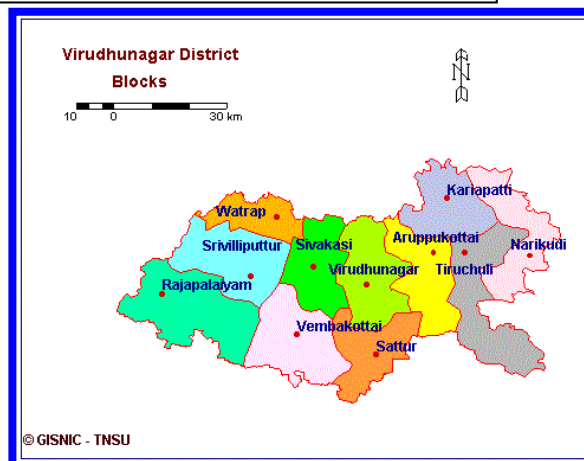


Environment Profile for Virudhunagar



Chapter

1

1.0 The Context

The **Department of Environment (DoE)** is the nodal department for dealing with environmental management of the State. The State has been endowed with multitude of natural resources, judicious management of, which will ensure essential for sustainable development in all sectors. Effective resources management calls for an in-depth assessment of their existing conditions and trends. A cursory evaluation of the present status of our environment and natural resources including land, soil, water, air and the life support systems like forests, rivers, coastal areas indicate that the health of such systems are threatened by serious levels of degradation. Though different Government Departments / Agencies are responsible for management of resources under their jurisdiction, information relating to the individual sector lie fragmented.

To manage the environment in a holistic manner and to develop an environment friendly sustainable development perspective, it becomes necessary to identify the gaps in the present management of resource bases. Such intervention would be realistic only if there is a strong database with data collected from the primary/secondary sources, compiled and presented in the form of district environment profiles. Thus the **AIMS Research (A Joint Venture of TCW/ICICI, IDBI and ICICI)** – one of the country's leading consultancy and research organisation has been engaged for the preparation of such a report. This report will form the basis for developing District level **Environmental Management Plans** that will spell out specific action programs to be implemented by local/state institutions. This Report provides a brief account of the manner in which the **District** has been prepared and presented.

To achieve certain degree of uniformity in the presentation of environmental data in the districts, it is considered necessary that certain standardised formats are adopted for collection and presentation of the relevant data besides interpretations of the data thus collected. Accordingly the data compiled in the prescribed formats have been synthesised and presented in the following chapters.



Chapter

2

2.0 Background**2.1 History**

The District of Virudhunagar was carved out as a separate district in the year 1985 as a result of trifurcating of Ramanathapuram district of Tamilnadu state vide State Government Notification, G.O. Ms. 347 dated 8.3.85. According to the said notification, seven taluks viz. Rajapalayam, Srivilliputtur, Virudhunagar, Tiruchuli, Aruppukkottai, Sattur and Sivakasi were separated from Ramanathapuram district and formed as a new district. At present, the district is comprised of seven taluks and eleven Community Development Blocks. As mentioned above, the present district of Virudhunagar was a part of undivided Ramanathapuram, its historical past is one and the same as of its parent district.

Fairs and Festivals: Pongal, Adiperukku, Karthigai Deepam, Temple Car festival, Chithirai and Brahmostsavam are the chief festivals celebrated in the district. Brahmostsavam is celebrated during the Tamil month of Adi. The temple of Srivilliputhur has a massive car (Ther) with a decorated height of 75 feet. The temple car is the second largest in Tamilnadu next only to the car at Tiruvarur. A tank known as Mukkulam is also found here which is said to be the same used by Andal to perform Margali festival during her life. Mariamman and Sach Innchiar koil festivals in Sattur taluk and Vaikasi Visakham in Srivilliputtur are the famous festivals of this district. The other important fair/festivals organised in different parts of the district are Iyanar koil festival, vailkukanthamman koil festival, Perumal koil festival, weekly fair, Panguni Pongal, Kalangada Kanniamman festival, Kannicheri Pudur fair, Koil Pongal, Muthalamman festival, Sundara Mahalinga festival, Purattasi Pongal festival, Peria Mariamman Koil Tookkuzhi, Thai Pongal `Adi Thiru' and Mullai Kottai Mariamman Koil festival.

2.2 Geographical Location of the District

Virudhunagar District is situated in the southern portion of Tamil Nadu State. It is bounded on the north by the districts of Madurai and Sivagangai, on the east by the districts of Sivagangai and Ramanathapuram, on the south by the districts of Thoothukudi and Tirunelveli and on the west by a portion of Kerala State and the district of Madurai. It has an area of 4432.55 sq. kms. The administrative headquarters is located at Virudhunagar town. The District lies between 90°20' and 90°72' north latitude and 77°20' and 78°70' east longitude. The general geographical information of the district is simple and flatted area. Two non-perennial rivers, namely Arjuna River and Vaipar River are flowing in the district and it will be dry during the summer season. Virudhunagar District consists of Seven Taluks, namely 1. Rajapalayam, 2. Srivilliputtur, 3. Sattur, 4. Virudhunagar, 5. Aruppukkottai, 6. Tiruchuli and 7. Sivakasi. The total geographical area of the district is about 4432.55 sq.km, and the district is divided into 11 Blocks. The details of the name of the taluks and area is shown in the following Table:

S.No.	Name of Taluks	Area in Sq.Km.
1	Rajapalayam	662.81
2	Srivilliputtur	675.83
3	Sattur	737.06
4	Virudhunagar	422.45
5	Aruppukottai	732.47
6	Tiruchuli	856.12
7	Sivakasi	345.81
District Total		4432.55

2.3 Administrative Arrangement in the District

Virudhunagar District comprises 7 Taluks, 11 Blocks and 600 Villages. As regards the hierarchy of administrative arrangement, there are 6 Municipalities, 10 Town Panchayats and 457 Village Panchayats in the District. The details regarding the number of blocks, villages, village panchayats, town panchayats and municipalities with regard to each taluk are given in Table No. 1. Community Development Blocks: Srivilliputtur, Watrap, Virudhunagar, Sivakasi, Tiruchuli, Narikudi, Kariapatti, Aruppukottai, Sattur, Vembakottai and Rajapalayam.

2.4 Meteorological Information

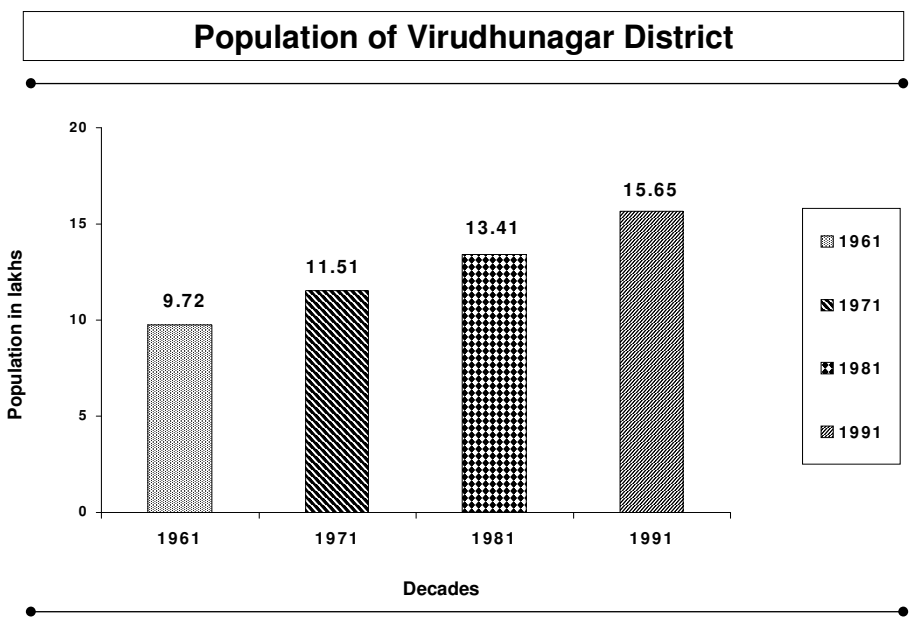
The monthly average rainfall in the district is worked out and it is 74.58 mm. The months of October, November and December receive a rainfall that is more than the annual average rainfall. The average number of rainy days, mean maximum temperature, mean minimum temperature and mean relative humidity for the period 1991-96 are given in Table No. 2.

2.5 Demographic Details

The Growth of population over the past three decades and the essential characteristics of the population for the past four decades in terms of birth rate, death rate, infant mortality rate and literacy level are given in Table Nos. 3,4 and 5.

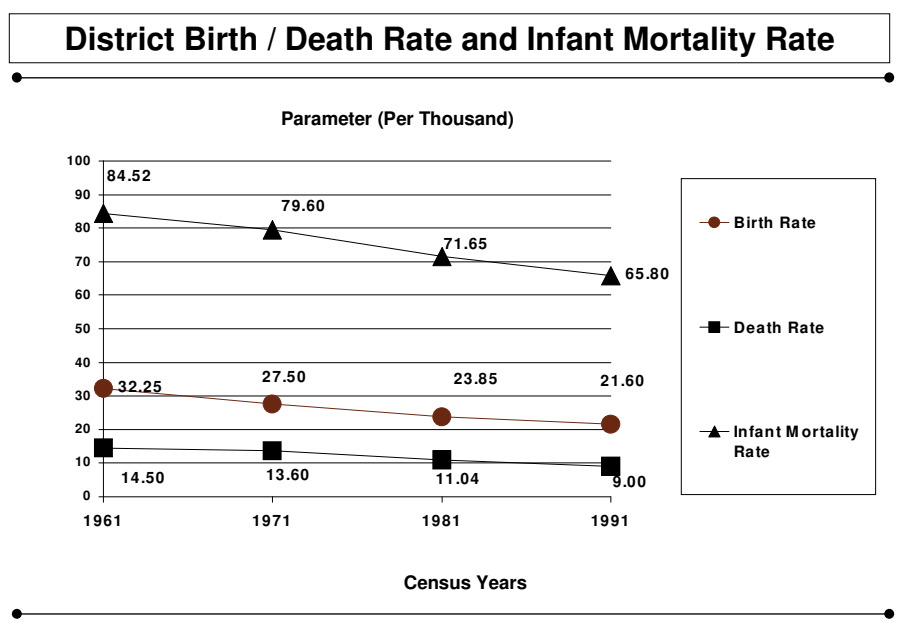
2.5.1 Population

The population of Virudhunagar District has grown from 9,72,288 in 1961 to 15,65,037 in 1991. The growth rate indicates that there has been a significant increase during the 1981-91 decade with the average growth rate being 1.67% per annum during this decade. According to the 1991 census of Sattur taluk is the most thickly populated and Thiruchuli taluk is the least populated in the district. Sivakasi taluk population is not available because it is newly trifurcated. The details of population growth along with the Growth Rate-taluk wise are given in Table No. 3.



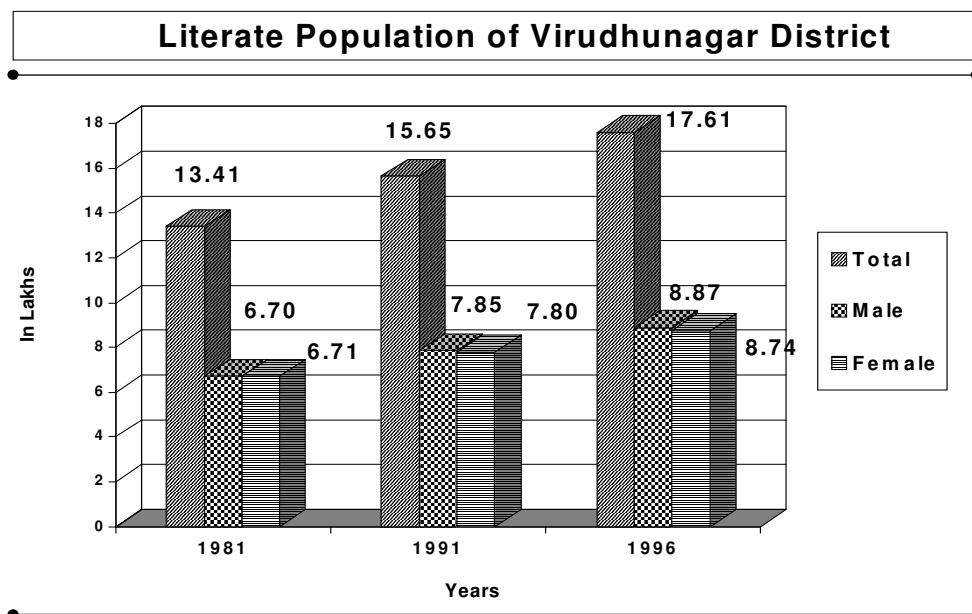
2.5.2 Trend in Birth/Death Rate and Infant Mortality Rate

There has been a steady decline in Birth Rate, Death Rate and Infant Mortality Rate over the past four decades in the district. The Birth Rate has gone down from 32.25 in 1961 to 21.60 in 1991 (figures - per thousand) and the Death Rate from 14.50 in 1961 to 9.00 in 1991 (figures - per thousand). The infant mortality rate has also gone down from 84.52 in 1961 to 65.80 in 1991 (figures - per thousand). The details of Birth rate, Death rate and Infant mortality rate over the past four decades are given in Table No 4.



2.5.3 Literacy Level among the Population

The literacy level of Virudhunagar district according to figures available for the year 1996 is 54.74% with male literacy level being more than the female literacy level. It is also observed while the male literacy level has grown steadily from 60.74% in 1981 to 65.45% in 1996, there has been a significant increase of female literacy level from 34.65% in 1981 to 45.91% in 1996. The information on literacy level of the district is given in Table No. 5.



Education: There are as many as 463 villages accounting for 90.43 percent of the total number of inhabited villages in the district where educational facility of one type or other is found. Primary and Middle schools are found in all towns. Arulmigu Kalasalingam College of Pharmacy, Srivilliputtur, Virudhunagar. Sankaralingam Bhuvanewari College of Pharmacy, Sivakasi, Virudhunagar. S B College of Pharmacy, Sivakasi, Virudhunagar. Sri s Ramasamy Naidu Memorial College, Sattur, Virudhunagar. Standard Fireworks Rajaratnam College for Women, Sivakasi, Virudhunagar. V Vanniaperumal College for Women, Virudhunagar, Virudhunagar. VHNSN College, Virudhunagar. Ayya Nadar Janaki Ammal College, Sivakasi, Virudhunagar. Mepco Schlank Engg College, Sivakasi, Virudhunagar.

Chapter
3

3.0 Resources – Availability Use and Environmental Status

3.1 Land Resources

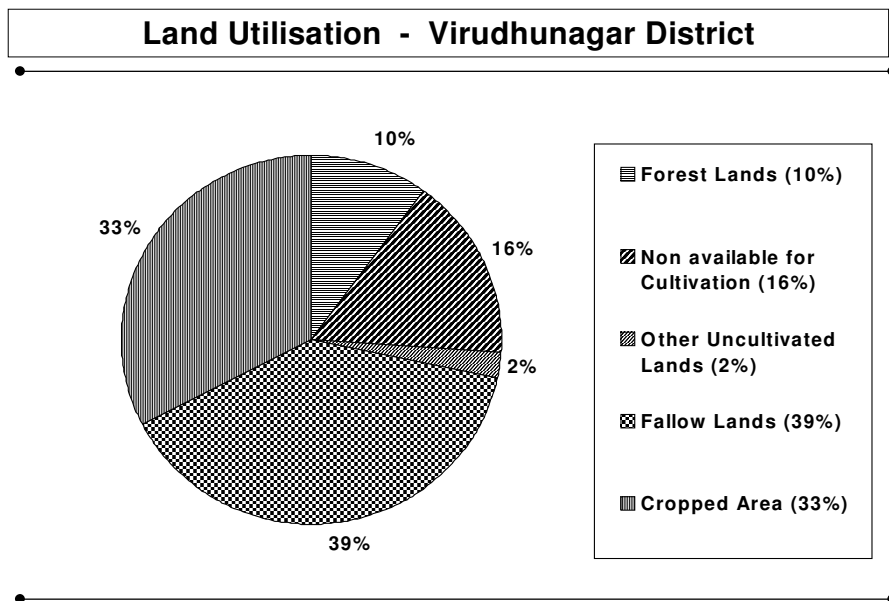
Resources of the district, their availability, use and environmental status is discussed in the following chapters.

3.1.1 Agriculture and Horticulture

Paddy is the most important food crop of this district. It is grown on wetlands irrigated by rivers, channels, tanks and wells. Cumbu, Cholan, Ragi, Varagu, Samai, and Kudiravali are the millets produced in the district. Large area in the taluks of Sattur and Aruppukkottai come under Cumbu, whereas Cholan is grown in the taluk of Aruppukkottai. Fodder Cholan in Sattur, Srivilliputtur and Aruppukkottai taluks, Varagu in Arupukkottai, and Samai in Aruppukkottai and Srivilliputtur taluks are grown in larger areas. Of the commercial crops of the district, the most important is cotton followed by chillies. Cotton is the staple crop in the black cotton soils of Sattur, Srivilliputtur and Aruppukkottai taluks. `Sattur Chillies' is famous in the market. The Agricultural Research Station at Kovilpatti is engaged in the evolution of a suitable variety of chillies for the tract. Groundnut is the prominent oilseeds grown in Sattur and Aruppukkottai taluks.

i. Land Utilisation: Geography and physical features

The total geographical area of the district was 4432.55 sq.km. In 1995-96. Cropped area accounts for about 32.54% of the total area. Forest cover is very minimum accounting for only about 9.98% of the land. A significant portion of the land falls under the category of 'non available for cultivation' and 'fallow lands'. The land utilisation pattern in Virudhunagar District (Block-wise) is given in Table No. 6.



ii. Trend in Production and Productivity of Important Crops

Cereals, pulses and oil seeds are observed to be the three important crops produced in the district. The productivity pattern over the past 7 years indicates that the productivity of cereals, pulses and oil seeds had been declining as the productivity has significantly gone down because of drought in the years 1995-96. Another significant feature is the reduction in the area under production for cereals, pulses and oil seeds. However, there seem to be certain anomalies in the reported production figures of cereals and oil seeds. The details on the productivity performance of the district in relation to Cereals, Pulses and Oil Seeds for the past 7 years are given in Table No. 7.

iii. Horticultural and Plantation Crops

There were Fruit Crops production of 36830 tonnes, Vegetables Crops of 11500 tonnes and Plantation Crops of 34700 tonnes cultivated in 3154 Ha. 1989 Ha. and 347 ha. respectively in the year 1995-96 (Refer Table No 8).

iv. Consumption of Fertilisers and Pesticides

19697 metric tonnes of Chemical Fertilisers were used in 1995-96, out of which more than 40% constitutes the Nitrogenous fertilisers. There has also been an intensive use of Bio-fertilisers in the district, followed by overall Pesticides. 8,936 metric tonnes of Urea and 1,66,610 pockets of Bio-fertilisers were used in 1995-96. Among Pesticides, the Powder variety was more popular with 1,04,236 metric tonnes being consumed in 1995-96 and 42,333 litres of Liquid Pesticides were used. The details on the total of consumption (Block wise details are not available) fertilisers and pesticides are given in Table No. 9.

v. Trend in consumption of Fertilisers and Pesticides

The usage of Chemical Fertiliser has increased from 17,807 tonnes to 19,697 tonnes during 1994-95 to 1995-96. The usage of Bio-Fertilisers has also increased from 1,16,125 pockets to 1,66,610 pockets during the same period. While the use of The Powder variety of Pesticides significantly decreased, the liquid variety of pesticides showed increase in their consumption over the past two years. The details with regard to the trends in the consumption of fertilisers and pesticides over the past two years are given in Table No 10.

vi. Soil Types

The area comprising of Sattur, Srivilliputtur and Aruppukkottai are mainly covered by black loamy soil. This soil is very much suited for the cultivation of cotton and also for chillies and millets. The district has two naturally district regions viz. (i) Eastern slopes of the Western Ghats in the Srivilliputtur taluk and (ii) the plains of the Sattur, and Aruppukkottai. The eastern slopes of the Western Ghats starts from the northern-most points along the boundary between Virudhunagar & Madurai districts and proceed southwards in an unbroken line as far as the Deviar, with an average elevation of 1500 metres approximately. The highest peak of this mountain range is Pemalai Mottai with a height of 1700 metres above mean sea level. Tea and coffee estates have sprung up on the slopes of the Ghats, where spices are also grown. Teak is also grown in some parts. The plain of Sattur and Aruppukkottai taluks mostly has black cotton soil, locally known as 'Karisal'. This soil is mostly used for growing cotton and cultivation of dry crops.

Black Soil is the predominant Soil type in this district accounting for 39.23%. The details with other types of soils are given in Table No. 11.

vii. Soil Problems

About 39.84% of the land available for Cultivation suffer from Salinity/Alkalinity and another 0.15% is prone to Soil Guillied, Ravinous Land. The details in this regard are given in Table No. 12.

viii. Status of Soil and Water Conservation Programs

About 36114 nos. of Tubewells and Borewells for irrigation works are existing in this district. Soil conservation works were undertaken in 36201 Ha. of cropping area. There is no check dams/stop dam put up in the district (Refer Table No. 13).

Animal Husbandry: The livestock population of this district includes cattle's and buffaloes, sheep's, goats, pigs apart from poultry birds. There are veterinary hospitals, dispensaries and sub-centres, which look after the welfare of animals. There is a sheep farm at Sattur with a poultry extension centre attached.

3.1.2 Forest Resources

i. Forest Area

There are 33 forest areas in Virudhunagar District constituting a total area of 55754.04 (557.54 Sq. Km) Ha. 32 areas fall under the Reserve Forest category with 55726.23 (557.26 Sq. Km) Ha. and 1 under Reserve Land category with 27.81 (0.28 Sq. Km) Ha. The details regarding the classification of forest area and their extent are given in Table No 14a.

ii. Green cover classification of forest

Under green cover classification total area of forest in the district is 26520 Ha. dense and sparse forest is 3103 Ha. and 2784 Ha. respectively. There is no degraded forest area in the district. Grassland cover is 7691 Ha. in Virudhunagar district. The details are given in Table No 14b.

iii. Trend in Per Capita Forest Area

The Forest area has 55754.04 Ha. The per capita forest area has however shown a declining trend from 0.057 Ha. in 1961 to 0.032 in 1996 due to the steady increase in population. The details are given in Table No.15.

iv. Man Made Forest Plantations

The Man Made Forest Plantations have been restricted to the existing forest areas in Virudhunagar district. About 3782.83 hectares of Man Made Forest Area is available in the district which is predominantly Neem, Tamarind and other MFP in 2658.45 hectares, Teak and Soft Wood in 368.44 hectares, 333.00 hectares respectively. Necessary details are given in Table No 16.

v. Details of Villages Abutting Forest Area

There is 4 Reserve forest area located in Srivilliputtur taluk. Details about name of the Revenue villages abutting forest area and their population are not available in this district (Refer Table No 17).

vi Tribal Hamlets

Tribal hamlets in this district, only known Tribals are "Paliyars" but their number is negligible to consider them as an important human resources. Even those people are found only in Srivilliputhur.

vii. Forestry Area Diverted for Non Forestry Purposes

There has been no forestry area diverted for non-forestry purpose in the district (Refer Table No 18).

viii. Conservation of Biological Resources, Wild Life Census, Rare/Threatened Species of Flora and Fauna

There is a sanctuary including Bird Sanctuary covering about 28 villages of Virudhunagar District over 485.20 Sq. Km. This constitutes 87.03% of total forest area in the district. Grizzled Giant Squirrel is the prominent species protected in the district. Wild life census in Virudhunagar district indicates that 468 animals are in the park/sanctuary. The rare plant of Sandal, the vulnerable plant of Vernoria travencorica, the endangered plant of Eugenia discifera is protected in the district. The rare Nilgiri Tahr, the vulnerable Elephant and the endangered animal Grizzled Giant Squirrel are also protected. Necessary information is furnished in Table Nos. 19, 20 & 21.

Srivilliputtur Grizzled squirrels wild life sanctuary: This sanctuary is located at 45 Kms. from Virudhunagar. The total area of the sanctuary is 48520 Ha. The main forest type in the sanctuary is dry deciduous with patches of tropical evergreen forests, semi-evergreen forests, moist mixed deciduous forests and grassland. Animals found in the sanctuary are grizzled giant squirrel, flying squirrel, tree shrew, elephant, lion-tailed

macaque, Nilgiri tahr, mouse deer, barking deer and many species of birds.

Animals: Tigers and panthers are found occasionally in the Srivilliputtur Range. The black bear roams the shola forests of Srivilliputtur. The sholas contain monkeys of the langur variety. The red-faced bonnet monkey is confined to the plains.

Reptiles: The common South Indian poisonous snakes like the cobra, the viper and the krait are well represented all over the plain and in the ghats. Hamadryads and pythons are restricted to the interior sholas only. They are poisonous, but fatalities rarely occur. Of the other reptiles Iguana the much hunted monitor lizard is recorded to occur in the Srivilliputtur forests, but is comparatively rare.

Tradition of Nandavanam

Srivilliputhur Andal Temple is the famous temple in the whole district of Virudhunagar. It was constructed during 16th century (1536 Approximately) by Pandya Dynasty and later by Chola Dynasty. This great temple is being considered as one of hundred and eight Vaishanava Sites. It is believed to be the birthplace of Saint Periyalvar and Andal. Gopurum of this temple is considered to be the tallest gopuram among the temples in Tamil Nadu and it is symbolically inscribed in the emblem of Government of Tamil Nadu.

Nandavanam (Tamil) meaning flower garden or tree grove is an assemblage of plants of various habits viz., trees, shrubs, herbs, etc., developed in an outdoor living space in the vicinity of towns. Nandavanams, which were considered akin to the sacred groves of ancient Tamilnadu, are found in existence in the urban environment of certain districts of the State. While the sacred groves represent small patches of forests containing the remnant of native vegetation, left untouched by the local inhabitants to the protected by the local village folk deities, Nandavanams are more or less a man-made collection of venetation.

Nandavanams received particular encouragement during Buddha's period. Principles were laid in Buddhist literature about making of a Nandavanam. One of the principles stated that " Nandavanam should be situated not too near the town nor too far away, well provided with entrances, easily reached by the people, not too noisy by day, perfectly calm by night, removed from crowds and disturbances, a place of retreat and lonely contemplation". Masterpieces of Kalidasa have many references to private and public Nandavanams which received a great deal of encouragement from the Indian Kings.

In the recent past, Nandavanams served as asylum for the public of the towns to provide relief from the harsh stress and strain of public life. They were particularly developed by communities in the urban and peri-urban areas of dry tracts of the State during the late nineteenth and early twentieth centuries. They played a vital role as recreation spots when public parks were not available. Though shrunk in size, reduced in trees, Nandavanams are existing even today in all the towns of Virudhunagar district.

In the present study, a survey has been made of the Nandavanams of Virudhunagar district of South Tamilnadu to throw light on their community utility, plant species diversity, present conditions and their future.

The survey was conducted during 1995-96 in five towns of Virudhunagar District which was part of the Ramanathapuram District upto 1986. Of the towns surveyed, Virudhunagar, Aruppukkottai, Srivilliputhur and Sattur are Municipalities and Tiruchuli is a Town Panchayat. A total of 48 Nandavanams (Virudhunagar-22, Aruppukkottai-9, Srivilliputhur-8, Sattur-7 and Tiruchuli-2) were included in the survey which represent more than 90% of the total Nandavanams in these towns.

A questionnaire was framed to cover aspects like the year of formation, location and extent, information on availability of community facilities viz., well, water lift, bathing trough, washing platform, rest shed and temple in the Nandavanams and information on their vegetation composition. Details on vegetation include the number of species, population of tree species, approximate age of trees, availability of vacant space for

planting, willingness of owners for further planting and their preference over species. Collection of above information was carried out through the questionnaire survey with the concerned owner coupled with a visit to the Nandavanam for an assessment of existing community facilities and the vegetation.

3.1.3 Mineral Resources

Lime Stone and Yellow Granite were the Mineral Reserves found in the district. Mineral concessions extend over an area of 895.19 Ha. and 2.56 Ha. respectively (Table No. 22).

3.2 Water Resources

3.2.1 Rivers, Canals and Waterways

The Arjuna Nadi and Sevalaperi River flows across Srivilliputtur and Sattur taluks and join Vaipar in Sattur taluk and then enters the Tirunelveli district, east of Sattur. The Mudangiar is a drainage channel in Srivilliputtur taluk and Uppodai is a drainage channel in Sattur taluk. The Vijaya Nadi and Mannarkottai Nadi are the two affluent of the Arjuna Nadi in Sattur taluk. The Gundar originates in the eastern slopes of the Varushanadu and Andipatty ranges above Watrap flows through Aruppukkottai and empties into the Gulf of Mannar. The Kanal Odai is a drainage channel in Aruppukkottai taluk.

3.2.2 River basins and their Catchment Areas

i. Catchment Areas:

Arjuna, Gundar, Vaigai and Vaippar are the four catchment areas of the river basins in the district. The place of origins, area of the basin and lengths within the district and area of the basin in acres are given in the Table. Refer Table No 23.

ii. Baseline Status of the Ground Water Availability

Total Geographical area of river basins in this district is 443255 Ha. Arjuna (Watrap) gets maximum range of Average annual rainfall of 913 mm. Basin-wise status of the Ground Water availability is given in Table No. 24.

iii. Details of Dams and Reservoirs

There are 3 reservoirs existing in this district – namely Anaikuttam, Vembakottai and Kullur Sandai reservoir, which gets water from Arjuna and Vaippar river (Refer Table 25.) A dam under construction near Irrukkankudi across Vaipar.

There are 156 Tanks existing in this district. Out of 156 Tanks 76 Tanks are rainfed tanks. Total area of tanks spread in the district is 10068.85 Ha. Area of rainfed tanks and panchayat tanks are 5981.20 Ha. and 4087.65 Ha. respectively in the district. (Refer Table No. 26).

iv. Irrigation by Different Sources

The main sources of irrigation in Virudhunagar district are Tanks and Wells. Canal system is not used for irrigation in the district. The total area irrigated by tanks, wells and other sources is 73,284 hectares. The gross area irrigated by tanks and wells are 28,292 hectares, 31,841 hectares respectively. On an average about 50.81% of the total cropped area is irrigated. The block wise details were not available in the district. The details on irrigated area by different sources are given in Table No. 27.

v. Incidence of Drought, Flood and Cyclone

There are 6 Taluks and 11 Blocks in the district. Information on this head is very scare. However it has been ascertained from the available information that 6 Taluks and 11 Blocks were affected by Flood during the years 1992-93 and 1993-94 and affected by Drought during the years 1990-91, 1991-92, 1994-95 and 1995-96 and information on the taluks and blocks affected by Cyclone was not available. The details on flood and Drought are given in Table No. 28.

3.2.3 Fisheries Production

There has been Inland Fresh Water area in 30005 hectares. There have been no Estuaries & brackish water area and Marine fishing villages in the district, as this is an

inland. The fish production fluctuates both in quantity and value from 1992 to 1996. Inland Fish Production is done in the district. (Refer Table No. 29).

i. General Fish Seed Production

The Fish Seed production was 131000 Standard Fry and the highest production was in the year 1994-95. The inland fish seed production has fluctuations in the district. As regards to fish production, there has been a significant reduction in the year 1995-96. The details on fish and fish seed production are given in Table No. 30.

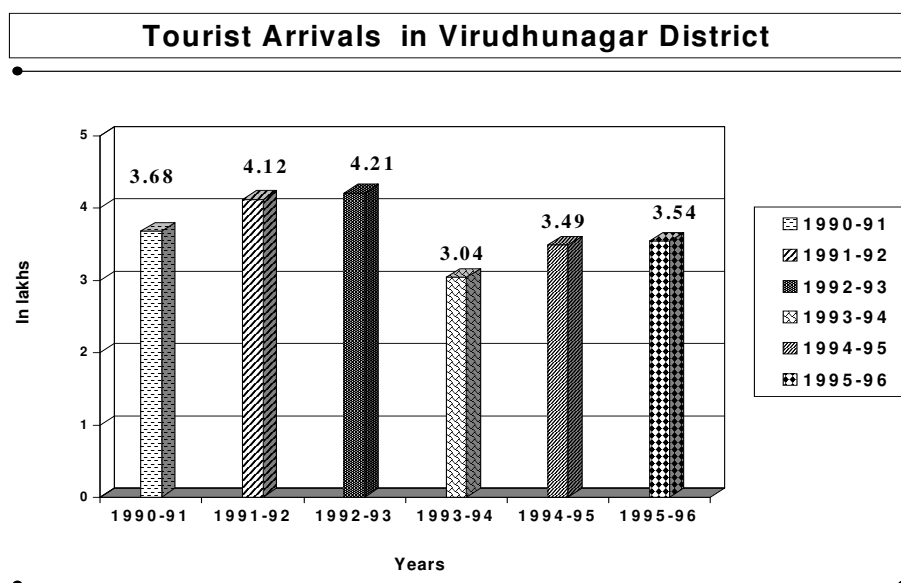
3.3 Heritage Resources

i. Protected and Conserved Monuments

There is no protected monument in the district as per the list of monuments maintained by Archaeology Department (Refer Table No. 31).

ii. Places of Tourist Attraction

The district has a number of places having temples, famous for antiquity and sculpture, which attract large number of persons from within the district, and outside. Srivilliputtur is one of the 108 sacred Vaishnavite places. This place is famous for its ancient temples of Vadabdrasai Koil and the Nachiar Koil. Vadabdrasai Koil tower is about 192 feet high and is an important landmark said to have been built in the 8th century. This temple, dedicated to Lord Vishnu, is in two floors. In the ground floor in Narasimha. The steps lead to Vadabdrasayanar Lord in a lying posture. The temple has many beautiful wooden sculptures. The Andal temple is said to have been built in the 8th century. The Vaishnavite saint Periyalwar had his residence here. The pillars of the Mandapam contain a number of images, life-like and highly elaborate in design. Viswakarma, Venugopalan, Dancing girl Mohini, Agora Veerabadra, Rathi, Manmadan etc. are some of the best sculptures on the pillars. The walls of the inner prakaram contain paintings of the shrine of the 108 Vaishnava temples. The Sanctum enshrines Andal, Rajamannar and Garudalwar. Between the Vadabdrasayanar temple and Andal temple there is a flower garden said to have been laid out by Andal's father, Periyal war. In Madavur vilagam, there is a temple dedicated to Vaidyanathaswamy. An old palace of Tirumalai Nayak of Madurai is in Srivilliputtur. Tourist arrivals both domestic and foreign have fluctuated from 1990 to 1996. (Refer Table No. 32 & 33).



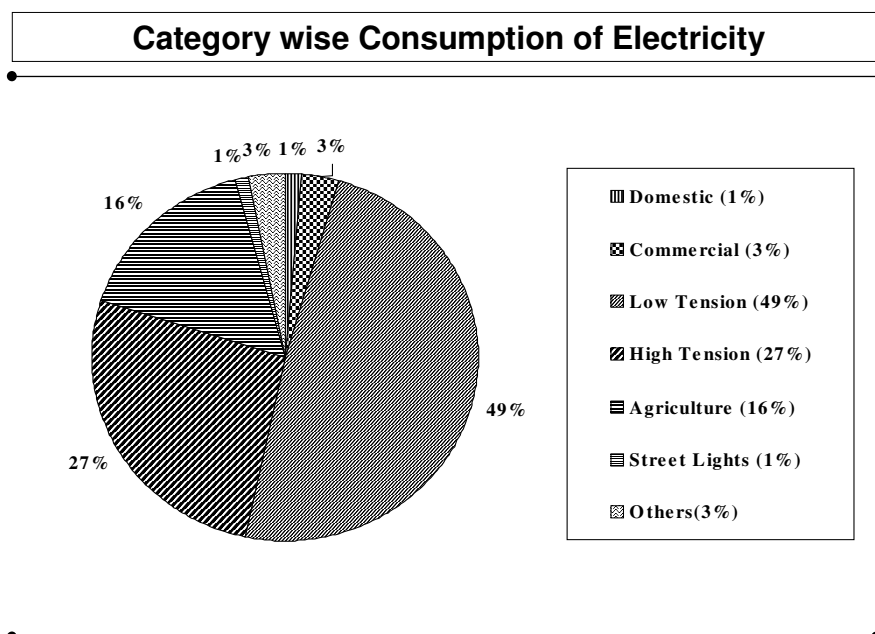
3.4 Energy Resources

i. Installed Power Projects

There have been no installed Power Projects in the district (Refer Table No. 34).

ii. Consumption of Electricity

There were 6,71,957 electrical connections with a total consumption of 1,121,578,765 KW/h as on 1995-96. Industrial type has the maximum consumers accounting 75.55% of the total consumption, followed by Agriculture type 15.91%. The category wise consumption of electricity is given in Table No. 35.



iii. Electrification of Villages

Virudhunagar district has achieved 100% electrification prior to 1986. All 600 villages in the district are electrified. The number of pump-set connections have increased in 5 taluks and decreased in three taluks over the past 15 years. The status on electrification of the energised pumps is given in Table No. 36.

iv. Non Conventional & Renewable Energy Sources Utilisation

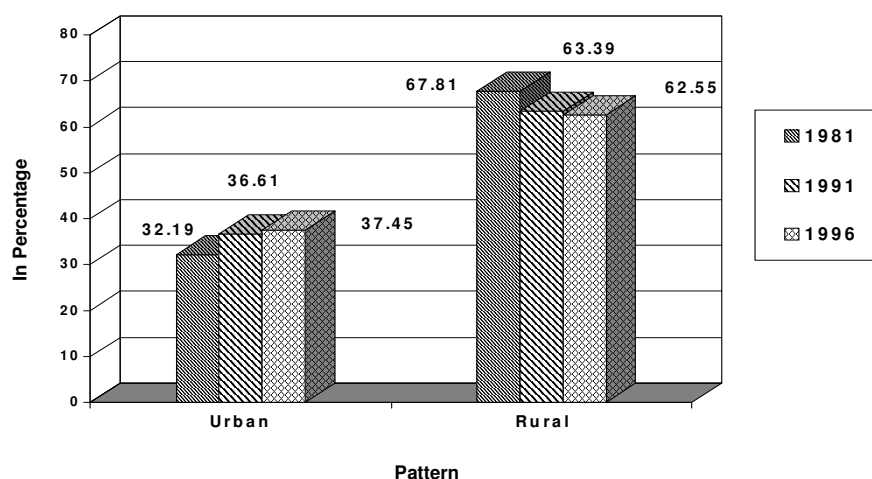
Biogas and Solar Photo Voltaic System (Lighting) is the method of non-conventional energy utilised in the district. The details are given in Table No. 37.

Chapter

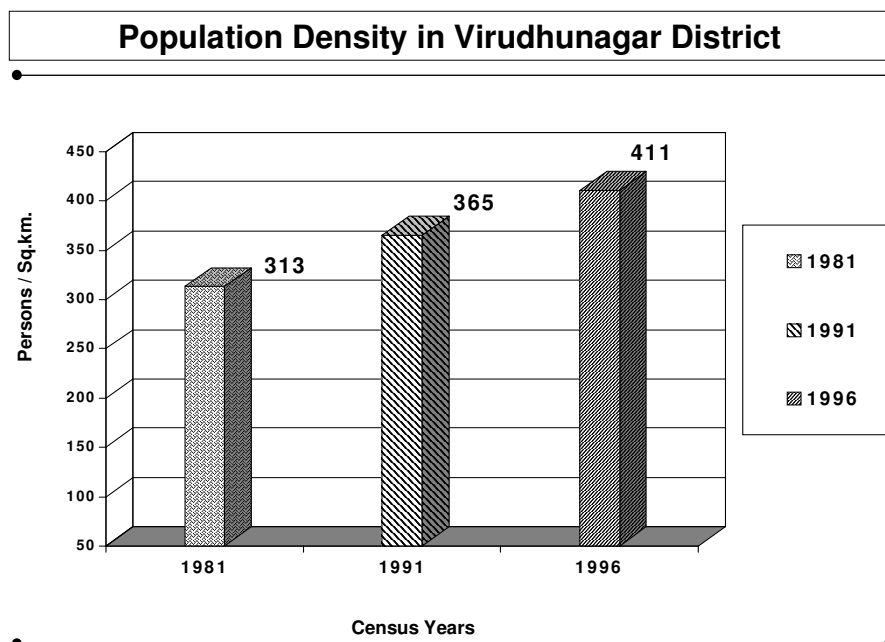
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4.0 Infrastructure**4.1 Urbanisation****4.1.1 Urbanisation pattern**

The proportion of urban population to total population has increased during 1981-91 from 32.19% to 36.61% and is estimated at about 37.45% during 1996. Among the urban areas, municipalities account for a greater share of urban population while compared to the other urban areas. The proportion of Rural Population to Total Population has decreased from 67.81% to 62.55% during the years 1981-1996. The urbanisation pattern of the district is given in Table No. 38.

Urbanisation Pattern of Virudhunagar District**4.1.2 Density of Population**

The overall density of population has increased from 313 persons / sq.km. in 1981 to 411 persons / sq.km. in 1996. The density in urban area has fluctuated from 4758 persons/sq.km. in 1981 to 4659 persons/sq.km. in 1996 and the density of rural area has increased from 217 persons/sq.km. in 1981 to 266 persons/Sq./Km. in 1996. The details on density are given in Table No. 39.



4.1.3 Decadal Growth rate in urban centres

The decadal growth rates in all Municipal Towns have increased from 1961 to 1996. The population of the district has grown from 11.51 lakhs in 1971 to 15.65 lakhs in 1991. The decadal growth rate indicates that there is a considerable growth in both Municipalities and Town Panchayats in the district. Sattur and Rajapalayam have registered the maximum growth rate among the municipalities in 1996 and Thiruthangal has the maximum growth rate among the town panchayats. The details of decadal growth rate are given in Table No. 40. The Decennial growth rate for urban population over the past three decades has increased steadily from 1961 to 1991 (Refer Table No. 41).

4.1.4 Urban Slum Population

There has been a steady increase in the percentage of slum population to total population from 1991 to 1996. The slum population has increased from 22.23% in 1991 to 23.12% in 1996 in spite of several poverty alleviation programmes undertaken by the Government. Rajapalayam has the maximum Slum Population (42786 persons) and Sattur has the minimum Slum Population (7650 persons) in 1996 among the Municipalities. No information in this regard is available for Town Panchayats. Necessary details are given in Table No. 42.

4.1.5 Trend in urbanisation and slums

The trend in Urbanisation and Slums indicates that both the percentage of urban population and the percentage of slum population to the urban population have increased from 1991 to 1996. The percentage of slum population to total population has increased marginally from 1991 to 1996. The trend in urbanisation and the slums is given in the Table No. 43.

4.2 Infrastructure Services and Environmental Status

4.2.1 Occupied Housing units

A total occupied household in 1991 was 372790 households in the district. Only 13.78% of households are having toilet facilities in the district. Likewise only 12.469% of the households are having piped water with in the house premises. (Refer Table No. 44)

4.2.2 Urban Services

Surface water is the major source for protected water supply system in the district. The average Percapita water supply is around 49.61 LPCD for the district. The Municipality of Sivakasi has the highest per-capita supply of 66 LPCD each, while the Town Panchayat of Thiruthangal has 45 LPCD. The municipality of Aruppukkottai has 20% at the maximum and the town panchayats; mamsapuram and Watrap have 25% each at the maximum of percentages of population uncovered for water supply. Details on water supply services are given in Table No. 45.

4.2.3 Domestic waste water generation and treatment

The estimated sewage generation is 256.31 lakh litres among municipalities and 84.86 Lakh litres among town panchayats. The district does not have any organised disposal of sewage. The disposal quantity of sample through land is 182.21 lakh litres in Municipalities and 84.86 lakh litres in Town Panchayats. All the town in the district hare only open drainage system, treatment facility is lacking in all towns. The details on domestic wastewater generation and treatment in the district are given in Table No. 46.

4.2.4 Municipal Solid Waste Generation

The solid waste generation is at the highest in Rajapalayam among municipalities and in Sattur among town panchayats. Overall the solid waste generated adds up to 54.02 tonnes with a collection of 46.76 tonnes and collection efficiency of 86% with a manpower of 410 on Solid waste management. The availability of compost yards is 6 in municipalities and 5 in town panchayats (Refer Table No. 47).

4.2.5 Composition of Solid Waste

Compostable mater covers 89.77% and other compositions like Rags, Wooden matter, etc. cover 10.23% in Virudhunagar District (Refer Table No. 48).

4.2.6 Coverage of Problem Villages

It has been identified that about 716 villages out of the total 1235 villages in the district have had problems with regard to supply of Drinking Water. However 318 problem villages have been covered during the VII Five Year Plan (1987-92) and 321 villages covered during the VIII Five Year (1992-97). 77 villages have yet problems with regard to supply of drinking water. Necessary details are given in Table No. 49.

4.2.7 Reported cases of water borne diseases

Gastro-enteritis and Cholera are the most commonly reported water borne diseases in the district. Incidence of Gastro-enteritis has been reported from 1991 to 1996. Cases of Cholera were also reported in the district. Deaths of gastro-enteritis are reported from 1991 to 1996. The maximum deaths of 41 were reported during the year 1992-93 due to gastro-enteritis. Deaths of Cholera were also reported during the year 1993-94. The details on the reported cases of water borne diseases are given in Table No. 50.

4.2.8 Facilities under Indian system of Medicines

Medical facility of one type or other is available in 131 villages, which constitute 25.59 percent of the total number inhabited villages. The following table provides town-wise break-up of medical institutions available in the towns alongwith bed facility.

Name of the Towns	Medical Institution	No. of Beds
1. Aruppukottai	Hospital –1 Dispensary – 1 Family Planning Centre – 1 TB Clinic – 1 Others – 8	66 - - - -
2. Chatrapatti	Others – 1	-
3. Dhalavoipuram	Hospital – 1	24
4. Rajapalayam	Hospital – 1 Dispensary – 2 Others – 2	104 - -
5. Sattur	Hospital – 1	44
6. Sivakasi	Hospital – 1 Dispensary – 2 Others – 1	46 - 8
7. Tiruttangal	Dispensary – 1	-
8. Srivilliputtur	Hospital – 1	86
9. Virudhunagar	Hospital – 1 Dispensary – 2	118 1

Allopathic is the only commonly practised system of medicine in the district and facilities for medical education is also available. Other systems of medicines are totally absent. The details on the facilities available under Indian Systems of Medicines in the district are given in Table No. 51.

4.2.9 Population below poverty line

As per Below Poverty Line (BPL) conducted in 1996, about 92468 families found were to be below poverty line in the district (Refer Table No. 52).

4.3 Transportation

The district is well served by both, rail and road transports. Virudhunagar is one of the very important railway junctions of metre gauge section of the Southern Railway. Apart from Virudhunagar, Sattur, Rajapalayam and Srivilliputtur are linked with Madurai, which is a prominent commercial and industrial town of the state by the metre gauge line. Road transport is another important aspect in communication facilities. The district is connected by National Highway no.7 with other areas i.e. Benaras cape Comerin road, connects Virudhunagar and Sattur. Another State Highway, Madurai-Tenkasi road connects Rajapalayam and Srivilliputtur.

4.3.1 Development of Roads, Bridges

The district has 50.8 km. of National Highway, 58.873 Km. of State highways, 321.080 Km. of Major district roads and 1336.364 of other district roads. 23.2 km. of Ghat roads, 263.400 Km. of panchayat roads and 300.83 km. of road maintained by urban local bodies in the year 1996. Over and above, there are 28 major bridges and 398 minor bridges and culverts in the district in the year 1996. Relevant information is provided in Table No. 53.

4.3.2 Growth of Vehicle population

There has been a significant increase of two, three and four wheeler vehicles in the district over the past 5 years. The details on the growth of vehicle population. Two

wheeler vehicles had registered as growth of 46.7% over 10 years between 1986 and 1996. the details is given in the Table No. 54.

4.4 Industrial Development and Environmental Status

The chief industries found in the district are handloom weaving of textiles, spinning and weaving of textiles in factories, cement crackers and fireworks and printing and allied industries. Handloom weaving of cotton textiles is an ancient occupation followed in this district. The important handloom centres are situated in Aruppukkottai, Srivilliputtur and Rajapalayam taluks. Textile mills are functioning at Rajapalayam, which produce a variety of yarns. Cotton which is that the chief raw material for spinning mills is available in the taluks Srivilliputtur, Sattur and Kovilpatti. One surgical cotton mill started in 1943 is located at Rajapalayam. Crackers and fireworks industry is one of the flourishing industry in this district. This industry has been established mainly in and around Sivakasi. Match industry and printing and allied industries are also found in Sivakasi and adjoining areas.

4.4.1 Number of Industries

There have been 185 Red Category, 784 Orange Category and 305 Green Category Industries in 1995-96 which are classified, based on the nature of hazardness by TNPCB. Red category industries are mostly chemicals, textiles and pharmaceutical industries. The details on the number of industries are given in Table No. 55.

4.4.2 Emission Inventory of Major Industries

Mrs. Arasan Aluminium Industry at Virudhunagar has been identified with the highest Average Emission level in terms of SPM (178.00 $\mu\text{g}/\text{m}^3$), SO (26.95 $\mu\text{g}/\text{m}^3$), NO (4.63 $\mu\text{g}/\text{m}^3$) while the emission levels of CO and HC are not recorded in the district. However all the six reported industries of the district are found to be having the emission rates will under the set standards (Refer Table No. 56).

4.4.3 Air pollution stressed area

Virudhunagar, Alankulam and Krishnapuram are the air pollution stressed areas with the major air pollution source being smoke and chemicals from industries. Alangulam area is more polluted with particulate than the area around Madras cements Thulukampatti. Dry process of cement manufacturing is economically and environmentally safe than wet process. Cement factory at Alangulam employs dry process only by 1996 and Ramco from 1980 onwards. Anyhow, dust emanating at some stage of cement manufacture pollutes the atmosphere. The details are given in Table No. 57.

4.4.4 Ambient Air quality Status

As per the urban air quality status is concerned, the industrial SPM, SO₂ and NO values seem to be with in the standards. These large-scale cement and textile industries particularly pollute the air. Ecological balance is bound to be disturbed with gases of SO₂, CO₂, CO and suspended particles like cement and mineral dust emitted from cement factories. They ultimately affect the supply of O₂ and Defoliation of Vegetation is also conspicuous. (Refer Table No. 58).

4.4.5 Water quality

Groundwater in this district is very much influenced by the geological formation, which is black cotton soil kankar, which affects water quality in the shallow zone. Even though the quality of water in the deeper hardrocks is good, the quantity that can be obtained

from such zones is limited. The areas of poor quality are identified as Virudhunagar, Aruppukkottai, Sivakasi, Sattur etc. The eastern parts around Srivilliputtur, Rajapalayam are slightly better quality of water (Refer Table No. 59)

4.4.6 Discharge of Industrial effluents

Virudhunagar District posses 7 taluks. The district is well known for comprising oil mills (V.V.D.), Mini Japan – Sivakasi, Cotton City – Rajapalayam Pollution generating large scale industries like cement factories and Textile industries are located in Virudhunagar, Sivakasi and Rajapalayam. Dhalavaipuram and Aruppukkottai are encircled with dying units. Chatrapatti in Rajapalayam Taluk is well known for bleaching units.

Dying is the major occupation of people inhabiting Dhalavaipuram and Aruppukkottai. The serious problem posed by these units is sensitivity of a few of the compounds and the ability to cause cancer. The effluent is intensively coloured and contains highly toxic dyes and acids. The pH of the effluent ranges from 3.5 to 8.5. Approximately 40 to 80 shades of dyes are used here. About 90 tonnes of effluent is discharged per month directly into the dry riverbeds. Already these places face a shortage of water for household and irrigation purposes due become poor. These toxic chemicals affect vegetation in and around. The soil microflora is subjected to toxicity. Accumulation of salts makes the soil sodic and hence unsuitable for cultivation. (Refer Table No. 60).

4.4.7 Noise levels

No data on residential noise levels has been provided as no ambient noise level monitoring is conducted by TNPCB. (Refer Table No. 61).

Chapter**5****5.0 Environmental Institutions****5.1 Environmental Education and Research Institutions**

There is no Environmental Education and Research Institution functioning in the district (Refer Table No. 62).

5.2 Environmental NGOs

SPEECH and RMPSSS are the two NGOs dealing with Environmental related issues in the district. the area of operation in Virudhunagar and Aruppukottai. (Refer Table No. 63).

Chapter

6

6.0 Summary of Observations

The key observations of the Environmental Profile of Virudhunagar District are summarised as below:

1. The growth rate of population has been in an increase at about 1.67 per annum during the period of 1981-91.
2. It is encouraging to note that the female literacy rate has significantly increased in the past 15 years.
3. Utilisation of land area in Virudhunagar district is upto 32.54%. 1.62% of the land area remains as cultivable wasteland.
4. The use of Chemical Fertilisers and Pesticides has increased and the use of Bio-Fertilisers and Pesticides has had fluctuations.
5. Black Soil (39.23%), Red Sandy (21.25%), Red Loam (20.60%) and other types (43.2%) are the soil types of Virudhunagar District.
6. No new construction of wells and check dam is done in the district for irrigation purposes.
7. The Forest area in Virudhunagar district is about only 9.98%. Tropical wetgreen, Tropical Semi Evergreen, Tropical dry deciduous, Tropical dry thorn and sub-tropical broad level are the forest types. The man made forest plantations have been restricted to the existing forest area in the district.
8. Conservation of biological resources is strengthened by the district administration, by way of declaration of large extent of forests in to a sanctuary. Protecting animals by the district administration are imperative for prevention of extinction. Focussing on these issues could result in better management of environment.
9. The main sources of irrigation of the district happen to be the tanks and wells and nearly 39.8% of the total cropped area is irrigated by these sources. Other sources of irrigation can be explored and also efforts to sustain the present main sources of irrigation become essential.
10. The inland forest water area of the district is 30005 hectare. This shows that the district has high potential for fishing. However, the total fish production over the past four years in the district had fluctuations.
11. Urbanisation process in Virudhunagar district has been taking place at a higher rate. However, certain essential needs of urban areas like drinking Water, Electricity, Public Convenience, drainage, approach Roads and Health Centre has not been increased keeping the pace with the process of urbanisation.

12. There is an increase in urban slum population in Virudhunagar district during the past five-year's in-spite of several poverty alleviation programmes undertaken by Government.
 13. There has been no much improvement of urban services particularly protected Drinking Water and Solid Waste Management in the district.
 14. The most commonly reported water borne diseases in the district were gastro-enteritis and cholera.
 15. There has been a significant growth of two, three and four wheeled vehicles in the district over the past ten years, thus resulting in an increased quantity of the emission of suspended air particles.
 16. The Red, Orange and Green categories of hazardous Industries are identified by TNPCB. The district is characterised by district clusters of red category industries in different urban centres.
 17. There is no environmental education institute in the district of Virudhunagar. Plan may be drawn to set up environmental education institutes in all major towns, following the model of other districts, which have environmental education institutions.
 18. Environmental NGOs may be involved in protecting environmental of the district for which action plans for better environment shall be made with NGOs participation.
 19. Participative planning for Environment Management, Creation of a Management Information System, Environment Management Training to officers of the stake-holding government departments would go a long way in the environment planning efforts of the **Directorate of Environment, Government of Tamil Nadu** in fulfilling its corporate objectives.
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