CHAPTER-III
PROFILE OF THE STUDY AREA
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General Information about Tuticorin District

The district of Tuticorin was carried out from the erstwhile Tirunelveli District on 20\textsuperscript{th} October 1986. Thiru R. Arumugam I.A.S. was the first Collector of this District.

Location

Tuticorin District is situated in the extreme South-Eastern corner of Tamil Nadu state. Total area of Tuticorin District is 4621 sq. kms. This District bounded on the north by the districts of Viruthunagar and Ramanathapuram, on the east and South-East by Gulf of Mannar and on the west and South-west by the District of Tirunelveli.

Area and Population (2001 Census)

Tuticorin district has geographical area of 4,621 sq. kms. It has eight taluks namely Tuticorin, Tiruchendur, Kovilpatti, Sathankulam, Srivaikuntam, Villatikulam, Ottapidaram and Ettayapuram. The total number of people living in this District is around 15,72,273. Only in Tuticorin municipal, male population is 23,368 and female is 2,01,995. In Tiruchendur male are around 1,38,040 and female are 2,01,995 in numbers. Kovilpatti has 1,28,711 of male population and 1,33,538 of female population itself. And the total population in Sathankulam is 96,820 in which male population is 43,692 and female population is 53128.

In Srivaikuntam, the male population is around 93,472 and female population is 98,411, which give 1,91,883 of total population. Vilattikulam has the total population of 1,35,285 of which 66,743 are male and 58,053 are female. Ettayapuram has the low population when compare with the population size of other Taluk. It has merely 35,596 of male population and 38,395 of female population which has the total population of just 73,991 only.
Land use pattern

The total extent of forest in the district is 11,012 hectares, which works out to 2.47 per cent of the total geographical area of the district. A deer sanctuary is maintained in the hills of Vallanad. Except Vallanad and Kurumalai hills, there are no other hills or mountains. In this District, 42.0 per cent of the total area indicates the predominance for agriculture. The area under cultivable waste is only 4.4 per cent, which can be reclaimed for cultivation.

Education

In this district, the percentage of effective literacy is 74 per cent. The number of educational institutions available in this district are; 12 arts and science colleges, 1 medical college, 3 engineering colleges, 1 agriculture college, 1 fisheries college, 1 college for special education, 1076 primary schools, 284 middle schools, 73 high schools, 97 higher secondary schools, 3 teacher training college, 2 government polytechnic.

A government polytechnic in the name of greatest Tamil poet Subramania Bharathiar is functioning from 1982 exclusively for girls at Ettayapuram.

Hospitals

There are around 10 hospitals in Tuticorin District. Apart from that, it has 47 primary health centres and 249 health sub-centres. The availability of beds in hospitals and dispensaries are around 1,072 in this District.

As far as the health department concern there are 196 doctors and 158 nurses and number of hospitals under Indian medicine are 2, which involved in the better health service to the society in Tuticorin District.

Entertainment

Tuticorin is having an All India Radio Station and a Doordharshan station. There are 42 permanent cinema theatres, 18 touring theatres, 4 semi permanent theatres and 3 open theatres, which are called open air theatres providing entertainment to the people of the district.
Agriculture

In this district, the total cultivated area is 1,97,413 hectares. Net area sown is 1,88,296 hectare, and area sown more than once is 9,117 hectare. There is an Agriculture college at Killikulam in Srivaikuntam Taluk and one cotton research centre at Kovilpatti handling research and development works on cotton.

In Tuticorin District, Paddy is mainly cultivated in Srivaikukntam, Satankulam and Tiruchendur Taluks. Cumbu Cholam, Kuthiraivalli and other pulses are raised in the dry tracts of Kovilpatti, Vilathiculam, Ottapidaram and Tuticorin Taluks. Cotton is being cultivated mainly in Kovilpatti, Ottapidaram, and Tuticorin Taluks. Groundnut cultivation is mainly undertaken in Kovilpatti, Tiruchendur and Sathankulam Taluks.

Palmyra trees are grown mostly in Tiruchendur, Srivaikuntam, Satankulam and Vilathikulam Taluks, Jaggery is produced from palmyra juice and the production of jaggery is the main occupation of the people of Tiruchendur and Sathankulam Taluks next to agriculture. Banana and other vegetables are raised in Srivaikuntam and Tiruchendur Taluks.

Animal Husbandry

According to livestock census of 1994, the district livestock population was 10,26,339. The poultry is numbered at 4,05,415, the cattle population is high in Tiruchendur followed by Kovilpatti and Srivaikuntam Taluk ranks first in sheep population.

Many kinds of veterinary Institutions are available in this district are; 1 clinical centre, 3 veterinary hospitals, 23 veterinary dispensaries and 73 veterinary sub-centres.

Government of Tamil Nadu has ordered in G.O. No.3, Animal Husbandry and fisheries development dated 10.01.2000 for conducting special camps for the welfare of cattle. So far 25 special camps have been organized in this district. The total number of cattle benefited through these schemes is 83,909.
Fisheries

Marine fisheries, pearl and chunk fishing are famous in this district from the year immemorial. Tuticorin is the main centre for deep sea fishing. This district has a lengthy coast line of about 140 kms. Prawn culture is very flourishing one in this district and it is earning considerable amount of foreign exchange. Now the prawn culture has been banned by the supreme court of India due to pollution issues. The other varieties of fishes are caught and most of the qualities of the fish are exported to all parts of the country.

Some kind of fishes are caught, powdered and backed and it is called as MASI. The fish-cakes produced here are used for food for prawns and other fishes. There are mainly 12 marine fishing villages in this district.

There is joint director of fisheries and assistant directors of fisheries in change of pearl-chunk fishing, fishermen training institute and for technical guidance. There is a fish-seed farm located at Kadamba and service centre/base workshop of this district is situated at Tuticorin. There is a fish curing centre at Punnakayal. There are 450 mechanized boats, 1300 vallams and 900 catamarans in this district. Around 5,428 fishermen families are directly engaged in fishing in Punnakayal.

The coast Tuticorin covers 60 kms of coastal stretches from Vembar to Punnakayal. There are 4 important landing centers from the north namely Vembar, Tharuvaikulam, Tuticorin and Punnakayal. In between these 4 landing centres, there are 8 small fishing villages namely Periyasamypuram, Kezhavaipar, Pattinamarudur, Vellapatti, Tuticorin north and south (inclusive of Siluvaipatti, Thalamuthu nagar, Thirespuram and Inico nagar), Ratchanyapuram and Pazhayakayal.

Though, there are 12 fishing villages in the study area, emphasis is only on Punnakayal village mainly because of the type of gears and crafts that used in this village for fishing. In the case of Punnakayal, fishing is undertaken, using drift and gill nets.
Earlier the fish catch was within 5 miles from the shore during 1980’s but today the kilograms of the fish caught is low even after sailing out of 40-45 nautical miles. The peak seasons for fishing were December to March every year. In this period the fishermen can trap up to 1.5 tonnes of fish even in a single boat. In the resent scenario a meager catch of hardly 400 kgs during the peak season is recorded.

Crafts and gears utilized in Lactarius fishery

There are no specific nets for fishing of false trevally. Trawl net catches are highly used to catch this kind of fish followed by drift gill nets, Irupuri nets, sardine nets, shrimp nets and No.2 gill nets. The main reason for the good catches in trawl nets is basically because of the speed of the fish and the matching speed of the trawlers.

False trevally undergoes vertical migration and is found nearer to the surface waters during the early hours of the morning and after sunset in the evening. Therefore maximum catches can be obtained between 07–10 hrs during day time and 18–20 hrs during the evening. As the whole group consists of fast swimming fish, the speed maintained by the boats is 3–3.5 nautical miles as compared to the normal speed of 2.8–2.9 nautical miles per hour. If the speed is less, the false trevally escapes from the targeted area. The trawler boats used for fishing are 54”x 19”x 12” and 51”x18”x17” having 160 Hp and 108 Hp respectively. Similarly country crafts called “Vallam”, a traditional craft in the Tuticorin region and this craft crafts are loaded with gear like drift gill nets that land the false trevally too. The size of the traditional country craft ranges from 25.5”x 7”x 4.5”, 27”x7”x 4.5”, 28.5”x 7”x 4.5” and 31.5”x7”x 4.5”feet. The engines used in this crafts are usually powered with 8, 10 or 12 Hp.

Problem of the fishermen

Problem faced by the fishermen is the misuse of marine fishing regulation. Usage of destructive nets and destructive fishing practices has caused loss of habitat for many species. Earlier there were clear-cut laws for fishing between the mechanized and non-mechanized crafts. The traditional country crafts were regulated to fish within 8 – 15 km zone whereas, the mechanized sector were to fish beyond 50 km zone seaward. Now, all fish in the same area and continuous conflicts are arising between these two sectors. The
season for fishing false trevally also seems to be during the season when 45 days fishing ban is operational.

**Fishing grounds in Tuticorin District**

A decade ago, the entire Tuticorin shallow coastal region had abundance of the false trevally in depths of 2 fathoms while now the fishermen have to travel long distances and fish in the deep continental region. In Vembar, the fishing season for the false trevally was during April where every boat at an average was able to bring ashore at least 10 Kgs of fish. The same period had a catch of 40 kg and more during the past one decade. Earlier the fishermen of this village were trapping false trevally in depths of 4 fathoms but in the present scenario, they are fishing at depths greater than 20 fathoms. The chief fishing zones identified in Vembar Lactarius fishery included that of the Sallipattu madai, 22 paagam madai, 6,7,8,9,10,11,12,13 paagam madai. The depth range of the fishing zones are from 6 fathoms to 22 fathoms. The Vembar group seems to be free of rocky reef topographical area while exclusively sandy silt in nature.

In case of Tharuvaikulam village, the fishing of false trevally was carried out near the estuarine mouth close to the shore of the river Kallar. Those days, shrimp nets were used to catch the species and this was supported by “Ola valai”, a modified mini version of the shore seine. This indigenous net was operated from the shore and this clearly portrays the abundance 2 decades ago. The fishermen at peak seasons were able to trap these fishes up to 160 kgs per boat. January and February months are the fishing season in this village where each boat brought not less than 50 - 60 kgs. Presently, the catches have come to a stand still. The fishermen have to travel long distances to trap these fishes which becomes very expensive and lengthy fishing hours leading to poor catches and minimal operation of time. Appa and Nallathanni islands of the Vembar group was once a paradise for the false trevally as they were dwelling in these areas in large quantities right from a depth of 2 fathoms. Certain destructive trawl nets with less than 5 mm mesh size have resulted in the loss of habitat and destruction of the reef. This has led to the loss of Lactarius species from the island area and the fishes have now migrated to deeper water where still the topography remains undisturbed due to severe overexploitation. The
main fishing grounds now that are used as fishing grounds are 20 fathoms or more in depth. Nadu madai was one of the most preferred areas having a depth of more than 20 fathoms. Other than that reef outer area of the Appa Island and adjacent reef area were preferred. The depth ranges from 20 to 35 fathoms for these fishing grounds.

Tuticorin region is the most commercially active region due to the large fleet of fishing crafts involved in trawling and associated activities. The peak fishing season is from December to March. A single boat landed 0.5 - 1 ton per day in a single catch during the late eighties. In the beginning of 1980, fishermen caught the fishes close to the shore (5 miles from land) in depth ranges of 5 - 20 fathoms. Now the same fishermen are traveling a distance of 40 - 45 miles in the sea if they need a good catch of Lactarius. Even these remain as a luck factor hence; fishermen instead of going for a particular fishery like the false trevally undertake a common fish trawl that will also trap other fish species. This has avoided loss of concentrating fishing on a particular species. The Tuticorin fishermen also depended on current patterns because of the migration of the shoal near estuarine mouth region of Punnakayal zone. Now in this region, only 20 kgs are caught and never more. Fishermen in the late eighties preferred to travel long distances up to Kanyakumari in the south and up to Yeruvadi in the north for fishing of this species. Due to the fishing competition and fishing pressure, fishermen are forced to shift fishing grounds and certain fishing grounds like the Punnakayal madai has to be shared between both country crafts as well as the mechanized ones. This has often resulted in clashes and problems between neighbouring villages. The main fishing area for Tuticorin fishermen is Punnakayal madai, Yeruvadi madai and Manapadu shoals area.

Punnakayal fishermen are using traditional country craft (Vallam) for the past 2 decades fishing with sardine gill net. This net is important for the trapping of false trevally in coastal waters very close to the shore. Certain fishermen are also operating the 3 logged catamarans for the fishing of shoaling fishes with an outboard engine of 8 Hp capacities. The main fishing grounds followed by these fishermen include Koil madai thavu - 5.5 fathoms, Kanna madai - 4.5 fathoms, Mela thundathi pallam 8 - 12 fathoms,
Pora paar - 6 fathoms, Punnakayal madai - 21 fathoms and Virudhachivi paar - 9 fathoms.

**Loss of Fishery due to Climate Impact**

Both nature and man have played a key role in the sudden decrease in the natural population of the false trevally Lactarius lactarius. Rainwater plays the most important role in the productivity of the coastal environment. Rainwater flushes all the nutrients of lithogenous origin entering into the hydrogenous system of rivers. The river water finally finds the sea forming estuarine complex near the mouth region. The estuarine areas thus provide ideal shelter and required food for all larvae, juveniles, fry and fingerlings of fin and shell fishes.

The entire Tuticorin coastal region has not received any proper rainfall for the past 6 years. Out of the 2 major rivers, Thamiraparani that meets the sea near Punnakayal is the only one that flows throughout the year while river Vaipar has totally dried up. The two small rivers namely Kallar and Vembar have also dried up as check dams and reservoirs are built all along the way. Lack of rains is the chief reason quoted by many of the fishermen, fisheries department personnel and fishery biologists for the loss of Lactarius fishery. This is evident from the rainfall data available from the meteorological department (given below). Similarly, there is a reduction in the associated parameters like temperature and in pressure for the region under consideration. Lack of supply of food in the coastal waters has led the species to move into deeper waters which is supported by continuous, unsustainable and repeated fishing in the same area.

A gradual decrease in rainfall is noticed right from the effect of El-Nino during the period of 1997 and 1998. Rainfall is poor from this effect onwards till the data that is available for 2003.

As far the pressure, it has been steady even during the El Nino periods but is slightly in the increase right from 2002 onwards. Thereby, El Nino has caused a change in the climatic pattern by an increase in the temperature and at the same time a decrease
in rainfall. Surprisingly, the pressure and the shortage of rains is found to be increase in the years 2002.

The actual habitat of the false trevally Lactarius is silty soil that is found near estuarine region (silty clay) and in the outer reef areas. Since there is reduction in production of the costal waters coupled with the industrial development in this part of the country, these fishes have shifted their breeding grounds to deeper waters. Lactarius are now thriving outside the reef area in deeper waters (Figs 4 and 5). No work on the biology or stock assessment of this species is available for this particular species in this particular region of the country. Research on the stock replenishment pattern and biology of this species needs to be conducted soon to sustain this species over a period of time.

**The Socio-economic Indices of Dependent Fishermen**

A decade ago, the fishermen of the Gulf of Mannar used to bring home 35 - 60 Kgs/ day of Lactarius during peak seasons (Rs. 80 - 100/ Kg) while 7 -12 Kgs/ day was caught during the lean seasons. Fishing took place throughout the year and on an average, a single fisher folk household was able to generate an income of Rs. 600 - 700 per day. Whereas, in the case of the trawl owners earned up to Rs. 1000 – 1500 per day.

The catch had a supportive market, especially in the neighbouring state of Kerala where it fetched better prices, offered by auctioneers and buyers. Record haul of 3 - 5 tons per day was witnessed during early eighties. This brought excellent returns to the fishermen in terms of market. Now, the drastic reduction in the fish stock has resulted in fishermen using a single fishing ground continuously that also lead to the slow decline of other species dwelling in that area. Because the boats travel longer distances but bring back poor catches, economic loss is inevitable.

Earlier, fishermen could earn a minimum of Rs. 100 - 200 per day for Lactarius, along with other catches. In the present state of affairs, they depend on other catches because of the loss of this fishery in coastal waters. As a fall out of the above, dependence on species like Lethrinids and snappers (< Rs. 40/ Kg) has increased. This
has further lead to a slow decline in the fishermen's overall income by 50 per cent, forcing many of them to take up alternate fishing gears like "Mayavalai" and "Mural Valai" (both modified gill nets). These two nets are suitable to catch half beaks, full beaks and snappers. In such circumstances, the low economic returns on these fisheries do not deter them.

Earlier, the fishermen of this village scenario, they are fishing at depths greater than 20 fathoms. The chief fishing zones identified in Vembar for lactarius fishing is included with the Sallipattu madai, 22 pagam madai,6,7,8,9,10,11,12 and 13 pagam madai. The depth range of the fishing zones are from 6 fathom to 8 fathom. The Vambar group seems to be free of rocky reef topographical area while exclusively sandy silt in nature.

Tharuvaikulam

In the case of Tharuvaikulam Village, the fishing of false travelly was carried out near the estuarine mouth close to the shore of the river kallar. Those days, shrimp nets were used to catch the species and this was supported by “Olavalai”, a modified mini version of type shore seine. This indigenous net was operated from the shore and this clearly portrays the abundance 2 decades ago.

The fishermen at peak season were able to trap these fish up to 160 kg. per boat. January and February month are considered as the fishing season in this village where each boat brought not less than 50-60 kgs. Presently, the catches have come to a stand still. The fishermen have to travel long distance to trap these fish which becomes leading to poor catches and minimal operation of time.

Appa and Nallathanni Islands of the Vembar group were once a paradise for the false travelly as they were dwelling in these areas in large quantities right from a depth of 2 fathoms. Certain destructive trawl nets with less than 5 mm mesh size have resulted in the loss of habitat and destruction of the reef. This has led to the loss of lactarius species from the island area and the fish have now migrate to deeper water where still the
topography remains undistributed due to severe over exploitation. Nadumadai was one of the most preferred areas having a depth of more than 20 fathoms. Other than that outer area of the Appa Island and adjacent reef area were preferred. The depth range is from 20 to 35 fathoms for these fishing grounds.

**Tuticorin**

Tuticorin region is the most commercially active region due to the large fleet of fishing crafts involved in trawling and associated activities. The peak fishing season in this region is from December to March. A single boat normally landed 0.5-1 tonnes of fish per day in a single catch during the late eighties. In the beginning of 1980, fishermen caught the fish far from 56 miles from land in the sea at depth ranges of 5-20 fathoms. Now, the same fishermen are traveling a distance of 40-45 miles in the sea if they need a good catch of lactarius. Due to the competition in fishing and also using the fishing grounds, certain fishing grounds like Punnakayal madai has to be shared between both country crafts as well as the mechanized boats. The main fishing area for Tuticorin fishermen are Punnakayal madi, Yervadi madai and Manapadu areas.

**Punnakayal**

Punnakayal fishermen use traditional country craft (Vallam) for the past 2 decades for fishing with sardine gill net. This net is important for the trapping of false traveling in coastal water. Certain fishermen are also operating the 3 logged catamarans for the fishing of shoaling fishes with an outboard engine of 8 HP capacities. Past catches in mid seventies and eighties have recorded landings up to 300-500 kg per boat. Now-a-days, hardly 1 or 2 kgs are landed and that too immediately sold out as the demand is high. The main fishing grounds followed by these fishermen included Koil madal thavu-5.5 fathoms, Kanna madi-4.5 fathoms, Mela Thundathi Pallam 8-12 fathoms, Punnakayal madai-12 fathoms and Viruthachivi Paar-9 fathoms.

The people involving in fishing activities as labour fishermen could draw salary at the range of Rs. 3000-5000 and the owners could simply get Rs.7000-10000 and above in peak seasons. In Punnakayal, approximately 60 per cent of the people are residing in
terraced houses and rests of the people are in living in tilled houses. The type of houses which are constructed in Punnakayal indicates the financial position of the people.

In the study area most of the people particularly the fishermen attained only middle school education (6th-10th standard). Fishing is the traditional business for the living in Punnakayal area both in present and past periods and also the fishermen has experienced for 10 to 20 years in this same field. The total members of family are at the range of minimum 2 to 6 and around 80 pre cent of the people are following nuclear family system. The family members are supporting to the fishermen in various forms such as financial, managerial, labour and repair in fishing field.

The fishermen kept themselves away from venturing into the sea on Thursday, following a 'general alert' sounded by the district administration in the wake of a massive earthquake in Indonesia on Wednesday. The Fisheries Department sources told media persons that the entire 320 mechanized boats and 3,000 country crafts, including catamarans that were registered in the district were either berthed near the shore or moved to 'safety'. Sources said that the alert was sounded since the administration did not want the fishermen to take chances, though the earthquake produced only slight variations in the tidal heights near the Indonesian coast and there was no imminent threat to the district coastline. Meanwhile, various departments concerned stayed on a preparation mode all through the day following the instructions from the Government to face emergencies.

The lack of natural shelters in the state made public investments in harbour facilities imperative and two major fishing harbours – Chennai and Tuticorin – and four minor harbours – Cuddalore, Nagapattinam, Sinnamuddam and Pondicherry – have been constructed for this purpose in the last three decades (Bavinck, 2001). In addition, many simple jetties were constructed at key points along the coast, although many of them face problems of siltation. The berthing facilities in the state are still considered inadequate by many boat owners.
Electricity

The Tuticorin thermal power station (TTPS) is the biggest power station in Tamil Nadu under the control of Tamil Nadu Electricity Board with three units of 2 tonne M.W.(Mega watt) each generating 50 million unit of energy daily. The first unit was commissioned in July, 1979, the second unit in December 1980 and the third unit in March 1982. This power station is feeding about 1/3 of the total power demand of Tamil Nadu.

Wind mills are generating around 28.1 M.U.(Metric Unit) of electricity, Thermal power plant produces 6,596 M.U.(Metric Unit) of electricity and energy purchased from other power generation unit is 28.1 M.U.(Metric Unit).

In Tuticorin District around 36 M.U.(Metric Unit) consumed for agriculture purposes, 369 M.U.(Metric Unit) consumed for Industrial purposes, 60 M.U.(Metric Unit) consumed for commercial purposes, 132 M.U.(Metric Unit) consumed for domestic purposes and 25 M.U.(Metric Unit) of energy is consumed for the purpose of public lighting and water works. In rural electrification, there are 20,817 of energized pumps sets in Tuticorin district. Hence, number of villages electrified is 468 in this district. Totally, there are 468 villages are electrified in this District.

Industries

The district constitutes 70 per cent of the total salt production of the state and meets 30 per cent requirement of our country. There are two industrial estates one at Kovilpatti with 11 units and the other at Tuticorin with 20 units. The farmer is managed by SIDCO and the later by SIPCOT. Small scale industries such as match industries, food- based and metal based industries are generally concentrated in Kovilpatti and Tuticorin Taluks. In Puthiamputhur village Ottapidaram Taluk and Kovilpatti, the production of readymade dresses are very much flourishing in recent times and the readymade dress produced here are exported to North India and it earns a reputed name.

About 2,200 and above small scale industries registered in the district and there 12 major industries producing cotton and staple yarn, caustic soda, PVC resin, fertilizers, soda-ash, Carbon dioxide gas in liquid from etc. The important major industries are
SPIC, TAC, Dharangadhara chemicals, Ramesh flowers, Nila sea foods, Deva & co. and Transworld Granite industries.

The following map clearly identify the study area (Punnakayal)

The public sector’s Undertakings are the Tuticorin thermal power station, heavy water plant (Hwp) and port trust. During this year, 1,128 vessels entered into this port and Cargos to the tune of 12.13lakh tonnes were handled. The central government is considering the construction of Titanium and Zirconium sponge plant, which comes under the control of depth of Atomic centre and the Tamil Nadu Industrial Investment Corporation are catering to the needs of the small and large scale industries.

The government is also encouraging unemployed youth and other to start industries by providing financial assistance and technical guidance. State bank of India is the “Lead bank” which is acting as the District co-coordinator between the banks and the government agencies for the preparation of credit plan for the district. Also it is monitoring the smooth implementation of all government sponsored programmes like JVVT, IRDP, Self-employment Schemes and TAHDCO etc.