Nagapattinam Coast: Study Area Description

2.1 Introduction

The District of Nagapattinam has been carved out as a separate district due to bifurcation of Thanjavur district. According to this division, six taluks namely Sirkazhi, Tharangampadi, Mayiladuthurai, Valangaiman, Nagapattinam and Vedaranniyam were detached from their parent district (Thanjavur) to form this new district. The earlier history of this district is more or less the same as of its parent district, Thanjavur being its part till recently. Tamil and Telugu are the main languages spoken in the district. Important fairs and festivals celebrated/organised in the district are Navarathri, Adi Pooram, Avani Moolam, Karthigai, Skandha Sashti, Thula Uthsavam, Vaikashi Brahmothsavam, Valli Kalyanam, Thirukkarthigai, Ahyayana Uthsavam, Chithirai and the floating festival, Mahasivaratri, Panguni Uthiram, 18 days theerthavari festival, Wedding of the Lord and His consort on the Sukla Sapthami day, Karthigai Deepam, Dhanur pooja (Thiruvathirai), Poosam and Pongal.

2.2 Geographical Location

The Nagapattinam district lies on the east coast to the south of Cuddalore district and another part of the Nagapattinam district lies to the south of Karaikkal and Tiruvarur districts. Its northern boundary is about 75 Km southwards from the
Head Quarters of the Cuddalore district. Thanjavur district and Tiruvarur district flank it on the west and on the south and east it is bordered by the Bay of Bengal. The district lies between 10.25° and 11.40° North Longitude and 76° 49° and 80.01° East longitude. The general geological formation of the district is plain and coastal. The Cauvery and its offshoots are the principal rivers. Rising in the Coorg Mountains, this river bifurcates about nine miles at the west of Trichy into two branches, of which the northern one takes the name of Coleroen and the southern one retains that of the Cauvery. Figure 2.1 shows the study area details. It visualizes the administrative arrangement of the district such as the Taluk boundary and District boundary. It also shows the Villages that are affected due to Tsunami and their boundary.

In Nagapattinam coast zone there are two fishing hamlets, namely Akkaraipettai and Keechankuppam, completely destroyed by the December Tsunami. Almost all the people in these two hamlets were washed away/ thrown away due to high tidal variations and force. The fishing hamlets are just few feet's away from the coast, in other words the surf (due to waves) reaching distance. There were approximately 1500 households with an approximate population of about 5000 were killed during the tsunami day. For the present study these two villages are taken as sample villages to demarcate the entire household and details for an elaborate and intensive study using GPS and GIS (figure 2.2).

There are no less than eleven ports on the coast Nagapattinam district, of which eight are open to foreign trades. The coastline has a number of harbors of which mention may be made of Nagore, Point Calimere, and Nagapattinam. The
significant small ports are Kilvellore, Thirumulaivasalam, Nagapattinam, Velankanni, Topputturai, Muttpet and Adirampatnam. The Nagapattinam district is made up the 6 Taluks of Nagapattinam, Kilvellore, Vedaranniyam, Mayiladuthurai, Sirkali and Thrangampadi. The East Side faces the Bay of Bengal. The district is the most part of a flat plain, slopping very gently to the sea on the east. The total geographical area of the district is about 3536.38 Sq.km.

To study the pond characteristics, forty two ponds of seven ownerships in the selected village of Pappakoil have been taken for the study along the Nagapattinam coast and these ponds are two kilometers away from the coast. They were worst affected during tsunami due to its locational character, which are located along the river uppanar and Kaduvaiyar river course. During tsunami the destruction waves carried sea water through the river course and the post tsunami study indicate that the intrusion of salt water through surface and subsurface levels (figure 2.3).

All along the course of Cauvery and its distributaries, on both the banks numerous narrow strips of river poromboke lands called Paduagais that are cut up by countless patta lands. These strips ranging in width from about 3 meters to 100 meters are made up of bits of lands. Even though the Paduagais and Poromboke lands are very dry they are very fertile. Flood banks of Cauvery and its distributaries are away from the watercourses in the upper reaches where the river is wide and closer in the lower reaches and the river become narrow gradually. The marine land or coastal land has plain lands except for few sand dunes. However there is a general tilt from coastal line to inland area. The Vederanyam salt swamp, which is the largest swamp in Tamilnadu, runs along the coast from Point Calimere
westwards to Muthupet. Consequently extensive lagoons have been formed in these areas. The terrain is an open plain, sloping towards the east and devoid of any hills. In south and Southwest of Thanjavur the country rises and forms a small plateau known as Vallam table land, broken by small ridges of grits and sandstone. Most of the rivers flow to the east into the Bay of Bengal. The most important feature of the district is the Cauvery River spread over with its numerous branches.

There are no less than eleven ports on the coast Nagapattinam district, of which eight are open to foreign trades. The coastline has a number of harbours of which mention may be made of Nagore, Point Calimere and Nagapattinam. The significant small ports are Kilvellore, Thirumulaivasalam, Nagapattinam, Velankanni, Topputturai, Muttupet and Adiramapatnam. The Nagapattinam district is made up the 6 Taluks of Nagapattinam, Kilvellore, Vedaranniyam, Mayiladuthurai, Sirkali and Thangampadi. The East Side faces the Bay of Bengal. The district is the most part of a flat plain, sloping very gently to the sea on the east. The total geographical area of the district is about 3536.38 Sq.km. The details of the name of the taluks with area in Sq.km. are given in the following a. Nagapattinam b. Kilvellore c. Vedaranniyam d. Mayiladuthurai e. Sirkazhi f. Thangampadi g. Thirukuvalai and Vedaranniyam salt swamp forms another great natural division. It runs along the coast from Point Calimere for about 48 kms. and is about 7 to 8 km. wide. This is the longest swamp of its kind in the state. It is filled by two periodical high tides during the full moon of months, May and June and retains sea water to a depth of two feet over a considerable area enclosed by low earthen banks, which when
closed prevent the water from flowing back into the sea after the tide recedes. It is in this manner the well-known Vedaranniyam spontaneous salt is produced.

2.3 Administrative Arrangement in the District

Community Development Blocks in the district are: Sirkazhi, Kollidam, Sembanarkoil, Kuttalam, Mayiladuthurai, Thirumarugal, Nagapattinam, Kilvelur, Talanayar, and Vedaranniyam. The Nagapattinam district comprises 6 Taluks, 11 Blocks and 497 Villages. As regards the hierarchy of administrative arrangement, there are 3 Municipalities, 10 Town Panchayats and 433 Village Panchayats in the district.

2.4 Weather and Climate

Temperature: The average maximum temperature for the district (from 1991 to 1996) as a whole is about 32.460°C and the average minimum temperature is 24.75°C. Wind: 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 month of November-December. Both these storms affect the plantation crop. During Southwest monsoon the air is calm and undisturbed.

The Northeast monsoon begins in October and ends in December and it contributes about 60 per cent of the total annual rainfall. The Southwest monsoon rains from June to September and from March to May accounts equally for the rest of the annual rainfall. The monthly average rainfall in the district was 108.87 mm in
1991-96. Cyclonic storm brings havoc normally once in 3 or 4 years and heavy downpour during Northeast monsoon leads to flooding of the district and damages field crops and wealth of soil. The average number of rainy days, means maximum temperature, means minimum temperature and means relative humidity for the period 1991-96.

2.5 Demography

The Growth of population over the past four decades and the essential characteristics of the population in terms of birth rate, death rate, infant mortality rate and literacy levels are given below. The marginal farmers (cultivators) and agricultural labourers constitute a sizeable population of the labour force in the district. The population of the Nagapattinam district has grown from 425,127 in 1951 to 1,185,295 in 1991. The growth rate indicates that there has been a significant increase during the 1951-61 decade with the average growth rate being 3.48 per cent per annum during this decade. The growth rate has however stabilised over the past three decades at about 1.65- per cent per annum. According to the 1991 census, Mayiladuthurai taluk is the highly populated and Kilvellore taluk is the least populated in the district. There was a reduction of population of Nagapattinam taluk between 1971 and 1981 comprising bifurcated Tiruvarur taluk. There were also reductions of Sirkali taluks comprising bifurcated Tharangambadi taluk in 1991.
2.6 Birth and Death Rate/ Infant Mortality Rate

There has been a steady decline in birth rate, death rate and infant mortality rate over the past four decades in the district. The birth rate has come down from 39.50 in 1951 to 22.50 in 1991 (figures - per thousand) and the death rate from 21.0 in 1951 to 7.99 in 1991 (figures - per thousand). The infant mortality rate has also gone down from 92.50 in 1951 to 47.50 in 1991 (figures - per thousand). The details of birth rate, death rate and Infant mortality rate over the past four decades are given in graph.

2.7 Literacy Level

The literacy level of the Nagapattinam district according to figures available for the year 1996 is 59.87 per cent with male literacy level being more than the female literacy level. It is also observed that while the male literacy level has grown gradually from 62.70 per cent in 1981 to 65.89 per cent in 1996, there has been a steady increase of female literacy level from 37.92 per cent in 1981 to 49.03 per cent in 1996. The information on literacy level among the population of the district is given in graph.

2.8 Land Resources

Resources of the district, their availability, use and environmental status are discussed in the following chapters. In Nagapattinam district, Narimanam village is the place where Petroleum products are available. In respect of other places, especially in riverbed region, petroleum products are available.
2.9 Land Utilization

The total geographical area of the district was 3536.38 Sq.km. in 1995-96. Cropped area accounts for about 65.53 per cent of the total area. Forest cover is very minimum accounting for only about 1.31 per cent of the land. The non-available for cultivation land covering barren and uncultivable land and land put into non-agricultural uses, accounts for 22.83 per cent. The other uncultivated lands including (a) permanent pastures and other gazing lands, (b) miscellaneous tree crops and groves not in the net area shown and (c) cultivable wasteland, cover 5.35 per cent. However, figure on forestland seems to be at variance with the reported extent of forest area by the forest department. The land utilisation pattern in the Nagapattinam district (Block-wise) is given in graph.

This coastal district abounds in green paddy fields, tall coconut groves, vast gardens of mango and plantain tree and other verdant 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 and vegetables. Among the non-food crops, cotton/fibre, edible oils crops (groundnuts, coconut and
gingelly) non-edible oils crops (castor, miser seeds, though in very small area) are the important ones.

2.10 Trend in Production and Productivity of Important Crops

Cereals, pulses and oil seeds are the three important crops produced in the district. The production of cereals, pulses and oil seeds fluctuate for the past five years (1991-96). The areas under production for cereals, pulses and oil seeds, also fluctuate for the past five years. The reason for the fluctuation could be using rotation of crops seasonally.

2.11 Horticultural and Plantation Crops

Fruits and Vegetables were the horticultural crops cultivated in the district in 1996-97 periods. Total area of Fruits and Vegetables cultivated in the district are 3143 Ha. Plantation crops were cropped in the district is 396 Ha. Gardens, nurseries and vegetable forms are available. It is feasible to have vegetable forms for brinjal, tomato, ladies finger, snake guard, bitter guards, beans, cluster beans, etc and nursery like coconut, bamboos, casuarinas, teak plant.

2.12 Consumption of Fertilizers and Pesticides

There are about 57,000 metric tones of Chemical Fertilizers were used in 1995-96, out of which more than 50 per cent constitute the nitrogenous fertilizers. Phosphoric fertilizers of 13,129 tones and Potassium fertilizers of 11,935 tones were used in the district. There were intensive uses of Bio-fertilizers in each block of the district, followed by Dust Pesticides 592,534 kgs. and 32,854 liters of Liquid-
Pesticides, 14,437 metric tones of Urea and 297,230 kgs. of Bio-fertilizers were used in 1995-96.

2.13 Trend in consumption of Fertilizers and Pesticides

The usage of all Chemical Fertilizers has increased from 28,989 tones to 57,123 tonnes during the past 5 years. In a general manner the consumption pattern indicates that there is a steady increase in the usage of chemical fertilizers except the year 1993-94 while the consumption of Bio-fertilizers fluctuates during the years 1991-96. Both the Powder and the Liquid varieties of Pesticides fluctuate in their consumption over the past 5 years.

2.14 Soil Types

Sandy Coastal Alluvium and Black Soil types cover 88.71 per cent and 6.58 per cent respectively in this district. The other Soils in the district comprise 4.71 per cent.

2.15 Soil Problems

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 Mayuram and Thiruthuraippundi. The worst land in the delta is found in the Tirutturaippundi and Nagapattinam taluks where the soil is saline and erinaceous and drainage is very defective. The chief sources of irrigation in the district are the rivers, a few tanks and wells. These tanks and wells occur mostly in the upland regions.

About 7.09 per cent of the land is affected by water logging and marshy land and 56.21 per cent are prone to floods. About 3.49 per cent of the land available for
cultivation suffers from salinity/alkalinity and 17.69 per cent of the lands are coastal sand. Thus the land affected by soil problems constitutes about 84.48 per cent of the total geographical area excluding forest area and area not available for cultivation. The data given are the composite old Nagai-Quaide-Milleth district comprising bifurcated Nagapattinam district.

2.16 Forest Resources

Forest types: The forests of this division can be divided into two regions from the topography, and flora point of view. They are: The Alluvial Regions or Riverine Land areas. These 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 teak, Arjun and Eucalyptus has 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 consist of limited number of herb and thorn species. The present situations do not bring them in any category of Forest type as per Classification of forests made by Champion and Seth.

The 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 per cent is used for cultivation of paddy for three times in a year but the forest cover has lesser percentage (1.31 per cent).
2.17 Forest Area

There are 41 forest areas in the Nagapattinam district constituting a total area of 5311.70 hectares. 35 forest areas fall under the Reserve Forest category with 5037.21 hectares and 6 under reserve land category with 274.49 hectares. Green cover classification report has been studied with reference to reported figure for the composite Thanjavur district comprising of Thanjavur Forest Division, where total area of forest is shown as 19971 Ha. Dense and Sparse forest are 2079 and 4947 Ha. respectively. There is no grass land in the region. Degraded forest area cover is 9567 Ha. in Thanjavur division. The given figures are composite figure of Thanjavur, Tiruvarur and Nagapattinam Districts.

2.18 Trend in Per Capita Forest Area

There has been no change in the forest area for the past five years (1991-96). The per capita forest area has the trend of 0.0064 to 0.0041 from 1981 to 1996, due to a steady increase in population. The Man Made Forest Plantations have been taken on the banks of irrigation canals and Padugai lands besides the existing forest areas in the Nagapattinam district. About 28699.13 hectares of Man Made Forest Area are available in the composite Nagapattinam district, which are predominantly Teak Plantation, followed by Fuel Wood and Cashew. Softwood, Casurina, Sandal and Neem, Tamarind other Man Made Forest Plantations are in 917 ha. 512.22 ha. 150 ha. and 151 ha. respectively.

The villages located in the taluks of Sirkazhi, Nagapattinam and Vedaranniyam abut forest areas in the district. Out of these Taluks, Sirkazhi has
more number of villages abutting the forest area. The total area of the villages abutting forest area is 5311.70 ha. The details regarding the villages abutting the forest area, however population figure for the abutting villages are not really available.

2.19 Wild life and Birds sanctuary

There is a sanctuary including Bird Sanctuary at Thalainayar village of Vedaranniyam Taluk in the Nagapattinam district spread over 1728.81 ha. This constitutes 14.92 per cent of total forest area in the district. Point Calimere Wild life and Birds sanctuary is located on the Coromandel coast in Nagapattinam district of Tamilnadu bounded by Bay of Bengal in the East and Palk Straits in the south forest area is extending over an area of approx. 333 Sq. Kms. which includes 23 Sq. Kms of tropical dry evergreen forests on the eastern extremity, 190 Sq. Kms. of Muthupet Mangrove forests towards the extreme west (proposed extension of sanctuary).

The Vast saline marshes of the Great Vedarayam Swamp forms the major refuge for migratory and resident birds along-with rich terrestrial population in the adjoining tropical dry evergreen forest of Kodiakkadu represented by approx. 300 plant species. Both the habitats inhabit more than 260 of resident and migratory birds belong to 50 families. With the onset of NE monsoons during October, a large number of passerine and aquatic species migrate to the area from Soviet Union, Iran, Australia, Europe, N-India and other places. Important species include Greater and lesser flamingos, Pelicans, Storks, Gulls, Wild ducks, Stints, Sandpipers, Plovers etc. Most of the birds return by the end of January i.e. in the beginning of salt extraction activity.
A wild life sanctuary was formed at Point Calimere in 1967 on an area of 1729 hectares to preserve wild in the original surroundings. The sanctuary is unique of having a large concentration of black bucks or Indian antelopes. Due to the absence of hills and forests, the district is devoid of wild animals like tigers, elephants, panther’s etc. In the small belt of Jungle at Kodaikadu near Point Calimere are found spotted deer, antelopes and wild pigs. Jackals and foxes can be found almost in the entire district. Snakes exist in large numbers. All the Indian birds like the crow, the kite, the vulture, the owl etc. can be found here. The swamps of Point Calimere are of great interest to ornithologist due to the abundance of variety of Avifauna. Special mention may be made of flamingoes visiting these swamps in thousands during winter months. The swarms of these birds with white and pink plumes are a rare sight and offer a spectacular display. Wild life census in Point Calimere Sanctuary indicates that 2043 animals are in the sanctuary. 1292 black bucks, 200 wild boars, 150 monkeys, 125 mongooses, 100 monitor lizards and other animals are protected in the sanctuary.

2.20 The flora

Tropical dry evergreen forests represented by Manilakara Hexandra, Memecyclon, Umbellatum, Maba Buxifolia, Syzygium Cumini etc.; there are 300 species within 218 genera and 77 families having a composition of 61 per cent evergreen, 36 per cent animals, 3 per cent deciduous. Mangrove forests with the domination of Avicennia Marina, Avicennia Alba, Aegiceros Corniculatus, Rhizophora Sp., Acanthus Illicifolius, And Suaeda Sp in great Vedaranyam swamp 106 species within 90 genera and 48 families represented by 60 species of herbs,
25 species of shrubs, 11 species of trees and 10 species of climbers had been recorded. Point Calimere has the second largest congregation of flamingos after Rank of Kutch. The birds visit the area mostly for feeding and evidences of breeding are not available. During early 80’s roughly 50,000 numbers of flamingos were recorded which has steadily reduced to less than 10,000 presently because of biotic interference, fishermen activity and reduced availability of shrimps and plankton due to increased salinity.

### 2.21 Animal Husbandry

Animal husbandry is an allied activity of agriculture in this district as well but it could not keep pace with the developmental work undertaken in the field of modern agricultural techniques. Therefore, the cultivators still depend on cattle imported from other neighboring districts. The livestock found in this district are generally cattle and buffaloes, sheep, goats, pigs apart from poultry birds, which include fowls and ducks. The district have several artificial Insemination centers, and sub-centers, key village blocks, veterinary hospitals and dispensaries which render valuable services for the development of livestock in the district.

### 2.22 Mineral Resources

**Lignite:** Lignite seams have been encountered between 320 to 370-metre depth during the course of drilling by the Oil and Natural Gas Commission (ONGC) in Tirumangalam area near Mayilathuthurai. The fixed carbon ranges from 26.12 per cent to 37.50 per cent, which is higher than the lignite of Neyveli. The similar
occurrences have also been reported from Vanadirajapuram, Chittakadu, Pandanallur and Kattumannarkoil areas.

Illemenite Sands: Illemenite garnet sands were located between Mimisal and Adiramapattinam, Tranquebar, Tirumullaivasal and at the mouth of Coleroon river. In Tranquebar probable reserves of Illemenite and garnet are estimated at 90,400 tonnes and 4,900 tonnes respectively. An occurrence of Ilmenite rich beach sands is reported in east of Kodiampalayam. It extends over a distance of 2 kilometres with an average width of 50 meters.

Kankar: Kankar and Tuffaceous limestone occurs under red soil, Laterite ranging in thickness from 0.3 to 1 meter, and Kankar layers are noticed in stream sections. The important occurrences are seen on the Grand Anicut canal cutting between Kuruvidipatti and Podur also in neighborhood Thirumalasamudram. The thickness of Kankar in Thirumalasamudram area ranges from 2 to 2.5 meters and the total reserves are about 0.5 million tonnes. The Kankar is of good quality, with Cao ranging from 48.43 to 52.72 per cent and low in magnesia and silica contents.

2.23 Water Recourses

The district is situated in the deltaic region of the famous river Cauvery and criss-crossed by lengthy network of irrigation canals. Kolli Dam River forms the northern boundary of the district, whereas Arasalar, Tirumalairajanar, Vettar and Vennar rivers drained the other parts of it. These all rivers are tributaries and branches of the river Cauvery.
2.24 Catchment Area of River Basin

Vettar, Odambogiari, Kaduvaiyar, Pandavaiyar and Vellaiyar are the five minor basins of river basins in the district. Place of origins, total and within the district length and area of the basin in areas. Basin-wise Status of the Ground Water Availability: Basin-wise status of the ground water availability for the Cauvery basin is made available only for composite Nagapattinam district comprising bifurcated Tiruvarur district.

2.25 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. Tanks and wells are rarely used for irrigation in the district. The gross area irrigated by canals and other sources are 113,374 hectares and 21,405 hectares respectively. The gross area irrigated by the tanks and the wells are 40 hectares and 50 hectares respectively. Therefore canal irrigation constituting 84.07 of the total irrigated area remains the predominant source of irrigation. On an average about 58.20 per cent of the total cropped area are irrigated. Mayiladuthurai block achieves about 74 per cent irrigation at the maximum and Vedaranniyam achieves 17.85 per cent at the minimum. Some blocks achieve irrigation at about 60 per cent.
2.26 Incidence of Drought, Flood and Cyclone

Information on this head is scarce. However 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 affected by Cyclone during the year 1993-94.

2.27 Fisheries Production

The Nagapattinam district has a coastal line of 165 kms. The Inland Fresh Water area spreads for about 1,000 (10 Sq. Km.) hectares. Marine fishing is practiced in 60 coastal villages of the district. The fish production fluctuates in both quantity and value from 1990-96. Fishery: Since the district is a coastal region, marine fishing assumes importance. The marine fish catch mainly comprises of leognathics, sharks, flying fish, chank, catfish, prawns, silver bellies, crabs, rays and other miscellaneous varieties. Mechanized boats; catamarans and country canoes are all used for fishing. A fish-landing jetty has been constructed at Kodikarai, which caters to the needs of marine fishermen and is the only workshop in this coastal area. A comparison indicates that the Coastal Fish Production is higher than the Inland Fish Production.

2.28 General Fish Seed Productions

The Fish Seed production thousands standard fry was 10545; the highest in the year 1993-94 followed the year 1994-95 and 1995-96. However in the year 1990-93, there was No Fish Seed production in this 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. As regards fish seed production, the same is observed from 1993-96.

2.29 Places of Tourist Attraction

Poompuhar (Sirkazhi block), Tharangampadi (Sembanarkoil block), Velankanni (Velankanni block), Nagore (Nagapattinam block) and Point Calimere (Vedaranniyam block) are the main tourist spots in the district. The first 4 tourist spots are visited throughout the year and the last tourist spot is visited from August to March. The foreign tourist arrivals have fluctuations and domestic tourist arrivals have been steadily increasing except in the years 1992-93 and the tourist arrivals both domestic and foreign are estimated at 2,99,150 during 1996. These five tourist spots are also included in the tourist circuits identified by the Tourism Department. The district has a large number of temples and many of these are under the management of Hindu Religious and Charitable Endowments Board. Among these, some selected ancient temples are briefly described in the following paragraphs:

Point Calimere, an important tourist place and a heaven for bird-watchers, is situated in Tirutturaiippundi taluk about 120 kms. From Thanjavur and is northern point of the Palks bay. The sanctuary here is noted for its incredible congregation of black bucks, spotted deer, wild pig, wild ponies and heavy concentration of migratory waterfowl. Twenty to thirty thousands of flamingoes can be seen here at one time during the winter months. During spring when the trees and shrubs are laden with wild fruits, thousands of birds like the green pigeons, mynas, barbets etc. can be seen. A bath in the sea at Kodikkarai, a sacred place nearby, is considered holy especially on the new moon day of Thai, Adi and Purattasi. Manora fort is located in
the village of Sethubaba Chattiram on the eastern coast 16 kms. off Peravurani. The fort facing the Bay of Bengal does the Maharaja Serfoji, the then ruler of Thanjavur, build an eight storied victory tower in 1814 to commemorate the victory of the British over Napoleon Banaparte in the War of Waterloo. The tower has steps in a circular way, which looks enchanting, and one can have a panoramic view of the green surroundings and the sea from this 30 meters high tower. This place is presently under the care of the Central Archaeological Department as a protected monument. Of late, it has become a picnic spot and people do come to enjoy their weekends here.

Kaviripoompattinam, known in classics has Poompuhar, was one of the chief cities and an important seaports of the Chola Kingdom. The original city port was submerged in the sea and at present there is only a small village. It is a sacred bathing place, being the confluence of the Mother Cauvery with the sea. The place is also birthplace of Saint Pattinathar, the poet and Kovalan and Kannagi. The temple of Pallavaneeswara immortalised by the saint Sambandar actuated here. It is a sight for such tourists who would like to wander amidst history. The ancient glory of the place has been revived to some extent by the Government of Tamil Nadu and it has been made a place of tourist importance. An Art Gallery depicting scenes from the Tamil Epic, Silapathigaram of Kannagi and Kovalan was opened in 1972. Monuments on the Nedungal Mandram, the Pavai Mandram, the Elango Mandram and the Kotrapandal are also at display.

Mayuram is an important pilgrim centre. Mayuram means a peahen and the legend say that Lord Siva turned His consort Parvati into an apeahen because of her
disobedience. She was blessed with her original form only after repentance, when she worshipped and bathed in the Mayilamman tank. Pilgrims from all parts of the state congregate at the annual Thula festival in October-November. On the occasion the holy Ganges is believed to mingle here with Mother Cauvery and a dip in these waters is believed to purge off the sins of devotees. The festival is popularly known as Kudamuzhukku Vizha.

2.30 Energy Resource

There were 44,769 electrical connections with a total consumption of 3,92,81,410 kw/h as on 1995-96. Industrial type has the maximum consumption accounting for nearly 22.80 per cent of the total consumption followed by Commercial type (22.23 per cent) and Low Tension (21.73 per cent). The data given are the composite old Nagai-Quaide Milleth district comprising bifurcated Nagapattinam district.

2.31 Electrification of Villages

The Nagapattinam district has achieved 100 per cent electrification prior to 1986. All 497 villages in the district are electrified. The number of pump connections has fluctuations in all the taluks over the past 15 years.

2.32 Non Conventional and Renewable Energy Sources Utilization

Biogas is the only method of non-conventional energy utilized in the district. The biogas plants are however able to generate around 86.65 per cent of their installed capacity of power. There has been no establishment of windmills and solar
thermal systems in the district. Improved chullas are used but there is no estimate for that.

2.33 Urbanization

The proportion of urban population to total population has increased during the decade 1981-91 and is estimated at about 26.79 per cent during the year 1996. The proportion of municipality population to the total population has decreased from 16.38 per cent in 1981 to 16.23 in 1996. But the proportion of town Panchayats population to the total population has increased steadily from 6.68 per cent in 1981 to 10.56 per cent in 1996. Among the urban areas, municipalities account for a greater share of urban population when compared to the other urban areas.

2.34 Density of Population

The overall density of the district has increased from 646 persons / sq.km. in 1981 to 770 persons / sq.km. in 1996. The density in urban and rural areas has increased from 2817 persons/sq.km. in 1981 to 3456 persons/sq.km. in 1996 and from 525 persons/sq.km. in 1981 to 600 persons/sq.km. in 1996 respectively.

2.35 Decadal Growth rate in Urban Centers

The urban population of the district has grown from 1.76 lakhs in 1961 to 3.43 lakhs in 1996. The decadal growth rate indicates that there is a considerable growth both in Municipalities and Town Panchayats in the district. Nagapattinam has registered the maximum growth rate among the municipalities and Vedarananyam has the maximum growth rate among the Town Panchayats. The details of decadal
growth rate are given in Table No: 40. The decennial growth rates both for Urban and rural population over the past four decades is furnished.

**2.36 Slum Population**

There has been a steady increase in the percentage of slum population to total municipal population from 1981 to 1996. It has increased from 37.80 per cent in 1991 to 42.81 percent in 1996. However slum population details for town panchayats are not available.

**2.37 Trend in urbanisation and slums**

The trend in Urbanization in Slums indicates that though the urban population has increased, the percentage of slum population to the urban population has decreased from 1981 to 1996. The percentage of urban population to total population has increased and the percentage of slum population to total population has fluctuated marginally from 1981 to 1996.

**2.38 Infrastructure Services and Environmental Status**

Dated in respect of Nagapattinam Municipality is only available. The total number of occupied housing units has increased from 1991 to 1996, and this increase is visible only in the urban occupied housing units. There has been an increase in the number of households accessing piped water supply connection and toilet facilities in urban areas.
2.39 Domestic wastewater generation and treatment

The estimated sewage generation is 123.75 lakh liters among municipalities and 45.57 lakh liters among town panchayats. The towns of the district do not have any treatment plant and hence there is no organized disposal of sewage. Nature of disposal and quantity through river water is 123.75 lakh liters in Municipalities and 45.57 lakh liters in Town Panchayats. The district also lacks underground drainage system.

2.40 Municipal Solid Waste Generation

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 tones with a collection efficiency of 75.22 per cent with a manpower of 111 for Solid waste management. The workers for solid waste management per thousand populations had shown only 0.32. There is no recycling process of manure in the district. The availability of compost yards is 3 in municipalities & 2 in town panchayats.

2.41 Composition of Solid Waste

On the basis of the figures furnished by Nagapattinam municipality, it was observed that 85 per cent of the solid wastes are compostable on wet basis and 15 per cent of rags, plastics, etc. are not compostable in the district.

2.42 Coverage of Problem Villages / Settlements

It has been identified that about 1614 settlements out of the total 2253 settlements in the district have had problems with regard to the supply of drinking
water. However 639 problem settlements have been covered during the VII five-year Plan (1992-97) and Plan Schemes are under implementation. The data do not hold well since no problem villages have become problem villages at any time because of the failure of water supply failure. The data given are the composite Nagai-Quaide-Milleth district comprising bifurcated Tiruvarur district.

2.43 Reported cases of water borne diseases

Gastro-enteritis and Dysentery are the most commonly reported water-borne diseases in the district. Incidence of Gastro-enteritis was very high during 1994-95. Cases of Cholera and Jaundice were also reported in the district. In some instances the Gastro-enteritis has also proved to be fatal. Deaths of gastro-enteritis are reported from 1985 to 1996. The maximum deaths of 100 were reported during the year 1992-93 due to gastro-enteritis. Deaths of Jaundice and Meningitis were also reported during the year 1991-93 and 1993-94 respectively.

2.44 Transportation

The composite Nagapattinam district has State highways, major district roads and other district roads. There are no National Highways. The length of the roads in all the categories has increased in 1996 in the district. The same situation is observed in the case of major and minor bridges and culverts and hence the real progress made in the development of roads and bridges could be seen. There has been a significant increase of two, three and four wheeler vehicles in the district over the past 10 years. Increase of vehicles may increase air pollution emitted from them.
2.45 Industrial Development and Environmental Status

The district is deprived of any major industry but it is a flourishing centre of cottage industries and handicrafts alike 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 flower garlands and bouquets are much in demand during Christmas days. Pith is grown on the beds of tanks in the Sirkazhi, and Mayuram taluks. The making of musical instruments of jack wood like the veena, the tambura, the violin, the mirudangam, the tabala and the kanjara exhibit excellent taste, knowledge and workmanship. The jack wood has special quality for producing musical sounds. Government has established an industrial training institute at Nagapattinam. This is to promote industrial development in the area. With a view to improve the condition of the weavers, the State Government like housing schemes has also initiated various welfare measures, introduction of group insurance etc.

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.

Environmental protection is becoming an issue of great importance for the present and future generations. Releasing this national priority, the R and D Centre has established a separate group for environmental studies and research, leading to effective measures to minimize air and water pollution. The ambient air is regularly monitored by a mobile unit to generate baseline data.

Taking its activities beyond Manali, MRL has commissioned a new grass-root refinery with a 0.5 million tonnes capacity per annum at Panangudi in the Cauvery River Basin together with a gas sweetening and LPG separation unit producing 16,000 tonnes of cooking gas. MRL’s Effluent Treatment Plants are operating to achieve MINAS. The Tertiary Sewage Water Treatment Plant of MRL, the first of its kind in Indian Refineries, augments water supply to the refinery complex. Also, MRL is working towards zero discharge.

2.46 Water quality

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 seawater into the land aquifers. The area mainly affected from seawater intrusion into the land acquires, are Kuttam area in Nagapattinam District. Further information was not available for water quality in the Nagapattinam district Under MINAR’s Scheme; TNPCB is monitoring the quality of water from 16 places of 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 content of water is exceeding the standard value, because of more water evaporation and influence of backwater. pH of water is slightly more than the standard. Disposal of sewage and drainage water into the Cauvery River is the main reasons to affect the biological quality of water.

2.47 Discharge of Industrial effluents

Information was not available for discharge of industry effluents in river basin/other water bodies as there are very few highly polluting categories of industries in this district.

2.48 Aqua Culture Activities

An Extensive water sample analysis carried out in over half-a dozen villages of Sirkali taluk, in the aquaculture belt of Nagapattinam district by the Gandigram Rural University as reported in Indian Express dated October 9, 1994 has revealed a disturbing deterioration in the quality of the only source of potable water ground water. An independent study made by the Bhagawati Environment Development Institute recently has established that hardness, chloride and alkalinity levels of water collected at 17 different points in Sirkali taluk of Nagapattinam District spread
over the seven villages of Niethalvasal, Mehendrapalli, Keelaiyur, Pudukuppam, Eranjimedu, Thirunagari and Radhanallur are in excess of the prescribed tolerance limits for drinking water.

Prawn culture and shrimp farming are done in coastal districts of Chengalpattu, Cuddalore, Thanjavur, Nagapattinam, Tiruvarur, Pudukottai, Ramanathapuram, Tuthukudi and Kanyakumari. There are about 1200 such aquaculture farms in Tamilnadu. The effluents let out of these farms containing biodegradable wastes are not properly treated in many cases and hence pollute groundwater in adjoining areas, even up to a distance of 6 km. affecting agriculture. Added to this, a majority of the prawn farms have been flouting environmental guidelines by discharging untreated effluents into the neighboring Poromboke lands. There are about 648 Aquaculture units, which are occupying the areas of about 1484 hectares. The estimate on wastewater generation from these units is also not available. There have been no aquaculture activities along the coastal line of the districts as per the report of fisheries department.