

UNIT- III

FOREST RESOURCES OF TAMIL NADU

Introduction:

Tamil Nadu is located in the southernmost part of the country. It has an area of 130,058 km² which constitutes 3.96% geographical area of the country. It lies between 8°05' N- 13°35' N latitude and 76°15' - 80°20' E longitude. Physiographically, the state can be divided into four major regions namely, Coastal Plains, Eastern Ghats, Central Plateau and Western Ghats. The south-west monsoon feeds the Plateau and the retreating north-east monsoon brings rain to the east coast. The temperature in state ranges from 2°C in the hills to 45°C in other areas. The average rainfall ranges from 925 mm to 1,170 mm.

Forest Cover:

The Forest cover in the state based on interpretation of satellite data, the forest cover in the state is 26,291 sq km which is 20.21% of the State's geographical area. In terms of forest canopy density classes, the state has 3,671 sq km under very dense forest, 10,979 sq km under moderately dense forest and 11,630 sq km under open forest.

Tree Cover:

The tree cover of the state has been estimated using trees outside forests (ToF) inventory data collected over a period of six years, i.e., 2017. The estimated tree cover in the state is 4,671 Sq km which is 3.59% of its geographical area.

Recorded Forest Area:

The recorded forest area is 22, 877 Sq.km which constitutes 17.59% of the geographical area of the state. Reserved Forests comprise 20,293 sq.km, Protected Forests 1,782 sq.km and Unclassed Forests constitute 802 sq.km.



Wild Biodiversity of Tamil Nadu:

One sixth of landmass of Tamil Nadu is covered with forests.. The recorded forest area of the state is 22,877 KM² constituting 17.59% of the geographic area. In Tamil Nadu, the moderately dense forest of 10199 KM² and 10697 KM² of open forest, 2948 KM² of very dense forest, and the total forest cover of the State is 23844 KM² constituting 130,058 of geographic.

Floral diversity:

The Angiosperm diversity of India includes 17,672 species. With 5640 species, Tamil Nadu ranks 1st among all the States in the Country. This includes 533 endemic species, 230 red-listed species, 1559 species of medicinal plants and 260 species of wild relatives of cultivated plant. The Gymnosperm diversity of the country is 64 species of which Tamil Nadu have 4 species of indigenous Gymnosperms and about 60 introduced species. The Pteridophytes diversity of India includes 1022 species of which Tamil Nadu has about 184 species. Tamil Nadu wild plant diversity also includes a vast number of Bryophytes, Likens, Fungi, Algae and Bacteria.

Faunal Diversity:

The faunal diversity of Tamil Nadu includes 165 species of fresh water Pisces, 76 species of Amphibians, 177 species of reptiles, 454 species of birds and 187 species of mammals. According to the Conservation Assessment and Management Plan (CAMP) reports the red-listed species include 126 species of Pisces, 56 species of Amphibians, 77 species of reptiles, 32 species of birds and 40 species of mammals. The endemic fauna includes 36 species of Amphibians, 63 species of reptiles, 17 species of birds and 24 species of mammals, 42 species of birds and 9 species of reptiles.



Protected Areas:

Tamil Nadu ranks 14th among all the States and Union Territories of India in terms of protected area. There are 12 wildlife sanctuaries and 12 bird sanctuaries, 5 National Parks, 4 Tiger Reserves, 4 Elephant Reserves and 3 Biosphere Reserves for in situ conservation of wild fauna and flora.

Biosphere Reserve in Tamil Nadu:

A) Gulf of Mannar Biosphere

The Gulf of Mannar Biosphere Reserve known for its 21 coral rich islands along with coast line from Rameswaram to Thoothukudi was declared as Marine National Park in 1986 by the Government of Tamil Nadu and later in 1989 Government of India declared it as the first Marine Biosphere Reserve of India. With its rich biodiversity of about 4223 species of various flora and fauna, the Reserve is prominent for its coral reefs, sea grass and mangroves. The Gulf of Mannar Biosphere Reserve supports several critically endangered species such as Dugong dugong (sea cow), sharks including whale shark, sea horses, green sea turtles, dolphins, sea cucumbers. The Government of India sanctions funds for this Reserve under two separate schemes viz. Gulf of Mannar Biosphere Reserve and Conservation and Management of coral reefs.

B) Nilgiris Biosphere Reserve pls check nos

The Reserve encompasses 5,520 sq.km. in the 3 southern States of which Tamil Nadu portion is 2537.6 sq.km. It forms an almost 48 complete ring around the Nilgiri Plateau. The Tamil Nadu Part covers parts of The Nilgiris, Erode and Coimbatore Districts. This area is very rich in Flora and Fauna.



FOREST RESOURCES – ANSWER FOR 5MARKS

Tamil Nadu is located in the southernmost State of the Indian peninsula is spread over 130,058 sq.km, which constitutes 3.96 % of the area of the country. It lies between latitude 8°05' and 13 ° 34' North latitudes and 76 ° 14' and 80 ° 21' East longitudes. The Tamil Nadu State of Forest Report' gives a detailed view of the health of the forest cover of the State based on the Forest Survey of India (FSI), India State of Forest Report (ISFR) 2015 assessment. The State Tamil Nadu has a spectrum of nine major forest types ranging from wet evergreen forest to moist deciduous, dry deciduous, sholas, grass lands and scrub forest. The Western Ghats, the longest hill range in the State is one of the 25 global hotspots of bio-diversity and one of the three mega centres of endemism in India.

STATE OF FOREST REPORT FOR TAMIL NADU – A GLANCE

Forest Cover of the State as per 2017 assessment is 26,281 sq.km which is 20.21 percent of the Geographical Area (GA) of the State. Area under forest cover within recorded forest area is 17,581 sq.km, forest cover outside recorded forest area is 8,700 sq.km.

Area under Very Dense Forest (VDF), Moderately Dense Forest (MDF) and Open Forest (OF) is 3672 sq.km (2.82% of GA), 10,979 sq.km (8.44% of GA) and 11,630 sq.km (8.94 % of GA) respectively.

Recorded Forest Area of the State as per 2017 assessment is 22,877 sq.km which is 17.59 percent of the Geographical Area (GA) of the State. Tree cover of the State is 4,671 sq. km.

District-wise forest cover shows districts like Erode (2,307 sq. km.), Coimbatore (1,975 sq. km), Dindigul (1,876 sq.km), Vellore (1,813 sq. km), The Nilgiris (1,719 sq.km) and Dharmapuri (1,698 sq.km) covers higher forest cover.

The forest and tree cover of the State now is 30,952 sq. km which constitutes 23.80% of the total geographical area of the State.



Recorded Forest Area in Tamil Nadu (As per ISFR 2017 assessment)

Recorded Forest Area	
Reserved Forest	20,293 sq. km
Protected Forest	1,782 sq. km
Unclassed Forest	802 sq. km
Total	22,877 sq. km
Of State's Geographical Area	17.59%
Of India's Forest Area	2.99%

CROPPING PATTERN OF TAMIL NADU

Cropping systems:-

It is defined as the order in which the crops are grown or cultivated on a piece of land over fixed period.

Cropping Pattern:-

Cropping pattern is the yearly sequence and spatial arrangement of crops and fallow on a given area. Cropping system comprises all cropping patterns grown on the farm and their interaction with farm resources, other household enterprises and the physical, biological, technological and sociological factors or environments". The following are the different cropping pattern of Tamil Nadu:

Monoculture/Monocropping: -

In this cropping system only one major crop is grown on the same land year after year or repetitive growing of only one crop on same piece of land year after year. e.g Rice-Rice, Bajra- Bajra

Advantages of monoculture/Monocropping:-

- ✓ Convenience in sowing with the help of machinery under mechanized farming
- ✓ It is convenient for harvesting with the help of machinery

Disadvantages of monoculture/Monocropping:-

- ✓ Sometimes fertility and productivity of the soil are lowered if suitable soil
- ✓ Management practices are not followed.



- ✓ Soil structure may be deteriorated.
- ✓ Increase infestation of pests, diseases and weeds.

Intensive Cropping systems:

(I) Multiple cropping:-

The cropping system in which two or more crops are grown either in succession or sequence or association for entire or part period of their life cycles on the same field in a year is called multiple cropping.

E.g. Sorghum-Wheat-Green Gram

Maize-Wheat-Green gram

Rice-Wheat-Black gram-Linseed

a) Parallel multiple cropping:-

When two or more crops are grown in association for part or entire period of their life cycle is known as parallel multiple cropping. It includes following cropping systems.

(ii) Mixed cropping:-

Growing two or more crops simultaneously with no distinct row arrangement is known as mixed cropping.

E.g. Maize + Green gram + Pigeon pea

Sorghum + Groundnut + Pigeon pea

Mixed cropping is common practice in rain fed or dry farming areas. Generally, legumes crops like red gram, black gram, green gram, cowpea etc. or oilseed crops like groundnut, mustard etc. are mixed with cereal crops like jowar or bajra. Sowing is done by drilling the mixture of seed with the help of seed drill or moghan can be attached behind the seed drill for sowing of mixed crop. Usually, cereals are grown as main crop and pulses or oilseeds as minor or mixed crop.

Advantages of mixed cropping:-

- ✓ Risk of failure of crop is less
- ✓ Fullfills the daily requirements of food grains, oilseeds, pulses etc.
- ✓ Improve fertility of the soil if legumes are taken as minor crop



- ✓ Better distribution of labour throughout the crop period
- ✓ Increase gross monetary returns
- ✓ Well balanced cattle feed is obtained
- ✓ Safeguards against pests and diseases
- ✓ Full utilization of space and available plant nutrients

Disadvantages:-

- ✓ Sometimes control of pests, diseases and weeds become difficult
- ✓ Sometimes affects the yield of main crop
- ✓ Harvesting with the help of machinery is not possible

Relay cropping:-

It is the cropping system in which succeeding crop (next crop) is or sown or planted when the first crop (preceding crop) has reached its physiological maturity stage or before it is ready to harvest is called as relay cropping. E.g. Rice Linseed /lentil /black gram /chickpea.

Advantages of relay cropping:

- ✓ Better utilization of residual moisture and fertilizers.
- ✓ Reduces the cost of cultivation practices.
- ✓ Also reduces the cost of fertilizers and irrigation.
- ✓ Labour requirement is less.
- ✓ Incidence of pest, diseases and weeds is less due to early sowing operation.

Disadvantages:-

- ✓ Risk of crop failure is more.
- ✓ Harvesting by means machinery is difficult.

Ratooning:

One of the important methods of intensive cropping, allowing the stubbles of paddy crop to strike again after harvesting and to raise another crop. The cultivation of crop regrowth after harvest is known as rotoon cropping. Ratooning is one of the important systems of intensive cropping, which implies more than one harvest from one sowing/planting because of regrowth from the basal buds on the stem after harvest of first crop. Thus ratooning consists of allowing the stubbles of the original crop to



strike again or to produce the tillers after harvesting and to raise another crop. e.g. Ratooning of Sugarcane, Hybrid Jowar, Hybrid Bajra, and Redgram etc.

Sequential cropping:

A form of multiple cropping in which paddy is grown in sequence on the same field, with the succeeding crop planted after the harvest of the preceding crop.

Thus, these are the different cropping pattern of Tamil Nadu.

AGRICULTURE SECTOR OF TAMIL NADU:

Introduction

Agriculture, with its allied sectors, is the largest source of livelihood in Tamil Nadu. More than two third of rural households in the State still depend primarily on agriculture for their sustenance, with 93 percent of farmers being small and marginal.

The welfare and well-being of the State's population mainly depends either directly or indirectly on fortunes of agriculture. Moreover, the primary responsibility of the State Government is to ensure stability in agricultural sector and sustainability in agricultural production of the State.

Agriculture is undergoing perceptible changes as it gets transformed from traditional to modern economy which is an important step towards economic development. The traditional uncompromising practices followed in the erstwhile years and the systematic method of cultivation impregnated with Good Agricultural Practices focussing on environment for production of food grains are gaining momentum in the modern agriculture. The State Government is promoting environment friendly sustainable agriculture and encouraging farmers to adopt such practices with an objective to meet the demands put forth by the growing population in the food segment as well as the raw materials for agro-based industries in an eco-friendly sustainable way.



Government of Tamil Nadu is taking all out efforts to increase productivity and farmers' income by adopting frontier agriculture technologies to a larger extent for various crops cultivated in Tamil Nadu by actively involving farmers and extension officers with due research backing.

Government of Tamil Nadu has set a remarkable footprint in food grain production by achieving more than 100 Lakh Metric Tonnes since 2011-12. The technological breakthrough in increasing the productivity and the cultivable area with interventions such as integrated approach to enrich the Soil fertility; Mission on Sustainable Dry land Agriculture, System of Rice Intensification, Collective farming, Integrated Farming System, Farm mechanisation; adoption of water conservation measures with Micro Irrigation; post-harvest management of crop produces, Risk Insurance, Agro information technological interventions; Organic farming,

Food Processing Policy and interlinking agricultural markets through eNAM etc., have removed the impasse in agriculture production and paved way for the State to surpass 100 Lakh Metric Tonnes of Food Grain production Six times in a row during 2011-2012, 2013-2014, 2014-2015, 2015-2016, 2017-18 5 and 2018-19 (4th advance estimate) except 2012-13 & 2016-17 being the years of severe drought. The State was conferred with "Krishi Karman award" four times (2011-12, 2013-14, 2014-15 & 2015-16) in a period of seven years by Government of India.



Productivity Position of Tamil Nadu at National Level

National Level Crop	Position of Tamil Nadu at National Level	Yield in Tamil Nadu (Kg/ha)	All India Average Yield (Kg/ha)
Maize	1	6,549	2,509
Cumbu	1	2,613	1,154
Groundnut	1	2,509	1,486
Total Oilseeds	1	2,230	968
Cotton	5	442	432
Coconut	2	9,238	6,721
Rice	2	3,918	2,404
Sugarcane(MT)	3	103	71
Sunflower	4	1,089	697
Jowar	3	1,558	780
Coarse cereals	2	3,759	1,596
Food grains	3	3,090	2,056
Total Pulses	8(*)	689	744
Total Geographical Area		130.33	100.00
Cropping Intensity (%)		118	-

Source: Department of Agriculture, Policy note 2018-19

Tamil Nadu is geographically located between 8°5' and 13°35' North latitude and between 76°14' and 80°21' East longitude. Tamil Nadu falls in semi-arid to dry sub humid climate. This geographical position supports higher crop productivity under irrigation.

The total geographical area of Tamil Nadu is 130.33 Lakh Ha which constitutes 4 percent of the Nation's geographical area (10th Largest State) with coastal line of 1,076 km. Tamil Nadu is one of the most water starved States endowed with only 3 per cent of the Nation's water resources putting high stress on irrigation water availability and vulnerable to seasonal fluctuations causing uncertainty in Agriculture production. However, the Tamil Nadu Government with its proactive policies and strategic implementation of schemes overwhelmed these challenges and paved the way for continued increase of food grain.



Land Use Pattern:

S. No	Details	Area (L.ha)	% with respect to Geographical area
1	Forest	21.57	16.55
2	Net Cropped Area (*)	43.47	33.35
3	Area under Misc. Tree crops	2.32	1.78
4	Permanent Pastures	1.08	0.83
5	Current fallow	13.61	10.44
6	Other fallow	18.47	14.17
7	Culturable Waste	3.23	2.48
8	Land put to non-agricultural use	22.01	16.89
9	Barren and uncultivable land	4.58	3.51
Total Geographical Area		130.33	100.00
Cropping Intensity (%)		118	-

INDUSTRIAL SECTOR OF TAMIL NADU:

Industry is the booming sector of Tamil Nadu. Tamil Nadu is ranked as third industrial state next to Maharashtra and Gujarat. The act of converting raw materials into finished and usable products is known as manufacturing. A single manufacturing unit is termed as a factory. Multiple units of same kind, which are spread over a larger area, are termed as an industry. About 34% of the state's income comes from the industrial sector.

Today, Tamil Nadu has emerged as the Second largest state economy following Maharashtra which has a much larger area and population. Tamil Nadu is ranked first among Indian states in terms of exporting and operational SEZs. During the year 2015-16, exports from SEZs in Tamil Nadu was Rs.82, 717 crore.

Tamil Nadu is ranked first among Indian states in terms of quantum of exports from Special Economic Zones.



Location of industries in a particular place normally has many reasons for its localization. These reasons are the factors influencing the location of industries and are listed below:

- ✓ Raw minerals
- ✓ Energy
- ✓ Capital
- ✓ Transport
- ✓ Market;
- ✓ Labour.

INDUSTRIES CLASSIFIED ON THE BASIS OF INVESTMENT - DEFINITION

The industry which has huge investment in terms of capital and infrastructure along with huge labour and production are known as **large-scale industries**. Iron and steel industry is an example for a large-scale industry.

A **medium-scale industry** is the one that runs with investment of Rs 1 crore to Rs 10 crore.

A **small-scale industry** has been defined as the unit that has investment up to Rs 1 crore.

DISTRIBUTION OF MAJOR INDUSTRIES IN TAMIL NADU:

The major industries of Tamil Nadu are textile industries, sugar industries, paper industries, leather industries, cement industries, electrical equipment's, automobiles, information technology, tourism industry and so on.

TEXTILE INDUSTRY OF TAMIL NADU:

Tamil Nadu plays a major role in the Indian textile industry in terms of production and export of yarn, fabrics, knitwear and garments. Tamil Nadu contributes nearly 25% of India's share in the export of cotton, yarns and fabric. Coimbatore region is known as 'the Manchester of South India'. The city of Karur is known as the 'Textile Capital of Tamil Nadu'.



SILK TEXTILE INDUSTRY OF TAMIL NADU:

Tamil Nadu occupies the fourth place in silk textile production in our country. Kancheepuram silk is unique in its quality and is known for its traditional value all over the world. Arani, Rasipuram and Thirubuvanam are other silk centres of Tamil Nadu. Sericulture Training Institute in Hosur trains farmers to adopt sericulture along with farm work to accelerate rural industrialisation.

FOOD AND BEVERAGE INDUSTRY OF TAMIL NADU:

Food and beverage based industry flourish well in Tamil Nadu. Mango pulp is processed and exported. Instant food varieties and ingredients for cooking are manufactured and marketed locally as well as exported. Snacks items and biscuits are marketed on a large scale. Tamil Nadu with its long coastline offers opportunities for industries based on marine products.

SUGAR INDUSTRY OF TAMIL NADU:

Tamil Nadu produces about 10% of total sugar in India. A majority of sugar units in the state are functioning under the cooperative sector. At present, Tamil Nadu has 42 sugar mills out of which 16 are under the cooperative sector, 3 owned by public sector and 23 as private mills. Sugar factories are concentrated in Villupuram, Cuddalore, Vellore, Erode, Coimbatore, Thiruvannamalai, Thiruchirappalli, Thanjavur and Madurai districts.

PAPER INDUSTRY OF TAMIL NADU:

Paper industry in Tamil Nadu stands second next to Andhra Pradesh in paper production in India. Pukkathurai in Kancheepuram district, Bhavanisagar, Pallipalayam, Pugalur, Paramathi, Vellore, Coimbatore, Udumaliapettai, Thoppampatti, Nillakkottai, and Cheranmadevi are centres of paper mills in Tamil Nadu.

LEATHER INDUSTRY OF TAMIL NADU:

Tamil Nadu accounts for 70% of national tanning factories and 60% export of India. Chennai, Vellore, Kancheepuram, Thiruvallur, Thiruchirappalli, Dindigul and Madurai districts have widespread centres for leather industry. Chennai, Vellore,



Ambur, Ranipet, Vaniyambadi, Dindigul and Thiruchirappalli are the main centres of leather industry.

CEMENT INDUSTRY IN TAMIL NADU:

The state of Tamil Nadu stands fourth in cement production in the country. It accounts for 10% of the country's cement production. Tamil Nadu Cements Corporation Limited (TANCEM) is wholly owned by the Government of Tamil Nadu and manufactures Ordinary Portland Cement (OPC) and Super Star Cement exceeding the requirements prescribed under the Indian standards. Major centres of cement industry are Sankari, Madukarai, Ariyalur, Dalmiapuram, Manamadurai, Thulukapatti, Allankulam, Sankarnagar and Thazhaiyuthu.

CHEMICAL INDUSTRIES OF TAMIL NADU:

Most of the chemical industries of Tamil Nadu are clustered around Chennai (Manali), Cuddalore, Panangudi (Nagapattinam) and Thuthukudi. The notable chemical industries of Tamil Nadu are SPIC (Southern Petrochemical Industries Corporation Ltd.) and Manali Petrochemicals Ltd. Pfizer pharmaceutical company and Dow Chemicals are important chemical units which have research and development facility in Chennai.

AUTOMOBILE INDUSTRIES IN TAMIL NADU:

An automobile industry in Tamil Nadu earns 8% of its GDP from automobile industry. This industry contributes for about 21% of passenger cars, 33% of commercial vehicles produced in India. Chennai city is the base for 30% of India's automobile and 35% of its auto components. This industrial supremacy has resulted in Chennai being known as the 'Detroit of Southern Asia'.

HANDLOOMS AND POWER LOOMS

The handloom sector in the State is the single largest cottage industry providing livelihood to a large number of rural people and promoting export earnings. The handloom sector and its related economic activities generate gainful employment for more than 4.29 lakh weaver households and 11.64 lakh weavers in the State. These



societies mainly produce the cloth required for the scheme of "Free Supply of Uniforms to School Children and Free Distribution of Sarees and Dhotis Scheme".

ELECTRICAL INDUSTRY OF TAMIL NADU:

Bharat Heavy Electricals Limited (BHEL) located at Thiruchirappalli is one among the six large units of India. It produces boilers generators and turbines used in the production of hydro-electricity.

ELECTRONICS INDUSTRY OF TAMIL NADU:

Electronics is a growing industry of Tamil Nadu. Many major global telecommunications like the Nokia, Flextronics, Motorola, Sony-Ericsson, Foxcon, Samsung, Cisco, Moser Baer, and Dell have chosen Chennai as their South Asian manufacturing hub. Products manufactured include circuit boards and cellular phone handsets.

OTHER NOTABLE INDUSTRIES OF TAMIL NADU:

Perambur Integral Coach Factory (ICF) is the largest in Asia to produce railway coaches in Tamil Nadu. Armoured vehicles and ammunition depot of India (Avadi) is about 23 km northwest of Chennai. The heavy vehicles factory produces battle tanks. Salem steel plant is a public sector company undertaken by the Government of India. Sivakasi is a big industrial centre which is world famous for fireworks. Thanjavur and Kumbakonam are specialised in the production of bronze statues and musical instruments.

TOURISM INDUSTRY OF TAMIL NADU:

Tamil Nadu's tourism industry is the second largest in India, with an annual growth of 16%. Presence of ancient monuments, pilgrim centres, hill stations, a variety of natural landscapes, long coastline, along with rich culture and heritage makes Tamil Nadu the best destination for tour lovers. Tourism in Tamil Nadu is promoted by Tamil Nadu Tourism Development Corporation (TTDC). Health tourism which is part of tourism industry is hosted by the leading health care centres in Chennai.

Thus these are different types of industries in Tamil Nadu.



FISHERIES OF TAMIL NADU:

The maritime state of Tamil Nadu is blessed with 1,076 km long coast line and 41,412 km² continental shelf area with an Exclusive Economic Zone (EEZ) of 1.9 lakh sq. km, contributing 5.209 lakh tons of marine fish production. This supports the livelihood of 10.48 lakh marine fishers through 5,803 mechanised and 41,337 traditional fishing crafts which are actively engaged in fishing. Tamil Nadu possesses 3.83 lakh ha of effective inland water resources comprising reservoirs, major irrigation tanks, minor irrigation tanks, short seasonal tanks, ponds, rivers, backwaters and derelict water bodies.

The inland fisher population is 2.35 lakh (2018-2019). An estimated brackish water area of 56,000 ha is under capture fisheries and an area of 6115.68 ha is under coastal aquaculture production, mainly shrimp aquaculture. Thiru D. Jayakumar, is the Hon'ble Minister for Fisheries and Personnel & Administrative Reforms, of Tamil Nadu.

Tamil Nadu is enriched with Marine, Brackish water and Inland fishery resources amenable for capture and culture fisheries. Substantial focus is being given on the economic and social dimensions of fishery resources by the Government of Tamil Nadu. The Indian Fisheries Act, 1897 enacted by the then Madras Presidency paved the way for the formulation of fisheries legislations across India. The Fisheries sector plays an important role in the socio-economic development of the country by providing livelihood to large number of fishers, generating employment opportunities in allied sectors and ensuring nutritional security.

The total fish production of the country in 2017-2018 was 12.59 million metric tonnes. India is the second largest producer of fish in the world and occupies the second position in inland fish production. The fisheries sector contributes 1% of the GDP of the country. Tamil Nadu ranks - 4th in total fish production of the country.



Tamil Nadu exported 1, 28,845 MT of marine products and earned a foreign exchange of Rs.5591.49 crore during 2018-2019.

The per capita consumption of fish in Tamil Nadu is 9.83 Kg as against the recommended requirement of 11.60 kg. With the increase in demand for fish, there is a need for augmenting the overall fish production of the State substantially from all the available fishery resources. However, aquaculture is emerging as a prominent activity for enhancing fish production and income generation in rural areas. Integration of fish culture with agriculture has proved to be an option for augmenting the unit productivity from aquaculture systems. The Government is determined to enhance the inland fish production three-fold in the coming years.

MARINE FISHERIES DEVELOPMENT:

Tamil Nadu has a coastal length of 1076 km (13% of the country's coast line) 1.9 lakh sq.km of EEZ (9.4% of the India's EEZ) and a continental shelf of about 41,412 sq.km and is one of the leading states in marine fish production. The marine fisheries production of the state is 4.97 lakh tons.

The State has marine fishermen population of 10.07 lakh from 608 marine fishing villages scattered along the 13 coastal districts. In the inshore waters the fishery potential is exploited by 38,779 traditional crafts and 5893 mechanized boats. The infrastructure facilities include 6 major fishing harbours, 3 medium fishing harbours, 36 fish landing centres and 254 fish landing points.

The export of marine products from the state during 2017-18 amounted to 88,257mts. valued at Rs.4341.78Crore. The per capita consumption of fish in Tamil Nadu is 9.83 Kg as against the recommended requirement of 11.60 kg.



Approximate coastal length of Tamil Nadu

Name of the coast	Region	Length
Coromandal Coast	Chennai to Point Calimere	357.2 Km.
PALK BAY	Point Calimere to Pamban	293.9 Km.
Gulf of Mannar	Pamban to Kanniyakumari	364.9 Km.
West Coast in Arabian Sea	Kanniyakumari to Neerodi	60.0 Km.

INLAND FISHERIES:

AQUACULTURE:

Coastal Aquaculture has been recognized as an important tool for employment generation and a vital source of food supply for meeting the food security and nutritional requirements of our growing population. In the context of increasing food security in the modern world, fish and fishery products are considered to be among the safest foods of animal origin.

Tamil Nadu is having the second longest coastline in the country with rich natural resources in coastal areas for coastal aqua farming. The total estimated brackish water area of Tamil Nadu is about 56,000 ha is under capture fisheries and an area of 6115.68 ha is under coastal aquaculture production, mainly shrimp aquaculture. In Tamil Nadu, shrimp farming has grown considerably and has emerged as a major commercial activity owing to the introduction of Specific Pathogen Free (SPF) Shrimp, *Litopenaeus vannamei*. So far, 1,859 shrimp farms (3,712.02 ha.) and 63 shrimp hatcheries have been registered under the Coastal Aquaculture Authority (CAA). Hence there is a wide scope for land based coastal aquaculture development in Tamil Nadu. The district-wise details are given below:



District	Brackish Water Area	Potential Area Readily Available (in ha.)
Chennai	240	-
Thiruvallur	14660	2662
Kancheepuram		
Villupuram	8100	2703
Cuddalore		
Nagapattinam		
Thiruvarur	31400	6300
Thanjavur		
Pudukkottai		
Ramanathapuram	900	1385
Tuticorin	400	1565
Thirunelveli		
Kanniyakumari	300	18
TOTAL	56000	14880

MINERAL RESOURCES OF TAMIL NADU:

Tamil Nadu is the leading holder of country's resources of vermiculite, magnetite, dunite, rutile, garnet, molybdenum and ilmenite. The State accounts for the country's 81% lignite, 75% vermiculite, 69% dunite, 59% garnet, 52% molybdenum and 30% titanium minerals resources.

A mineral is a substance or compound of organic or inorganic origin found on the earth's crust. Every mineral has a definite composition and distinct physical characteristics. Most of the minerals are crystalline in nature and occur widely in rocks. Rocks contain one or more minerals.

Natural forms of minerals are called ores and minerals are processed from the salt used in cooking and graphite in your lead pencil is a mineral. The major mineral



resources found in Tamilnadu are lignite, vermiculite, garnet, zircon, graphite, limonite, rutile, monazite, Bauxite, Granite, Limestone, Quartz, Silica, Graphite, Lignite, titanium, Dolomite, Iron ore and magnesite.

There are three categories of minerals found in Tamil Nadu.

- ✓ Metallic minerals
- ✓ Non – Metallic Minerals
- ✓ Mineral fuels

Metallic minerals of Tamil Nadu

Minerals	District
Iron ore	Salem, Namakkal and Thiruvannamalai
Copper	Salem , Nilgiris, Coimbatore, Madurai and Mamandur
Bauxite	Salem, Nilgiris, Coimbatore, Vellore, Dhamapuri, Madurai and Villupuram
Chromite	Salem, Namakkal, Thiruchirappalli and erode
Pyrite	Villupuram

Non – Metallic Minerals

Minerals	District
Lime stone	Virudhunagar, Thuthukudi, Thirunelveli, Thiruchirappalli, Kanchipuram and Salem
Mica	Thiruchirappalli, Coimbatore and Ramanathapuram
Magnesite	Salem, Namakkal, Coimbatore and erode
Steatite	Vellore, Cuddalore, Coimbatore, Salem and Thiruchirapalli
Salt	Chennai, Thuthukudi, Cuddalore, Nagapattinam and Thiruvarur



Mineral fuels

Minerals	District
Petroleum	Thiruvarur (Panamgudi), Narimanam (Kaveri Delta Region)

- ✓ **Bauxite** in Dindigul, Namakkal, Nilgiris & Salem districts;
- ✓ **Dunite/pyroxenite** in Salem district;
- ✓ **Felspar** in Coimbatore, Dindigul, Erode, Kanchipuram, Karur, Namakkal, Salem & Tiruchirapalli districts;
- ✓ **Fireclay** in Cuddalore, Kanchipuram, Perambalur, Pudukottai, Sivaganga, Thiruvallur, Tiruchirapalli, Vellore & Villupuram districts;
- ✓ **Garnet** in Ramanathapuram, Tiruchirapalli, Tiruvarur, Kanyakumari, Thanjavur & Tirunelveli districts;
- ✓ **Granite** in Dharmapuri, Erode, Kanchipuram, Madurai, Salem, Thiruvannamalai, Tiruchirapalli, Tirunelveli, Vellore & Villupuram districts;
- ✓ **Graphite** in Madurai, Ramnathapuram, Shivganga & Vellore districts;
- ✓ **Gypsum** in Coimbatore, Perambalur, Ramnathapuram, Tiruchirapalli, Tirunelveli, Thoothukudi & Virudhunagar districts. Similarly, occurrences of minerals, such as
- ✓ **Lignite** deposits are located in Cuddalore Ariyalur, Thanjavur, Thiruvarur, Nagapattinam & Ramanathapuram districts;
- ✓ **Limestone** in Coimbatore, Cuddalore, Dindigul, Kanchipuram, Karur, Madurai, Nagapattinam, Namakkal, Perambalur, Ramnathapuram, Salem, Thiruvallur, Tiruchirapalli, Tirunelveli, Vellore, Villupuram & Virudhunagar districts;



- ✓ **Magnesite** in Coimbatore, Dharmapuri, Karur, Namakkal, Nilgiri, Salem, Tiruchirapalli, Tirunelveli & Vellore districts;
- ✓ **Quartz/silica sand** in Chennai, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kanchipuram, Karur, Madurai, Namakkal, Periyar, Perambalur, Salem, Thiruvallur, Thiruvarur, Nagapattinam, Tiruchirapalli, Villupuram, Virudhunagar & Vellore districts;
- ✓ **Talc/ steatite/soapstone** in Coimbatore, Salem, Tiruchirapalli & Vellore districts;
- ✓ **Titanium minerals** in Kanyakumari, Nagapattinam, Ramanathapuram, Thiruvallur, Tirunelveli & Thoothukudi districts;
- ✓ **Vermiculite** in Dharmapuri, Tiruchirapalli & Vellore districts;
- ✓ **Zircon** in Kanyakumari district have been established. Other minerals that occur in the State are apatite in Dharmapuri & Vellore districts;
- ✓ **Barytes** in Erode, Madurai, Perambalur, Tirunelveli & Vellore districts;
- ✓ **Bentonite** in Chengai-Anna district;
- ✓ **Calcite** in Salem district;
- ✓ **China Clay** in Cuddalore, Dharmapuri, Kanchipuram, Nilgiris, Sivaganga, Thiruvallur, Tiruvannamalai, Tiruchirapalli & Villupuram districts;
- ✓ **Chromite** in Coimbatore & Salem districts;
- ✓ **Copper, lead-zinc and silver** in Villupuram district;

Thus, these are the different types of Mineral Resources in Tamil Nadu.

SERVICE SECTOR OF TAMIL NADU:

The services sector has grown especially rapidly since the late 20th century, and by the early 21st century it had become the largest contributor to Tamil Nadu's economy. Expansion of the information-technology industry has been a priority of the state's economic development policies. Tourism also has been an area of emphasis,



with ongoing improvements in infrastructure, accommodations, restaurants, and cultural and recreational attractions.

Tamil Nadu has 526 engineering colleges, the most for any state in India giving the services industry access to qualified and skilled labour force. The state has a wide network of about 110 industrial parks and estates offering developed plots with supporting infrastructure. Also, the state government is promoting other industrial parks like Rubber Park, Apparel Parks, Floriculture Park, TIDEL Park for IT/ITS, TICEL BioPark for Biotechnology, Siruseri IT Park, Elcot SEZ and Agro Export Zones among others. Tamil Nadu has the largest number of Small and medium enterprises (SMEs) in India

- ✓ Tidel Park, Chennai
- ✓ Tidel Park, Coimbatore

The below chart shows a trend of software exports from Tamil Nadu published by Electronics Corporation of Tamil Nadu with figures in Crores of Indian Rupees.^[90]

Year	Software exports
1995	₹₹370 crore (US\$52 million)
2000	₹₹31,160 crore (US\$4.4 billion)
2005	₹₹41,150 crore (US\$5.8 billion)
2010	₹₹62,100 crore (US\$8.7 billion)
2013	₹₹82,450 crore (US\$12 billion)
2017	₹₹111,179 crore (US\$16 billion)
2018	₹₹139,129 crore (US\$20 billion)

Chennai is the second largest software exporter in India, next only to Bangalore. India's largest IT park is housed at Chennai. Software exports from Tamil Nadu during 2017–2018 rose 8.6% per cent to touch ₹₹1,11,179 crore, involving a workforce of 780,000.



Chennai is the largest hub for e-publishing, as there are 67 e-publishing units registered with the STPI in Chennai and 25 in Bangalore.

Companies such as HCL Technologies, NTT DATA, Wipro, Tata Consultancy Services, Capgemini, Amazon.com, LTI, TechMahindra, Infosys, IBM, Cognizant, Accenture, Sopra Steria, CGI Inc., Verizon, DXC Technology, Atos, Virtusa and many others have offices in Chennai. Infosys Technologies has set up India's largest software development centre to house 25,000 software professionals at an estimated investment of ₹12,500 million (US\$180 million) in Chennai.

India's largest IT park – SIPCOT is housed at Siruseri – Chennai, It has numerous IT companies such as TCS, CTS, Syntel, Steria, Polaris, Patni, Hexaware etc. Chennai has been rated as the most attractive city for offshoring services.

Coimbatore is second largest Software exporter in Tamil Nadu with presence of Amazon.com, Bosch, Cognizant, Ford, NTTData, TCS, Wipro, HCL, Altran, Harman, Deloitte. Cognizant has more than 13,000 employees working in Coimbatore, which is their second largest headcount in India after Chennai. Bosch has one of the largest R&D development centre in Coimbatore outside Germany which employees close to 5500 in the city. Tiruchirappalli is the next biggest IT city. The IT Companies like Capgemini, Sutherland, TTS Business Services, Sun Business Solution (Sun Group), Scientific Publishing, Omega Healthcare, Vagus Technologies, MMC Infotech are also in Tiruchirappalli.

Chennai has emerged as the "SaaS Capital of India". The SaaS sector in/around Chennai generated \$1 Billion USD in revenue and employed about 10000 personnel in 2018.

