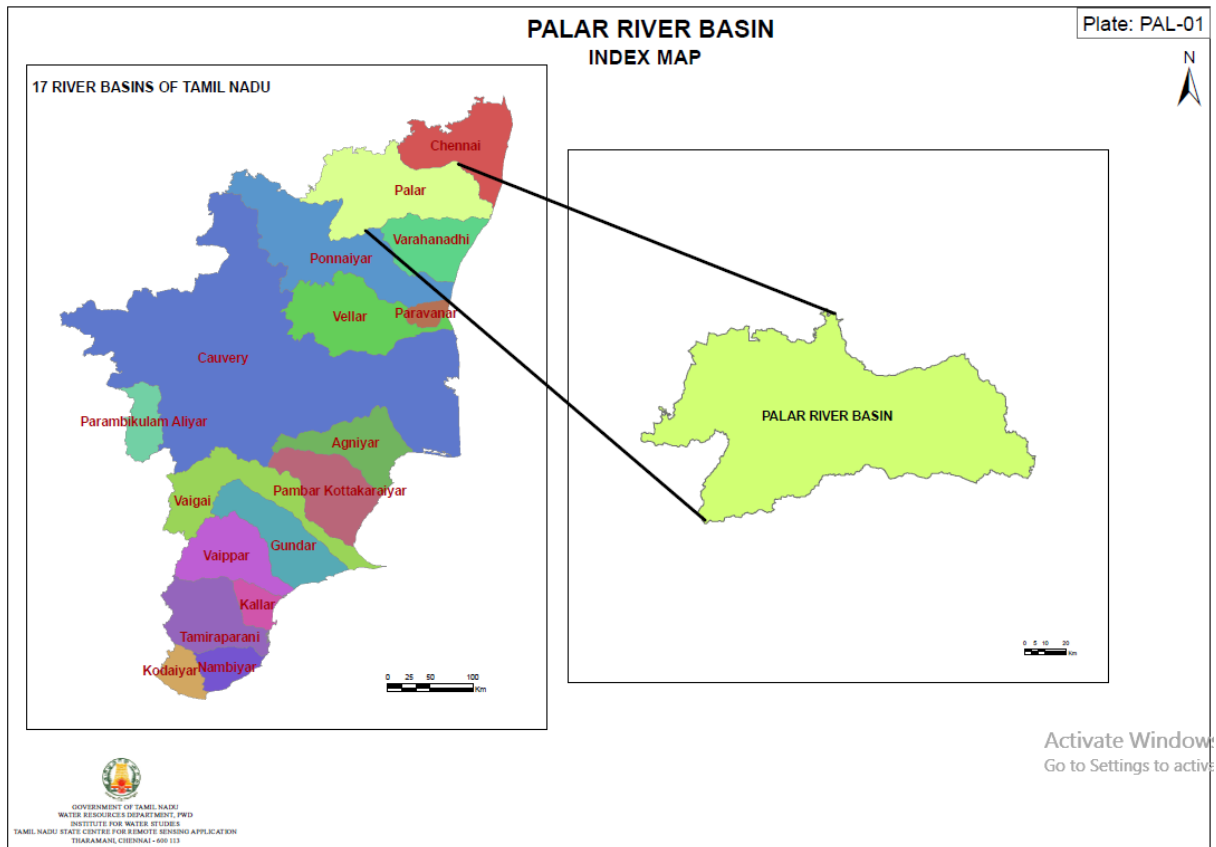


## Palar Report

The Palar River Basin is one of the major river basins in Tamilnadu. The main Palar River originates in Nandhi Durg, Kolar district at an elevation of 800 m above MSL in eastern part of Karnataka State, through Kolar and Bangarupet Taluks where it forms the very large Bethamangal tank, which is the main source of water supply to Kolar Gold Field and Bharath Earth Movers Limited. It leaves Karnataka border and flows through Andhra Pradesh for a small distance in Kuppam Taluk in Chittoor District and enters Vellore District of Tamil Nadu and passes through west of Vaniambadi Town and flows into the Bay of Bengal, east of Maduranthagam and south of Mahabalipuram.

The total area of Palar River Basin is 17,633.19 sq.km which includes an area of 3,123 sq.km in Karnataka state, 4,267 sq.km in Andhra Pradesh and 10273.19 Sq Km in Tamil Nadu. It lies between 78°24'43" E, 12°36'26" N and 80°09'54" E, 12°31'26" N from east to west and between 79° 14'23"E, 13°10'21" N and 78°41'51" E, 12°14'05" N in north to south. The Index map is given in Figure 1.



**Figure 1 Index Map of Palar River Basin**

The basin is bordered on the northwest by Andhra Pradesh state, northeast by Chennai River Basin, southwest by Penniayar river basin and northeast by Varahanadhi river basin. The base map is

given in Figure 2.

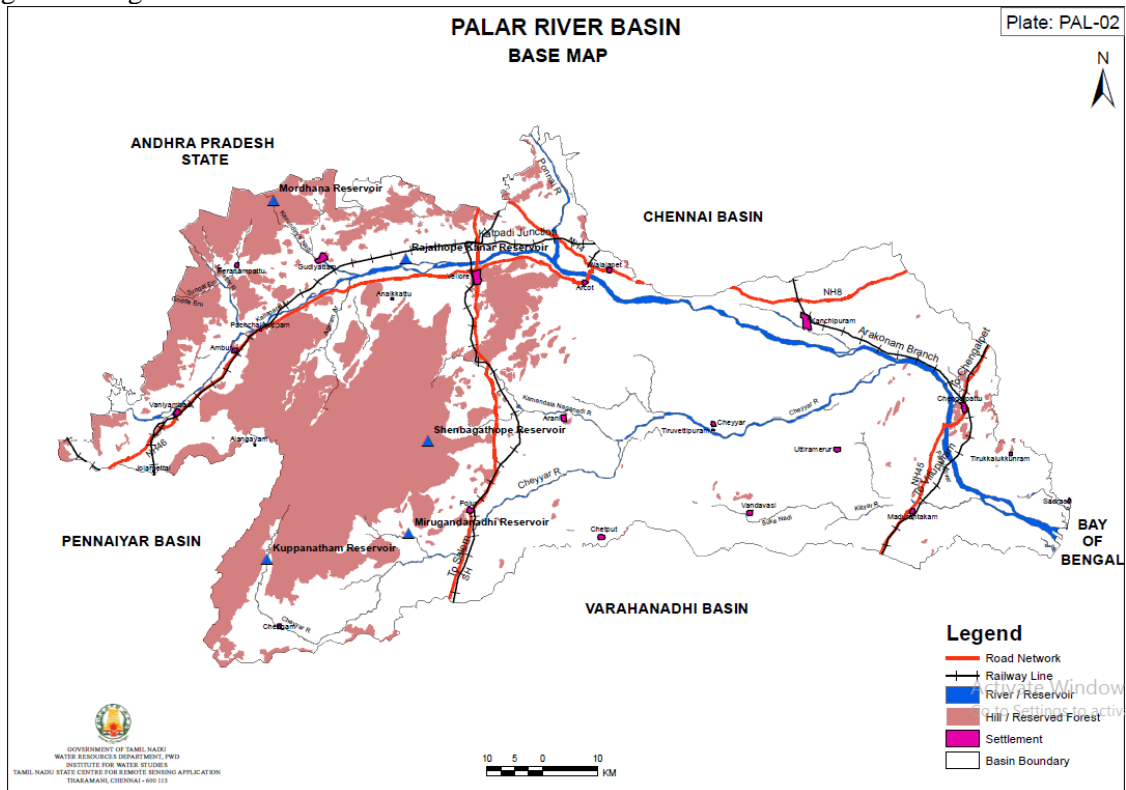


Figure 2 Base Map of Palar River Basin

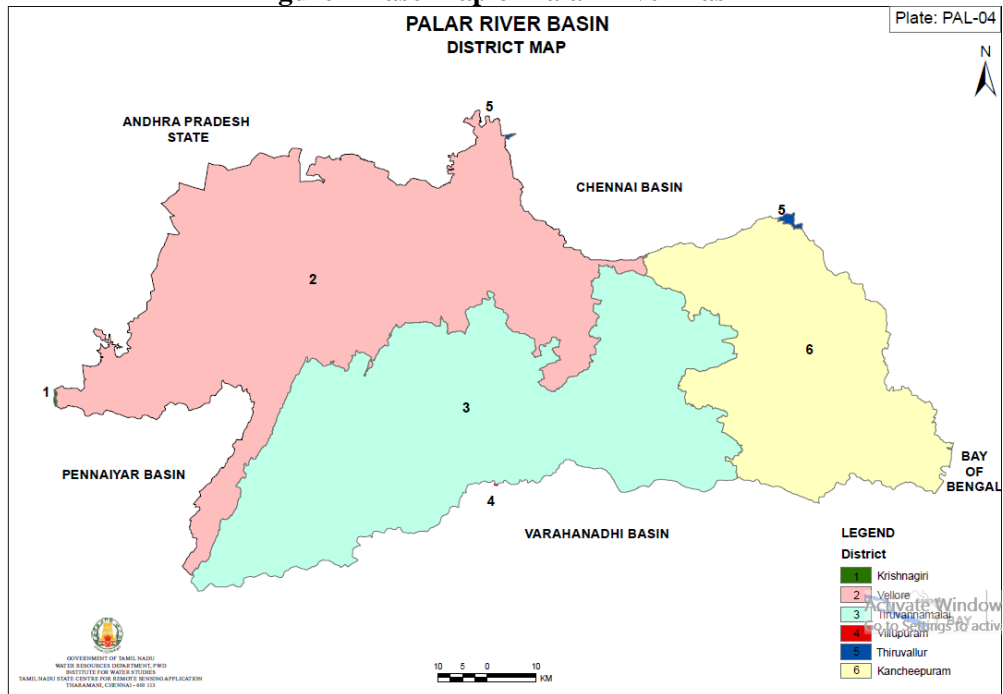
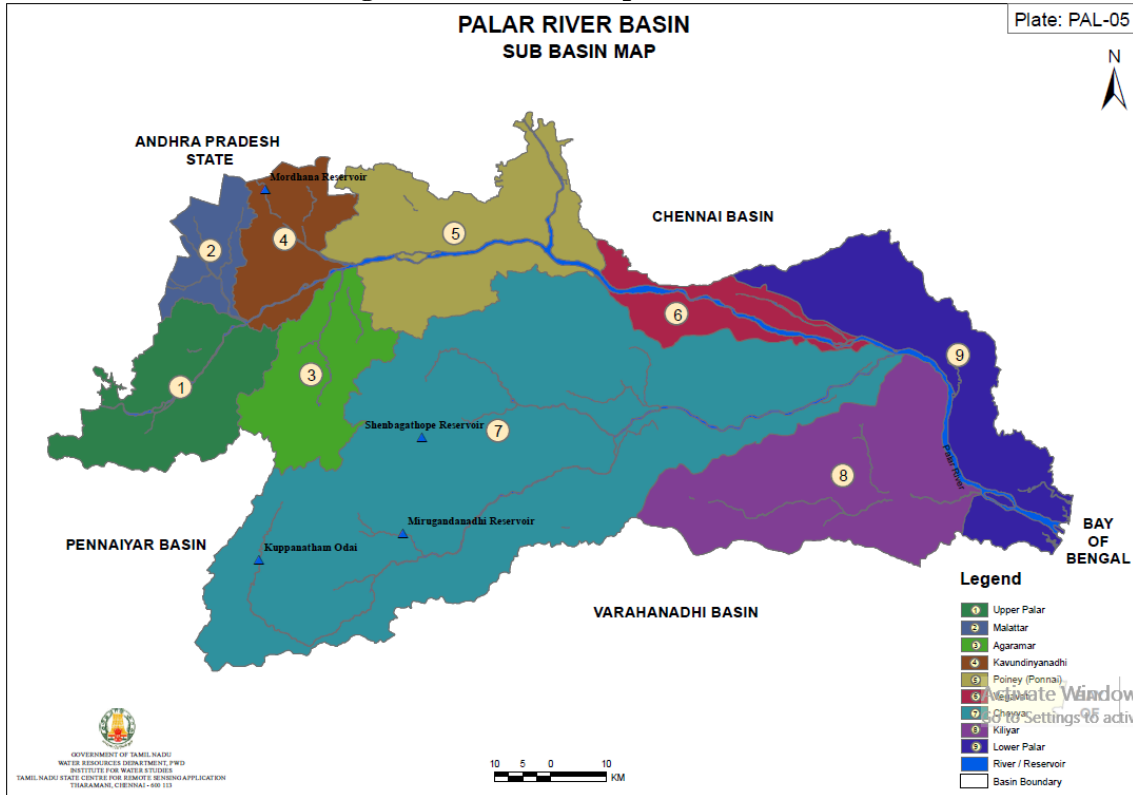


Figure 3 District Map of Palar River Basin

**Figure 4 Sub Basin Map of Palar River Basin**



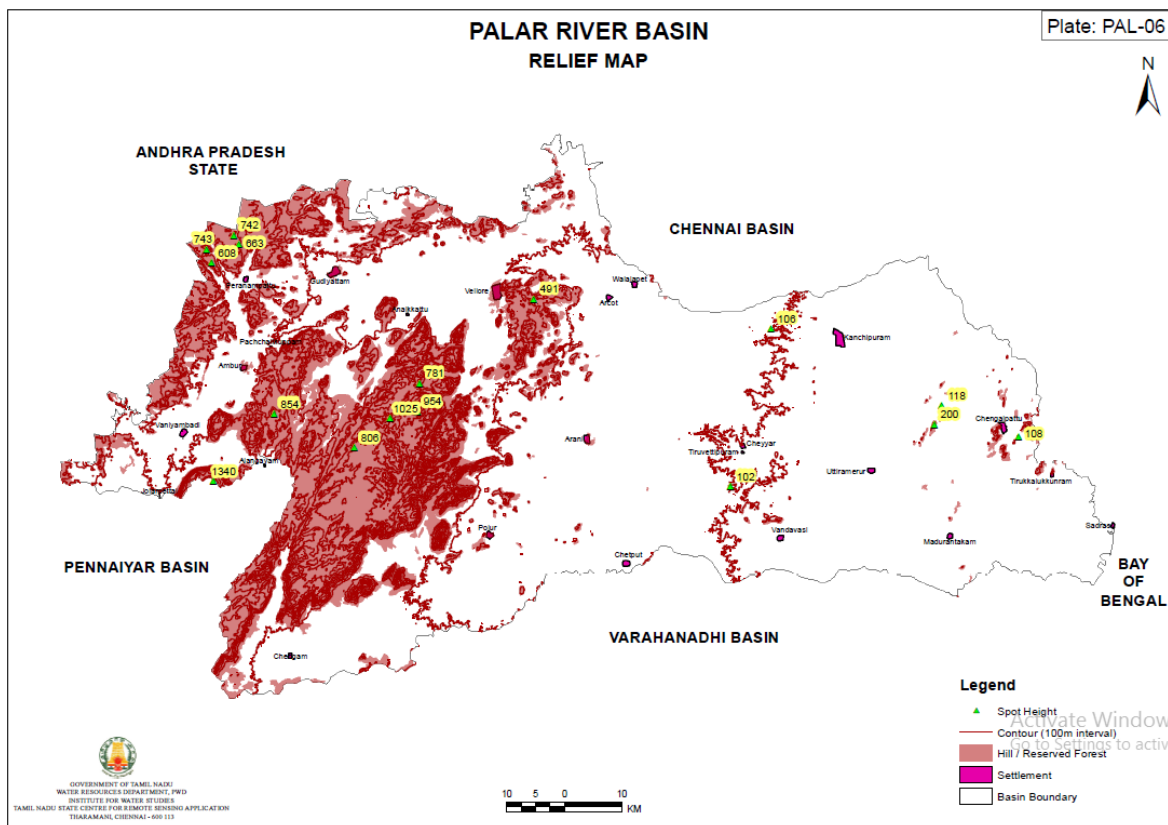
The basin covers Vellore, Thiruvannamalai, Kancheepuram, Thiruvallur, Villupuram and Krishnagiri districts of Tamilnadu. The important tributaries are 1.Poineyar 2.Kaudinya Nadhi 3.Malattar 4. Cheyyar 5.Agaramar 6.Kamandalar 7.Naganadhiar 8.Killiyar 9.Vegavathiar. In this basin there are 50 blocks either partly or fully falling in the above districts. The district map is given in Figure 3. The details of the sub basins and the districts covering the sub basins are given in Table 1.

**Table 1 Districts Falling in Palar River Basin**

Sl. No	Sub basin	Sub basin area sq. Km	Sl. No	District	District area falling in the basin sq.km
1	Agaramar	581.29	1	Vellore	520.22
			2	Tiruvannamalai	61.07
2	Cheyyar	4362.69	1	Kanchipuram	191.73
			2	Tiruvannamalai	3212.46

			3	Vellore	958.44
			4	Villupuram	0.07
3	Kavudinya nadhi	466.85	1	Vellore	466.85
4	Kiliyar	1322.08	1	Kanchipuram	824.86
			2	Tiruvannamalai	497.22
5	Lower palar	1035.24	1	Thiruvallur	7.82
			2	Kanchipuram	1027.43
			3	Vellore	0.001
6	Malattar	265.61	1	Vellore	265.61
7	Ponnai river (poiney)	1090.1	1	Vellore	1088.8
			2	Thiruvallur	1.3
8	Upper palar	738.16	1	Vellore	736.43
			2	Krishnagiri	1.72
9	Vegavathi	411.16	1	Kanchipuram	155.75
			2	Tiruvannamalai	112.99
			3	Vellore	142.41
<b>Total area sq. Km</b>		<b>10273.19</b>			<b>10273.19</b>

This basin is divided into three major topographical divisions namely, (i) the hill ranges of Eastern Ghats (ii) the plateau region and (iii) the coastal plains. The general trend of slope is steep to moderate. After rolling from the higher relief of hill ranges (305 to 91 m) a plain undulating terrain is mapped. It is narrow and combined with frequent low relief zones up to 76 to 91 m range. After 76 m it shows moderate to gently sloping open relief before the coastal zone. Near the coastal zone the relief is very less (0.5 m). It is almost a plain topography gently sloping towards the Bay of Bengal. The relief map is shown in Figure 5.

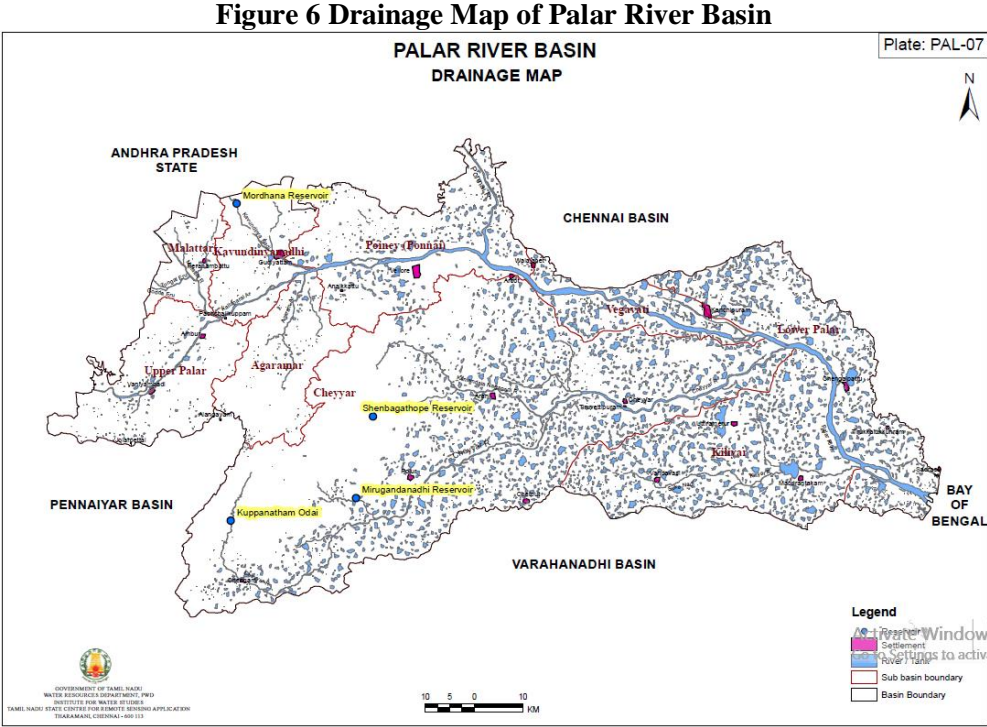


**Figure 5 Relief Map of Palar River Basin**

When the water table was near bed level of river there were a number of spring channels in the bed of the river, and during a large part of the year these spring channels dries out and groundwater in

the deep, and sandy river bed are the main source for farmers and for drinking water supply schemes.

The drainage map is shown in Figure 6.

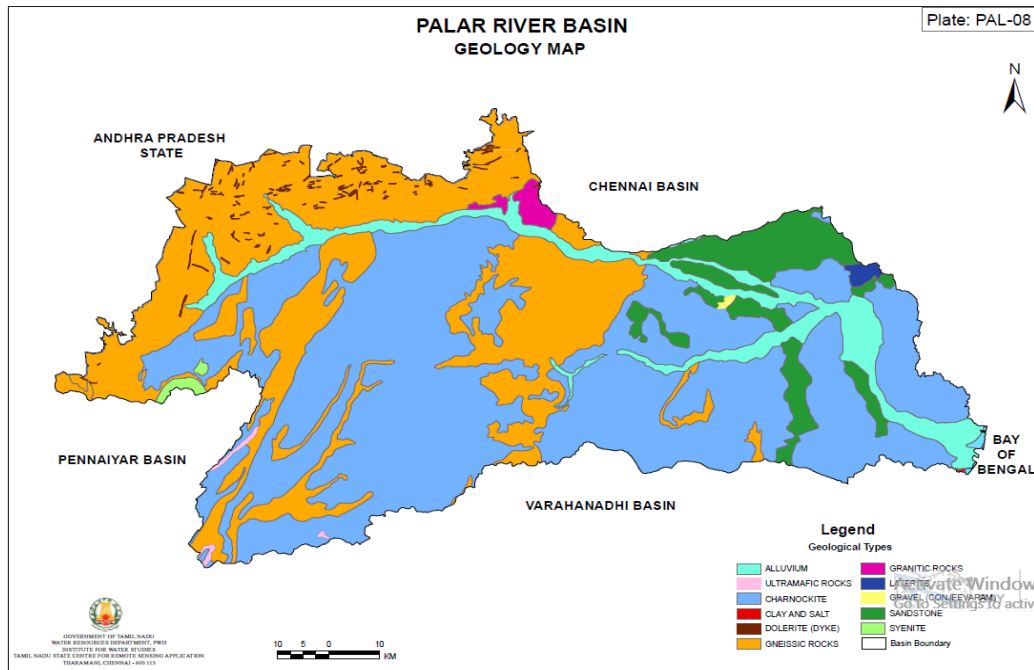


The geology of the Palar Basin is presented in Figure 7. Out of the total area extent, 10273.19 sq.km is occupied by Archaean crystalline formations like Gneisses and Charnockites and the remaining 1383 sq.km is predominantly covered by sedimentary formations such as upper Gondwana, Alluvium

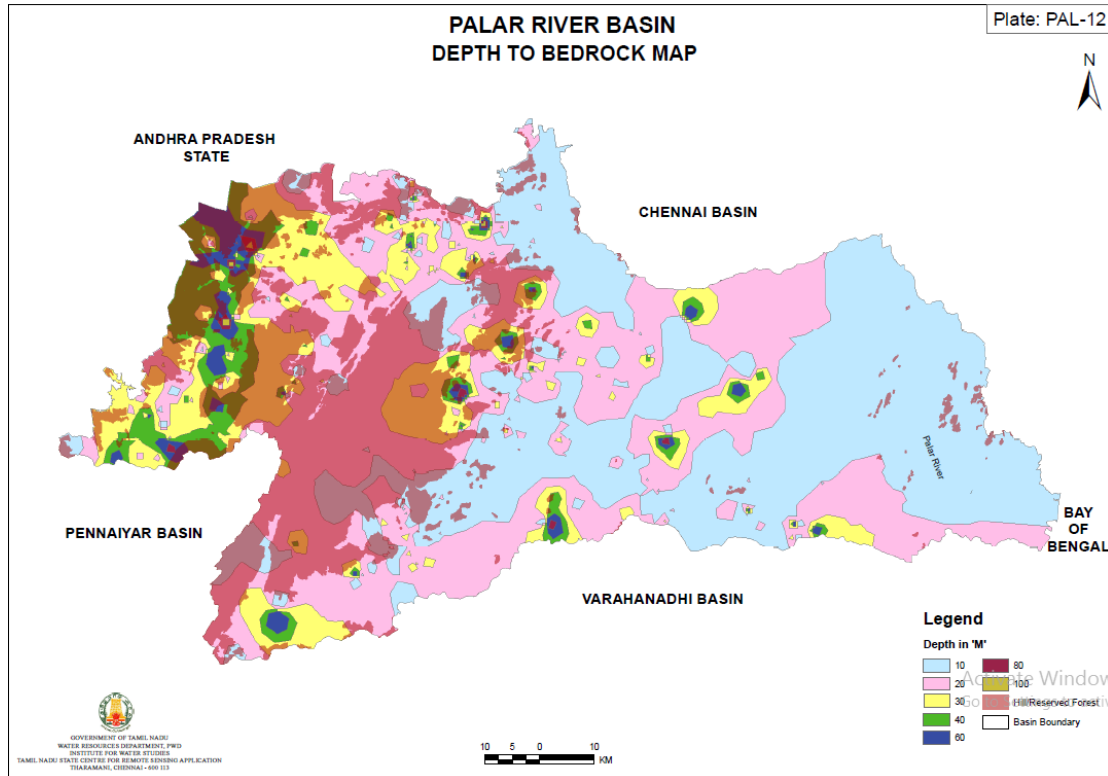
including

coastal

deposits.



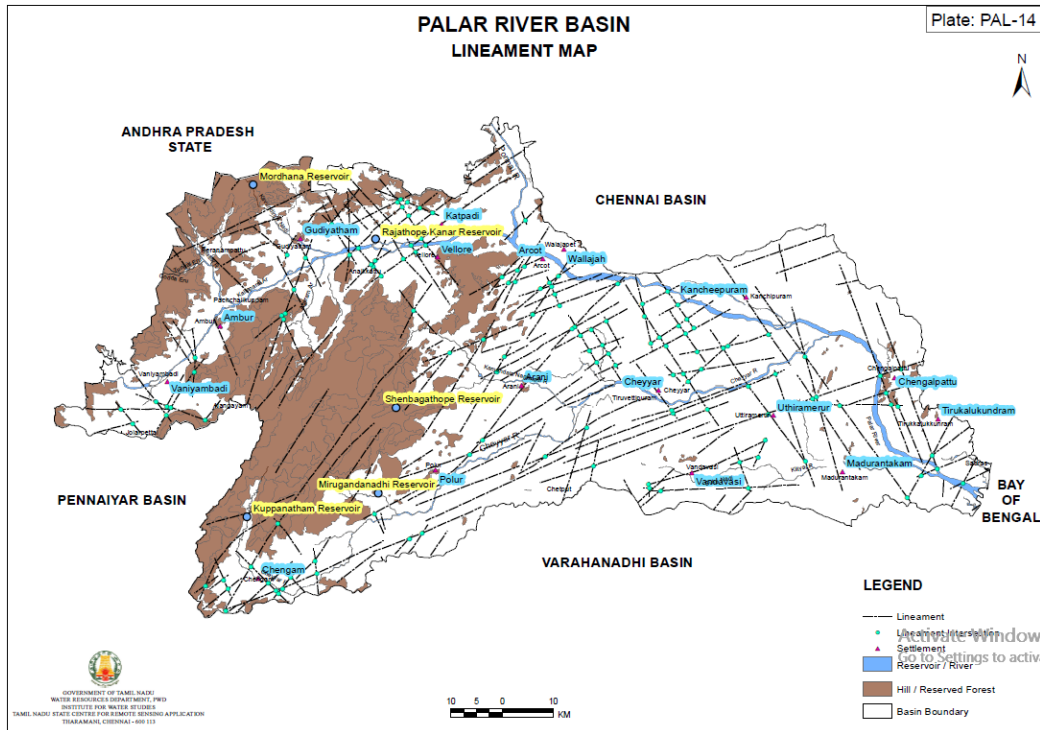
**Figure 7 Geology Map of Palar River Basin**



**Figure 8 Depth to Bedrock Map of Palar River Basin**

Groundwater in the basin occurs in 1) Unconsolidated and semi consolidated formations and 2) Weathered, fissured and fractured crystalline rocks. The ground water occurs under water table conditions and the depth of the wells ranges from 5 to 15 m bgl. The depth to water level ranged from 2.89 to 8 m bgl during May 2006 and 1.05 to 3.40m bgl during Jan'2007. The unconsolidated alluvium occurs mainly along the banks of Palar and Cheyyar rivers and the sand layers of this alluvium form the potential aquifer. Between Walajabad and Kancheepuram, small diameter dug wells tap the alluvium with depths ranging between 6 and 12 m bgl. Ground water in fissured crystallines is developed by means of dug wells, dug-cum-bore wells and bore wells. The wells range in depth between 6 and 17.00 m bgl. The depth to water level ranged from 3.50 – 8.34 m bgl during May 2006 and 1.32 – 7.53 m bgl during January 2007. The depth to bed rock map is given in Figure 8.





**Figure 9 Lineament Map of Palar River Basin**

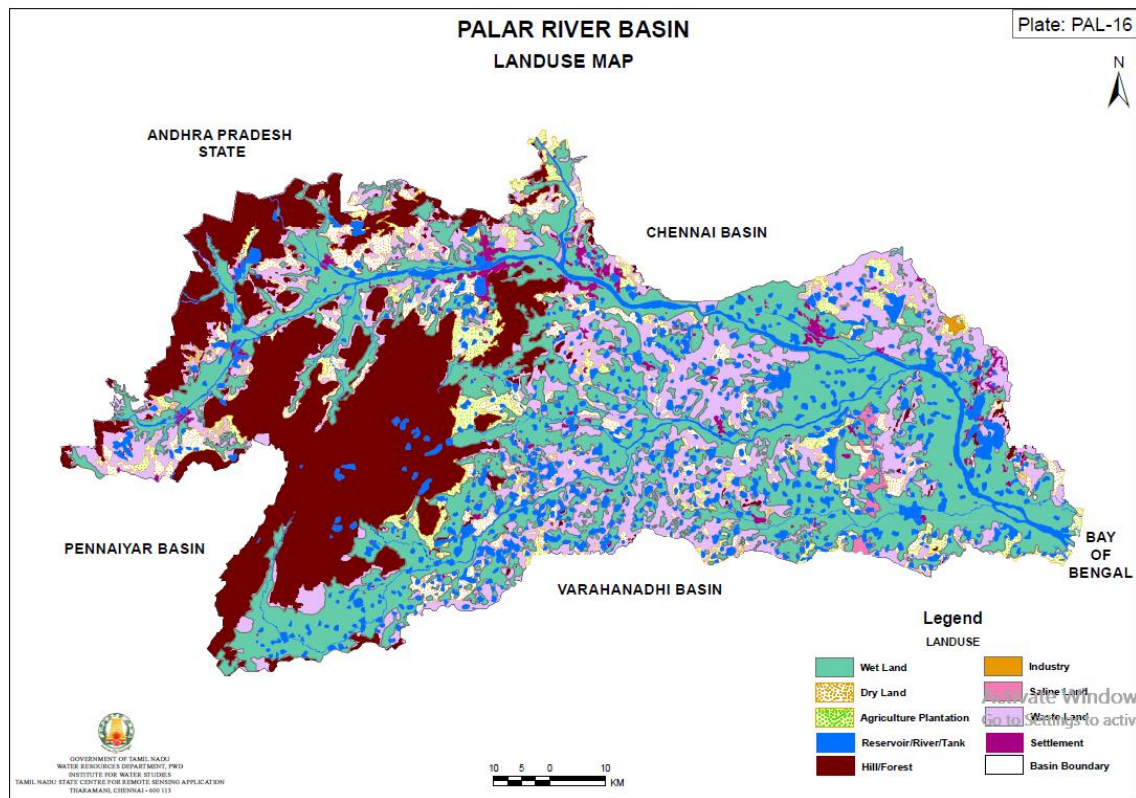
The pattern of dyke, joints and fractures shows that the area was once subjected to much structural disturbances as seen in the outcrops of dykes and rocks. One prominent set of dyke is running south of Uttiramerur - Wandiwash road in E -W direction to a length of 5.5 km with a width of 10-15 m. Three major important faults are noticed in the basin area such as 1. Amudi fault 2. Javadi hills fault and 3. Malattar fault. These faults occupy southwestern part of the basin. Minor faults are presumed along the Cheyyar river course near Polur in NE-SW direction. Similarly river Malatar follows fault line in NW-SE direction. The lineament is provided in Figure 9 for further reference.

The land use map of the Palar river basin is shown in Figure 10. The various classes used in the classification of the basin area is given in Table 2

**Table 2 Spatial Distribution of Land use/cover**

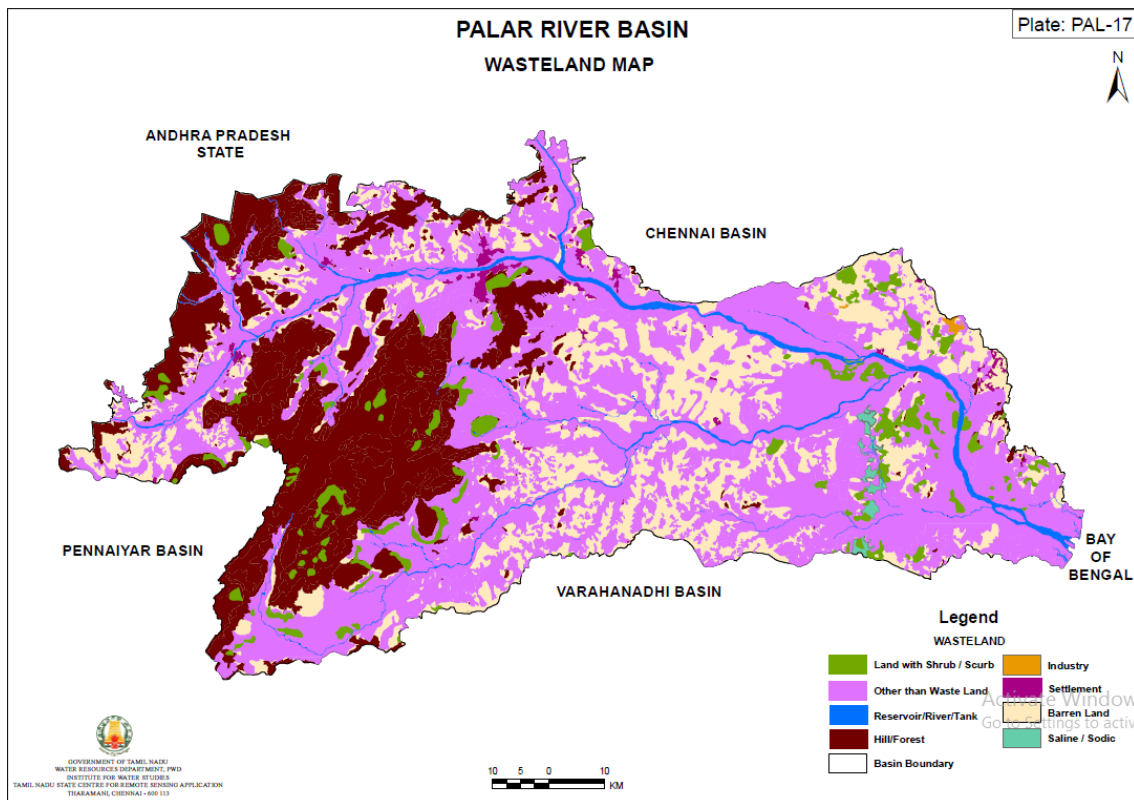
Land Use Category	1998		2013	
	Area in Sq.km	% of Total	Area in Sq.km	% of Total
1. Built-up land	85.1	0.78%	188.14	1.83%
1. Major settlements and Industries				
2. Agricultural land	156	1.43%	746.2	7.26%
1. Dry crop				
2. Wet crop				

3. Plantation	124.7	1.13%	513.75	5.00%
<b>Sub-Total</b>	<b>7,009.2</b>	<b>63.84%</b>	<b>5487.65</b>	<b>53.42%</b>
3. Forest				
1. Hills and forest	2,335.9	21.28%	2638.67	25.69%
4. Wasteland				
1. Barren	762.1	6.94%	1081.59	10.53%
2. Saline	183.2	1.68%	230.13	2.24%
<b>Sub-Total</b>	<b>945.3</b>	<b>8.61%</b>	<b>1311.72</b>	<b>12.77%</b>
5. Water bodies	603.1	5.49%	647.00	6.30%
<b>Total</b>	<b>10,978.6</b>	<b>100.00%</b>	<b>10,273.18</b>	<b>100.00%</b>



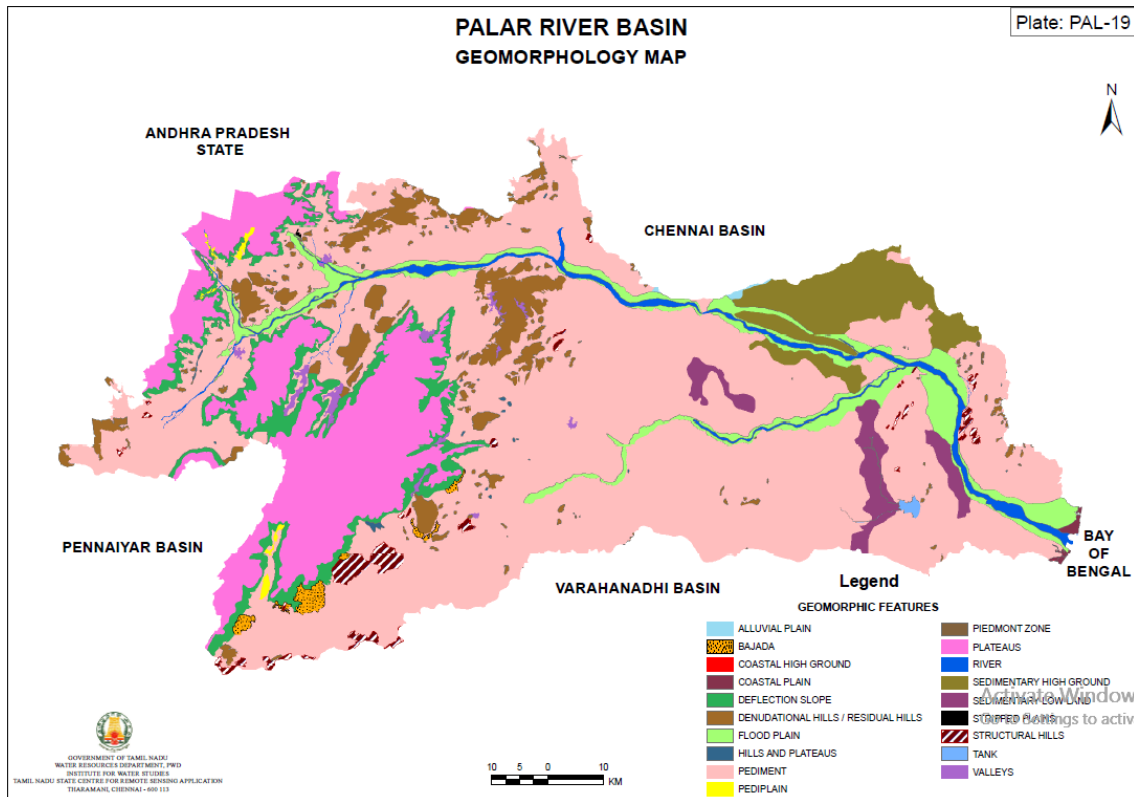
**Figure 10 Landuse Map of Palar River Basin**

Waste land mapping is done to explore the wasteland categories and to plan to develop the waste land into productivity land by utilizing the available water adopting water management techniques. The wasteland map of the Palar Basin is given in Figure 11.

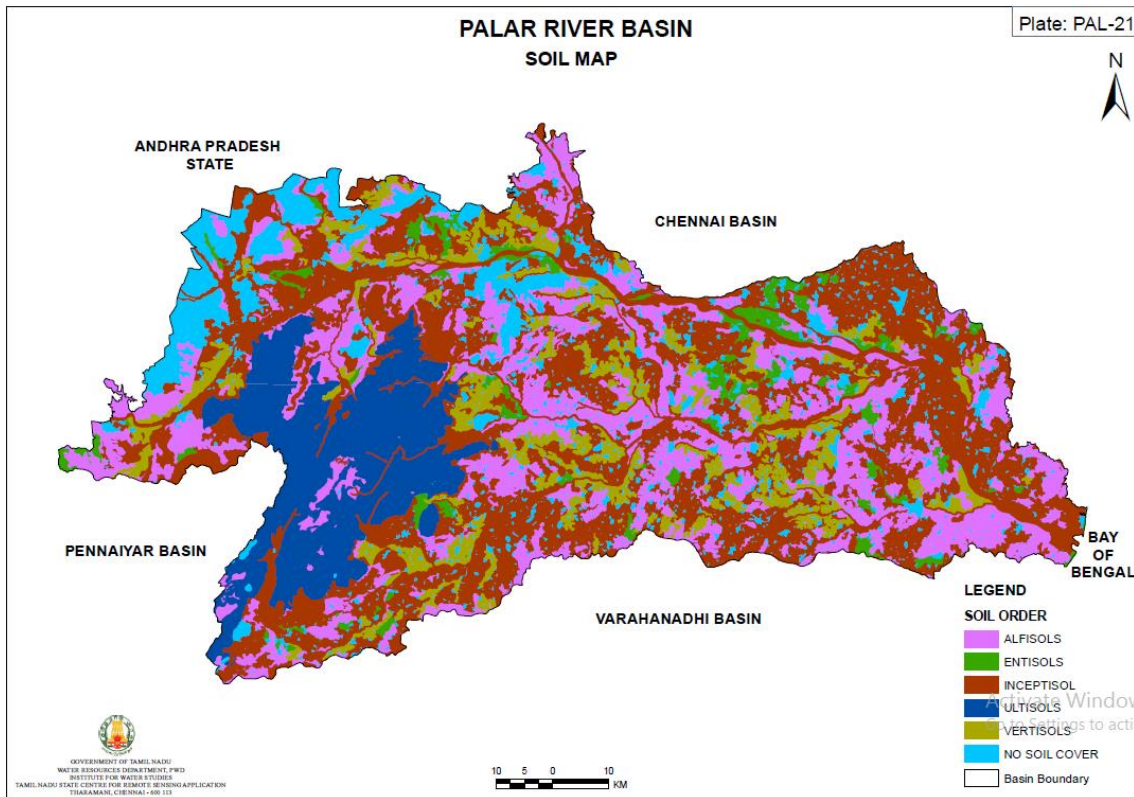


**Figure 11 Wasteland Map of Palar River Basin**

The Palar basin is mostly covered by structural hills and pediplain areas. Fluvial landforms are extensively covering the Palar river and its environ in this area while denudation land forms are developed in the hilly areas. The river alluvium seen along the course of Palar River on its banks as well as on the interfluvial zone between the confluence of Poini river and Cheyyar river with Palar. The sandstone and shale are common around the low-lying areas of the river Palar and Cheyyar confluence. These sandstones are sedimentary in deposition and occur as beds in patches. The beds are composed mainly of white to pink clays, shales and feldspathic sandstone. Landforms of fluvial origin occur predominantly in the eastern part of the study area like maduranthagam, uthiramerur, vayalur, kalpakkam, and thirukalukundram areas. The Geomorphology map is given in Figure 12.

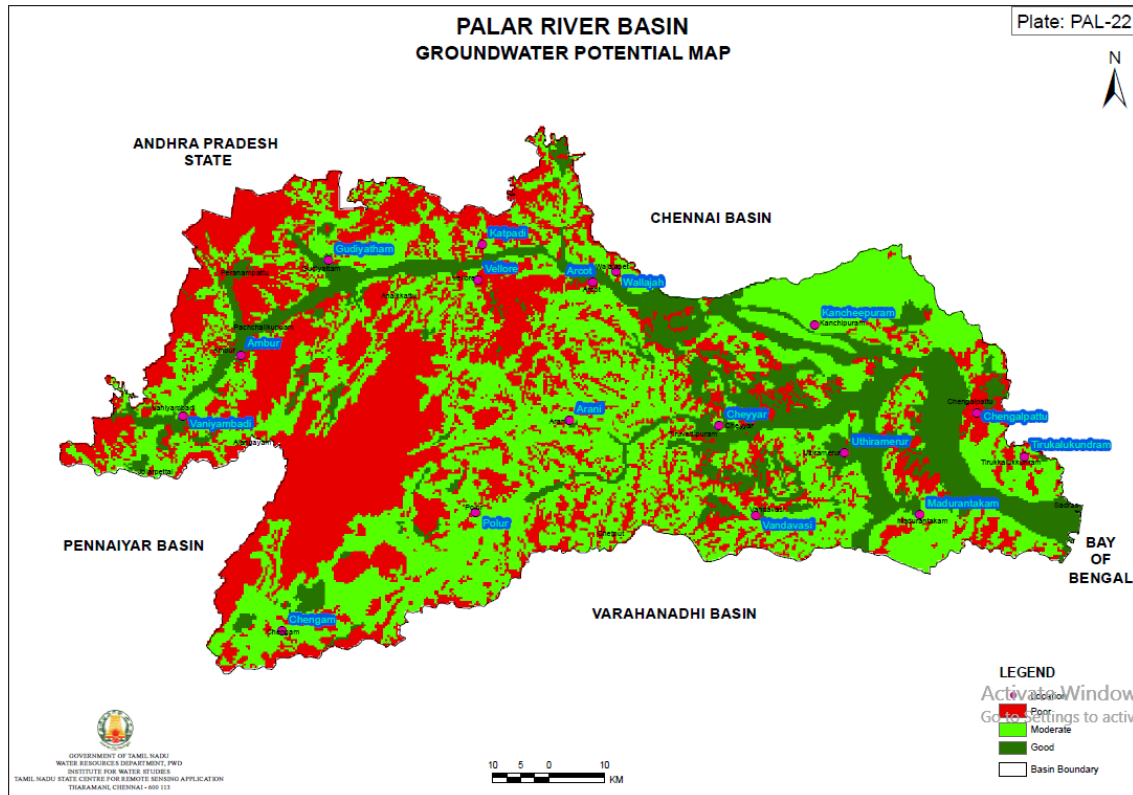


**Figure 12 Geomorphology Map of Palar River Basin**



**Figure 13 Soil Map of Palar River Basin**

The predominant soil order found in this river basin is Inceptisol, Alfisol, Entisol, Ultisols and Vertisol. Due to different stages of weathering of parent material, the above soil types are met with in combination. The chief order of soil seen here is Inceptisol. The Soil map of the Palar Basin is given in Figure 13.



**Figure 14 Groundwater Potential Map of Palar River Basin**

The Groundwater Potential map of the Palar river basin is shown in Figure 14. The moderate and poor ground water potential zones occupied major portion in Palar river basin area. The good ground water potential zones are identified along the river course. Poor ground water potential zones are encountered in the north western part of the basin area including Vaniyambadi, Ambur, Gudiyatham, Vellore and surrounding areas. The moderate ground water potential zones are occurred in the central and north eastern portion of the basin including Arani, Arcot, Gudiyatham, Polur and Kancheepuram areas. Good potential zones are identified along the river alluvium, flood plain areas of the basin in and around Cheyyar, Uthiramerur, maduranthagam and Chengam areas.

The district wise category of agriculturists/ farmers in Palar Basin based on the land holdings size is given below. Marginal farmers accounts for 81.46 % in Palar Basin. The Landholding details of the Palar river basin is given in Table 3.

Sl. No.	Name of the District	Number of Farmers					Total
		Marginal (less than 1 Ha)	Small (1 to 2 Ha)	Semi medium (2 to 4 Ha)	Medium (2 to 5 Ha)	Larger (5 Ha & above)	
1	2	3	4	5	6	7	8
1	Kancheepuram	181807	25095	9699	2961	464	220026
2	Tiruvallore	185087	22525	9049	2618	293	219572
3	Vellore	313666	51257	16615	3373	174	385085
4	Tiruvannamalai	356455	68175	20126	3445	164	448365
<b>Total</b>		<b>1037015</b>	<b>167052</b>	<b>55489</b>	<b>12397</b>	<b>1095</b>	<b>1273048</b>
<b>Percentage to Total (%)</b>		<b>81.46</b>	<b>13.12</b>	<b>4.36</b>	<b>0.97</b>	<b>0.09</b>	<b>100.00</b>

**Table 3 Landholding Details of Palar River Basin**

## Hydrometeorology

Twenty three rain gauge stations in Palar basin are considered for analysis. Three weather stations (full climate stations) are there in this basin. All the rain gauge stations and climate stations are maintained by Public Works Department.

Palar river basin lies within the tropical monsoon zone.

### **Raingauge stations considered for Run-off analysis**

<b>S. No.</b>	<b>Name of subbasins</b>	<b>Subbasin area (Sq.Km.)</b>	<b>Raingauge stations</b>
1	Upper Palar	738.16	Ambur, Jolarpettai, Vaniyambadi
2	Malattar	265.61	Ambur
3	Agaramar	581.29	Alangayam
4	Kavundinyanadhi	466.85	Gudiyatham
5	Poiney	1090.1	Poiney anicut, Aliyabad, Ranipet, Vellore
6	Vegavathi	411.16	Kancheepuram, Kaveripakkam
7	Cheyyar	4362.69	Arni, Cheyyar anicut, Chengam, Dusiyankulam, Elathur anicut, Kovilur anicut, Polur, Palar anicut
8	Kiliyar	1322.08	Maduranthagam, Vandavasi.
9	Lower Palar	1035.24	Chengalpattu, Panankattucheri, Panapakkam, Sriperumbudur
<b>Total</b>		<b>10273.18</b>	

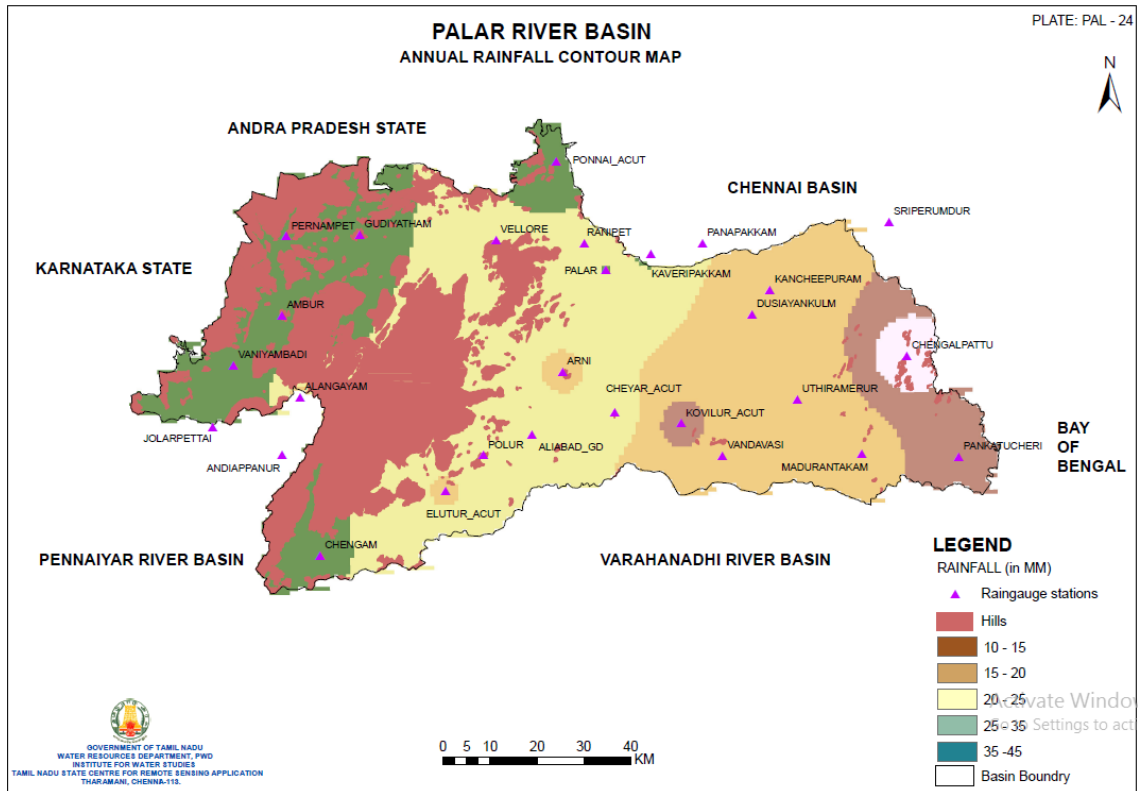
The 25%, 50%, 75% and 90% dependable rainfall for Palar basin are tabulated below in Table 5.

**Table 5 Sub basin wise Dependable Rainfall (in mm) in Palar River Basin**

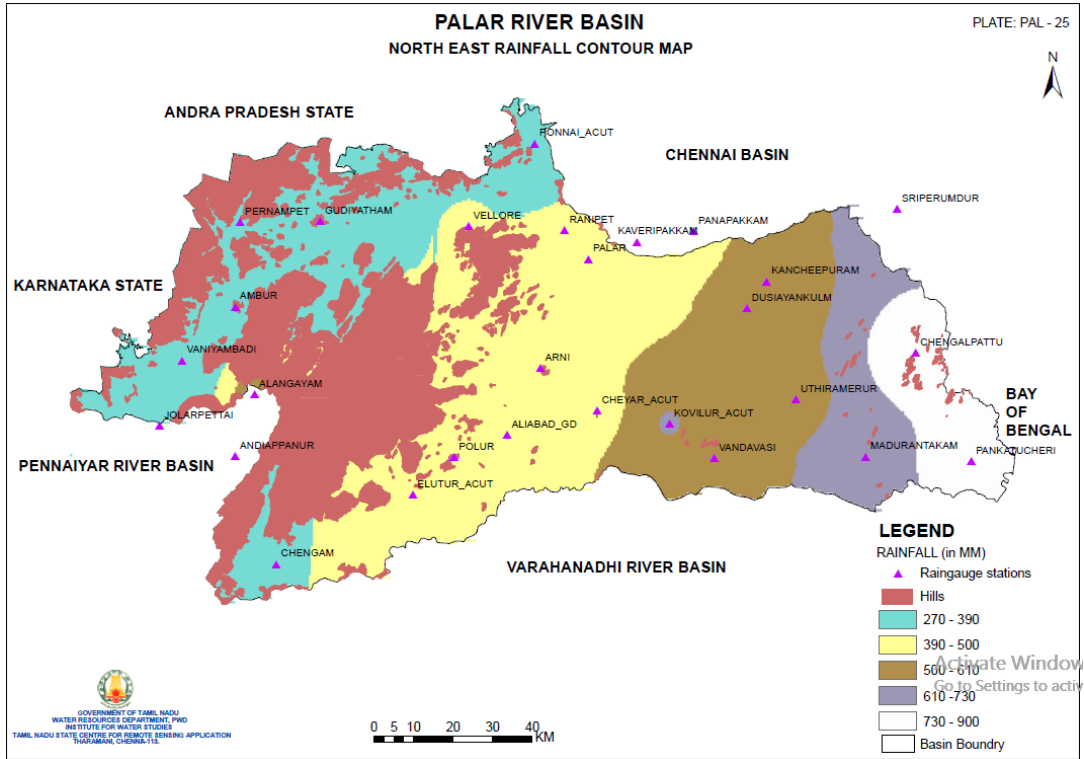
<b>Sl. No.</b>	<b>Sub basin</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>	<b>90%</b>
1	Upper Palar	139.51	107.30	86.78	52.12
2	Malattar	52.17	38.97	31.68	19.47
3	Agaramar	182.86	104.03	62.20	33.51
4	Kavundinyanadhi	92.55	76.72	64.14	46.53
5	Poiney	245.29	197.81	156.64	122.54
6	Vegavathi	106.98	82.18	66.73	54.49
7	Cheyvar	1048.35	867.82	771.83	553.91
8	Kiliyar	382.34	274.89	229.70	161.86
9	Lower Palar	325.45	250.39	204.42	145.61

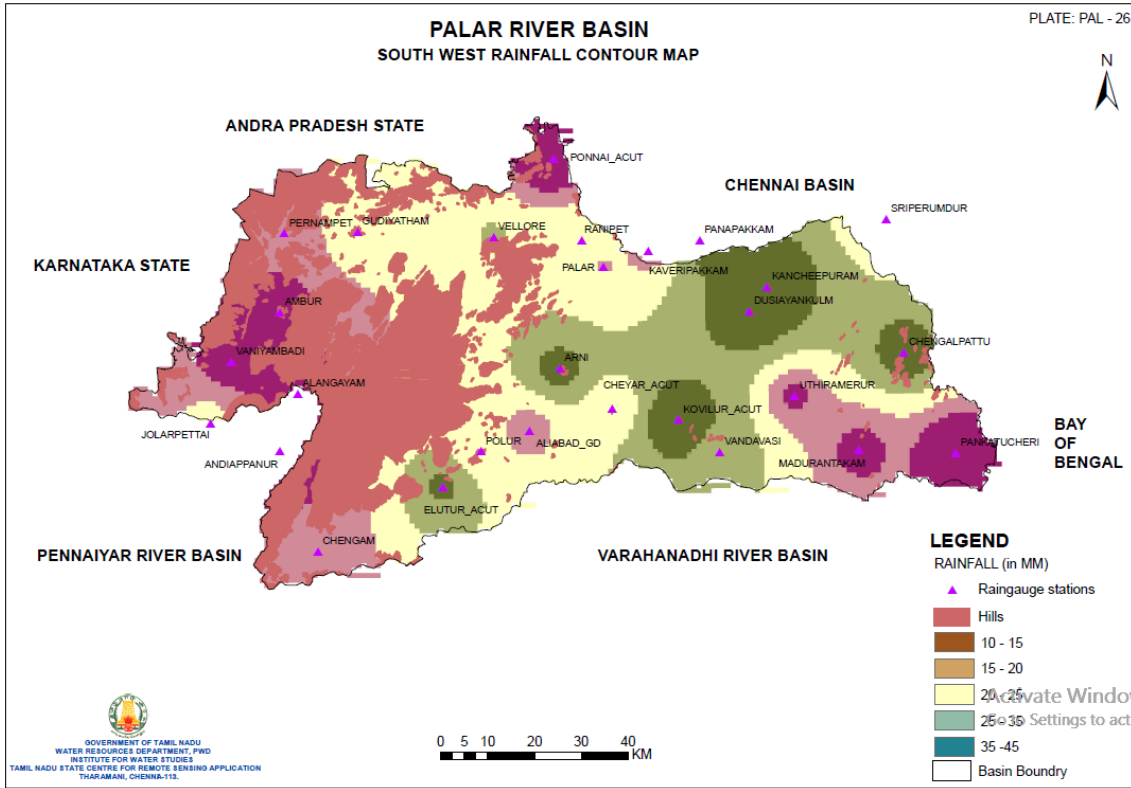


The Annual Rainfall contour map, North East rainfall and South East Rainfall contour maps are given in Figure 15, 16 and 17 below.



**Figure 15 Annual Rainfall Contour Map**





**Figure 17 South West Rainfall Contour Map**

The maximum, minimum and average annual rainfall for the nine sub basins have been given below.

- Maximum Annual Rainfall of this basin is 2854.10 mm in Agaramar (1985-86)
- Minimum Annual Rainfall of this basin is 203.5 mm in Kavundhiyanadhi (1971-72)
- Average annual rainfall of the Palar basin is 1042.60 mm

Three weather stations namely Karunguzhi , Dusiayangarkulam and Gollapally are considered for analysis. The climatological values of this river basin are given in table 7.

Eto values (mm/month) of FCS for Palar basin													
Name of the basin & FCS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Average
Palar basin -	118	139	178	190	202	160	156	148	136	114	95	97	144.

Karunguli FCS	.4	.4	.5	.9	.0	.8	.5	.5	.3	.9	.3	.9	9
Palar basin - Thusiyankulam FCS	97.0	108.6	133.3	140.7	139.2	120.9	116.9	111.6	104.7	100.4	84.3	89.6	112.3

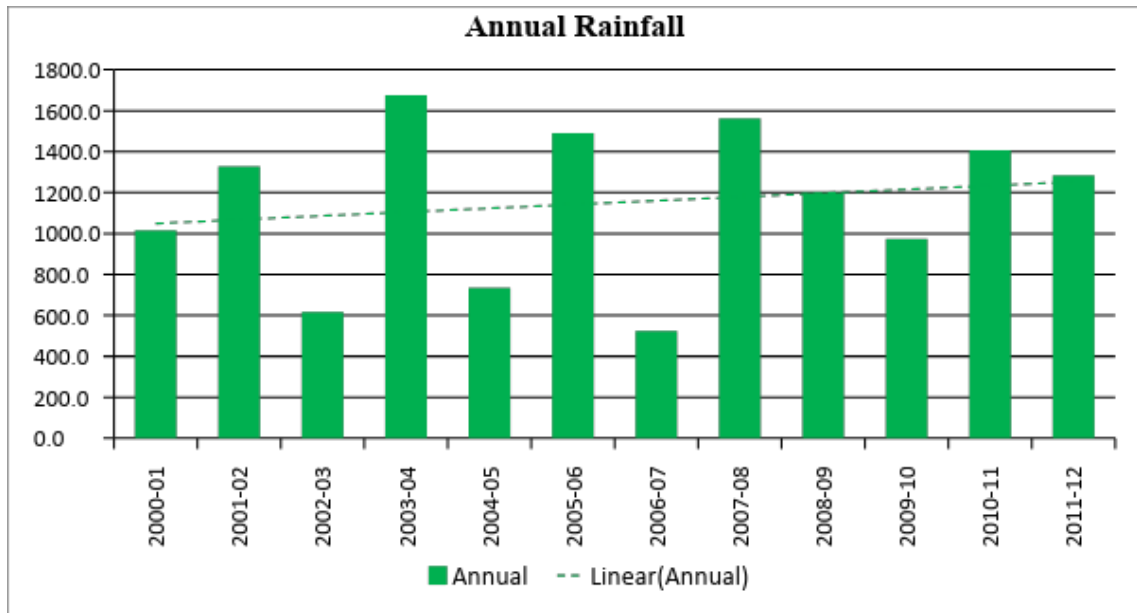
**Table 7 Climatological Parameters**

SI. No	Climatological Parameter	Karunguzhi	Dusiayangarkulam	Gollapally
1	Average monthly temperature Maximum in ° Celsius	32.55	32.33	30.87
2	Average monthly temperature Minimum in ° Celsius	28.22	24.45	23.24
3	Average mean temperature in ° Celsius	30.39	28.39	27.06
4	Average relative humidity in %	73.88	69.90	82.65
5	Average wind velocity in km/hour	2.14	1.72	3.24
6	Average Sunshine hours / day	6.21	5.19	5.61
7	Pan Evaporation in mm/month	154.20	123.85	114.17

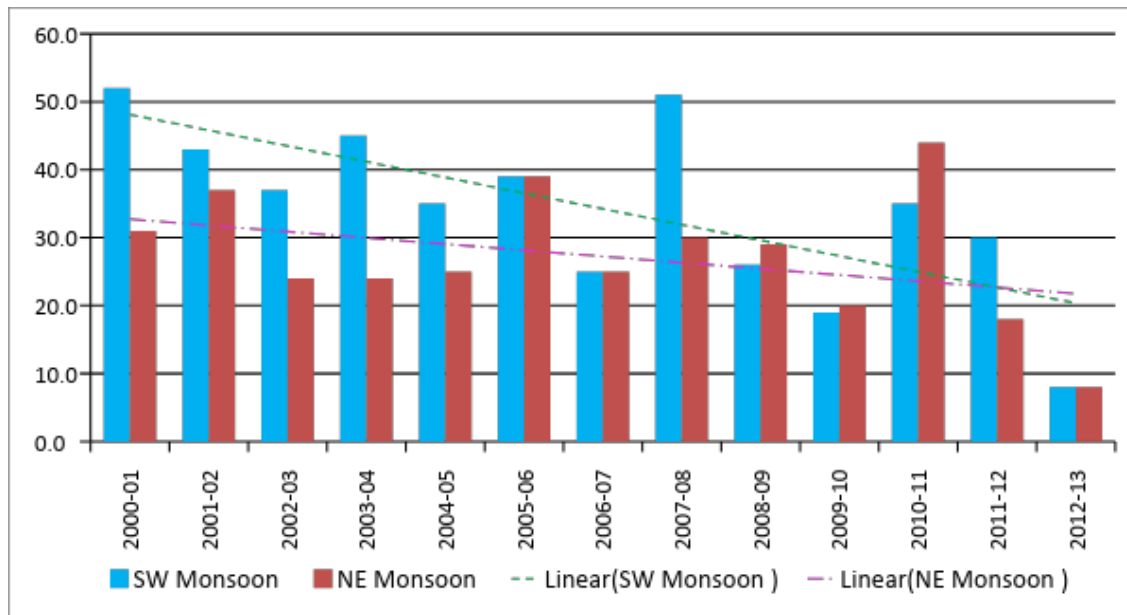
Flash flood is more likely to occur, especially in urban areas with poor drainage network. Although rainfall is more, drought is also likely to occur, as the rainfall come in intense spells. Crop loss due to flood and drought, both will be more. Groundwater recharge will be poor due to high intensity of rainfall. Runoff or water yield will be more and infiltration/percolation will be less.

Analysis results of climatic data (2000-2012) of the weather station in Dusiayangarkulam is as follows and given in Figure 18 and 19.

**Figure 18 Results of climatic data - Dusiyangarkulam (2000 – 2012)**



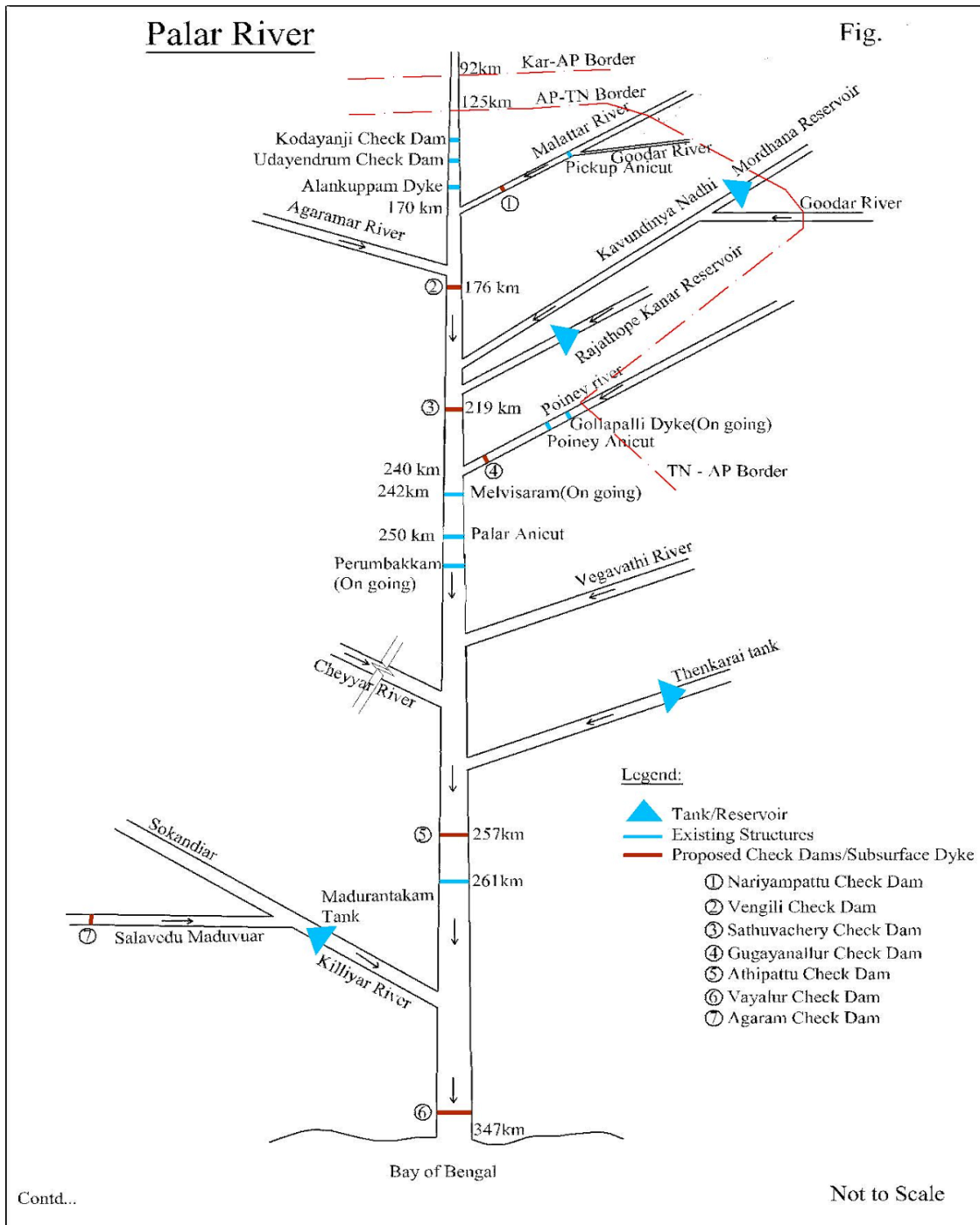
**Figure 19 Rainy days in Palar River Basin**



### Surface Water Potential

The Palar and Cheyyar river flow diagrams are given in **Figure 20** and **Figure 21**. The Irrigation System Map showing the locations of Reservoirs and Anicuts are given in **Figure 22**.

**Figure 20 Flow Diagram of Palar River Basin**



# Cheyyar River of Palar River

Fig.

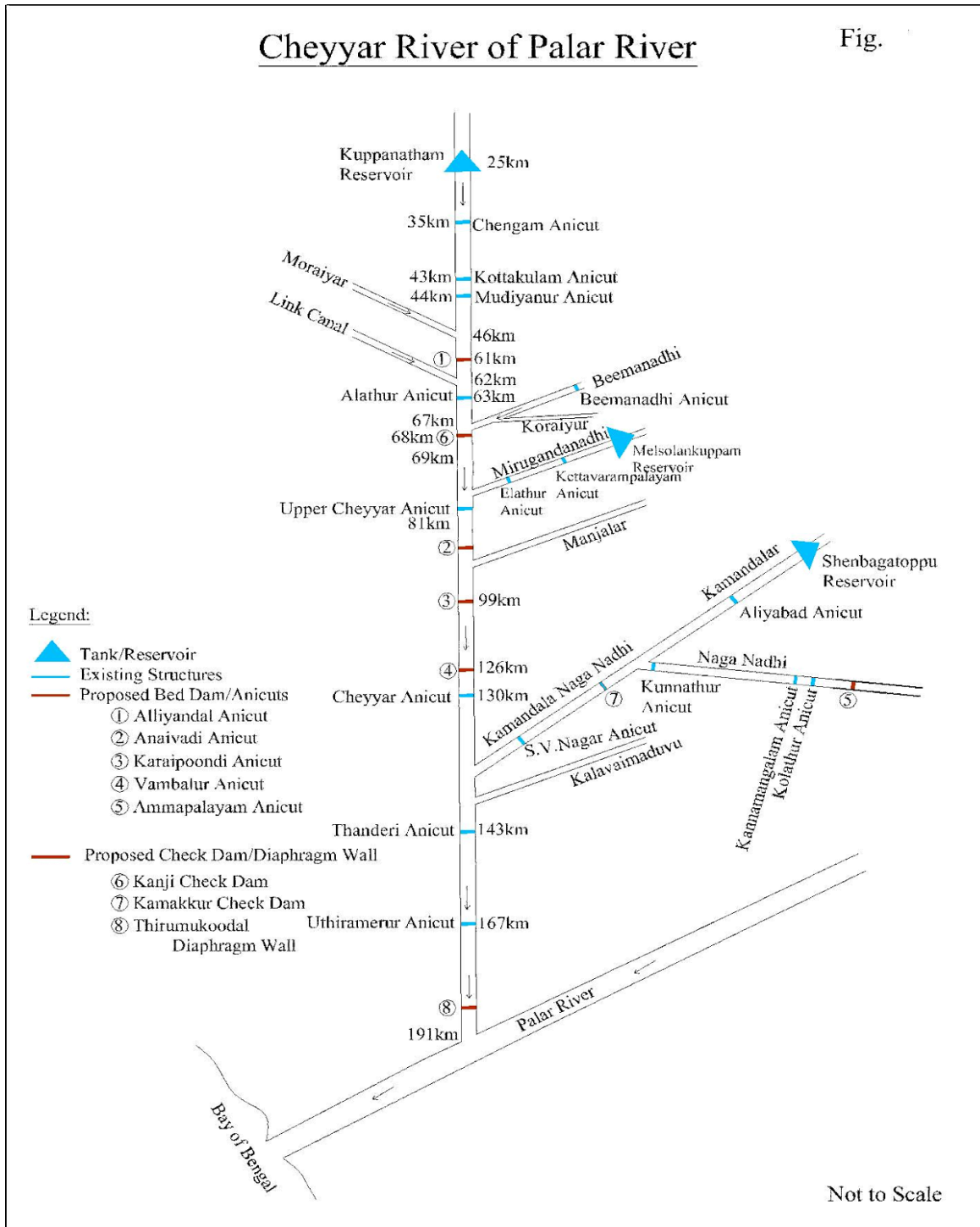
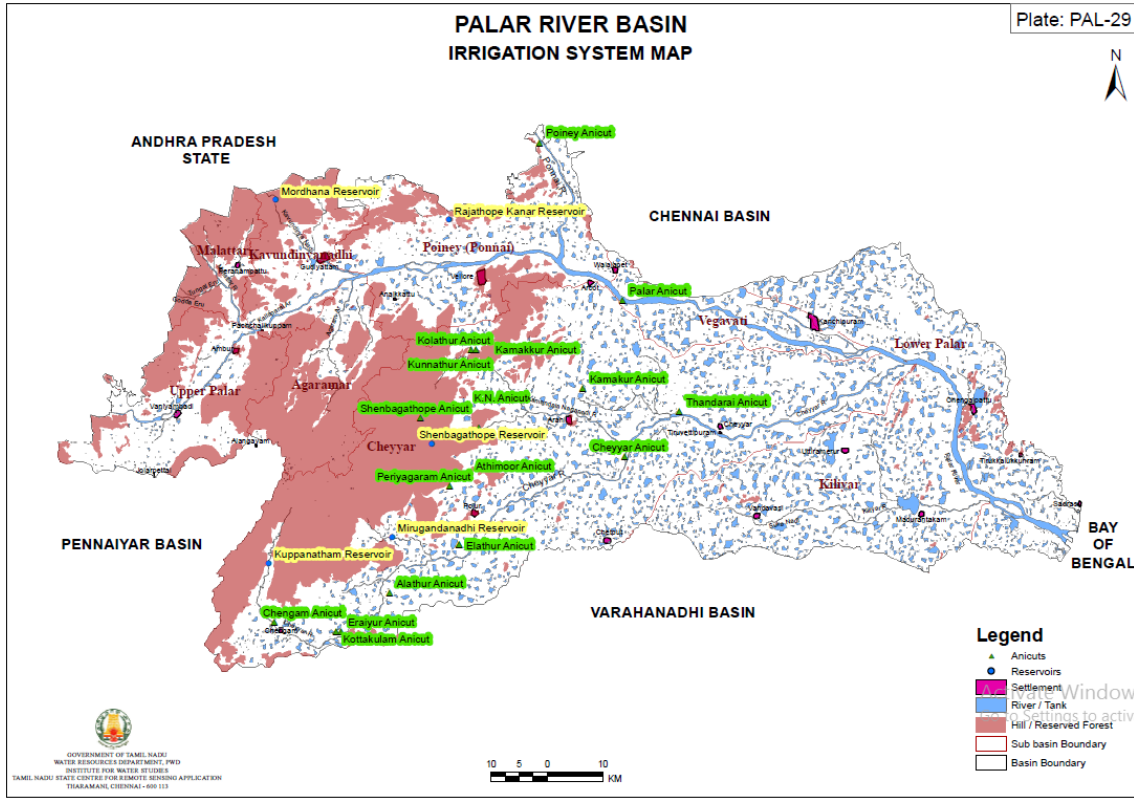


Figure 21 Flow Diagram of Cheyyar River of Palar River Basin



**Figure 21 Irrigation System Map of Palar River Basin**



There are 5 Reservoirs in the basin having a total ayacut of 11506.02Ha. The details of the reservoirs are given in **Table 8**.

**Table 8 Reservoirs in Palar River Basin**

S. No.	Name of Reservoir	Name of River	Name of Sub Basin	Gross capacity in Mcum	Ayacut in Ha
1.	Mordhana Reservoir	Kavundinya Nadhi	Kavundinya Nadhi	7.40	3387.00
2.	Rajathope Kanar Reservoir	Rajathope Kanar	Kavundinya Nadhi	0.58	219.24
3.	Kuppanatham Reservoir	Cheyyar	Cheyyar	19.82	3971.72
4.	Mirugandanadhi Reservoir	Mirugandanadhi	Cheyyar	2.47	1219.37

5.	Shenbagathope Reservoir	Kamandalar	Chey yar	8.13	2708.69
<b>Total</b>				<b>38.40</b>	<b>11506.02</b>

The major anicuts and their ayacut details are given in **Table 9**.

**Table 9 Major Anicuts in Palar River Basin**

S. No.	Name of Anicut / Regulator	Name of River	Name of Sub basin	Ayacut in Ha
1.	Poiney Anicut	Poiney	Poiney	8350.95
2.	Palar Anicut	Palar	Poiney or Vegavathi	32796.19
3.	Chengam Anicut	Chey yar	Chey yar	598.00
4.	Kottakulam Anicut	Chey yar	Chey yar	543.00
5.	Alathur Anicut	Chey yar	Chey yar	409.33
6.	Elathur Anicut	Miruganda Nadhi	Chey yar	153.03
7.	Erai yur Anicut	Chey yar	Chey yar	728.00
8.	Upper Chey yar Anicut	Chey yar	Chey yar	869.63
9.	Athimoor Anicut	Manjalar	Chey yar	49.19
10.	Mampattu Anicut	Manjalar	Chey yar	98.34
11.	Periyagaram Anicut	Manjalar	Chey yar	163.96
12.	Chey yar Anicut	Chey yar	Chey yar	7850.85
13.	Shenbagathope Anicut	Kamandalar	Chey yar	34.82
14.	Aliyabad Anicut	Kamandalar	Chey yar	10.51
15.	Thandarai Anicut	Chey yar	Chey yar	3079.98
16.	Uthiramerur Anicut	Chey yar	Chey yar	2205.52
<b>Total</b>				<b>57,941.30</b>

There are about 1311 tanks in Palar river basin. The non-system tanks use surface water of the direct runoff from their own catchment, whereas the system tanks are filled from the canal flow diverted

by the anicuts across the river apart from the direct runoff from their own catchment. The total storage capacity of these tanks is 848.24 Mcum and the total ayacut benefitted is 1, 04,331.41 Ha.

**Table 10 Tank details of Palar River Basin**

Sl. No	Name of the Sub basin	Area of the Sub basin	Total Tanks		
			Nos	Capacity in Mcum	Ayacut in Ha
1	Upper Palar	738.16	14	53.45	1636.51
2	Malattar	265.61	-	-	-
3	Agaramar	581.29	9	4.13	1164.41
4	Kauvndinyanadhi	466.85	14	8.87	1464.50
5	Poiney	1090.1	93	69.34	5906.13
6	Vegavathy	411.16	80	50.69	6882.67
7	Cheyyar	4362.69	537	375.02	43795.82
8	Kiliyar	1322.08	203	143.02	16963.88
9	Lower Palar	1035.24	361	143.72	26517.49
<b>Total</b>		<b>10273.2</b>	<b>1311</b>	<b>848.24</b>	<b>104331.41</b>

**Surface Water potential:**

Palar River Basin has a drainage area of 10,273.18Sq.Km. Surface water potential is computed by three methods.

**A. Rainfall-runoff coefficient method**

In this method, a coefficient of 0.15 for the plains and 0.20 for hilly terrains was used to arrive at the basin yield. The basin yield works out to 1386 Mcum at 75% dependability.

**B. Surface water potential by Monthly Runoff Simulation (MRS) model**

According to this model, the basin yield works out to 1393 Mcum at 75% dependability.

**C. Surface water potential by NWDA Approach**

According to this method, the basin yield works out to 1216.34 Mcum.

**Table 4.8 75% Dependable Surface Water Potential using MRS Model for**

**Palar River Basin**

Sl. No.	Name of Sub basin	75% Dependable Surface Water Potential in Mcum			
		SW	NE	NM	Annual
1	Upper Palar	27.00	45.94	13.85	86.78
2	Malattar	21.86	8.58	1.24	31.68
3	Agaramar	42.98	10.99	8.23	62.20
4	Kavundinyanadhi	32.56	25.37	6.21	64.14
5	Poiney	44.41	83.92	28.31	156.64
6	Vegavathi	37.07	24.92	4.75	66.73
7	Cheyvar	350.01	313.87	107.96	771.83
8	Kiliyar	79.82	145.81	4.07	229.70
9	Lower Palar	37.23	150.15	17.05	204.42
<b>Total</b>		<b>672.94</b>	<b>809.55</b>	<b>191.67</b>	<b>1674.12</b>
<b>South West Monsoon Potential</b>		<b>672.94 (or) 673 Mcum</b>			
<b>North East Monsoon Potential</b>		<b>809.55 (or) 810 Mcum</b>			
<b>Non Monsoon Potential</b>		<b>191.67 (or) 192 Mcum</b>			
<b>Annual Potential</b>		<b>1674.12 (or) 1675 Mcum</b>			

**Annual Surface Water Potential of Palar River Basin calculated using MRS Model is 1675 Mcum at 75% dependability.**

### Groundwater potential

Table 11 presents the number of wells in every sub basin of Palar Basin and the geological formations in which these wells are sunk.

**Table 11 Extent of hilly area and number of observation wells in**

#### **Different geological formations**

S. No.	Sub Basin	Hilly Area (Sq.Km)	% of Hilly Area	Geological formations & no. of observation wells					
				ALV	CGN	CNK	GGN	GNS	GWA
1	Upper Palar	284.38	38.53	1	-	-	5	-	-
2	Malattar	196.26	73.89	-	-	-	2	-	-
3	Agaramar	431.21	74.18	-	-	2	3	-	-
4	Kavundinyanadhi	212.55	45.53	-	-	-	3	1	-
5	Poiney (Ponnai)	245.54	22.52	-	-	1	7	-	-
6	Vegavathi	0.23	0.06	6	-	-	-	-	-
7	Cheyar	1234.61	28.30	1	1	18	9	-	-
8	Kiliyar	10.92	0.83	1	-	14	-	-	-
9	Lower Palar	22.10	2.13	12	-	3	-	-	1
	<b>Total</b>	<b>2637.80</b>		<b>21</b>	<b>1</b>	<b>38</b>	<b>29</b>	<b>1</b>	<b>1</b>

Note:

ALV - Alluvium/Sand

CGN - Calcareous Gneiss

CNK - Charnockite

GGN - Granitic Gneiss

GNS - Gneiss

GWA - Gondwana

The sub basin wise groundwater potential, groundwater extraction and the balance groundwater potential and the stage of groundwater development are presented in **Table 12.**

The groundwater potential of Palar basin was worked out as 891.67 MCum and is shown in table 12.

**Table 12 Groundwater Potential as on March 2013**

Name of District covered	Area covered in %	Net water available	Ground water potential District wise
Vellore	40.01	58970.76	23594.201
Tiruvannamalai	38.22	111687.47	42686.951
Krishnagiri	0.02	35425.08	7.085
Kanchipuram	21.69	105447.62	22871.589
Tiruvallur	0.01	70462.05	7.046

**89166.872 Ha.M**  
**891.67 M.cum**

**Table 13 Change in Classification of the Blocks based on the level of**

**Ground Water Development from 2003 to 2009**

S. No.	Block	District	Categorisation of Block (2003)	Categorisation of Block (2009)
1	Acharapakkam		Semi Critical	Semi Critical
2	Chithamur		Critical	Safe
3	Kanchipuram		Safe	Semi Critical

4	Kattankolathur	Kanchipuram	Semi Critical	Semi Critical
5	Kunrathur		Semi Critical	Safe
6	Lathur		Over Exploited	Semi Critical
7	Madhuranthagam		Semi Critical	Safe
8	Sriperumpudur		Safe	Safe
9	Thiruporur		Semi Critical	Safe
10	Tirukkalukkunram		Critical	Over Exploited
11	Uthiramerur		Over Exploited	Over Exploited
12	Walajapet		Semi Critical	Critical
13	Bargur		Krishnagiri	Over Exploited
14	Kadambathur	Thiruvallur	Critical	Safe
15	R.K.Pet		Over Exploited	Critical
16	Anakkavur	Tiruvannamalai	Over Exploited	Semi Critical
17	Arni		Semi Critical	Semi Critical
18	Chengam		Over Exploited	Over Exploited
19	Chetput		Semi Critical	Over Exploited
20	Cheyyar		Semi Critical	Semi Critical
21	Jawadhu Hills		Critical	Critical
22	Kalasapakkam		Over Exploited	Semi Critical
23	Peranamallur		Safe	Semi Critical

24	Polur		Over Exploited	Over Exploited
25	Pudupalayam		Over Exploited	Semi Critical
26	Thandarampet		Over Exploited	Critical
27	Thellar		Safe	Semi Critical
28	Thurinjipuram		Over Exploited	Critical
29	Vandavasi		Over Exploited	Over Exploited
30	Vembakkam		Semi Critical	Over Exploited
31	West Arni		Critical	Semi Critical
32	Alangayam	Vellore	Over Exploited	Semi Critical
33	Anicut		Over Exploited	Over Exploited
34	Arcot		Over Exploited	Critical
35	Gudiyatham		Over Exploited	Over Exploited
36	Jolarpettai	Vellore	Over Exploited	Over Exploited
37	K.V.Kuppam		Over Exploited	Over Exploited
38	Kaniyambadi		Over Exploited	Over Exploited
39	Katpadi		Over Exploited	Over Exploited
40	Kaveripakkam		Semi Critical	Safe
41	Madhanur		Over Exploited	Over Exploited
42	Natrampalli		Over Exploited	Critical
43	Nemili		Critical	Critical



44	Pernampattu		Over Exploited	Over Exploited
45	Sholinghur		Over Exploited	Over Exploited
46	Thimiri		Over Exploited	Semi Critical
47	Thirupathur		Over Exploited	Critical
48	Vellore		Over Exploited	Over Exploited
49	Walajah		Semi Critical	Safe
50	Melmalaiyanur	Villupuram	Over Exploited	Critical

**Water demand:**

**Domestic water demand:**

The projected annual domestic water demand for each sub basin, for each target year and for each population sector are arrived and are given in **Table 14**.

**Table 14 Projected Domestic Water demand for Palar River Basin**

Year		Population	Total demand		
			in MLD	in MLD	in Mcm
2011	Urban	1826056	180.52	354.12	129.25
	Rural	4340112.3	173.60		
2017	Urban	2056436	203.30	390.89	142.68
	Rural	4689836	187.59		
2020	Urban	2182305	215.75	410.76	149.93
	Rural	4875127	195.01		
2030	Urban	2660219	263.00	484.89	176.99
	Rural	5547284	221.89		
2040	Urban	3242792	320.59	573.07	209.17
	Rural	6312115	252.48		
2050	Urban	4451659	425.04	712.34	260.00
	Rural	7182396	287.30		

Source: Census 2011, Directorate of Census Operations, Besant Nagar, Chennai 90.

**Industrial Water Demand:**

The computed values of the water demand for the small, medium and large scale industries for the years 2013, 2020, 2023, 2030 and 2040 are given in the **Table 15**.

**WATER DEMAND CALCULATION FOR SMALL, MEDIUM AND LARGE INDUSTRIES BASED ON INDUSTRY CENSUS AS TAKEN FROM IWS**

Sl. No	Type of industry	Average Rate of Water consumption as given in IWS m <sup>3</sup> /day	2013		2017		2020		2030		2040		2050	
			No. of industry as per IWS	Water Demand	No. of industry	Water Demand	No. of industry	Water Demand	No. of industry	Water Demand	No. of industry	Water Demand	No. of industry	Water Demand
1	Small scale industry	2.5	5999	5.47	<b>8162</b>	7.45	<b>10281</b>	9.38	<b>22196</b>	20.25	<b>47920</b>	43.73	<b>103457</b>	94.4
2	Medium & large scale industry	2500	202	184.33	<b>275</b>	250.94	<b>346</b>	315.73	<b>747</b>	681.64	<b>1614</b>	1472.78	<b>3484</b>	3179.15
<b>Total Demand in M.Cum</b>				<b>189.8</b>		<b>258.39</b>		<b>325.11</b>		<b>701.89</b>		<b>1516.5</b>		<b>3273.55</b>

## Water balance

The total water demand in Palar River Basin for different planning stages is tabulated in Table 19 below.

**Table 19 Total Sectoral Water Demand in Palar River Basin (75% dependability)**

Sl. No	Name of the basin	Area of the basin (in Sq.Km)	No. of Sub basins	Year	Demand of water in various sectors (MCM)						Water availability (MCM)					Surplus / Deficit in Mcum
					Irrigation	Domestics	Industries	Live stock	Others	Total	Surface water potential	Ground water potential	Quantity of recycled water from Sewage	Quantity of water from desilting	Total	
1	PALAR	10217.18	8	2017	1950.59	142.68	258.39	120.794	0.00	2472.45	1392.30	891.669	-	181.21	2465.18	-7.28
				2020	1950.59	149.93	325.11	125.030	0.00	2550.66	1392.30	891.669	-	181.21	2465.18	-85.48
				2030	1950.59	176.99	701.89	153.402	0.00	2982.87	1392.30	891.669	-	181.21	2465.18	-517.69
				2040	1950.59	209.17	1516.51	221.740	0.00	3898.01	1392.30	891.669	-	181.21	2465.18	-1432.83
				2050	1950.59	260.00	3273.55	381.643	0.00	5865.78	1392.30	891.669	-	181.21	2465.18	-3400.61