CHAPTER I

ABOUT THURINJALAR SUB BASIN

The Thurinjalar river is one of the Major Tributaries of Pennaiyar originates from Kauthimalai reserve forest in Chengam Taluk of Tiruvannamalai District, Tamil Nadu, India lies between 12^0 54' N and 79^0 54' E. Thurinjalar river Basin is Located in the Southeren Part of Tiruvannamalai District and Northern Part of Villupuram District. The Major Portion of the Basin is Located within Thirukoilur and Gingee Block of Villupuram District. It flows in South-South east direction of the basin, crossing Thurinjapuram, Kilpennathur and Thiruvannamalai blocks and confluences with Pennaiyar River near Thirukkoilur after flowing a distance of about 44 km . The length of the river basin is about 48 km and its width is about 22 km. Thurinjalar sub basin has a drainage area of 835.53 Sq.Km. The Taluks covered in the sub basin are Tiruvannamalai, Thandarampet and Chengam Taluk in Tiruvannamalai District. It receives an annual average rainfall of 943 mm. In the Thurinjalar Sub basin rain fall receives by both from N-E and S-W monsoons. Runoff received from Thurinjalar Catchment is 3886 Mcft Per Annum. The Surface Water Potential is worked out for the 75% of the Dependable Yield for South West and North east and Non monsoon period.

Table 1.1. Details of Thurinjalar Sub basin

Sl. No	Name of Macro watershed	Macro watershed Code	No. of Blocks	No. of Gram Panchayat	No. of Micro watersheds	Total Macro watershed Area in Ha
1	Cheyyar River	4C2A4	1	3	10	366.6
2	Pambai	4C1D1	1	1	3	24.81
3	Pamban	4C1B5	3	6	12	601.73
4	Thurinjalar	4C1B3	6	125	149	72400.21
5	Tondi, Veraha	4C1D3	2	7	13	455.57

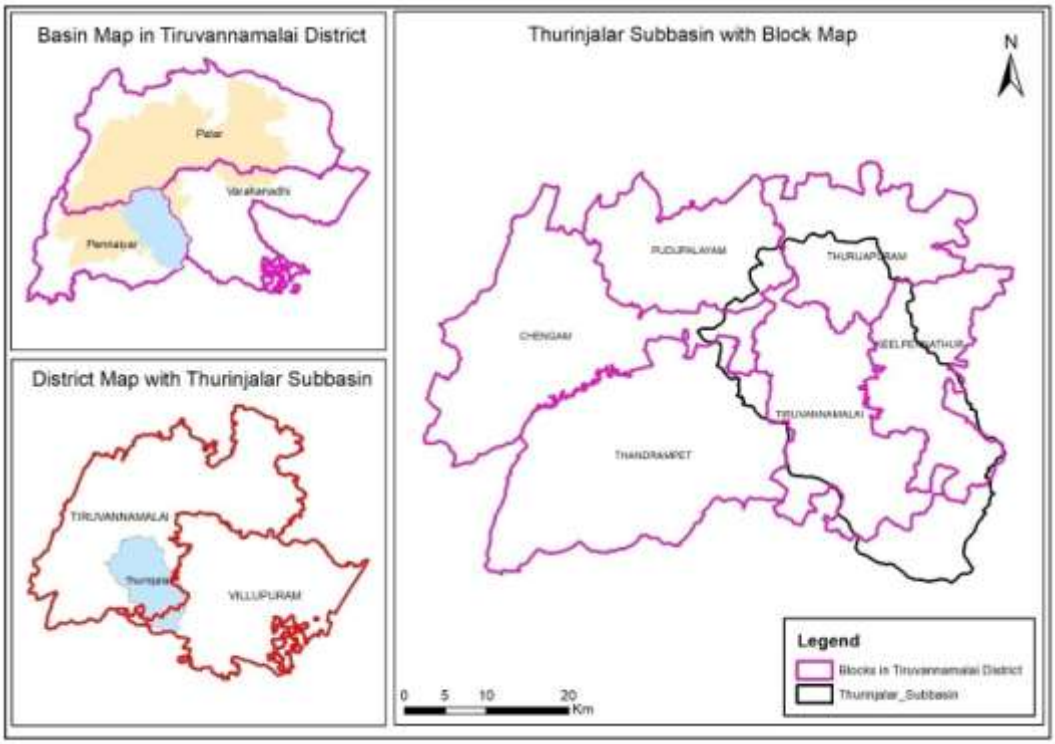

Fig. 1.1. Thurinjalar Sub Basin map of Tiruvannamalai District

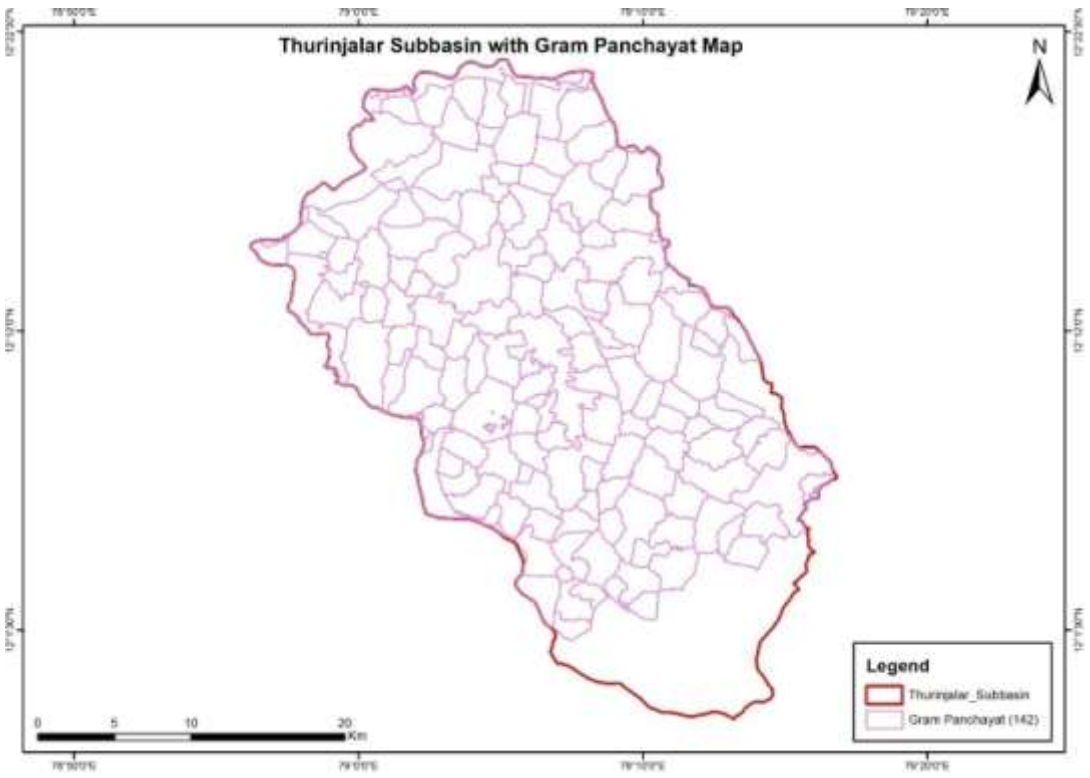

Fig. 1.2. Thurinjalar sub basin map with Gram Panchayats

Table 1.2. Blocks and Gram Panchayat Details of Thurinjalar Sub basin - Tiruvannamalai District

Sl. No	Name of the Macro watershed	Name of the Block	Name of the Gram Panchayat	Area Coverage
1	Cheyyar River	Pudupalayam	Kilpadur	Partially
2	Cheyyar River	Pudupalayam	Gulalpadi	Partially
3	Cheyyar River	Pudupalayam	Melpadur	Partially
4	Pambai	Keelpennathur	Olaipaddi	Partially
5	Pamban	Chengam	Beemanandal	Partially
6	Pamban	Chengam	Kannakurkkai	Partially
7	Pamban	Thandrampet	Varagur	Partially
8	Pamban	Thandrampet	Keelsirupakkam	Partially
9	Pamban	Tiruvannamalai	Viswanthangal	Partially
10	Pamban	Tiruvannamalai	Meyyur	Partially
11	Thurinjalar	Chengam	Paliapattu	Fully covered
12	Thurinjalar	Chengam	Chinnakolapadi	Fully covered
13	Thurinjalar	Chengam	Aswaragasurunai	Fully covered
14	Thurinjalar	Chengam	Vinnavanur	Fully covered
15	Thurinjalar	Chengam	Che.agaram	Fully covered
16	Thurinjalar	Chengam	Perumbakkam	Fully covered
17	Thurinjalar	Chengam	Periakolapadi	Fully covered
18	Thurinjalar	Keelpennathur	Vedanatham	Fully covered
19	Thurinjalar	Keelpennathur	Chellankuppam	Fully covered
20	Thurinjalar	Keelpennathur	Nariyamangalam	Fully covered
21	Thurinjalar	Keelpennathur	Gengapattu_na	Fully covered
22	Thurinjalar	Keelpennathur	Su_polakunnam	Fully covered
23	Thurinjalar	Keelpennathur	Kallikulam	Fully covered
24	Thurinjalar	Keelpennathur	Namiyandal_so	Fully covered
25	Thurinjalar	Keelpennathur	Aranji	Fully covered
26	Thurinjalar	Keelpennathur	Kalingaleri	Fully covered
27	Thurinjalar	Keelpennathur	Keeranur	Fully covered
28	Thurinjalar	Keelpennathur	Konalur	Fully covered
29	Thurinjalar	Keelpennathur	Velanandal	Fully covered
30	Thurinjalar	Keelpennathur	Nadalarganandal	Fully covered
31	Thurinjalar	Keelpennathur	Rajanthangal	Fully covered
32	Thurinjalar	Keelpennathur	Sanipoondi	Fully covered
33	Thurinjalar	Keelpennathur	Arumbakkam	Fully covered
34	Thurinjalar	Keelpennathur	Kaniyampundi	Fully covered
35	Thurinjalar	Keelpennathur	Somasipadi	Fully covered
36	Thurinjalar	Keelpennathur	Panniyur	Fully covered
37	Thurinjalar	Keelpennathur	Vaippur	Fully covered
38	Thurinjalar	Keelpennathur	Anukkumalai	Fully covered
39	Thurinjalar	Keelpennathur	Kadambai	Fully covered

40	Thurinjalar	Keelpennathur	Karikilambadi	Fully covered
41	Thurinjalar	Keelpennathur	Neelanthangal	Fully covered
42	Thurinjalar	Keelpennathur	Kattumalaiyanur	Fully covered
43	Thurinjalar	Keelpennathur	Avoor	Fully covered
44	Thurinjalar	Keelpennathur	Kallayyee	Fully covered
45	Thurinjalar	Keelpennathur	Kolathur	Fully covered
46	Thurinjalar	Keelpennathur	Gudalur_z	Fully covered
47	Thurinjalar	Keelpennathur	Angunam	Fully covered
48	Thurinjalar	Keelpennathur	Vayalur	Fully covered
49	Thurinjalar	Keelpennathur	Agaram	Fully covered
50	Thurinjalar	Pudupalayam	Voividanthangal	Fully covered
51	Thurinjalar	Thandrampet	Nedungavadi	Fully covered
52	Thurinjalar	Thandrampet	Vanapuram	Fully covered
53	Thurinjalar	Thurijapuram	Kunnandal	Fully covered
54	Thurinjalar	Thurijapuram	Drugiammiandal	Fully covered
55	Thurinjalar	Thurijapuram	Usambadi	Fully covered
56	Thurinjalar	Thurijapuram	Karunthurambadi	Fully covered
57	Thurinjalar	Thurijapuram	Sadayanodai	Fully covered
58	Thurinjalar	Thurijapuram	Kalasthambadi	Fully covered
59	Thurinjalar	Thurijapuram	Kiliapattu	Fully covered
60	Thurinjalar	Thurijapuram	Randam	Fully covered
61	Thurinjalar	Thurijapuram	Vada andapattu	Fully covered
62	Thurinjalar	Thurijapuram	Madalambadi	Fully covered
63	Thurinjalar	Thurijapuram	Vadakarimbalore	Fully covered
64	Thurinjalar	Thurijapuram	Kolakkaravadi	Fully covered
65	Thurinjalar	Thurijapuram	Pudumallavadi	Fully covered
66	Thurinjalar	Thurijapuram	Thurinjapuram	Fully covered
67	Thurinjalar	Thurijapuram	Nookambadi	Fully covered
68	Thurinjalar	Thurijapuram	Sananandal	Fully covered
69	Thurinjalar	Thurijapuram	Mallavadi	Fully covered
70	Thurinjalar	Thurijapuram	Vallivagai	Fully covered
71	Thurinjalar	Thurijapuram	Seelapandal	Fully covered
72	Thurinjalar	Thurijapuram	Sorakolathur	Fully covered
73	Thurinjalar	Thurijapuram	Inam kariyandal	Fully covered
74	Thurinjalar	Tiruvannamalai	Pandithapattu	Fully covered
75	Thurinjalar	Tiruvannamalai	Nallavanpalayam	Fully covered
76	Thurinjalar	Tiruvannamalai	Nochimalai	Fully covered
77	Thurinjalar	Tiruvannamalai	Nallampillaipettai	Fully covered
78	Thurinjalar	Tiruvannamalai	Savalpoondi	Fully covered
79	Thurinjalar	Tiruvannamalai	Chinnakangiyanur	Fully covered
80	Thurinjalar	Tiruvannamalai	Nadupattu	Fully covered
81	Thurinjalar	Tiruvannamalai	Aradapattu	Fully covered
82	Thurinjalar	Tiruvannamalai	Parayampattu	Fully covered
83	Thurinjalar	Tiruvannamalai	Pavithiram	Fully covered

84	Thurinjalar	Tiruvannamalai	Kattampoondi	Fully covered
85	Thurinjalar	Tiruvannamalai	Nariyapattu	Fully covered
86	Thurinjalar	Tiruvannamalai	Veraiyur	Fully covered
87	Thurinjalar	Tiruvannamalai	Thachchampattu	Fully covered
88	Thurinjalar	Tiruvannamalai	Panaiyur	Fully covered
89	Thurinjalar	Tiruvannamalai	Andampallam	Fully covered
90	Thurinjalar	Tiruvannamalai	Tandarai	Fully covered
91	Thurinjalar	Tiruvannamalai	Su_nallur	Fully covered
92	Thurinjalar	Tiruvannamalai	Ayyam palayam	Fully covered
93	Thurinjalar	Tiruvannamalai	Alaganandal	Fully covered
94	Thurinjalar	Tiruvannamalai	Aruddirapattu	Fully covered
95	Thurinjalar	Tiruvannamalai	Kalleri	Fully covered
96	Thurinjalar	Tiruvannamalai	Devanandal	Fully covered
97	Thurinjalar	Tiruvannamalai	Adayur	Fully covered
98	Thurinjalar	Tiruvannamalai	Anapurandan	Fully covered
99	Thurinjalar	Tiruvannamalai	Athiyandal	Fully covered
100	Thurinjalar	Tiruvannamalai	Kilkachirapattu	Fully covered
101	Thurinjalar	Tiruvannamalai	Malappambadi	Fully covered
102	Thurinjalar	Tiruvannamalai	Madurampattu	Fully covered
103	Thurinjalar	Tiruvannamalai	Kanadhampoondi	Fully covered
104	Thurinjalar	Tiruvannamalai	Eandal	Fully covered
105	Thurinjalar	Tiruvannamalai	Melkachirapattu	Fully covered
106	Thurinjalar	Tiruvannamalai	Su_pappambadi	Fully covered
107	Thurinjalar	Tiruvannamalai	Thenmathur	Fully covered
108	Thurinjalar	Tiruvannamalai	Melathikkan	Fully covered
109	Thurinjalar	Tiruvannamalai	Kannapandal	Fully covered
110	Thurinjalar	Tiruvannamalai	Udayanandal	Fully covered
111	Thurinjalar	Tiruvannamalai	Nachianandal	Fully covered
112	Thurinjalar	Tiruvannamalai	Kolakkudi	Fully covered
113	Thurinjalar	Tiruvannamalai	Su_andapattu	Fully covered
114	Thurinjalar	Tiruvannamalai	Allikondapattu	Fully covered
115	Thurinjalar	Tiruvannamalai	Chinnakallapadi	Fully covered
116	Thurinjalar	Tiruvannamalai	Viruvilanginan	Fully covered
117	Thurinjalar	Tiruvannamalai	Su_valavetti	Fully covered
118	Thurinjalar	Tiruvannamalai	T.valasai	Fully covered
119	Thurinjalar	Tiruvannamalai	Kilkaripoor	Fully covered
120	Thurinjalar	Tiruvannamalai	Ananandal	Fully covered
121	Thurinjalar	Tiruvannamalai	Su_kambupattu	Fully covered
122	Thurinjalar	Tiruvannamalai	T.valavetti	Fully covered
123	Thurinjalar	Tiruvannamalai	Adiannamalai	Fully covered
124	Thurinjalar	Tiruvannamalai	Vengikkal	Fully covered
125	Thurinjalar	Tiruvannamalai	Kilchettipattu	Fully covered
126	Thurinjalar	Tiruvannamalai	Pavupattu	Fully covered
127	Thurinjalar	Tiruvannamalai	Melchettipattu	Fully covered

128	Thurinjalar	Tiruvannamalai	Talayampallam	Fully covered
129	Thurinjalar	Tiruvannamalai	Navampattu	Fully covered
130	Thurinjalar	Tiruvannamalai	Perumanam	Fully covered
131	Thurinjalar	Tiruvannamalai	Kadagaman	Fully covered
132	Thurinjalar	Tiruvannamalai	Naraiyur	Fully covered
133	Thurinjalar	Tiruvannamalai	Isukalikatteri	Fully covered
134	Thurinjalar	Tiruvannamalai	Periyakallapadi	Fully covered
135	Thurinjalar	Tiruvannamalai	So kilnachipattu	Fully covered
136	TONDI,VERAHA	Keelpennathur	Sirunathur	Partially
137	TONDI,VERAHA	Keelpennathur	Ganalapadi	Partially
138	TONDI,VERAHA	Keelpennathur	Iyangunnam	Partially
139	TONDI,VERAHA	Keelpennathur	Neivanatham	Partially
140	TONDI,VERAHA	Keelpennathur	Rayampettai	Partially
141	TONDI,VERAHA	Thurijapuram	Mangalam	Partially
142	TONDI,VERAHA	Thurijapuram	Palanandal	Partially

1.1. Soil classification of basin

Soil is one of the natural resources, which has the most direct impact on agricultural development. The Types of soils along with their sub groups are described as below.

1.1.1. Entisoils

They are found distributed on steep, actively eroding slopes and on flood plains which receive new deposits of alluvium. Erosion is active in these soils. Resistant nature of the parent material like quartzite, base rock etc prolongs the period of undistinguished horizons. The following are the 4 sub groups identified under Entisols.

1.1.1.1. Typic Ustorthents

These are reddish brown to red, light to medium textured and mostly non calcareous soils. They are well draped externally and the permeability is moderate to rapid. Soil erosion is the major concern in these soils. Dry cultivation with millets, pulses and groundnut is quite common.

1.1.1.2. Lithic Ustorthents

These soils resemble Typic Ustorthents but their depth is within 50 cm followed by bedrock.

1.1.1.3. Typic Ustifluvents

These soils are dark brown to dark grey soils of fluvial (alluvial) origin with rapid permeability and are well drained. Stratification of layers on account of fluvials deposition with irregular decrease in organic matter with

depth is common. These are confined to river systems. Intensive agriculture is being followed on these soils both irrigated and rainfed.

1.1.1.4. Typic Ustipsamments

These soils are very deep, freely drained sands and have low water holding capacity.

1.1.2. Inceptisols

This comprises of immature soils having profile features more weakly expressed. All the pedogenic processes are active to some extent but none predominates in these soils. They are poorly drained to well drained with moderate to rapid permeability. Most of them are cultivated under irrigated or rained conditions.

1.1.3. Vertisols

This order includes dark brownish grey, very deep, calcareous, heavy clayey and self churning soils that have deep wide cracks. The surface shows a complex micro topography of mounds and depressions. Slickenside feature is common in the sub surface and the mineralogy is dominantly montmorillonitic which is expanding clay. They are moderately well drained with slow permeability except in the cracks. The following two sub groups are identified under Vertisols.

1.1.3.1. Typic Chromusterts

These have a chroma, moist of 1.50 or more and colour value, moist less than 3.50 and a value dry less than 5.50 throughout the 30 cm of the pedon i.e. surface soils are gray in colour. The cracks remain open more than 150 cumulative days in most years.

1.1.3.2 Udorthentic chromusterts

The cracks of these soils remain open from 90 to 150 cumulative days in most years with higher color values.

1.1.4. Alfisols

This consists of deep, matured soils with alluvial concentration of clay in the sub-horizon. The surface horizon is massive and hard. Cultivation is extensive on these soils. They have moderate to high base saturation. The following sub groups are identified. Crops grown in this sub basin area are Coconut, Banana, Amla, Mango as annual crops, besides Paddy, Vegetables, pulses, Maize are grown during first season and Paddy, Vegetables, Pulses etc., as second season crops.

1.2. Land Holdings

The details of farm holdings and size classes prevalent in Thurinjalar Sub basin are given below

Table 1.3. Farmer Size holdings

Category	Size of holdings	Numbers
Marginal	Below 1.00 Ha	9765
Small	1.00 – 2.00 Ha	612
Medium	2.00 – 5.00 Ha	160
Big	5.0 ha & above	37
Total		10574

Above table revealed that the marginal farmers alone accounted for 65.5 percent in the sub basin followed by small farmers. Developmental initiatives will need to take the fact into account.

CHAPTER II

CLIMATE AND WATER SECURITY

Generally semi arid climate prevails over the Thurinjalar river basin area without any sharp variation. In general, this semi-arid region has dry and hot weather. The mean maximum temperature is 33^{o}C and means minimum temperature is 22.8^{o}C during last 30 years (1989-2018) (IMD). In summer months the maximum temperature goes up to 45^{o}C for few days. The climate of the area is characterized by four distinct seasons, namely southwest monsoon (Jun – Sep), Northeast Monsoon (Oct – Dec), winter season (Jan – Feb) and hot summer season (Mar – May).

2.1. Rain fall

Normally this region receives major rainfall from North-East Monsoon (NEM) (October to December) and South-West Monsoons (SWM) (June to September). Past records show the annual average rainfall of this region is 1,047 mm (WRIS, GoI). Both North-East and South-West Monsoons contribute nearly 87 % of the annual rainfall in which SWM is slightly stronger. While summer (March to May) rainfall accounts for 9 % of the total rain□fall and winter (January, February) season has low contribution (4%) to the annual rainfall (Table). The average relative humidity is 67- 86 % and during summer it ranges between 47-63 %.

Table 2.1. Season-wise distribution of annual rainfall

Season	Period	Rainy days	Rainfall (mm)	% of rainfall
South West monsoon	June-September	82	465.8	45
North East monsoon	October – December	72	439.8	42
Winter	January- March	--	45.8	4
Summer	April- May	11	95.2	9

The average annual rainfall days are 172 days in which 72 days are from NEM and 82 days are from SWM months. Onset of SWM rainfall starts in the 1st week of June and cessation would be in the 1st week of October. Onset of NEM rain fall starts in the 2nd week of October and cessation would be in the 4th week of December. Though the number of rainy days is slightly lesser than SWM, the intensity is more in NEM. □

2.2. Temperature

In recent decades, the world is witnessing significant changes in its climate. These changes include increase in average temperature, variations in the rain□fall intensity and its frequency. This region is also no exception, and an increase in maximum and minimum temperature of 1.2^{o}C and 0.5^{o}C was observed during 1951 to 2015 (IMD). The rainfall variability is also well observed. During 1951 to 2015, there were 15 excess rainfall years (above normal rainfall) and 15 deficient rainfall years (below normal rain□fall) recorded. The consecutive excess and deficient rainfall leads to rainfall variability and its extremities. Since this region is heavily dependent on monsoon rains, it is prone to droughts when the monsoons fail. As rainfall is the major source for determining water storage, existing water resources such as rivers, dams and major and minor tanks fail along with deficient rainfall years. The continuous assessment reports of Intergovernmental Panel on Climate Change (IPCC) cautioned that the changes in climate have a key role in intensifying and triggering extreme events, such as floods, droughts, heat waves, and tropical cyclones, which are all likely to increase in the future also.

Recent IPCC Assessment Report 6 outlines that climate changes will increase in all regions of the globe over the coming decades and that even with 1.5°C of global warming, there will be increasing heat waves, longer warm seasons, and shorter cold seasons – which will become more intense at 2°C of warming.

Climate projection based on global climate models indicated that there would be 1^{o}C increase in maximum temperature in mid-century (MC) period (2041-2070) and 1.5^{o}C increase in end-century (EC) period (2071-2100) from the baseline scenario under RCP 4.5 climate scenario in this region. The minimum temperature would increase nearly 1.2o C and 2.1o C during MC and EC periods. Average annual rainfall for IPCC AR5 RCP4.5 scenarios is projected to increase about 13 % towards MC and increase by about 21% towards EC period.

- 1.2^{o}C increase in maximum temperature during 1951-2015
- 0.5^{o}C increase in minimum temperature during 1951-2015
- 1^{o}C increase in max temp during 2041-2070 (RCP4.5)
- 1.5^{o}C increase in max temp during 2071-2100 (RCP 4.5)

The observed and projected climate changes will have serious impacts in the areas of:

- Surface and ground water availability
- River flow
- Water quality

- Soil moisture
- Evapo-transpiration

As a result, these impacts pose severe risks to dependent sectors such as agriculture and allied activities, industry, and livelihoods of people, particularly the vulnerable sector.

2.3. Climate Risks

Increasing temperature, fluctuating rainfall patterns and its extremities create shorter rainy seasons and longer dry seasons making river basins more vulnerable. This District experiences climate hazards in the past such as floods, drought and heat waves.

2.3.1. Flood

Being situated approximately 150 – 200 Km from Bay of Bengal, this region experiences heavy rain and flood during deep depressions/cyclones forms in the Bay of Bengal. In recent decades, all parts were severely affected during 2005, 2010, 2015 heavy rainfall events and Thane (2011) and Vardah (2016) cyclones. State Disaster Management Authority, Government of Tamil Nadu identified 75 locations of Thiruvannamalai District as flood vulnerability spots. In the basin Thurinjapuram Block of Andapattu (V) and Kliyapattu GPs are moderately vulnerable to floods.

2.3.2. Drought

Low rainfall coupled with the erratic behavior of the monsoon in the state makes Tamil Nadu the most vulnerable to drought. Thiruvannamalai District comes under drought vulnerable area as less than 40 % of normal rainfall was received and has experienced frequent droughts in the past, particularly in the years 2003 and 2009. The District also experienced severe drought during the year 2016- 2017. All parts of the District is affected by drought and its consequences are large area crop losses and drinking water scarcity. In Thurinjapuram Block, all GP's are prone to drought.

2.3.4. Heat wave

A heat wave is a period of abnormal high temperatures, more than the normal maximum temperature that occurs during the (hot weather) summer season. Heat waves typically occur between March and June. The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death. Normally, all parts of this District witnesses heat waves. All GPs in Thurinjalar basin are prone to Heat waves.

2.4. WASCA Climate Vulnerability Indicators

During 2019, WASCA Tamil Nadu conducted a preliminary State level scoping study on the State's rural water security through the climate lens and identified climate and water security hotspots/potential geographical areas for project demonstration through scientific criteria jointly with Centre for Climate Change and Disaster Management (CCCDM), Anna University. The vulnerability of a region to the climate depends on several intrinsic factors such as physical, social, economic, and environmental conditions. On the basis of ground reality and ac□curate observations, WASCA TN study proposed 18 indicators to reflect the State's rural water security through four interconnected CWRM areas viz., climate extremities, water resources, agriculture and socio-economic to assess climate-water vulnerability at the District level (Table 2.2).

Table 2.2. Biophysical and Socio-Economic indicators used in vulnerability assessment

CWRM	Indicators of Rural water security vulnerability	Indicators label	Linked SDG
Climate	Changes in max temperature (OC)	C1	Goal 13
	Changes in min temperature (OC)	C2	
	Changes in rainfall (%)	C3	
	Excess rainfall years	C4	
	Deficient rainfall years	C5	
Water	Ground water extraction (%)	W1	Goal 6
	Ground water Recharge (m^3)	W2	
	Surface water availability (mm)	W3	
	Water gap (mcm)	W4	
	% of contamination	W5	
Agriculture	Rainfed area (%)	A1	Goal 15
	Cropping intensity (%)	A2	Goal 2
	Soil moisture (Kg/m^2)	A3	Goal 15
	Evapo-transpiration (Kg/m^2)	A4	
	Rural proportion (%)	S1	Goal 2
	Multidimensional poverty index	S2	Goal 1

Socio-economic	Source of drinking water within premises in rural (%)	S3	Goal 6
	Marginal farmers land holdings (%)	S4	Goal 2

Data from these 18 bio-physical and socio-economic indicators was collected at the District level and categorized into exposure, sensitivity and adaptive capacity for the analysis. The vulnerability ranking was given based on IPCC protocol of vulnerability assessment methodology. Based on the analysis, Tiruvannamalai Districts were selected by the State Level Steering Committee headed by the Secretary RD&PR in Nov 2019 for implementing the WASCA. Subsequently, all the key water actions, CWRM planning and implementation works are envisaged for the above Districts through these influencing indicators collectively under four CWRM areas viz. climate, water, agriculture and socio-economic.

2.5. Compressive Analysis Of Block Level Vulnerability

WASCA TN has progressed towards Block and Sub Basin level climate vulnerability mapping in order to strengthen water resources and build context specific climate resilient models at GP level. The 18 vulnerability indicators at District level under four areas via climate, water, agriculture and socio-economic are further explored at GP level through Composite Water Resource Management (CWRM) approach by GIZ, Department of Rural Development (Mahatma Gandhi NREGS), National Water Mission, Tamil Nadu along with technical partners of WAS□CA project Viz., MS Swaminathan Research Foundation (MSSRF), Prime Meridian and key sectoral experts. Based on national level workshop on WAS□CA for GIS based planning using IWRM principles, a Composite Water Resources Management plan framework was customized to suit to Tamil Nadu State's conditions, including climate vulnerability as per the scoping study recommendations. Major CWRM parameters are thus identified under four areas via climate, water, and agriculture and socio-economic for advancements towards actions. The major parameters identified at Block level are collected both from primary and secondary sources and analyzed statistically and geospatially.□

CHAPTER III
CONVERGENCE OF WASCA AND MAHATMA GANDHI NREGA

GIZ has evolved a GP based CWRM planning approach for facilitating convergent planning under MGNREGA for Water Security and Climate Adaption in Thurinjalar Sub Basin. This is as per the recommendations of National Level Work□shop organized in February 2020, by MoRD, MoJS, GIZ, along with State Rural Development Department of WASCA. While developing the framework, inputs from all relevant stakeholders were considered including communities, public institutions, civil society, research organizations, and private agencies. The basis on which GIS based planning was developed for all GPs is the annual master circular issued during 2021-22 and the annual planning circular issued in September 2020 by MoRD. The planning exercise for Mahatma Gandhi NREGS will be part of the convergent planning exercise for the Ministry. The thrust is on planning for works related to Natural Resource Management (NRM), Agriculture & Allied Activities and Livelihood related works on individual lands leading to sustainable livelihoods as well as provisioning of livestock shelters for individual households. The NRM related works under MGNREGS will be taken up in convergence with other programmes such as Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Integrated Watershed Management Programme (IWMP) and Command Area and Water Management (CAD&WM) schemes for better outcomes of the water conservation and water harvesting measures at farm level. PMKSY aims to achieve a high degree of effective water availability and use for Indian farms, especially in water scarce regions. IWMP, Mission Water Conservation, Har Khetko Pani and Per Drop More Crop are the four pillars of PMKSY. Technical inputs for planning are to be drawn from the technical resources available in the District under MGNREGS, CSO partners and other line department agencies. In case of planning for NRM works, the technical inputs will be drawn from the joint pool of technical personnel of IWMP in Watershed Cell cum Data Centre (WCDC), Mahatma Gandhi NREGS unit, and Water Resource Department and the Agriculture Department. The technical inputs relating to Excavation, Renovation & Modernization (ERM) of water bodies may also be sought from the regional office of Central Ground Water Commission (CWC). The GPs will keep in perspective the Macro and Micro-watersheds of 500-100 ha that comprises of 1-10 GPs, while deliberating and finalizing prioritization of shelf of projects. Special focus is given to vulnerable households and communities while preparing estimates for anticipated demand, list of works on individual land, and list of other works that provide direct individual benefits. The Convergent Planning Exercise will make use of automatically included and deprived Households of SECC to ensure full coverage of poor and vulnerable households. Infrastructure built under Mahatma Gandhi NREGS leads to increased water availability for irrigation, groundwater recharge, increased agricultural production, and carbon

sequestration. The Ministry of Environment, Forest and Climate Change recognizes Mahatma Gandhi NREGA as one of the 24 key initiatives to address the problem of climate change, while playing a significant role in improving the livelihood conditions of the vulnerable people. Planning and design of works under Mahatma Gandhi NREGS should take into account, impacts of climate change in order to ensure resilience of vulnerable rural communities and make the benefits sustainable in the long run.

Table 3.1. Types of works recommended under MGNREGA

Kinds of work	Number
Works relate to NRM alone	182
Works related to Agriculture & allied works	164
Water related works out of NRM	85
Total works in schedule-I of MGNREGA	**262**

In pursuance of Schedule-I of Mahatma Gandhi NREGA, 262 kinds of works/ activities have been identified as permissible works, of which 182 kinds of works are related to NRM alone. Among NRM works, 85 activities focus on water conservation and harvesting while 164 works are related to Agriculture and Allied works. As MGNREGA activities benefit both the community and individuals, this should typically change 'relief works mode' to an integrated NRM perspective. Planned and systematic development of land and harnessing of rain-water following watershed principles should become the central focus of Mahatma Gandhi NREGS work across the country to sustainably enhance farm productivity and income of poor people. Even the works on private lands should be taken up following the principles of watershed management in an integrated manner. To facilitate evidence based scientific NRM planning process, technological support shall be taken from National Remote Sensing Centre, ISRO for identification and holistic planning of permissible works in the watersheds using web-GIS platform (Bhuvan Geoportal). The GIS (Geographical Information System) plans shall be comprehensive ones incorporating all eligible works under Mahatma Gandhi NREGS and the same shall be implemented in a phased manner. Section 22 of annual master circular provides the key steps for GIS based planning.

3.1. Composite Water Resource Management Approach

CWRM approach for WASCA uses simple scientific tools that can help Block or GP level officer to organize, analyze and prepare a developmental draft plan for participatory discussion at GP level. This approach involves analyzing key water challenges using both non-spatial and geo-spatial data in GIS, coupled with extensive ground truth verification. The non-spatial data includes the socio-economic, climatic, hydrological, edaphic and agricultural areas which are concurrently used for analysis along with the spatial data obtained from remote sensing in GIS platform. It starts with mapping of the administrative (habitations/panchayat/revenue village, Block/taluk, agro-ecological (regional and sub-regional, climatic and agricultural zonation's) and hydrological (drainage points/watersheds/sub basin) units keeping GP as the lowest unit for planning and execution. Following this, a detailed socio-economic profile was mapped covering male/female population, pro portion of SC and ST population, vulnerable households and access to employment in Mahatma Gandhi NREGS and proportion of works carried out in the village through amount of budget utilized as well as actual works completed. The climatic parameters including maximum and minimum temperature, sea son-wise rainfall and rainy days, evapo-transpiration and soil moisture are used to understand the climate related issues. The next step is to assess land use, watersheds, drainage networks and surface runoff, existing water supply and storage systems, water management for the key sectors and water demand and prepare the water budget for the GP

3.1.1. Major Components Involved In CWRM Planning

i) Scientific planning

a) Spatial and non-spatial data collection
b) Spatial data: Bhuvan geo-portal (NRSC) & WRIS
c) Non-Spatial data (Secondary): Govt. sources (published)
d) Non-Spatial data (Primary): Govt. records local level

ii) Gram Panchayat Water budget

a. Analysis of water from supply and demand side
b. Water budgeting: Surface & ground water
c. Status of soil moisture availability
d. Status of evapo-transpiration losses

iii) Deriving GP water actions

a. Identification of Key water challenges at GP level
b. Identification of location specific actions at GP level

c. Integration actions at block, sub-basin and District level
d. 262 list of works under Mahatma Gandhi NREGS
e. List of Works -under various schemes

iv) Results

a. Works and its impact on augmenting Water
b. Works and its impact on conserving water
c. Works and its impact promoting efficient use of water at Block level

v) Gramsabha approvals

a. Verification
b. Community consultation
c. GP Approval
d. Integration to NREGA software
e. AS and TS

vi) Integration and implementation

a. Block level
b. Watershed level & Sub-basin level
c. District level and
d. Baseline for assessing the impact

Such a comprehensive analysis helps in preparing the water budget integrating ground water, surface water through runoff from rainfall, evapo-transpi□ration and soil moisture which further helps to identify potential areas of action to augment the water resources in public /common land, agriculture and allied sectors and rural infrastructure dimensions. The analysis also helps to understand the areas of interest and appropriate climate resilient measure as an adaptive measure to the emerging climate change scenarios. The water challenge linked water actions are the key in developing the perspective plan for the water secured GPs, to serve as shelf of projects. This shelf of projects is again mapped with the schemes available and financial plans for execution, adopting convergence and inter-sectoral principles. In the execution process the District level technical and administrative teams are involved in planning, monitoring and evaluation in terms of outcome/impact mapping. In the execution stage, the approach of saturation of works, planning at watershed approach (Ridge to Valley), and convergence are some of the key aspects that needs attention for a tangible outcome in both NRM as well as livelihoods. The District WASCA resource centers established in the project area, facilitates this whole process for planning and implementation. This comprehensive and integrated approach has been accepted nation□ally and by state governments as a comprehensive and climate adapted planning approach for water security. The whole process has been categorized into four stages – pre planning, planning, review and verification and integration and approval.

3.2. Steps involved in sub basin level analysis through CWRM approach

1) Indentfication of GPs in sub basin level
2) Categorization of GPs in block level
3) Data Collection – Integration and synthesis of GP based spatial and non-spatial data at the basin level scale
4) Data analysis – Identification of Key water challenges & vulnerability analysis climatic risks, issues in socio-economic, edaphic, hydrological & agricultural sectors
5) Drafting Key Water Actions – Integrating GP based actions in 4 categories – Public and common land, agriculture and allied sectors, rural infrastructures and climate resilient measures.

This integrated approach has been accepted by the National, State, and District Level Steering Committees headed by the Additional Chief Secretary RD&PR and the District Collector respectively in the project area of Tamil Nadu government as a comprehensive and climate adapted planning approach for water security under the Mahatma Gandhi NRGES and National Water Mission.

3.3. Four levels of CWRM planning under WASCA

1. Developing plans at lowest administrative level: GP level plans
2. Integrating GP level plans at sub basin level
3. Integrating GP plans at watershed and sub-basin (catchment) level on NRM
4. Integrating GP plans to develop WASCA districts CWRM plans

3.4. Main stages of CWRM planning process

a) Pre-planning stage
b) Planning stage
c) Integration and approval
d) Review and verification

3.4.1. Pre planning stage consists of

1. Categorizing GPs for planning as per Mahatma Gandhi NREGS guidelines
2. Human resource and capacity building at administrative levels for planning facilitation
3. Capacity Building of State, District level officers towards implementing the Mahatma Gandhi NREGS
4. Building District specific CWRM frame□work and indicators suitable to the terrain and geography

5. Identification of Phases for pre pilot GPs for planning (4 GP Plans per Block) as per DLSC and SLSC as per DLSC and SLSC

3.4.2. Planning stage consists of

1. Collection on Non-Spatial statistical data as per MoRD guidelines CWRMP
2. Collection of Spatial as per MoRD guide□lines and CWRMP
3. Water Budget Estimation (as per CWRMP guidelines)
4. Conducting district specific studies on Ground Water Assessment as per CWRM
5. Inclusion on Non-NRM activities under Mahatma Gandhi NREGS with CWRMP
6. Identification of Key Water Challenges - CWRMP
7. Identification of Key Water Actions –CWRMP

3.4.3. Integration and approval stage consists of

1. Preparation of Integrated plans (at Block, basin levels)
2. District Level WASCA Plan
3. Approval at GP level for preparation of Labour budget using CWRM frame work outcomes
4. Approval of District plan at DLSC as per above recommendations of GP level
5. Submitting approved District WASCA plan from DLSC to SLSC for financing and convergence

3.4.4. Review and verification stage consists of

1. Matching spatial data as per Mahatma Gandhi NREGA- MoRD guidelines on GIS based planning
2. Field Verification, GP level Meetings for inclusion in labour budget 2021-22
3. Approvals of verified works at GP by the Block and GP level officers implementing Mahatma Gandhi NRGES
4. Integrating verified, approved works into NREGA soft (MORD NIC Portal) for main□streaming WASCA
5. Regular review on progress at each level

3.5. Categorization of GPS

The CWRM uses both spatial and non-spatial data for developing GP level plans. Most of the non-spatial data are available at the revenue village level. To synchronize planning at GP, keeping data availability and administrative boundary for GIS planning, various GP's are categorized based on revenue village boundaries, for collecting and organizing the datasets. Based on the above factors, five different types of GPs are classified as Type I, II, III, IV and IV. The description on categorization of

GP's is annexed (Annexure 1). Details of categorization of GPS in Thurinjalapur Basin is tabulated in Table

Table 3.2. GP type of Tiruvannamalai block

No. of GP	GP type	Name of Panchayat
48	**Type-I:** GP and revenue village data and boundary match	Adaiyur, Alaganandal, Ananandal, Allikondapattu, Anaipirandan, Andampallam, Aradapattu, Aruthirapattu, Athiyandal, Ayyam Palayam, Chinnakkallapadi, Devanandal, Su.Kinachipattu, Devanur, Endal, Melkachirapattu, Meyyur, Nallanpillaipetral, Savalpoondi, Udayanandal, Viswanthangal, Isukkalikatteri, Kallottu, KandiyanNadupattu, Kannapandal, Kattampoondi, Kolakkudi, Madurampattu, Nachanandal, Nadupattu, Naraiyur, Navampattu, Nariapattu, Panaiyur, Pandithapattu, Parayampattu, Pavupattu, Periakallapadi, Perumanam, Su.Andapattu, Su.Pappambadi, Su.Valavetti, Thandarai, Thatchampattu, Thiruvanaimugam Valasai, Velayambakkam, Veraiyur, Viruthuvilanginan
2	**Type-II:** Having more than one GPs in one Revenue Village	Su.Kambupattu, Su.Nallur
18	**Type-III:** One GP is falling under more than Type 1 one Revenue Village	Adiannamalai, T.Kalleri, Kanandampoondi, Chinnakangianur, Kikachirapattu, Kilchettipattu, Melathikan, Melchettipattu, Nallavanpallyam, Thenmathur, Kilkaripur, Malappambadi, Nochimalai, Thalayampallam, Palaiyanur, Pavithiram, Kadagaman, Thiruvarangam Valavetti
1	**Type-V:** Newly formed GP after 2011 census publication	Vengikkal

Table 3.3. GP type of Thurinjapuram block

No. of GP	GP type	Name of Panchayat
29	**Type-I:** GP and revenue village data and boundary match	Andapattu, Arpakkam, Boodamangalam, Durginammiandal, Erumpoondi, Kalasthambadi, Kamalaputhur, Karkonnam, Karunthuvambadi, Kolakkaravadi, Kovur, Kunniyandal, Madalambadi, Mallappa Nayakkam Palayam, Mangalam, Maruthuvambadi, Mutharasampundi, Nookkambadi, Palanandal, Porkunam, Sadayanodai, Salayanur, Sananandal,Thurinjapuram, Usambadi, Uthirampoondi,Vada Karingalipadi, Vada Pulidiyur, Velunganandal
4	**Type-II:** Having more than one GPs in one Revenue Village	Kariyandal, Karumarapatti, Kothantavadi, Sorakolathur
12	**Type-III:** One GP is falling under more than Type 1 one Revenue Village	Devanampattu, Inam Karianadal, Kiliapattu, Meppathurai, Naidumangalam, Narthampoondi, Periyakilambadi, Randam, Seelappandal, Vadakarimbalur, Vallivagai, Vedanthavadi
1	**Type-V:** Newly formed GP after 2011 census publication	Vengikkal

Table 3.4. GP type of Keelpennathur block

No. of GP	GP type	Name of Panchayat
22	**Type-I:** GP and revenue village data and boundary match	Agaram, Angunam, Arumbakkam, Avoor, Cengalpattu, Gudalur, Kallayyee, Kallikulam, Kaniyampundi,Karikilambadi, Kattumalaiyanur, Keeranur, Kolathur, Konalur, Nadalarganandal ,Namiyandal , Panniyur Sanipoondi, Somasipadi, Vaippur, Vayalur, Vedanatham
11	**Type-III:** Having more than one GPs in one Revenue Village	Anukkumalai, Aranji , Chellankuppam, Kadambai, Kallayyee, Kalingaleri, Kolathur, Nariyamangalam,Rajanthangal, Su_polakunnam, Velanandal
1	**Type-V:** Newly formed GP after 2011 census publication	Neelanthangal

Table 3.5. GP type of Chengam block

No. of GP	GP type	Name of Panchayat
07	**Type-I:** GP and revenue village data and boundary match	Paliapattu, Chinnakolapadi, Aswaragasurunai, Vinnavanur, Agaram (se), Periakolapadi and Perumbakkam
01	**Type-III:** One GP is falling under more than Type 1 one Revenue Village	Perumbakkam

Table 3.6. Pudupalayam block

No. of GP	GP type	Name of Panchayat
01	**Type-I:** GP and revenue village data and boundary match	Voividanthangal

3.6. Data collection

The CWRM planning framework has four vulnerability areas, integrating both non-spatial and spatial parameters with 18 indicators based on the IWRM and climate adaptation principles. The planning process comprises of the following dimensions in a scientific and organized manner to prepare a meaningful plan at the lowest administrative unit i.e. GP plans.

3.6.1.Spatial data

The spatial datasets are supportive evidence to understand the existing conditions and issues in the area/ region. Considering the spatial datasets such as Land Use and Land Cover (LULC), waste land, salt and erosion affected lands, drainage lines, ground water potential, lineament, geomorphology, and slope will play a significant role in contributing to preparation of the most appropriate and suitable science-based decision plans towards holistic development of the region, emphasized with the water actions. The use of different spatial data to assess and confirm the key water challenges along with the non-spatial data is discussed below:

3.6.2.Non spatial data

- Characterization of catchment landscapes based on the ten-fold land use classification to know available land area in both public and individual land ownership and its current position in terms of available area and use, its links with surface runoff as good, average and bad runoff.
- Watershed based analysis is to understand the hydrological and administrative boundaries. This aids in understanding the profile and condition of the watershed at macro or micro level for planning and relevant water actions.
- Soil characteristics including the macro and micro nutrient status, physical quality of the land using pH values and textural soil quality to understand its permeability, infiltration and water holding capacities which are crucial for soil moisture content.
- The agriculture and livestock datasets help in understanding the quantum of water requirement of the key crops and type of cropping systems adopted, number and type of different livestock resources and its water requirement vis-a-vis its linkage to livelihoods of the vulnerable population in the village.
- Grey water generation at GP level to understand the quantum of grey water available and existing methods of its use. This information is essential to plan effective strategies for recycle and reuse.
- Water budgeting at GP level to demonstrate the sector wise water demand and available water through the traditional water harvesting and storage bodies and the potential runoff that can be conserved through appropriate actions on the supply side. The difference between demand and supply at the GP level helps the communities to understand the gap and practice the necessary water actions.

Data from a total of 99 parameters were collected, out of which 13 parameters are primary source data and were collected at GP administrative units by GPs officers. 65 parameters are secondary source data collected from Govt. sources and authentic websites and the remaining 21 requisite parameters for water budgeting and grey water were calculated using standards/suitable methods or formulas. CWRM parameters and its data sources is attached in the Annexure 1 to 3. The methods, and formulas used for water budgeting is attached in Annexure 4 and for grey water generation in Annexure 5.

3.7. CWRM planning analysis – climate

All the CWRM parameters are intended at Block level. On the other hand, all the climate change observations and projections are at district or sub basin level. Current data at the Block level is not available at present.

Hence, previous hydro-meteorological disasters are considered to denote Block's change in climate (temperature, rainfall) extremities and its risks, which was recorded by State Disaster Management Agency, 2020.

3.8. CWRM planning analysis – water

For effective planning, the available traditional water storage and conveyance structures along with its supply and demand status for different sectors at Block level are necessary. Both spatial and non-spatial data including details and status on watershed and drainage network, canal network, irrigation facilities, catchments area wise available runoff, conserved runoff, present ground water extraction, water demand for domestic, agriculture and livestock, ground water utilization for domestic, agriculture and livestock are collected from authorized open sources and analyzed at basin level.

3.9. Spatial data

Spatial data of geomorphology, lineament, terrain, slope drainage network, surface water bodies, ground water potential, and watershed were collected to understand the site-specific problems and together with non-spatial data, take decisions to draft scientific key water actions. Available Bhuvan source thematic spatial maps/web site view was referred to understand, interpret and analyze the spatial parameters of the basin.

3.9.1. Geomorphology

Geomorphology deals with the scientific study of "landforms and landscapes, including their description, type, and genesis". Landform is the end product resulting from the interactions of the natural surface genesis and the type of rock. The scope of geomorphology was further expended with landform maps, which are widely used in various fields of hydrology, pedology, geo science, urban and regional planning etc.

Tiruvannamalai Block majorly engrossed with Denudation origin – Pediment- Pediplain complex and northern minute area witnessed Structural origin land form.The Pediment-Pedipain complex is the result of weathering and cross cut eroded area by drainage systems with gentle slope or a low relief plain.

Thurinjapuram block is engrossed with denudational and fluvial origin landform units. Majorly denudational origin Pediment and Pediplain Complex is witnessed in the area, Pediment is the low relied or plain with gently slope area close to the mountains at their foot with or without debris whereas pediplain is relatively flat rock surface formed by joining of several pediments. Fundamental information of landform by its units will act as critical input in the identification of suitable sites for NRM activates under CWRM plan preparation.

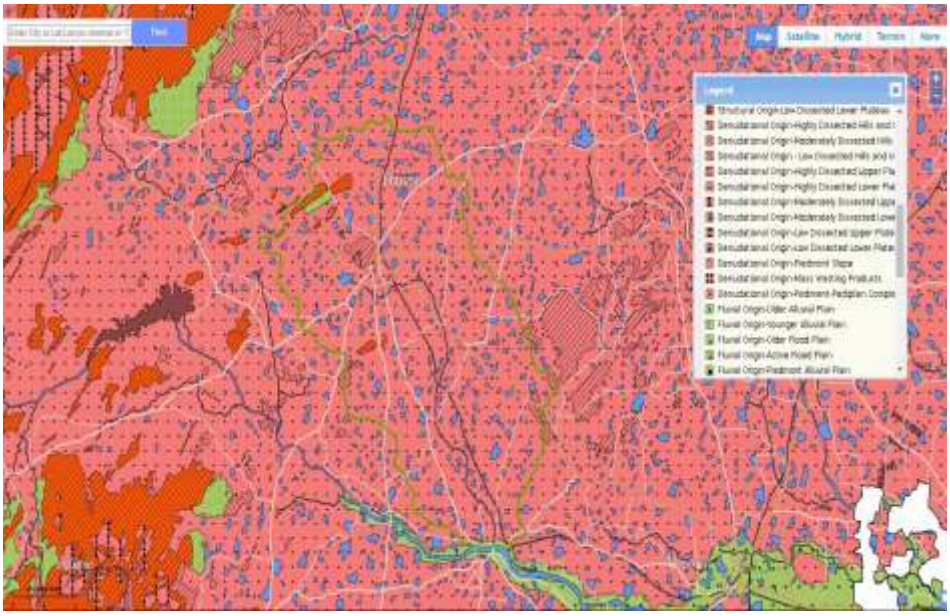

Fig. 3.1. Geomorphology map of Thurinjalar basin

3.9.2. Lineament

The lineament is also a lithological unit which reveals the hidden architecture of rock basement, representation of an underlying geological structure such as a fault, fracture (Figure 3.2). Lineament plays a significant role in identification of ground water and oil exploration sources. Lineament is represented with linear feature where two different landform converges or diverges. This site allows water to percolate at a high rate. GP wise lineament type is illustrated in the table below. These observations are widely used to locate points of high-water flow especially in groundwater exploration.

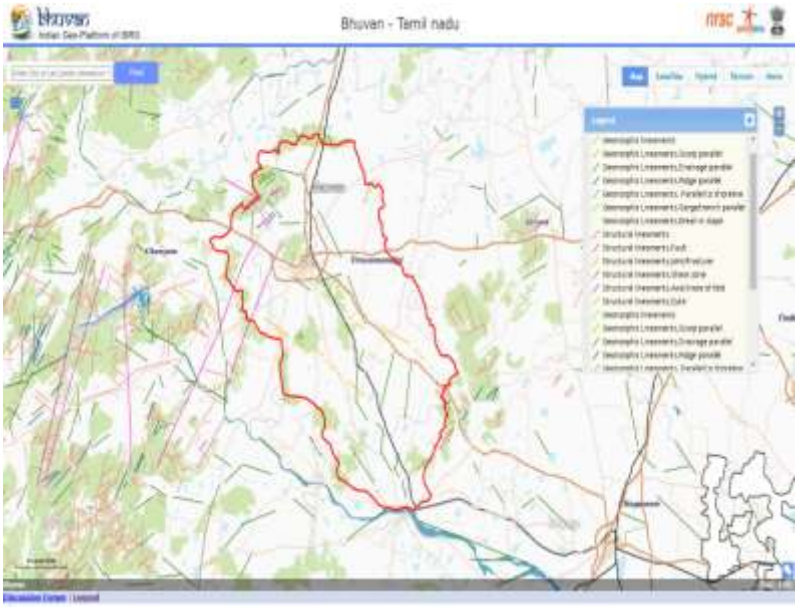

Fig. 3.2. Lineament map of Thurinjalar basin

3.9.3. Terrain

The terrain map is a product of Digital Elevation Model (DEM), which gives information related to elevation from above sea level used to represent the relief features. It is clearly noticed that the Block belongs to a particular range of elevation (green colour in Figure 3.3). This map will be useful in identification of better suitable sites for proposing the water and soil conservation related activities.

Fig. 3.3. Terrain map of Thurinjalar basin

3.9.4. Contour map

The contour is the most important element in the cartographic representation of the terrain and only one which determines relief forms such as valleys and hills, and the steepness or gentleness of slopes in geometrically. A contour map is illustrated with contour lines which show the elevation of that earth surface from above sea level. The constant vertical distance between two consecutive contours, i.e. their height difference, is called contour interval. Density of the contour lines is related to the geomorphologic units. The contour map also plays a vital role in delineation of watershed & its units, used in planning and identifying the recharge structures, farm ponds and construction of grey water drain network etc.

3.9.5. Slope

The average slope of a terrain feature is calculated from contour lines on a topo map or DEM. Slope is typically expressed in percentage, angle, or in ratio. Slope map illustrates the measure of steepness or the degree of

inclination of a feature relative to the horizontal plane. It is noticed that with respect to the land□form units the slope varies in the Block (Figure 3.5). Flat and very flat slope ranges were noticed in the Block, GP wise details is shown in the illustration below. Slope information plays a significant role in identification of soil eroded sites, depth profiles, also used in analyzing / proposing the soil conservation measures such as check dam, farm ponds etc.

100 % of area in Meyyur and 90 % area of GPs Kilchet□tipattu, So.Kilnachipattu, T.Valasai, and Su.Valavetti area witnessed Very Flat (0-1%). Whereas 90 % of area in Vengikkal & 80 % of GPs Tandarai, Kandiyangkuppam, Nadupattu, Viruvilanginan, & Nadupattu of Flat slope (1-3%) and 20 % of GP Tiruvannamalai with steep slope (10 -35 %).

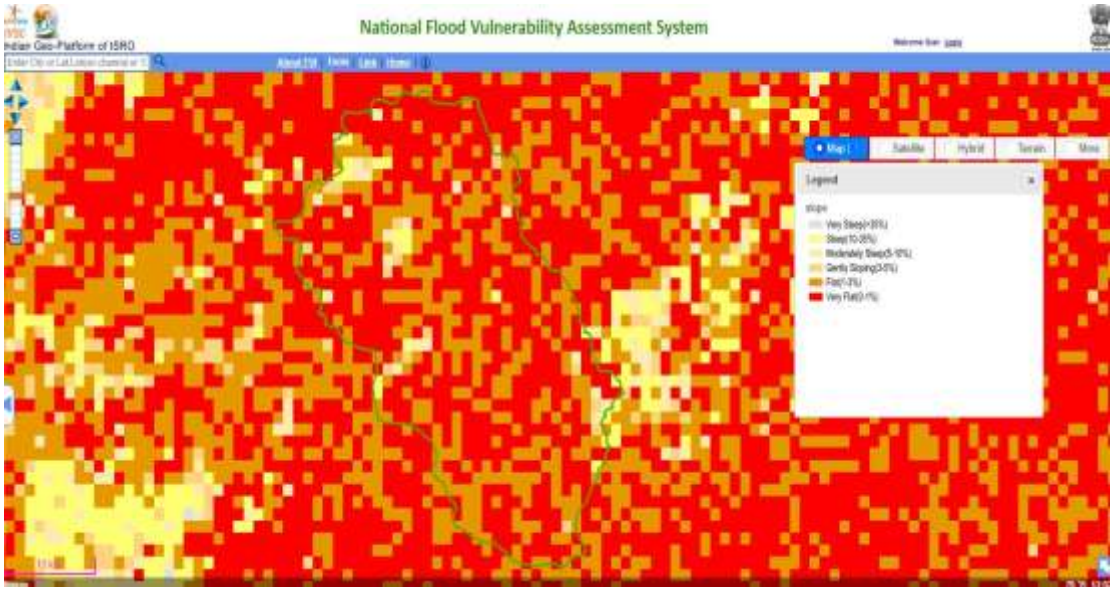

Fig. 3.4. Slope map of Thurinjalar basin

Table 3.7. Slope of Thirunjapuram block

Slope range	Area in %	Gram Panchayat
Very flat (0-1 %)	93.3	Devanampattu, Kovur, Maalavadi, Maruthuvambadi, Northampoondi, Palanadhal, Seelapandhal - 100%, Bhoodamangalam, Erumpoondi, Inam Kariyandhal, Madalambadi, Meepathurai, Salaiyanoor, Sorakolathur, Uthirampoondi, Vadakarimbalore, Vedanthavadi - 90%, Mangalam - 80
Flat (1-3%)	86	Kamalaputhur, Andapattu (V), Vallivagai - 90%, M.N. Palayam, Porkunnam - 80%

Table 3.8. Slope of Thiruvannamalai block

Slope range	Area in %	Gram Panchayat
Very flat (0-1 %)	92	Kilchettipattu - 100%, Meyyur, So.Kilnachipattu, Su.Valavetti, T.Valasai - 90
Flat (1-3%)	82	Vengikkal - 90%, Kandiyangkuppam, Nadupattu, Tandarai, Viruvilanginan - 80%
Steep (20%)	20	Tiruvannamalai

3.9.6. Drainage Network

The Drainage network pattern of a region is particularly dependent on the lithological characteristics, regional slope, structural control, climate condition etc. Dendritic or tree pattern drainage system was observed in the Thurinjalar basin (Figure 3.5). Moderately less dense drainage network covered more area followed by less while moderate high witnessed in a GP which is situated in North–East side. The dendritic pattern is characterized by irregular branching of tributary streams in all directions. Drainage network is referred to while identifying suitable sites for soil and water conservation measurements such as dams, ponds, bunding, restoration of gullied region etc.

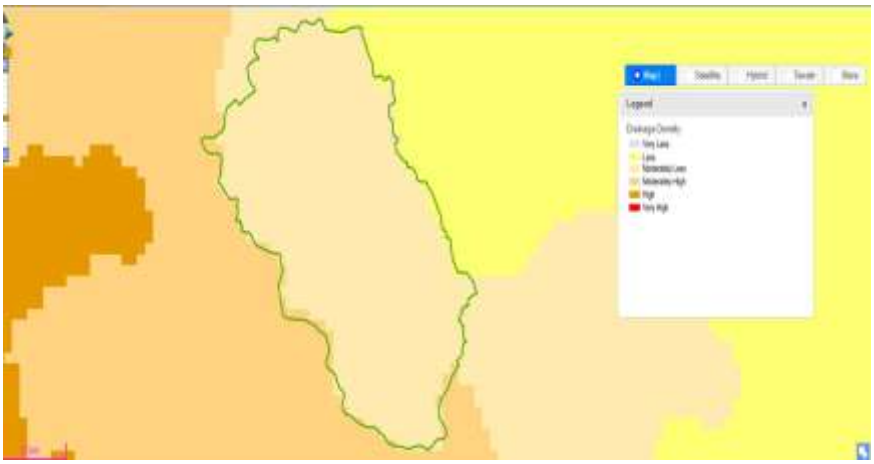

Fig. 3.5. Drainage network and density of Thurinjalar basin

3.9.7. Watershed

Implementation of any water management measure requires a suitable hydrological unit. A properly delineated watershed forms a convenient hydrological unit for computation of water balance parameters and thus implementation of water management schemes. Also, in achieving a better sustainability in development mainly NRM at the grass root level, watersheds are recognized as viable and effective management units and adopted in most of the developmental programmes such as IWMP,

MGNREGA etc. A watershed is the area/region of land where all of the water that falls in it and drains off goes into the common outlet. Thurinjalar basin watershed map is illustrated in Figure 4.7. Watershed is used for the interventions based on Ridge to Valley (R2V) concept and sequencing the plan accordingly. R2V approach intends to conserve each drop of rain water from ridge to a reasonable extent and it ensures the better surface water flow management also aids in strengthening the durability of land, soil and water conservation structures of the downstream.

Fig. 3.6. Watershed map of Thurinjalar basin

3.9.8 Ground water perspectives

Ground water is one of the important natural resources in semi-arid region like Thurinjalar basin. The ground water perspectives map is the integration of lithology, geomorphology, geological structures, hydro geomorphic datasets, which provides the required information related to ground water exploration and the probable ground water prospects. This map will help in identification of tentative locations for construction of recharge structures. Most of GPs area witnessed the enriched yield of 50-100 LPM in above 80 m deep well, whereas some GPs with no yield (Figure 3.7). The GPs wise details of Ground Water (GW) prosperity is shown in the illustration below. This specific information is will play crucial role in identifying sites for recharge structures in order to address water scarcity issues in the basin.

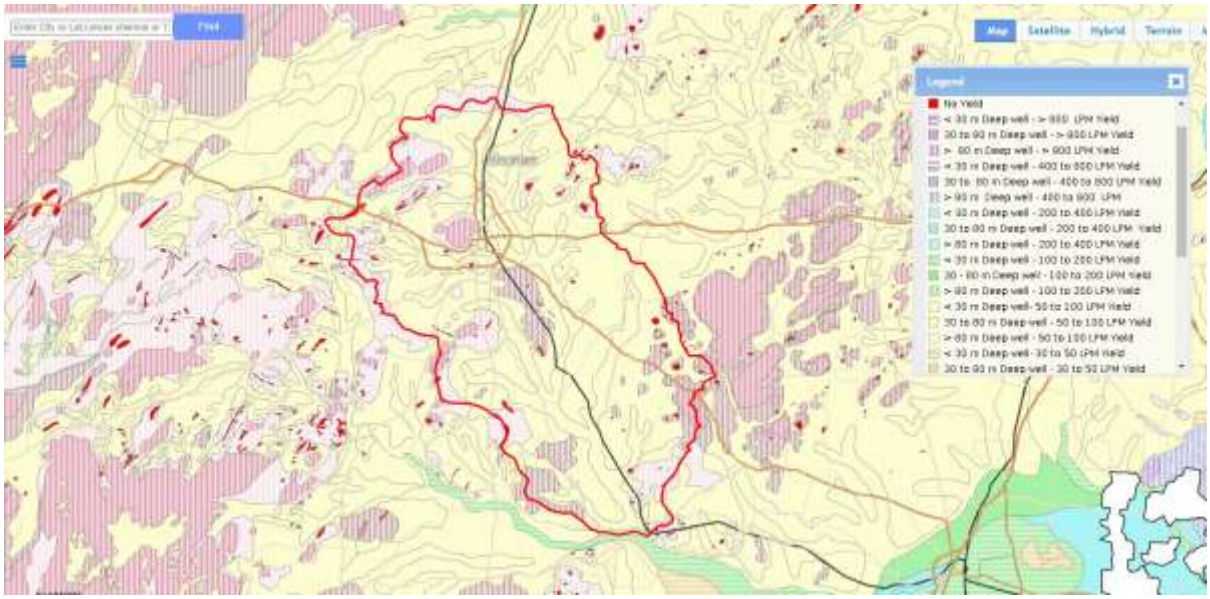

Fig. 3.7. Groundwater perspective map of Thurinjalar basin

3.10. Non spatial data-Water Resources

Water resource based non-spatial secondary data related to irrigation facilities such as canal, traditional water bodies, water quality, demand and supply were collected from Govt. sources (Table 3.8). GP wise current water resources state and its supply and demand side are shown in the annexure.

Table 3.8. CWRM parameter based water resources status in the Thiruvannamalai and Thurinjapuram block

Sr. No.	Key CWRM parameter
	Canal network (in m)
1	Length of Main Canal (m)
2	Length of minor Canal (m)
3	Length of distributaries (m)
4	Water courses (Field channel (m)
	Traditional Water bodies in No
	Number of Tanks (PWD & Union) (No.)
5	Number of Ooranis (No.)
6	Other surface water bodies (No.)
	Area under Irrigation Facilities (ha)
7	Tank Irrigation
8	Canal irrigation
9	Open & Tube Well Irrigation
	Catchment area wise available runoff (ha.m)
10	Good Catchment Area

11	Average Catchment Area
12	Bad Catchment Area
	Watershed and Drainage Networks
13	Length of Natural Drainage Lines (m)
14	Number of Natural Drainage Lines (No.)
15	Number of micro-watersheds (No.)
	Water Demand in ha.m
16	For Humans (ha.m)
17	For Livestock (ha.m)
18	For Agriculture (ha.m)
19	% GW Utilization for Drinking (%)
20	% GW Utilization for Livestock (%)
21	% GW Utilization for Agriculture (%)
22	% SW Utilization for Drinking (%)
23	% SW Utilization for Livestock (%)
24	% SW Utilization for Agriculture (%)

3.10.1. Existing Water Structures

The basin has structured traditional water storage units such as tanks, and Ooranis which are the life line of local communities for their lives and livelihoods.

Table 3.10. Existing water resources in Thiruvannamalai and Thurinjapuram

Water resources	Thiruvannamalai	Thurinjapuram
Tanks	98 (27 %)	101(24 %)
Ooranis	224 (63%)	326 (76 %)
Other Surface water bodies	36 (10 %)	0

3.10.2. Sources of Irrigation

3.10.2.1. Thiruvannamalai block

The total area under irrigation in the block is 11,166 ha, of which 87 % (9,764 ha) is irrigated through ground water, while 11 % (1,243 ha) area is tank based and 1 % (159 ha) from canal-based irrigation is practiced

3.10.2.2. Thirunjapuram block

The total area under irrigation in the block is 9,724 ha, of which 87.3 % (8,490.21 ha) is irrigated through ground water stored in open/tube wells. 12.7% (1,233.74 ha) is irrigated through water source of tanks

Table 3.11. Irrigation source in Thurinjalar Sub Basin

Source of irrigation	Area (ha)
Open well & tube well irrigation	18,252.21(87%)
Tank irrigation	2476.74(12%)
Canal irrigation	159(0.5%)

3.10.3. Available Run off

The available runoff in catchment area of Thiruvannamalai block is 6,920 ha.m. out of which 31.1 % (2,152 ha.m) comes under good catchment area, 2.80 % (194 ha.m) comes under average catchment area and 66.1 % (4,574 ha.m) comes under bad catchment area. As the area has more bad catchment area (twice that of good catchment area), the runoff generated is more. The amount of runoff generated in bad catchment area is 3.1 times higher in good catch□ment and more than 23.5 times in average catchment areas.

The total available runoff in the catchment area of Thirunjapuram block is 6,784.70 ha. m and in that 66.88 % (4,537.40 ha. m) comes under bad catchment area followed by 31.66 % (2,174.80 ha. m) comes under good catchment area and rest 99.50 ha. m is average catchment area. As the area has more bad catchment area (twice that of good catchment area), the runoff generated is more. The amount of runoff generated in bad catchment area is 2.11 times higher than good catchment area and more than 46 times in average catchment areas.

Table 3.12. Runoff in Thurinjalar Sub basin

Type of catchment	Runoff catchment area (ha. m)
Bad catchment	9111.4 (66.49%)
Good catchment	4326.8 (31.38)
Average catchment	293.5 (1.63%)

3.10.4. Water Demand

The total demand for water of Thiruvannamalai block including domestic, agriculture and livestock purpose is 15,826 ha.m. In which 477 ha.m for drinking, 194 ha.m for livestock and 15,155 ha.m for agriculture sector. Utilization of ground water is more than ground water. About 94 % of the agriculture purpose is met through groundwater and 6% from surface water. At the same time, utilization of surface water is more for domestic purposes (78 %). For livestock also ground water utilization (91%) is more than surface water (9%)

The total demand for water of Thirunjapuram block including domestic, agriculture and livestock purpose is 11,654.59 ha. M. Out of the total water demand, the more of 95.63 % demand is from agriculture activities followed by 2.90 % from domestic sector reset is of livestock's. Since water is supplied from two sources, more groundwater is used for agriculture (83.26 %) and livestock (91.66 %) purposes. 11.96% of the ground water is used for domestic purpose, while 88.04 % of surface water is utilized for domestic purpose.

Table 3.13. Water demand in Thurinjalar Sub basin

Purpose	Water demand (ha. m)
Domestic	814 (2.95)
Agriculture	26,300 (95.695)
Livestock	366 (1.345)

Table 3.14. Percentage of groundwater and surface water utilization in Thurinjalar Sub basin

Purpose	% of ground water utilization	% of surface water utilization
Domestic	55	45
Agriculture	55.5	44.5
Livestock	49.5	12

3.10.5. Soil texture

The soil consistency of particle size is distinguished through soil texture types, especially it is determined by amount of sand, silt or clay. The basin has diverse soil types and predominant in vertisol and alfisol, with reference to soil texture, the proportion of fine and fine loamy texture type is dominated across the basin (Figure 4.13). Soil texture devise the details about the soil properties such as water holding capacity, permeability, soil workability also the ability of plant to grow and this will help in proposing the relevant conservation measures for natural resources.

3.10.6. Soil erosion

Soil erosion is a natural process of displacement of upper layer of soil caused by dynamic erosion agents i.e. water, air, plants and humans. In Thiruvannamalai block soil sheet erosion was witnessed in all areas of the GPs whereas areas of the south western and central GPs soil is affected by sheet erosion. 60 % of T.Valasai GP is affected by soil erosion which is the highest, followed by 50 % in Su.Kambupattu, Perumanam, Kallottu, and Kandiyangkuppam, Nadupattua GPs and 5% in Devanandal, Ayyampalayam, Kanandampoondi, Chinnakangiyanur, Su.Nallur, and Melchettipattu GPs. In Thirunjapuram block Sorakolathur GP with a Reserve Forest witnessed sheet erosion while small patches of land are affected with sheet erosion in some GPs. The details sheet erosion respect to GP is illustrated below. This soil eroded sites will act as direct input in preparation of plan, to suggest soil conservation and watershed management activities

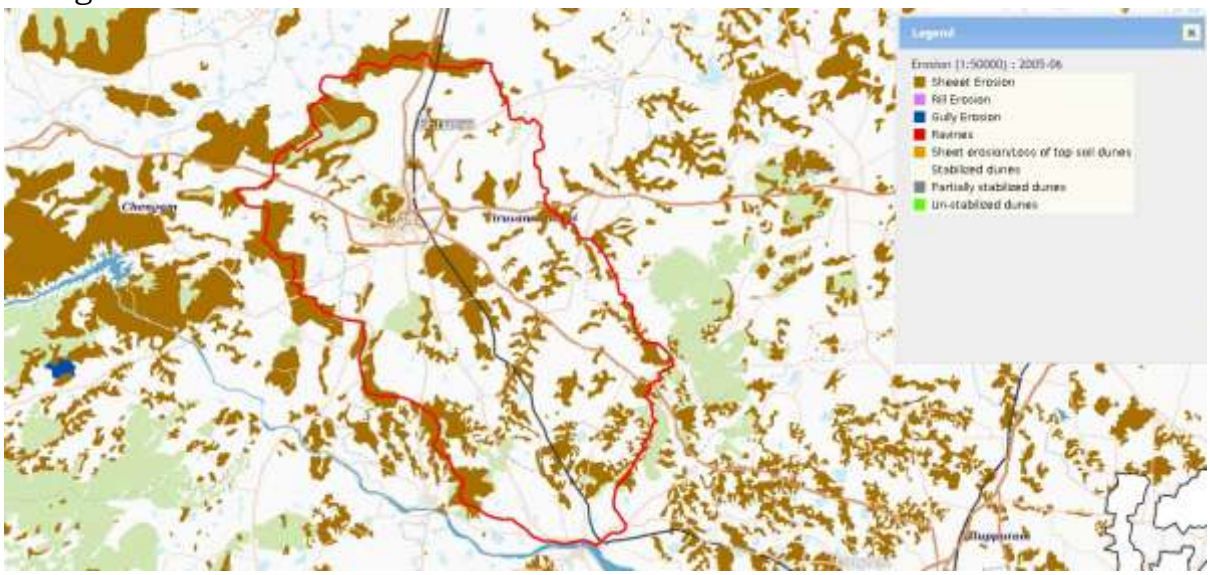

Fig. 3.9. Soil erosion map

Table 3.15. Percentage of area in Thurinjalar Sub basin

% of area	Gram Panchayat
60	T.Valasai, Sadayanodai, Thurinjapuram
50	Su.Kkambupattu, Perumanam, Kallottu, KandiyangNadupattu
40	Andampallam, Navampattu, Meyyur
30	Kattampoondi, Aradapattu, Ananandal, Su.Valavetti, Velaiyambakkam, Su.Valavetti, Madurampattu
25	Kalleri, Palayanur
20	Adiannamalai, Malappambadi, Su.pappambadi, Pavithram, Thandarai, Kilkaripur, Devanur, Naraiyur
15	Isukalikatteri
10	Vengikkal, Nallavanpalayam, So.kilnachipattu, Endal, Thatchampattu, Panaiyur, Kadagaman, Madalambadi, Mangalam, Vedanthavadi
5	Devanandal, Ayyampalayam, Kanandampoondi, Chinnakangiyanur, Su.Nallur, Melchettipattu, Devanampattu, Maruthuvambad

3.10.7. Land Use & Land Cover (LULC)

LULC are two separate terminologies which are often used interchangeably. In general, land cover is defined as 'the observed biophysical cover on the Earth's surface'. It includes vegetation and man-made features as well as bare rock, bare soil, and inland water surfaces; while land use refers to 'the way in which land has been used by humans and their habitat, usually with the accent on the functional role of land for economic activities'. LULC has become increasingly important which, in turn, underlines many environment-development policies.

A major area of Tiruvannamalai block is agricultural land followed by forest area and wasteland. 90% area of Alaganandhal, Kilkachirapattu, Meyyur, Su.Papampadi, Thandarai, Udayanandhal, and Viswathangal GPs is agriculture land. 70% of barren land is in Adaiyur GP, 50 % of Su.Valavetti GP is barren and agriculture land.

Thurinjapuram Block is dominated with barren and uncultivable land while agriculture practices are more in Eastern region GPs. LULC map helps the decision makers and planners in focusing on the fallow land development activities. During the CWRM planning of GPs, activities for fallow lands have been proposed based on the data.

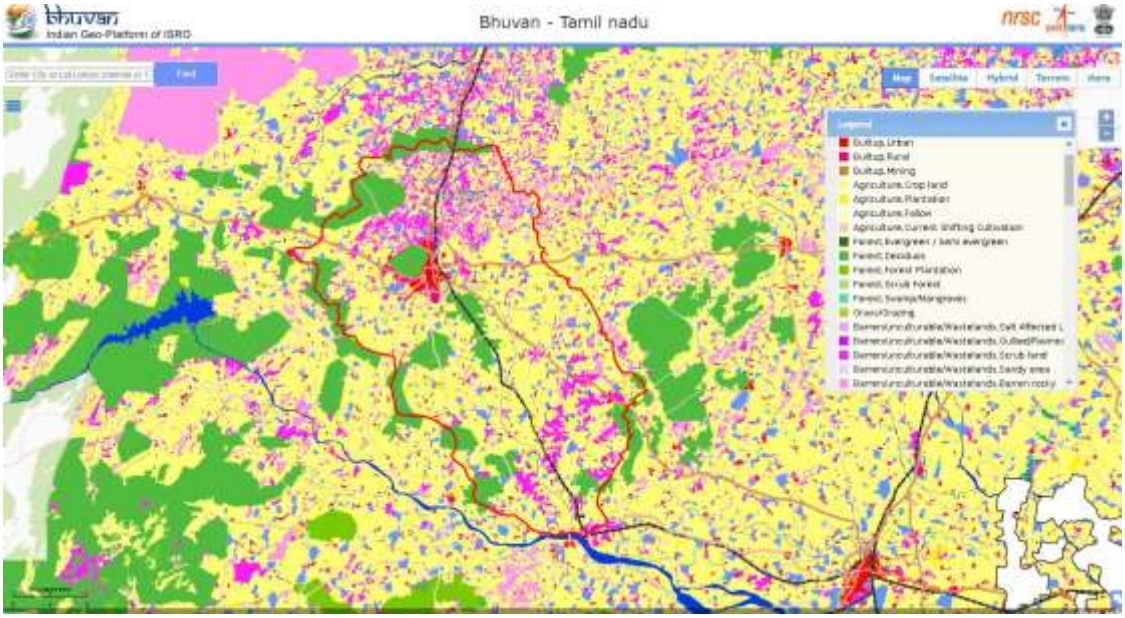

Fig. 3.10.Land use and land cover map

Table 3.16. Land use pattern in Thiruvannamalai and Thurinjapuramin Thurinjalar Sub basin

Land use	Thiruvannamalai		Thurinjapuram	
	% of area coverage	Gram Panchayat	% of area coverage	Gram Panchayat
Barren lands	16	Adaiyur - 70%, Devanandal, So.kilnachipattu - 40%, T.vala□sai - 30%, Andampallam, Devanur, Vengikkal - 20%, Madur□ampattu, Palayanur - 15%, Adiannamalai, Chinnakallapadi, Kadagaman, Nochimalai, Panaiyur - 10%, Kalleri, Kanan□dampoondi, Nallavanpalayam, Naraiyur, Thatchampattu,	87	Arppakkam, Durgainammiyandal, Inamkariyandal, Kalasthambadi, Kamalaputhur, Kariyandal, Karumarapatti, Karunthuvambadi, Kiliapattu, Kovur, Kunniyandal, M. N. Palayam, Madalampadi, Mallava□di, Mangalam, Meppathurai, Mutharasampoondi, Naidumangalam, Nookkambadi, Northampoondi, Palanandal,

		Velaiyambakkam, Viruduvilanginan - 5%, Pavithram - 2%		Pudumallavadi, Randam, Sadayanodai, Uthirampoondi, Vadapuzudiyur, Vallivagai, Veluganandal - 90%, Devanampattu, Sananandal, Thurinjapuram, Usampadi, Vadaandapattu, Vadakaringalipadi - 80%, Salaiyanur, Seelappandal, Vadakarumbalore - 70%
Barren lands and Agriculture crop lands	38	Devanur, Perumanam - 40%, Panaiyur - 5%, Ananandal - 30%, Endhal, Malappambadi, Su.Valavetti - 50%	-----	-----
Agriculture crop lands and Plantation	90	Alaganandhal, Kilkachirapattu, Meyyur, Su.Papampadi, Thandarai, Udayanandhal, Viswathangal - 90%	82	Kothanthavadi, Vedandavadi -90%, Budhamangalam - 80%, Erumpundi, Karkonnam, Kolakkaravadi, Maruthuvambadi, Periyakilambadi, Porkunnam, Sorakolathur - 70%

3.10.8. Waste land

A Parcel of land that is not suitable for any agriculture activity and mostly covered with dense or open scrub is called as wasteland. The extent of Wasteland will act as a direct input for preparation of plans for land development activities or greenery. Wasteland parcels of degraded forest and scrub land are noticed in the Thiruvannamalai block. The degraded forest is observed in the GPs Adiannamalai, Athiyandal, and Palayanur GPs have

degraded forest lands and Palayanur, Su.Valavetti, Adiannamalai, Devanandal GPs have scrub land. Small patches of wasteland parcels are noticed along the Thurinjapuram block boundary periphery of southern GPs and one parcel in a GP which is situated in East. Almost 60 % area of Sorakolathur reserve forest is degraded.

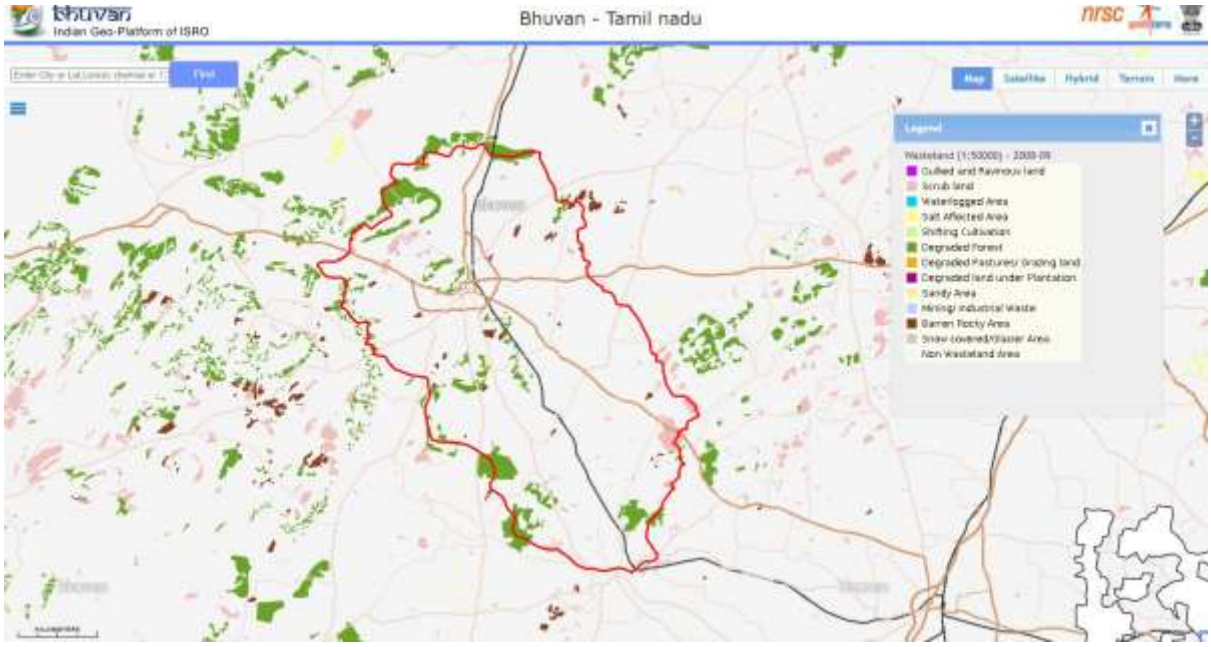

Fig. 3.11. Waste Land map

Table 3.17. Waste Land type in Thiruvannamalai and Thurinjapuram in Thurinjalar Sub basin

Waste land type	Thiruvannamalai		Thurinjapuram	
	% of area coverage	Gram Panchayat	% of area coverage	Gram Panchayat
Barren rocks	----	----	12	Mangalam - 20%, Bhoodamangalam - 10%, Vallivagai – 5
Degraded forest	5	Adiannamalai - 10%, Athiyandal, Palayanur - 5%	----	----
Scrub land	4	Palayanur - 10%,Su.Valavetti, Adiannamalai, Devanandal - 5%	2	Bhoodamangalam, Vadakarimbalore

3.10.9. Salt affected area

Saline and sodic types of salt affected area is noticed in Kandiyang, Nadupattu, Velaiyambakkam, Kadagaman, and Viruduvilanginan GPs of

Thiruvannamalai block and ten percent of Kiliyapatttu and Katumarapatti GP area is noticed as salt affected area in the Thurinjapuram block. These parcels will act as a direct input while planning process to propose soil conservation measures, mainly activities to reduce salinization and suggestions for alternative cropping.

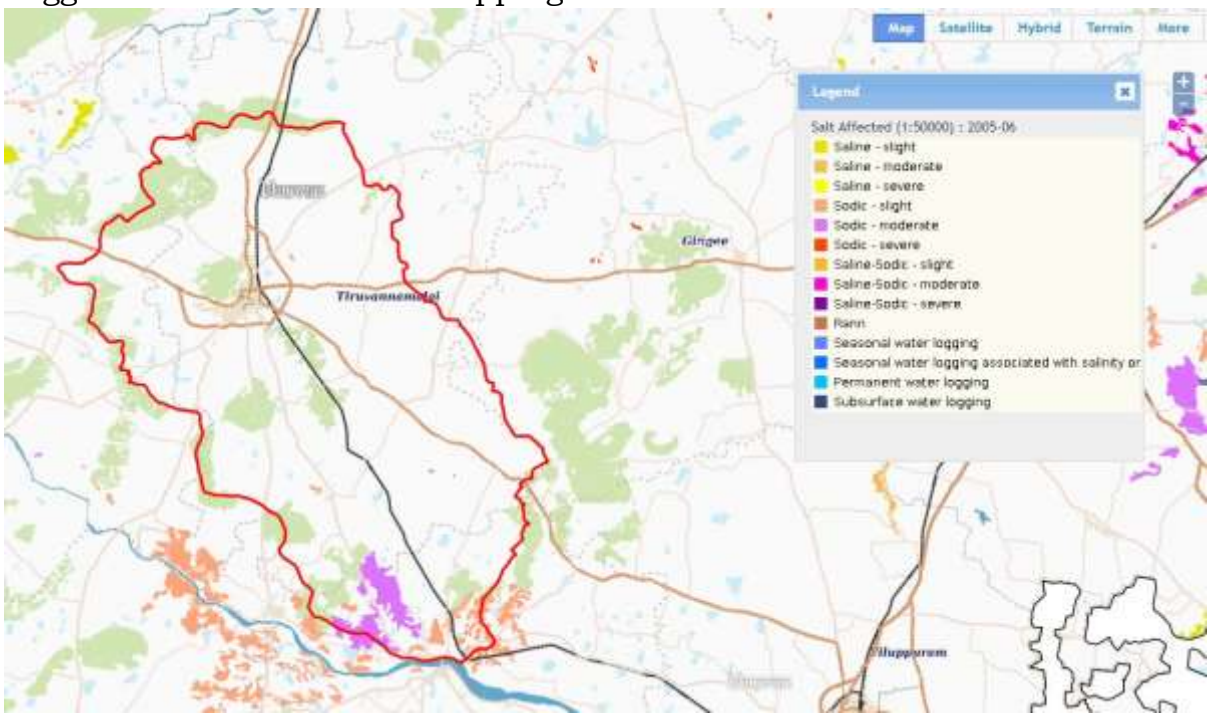

Fig. 3.11 Salt affected area

3.11. Non spatial data-Agriculture Resources

Agriculture based non-spatial secondary data related to land resources, catchment, crop type, soil micro-macro nutrient, moisture, ET and livestock data were collected from govt. sources (Table 3.18.). The key CWRM parameters of agriculture area for all GPs are tabulated in Annexure 3.7.

Table 3.18. CWRM parameter-based agriculture resources status in the Thurinjalar basin of Thiruvannamalai District

Sr. No.	Key CWRM Parameter
	Area under land resources (in ha.)
1	Forest land
2	Non-Agricultural Uses
3	Barren & Un-cultivable Land
4	Permanent Pastures and Other Grazing Land
5	Land Under Miscellaneous Tree Crops etc.
6	Cultivable Waste Land

7	Fallows Land other than Current Fallows
8	Current Fallow land
9	Unirrigated Land
10	Area Irrigated by Source
	Land under Catchment Area (ha)
11	Good Catchment
12	Average Catchment
13	Bad Catchment
	Crop details
14	Irrigated Area (ha)
15	Rainfed area (ha)
16	Paddy Cultivation (ha)
17	Crop Water Requirement - Irrigated condition (ha-m)
18	Crop Water Requirement - Rainfed condition (ha-m)
	Soil Resources: status of available Nitrogen (%)
19	Very Low
20	Low
21	Medium
	Status of Organic Carbon (%)
22	Very Low
23	Low
24	Medium
25	High
	Status of Soil micro-nutrients (%)
26	Sufficient
27	Deficient
	Status of physical condition of the soil (%)
28	Moderately Acidic
29	Strongly Acidic
30	Highly acidic
31	Moderately Acidic
32	Slightly Acidic
33	Neutral
34	Moderately Alkaline
	Soil Texture (%)
35	Clay soil
36	Fine soil
37	Coarse loamy
38	Soil Water Permeability (Low,

	Moderate, high)
	Soil moisture and ET
39	Volumetric Soil Moisture (%)
40	Estimated Soil Moisture (ha.m)
41	ET Losses (ha.m)
	Means of water extraction (%)
42	Gravity
43	Lifting
	Irrigation methods (%)
44	Wild Flooding
45	Control Flooding
	Livestock (No.)
46	Cattle Population
47	Sheep Population
48	Goat Population

3.11.1. Land utilization

The standard land use classification helps to understand the distribution and the extent of different land use categories. As the runoff and water harvesting actions are linked to the land use systems, its distribution across the geographical boundary of the basin is necessary to take decisions. Of the total land area of 30,886 ha, 36.5 % of land is irrigated by source irrigation, followed by 31.5 % area is current fallow land and the least of less than percent area is forest land resource is available in the Thiruvannamalai block.

3.11.2. Catchment Area

The land use types in each of the GPs are categorized into three different types of runoff; good, average and bad catchment area. This analysis helps to focus on prioritizing the works in the land use systems under the good and bad catchment areas.

3.11.3. Soil moisture

Soil is an important medium to store the available water and the storage capacity varies with the type of soil especially its textural composition. In overall composite water budgeting, estimation of stored water in the soil assumes greater significance in this basin because of its significant proportion of area under rain-fed cultivation.

3.11.4. ET losses

The loss of water through ET is important in water budgeting. The annual total ET loss during 2018-19 was 22735.79 ha m.

3.11.5. Macro soil nutrients Nitrogen

The macro soil nutrients such as nitrogen and organic carbon falls under very low to moderate category in all the soil samples tested. The available nitrogen is very low in 25 % of the samples tested while it was 38 % under low category and four percent under medium. According to soil resource map, this basin is identified as one of the nitrogen deficient Block (Tiruvannamalai district profile 2020). Nitrogen deficient Block (Tiruvannamalai district profile 2020).

3.11.6. Macro soil nutrients

A similar trend was recorded for soil organic carbon. Soil organic carbon is also ranges between very low and high in the basin. Nearly 49 % of the soil samples tested fall under very low category followed by 39 % is falls under low category while less five percent under high. This indicates that the soil fertility is very poor and further intensive practices will make the soil more vulnerable to degradation over a period of time.

3.11.7. Status of the soil micro nutrients

This basin is one of the Nitrogen, zinc and ferrous deficient basin of Tiruvannamalai district. The micro nutrient status of the soil with specific reference to Manganese, Boron and Zinc, Ferrous, Copper, and Sulphate are deficient in 46 % and 54 % sufficient in the soils tested.

3.11.8. Physical parameters

pH status With reference to the physical parameters, 81.89 % of the soil is moderately alkaline in nature followed by 4.63 % is neutral, 2.96 % is slightly acidic, 1.37 % is moderately acidic, and 0.53 % is highly acidic in nature.

3.11.7. Cropping pattern

Irrigation source and rain-fed source crop cultivated area in the basin. Groundnut, Paddy and pulses area the dominated crops in the basin. Paddy is the predominated crop of irrigation area (31 %) followed by ground nut (27 %). Whereas ground nut is predominant in rainfed area (54 %) followed by pulses (44 %). Horticulture crops such as sugarcane, banana, medicine plants and turmeric are cultivated in the irrigated area.

3.11.8. Irrigation methods

In case of the surface water resources, wild flooding is the primary method of irrigation. But in case of ground water resources, the predominant type of irrigation is controlled flooding. In the Basin, 84.43 % of the irrigation is done by control flooding and only 15.57 % of the irrigation is done by wild flooding.

3.11.9. Means of water extraction

Water is extracted in two ways, one by gravity and another is by lifting. Water is drawn from surface water sources such as tanks, ponds etc., by using gravity method and that of ground water sources such as open well, hand pump, bore well by using lifting method. In the Basin, since the dependence on ground water sources is more, 91.86 % of the water extraction methods are under lifting means of extraction and only 8.14 % comes under gravity means of water extraction.

3.11.10. Livestock Details

This basin has considerable proportion of livestock resources of which small ruminants such as sheep and goat constitute 20.43 % and 24.52 % of the total livestock. While cattle population is higher in Basin (55.05 %). The total water requirement for livestock which, 91.66 % is met through ground water and remaining is from surface water resources.

3.12. CWRM planning analysis-socio economic

The demographic details such as population, gender, vulnerable population/ households, drinking and grey water details are collected from authentic primary and secondary sources and analyzed. Data of MGNREGA job holders is also taken for the analysis.

Table 3.19. CWRM parameter based socio-economic status in the block

Sr. No	Key CWRM Parameter
1	Geographical Area
2	Male Population (No.)
3	Female Population (No.)
4	Total Population (No.)
5	SC Population (No.)
6	ST Population (No.)
7	Vulnerable population (No.)
8	Households (HH's) (No.)
9	Only one room HH's (SECC) (No.)
10	Female Headed HH's (SECC) (No.)
11	Vulnerable Households (SECC) (No.)
12	% of Vulnerable Households
13	Registered MGNREGA Job cards (Persons)
14	Active person working in MGNREGA job Cards (Persons)
15	Drinking Water Sources (No.)
16	Ground Water - Drinking source (No.)
17	Surface water - Drinking source (No.)

18	Sum of drinking water sources (No.)
19	HH's have tap water connection for drinking water (No.)
20	HH's dependent on other sources for drinking water (No.)
21	Annual Grey water Generation (ha – m)

3.12.1 Population

The total population of this basin 3,06,515 of which the women proportion is almost equal to proportion of men. In the CWRM planning process due attention is given for the intersecting variables such as gender, class, caste and marital status and availability of safe drinking water resources. In the basin, about 12.67 % of the total populations (38838) are under vulnerable population (SC & ST population).

3.12.2 Drinking Water Sources

Only few households have tap water connection while other households depend on other water sources for domestic use, where other sources included RTRWHS / Tanka (Roof Rain Water Harvesting Systems, Hand pump, Open wells, Bore wells, Tank/ Pond/ Oorani, Springs and River/ Streams.

3.12.3 Annual Greywater Generation

The grey water generation estimated across this basin which is available for reuse or recycle.

CHAPTER IV

VULNERABILITY RANKING OF GP

The vulnerability assessment has been carried out using IPCC methodology. Intergovernmental Pan□el on Climate Change (IPCC) defined Vulnerability as 'the propensity or predisposition to be adversely affected' (IPCC 2014). Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and the lack of capacity to cope and adapt. It is determined by sensitivity and adaptive capacity of the system.

Generally, vulnerability assessments are made to identify

- Current and potential hotspots
- Drivers of vulnerability
- Entry points for intervention
- Priorities adaptation intervention

The CWRM parameters which been explored through rigorous study were considered here to address the key water challenges at GP level. About 70 spatial and non-spatial parameters/ indicators under 4 dimensions via Climate (3), Water (25), Agriculture (31) and Socio-demographic (11) are categorized into adaptive capacity, sensitivity and expo□sure indicators for vulnerability analysis as per IPCC norms. Table 9 lists CWRM parameters/indicators, its rationale to vulnerability, source of data and its linkage with WASCA TN's primary 18 indicators.□

Table 4.1. CWRM Parameters/indicators selected for basin level vulnerability

	Key CWRM Parameter	**Key CWRM Parameter**
Climate	Drought	**Climate risk/Sensitivity**
	Flood locations	
	Heat wave	
	Canal network (m)	**Adaptive**
	Length of main canal	

Water	Length of minor canal	**capacity**
	Length of distributaries	
	Water courses (Field channels)	
	Traditional water bodies (in No.)	**Adaptive capacity**
	No of Tanks	
	No of Oranis	
	Other Surface Water Bodies	
	Irrigation facilities (ha)	**Sensitivity**
	Area under Tank Irrigation	
	Area under Canal Irrigation	
	Area under Open & Tube Well Irrigation	
	Catchment Area wise Available Runoff (ha.m)	**Sensitivity**
	Good Catchment Area	
	Average Catchment Area	
	Bad Catchment Area	
Water	**Watershed and Drainage Networks**	**Adaptive capacity**
	Length of Natural Drainage Lines	
	Number of Natural Drainage Lines	
	Number of Micro-watersheds	
	Water demand (ha.m)	
	For Humans	**Sensitivity**
	For Livestock	
	For Agriculture	
	% GW utilization for Drinking	
	% GW utilization for Livestock	
	% GW utilization for Agriculture	
	% SW utilization for Drinking	
	% SW utilization for Livestock	

	% SW utilization for Agriculture	
Agriculture	**Area under land resources (in ha)**	
	Forest land	**Adaptive capacity**
	Non-Agricultural Uses	
	Barren & Un-cultivable Land	
	Permanent pastures and Other grazing land	
	Land under miscellaneous tree crops etc.	
	Cultivable wasteland	
	Fallows land other than current fallows	**Sensitivity**
	Current fallow land	
	Unirrigated land	
	Area irrigated by source	
Agriculture	**Land under catchment area (ha)**	
	Good Catchment Area	**Adaptive capacity**
	Average Catchment Area	
	Bad Catchment Area	**Sensitivity**
	Crop Area details (in ha)	
	Irrigated Area	**Sensitivity**
	Rainfed area	
	Soil Resources: Status of available Nitrogen (in %)	
	Very low to low	**Sensitivity**
	Status of Organic Carbon (in %)	
	Very low to low	**Sensitivity**
	Status of Soil Micro Nutrients (in %)	
	Deficient	**Sensitivity**
	Status of Physical condition of the soil (in %)	
	Highly acidic/alkaline	**Sensitivity**

	Slightly acidic	**Adaptive capacity**
	Neutral	
	Moderately alkaline	
	Soil Texture (in %)	
	Clay	**Sensitivity**
	Fine	**Adaptive capacity**
	Coarse loamy	
	Soil Water Permeability (Low, Moderate, high)	
	Soil moisture and ET (in ha.m)	
Agriculture	Estimated soil moisture	**Adaptive capacity**
	ET losses	**Sensitivity**
	Means of Water Extraction (in %)	
	Lifting	**Sensitivity**
	Irrigation Methods (in %)	
	Wild flooding	**Sensitivity**
	Livestock (in No.)	
	Livestock density (cattle, sheep, Goat, poultry)	**Sensitivity**
	Population density (persons per ha)	**Sensitivity**
	Demographic (in %)	
	Female Proportion	**Sensitivity**
	Vulnerable population Proportion	
	Economic (In %)	
	Only one room HH's	**Sensitivity**
	Female headed HH's	
	Vulnerable households	
	MGNREGA (in %)	

	Registered MGNREGA Job cards	
	Active person working in MGNREGA job Cards	**Adaptive capacity**
	Water accessibility (in %)	
	HH's have tap water connection for drinking water	**Adaptive capacity**
	HH's dependent on other sources for drinking water	**Sensitivity**
	Annual Greywater Generation (in ha.m)	

The identified indicators are from different sources and measured in different units. As the vulnerability assessment is about ranking, the indicators have to be in common units. This is done through normalization. The normalized indicators are aggregated and categorized to different vulnerability level as very high, high, medium, low and very low. The vulnerability assessment methodology is given in Annexure.

CHAPTER V

STRATEGY PLAN

The appropriate and site-specific works are identified for the development of public and common land, agriculture and allied activities, rural infrastructures, and climate-resilient measures to reduce the vulnerability in the GP. About 30 % of the total land area is taken for WASCA treatment activities like plantation and conservation works. The total proposed area for treatment in Thurinjalar sub basin is 83,553 ha. More attention is given for non-agriculture land followed by area under irrigated by source, area under current fallow land and unirrigated land. The appropriate and site-specific works have been identified for the development of public and common land, agriculture and allied activities, rural infrastructures, and climate-resilient measures to reduce the vulnerability in the GP is attached in annexure.

the detailed perspective plan and estimates of the work, budget, and person-days for three years from 2022-2023 to 2024-2025 in Thurinjalar GP. More attention was given to include appropriate works to improve the common and public land development. Regarding CWRM themes of the total number of projects identified, 75 % works are in agriculture and allied sector while 17 % works are in public and common land, and 8% works are in rural infrastructure respectively.

5.1. Impacts

The proposed water actions based on the above key water challenges cover a period of three years from 2021- 2022 to 2023-2024. At the end of the implementation period i.e., in the year 2024, the impacts evaluation will be carried out. It is expected that these impacts will potentially reduce the vulnerability and improve the resilience of the system to the projected climatic change events and ensured water security.

5.2. Proposed activity map

The proposed activity map for,Meppathurai GP, Thurinjapuram Block shows a shelf of projects for all three year works from 2021-2024 (Figures 5.1 to 5.6).

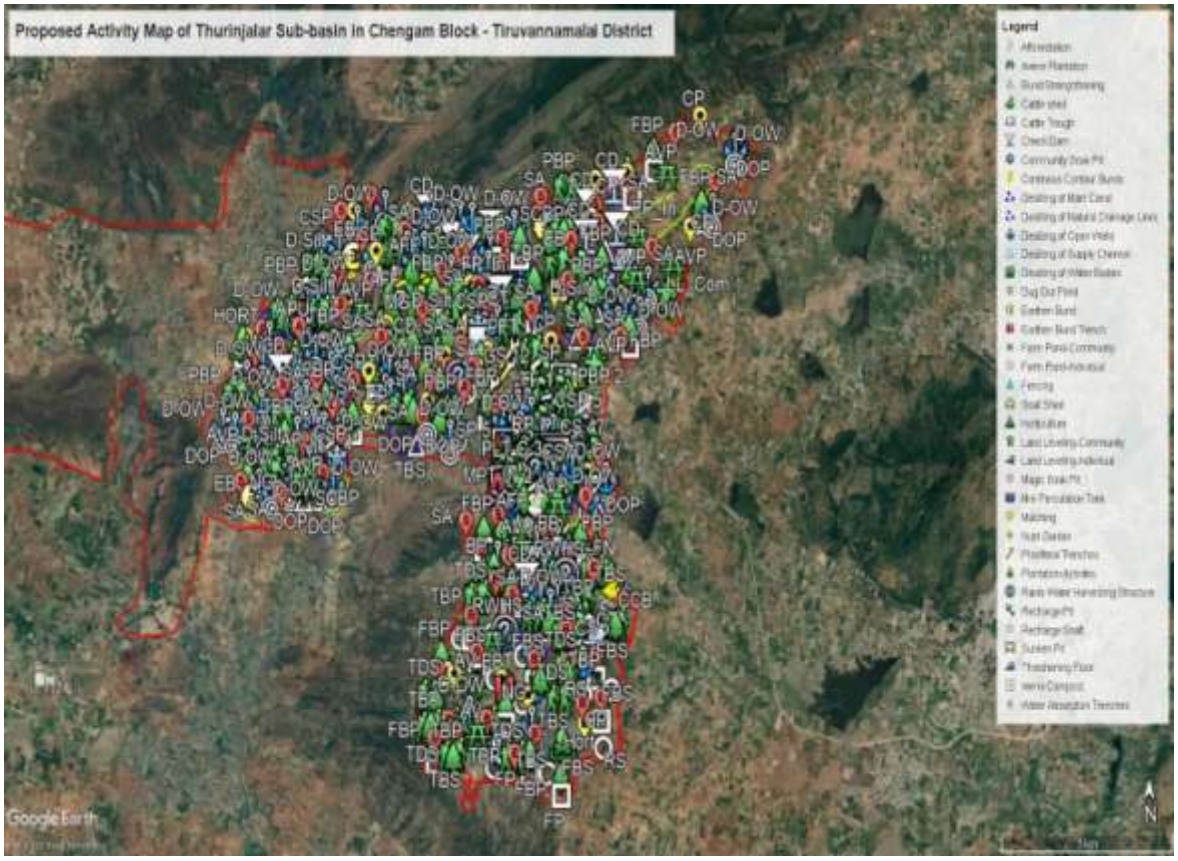

Fig. 5.1. Proposed activity plan of Chengam Block in Thurinjalar sub basin

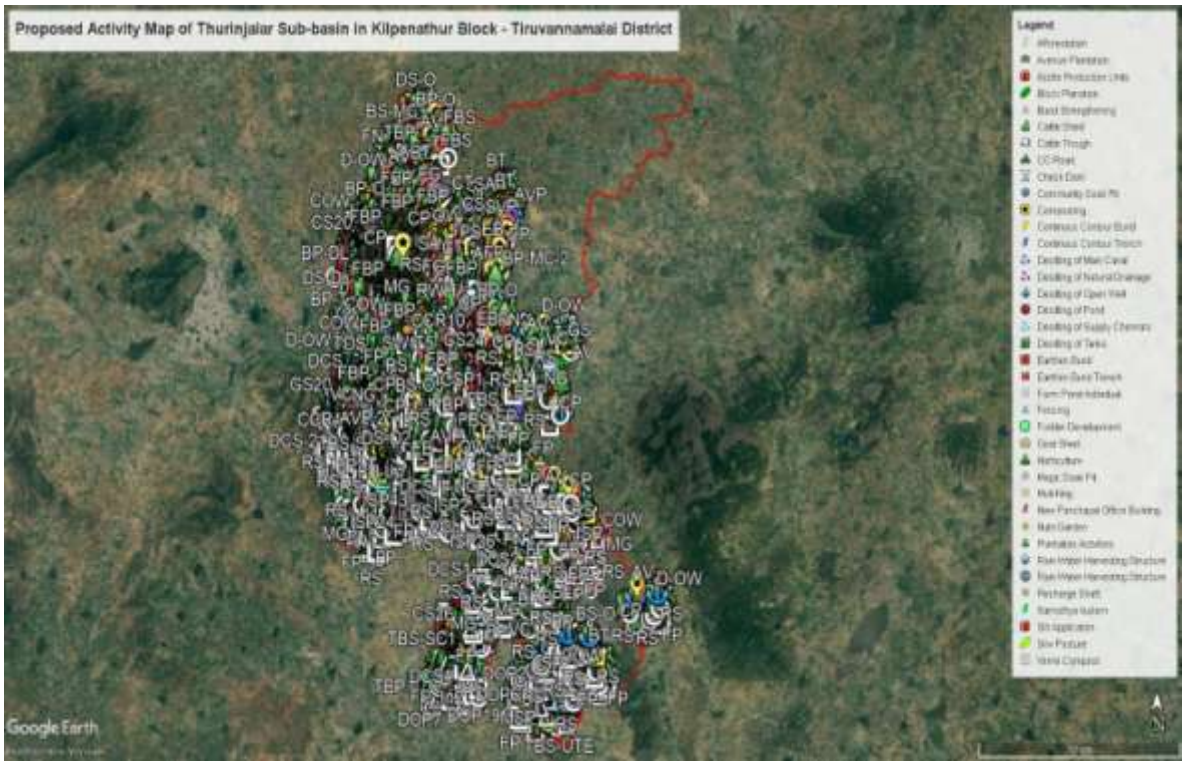

Fig. 5.2. Proposed activity plan of Kilpenathur Block in Thurinjalar sub basin

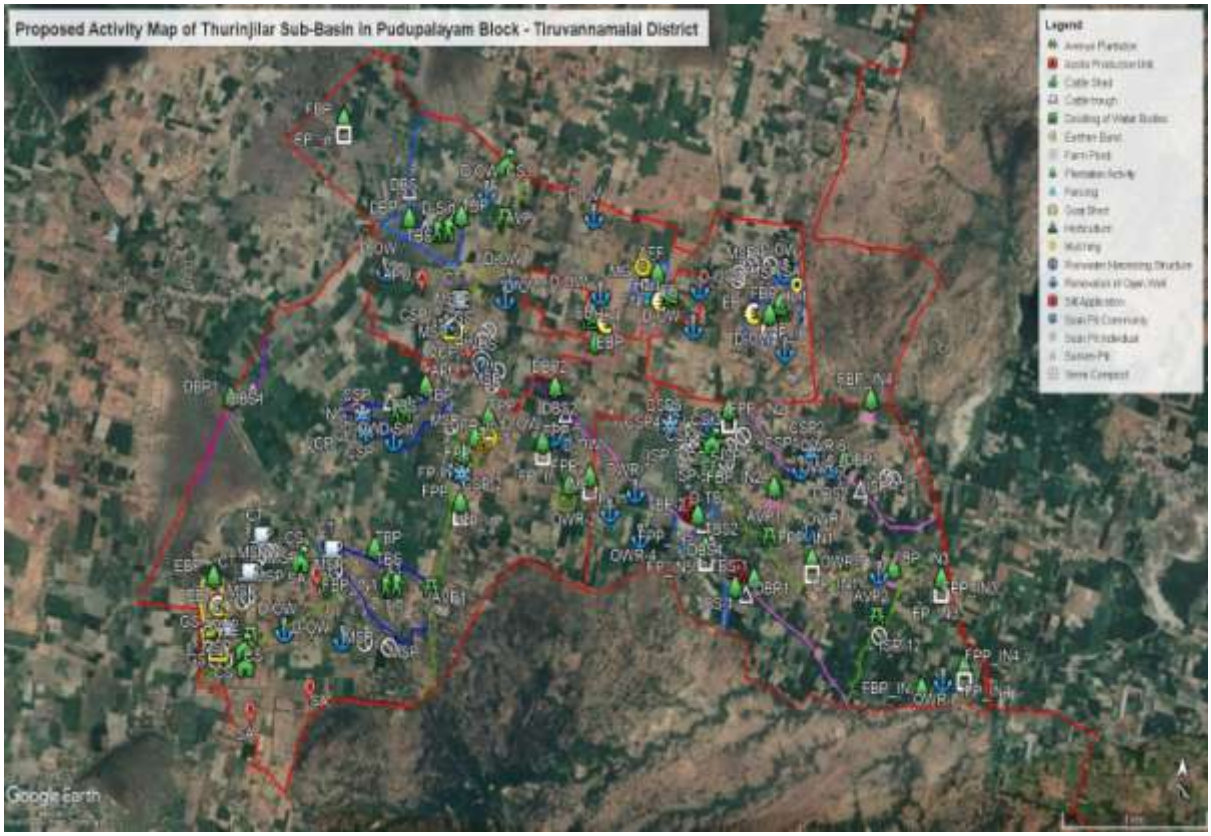

Fig. 5.3. Proposed activity plan of Pudupalayam Block in Thurinjalar sub basin

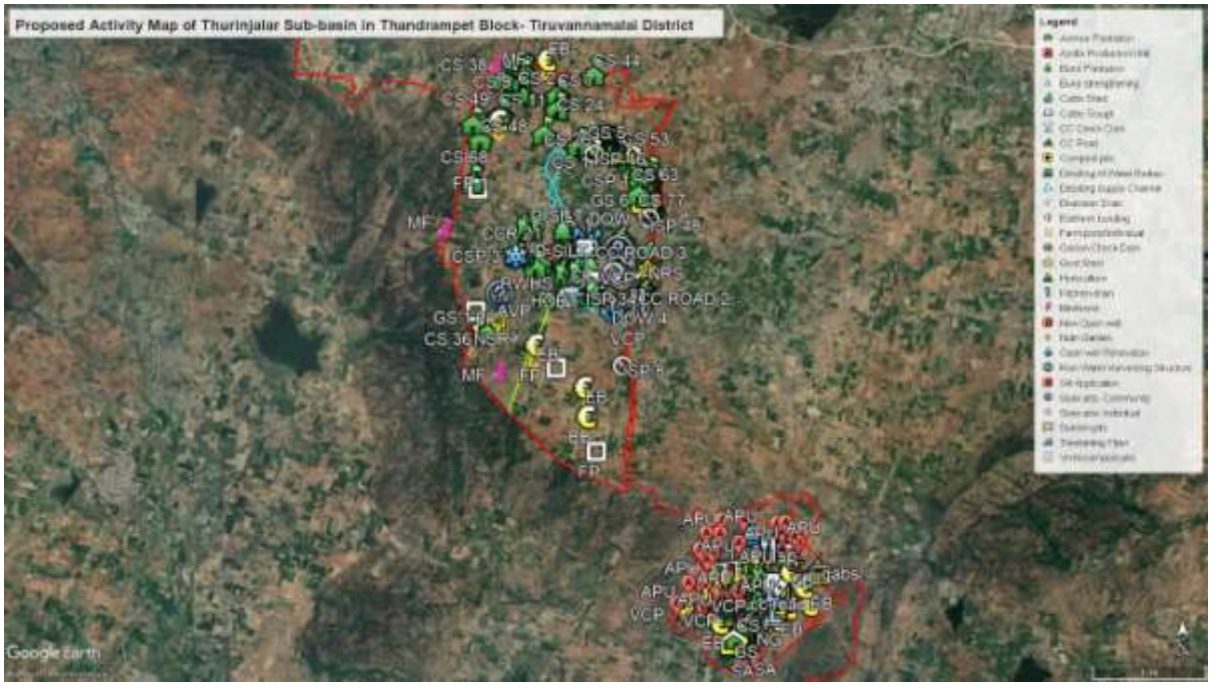

Fig. 5.4. Proposed activity plan of Thandrampet Block in Thurinjalar sub basin

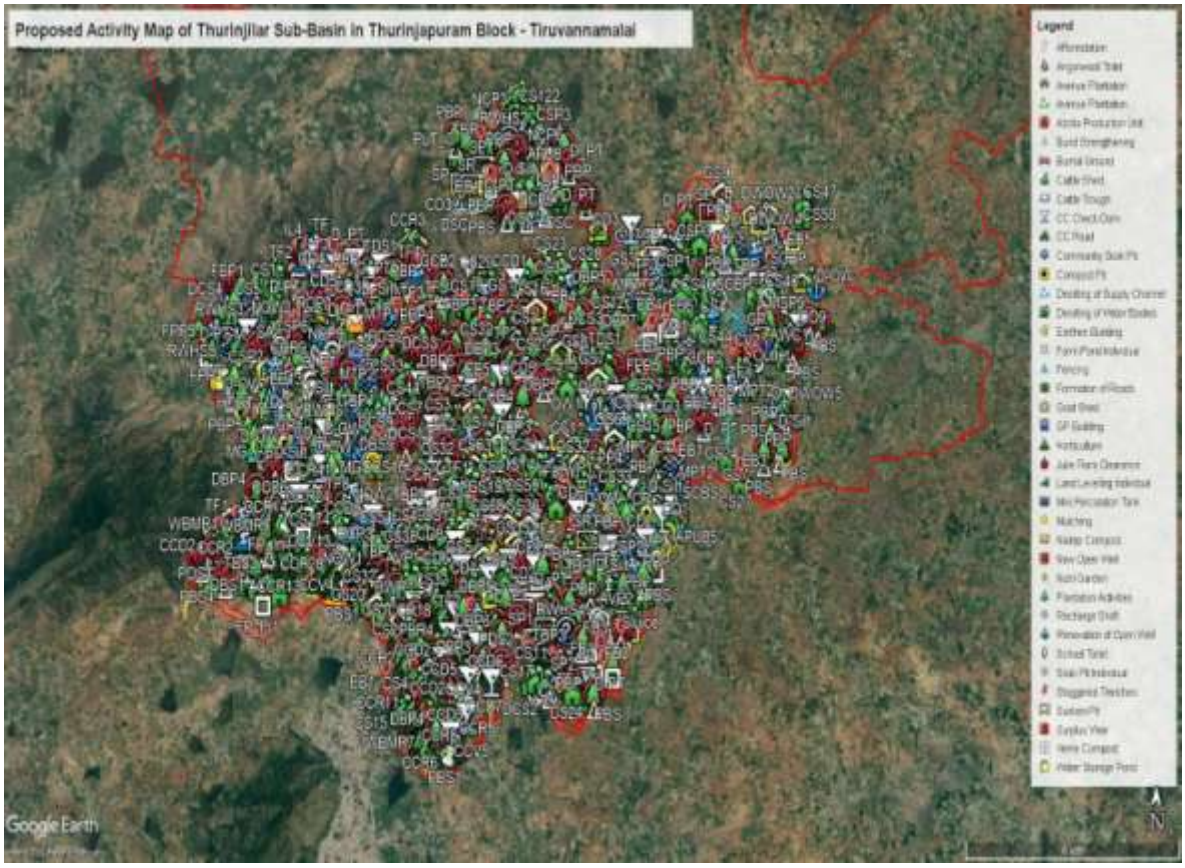

Fig. 5.5 Proposed activity plan of Thurinjapuram Block in Thurinjalar sub basin

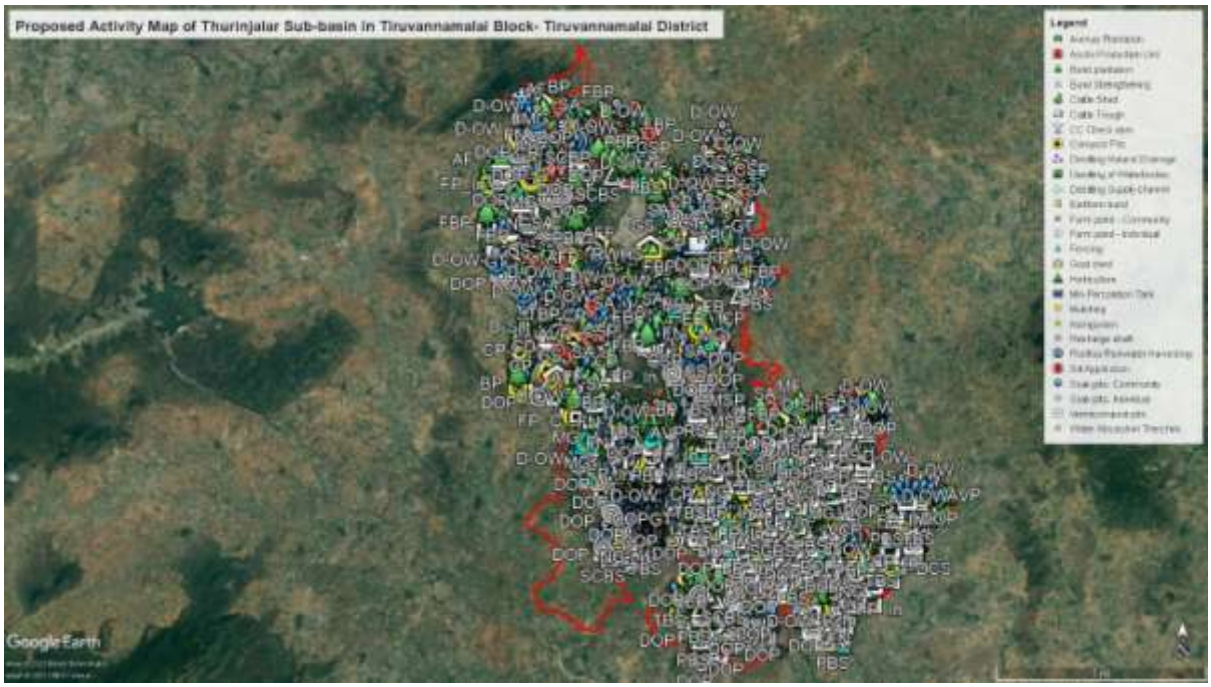

Fig. 5.6 Proposed activity plan of Tiruvanamalai Block in Thurinjalar sub basin

CHAPTER VI

PROJECTED OUTCOMES OF THE PLANNING

Keeping in view the guidelines of Mahatma Gandhi NREGS, Key Water Actions are proposed based on climate vulnerability assessment and challenges at GP level for a period of three years: from 2021- 2022 to 2023-2024. At the end of the implementation period during 2024, the following productive outcomes are envisaged on successful accomplishment of all proposed Key Water Actions. The anticipated outcomes will reduce the water security vulnerability and increase the resilience of the GPs under current and projected climatic change scenarios.

6.1. Outcomes of development of public and common lands

1) Proportion of Land development under WASCA treatment
2) No. of waterbodies restored
3) Area under afforestation
4) Area under silvi-pasture development
5) Length of drainage line treated
6) Nursery development

6.2. Outcomes of development of agriculture and allied activities

1) Assessment of sources of water for livestock and agriculture demand No of structures established for on-farm (in-situ) water harvesting in dry lands
2) Improvement in soil health
3) Dry land development with agro-forestry
4) Households established fodder plots

6.3. Outcomes of rural infrastructure development

1) No. of villages having liquid waste management systems
2) Roof rain water harvesting measures
3) Nutri-garden

6.4. Outcomes of climate resilience measures

1) Vulnerable GPs are identified for key water actions
2) Climate resilient measures are identified for climate risks

6.5. Linkages to SDGS, NDCS

The 2030 Agenda and the Paris Agreement put forth an innovative and complementary framework for accelerating action and achieving ambitious sustainable development objectives. Under the 2030 Agenda, a series of 17 global Sustainable Development Goals (SDG) have been agreed

that are to be universally achieved. Under the Paris Agreement countries are committed to reduce greenhouse gas emissions through Nationally Determined Contributions (NDC) in order to strengthen resilience to climate change. Both The SDGs and Paris Agreements demands urgent climate action and linking WASCA activities with these two agendas is indispensable.

6.5.1 Nationally determined contribution goals and WASCA TN'S progress through NDC

2015 was a historic year in which 196 Parties came together under the Paris Agreement to transform their development trajectories so that they set the world on a course towards sustainable development, aiming at limiting warming to 1.5 to 2 degrees C above pre-industrial levels. Through the Paris Agreement, Parties also agreed to a long-term goal for adaptation – to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production. Additionally, they agreed to work towards making finance flows consistent with a pathway towards low greenhouse gas emissions and climate- resilient development. Nationally Determined Contributions (NDCs) are at the heart of the Paris Agreement and the achievement of these long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, Paragraph 2) requires each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions. Internationally, the recent process on NDC Enhancement (2020) significantly acknowledge the climate change vulnerability on national sectors including agriculture, energy, and urban areas, especially through impacts on water resources. The role that water and water-related activities play in national economies has been increasingly recognized in most Nationally Determined Contributions (NDCs). Many parties included measures related to flooding and drought and chose to include qualitative information on the likely effect of climate change on key sectors.

WASCA TN marching on the road to support India's NDC vision by

1) Supporting creation of an additional carbon sink of 2.5–3 billion tonnes through additional forest and tree cover
2) Enhancing investments in development programs for climate change adaptation in vulnerable sectors
3) Implementing programs to achieve the sustainable natural resource management and efficient utilization of natural resources, leading to a reduction in the "ecosystem footprint"

4) Providing qualitative information on the likely effect of climate risks on key sectors via, water, agriculture and allied sector and socio economic

6.5.2 WASCA TN supports SDG

WASCA – TN's four major actions for making "Climate Resilience for Future Livelihoods" are envisaged through SDGs.

1) Development of public and common lands
2) Development of Agricultural and Allied Sector
3) Development for Rural Infrastructure
4) Development of CRM Measures

TN WASCA will achieve the above actions working closely with Mahatma Gandhi NREGA programme of Ministry of Rural Development and National Water Mission programme of (MoJS). These two ministries are the key stakeholders for WASCA. Apart from these two ministries, the works under WASCA TN are closely linked with Ministry of Agriculture and MoEFCC. The commitments of the above mentioned four ministries towards SDG goals achievements are mapped in connection with the interventions under WASCA Tamil Nadu. The intervention under WASCA TN has direct and indirect contribution to the SDGs and its national targets set as per NITI Aayog.

SDG 6 by 2030: Ensure availability and sustainable management of water and sanitation for all

6.1 Achieve universal and equitable access to safe and affordable drinking water for all

6.2 Achieve access to adequate and equitable sanitation and hygiene for all and end open
defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

6.3 Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 Increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 Implement integrated water resources management at all levels (6.5.1)

6.6 Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.A. Expand international cooperation and capacity-building support to developing countries in water-and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

6.B. Support and strengthen the participation of local communities in improving water and sanitation management

The detailed proposed water actions in CWRM which was assessed based on the vulnerability dimensions are linked with climate vulnerability index and SGDs are tabulated in

Table 6.1. Water actions on development of public & common lands & its linked SDG

Name of the work	No. of CWRM works	Climate Vulnerability Index Impacting (WASCA TN)	Linked SDG Goal
Contour Continuous Bunds (CCB) for Afforestation area (m)	268998	W3	SDG 1,2, 6,13&15
Composting (No. of units)	659	W1	SDG 1 & 6
Afforestation in Public/common lands (ha)	1551.72	C1,C2,C3, W3,	SDG 1, 2,6,13&15
Block Plantation (Community) (ha)	498.42	C1,C2,C3,W3,S2	SDG 1,2, 6 &13, 15
Silvi-pasture Development (ha)	908	C1,C2,C3,W3	SDG 12 &15
Linear Plantation (Km)	102.515	C1,C2,C3,W3,S2	SDG 1,2,6,12&13, 15
Canal Bund Plantation (ha)	143410	C1,C2,C3,W3,S2	SDG 1, 6&13, 15
Nursery Development (No. of units)	134332	C1,S2,S4	SDG 1,2 &6
Drainage Line Treatment (DLT) (m)	203538	W1,W3,W4	SDG1 & 6

Table 6.2 Water actions on development of agricultural and allied sector & its linked SDG

Name of the work	No. of CWRM works	Climate Vulnerability Index Impacting (WASCA TN)	Linked SDG Goal
Farm Bunding with Boundary Trenches - Individual (ha)	2124.74	A1,A3,W1,W3	SDG 1,2&6
Micro-irrigation (ha)	293	A1,A3,A5,W5	SDG 1,2&6
Construction of Farm Ponds - Individual (No. of units)	1032	A1,A3,W5,W1, W3	SDG 2 & 6
Land development - Individual (ha)	1370.21	W1,W5,A1,A3,S2,S4	SDG 2 & 6
Dry land horticulture/Agro-forestry - Individual (ha)	933.09	A1,A3,A4,W1,S4,S2,C1	SDG 1& 2,15
Azolla units - Individual (No. of units)	5613	A3,A4,S4	SDG 1& 2
NADEP vermi compost (No. of units)	4218	A3, W1, S4	SDG 1& 2,6
Cattle shelters (No. of units)	5015	S4	SDG 1& 2
Cattle trough (No. of units)	5015	S4	SDG 1& 2
Goat/sheep shelters (No. of units)	2709	W5,S4	SDG 1& 2
Construction of new open wells & recharge shafts (No. of units)	3090	S3,W5,W1	SDG 1,2 & 6

Table 6.3 Water actions on rural water management & its linked SDG

Name of the work	No. of CWRM works	Climate Vulnerability Index Impacting (WASCA TN)	Linked SDG Goal
Soak Pits (Community) (No. of units)	514	W3,S2	SDG 1& 6
Soak Pits (Individual) (No. of units)	3190	W3,S2	SDG 1& 6
Roof Rain Water Harvesting (No. of units)	250	W3,S1,S3	SDG 1& 6

ANNEXURES

Annexure 1: GP wise demography

GP WISE DEMOGRAPHY							
	Key CWRM parameter	**Geographical area**	**Male population**	**Female population**	**Total population**	**SC population**	**ST population**
	Unit	**ha**	**No**	**No**	**No**	**No**	**No**
	GP NAME						
Chengam block							
	Paliapattu	876	1685	1799	3484	996	0
	Chinnakolapadi	230	588	1194	606	299	6
	Aswaragasurunai	311	693	1440	747	594	0
	Vinnavanur	363	973	953	1926	87	0
	Agaram (se)	330	756	774	1530	516	0
	Periakolapadi	475	1204	1151	2355	513	0
	Perumbakkam	747	1345	1286	2640	986	0
Keelpennathur block							
	Agaram	257	693	683	1376	410	0
	Angunam	481	498	482	980	334	47
	Anukkumalai	822	879	916	1792	637	9
	Aranji	367	984	1013	1997	424	0
	Arumbakkam	168	533	548	1081	0	0
	Avoor	630	2654	2559	5213	374	49
	Chellankuppam	643	1686	1630	3316	1392	0
	Gengapattu_na	223	755	765	1520	6	0
	Gudalur_z	607	1369	1349	2718	105	0
	Kadambai	629	1179	1120	2399	0	0

	Kalingaleri	206	416	403	819	156	36
	Kallayyee	538	1262	1271	2533	454	0
	Kallikulam	302	767	702	1469	178	0
	Kaniyampundi	178	448	436	884	99	8
	Karikilambadi	310	1123	1040	2163	494	183
	Kattumalaiyanur	1094	1934	1885	3819	1588	53
	Keeranur	452	1156	1148	2304	0	0
	Kolathur	947	1517	1504	3021	781	13
	Konalur	588	1551	1468	3019	978	0
	Nadalarganandal	327	1044	1140	2184	38	0
	Namiyandal_so	254	698	720	1418	12	0
	Nariyamangalam	687	1654	1580	3234	1018	0
	Neelanthangal	607	373	347	720	0	0
	Panniyur	488	911	853	1764	1415	0
	Rajanthangal	323	901	854	1755	258	0
	Sanipoondi	337	892	877	1769	352	3
	Somasipadi	1037	2799	2687	5486	1489	281
	Su_polakunnam	768	1493	1454	2947	721	2
	Vaippur	465	885	886	1771	359	25
	Vayalur	227	533	496	1029	238	126
	Vedanatham	475	1271	1250	2521	844	0
	Velanandal	421	1308	1237	2545	5	0
Pudupalayam							
	Voividanthangal	372	1140	1015	2191	878	63
Thandrampet							
	Nedungavadi	283	447	461	908	266	0
	Vanapuram	909	3285	3332	6617	1206	454
Thurijapuram							

	Drugiammiandal	168	904	932	1836	155	0
	Inam kariyandal	1232	3044	2889	5933	1564	20
	Kalasthambadi	475	1200	1140	2340	552	10
	Karunthurambadi	464	756	753	1509	636	41
	Kiliapattu	724	1860	1804	3664	719	0
	Kolakkaravadi	431	1411	1348	2759	769	27
	Kunnandal	150	596	611	1207	0	0
	Madalambadi	836	1815	1775	3590	572	24
	Mallavadi	389	1378	1449	2827	1222	208
	Nookambadi	629	1625	1677	3302	732	25
	Pudumallavadi	319	755	743	1498	61	53
	Randam	428	928	915	1843	1	0
	Sadayanodai	235	761	762	1523	296	0
	Sananandal	380	811	791	1602	0	0
	Seelapandal	581	1347	1313	2660	376	103
	Sorakolathur	801	1698	1687	3385	738	13
	Thurinjapuram	789	1445	1435	2880	1250	83
	Usambadi	155	784	867	1651	1087	0
	Vada andapattu	278	1050	1086	2136	635	0
	Vadakarimbalore	628	1034	1024	2058	710	6
	Vallivagai	888	1661	1665	3326	893	14
Tiruvannamalai							
	Adayur	558	2170	2066	4236	0	0
	Adiannamalai	755	2086	1980	4066	0	0
	Alaganandal	383	931	0	931	0	0
	Allikondapattu	111	697	674	1371	0	0
	Ananandal	272	1063	987	2050	0	0
	Anapurandan	212	742	747	1489	0	0

	Andampallam	942	3186	310	3496	0	0
	Aradapattu	417	1379	1402	2781	0	0
	Aruddirapattu	84	338	319	657	0	0
	Athiyandal	275	875	955	1830	0	0
	Ayyam palayam	622	1890	1933	3823	0	0
	Chinnakallapadi	367	1117	1073	2190	0	0
	Chinnakangiyanur	604	2054	1610	3664	0	0
	Devanandal	434	863	784	1647	0	0
	Eandal	481	1292	1193	2485	618	83
	Isukalikatteri	652	1747	1659	3406	0	0
	Kadagaman	496	1356	1276	2632	0	0
	T Kalleri	517	1440	1395	2835	0	0
	Kanadhampoondi	443	826	729	1555	0	0
	Kannapandal	86	624	623	1247	0	0
	Kattampoondi	562	1873	1852	3725	0	0
	Kilchettipattu	340	739	693	1432	0	0
	Kilkachirapattu	378	932	886	1818	0	0
	Kilkaripur	471	1446	1342	2788	0	0
	Kolakkudi	319	1024	1042	2066	0	0
	Madurampattu	642	1247	1266	2513	0	0
	Malappambadi	581	1269	1315	2584	0	0
	Melathikkan	572	1703	1692	3395	0	0
	Melchettipattu	360	830	861	1691	0	0
	Melkachirapattu	485	776	778	1554	541	182
	Nachianandal	276	909	818	1727	0	0
	Nadupattu	191	561	552	1113	0	0
	Nallampillaipettai	330	928	976	1904	352	52
	Nallavanpalayam	862	2858	2993	5851	0	0

	Naraiyur	706	1787	1710	3497	0	0
	Nariyapattu	333	663	648	1311	0	0
	Navampattu	491	1213	1213	2426	0	0
	Nochimalai	386	971	1017	1988	0	0
	Panaiyur	414	563	545	1108	0	0
	Pandithapattu	307	1058	1058	2116	0	0
	Parayampattu	223	990	963	1953	0	0
	Pavithiram	1093	2294	2439	4733	0	0
	Pavupattu	447	1620	1534	3154	0	0
	Periyakallapadi	530	1294	1349	2643	0	0
	Perumanam	806	1686	1663	3349	0	0
	Savalpoondi	348	537	539	1076	514	43
	Su kilnachipattu	277	1217	1158	2375	0	0
	Su_andapattu	279	601	850	1181	0	0
	Su_kambupattu	315	686	626	1312	0	0
	Su_nallur	229	458	445	903	0	0
	Su_pappambadi	102	734	712	1446	0	0
	Su_valavetti	628	1117	1142	2259	0	0
	T.valasai	180	458	444	902	0	0
	T.valavetti	286	707	731	1438	0	0
	Talayampallam	587	1908	1967	3875	0	0
	Tandarai	540	1072	1046	2118	0	0
	Thachchampattu	411	1081	1042	2123	0	0
	Thenmathur	725	1939	2603	4542	0	0
	Udayanandal	157	343	354	697	0	0
	Vengikkal	701	9278	8966	18000	0	0
	Veraiyur	288	524	533	1057	0	0
	Viruvilanginan	289	1168	1114	2282	0	0

Annexure 2: GP wise status of water resource and its supply and demand

GP WISE STATUS OF WATER RESOURCE AND ITS SUPPLY AND DEMAND							
		Water source			Irrigation facilities		
	Key CWRM parameter	No of tanks (PWD & unions)	No of Ooranis	Other surface water bodies	Area under tank irrigation	Area under canal irrigation	Area under open & Tube well irrigation
	Unit	No.	No.	No.	ha	ha	ha
	GP NAME						
Chengam block							
	Paliapattu	2	0	3	0	134.63	0
	Chinnakolapadi	1	0	5	0	101.71	0
	Aswaragasurunai	1	0	3	0	83.87	39.87
	Vinnavanur	1	0	6	0	147.4	0
	Agaram (se)	2	0	4	0	109.6	0
	Periakolapadi	1	0	9	0	152.9	0
	Perumbakkam	3	0	10	0	316.17	0
Keelpennathur block							
	Agaram	3	1	7	0	157.87	19.68
	Angunam	3	2	3	0	92.29	47.18
	Anukkumalai	2	0	7	0	298.96	0
	Aranji	2	0	4	0	203.99	42.4
	Arumbakkam	0	0	3	0	96.89	0
	Avoor	2	0	7	0	118.76	0
	Chellankuppam	3	0	2	0	172.4	50.33
	Gengapattu_na	2	3	2	0	37.66	4.96

	Gudalur_z	2	3	7	0	136.74	74.62
	Kadambai	2	0	9	0	268.76	59.85
	Kalingaleri	1	0	2	0	111.01	16.78
	Kallayyee	4	0	7	0	215.51	65.08
	Kallikulam	1	1	5	0	16.73	9.25
	Kaniyampundi	1	0	4	0	80.69	30.63
	Karikilambadi	1	0	4	0	105.9	19.92
	Kattumalaiyanur	5	0	8	0	276.9	0
	Keeranur	2	1	7	0	187.1	40.08
	Kolathur	2	0	9	0	140.8	0
	Konalur	2	0	8	0	68.13	4
	Nadalarganandal	2	1	5	0	55.02	19.36
	Namiyandal_so	1	0	2	0	69.95	0
	Nariyamangalam	3	0	8	0	31.32	0
	Neelanthangal	2	0	5	0	145.55	36.4
	Panniyur	1	1	3	0	105.83	27.41
	Rajanthangal	2	0	7	0	123.03	18.1
	Sanipoondi	2	0	3	0	175.36	0
	Somasipadi	0	1	9	0	399.8	66.5
	Su_polakunnam	6	0	9	0	168.11	56.75
	Vaippur	3	0	5	0	290.02	35.7
	Vayalur	2	0	10	0	78.27	0
	Vedanatham	0	0	11	0	131.11	0
	Velanandal	2	0	5	0	108.78	0
Pudupalayam							
	Voividanthangal	3	3	0	149.37	0	17.07
Thandrampet							
	Nedungavadi	1	5	0	0	106.76	0

	Vanapuram	2	0	0	50.01	414.03	43.54
Thurijapuram							
	Drugiammiandal	2	1	0	0	48.96	31.34
	Inam kariyandal	4	9	0	0	270.37	0
	Kalasthambadi	1	5	0	0	135.72	0
	Karunthurambadi	2	5	0	0	144.83	0
	Kiliapattu	1	3	0	0	262.39	33.53
	Kolakkaravadi	0	9	0	0	204.77	122.62
	Kunnandal	2	2	0	0	91.3	0
	Madalambadi	1	5	0	0	343.77	0
	Mallavadi	1	13	0	0	130.32	0
	Nookambadi	0	6	0	0	111.26	17.85
	Pudumallavadi	2	12	0	0	99.12	0
	Randam	1	6	0	0	115.14	0
	Sadayanodai	1	2	0	0	107.14	0
	Sananandal	0	5	0	0	0	0
	Seelapandal	2	6	0	0	295.54	0
	Sorakolathur	3	11	0	0	301.25	0
	Thurinjapuram	3	9	0	0	0	0
	Usambadi	2	4	0	0	86	0
	Vada andapattu	0	4	0	0	109.52	0
	Vadakarimbalore	4	5	0	0	200.51	0
	Vallivagai	1	10	0	0	309.12	0
Tiruvannamalai							
	Adayur	1	4	0	0	125.47	0
	Adiannamalai	1	12	0	0	102.11	0
	Alaganandal	1	3	0	0	233.87	0
	Allikondapattu	1	3	0	0	57.44	5.72

	Ananandal	1	4	0	0	132.91	0
	Anapurandan	0	8	0	0	24.69	0
	Andampallam	2	13	0	0	211.85	0
	Aradapattu	2	13	0	0	211.85	0
	Aruddirapattu	1	2	0	0	17.88	0
	Athiyandal	2	5	0	0	69.51	26.54
	Ayyam palayam	3	0	0	0	100.54	0
	Chinnakallapadi	1	2	0	0	150.68	22.12
	Chinnakangiyanur	1	6	1	0	200.42	0
	Devanandal	1	3	0	0	81.34	0
	Eandal	0	3	4	0	86.25	52.15
	Isukalikatteri	4	4	0	0	326.72	37.5
	Kadagaman	1	3	0	0	168.86	0
	T Kalleri	2	5	0	0	226.8	27.25
	Kanadhampoondi	1	4	0	143.54	0	0
	Kannapandal	0	3	0	59.27	0	0
	Kattampoondi	1	1	0	0	56.2	166.58
	Kilchettipattu	1	0	1	0	166.63	0
	Kilkachirapattu	1	0	3	0	106.67	7
	Kilkaripur	1	2	0	0	262.68	0
	Kolakkudi	2	6	0	0	153.43	0
	Madurampattu	3	2	0	0	185.41	0
	Malappambadi	2	2	0	0	97.29	0
	Melathikkan	2	7	3	0	0	0
	Melchettipattu	1	0	1	0	0	0
	Melkachirapattu	1	0	7	0	0	0
	Nachianandal	2	3	0	0	0	0
	Nadupattu	2	2	0	0	106.25	0

	Nallampillaipettai	0	3	1	0	95.44	0
	Nallavanpalayam	2	0	3	0	309.27	0
	Naraiyur	3	3	0	0	260.73	0
	Nariyapattu	1	3	0	1	218.34	0
	Navampattu	3	4	0	0	225	15
	Nochimalai	1	2	0	0	93.82	0
	Panaiyur	2	4	0	0	82.94	0
	Pandithapattu	2	3	0	0	50.83	0
	Parayampattu	1	5	0	0	158.35	0
	Pavithiram	2	0	0	0	259.32	22.6
	Pavupattu	2	3	0	0	218.4	0
	Periyakallapadi	1	3	0	0	31.5	212.12
	Perumanam	2	4	0	0	34.28	47.25
	Savalpoondi	1	0	1	0	0	148.6
	Su kilnachipattu	0	1	0	0	83.77	0
	Su_andapattu	2	3	0	139.37	0	0
	Su_kambupattu	1	3	0	214.05	0	0
	Su_nallur	1	3	0	0	214.05	0
	Su_pappambadi	0	3	0	0	38.11	0
	Su_valavetti	1	4	0	0	160.98	44.15
	T.valasai	1	1	0	0	82.87	0
	T.valavetti	1	3	0	0	137.39	0
	Talayampallam	2	6	0	0	348.83	0
	Tandarai	2	3	0	0	145.66	0
	Thachchampattu	2	2	0	0	219.06	14
	Thenmathur	0	5	2	0	23375	0
	Udayanandal	3	0	3	0	83.65	0
	Vengikkal	1	3	0	0	0	0

	Veraiyur	1	3	0	0	93.39	30.25
	Viruvilanginan	1	6	0	0	98.01	0

Annexure 3 : Catchment area wise available runoff

		Catchment area wise available runoff			**Runoff conserved existing**			**watershed and drainage networks**		
	Key CWRM parameter	Good	Average	Bad	Good Catchment area	Bad Catchment area	Average Catchment area	Length of natural drainage lines	No of natural drainage lines	No of micro watersheds
	Unit	ha.m	ha.m	ha.m	ha.m	ha.m	ha.m	m	No.	No.
	GP NAME									
Chengam block										
	Paliapattu	67.4	0	91.14	32.6	0	8.86	19841	20	5
	Chinnakolapadi	80.2	0	90.99	19.8	0	9.01	6653	7	2
	Aswaragasurunai	83.08	80	89.8	16.92	20	10.2	441	2	4
	Vinnavanur	62.67	0	92.43	37.33	0	7.57	3906	6	6
	Agaram (se)	75.02	47.62	95.89	24.98	52.38	4.11	1354	3	4
	Periakolapadi	71.95	57	91.34	28.05	43	8.66	4538	6	3
	Perumbakkam	74.27	55.88	98.96	25.73	44.12	1.04	6040	8	5
Keelpennathur block										

	Agaram	59.58	0	81.85	40.42	0	18.15	2055	2	5
	Angunam	6.86	55.05	97.27	39.14	44.95	2.73	5339	7	5
	Anukkumalai	60.88	56.23	89.07	39.12	43.77	10.93	8066	7	5
	Aranji	88.59	54.91	88.58	11.41	45.09	11.42	346	2	4
	Arumbakkam	72.3	58.82	94.99	27.7	41.18	5.01	3998	3	5
	Avoor	81.18	56.24	92.09	18.82	43.76	7.91	5439	7	7
	Chellankuppam	55.12	56.02	87.21	44.88	43.98	12.97	6249	7	7
	Gengapattu_na	59.25	54.79	97.45	40.75	45.21	2.55	2801	6	6
	Gudalur_z	82.84	0	91.18	17.16	0	8.82	0	0	0
	Kadambai	54.93	56.07	95.98	45.07	43.93	4.02	4139	4	3
	Kalingaleri	85.4	0	94.09	14.6	0	5.91	2285	3	5
	Kallayyee	55.99	55.84	92.27	44.01	44.16	7.73	4190	7	5
	Kallikulam	70.74	0	94.91	29.26	0	5.09	911	2	5
	Kaniyampundi	61.74	0	94.88	38.26	0	5.12	2816	2	3
	Karikilambadi	86.06	0	89.11	13.94	0	10.89	3156	7	5
	Kattumalaiyanur	62.11	0	87.43	37.89	0	12.57	9085	7	9
	Keeranur	85.85	0	92.91	14.15	0	7.09	4311	6	6
	Kolathur	60.92	56.25	87.21	39.08	43.75	12.79	8621	12	5
	Konalur	59.76	0	88.01	40.24	0	11.99	9517	6	6
	Nadalarganandal	73.52	0	88.76	26.48	0	11.24	3499	4	3
	Namiyandal_so	12.89	0	94.46	87.11	0	5.54	3245	7	5
	Nariyamangalam	57.4	0	87.22	42.6	0	12.78	6536	14	7
	Neelanthangal	85.84	0	91.18	14.16	0	8.2	5164	5	4
	Panniyur	60.49	56.21	92.53	39.51	43.79	7.47	6423	5	6
	Rajanthangal	66.6	47.62	94.1	33.4	52.38	5.9	2107	6	3
	Sanipoondi	62.97	56.18	90.19	37.03	43.82	9.81	1548	5	6
	Somasipadi	56.42	0	87.22	43.58	0	12.78	11562	6	7
	Su_polakunnam	58.83	57.14	92.27	41.17	42.86	7.73	969	2	7

	Vaippur	93.9	55.86	96.01	6.1	44.14	3.99	7555	6	5
	Vayalur	76.93	0	87.78	23.07	0	12.22	2049	4	2
	Vedanatham	90.74	0	83.49	9.26	0	16.51	8256	6	7
	Velanandal	72.97	55.21	87.2	27.03	44.79	12.8	1301	3	4
Pudupalayam										
	Voividanthangal	99.03	57.14	90.44	0.97	42.86	9.56	640	2	3
Thandrampet										
	Nedungavadi	19.24	57.69	93.4	80.76	42.31	6.6	3013	6	2
	Vanapuram	79.32	57.14	91.57	20.68	42.86	8.43	19255	19	7
Thurijapuram										
	Drugiammiandal	67.74	0	85.86	32.26	0	14.14	1855	3	3
	Inam kariyandal	66.09	56.52	82.67	33.91	43.48	17.33	19664	24	6
	Kalasthambadi	67.75	57.14	83.65	32.25	42.86	16.35	3601	7	5
	Karunthurambadi	85.05	57.14	83.65	14.95	42.86	16.35	4858	7	5
	Kiliapattu	66.45	56.25	84.72	33.55	43.75	15.28	12228	15	0
	Kolakkaravadi	86.84	57.14	86.55	13.16	42.86	13.45	4557	7	4
	Kunnandal	42.5	0	87.63	57.5	0	12.37	1830	4	2
	Madalambadi	89.72	56.74	85.03	10.28	43.26	14.97	396	7	6
	Mallavadi	89.74	66.67	84.32	10.26	33.33	15.68	64	1	4
	Nookambadi	88.44	57.24	82.41	11.56	42.76	17.59	7490	7	5
	Pudumallavadi	89.02	0	84.25	10.98	0	15.75	4879	7	5
	Randam	61.53	54	92.53	38.47	44	7.47	4392	11	6
	Sadayanodai	89.73	0	85.35	10.27	0	14.65	3204	6	3
	Sananandal	82.55	57.58	85.49	17.45	42.42	14.51	4359	7	3
	Seelapandal	66.76	58.33	86.33	33.33	41.67	13.67	7500	8	7

	Sorakolathur	64.74	0	92.31	35.26	0	7.69	1907	6	6
	Thurinjapuram	89.72	0	83.2	10.28	0	16.8	7925	7	8
	Usambadi	86.29	0	88.15	13.71	0	11.85	815	2	3
	Vada andapattu	67.77	57.14	85.49	32.23	42.86	14.51	4241	5	3
	Vadakarimbalore	63.94	57.3	84.32	36.06	42.7	15.68	5355	13	4
	Vallivagai	66.47	58.33	84.23	33.53	41.67	15.77	8402	16	9
Tiruvannamalai										
	Adayur	66.39	0	92.88	33.61	0	7.12	4769	4	4
	Adiannamalai	82.11	55	95.58	17.89	45	4.42	6039	12	6
	Alaganandal	93.77	57.1	90.56	6.23	42.9	9.44	5005	5	3
	Allikondapattu	79.55	0	90.57	20.45	0	9.43	470	1	1
	Ananandal	39.39	0	89.27	60.61	0	10.73	2111	3	4
	Anapurandan	86.19	0	94.1	13.81	0	5.9	0	0	2
	Andampallam	60.9	58.82	92.46	39.1	41.18	7.54	5248	7	3
	Aradapattu	74.81	57.14	90.53	25.19	42.86	9.47	4021	6	2
	Aruddirapattu	67.19	0	96.12	32.81	100	3.88	2102	2	1
	Athiyandal	92.28	0	92.9	7.72	100	7.1	1594	3	2
	Ayyam palayam	66.93	100	93.65	33.07	0	6.35	6133	6	5
	Chinnakallapadi	63.19	57.59	93.2	36.81	42.41	6.8	4577	4	1
	Chinnakangiyanur	67.04	57.05	88.62	32.96	42.95	11.38	11292	11	8
	Devanandal	70.46	57.14	93.32	29.54	42.86	6.68	7115	7	3
	Eandal	94.58	60.61	92.85	5.42	39.39	7.15	1550	4	3
	Isukalikatteri	61.87	58.06	91.78	31.13	41.94	8.22	5248	7	3
	Kadagaman	92.4	66.67	91.95	7.6	33.33	8.05	2473	5	2
	T Kalleri	87.5	58.33	88.42	12.5	41.67	11.58	3286	6	3
	Kanadhampoondi	80.89	0	95.5	19.11	0	4.5	3377	2	5

	Kannapandal	64.12	56.5	90.91	35.88	43.5	9.09	2229	3	1
	Kattampoondi	63.44	55.94	91.1	36.56	44.06	8.9	5524	5	5
	Kilchettipattu	94.12	57.14	92.42	5.88	42.86	7.58	1008	1	4
	Kilkachirapattu	66.35	57.07	91.65	33.65	42.93	8.35	78	1	5
	Kilkaripur	94.22	0	92.92	5.78	0	7.08	3950	7	5
	Kolakkudi	83.55	0	90.7	16.45	0	9.3	1620	3	4
	Madurampattu	67.61	57.89	89.7	32.39	42.11	10.3	7542	7	3
	Malappambadi	92.11	57.27	93.67	7.89	42.73	6.33	3806	6	6
	Melathikkan	67.24	57.61	95.34	32.76	42.39	4.66	2597	3	4
	Melchettipattu	94.31	56.76	92.17	5.69	43.24	7.83	1299	3	4
	Melkachirapattu	75.48	57.14	91.4	24.52	42.86	8.6	4756	7	4
	Nachianandal	62.97	57.2	92.27	37.03	42.8	7.73	4331	5	1
	Nadupattu	34.28	42.86	92.3	65.72	57.14	7.7	1840	2	3
	Nallampillaipettai	90.56	57.14	93.84	9.4	42.86	6.16	2905	3	3
	Nallavanpalayam	71.41	56.76	92.75	28.59	43.24	7.25	2979	4	6
	Naraiyur	6.97	57.38	91.85	32.03	2.62	8.15	7908	8	3
	Nariyapattu	87.69	0	92.27	12.31	0	7.73	6007	6	3
	Navampattu	78.9	57.14	93.86	21.1	42.86	6.14	6831	6	4
	Nochimalai	63.38	57.03	93.75	36.62	42.97	6.25	5528	12	6
	Panaiyur	66.19	58.82	92.11	33.81	41.18	7.89	2917	4	3
	Pandithapattu	94.08		96.72	5.92		3.28	0	0	2
	Parayampattu	93.15	58.33	90.91	6.85	41.68	9.09	5070	5	2
	Pavithiram	78.42	44.44	92.06	21.58	55.56	7.94	7109	8	7
	Pavupattu	62.88	0	89.72	37.12	0	10.28	8863	6	3
	Periyakallapadi	94.91	57.14	90.07	5.49	42.86	9.93	7133	7	3
	Perumanam	91.39	50	87.43	8.61	50	12.57	5399	6	3
	Savalpoondi	80.96	56.98	92.5	19.04	43.02	7.5	2131	2	2

	Su kilnachipattu	71.23	52.63	92.29	28.77	47.37	7.71	3862	4	5
	Su_andapattu	92.45	56.99	91.73	7.55	43.01	8.27	2497	3	3
	Su_kambupattu	66.25	0	85.29	33.75	0	14.71	1855	3	2
	Su_nallur	65.55	0	85.29	34.45	0	14.71	1150	1	1
	Su_pappambadi	62.83	60.61	89.39	37.17	39.39	10.61	2765	3	2
	Su_valavetti	94.66	55	92.77	5.34	45	7.23	4769	6	4
	T.valasai	88.89	0	92.09	11.11	0	7.91	1432	3	4
	T.valavetti	66.68	0	90.18	33.32	0	9.82	1515	2	1
	Talayampallam	70.24	58.33	90.74	29.76	41.67	9.26	13581	8	4
	Tandarai	69.18	57.14	92.84	30.82	42.86	7.16	5401	5	2
	Thachchampattu	69.18	60	92.37	30.6	40	7.63	6051	6	2
	Thenmathur	67.29	57.14	91.81	32.71	42.86	8.19	6004	7	6
	Udayanandal	63.31	57.14	91.13	36.69	42.86	8.87	3730	7	2
	Vengikkal	96.83	57	88.71	3.17	43	11.29	4001	5	7
	Veraiyur	82.34	50	90.83	17.66	50	9.17	2727	3	3
	Viruvilanginan	60.9	58.82	92.46	39.1	41.18	7.54	3014	4	2

Annexure 4 : Water Demand

		Water Demand								
	Key CWRM parameter	Humans	Livestock	Agriculture	GW utilization for drinking	GW utilization for livestock	GW utilization for agriculture	SW utilization for drinking	SW utilization for livestock	SW utilization for agriculture
	Unit	ha.m	ha.m	ha.m	%	%	%	%	%	%

	GP NAME									
Chengam block										
	Paliapattu	9.54	3.41	227.63	100	87	76	0	13	24
	Chinnakolapadi	3.27	2.29	74.23	95	80	65	5	20	35
	Aswaragasurunai	3.94	1.38	1.56	0	0	100	0	0	0
	Vinnavanur	5.27	1.59	209.16	70.37	86	91	29.63	14	9
	Agaram (se)	4.19	2.56	157.67	83.33	92	80	16.67	8	20
	Periakolapadi	6.45	2.73	199.07	100	87	76	0	13	24
	Perumbakkam	7.23	3.02	272.34	96	88	71	4	12	29
Keelpennathur block										
	Agaram	3.77	1.08	166.5	67	95	97	33	5	3
	Angunam	2.68	0.57	135.58	97	92	95	3	8	5
	Anukkumalai	4.91	2.71	248.11	78	94	88	22	6	12
	Aranji	4.83	0.5	149.41	67	98	74	33	2	26
	Arumbakkam	2.96	2.2	40.54	91	95	100	9	5	0
	Avoor	14.27	2.35	227.2	97	92.93	88	3	7.07	12
	Chellankuppam	9.08	2.77	354.67	93	96	91	7	4	9
	Gengapattu_na	4.16	1.42	67.84	90	89.9	83	10	10.1	17
	Gudalur_z	7.44	4.85	128.88	88	91	95	12	9	5
	Kadambai	6.57	2.95	112.97	40	97	65	60	3	35
	Kalingaleri	2.24	1.59	58.79	71	85	90	29	15	10
	Kallayyee	6.93	2.01	265.4	69	89	92	31	11	8
	Kallikulam	4.02	4.17	58.13	87	92	99	13	8	1
	Kaniyampundi	2.42	1.3	97.5	82	94.9	100	18	5.1	0
	Karikilambadi	5.92	4.48	129.91	69	91	100	31	9	0

	Kattumalaiyanur	10.45	11.41	303.96	93	97	53	7	3	47
	Keeranur	6.31	1.47	146.56	93	86	100	7	14	0
	Kolathur	8.27	4.59	299.3	50	83	87	0	17	13
	Konalur	8.26	2.08	186.13	84	94	79	16	6	21
	Nadalarganandal	5.98	2.78	113.06	96	92	59	4	8	41
	Namiyandal_so	3.88	4.77	78.87	100	0	100	0	0	0
	Nariyamangalam	8.85	3.54	207.17	50	95.66	80.56	50	4.34	19.44
	Neelanthangal	1.97	4.85	128.88	71	91	95	29	9	5
	Panniyur	4.83	0.5	149..41	67	98	74	33	2	26
	Rajanthangal	4.8	5.99	209.9	62	94	85	38	6	15
	Sanipoondi	4.83	3.64	149.06	75	92.93	86	25	7.07	14
	Somasipadi	1.21	5.93	217.19	0	93	90	0	7	10
	Su_polakunnam	8.07	4.22	157.97	79	95	72	21	5	28
	Vaippur	4.85	1.46	259.45	100	96	92	0	4	8
	Vayalur	2.82	1.52	127.24	91	89	93	9	11	7
	Vedanatham	6.9	3.5	164.52	100	93	100	0	7	0
	Velanandal	6.97	3.38	140.14	62	96	86	38	4	14
Pudupalayam										
	Voividanthangal	6	2.94	72.66	63.33	95.96	51	36.67	4.04	49
Thandrampet										
	Nedungavadi	2.49	1.22	135.56	70.83	93.98	99	29.17	6.02	1
	Vanapuram	18.11	8.08	433.38	0	95	99	0	5	1
Thurijapuram										
	Drugiammiandal	5.03	3.46	55.53	90.48	82	99	9.52	18	1
	Inam kariyandal	16.24	6.29	338.77	78.57	80	99	21.43	20	1

	Kalasthambadi	16.24	6.29	338.77	78.57	80	99	21.43	20	1
	Karunthurambadi	4.13	2.96	304.37	70.21	84	100	29.79	16	0
	Kiliapattu	10.03	5	230.31	83.33	95	86	16.67	5	14
	Kolakkaravadi	7.55	3.64	189.94	100	78	79	0	22	21
	Kunnandal	3.3	2.87	70.89	75	97.98	100	25	2.02	0
	Madalambadi	9.83	6.32	84.86	71.43	98	36	28.57	2	64
	Mallavadi	7.74	2.58	119.45	50	87	100	50	13	0
	Nookambadi	9.04	5.14	197.39	81.82	96	95	18.18	4	5
	Pudumallavadi	4.1	1.26	73.61	45.45	87	69	54.55	13	31
	Randam	5.05	6.86	108.59	63.16	96.97	93	36.84	3.03	7
	Sadayanodai	4.17	1.96	44.83	75	97	50	25	3	50
	Sananandal	4.39	2.79	61.93	73.91	99	37	26.09	1	63
	Seelapandal	7.28	3.48	115.02	61.54	76	67	38.46	24	33
	Sorakolathur	9.27	4.86	632.13	84	97	100	16	3	0
	Thurinjapuram	7.88	2.66	172.21	64.29	76	48	35.71	24	52
	Usambadi	4.52	1.74	75.3	50	85	74	50	15	26
	Vada andapattu	5.85	2.47	85.94	60	94	60	40	6	40
	Vadakarimbalore	5.63	1.74	125.28	38.46	84	27	61.54	16	73
	Vallivagai	9.1	6.3	260.87	66.67	98	92	33.33	2	8
Tiruvannamalai										
	Adayur	11.6	5.81	225.18	100	97	100	0	3	0
	Adiannamalai	11.13	2.71	176.58	100	97	100	0	3	0
	Alaganandal	2.55	2	204.77	87.5	95	99	12.5	5	1
	Allikondapattu	3.75	1.51	112.2	75	95	100	25	5	0
	Ananandal	5.61	2.09	115.91	87.55	92.04	84.45	12.5	7.96	15.55
	Anapurandan	4.08	1.07	79.25	60	97	100	40	3	0

	Andampallam	4.26	3.41	140.71	87.5	94	99	12.5	6	1
	Aradapattu	3.37	7.61	255.05	96.43	88.89	83	3.57	11.11	17
	Aruddirapattu	1.8	1	39.52	100	96	84	0	4	16
	Athiyandal	5.01	0	95.58	96.15	0	100	3.85	0	0
	Ayyam palayam	10.47	0.84	286.24	100	91	100	0	9	0
	Chinnakallapadi	6	4.44	171.33	87.5	90.91	100	12.5	9.09	0
	Chinnakangiyanur	10.03	3.02	129.7	97.53	96	99	2.47	4	1
	Devanandal	4.51	0.77	186.38	92.31	94.95	100	7.69	5.05	0
	Eandal	6.8	0	419.19	90	0	98	10	0	2
	Isukalikatteri	9.32	1.7	149.22	88.89	89.8	95	11.11	10.2	5
	Kadagaman	7.21	2.1	157.07	0	93	78	0	7	22
	T Kalleri	7.76	6.46	297.14	67	95	80	33	5	20
	Kanadhampoondi	4.26	3.41	140.71	87.5	94	99	12.5	6	1
	Kannapandal	3.41	1.97	128.17	70	96	99	30	4	1
	Kattampoondi	10.2	4.2	407.68	80	95	100	20	5	0
	Kilchettipattu	3.92	0.86	115.75	100	95	100	0	5	0
	Kilkachirapattu	4.98	2.43	247.87	85.71	94.95	91	14.29	5.05	9
	Kilkaripur	7.63	4.82	240.93	0	96	97	0	4	3
	Kolakkudi	7.63	4.82	240.93	95.45	94	100	4.55	6	0
	Madurampattu	6.88	2.4	183.37	90.48	94	82	9.25	6	18
	Malappambadi	7.07	5.03	178.01	100	94.83	100	0	5.17	0
	Melathikkan	9.29	1.75	294.71	100	95	100	0	5	0
	Melchettipattu	4.63	0.68	164.52	77.78	92	99	22.22	8	1
	Melkachirapattu	5.25	2.06	168.81	95.24	87.88	81	4.76	12.12	19
	Nachianandal	4.73	2.77	86.55	88.89	94.95	91	11.11	5.05	9
	Nadupattu	3.05	2.39	153.43	95.16	93.94	100	4.84	6.06	0

	Nallampillaipettai	5.21	2.57	116.8	77.78	95	100	22.22	5	0
	Nallavanpalayam	16.02	3.7	217.86	96	100	99	4	0	1
	Naraiyur	9.57	2.66	246.73	90	90.91	95	10	9.09	5
	Nariyapattu	3.59	1.01	542.84	0	98	100	0	2	0
	Navampattu	6.64	4.11	329.76	77	98	96	23	2	4
	Nochimalai	5.44	4.29	166.97	83.33	97	100	16.67	3	0
	Panaiyur	3.03	1.3	337.46	94.44	94	89	5.56	6	11
	Pandithapattu	5.79	5.33	177.73	100	98	99	0	2	1
	Parayampattu	5.35	1.81	325.05		97.98	100		2.02	0
	Pavithiram	12.96	6.82	380.02	59	91.92	85	41	8.08	15
	Pavupattu	8.63	4.18	186.29	50	97	100	50	3	0
	Periyakallapadi	7.24	4.53	461.23	87.5	94.95	100	12.5	5.05	0
	Perumanam	9.17	3.25	484.77	50	97	100	50	3	0
	Savalpoondi	3.01	2.95	140.51	90.91	97	100	9.09	3	0
	Su kilnachipattu	6.5	3.45	52.3	100	96	100	0	4	0
	Su_andapattu	3.23	2.43	134.56	64.84	94	99	35.16	6	1
	Su_kambupattu	3.59	1.58	222.62	40.32	88	84	59.68	12	16
	Su_nallur	2.47	1.58	222.62	0	88	84	0	12	16
	Su_pappambadi	3.96	2.18	55.06	100	92	100	0	8	0
	Su_valavetti	6.18	1.51	332.31	88	100	76	12	0	24
	T.valasai	2.47	2.37	89.41	76.92	94.05	82.83	23.08	5.95	17.17
	T.valavetti	3.94	0.93	9.76	61.54	92	100	38.46	8	0
	Talayampallam	10.61	4.46	654.65	0	97	97	0	3	3
	Tandarai	5.8	2.47	181.56	92	89	75	8	1	25
	Thachchampattu	5.81	4.12	307.83	81.4	92	91	18.6	8	9
	Thenmathur	12.43	2.56	422.27	81	89.9	95	19	10.1	5
	Udayanandal	1.91	1.18	159.84	85.71	97	100	14.29	3	0

	Vengikkal	49.94	3.59	102.07	0	97	100	0	3	0
	Veraiyur	2.89	0.92	157.06	100	93	95	0	7	5
	Viruvilanginan	6.25	2.44	62.66	85	85.86	74	15	14.14	26

Annexure 5 : GP wise status of agriculture resource

GP WISE STATUS OF AGRICULTURE RESOURCE											
		Area under Land Resources									
	Key CWRM parameter	Forest land	NA use	Barren & Uncultivable	Permanent pasture & other grazing	Under miscellaneous Trees	Cutur able Waste land	Fallow land other than current fallows	Current fallow land	Unirrigated land	Irrigated by source
	Unit	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
	GP NAME										
Chengam block											
	Paliapattu	0	63	108	0	0	0	116	442	11	135
	Chinnakolapadi	0	52	10	3	0	0	0	100	6	58
	Aswaragasurunai	0	66	22	0	0	11	34	53	0	124
	Vinnavanur	0	53	25				6	131	0	147
	Agaram (se)	0	44	18	0	0	0	1	117	37	110
	Periakolapadi	0	62	65	0	0	20	47	121	1	153
	Perumbakkam	0	93	24	0	0	9	0	247	30	331
Keelpennathur block											

	Agaram	0	45	6	0	0	0	0	47	13	159
	Angunam	0	90	33	0	0	2	0	202	14	139
	Anukkumalai	0	87	92	0	0	13	0	193	138	299
	Aranji	0	85	0	0	0	0	0	53	21	204
	Arumbakkam	0	18	4	0	0	0	0	0	47	97
	Avoor	0	135	2	0	16	0	0	272	64	123
	Chellankuppam	0	128	1	0	0	3	0	262	13	228
	Gengapattu_na	0	44	2	0	0	2	0	129	0	43
	Gudalur_z	0	123	20	0	0	0	0	107	146	211
	Kadambai	0	115	13	0	0	4	0	196	32	269
	Kalingaleri	0	43	4	0	0	0	0	28	0	128
	Kallayyee	0	81	23	0	0	0	0	44	108	281
	Kallikulam	0	34	18	0	0	0	0	53	169	28
	Kaniyampundi	0	31	0	0	0	0	0	22	13	111
	Karikilambadi	0	65	1	0	0	0	0	23	90	126
	Kattumalaiyanur	0	179	0	0	0	0	0	463	175	277
	Keeranur	0	99	2	0	0	0	0	110	12	227
	Kolathur	0	176	14	0	0	0	0	414	192	147
	Konalur	0	156	5	0	0	0	0	158	247	72
	Nadalargandal	0	36	10	0	0	0	8	75	142	55
	Namiyandal_so	0	26	0	0	0	0	0	29	129	70
	Nariyamang	0	95	23	0	0	0	0	113	375	81

	alam										
	Neelanthangal	0	123	20	0	0	0	0	107	146	211
	Panniyur	0	87	12	0	6	0	0	232	16	133
	Rajanthangal	0	52	2	0	0	0	0	131	14	123
	Sanipoondi	0	45	5	1	0	0	0	91	22	174
	Somasipadi	0	158	20	0	0	0	5	335	120	400
	Su_polakunnam	0	158	20	0	0	0	5	335	120	400
	Vaippur	0	55	6	0	0	15	0	55	2	326
	Vayalur	0	95	0	0	0	0	0	20	33	78
	Vedanatham	0	111	0	0	0	0	0	55	178	131
	Velanandal	0	56	17	0	0	2	0	191	40	114
Pudupalayam											
	Voividanthangal	0	54	0	0	1	16	9	120	2	166
Thandrampet											
	Nedungavadi	0	58	15	0	0	5	0	86	12	107
	Vanapuram	0	239	41	0	0	3	68	1	2	51
Thurijapuram											
	Drugiammiandal	0	28	0	0	0	0	0	18	41	80
	Inam kariyandal	0	198	17	0	0	7	102	348	287	270
	Kalasthambadi	0	94	0	0	0	6	0	137	102	136

	Karunthurambadi	6	58	1	0	0	0	2	172	73	145
	Kiliapattu	0	80	0	0	0	3	0	251	94	296
	Kolakkaravadi	0	101	0	0	0	15	0	9	111	205
	Kunnandal	0	24	0	0	0	0	0	5	30	91
	Madalambadi	0	135	0	0	0	0	0	268	87	344
	Mallavadi	0	84	0	0	0	0	0	124	51	130
	Nookambadi	0	87	0	0	0	11	0	104	290	129
	Pudumallavadi	0	82	0	0	0	0	0	74	64	99
	Randam	0	49	50	0	0	1	6	23	176	119
	Sadayanodai	0	30	0	0	0	0	0	73	24	107
	Sananandal	0	79	15	0	0	11	13	8	108	147
	Seelapandal	0	93	0	0	0	1	0	69	118	296
	Sorakolathur	0	296	0	0	0	0	0	424	219	301
	Thurinjapuram	0	92	0	0	0	0	0	392	81	224
	Usambadi	0	43	0	0	0	0	0	5	21	86
	Vada andapattu	0	22	0	48	0	0	36	12	50	110
	Vadakarimbalore	2	99	35	0	0	17	0	164	110	201
	Vallivagai	0	149	0	0	0	0	2	116	294	309
Tiruvannamalai											
	Adayur	0	111	11	0	0	0	0	250	49	125

	Adiannamalai	0	82.6	21.37	0	0	4.04	0	509.48	35.36	102.11
	Alaganandal	0	41.2	0	30.1	0	21.22	0	25.63	9.15	233.87
	Allikondapattu	0	14.75	3.99	0	0	0	0	20.26	8.44	63.16
	Ananandal	0	24.94	8.59	0	0	0	0	71.12	34.46	132.91
	Anapurandan	0	23.99	2.18	0	0	0	0	99.49	59.8	24.69
	Andampallam	0	171	0	0	0	0	0	5	326	388
	Aradapattu	0	76	0	117	0	0	0	2	6	212
	Aruddirapattu	0	23	0	0	0	0	0	0	0	18
	Athiyandal	0	62	4	0	0	0	0	107	5	96
	Ayyam palayam	0	122	5	0	0	0	50	301	43	101
	Chinnakallapadi	0	64	29	0	0	4	0	94	0	176
	Chinnakangiyanur	0	111	0	0	0	30	0	152	109	200
	Devanandal	0	42	55	0	0	16	0	207	16	98
	Eandal	0	123	0	0	0	0	0	214	0	138
	Isukalikatteri	0	13	68	1	0	0	0	117	88	364
	Kadagaman	0	56	6	0	0	0	42	145	78	169
	T Kalleri	0	24	0	0	0	0	15	178	42	254
	Kanadhampoondi	0	98	21	1	0	1	35	104	22	279
	Kannapandal	0	15	0	0	0	4	0	8	0	59

	Kattampoondi	0	98	21	0	0	1	35	104	22	279
	Kilchettipattu	0	26	0	0	0	0	45	58	43	167
	Kilkachirapattu	0	74	0	19	14	41	0	112	0	114
	Kilkaripur	0	98	21	0	0	0	35	104	22	279
	Kolakkudi	0	84	20	0	0	0	0	56	4	153
	Madurampattu	0	32	58	0	0	8	40	296	23	185
	Malappambadi	0	84	10	44	0	0	0	191	155	97
	Melathikkan	0	13	2	0	18	0	0	271	0	156
	Melchettipattu	0	31	0	0	0	8	0	121	20	181
	Melkachirapattu	0	49	38	0	0	90	6	125	29	147
	Nachianandal	0	53	23	0	0	32	0	49	10	110
	Nadupattu	0	28	0	0	17	0	10	28	0	106
	Nallampillaipettai	0	42	0	0	95	0	0	105	85	95
	Nallavanpalayam	0	86	51	0	0	7	0	304	98	309
	Naraiyur	0	29	37	0	0	7	0	286	66	261
	Nariyapattu	0	38	7	0	0	0	7	49	0	231
	Navampattu	0	44	17	0	0	3	30	117	37	240
	Nochimalai	0	72	0	24	1	0	0	176	19	94
	Panaiyur	0	86	0	0	0	3	0	220	20	83
	Pandithapattu	0	38	0	0	0	0	0	112	105	51

	Parayampattu	0	53	0	0	0	2	0	7	0	158
	Pavithiram	0	153	75	0	0	0	78	497	5	282
	Pavupattu	0	89	50	0	0	0	0	61	28	218
	Periyakallapadi	0	41	0	30	0	21	22	26	1	234
	Perumanam	0	117	8	0	0	0	0	453	146	82
	Savalpoondi	0	42	19	0	0	7	0	103	28	149
	Su kilnachipattu	0	20	0	0	0	0	0	159	13	85
	Su_andapattu	0	72	0	0	0	23	0	38	8	139
	Su_kambuppattu	0	89	11	0	0	0	0	222	7	214
	Su_nallur	0	89	11	0	0	0	0	222	7	214
	Su_pappambadi	0	3	12	0	0	0	0	5	42	38
	Su_valavetti	0	33	0	0	0	3	56	311	19	21
	T.valasai	0	53	0	0	0	0	2	32	10	83
	T.valavetti	0	53	2	0	0	0	0	73	20	137
	Talayampallam	0	120	6	0	0	0	3	98	0	349
	Tandarai	0	33	36	0	0	0	1	86	226	146
	Thachchampattu	0	57	35	0	0	1	29	28	26	234
	Thenmathur	0	126	0	18	0	27	0	279	19	247
	Udayanandal	0	28	0	7	0	0	0	28	7	86
	Vengikkal	5	101	0	40	0	0	1	315	195	45

	Veraiyur	0	118	0	0	0	0	0	44	0	124
	Viruvilangin an	0	32	51	0	0	0	13	56	36	98

Annexure 6 : Crop details of land under catchment area

		Land under catchment area			**Crop details**		
	Key CWRM parameter	Good	Average	Bad	Irrigated area	Rainfed area	Paddy Cultivation
	Unit	ha	ha	ha	ha	ha	ha
	GP NAME						
Chengam block							
	Paliapattu	171.58	0	704.07	142.68	140.74	103
	Chinnakolapadi	62.62	0	167.22	39.32	68.05	27.15
	Aswaragasurunai	87.84	11.43	211.54	2.83	0	0
	Vinnavanur	78.38	0	285.04	126.17	51.09	105.73
	Agaram (se)	61.37	0.5	267.79	87.93	86.52	75.87
	Periakolapadi	127.16	20.24	327.17	113.77	129.09	92.09
	Perumbakkam	124.81	10.36	611.59	138.97	122.34	99.17
Keelpennathur block							
	Agaram	50.54	0	218.78	155.85	12.53	60.87
	Angunam	123.17	2.2	355.91	119.94	19.91	32.94
	Anukkumalai	178.84	13.05	630.05	145.44	81.54	137.75
	Aranji	85.23	0.39	278.4	59.81	34.25	23.63
	Arumbakkam	22.01	0.95	144.72	51.81	0	10.61
	Avoor	153.53	17.64	459.09	122.89	78.91	69.81
	Chellankuppam	129.87	9.6	503.9	226.93	87.82	113.89

	Gengapattu_na	45.74	3	174.04	35.04	17.79	27.02
	Gudalur_z	142.81	0	464.314	85.55	18.81	46.37
	Kadambai	127.92	4.24	497.01	108.62	42.21	7.71
	Kalingaleri	47.72	0	158.55	40.04	16.65	18.69
	Kallayyee	103.44	1.44	432.64	157.76	6.23	129.99
	Kallikulam	52.47	0	249.28	115.5	0	4.83
	Kaniyampundi	31.32	0	146.67	114.22	0	36.11
	Karikilambadi	70.82	0	238.81	147.54	0	46.01
	Kattumalaiyanur	178.68	0	915.16	102.13	404.06	37.22
	Keeranur	101.72	0	349.82	113.15	0	57.53
	Kolathur	190.54	3.19	753.58	251.95	107.09	87.54
	Konalur	110.96	0	477.27	109.55	101.82	78.55
	Nadalarganandal	46.26	0	280.71	43.2	130.88	35.02
	Namiyandal_so	25.57	0	228.04	110.6	0	17.04
	Nariyamangalam	117.9	0	68.92	257.1	114.9	48.13
	Neelanthangal	142.81	0	464.34	85.55	18.81	46.37
	Panniyur	99.12	8.49	380.68	111.11	66.95	36.38
	Rajanthangal	54.42	0.51	268.19	111.81	47.19	78.73
	Sanipoondi	49.15	1.77	286.49	86.4	58.58	75.51
	Somasipadi	178.03	0	858.84	228.31	62.72	44.33
	Su_polakunnam	140.9	1.38	626.15	83..53	126.02	51.5
	Vaippur	61.27	15.4	388.07	226.47	62.71	81.84
	Vayalur	95.22	0	131.77	73.77	23.71	46.08
	Vedanatham	111	0	364.1	215.63	0	18.07
	Velanandal	73.01	3.3	344.65	81.07	56.74	71.39
Pudupalayam							
	Voividanthangal	54.4	18.59	298.51	33.79	93.32	12.4
Thandrampet							

	Nedungavadi	73.46	5.43	204.54	140.1	0	65.2
	Vanapuram	279.22	2.88	627.15	332.9	0	114.94
Thurijapuram							
	Drugiammiandal	28.06	0	139.58	50.6	0	23.2
	Inam kariyandal	215.12	9.4	1007.25	273.5	0	89.81
	Kalasthambadi	94.06	5.86	374.95	83.18	15.66	11
	Karunthurambadi	64.88	1.4	397.49	0	219.64	85.8
	Kiliapattu	80.14	3.22	640.59	144.15	90.68	57.65
	Kolakkaravadi	101.46	5	324.29	159.75	87.56	78.46
	Kunnandal	243.36	0	126.11	57.89	0	10.68
	Madalambadi	134.9	2.89	697.84	28.11	154.92	9.48
	Mallavadi	8390	0.56	304.93	202.97	0	21.5
	Nookambadi	89.58	12.06	527.43	334.29	23	24.38
	Pudumallavadi	82.11	237.32	0	65	36.8	23.3
	Randam	98.97	5	324.43	156.22	20.19	26.25
	Sadayanodai	29.53	0	205.71	21.38	63.12	8.08
	Sananandal	93.63	10.5	275.7	20.4	111	0
	Seelapandal	93.25	4.89	482.76	56.82	108.21	43.24
	Sorakolathur	295.75	0	944.35	709.85	0	312
	Thurinjapuram	91.72	0	697.47	60.05	253	40.05
	Usambadi	43.39	0	111.81	37.34	55	29.5
	Vada andapattu	21.92	48.42	207.76	35.77	98.34	16.47
	Vadakarimbalore	135.71	18.05	474.07	38.9	263.04	9
	Vallivagai	148.62	2.39	736.8	294.51	60.72	85.55
Tiruvannamalai							
	Adayur	121.78	0	435.99	151.84	0	130.72
	Adiannamalai	103.97	4.04	646.95	165.1	0	80.93
	Alaganandal	41.2	51.32	290.87	127.8	0	87

	Allikondapattu	18.74	0	91.86	104.51	0	21.8
	Ananandal	33.53	0	238.49	53.07	51.49	3.63
	Anapurandan	26.17	0	186.13	76.33	0	43.19
	Andampallam	175.82	0	766.43	391.96	0	0
	Aradapattu	79.21	2.83	334.54	146.78	65.23	62.94
	Aruddirapattu	22.92	0	60.9	18.28	18.03	5.85
	Athiyandal	66.96	0	208.51	89.93	0	46.92
	Ayyam palayam	126.33	0	495.6	209.2	0	180.24
	Chinnakallapadi	93.14	3.84	272.91	133.07	0	15.8
	Chinnakangiyanur	111.62	30.17	461.88	70.69	0	10.04
	Devanandal	96.56	15.67	321.34	134.3	0	69.09
	Eandal	123.29	0.6	356.87	249.52	28.3	127.14
	Isukalikatteri	80.35	3.08	569.04	89.61	21.22	25.73
	Kadagaman	61.49	0.56	433.94	76.29	98.61	16.81
	T Kalleri	24.34	2.34	489.95	125.72	168.13	11.5
	Kanadhampoondi	67.8	0	374.71	130.13	0	73.64
	Kannapandal	15.17	3.63	67.61	80.66	0	63.06
	Kattampoondi	118.93	3	439.76	277.25	0	95.9
	Kilchettipattu	96.56	15.67	321.34	101.21	0	49.9
	Kilkachirapattu	74.03	74.84	229.13	143.61	66.65	64.91
	Kilkaripur	43.37	0	427.8	167.62	17.1	34.31
	Kolakkudi	104.36	0	214.17	139.11	0	79
	Madurampattu	89.66	7.69	544.88	88.27	96.3	36.83
	Malappambadi	93.36	44.72	43.39	181.99	0	73.21
	Melathikkan	115.46	18.73	437.78	195.39	0	121.79
	Melchettipattu	30.97	7.61	320.98	187.76	0	48.64
	Melkachirapattu	87.83	90.05	307.13	96.32	89.6	53.48
	Nachianandal	76.36	31.62	168.47	66.53	21.11	23.11

	Nadupattu	28.38	17.06	145.26	123.2	0	56.3
	Nallampillaipettai	43.74	1.12	285.15	84.71	24.04	38.39
	Nallavanpalayam	136.6	7.4	718.11	139.98	8	86.54
	Naraiyur	79.02	7.4	619.12	137.5	32.38	71.26
	Nariyapattu	45.54	0	287.05	296.31	0	22.4
	Navampattu	61.38	4.27	424.88	186.8	40.01	44.69
	Nochimalai	71.94	25.9	288.52	141.79	0	72.43
	Panaiyur	85.69	3.47	324.56	164.42	109.52	56.25
	Pandithapattu	38.19	0	268.47	163.22	0	75.12
	Parayampattu	54.52	2.35	165.78	187.42	0	27.3
	Pavithiram	227.62	3.57	861.38	223.25	167.8	78.3
	Pavupattu	138.58	0	308.09	119.82	0	37.96
	Periyakallapadi	41.2	51.32	290.87	282.23	0	11.99
	Perumanam	124.5	0.84	680.69	482.08	0	65.89
	Savalpoondi	60.59	7.15	280.05	108.09	0	61.47
	Su kilnachipattu	20.1	0.42	256.23	43.14	0	19.64
	Su_andapattu	71.5	22.92	185.05	85.02	4	56.03
	Su_kambupattu	99.55	0	443.14	111.58	101.67	32.4
	Su_nallur	99.55	0	443.14	111.58	101.67	32.4
	Su_pappambadi	15.93	0.6	85.47	40.3	0	9.6
	Su_valavetti	33.19	4.06	590.56	132.56	224.16	16.87
	T.valasai	55.42	0	124.56	43.95	43.86	17.43
	T.valavetti	54.97	0	230.74	20.77	0	0
	Talayampallam	125.87	4.92	455.97	352.49	57.5	72.49
	Tandarai	80.87	1.34	457.57	101.46	127.48	33.09
	Thachchampattu	92.53	1.1	317.33	154.4	80.4	49.6
	Thenmathur	125.67	54.2	545.25	247.39	55.66	143.17
	Udayanandal	28.41	7.09	121.02	124.24	0	63.56

	Vengikkal	105.78	40.73	554.53	60.44	0	36.25
	Veraiyur	118.12	0.41	169.36	78.25	24.45	5.69
	Viruvilanginan	82.54	3.41	203.37	25.19	46.58	5.52

Annexure 7 : Status of available Nitrogen and organic carbon

		Soil resources: Status of available Nitrogen					**Status of organic carbon**				
	Key CWRM parameter	Very low	Low	Medium	High	Very high	Very low	Low	Medium	High	Very high
	Unit	%	%	%	%	%	%	%	%	%	%
	GP NAME										
Chengam block											
	Paliapattu	38.64	52.27	9.09	0	0	51.43	41.9	6.67	0	0
	Chinnakolapadi	10.17	89.83	0	0	0	71.21	28.79	0		0
	Aswaragasurunai	73.53	25.74	0.74	0	0	0	18.64	81.36	0	0
	Vinnavanur	17.02	82.98	0	0	0	59.57	32.98	7.45	0	0
	Agaram (se)	21.21	78.79	0	0	0	72.17	27.83	0	0	0
	Periakolapadi	60.61	39.39	0	0	0	42.55	57.45	0	0	0
	Perumbakkam	100	0	0	0	0	98.04	0	1.96	0	0
Keelpennathur block											
	Agaram	0	75.44	24.56	0	0	66.67	33.33	0	0	0
	Angunam	26.67	65.33	8	0	0	40.26	59.74	0	0	0
	Anukkumalai	33.33	64.1	2.56	0	0	27.78	21.72	0	0	50.51
	Aranji	0	94	6	0	0	72.46	27.54	0	0	0

	Arumbakkam	25.93	74.07	0	0	0	67.06	32.94	0	0	0
	Avoor	13.24	83.82	2.94	0	0	61.11	37.78	1.11	0	0
	Chellankuppam	37.93	59.77	2.3	0	0	57.28	47.72	0	0	0
	Gengapattu_na	14	86	0	0	0	64.2	35.8	0	0	0
	Gudalur_z	34.82	16.07	22.32	26.79	0	22.58	75.81	1.61	0	0
	Kadambai	34.25	58.9	6.85	0	0	47.06	52.94	0	0	0
	Kalingaleri	0	100	0	0	0	84.75	15.25	0	0	0
	Kallayyee	20	80	0	0	0	73.45	14.16	9.73	2.65	0
	Kallikulam	0	73.91	0	26.09	0	0	74.49	25.51	0	0
	Kaniyampundi	47.06	52.94	0	0	0	52.53	39.39	0	8.08	0
	Karikilambadi	48.19	48.19	3.61	0	0	34.18	16.46	1.9	47.47	0
	Kattumalaiyanur	41.94	58.06	0	0	0	78.26	21.74	0	0	0
	Keeranur	25	62.5	12.5	0	0	67.44	32.56	0	0	0
	Kolathur	24.32	67.57	8.11	0	0	66.67	27.62	5.71	0	0
	Konalur	30.77	61.54	7.69	0	0	62.5	37.5	0	0	0
	Nadalarganandal	24.14	75.86	0	0	0	38.39	14.29	0	2.68	44.64
	Namiyandal_so	26.05	11.76	18.49	43.7	0	22.86	77.14	0	0	0
	Nariyamangalam	21.31	77.05	1.64	0	0	50.97	16.13	0.65	0	32.26
	Neelanthangal	22.58	75.81	1.61	0	0	57.5	42.5	0	0	0
	Panniyur	33.33	61.11	5.56	0	0	71.03	28.9	0	0	0
	Rajanthangal	0	100	0	0	0	0	75.19	24.81	0	0
	Sanipoondi	39.74	56.41	3.85	0	0	59.43	35.85	4.72	0	0
	Somasipadi	32	68	0	0	0	68.18	31.82	0	0	0
	Su_polakunnam	37.5	56.94	5.56	0	0	50.6	45.78	0	3.61	0
	Vaippur	28.95	52.63	18.42	0	0	26.04	21.35	0	0	52.08
	Vayalur	54.22	43.37	2.41	0	0	59.77	34.48	5.75	0	0
	Vedanatham	54.22	43.37	2.41	0	0	59.77	34.48	5.75	0	0
	Velanandal	0	86.36	13.64	0	0	75.41	24.59	0	0	0

Pudupalayam											
	Voividanthangal	0	53.33	46.67	0	0	59.79	40.21	0	0	0
Thandrampet											
	Nedungavadi	0	100	0	0	0	64.22	35.78	0	0	0
	Vanapuram	0	100	0	0	0	71.43	28.57	0	0	0
Thurijapuram											
	Drugiammiandal	0	0	0	0	0	0	0	0	0	0
	Inam kariyandal	40.58	59.42	0	0	0	40.26	49.35	0	10.39	0
	Kalasthambadi	44.62	46.15	9.23	0	0	43.86	56.14	0	0	0
	Karunthurambadi	53.68	40	6.32	0	0	52.69	35.48	11.83	0	0
	Kiliapattu	0	82.46	17.54	0	0	67.11	32.89	0	0	0
	Kolakkaravadi	60.92	39.08	0	0	0	55	45	0	0	0
	Kunnandal	32.47	57.14	10.39	0	0	63.03	36.97	0	0	0
	Madalambadi	32.5	63.75	3.75	0	0	59.46	40.54	0	0	0
	Mallavadi	0	83.05	16.95	0	0	65.67	32.84	1.49	0	0
	Nookambadi	56.12	40.82	3.06	0	0	51.14	48.86	0	0	0
	Pudumallavadi	0	83.05	16.95	0	0	65.67	32.84	1.49	0	0
	Randam	0	86.96	13.04	0	0	0	93.48	6.52	0	0
	Sadayanodai	0	100	0	0	0	0	100	0	0	0
	Sananandal	31.94	41.67	26.39	0	0	68.14	27.43	4.42	0	0
	Seelapandal	33.33	66.67	0	0	0	54.46	45.54	0	0	0
	Sorakolathur	37.21	59.3	3.49	0	0	63.46	36.54	0	0	0
	Thurinjapuram	41.38	58.62	0	0	0	63.27	34.69	2.04	0	0
	Usambadi	44.44	55.56	0	0	0	58.25	41.75	0	0	0
	Vada andapattu	61.05	37.89	1.05	0	0	51.22	48.78	0	0	0
	Vadakarimbalore	26.83	71.95	1.22	0	0	65.38	33.65	0.96	0	0
	Vallivagai	23.68	61.84	14.47	0	0	58.2	41.8	0	0	0
Tiruvannamalai											

	Adayur	41.77	58.23	0	0	0	77.01	22.99	0	0	0
	Adiannamalai	29.21	57.33	13.48	0	0	61.16	34.71	4.13	0	0
	Alaganandal	14.58	81.25	4.17	0	0	74	26	0	0	0
	Allikondapattu	36	50	14	0	0	53.33	41.67	5	0	0
	Ananandal	14.58	81.25	4.17	0	0	74	26	0	0	0
	Anapurandan	40	55.79	4021	0	0	56.25	41.96	1.79	0	0
	Andampallam	71.01	28.99	0	0	0	65.22	34.78	0	0	0
	Aradapattu	43.96	45.05	8.99	0	0	56.86	39.22	3.5	0	0
	Aruddirapattu	84.06	15.94	0	0	0	60	30	10	0	0
	Athiyandal	0	68.63	31.37	0	0	67.11	28.86	4.03	0	0
	Ayyam palayam	62.34	37.66	0	0	0	58.02	20.99	20.99	0	0
	Chinnakallapadi	39.76	53.01	7.23	0	0	49.46	50.54	0	0	0
	Chinnakangiyanur	53.19	43.62	3.19	0	0	52.08	45.83	2.08	0	0
	Devanandal	30.3	59.09	10.61	0	0	56.99	43.01	0	0	0
	Eandal	0	100	0	0	0	0	100	0	0	0
	Isukalikatteri	54.67	44	1.33	0	0	27.37	15.08	1.68	55.87	0
	Kadagaman	29.58	46.48	23.94	0	0	63.79	30.17	6.03	0	0
	T Kalleri	56.84	42.11	1.05	0	0	46.91	51.85	1.23	0	0
	Kanadhampoondi	50	50	0	0	0	26.67	73.33	0	0	0
	Kannapandal	72.06	27.94	0	0	0	72.46	26.09	1.45	0	0
	Kattampoondi	50	50	0	0	0	26.67	73.33	0	0	0
	Kilchettipattu	33.33	51.11	15.56	0	0	56.45	37.1	6.45	0	0
	Kilkachirapattu	32.61	53.26	14.13	0	0	61.95	34.51	3.54	0	0
	Kilkaripur	55.75	44.23	0	0	0	45.16	54.84	0	0	0
	Kolakkudi	25.93	64.81	9.26	0	0	66.04	26.42	2.83	4.72	0
	Madurampattu	72.06	27.94	0	0	0	72.46	26.09	1.45	0	0
	Malappambadi	0	86	14	0	0	70.42	29.58	0	0	0
	Melathikkan	50.54	47.31	2.15	0	0	54.64	45.36	0	0	0

	Melchettipattu	0	57.63	30.51	0	11.86	20.97	79.03	0	0	0
	Melkachirapattu	15	44.74	5.26	0	0	38.1	61.9	0	0	0
	Nachianandal	38.36	52.05	9.59	0	0	52.5	47.5	0	0	0
	Nadupattu	0	100	0	0	0	100	0	0	0	0
	Nallampillaipettai	0	100	0	0	0	73.53	26.47	0	0	0
	Nallavanpalayam	42.42	50.51	7.07	0	0	54.72	39.62	5.66	0	0
	Naraiyur	60	40	0	0	0	22.03	77.97	0	0	0
	Nariyapattu	38.36	52.05	9.59	0	0	52.5	47.5	0	0	0
	Navampattu	69.16	26.17	4.67	0	0	0	100	0	0	0
	Nochimalai	32.98	52.13	14.89	0	0	55.65	39.52	4.84	0	0
	Panaiyur	30.14	57.53	12.33	0	0	45.88	54.12	0	0	0
	Pandithapattu	0	100	0	0	0	0	100	0	0	0
	Parayampattu	27.49	72.06	0	0	0	73.64	26.36	0	0	0
	Pavithiram	48	39	10	3	0	43.48	54.35	2.17	0	0
	Pavupattu	53.19	45.74	1.06	0	0	0	100	0	0	0
	Periyakallapadi	60.61	39.39	0	0	0	42.55	57.45	0	0	0
	Perumanam	53.09	46.91	0	0	0	44.87	51.28	3.85	0	0
	Savalpoondi	0	0	0	0	0	0	0	0	0	0
	Su kilnachipattu	50.59	45.88	3.53	0	0	34.33	65.67	0	0	0
	Su_andapattu	27.54	46.38	26.09	0	0	0	1.09	44.57	54.35	0
	Su_kambupattu	0	100	0	0	0	60.24	0	39.76	0	0
	Su_nallur	0	100	0	0	0	60.24	0	39.76	0	0
	Su_pappambadi	0	100	0	0	0	79.37	20.63	0	0	0
	Su_valavetti	30	70	0	0	0	46.67	50.67	2.67	0	0
	T.valasai	37.5	62.5	0	0	0	50.63	18.99	30.38	0	0
	T.valavetti	32.26	52.69	15.05	0	0	57.85	38.02	4.13	0	0
	Talayampallam	21.13	76.06	2.82	0	0	62.39	35.9	1.71	0	0
	Tandarai	0	100	0	0	0	70.92	29.08	0	0	0

	Thachchampattu	0	100	0	0	0	70.92	29.08	0	0	0
	Thenmathur	32.29	50	17.71	0	0	58.47	37.29	4.24	0	0
	Udayanandal	37.11	49.48	13.4	0	0	54.7	41.03	4.27	0	0
	Vengikkal	0	45.65	15.22	0	39.13	0	50.93	49.07	0	0
	Veraiyur	50	50	0	0	0	50	0	50	0	0
	Viruvilanginan	31.75	68.25	0	0	0	47.62	35.71	16.67	0	0

Annexure 8 : GP wise soil micro nutrients details

GPWISE SOIL MICRO NUTRIENTS DETAILS

		Status of soil micro nutrients		**Status of Physical conditions of soil**							
	Key CWRM parameter	Sufficient	Deficient	Acidic Sulphate	Strongly Acidic	Highly Acidic	Moderately Acidic	Slightly Acidic	Neutral	Moderately Alkaline	Strongly Alkaline
	Unit	%	%	%	%	%	%	%	%	%	%
	GP NAME										
Chengam block											
	Paliapattu	81	19	0	0	0	0.55	17.03	11.5	70.88	0
	Chinnakolapadi	61	39	0	0	0	0	0	6.25	93.75	0
	Aswaragasurunai	62	38	0	0	0	0	0	1.79	98.21	0

	Vinnavanur	92	8	0	0	0	0	0	0	100	0
	Agaram (se)	69	31	0	0	0	0	0	0	100	0
	Periakolapadi	58	42	0	0	0	0	23.4	7.45	69.15	0
	Perumbakkam	0	0	0	0	0	4.27	36.75	2.56	56.42	0
Keelpennathur block											
	Agaram	60	40	0	0	0	0	0	0	100	0
	Angunam	56	44	0	0	0	0	4.95	6.93	88.12	0
	Anukkumalai	56	44	0	0	0	0	0	0	100	0
	Aranji	50	50	0	0	0	0	0	0	100	0
	Arumbakkam	47	53	0	0	0	0	0	0	100	0
	Avoor	58	52	0	0	0	0	0	1.3	98.7	0
	Chellankuppam	55	45	0	0	0	0	0	0	100	0
	Gengapattu_na	35	65	0	0	0	0	0	0	100	0
	Gudalur_z	62	38	0	0	0	0	0	1.18	98.82	0
	Kadambai	56	44	0	0	0	0	1.35	8.11	90.54	0
	Kalingaleri	50	50	0	0	0	0	0	0	100	0
	Kallayyee	53	47	0	0	0	0	0	6.9	93.1	0
	Kallikulam	67	33	0	0	0	0	0	5.17	94.83	0
	Kaniyampundi	54	46	0	0	0	0	0	0	100	0
	Karikilambadi	75	25	0	0	0	0	0	1.59	98.41	0
	Kattumalaiyanur	49	51	0	0	0	0	0	1.31	98.69	0
	Keeranur	45	55	1.35	0	0	0	0	1.35	95.95	0
	Kolathur	52	48	0	0	0	19.17	18.33	6.67	55.83	0
	Konalur	42	58	0	0	0	0	0	1.12	98.88	0
	Nadalarganandal	58	42	0	0	0	0	0	0	100	0
	Namiyandal_so	61	39	0	0	0	0	0	1.82	98.18	0

	Nariyamangalam	68	32	0	0	0	0	0	5	95	0
	Neelanthangal	62	38	0	0	0	0	0	1	99	0
	Panniyur	53	47	0	0	0	0	0	5.41	94.59	0
	Rajanthangal	48	52	0	0	0	0	0	0	100	0
	Sanipoondi	52	48	0	0	0	0	0	0	100	0
	Somasipadi	80	20	0	0	0	0	0.99	0	99.01	0
	Su_polakunnam	51	49	0	0	0	1.37	0	15.07	83.56	0
	Vaippur	58	42	0	0	0	0	0	0	100	0
	Vayalur	50	50	3.23	0	0	0	0	0	96.77	0
	Vedanatham	50	50	0	0	0	0	0	1.22	97.56	1.22
	Velanandal	38	62	0	0	0	0	0	1.01	98.99	0
Pudupalayam											
	Voividanthangal	45	55	0	0	0	0	0	0	100	0
Thandrampet											
	Nedungavadi	60	40	0	0	0	0	0	0	100	0
	Vanapuram	53	47	0	0	0	0	15.65	2.61	81.74	0
Thurijapuram											
	Drugiammiandal	0	0	0	0	0	0	0	0	0	0
	Inam kariyandal	44	56	0	0	0	0	0	0	100	0
	Kalasthambadi	58	42	0	0	0	0	0	12.24	87.76	0
	Karunthurambadi	54	46	0	0	0	0	0	8.16	91.84	0
	Kiliapattu	69	31	0	0	0	2.38	0	0	97.62	0
	Kolakkaravadi	43	57	0	0	0	0	1.27	1.27	97.46	0
	Kunnandal	65	35	0	0	25	40	0	0	35	0
	Madalambadi	58	42	0.6	0	0	0.6	0.6	0.6	92.21	0

	Mallavadi	45	5	0	0	0	0	0	1.54	98.46	0
	Nookambadi	52	48	0	0	0	0	1.75	1.75	93.86	0
	Pudumallavadi	45	55	0	0	0	0	0	1.54	98.46	0
	Randam	56	44	0	0	0	0	0	16.67	83.33	0
	Sadayanodai	33	67	0	0	0	0	0	0	100	0
	Sananandal	62	38	0	0	0	0	2.5	2.5	92.5	0
	Seelapandal	61	39	0	0	0	0	5.41	4.05	90.54	0
	Sorakolathur	58	42	0	0	0	0	0	0	100	0
	Thurinjapuram	55	45	0	0	0	0	0	20.9	79.1	0
	Usambadi	70	30	0	0	0	0	0	17.86	82.14	0
	Vada andapattu	60	40	0	0	0	0	0	4.26	95.74	0
	Vadakarimbalore	58	42	0	0	0	0	0	1.92	98.08	0
	Vallivagai	60	40	0	0	0	0	0	2.46	97.54	0
Tiruvannamalai											
	Adayur	61	39	0	0	0	0	0	0	100	0
	Adiannamalai	50	50	0	0	0	0	0	8.33	91.67	0
	Alaganandal	49	51	0	0	0	0	0	4.65	95.35	0
	Allikondapattu	49	51	0	0	0	0	0	11.54	88.46	0
	Ananandal	49	51	0	0	0	0	0	4.65	95.35	0
	Anapurandan	55	45	0	0	0	0	0	12.5	87.5	0
	Andampallam	40	60	0	0	0	0	0	0.84	99.16	0
	Aradapattu	54	46	0	0	0	0	0	9.88	99.12	0
	Aruddirapattu	35	65	0	0	0	0	0	0	100	0
	Athiyandal	61	39	0	0	0	4	36	20	40	0
	Ayyam palayam	39	61	0	0	0	0	39.06	1.56	59.38	0

	Chinnakallapadi	49	51	0	0	0	0	0	14.61	85.39	0
	Chinnakangiyanur	44	56	0	0	0	0	0	0	100	0
	Devanandal	60	40	0	0	0	0	3.64	0	96.36	0
	Eandal	61	39	0	0	0	10	37	0	53	0
	Isukalikatteri	43	57	0	0	0	0	0	1.38	98.62	0
	Kadagaman	53	47	0	0	0	0	0	2.94	97.06	0
	T Kalleri	57	43	0	0	1.09	7.61	20.65	3.26	67.39	0
	Kanadhampoondi	56	44	0	0	0	10	4.88	0	95.12	0
	Kannapandal	36	64	0	0	0	0	0.88	4.47	94.7	0
	Kattampoondi	56	44	0	0	0	11.86	0.85	22.88	64.41	0
	Kilchettipattu	52	48	0	0	0	0	0	14	86	0
	Kilkachirapattu	49	51	0	0	0	0	0	0	100	0
	Kilkaripur	48	52	0	0	0	0	0	8.33	91.67	0
	Kolakkudi	82	18	0	0	0	0	0	0	100	0
	Madurampattu	36	64	0	0	0	0	0.88	4.42	94.7	0
	Malappambadi	48	52	0	0	0	0	0	8.82	91.18	0
	Melathikkan	50	50	0	0	0	0	0	0	100	0
	Melchettipattu	43	57	0	2	0	0	0	0	98	0
	Melkachirapattu	51	49	0	0	0	11.11	0	21.21	67.68	0
	Nachianandal	49	51	0	0	0	0	0	5.95	94.05	0
	Nadupattu	57	43	0	0	0	100	0	0	0	0
	Nallampillaipettai	59	41	0	0	0	100	0	0	0	0
	Nallavanpalayam	49	51	0	0	0	0	0	0	100	0

	Naraiyur	58	42	0	0	0	0	0	0	100	0
	Nariyapattu	49	51	0	0	0	0	0	5.95	94.05	0
	Navampattu	42	58	1.05	0	0	0	0	0	98.95	0
	Nochimalai	54	46	0	0	0	0	0	7.32	92.68	0
	Panaiyur	46	54	0	0	0	0	0	11.76	88.24	0
	Pandithapattu	57	43	0	0	0	0	0	0	100	0
	Parayampattu	73	27	0	0	0	0	0	0	100	0
	Pavithiram	55	45	0	0	0	0	0	0	100	0
	Pavupattu	62	38	0	0	0	12.09	16.13	3.23	67.74	0
	Periyakallapadi	58	42	0	0	0	0	23.4	7.45	69.15	0
	Perumanam	52	48	0	0	0	4.62	0	0	93.64	0
	Savalpoondi	0	0	0	0	0	0	0			
	Su kilnachipattu	54	46	0	0	0	10.88	0.68	4.76	83.68	0
	Su_andapattu	53	47	0	0	0	0	0	3.85	96.15	0
	Su_kambupattu	50	50	0	0	0	0	0	0	100	0
	Su_nallur	50	50	0	0	0	0	0	0	100	0
	Su_pappambadi	80	20	0	0	0	0	0	0	100	0
	Su_valavetti	56	44	0	0	0	0	0	2.22	97.85	0
	T.valasai	49	51	0	0	0	0	0	0	100	0
	T.valavetti	51	49	0	0	0	0	0	4.84	95.16	0
	Talayampallam	55	45	0	0	0	0	3.09	6.19	90.72	0
	Tandarai	43	57	0	0	0	0	0	0	100	0
	Thachchampattu	43	57	0	0	0	0	0	0	100	0
	Thenmathur	0	0	0	0	0	0	0	8	92	0
	Udayanandal	41	59	0	0	0	0	5	5	93	0
	Vengikkal	58	42	0	0	0	1.54	0	0	98.46	0
	Veraiyur	50	50	0	0	0	0	0	7	90	3

	Viruvilanginan	48	52	0	0	0	0	0	5.56	94.44	0

Annexure 9 : GP wise soil texture and soil moisture and ET details

GP WISE SOIL TEXTURE AND SOIL MOISTURE AND ET DETAILS

		Soil texture			**Soil moisture and ET**			
	Key CWRM parameter	Clay soil	Fine soil	Coarse loamy	Soil water permeability	Volumetric soil moisture	Estimated Soil moisture	ET losses
	Unit	%	%	%	Low/Moderate/high	%	ha.m	ha.m
	GP NAME							
Chengam block								
	Paliapattu	3	70	0			812.55	76.01
	Chinnakolapadi	0	76	2			177.38	33.67
	Aswaragasurunai	0.64	79.1	4.18			244.7	64.91
	Vinnavanur	74	13	2.2			310.44	77.26
	Agaram (se)	15.15	48.18	30.61			286.12	76.71
	Periakolapadi	1	39	0			412.41	83.07
	Perumbakkam	1.49	41.27	0.41			653.8	189.39
Keelpennathur block								
	Agaram	0	33	47			51.64	89.47
	Angunam	0	85	0			90.01	123.61
	Anukkumalai	0	61	22			169.12	228.32
	Aranji	13	70	7			64.27	181.04
	Arumbakkam	30	69	0			34.35	78.97
	Avoor	0	42	35			113.96	163.49

	Chellankuppam	34	50	16			118.54	197.79
	Gengapattu_na	2	86	0			41.08	35.93
	Gudalur_z	0	0	0			111.42	286.96
	Kadambai	18	5	64			118.21	241.85
	Kalingaleri	8	53	27			35.58	104.67
	Kallayyee	9	67	0			105.06	312.85
	Kallikulam	0	99	0			61.55	102.59
	Kaniyampundi	0	77	13			33.79	100
	Karikilambadi	0	30	59			56.31	173.32
	Kattumalaiyanur	15	58	14			210.49	363.4
	Keeranur	6	56	32			81.1	192.54
	Kolathur	0	78	8			177.37	273.48
	Konalur	32	56	0			110.85	256.75
	Nadalarganandal	0	87	0			66.92	158.64
	Namiyandal_so	0	100	0			52..45	160.22
	Nariyamangalam	0	95	0			136.1	366.72
	Neelanthangal	7	77	0			111.42	186.31
	Panniyur	0	72	8			92.26	126.53
	Rajanthangal	0	100	0			62.31	110.45
	Sanipoondi	0	89	0			67.34	158.54
	Somasipadi	13	81	2			202.14	417.58
	Su_polakunnam	4	84	13			144.33	224.05
	Vaippur	0	24	57			94.13	267.72
	Vayalur	0	100	0			30.31	89.65
	Vedanatham	0	41	47			83.74	248.47
	Velanandal	6	86	4			83.98	124.58
Pudupalayam								
	Voividanthangal	0	100	0			72.93	137.43

Thandrampet								
	Nedungavadi	0	72.1	0			51.83	61.97
	Vanapuram	37.07	50.17	0.22			154.24	429.22
Thurijapuram								
	Drugiammiandal	0	88.24	0			32.1	97.66
	Inam kariyandal	7.22	82.99	0.41			237.81	447.9
	Kalasthambadi	9.19	75.43	0			87.59	19.98
	Karunthurambadi	0	91	0			93.41	180.93
	Kiliapattu	2.82	93.42	0.67			148.08	313
	Kolakkaravadi	0	87	0			75.81	253.83
	Kunnandal	0	93	0			29.01	97.14
	Madalambadi	0	66	0			161.17	226.15
	Mallavadi	15.84	67.99	0			70.26	145.79
	Nookambadi	0	91	0			124.63	338.01
	Pudumallavadi	12.47	74.81	0			54.58	131.25
	Randam	0	86.08	10.44			87.31	238.22
	Sadayanodai	7	91	0			47.31	105.15
	Sananandal	13	71	2			69.29	205.3
	Seelapandal	0	94.69	1.2			112.32	332.24
	Sorakolathur	20.25	48	0			217.2	418.54
	Thurinjapuram	54	37	0			160.42	245.24
	Usambadi	33	51	0			25.72	5.86
	Vada andapattu	0	98	0			58.92	108.45
	Vadakarimbalore	27.84	63.84	0			121.73	251.9
	Vallivagai	0	88.69	4.86			170.01	485.08
Tiruvannamalai								
	Adayur	8.78	80	9			102.81	91.02
	Adiannamalai	0	98.92	1.08			154.64	110.53

	Alaganandal	0	100	0			78.7	219.59
	Allikondapattu	0	100	0			22.05	57.57
	Ananandal	5.05	94.95	0			56.83	134.57
	Anapurandan	0	100	0			43.31	67.93
	Andampallam	1	87	0			177.47	574.25
	Aradapattu	42	43	0			78.4	175.47
	Aruddirapattu	0	100	0			14.02	14.38
	Athiyandal	0	90	0			49.1	81.24
	Ayyam palayam	82	40	14			115.09	115.78
	Chinnakallapadi	0	84	1			70.26	143.69
	Chinnakangiyanur	1	64	0			113.26	249.15
	Devanandal	5.04	78	0			90.12	91.59
	Eandal	12	76	0			82.22	113.94
	Isukalikatteri	0	100	0			147.15	364.36
	Kadagaman	5	42	49			101.28	198.4
	T Kalleri	0	86	4			113.37	238.23
	Kanadhampoondi	0	83	7			91	202.37
	Kannapandal	0	77	23			16.39	30.94
	Kattampoondi	34	55	5			106.65	241.77
	Kilchettipattu	0	61	0			72.24	168.53
	Kilkachirapattu	0	71	0			69.91	121.65
	Kilkaripur	0	86	0			98.96	53.49
	Kolakkudi	40	41	0			53.88	126.78
	Madurampattu	0	65	17			140.43	167.33
	Malappambadi	14	74	0			114.53	237.98
	Melathikkan	58	2	1			105.5	148.64
	Melchettipattu	0	83	0			75.58	160.97
	Melkachirapattu	0	78	2			100.17	141.21

	Nachianandal	8	74	7			51.36	96.44
	Nadupattu	0	69	24			37.33	100
	Nallampillaipettai	10	89	0			66.15	144.76
	Nallavanpalayam	42	19	0			178.51	327.59
	Naraiyur	0	100	0			155.53	262.63
	Nariyapattu	0	100	0			67.95	185.86
	Navampattu	48	36	4			102.61	222.6
	Nochimalai	0	88	0			72.32	110.07
	Panaiyur	0	73	12			75.45	83.1
	Pandithapattu	0	90	0			61.79	125.58
	Parayampattu	0	100	0			38.92	127.31
	Pavithiram	17	55	29			216.21	230.63
	Pavupattu	0	82	9			82.36	128.74
	Periyakallapadi	23	64	0			78.7	219.59
	Perumanam	0	68	16			158.56	182.73
	Savalpoondi	39	2	0			70.4	142.24
	Su kilnachipattu	0	100	0			59.03	50.66
	Su_andapattu	3	78	4			47.83	118.28
	Su_kambupattu	3	88	0			104.45	177.73
	Su_nallur	20	52	27			104.45	177.73
	Su_pappambadi	40.2	59	0			22.66	65.12
	Su_valavetti	4	62	30			136.76	179.85
	T.valasai	42	45	0			29.1	745.13
	T.valavetti	3	90	0			53.48	126.81
	Talayampallam	0	91	0			107.36	281.63
	Tandarai	2.04	91	0			116.64	299.61
	Thachchampattu	0	94	0			81.31	208.87
	Thenmathur	0	72	0			137.87	228.13

	Udayanandal	0	52	0			29.47	80.5
	Vengikkal	0	75	25			138.12	229.82
	Veraiyur	14	76	0			39.1	100.94
	Viruvilanginan	2	70	4			59.28	108.01

Annexure 10 : GP wise water extraction and methods of irrigation details

GPWISE WATER EXTRACTION AND METHODS OF IRRIGATION DETAILS

		Means of water extraction		**Irrigation methods**		**Livestock population**		
	Key CWRM parameter	Gravity	lifting	Wild flooding	Control flooding	Cattle	Sheep	Goat
	Unit	%	%	%	%	No	No	No
	GP NAME							
Chengam block								
	Paliapattu	2	98	0	100	810	850	356
	Chinnakolapadi	2	98	0	100	502	763	502
	Aswaragasurunai	17	83	32	68	341	309	72
	Vinnavanur	1	99	0	100	368	368	249
	Agaram (se)	3	97	0	100	641	334	258
	Periakolapadi	1	99	0	100	652	754	213
	Perumbakkam	1	99	5	95	724	455	569
Keelpennathur block								
	Agaram	4	96	11	89	282	19	122
	Angunam	2	98	34	66	144	40	80

	Anukkumalai	3	97	6	94	696	184	194
	Aranji	2	98	17	83	856	156	356
	Arumbakkam	0	100	0	100	574	136	154
	Avoor	1	99	3	97	591	62	398
	Chellankuppam	2	98	23	77	730	120	157
	Gengapattu_na	3	97	12	88	346	301	81
	Gudalur_z	1	99	35	65	1205	863	378
	Kadambai	3	97	18	82	783	145	92
	Kalingaleri	2	98	13	87	380	461	183
	Kallayyee	3	97	23	77	2.01	488	325
	Kallikulam	2	98	33	67	1051	354	573
	Kaniyampundi	6	94	28	72	332	32	154
	Karikilambadi	2	98	16	84	1118	834	265
	Kattumalaiyanur	2	98	2	98	3031	684	205
	Keeranur	1	99	18	82	344	199	124
	Kolathur	3	97	4	96	1040	1820	323
	Konalur	2	98	6	94	536	255	66
	Nadalarganandal	2	98	26	74	701	510	85
	Namiyandal_so	3	97	0	100	1288	0	128
	Nariyamangalam	9	91	61	39	928	98	323
	Neelanthangal	3	97	20	80	1205	863	378
	Panniyur	1	99	21	79	135	25	6
	Rajanthangal	3	97	13	87	1541	610	387
	Sanipoondi	1	99	0	100	919	282	275
	Somasipadi	1	99	14	96	1514	724	0
	Su_polakunnam	3	97	25	75	1101	192	289
	Vaippur	2	98	11	89	366	131	19
	Vayalur	2	98	0	100	372	138	301

	Vedanatham	0	100	0	100	895	518	115
	Velanandal	4	96	4	96	891	155	170
Pudupalayam								
	Voividanthangal	30.53	69.47	0	100	768	142	213
Thandrampet								
	Nedungavadi	2.29	97.71	0	100	316	77	98
	Vanapuram	1.19	98.81	9.52	90.48	2109	438	578
Thurijapuram								
	Drugiammiandal	9.27	90.73	39.03	60.97	780	854	819
	Inam kariyandal	3.57	96.43	0	100	1380	1519	1907
	Kalasthambadi	1.81	98.19	0	100	446	271	538
	Karunthurambadi	3.34	96.66	0	100	683	538	736
	Kiliapattu	0.94	99.06	11.33	88.67	1296	256	463
	Kolakkaravadi	0	100	37.45	62.55	782	1039	1116
	Kunnandal	5.19	94.81	0	100	766	64	130
	Madalambadi	0.72	99.28	0	100	1692	116	280
	Mallavadi	1.88	98.12	0	100	614	490	426
	Nookambadi	0	100	13.83	86.17	1348	253	293
	Pudumallavadi	4.8	95.2	0	100	300	243	211
	Randam	2.13	97.87	3.41	96.59	1811	280	349
	Sadayanodai	2.28	7.72	0	100	519	127	48
	Sananandal	0	100	0	100	755	34	64
	Seelapandal	1.66	98.34	0	100	727	1285	966
	Sorakolathur	2.43	97.57	0	100	1285	176	278
	Thurinjapuram	100	0	100	0	553	1008	746
	Usambadi	5.49	94.51	0	100	404	240	478
	Vada andapattu	0	100	0	100	635	239	163
	Vadakarimbalore	4.75	95.25	0	100	399	359	412

	Vallivagai	0.8	99.2	0	100	1687	160	238
Tiruvannamalai								
	Adayur	1.95	98.05	0	100	1548	201	230
	Adiannamalai	2.39	97.67	0	100	651	24	233
	Alaganandal	1.06	98.94	0	100	521	90	164
	Allikondapattu	4.17	95.83	9.06	90.94	392	77	129
	Ananandal	1.85	98.15	0	100	526	136	319
	Anapurandan	0	100	0	100	285	0	78
	Andampallam	0.64	99.36	0	100	2794	166	845
	Aradapattu	2.31	97.69	0	100	814	688	374
	Aruddirapattu	12.27	87.73	0	100	264	20	92
	Athiyandal	6.71	93.29	27.63	72.37	0	0	0
	Ayyam palayam	6.94	93.06	0	100	210	201	0
	Chinnakallapadi	1.63	98.37	12.8	87.2	1096	743	358
	Chinnakangiyanur	1.23	98.77	0	100	793	53	266
	Devanandal	2.98	97.02	16.68	83.32	198	0	111
	Eandal	0	100	37.68	62.32	0	0	0
	Isukalikatteri	2.97	97.03	10.3	89.7	411	275	199
	Kadagaman	1.46	98.54	0	100	534	334	56
	T Kalleri	2.16	97.84	10.72	89.28	1661	445	397
	Kanadhampoondi	1.7	98.29	0	100	875	404	191
	Kannapandal	0	100	0	100	519	49	156
	Kattampoondi	4.26	95.74	74.77	25.23	1091	0	568
	Kilchettipattu	2.98	97.02	16.68	83.32	218	92	29
	Kilkachirapattu	2.29	97.71	93.84	6.16	626	287	67
	Kilkaripur	0.94	99.06	0	100	1266	343	208
	Kolakkudi	3.16	96.84	0	100	902	189	406
	Madurampattu	3.89	96.11	0	100	616	122	304

	Malappambadi	4.89	95.11	0	100	1303	287	424
	Melathikkan	3.1	96.9	0	100	456	87	136
	Melchettipattu	1.36	98.64	0	100	172	54	93
	Melkachirapattu	1.67	98.33	0	100	492	627	74
	Nachianandal	4.35	95.65	0	100	716	0	406
	Nadupattu	4.49	95.51	0	100	611	145	276
	Nallampillaipettai	0	100	0	100	666	67	295
	Nallavanpalayam	1.59	98.41	0	100	973	170	224
	Naraiyur	2.8	97.2	0	100	659	408	274
	Nariyapattu	16.31	83.69	94.45	5.55	257	0	43
	Navampattu	3.23	96.77	6.34	93.66	1101	142	10
	Nochimalai	2.6	97.4	0	100	947	158	168
	Panaiyur	5.69	94.31	0	100	336	166	49
	Pandithapattu	8.96	91.04	0	100	953	220	98
	Parayampattu	1.55	98.45	0	100	483	81	28
	Pavithiram	1.89	98.11	8.02	91.98	1701	1022	533
	Pavupattu	2.24	97.76	0	100	1111	0	309
	Periyakallapadi	7.35	92.65	12.93	87.07	1169	436	225
	Perumanam	12.73	87.27	57.95	42.05	867	213	0
	Savalpoondi	1.65	98.35	0	100	790	66	197
	Su kilnachipattu	0	100	0	100	903	276	81
	Su_andapattu	100	0	0	0	628	293	74
	Su_kambupattu	1.15	98.85	0	100	383	390	122
	Su_nallur	1.15	98.85	0	100	383	390	122
	Su_pappambadi	0	100	0	100	549	281	167
	Su_valavetti	1.53	98.47	21.52	78.48	409	12	0
	T.valasai	2.93	97.07	0	100	610	255	131
	T.valavetti	1.79	98.21	0	100	234	125	84

	Talayampallam	1.41	98.59	0	100	1179	99	307
	Tandarai	3.32	96.68	0	100	603	595	52
	Thachchampattu	2.23	97.77	6.34	93.66	1034	602	273
	Thenmathur	0	100	4.61	95.39	627	416	262
	Udayanandal	8.23	91.77	2.9	97.1	295	35	60
	Vengikkal	100	0	100	0	953	220	71
	Veraiyur	2.61	97.39	24.47	75.53	234	0	180
	Viruvilanginan	2.49	97.51	0	100	570	880	88

Annexure 11 : GP wise WASCA proposed treatment area

GP WISE WASCA PROPOSED TREATMENT AREA										
	Key CWRM parameter	NA use	Barren & Unculti vable	Permanent pasture & other grazing	Under miscellaneo us Trees	Cutur able Waste land	Fallow land other than current fallows	Current fallow land	Unirri gated land	Irrigat ed by source
	Unit	ha	ha	ha	ha	ha	ha	ha	ha	ha
	GP NAME									
Chengam block										
	Paliapattu	0	81	0	0	0	11	43	0	13
	Chinnakolapadi	1	8	0	0	0	0	10	0	6
	Aswaragasurunai	0	16	0	0	9	8	13	0	12
	Vinnavanur	26	19				0	8	0	15
	Agaram (se)	0	13	0	0	0	0	0	0	11
	Periakolapadi	0	49	0	0	15	4	11	0	15

	Perumbakkam	32	0	0	0	0	0	2	0	3
Keelpennathur block										
	Agaram	22	0	0	0	0	0	10	3	34
	Angunam	45	25	0	0	0	0	5	0	4
	Anukkumalai	0	69	0	0	0	0	23	16	35
	Aranji	3	0	0	0	0	0	7	3	25
	Arumbakkam	0	3	0	0	0	0	0	2	5
	Avoor	0	19	0	2	0	0	22	5	10
	Chellankuppam	26	0	0	0	0	0	37	0	32
	Gengapattu_na	22	0	0	0	0	0	3	0	1
	Gudalur_z	0	15	0	0	0	0	10	13	20
	Kadambai	58	0	0	0	0	0	8	1	11
	Kalingaleri	0	0	0	0	0	0	2	0	8
	Kallayyee	40	17	0	0	0	0	4	9	22
	Kallikulam	0	14	0	0	0	0	3	9	1
	Kaniyampundi	16	0	0	0	0	0	1	1	6
	Karikilambadi	0	5	0	0	0	0	3	10	15
	Kattumalaiyanur	89	0	0	0	0	0	64	24	38
	Keeranur	0	0	0	0	0	0	8	0	17
	Kolathur	88	2	0	0	0	0	58	27	21
	Konalur	53	0	0	0	0	0	21	32	9
	Nadalarganandal	0	8	0	0	0	0	9	17	7
	Namiyandal_so	13	0	0	0	0	0	1	5	7
	Nariyamangal	48	17	0	0	0	0	16	52	11

	am									
	Neelanthangal	0	15	0	0	0	0	10	13	20
	Panniyur	44	9	0	0	0	0	18	0	10
	Rajanthangal	10	0	0	0	0	0	8	0	7
	Sanipoondi	22	0	0	0	0	0	9	2	18
	Somasipadi	79	0	0	0	0	0	47	17	56
	Su_polakunnam	79	0	0	0	0	0	47	17	56
	Vaippur	0	0	0	0	12	0	0	0	13
	Vayalur	21	0	0	0	0	0	21	4	10
	Vedanatham	4	0	0	0	0	0	10	34	25
	Velanandal	0	13	0	0	0	0	27	6	16
Pudupalayam										
	Voividanthangal	0	0	0	0	12	0	14	0	17
Thandrampet										
	Nedungavadi	29	12	0	0	4	0	3	0	11
	Vanapuram	44	30	0	0	0	4	0	0	0
Thurijapuram										
	Drugiammiandal	14	0	0	0	0	0	5	10	8
	Inam kariyandal	99	0	0	0	0	26	87	72	27
	Kalasthambadi	47	0	0	0	0	0	34	25	14
	Karunthurambadi	7	0	0	0	0	0	43	18	14
	Kiliapattu	40	0	0	0	0	0	63	23	30

	Kolakkaravadi	12	0	0	0	0	0	0	28	20
	Kunnandal	3	0	0	0	0	0	1	7	9
	Madalambadi	16	0	0	0	0	0	67	22	34
	Mallavadi	5	0	0	0	0	0	31	13	13
	Nookambadi	10	0	0	0	0	0	26	73	13
	Pudumallavadi	5	0	0	0	0	0	19	16	10
	Randam	24	38	0	0	0	0	2	12	12
	Sadayanodai	4	0	0	0	0	0	18	6	11
	Sananandal	9	11	0	0	8	0	0	27	5
	Seelapandal	46	0	0	0	0	0	17	30	30
	Sorakolathur	148	0	0	0	0	0	30	15	30
	Thurinjapuram	11	0	0	0	0	0	98	20	22
	Usambadi	5	0	0	0	0	0	0	5	9
	Vada andapattu	11	0	36	0	0	9	3	12	11
	Vadakarimbalore	49	26	0	0	13	0	41	28	20
	Vallivagai	74	0	0	0	0	4	29	74	31
Tiruvannamalai										
	Adayur	55	0	0	0	0	0	17	17	0
	Adiannamalai	0	16.03	0	0	3.03	0	18.56	1.29	10.21
	Alaganandal	0	0	22.58	0	15.92	0	3.13	1.12	23.89
	Allikondapattu	0	2.99	0	0	0	0	2.3	0.96	6.32
	Ananandal	0	6.44	0	0	0	0	10.36	5.02	13.29
	Anapurandan	0	1.64	0	0	0	0	5.67	3.41	2.47
	Andampallam	5	0	0	0	0	0	0	37	39
	Aradapattu	2	0	13	0	0	0	0	0	21

	Aruddirapattu	2	0	0	0	0	0	0	0	2
	Athiyandal	2	0	0	0	0	0	6	0	10
	Ayyam palayam	61	5	0	0	0	3	18	3	10
	Chinnakallapadi	32	22	0	0	0	0	2	0	18
	Chinnakangiyanur	56	0	0	0	23	0	23	16	20
	Devanandal	0	41	0	0	12	0	12	0	10
	Eandal	7	0	0	0	0	0	13	0	14
	Isukalikatteri	0	51	0	0	0	0	8	6	36
	Kadagaman	0	6	0	0	0	3	12	6	17
	T Kalleri	0	0	0	0	0	0	29	7	25
	Kanadhampoondi	49	16	1	0	1	3	10	1	28
	Kannapandal	8	0	0	0	3	0	1	0	6
	Kattampoondi	49	16	0	0	1	3	10	0	28
	Kilchettipattu	0	0	0	0	0	3	4	3	17
	Kilkachirapattu	37	0	14	11	31	0	9	0	11
	Kilkaripur	49	16	0	0	0	3	10	0	28
	Kolakkudi	5	15	0	0	0	0	6	0	15
	Madurampattu	0	44	0	0	0	5	36	0	19
	Malappambadi	0	0	33	0	0	0	11	9	10
	Melathikkan	57	0	0	14	0	0	6	0	16
	Melchettipattu	0	0	0	0	0	0	8	1	18
	Melkachirapattu	0	29	0	0	68	0	11	3	15
	Nachianandal	27	17	0	0	24	0	3	0	11

	Nadupattu	0	0	0	13	0	0	1	0	11
	Nallampillaipettai	0	0	0	10	0	0	5	4	10
	Nallavanpalayam	0	38	0	0	0	0	19	6	31
	Naraiyur	50	0	0	0	0	0	23	5	26
	Nariyapattu	0	5	0	0	0	0	1	0	23
	Navampattu	0	13	0	0	0	1	2	1	24
	Nochimalai	36	0	18	0	0	0	9	1	9
	Panaiyur	43	0	0	0	0	0	18	2	8
	Pandithapattu	0	0	0	0	0	0	2	2	5
	Parayampattu	2	0	0	0	0	0	0	0	16
	Pavithiram	0	56	0	0	0	6	40	0	28
	Pavupattu	44	38	0	0	0	0	9	4	22
	Periyakallapadi	0	0	23	0	16	3	4	0	23
	Perumanam	0	0	0	0	0	0	68	22	8
	Savalpoondi	0	14	0	0	0	0	6	2	15
	Su kilnachipattu	0	0	0	0	0	0	12	1	8
	Su_andapattu	4	0	0	0	17	0	2	0	14
	Su_kambupattu	44	0	0	0	0	0	53	0	21
	Su_nallur	44	0	0	0	0	0	53	0	21
	Su_pappambadi	0	9	0	0	0	0	1	6	4
	Su_valavetti	0	0	0	0	0	4	21	205	0
	T.valasai	5	0	0	0	0	0	2	1	8
	T.valavetti	27	0	0	0	0	0	9	2	14
	Talayampalla	60	0	0	0	0	0	10	0	35

	m									
	Tandarai	0	0	0	0	0	0	6	15	15
	Thachchampattu	0	26	0	0	0	1	1	1	23
	Thenmathur	63	0	13	37	0	0	22	0	25
	Udayanandal	14	0	5	0	0	0	2	0	9
	Vengikkal	0	0	30	0	0	0	41	25	4
	Veraiyur	25	0	0	0	0	0	4	0	12
	Viruvilanginan	16	38	0	0	0	0	4	2	10

Annexure 12 : GP wise proposed works of Thurinjalar sub basin Tiruvannamalai district of Tamil Nadu state

Block	**Gram Panchayat**	**CO**		**SPD**		**LP**		**CBP**		**DLT**		**FBBT**		**M I**		**FP**	**LD**		**DLHA**	
		No	**A(ha)**	**No**	**A(ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**A (ha)**	**No**	**No**	**A (ha)**	**No**	**A (ha)**
Pudupalayam	Voividanthangal	6	33	0	0	0	0	0	0	128	640	16	33	7	18	15	3	7	13134	16
Thandrampet																				
	Nedungavadi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vanapuram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chengam																				
	Paliapattu	6	70	0	0	0	0	0	0	1597	7986	23	57	5	13	10	11	28	28163	35
	Chinnakolapadi	6	17	0	0	0	0	0	0	1331	6653	4	11	2	6	10	2	5	6689	8
	Aswaragasurunai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vinnavanur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Agaram (se)	6	16	0	0	0	0	0	0	0	0	0	0	6	15	10	0	0	11928	15
	Periakolapadi	6	29	0	0	0	0	0	0	908	4538	12	31	6	14	10	3	8	11778	15
	Perumbakkam	3	0	0	0	918	4590.9	0	0	0	0	1	1.4	0	0	10	1	1.4	612	3.06

APU	CS	CT	GSS	COWRS	SPC	SPI	RTRWHS	ND		NADEP	IC		BP		CCB		Aff.	
No	No	No	No	No	No	No	No	No	A (ha)	No	No	L (m)	No	A (ha)	No	L (m)	No	A (ha)
19	19	19	9	0	5	52	2	2076	415	19	0	0	2278	3	0	0	11104	14
0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
20	20	20	47	0	8	83	2	4150	830	20	0	0	859	1	0	0	65088	81
13	13	13	43	0	3	30	2	1500	300	13	0	0	714	1	0	0	6096	8
0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
160	160	160	43	0	0	0	2	1600	320	160	0	0	2675	13	0	0	311	0
16	16	16	40	0	6	58	2	2915	583	16	0	0	846	1	0	0	51144	64
3	3	3	0	126	4	0	2	2115	423	3	0	0	25326	31.66	6738	37.77	0	0

Block	GP Name	CO		SPD		LP		CBP		DLT		FBBT		M I		FP	LD	
Thurijapuram		No	A(ha)	No	A(ha)	No	L (m)	No	A (ha)	No	L (m)	No	A (ha)	No	A (ha)	No	No	A (ha)
	Drugiammiandal	0	0	0	0	0	0	0	0	0	0	1	2.5	0	0	6	0	0
	Inam kariyandal	0	0	0	0	0	0	0	0	1489	7443	1	2.5	0	0	6	0	0
	Kalasthambadi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Karunthurambadi	77	0	0	0	0	0	0	0	972	4858	15	37.5	0	0	0	0	0
	Kiliapattu	0	0	0	0	0	0	0	0	1314	6571	0	0	0	0	0	0	0
	Kolakkaravadi	0	0	0	0	0	0	140	700	0	0	0	0	0	0	5	0	0

	Kunnandal	0	0	0	0	0	0	400	2000	366	1830	6	15	0	0	0	0	0
	Madalambadi	0	0	0	0	200	1000	0	0	0	0	11	27.5	0	0	5	0	0
	Mallavadi	0	0	0	0	0	0	0	0	0	0	25	62.5	0	0	4	0	0
	Nookambadi	0	0	0	0	0	0	0	0	0	0	2	5	0	0	11	0	0
	Pudumallavadi	0	0	0	0	0	0	0	0	0	0	22	55	0	0	18	0	0
	Randam	0	0	0	0	0	0	0	0	0	0	11	27.5	0	0	3	5	2
	Sadayanodai	0	0	0	0	0	0	0	0	641	3203	5	12.5	0	0	5	0	0
	Sananandal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Seelapandal	0	0	0	0	0	0	0	0	0	0	48	120	0	0	0	0	0
	Sorakolathur	0	0	0	0	0	0	0	0	381	1906	2	5	0	0	9	0	0
	Thurinjapuram	0	0	0	0	0	0	0	0	1986	9932	0	0	0	0	1	0	0
	Usambadi	0	0	0	0	0	0	0	0	0	0	4	10	0	0	0	0	0
	Vada andapattu	0	0	28800	36	0	0	0	0	245	1225	9.6	24	0	0	10	10	24
	Vadakarimbalore	0	0	0	0	0	0	0	0	1056	5278	7	17.5	0	0	1	0	0
	Vallivagai	0	0	0	0	0	0	0	0	0	0	5	12.5	0	0	7	0	0

DLHA		**APU**	**CS**	**CT**	**GSS**	**COWRS**	**SPC**	**SPI**	**RTRWHS**	**ND**		**NADEP**	**IC**		**BP**		**CCB**		**Aff.**	
No	**A(ha)**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**A(ha)**	**No**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A(ha)**
0	0	10	49	0	48	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	25	274	0	46	6	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	0	84	84	41	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	77	77	77	17	7	0	0	2	0	0	0	600	3000	0	0	0	0	0	0
0	0	87	252	252	19	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	322	150	150	150	2	0	0	2	322	64	0	0	0	0	0	0	0	0	0
0	0	0	38	38	4	1	6	0	2	0	0	0	400	2000	0	0	0	0	0	0
0	0	7	42	42	16	3	0	0	2	0	0	0	0	0	800	1	0	0	0	0
0	0	39	88	88	26	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0

0	0	13	35	35	10	2	0	0	2	0	0	0	0	0	0	0	0	0	0
0	0	9	112	112	45	3	0	0	2	0	0	0	0	0	1	1.6	0	0	1	0.46
0	0	139	233	233	15	2	0	0	2	0	0	0	160	800	1072	1.34	0	0	3	6.37
0	0	10	64	64	4	2	0	0	2	0	0	10	0	0	128	0.16	0	0	0	0
0	0	0	56	56	16	2	0	0	2	0	0	0	0	0	1600	2	0	0	0	0
0	0	43	83	83	0	0	52	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	8	176	176	13	2	0	0	2	0	0	8	593	2966	480	0.6	0	0	0	0
0	0	8	51	51	8	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	0	10	10	3	3	0	0	2	474	95	0	0	0	0	0	162	1.62	0	0
0	0	0	33	33	3	0	0	0	2	573	115	1	0	0	0	0	0	0	0	0
0	0	7	58	58	10	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	35	200	200	10	3	0	0	2	0	0	27	100	500	864	1.08	0	0	1	0.41

Block	**GP Name**	**CO**		**SPD**		**LP**		**CBP**		**DLT**		**FBBT**		**M I**		**FP**	**LD**	
Keelpennathur		**No**	**A(ha)**	**No**	**A(ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**A (ha)**	**No**	**No**	**A (ha)**
	Agaram	5	0	0	0	443	2214.5	1500	7500	0	0	3	6.34	0	0	10	3	6.34
	Angunam	3	0	0	0	647	3236.8	980	4900	0	0	1	2.9	0	0	26	1	2.9
	Anukkumalai	16	0	0	0	587	2936.5	1000	5000	0	0	8	19.4	0	0	31	8	19.4
	Aranji	4	0	0	0	349	1747	860	4300	0	0	2	4.58	0	0	7	2	4.58

	Arumbakkam	2	0	0	0	84	419	440	2200	0	0	0	1.21	0	0	4	0	1.21
	Avoor	11	0	0	0	471	2355.4	4100	20500	0	0	6	13.78	0	0	18	6	13.78
	Chellankuppam	15	0	0	0	768	3841	0	0	0	0	8	19.33	0	0	24	8	19.33
	Gengapattu_na	3	0	0	0	384	1920	800	4000	0	0	1	1.64	0	0	10	1	1.64
	Gudalur_z	9	0	0	0	757	3785.7	0	0	0	0	5	11.69	0	0	13	5	11.69
	Kadambai	4	0	0	0	950	4748	0	0	0	0	2	4.57	0	0	19	2	4.57
	Kalingaleri	2	0	0	0	238	1187.5	440	2200	0	0	0	0.92	0	0	3	0	0.92
	Kallayyee	5	0	0	0	553	2765	1300	6500	0	0	2	6.08	0	0	16	2	6.08
	Kallikulam	5	0	0	0	298	1489	1200	6000	0	0	2	6	0	0	7	2	6
	Kaniyampundi	2	0	0	0	313	1565.3	0	0	0	0	0	0.91	0	0	6	0	0.91
	Karikilambadi	5	0	0	0	526	2630	0	0	0	0	3	6.6	0	0	7	3	6.6

	Kattumalaiyanur	35	0	0	0	1207	6032.6	640	3200	0	0	18	43.8	0	0	51	18	43.8
	Keeranur	4	0	0	0	707	3536	1200	6000	0	0	2	4.47	0	0	7	2	4.47
	Kolathur	34	0	630	0.79	819	4096	1240	6200	0	0	17	42.47	0	0	56	17	42.47
	Konalur	21	0	0	0	609	3045.9	240	1200	0	0	11	26.34	0	0	33	11	26.34
	Nadalarganandal	12	0	0	0	461	2304.5	800	4000	0	0	5	13.66	0	0	14	5	13.66
	Namiyandal_so	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nariyamangalam	27	0	0	0	480	2399	826	4130	0	0	14	34.13	0	0	40	14	34.13
	Neelanthangal	9	0	0	0	515	2572.6	0	0	0	0	5	11.69	0	0	13	5	11.69
	Panniyur	8	0	0	0	329	1643.9	0	0	0	0	4	9.54	0	0	20	4	9.54
	Rajanthangal	4	0	0	0	530	2648	0	0	0	0	2	4.35	0	0	9	2	4.35
	Sanipoondi	0	0	960	1.2	0	0	0	0	310	1548	0	0	0	0	10	11	27

	Somasipadi	38	0	8000	10	0	0	230	1150	2312	11562	0	0	0	0	10	34	85
	Su_polakunnam	13	0	0	0	934	4669.6	1310	6550	0	0	6	16.05	0	0	28	6	16.05
	Vaippur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vayalur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vedanatham	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Velanandal	13	0	0	0	490	2450.5	380	1900	0	0	6	16.16	0	0	18	6	16.16

DLHA		**APU**	**CS**	**CT**	**GSS**	**COWRS**	**SPC**	**SPI**	**RTRWHS**	**ND**		**NADEP**	**IC**		**BP**		**CCB**		**Aff.**	
No	**A(ha)**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**A(ha)**	**No**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A(ha)**
4633	23.16	83	83	83	13	63	4	0	2	1955	391	83	0	0	3432	4.29	6672	73.03	17928	22.41
954	4.77	5	5	5	10	37	2	0	2	895	179	5	0	0	21270	26.59	14927	81.09	35968	44.96
7384	36.92	48	48	48	29	120	4	0	2	2065	413	48	0	0	63156	78.95	19789	152.78	0	0
3428	17.1	62	62	62	43	82	5	0	2	253	506	62	0	0	630	0.79	1702	37.8	2187	2.73

	4									0									
729	3.65	13	13	13	22	39	3	0	2	1260	252	13	300	1500	2772	3.47	973	10.76	0	0
3763	18.82	86	86	86	43	48	11	0	2	5270	1054	86	0	0	21822	27.28	8633	66.78	1497	1.87
7055	35.27	98	98	98	22	69	7	0	2	3570	714	98	0	0	6900	8.63	10779	104.77	20475	25.59
434	2.17	8	8	8	23	15	3	0	2	1645	329	8	0	0	2736	3.42	5445	29.85	17672	22.09
4292	21.46	57	57	57	81	55	6	0	2	3105	621	57	0	0	12066	15.08	5461	58.26	205	0.26
1988	9.94	20	20	20	16	108	5	0	2	2525	505	20	0	0	10158	12.7	15083	90.19	46092	57.62
951	4.76	11	11	11	41	44	2	0	2	925	185	11	0	0	2892	3.62	1020	13.47	274	0.34
3461	17.31	46	46	46	47	86	6	0	2	3035	607	46	0	0	14478	18.1	12997	93.08	32300	40.38
1279	6.39	14	14	14	75	7	3	0	2	1355	271	14	0	0	10992	14	3891	27	0	0
757	3.79	11	11	11	17	32	2	0	2	1085	217	11	430	2150	150	0.19	3359	23.29	12428	15.54
2790	13.95	55	55	55	68	42	5	0	2	2345	469	55	570	2850	3600	4.5	2384	33.01	485	0.61
12561	62.81	120	120	120	55	111	9	0	2	4375	875	120	0	0	0	0	26739	214.95	71472	89.34
2547	12.7	37	37	37	22	75	5	0	2	252	504	37	0	0	1686	2.11	1766	29.46	1507	1.88

	4									0									
10550	52.75	104	104	104	123	56	7	0	2	3745	749	104	0	0	9930	12.41	28804	206.77	70452	88.07
6207	31.04	91	91	91	19	2	7	0	2	3510	702	91	0	0	2802	3.5	16599	118.72	42516	53.15
3399	16.99	65	65	65	34	22	5	0	2	2680	536	65	0	0	6150	7.69	4292	41.68	0	0
0	0	40	106	106	12	0	0	40	2	455	91	0	0	0	0	0	0	0	0	0
7965	39.82	105	105	105	37	13	8	0	2	3825	765	105	0	0	13686	17.11	19769	144.3	38036	47.55
4292	21.46	57	57	57	81	58	6	0	2	3105	621	57	0	0	12066	15.08	5464	58.26	205	0.26
2935	14.68	27	27	27	2	42	3	0	2	1725	345	27	0	0	12264	15.33	13733	88.27	34868	43.59
1609	8.05	28	28	28	69	49	4	0	2	2220	444	28	0	0	1638	2.05	3418	28.58	8352	10.44
0	0	35	45	45	13	10	35	0	2	885	177	35	0	0	0	0	0	0	2720	3.4
0	0	135	151	151	72	10	0	135	2	675	135	0	0	0	0	0	0	0	0	0
5009	25.05	54	54	54	39	67	7	0	2	3310	662	54	0	0	828	1.04	17575	121.58	56360	70.45
0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0

0	0	41	0	0	0	0	41	0	2	0	0	0	0	0	0	0	0	0	0
4825	24.13	75	75	75	25	44	5	0	2	2730	546	75	0	0	12276	15.35	6344	63.6	0	0

Block	GP Name	CO		SPD		LP		CBP		DLT		FBBT		M I		FP	LD	
TMV		No	A(ha)	No	A(ha)	No	L (m)	No	A (ha)	No	L (m)	No	A (ha)	No	A (ha)	No	No	A (ha)
	Adayur	0	0	0	0	0	0	0	0	954	4769	29	72	0	0	12	28	69
	Adiannamalai	0	0	0	0	0	0	0	0	0	0	33	132	0	0	20	53	132
	Alaganandal	0	0	0	0	0	0	0	0	1001	5005	3	8	0	0	10	9	22
	Allikondapattu	6	6	0	0	0	0	200	1000	94	470	1	2	0	0	10	0	1
	Ananandal	6	17	0	0	0	0	400	2000	422	2111	3	7	4	9	10	1	4
	Anapurandan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	14	34
	Andampallam	6	54	0	0	0	0	600	3000	763	3817	11	27	11	27	10	5	13
	Aradapattu	6	37	0	0	0	0	1600	8000	804	4021	6	15	9	23	10	3	7
	Aruddirapattu	0	0	0	0	0	0	0	0	142	709	3	11	0	0	2	4	11
	Athiyandal	0	0	0	0	0	0	0	0	319	1594	10	25	0	0	5	11	28
	Ayyam palayam	0	0	0	0	0	0	0	0	245	1226	6	14	0	0	15	32	81
	Chinnakallapadi	6	7	0	0	0	0	0	0	915	4577	2	5	2	4	10	0	1
	Chinnakangiyanur	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Devanandal	0	0	0	0	0	0	700	3500	1423	7115	22	54	0	0	10	22	54
	Eandal	0	0	0	0	0	0	0	0	310	1550	0	0	0	0	0	0	0

	Isukalikatteri	6	40	630	1	0	0	1000	5000	1050	5248	6	16	10	25	10	3	7
	Kadagaman	5	0	0	0	0	0	0	0	177	886	6	0	0	0	6	1	5
	T Kalleri	17	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0
	Kanadhampoondi	6	37	0	0	0	0	0	0	1105	5524	0	0	0	0	0	0	0
	Kannapandal	6	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kattampoondi	6	37	0	0	0	0	0	0	1105	5524	0	0	0	0	0	0	0

DLHA		**APU**	**CS**	**CT**	**GSS**	**COWRS**	**SPC**	**SPI**	**RTRWHS**	**ND**		**NADEP**	**IC**		**BP**		**CCB**		**Aff.**	
No	**A(ha)**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**A(ha)**	**No**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A(ha)**
0	0	155	155	155	12	10	5	4	2	662	132	155	0	0	0	0	0	0	6400	8
0	0	65	65	65	12	10	7	0	2	346	69	0	0	0	0	0	0	0	15200	19
0	0	52	52	52	8	10	10	0	2	120	24	0	0	0	0	0	0	0	0	0
2572	3	10	10	10	5	0	3	0	2	3060	312	10	0	0	177	0	0	0	2394	3
6678	8	13	132	132	52	0	4	39	2	3060	612	0	0	0	300	0	0	0	5154	6
0	0	29	29	29	0	3	0	0	2	106	21	29	0	0	0	0	0	0	1600	2
21460	27	70	70	70	16	0	14	141	2	3060	312	70	600	3000	2050	3	0	0	3120	4
1472	18	20	20	20	38	0	6	58	2	306	612	20	0	0	1150	1	0	0	3558	4

0										0										
0	0	27	27	27	5	4	0	0	2	99	20	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	7	0	0	2	0	0	0	0	0	0	0	0	0	3200	4
0	0	21	21	21	11	10	0	0	2	672	134	0	0	0	0	0	0	0	3280 0	4
2620	3	27	27	27	41	60	5	46	2	306 0	612	27	0	0	774	1	0	0	1953 0	24
0	0	79	79	79	13	0	0	0	2	330	66	0	0	0	0	0	0	0	0	0
0	0	20	20	20	6	10	0	0	2	102 5	205	20	0	0	0	0	0	0	4240 0	53
0	0	0	0	0	0	0	0	0	2	286	57	0	0	0	0	0	0	0	3200	4
1593 3	20	10	10	10	16	0	6	65	2	306 0	612	10	0	0	152	0	0	0	4182 0	52
0	0	47	38	38	14	68	2	30 9	2	235	47	38	0	0	12000	15	0	0	4000	5
1936 8	24.2 1	35	16 7	16 7	65	91	17	0	2	175	35	167	0	0	14192	17.7 4	0	0	1920	2.4
0	0	109	10 9	10 9	28	0	0	0	2	270	54	109	0	0	0	0	0	0	1437 0	18
0	0	52	52	52	8	0	0	0	2	107	21	52	0	0	0	0	0	0	0	0
0	0	109	10 9	10 9	28	0	0	0	2	270	54	0	0	0	0	0	0	0	1437 0	18

Block	GP Name	CO		SPD		LP		CBP		DLT		FBBT		M I		FP	LD	
TMV		No	A(ha)	No	A(ha)	No	L (m)	No	A (ha)	No	L (m)	No	A (ha)	No	A (ha)	No	No	A (ha)
	Kilchettipattu	0	0	0	0	221	1105	0	0	0	0	5	100	0	0	11	0	0
	Kilkachirapattu	2	0	11520	14.4	645	3225	0	0	323	1617	2	5	0	0	7	0	0
	Kilkaripur	3	0	0	0	222	1110	0	0	0	0	0	0	0	0	6	1	2
	Kolakkudi	6	37	0	0	0	0	0	0	324	1620	0	0	0	0	0	0	0
	Madurampattu	0	0	0	0	0	0	0	0	0	0	1	2.23	0	0	10	14	34
	Malappambadi	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Melathikkan	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Melchettipattu	5	0	0	0	146	730	0	0	0	0	0	0	0	0	7	2	6
	Melkachirapattu	0	0	0	0	0	0	0	0	951	4756	15	37	0	0	10	15	37
	Nachianandal	7	0	0	0	153	765	0	0	0	0	0	0	0	0	7	0	0
	Nadupattu	0	0	0	0	0	0	0	0	0	0	10	25	0	0	0	0	0
	Nallampillaipettai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nallavanpalayam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Naraiyur	6	50	0	0	379	1895	0	0	0	0	0	0	0	0	11	2	0
	Nariyapattu	8	0	0	0	176	880	0	0	0	0	4	10	0	0	7	0	0
	Navampattu	6	8	0	0	0	0	820	4100	1366	6831	3	7	2	5	10	1	2
	Nochimalai	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Panaiyur	6	26	0	0	0	0	800	4000	583	2917	9	22	3	7	10	4	10
	Pandithapattu	0	0	0	0	0	0	0	0	212	1060	10	25	0	0	10	16	41
	Parayampattu	3	0	0	0	1168	5840	0	0	0	0	3	7.5	0	0	4	0	0
	Pavithiram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DLHA		**APU**	**CS**	**CT**	**GSS**	**COWRS**	**SPC**	**SPI**	**RTRWHS**	**ND**		**NADEP**	**IC**		**BP**		**CCB**		**Aff.**	
No	**A(ha)**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**A(ha)**	**No**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A(ha)**
10240	12.8	20	23	23	6	67	1	0	2	100	20	23	59	294	0	0	0	0	0	0
0	0	35	63	63	17	43	2	0	2	175	35	63	159	794	1920	22.4	4480	22.4	13360	16.7
0	0	23	127	127	27	105	2	578	2	115	23	127	0	0	8000	10	0	0	1600	2
0	0	90	90	90	20	0	0	0	2	101	20	90	0	0	0	0	0	0	12066	15
0	0	0	0	0	0	7	1	0	2	0	0	0	0	0	0	0	0	0	1600	2
0	0	130	130	130	21	0	0	0	2	106	21	130	0	0	0	0	0	0	0	0
0	0	45	45	45	7	0	0	0	2	34	7	45	0	0	0	0	0	0	1308	2
0	0	25	17	17	8	72	2	185	2	125	25	20	0	0	6400	8	0	0	4800	6
0	0	49	49	49	4	15	0	0	2	233	47	49	0	0	0	0	0	0	77600	97

11200	14	40	72	72	20	46	40	0	2	200	40	72	0	0	0	0	0	0	16032	20.04
0	0	61	61	61	14	0	0	0	2	345	69	61	0	0	10236	13	0	0	0	0
0	0	66	66	66	14	0	0	0	2	365	73	66	0	0	0	0	0	0	1482	2
0	0	80	97	97	20	0	2	0	2	400	80	97	0	0	0	0	0	0	0	0
11464	14	58	16	16	5	0	2	58	2	612	122	16	457	2291	400	1	0	0	34264	43
0	0	10	27	27	0	26	2	0	2	50	10	27	0	0	0	0	0	0	0	0
3399	4	28	28	28	8	90	6	55	2	3060	612	28	0	0	533	1	0	0	12762	16
0	0	95	95	95	8	0	0	0	2	210	42	95	0	0	0	0	0	0	1632	1
10386	13	8	8	8	8	33	2	3	2	3060	612	8	0	0	1167	1	0	0	2082	3
0	0	95	95	95	5	5	4	0	2	205	41	95	0	0	0	0	0	0	0	0
0	0	61	30	30	3	63	2	0	2	305	61	30	1027	5135	0	0	0	0	2080	2.6
0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0

Block	**GP Name**	**CO**		**SPD**		**LP**		**CBP**		**DLT**		**FBBT**		**M I**		**FP**	**LD**	
TMV		**No**	**A(ha)**	**No**	**A(ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**L (m)**	**No**	**A (ha)**	**No**	**A (ha)**	**No**	**No**	**A (ha)**

	Pavupattu	7	0	0	0	1371	6855	0	0	0	0	0	0	0	0	7	0	0
	Periyakallapadi	6	49	18060	23	0	0	0	0	1427	7133	10	26	16	40	10	2	5
	Perumanam	6	163	0	0	0	0	80	400	1080	5399	58	144	8	20	10	29	72
	Savalpoondi	8	0	0	0	456	2280	0	0	179	894	8	20	0	0	10	0	0
	Su kilnachipattu	6	37	0	0	0	0	0	0	772	3862	0	0	0	0	0	0	0
	Su_andapattu	6	40	0	0	0	0	2000	10000	860	4299	10.8	27	12	30	10	2	5
	Su_kambupattu	4	0	0	0	0	0	0	0	160	800	6	0	0	0	6	1	1.2
	Su_nallur	3	13	0	0	0	0	0	0	160	800	6	0	0	0	6	1	0
	Su_pappambadi	0	0	0	0	0	0	0	0	0	0	1	2.5	0	0	6	0	0
	Su_valavetti	9	0	0	0	0	0	0	0	1473	7367	10	25	0	0	11	5	12
	T.valasai	4	0	0	0	0	0	456	2280	60	302	5	12.5	0	0	5	2	0
	T.valavetti	2	0	0	0	0	0	0	0	286	1432	4	10	0	0	2	1	4
	Talayampallam	6	48	0	0	0	0	0	0	860	4299	6	15	15	37	10	2	6
	Tandarai	7	0	0	0	0	0	0	0	1080	5401	43	107.5	0	0	0	17	44
	Thachchampattu	5	0	0	0	0	0	0	0	1210	6051	32	80	0	0	0	16	40
	Thenmathur	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Udayanandal	0	0	4000	5	0	0	0	0	328	1638	5	12	0	0	0	4	9
	Vengikkal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Veraiyur	0	0	0	0	0	0	0	0	545	2727	0	11	0	0	0	4	11
	Viruvilanginan	3	0	0	0	0	0	0	0	603	3014	42	105	0	0	0	18	44

DLHA		APU	CS	CT	GSS	COWRS	SPC	SPI	RTRWHS	ND		NADEP	IC		BP		CCB		Aff.	
No	A(ha)	No	No	No	No	No	No	No	No	No	A(ha)	No	No	L (m)	No	A (ha)	No	L (m)	No	A(ha)
0	0	109	81	81	12	87	2	0	2	545	109	81	1100	5502	26574	33.22	0	0	30000	37.5
19779	25	29	29	29	24	20	6	58	2	3060	612	29	0	0	495	1	0	0	12732	16
65346	82	22	22	22	11	0	8	76	2	3060	612	22	0	0	1402	2	0	0	5208	7
0	0	34	79	79	17	56	2	0	2	170	34	79	0	0	0	0	0	0	5208	6.51
0	0	90	90	90	4	0	0	0	2	190	38	90	0	0	0	0	0	0	0	0
16033	20	16	16	16	15	0	3	28	2	1390	278	16	0	0	858	1	0	0	13752	17
0	0	172	38	38	26	43	3	172	2	172	34	38	0	0	12000	15	0	0	960	1.2
0	0	141	45	45	30	43	3	104	2	260	52	45	0	0	12800	16	0	0	5600	7
0	0	55	55	55	14	10	0	0	2	70	14	55	0	0	0	0	0	0	7200	9
0	0	14	14	14	0	64	8	53	2	799	160	14	0	0	0	12	0	0	2436	3
0	0	37	14	14	10	55	3	180	2	290	58	14	0	0	800	1	0	0	56000	7
0	0	25	19	19	17	33	1	416	2	228	46	25	0	0	0	0	0	0	41883	52
1933	24	29	29	29	8	140	9	87	2	432	865	29	0	0	1988	2	0	0	6132	8

3										5										
0	0	20	20	20	21	58	5	31	2	460	92	20	0	0	0	0	0	0	29268	37
0	0	16	16	16	2	0	5	16	2	493	99	16	0	0	0	0	0	0	21720	27
0	0	62	62	62	13	0	0	0	2	65	13	62	0	0	0	0	0	0	0	0
0	0	30	30	30	5	0	10	0	2	215	43	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
0	0	23	23	23	18	10	0	0	2	167	33	23	0	0	0	0	0	0	0	0
0	0	19	19	19	30	39	5	30	2	459	92	19	0	0	0	0	0	0	32478	41

Abbreviations as follows:

CO- Composting
SPD-Silvi pasture Development
LP-Linear Plantation
CBP- Contour bund plantation
DLT- Drainage Line treatment
FBBT- Farm bund plantation with boundaries
MI- Micro irrigation
FP- Construction of farm ponds
LD- Land Development
DLHA- Dry land Horticulture area
APU- Azolla Production unit
CS- Cattle Shelter
CT- Cattle Trough
GSS- Goat Sheep shelter
COWRS- Construction of water resources (New open well)
SPC- Soak pit Community
SPI- Soak pit Individual
RTRWHS- Roof top rain water harvesting structures
ND- Nursery Development
NADEP- Vermi compost
IC- Irrigation channels
BP- Block plantation
CCB- Contour continuous bund
Aff.- Afforestation