

DISTRICT SURVEY REPORT- SAND RAMANATHAPURAM DISTRICT TAMILNADU STATE

(Prepared as per Gazette Notification S.O.3611 (E) dated 25.07.2018 of Ministry of Environment, Forest and Climate Change)



தமிழ்நாடு அரசு
புவியியல் மற்றும் சுரங்கத்துறை



GOVERNMENT OF TAMIL NADU
DEPARTMENT OF GEOLOGY AND MINING

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19/8/2019
Assistant Director
(Geology and Mining
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1. INTRODUCTION

In pursuance to the Gazette Notification, Ministry of Environment, Forest and Climate Change, the **Government of India Notification No. S.O.3611 (E) dated 25.07.2018** laid procedure for preparation of District Survey Report of minor minerals sand mining or river bed mining. The main purpose of preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

The main purpose of preparation of District Survey Report is to identify the mineral resources and develop the mining activities along with relevant current geological data of the District. The DEAC will scrutinize and screen scope of the category “B2” projects and the DEIAA will grant Environmental Clearance based on the recommendations of the DEAC for the Minor Minerals on the basis of District Survey Report. This District Mineral Survey Report is prepared on the basis of field work carried out in Ramanathapuram district by the official from Geological Survey of India and Directorate of Geology and Mining, (Thoothukudi District), Govt. of Tamilnadu.

2. OVERVIEW OF MINING ACTIVITY

The district of Ramanathapuram is not very much rich in mineral resources. Among the known resources, only minor minerals are mostly found. Mineral of Economic importance found in Ramanathapuram district are mainly placer deposits like beach sand carrying garnet and

Ilmentite, gypsum, salt, savadu, gravel/laterite, lignite and oil & natural gas. Mining activities based on these minerals are very less.

In addition to above, 'brick clay' mining is also active in Kulanthapuri and Karuthanendal areas.

ONGC is carrying out pumping of crude oil & natural gas since last one decade in ThrippulaniRegunathapuram and Valandharavai areas. GSI has also explored presence of lignite in Vella and Bogalur and Kalari east sector.

The Office of the Assistant Director, Department of Geology and Mining (DGM) is functioning in Ramanathapuram district under the control of District Collector, Ramanathapuram. The DGM is looking after the work of granting leases for minor minerals (savadu, gravel/laterite, brick clay, etc) dimensional stones and rough stones. DGM is also curbing illicit trading in the district.

Tamil Nadu Public Works Department, pioneer in all branch of engineering, is the custodian of Odai, Canal, Rivers and Water bodies in the State. Public Works Department creates, Maintains and protects all irrigation systems including the rivers. Periodical maintenance including desilting of the drains/river is carried out to maintain the functional efficiency including the carrying capacity of the river. But in rivers flood protection works are carried out by increasing top level of bund and protecting the sides of bund with revetment. The desilting was never carried out in river due to the cost constraints. Therefore, prolonged siltation for decades and more, the level of the floor of riverbed has increased and reduced the carrying capacity.

Vaigai and Gundar flowing in Ramanathapuram district, whenever floods and consequent damages occurred, it was resorted to increase the bund level to restore the carrying capacity of river. It was never thought of desilting the river due to the enormous cost, it require and the problem of ways and means to dispose the desilted sand. Consequence of this change in river regime and reduction in carrying capacity of the Rivers, the shoals in the rivers, divert the flow of water resulting in bund erosion and consequent breaches, which lead to loss of property and lives.

Solution to the above problem is to desilt the shoals in the Vaigai and Gundar River by expending huge amount. Alternatively, the economical solution to this problem is to mine the sand to remove the shoals. This option would yield net revenue to the state exchequer apart from making available the important construction material for infrastructure development at a reasonable price to the common people.

The quarrying of sand in Government Poramboke lands and private patta lands had been entrusted to private agencies by the Revenue Department after concluding a lease agreement with them. The process was in practice up to August 2002.

As per G.O.No. 46/Industries (MMC.1) Department, dated 25.09.2002, a high level committee had been constituted to conduct a survey of rivers and river beds in the state with reference to sand quarry. The high level committee concluded that,

a) Even through several rules on sand mining exist, illegal quarrying of sand is out of control. Authority for regulating sand mining is vested with different organization such as, State Geology and Mining Department, Revenue Department and Public Works Departments. Hence, implementation and monitoring of rules and regulation regarding sand quarrying are not effective. The important task of sand mining therefore, should be entrusted to a SINGLE AGENCY.

The Government issued an order vide G.O. Ms.No. 95, Industries (MMC.1) Department , dated. 01.10.2003 to operate sand quarries in Tamil Nadu by Public Works Department. Accordingly, Sand quarrying operations are being carried out from October 2003 in District of the Tamil Nadu.

Based on the above instructions, the concerned Executive Engineers with their field staff will identify the quarry site considering the availability of sand deposits and sand humps, approach to the site, existing infrastructures, water head works, cross masonry works etc. After selecting the site, proposals will be sent to the concerned District Collectors.

The sand mining activity not carried out by the Public Works Department for the past three years in the district.

3. List of Sand Mining Leases in the District.

Sl. No	Taluk/Division	Village	S.F.No. & Extent in Hects	River Name	Collector's Proceedings No & Date	Lease Period	Bullock Cart/Lorry
Nil							

4. Details of Revenue received in last three years

Sl. No	Name of the Quarry	Quantity of sand Quarried in Loads (Unit)	Year	Rate Per Load in Rupees	Total Royalty/Revenue in Rupees
1.	Kottakaraiyar Pullamadai R.S.Mangalam	2575	2017-18	420	1081500
2.	Kottakaraiyar Pullamadai R.S.Mangalam	4210	2018-19	420	1768200
3.	Koogudi Thiruvadana	8862	Nov 2017	420	3722040
4.	Koogudi Thiruvadana	1702	Dec 2017	420	714840

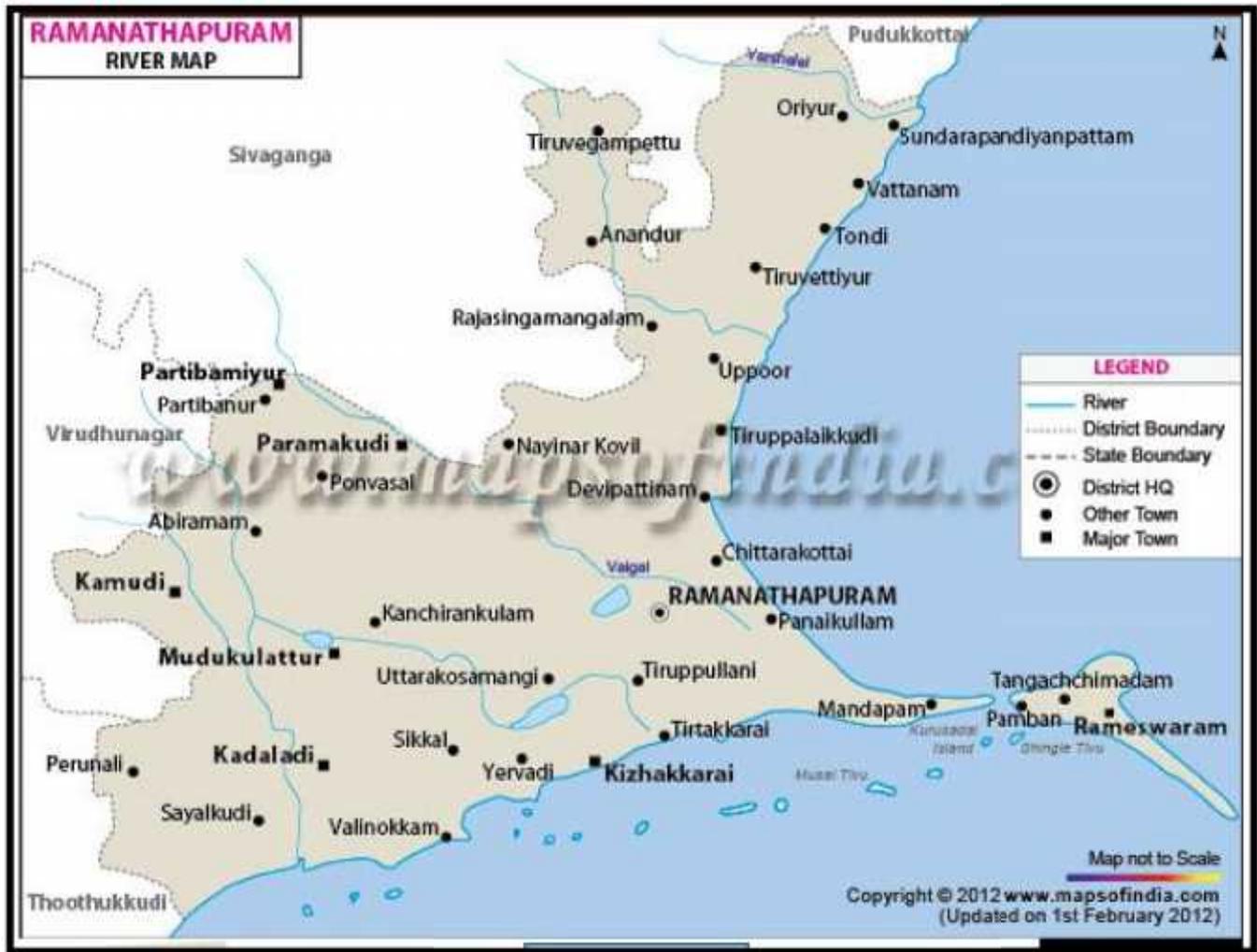
5. Details of Production of Sand in last three years

Sl. No	Name of sand Quarry	Taluk	Name of river	Period of production	Quantity of sand Quarried in Loads (units)
1.	Pullamadai	R.S.Mangalam	Kottakaraiyar	2017-18	2575
2.	Pullamadai	R.S.Mangalam	Kottakaraiyar	2018-19	4210

3.	Koogudi	Thiruvadanai	Kottakaraiyar	2017-18	10564
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6. Process of Deposition of Sediments in the rivers of the District

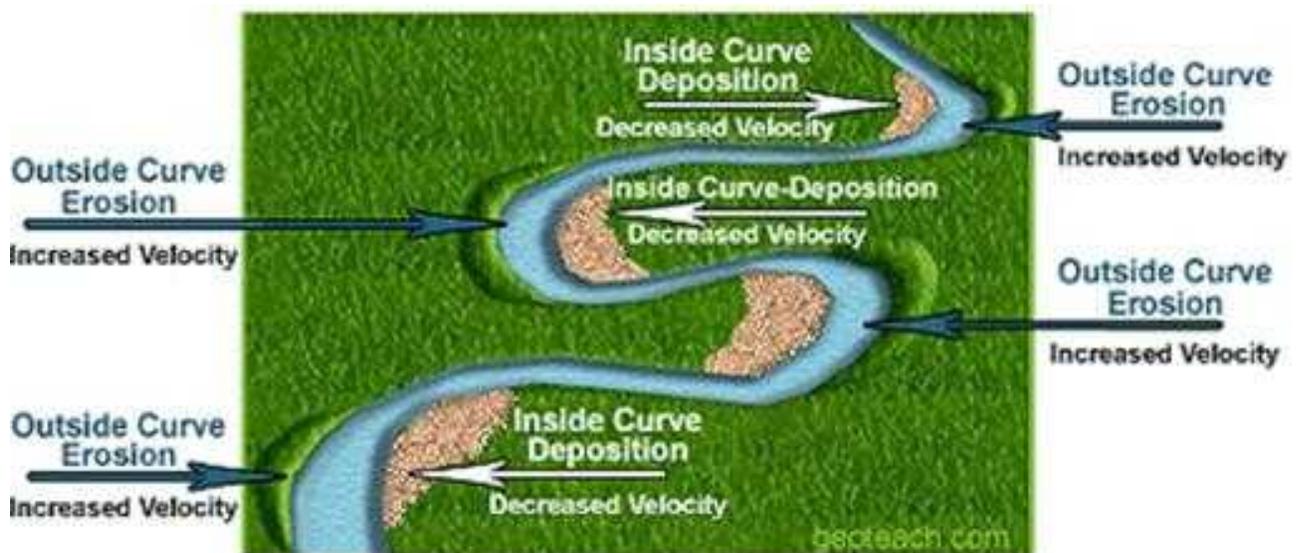
River sediment refers to the conglomerate of mineral matters such as clay, silt and sand which are derived from erosion and weathering of rocks present in the river bed. Breaking down of rocks by a geological agent, here it is river (water flow), is called erosion. Erosion of rocks occurs in many ways. Weathering is described as disintegration and decomposition of rocks due to change in physical and chemical conditions of the rock. Sediments are derived by these natural processes. Sediments are subsequently transported by water and/or by the force of gravity acting on the sediments.



Sediments become the river's load and the river transport this loads through its course. Transportation of the sediments depends on the energy of the river and how big the load is. Boulders are transported by traction by which boulders are rolled along the bed of the river, eroding the bed and the particles in the process, because the river doesn't have enough energy to move these large particles in any other way. Slightly smaller particles, such as pebbles and gravel, are transported by saltation. This is where the load bounces along the bed of the river because the river has enough energy to lift the particles off the bed but the particles are too heavy to travel by suspension. Fine particles like clay and silt are transported in suspension; they are suspended in the water. Most of a river's load is transported by suspension. Solution is a special method of transportation. This is where particles are dissolved into the water so only rocks that are soluble, such as limestone or chalk, can be transported in solution.

Deposition occurs when forces responsible for sediment transportation are no longer sufficient to overcome the forces of gravity and friction which are creating a resistance to motion. To transport load, a river needs to have energy at the same time when a river loses energy, it is forced to deposit its load. One of the following ways, a river could lose its energy:

1. Reduction in the discharge: Reduction in discharge may be due to lack of precipitation and evaporation and abstraction by human activity.
2. Change in the river gradient: If the gradient of the river's course flattens out, the river will deposit its load because it will be travelling a lot slower. When a river meets the sea a river will deposit its load because the gradient is generally reduced at sea level and the sea will absorb a lot of energy.



Much of the material will be carried in suspension and loads in suspension erode the river banks by abrasion. When rivers flow over flatter land, they form large bends called meanders. As a river goes around a bend, most of the water is pushed towards the outside causing increased erosion. The river is now eroding sideways into its banks rather than downwards into its bed, a process called lateral erosion. On the inside of the bend, in contrast, there is much less water. The river will therefore be shallow and slow flowing. It cannot carry as much material and so sand and gravels will be deposited. This is called a point bar or slip off slope. Due to erosion on the outside of a bend and deposition on the inside, the shape of a meander will change over a

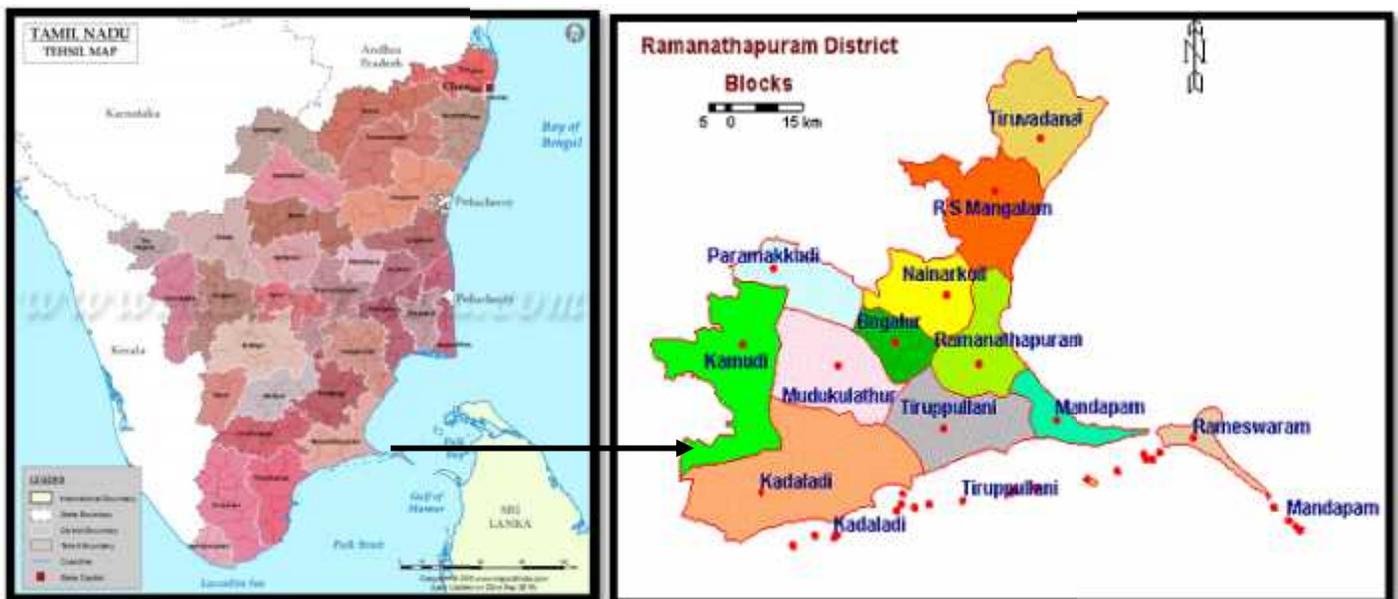
period of time. Eventually deposition will block off the old meander to leave an oxbow lake. The oxbow lake will slowly dry up, only refilling after heavy rain or during a flood.

7. GENERAL PROFILE OF THE DISTRICT

In the early 15th Century the present territories of Ramanathapuram district comprising of taluks Tiruvadanaï, Paramakudi, Kamuthi, Mudukulathur, Ramanathapuram and Rameswaram were included in Pandiyan Kingdom. For a short period, this area was under the Chola Kings when RajendraChola brought it under his territory in 1063 AD. In 1910, Ramanathapuram was formed by clubbing portions from Madurai and Tirunelveli district. During the British period this district was called “Ramnad”. The name continued after independence. Later the district was renamed as Ramanathapuram to be in conformity with the Tamil name for this region.

7.1 LOCATION

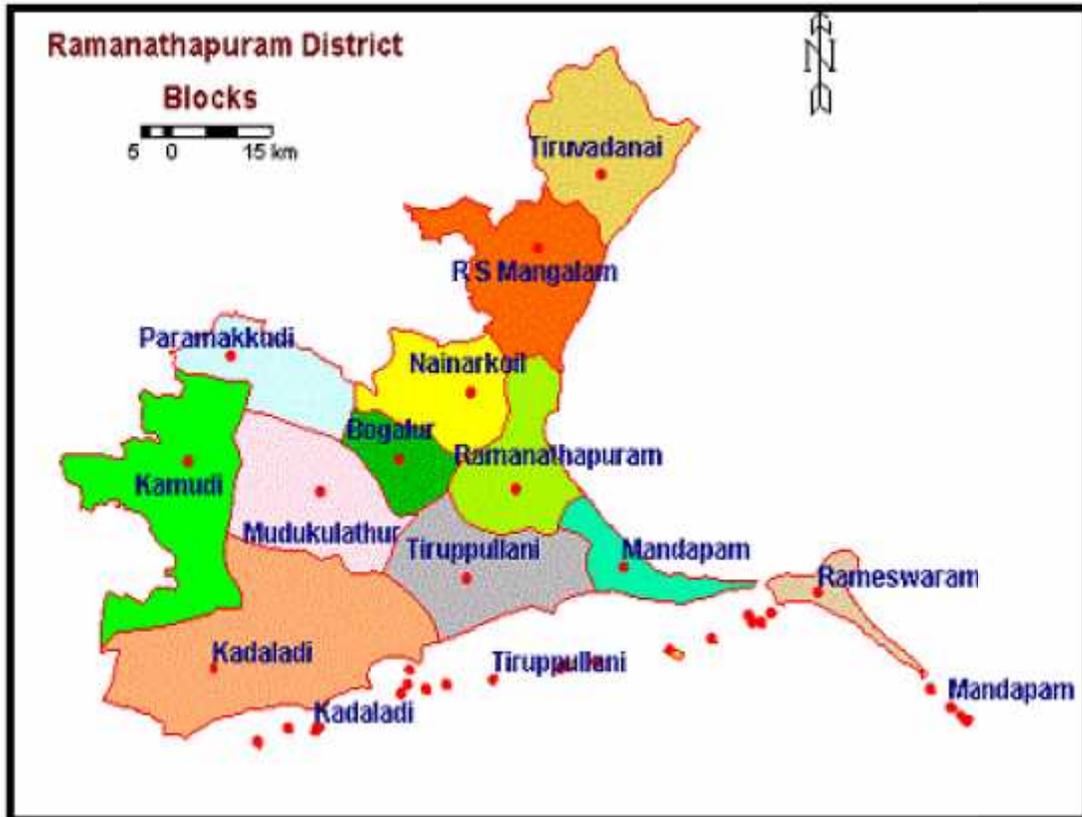
Ramanathapuram District covers an area of 4123 sq.km and falls within the latitude from 09°05' to 09°50' and longitude from 78°10' to 79°27'. Ramanathapuram District is bounded on the north by Sivaganga District, on the northeast by Pudukkottai District, on the east by the Palk Strait, on the south by the Gulf of Mannar, on the west by Thoothukudi District, and on the northwest by Virudhunagar District.



7.3 ADMINISTRATIVE SET - UP

Ramanthapuram District covers an area of 4123 sq.km and falls within the latitude from 09°05' to 09°50' and longitude from 78°10' to 79°27'. It has seven taluks (Ramanathapuram, Tiruvadanai, Rameswaram, Paramakudi, Mudukulathur, Kamuthi and Kadaladi. with total population of 1,353,445 (as per 2011 census). But now one new Taluk named Kilakarai has been formed by clubbing portion of Ramanathapuram and Kadaladi Taluks in the year 2015 and its head quaters in Kilakarai. Total No. of Hamelet villages are 2362. The divisional details of the district is given below:

Name of the Division	Taluks comprised in the Division	Total No. of firkas	Total No.of Revenue Villages	Total No.ofHamelet villages
Ramanathapuram	Ramanathapuram	4	43	529
	Tiruvadanai	4	61	635
	Rameswaram	1	2	31
	Keelakarai	3	26	-
	R.S Mangalam	3	39	-
Paramakudi	Paramakudi	6	93	367
	Mudukulathur	6	46	207
	Kamuthi	5	49	352
	Kadaladi	6	45	241



7.4 AGRICULTURAL RESOURCES AND IRRIGATION

The above district profile reveals that the Ramanathapuram district is a dry and most backward area which has more sandy soil on which nothing grows. Among the cultivation of major important crops, the productions of pulses are more than other crops. The important food crops grown were paddy, millets like Cholam, Cumbu, Chillies, ragi and Varagu, groundnut and sugarcane. It is known that the pulses occupied first place by production and covering 47.98 per cent of the districts total principal crops in production. It is inferred from the result that the farmers preferred dry crops (Pulses) for earning more money because of shortage of rain water.

The major source of irrigation in the district was tank fed by rains. Details with regard to net area irrigated by sources of tanks, tubewells and other wells revealed the erratic pattern in area irrigated. The net area irrigated by the three different sources was very high and dependence on well had been relied upon in the event of tank water shortage.

7.5 TRADE AND COMMERCE

This district is industrially backward and the three taluks, Paramakkudi, Kadaladi and Kamuthy had been declared by the State Government as backward areas. The main industries in which they were engaged were wood based industries, tinkering, fabricating of metal products, printing and binding, manufacture of agricultural implements and cement tiles, automobiles servicing and repair and safety matches. In addition to the small scale units, there were a number of villages and 320 cottage industries prominent among them were pottery, blacksmith, carpentry, basket making, rope making and synthetic gem-cutting.

There are about 184 fishing villages situated along the coastline in Ramanathapuram district. This district had the natural advantage of having its fishing ground in Palk Bay and the Gulf of Manner. The coastal area is not influenced by dynamic changes of the sea like tsunami waves, monsoon winds and currents. Therefore, it is offered wide scope for spawning activities of fishes. These favourable natural conditions facilitated the conduct of marine fishery operations throughout the year. But the inland fisheries are also ineffectively carried on in this district. In Ramanathapuram district 7 fish processing factories are functioning in Tondi and Mandapam. Prawn, Squids, Cuttle fish, Crabs and fish are processed by fishing and exported to foreign

countries. Many small entrepreneurs are involved in fish drying and dried fish is used in poultry and cattle feed manufacturing.

8. LAND UTILISATION PROFILE OF THE DISTRICT

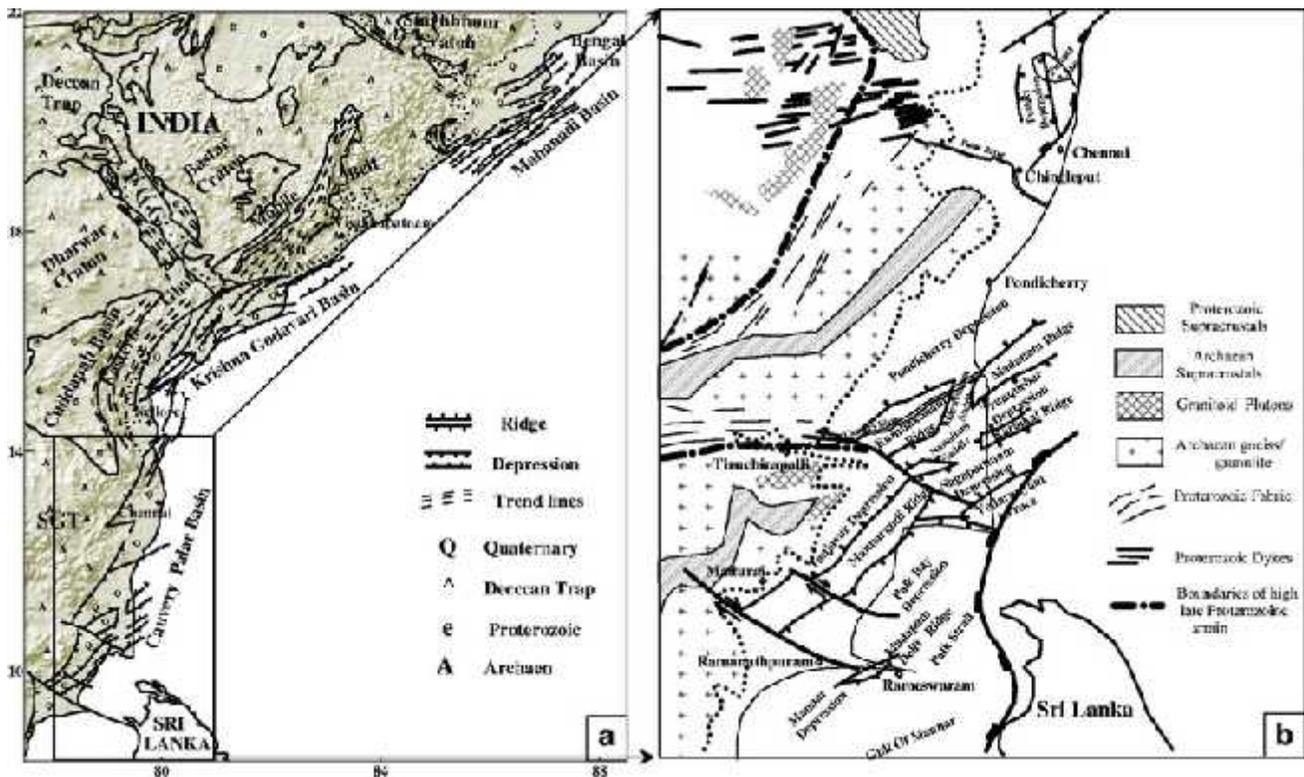
Soil is one of the natural resources which has the most direct impact on agricultural development. Types of soil, rainfall and irrigation projects have influenced the development of land use in the district. While the entire area of this district consists of Red loam, Laterite soil Black soil and Sandy soil. This area is dry and backward and known as East Ramanathapuram, comprising the taluks Thiruvadanaï, Ramanathapuram, Kadaladi and Rameswaram. This region is called coastal region of Ramanathapuram district. It has all the depressing features such as poor soil, frequent droughts, absence of irrigation systems, precarious farming etc. This area is much more backward and underdeveloped than any other districts. Mainly in coastal area, the terrain is completely a sandy tract with very little scope for agriculture. So, all the people of coastal region of Ramanathapuram are engaging themselves intensively in the fishing occupation. The major source of irrigation in the district was tank fed by rains. Details with regard to net area irrigated by sources of tanks, tube wells and other wells revealed the erratic pattern in area irrigated. The cattle wealth of this district is important to improve its agricultural resources. The important subsidiary activities carried on by the cultivators and agricultural labourers are dairying, sheep rearing and poultry. The following table shows land utilization pattern in the district.

Nine Fold Classification

Sl.No	Land Classification	AREA			
		Current	LastYear	Diff.	Perc.
a	Forest	4488.000	4488.000	0.000	0.00
b	Uncultivable Waste	4524.395	4524.395	0.000	0.00
c	Non Agri Uses				
	-Building	5106.312	5100.382	5.930	0.12
	-Roads	5941.606	5941.606	0.000	0.00
	-Railway Lines	630.000	630.000	0.000	0.00
	-Rivers	7184.000	7184.000	0.000	0.00
	-Canals	7593.270	7593.270	0.000	0.00
	-Check Dams	38900.010	38900.010	0.000	0.00
	-Swamp Area	2341.000	2341.000	0.000	0.00
	-Social Forest	4557.300	4557.300	0.000	0.00
	-Others	14791.755	14797.685	-5.930	-0.04
	-Total	87045.253	87045.253	0.000	0.00
d	Cultivable Waste Land	3490.860	3532.670	-41.810	-1.18
e	Permanent Pasture & Grass Land	154.000	154.000	0.000	0.00
f	Misc. Tree Crops & Groves	30922.489	30940.949	-18.460	-0.06
g	Current Fallow	61622.097	38289.801	23332.296	60.94
h	Other Fallow	49239.296	41163.702	8075.594	19.62
i	Net Cultivated Area	167470.645	198818.265	-31347.620	-15.77
Total		408957.035	408957.035	0.000	0.00

9. PHYSIOGRAPHY OF THE DISTRICT

Physiographically, the entire district is a plain terrain. Major part of the district is a gently sloping plain except for remnant hills in the western area. Recent Quaternary studies have brought out various erosional and depositional landforms of fluvial and marine regimes. The fluvial landforms comprise flood plains of Vaigai, Varshalei, Pambar, Kottakkarai and Gundarai rivers. The marine landforms comprise sand mounds (Teri's) and barrier dunes along the present coast. The erosional processes are manifested in the form of pediments and pediplain around Kamuthi.



The Cauvery-Palar basin is one of the major petroliferous basins located at the south eastern coast of the peninsular India covering the coast between Ramanathapuram near the Palk Strait. The basin is characterized by the presence of NE-SW trending horst-graben subsurface basement structural features having a sediment cover of nearly 1–6 km.

The marine formation comprises coastal plain deposits of sand and clay in varied proportion. Marine calcareous hardpan occurs as low terraces and platforms, with admixture of quartz, limonite and garnet concentration.

10. CLIMATE AND RAINFALL OF THE DISTRICT

Ramanathapuram district is a dry and backward area. Here, the hottest months of a year are May and June. The rainy season begins from the month of August. The average annual rainfall of this district from South-West monsoon is 136.1 mm and North-East monsoon is 507.4 mm, the district also gets considerable rainfall during North-East monsoon.. Month wise rainfall data of the district is given below:

YEAR	JAN		FEB		MAR		APR		MAY		JUN	
	R/F	%DEP										
2014	-	-	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-

YEAR	JUL		AUG		SEPT		OCT-DEC	
	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
2014	-	-	-	-	-	-	630.64	-
2015	-	-	-	-	-	-	627.31	-
2016	-	-	-	-	-	-	173.29	-

11. GEOLOGY AND MINERAL WEALTH OF RAMANATHAPURAM DISTRICT

Most of the area is covered by the unconsolidated sediments of Quaternary age except in the northwestern part, where isolated patches of Archaen Crystallines and Tertiary sandstone are exposed. The Archaeans are mainly represented by the Charnockite Group of rocks comprising garnetiferous granulite and the Khondalite Group of rocks made up of quartzite of geneses. The Tertiary sandstone (Cuddalore Formation) comprise pinkish, yellowish, reddish (variegated colours) medium to coarse grained sandstone and clay stone. It is overlain by thin alluvium and exposed towards north of Vaigai River.

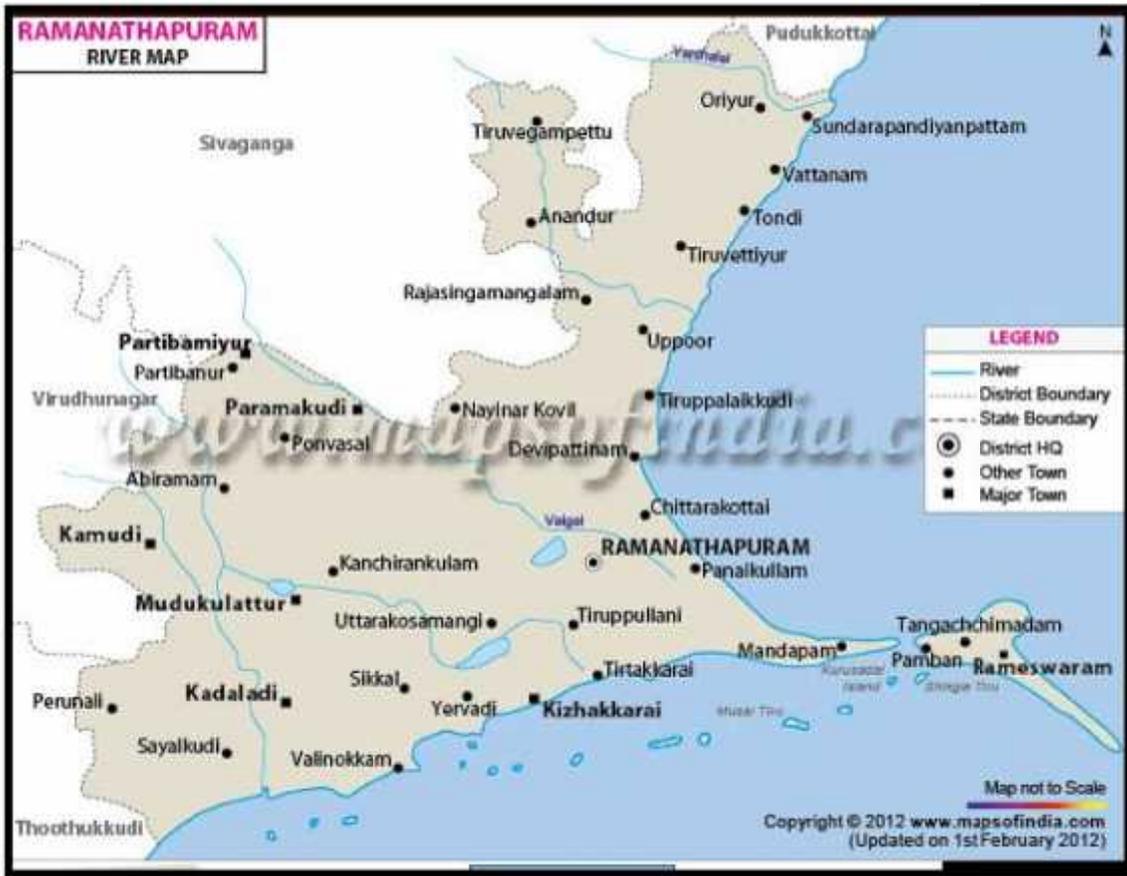
Detached exposures of laterite and lateritic soil are seen in the northwestern part of the district. A major part of the district is covered with the fluvial, fluvio-marine, Aeolian and marine sediments of Quaternary age. The fluvial deposits which are made up of sand, silt and clay in varying degree of admixture occur along the active channels of Vaigai, Gundar, Manimuthar and Pambar rivers. They have been categorized into levee, flood basin, channel bar/ point bar and paleo-channel deposits. The paleo channel deposits comprise brown coloured, fine to medium sands with well preserved cross-beddings.

The fluvio-marine deposits are exposed in the Vaigai delta as deltaic plain, paleo-tidal and dune flat deposits. The deltaic plain and dune flats comprise medium, Grey brown sands. The paleo tidal flat deposits include black silty clay, black clay and mud. In Rameswaram Island, the fluvio-marine deposits include indurated sand and dune sands.

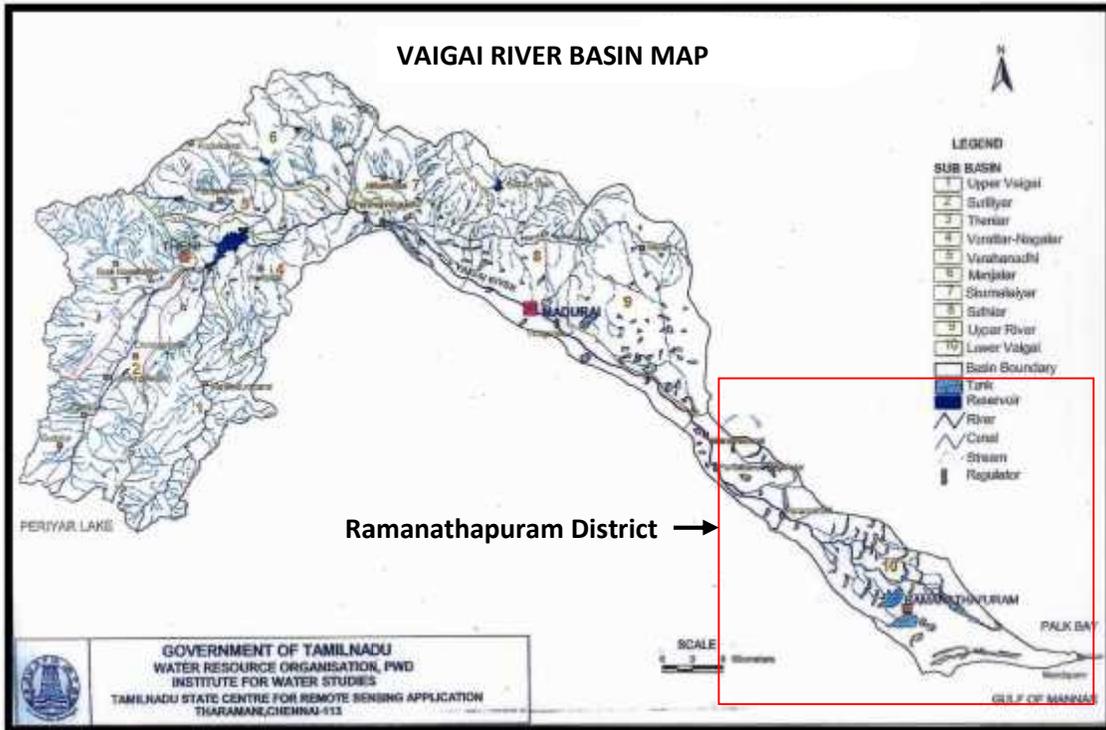
The Aeolian deposits comprise red sands which are in nature of ancient dunes and occur over a 3.2 Km wide and 8 Km long stretch and lie parallel to the sea coast. These are separated by marshy deposits of black clays. The sands are underlain by calcareous hardpan. In Rameswaram Island also brown sand deposits occur around Sambaimadam on either side of NH 49 west of the town.

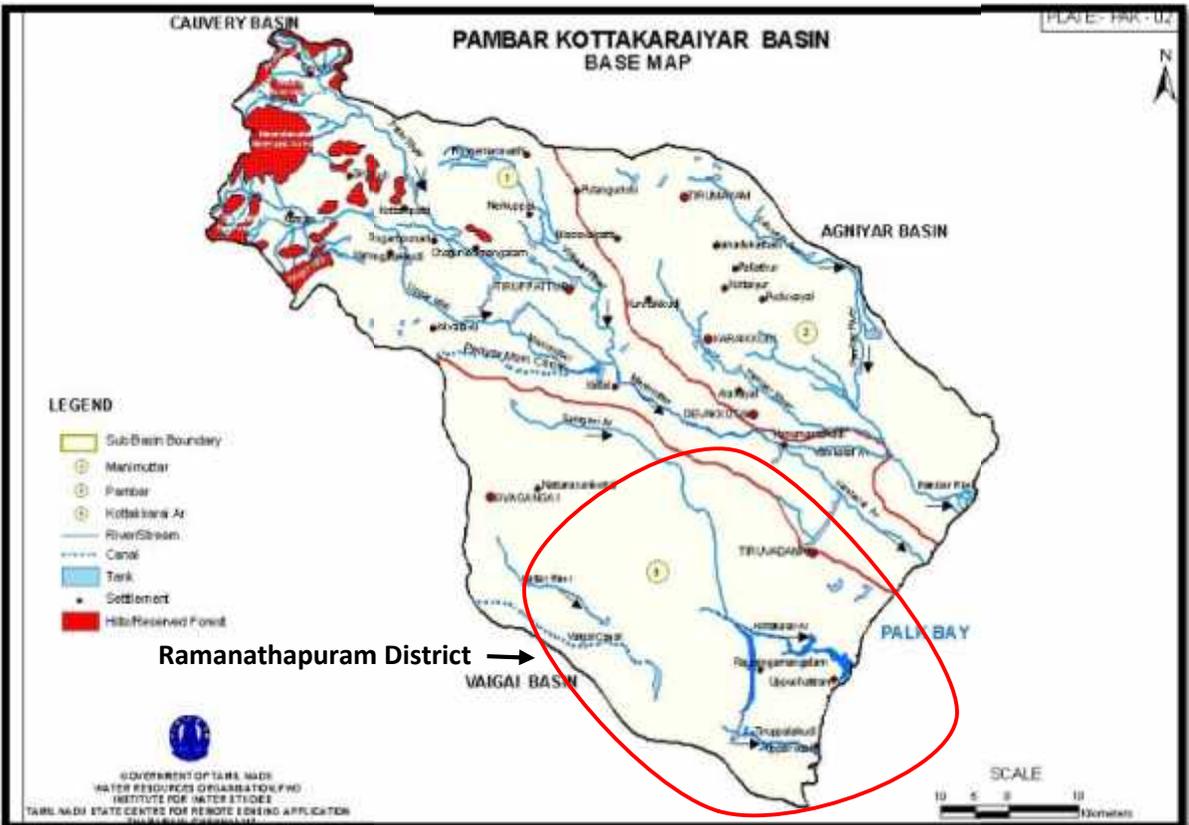
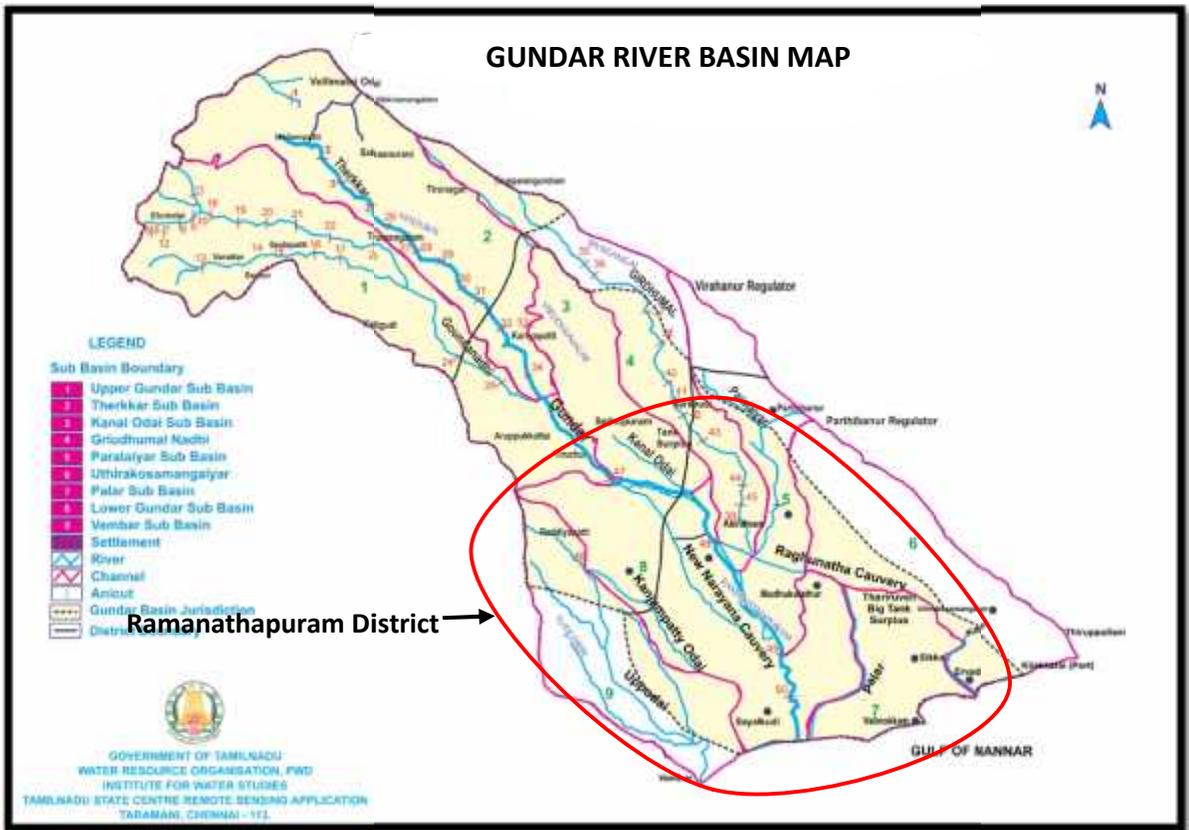
12. DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVERS

In Ramanathapuram district, five rivers are flowing namely Pambar, Vaigai, Gundar, Kottakaraiyar and Paralaiyar . Vaigai, Pambar, Kottakaraiyar and Gundar are flowing in a same trend. Pambar and Kottakaraiyar have four sub basins namely Koluvar, Pambar, Manimukthar and Kottakaraiyar. Gundar major basin is divided into three sub basins namely Uthirakosamangaiyar, Gundar and Vembar. The Vaigai river basin covers 7031 sq.km, Gundar river basin covers 5647 sq.km and Pambar and Kottakaraiyar river basin covers 5847 sq.km.



River Map of Ramanathapuram District





13. SALIENT FEATURES OF IMPORTANT RIVERS AND STREAMS

Sl.No.	Name of the River (or) Stream	Total Length in the District (in Km)	Place of Origin	Altitude at Origin
1.	Vaigai	258 km	Varusanadu Hills	2695 m
2.	Gundar	25 km	Mundankoil Mottai above Coutralam	2000 m
3.	Pambar and kottakaraiyar	90 km	Thamarai kanmoi tank in Thirumayam taluk.	-

VAIGAI RIVER

The Vaigai river is originating at an altitude of 1524m from the Gandamanaicknur zamindari in Western Ghats. After running through thick forests, the river enters the plains near Gandamanaicknur village and confluence with Suruliaru near Kunnur village, the combined flow of these two rivers is called as Vaigai aru thereafter. The important tributaries of Vaigai river are Suruliaru, Kottagudiaru and Suthangai aru. The river Vaigai is the major source of irrigation in Theni, Madurai, Sivagangai and Ramanathapuram districts of Tamilnadu.

The river Vaigai originates in the eastern slope of the Western ghat mountainous offshoot in the Varushanad area and flows northwards through Gandamanayakkanur. The Suriliyar and Theniar join Vaigai near Kottapatti. There after Vaigai flows east and south east directions till it confluences with Bay of Bengal. Varattar, Nagalar, Varahanadhi, Manjalar, Marudhanadhi, Sirumaliar, Sathaiyar originate in Palani hills and Sirumalai hills which are the main tributaries, joining Vaigai along its course. Uppar river originates in the Alagar hills and joins Vaigai near Manamadurai. Then Vaigai enters into the Ramnad big tank and the surplus only reaches the sea. The length of the Vaigai river upto Ramnad big tank is 266.71 km and Ramnad big tank to sea is 28.40 Km. Vaigai river and its tributaries are semi perennial to ephemeral in nature, and the flow in the Suriliyar and Vaigai is mainly due to the Periyar lake water diverted through Viravananar and then to Suriliyar during the monsoonal periods

GUNDAR

Gundar River Basin lies in a low rainfall region and in one of the most drought prone areas of Tamilnadu. It contains a large network of natural and trained channels, series and supply rainfall runoff to the diversions on natural streams and about 2276 tanks, to capture, store and supply rainfall runoff to the parched lands and thirsty livestock and human population.

Gundar basin lies in between 9⁰ 05'' N – 10⁰ 03'' N Latitude and 77⁰ 35'' E – 78⁰ 55'' E Longitude, covering 22 blocks (Panchayat Unions) falling under Ramanathapuram, Virudhunagar, Sivagangai, Madurai and Tuticorin districts. Gundar, the non-perennial river originates at an altitude of 500 meters above MSL, near Kottamalai of Saptur Reserve Forest belonging to the Varushanadu hills. Two other main streams Goundanathi and Therkaar originate from Elumalai hills and part of eastern ghat near Usilampatti respectively and join the river. The river confluences the sea at with Gulf of Mannar, at about 6 km south-east of Sayalkudi in Ramanathapuram district, after traversing about 150 kms. Many drainage channels join of Gundar River along its entire course.

PAMBAR AND KOTTAKARAIYAR

Ponpethiar is the tributary of Pambar. Koluvar and Papanar are two individual rivers in Pambar sub basin. Pambar originates at the surplus of Thamarai kanmoi tank in Thirumayam taluk. Thamarai Kanmoi group is a group of 137 tanks. The last tank, the Thamarai Kanmoi, of the group is situated in Thirumayam taluk and the surplus course of this tank is the origin of the Pambar River. Pambar then feeds Mudukkuvayal periya kanmoi. At the 40th Km point of Pambar river, Irumbanadu dividing dam is located. The left arm from this dam is called Ponpethiar. The right arm is the Pambar river and it falls into Irumbanadu big tank in Avudayarkoil taluk. Again this river takes its course from the right side surplus of Irumbanadu big tank and passes through Sananvayal. Then at the 50th Km point of Pambar river, the tributary, Kottakudiar joins with it. Pambar then passes through Pulangudi, Tevarendal and Iluppakkudi villages. At 1 Km south east of Iluppakkudi, at the 55th Km point of Pambar, its tributary, Thenar joins with it. At the 58th Km point of Pambar, its tributary, Manimuthar joins with it. Then Pambar passes through Tirukalyanapuram, Mudukkuvayal, Pullangakottai, Thiruppunavasal and Sundarapandianpattanam. It confluences with Palk bay in between Puttukkidapatnam and Sundarapandianpattanam. There are ten anicuts in the River Pambar with 16 supply channels and feeds an ayacut of 3250.75 hectares. In addition, there are 9 open off

takes for feeding the tanks. There are many non-system tanks in the basin which are all rain fed. Kottakudiar The surplus of Sakkaivayal big tank is the origin of Kottakudiar and from this origin point it forms into a regular river course. It passes through Nenmeni, Kalathur, Pappakudi and Perunganur and finally confluences with Pambar at 1Km east of Valaiyanvayal village ie., at a point 400m upstream of Kalabam Anicut. There are no anicuts across this river. However there are two open off takes and one bed dam in the river for feeding 22 tanks. The command area is 686.80 Ha. The total length of Kottakudiar is 24Km. Thenar . The total length of Thenar is 31.7 Km. There are 3 Anicuts and 19 Open off-takes having 63 tanks feeding the ayacut of 3639.85 Ha in Sivagangai and Pudukottai Districts. Ponpethiar At the 40th Km point of Pambar river, Irumbanadu dividing dam is located. The left arm from this dam is the origin of Ponpethiar and empties into Bay of Bengal. There is only one anicut in Ponpethiar and 15 open off-takes feeding 19 non-system tanks and 2 nos of rainfed tanks. The area irrigated by Ponpethiar is 1474.32 Ha. Koluvanar Koluvanar originates from the surplus of Kamalakkudi tank in Avudaiyarkoil taluk of Pudukkottai district. traverses a distance of 23 Km and finally confluences with Palk bay at Mimisal. There are 4 Anicuts, one Open Off-take and 27 Nos of tanks having a command area of 2183.98 Ha.

14. MINERAL POTENTIAL

The periodical accumulation of sand in rivers affect the water flow and it leads to damage the bunds in both sides of the river. To avoid the aggradations and degradation of the water flow in the river it is essential to maintain the bed level of the river by removing shoels and excess sand deposits. It is possible to maintain the river course by quarrying operation in recommended areas. The following areas are the places which are identified for Quarrying operation in the district.

I) VAIGAI RIVER

Sl.No	Location	Taluk
1.	Enathikottai	Paramakudi
2.	Foreshore area of Parthibanoor Regulator	Paramakudi
3.	Soodiyur	Paramakudi

4.	Paramakudi	Paramakudi
5.	Valasai	Paramakudi
6.	Gangaikondan	Paramakudi
7.	Nenmeni	Paramakudi
8.	Menathi Nagachi	Paramakudi
9.	Pottithatti below Kalari bed dam	Paramakudi

II) GUNDAR RIVER

Sl.No	Location	Taluk
1.	Kallikulam	Kamudhi
2.	Foreshore of Malattar	Kamudhi
3.	Anicut of Periyar	Kamudhi
4.	Appanur	Kadaladi
5.	Veppangulam	Kadaladi
6.	Upstream of Malattar Vilakku	Kadaladi

III) KOTTAKARAIYAR RIVER

Sl.No	Location	Taluk
1.	Chettikiottai	R.S.Mangalam
2.	Kokkoorani	R.S.Mangalam
3.	Pullamadai	R.S.Mangalam

IV) SARUGANIYAR RIVER

Sl.No	Location	Taluk
1.	Sithalur	R.S.Mangalam
2.	Anandhur	R.S.Mangalam

V) VIRUSULIYAR & PALAR RIVER

Sl.No	Location	Taluk
1.	Koogudi	Thiruvadanai
2.	Kidangur Anicut	Thiruvadanai
3.	Oriyur	Thiruvadanai