

NAGAPATTINAM DISTRICT

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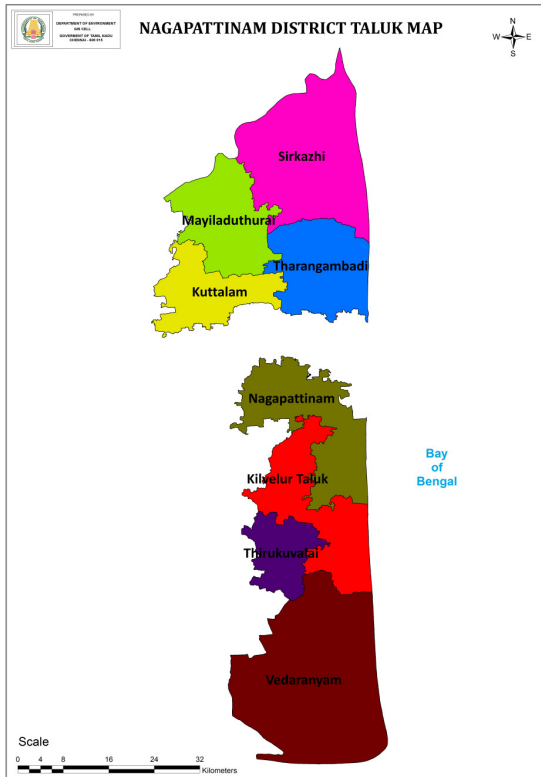
1. Introduction

i) Geographical location of the district

Nagapattinam is a coastal district of Tamil Nadu situated on the eastern side of Nagapattinam the district headquarter lie 326 km, south of the State capital, Chennai, 145 km from Trichy, This district lies south of Cuddalore district and another part of the Nagapattinam district lies to the south of Karaikkal and Tiruvarur districts. Nagapattinam lies between Northern Latitude 10.7906 degrees and 79.8428 degrees Eastern longitude. The district spreads over an area of 2,715.83 sq.km

ii)Administrative profile

This district envelop 11 Panchayat unions, 4 municipalities, 8 town Panchayats on its development side 2 revenue divisions and 523 revenue villages.



Revenue Divisions	2
Taluks	8
Municipalities	4
Panchayat Unions	11
Town Panchayats	8
Village Panchayats	434
Villages	2508

iii) Meteorological information

The average maximum temperature of the district as a whole is about 32⁰ C and the average minimum temperature is 24.6⁰C. Dust storms, whirl winds and dusty winds blow from various quarters towards the end of May. The Southwest winds sets in during April, it is the strongest in June and continues till September.

Northeast monsoon starts during the month of October and blow till January. Cyclonic storm with varying wind velocity affects once in 3 or 4 years during the months of November-December. The storms affect the plantation crop. During Southwest monsoon the air is calm and undisturbed. The Northeast monsoon which starts in October and ends in December contributes about 60% of the total annual rainfall. The southwest monsoon rains occur from June to September.

The average normal and actual rainfall is 265.2 and 250.6 mm respectively during south west monsoon while it is 908.8 and 969.2 mm respectively during north east monsoon during 2007-2008.

2. Resources availability

i) Land resources

Sandy coastal alluvium and black soil types cover 88.71% and 6.58% respectively in this district. The other soils in the district comprise 4.71%. The soil of the district is mostly alluvial but varies greatly in quality. The rich soil is found in the north and the south of the railway line between Mayiladuthurai and Thiruthuraipundi. The saline soil is found in the Tirutturaipundi and Nagapattinam taluks where the drainage is very defective.

ii) Agriculture and horticulture

One of the major economic activities of the district, agriculture contributes a higher share of rice production in the State. Important crops in the district include rice, groundnut, pulses, gingelly, sugarcane and cotton.

Details of important crops in district		
Sl. No.	Name of the crop	Area in ha
1	Rice	1,54,945
2	Sugar cane	8,824
3	Cotton	650
4	Groundnut	5,820
5	Gingerly	2,950
6	Green gram	17,130
7	Black gram	48,400
8	Vegetables	746
9	Coconut	3,116

This coastal district abounds in green paddy fields, tall coconut groves, vast gardens of mango and plantain and other vegetations. Paddy is the main crop of this district and it is grown three times in a year. The first crop is known as 'Kuruvai' (the short-term crop) with duration of three and a half to four months from June-July to October-November. The second crop called

the 'Thaladi' has duration of five to six months from October - November to February-March. Third is the 'Samba' (the long-term) crop and has duration of almost six months from August to January. Other cereal crops of the district are cumbu, ragi, maize, korra and varagu. The pulses grown in the district are redgram, greengram and blackgram. Other food crops are condiments and species, sugar crops, fruits edible oils crops (groundnuts, coconut and gingelly) and vegetables. Among the non-food crops, cotton/fibre, non-edible oils crops (castor, miger seeds, though in very small area) are the important ones.

i) Forest resources

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 by Wildlife 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. The important forest and wildlife areas in the division includes Point Calimere Wildlife sanctuary. The other important areas are,

1. Vaduvor
2. Udayamarthandapuram
3. Karaivetti bird sanctuarie
4. Muthupet mangroves

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 pruriens*, *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 Calimere Wildlife 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 the largest 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 the banks of river and canal in the form of narrow 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 biotic pressure 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.

iv) Mineral resources

Major minerals

The important major minerals available in Nagapattinam District are as follows:

1. Crude oil
2. Natural gas
3. Silica sand
4. Lime shell
5. Heavy mineral sand (Garnet, Iluminite, Rutile Zircon, Monozite)

Silica sand

The silica sand is an oxide of silicon which is used mainly for the manufacture of Sodium Silicate, which in turn is used in the soap and detergent manufacturing industries and also used in foundries, glass making and ceramics as an abrasives. The Silica sand deposit is 4.86 million tonnes, occurring in Vadamalai Manakkadu, Vanduvancherri, Thanikottagam villages of Vedaranyam Taluk in Nagapattinam District. There are 7 silica sand leases functioning in Nagapattinam District.

Grude oil and natural gas

Crude oil is petroleum in its natural state before it has been refined. Petroleum is naturally occurring hydrocarbons in free state whether in the form of natural gas or in a liquid viscous (or) solid form. Natural gas means gas obtained from bore holes and primarily consisting of hydro-carbons. The oil and natural gas are being extracted in Narimanam, Kuthalam villages by the Oil and Natural Gas Commission.

Lime-shell

Lime-shell deposits are available in Sirkali and Nagapattinama taluk of Nagapattinam district (1,87,064 Tonnes). It is used for making lime-mortar and bleaching agent in sugar industries. In Nagapattinam district, one lime-shell lease is functioning.

Heavy minerals

The heavy mineral sands comprise an assemblage of minerals of higher specific gravity and 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 synthetic gems. Ilminate is used for aircraft industry.

Zircon is used for manufacturing Zirconium crucibles. The estimated reserve of the following minerals are

Mineral table	
Mineral	Volume
Ilmenite	8,670 metric tonnes
Garnet	8,450 metric tonnes
Zircon	430 metric tonnes
Monozite	330 metric tonnes
Rutile	110 metric tonnes
Leucozyme	430 metric tonnes
Magnetite	1,720 metric tonnes

The above estimation does not include seasonal replenishment of heavy minerals in the coastal area.

Minor minerals

In Nagapattinam district, minor minerals such as sand and brick earth quarries are available. There are 8 sand quarries operating in this district in Kollidam river, *Thirumalairajan* river and Vettar areas. The details of quarrying leases granted for quarrying various minerals are given in the following table.

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

Quarry details

Name of the minerals	No. of leases in patta lands	No. of leases in poramboke lands
Crude oil and natural gas	2	--
Silica sand	7	--
Lime shell	-	1
Sand	2	8
Brick earth	4	--
Total	15	9

Water resources

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. All these are tributaries and branches of the river Cauvery. Canals serve nearly 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. Tanks and wells are rarely used for irrigation in the district.

The gross area irrigated by canals and other sources is 1,13,374 ha and 21,405 ha respectively. The gross area irrigated by the tanks and the wells are 40 ha and 50 ha respectively. Therefore canal irrigation constituting 84.07% of the total irrigated area remains the predominant source of irrigation. On an average about 58.20% of the total cropped area is irrigated. Mayiladuthurai block achieves about 74% irrigation at the maximum and Vedaranniyam achieves 17.85% at the minimum. Some blocks achieve irrigation at about 60%.

vi) Fisheries production

The Nagapattinam district has a coastal line of 188 km. Fishery is the economic backbone of this coastal district. Having a long coastal area, this district plays a major role in marine commodities. The marine ecosystem provides mankind with food, medicines, industrial products etc. This ecosystem has to be maintained in a healthy state, if it is to provide people the benefits in a sustained manner. The waters along the Bay of Bengal coast of India are biologically very productive and possess several unique environmental features. However, little is known about the marine biodiversity resources along the Bay of Bengal coast near Sirkali taluk, Nagapattinam district (Tamilnadu State).

Numerous industries, chemical factories and aquaculture farms are also developing along this coast, which already threatens the mangrove forests and marine life along the coast in Sirkali taluk. The input of freshwater and silt impacts the salinity of the coastal and estuarine waters as well as coastal circulation patterns. Some coastal areas serving as nursery grounds for commercially valuable species of prawns are polluted. The areas of critical biological diversity are the mangrove rich habitat along the coast of Nagapattinam district. The district has good fishing potential in view of its rich coastal area. The coastal fish production is more than the inland fish

production and the production has seen fluctuations.

vii) Heritage sites

Nagapattinam

The district came into existence in the year 1991 with its headquarter in Nagapattinam town. It has Shri Kayahorana Swami Neelayathatchi Amman Temple, Sowriraja Perumal Temple, and Nellukkadai Mariamman Temple. The mini museum, the towering lighthouse and the long beautiful beach are some of the places worth visiting in this city. The pillar located in front of the district collectorate stands for the achievement of the administration along with the citizens of this district in taking the Guinness record achievement of planting the maximum number of saplings in 24 hours.

Poombuhar

Poombuhar is in Sirkali taluk of Nagapattinam district. It is known as Kaveripoompattinam. Tourists have to alight at Mayiladuthurai junction to proceed Poombuhar by road. Visitors from Chennai by train have to get down at Sirkali. Poombuhar is connected to Mayiladuthurai as well as Sirkali by road. The distance from Poombuhar to Mayiladuthurai is 24 km and to Sirkali 21 km

Nagore

The Dargha in Nagore near Nagapattinam, the district headquarters is a holy place. Not only the followers of Islam but also of all faiths visit this sacred centre throughout the year to offer their prayers and get the blessings of the saint. Nearly five hundred years ago a son was born in a

devout Muslim family in a village in the central provinces [Madhya Pradesh], He was named Abdul Kadhar. He came to Tamil Nadu after visiting different places like Keelakkarai and preaching the doctrine of love, service devotion to the Almighty. He settled down in Nagore in a piece of land granted by a devotee of this saintly preacher. His words and deeds were divine and prophetic. He said Islam preaches the fatherhood of God and brotherhood of Man. He sent his disciples to work among the people and spread the message of Prophet Mohammed. He passed away in year 1,558 at the age of 68 in Nagore dargha. Khandoori festival is the anniversary celebrations and devotees from all over the world join the festivals to get blessed by Nagore Andavar.



**Dargha in Nagore
Velankanni**

Velankanni is one of the most visited pilgrim centres in India. It is a town situated on the shores of Bay of Bengal. This renowned shrine Basilica of the Lady of Health draws pilgrims from all over the World. Not only Christians but also the people of other faiths come to this church to pray at the shrine of our lady of health.

Knowing the importance of this town the Pope in the Vatican city has declared Velankanni as a Holy city. This Roman Catholic Church has an extended Basilica, which has two floors where one can find the statue of Jesus Christ. The Gothic style of architecture is a unique feature of the church.



Velankanni Church

The church itself is an imposing building with inspiring architecture. While the buildings have been painted white, roof of the church is made by tiles with striking red in contrast to the colour of the walls. The environment around the shrine is spick and span. There is also a shrine of 'lady of sorrow' where in the sorrowing Mother is depicted carrying infant Jesus in her hand.

Tarangampadi

It is 35 km north of Nagapattnam on the east coast of Bay of Bengal. Bus facilities are available to this place from Nagapattinam, Mayiladuthurai, Poompuhar, Sirkali and Chidambaram. Built in the year 1620 it exhibits Danish architecture. The fort is now under the control of TamilNadu Archeological Department. It houses an archaeological museum. This museum is open on all days except Friday.

Sikkal

A beautiful Muragan Temple dedicated to Lord Singaravelan is housed in a large complex. The pillars of this temple are adorned with intricate and exquisite carvings. The beautiful paintings of a bygone era are amazing in colour and portrayal. Beside this temple has the shrine of Siva, Vishnu and Hanuman. It is a rare combination, indeed. Worship in this temple removes all the hurdles of the devotees, it is believed.

Thirumullaivasal

This town is 14 km East of Sirkali. It is popular for its fine beach, which is full of natural beauty. This town has an ancient temple. The presiding deity of this temple is Arulmigu Mullaivananathar.

Keelaperumpallam

Situated 3 km from Poompuhar, Keelaperumpallam receives a stream of devotees every day for worshipping Shri Naganatha Swami. This temple is the seat of the Ninth Navagraha, the Kedhu.

Thiruvengadu

Thiruvengadu is situated 8 km from Poompuhar. Navagraha Budhan is situated inside the Temple of Arulmigu Swetharanya Swami. Devotees from all over India and abroad come to worship Budhan every day.

Vaitheeswarankoil

In the divine songs of Devaram, Vaitheeswarankoil is called Pullirukkuvellur. The Presiding deity Lord Vaithyanathan and the Devi is Thaiyalnayagi. Lord Muruga is called here as Arulmigu Muthukumaraswami. Vaitheeswarankoil is situated 12 km from Mayiladuthurai and 5 km from Sirkazhi. This temple is the seat of another Navagraha, the Mars.

Thirunangore

Situated 10 km from Sirkazhi, Thirunangore is one of the most sacred places for Vaishnavaiter. Shri Narayanaperumal Temple, Purushothama Perumal temple, Kudamadum Kootha Perumal kovil, Semponnarangar kovil, Pallikondaperumal kovil, Varadharaja Perumal koil which had been performed Mangala Sananam by Thirumangai Azhwar are located in this small town. Around Thiru Nangore, there are other Vaishnava temples in Thiruvai, Thirunagiri, Keezhasalai and Perumal koil.

Thirukkadaiyur

Thirukkadaiyur is in and the bus route between Chidhambaram - Nagappattinam. In this temple, Lord Siva had annihilated Yama, the God of death and destruction to save the life of Markandeya and bestowed immortality on him. It is one of the most important seats of Sakthi. Inside the precincts of the temple of Arulmigu Amerthakadeswarar is located the temple of Shri Abirami Amman.

Sirkazhi

Sirkazhi is located on the main route between Mayiladuthurai and Chidhambaram. Shri Arulmigu Sattanatha Swami temple has many wonderful architectural and sculptural features. This temple has been glorified in the divine songs of Thevaram. One of the four great divine poets, the Saiva Saint Thirugnana Sambandar was bestowed with the divine grace by Lord Siva and Parvathy here. Every year in the Tamil month of Chithirai, Thirumulaippal festival is celebrated in a grand manner.

Mayiladuthurai

Arulmigu Mayuranathar temple is located here. According to the Hindu mythology, Annai Parasakthi danced in the form of a peacock and hence the place is

called Mayiladuthurai. Devotees after worshipping Mayuranathar can travel from here to all the places of Navagrahas and other important temples by bus. The festival of Holy bath known as Kadai Muzhukku in the river Cauvery is celebrated in the month of Ippasi.

Ananthamangalam

On the east coast between Nagappattinam and Chidhambaram, Ananthamangalam is located 5 km from Thirukkadaiyur. People from all over Tamil Nadu visit the temple of Lord Anjaneyar for his grace. The divine statue of Anjaneya here is unique with its three eyes and ten hands. Special worship of Anjaneya is held on Saturdays and on the days of Amavasya.

viii) Biodiversity

Kodikkarai (55 km) also called Point Calimere, is situated abutting the Palk Strait. Spread over an area of over 312.17 ha, this Wild Life Sanctuary boasts of mammals like blue buck, spotted deer, wild boar, semi wild ponies, bonnet macaque, water birds like flamingoes, ibises, herons, and spoonbills. Sea turtle, starred tortoise, vipers, marsh crocodiles, etc., are some of the reptiles. Fish, dolphins, dugong, sea lion, sea cow are occasionally found here



Point Calimere Wildlife Sanctuary

The Muthupet mangrove wetland is located in the Southern most part of the Cauvery delta with Palk Strait in the south and extensive mudflats in the north. Many of the drainage arteries of the Cauvery River, namely, Pamini, Korayar, Marakakoryar, Pattuvanachi and Nasuvini, empty their water into the Muthupet mangrove wetland. The Muthupet mangrove wetland comprises of healthy and degraded mangroves, large lagoon and canals, besides creeks and manmade fishing canals.

According to the 1996 remote sensing data, the total area of the Muthupet mangrove wetland is about 12,000 ha and for administrative purposes it is divided into 6 Reserve Forests. The presence of two large lagoons of about 1,700 ha which are contiguous, is one of the characteristic features of the Muthupet mangrove wetlands. The data also show that the area of the healthy mangrove forest is only about 1855 ha whereas nearly 7,178 ha of mangrove forest is in degraded condition. Only 5 mangrove species namely, *Acanthus illicifolius*, *Agiceras corniculatum*, *Avicennia marina*, *Excoecaria agallocha* and *Luminitzera racemosa* are present in the Muthupet mangrove wetland. Among them, *Avicennia marina*, which is locally called Alaiyathi is dominant, constituting more than 95% of the tree population. But unlike Pichavaram, trees of *Avicennia marina* are very tall in Muthupet and form a beautiful line along the banks of the tidal creeks, lagoons and canals. Hyper salinity in soil and water is the main reason for the presence of low number of mangrove species.

The harvestable forest resources such as timber and non-timber produce are very limited in the Muthupet mangroves. Though fodder is available in the wetland, no regular grazing is practised since mangrove forest is located far away from the villages and

access is very difficult due to muddy soil. Use of mangroves for firewood for household consumption is also very less but about 75 families, mostly headed by destitute women and widows, collect dead wood and dry twigs of the mangroves and sell them at the local market for their livelihood. People belonging to 26 hamlets of 16 revenue villages live around the Muthupet mangrove wetlands. The total population of these hamlets is about 37,255 but average use of the mangrove wetland for fishing is only limited.

Only during the monsoon season (October to December) fishers of all these fishing hamlets are engaged in fishing in the mangrove lagoon. During the non-monsoon period, most of the fisher folks fish in the nearby coastal waters.

3. Impacts

i) Urbanization

The estimated sewage generation is 123.75 lakh liters among municipalities and 45.57 lakh liters among town panchayats. Nature of disposal is through river water and quantities is 123.75 lakh liters in municipalities and 45.57 lakh liters in town panchayats.. The solid waste generation is highest in Nagapattinam among municipalities and Vedaranniyam among town panchayats. Overall the solid waste generated adds up to 37.16 tonnes with a collection efficiency of 75.22%.

ii) Industrial development

The district is deprived of any major industry but it is a flourishing centre of cottage industries and handicrafts. The district is equally well known for its pith articles consisting of beautiful models of Hindu idols, temples, mosques, flower garlands, bouquets, parrots and peacocks.

The making of musical instruments of jack wood like the veena, the tambura, the violin, the mridangam, the tabla and the kanjara exhibit excellent taste, knowledge and workmanship. There are 490 industrial units situated in the composite Thanjavur district, of which, four sugar units, a petroleum refinery, a distillery, a thermal power plant are coming under highly polluting industry. M/s. ONGC has explored crude oil and natural gas in Nagapattinam District. The crude oil is made available for Madras Refineries Limited whereas natural gas is utilized as fuel in ten numbers of sodium silicate units. Also this gas is utilized as a fuel for one thermal power generation unit (2X5 MW) by TNEB in this area. A SIDCO Industrial Estate is located at Nagapattinam. The industrial units in these estates are non-polluting or less polluting in nature. Madras Refineries Limited (MRL), a major refinery in South India with an exemplary track record, has been conscious of its role in maintaining the eco-balance through a number of environmental control measures. Cauvery River Basin Refinery at Panangudi in Nagapattinam, MRL refines 0.5 million metric tonnes per annum of crude. MRL, ever since its inception, has been methodically planning and implementing several environment relative projects to contain pollution within the Minimal National Standards (MINAS) on several fronts.

MRL has been working on reducing air pollution on two fronts: at its own plants as well as in vehicles using petrol or diesel. At its plants, MRL has switched over to LSHS fuel – far less polluting than the high sulphur fuel used earlier. A Sulphur Recovery Unit has been installed at MRL, resulting in substantial reduction of sulphur dioxide emission. Taking its activities beyond the greening of MRL and its environs is another fact of environmental

conservation. Planting and maintaining thousands of trees and shrubs form a Greet Belt around MRL's Plant in Panangudi. This mitigates fugitive emission, dilutes accidental releases and balances eco-environment besides beautifying the surroundings.

The areas with air pollution are the Thalainayar and Panangudi villages where sugar factory and refinery are functioning. As per the ambient air quality status, the average industrial SPM values seem to be on the lower side compared to the standards. Rest of the indication on Air Quality Status is found to be well within the limits. Ground water contamination is observed in certain locations due to sea water intrusion. In several places along the coast either the ground water is naturally saline or it is artificially made saline by over extraction and consequent intrusion of sea water into the land aquifers. The area mainly affected from sea water intrusion into the land acquires, are Kuttam area in Nagapattinam District.

TNPCB is monitoring the quality of water from 16 places in Cauvery river bed. As per the test, the quality of water is normal. In Kollidam, sampling station falling within the composite Nagapattinam district, TDS and Chloride contents of water are exceeding the standard value, because of more water evaporation and influence of backwater. pH of water is slightly more than the standard.

iii) Natural hazards

The tsunami caused heavy damage to houses, tourist resorts, fishing boats, prawn culture ponds, soil and crops, and affecting the livelihood of large numbers of the coastal communities. It was found that 1,320 ha of agricultural and non-agricultural lands were affected by the tsunami. The lands

were affected by soil erosion, salt deposition, water logging and other deposited sediments and debris. Pre and Post Tsunami surveys on soil quality showed an increase in pH and EC values, irrespective of distance from the sea. Rainfall during season showed dilution of soluble salts in sediments. Pumping of water has reduced the salinity levels in the well water samples as well as in the open ponds.

iv) Natural disaster prone areas

About 7.09% of the land is affected by water logging and 56.21% is prone to floods. It has been ascertained from the available information that all the 6 taluks and 12 blocks were affected by flood during the year 1991-92 and cyclone during the year 1993-94. As India and the world witnessed the catastrophic loss of humanity due to tsunami on 26th December 2004, Nagapattinam also unintended the worst tragedy with 6065 confirmed deaths. The entire coastline was devastated in the district. Around 73 habitations in 38 revenue villages and 5 taluks were affected. Out of 6065 people who died, 1776 were children (887 male, 889 females) and 2406 were women. The high death toll of children and women highlighted the fact that Tsunami had caught people unawares.

A possible explanation for the high number of deaths among women was that the tsunami struck at a time when most of them were in the shore receiving their men folk returning from the sea. Added to this was the fact that it was a day after the Christmas and a Sunday morning, which had a large number of people, enjoying the morning breeze. Nagapattinam district alone accounted for 76 percent of the deaths of entire state and was the worst affected district in India. In the education front, 41

elementary / primary schools, two high schools and 1 higher secondary school were damaged. On the health side four public health centres and one government hospital was damaged.

4. Government initiatives

i) Initiatives to improve fisher folk livelihood

Following initiatives were taken after the tsunami for the coastal fisher folk, Construction of permanent houses

1. 15,038 houses have been relocated and 4,698 houses are being constructed on in-situ sites.
2. Of 19,736 houses, the construction of 19,019 have been completed handed over to the beneficiaries 717 houses are under various stages of completion.
3. In the 2,035 houses constructed by the Government 1,143 houses are built by tsunami district implementation unit in rural areas and 892 houses by Tamil Nadu Slum Clearance Board in urban areas.
4. Of 717 houses which are under various stages 409 houses by NGOs were completed before December 2009 and remaining 276 houses by Government by November 2009.

ii) Coastal protection initiatives

Nagapattinam port

The barren land North of Nagapattinam port is an excellent place for dense plantations. The presence of the vertical wall constructed for the Nagapattinam port at a distance of about 60 m from the shoreline has acted as a barrier only marginally against the powerful tsunami.

In spite of the presence of this wall, a number of boats were carried away to the land and water on its rear side has moved to a distance of 300 m and a height of about 8 m.

Keechankuppam

This is the worst affected area due to tsunami and a number of casualties and loss of property were reported. The plantations have just begun along the coast. The tsunami has resulted in damage to several bridges and houses along this stretch.

Velankanni

The hutments close to the beach have been washed away by the tsunami. A clear width of beach is available. The river Vellayar joins the sea adjacent to this stretch of the coast. It is recommended to dredge the mouth of river Vellayar and nourish the beach on its Northern side as well as to construct a sand dune. Plantations backed up with sand dunes and masonry buffer blocks are recommended for this stretch of the coast. The buffer blocks may also serve as a relaxing facility for the pilgrims and locals.

Vellapallam

This area can be taken up for dense plantations as hutments are away from the shoreline at a distance of about 200 m. The shoreline is found to be stable. Two long training walls for the improvement of the mouth of Nallar Straight cut should be taken up.

Tharangampadi (Tranquebar)

This stretch of the coast at Tharangampadi comes under the protection of monuments and places of National heritage. The village Sathankudi, located North of the fort has suffered huge loss of life and dwelling units. The water has penetrated to a distance of about 750 m from the shoreline. The PWD has a proposal for construction of a seawall for a distance of about 850 m from the existing seawall. In

addition to the seawall, a groynes field consisting of 5 transition groynes of average length of 100 m, with one or two groynes is to be formed as 'Thoondilvalivu'. This will help the fishing community as there are number of boats. The rubble mound seawall may be considered after construction of the groynes and monitoring the shoreline changes. In the barren land due to the damaged houses, plantations are recommended.

Poombuhar

The beach south side of the above location is protected by an existing seawall. The tsunami has penetrated to a distance of about 75 m from shoreline with a run-up of about 1.5 m. The performance of the existing seawall is good as beach has formed. However, the seawall has to be rehabilitated with a crest elevation of + 4.3 m. The North of this village has to be protected by a seawall for a distance of about 650 m. The large extent of barren land is to be developed with plantations.

Vaanagirikuppam

This stretch of the coast is situated South of Poombuhar and South of Cauvery infall point. This is a location, where, a number of casualties and damages to houses have taken place. The damages on the Southern side of the location showed that land has been cleared. This area has again been cleared of the debris and barren land is an ideal location for plantations. The beach can be protected by groynes field and the rubble mound seawall with cross-section similar to Tharangambadi.

Pudukuppam

The entire village has been washed out by the tsunami and the people have totally abandoned their houses. Only plantations are recommended in this stretch of the coast.

Palayur

A number of casualties and damages to the property have taken place in this stretch of coast. As the village is right on the banks of river Coleroon, one suggestion is to retain the dunes already constructed by the local people and the top level of the dune may be further raised. The ditch in front of the dune should be shifted to rear side of the dune. The dune should take the shape for a distance of about 1km Plantations on the seaside and on the dune are recommended.

Thirumalaivasal

The local people report a number of casualties and damage to property. This stretch of the coast is at the confluence point of the river Vellapallam Uppanar. Entire stretch needs to be dredged and a bund has to be created using this dredged spoil for a distance of about 1 km from the mouth. Two training walls, at the mouth of the river Vellapallm Uppanar are recommended. A few spurs along the banks of this river need to be provided in order to divert the flow into the ocean. Plantation along the banks of the river is recommended.

iii) Awareness initiatives

Various awareness creation activities have been made among the fisher folk about tsunami and CRZ issues by different Government and Non Government organizations. Attempts have been made to develop bioshields, rebuild livelihoods, and reclaim soil in the tsunami affected agricultural fields in Nagapattinam district.

iv) Biodiversity

Mangrove restoration has been done by M.S. Swaminathan Research Foundation (MSSRF) after the tsunami. MSSRF started a project during 1993 in Muthupet mangrove wetlands to identify causes of degradation of Muthupet mangrove wetlands and to

develop and demonstrate techniques to restore the degraded areas.

5. Summary / Conclusion

- Nagapattinam is a coastal district of Tamil Nadu, which lies on the east coast south of Cuddalore district and part of the Nagapattinam district lies to the south of Karaikkal and Tiruvarur districts with an area covering 2,715.83 sq.km
- This district is enveloping 11 panchayat unions, 4 municipalities, and 8 town panchayats on its development side. On the revenue side it is housing 2 revenue divisions with 4 and 3 taluks respectively and 523 revenue villages.
- The soil type comprises of sandy coastal alluvium (88.71%), black soil (6.58%) and other soils (4.71%).
- Agriculture, the major economic activity the districts contributes higher share of rice production in the state. Important crops grown in the district are rice, groundnut, pulses, gingelly, sugarcane and cotton.
- There are 41 forest areas in the Nagapattinam district constituting a total area of 5311.70 ha 35 forest areas fall under the reserve forest category with 5037.21 ha and 6 under reserve land category with 274.49 ha
- The important major minerals available in Nagapattinam district are crude oil, natural gas, silica sand, lime shell and heavy mineral sand (garnet, iluminite, rutile zircon, monozite).
- The district is situated in the deltaic region of the famous river cauvery and is criss-crossed by lengthy network of irrigation canals.

- The Nagapattinam district has a coastal line of 165 km Fishery is the economic backbone of this coastal district.
- The muthupet mangrove wetland is located in the Southern most part of the cauvery delta with Palk Strait in the south and extensive mudflats in the north.
- According to the 1996 remote sensing data, the total area of the Muthupet mangrove wetland is about 12,000 ha
- The district is deprived of any major industry but it is a flourishing centre of cottage industries and handicrafts alike.
- One Thermal Power Project with installed capacity of 10 MW is (2x5 MW) available in the district.
- The tsunami caused heavy damage to houses, tourist resorts, fishing boats, prawn culture ponds, soil and crops, and consequently affected the livelihood of large number of coastal communities.
- It was found that 1,320 ha of agricultural and non-agricultural lands were affected by the tsunami.
- The tsunami left around 6065 people dead and the entire coastline devastated in this district. Around 73 habitations in 38 revenue villages and 5 taluks were affected.
- Mangrove restoration has been done by M.S. Swaminathan Research foundation after the tsunami.