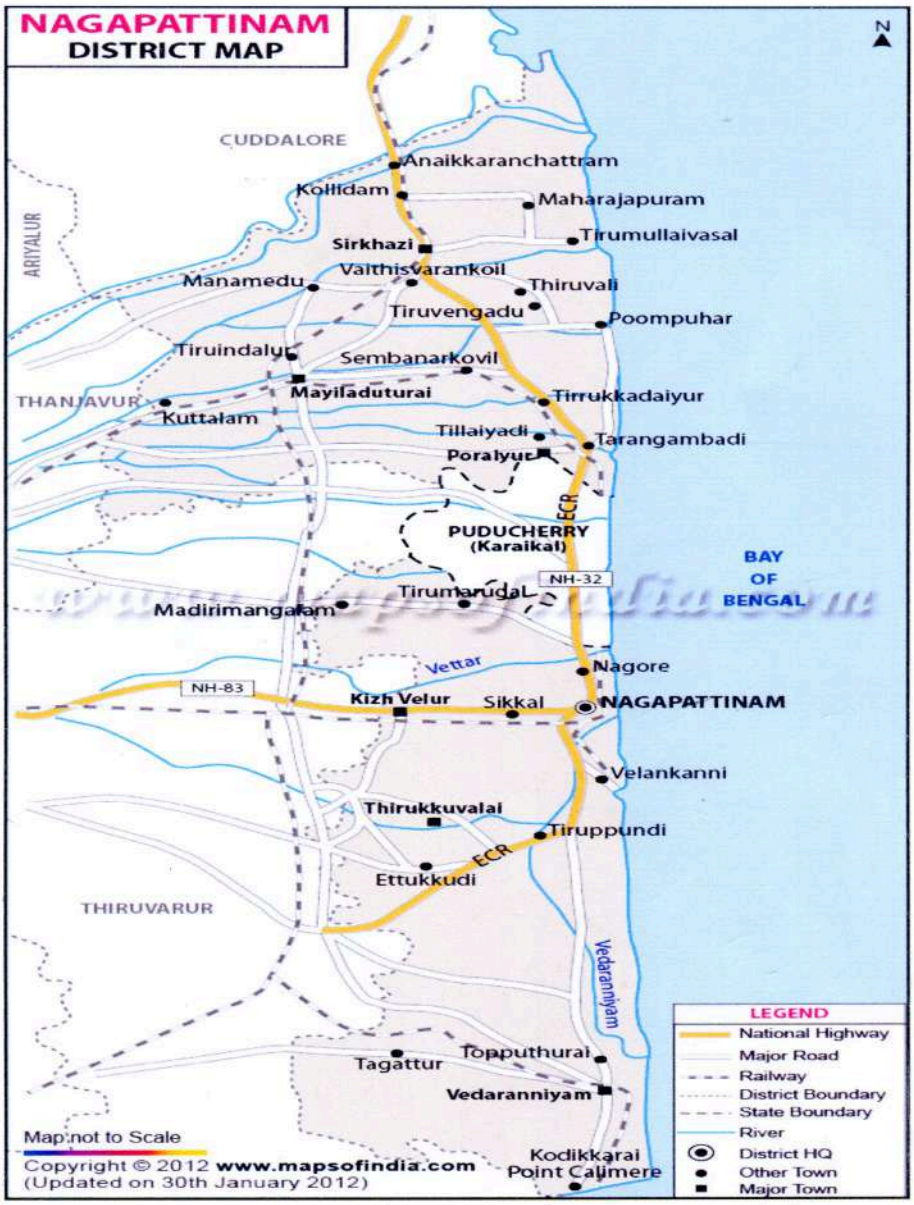
DISTRICT SURVEY REPORT FOR SILICA SAND

NAGAPATTINAM DISTRICT



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

2019

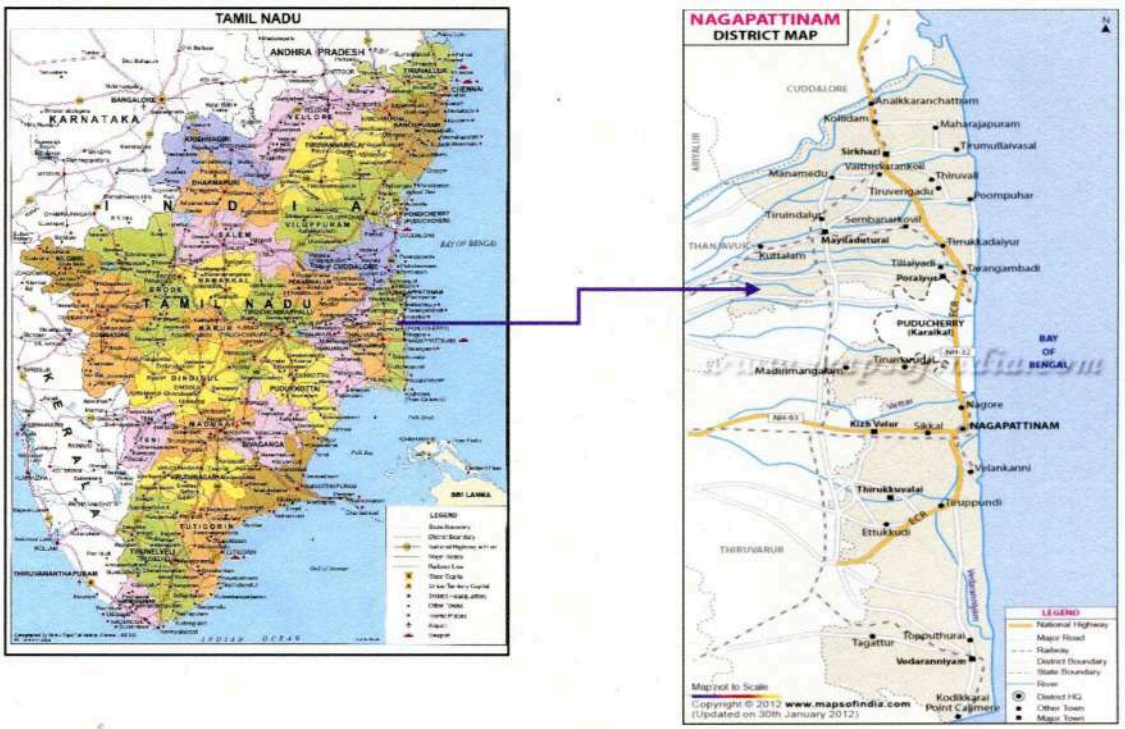
1.0 INTRODUCTION:

In conjunction to the Ministry of Environment, Forest and Climate Change, the Government of India Notification No.SO.141 (E) dated 15.01.2016 and SO.190(E) dated 20.01.2016 the District Level Environment Impact Assessment Authority (DEIAA) and District Environment Appraisal Committee (DEAC) were constituted in Nagapattianam District for the grant of Environmental Clearance for category "B2" projects for quarrying of Minor Minerals.

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 Nagapattinam district by the official from Geological Survey of India and Directorate of Geology and Mining, (Nagapattinam District), Govt. of Tamil Nadu. The following District Survey Report (DSR) report prepared based on the guidelines by MOEF S.O. 3611(E) dated: 25July 2018.

Nagapattinam District was carved out of erstwhile Thanjavur District on 18 October 1991. Subsequently it was bifurcated in 1997 as Nagapattinam and Tiruvarur Districts.It is a very small district with a total geographical area of 2715.83 Sq.Kms. This constitutes just 2.09 % of the area of the State. Nagapattinam district is bounded in the North by Cuddalore district, in the west by Thanjavur and Thiruvarur districts and in the south and east by Bay of Bengal.The District lies between 10^{0}15'00 N to 11^{0} 30' 00"N Latitude, 79^{0} 30' 00"E to 79^{0} 55' 00"E Longitude. (FigNo.1).

Fig.1Location Plan



2.0. OVERVIEW OF MINING ACTIVITY IN THE DISTRICT:

The important major mineral wealth of Nagapattinam district are as follows Crude Oil (Oil & Natural Gas), , Heavy mineral sand (Garnet, Iluminite, Rutile, Zircon, Monozite). Crude oil (Oil & Natural gas) exploration and exploitation work carried out by ONGC at different parts/ blocks of Nagapattinam district such as Narimanam, Kuttalam etc., in Cauvery basin. The minor mineral wealth of Nagapattinam is Sand, Savudu/Brick earth (clayey sand) Silica sand and Lime shell.

The silica sand is an oxide of silicon which is used mainly for the manufacture of Sodium Silicate, which in turn used in the soap and detergent manufacturing industries and also used in foundries, glass making, and ceramics and as an abrasives. The Silica sand deposit is 4.86 million tonnes, occur in Vadamalai Manakkadu, Vanduvancherri, Thanikottagam villages of Vedaranyam Taluk in Nagapattinam District. There are eight silica sand leases at Nagapattinam District by different private mining companies. Lime-shell deposits are available in Sirkali and Nagapattinam taluk of Nagapattinam district which is about 1,87,064 Tonnes. It is used for making lime-mortar and bleaching agent in Sugar industries.

In Nagapattinam District, heavy minerals includes an assemblages of garnet, illmanite, rutile, zircon and monazite sands which are higher in specific gravity, occur as placer deposit along the sea coast in the beach sand. It occurs in Tharangampadi and Sirkali Taluks in Nagapattinam District. Garnet is used in the abrasive industries, and manufacturing of synthetic gems. Illuminate is used for aircraft industry. Zircon is used for manufacturing Zirconium Crucibles. Silliminate is used for Aluminum industries. Besides that brick earth quarries are available. Sand mining activities are very recently initiated by PWD, Nagapattinam district in different parts of Coleroon River viz., Siddhamalai, Kadakkam Villages of Mayiladuthurai and Sirkazhi Taluk.

- **Silica sand(Minor mineral):**

In different parts of Vedaranyam taluk of Nagapattinam District eight numbers of silica sand mining leases had been granted and they are under non-operation for want of Environment Clearance *(Photographs: 1-16).*

3.0 GENERAL PROFILE OF THE DISTRICT:

Nagapattinam district is a coastal district of Tamil Nadu, recently bifurcated from the erstwhile Thanjavur district. This district with Nagapattinam as headquarters occupies about half of the Cauvery delta. Its geographical extent is 2569 sq.km and is situated between North Latitudes (10° 15': 11° 20') and East (79° 15': 79° 50') and above mean sea level (MSL) 9 m. It is bound on the east by Bay of Bengal, west by Thanjavur district, north by Cuddalore district and south by Palk Strait and comprises Nagapattinam, Nannilam, Mannargudi, Mayuram, Sirkazhi and Tirutturaipundi taluks

REVENUE ADMINISTRATION:

The Nagapattinam district consists of two revenue division namely, Nagapattinam and Mayiladuthurai and eight taluks namely Nagapattinam, Kilvelur, Thrirukkuvalai, Vedaranyam, Mayiladuthurai, Tharangambadi, Kuttulam and Sirkazhi *(Fig.1).* Besides that, the district consists of 08 town panchayats and 423 village panchayats.

MEDICAL HEALTH:

The district consists of 25 government hospitals and 53 primary health centers and 258 health sub centers.

POPULATION:

The district consists of total population of 14,88,839, which includes male population is 7,39,064 and female population is 7,49,765. Total house hold rural population is 2,71,827 and urban population is 71,786 and total is 3,43,613.

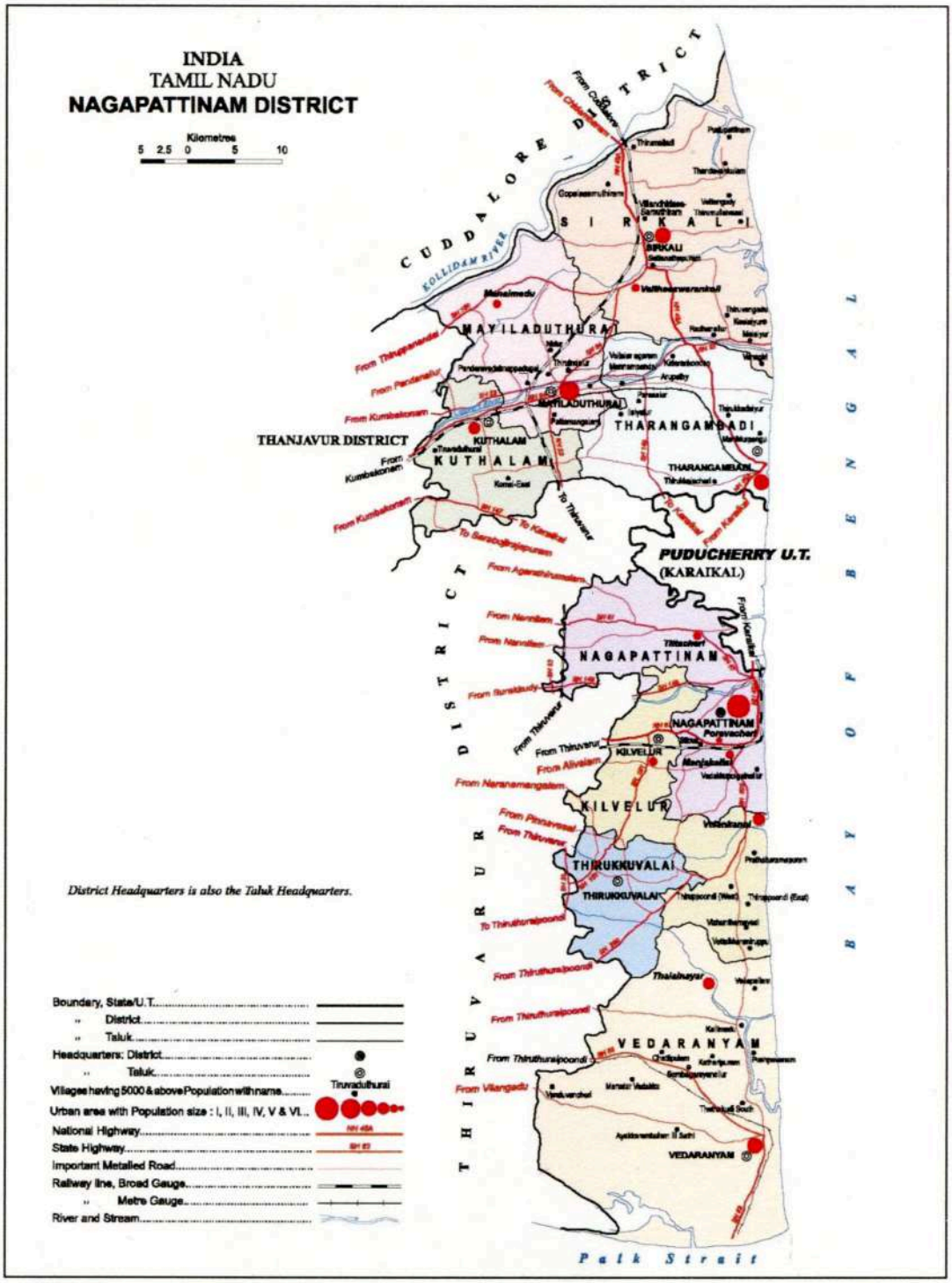


Fig No.2: District Map

4.0 GEOLOGY OF THE DISTRICT:

The district can be broadly divided into (i) western gently undulating laterised country, (ii) central alluvial plains of the Cauvery delta, (iii) N-S and E-W trendning fluviomarine deltaic and, (iv) N-S and E-W trending coastal Chenier Plain between Kollidam mouth in the north, Muthupet in the southwest and Vedaranyam in the southwest.

The area forms part of the Cauvery delta with a gently slope towards Bay of Bengal. No surfacial older formation are exposed except for small area around Mannargudi (10° 40': 79° 29') covered by laterites and lateritic soil over the Cuddalore Formations of Miopliocene age. The rest of the area is represented by Quarternary deposits. The thickness of quarternary sediments increase south of Kollidam river. At Mayuram (11° 06': 79° 31'), thickness of these sediments is 80 m. These sediments have been delineated as alluvial plain deposits (Cauvery Formation) of the Cauvery river and its distributaries, narrow fluviomarine deltaic plain deposits (Nagapattinam Formation) and marine coastal plain deposits (East Coast Formation). The fluvial deposits comprise flood plain, flood basin, point bar, channel bar and paleo channels with admixtures of sand, silt, clay and gravel. The deltaic plain includes paleo tidal flats with clays and sands and sand ridges of grey brown sand. The marine coastal plains include beach, tidal flats, salt marsh, mangrove swamps, deposits of sand and clay.

The area mapped is extensively covered by river alluvium, reddish-brown sandy soil and windblown, marine sand. The different formations met with are given below in the order of increasing age from bottom to top.

Recent to sub- Recent	Coastal sand, River alluvium, Red, brown and buff sand soil Lateritic gravels.
Tertiary (Mio-pliocene)	Mottled incoherent sandstone (argillaceous)
Cuddalore Sandstones Series	White gritty sandstone.

Source: Dharmaraj. A, FS 1970-71.

A NW-SE trending deep seated fault is located to the east of Tirutturaipundi (10°31'30":79°38'30").Thermal water occurrences near Tirutturaipundi are probably associated with this fault. A major N-S trending fault is also marked along the coast.*(Trectnic Map of Indian ONGC, 1968).*

5.0. DRAINAGE OF IRRIGATION PATTERN:

Irrigation by Different Sources Nearly canals serve 80 percent of the total net area irrigated and only the river Cauvery feeds these canals. The Cauvery Delta system is the most ancient of all irrigation schemes in the undivided Thanjavur. This comprises mainly of three important projects. They are the famous Grand Anicut, the Upper Anicut and the Cauvery Vennar Regulator Project.

5.1: Cauvery Basin in Nagapattinam District:

Since 1971, the three major cauvery delta districts in Tamil Nadu- Thanjavur, Tiruvarur and Nagapattinam- have seen a massive diversion of farmland to other purposes, an ongoing study at the Madras Institute of Development studies has found. Using data the Indian Space Research Organisation, the study, being authored by water- management expert S.Janakarajan, said in its interim report in September that hundreds of square kilometres of agricultural land has been diverted and built up in the three districts over the last four decades.

Further, with the Mettur dam- the entry point of the Cauvery in Tamil Nadu- blocking the river's natural flow and vital sediment deposits, the coastal delta district of Nagapattinam has become highly vulnerable to invasion by the sea. Parts of the district could start slipping under the sea in the coming decades if mitigation efforts are not implemented. The delta also assumes significance since a significant shrinkage in area of cultivation could adversely affect food production in Tamil Nadu.

COLEROON RIVER:

The river Coleroon is a major flood carrier branching off from Cauvery river at Upper anicut and confluences with Bay of Bengal after traversing a distance of 168.21 Km (100 miles). Normally the flood water received in cauvery will be surplused into Coleroon river at Upper anicut. The surplus water realized in cauvery river at Grand anicut head also be diverted into coleroon through the surplus arrangements and scour vent provided in Grant Anicut.

The Coleroon river is branching off from river cauvery at Upper anicut in Trichy District and traverse to a distance of 168.210 Km (100 miles) through Trichy, Perambalur, Thanjavur, Nagapattinam and Cuddalore and infalls into Bay of Bengal near Mahendriapalli village in Sirkali Taluk of Nagapattinam District. The Coleroon river sub basin is located in the northern middle part of Tamil Nadu state between the latitudes 11 ^{0}6'00" - 11^{0}23'57" and longitudes 79 ^{0}24'00" - 79^{0}49'00".

Coleroon river is the only flood carrier for the entire cauvery delta system which branching from cauvery. Cauvery is an inter state river aling with many sub rivers from Karnataka and Kerala states and flows nearly 800 Kms. The entire sflood water from catchment area of river cauvery comprising about 802290 sq.kms passes through the coleroon river. Also during flood occurring and flood water flow in the coleroon drainage carries, a lot of mass of sand silt deposited over the normal bed level for a height of more than 2m in different places forming as shoal which restricts the normal flow of flood water. Such a shoal of sand silt finds out and quarried the same by forming a river sand quarry at this place. Presently six places of huge height of shoal of sand silt have found out and necessary action is being taken out for quarrying for the sand for free flow of water. Bank erosion is occurred in coleroon river mainly due to instability of banks and the shoal of sand silt format restricted the normal flow of flow of flow water.

6.0 LAND UTILISATION PATTERN IN THE DISTRICT; FOREST, AGRICULTURAL, HORTICULTURAL, MINING ETC:

Total geographical area is 2,71,583 hector area in Nagapattinam district. The major portion of the land 1,50,680 hector (55.48 %) is covered by sown (plantation) category. Barren and uncultivable land coverage is under 33,418 hector (12.30 %). Land put to non agriculture land is 47,735 hector (17.6%). Forest area coverage is 4,633 hector (1.7 %).Current fallow and other fallow lands coverage is 9,446 hector (3.47 %) & 16,347 hector (6.02 %). Land under miscellaneous tree crops coverage is 6,381 hector (2.35 %). Land coverage under cultural waste & permanent pastures are 2,097 hector (0.77 %) & 846 (0.31%) respectively.

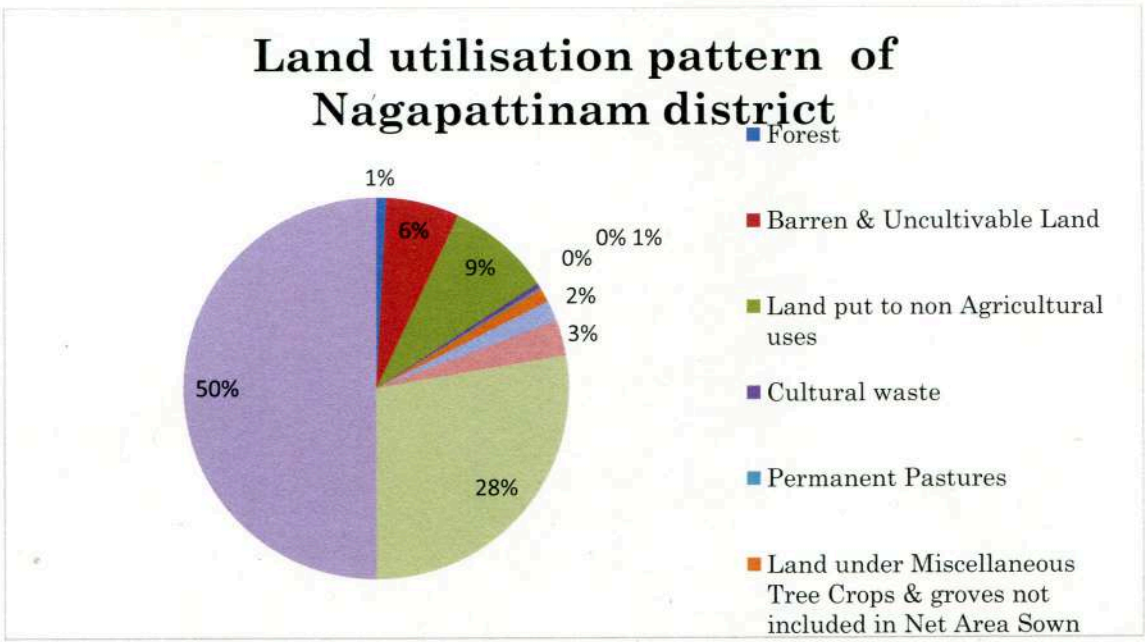


Fig No.3: Land utilization pattern

FOREST:

There are 41 forest areas in the Nagapattinam district constituting a total area of 5,311.70 ha with 35 forest areas falling under the Reserve Forest category with 5,037.21 ha and 6 under reserve land category with 274.49 ha Forestry activities in the district are being carried out byWildlife Division, with

Wildlife Warden as the administrative head. The division consists of 4 ranges with headquarters at Nagapattinam, Kodiakkarai, Muthupet and Thanjavur. The basic responsibilities of the division include afforestation activities like raising coastal shelterbelt, greenbelts,mangrove restoration, wildlife management and attending to environmental issues. Theimportant forest and wildlife areas in the division includes Point Calimere Wildlifesanctuary. The other important areas are, Tropical dry-evergreen forest covers nearly 15 sq.km of Point Calimere Wildlife sanctuary. The forests are mostly of the nature of scrubland that stands on low sand dunes located on the western half of the sanctuary. Manilkara hexandra, locally called Palai is the most important evergreen species of the sanctuary.

In the sanctuary grasslands the dominant graminoid is Aeluropus lagopoides followed by Sporobulu tremulus and Cressa cretica.The forest is home to 154 species of medicinal plants like Mucuna ruriens,Solanum trilobatum, Tinospora cordifolia Randia dumatorum and Cissus quadrangularis. A forest rest house at Kodiakkarai is available for visitors to the sanctuary.Point Calimere Wildlife Sanctuary and the Muthupet mangroves are the most important forests and wildlife areas of Nagapattinam district.Point CalimereWildlife sanctuary is located 60 km from Nagapattinam and Muthupet mangroves is located 70 km from Nagapattinam. Point Calimere Wildlife sanctuary with a total protected area of 30 sq.km is home to thelargest population of the endemic Blackbuck in south India. Other animals of the sanctuary include the jackal, spotted deer,jungle cat, feral horses, black napped hare, including a variety of reptiles.

From October to January nearly 90 species of migratory water birds visit the sanctuary and its surroundings. They include Flamingoes, Painted storks, Pelicans, Spoonbills, ducks, teals and a variety of shore birds. The best time to visit the sanctuary for bird watching is November- December. The sanctuary is open to visitors throughout the year.The forests of this division can be divided into two regions from the topography, and flora point of view; the alluvial regions or riverine land areas and the coastal regions. Riverine areas lie on thebanks of river and canal in the form ofnarrow strips. Teak plantations mostly cover these

areas, wherever the soil is unsuitable for Dalbergia sisso, Terminalia arjuna and Eucalyptus have been planted in such areas. Although the soil is light and porous with high water table, the forest areas under these zones are subjected to tremendous bioticpressure and at present their poor floristic composition consists of limited number of herb and thorn species.

The present situations does not bring them in any category of Forest type as per Classification of forests made by Champion and Seth 1968. The Coastal regions contain the Casurina plantations, the mangroves and the scrub jungle with the exception of a portion of Point Calimere sanctuary where about 23 sq.km of tropical dry evergreen forests are existing.

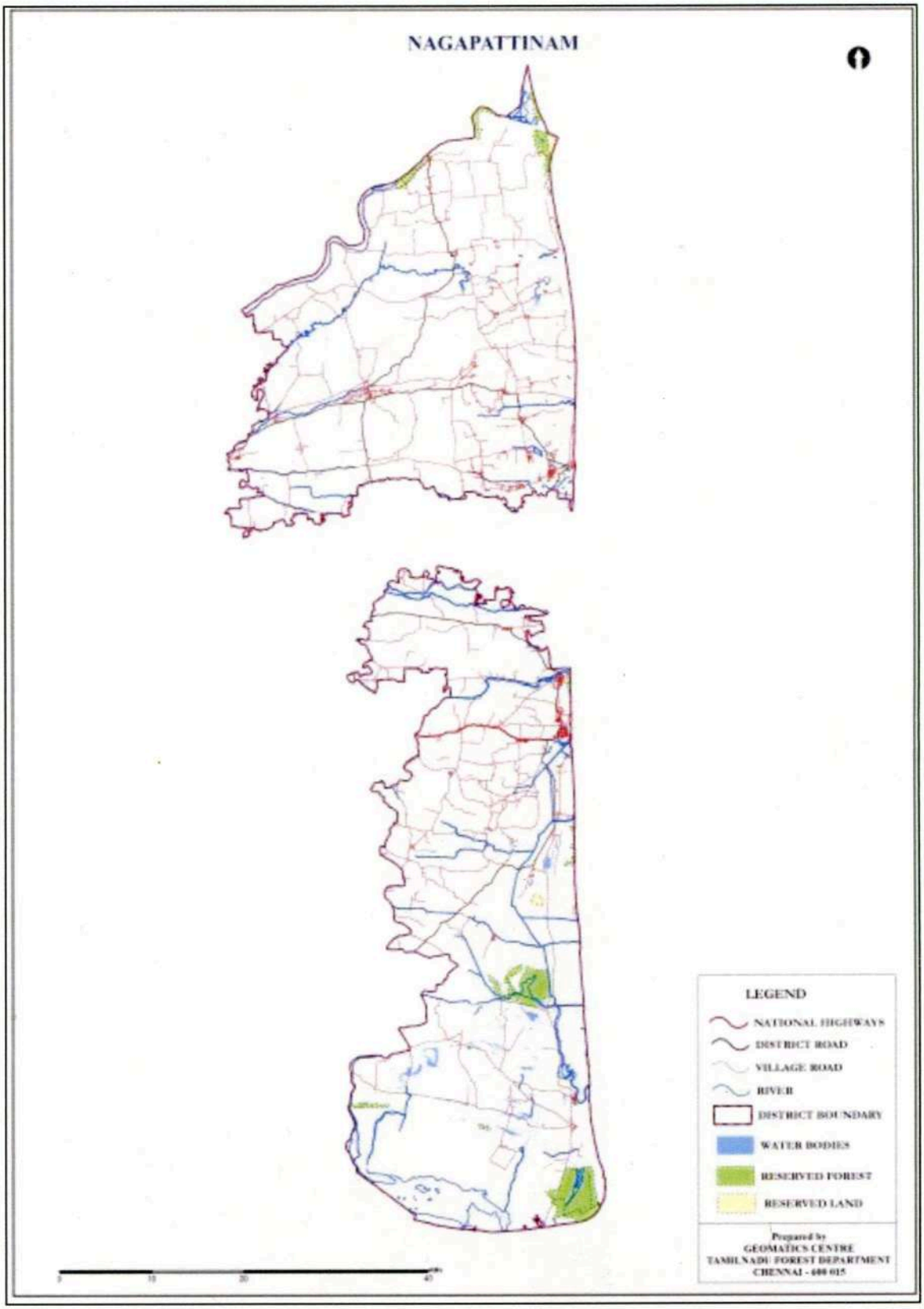


Fig No.4: Forest Map of the District

AGRICULTURAL:

Nagapattinam District is predominantly an agricultural district. Paddy, the principal crop is grown throughout the year. The other crops are sugarcane, banana, groundnuts, pulses and oil seeds. Latest farming techniques are widely being adopted by most of the farmers.

HORTICULTURE:

Major horticulture crops cultivated in this district are fruits crops like mango, banana, vegetables like tomato, brinjal, bhendi, onion, tapioca and chillies, spices like turmeric, tamarind and chillies, plantation crops like areca nut, betel vine, flower crops like jasmine, crossandra, chrysanthemum, tuberose and rose and medicinal crops like gloriosa.

SOILS:

The major part of the district is covered by black clay and isolated patches of brown clay loam in the area bordering the NE boundary of Karaikal Region is seen. Some patches of Arenacious soils are also found along the coastal line.

MINING:

The important major mineral wealth of Nagapattinam district are as follows crude oil (oil & natural gas), silica sand, lime shell, heavy mineral sand (Garnet, Iluminite, Rutile Zircon, Monozite). Crude oil (Oil & Natural gas) exploration and exploitation work carried out by ONGC at different parts/ blocks of Nagapattinam district such as Narimanam, Kuttalam etc., in Cauvery basin.

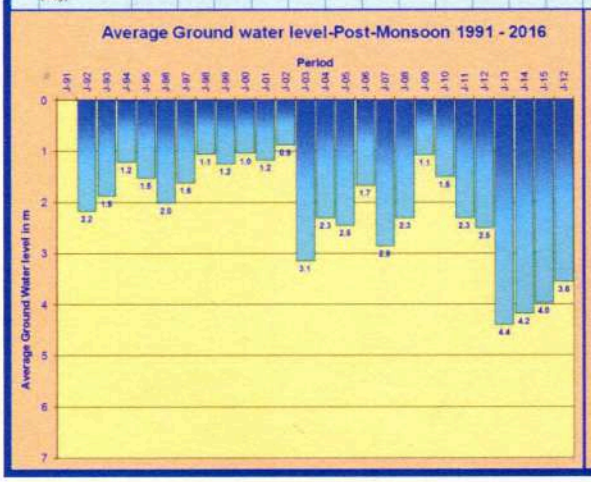
7.0 SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT:

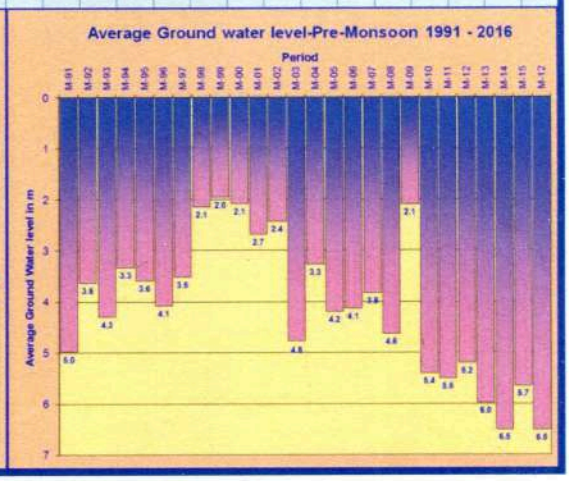
River water is the only source of irrigation in the district. The district is part of the composite east flowing river basin having Cauvery and Vennar sub basin. The district is drained by Kollidam and Cauvery in the north, Virasolanar, Uppanar in the central part and Arasalar, Tirumalairajan, Vettar, Kedurai, Pandavai,Vedaranyam canal and Harichandra Nadi in the southern part of the district.The district is situated in the deltaic region of the famous river Cauvery and criss-crossed by lengthy network of irrigation canals.

The entire district covered by semi-consolidated formations consisting of sand, silt and Clays. Ground water occurs under water table, semi-confined and confined conditions. The Ground Water levels from the 26 number of observation wells of TWAD have been analysed for Post-Monsoon and Pre-Monsoon. Since 1991, average Ground water level in m Below Ground Level for pre and post monsoon is as follows:

Nagapattinam District - Ground water level from 1991 - 2016

Sl. No	District	Average	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Post Monsoon Ground water Level in m (January)	2.2		2.2	1.9	1.2	1.5	2.0	1.6	1.1	1.2	1.0	1.2	0.9	3.1	2.3	2.5	1.7	2.9	2.3	1.1	1.5	2.3	2.5	4.4	4.2	4.0	3.6
2	Pre Monsoon Ground water Level in m (May)	4.1	5.0	3.8	4.3	3.3	3.8	4.1	3.5	2.1	2.0	2.1	2.7	2.4	4.8	3.3	4.2	4.1	3.8	4.8	2.1	5.4	5.5	5.2	6.0	6.5	5.7	6.5





Source: http://www.twadboard.gov.in

Ground Water Potential as per CGWB:

Net Groundwater availabiltity (in MCM)	159.16
Existing Gross Groundwater draft for all users (in MCM)	162.88
Stage of Groundwater development (in %)	102%
Catergorization of District	Over - exploited

The status of categorization of firkas for the district:

Categorisation based on extraction	Firkas
Over exploited (›100%)	Kuttalam, Manganallur, Mayilladuthurai, Melaiyur, Palaiyur, Pattavarthi, Puthur, Sembanarkoil, Thiruvillaiyatam, Vaitheeswaran Koil, Sirkazhi.
Critical (90% - 100%)	Madhanam
Semi critical (70%- 90%)	
Safe(‹ 70%)	Manalmedu, Thirukannapuram
Others (Poor & Saline)	Kangalacheri, Keelaiyur, Kilvelur, Nagapattinam, Nirmulai, Thagatur, Thalainayar, Therkupoigainallur, Thevoor, Thillayadi, Thirukkuvalai, Thirumarugal, Theiruvengadu, Valivalam, velanganni, Vedharanyam, Kariyapattinam.

8.0 RAINFALL OF THE DISTRICT AND CLIMATE CONDITION:

The temperatures various from 40.6 to 19.3° C with sharp fall in night temperaturesduring monsoon period. The relative humidity ranges from 70 – 77% and it is high duringthe period of October to November.

The district receives rainfall under the influence of both southwest and northeast monsoon. A good part of the rainfall occurs as very intensive storms resulting mainly from cyclones generated in the Bay of Bengal especially during northeast monsoon. The district receives rainfall almost throughout the year. The Nagapattinam district yields major rain fall during north east monsoon, the normal rain fall is 908.80 mm and actual rain fall is 969.2 mm. The south west monsoon yields normal rain fall is 265.20 mm and actual rain fall is 250.60 mm. The north east monsoon provided more rain fall than south west monsoon. Besides that month wise rain fall data for Nagapattinam district is provided below.

District	Year	Jan	Feb	Mar	Apr	May	Jun	Jly
Nagapattinam	2004	9.5	4.7	10.3	0	337.4	1.7	38.1
	2005	2.8	0	8	190	28.3	6.1	34.7
	2006	36.7	0	35.7	52.9	40	17.3	4.8
	2007	0	36.9	0	14.7	5.9	35.9	53.9
	2008	64.1	12.4	328.6	8.2	33.7	33.7	19.3
	2009	58.3	0	176.5	81.8	29.8	7.3	2.6
	2010	57	0	0.1	10.6	100	70.8	31

Aug	Sep	Oct	Nov	Dec	Total
71.2	236.3	639.5	378.5	67.3	1794.5
88.4	161.9	216.1	821	128.8	1686.1
67.7	90.3	456.3	361.7	80.7	1244.1
199.4	72.3	483	159.1	423.4	1484.5
66	56.8	259.3	786.5	188.4	1857
106.4	42.8	133	671.1	536	1845.6
171.2	113.2	151.7	499.8	390.1	1595.5

Source: www. indianwaterportal.org.

Table No.1: Rain fall data of Nagapattinam district from 2004 to 2010

YEAR	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEPT		OCT		NOV		DEC	
	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
2013	30.3	-52	23.5	2	31.2	69	0.2	-99	8.3	-78	39.6	8	28.4	-53	144.0	55	104.1	8	107.7	-55	311.3	-24	201.3	-30
2014	13.7	-78	8.0	-65	0.0	-100	0.0	-100	156.7	312	35.0	-5	51.6	-14	98.3	6	35.5	-63	459.8	91	351.6	-15	204.8	-29
2016	0.6	-99	0.2	-99	0.0	-100	0.0	-100	166.4	338	53.8	46	24.2	-60	125.6	35	41.9	-57	69.2	-71	122.0	-70	57.4	-80
2017	139.4	123	6.9	-70	48.7	163	0.0	-100	2.7	-93	38.5	5	39.4	-34	130.1	40	91.0	-6	239.0	-1	704.9	71	188.4	-35

Source:http://hydro.imd.gov.in

Note :(1) The District Rainfall in millimeters (R/F) shown below are the arithmatic averages of Rainfall of Stations under the District.

(2) % Dep. are the Departures of rainfall from the long period averages of rainfall for the District.

(3) Blank Spaces show non-availability of Data

9.0 DETAILS OF THE MINING LEASES IN THE DISTRICT AS PER THE FOLLOWING FORMAT

Sl. No.	Name of Mineral	Name and Complete address of lessee	Village and Taluk	SF Nos. and extent (in hects.)	G.O./Proceedings/ Period of lease	Classification of land.	Operative / Non operative.	Latitude / Longitude
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Silica Sand	Sakthi Mines and Minerals, Thiruthuraipoondi.	Vanduvancher y Vedaranyam	205/1C 4.00 Acres (0-80-0 hectare)	CGM/Chennai. Rc No.24/MM3/2004 20 Years upto 1.04.2024	Patta Land	Non Operative	10°26'2.05"N 79°39'54.98"E
2	Silica Sand	Sri Ram Mines and Minerals – I Hospital Road, Thiruthuraipoondi.	Vadamazhi, Vedaranyam	300&301 2.52.0 Hects.	Dist.Collector/ Nagapattinam. Rc No.213/2004/G&M	Patta Land	Non Operative	10°27'25.07"N 79°42'29.97"E

					dt.24.11.2000 20 Years upto 23.11.2020.			
3	Silica Sand	Sri Ram Mines and Minerals – II Hospital Road, Thiruthuraipoondi	Vanduvancher y Vedaranyam	158 0.92.5 Hectr.	Rc.No.5998/ MM 6 /2000, dt.19.9.2002 20 Years upto 18.09.2022	Patta Land	Non Operative	10°26'17.54"N 79°39'48.32"E
4	Silica Sand	Thiru.S.T.Ravichan dran 98/59A Mannai Road, Thiruthuraipoondi Thiruvarur.	Thanikottagam Vedaranyam	160/4C etc., 2.32.5 Hects.	Commissioner RC.No.724/MM /3/ 2004,dt.8.7.2004 20 Years 12.12.04 to 31.11.2024	Patta Land	Non Operative	10°44'652"N 79°68'307"E
5	Silica Sand	N. Sargunan, Proprietor, M/s.Star Mines & Minerals, 4/204, Main Road, Vilakkudi – Post, Thiruthuraipoondi Taluk.	Chettipulam Vedaranyam Taluk.	254/1 & 231/5 1-49-0 Hectares	Director's proceedings RC.No.14744/ MM3/02, Dated 23.04.2008 – for twenty years – 05-09-2008 to 04-09-2028.	Patta Land	Non Operative	10°27'35" N 79°44'30" E
6	Silica Sand	A. Muthukumar, Proprietor, Tvl. K.A.M.Mines and Minerals, Chettiyakadu, Vedaranyam Taluk	Thagattur, Vedaranyam Taluk.	2/6,17/4,18/5 3.06.0 Hectares	Commissioner' S Pro.R.C.7291/ MM3/2003 dt.30.06.2009/ for 20 years upto 29-06-2029	Patta land	Non Operative	10°26'53.2"N 79°41'31.4"E
7	Silica Sand	Tvl Silver Sand Mines and Minerals, Thiruthuraipoondi.	Chettipulam Vedaranyam Taluk.	74/2B 3,89/4B 1.17.5 Hectares	Commissioner' s Pro.R.C.4544/ MM3/2007 dt.7.07.2009/ for 20 years upto 06-07-2029	Patta land	Non Operative	10°27'517"N 79°44'319"E
8	Silica Sand	Tvl Silver Sand Mines and Minerals, Thiruthuraipoondi.	Thanikottagam Vedaranyam Taluk.	27/1 ,27/2 & 27/17 1.89.5 Hectares	Commissioner' s Pro.R.C.4545/ MM3/2007 dt.7.07.2009/ for 20 years upto 06-07-2029	Patta land	Non Operative	10°25'267"N 79°39'403"E

10. Details of Royalty or Revenue received in last three years:

Revenue Collection Details				
Sl.No	**Name of the Mineral**	**2016-17 Amount in Rs.**	**2017-18 Amount in Rs.**	**2018-19 Amount in Rs.**
1	Silica Sand	37,76,748	***6,20,800**	0

*Arrear collection

11. Details of production of Silica Sand in last three years.

Sl.No.	Name of the Mineral	2016-17	2017-18	2018-19
1.	Silica Sand (MTs)	75235	0	0

12.0 MINERAL MAP OF THE DISTRICT:

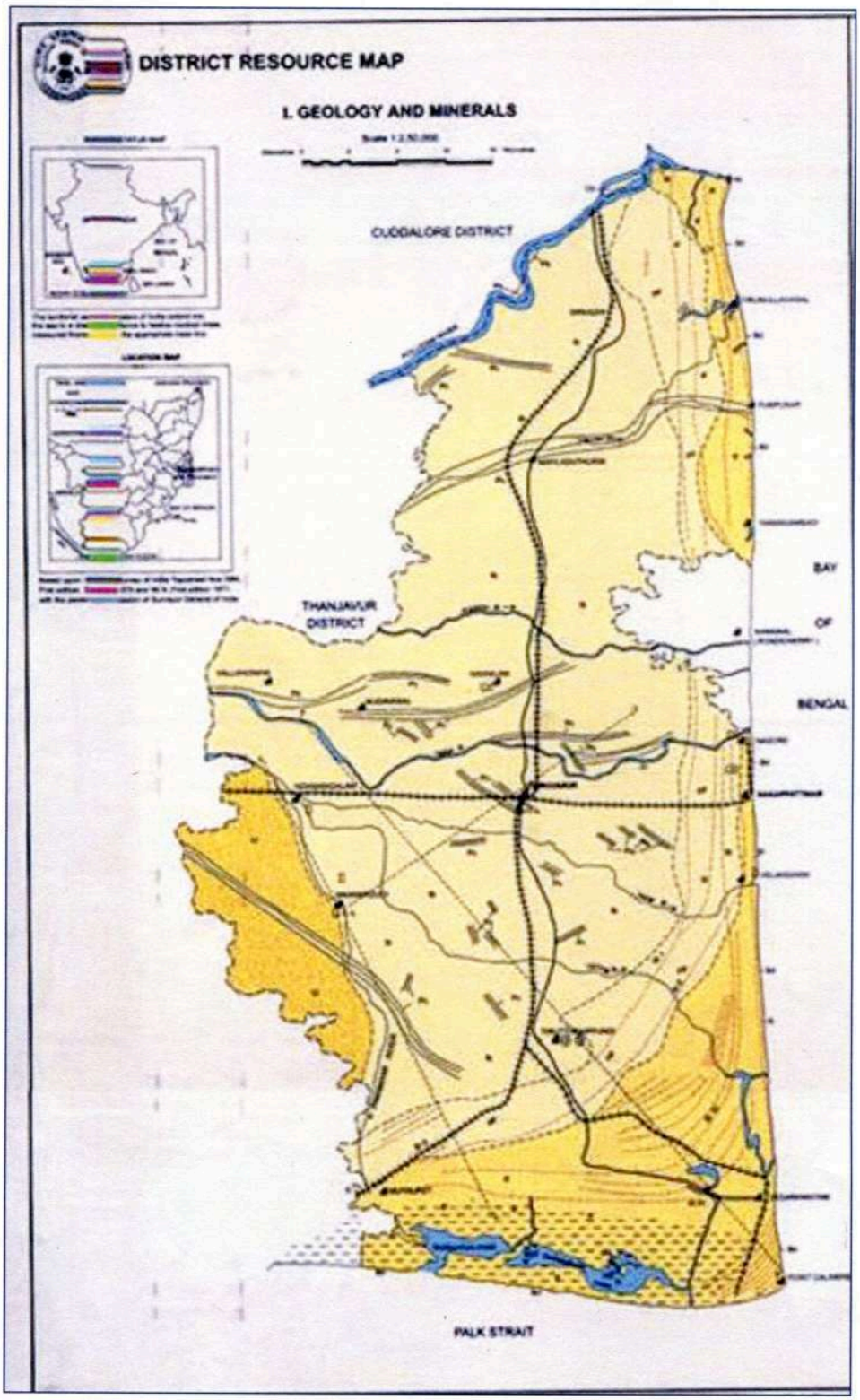


Fig No.6:

Mineral Map of Nagapattinam District

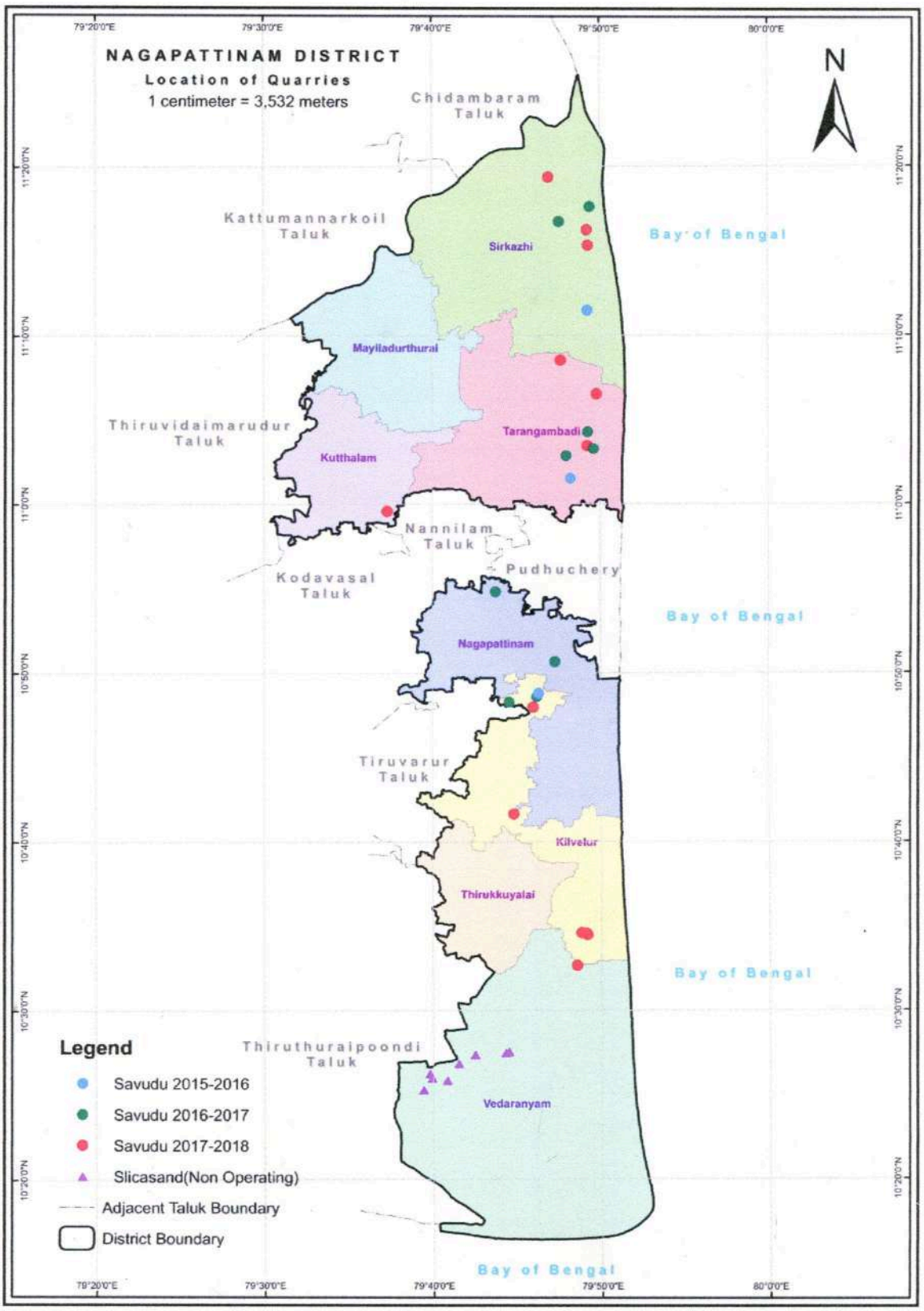


Fig No.6: Mineral Map of Nagapattinam District

13.0 LIST OF LETTER OF INTENT (LOI) HOLDERS IN THE DISTRICT ALONG WITH ITS VALIDITY AS PER THE FOLLOWING FORMAT

Table No 5: Details of List of Intent (LOI) holders in the district.

LIST OF LETTER OF INTENT (LOI) HOLDERS IN THE DISTRICT									
S No	**Name of the Mineral**	**Name of the Lessee**	**Address & Contact No. of Lessee**	**Letter of Intent Grant Order No & Date**	**Area of Mining lease (ha)**	**Validity of LOI**	**Use (Capitive /Non Capitive**	**Location of the Mining lease (Latitude & Longitude)**	
								Latitude	**Longitude**
1	Nil								

14.0 TOTAL MINERAL AVAILABLE IN THE DISTRICT:

The Silica sand deposit is 4.86 million tonnes, occurring in Vadamalai Manakkadu, Vanduvancherri, Thanikottagam villages of Vedaranyam Taluk in Nagapattinam District. There are 8 silica sand leases in Nagapattinam District.

Tabe No .6: Occurrence of Silica sand in Nagapattinam

Area of occurrence of silica sand in Nagapattinam District	
Name of the Belt	**Area (sq.m)**
Vadamalai – Manakkadu	1,795
Kariappattinam – Chettipulam	6,985
Avarikkadu	1,000
Nagakkudaiyan	3,200
Vellikidankku – Tanikkottagam	6,500
Dumbavanam – Vanduvancherri	10,250
Thillaivilagam – Melvaymedu	16,500
Ambuvamadal – Therkku Thillaivilagam	9,500

15.0 QUALITY / GRADE OF MINERAL AVAILABLE IN THE DISTRICT:

Silica Sand :

SiO_2 - 90.68%
MgO - 0..51%
Al_2O_3 - 2.56%
Fe_2O_3 - 0.92%
SO_3 - 2.12%
Na_2O - 0.06%
K_2O - 0.01%

16. USE OF MINERAL:

The silica sand is an oxide of silicon which is used mainly for the manufacture of Sodium Silicate, which in turn used in the soap and detergent manufacturing industries and also used in foundries, glass making, ceramics and

as an abrasives. Sand will also used in moulding purposes. The stranded sand used for assessing the quality of cement.

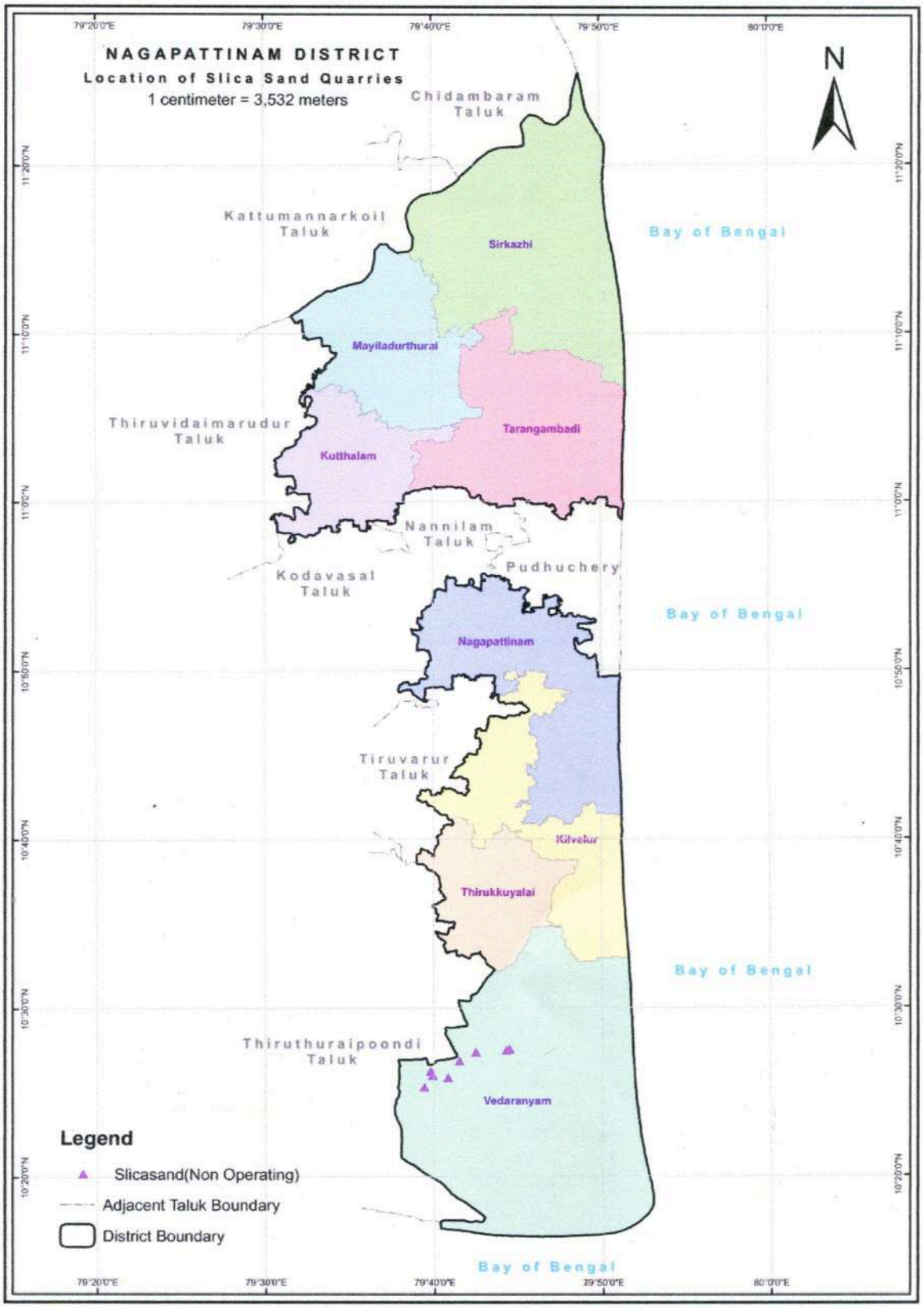
Because of iron content and clay matter, the silica sand has to be washed . The silica sand can be beneficiated by washing, attrition with acid and froth floatation, to remove not only clay and iron as coating on the silica sand, but also heavy minerals like magnetite and ilmenite which increase the iron and titanium content . After beneficiation the iron (Fe2O3) content will be less than 0.06% which is required limit in Glass manufacture industry.

17.0 DEMAND AND SUPPLY OF THE MINERAL IN THE LASE THREE YEARS:

In respect of Nagapattinam District, there is heavy demand for Silica Sand but supply of the mineral in the last three years in the district is Nil as all the eight leases are under non operation for want of Environment Clearance.

Sl.No	Name of the Mineral	2015-16	2016-17	2017-18
1.	Silica Sand (Cbm)	0	0	0

18.0 MINING LEASES MARKED ON THE MAP OF THE DISTRICT:



FIELD PHOTOGRAPHS (with Latitude and Logitude)

Photo - 1

Close view of silica sand quarry of at Thanikottagam village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 41' 03.5").

Photo - 2

Close view of silica sand quarry of at Thanikottagam village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 41' 03.5").

Photo - 3

Water logged in silica sand quarry of Vanduvancherry village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 39' 46.9").

Photo – 4

Close view of silica sand quarry of Vanduvancherry village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 39' 46.9").

Photo - 5
Close view of water logged in silica sand quarry of Thanikottagam village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 39' 46.9").

Photo - 6
Close view of silica sand quarry of Thanikottagam village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 45.5" to E 79° 39' 46.9").

Photo - 7
Panoromic view of water logged in silica sand quarry of Vanduvancherry village of Vedaranyam taluk at Nagapattinam district (N 10° 25' 48.5" to E 79° 39' 49.9").

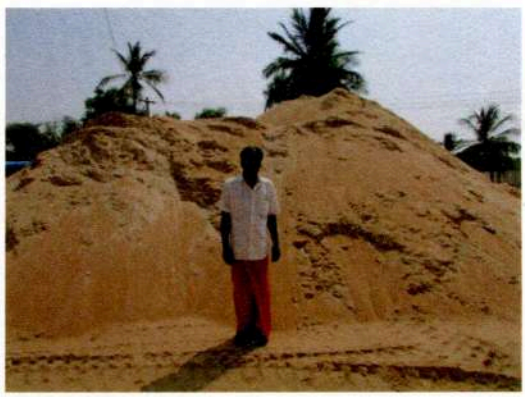


Photo - 8
A view of pile of silica sand at Vanduvancherry village of Vedaranyam taluk at Nagapattinam district (N 10° 25' 48.5" to E 79° 39' 49.9").

Photo - 9
Panoromic view silica sand quarry of Thagattur village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 54.3" to E 79° 41' 35.5").

Photo - 10
Close view silica sand quarry of Thagattur village of Vedaranyam taluk at Nagapattinam district (N 10° 26' 54.3" to E 79° 41' 35.5").

Photo - 11

Long view of silica sand quarry of Vadamazhi village of Vedaranyam taluk at Nagapattinam district (N 10° 27' 19.0" to E 79° 42' 28.3").

Photo - 12

Close view of silica sand quarry of Vadamazhi village of Vedaranyam taluk at Nagapattinam district (N 10° 27' 19.0" to E 79° 42' 28.3").

Photo - 15

View of sand quarry of Chettipulam village of Vedaranyam taluk at Nagapattinam district (N 10° 28' 03.9" to E 79° 45' 02.3").

Photo - 16

Close view of sand quarry of Chettipulam village of Vedaranyam taluk at Nagapattinam district (N 10° 28' 03.9" to E 79° 45' 02.3").

19.0 DETAILS OF THE AREA WHERE THERE IS A CLUSTER OF MINING LEASES VIZ., NUMBER OF MINING LEASES, LOCATION (latitude & longitude)

CLUSTER OF MINING DETAILS IN THE DISTRICT									
S No	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Letter of Intent Grant Order No & Date	Area of Mining lease (ha)	Validity of LOI	Use (Captive /Non Captive	Location of the Mining lease (Latitude & Longitude)	
								Latitude	Longitude
1	--NIL –								

Table No.7:Details of the area where there is a cluster of mining lease.

20.0 DETAILS OF ECO-SENSITIVE AREA:

The Point Calimere Wildlife Sanctuary, declared in 1967 is spread over an area of 17.29Sq.km (1,728.81 Ha) and Block B, declared in 2013 is spread over an area of 5.22 Sq.km (521.36 Ha) and located in Vedaranyam Taluk of Nagapattinam District in the state of Tamil Nadu.It is located 60 kilometres south of the Nagapattinam and lies where the Bay of Bengal meets the Palk Strait. The total area of sanctuary is 22.51 sq. km. The sanctuary and its surrounding wetlands are important wintering grounds for water birds from the North. Nearly 100 species of migratory water birds including the Greater Flamingo start arriving in the sanctuary and its surroundings from September onwards and stay on till January before their return to the North. The sanctuary coast has been a regular nesting site of the endangered Olive Ridley turtle.

GOOGLE MAP OF ECO-SENSITIVE ZONE OF POINT CALIMERE WILDLIFE SANCTUARY WITH BLOCK B

THEMATIC MAPS OF ECOLOGICALLY SENSITIVE AREAS OF NAGAPATTINAM DISTRICT

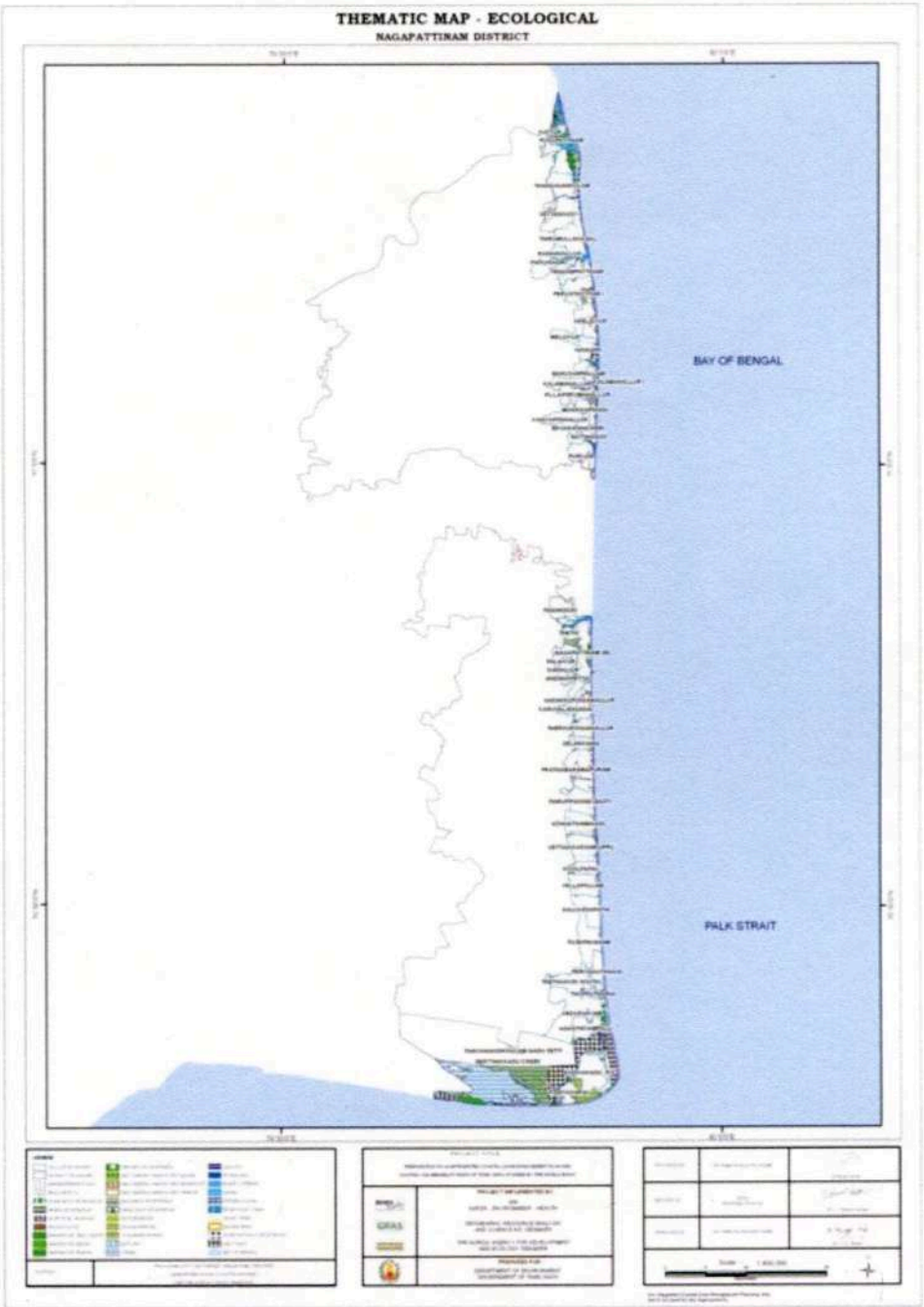


Fig.No. 9 Ecological Map of Nagapattinam District

Source: *Preparation of an Integrated Coastal Zone Management Plan and Coastal Vulnerability Maps of Tamil Nadu (2012). Department of environment, Government of Tamil Nadu, India.*

COASTAL REGIONS:

This zone contains the Casurina plantations, the mangroves and the scrub jungle with the exception of a portion of Point Calimere sanctuary where about 23 sq.km. of tropical dry evergreen forests are existing. Major portion of the land 65.55% is used for cultivation of paddy for three times in a year but the forest cover has lesser percentage (1.31%).

21.0 IMPACT ON THE ENVIRONMENT DUE TO MINING ACTIVITY:

Environmental impact on quarrying can be broadly classified in to two categories:

1. Environmentaldegradation
2. Environmental pollution

ENVIRONMENTAL DEGRADATION:

Degradation of topography, fauna and flora in variably takes place on quarrying. While developing infrastructure, vegetation cover is destroyed, topography degraded and fauna and flora affected. If it is rubber plantation in Kerala, it is mango grooves in Tamil Nadu that is destroyed. Natural lakes, nalla beds have become the convenient locito dump the over burden. Filling up of the natural drainage channels creates problem in the water way system. Degradating the topography leads to destruction of vegetative cover, dry air circulation, non precipitation, choking of natural drainage and finally to extreme drought. This is happening presentin excessively quarried areas for which the reason attributed is failure of monsoon.

ENVIRONMENTAL POLLUTION:

Air, water and noise pollution are some of the impacts of quarrying on environment which have extreme destructive consequences. Silicosis is the prevalent disease that affects majority of the quarry workers and the adjoining villages. In addition to the natural water sources getting contaminated with particulates, deepening of quarry depth intercepts ground

water table. Natural topo graphic gradient is upset with concomitant change in drainage pattern. Deepened out quarries have become overnight perched aquifers draining away water from all the surrounding highlands. Noise pollution, over and above those from quarrying equipment get saccentuated from increase duse of jet burners (flames cutters). Solid waste is non-biodegradable and slow mechanical disintegration of which leads to environment of silica, sodium, potassium and calcium in soils. Soils become unproductive. Inadequate space for dumping solid wastes near quarries leads to dumping of them on either side of the road.

22.0 REMEDIAL MEASURE TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT

The following remedial measures to be taken during mining

22.1 Remedial Measures to mitigate Air Pollution

- Water sprinkling on mineral transport road from the mines to the main road
- Black topping of the main transportation roads to the possible extent.
- Avoiding crowding of trucks by properly spacing them to avoid the concentration of dust emission at any time
- Covering the trucks by tarpaulin sheets during ore transportation
- Proper maintenance of HEMM to minimize gaseous emission
- Imparting sufficient training to operators on safety and environmental parameters
- Development of green belt / plantation around mine, along the roads, backfilled area in various undisturbed areas within the mine lease areas etc.,

22.2 Remedial Measures to mitigate water Pollution

- Industrial effluent treatment systems wherever necessary to be introduced and maintained properly.
- Safety barriers to be provided for all water bodies and no mining activities should be carried out in the safety barrier area.
- Mitigative measures like construction of garland drains formation of earth bunds to be followed in the waste dumping areas to avoid wash off.
- Domestic effluents to be treated in scientific manner
- Required statutory clearances to be obtained and all precautionary measures to be adopted wherever pumping of ground water is involved.

22.3 Remedial Measures to reduce Noise & Vibration

- Planting rows of native trees around mine, along the roads, other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipment may lead to less noise generation.
- Proper and regular maintenance of equipment may lead to less noise generation
- Air silencers of suitable type that can modulate the noise of the engines of machinery to be utilized and will be maintained effectively.
- Providing in-built mechanism for reducing sound emissions.
- Providing ear muff's to workers exposed to higher noise level and to those persons operating or working close to any machine.
- Conducting regular health check-up of workers including Audiometric test for the workers engaged in noise prone area.

22.4 <u>Remedial measures to reduce Impact on Land Environment</u>:

Scientific reclamation measures to be adopted to reduce the impact of land environment due to mining.

22.5 Remedial measures to reduce Impact on Biological environment:

- Necessary mitigative measures like dust suppression, proper maintenance of equipments, black topping of roads etc., to be carried out to prevent dust generation & any further impact on the vegetation.
- Conservation plan for schedule –I species if any to be prepared in consultation with the Forest Department and the proposals given in the conservation plan to be strictly implemented.
- Effluents generated in the mining areas to be treated properly.

23.0 RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATIONS, PROPOSED RECLAMATION PLAN:

The reclamation of mined out lands by simultaneous backfilling and development of plantation in the backfilled areas will be the best practice of reclamation.

24.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN:

Any mines have dangers or risk like fires, inundation, failure of machinery, which need to be investigated,addressed and mitigated. Disaster management is formulated with an aim of taking precautionary steps to avert disaster and also to take such action after the disaster which limits the damage to the minimum.Mining operations may be carried to the utmost safety but there is always some element of danger or risk in it. No major disaster is envisaged. Only minor accidents may take place. No perennial source of surface water is present in the quarry area. The mining operations will be carried out under supervision of statutory personnel's& strictly following safety aspects as per MMR 1961.The following natural/industrial hazards may occur during normal operation.

Risk Assessment and Disaster Management plan in connection with mining and allied operations should be spelt out in detail to cover possible

dangers /risks/explosions/accidents etc., likely to arise from the project operations including onsite and off-site emergency plans to meet the disastrous situations if any.The management is able to deal with the situation efficiently to reduce confusion keeping in view of the likely sources of danger in the mine.

25.0 DETAILS OF OCCUPATIONAL HEALTH ISSUE IN THE DISTRICT (LAST FIVE –YEAR DATA OF NUMBER OF PATIENTS OF SILICOSIS & TUBERCULOSIS IS ALSO NEEDS TO BE SUBMITTED)

The details of number of patients treated for silicosis and Tuberculosis for the last five years in the district is given below:

OCCUPATIONAL HEALTH ISSUE IN THE DISTRICT (LAST FIVE – YEARs)			
S No	**Year**	**Number of patients treated for silicosis**	**Number of patients treated for Tuberculosis**
1	2014-15	52	1506
2	2015-16	46	1673
3s	2016-17	48	1629
4	2017-18	56	1687
5	2018-19	54	1769

Table No.8: Details of occupational health issue in the district

26.0 PLANTATION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT:

It is necessary to develop Green belt in and around the polluted site with suitable species to reduce the air pollution effectively. Implementation of afforestation program is of paramount importance. In addition to augmenting

existing vegetation, it also checks soil erosion, make the ecosystem more complex and functionally more stable and make the climate more conductive.

Simultaneous backfilling method will be followed in most of the mining areas. During the operations, the plantation will be proposed and will be carried out on the safety barrier areas and also on the mined out and backfilling areas.

27. ANY OTHER INFORMATION:

- This District Survey Report has been prepared by doing field work in a short span of ten working days. The details related to the occurrence of mineral resources and other data of the district are subject to updation of district mineral inventory from time to time. It may be periodically done every five (05) years with the help of GSI and other govt/non-govt geoscience exploration organisations.
- Laterites,tidal clays,Lime shells,Brick clays and salt pans are the locally exploited mineral resources of the area.
- Sandy silt and clay along the river banks and from basin are suitable manufacturing of bricks.
- The district is situated in the deltaic region of the famous river Cauvery and criss-crossed by network of irrigation canals. Kollidam river forms the Northern boundary of the district, whereas Arasalar, Thirumalairajan, Vettar and Vennar rivers drain the other parts of it. GPS/Auto Tags installed tracking of mined out mineral vehicles will fetch more revenue to the state exchequer and over exploitation.
- Tropical dry-evergreen forest coversnearly 15 sq.km of Point Calimere Wildlifesanctuary.
- The introduction of e-permit system and implementation of Mineral Dealers Rule and the despatch slips / transit permits with tampered proof security features and tracking of mined out minerals will fetch more revenue to the State Exchequer as well as sustainable development.

ASSISTANT DIRECTOR
GEOLOGY AND MINING
NAGAPATTINAM.

DISTRICT COLLECTOR
NAGAPATTINAM.