

## Chapter Two

### Kollidam Estuary and Sample Ponds Environmental Quality: A Study Area Profile

#### 2.1 Introduction

The word "aquaculture" has been defined by as a cultivation of plants or animals to serve human purposes by deliberate modification of their natural environment and by selective breeding of stock to improve cultured species" in simplex been aquaculture is nothing but it forming of commercially important organizations under controlled conditions. The process of growing the baby prawn up to a marketable size in an enclosed water body for a specific period in a specially created aquatic environment is termed as prawn forming.

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, Sirkazhi and Tharangampadi. 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 3,536.38 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. Tharangampadi g. Thirukuvalai

Vedaranniyam salt swamp forms another great natural division. It runs along the coast from Point Calimere for about 48 kms and it 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.

East coast is the second largest coastal area in the World. The length of the coastal line is about 2700 km. There are many important Tourist places are situated. It is also of economic importance as many Natural resources and many important business activities are found. Harbour in these regions plays an important role in import and export activities. It is also useful for Water Transport as many Harbours are constructed along the coasts. Most important Harbour is Chennai and Kolkatta. Along the coast many major and minor rivers are found mixes with Bay of Bengal. The Eastern Coastal Plain is a wide stretch of land lying between the Eastern Ghats and the Bay of Bengal. It stretches from Tamilnadu in the south to West Bengal in the north. Deltas of many of India's rivers form a major portion of these plains. The Mahanadi, Godavari, Kaveri and Krishna rivers drain these plains. The region receives both the Northeast and Southwest monsoon rains with its annual rainfall averaging between 1,000 mm and 3,000 mm. The width of the plains varies between 100 to 130 km. The plains are divided into six regions: The Mahanadi delta; the Southern AndhraPradesh plain; the Krishna Godavari deltas; the Kanyakumari coast; Coromandel Coast and sandy littoral. In the

above explored East coast the area taken for study comprises of Coastal areas of Nagapattinam district, Cuddalore district and Pondicherry State.

Mangroves, the intertidal ecosystems occurring primarily in the tropical regions of the world, are valuable natural resources with high productivity and unique habitat value. However, the genetic structure of plant species within the mangrove ecosystem is poorly understood. The present communication is the first report on the use of molecular markers in assessing intra-site and intra-specific polymorphism in one of the mangrove species, *Acanthus ilicifolius*, for identifying/ detecting distinct genotypes for long-term conservation. Random amplified polymorphic DNAs (RAPDs) and restriction fragment length polymorphisms (RFLPs) were used to elucidate the intra- and inter-population variability in this widely distributed mangrove species. In all, 48 genotypes representing eight distinct populations were analyzed. A low level of polymorphism was detected at the intra-population level through both RAPD (3.8-7.3) and RFLP (3.2-9.1) analyses. At the inter-population level, 25 of the 73 RAPD loci (34) detected through the use of 13 random primers and 44 of the 96 RFLP loci (45.8) revealed through 15 probe/enzyme combinations were polymorphic. RFLP analyses were carried out using genomic clones developed from the same species. The somatic cells of the species displayed 48 chromosomes, with no numerical changes at either intra- or inter- population levels.

## **2.2 Brief History of the study area**

The earliest mention of Sirkazhi is found in the history of the Chola king Kocengannan from the Sangam Age (3rd century BCE to 4th century CE), who is believed to have won a bloody battle here. During the 7th–8th century, there

were widespread disputes between the Hindu sects of Saivism and Vaishnavism. Tirugnanasambandar and Thirumangai Azhwar, belonging to Saivism and Vaishnavism, respectively, and both natives of Sirkazhi, had disputes over their religious compositions and theologies during the period. The Chola Kings ruled over the region for more than four centuries, from 850 to 1280, and were temple patrons. There 41 inscriptions from the Chola kings in the temple that record various gifts like land, sheep, cow and oil to the temple.

The region fell under the control of Pandyas in 1532 and later became part of the Thanjavur Nayak kingdom. The region was conquered in 1674 by Ekoji I (1675–84), the Maratha enemy of the Nawab of Bijapur and half-brother of Shiviji (1674–80). The town and the region became part of the British East India Company during the mid-18th century. Tanjore district was constituted in 1799 when the Thanjavur Maratha ruler Serfoji II (1798–1832) ceded most of his kingdom to the British East India Company in return for his restitution on the throne. After India's independence, Sirkazhi continued to be a part of Thanjavur district until 1991, when it became part of the newly created Nagapattinam district.

### **2.3 Physical Aspects**

The Nagapattinam district stands for paddy production in Tamilnadu. So this district is popularly called as "**Granery of Tamilnadu**" in this districts, Sirkazhi Taluk is important Taluk. It is garlanded by the rivers, cauvery, Uppanar and Kollidam. These are main source agriculture and prawn culture of this district. This districts also facinating ancient temple and tourist of Poombuhar, Vaithisvarankoil is famour for "Nadi Jothidam" this is the pride of this district

Vaithisvarankoil which invites ever other states people because of the Traditional value. Sirkazhi Taluk is situated at  $11^{\circ}20'$  North to  $17^{\circ}, 95'$  North Latitude and  $79^{\circ} 46'$  East to  $75^{\circ}, 37'$  East Longitude and it is located at 280 Km south off Chennai to state capital and 90 km East off Thanjavur (Figure 2.1). Sirkazhi is located on the eastern flank of the Kumbakonam-Shiyali ridge, which runs along the Kollidam River. Sirkazhi has an average elevation of 5.18 m above sea level and is located at 13 km west of Bay of Bengal. It is located 95 km north-east of Thanjavur, 24 km north of Mayiladuthurai and 20 kilometres south of Chidambaram.

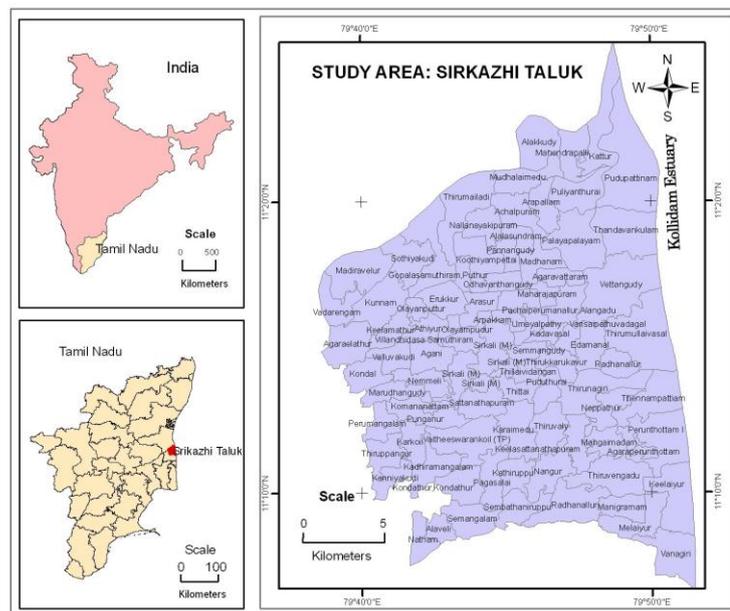


Figure - 2.1

This region experiences long summers and short winters, and receives an average yearly rainfall of 1,250 mm, mainly from the north-east monsoon between October and December. Its close proximity to the sea means that Sirkazhi receives more rainfall than neighboring areas. Sirkazhi is part of the

Cauvery delta region and has irrigation channels, called the Kollidam channels, which carry water from the rivers and provide a rich deposit of fertile silt before reaching the sea. The soil is black and contains fertile alluvial sediment. The area's main crop is rice; other crops grown in the area are coconut, tamarind and neem. The landscape mostly consists of plain lands with fields and small portions of scrub jungle. Antelope, spotted deer, wild hog, jackal and fox are present in the jungles and outlying areas of the town. Crow and ordinary game birds are found in large numbers in the town.

The 2004 Indian Ocean Earthquake was an undersea, mega thrust earthquake that occurred on 26 December 2004, with an epicenter off the west coast of Sumatra, Indonesia, triggering a series of devastating tsunamis along coastal fringes of the Indian Ocean. Nagapattinam district was the most affected part of Tamil Nadu, accounting for 6,064 of the 8,009 casualties in the state. Sirkazhi remained mostly unaffected by the tsunami, but the groundwater quality deteriorated where aquifers were close to the water bodies. There was heavy salt water intrusion inland. The river Kollidam is useful to draw water for shrimp farming in the dissected areas. Thandavankulum village is situated sixteen kilometers from Sirkazhi town which is well connected by transport system. The village is supported by schools and hospitals to serve the neighboring areas. Three distributaries namely, Palayur, Uppanar and Pakingam canal passes through the village. The third sample village of Radhanallur is located twelve kilometers from Sirkazhi and the land pollution is visible when any one passes across the village. The river Uppanar is the main source of shrimp farming. The fourth village Thirunagauri is the largest in the taluk as far as the area and population

is concerned. It is located on the river of "Uppanar" which is a main source of the prawn family. This river separates the Thirunagari from Thirumullaivasal, a coastal Area. It has a Famous Temple called "*Thirunagari Azhuvar Temple*" this village has two primary schools and one middle school. This village is served by one primary co-operative society and one agriculture co-operative bank.

Pichavaram is located 51 km north east of Chidambaram, Cuddalore district, Tamil Nadu; it is an estuarine type of mangrove situated at the confluence of Uppanar, a tributary of the Coleroon River. Fishing villages, croplands, and Aquaculture ponds surrounds the area. This mangrove environment is attracting large number of tourists The Pichavaram mangrove wetland has 51 islets and the total area of the Vellar-Pichavaram-Coleroon estuarine complex is 2335.5 ha of which only 241 ha. is occupied by dense mangrove vegetation. Nearly 593 ha, of this wetland are occupied by helophytic vegetation like Suaeda, 262.5 ha. Barren mud flat and 1238.5 ha. Barren high saline soil (Krishnamoorthy et al., 1994) out of the 2335.5 ha of this mangrove wetland only 1100 ha. Comprising the entire mangrove vegetation located in the middle portion of the Vellar-Pichavaram-Coleroon wetland has been declared as a reserved forest. Department of Forest, Government of Tamil Nadu, declared the Pichavaram mangrove as a Reserved Forest.

### **2.3.1 Relief**

Kollidam estuaries of Pichavaram mangrove wetland, occupying an area of about 1400 ha, is located about 280 km down south of Chennai, in the Cuddalore District. Fishing and farming communities belonging to 17 hamlets

utilize the resources of the Pichavaram mangrove wetlands of Cuddalore District. Out of these 17 hamlets, 6 hamlets are under physical coverage of the mangrove wetlands, 5 hamlets are located on or near to the open beach and not protected by mangroves. Remaining 6 hamlets are far away from mangrove forest. There was no damage to 6 hamlets that are physically protected by the mangroves but hamlets located on or near to the beach have been totally divested.

### **2.3.2 Geology**

Spatial and temporal geochemical variations of various parameters in the water and sediment of a relatively small mangrove situated on the southeast coast of India were examined in detail for the first time. The water quality generally reflects the impact of seawater and the Vellar estuary (mixing effect) aided by evaporation and in situ biological productivity. The depletion and fluctuation of dissolved silica are controlled by biological processes. Nitrate and phosphate are contributed by fertilizer input from adjoining agriculture fields. Total suspended matter (TSM) shows an erratic range and trend due to deforestation and re-suspension processes. Sand and silt constitute 70–90percent of the sediments. Statistical analysis of the sediments shows the prevalence of a moderately high-energy environment with very effective winnowing activity. Organic matter content is higher in the mangrove sediments in comparison to adjacent estuaries. Water and sediment show fluctuations in their chemical concentration, but no specific trends could be identified. Heavy metals are also enriched in the mangrove sediments, indicating their unique chemical behavior and the existence of trapping mechanisms. Factor analysis and correlation analysis of water and sediments

show the complexity of the system and the multitude of contributing sources. The core sediment chemistry suggests the depletion of metal input due to the damming of the detrital inputs. The Pichavaram mangrove seems to be relatively unpolluted, since the anthropogenic signal observed is small and acts as a sink for heavy metals contributed from a multitude of sources without an adverse effect.

The 26<sup>th</sup> December 2004-tsunami has deposited sediments in the Pichavaram mangrove ecosystem, east coast of India. Ten surface and three core sediment samples were collected within 30 days of the event and analyzed for nutrients. Water samples were also analyzed to see the impact of tsunami on the geochemical behavior of nutrients. An increase in the concentration of various nutrients namely nitrate and phosphate was observed. The geochemistry of the mangrove forest were observed to be influenced by a number of factors like rapid increase of aquaculture farms, agricultural practices and the anthropogenic discharge from the nearby-inhabited areas. Further the sediment column was disturbed due to energetic tsunami waves, which has caused a sheer increase in the dissolved oxygen in water. As a result, the change in the redox potential has resulted in change in the nutrients absorbed/associated with the sediments. In addition, role of retreating water after tsunami on the nutrient geochemistry was also evaluated.

### **2.3.3 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. 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 Thiruthuraipundi. The worst land in the delta is found in the Tirutturaipundi and Nagapattinam taluks where the soil is saline and arenaceous and drainage is very defective. The chief sources of irrigation in the district are the rivers, a few rainfed 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 land is 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.

The soil available in Sirkazhi can be broadly in high fertility clay and sand soil. The soil is fertile in some region and sterile in some region particularly the land near the river. Sirkazhi Taluk has Thiruvali Lake which is Tributary of Cauvery which acts as a drainage canals to the villages. Rivers like Cauvery, Upparnar, Palayar and Kollidam are main drainage sources of Sirkazhi Taluk. These rivers are flow from west to east are all perennial rivers. The soil of Pichavaram mangrove wetland is in general dry for most of the year and highly firm. From the geo chemical point of the view soils are clay and rich in alkaline and alkaline earth elements such as calcium and magnesium. Soil salinity in general very high the stagnation of saline water in trough shaped portion of the degraded mangroves. The soil salinity clearly indicates that suitable drainage system proper of the mangrove wetland need

to be introduced both degraded area and in the healthy where soil salinity is high.

Deep ploughing and land smoothing spreading and incorporation of sand/clay deposit Removal of cyperus and other weed species providing proper drainage facilities Sowing and in situ incorporation of green manures leaching wherever possible application of Farm yard Manure Selection of salt tolerant varieties Application of Bio-fertilizers - salt tolerant strains of a) Phospho-bacteria and Azospirillum species, b) Pseudomonas applied, c) Gravity drip system to enhance water use efficiency, d) During the northeast monsoon the area received nearly 600 mm of rainfall.

#### **2.3.4 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 Illemenite rich beach sands is reported in east of Kodiampalayam. It extends over a distance of 2 kilometres with an average width of 50 metres.

**Kankar:** Kankar and tuffaceous limestone occurs under red soil/laterite ranging in thickness from 0.3 to 1 metre, and Kankar layers are noticed in stream sections. The important occurrences are seen on the Grand Anicut canal cutting between Kuruvadipatti and Podur also in neighbourhood Thirumalasangudram. The thickness of Kankar in Thirumalasangudram area ranges from 2 to 2.5 metres 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.

**Salt:** Salt pans are located at Adiramapattinam and Vedaranyam. ONGC: The ONGC of India is intensively exploring to augment the underground oil and natural gas resources of the Cauvery delta and not it is estimated to have vast potential. Many wells are being opened and started yielding oils and gas.

## **2.4 Rainfall and Climate**

Climate is the most important factors of environmental which governs the agricultural activities. Sirkazhi experiences Tropical humid climate, there are four Seasons.

- The hot Weather Season - Mid March - Mid June
- The South west monsoon Season - Mid June
- The North East Monsoon Season - Mid September - Mid December
- The Cold weather Season - Mid December - Mid March.

**Climate:** Climate is the most important factor of environment controls of agricultural activities of the study area. Summer season maximum temperature recorded about 36.6°C. Minimum temperature recorded 32.5°C. Maximum cooler 23.5°C, Minimum cooler 22.8°C in the winter season. The study area has a high temperature and low degree of humidity. Even though

this area is not subjected to extremes of climate the summer months are quite hot and the difference between maximum and minimum temperature are moderate.

The Pichavaram are fragile complex and dynamic ecosystem, and are dependent on the following inter-related, environmental both, biotic and abiotic factors: Climate of any inter-tidal region acts as the most significant and important factors for natural growth, development and succession of the Pichavaram. Among these climatic factors they are Rainfall, Regular wind flow, Frost free, Radiation and Sedimentation play very dominant role for the viability in a holistic manner.

**Temperature:** Among these basic climatic factors, the air temperature of the region may be governed by the geographic distribution of the different species of Pichavaram Atmospheric temperature fluctuation ranges between 20o c and 35o c

**Rainfall:** Since the Pichavaram depend on the seasonality was relative distribution of the rainfall its peak and trough. The highest rainfall occurs during October and November. The rain abates during December. According to the rainwater in a particular area of the village sufficient for the years there might be no problem with water availability till the month of April and a good groundnut harvest could be expected. Some shower occurs during June and July is insufficient to any crop. The rainfall was distributed events throughout the monsoon. If the rain occurs only for a short period yield may suffer even if the amount of rainfall is very high.

**Wind:** The wind flow may have the drying power of the air and its mechanical effect may cause damage to the plants and its ecosystem The Sundarbans

mangrove forest have several cyclone hits, arising from the bay of Bengal. The destruction of mangrove plants and ecosystem has been experienced during the last two centuries. Several cyclones have affected the mangrove forests. The coastal zone of the Sundarbans are funnel shaped in its coast line and every year 4-5 cyclonic storms are common in the mangrove forests of Sundarbans.

## **2.5 Agriculture and Horticulture**

Crops like paddy, coconuts, arc nuts, condiments, spices, pulses, groundnut and chilies are cultivated here. In the surrounding coastal area mainly rice, sugarcane, coconut, betel vines, millets etc are cultivated. In some parts cotton and also flowers such as Jasmine, rose, marigold etc are grown. The agriculture in the hamlet is groundnut. Minor millets such as pearl millet, cumbu millet, ragi millet and maize also cultivated, but only by small number of farmer. Paddy is cultivated only in small area. One of the participants said that about five years ago, the villagers owned some 30 acres of paddy land along the Uppanar River but outside of their hamlet. Almost all these lands are sold to outsiders. During summer, cucumber and watermelon varieties are cultivated in the low-lying dry land by a few farmers.

## **2.6 Land utilisation**

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 grazing

lands, (b) miscellaneous tree crops and groves not in the net area shown and (c) cultivable waste land, cover 5.35 per cent. However, forest land seems to be at variance with the reported extent of forest area by the forest department.

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, miger seeds, though in very small area) are the important ones.

## **2.7 Vegetation**

The Indian mangroves comprise approximately 59 species in 41 genera and 29 families. Of these, 34 species belonging to 25 genera and 21 families are present along west coast. There are about 25 mangrove species which have restricted distribution along the east coast and are not found on the west coast. Similarly, there are eight species of mangroves like *Sonneratia caseolaris*, *Suaeda fruticosa*, *Urochondra setulosa* etc. Which have been

reported only from the west coast? There are approximately 16 mangrove species reported from the Gujarat coast, while Maharashtra has about 20 species, Goa 14 species and Karnataka 10. There are hardly three to four species of mangrove which are rarely found along the Kerala coast. The associated mangrove flora is quite common to both the coasts, with minor variations in distribution.

## **2.8 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.

### **2.8.1 Forest types**

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 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, Sisso, 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.

## **2.9 Fauna**

There are different types of faunal communities in mangrove waters which are dependent on the water component in one way or the other. The planktonic

and benthic animal communities also play a very important role in the mangrove ecosystem just like the terrestrial animals. The fishes are represented by several species like the mud skippers, carangids, clupeids, serranids, mullets, hilsa, sea bass, milkfish etc. The wildlife of Indian mangrove forests is quite diverse and interesting. Apart from the famous Royal Bengal tiger and estuarine crocodile (*Crocodilus porosus*), there are different kinds of monkeys, otters, deer's, fishing cats, snakes and wild pigs. The mangrove swamps of India are favored by a variety of birds, both migratory and resident.

## **2.10 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 in Nagapattinam district 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).

### **2.10.1 Tidal Amplitude**

The tidal fluctuations have the major role for habitats, as most grow well in between the Mean High Water Spring Tide (MHWST) and Mean Sea Level (MSL). Along the west coast the tidal amplitude changes from south to north. At the southernmost tip of India (Kerala), tidal amplitude is minimal. However, at Goa this difference is about 1.5 to 2 meters. In the Gulf of Khambhat the highest tidal amplitude is about 8-9 m, while in the Gulf of Kuchchh it is around 5 meters. These are regular high tides which are also known as 'tidal bore'. Along the west coast, differences between the tidal bore is seen in

Hoogly River, particularly during cyclonic conditions. Tides are also affected by freshwater discharge, particularly, floods during monsoon seasons.

### **2.11 Population**

According to 2011 census, Sirkazhi had a population of 34,927 with a sex-ratio of 1,028 females for every 1,000 males, much above the national average of 929. A total of 3,367 were under the age of six, constituting 1,740 males and 1,627 females. The average literacy of the town was 81.5 per cent, compared to the national average of 72.99 per cent. The town had a total of: 8756 households. There were a total of 11,476 workers, comprising 352 cultivators, 1,398 main agricultural labourers, 150 in house hold industries, 7,681 other workers, 1,895 marginal workers, 88 marginal cultivators, 809 marginal agricultural labourers, 77 marginal workers in household industries and 921 other marginal workers. As per the religious census of 2011, Sirkazhi had 86.91 per cent Hindus, 9.46 per cent Muslims, 2.16 per cent Chistians, 0.02 per cent Sikhs, 0.46 per cent Buddhists, 0.33 per cent Jains, 0.63 per cent following other religions and 0.04 per cent following no religion or did not indicate any religious preference.

### **2.12 Transport**

The service sector provides most employment in the town. Limited agriculture is carried out; the main crop is paddy rice. During the British Raj, Sirkazhi was known for mats made with a kind of cyperus. The headquarters of the taluk, panchayat union administration and many government offices are located in the town. There are no major industries within the town, except for several rice mills. Sirkazhi has many Hindu temples, which draw in tourism activity. Sirkazhi Coop Urban Bank, founded in 23 Apr 1918 is the oldest bank in

Sirkazhi. All major nationalized banks and private banks have branches in the town, and all have ATMs.

Sirkazhi municipality has 51.5 km of roads: 18.3 km of BT roads, 30.4 km of cement roads and 2.2 km of water-bound macadam surface and 0.6 km of other roads. Bullock carts are the traditional mode of transport; as late as the 1950s, landlords and rich farmers travelled mostly by bullock carts except on rare, long journeys, which they undertook by buses or motor vehicles. Buses are the main mode of public transport from Sirkazhi. The municipality operates a B-Class bus stand with 36 bays that accommodate local and intercity buses. The buses are operated by Tamil Nadu State Transport Corporation, connecting the town to Chidambaram, Mayiladuthurai, Karaikkal and other cities in Tamil Nadu. Sirkazhi's railway station is on the main line between Chennai and Trichy via Cuddalore and Chidambaram. Daily express trains connect major cities in Tamil Nadu like Chennai, Madurai and Trichy, and weekly express trains connect Tirupathi, Varanasi, Tiruchendure and Bhubaneswar. There are also daily passenger trains to Mayiladuthurai, Salam, Villupuram and Bangalore daily. The nearest airport is Tiruchirapalli Airport which is 160 km (99 mi) from Sirkazhi.

### **2.13 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.