

ANNEXURES

ANNEXURE I BASELINE ENVIRONMENTAL AND SOCIAL INFORMATION OF RIVER BASINS

CHENNAI BASIN

Demography

Chennai river basin consists of 11 taluks spread out in Tiruvellore, Vellore (part) and Kanchepuram(part) districts. There are 19 blocks covering the river basin within this, nearly 312 villages and 52 towns. According to 2001 population, the population concentration in villages is works out to be 6,62,320 and in urban areas (Chennai City, Municipalities and Townpanchayats) and total population located within 5 Km areas urban area 62,36,061, which shows high population concentration in Chennai river basin.

Location

The Chennai basin is situated between latitudes 12° 40'N and longitudes 79°10'E and 80°25'E at the north east corner of Tamil Nadu. The basin area is 7,282 km², out of which 5,542 km² lie in Tamil Nadu limits and the remaining area lies in Andhra Pradesh limits. The present extent of Chennai city is 172sq km and the area covered by the Chennai Metropolitan area is 1167 sq kms. The length of the Chennai River basin is estimated to be about 329 Km, which passes through Tiruvallur, Kanchepuram(part) and Vellore (part)

Hydrology

Chennai River Basin consists of 4 important rivers i.e. Araniyar, Kosathalaiyar, Cooum and Adayar and each has its own sub basin to drain the surface runoff.

Hydrogeology

The yield in the borehole in crystalline rock formation varies from 90 to 4541lpm. In the Gondwana formations the yield of the well varies from 45 to 180 lpm. The yield in the tertiary formation varies from 68 to 90 lpm. The yield in quaternary formations varies from 158 lpm to 14900 lpm.

Ground water potential

The depth to ground water level in the different sub basins are in the range of 2 to 12m. Over the years, progressive lowering in the ground water level is observed in the lower reaches of the entire sub basin. The levels of groundwater in different sub basins are ranges from 2 to 12m. The total ground water potential of the basin is 1120 Mcum

Stage of Ground Water Exploitation

The level of water exploitation in the basin area over a period of time has been increased from 4 (dark areas) and 8 (> 100%) areas between 1997 and 2003. This has further defined into Critical and Semi critical zones, which indicate an alarming rate of 8 blocks.

Surface Water Potential

According to runoff coefficient of 0.15 adopted for plains for south-west and north east monsoon and based on the total surface water potential for 75% probably, the total Chennai basin has annual surface water potential of 784 MCM.

Surface water potential during South west monsoon	248.0 MCM
Surface water potential during North east Monsoon	422.0 MCM

Surface Water Quality

Based on the sample collected from BOD, heavy metals content, coliform content in the water collected from the Cooum, Adyar, and Buckingham canal are much in excess of permissible limits for domestic use. Pollution of surface water in Chennai City is very high due to addition of industrial and municipal waste.

Ground Water Quality

The general fall of groundwater level in Chennai basin group was observed to be 1m and 2m for 10 years and 20- years respectively. It is observed that the Chennai basin group is predominantly sodium chloride type. The ground water available in Chennai basin group is free from iron and fluoride. The nitrate content is seen in groundwater in the areas near Arakkonam.

Overall pH, Chloride, EC and TDS level exceeds in Cooum river and similarly, Kosathalaiyar water quality exceeds the limit in selected areas i.e. urban areas in North Chennai indicate the water quality level having high value of EC.

Industries

In Kosathalaiyar sub basin, out of the 96 industries, nearly 50% of the industries are consuming less than 10 KLD of water for the industrial production. Some of the major chemical industries situated in Eranavur, Manali, Kosapur of Puzhal Block are utilizing 1000 KLD to 18000 KLD. Nearly 50% of industries are having trade effluent and 38 industries are having arrangement for treating the effluent and using it within their premises for various uses. Severe problem relating to air and water exit in North Chennai area i.e. Manali, Ennore areas. Tannery industry located in Chrompet area create pollution problem leading to contamination of groundwater in Pallavaram and Chrompet.

Sewerage System

Chennai city's sewerage system is serving for more than 41 lakhs population consists of a network of gravity sewers, force mains and pumping stations serving different parts of the city. Due to raw sewage inflow into the waterways level of B.O.D is very high in all river area within the city.

Solid waste

In general, MSW is a continuous problem for all over India and TN is no exception. The mix of sewage water into the system, spoils the environment at the tail end of the Cooum and Adayar rivers.

Forest

The total area of forests located in the basin is 29,855 ha, which forms 5.1% of the total area. Flora and fauna details Guindy National Park, Arignar Anna Zoological Park and Pulicat lake Bird Sanctuary are some of the major spots in the basin.

Agriculture

The major crop is paddy as it occupies 69.3% of the gross cropped area. In the basin 3,66,858 tones of paddy, 5109 tones of oil seeds, 8206 tones of millets, 541 tones of pulses and 7,70,849 tones o-f sugarcane are produced on an average per annum.

Water weeds

It is observed from the field offices in Chennai Basin area that the aquatic weeds growth, ipomoea, locally known as Kadal Palai is found to be in almost 80% of the tanks. According to the officials the plant growth varies between 40% and 80% in various tanks. In general weeds growth restricts the water storage and loss in capacity of the tanks. There are nearly 47 tanks have been identified affected by the above weeds

Sedimentation

Siltation studies done in Kaveripakkam tank show that average annual silt load is 0.0519 MCM/year and average annual silting rate is 0.0003228 MCM/Sq.Km. The studies done in Konasamudram tank show that annual rate of silting is 0.013 MCM.

Sand mining

Excess quarrying of sand from Cooum river near A.N.Kuppam anicut has resulted in washing away of anicut portion. The causeway near Tiruvallore Railway station across Cooum, the Karanodai Bridge across Kosathalaiyar in Chennai – Calcutta highway and the Tamaraiakkam anicut were affected due to excess sand quarrying.

Sea water intrusion

Seawater intrusion has started in many places, resulting in soil losing their fertility and found uneconomical for cropping. Seawater instruction is noticed around Minjur belt, north of chennai and about 10000 ha. in Gummidipoondi, Sholavaram, and Ponneri blocks are affected.

Encroachments

River basin is being encroached for various kinds of activities;which includes urban activities, farming activities and industrial activities. Out of 1591 tanks in the basin, majority of the tanks are affected by encroachments near Arani, Periyapalayam, Pooneri and this may create the chances of occurrence of flood during monsoon period by arresting the free flow of water in the river

Fisheries

There are 58 Marine fishing villages are located in Thiruvallur district with a population of 55,000. The fisherman community use mechanised boats for their fishing activities and there are roughly 800 mechanised boats and 2500 Kattumarams are being used. Two fishing farms located in this region one at Pulicat and another at Chetpet using fresh water with a total production of 15,948 tonnes in the basin. Inland fishing is dominant in Kancheepuram district as there are 64 fisherman villages with a population of fisherman 45,000 identified in the district as per 2002 figures. The total production of fishing in Pulicat lake is 928 kg/ha. The Inland Fish production in Kancheepuram is 8221 Tonnes in 2002-01.

Adayar Estuary and Creek

Chennai is one of the few cities having an estuarine ecosystem. The Adayar creek is of a tidal type and a part of the natural estuarine ecosystem located right in the heart of the city. The Adayar river, of which the creek is a part, is highly polluted. But at the estuary there is still vegetation and nesting of migratory birds.

The ecological functions of a creek can be summarised as follows:

- a)Acts as a natural flood control system
- b)Prevents storm damage by retaining storm water.
- c)Maintains water balance in the region.
- d)Is a nutrient-rich spawning ground for aquatic life.
- e)Provides visual contrast and diversity to the landscape.
- f)Cleans polluted water and prevents eutrophication.
- g)Supports biodiversity.

Diseases

Acute Diarrhea is a major disease prevailing in the basin, however there are no deaths reported under this disease. In addition Dysentery and Jaundice is prevalent in

the basin (majority of the areas lies in Tiruvallur district) and few deaths reported due to Dysentery and Jaundice. This is due to contamination of sewage water and lack of knowledge with the people to boil and drink the water for safety reasons.

Sub Basins under IAMWARM for the 1st year

Araniyar, Kusathalaiyar, Cooum and Adyar River are the four important rivers in this basin, each having its own sub basin to drain the surface runoff.

Kosathalaiyar sub basin

The Kusathalaiyar River originates from the surplus waters of Kaveripakkam tank, which is one of the irrigation tanks supplied by Palar Anicut. Kesawaram anicut has been constructed across the Kusathalaiyar with a regulator to supply water to Cooum River. Nagari and Nandhi rivers are the tributaries of Kusathalaiyar just above Poondi reservoir. Chennai basin contains of 4-sub basin, Sathayamoorthy sagar, popularly known, as Poondi reservoir is the only reservoir constructed across Kusathalaiyar. Red Hills, Cholavaram and Chembarabakkam are the other reservoirs in this basin.

System deficiencies

1. Overall efficiency of tank irrigation system is 30-40%*
2. There is 15-20% reduction in tank storage capacity due to siltation
3. Poor water scheduling
4. Inadequate supplies produce water stress condition and yield is reduced.
5. Water losses due to unlined canals

Proposed actions

1. Conjunctive use of surface and ground water
2. Renovating old tanks, desilting of ponds and supply channels and water harvesting
3. Crop rotation
4. Selective lining to canals where seepage loss is appreciable

PALAR RIVER BASIN

Demography

Palar river basin consists of 20 taluks spread out in Vellore, Kancheepuram and Tiruvanmalai districts. There are 45 blocks covering the river basin within these nearly 507 villages and 46 towns. According to 2001 population, the population concentration in villages works out to be 10,87,765 and in urban areas (Municipalities and Townpanchayats) is 15,12,565 and total population located within 5 Km areas is 25,00,3334, which shows quantum of population concentration near to Palar river basin.

Location

The Palar river basin lies between $12^{\circ} 14' N$ and $13^{\circ} 37' N$ latitudes and $77^{\circ} 48' 40'' E$ and $80^{\circ} 14' 40'' E$ longitudes. The total area of the basin is $18,300 \text{ km}^2$ of which $10,910 \text{ km}^2$ is present in Tamil Nadu. The basin area is spread in the districts namely, Vellore, Tiruvannamalai and Kancheepuram covering $4,710 \text{ km}^2$, $4,013 \text{ km}^2$ and $2,187 \text{ km}^2$, respectively. The Palar river basin is bounded on its Northern side by the Swarnamughi river basin of Andhra Pradesh and the Chennai basin on the Northeastern side.

Hydrology

Palar River originates in Nandhi Durg, Kolar district in eastern part of Karnataka State at an elevation of 800m above MSL, which passes through the hilly terrain of south western part of Andhra Pradesh and enters into Tamilnadu on the west of Vaniyambadi town and flows through Vellore, Thiruvannamalai and Kancheepuram Districts and finally enters into Bay of Bengal near Sadarangapattinam. The total length of the river is estimated to be about 350 Km. The important tributaries are Poiney, KavundinyanagaNadhi, Malattar, Cheyyar, Agaram, Kiliyar and Vegavathi.

Geology

Palar river basin consists of hard crystalline rock masses of Archaean age in most of the basin area and sedimentary rocks of Gondwana, tertiary and quaternary age on the eastern part of the basin.

Hydrogeology

The hydrogeology of the Palar river basin is such that 87 % of the area under the basin is hard crystalline rock while the remaining 13 % is sedimentary. The general depth of the bedrock varies from 10 m to 60 m where crystalline formations are found. Ground water is found to occur in semi confined / confined or water table conditions.

Surface Water Potential

Palar river basin receives an average annual rainfall of 1039 mm. The Palar River Basin having an annual potential of 1758 MCM and average annual flow into the sea works out to be 12.5 TMC.

Ground Water Potential

The ground water potential of the basin is 2610.32 MCM.

Surface Water Quality

Analysis of water samples shows that during the flow pH, Electrical Conductivity, Total Hardness, Chloride and Coliform values are within the limits. Dissolved Oxygen falls below 5 mg/lit at places such as Koudanaya river, Nandhiyalam village, Rajakal head sluice, Mettur village and at stretches between Wallajabad to Asur due to mixing of Tannery effluent with water. This affects the aquaculture in the area. The river water is contaminated with domestic sewage. It is also found that Total Dissolved Solids is beyond the tolerable limit in tannery-polluted areas. Chloride is above the acceptable limit but below permissible limit. Total hardness fluctuates above and below tolerable limits and Biological Oxygen Demand is found to be very high in some head works.

Ground Water Quality

The ground water in Upper Palar basin is highly unsafe for domestic and irrigation purposes owing to the high chloride values which exceed the permissible limits. In Kamandala Naganadhi, Upper Cheyyar and Lower Cheyyar zone the salinity and chloride values are within the acceptable limits. In the Lower Palar zone comprising Wallajabad, Kanchepuram and Mamandur ground water contains high salinity and chloride caused by industrial and tannery effluents. Moderate salinity is observed in Kilsathamangalam, Nallululmalai, West Salai, Vendur and Thirukallukundram.

Industrial effluents have polluted ground water in Pernambut, Ambur, Thuthipattu and Vaniyambadi. The chloride concentration is of the order of 1000 mg / l against the standard of 250 mg / l. In certain packets at Pernambut, Ambur and Vaniyambadi irrigation water has high sodium concentration and is grouped under high saline and sodium water.

Industries

There are 120 large and medium scale industries and 11,000 small-scale industries are functioning in the basin area. This includes manufacturing of Textile, Wood, paper products rubber plastics, chemical, leather etc. There are sizable numbers of large scale industries are engaged in Leather, Automobiles, and Chemical products in this region. Vaniyambadi, Ambur, Arcot, Ranipet, Kanchepuram, Chengelpet and Cheyyar. There are nearly 473 Tanneries are located in Vellore and Vaniyambadi region.

Sewage and Solid waste

There are number of towns that are located all along the river course i.e. Vaniyambadi, Ambur, Pallikonda, Vellore, Ranipet, Arcot, Gudiyattam, Peranambattu, Arani, Tiruvettipuram, Chengam, Kanchepuram, Ayyampettai, Walajabad, Chengalpattu etc. discharging heavy amount of untreated sewage water without any treatment into the river course and nearby water source. Dumping of solid waste along the river margins and tanks, which block the natural, recharge capacity of the water source.

Water weeds

Out of 661 tanks in the Palar Basin areas, it is identified that nearly 200 tanks in the basin having weed growth for 80%.

Agriculture

Rice, Cholan, Cumbu, Ragi, Sugarcane, Pulses, Groundnut, Banana and Coconut, are cultivated extensively in Vellore district, while Cotton is cultivated in a few places. The total land used for cultivation of these crops is 2,76,062 ha. Rice, Ragi, Sugarcane, Pulses, Groundnut and Coconut are the major crops cultivated in Kanchepuram district. Land used for cultivation here is 2,324 ha which is comparatively lower than that used in Vellore District. The major crop in this river basin is paddy.

Seismic Zones

The basin area is falls under the Zone II of seismic zones classification. The basic seismic coefficient for Palar basin is 0.02 and the importance factor for all types of dams is 3. The design of dams and water retaining structures are based on IS: 1893 – 1984.

Forest

Forest Department records show a total extent of 1,92,461 ha under forests in the Vellore district. Among this area 89 % is Reserve forest, 2.6 % is Reserve Land and 8.4 % under unclassified forests. The total forest area in Tiruvannamalai district is 42,630.41ha. Kancheepuram district has a reserves forest area of 230.19 km² while the reserved lands and unclassified forestlands are 5.61 km² and 2.31 km² respectively.

Sea Water Intrusion

Seawater intrusion is not predominant in the coastal area except some pockets near Kalpakkam, where the large-scale water extraction and sand mining activity trigger the factor of seawater intrusion especially in Vayallur areas in Thirukazukundrm block.

Sedimentation

Average annual rate of silting in the Uthiramerur tank, Maduranthakam tank, Dusi - Mamandur tank and Kalavai tank were 0.45 %, 0.051 %, 0.593 % and 2.37 % respectively. A loss of 37.63% and 16.24 % capacity were observed in the Maduranthakam tank and Uthiramerur tank in 1985 and 1987

Encroachments

Out of 661 tanks in Palar river basin, majority of the tanks are affected by encroachments. Damal tank is encroached by 25%. Dumping of Solid Waste is also one among the reasons for encroachment. Vegavathi river area near Ayyampettai encroached by 50%. River margins near Vellore, Ayyampettai, Wajajabad, Ambur, Vaniyambadi, Arni, Vandavasi and several other places are affected by encroachments.

Fisheries

Inland and marine fishing are practiced in this basin. Brackish water fish farm at Vaninchavadi produce about 1 tonne /annum. Fishing in Kalavai Tank situated in Vellore district with fish production about 9000 tonnes. The marine fish production is estimated at 700 tonnes/annum.

Diseases

Acute Diarrhoea Disease (ADD) is prevalent in all districts. Gastroenteritis is the most prevalent disease in Vellore and Thiruvannamalai districts. Malarial fever is also a common disease and Iodine Deficiency is a common problem in Vellore and Vaniyambadi region.

Sub basins under IAMWARM for the 1st year

Cheyyar Sub Basin

Cheyyar sub basin originates from Javadhi hills and flow through Thiruvannamalai and Kanchipuram districts and confluence with Palar near Thirumukkodal village in Walajabad. The maximum area is in Thiruvannamalai district. The total area of the sub basin is 4311.88 sq.km. Cheyyar sub basin has 8 taluks i.e. Chengam, Thiruvannamalai, Arcot, Cheyar, Polur, Uthiramerur, Vandavasi and Arni. There are 6 tributaries to the Cheyyar river and it has 2 reservoirs and 8

major anicuts. Paddy is the major crop in the sub basin.

System deficiencies

1. Overall efficiency of tank irrigation system is 30-40%
2. There is 15-20% reduction in tank storage capacity due to siltation
3. Poor water scheduling
4. Inadequate supplies produce water stress condition and yield is reduced.
5. Water losses due to unlined canals

Proposed actions

1. Conjunctive use of surface and ground water
2. Renovating old tanks, desilting of ponds and supply channels and water harvesting
3. Crop rotation
4. Selective lining to canals where seepage loss is appreciable

Kliyar Sub Basin

Kliyar sub basin has four taluks i.e. Wandiwash, Uthirumerur, Maduranthakam and Cheyyar. Wandiwash taluk consists Uthiramerur and Pernamallur blocks. Uthirumerur taluk consists of two blocks i.e. Kalasappakkam and Chetput. Maduranthakam taluk consists of Maudranthakam block and Cheyyar taluk consists of three blocks i.e. Lathur, Cheyyar and Anakkavur.

System deficiencies

1. Overall efficiency of tank irrigation system is 30-40%
2. There is 15-20% reduction in tank storage capacity due to siltation
3. Poor water scheduling
4. Inadequate supplies produce water stress condition and yield is reduced.
5. Water losses due to unlined canals

Proposed actions

1. Conjunctive use of surface and ground water
2. Renovating old tanks, desilting of ponds and supply channels and water harvesting
3. Crop rotation
4. Selective lining to canals where seepage loss is appreciable
5. Use of drip and sprinkler irrigation.

PENNAIYAR RIVER BASIN

Demography

The population, density of the basin is 4334 persons per sq.km. The literacy rate is 62.3% for male and 49.2% for female. The birth and death rates are 17.23 and 5.94 per thousand as per 2001 statistics. The distribution of population between urban and rural is 15% and 85% respectively. Agriculture is the main occupation of rural population. The farmers mostly depend on tank irrigation and well irrigation besides areas under projects like, Krishnagiri Reservoir, Sathanur Reservoir etc. Most of them are marginal and small farmers and there is inequality in the distribution of lands. This aspect has seriously eroded the economic viability of farm, leading to reduced efficiency, productivity and profit margin.

Location

Pennaiyar River originates on the south-eastern slopes of Chennakesava Hills, northwest of Nandidurg in Karnataka State at an altitude of 1000 m above M.S.L. After flowing through Karnataka, the river enters Tamilnadu near Begalur village of Hosur Taluk. Pennaiyar river basin is bounded by Cauvery basin at its West, Vellar basin at South and Palar & Varahanadhi river basins at its North. The geographical co-ordinates of this basin are Latitude 11°45'00" North to 13°14'00" North and Longitude 77°45'00" East to 79°45'00" East. The total area of the basin in Tamilnadu State is 11,257 Sq.Kms.

Hydrology

The Pennaiyar river is having 10 tributaries, namely, a. Chinnar-I, b. Chinnar-II, c. Markandanadhi, d. Pullampattinadhi, e. Pambar, f. Vaniar, g. Kallar, h. Pambanar, i. Musukundanadhi and j. Thurinjalar. There are 7 major Anicuts namely Nedungal Anicut, Kumarapatti Anicut, Ichembadi Anicut, Sathanur pick up Anicut, Tirukkoilur Anicut, Ellis Choultry Anicut and Sornavur Anicut, 152 Minor Anicuts and about 22 open offtake channels. Total ayacut of the basin is 90806 Ha.

Geology

The geology of the area include metamorphic complex meta sediments and younger intrusives of Archaean formations on the central and western portion and the overlying sedimentaries of upper Cretaceous, tertiary and quaternary formations of the eastern part. The Archaean formations include granite gneiss, charnockite, hybrid gneiss and mixed gneiss, magmatites, denites, pyroximites etc. of Dharwar group and Dolerite. Pegmatite, granites synites, carbonatites of younger intrusives.

Hydrogeology

Pennaiyar river basin is underlain by crystalline formations on the western part of the basin and by sedimentary formations in the eastern coastal part of the basin. The thickness of the weathered zone varies from 5 to 60 m bgl. The yield of the boreholes range from 27 lpm to 205 lpm. In hard rock area yield varies from 60 to 180 lpm and transmissivity vary from 0.45 m²/day to 338.4 m²/day. In sedimentary formations, the

yield of the borewells ranges from 61 lpm to 1273 lpm and transmissivity ranges from 17.5 m²/day to 1133 m²/day.

Ground Water Potential

The zone of water level fluctuation varies from 3.90 m to 10.78 m in hard rock areas and from 2.15 m to 7.10 m in alluvium areas. The water level elevation above MSL varies from 80.0 m to 40.0m in hard rock areas and from 40.0m to 0m in sedimentary formations of the basin. The hydraulic gradient of ground water in the basin is 3.15 m/km in hard rock areas and from 0.93 m/km in sedimentary areas. The Total Ground water potential in Pennaiyar basin is 1560 MCM. There are about 172 observation wells in this basin.

Ground Water Exploitation

This river basin is converted into 51 blocks. Out of 51 blocks, 32 blocks are over exploited, 2 blocks are critical 13 blocks are semi critical and 4 blocks are safe.

Surface Water Potential

The annual surface water potential in the 4 zones based on 75% dependable rainfall is 1282 MCM.

Surface Water Quality

The quality of water in kelavarapally dam is polluted drastically due to the effluent and sewage let into the Pennaiyar River on the upstream side of kelavarapally reservoir. The surface water quality of krishnagiri reservoir shows that the water is alkaline in nature and the DO was present at near saturation levels; the nitrate concentration varied from 0.1-0.4 mg/l, while phosphate varied from 0.1-1.0 mg/l.

Ground Water Quality

In the basin, the chloride values do not exceed the limit. Total hardness above 180 mg/l exists in nearly 90% of ground water basin, which restricts the use of water for industries. Ground water in Melumalai, Mettupatti, Periyadobhai, Hanumanthapuram, Chinnamuthur, Bargur, Agaram, Kunnathur, Anandur, K. Vetripatti, Harur, Pappireddi areas are found to contain fluoride above the permissible limit of 1.5 mg/l. Ground water quality impairment has occurred on account of excessive salinity and fluoride in about 20% of the hard area of the basin. In the sedimentary area of the basin, the ground water is suitable for human consumption and irrigation use.

Industries

In the Ponnaiyar river basin there are about 7146 numbers of small-scale industries and medium industries. The small scale industries include food, beverage, tobacco, cotton, textile, paper, leather, chemical, metal and machinery products and the large and medium industries belongs to the categories like, fertilizer, paper, sugar, automobiles, textiles and machinery products

Forest

The catchment area of Pennaiyar basin is having reserve forests to an extent of 97.25 Sq.Km. the reserve forest area covers 3 major reserve forests mainly Sanamavu Reserve Forest, Kamasandra Reserve Forest and Maharaja Kadai Reserve Forests. The types of forests found in the catchment are tropical dry mixed deciduous forests, Secondary dry deciduous forests and dry deciduous scrub forest. There are also plantations like Eucalyptus, Bamboo, Tamarind and Cashew in some parts of the catchment

Deforestation

The reserved forest area in the catchment area falling in Hosur, Krishnagiri, Uthanagarai and Dharmapuri taluks are in a highly degraded condition. While the forest area in Harur taluk, especially Chettari hills are fairly dense. The areas in Tirupattur taluk are fairly open due to heavy influences, especially goats. The forest in Chengam and Thiruvannamalai taluks are open due to excessive goat rearing and illicit felling of trees.

Agriculture

In this basin major crop is paddy. Oil seed crops like groundnut, millets like cholam, campu, varagu, ragi, pulse crops like blackgram, greengram, sugarcane and banana are also cultivated in this area. The extent of crop area irrigated is 62227 Ha and the extent of Non-system crop area is 412106 Ha.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Pennaiyar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Sedimentation

The loss in storage capacity of Krishnagiri Reservoir in 26 years is 30.81% and the rate of silting is 1.19. Classification of reservoir curves indicated the Krishnagiri reservoir to be flood-plain-foot-hill type

Soil Erosion

Severe zones of erosion are seen in the Veppanapally water shed, the middle and lower part of Markhandanadhi water shed, the lower part of Nachikuppam water shed and the lower Pennaiyar water shed.

Solid Waste

Dharmapuri, Thiruvannamalai, Villupuram, Cuddalore and Vridachalam municipalities are having compost yards. Other municipalities and town panchayat are not having disposal facilities. There is absolutely no solid waste collection and disposable mechanism at village level in river basin area.

Salinity

The Electrical Conductivity values in the hard rock area varied from 350 to 6400 micro siemens per centimeter. It has been observed that 19% of the wells exceeds the recommended limit of 1500 mg/l, which approximately corresponds to the Electrical conductivity value of 2250 microsiemens per cm. Saline pockets in hard rock area fall around Krishnagiri, near Thirupattur- around Papparapatti, Thoranapatti, Andiappanur and Alangayam and near Dharmapuri.

Sea Water Intrusion

Sea water - fresh water interface is observed only shallow-phreatic aquifer located along the coastal width 1.5 - 4.0 km. Potable aquifer zone dispositioned in the range between 40 mts and 200 mts at Cuddalore O.T., General Hospital, Villipalayam, Kudikady and Periyapattu

Diseases

The observed general trend is that the number of cases of water borne diseases reported is larger during post monsoon period. Acute Diarrohea diseases (ADD) is the major disease reported in the basin

Sub basins under IAMWARM for the 1st year

Chinnar 1a sub basin

Chinnar 1-a sub basin originates from Hosur taluk and it is having an area of 144.52 sq.km. This has been identified as a deficit sub basin at the rate of 0.25%. The registered ayacut of this sub basin is 461.87 Ha.

System deficiencies

1. Unassured supply of water and prolonged drought

2. Low crop yields
3. Over exploitation of ground water
4. Non adopting modern irrigation and agriculture practices
5. No organized coordination among the farmer communities

Proposed actions

1. Strengthening of existing tank bunds and repairs to head sluice and surplus weir
2. Providing hitech micro irrigation facilities
3. Encouraging horticulture crops like fruits, vegetables, spices and medicinal plants
4. Training to farmers and water user association members

Chinnar 1b sub basin

Chinnar 1-b sub basin originates from Hosur taluk and it is having an area of 280.65 sq.km. This has been identified as a surplus sub basin. The registered ayacut of this sub basin is 749.47 Ha.

System deficiencies

1. Unassured supply of water and prolonged drought
2. Low crop yields
3. Over exploitation of ground water
4. Non adopting modern irrigation and agriculture practices
5. No organized coordination among the farmer communities

Proposed actions

1. Strengthening of existing tank bunds and repairs to head sluice and surplus weir
2. Providing hitech micro irrigation facilities
3. Encouraging horticulture crops like fruits, vegetables, spices and medicinal plants
4. Training to farmers and water user association members

Vaniar sub basin

Vaniar is one of the tributaries of Pennaiyar River. It originates from the shaveroy's hill ranges at an altitude of 1420 m above MSL and enters into the plains above 5km in Mullikadu in Papireddipatti taluk of Dharmapuri district. The total length of the river is 55 kms and the catchment area is 1100 sq.km. There are 2 reservoirs, 42 anicuts and 8 tanks in the sub basin. The total ayacut is 8003.16 Ha.

System deficiencies

1. Damaged anicuts
2. Canal silting and encroachments
3. Over exploitation of ground water
4. Non adopting modern irrigation and agriculture practices
5. No organized coordination among the farmer communities

Proposed actions

1. Provision of sand vent with shutter arrangements and construction of head sluices
2. Strengthening of existing tank bunds and repairs to head sluices, anicuts and surplus weir
3. Canal lining and eviction of encroachments
4. Providing hitech micro irrigation facilities
5. Rehabilitation of Vaniar dam infrastructures
6. Training to farmers and water user association members

Muskundhanadhi sub basin

Muskundhanadhi sub basin originates from Kalrayan hills and extends through eastern part of sankarapuram and Rizivandhayam area. The total area of the sub basin is 175.59 sq.km. It is having 11 anicuts and 22 tanks. The average annual of the sub basin is 950 mm. it is proposed to construct a reservoir in the upper reaches of the river. The registered ayacut of the sub basin is 1185.71 Ha.

Proposed actions

1. Desilting of tanks
2. Strengthening of existing tank bunds and repairs to head sluices, anicuts and surplus weir
3. Canal lining
4. Alternate cropping
5. Introduction of micro irrigation facilities

Pennaiyar upto Krishnagiri dam sub basin

The sub basin originates from Hosur taluk and has an area of 680.59 sq.km. this is a deficit sub basin at the rate of 0.39%. The registered ayacut of the sub basin is 5250.39 Ha.

System deficiencies

1. Unassured supply of water and prolonged drought
2. Low crop yields
3. Over exploitation of ground water
4. Non adopting modern irrigation and agriculture practices
5. No organized coordination among the farmer communities

Proposed actions

1. Strengthening of existing tank bunds and repairs to head sluice and surplus weir
2. Providing hitech micro irrigation facilities
3. Encouraging horticulture crops like fruits, vegetables, spices and medicinal plants
4. Training to farmers and water user association members

VARAHANADHI RIVER BASIN

Location

Varahanadhi basin is situated between Latitude 11° 55' North and 12° 30' North and Longitude 79° 05' East 80° 05' East. The total basin area is 4357 Sq. km of which 4214 sq. km lies in Tamil Nadu and 143 sq. km. lies in Pondichery State. The districts covered by the basin are Kancheepuram, Thiruvannamalai and Villupuram Districts. This basin is bounded by Palar basin on the North, Ponnaiyar basin on the West and South and Bay of Bengal on the East.

Hydrology

The Varahanadhi River originates in between the borders of Kilpenathur taluk of Thiruvannamalai District and western borders of Gingee Taluk in Villupuram District. The total length of the river estimated to be 78.50 Km with a total catchment area of 1936.75 Sq.Km. Varahanadhi River basin consists of two sub basins namely Varahanadhi and Ongur, the smaller sub basin called Nallavur or Kondamur located between Varahanadhi and Ongur sub basins, Other tributaries of this basin include Annamanagalam, Nariyar, Tondiar, Pambaiyar, Pambai channel and Chengai odai.

Geology

The terrain of Varahanadhi River Basin consists of different type of rocks, which is dominated by Crystalline by 87%, and sedimentary rock by 13 % and alluvial found along the coastal areas. The Varahanadhi basin completely drains in Villupuram district and geological formation identified underlain by crystalline metamorphic complex in the western parts of district and sedimentary tract in eastern side.

Hydrogeology

The hydrogeology of this basin is such that 87 % of the area under the basin is hard crystalline rock while the remaining 13 % is sedimentary. The general depth of the bedrock varies from 10 m to 60 m where crystalline formations are found.

Surface Water Potential:

The river basin has the water potential of 416 MCM based on 75% dependability of rainfall.

Ground Water Potential

The utilizable ground water recharge, draft and balance potential of Varahanadhi basin has been estimated, which shows the overall ground water recharge potential of 1482 MCM. Therefore, the total potential for this basin is estimated to be 1898 MCM.

Ground Water Exploitation

Varahanadhi river basin has been exploited fully by excess of water withdrawal, which makes the entire classification under over exploited category. According to 2003 data from the ground water department reveal that 7 blocks are identified with over exploitation ground water resources.

Surface Water quality

Varahanadhi is a non-perennial river and flow is possible only during the rainy days i.e. north east monsoon period and since last two years there is no water is identified in the river basin area.

Ground Water Quality

The ground water quality in different villages in the block of Villupuram, Tiruvannamalai and Kancheepuram (Varahanadhi River basin area only) indicate presence of EC value of 3640 microsiemen/cm in Omandur in Tindivanam Block of Villupuram District and 3140 in Orathur in Villupuram Block in Villupuram District . Similarly in Chitamur Block, the presence of EC value of 4890 microsiemen/cm indicates the quality is unfit for any safe use.

Industries

There are about 30 large and medium scale industries and more than 2,600 small scale industries are functioning in this basin area. These industries mainly engaged in manufacturing of Oil, Sugar, machinery, Textile, chemical, leather, food, beverage, plastic paper, fertilizer, cement products etc. There are sizable numbers of large industries engaged in food, tobacco, textiles, automobiles, Chemical products in the region.

Agriculture

Dominant irrigated cropping is paddy as it occupies 52.7% of the gross irrigated area. The other important irrigated crops in this basin cultivated in rotation with paddy are groundnut, sugarcane, millets like, cholam, cumbu and ragi, pulses, cotton etc. Under unirrigated cropping it is groundnut based. The organic farming in river basin support for growing of fruit and vegetable crops including flowers. There is high potential exist for organic farming in this are, which need proper attention for maintaining long term organic farming activities in the basin area .

Forest

Forest areas in this district contribute about 7.77% of the total area, which spread in the basin area bordering Salem, Dharmapuri and Tiruvanamalai Districts with divisions of Reserve Forest, interface forest and social forest. Teakwood, rosewood and Sandal wood trees are found to be grown in the hills.

Sand mining

The sand mining is a major problem in this basin, which poses major treat to riverbed of Varahanadhi. However the Water Resources Organisation having approved 5 places of sand quarry in this basin

Water Logging

In the urban areas of Gingee, Villupuram etc. are having the problem of water logging in selected pockets due to lack of drainage and storm water provisions.

Water Weeds

This basin is affected by the waterweeds in general. Out of 1421 tanks, nearly 100 tanks have been identified with 100% weeds growth spread out in the entire basin. Remaining tanks have 10% to 25% with aquatic weeds such as Cyprus rotundas, (korai, Velikattan.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Varahanadhi is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Diseases

The observed general trend is that the number of cases of water borne diseases reported is larger during post monsoon period. Acute Diarrohea diseases (ADD) is the major disease reported in the basin

Varahanadhi sub basin

System deficiencies

1. Overall efficiency of tank irrigation system is 30-40%
2. There is 15-20% reduction in tank storage capacity due to siltation
3. Poor water scheduling
4. Inadequate supplies produce water stress condition and yield is reduced.

5. Water losses due to unlined canals

Proposed actions

1. Conjunctive use of surface and ground water
2. Renovating old tanks, desilting of ponds and supply channels and water harvesting
3. Crop rotation
4. Selective lining to canals where seepage loss is appreciable
5. Use of drip and sprinkler irrigation.

VELLAR RIVER BASIN

Demography

Vellar river covers fully Athur taluk of Salem District, Thittagudi and Kallakurichi taluks of Villupuram District. It covers partly Harur taluk of Dharmapuri District, Salem taluk of Salem District, Rasipuram taluk of Namakkal District, Ariyalur & Perambalur taluks of Perambalur District, Udayarpalayam, Thuraiyur Taluks of Trichy District, Kattumannar Koil, Chidambaram & Vridachalam Taluks of Cuddalore District.

Location

The Vellar river basin is located in the Northern part of Tamilnadu state, between latitude 11° 13' North and 12° 00' North and longitude 78° 13' East and 79° 47' East. The total area of the Vellar river basin is 7659 Sq. Km. A portion of Dharmapuri, Salem, Trichy, Villupuram and Cuddalore districts are covered in Vellar river basin. This basin lies in between Ponnaiyar basin in the north and Cauvery basin in the south.

Hydrology

The river Vellar is having 6 tributaries. They are (i) Anaimaduvu, (ii) Swethanadhi, (iii) Kallar, (iv) Chinnar, (v) Manimukthanadhi, (vi) Gomukhi. A portion of Dharmapuri, Salem, Perambalur, Trichy, Villupuram and Cuddalore districts are covered in Vellar river basin. The Vellar basin is a medium river basin in Tamilnadu. The river Vellar originates at Chitteri hills in Salem District, flows entirely within Tamilnadu and falls into Bay of Bengal at Portonovo.

Geology

Both Archaen and sedimentary formations occupy this basin. Archaen group of rocks occurs on the western part of the basin (82% of-basin area) and sedimentary formations of cretaceous, tertiary and quaternary systems on the eastern part.

Hydrogeology

The depth to water level of aquifer varies from 2m to 15m in hard rock area and lowest water level is 9.00m in alluvium. The zone of water level fluctuation varies from 2.20m to 13.39m in hard rock areas and varies from 2.83m to 16.40m in sedimentary areas. The hydraulic gradient of ground water in this basin is 2.75m/km in hard rock areas and 0.65m/km in sedimentary areas. The average hydraulic gradient of Vellar river basin is 1.70m/km.

Stage of Ground Water Exploitation

Out of 39 blocks, the State Ground Water Department has identified 7 blocks as safe (< 70%), 11 blocks as semi critical (70% to 90%), 1 block as critical (90% to

100%) and 20 blocks as Over –exploited (> 100%).

Water potential

The annual total water resource potential of this basin is 2409 MCM. This basin also receives surplus water of 78 MCM from Veeranam tank of adjoining cauvery basin at Sethiathope anicut. Thus the total water potential of this basin is 2415 MCM.

Surface Water Quality

It is found that during flow pH, EC, Total Hardness, Chloride, Coliform values are within the limits. But in Koudinyar river, Palar in Nandhiyalam village and Palar river in Rajakal head sluice near perumbakkam on Kanchepuram to Arcot route, Palar in Mettur village enroute from Walajabad to Asur the Dissolved Oxygen falls below the limit of 5mg/lit, which is due to Tannery effluent mixing with water this effects the aquaculture in the area. Total dissolved solids are very high beyond the tolerable limit. Chloride is above the acceptable limit but below permissible limit, Total hardness fluctuates above and below tolerable limits and Biological oxygen demand found to be very high in some head works.

Ground Water Quality

In Mangalur, Thiyagadurgan, Viragathur, Kalathur, Edaicheruvai, Miralur, Keerapalayam, Karikai Athur and Peddanaickanpalayam areas, the quality of ground water is salined and unsafe for human consumption. The Chloride values are also high in these areas. The nitrate values are also found to exceed the permissible limits indicating the nitrate risk. The chemical composition data for few bore wells in Portonovo, Sethiathope and Purudakurayapettai locations indicate that they are of good quality. Overall ground water quality assessment indicate that about 80% of the ground waters are good to moderate in quality and may be used for human consumption and utilization purposes.

Industries

There are 9229 industries located in basin area. The water pollution due to industrial activities is minimum except ground water pollution in Pennadam area in Perambular district and discharge of Neyveli mining waters into Wallaja tank

Sewage and Solid Waste

There is no Sewage treatment plant either for municipalities or Town Panchayats. They are letting untreated/ primary treated sewage either on land or into water bodies. There are very few villages in Vellar basin is having community toilets.

Except Vridhachalam municipality, no composting yard for solid waste management is available in Vellar River Basin. There is absolutely no solid waste collection and disposable mechanism at village level in river basin area.

Forest

Thick dense forest occurs in the chitteri and Kalrayan hills. Medium dense forest occurs in the Kolli, Pachamalai, Chitteri and Kalrayan hills. Low dense forest and shrub forests are well developed in the slopes and foot of hills. Isolated pockets of reserve forest occur in the basin. Total forest area of the basin is about 27 %

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Vellar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Agriculture

The major crop of this basin is paddy. Oil seeds crop like gingelly, groundnut, coconut, sunflower and castor, millets, pulses and sugarcane are grown in this area

Sedimentation

Though there are 5 reservoirs in this basin. In Wellington Reservoir, the loss in capacity over 61 years is 22.58% and % capacity loss per year is 0.36%. Some of the watercourses of the system run near the river Vellar and occurrence of the heavy rains due to the effect of cyclone results in floods in Vellar causing breaches and damages to the banks and structures in the irrigation system.

Water logging

Water logging seems to be a serious problem at least in one of the six tank ayacuts studied (Ambapuram, Kummadimoolai, Nathamedu, Chokkankollai, Kothavacheri and Sathappadi tanks). The farmers reported that about 25% of the total cropped area under Ambapuram tank are affected by water logging.

Water weeds

Kothavacheri, Nathamedu, Kummidimoolai, Sathappadi and Chokkankollai tanks are infested with weeds such as Water hyacinth and Ipomoea SP.

Sea Water Intrusion

In the coastal area, i.e in Cuddalore district the analysis of water samples from bore wells and open dug wells were done. Open dug wells in the coastal villages Thopuiruppu, C-Muttur, Kallai and Portnovo shows poor quality ground water. Deep bore wells drilled at Periyakomatti, Thatchakadu, Chidambaram IB, Pinnathur and Pichavaram shows very poor quality of water (EC- 12800 micromhos, TDS-7682 mg/l).

Sub basins under IAMWARM for the 1st year

Manimuktha nandhi sub basin

The basin originates in Kalryan hills with drainage Area of 749.54 Km having I two drainages namely Mani river and Muktha river originating in the Northern part of the eastern slope of the Kalrayn Hills in Sankarapuram Taluk at an altitude of about 40 km and the Muktha River flows for 32 km. Manimuktha Nadhi sub basin having 18 Anicuts , 49 PWD tanks, and one Manimuktha Nadhi reservoir having the total Ayacut of 5027 Hectares. Average rainfall is 950mm in this sub basin.

Upper Vellar sub basin

It originates at an altitude of 1266m. At its starting pointing, it is known as Anaimaduvu River is called Anaimaduvu reservoir. Upper Vellar sub basin is having thirty-five Anicuts and thirty-three PWD tanks.

Lower vellar basin

The lower velar river starts from Tholudur Anicut and finally falls into portnova in Bay of Bengal. The basin is situated between latitude 11° 13' N-12° 00'N and Longitude 78° 13' E-79° 47'E. The total area of this basin is 1753 Sq.Km. the total length of lower Velar River is 128 kms. The total register Ayacut of the sub basin is 44,166 hectares. The annual rainfall of the sub basin is 1165 mm

System deficiencies

1. Submersion of standing crops during heavy flood times.
2. Silting of channels and breaches of bunds in tanks and of channels.
3. Lack of adequate control of regulating structures like anicut etc.,
4. Deteriorated canal with low efficiency and their inspection roads.
5. Full growth of Neyveli Kattamanakku, and other scrup jungles obstructs the free flow and ayacuts at the tail end area suffering for inadequate supply.

Proposed actions

1. Lining of channels.
2. Rehabilitate the Irrigation Structures such as anicuts, regulators, head sluices inlets, bed dam and tank sluices weirs etc.,
3. Desilting channel.
4. Formation of fore shore bund in tanks.
5. Flow measurements structures etc.,
6. On farm Development works to Anicuts and Tanks etc.,
7. Construction of community wells etc.,

Anivari odai sub basin

Anivariodai originates in Perambalur taluk joins the vellar on its right flank at about 10 km below the confluence point of Chinnar. The total irrigated area is 1140 hectares and 59 tanks. The total population is 0.126 million.

System deficiencies

1. Old irrigation network
2. Low Water use efficiencies
3. Inadequate transportation , storage and marketing facilities

Proposed actions

1. Lining of channels.
2. Rehabilitate the Irrigation Structures such as anicuts, regulators, head sluices inlets, bed dam and tank sluices weirs etc.,
3. Desilting channel.
4. Formation of fore shore bund in tanks.
5. Flow measurements structures etc.,
6. On farm Development works to Anicuts and Tanks etc.,
7. Construction of community wells etc.,

VAIGAI RIVER BASIN

Demography

In the Vaigai basin there has been a progressive increase in population in the last three decades. The projected figure for the year 2015 AD is about 46 million. Increase in population in the areas of catchment is also responsible for degradation and environmental impact. The catchment area hitherto untouched started getting exploited for daily domestic needs of the local inhabitants who have started concentrating in the area.

Location

Vaigai basin is one of the major seventeen river basins in Tamilnadu. It lies between the geographic co-ordinates N latitude 9° 15' and 10° 20' and E longitude 77° 10' - 79° 05'. Vaigai river basin covers an area of about 7031 sq. km. and lies in the Madurai, Theni, Dindigul, Sivagangai and Ramnad Districts of Tamilnadu.

Hydrology

The hydrology of the vaigai basin has been worked out sub basin wise. The vaigai river basin has been divided into ten sub – basins from the origin to the sea. The total sub basin area is 7031.46 Sq.km against the basin area of 7039 Sq. km.

The major tributaries namely Suruliar, Theniar, Varatar, Nagalar, Varahanadhi, Manjalar, Marudhandhi, Sirumalayar, Sathiar, Uppar etc. constitute the sub basins of vaigai basin. Vaigai basin consists of ten minor basins of Suruliar, Upper Vaigai, Theniyar, Nagalar, Varahanathi, Manjalar, Sirumalaiyar, Sathaiyar, Uppar and Lower vaigai. The major reservoirs in this basin are Periyar, Vaigai, Sothuparai, Manjalar and Marudhanadhi reservoirs.

Geology

This area consists of Archaean formations like granite, charnockites, granite gneiss, and quartzite and Quaternary formations like alluvial sediments upper gondwana, tertiary sand stone. Hard rock occupies 74% sedimentary 26% of total area.

Hydrogeology

The borehole lithological and aquifer parameter studies have revealed the existence of weathered granular aquifer, phreatic to semi confined aquifer in the alluvium and valleyfills in the crystalline rock formation and confined to semi confined aquifer conditions in the sedimentary formations. The depth of bedrock thickness in the crystalline formations varies from 9 to 60m below ground level in the fracture zones. Valley fill thickness is varying from 10 to 25m below the ground level including the fracture zones. Alluvial thickness and the extent is phreatic and confined

to the river. The thickness is varying from .10 to 25m and the lateral extent is 6 to 12 km beyond Madurai.

Ground Water Potential

Water levels are being observed in number of shallow observation wells and borewells in the entire vaigai basin. Water levels are observed every month during the first week. Hydrographs for all the wells are being maintained. As per the estimate, the net recharge of the Vaigai Basin is about 993.07 MCM. The net extraction is around 540.37 MCM and balance potential available is 452.70 MCM

Surface Water Potential

The surface water potential of the basin is 2025.92 Mcum based on 50% dependability and 1571.01 Mcum based on 75% dependability

Surface Water Quality

As per the samples taken from Peranai regulator indicates that water is clear and contains lesser amount of chemical constitutions such as TDS, PO₄, NO₂. Most of the physico – chemical parameters are within the permissible limits. This can be attributed to lesser human activities and provision of effluent treatment plants provided by the industries discharging their effluent into the river.

Ground Water Quality

The wells located at Ramanathapuram, Valantharavai, Idayanvalasai and Periyapattinam with the EC values ranging from 1125 to 2590. In other places like Mandapam, Devipattinam, Chithayankottai, Sembadayarkulam, the quality of water is poor with EC values ranging from 3125 to 6240. The poor quality is due to marine sedimentation in this area.

Sand Mining

Indiscriminate and illegal sand mining was going on at an alarming rate throughout Vaigai riverbed. Sand was mined to a depth of more than 3 mts and even more in some places. As a result in a major portion of the river the entire sand in the riverbed has been removed and the rocky bed is exposed in many places like Mannadimangalam, Thenur and Thiruvudagam villages.

Sedimentation

The studies revealed that the capacity of the reservoir as on 1976 is 178.191 Mcum as against the original capacity of 194.785 Mcum. The rate of silting was observed to be 0.473% per year and the average rate of sedimentation per sq. km. of catchment area was 0.0004 Mcum. It was also observed that the useful life of the vaigai reservoir was estimated to be 155 years. So, the catchment area should be stabilised by suitably addressing the causes of soil erosion.

Encroachment

On both sides of the Vaigai people encroached and constructed houses. Apart from the banks the riverbed is also encroached. Vaigai River from the headreach to the tail end, this menace of encroachment is there everywhere. Especially in the reaches where small villages and towns are located close to the main river and the irrigation channels taking off from Vaigai River and its tributaries the encroachment problem is predominant. The Raja Boobala Samudhram tank in Budipuram of Theni district is one of the classic example of encroachment.

Solid Waste

Vaigai River is no exception. Solid waste dumping is a problem for all the river basins. The tributaries of Vaigai like Theniyar, Varahanadhi etc. get the same treatment. Solid waste is dumped into the irrigation channels also in the Cumbum valley area. In the head reach in Varusanadu village solid waste is dumped in the river course. In Chinnamanur the solid waste is collected by vehicles and dumped in the compost yard. But the people living near by the river and the channel put their household solid waste in the channels nearby. In Periyakulam municipality the solid waste is dumped in the existing compost yard. In Madurai city the position is alarming. Even though large quantity of solid waste is collected and dumped in the compost yard people living on both banks of river dump the solid waste into the river. Similarly lower down reaches in Tiruppuvanam and Paramakudi the solid waste are put into the river and the irrigation channels. In Paramakudi the solid waste is dumped in the compost yard situated in Urapuli village near Paramakudi.

Water Logging

A large area lies downstream of Sakkarakottai Kanmai near the villages Therkutharavai, Vallimadavalasai, Viranvalasai, Kannanendal and Pallamorkulam. Another stretch of land lies near the villages Naganada chaultry, Madattur, Pannakarai and Nattakulam. Another area lies near the villages Vannankundu, Badratharavai, Regunathapuram, Karantharavaikudi. In addition to this water logged area is available near Rettaiurani, Tamaraikulam, Vellariodai and Manangudi.

Salinity

In vaigai basin the coastal areas such as Sivagangai and Ramanathapuram districts have been affected with soil salinity. The other districts such as Theni, Dindigul and Madurai are not affected with salinity. The coastal saline soils such as in Ramanathapuram and Sivagangai districts have saline ground water table at shallow

depth. Both the ground water and the soils are rich in chlorides and sulphates of sodium, magnesium and calcium. The soil salinity and depth to ground water table vary with the season. Soil salinities are maximum in dry seasons and minimum in monsoon months.

Industries

The industries in the vaigai basin are categorised as Rubber, Textiles, Spinning, Sugar, Distillery, Food Beverages, Dyeing, Pulp and Paper, Electro Plating chemicals, Dairy and Miscellaneous. These industries have been further classified as Red, Orange and Green categories depending upon the pollution level of the effluent.

Agriculture

In this basin there are well knitted irrigation systems from where water is supplied for irrigation from major reservoirs, anicuts, channels etc in addition to the tank systems. The dominant crops cultivated in the Vaigai basin are paddy, cholam, cumbu, ragi, green gram, black gram, chillies, groundnut, gingelly, cotton, sugarcane, vegetables and banana.

Seismic Zones

The basin area falls under the Zone II of seismic zones classification. The basic seismic coefficient for Vaigai Basin is 0.02 and the importance factor for all types of dams is 3. The design of dams and water retaining structures are based on IS: 1893 – 1984.

Water Weeds

The two common weeds responsible are “*Eichhornia crassipes*” and “*Ipomea carnea*”. In Vaigai River, *Ipomea carnea* is the major bank and shore weed. Severe blockage of water by *Ipomea carnea* has led to the formation of mini silt islands (Isles) in the rivers, which now grow several weedy bushes and cause floods. Water hyacinth also disseminates in larger places and causes severe disturbance in Vaigai River. Besides these two notorious waterweeds, the other waterweeds such as Pistia, Nelumbo, Nymph, Hydrilla, Vallisneria etc., causes some problems in Vaigai River.

Diseases

The important water borne diseases in the basin are caused acute diarrhoeal diseases, reproductive tract infection, Amoebiasis, Worm infestation, typhoid fever, Viral fevers Jaundice and Malaria

Sub basins included in IAMWARM for the 1st year

1. Swedhanadhi sub basin

Swedhanadhi originates from kolli hills in Rasipuram taluk of Salem district at an altitude of 1417 m above MSL. The sub basin is having 33 anicuts and 18 tanks.

System deficiencies

1. Silting of supply channels
2. Anicuts are in dilapidated condition
3. Erosion of side banks

Proposed actions

1. Strengthening of head works and repairing the anicuts
2. Lining of supply channels and reconstruction of sluices
3. Construction of field channels upto 10 Ha
4. Desilting of sathaiyar dam and tanks

2. Varaganadhi sub basin

Varaganadhi originates from western ghats and joins vaigai near Gullapuram. It has 11 anicuts and 31 tanks. The total area of the sub basin is 390. The total annual rainfall in the sub basin is 851 mm. The total ayacut is 3041.18 Ha.

System deficiencies

1. Silting of supply channels
2. Anicuts are in dilapidated condition
3. Erosion of side banks
4. Water use efficiencies are minimum
5. Inadequate facilities of transportation and marketing

Proposed actions

1. Strengthening of head works and repairing the anicuts
2. Lining of supply channels and reconstruction of sluices
3. Construction of field channels upto 10 Ha
4. Desilting of sathaiyar dam and tanks

3. Sathaiyar sub basin

Sathaiyar originates from sirumalai hills and flows southward and empties into Vaigai River. The basin covers an area of 819 sq.km. The total ayacut of the sub basin is 4279.89 Ha.

System deficiencies

1. Silting of supply channels
2. Anicuts are in dilapidated condition
3. Erosion of side banks
4. Water use efficiencies are minimum
5. Inadequate facilities of transportation and marketing

Proposed actions

1. Strengthening of head works and repairing the anicuts
2. Lining of supply channels and reconstruction of sluices
3. Construction of field channels upto 10 Ha
4. Desilting of sathaiyar dam and tanks

4. Manjalar sub basin

Manjalar originates from Palani hills and runs towards east and joins Vaigai River near Kootathu. There are 9 anicuta and 9 tanks in this sub basin. It receives an annual rainfall of 775 mm. The total sub basin area is 470 sq.km. The total ayacut of the sub basin is 2155.53 Ha.

System deficiencies

1. Silting of supply channels
2. Anicuts are in dilapidated condition
3. Erosion of side banks

Proposed actions

1. Strengthening of head works and repairing the anicuts
2. Lining of supply channels and reconstruction of sluices
3. Construction of thrashing floor at every village

AGNIYAR RIVER BASIN

Demography

The total population of the basin based on 2001 census is 1021222. In this basin male population (505487) constitutes 49.50 % of the total population. The total female population (515735) of 2001 has an edge over male population constituting 50.5% over the total population of the basin for 2001. The total population density of the basin (Based on 2001 census) is 302.63 / Sqkm

Location

Agniyar River Basin is located in between latitudes 90° 55' N to 100° 48' N and Longitudes 78° 14' E to 70° 30' E. The total area of Agniyar basin is 4,566 km² and lies entirely within Tamil Nadu. It has three minor river basin namely Agniyar, Ambuliyar and Southvellar. The western portion is 200m above sea level and tapers towards the east and reaches sea level. Tank irrigation plays an important role and there are about 40,00 irrigation tanks irrigating about 76,350 ha.

Hydrogeology

The bore wells drilled in the crystalline area are shallow ranging in depth between 30 and 60 m and the bore wells drilled in the sedimentary formation are medium to deep ranging from 150 to 350 m depth. The yield of the wells in the Archaean formation varies from 5 to 50 lpm, where as in the sedimentary formation yield of the wells various between 25 to 500 lpm. In the cretaceous formations, the yield varies between 5 lpm to 60 lpm. In the alluvium formation, the yield of the well varies between 100 to 1000 lpm. Artesian conditions were encountered in Manalmelkudi and in Kattumavadi Villages. The maximum yield of well is found in Kuppaikudi and in Orathanadu area.

Ground Water Availability

The total ground water potential in this basin is 920 MCM

Surface Water Potential

This is a small river basin comparatively with lesser drainage area. The 75 % annual weighted rainfall of this basin is 652.93 mm the annual surface water potentials are assessed for 75 % dependable rainfall for Agniyar River Basin is 585 MCM. The total surface water potential is about 697.54 million cum. A further quantity of 499.81 million cum of water is receiving from Grand anaicut canal summing the total surface water potential of the basin to 1197.34 million cum.

Ground water potential

The average annual ground water potential is 984.89 Million cum.

Surface Water quality

The maximum value of salt concentration of 8,448 ppm is recorded at Sathankulam and Aranikulam tanks. The minimum value of 3,200 ppm is recorded at Keemakanmoi, Periyakulam Eri, Kothamangalam and Periyakulam.

Ground Water quality

The ground water quality study of Agniyar basin reveals that the water quality is found to vary from good to moderate in most parts of the basin. Electrical Conductivity (EC) in this basin is varying between 0.9 mhos/cm to 1.34 mhos/cm. Sodium Absorption Ration (SAR) ranges between 1.4 and 36.6. In places like Avudayarkoil Aranthangi and Annavasal etc of this basin SAR is found to be higher than that of the permissible value of 1.4. Hence in those places water is not suitable for irrigation. The geo-chemical type of this basin is sodium chloride. Generally a moderate ground water quality prevails in many parts of the basin.

Agriculture

The cropping pattern is slowly changing into other pattern depending upon the availability of water source. Rice is the major crop in Agniyar basin. Other important crops are Groundnut, Cotton, Pulses, Millets, Gingelly, Chillies and Sugarcane. Rice is grown in three seasons, namely Kuruvai, Samba and Thaladi. The major crop is Groundnut, which occupies 68.49 % of gross rain fed crops. Other important dry land crops like Millets and Cotton are raised in rotations with Groundnut.

Forest

The forest coverage in this basin is very low, about 5 % of the basin area.

Sand mining

Sand mining is a very common phenomenon in rural area and is being transported through bullock carts, mini tractors and lorries

Aquatic environment

There are about 30 fishing villages with a population of 0.18 Million. Inland fishing through tanks and ponds is 4,500 tones per annum. A few aquaculture industrial units are located in the coastal areas of this basin in Anadaikadu, Rajamadam, and Eripurakkai of Pattukottai Taluk of Thanjavur District and around Kattumavadi of Avudaiyarkoil Taluk in Pudukkottai District.

Solid waste

Solid waste management is one of the important factors to be taken care in respect of environment. Among the municipalities, pudukkottai is doing extensive solid waste management programmes and on the other hand in pattukottai it is being paid less importance than in pudukkottai. A quantity of about 25 to 30 MT is generated per day and composted an aerobically.

Diseases

The types of diseases prevailing in the basin are Fever, Typhoid fever, Tuberculosis, Leprosy, Twakrogam, Verinam, Hypertensive diseases, Isehemic diseases, Sivogam, Nasrogam and others.

Water weeds

All ponds situated nearer to the habitations are the sources and the existence of waterweeds. The tanks affected by waterweeds are water hyacinth, salvania, water pennywort, spirulina, giant brown kelp and red seaweed.

Sub Basins Under IAMWARM 1st year

Agniyar Sub Basin

The Agniyar river otherwise Known as “Agnanavimochana” originates from the surplus of Kulathur tank in Kulathur Village, Kulathur taluk of Pudukottai District at latitude of 10° 35 N and longitude of 78° 46 E and at a distance of 36km from Trichy along Trichy-Pudukkotai road. The river runs for a distance of about 80 km from its origin and joins the Bay of Bengal at about 5 km South of Rajamadam Village of Pattukkottai Taluk. Agniyar has three tributaries namely Nariar I, Nariar II, and Maharaja Samudram.

Ambuliyar Sub Basin

River Ambuliyar has its origin in the catchment area of Manjamviduthi tank of Alangudi Taluk, Pudukottai District. The River after traversing a total distance of 48 km empties into Bay of Bengal in Ammanichatram Village of Pattukottai Taluk in Thanjavur District. The total sub basin area of Ambuliyar is 759.70 km². In the Upper Ambuliyar basin there are no tributaries, but two tributaries join in the lower Ambuliyar Basin.

South Vellar Sub Basin

The South Vellar River originates as a stream in Kumarikatti reserve forest area near Manjinampatti Village, 20 km Northwest of Thuvankurichi in Manapparai Taluk of Tiruchi District. The total length of South Vellar River from its origin to its confluence with sea is about 137 km. The total basin area of Vellar River is 1931.51 km². The main tributaries of South Vellar River are Nerunjiludiar and Gundar.

System deficiencies

1. Most of the anicuts, sluices and weirs are in damaged condition
2. Water use efficiencies are minimum due to old irrigation practices
3. Inadequate facilities of marketing, storing and transportation

Proposed actions

1. Providing equitable distribution of irrigated water by better water management
2. Rehabilitation of anicuts, tanks and lining of supply channels, desilting of tanks.
3. Alternate crop pattern
4. Adopting sprinkler and drip irrigation
5. Creating awareness among farmers, public and local bodies.

PAMBAR RIVER BASIN

Demography

The total population of the basin based on 2001 census is 1021222. In this basin male population (505487) constitutes 49.50 % of the total population. The total female population (515735) of 2001 has an edge over male population constituting 50.5% over the total population of the basin for 2001. The total population density of the basin (Based on 2001 census) is 302.63 / Sqkm.

Location

The Pambar basin is bounded by the longitudes 78⁰7'20" E to 79⁰7'9" E and latitudes 9⁰44'19"N to 10⁰25'32"N. It is spread over the districts of Pudukkottai, Sivagangai, Trichy, Dindigul, Madurai and Ramnad.

Hydrology

The main river Pambar (one of the minor rivers in Tamil Nadu) originates in left side Callingullah of ThamaraiKANMOI which is the tail end tank of ThamaraiKANMOI group, in Thirumayam village and taluk in Pudukkottai district and traverse through Pudukkottai district & Ramanathapuram district and gets divided into three courses and finally falls into the Bay of Bengal .The rivers Kottakariyar, Thenar and Virusuliar alias Manimuthar are the three tributaries joining the main river Pambar.

Geology

The area is comprised of Archaean complex on the northwest and overlain by upper Gondwana, Tertiary and recent to sub recent formations on the east. Cretaceous formations occur in the sub surface.

Hydrogeology

The thickness of weathered zone varies from 20-40m BGL. In Crystalline formations the depth of bore wells range from 14-82m BGL. The Yield of the bore wells range from 50 lpm to 200 lpm. In the sedimentary formations, the thickness of sandstone varies from 70-100m BGL. The depth of the bore well ranges from 27m to 429m BGL. The yield of the bore wells ranges from 50-500 lpm.

Surface water potential

Rainfall is the only source that contributes to this potential. Isohyetal method was used to arrive at the average rainfall using Isohyets for all the 3 different seasons. The surface water potential of the basin is 508.8 Mcum

Ground water potential

The ground water potential of the basin is 1085.14 Mcum.

Surface Water Quality

The quality of surface water at Pambar basin is found to be contaminated but the contamination level has to be considered low which is good both for human consumption and irrigation use.

Ground Water Quality

Areas of Pudukottai and Ranmad Districts the TDS in water exceeds 2000 ppm which limits its use for internal consumption

In Pambar basin the following areas are having high nitrate content namely Keelasevalpatti, Kattukudipatti, Kottaiyur & Sambanur. The EC in the lower reaches are found to vary much from the permissible limits. Pulipatti and Kottampatti of Melur taluk are the areas posing potential danger of fluoride.

Agriculture

Of the total cultivable area of 112510 ha, 75293 ha of area is covered under wet agriculture and the remaining 37217 ha under dry crops. There are only a few wells in the command area and in dry crop area for supplementation. Mostly rainfed dry crops are raised in the dry lands and only in areas where well irrigation facility is available, irrigated dry crops are raised, Some farmers, raise irrigated dry crops even in the absence of wells in their lands, by purchasing water from adjacent wells.

Sand mining

At present sand mining is not being done any where in the basin area due to non-availability of sand.

Water weeds

Of the waterweeds generally found in waterway, Ipomoea and water hyacinth are the two plants that are common. While Ipomoea is commonly found in many tanks in the basin, water hyacinth grows prolifically in Ooranies.

Seismic zones

The basin area is falling under the Zone II. The basic seismic coefficient for Pambar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Solid waste

Water bodies of the nearby areas are invariably used for disposal. Six such cases have been noticed in Pambar basin, which are Tiruppathur where All the solid waste produced by the town population is disposed off in the foreshore of Panikkanendal tank, Singanpunari is yet another town that deposits its solid waste of 5 tonnes, in the Palar river which flows very near to the town, Thirumayam and

Ponnamaravathi the waste is dumped in dumped at foreshore of Vengai kanmoi and Thirumukkani tank.

Diseases

Acute diarrhoeal disease, cholera, Typhoid, Jaundice, Malaria, Measles and chicken pox are the diseases common in all areas of the basin.

Salinity

The taluks affected by salinity in this basin are Devakkotai, Thirupattur and Thiruvadana. The range of percentage of area affected in the basin is 30-100%

Literacy

The literates of the basin are 620820, which constitute 60.79% of the total population. The no. of male literates is 367341 constituting 59.17 % and the female literates (253479) constitute 40.83 %.

System deficiencies

1. Low level of tank bunds and deep bed sluices reduce the storage capacity of the tank
2. Dilapidated conditions of sluices and weirs resulting in uncontrolled water delivery
3. Lack of adequate control of regulating structures like anicuts

Proposed actions

1. Improving the overall irrigation efficiencies by rehabilitation of conveyance and storage system
2. Conjunctive use of surface and ground water by giving awareness to farmers
3. Lining of field channels to the required extent
4. Rehabilitation of system and non system tanks and anicuts

GUNDAR BASIN

Demography

Gundar Basin is having a total population of 2,289,876 of which 1,149,875 is male population and 1,140,001 is female population. Within the basin Madurai South Taluk area is having highest population 944,663 of which male 478,419 and female 466,244.

Location

Gundar river basin is one of the major river basins of Tamil Nadu with a drainage area of 5912 Sq. km. It is located between the geographic co-ordinates Latitude $9^{\circ} 05'N$ – $10^{\circ} 03'N$ and Longitude $77^{\circ} 35' E$ – $78^{\circ} 35' E$. It is situated in between Vaigai basin in the North and Vaippar basin in the south. The basin covers part of Madurai, Sivagangai, Virudhunagar, Ramanathapuram and Thuthukudi Districts

Hydrology

The Gundar River takes its rise from the Eastern slope of Varusanadu hills at an altitude of 500 m and about 60 km westward of Madurai city. Gundar basin includes Vembar, Palar and Kottakudiar (Uthirakosamangaiar) sub basins. Vembar sub basin is located in the southern side of Gundar Basin. Palar and Kottakudiar (Uthirakosamangaiar) sub basins are located on the northern side of Gundar Basin

Geology

Gundar river basin comprises crystalline rocks of Achaean age on the Northwest and sedimentary rocks of tertiary and quaternary age on the southeastern coastal area. Archaean and sedimentary formations are more or less equally distributed in this area.

Hydrogeology

The thickness of withered zone in crystalline areas is from 15 to 40 m and highly sheared and jointed zone is from 10 to 60m below ground level. Depth to bedrock varies from 10 to 60m in the crystalline formation and is in the increasing trend in the coastal sedimentary. The depth of the boreholes drilled in the crystalline formations ranges from 24 to 50m in general. The reported yield of bore wells in the crystalline formations range from 18 to 836 liters per minute (lpm). The specific capacity values varying from 0.001 to 0.09 $m^3/min/m$ indicate that the hard rock in the basin is generally poor aquifers. Transmissivity varies from 16 to 168 m^2 / day . About 40 % of the basin area is occupied by sedimentary formation. Specific capacity of bore wells in the sedimentary formations range from 0.00018 $m^3/min/m$ to 0.226 $m^3/min/m$.

Surface water quality

There is no surface flow in the basin due to failure of monsoon, hence surface water quality as on date could not be assessed and reported. However the past experience shows that the surface water in the basin is generally good and fit for irrigation and other purposes.

Ground Water quality

Ground water quality is generally good in small patches within the basin in Thirumangalam, Vilathikulam, Thiruchuli, Madurai and Ramanathapuram taluks with total dissolved solids ranging between 31 - 499 mg/l. Except a few patches in major portion of Ramanathapuram, Kadaladi, Mudukulathur, Kamudi and Paramakudi Taluks the quality of groundwater is poor with total dissolved solids above 2000 mg/l. Almost 75% of the basin area the quality is moderate with TDS ranges between 501 to 1999 mg/l. Fluoride concentration in drinking water is high in Narikudi, T. Meenakshipuram, P. Pudupatti, Ramanujapuram villages of Madurai district. The nitrate concentration is also high in Utthappanaickanur, Chinnakattalai and Elaiarpathi villages.

Industries

In this basin there are 1293 small, medium and large-scale industries with various kinds of activities. Most of the industries are small and medium scale industries and there is only a few large scale industries. Out of 1293 industries 1037 are located in Madurai South and Thirumangalam Taluk and 256 are in rural area. Concentration of industries is high only in urban areas – Madurai and Thirumangalam Taluk. In rural areas the numbers of industries are thin.

Waterweeds

There is lush growth of Juliflora on the Kattanur tank bund of Virudhunagar district. In Girudhumal river within Madurai city limit in the stretches wherever sewage water from the adjoining habitats let into the river there is abundant growth of water Hyacinth. Near Ellies Nagar growth of water Hyacinth choked the Girudhumal River. Valaiveesi Teppakulam near Ellis Nagar and Virahanur Tank are fully infested with water Hyacinth. Ipomoea is present in majority of tanks in Gundar basin.

Encroachments

The Gudumal River has been encroached and the solid wastes and Garbage collected from the houses situated in the vicinity are being dumped in Girudamal. The encroachments in other channels, which are flowing across Madurai city, cause much damage to the life and property of people during floods.

Solid Waste

The Major Source Of Solid Wastes Dumped in water bodies is the Madurai city lying in the South of river Vaigai. Various locations of water bodies namely Gridhumal River, supply channels passing through Madurai city and tanks.

Agriculture

The main occupation of people living in Gundar Basin is only agriculture and Cattle rearing. 80 % of the population is having their livelihood by means of these two sectors only. Most of the lands are rain fed used for cultivation of dry crops like Ground nut, Millets, Cotton and Pulses. The area under tanks is cultivated with crops like Paddy, Cotton, Millets and Pulses according to the availability of water in the tanks. Perennial crops like Sugarcane, Banana and Flowers are cultivated in the tank fed areas supplemented by wells.

Literacy

Total literate population in the basin is 1,611,937 of which male literate 907,124 and female literate 704,813. In the basin 70.39% people are literate. Within the basin Madurai south taluk having highest population is also having highest male literates 498,495 and female literates 423,250.

Sub basins under IAMWARM for the 1st year

Therkkar sub basin

Therkkar River originates from the northern end of Doddappanaicken hill ranges near Usilampatti in Madurai District. There are 271 tanks situated within the Therkkar minor basin catchment area. The total ayacut under these tanks is 9736.09 ha.

Paralaiyar sub basin

The river Paralaiyar is a tributary of Gundar River. It starts about 11 Kms west of Manamadurai that is from the surplus of Keelapasalai Tank and is fed by surplus of many Vaigai fed tanks in Manamadurai taluk of Sivagangai District. The river runs into two arms up to Mosukudi where it joins together and runs through Manamadurai, Pramakudi, Kamuthi, and Mudukulathur Taluks. The total area of sub basin is about 670 sq.km. The total No of tanks benefited under this basin is 41. The total ayacut under this basin is about 1586.00 Hec.

The cropping pattern of this system

1st crop is paddy and the 2nd crops are chilly, groundnut, pulses, vegetables and cotton.

System deficiencies

1. The system is one of the old system existing for more than hundred years, as such requires rehabilitation.
2. Heavy accumulation of silt due to hilly region and contour nature of canal system.
3. No scheme works were done during the passt years. Results non-effective irrigation.
4. Lack of adequate control of regulating structures like anicut etc.,
5. This sub basins totally consists of Non system tanks. Hence this non-system tank requires rehabilitation.

Proposed actions

1. Improving the supply channels to improve and assure the irrigation efficiency of the conveyance system by rehabilitation of the supply channels in the way of desilting and lining the supply channel.
2. Rehabilitation of non-system tanks and its components like sluices, weirs etc.,
3. Rehabilitate the Anicut by Repairs and Reconstruction of Anicuts.
4. Improve the River system and channel by River Training works.
5. To improve the facilities by agriculture by providing Thrashing floor,
6. Construction of open wells, etc.,
7. To improve the Basic Activities of the WUA by constructing Buildings for water users Associations.

KALLAR RIVER BASIN

Demography

The river basin covers three taluks i.e, Kovilpatti, Ottapidaram and a small part of Vilathikulam. Under Kovilpatti it comes around 23 panchayats, under Ottapidaram it comes around 24 panchayats and under Vilathikulam taluk 9 panchayats. Thus there are 56 panchayats with a population of 52517 in Kovilpatt. 71158 in Ottapidaram 29795 in Vilathikulam.

Location

The river basin Kallar including Korampallamaru is situated entirely in Tuticorin district between the latitudes 8 ° 45' N and 9 ° 09' N and longitudes 77 ° 45' E and 78 ° 13' E. 40.66% of the total area of Tuticorin district (4621 km²), which accounts to about 1878.80 km² is covered by the Kallar river basin area. There are two rivers in this river basin. They are the Kallar River in the northern side and Korampallam River in southern side. This basin is surrounded by Vaippar basin in the north, Tambiraparani basin in west and south and the Gulf of Mannar in the east.

Hydrology

The Malattar is the main tributary of river Kallar. The catchment area of the basin is 465.7358 sq. km. There are eight anicuts in the Kallar river basin.

Geology

The basin is covered by geological formation of Archaean, tertiary and recent to sub-recent periods. The Archaean sets up of rocks are identified at Ottapidaram and Vilathikulam taluks which are found to have crystalline metamorphic complex exposed in many areas. Tertiary rock sandstones are recorded in the coastal village of Pattinamarudur.

Hydrogeology

The quaternary sediments occurring in this basin are represented by laterites, older alluvium, recent alluvium and teri sands. In this alluvial formation, the depth of the bore wells drilled varies from 18m to 302.4m BGL.

Seismicity

The north east part of Tamil Nadu including Chennai is included in zone III according to the revised seismic zoning map. The remaining areas come under the zone II. Kallar river basin including Korampallamaru is included in zone II where the seismic activities are comparatively less.

Surface water potential

Total surface water potential of this basin is 203 MCM, which is roughly 0.8% of the available surface water potential of the state.

Ground water potential

The ground water details for the Kallar river basin are observed from seven stations, namely Eppodumvendran, Idaiseval, Keelakarai, Kadumbur, Kulathur, Pasuvandanai and T.Duraiyoor. The ground water levels in all the seven stations were declining gradually in the past few years

Surface Water Quality

High TDS is observed in wells near the coastal tracks. High nitrate concentration is noticed in Vilatikulam, Kovilpatti, Kayathar, Pasuran thanai, Puthiamputur and Eppodum ventran. Domestic sewages of wayside villages are directly discharged into the river. The industrial effluents allowed into the river cause water pollution in several areas. Major industries located in Thoothukudi in Kallar basin spoil marine eco system. Sterilite industry also located in this basin is causing water pollution.

Ground Water Quality

Kallar basin is not having enough water resources and the rural population depends on ground water for drinking purposes. For fresh water the EC ranges from 10 to 1000 micromhos/cm. In kallar basin area the EC ranges from 600 to 9000 micromhos/cm which is an indication of water pollution. pH is also high on the alkaline side, ranging from 7.10 to 9.0. The total hardness and total dissolved solids are also high in all the places. The average concentration of sulphates and chlorides are very high. Nitrate exceeds the drinking limit of 45 ppm. Ground water of kallar basin is generally hard to very hard in nature, with high sulphates, bicarbonates and high concentration of nitrates. The ground water quality is poor in most of the area of Kallar basin.

Forest

The forest cover area that is found around the river basin is 2341.01 hectares. The forest area cover under the RF (reserve forest area) was noticed only at two places in kallar river basin. 1. Kurumalai - 1258.24 hectares - this comes under the Kovilpatty taluk and 2. Salikulam - 1082.77 hectares - present in the Ottapidaram taluk. There are 5 Reserve Forests in the basin.

Agriculture

In the Kovilpatti taluk, which comes under the Kallar basin area, constitutes of 73.57% of dry lands and 26.43% of wetlands. The Ottapidaram taluk area, which

comes under the Kallar basin area, consists of 82.05% of dry lands and 17.95% of wetlands. As in the case of Vilathikulam taluk under the basin area the dry land percentage was as high as 96.11% while the wetland percentage was a low 3.89%. In average, the kallar basin area consists of 83.91% of dry land and 16.09% of wetlands. Among cereals, paddy, cumbu and cholam occupy greater proportion of the area. Green gram and black gram are the major pulses cultivated. Among spices, coriander and chillies accounts for greater proportion of the area. In the non-food category cotton occupies the major area.

Sand mining

Among the villages covered the river basin, illegal sand mining is carried out in Mullur. Water flows through the Kallar and Korampallam only during the rainy seasons. Due to the sand mining the free flow of water is interrupted and much water doesn't reach the end region of the river.

Industries

A total of 57 match industries and the waste are dumped in a pit and finally burnt. The effluents are discharged in to the open drains. So far, there has been no pollution problem in the activity of these small-scale industries. Calcium factories/ bone mill at Chozhapuram village sends out foul smell in the area. There are 12 salt pans and 6 match factories.

Solid waste

Ottapidaram block has this consistent problem where the solid wastes are dumped into water bodies.

Soil Erosion

Erosion is witnessed near Tharuvaikulam and Vellapatti in a slow and steady pace. The Pattinamarudur coast has remains of rocks on the shore that clearly portrays the action on waves on the rocks leaving behind ruptured marks. In the river basin the dry lands occupy the major share compared to wetlands

Waterweeds

Eppodhumvendran tank has sometimes the infestation of Eichornia sp., Lemna major and L. minor. Other than that there is no major water infestation for this basin area.

Water logging and salinity

Water logging is a phenomenon when the soil is clay in nature. These types of lands avoid the percolation of water and water is easily retained. As for salinity this occurs in almost all the coastal villages of Ottapidaram and Vilathikulam taluks. The villages that face salinity problem in the coastal area include Veppalodai, Vadakkukalmedu, Therkukalmedu, Tharuvaikulam, Pattinamarudur and

Sakkampallapuram. The salinity problem occurs throughout the year.

Sea Water Intrusion

The seawater intrusion is found to be a major problem in some of the villages in both Kallar and Korampallam river basins. Irrational exploitation of the groundwater by digging bore wells has paved way for the intrusion of the seawater into the ground water table. The effect of seawater is felt up to a distance of 9 Km towards the villages in Ottapidaram and Vilathikulam taluks.

Diseases

Most of the villages in both the river basins were devoid of any proper drainage system or sanitation system. The water borne diseases in both the basin areas are found to be caused by bacteria and viruses. The major bacterial diseases are Cholera, Typhoid, Paratyphoid, Dysentery, Diarrhea, Leptospirosis and Tuberculosis.

System deficiencies

- 1) This system is a good old system existing for more than thousand years, as such requires rehabilitation.
- 2) Heavy accumulation of silt due to hilly region and contour nature of canal system.
- 3) The deteriorated condition of the conveyor system resulting in heavy seepage, leakage, especially in the left out portions of WRCP Phase I.
- 4) Lack of adequate control of regulating structures like anicut etc.,
- 5) Deteriorated canal with low efficiency and their inspection roads.
- 6) Rehabilitation of system and non system tanks.
- 7) Lack of awareness among the farmers for effective utilization of water.
- 8) Lack of modern communication system for effective water regulation

Proposed actions

1. Improving the overall efficiency of the conveyor systems.
2. Rehabilitation of system and non system tanks.
3. Conjunctive use of surface and ground water in all sources by giving awareness among farmers.
4. Providing micro irrigation wherever possible in consultation with line departments.
5. Introducing horticultural crops requiring less water consumption.
6. Introducing modern techniques in crop cultivation like SRI, Vermi compost, coir pith etc., by giving awareness among farmers using demo plots.
7. Providing check dams, gully plugging etc., so as to increase the ground water recharge and reduction in soil erosion.
8. Providing adoptive research trials and publicity, seminar etc, among the farmers of the sub basin with the help of TNAU.
9. Providing modern communication system for effective water regulation.

KODAIYAR RIVER BASIN

Demography

Kothaiyar basin has an area of 1523 Km² and it covers almost the entire Kanyakumari District. There are four Municipalities, five urban town Panchayats, sixty-one rural town Panchayats and one Panchayat Township. The population density of this basin is 994 people per Km² as against state population density of 428 people per Km²

Location

Kodaiyar river basin is located between latitude 08°05 N and 08°35 N and longitude 77°05 E and 77°35 E. This basin lies at the southern most tip of Indian Peninsular. This is a small basin having an area of 1533 Sq.Km and hilly area of 607 Sq. Km, which is more than 1/3rd of basin area. The entire basin in the north and Nambiyar basin in the east and Neyyar basin of Kerala state in the west. Out of four taluk of Kanyakumari districts it covers the full extent of Villavancode, Kalkulam and Agastheeswaram taluk and most of Thovalai taluk.

Hydrology

The river Kodaiyar originates in the western slope of Western Ghats and falls into Arabian Sea near Thengapattinam in the name of Tambaraparani. The river has got two main tributaries – Kodaiyar and Paralayar. The river Kodaiyar is the major tributary of river Kuzhithuraiar and it originates on the western slopes of Agasthia hills at an altitude of 1500m M.S.L. and has many tributaries of which Chittar I and Chittar II are major ones.

Geology

The geological formations met within the Kothaiyar river basin belong to the Archaean, Tertiary and Quarternary ages. The Archaean formations include garnetiferous sillimanite gneiss, garnetiferous biotite gneiss, felspathic gneiss and charnockite. The tertiary formations include thin bands of shell limestone, sandstone and variegated clay, which are overlain by recent to sub recent kankar, laterite, terisands coastal alluvium and soils.

Hydrogeology

Groundwater in this basin occurs under water table conditions in the weathered zones of gneiss and charnockites. The depth of well extends upto 40m below ground level (bgl). The water level varies from 19 to 25m in summer and in winter it reaches to ground level to 3m below ground level. Weathered and partially weathered zone underlying the topsoil varies from 8m to 65m bgl.

Water Potential

The surface and groundwater potential of Kodayar basin is 925 MCM, 342.1 MCM and Pazhayar Sub Basin is 95.5 MCM, 117.09 MCM respectively.

Surface Water Quality

The entire sewage coming from the Municipal limits of Nagercoil is let into Pazhayar River and its branch Parakkaikal. This poses considerable pollution. Surface water quality is affected due to coir retting along the coast of Kanyakumari district.

Ground Water Quality

The chloride contents in the well near Mylady exceeds the permissible limit of 1000 mg/lit, the content being 1175 and 1283 mg/lit for pre and post-monsoon period respectively. However in well Aralvoimozhi increased sulphate content is noted over certain periods. In Mylaudy and Aralvoimozhi nitrate content is found to be high. In general water quality is found to be good in most areas.

Agriculture

Kothaiyar basin has a total cultivated area of 106559 ha. The net area sown on an average is 80944 ha and area sown more than once is about 19816 ha. The major crop is paddy. The oil seeds crop like gingelly, groundnut, castor, millets like cholam, cumbu, ragi, pulse crops like green gram, red gram, balck gram, and sugar cane occupies the remaining area.

Forest

The Forests in Kanyakumari District are verdant and virgin and are said to be 75 million years old. Of the total district area of 167130 ha. Government Forests occupy an area of 50486 ha which comes to about 30.2 % of the total District geographic area. The forest area is 30.2 % of total district geographical area, which is next to Nilgiris district with 59 % and Dharmapuri District with 38 % in the State. The District is having 52% of its forests as dense forests coming only second to Dharmapuri District with 58 %.

Sand mining

Sand mining is severe in the places of Chitharai, Mancaud, Themanoor and Kuzhithurai of the basin area.

Soil Erosion

There is the specific catchment degradation problem in the watershed of this basin. The areas severely affected by this basin are Kanyakumari and Thengaipattinam.

Encroachment

The river basin is degraded and damaged due to different types of encroachments. The waterspread area of most of the ponds reduced and increased siltation. The encroachment of the channels and their banks reduced or totally obstructed the flow of water.

Weeds

Waterweeds are a major problem in most of the ponds in Kanyakumari district. The blocks affected by waterweeds are Rajakkamangalam, Agasthesswaram, Kallakulam and Vilavancode. The dominant weeds are Eichhornia, Ottelia, Lotus, Lilly, Ipomoea, Salvinia, Pistia, Trapa, Typha and Neptunia.

Sea Water Intrusion

Kanniyakumari Districts covers a long coastline running for about 65km. Length. Cystaline rocks comprising granite occupy most of the 6 miles area from sea cost and gneiss acts as a barrier to seawater intrusion. The coastal area of the basin is affected by this saline water intrusion. Sea Water intrusion is recorded in many coastal villages, particularly in Anjugramam, Manakudy, Puthalam, Pallam, Eathamozhy, Rajakkamangalam, Kadiyapattinam, Colachel, Midalam, Enayam, and in many others particularly during summer.

Diseases

The common water borne diseases prevalent in the basin are malaria, diarrhea, Jaundice, Japanese encephalitis and cholera.

Solid waste

Some of the ponds in Municipal; and Town Panchayat areas were filled up with solid wastes and now converted into play grounds, stadiums; and for construction of buildings.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Kodaiyar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Literacy

The literacy rate is 85.7% for males and 78.39% for females as against the state literacy rate of 74.83% for males and 52.29% for females.

Pazhayar sub basin

Pazhayar is one of the sub basins of Kodayar basin considered for treatment under IAMWARM Project. The river Pazhayar actually originates in the Northern slope of Western ghats from Kurathimalai at an altitude of 550m above M.S.L. Thadavaiyar, Ulakkaruviar, Koya Odai, Alanthuraiyar and Poigaiyar are the tributaries of Pazhayar. The river Pazhayar, a medium size river originating near Surulacode, drains the Pazhayar basin and finally enters the Arabian Sea near Manakudy after traveling a distance of 35km. The Pazhayar sub basin area is 476 sq.km.

System deficiencies

1. This system is a good old system existing for more than thousand years, as such requires rehabilitation.
2. Heavy accumulation of silt due to hilly region and contour nature of canal system.
3. The deteriorated condition of the conveyor system resulting in heavy seepage, leakage, especially in the left out portions of WRCP Phase I.
4. Lack of adequate control of regulating structures like anicut etc.,
5. Deteriorated canal with low efficiency and their inspection roads.
6. Rehabilitation of system and non-system tanks.
7. Lack of awareness among the farmers for effective utilization of water.
8. Lack of modern communication system for effective water regulation

Proposed actions

1. Improving the overall efficiency of the conveyor systems.
2. Rehabilitation of system and non-system tanks.
3. Conjunctive use of surface and ground water in all sources by giving awareness among farmers.
4. Providing micro irrigation wherever possible in consultation with line departments.
5. Introducing horticultural crops requiring less water consumption.
6. Introducing modern techniques in crop cultivation like SRI, Vermi compost, coir pith etc., by giving awareness among farmers using demo plots.
7. Providing check dams, gully plugging etc., so as to increase the ground water recharge and reduction in soil erosion.
8. Providing adoptive research trials and publicity, seminar etc, among the farmers of the sub basin with the help of TNAU.
9. Providing modern communication system for effective water regulation.

KOTTAKARIYAR RIVER BASIN

Demography

The basin has a total population of 5,12,046. Out of this male population is 250061 accounts for 48.84% and the female population is 261985 accounts for 51.16%. The average population density of the basin is 229.41 persons/sq.km. The percentage of male literacy of the total male population is 73.78% where as the percentage of female literacy is 55.34.

Location

The Kottakaraiyar basin lies in between 78⁰23'42" E to 79⁰1'12. 5" E longitude and 9⁰29'20" N to 10⁰2'56" N latitudes. The basin extends over a total area of 2232.06 Km² in the districts of Madurai, Sivagangai and Ramnad.

Hydrology

Kottakaraiyar River is a jungle stream formed by the surplus of many tanks in Sivaganga and Thiruvadana taluks. The river originates from Kottakaraiyar anicut constructed just below the link channel in Suryankottai River.

Geology

The area is comprised of Archaean Complex on the north west and overlain by Upper Gondwana, Tertiary and recent to sub recent formations on the east. Cretaceous formations occur in the Sub-surface. Overlying the Archaeans, upper gondwana formations, known as Sivaganga beds of upper Jurassic age crop out over cretaceous formations of lower cretaceous formations consist of top forming marker limestone bed and the bottom forming the clay sandstone with shale formations.

Hydrogeology

The basin is built up of Archean rocks comprising of Gneisses and Charnockites on Western part and sedimentary rocks comprising of Tertiary sandstone and laterite in the Eastern portion. The thickness of weathered zone varies from 20-40m BGL. In Crystalline formations the depth of bore wells range from 14-82m BGL. The Yield of the bore wells range from 50 lpm to 200 lpm. In the sedimentary formations, the thickness of sandstone varies from 70-100m BGL. The depth of the bore well ranges from 27m to 429m BGL. The yield of the bore wells ranges from 50-500 lpm.

Surface Water Potential

The total surface water potential of the basin is 310.92 Mcum. 15% of rainfall recorded is available in the form of surface flow in any season.

Ground Water Potential

The total ground water potential of the basin is 304.69 Mcum

Surface Water Quality

Sewage disposal is a daily phenomenon, the sewage ponds up in low pockets and gets diluted only when the tank receives water. This amounts to large-scale contamination and affects soil crop and, ground water, as also the health of humans and cattle and aquatic life.

Ground Water Quality

In Kalaiyarkovil, Thondi, Thiruvadani, Devakottai, Sivangangai areas, the ground water quality is found to be saline and unsafe for human consumption and the chloride values exceed the permissible limits. In Ilayangudy, Sivagangai and Semburam of Karaikudy taluk the ground water wells are found to have excessive nitrates causing nitrate contamination. In some areas of Manamadurai, and Paramakudy taluks, fluoride in ground water is below the lower tolerable limit of 0.4-ppm. In Thondi of Tiruvadana Taluk and in RS Mangalam the TDS exceeds 5000 ppm. Potable water is available in areas near the coast only at very shallow depth of 6m.

Industries

Except for a few textile industries, there are no major industries in this basin. Small-scale industries are needed to be established in order to generate employment in the villages.

Agriculture

Agriculture is the main occupation of the basin population besides Cattle and sheep-goat keeping and poultry. Of the total cultivable area of 82038 ha, 57715 ha of area is covered under wet agriculture and the remaining 24323 ha under dry crops. Mostly rainfed dry crops are raised in the dry lands and only in areas where well irrigation facility is available, irrigated dry crops are raised. Some farmers, raise irrigated dry crops even in the absence of wells in their lands, by purchasing water from adjacent wells.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Kottakariyar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Water weeds

The weed growth is the major issue of concern in this basin. Most of the water-spread area is covered with ipomea, water hyacinth. Ipomoea is commonly found in many tanks in the basin. Water hyacinth grows prolifically in Ooranies. An average of about 15% of the basin area is estimated to have been covered by these pest plants. The problems encountered in the basin due to the prolific growth of these plants are

Water logging

In low-lying areas near the coast water logging conditions prevail. These areas are located between Tondi and Devipattinam. The average width of the area affected is about 1.2 km.

Sea Water Intrusion

Seawater intrusion is a problem near coastal areas. In R.S.Mangalam, and other coastal areas, potable water is available only in depths up to 6m. In R.S.Mangalam, the TDS exceeds 7000mg/litre.

Diseases

Acute diarrheal disease (A.D.D), cholera, Typhoid, Jaundice and Malaria are the diseases that affect the basin population generally. Respiratory disorders and TB are common in Vellalore and areas where stone quarrying is done Leprosy is prevalent in all areas although the prevalence rate is small.

Sub basins under IAMWARM for 1st year

Kottakariyar sub basin

Kottakariyar sub basin originated from RS Mangalam tank and confluences at Palk Strait near Puthukadu. Nattarkal and Nattar are the tributaries of the basin. The total area of the sub basin is 1427.20 sq.km.

Saruguniar sub basin

Saruguniar river is the first river of the basin originating from Alavaikottai tank of Sivagangai Taluk and confluences at R.S. Mangalam big tank and a part of this falls in Kottakariyar. The Surplus of this tank empties into the Palk Strait near Puthukadu. The total area of the sub basin is 557.56 sq.km

System deficiencies

1. Low level of tank bunds and deep bed sluices reduce the storage capacity of the tank
2. Dilapidated conditions of sluices and weirs resulting in uncontrolled water delivery
3. Lack of adequate control of regulating structures like anicuts

Proposed actions

1. Improving the overall irrigation efficiencies by rehabilitation of conveyance and storage system
2. Conjunctive use of surface and ground water by giving awareness to farmers
3. Lining of field channels to the required extent
4. Rehabilitation of system and non system tanks and anicuts

NAMBIYAR RIVER BASIN

Demography

The total population of Nambiyar basin as per 2001 census is 155926 and the male population is 74491 and that of females is 81435.

Location

Nambiyar River Basin is located in the Southern most part of South India and situated between 8 °33' N and 8° 33' N altitude and the longitude 77° 28 E and 78° 6 E. The total area of the basin is 2084 Sq.Km. This basin is bounded by Tambaraparani basin in the North, Pazhayar and Valliyoor basin on the West, Bay of Bengal on the East and Indian Ocean on the South.

Hydrogeology

Water level in winter reaches ground level and in summer it lowers down to 10m. Draw down in the ayacut is 2m and recuperation requires 15 hrs. Nearly 2736 wells are located and each well irrigates an area of 1.7 hectares. The non-ayacut area of the sub-basin is 67930.3 hectares. The weathered thickness in the non-ayacut extends up to 17m. Average depth of the well is 11m. Water level in summer lowers down to 9m and reach 4m in winter. Draw down in the non-ayacut is 1.5m and the recuperation requires 15hrs.

Seismicity

In the seismic Zoning Map of India published by Bureau of Indian Standards, the basin lie in Z one II, which corresponds to seismic intensity VI on M.M. scale. However, the western part of the basin is close to zone III that corresponds to seismic intensity VII.

Surface water potential

The annual surface water potential for 75% dependability is 203.87MCM

Ground water potential

The ground water potential of the Nambiyar basin can be taken as 274.74 MCM/year

Industries

Palmyra industry is in many places. The cottage industries include be-keeping, artificial flowers making, cane furniture, wood turning industry, tailoring etc. Safety matches are done in many places. Handloom weaving, beedi rolling and net weaving are predominant in some places. Cotton and yarn and textile are the main items produced by the large-scale industries.

Agriculture

Wet crops like paddy, banana, fruits and vegetables, groundnut pulses, millets, cotton are grown and irrigated dry crops like groundnut, pulses, and millets are grown in the basin

Forest

The forest area is only 12.7%, which is very much low compared to national standards, dense forest occurs only in the high altitude ranges of Mahindragiri and surrounding areas. In the plains medium and low dense forest and scrub forest developed.

Water Weeds

Most of the Basin area is covered with waterweeds like *Eichornia crassipes*, (Mart.) Solms. Lamb, *Ipomea carnea* Jacq, *Prosopis cineraria* (L.) Druce. Due to the encroachment of these weeds the flow of water and ground water potential are severely affected. Besides these weeds there are other minor weeds are also seen in the basin.

Diseases

The incidence of water borne diseases is high. Malaria is in high order in Tirunelveli district.

System Deficiencies

1. As the irrigation network is age old, the existing conveyance distribution systems are functioning with moderate / less efficiencies.
2. Due to outdated old traditional method of irrigation practices, the water use efficiencies are also minimum.
3. The income of the farmers are mainly from agricultural outputs and thereby the living standards of the farmers and their dependant are not enriched.
4. Due to inadequate facilities of transporting, storing and marketing, the full benefit of the hard works are not rewarded. This in turn reflects in the growth of the Nation.

Proposed actions

1. Improving the over all irrigation efficiency of the existing irrigation system.
2. Saving surface water to possible extent and planning for rain water harvesting.
3. Rehabilitation and modernization of the irrigation structures.
4. Improving the overall conveyance efficiency and in also providing equitable distribution of irrigation water.

5. Improve the system tanks and Non system tanks.
6. Adopting Sprinkler and drip irrigation.
7. Conjunctive use of surface and Ground water in all sectors.
8. Awareness and participation of women in WUA.

PARAMBIKULAM ALIYAR RIVER BASIN

Demography

The total basin population is 14, 61,744. There is a significant growth rate in this basin. Valparai taluk is less thickly populated and there has been a reduction in its growth rate by 4%. The literacy percentage is 65.44 in the basin.

Location

Parambikulam Aliyar Project (PAP) basin is one of the inter-state project of Kerala and Tamil Nadu lies between latitude $10^{\circ}10'N$ and $10^{\circ}30'N$ and Longitude between 76° and $77^{\circ}13E$. The total catchment area of PAP is 841 km^2 . The PAP command area is located in parts of Pollachi, Udumalpet, Palladam and Triuppur taluks in Coimbatore district. A little part of the areas extends into Kangeyam and Dharapuram taluks of Erode district.

Hydrology

Parambikulam River has its origin in Ramakrishna hills and confluence with Challakudi River, the catchment of this dam lies in both Tamilnadu and Kerala state areas, which is dense forest. The total catchment area of PAP is 841 sq.km . The PAP successfully accomplished the diversion of integration of 8 west flowing rivers of which 6 in the Annamalai hills and 2 in the plains for the benefit of drought prone areas of Coimbatore and Erode districts of TamilNadu and stabilizing the existing irrigation system in Chittorpuzha of Kerala. The important tributaries of PAP river basin are Upper Nirar, Thunakadavu, Sholayar and Thirumoorthy.

Geology

The basin area of PAP consists of metamorphic igneous rocks.

Hydrogeology

The potential hard rock aquifers are found in Coimbatore district. The existences of deeply weathered and fractured zones are noticed along certain lineaments, which are capable of yielding potential supplies.

Surface Water Quality

In Thunakadavu dam, the TDS concentration is high. The impounded surface water from Upper Aliar is also very soft with low mineral matter content but however shows somewhat higher figures compare to other dam sources. Surface water is getting contaminated due to coconut fibre soaking. The units of textile industry are contributing most of the contamination and pollution.

Ground Water Quality

The ground water quality is generally alkaline with pH values ranging from 7.2 to 9. The quality of water in the major part of the area is moderate. Ground water of moderate salinity (less than 200 micromhos/cm) occurs in areas adjoining the various 2000 micromhos/cm has been observed in areas around Palladam and Udumalpet. The poor quality of water is noted in Unjavelampatti, Chinnapoolanginar, Dhali, Udumalpet and Poosaripatti villages. The highest value of EC of >8000 microsiemens/cm is observed in Chinnapoolanginar.

Nitrate concentration is reaching as high as 1200 mg/l. Excessive concentration of nitrate in ground water is found in udumalpet pollachi, negamam, annamalai and kottur. In Anamalai, there is a large fluctuation in the nitrate concentration in ground water over a period of time. Some of the areas with excess fluoride in groundwater are Eachanari, Vadachiittoor, Sangampalayam, Vedasandur, Unjavelampatti, Kolarppatti, Devanurpudur, Erisanampatti, and Karamadaiyur. The occurrence of fluoride is attributed to appetite rich granties gnesis.

Agriculture

The total cropped area is about 190907 Ha which is about 39% of the total basin area. Main crops are cereals, pulses, oil seeds and fibre .Tea plantations are conspicuous in hilly reasons. Paddy is cultivated in the some low-lying pockets. Coconut farmers are suffering for need of water in Pollachi, Udumalai and Palladam areas.

Forest

Indira Gandhi wild life sanctuary is one of the important catchment area of the PAP. There are about 320 bird species in the sanctuary. Anamalai wild life sanctuary is the largest sanctuary in Tamil Nadu with a wide variety of flora and fauna including many endemics.

Catchment degradation

There is excessive deforestation in Western Ghats. Cattle growing are polluting the river system. Due to cattle washing in the water bodies, there is a spread of leptospirosis disease in vk pudur, anaimalai, kothur and samathur.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for PAP is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Salinity

Ground water of moderate salinity (less than 200 micromhos/cm) occurs in areas adjoining the various 2000 micromhos/cm has been observed in areas around

Palladam and Udumalpet. Such poor quality, areas are generally covered by black cotton soil with poor drainage. The urban areas of Palladam, Udumalpet and Tiruppur have contributed to higher salinities due to human activities and also due to textile industry to some extent.

Sand mining

Sand mining is done in water-spread areas of Aliyar and Thirumurthy dam. This has led to ground water depletion in the riverbed.

Water logging

Water logging is found in certain places like Poosaripatti and Anamalai in Pollachi taluk, Ammapatti in Gudimangalam block, Kongalnagar, salayur and C.P.Kinar in Udumalpet block.

Water Weeds

Waterweeds are a major problem in the PAP basin. The waterweeds like Pistia and Eichornia cover larger area of water body in Anamalai, Kottur and Samathur.

Diseases

Water borne bacteria are responsible for causing cholera, dysentery and gastro enteritis. Diseases like Malaria, Yellow fever, filariasis are distinctly seen in Anamalai, Kottur, Somanur, Dhali of the basin.

Tribals

A total of 4600 tribals with 6 major tribal communities in 35 settlements in PAP basin. Tribals play a crucial role in preserving forest and wild animals and primitive agricultural practices. Natural organic farming and bio control of pests are practiced.

Palar sub basin

Palar is one of the sub basins of PAP basin. The average rainfall in this sub basin is 90 cm.

System deficiencies

1. 40% of the conveyance system has been rehabilitated under wrpc phase 1
2. Conveyance efficiency gets reduced to greater extent
3. Tail end areas are not getting equitable supply of water

Proposed actions

1. Increasing application efficiency from 65 -85%

2. Rain water harvesting
3. Replacement of inefficient agricultural pumpsets
4. Construction of godowns, drying yards and supply of tarpaulins
5. Reduce the conveyance and distribution losses and improve it to 70-80% by field channel lining

TAMBRAPARANI RIVER BASIN

Demography

This is the largest basin, 212 revenue villages are included in this area. It starts with Tirunelveli taluk and ends with Tiruchendur taluk of Tuticorin district. The total area of this river basin is 1,57,090.7 hectare. Total population of this area is 4,83,632. The total female population (2,49,938) is larger than the male population (2,33,694). The overall literacy rate of Tamiraparani river basin is 57%. In this area 66% of the male population and 53% of the female population are literates

Location

The River Tamiraparani is located in the world map, between 08° 8' and 09° 23' N latitude and 77° 09' and 77° 54' E longitude. The total area of the district is 6,823 sq. km. The river basin of the district includes Shenkottai, Tenkasi, Sankarankovil (Part) Veerakeralampudur, Ambasamudram, Nanguneri (Part), Tirunelveli and Palayamkottai taluks. In the Thoothukudi district Srivaikuntam and Tiruchendur Taluks (Part), are in the river basin. The total area of the basin constitutes 5942 sq km the whole basin lies fully in the boundaries of Tamilnadu.

Hydrology

The river Tambraparani originates at Agastya-Malai (Pothigai Hills) on the Eastern slopes of Western Ghats at an altitude of 200 OM and it confluences with the bay of Bengal at Gulf of Mannar. The total length of river is 120 K.M. (80 K.M. in Tirunelveli District and 40 K.M. in Thoothukudi District approximately. Kariyar, Servalar, Pambar, Manimuthar, JambuNathi, Ramanathi, GadanaNathi, Patchaiyar, Chittar are the tributaries of Tambraparani. The river drains with its tributaries an area of about 4500 sq. km.

Hydrogeology

The aquifer thickness in the sedimentary area ranges between 5.0 to 40.0 m underlain by clay, Sand stone, shale or weathered rock, water table in aquifer varies from 10m to 18.0m bgl.

Surface water and ground water potential

The annual water potential of the state including surface and ground water is assessed as 46,540 Mm³ (1643 TMC) where as the estimated demand is 54,395 Mm³ (1921 TMC) as of now and is likely to shoot up to 57,725 Mm³ (2038 TMC) by the year 2050.

Surface Water Quality

The Calcium Carbonated hardness varies from 20 – 125 mg/l. Though the hardness of water in Tambraparani basins was not very high, even that the level was found to be ecologically effective. The amount of Chloride ion was ranges from 7 –

28 mg/l, this moderate level of Chlorides cause sufficient water pollution. The values of TDS ranges from 20 – 201 mg/l. BOD ranges between 1.0 – 5.0 mg/l. and COD ranges between 8.0 – 200 mg/l.

Ground water quality

The ground water is fit for domestic and industrial purpose in inland area while in coastal areas, there is Saline water intrusion results in high concentration of TDS and minerals like chlorides and renders the ground water unsuitable for the purpose for which they were serving.

Industries

The industries located within 5 km from the banks of Tamiraparani River are Tamil Nadu State Transport Corporation Workshop, Papanasam, Coats Vyolla Limited, Vickramasingapuram, Sun Paper Mills, Cheranmadevi and TamilNadu State Corporation Workshop Tirunelveli. In addition to that many small-scale industries are also located along the banks of the river. There are 26 industries in the basin area.

Agriculture

Paddy, Banana, Sugarcane, Groundnut, Chillies, cotton, Sorghum, Cumbu, Ragi, Vegetables and Pulses are the various crops raised in Tamiraparani basin area. In dry regions, diversified cropping patterns exist and no single crop claims a large share of the gross cropped area. Millets are cultivated in dry lands as rainfed crops. The dominant crops cultivated in the Tamiraparani are paddy, banana, groundnut, chillies, cholam, cumbu, ragi and maize. In this basin, the major crop is paddy as it occupies 60.7% of the gross cropped area.

Forest

The reserve forest is comprised of two adjacent wildlife sanctuaries viz. Kalakkad wild life sanctuaries and Mundanthurai Wild life Sanctuaries. Both in Tirunelveli district and also part of Veerapuli and Kilamalai reserve forest in Kanyakumari district. The total area of the reserve is 895 sq. km The total catchments area of this basin is 4500 sq. km. of which hilly catchments area (western ghats) is 688 sq. km. The papanasam reserve forest, part of kalakad- Mundanthurai tiger reserve is included in this catchment.

Catchment Degradation

The total catchment area of this basin is 4500 km² of which hilly catchment area is 688 km². The Papanasam reserve forest and a part of Kalakad - Mundanthurai tiger reserve constitute the catchment area. In the Upstream areas of Thamiraparani River, removal of vegetation, erosion of bank materials, absence of canopy cover are the common features.

Soil Degradation

Tamiraparani river basin with tropical climate typically faces the problem of soil degradation to a higher degree during summer, as vegetation dries up and the ground is loose, topsoil-developing cracks. Subsequently heavy rains carry huge quantum of silt in to the river.

Waterlogging

Water logging is found in the taluks of Palyamkottai, Ambasamudram, Tirunelveli and Srivaikuntham of Tirunelveli District in Tambraparani Basin Water logging in Tirunelveli district is not permanent in nature.

Salinity

In the areas like Punnakayal and Athur in Thoothukudi district, the backwater flows in to Tambraparani River. Due to this the ground water in the adjoining places has been contaminated. In sawyerpuram area, where the ground water extraction is little bit larger scale, high salinity is noticed in ground water due to presence of calcareous materials

Encroachment

Encroachment is intensive in plains of the river, channel and ponds. Encroachments occur in Chittar Water Basin in 27 villages, in Gundar 2, in Hanumannadhi 14, in Karuppanadhi 5, in Tambraparani 49 and in Manimuttar 1 village.

Water Weeds

The invasion of waterweeds is more pronounced in this basin. Eichhornia and Ipomoea are the most dominant weeds in this basin. The infestation ranges from 10 to 100% in the tanks in this area. In Melathirukenkathanapuram tank Nymphaea Stellata (Lily), Melumbium Speciosum (Lotus) are seen. Pistia is seen in tanks in Muneerpallam, Kilanatham, vagaikulam, Udaiarkulam, etc. The infestation of waterweeds is estimated to be 3200 ha in this sub-basin

Solid Waste

Out of the 21 local bodies, which are letting untreated raw sewage in to the river, only the Tirunelveli municipality is provided with a sewerage scheme for part of the town. This scheme covers the main town and palaya pettai area. The total length of the sewers is about 40km. Pumping station is located to the east of Nainarkulam.

Diseases

When the water is released from the Papanasam reservoir, bad odor is felt. Impounded water in the reservoir contains ova of mosquitoes and other virus germs causing malaria, Typhoid, Cholera etc.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Tambraparani is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984

Sub basins under IAMWARM for the 1st year

Manimuthar sub basin

The river Manimuthar is a major tributary of the Tamiraparani. It arises from the dense forest atop Senkutheri in Ambasamudram taluk at the height of about 1300 m. above MSL. The tributaries of the Manimuthar are the Keezha Manimuthar (lower or eastern Manimuthar) and the Varattar. The river runs from its source for a distance of 9 km. and confluences with the Tamiraparani near Kallidaikurichi. The catchment area of the river is 100.55 km². The total area of the Manimuthar sub basin is 199.5 sq km. The total area of this sub basin is 4,204.47 hectare and total population is 20,459. Among this female population is 10,304 and male population is 10,155. In manimuthar sub – basin 72% male population is literate and 54% of female population is literate. Though the female population is higher than the male population the literacy rate of female population is low.

System Deficiencies

1. Heavy silt accumulation due to hilly region
2. Deteriorated condition of conveyor system resulting in heavy seepage, leakage especially in the left out portions of WRCP phase-1
3. Lack of adequate control of regulating structures like anicuts, sluices

Proposed actions

Improving the overall irrigation efficiency of conveyor system by rehabilitation of channels, tanks and anicuts

1. Conjunctive use of surface and ground water
2. Adoption of latest technology in agriculture

Chittar sub basin

Chittar sub – basin is the second largest area in the Tamiraparani river sub – basin. 127 revenue villages are come under Chittar sub – basin. The total area of this sub – basin is 1,51,547.8 hectare. Total population of this area is 4,68,577. Male population is 2,31,790 and female population is 2,36,787. In chittar sub – basin the total literacy rate is 47%. The male literacy rate is 58% and female literacy rate is 35%.

There are 17 anaicuts in Chittar irrigation system. Total ayacut is 9646 ha. Of this 2074 ha is irrigated directly and 7,570 ha is irrigated indirectly. Total number of villages benefited is 120 and there are 4,294 wells in this area. Tank irrigation is the major source in this sub basin.

System Deficiencies

1. Heavy silt accumulation due to hilly region
2. Crop failure
3. Traditional methods of irrigation practices
4. Difficulty in transportation
5. Damages due to wild animals

Proposed actions

Improving the overall irrigation efficiency of conveyor system by rehabilitation of channels, tanks and anicuts.

1. Providing drip and sprinkler irrigation systems to conserve ground water
2. Constriction of rain water harvesting structures such as farm ponds
3. Adoption of latest technology in agriculture
4. Construction of Gabion structures across the waterways to arrest siltation in the downstream tanks

Lower Tamiraparani sub basin

System Deficiencies

1. Heavy silt accumulation due to hilly region
2. Deteriorated condition of conveyor system resulting in heavy seepage, leakage especially in the left out portions of WRCP phase-1
3. Lack of adequate control of regulating structures like anicuts, sluices

Proposed actions

1. Conjunctive use of surface and ground water
2. Adoption of latest technology in agriculture
3. Providing thrashing floors, farm roads for easy conveyance and to get quality farm products
4. Training the farmers in hitech irrigation systems
5. Improving the overall irrigation efficiency of conveyor system by rehabilitation of channels, tanks and anicuts

VAIPPAR BASIN

Demography

Vaippar basin area further covers 14 taluks and 17 panchayat unions. The taluks covering fully within the basin are Srivilliputhur, Rajapalayam, Sattur, Virudhunagar, Sivakasi and Sivagiri while covering part of taluks of Peraiyur, Thirumangalam, Aruppukottai, Kariapatti, Kovilpatti, Ettayapuram and Vilathikulam and Sankaran kovil.

Location

Vaippar river basin is located in the southern most part of South India and situated between latitude 8° 59'N to 9° 49'N and longitude 77° 15' E to 78° 23' E. This basin is bounded by Vaigai basin and Western Ghats on the western side, Tambaraparani and Kallar river basin on the southern side and Gundar river basin on the northern side and the Gulf of Mannar on the east. The basin area of 5423sq.km covers the administrative districts of Virudhunagar (68%) Madurai (7%) Tirunelveli (5%) and Thoothukudi (20%). There are 9 municipalities, 6 town panchayats and 13 rural town panchayats.

Hydrology

The river Vaippar is known as Nichabandhi in the upper reaches. Only after the confluence of Deviar with Nichabandhi the river is called as Vaippar. The River originates at an altitude of 1,651 m above MSL in the Vasudevanallur reserve forests on the Eastern slopes of the Western Ghats at Neduntheri Mottai in Sivagiri Taluk of Tirunelveli district.

Hydrogeology

The occurrence and movement of groundwater in the hard rocks are controlled by the secondary porosity developed in them. Since the greater part of Virudhunagar District is underlain by crystalline metamorphic rocks of Archaean age, weaker zones like joints, fractures and fault zones and the pore spaces in the weathered zone play a dominant role in determining the water bearing and yield characteristics of these rocks. The weathered thickness in this formation varies from 4-30 mt and depth to basement varies from 10-63 mt. The maximum and minimum water levels are observed as 1 mt and 25 mt below ground level.

Ground Water Potential

The ground water potential is 1167 MCM, which is roughly 4.9% of the available total ground water potential of the state. There are at about 148 observation wells in the basin covering an area of 18.3 sqkm.

Surface water potential

The total storage capacity of this basin as created now is 638.86 mcm (104.46mcm + 559.40 mcm).

Surface Water Quality

The surface water quality is generally good in all sub basins, low in TDS (<0.5 gms/cm), chloride medium to hard (temporary) alkaline in nature. All streams and tanks complied with drinking and irrigation quality standards. The surface water is low in T.D.S. and Chlorides, medium to hard (temporary), alkaline in nature and complies with drinking and irrigation water quality standards. The E.C. value varies from 0.13 ms/cm to 1.46 ms/cm. Nitrogen concentrations are less than 5 ppm.

Ground Water Quality

Water samples show that certain parts in Virudhunagar and Sivakasi are having less fluoride content (<0.4 mg/l) while in Aruppukottai, Kariapatti, Sathur and Rajapalayam area, the content is above 1.5 mg/l. In Vaippar basin, Srivilliputhur, Alangulam, Sathur, Naduvakurichi and Vellankulam are areas of high concentration of nitrate. The industrial effluents discharged by the textile and dyeing units contaminate the ground water.

Industries

In the Vaippar basin about 76 major and medium industries and 9000 minor industries are located mostly concentrated in Sivakasi, Srivilliputhur, Sattur, Rajapalayam and Virudhunagar taluks of Virudhunagar district, Kovilpatti in Thoothukudi district and Vasudevanallur in Tirunelveli district. Textile, cement, chemical industries, match and fireworks industries are prominent in the area. Sattur, Sivakasi and Rajapalayam are the leading industrial towns in this basin.

Agriculture

In Vaippar basin, major area is under black soils viz., Vertisols and less area red soils and other types of soils. Paddy, sugarcane, cotton, Chillies, Vegetables, Pulses, Millet, Groundnut and Sunflower are the crops raised in Vaippar basin area. Paddy is the principal crop extensively cultivated in the state. Paddy is grown in all the districts in the state. It accounted for 32.8% of the total cropped area in the state during 2000-01.

Seismic Zones

The basin area is falling under the Zone II. The basic seismic coefficient for Vaippar is taken as 0.02 and the value of importance factor of all types of dams is considered as 3. And being designed based on the specifications specified in IS 1893 – 1984.

Forest

The total area of this basin is 5423 km² of which plain area is 4841 km² and hilly area is 582 km². The Vasudevanallur reserve forest, Rajapalayam reserve forest and Srivilliputtur reserve forest of Western Ghats are included in the hilly catchment area.

Water Logging

Water logging temporarily occurs during rainy season in Virudhunagar and Thoothukudi Districts. It is understood that we can expect a possible drainage problem if the E.C value of the soil exceeds due to the salinity of soil.

Water Weeds

The common waterweeds present in the river basin are water hyacinth, Ipomea, Nymphaea Typha and water lettuce. Water hyacinth and Ipomea Carnia are common everywhere. These are present in Vilathikulam, Rajapalayam and Sivagiri taluks.

Sand mining

Sand has been removed to a depth of about 1.80 m in the Nagariyar River near Kallanai anicut in Seithur village, Rajapalayam taluk. As a result, there is no flow of water on the left side of the river through Kallanai anicut to the lower down tanks. Sand mining is noticed on the upstream side of the Rajapalayam – Kalingapatti Road bridge near Vadakarai Village in the Sevalperiar river to a depth of about 1.20 m. Sand mining was found to be severe on the down stream side of the road bridge leading to Shenbagathoppu, in the head reach of Anathalaiyar river which joins Kayalkudiyar river near the origin. Sand mining is alarming on the upstream and down stream of the check dam as well as in the vicinity of the infiltration well for a depth of about 1.20m and 2.50m respectively.

Solid waste

In Vaippar basin there are 9 Municipalities, 6 urban town Panchayats and 13 rural town Panchayats.

Rural town Panchayats	Solid waste generated/day
(1) T.Kallupatti	2.4 MT
(2) Pudur	2.2 MT
(3) Sethur	5.5 MT
(4) S .Kodkulam	3.5 MT
(5) Kariapatti	3.8 MT
(6) W.Pudupatti	2.4 MT
(7) Sundarapandian	2.5 MT
(8) Mamsapuram	5.5 MT
(9) Rayagiri	3.1 MT
(10) S.Pudur	3.6 MT
(11) Thiruvengadam	1.9 MT
(12) Sivagiri	6.4 MT

Seawater intrusion

Seawater intrusion is experienced in Vilathikulam taluk of Vaippar basin. The river Uppodai is an estuarine complex area having the influence of the tidal seawater that can be felt to a distance of 5-6 km. inland. At Keelzhavaippar village, where the Vaippar river joins the sea, sea water intrudes upto Vaippar bridge and extends upto Subramanyapuram making ground water and drinking water saline.

Diseases

Acute Diarrhoeal disease, Respiratory tract infection, whooping cough, Arthritis and Viral fevers are more prevalent than other diseases in Virudunagar district while Malarial cases numbering about 194 were reported in Kil Vaippar, Vaippar and Vembar villages in Thoothukudi district. Respiratory tract infection, Anaemia, Typhoid and Viral fevers are common in Sankarankovil taluk of Tirunelveli district. In Kovilpatti area, gastro-enteritis, dysentery, cholera, jaundice and meningitis are reported. Sandaiyur hamlet in T.kallupatti block, Madurai District has old leprosy cases and in M.Puliampatti few people are affected by hydrosol and filaria. Goiter is found in T.Kunnathur while corneal ulcer (eye problem) in Peraiyur block.

Sub basins under IAMWARM for the 1st year**Nichabanadhi Sub basin**

Vaippar is called as Nichabanadhi in the head reach. It originates in Vasudevanallur reserve forest on the eastern slopes of Western Ghats in Sivagiri Taluk of Tirunelveli District. Ullatrumottai and Pudumalai Kavu are the other two hills on the other side of Kerala State. This sub basin area is 565 sq.km out of which the hilly area is 62 sq.km. There are 18 anicuts, 15 system tanks, and 151 non-system tanks in this sub basin. The command area is 5683.71 ha.

Kalingalar sub basin

The river Kalingalar, a tributary of Nichabanadhi, originates in the Vasudevanallur reserve forest area, just north of the origin of Nichabanadhi at an altitude of about 1325 m. The total drainage area of this sub basin is 111 sq.km. There are five anicuts across Kalingalar. There are 31 tanks under this sub basin. The total registered ayacut including system and non-system ayacut is 2451.22 ha.

Sinkottaiyar sub basin

Sinkottaiyar originates near Aruppukottai area at about 100 m above MSL. Sinkottaiyar starts in the plains with a catchment area of 487 sq.km. Aruppukottai and Nagalapuram towns lie in this sub basin. The command area under this sub basin comes under non-system ayacut. 37 tanks feed an extent of 2105.82 ha.

Sindapalli uppodai sub basin

Sindapalli Uppodai is a tributary to Arjunanadhi and it is a small sub basin. It originates at an altitude of about 120m above MSL near Duraisampuram village of Sivakasi taluk. Sindapalli uppodai has a plain catchment area of 177 sq.km. There is no anicut across Uppodai. There are 25 non-system tanks in this sub basin and the total registered ayacut is 842.60 ha.

Arjuna nadhi sub basin

Arjunanadhi is a major tributary to Vaippar River Periyar reservoir was constructed in the year 1976 across the river Periyar with a capacity of 5.452 mcm to benefit 388.5 ha.

System deficiencies

1. The system is a good old system existing for more than hundred years, as such requires rehabilitation.
2. Heavy accumulation of silt due to hilly region and contour nature of canal system.
3. Lack of adequate control of regulating structures like anicut etc.,
4. Deteriorated canal with low efficiency and their inspection roads.
5. The system and Non-system tanks are to be rehabilitated.

Proposed actions

1. Rehabilitation of system and non-system tanks, Anicuts.
2. Introducing hitech irrigation methods including drip and sprinkler irrigation.
3. Laying of pipelines for water conveyance.
4. Water harvesting structures for ground water recharge.
5. Sinking of new bore wells and electrification.
6. Thrashing floors and farm road in necessary places.
7. Providing modern agriculture machineries.
8. Providing retaining structures where erosion is high.
9. Conjunctive use of surface and ground water in all sources by giving awareness among farmers.
10. On farm development works.
11. Replacement of old pumps sets.
12. Desilting of existing inflow / outflow and drainage channels.
13. Farm pond
14. Community Wells.
15. WUA Buildings.
16. Training and exposure visits for farmers and project staff.

STATISTICAL DATA

CHENNAI BASIN

1. Districts and Coverage of area

S.No	District	Districts area in Sq.Km.	District areas falling in the basin (Sq.Km)	% of area in the basin
1	Chennai	174	174	100
2	Tiruvallur	7857	4275	54.4
3	Vellore	6077	1093	17.98

Source: IWS, Tharamani

2. Details of Sub basin area

S.No.	Name of the Basin	Area of the Basin (Sq.Km)
1	Araniyar	763
2	Kusaithaliyar	3240
3	Cooum	682
4	Adayar	857
	Total	5542

Source: IWS, Tharamani

3. Geographical Spread– Taluk and Blocks

S.No	Name of River Basin	District	Taluk	Block
1	Chennai	Chennai		
2		Thiruvallur	Gummidipoondi	
				Gummidipoondi
			Ponneri	Sholavaram
				Minjur
			Uttukottai	Ellapuram
			Tiruttani	Tiruttani
				Thiruvelankadu
			Pallipattu	Pallipattu
				RKPet
			Thiruvallur	Poondi

				Kadambattur
				Tiruvallur
			Poonamalle	Poonamele
3		Kancheपुरam	Sriperumbudur	Kunnathur
4		Vellore		
			Arakkonam	Kaveripakkam
				Nemili
				Arakkonam
				Sholigar
			Walajapet	Walajapet

4. Details of Major Reservoirs

S No	Name of the Dam/Reservoir	Capacity (MCM)		Command Area (ha)
		Before Raising FRL	After Raising FRL	
1	Poondi	77.96	97.98	NIL
2	Red Hills	80.71	93.46	NIL
3	Cholavaram	25.63	25.30	NIL
4	Chembarabakkam	88.36	103.23	5, 452

5. Water Potential of Sub-basins

S.No	Name of Sub-basin	Utilisable ground water recharge in MCM	Net ground water in MCM	Balance potential in MCM	Percentage of development
1	Araniyar	140.49	69.10	71.39	49.18
2	Kuasithalaiyar	549.99	448.66	101.33	81.57
3	Cooum	206.70	148.28	58.42	71.34
4	Adayar	222.21	102.82	119.39	46.27
	Total	1119.39	768.86	350.53	68.69

6. Water exploitation areas

Basin	Overexploited > 100 % Exploited	Critical 90- 100 % Exploited	Semi-Critical 70%- 90 %	Safe < 70 %
Tiruvallur	Ellapuram Minjur Pallipattu RKPet Thiruttani Tiruvelankadu	Kadambatthur Poonamalle	Gummidipoondi Madhavaram Pooneeri Sholavaram Thiruvallur	Villivakkam
Vellore	Sholingur	Nemili	Arakkonam	
			Walaja	
			Kaveripakkam	
Kancheperam	Kunnathur			

7. Water Demand and Water Balance

S No	Purpose	1999	2004	2019	2044
1	Domestic uses	230.88	253.32	320.62	432.79
2	Agriculture	3655.57	3655.57	3033.69	2619.11
3	Industries	129.35	172.46	301.81	517.38
4	Livestock	38	38	38	38
5	Power	22.4	23	25	30
6	Environment	28	28	28	28
7	Total	4104.2	4170.35	3747.12	3665.28
8	Water Balance (MCM)	-2078.2	-1739.35	-1316.12	-1234.28

(Source: State framework resources Plan of Tamil Nadu)

8. Land use / Land cover

S. No	Description	Area (ha)
1	Geographical area	5,54,200
2	Forest	28,264

3	Barren and uncultivable waste	17,734
4	Land under non - agricultural use	1,45,755
5	Cultivable waste	12,192
6	Permanent pastures and other crazing land	12,192
7	Current fallows	74,817
8	Other fallows	52,649
9	Land under Misc. use	15,518
10	Net area sown	1,95,078

(Source: State Framework resources plan PWD/WRO)

9. Crops and extent of cultivation

S No	Crop	Season	Area (ha)	Gross Irrigated Area (%)
1	Paddy	Samba	79,390	60.3
		Navarai	29,205	22.2
		Soranavari	23,070	17.5
	Sub Total		1,31,665	100
2	Ground Nut	Dec-April	37,622	19.8
3	Sugar cane	Jan-Nov	8,546	4.5
4	Cholam			
5	Cumbu	Mar-Jun	5,395	2.8
6	Ragi			
7	Vegetables	Feb-July	3,545	1.9
8	Pulses			
	Black gram Green gram	Feb-April	3,545	0.7
9	Gingelly	Jan-May	1,039	0.5
10	Chillies	Feb-July	1,019	0.5

(Source: Environmental Status report of Chennai Basin, 2001)

10. List of tanks with weeds

S.No	Location	Name of Tank	Type of Weed
1	Kakkalur	Kakkalur Tank	Ipomea
2	Kadambattur	Kadambattur	Prosopis
3	Pandur	Pandur	Prosopis
4	Panambakkam	Panambakkam Big and Small Tank	Ipomea
5	Senji	Senji Big tank	Ipomea
6	Valliyur	Valliyur tank	Ipomea
7	Pattaraiperumpudur	Pattaraiperumpudur Manjakuppam	Prosopis
8	Misrakandapuram	Misrakandapuram	Prosopis
9	Mylerwada	Mylerwada	Prosopis
10	Athimanjari	Athimanjari	Ipomea
11	Janakarajakuppam	Janakarajakuppam Padmapuram	Prosopis
12	Peddanaganpudi	Peddanaganpudi	Prosopis
13	Silambu	Silambu tank	Ipomea
14	Vediyankadu	Vediyankadu	Prosopis
15	Veeramangalam	Veeramangalam	Ipomea
16	Medur	Medur Large	Prosopis
17	Guduvanjeri	Guduvanjeri Tank	Prosopis
18	Andavoyal	Andavoyal	Ipomea
19	Aladu	Aladu ex zamin tank	Prosopis
20	Vembedu	Vembedu ex zamin tank	Ipomea
21	Tatamanji	Tatamanji system tank	Prosopis
22	Kattur	Kattur system tank	Prosopis
23	Pralayambakkam	Pralayambakkam PWD tank	Ipomea
24	Nallur	Nallur Tank	Prosopis
25	Gnayar	Gnayar tank	Ipomea
26	Perungavoor	Perungavoor tank	Prosopis
27	Amoor	Amoor tank	Prosopis
28	Nerkundrum	Nerkundrum tank	Ipomea

29	Athipattu	Athipattu Thangal PWD tank	Prosopis
30	Arani	Arani PWD Tank	Ipomea
31	Puduvoyal	Puduvoyal ex zamin tank	Ipomea

11. List of Red Category industries in Kosasthalaiyar Basin

S.No.	Name of Industry	Total no in the basin	No.of Industries		Disposal of Effluent	
			Generatin g Trade effluent	Using with in their premises	Using with in their premises	Letting out in open ditches/storm water drains
1	Chemical	40	21	15	15	6
2	Rubber	2	2	1	1	1
3	Steel plant	4	1		1	
4	Elector Planting	1	1		1	
5	Oil&Refiner y	3	3	2		3
6	Paper&pulp	1	1	1	1	
7	Engineering	8	2	1	1	1
8	Foundry	6	2	2	2	
9	Cement	1	1	1		1
10	Tannery	4	3	3	1	2
11	Fertilizer	4	3	3	1	2
12	Thermal Plant	3				
13	Pesticide	1				
14	Petrochemic al	2	2	2	1	1
15	Non-ferrous	1				
16	Miscellaneo us	15	8	7	8	
	Total	96	50	38	33	17

12. Prevalent Diseases

Year	Reported Cases				
	Acute Diarrhea	Dysentery	Cholera	Jaundice	Malaria
2002	7098	2678	435	324	45
2003	7247	2455	345	267	43

13. Population details

Districts	Region	Population		
		Persons	Male	Female
Vellore	Total	30,26,432	15,29,944	14,96,488
	Rural	20,66,718	10,48,055	10,18,663
	Urban	9,59,714	4,81,889	4,77,825
Kanchipuram	Total	24,42,179	12,44,756	11,97,423
	Rural	14,29,610	7,24,502	7,05,108
	Urban	10,12,572	5,20,257	4,92,315
Tiruvallur	Total	27,38,866	13,90,292	13,48,574
	Rural	12,46,832	6,25,817	6,21,015
	Urban	14,92,034	7,64,475	7,27,559
Chennai	Total	42,16,268	21,61,605	20,54,663
	Rural	0	0	0
	Urban	42,16,268	21,61,605	20,54,663

14. Literacy level

Districts	Literate		
	Persons	Male	Female
Vellore	1572292	950943	621349
Kanchipuram	1980898	1096992	883906
Tiruvallur	1857231	1041183	816048
Chennai	3079004	1670094	1408910

(Source: Statistical handbook of Tamil Nadu, 2002)

15. Tourist attractions

S No	District	Tourist Place/Pilgrim center
1	Chennai	Fort St. George, Santhome, AnnaSquare, Deer Park, Snake Park, Marina, Kapileswar Temple, Besant nagar temple
2	Vellore	Vellore Fort, Elagiri, Rathinagiri and Sholingur
3	Kancheepuram	Anna zoological park, Mammallapuram, VGP golden beach, MGM, Kishkintha and Kancheepuram temple
4	Tiruvallur	Poondi reservoir, Sriperumbudur, Thiruverukadu and Thiruttani

(Source: Statistical Handbook of Tamil Nadu, 2002)

16. Sewage generation

	Population 2001	Estimated Sewage Generatio n (MLD)	Existence of Sewerage Under Ground (C/P)	Open (C/P)	Upto Primary	Upto Secondary	Upto Teritiary	No Treatment	Nature of disposal and quantity		
									Water Body		
									River	Reserv oir	Land
A) Corporation											
Chennai	4,216,268	112	yes				yes	No	112		
B) Municipalities											
Thiruvallur	45,517	12.60	-	P	-	-	-	Yes	3.50	-	9.10
Avadi	230,913	55.00	-	P	-	-	-	Yes	-	-	55.00
Ambathur	302,492	54.00	-	P	-	-	-	Yes	-	2.00	52.00
Kathivakkam	32,556	14.70	-	P	-	-	-	Yes	-	-	14.70
Madhavaram	76,793	16.50	-	P	-	-	-	Yes	-	-	16.50
Thiruvottiyur	211,768	49.62	7.6 Km.(p)	P	-	-	-	Yes	40.00	-	9.62
Alandur	146,154	43.50	-	P	-	-	-	Yes	-	-	43.50
Thambaram	137,609	27.30	-	P	-	-	-	Yes	-	-	27.30
Pallavaram	143,984	28.65	-	P	-	-	-	Yes	-	-	28.65
C Town Panchayats (Urban)											
Thruverkadu	30,734	9.00	P	P	-	-	-	Yes	7.00	-	2.00
Thiruthani	38,502	12.00	-	C	-	-	-	Yes	-	-	12.00
Poonamallee	42,522	8.50	-	C	-	-	-	Yes	-	-	8.50

Towns	Population 2001	Estimated Sewage Generatio n (MLD)	Existence of Sewerage Under Ground (C/P)	Open (C/P)	Upto Primary	Upto Secondary	Upto Tertiary	No Treatment	Nature of disposal and quantity		Land
									Water Body		
									River	Reservoir	
Manali	28,174	-	-	P	-	-	-	Yes	-	-	-
Porur	28,782	2.80	-	P	-	-	-	Yes	2.80	-	-
Ponneri	24,205	5.40	-	P	-	-	-	Yes	-	-	5.40
Naravarikuppam	18,327	-	-	P	-	-	-	Yes	-	-	-
Minjur	18,327	2.50	-	P	-	-	-	Yes	-	-	2.50
Puzhal	20,297	1.00	-	P	-	-	-	Yes	-	1.00	-
Chinnasekkadu	9,744	-	-	P	-	-	-	Yes	-	-	-
Thirunindravur	29,395	-	-	P	-	-	-	Yes	-	-	-
Uthukottai	10,639	-	-	P	-	-	-	Yes	-	-	-
Maduravayal	44,127	7.00	P	P	-	-	-	Yes	7.00	-	-
Thirumazhisai	15,271	4.80	-	P	-	-	-	Yes	-	-	4.80
Gumudipoondi	16,116	3.30	-	P	-	-	-	Yes	-	-	3.30
Pallipat	8,904	-	-	P	-	-	-	Yes	-	-	-
Pammal	49,744	10.75	-	C	-	-	-	Yes	-	-	10.75
Anakaputhur	31,733	5.20	-	P	-	-	-	Yes	-	-	5.20
Chitlapakkam	25,292	4.75	-	P	-	-	-	Yes	-	-	4.75

	Population 2001	Estimated Sewage Generatio n (MLD)	Existence of Sewerage Under Ground (C/P)	Open (C/P)	Upto Primary	Upto Secondary	Upto Teritiary	No Treatment	Nature of disposal and quantity		
									Water Body		
									River	Reserv oir	Land
Kundrathur	25,028	9.85	-	P	-	-	-	Yes	-	-	9.85
Nandhampakkam	9,093	6.55	-	P	-	-	-	Yes	-	-	6.55
N.Guduvancherry	27,386	6.43	-	P	-	-	-	Yes	-	-	6.43
Perungalathur	27,386	5.30	-	P	-	-	-	Yes	-	-	5.30
Puzhudiavakkam	29,086	6.90	-	P	-	-	-	Yes	-	-	6.90
Sriperumpudur	16,085	4.75	-	P	-	-	-	Yes	-	-	4.75
Sholinganallur	15,519	3.85	-	P	-	-	-	Yes	-	-	3.85
Pallikaranai	22,503	3.80	-	P	-	-	-	Yes	-	-	3.80
Thiruneermalai	29,086	6.85	-	P	-	-	-	Yes	-	-	6.85
Total	6,236,061	545.15									369.85

17. Status of solid waste management

	Population 2001	Solid Waste Management (Tonnes)			Workers for solid waste anagement Total No.	waste management			
						No./1000 Population	Availability Of Compost Yard	Recycling as Manure Yes/No	If yes annual Productio n
Minjur	18,327	4.5	4	90	15				

Puzhal	20,297	2.85							
Chinnasekkadu	9,744	NA							
Thirunindravur	29,395	3.5	3	98	18				
Uthukottai	10,639	NA							
Maduravayal	44,127	2.5	0.5	20	10				
Thirumazhisai	15,271	NA							
Gumudipoondi	16,116	NA							
Pallipat	8,904	5.50	5.00	90.91	28	0.70	Nil	No	-
Pammal	49,744	5.50	4.50	81.82	6	0.31	Nil	No	-
Anakaputhur	31,733	3.80	3.50	92.11	10	0.58	Nil	No	-
Chitlapakkam	25,292	4.20	4.00	95.24	14	0.56	Nil	No	-
Kundrathur	25,028	2.50	2.25	90.00	8	0.72	Nil	No	-
Nandhampakkam	9,093	-	-	-	-	-	Nil	No	-
N.Guduvancherry	27,386	-	-	-	-	-	Nil	No	-
Perungalathur	27,386	3.50	3.25	92.86	13	0.68	Nil	No	-
Puzhudivakkam	29,086	-					Nil	No	-
Sriperumpudur	16,085	1.76	1.50	85.23	21	2.33	Nil	No	-
Sholinganallur	15,519	1.25	1.00	80.00	3	0.13	Nil	No	-
Pallikaranai	22,503	2.50	2.00	80.00	6	0.60	Nil	No	-
Thiruneermalai	29,086	1.25	1.00	80.00	3	0.13	Nil	No	-
Total	6,236,061								

PALAR BASIN

1. Geographical Area and Coverage

S.No.	Districts	Area (sq.km.)
1	Vellore	4710.58
2	Kancheपुरam	2187.90
3	Thiruvanamalai	4012.19
	Total	10,910.67

Source: IWS Report, Tharamani

2. Geographical Spread– Taluks and Blocks

S.No	District	Taluk	Block
1	Vellore	Walajapet	Sholinghur(part)
			Walajapet (part)
		Arcot	Arcot
			Timiri
		Gudiyatham	Gudiyatham
			Pernampet
		Katpadi	KVKuppam
			Katpadi
		Tirupattur	Tirupattur (part)
			Natrampalli (part)
		Vaniyambadi	Madhanur
			Jolarpett(part)
			Alangayam (part)
		Vellore	Anicut
			Vellore
			Kaniyambadi
		Arakkonam	Kaveripakkam (part)
			Nemili (part)
	Kancheपुरam	Kancheपुरam	Kancheपुरam (part)

			Walajabad (part)
		Chengalpattu	Kattankaolathur (part)
			Thiruporur (part)
		Thirukazhukundrum	
			Thirukazhukundrum
		Sriperumbudur	Sriperumbudur (part)

		Uthiramerur	Uthiramerur
		Maduranthagam	Achrapakkam(part)
			Madhurantagam(part)
		Cheyyar	Lathur (part)
			Chittamur(part)
	Thiruvanamalai	Cheyyar	Vembakkam
			Cheyyar
			Annakavur
		Vandavasi	Pernamallur (part)
			Theallar (part)
			Vandavasi(part)
		Polur	Polur
			Kalaspakkam
			Chetput
		Thiruvanamalai	Thurijinapuram(part)
		Chengam	Jawadhi Hills
			Pudupalayam
			Chengam(part)
			Thandrampet(part)
		Arni	Arani
			West Arani

3. Zone wise surface water potential

S.No.	Name of zone	75% Dependable Surface Water Resource in MCM		
		South West	North East	Annual
1.	Upper Palar	147.46	162.44	409.52
2.	Lower Palar	81.25	117.46	245.57
3.	Kavundanilya Naganadhi	45.94	50.57	137.55
4.	Upper Cheyyar	113.53	135.99	315.09
5.	Lower Cheyyar	90.22	112.54	261.52
6.	Kiliyar Palar	121.54	207.48	388.75
Total for Palar River Basin		599.94	786.48	1758.0

Source: State Frame Work Report, IWS, Tharamani

4. Ground Water exploitation areas - 2003

District	Over exploited- Greater than 100%	Critical- 90% to 100%	Semi Critical- 70% to 90%	Safe – less than 70%*
Kanchepuram	Tiruporur	Thirukalikundrum	Chittamoor	Acharapakkam
	Kattankalathur		Uthiramerur	
	Walajabad			
	Kanchepuram			
	Madurantagam			
	Lathur			
	Sriperumpudur			
	Vellore	Kaniyambadi	Nemili	Walaja
Anaicut			Kaveripakkam	
Madanur				
Peranampet				
Gudiyatham				
KVKuppam				
Katpadi				
Thirupattur				

	Alangayam			
	Nattrampalli			
	Jolarpet			
	Arcot			
	Timiri			
	Vellore			
Thiruvanamalaiai	Chengam	Javadhi Hills	Annakavoor	Tellar
	Thurinjiapuram	Arni west	Arni east	Peranamallur
	Vandavasi		Chetpet	
	Kalasapakkam		Cheyar	
	Polur		Vembakkam	
	Pudupalayam			
	Thandarampet			

5. Total Water Requirement (in MCM)

S. No	Purpose	1999	2004	2019	2044
1.	Agriculture	3655.57	3655.57	3655.57	3655.57
2.	Domestic	116.88	127.82	160.64	215.33
3.	Industrial	64.65	86.20	150.85	258.60
4.	Live Stocks	60.09	60.09	60.09	60.09
5.	Power	10.00	10.00	10.00	10.00
	TOTAL	3907.19	3939.68	4037.15	4199.59

6. Land use pattern

S.No	Land Use Type	Area (hectares)
1	Forest area	2,18,620
2	Barren and Uncultivated (Including wasteland)	42,412

3	Non agricultural	1,72,042
4	Cultivated wasteland	18,804
5	Permanent pastures and grazing land	15,219
6	Current Fallows	93,128
7	Other Fallows	46,244
8	Miscellaneous Use	10,762
9	Net area sown	4,76,836

(Source: Status report of the Palar basin, 2003)

7. Population

Districts	Region	Population	Male	Female
Vellore	Total	34,82,970	17,43,871	17,39,099
	Rural	21,64,654	10,85,192	10,79,462
	Urban	13,18,316	6,58,679	6,59,637
Kanchipuram	Total	28,69,920	14,55,302	14,14,618
	Rural	13,35,189	6,73,387	6,61,802
	Urban	15,34,731	7,81,915	7,52,816
Tirvanamalai	Total	21,81,853	10,93,191	10,88,662
	Rural	17,81,304	8,93,132	8,88,172
	Urban	4,00,549	2,00,059	2,00,490

(Source: Statistical handbook of Tamil Nadu, 2002)

8. District wise literacy level

Districts	Literates	Male	Female
Vellore	22,46,052	12,66,981	9,79,071
Kanchipuram	19,80,898	10,96,992	8,83,906

Tiruvannamalai	13,17,651	7,73,367	5,44,284
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(Source: Statistical handbook of Tamil Nadu, 2002)

9. District wise Tourist attractions

S.no	District	Tourist Place/Pilgrim center
1	Vellore	Vellore Fort, Elagiri,Rathinagiri and Sholingur
2	Kancheepuram	Anna zoological park, Mammallapuram,VGP golden beach, MGM, Kishkintha and Kancheepuram temple
3	Tirvannamalai	Sattanur, Javvadu Hills and Tiruvanmalai temple

10. Environmental Status of Domestic sector – Sewerage Condition-Towns in Palar River Basin

Name of the town	Population 2001	Estimated Sewerage Generation (Lakh Lit)	Existence of Sewerage		Upto Primary	Upto Secondary	Upto Tertiary	No Treatment	Nature of disposal and quantity		
			Under Ground (C/P)	Open (C/P)					Water Body		
									River	Reservoir	Land
Dharapadavedu (TP)	30070	12.00						Yes			1
Kalinjur (TP)	16853	7.20						Yes			7.20
Kangeyanallur (CT)	12669	6.00						Yes			6.00
Gandhinagar (Katpadi Extn) (TP)	9487	4.00						Yes			4.00
Pallikonda (TP)	20771	10.40						Yes			10.40
Shenbakkam (TP)	13390	7.20						Yes			7.20
Sathuvachari (TP)	44942	20.00						Yes			20.00
Konavattam (CT)	9359	4.00						Yes			4.00
Allapuram (TP)	26948	12.00						Yes			12.00
Thorapadi (TP)	13924	6.40						Yes			6.40
Palavansathu (CT)	16962	8.00						Yes			8.00
Odugathur (TP)	8148	4.00						Yes			4.00

Virupakshipuram (CT)	12885	5.60						Yes			5.60
Thuthipattu (CT)	6984	2.40						Yes			2.40
Uthayendram (TP)	11567	5.60						Yes			5.60
Jaffrabad (CT)	6631	2.40									2.40
Tiruvanamalai											
Polur (TP)	25505	11.20	No	Yes	-	-	-	Yes	-	-	11.20
Arani (M)	60815	21.00	No	Yes	-	-	-	Yes	-	-	21.00
Kannamangalam (TP)	7316	2.10	No	Yes	-	-	-	Yes	-	-	2.10
Peranamallur (TP)	5557	1.75	No	Yes	-	-	-	Yes	-	-	1.75
Tiruvethipuram (M)	35201	14.14	No	Yes	-	-	-	Yes	-	-	14.14
Pudupalayam (TP)	10005	7.00	No	Yes	-	-	-	Yes	-	-	7.00
Kalambur (TP)	13291	4.20	No	Yes	-	-	-	Yes	-	-	4.20
											497.54
	1512565	529.708									8

12. Water Quality Analysis – Palar River (Selected Locations, Wells and Parameters)

District	Block	Village	Well No	Date of collection	EC_GEN	pH_GEN	Ca	SO4
Palar River								
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	1/24/03	860	8.2		
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	4/24/03	920	7.8		
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	7/27/03	790	7.5	48	5

Kancheepuram	Thirukazhukkuntram	Sadras	U23089	7/21/03	1060	8.4	54	77
Kancheepuram	Thirukazhukkuntram	P. V. Kalathur	02001	7/21/03	670	8	44	29
Kancheepuram	Kattankolathur	Patravakkam	02026	7/30/03	810	8.4	40	65
Kancheepuram	Kattankolathur	Karunilam	02012	7/21/03	1380	8.1	86	86
Kancheepuram	Kancheepuram	Orikkai Water Works	2403	7/31/03	370	8.5	24	19
Kancheepuram	Kancheepuram	Kailasanatharkoil	U23005	7/31/03	1520	8.1	36	44
Kancheepuram	Walajabad	Walajabad	02037	7/31/03	1620	8.3	52	144
Vellore	Kaveripakkam	Karivedu	U23029	7/17/03	1420	8	40	81
Vellore	Kaveripakkam	Karivedu	U23029	1/9/03	1600	8.6		
Vellore	Arcot	Pudupadi	21527	7/18/03	6300	7.5	20	350
Vellore	KV Kuppam	Latteri	21541	7/24/03	1430	8.1	68	115
Vellore	Gudiyatham	Gundalapalli	21547	7/24/03	2560	7.7	40	226
Vellore	Gudiyatham	Arumbaruthi	21511	7/25/03	2640	8.2	72	211
Vellore	Natrampalli	Kothur	21542	7/29/03	1410	8.4	22	72
Vellore	Vaniyambadi	Vaniyambadi	23023	1/6/03	3550	8.3		
Vellore	Vaniyambadi	Vaniyambadi	23023	4/11/03	3680	8.2		
Vellore	Vaniyambadi	Vaniyambadi	23023	7/28/03	3800	8.5	48	211
Vellore	Vaniyambadi	Natrampalli	21543	7/29/03	1270	8.3	24	91
Vellore	Vaniyambadi	Vengili	21512	7/28/03	1430	8.2	58	106
Vellore	Vaniyambadi	Thekkupattu	21544	7/28/03	1260	8.2	16	71
Vellore	Madhanur	Kommeswaram	21550	7/28/03	3430	8	120	274
Vellore	Anaicut	Perumugai	23071	7/25/03	950	8.2	20	62

Vellore	Vellore	Poigai sathyamangalam	23078	1/10/03	1740	8		
Vellore	Vellore	Poigai sathyamangalam	23078	4/8/03	2450	7.9		
Vellore	Walajahpet	Sengalnatham	21556	7/19/03	6600	7.6	40	523
Vellore	Walaja	Sathambakkam	U23042	7/19/03	760	7.7	30	35
Vellore	Walajahpet	Gudimallur	21529	7/19/03	900	8.4	34	45
Tiruvannamalai	Cheyyar	Natteri	21578	8/12/03	2970	7.5	168	149
Tiruvannamalai	Cheyyar	Dusi	21577	8/19/03	1410	7.8	36	61
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	1/24/03	78	4		
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	4/24/03	113	4		
Kancheepuram	Thirukazhukkuntram	Vayalur	U23091	7/27/03	106	5	463	200
Kancheepuram	Thirukazhukkuntram	Sadras	U23089	7/21/03	138	3	646	265
Kancheepuram	Thirukazhukkuntram	P. V. Kalathur	02001	7/21/03	74	3	404	170
Kancheepuram	Kattankolathur	Patravakkam	02026	7/30/03	149	4	461	295
Kancheepuram	Kattankolathur	Karunilam	02012	7/21/03	213	11	824	380
Kancheepuram	Kancheepuram	Orikkai Water Works	2403	7/31/03	50	2	236	125
Kancheepuram	Kancheepuram	Kailasanatharkoil	U23005	7/31/03	277	8	993	120
Kancheepuram	Walajabad	Walajabad	02037	7/31/03	213	5	1005	190
Vellore	Kaveripakkam	Karivedu	U23029	7/17/03	269	3	781	300
Vellore	Kaveripakkam	Karivedu	U23029	1/9/03	383	2		

Vellore	Arcot	Pudupadi	21527	7/18/03	1914	5	3571	1800
Vellore	KV Kuppam	Latteri	21541	7/24/03	149	19	917	325
Vellore	Gudiyatham	Gundalapalli	21547	7/24/03	468	41	1634	410
Vellore	Gudiyatham	Arumbaruthi	21511	7/25/03	447	23	1591	300
Vellore	Natrampalli	Kothur	21542	7/29/03	163	17	859	305
Vellore	Vaniyambadi	Vaniyambadi	23023	1/6/03	865	22		
Vellore	Vaniyambadi	Vaniyambadi	23023	4/11/03	822	21		
Vellore	Vaniyambadi	Vaniyambadi	23023	7/28/03	978	17	2342	900
Vellore	Vaniyambadi	Natrampalli	21543	7/29/03	199	7	680	355
Vellore	Vaniyambadi	Vengili	21512	7/28/03	213	13	848	500
Vellore	Vaniyambadi	Thekkupattu	21544	7/28/03	128	8	755	265

PENNAIYAR BASIN

1. Basin Area District Wise

S. No.	Name of the District	Total Area of the District	Area of the basin falling in the District	% Area of the District falling in the basin	% Area of basin falling in the District
1.	Dharmapuri	9622	6744.03	70	59.91
2.	Vellore	6077	460.35	7.57	4.09
3.	Thiruvannamalai	6312	1761.00	13.54	7.59
4.	Villupuram	7222	2195.22	30.4	19.5
5.	Cuddalore	3678	1002.44	27.25	8.91
			11257.00		100.00

2. List of Blocks

S.No.	Block Name	Taluk Name	District Name
1.	Papireddipettai	Harur	Dharmapuri
2.	Harur	Harur	Dharmapuri
3.	Morapur	Harur	Dharmapuri
4.	Uttangarai	Uttangarai	Dharmapuri
5.	Dharmapuri	Dharmapuri	Dharmapuri
6.	Nallamapalli	Dharmapuri	Dharmapuri
7.	Palacode	Palacode	Dharmapuri
8.	Kaveripattanam	Pochampalli	Dharmapuri
9.	Bargur	Krishnagiri	Dharmapuri
10.	Krishnagiri	Krishnagiri	Dharmapuri
11.	Kelamangalam	Dhenkanikottai	Dharmapuri
12.	Veppanapalli	Krishnagiri	Dharmapuri
13.	Sholagiri	Hosur	Dharmapuri
14.	Hosur	Hosur	Dharmapuri

S.No.	Block Name	Taluk Name	District Name
15.	Karimangalam	Palacode	Dharmapuri
16.	Mathur	Uttangarai	Dharmapuri
17.	Pennagaram	Pennagaram	Dharmapuri
18.	Thally	Dhenkanikottai	Dharmapuri
19.	Alangayam	Vaniyambadi	Vellore
20.	Thirupattur	Thirupattur	Vellore
21.	Kandili	Thirupattur	Vellore
22.	Nattarampalli	Thirupattur	Vellore
23.	Jolarpet	Thirupattur	Vellore
24.	Yercaud	Yercaud	Salem
25.	Ayodhyapattinam	Valapadi	Salem
26.	Peddanayakkampalayam	Attur	Salem
27.	Thiruvannamalai	Thiruvannamalai	Thiruvannamalai
28.	Thandrampattu	Chengam	Thiruvannamalai
29.	Chengam	Chengam	Thiruvannamalai
30.	Pudupalayam	Chengam	Thiruvannamalai
31.	Thurinapuram	Thiruvannamalai	Thiruvannamalai
32.	Kilpennatur	Thiruvannamalai	Thiruvannamalai
33.	Kandamangalam	Villupuram	Villupuram
34.	Kolianur	Villupuram	Villupuram
35.	Kanai	Villupuram	Villupuram
36.	Thiruvannainallur	Ulundurpettai	Villupuram
37.	Thirukovillur	Thirukovillur	Villupuram
38.	Mugaiyur	Thirukovillur	Villupuram
39.	Rishivandiyam	Kallakurichi	Villupuram
40.	Sankarapuram	Kallakurichi	Villupuram
41.	Kalarayan Hills	Kallakurichi	Villupuram
42.	Ulundurpet	Ulundurpet	Villupuram
43.	Tiyagaidurgam	Kallakurichi	Villupuram
44.	Gingee	Chenji	Villupuram
45.	Thirunavalur	Ulundurpettai	Villupuram
46.	Annagraman	Panruti	Cuddalore
47.	Panruti	Panruti	Cuddalore
48.	Cuddalore	Cuddalore	Cuddalore
49.	Vridachalam	Vridachalam	Cuddalore

S.No.	Block Name	Taluk Name	District Name
50.	Kurinchipadi	Cuddalore	Cuddalore
51.	Kammapuram	Vridachalam	Cuddalore

3. Storage Capacity and Command Area of Reservoirs

S.No.	Name of the Reservoir	Capacity in MCM	Ayacut in Ha.
1.	Krishnagiri	66.10	3642
2.	Sathanur	229.00	18222
3.	Pambar	7.00	1620
4.	Shoolagiri Chinnar	2.30	352
5.	Vaniar	11.80	4212
6.	Thumbalahalli	3.70	884
7.	Kelavarapalli	13.10	3240
	Total	333.00	32172

4. Ground Water Availability Zone Wise

S.no	Zone	Recharge area Km ²	Recharge MCM/Yr	Extraction MCM/Yr	Balance MCM/Yr
1.	Zone 1 (basin area from Karnataka territory to Krishnagiri reservoir)	1005	102	88	14
2.	Zone 2 (from Krishnagiri to Sathanur Dam)	3876	550	497	53
3.	Zone 3 (from Sathanur to Thirukovilur anicut)	1533	222	198	24
4.	Zone 4 (Thirukovilur anicut to sea)	2075	625	560	65
	Total	8489	1499	1343	156

Source: IWS Report, PWD, WRO.

5. Projected water demand and water balance for various uses in Mcm.

S.no	Purpose	1999	2004	2019	2044
1	Domestic uses	74.69	80.56	96.43	122.88

2	Agriculture	2668.8	2668.8	2321.4	2089.78
3	Industries	104.39	139.18	243.57	417.54
4	Livestock	53.84	53.84	53.84	53.84
7	Total	2901.72	2942.38	2715.24	2684.04
8	Water Balance	-31.72	-72.38	154.76	185.96

Source: State framework resources Plan of Tamilnadu

6. Water Requirement for Irrigation Purpose

Crop	Area in Ha.	Net Crop Water Requirement Mm ³
SYSTEM AREA		
Paddy	23973	206.80
	6020	51.93
Groundnut	13981	63.45
Ragi	12433	50.45
Sugarcane	5820	75.66
Total	62227	448.29
NON-SYSTEM AREA		
Paddy (tanks)	28579	246.54
Paddy (Others)	41166	355.12
Sugarcane	26436	343.68
Total	412106	945.34

Source: IWS Report, PWD, WRO

7. Classification of Ground Water Exploitation

S.no	Block Name	Classification as on January 2003
1.	Papireddipatti	Over Exploited
2.	Harur	Over Exploited
3.	Morapur	Over Exploited
4.	Uthangarai	Over Exploited
5.	Dharmapuri	Over Exploited
6.	Nallamapalli	Over Exploited
7.	Palacode	Over Exploited
8.	Kaveripattanam	Semi Critical
9.	Bargur	Over Exploited
10.	Krishnagiri	Semi Critical
11.	Kelamangalam	Safe
12.	Veppanapalli	Over Exploited
13.	Sholagiri	Semi Critical
14.	Hosur	Semi Critical
15.	Karimangalam	Over Exploited
16.	Mathur	Over Exploited
17.	Pennagaram	Critical
18.	Thally	Safe
19.	Alangayam	Over Exploited
20.	Thirupattur	Over Exploited
21.	Kandili	Over Exploited
22.	Nattarampalli	Over Exploited
23.	Jolarpet	Over Exploited
24.	Yercaud	Safe
25.	Ayodhyapattinam	Over Exploited
26.	Peddabayakkampalayam	Over Exploited
27.	Thiruvannamalai	Over Exploited
28.	Thandrampatty	Over Exploited
29.	Chengam	Over Exploited
30.	Pudupalayam	Over Exploited
31.	Thurinjiapuram	Over Exploited
32.	Kilpennatur	Over Exploited

S.no	Block Name	Classification as on January 2003
33.	Kandamangalam	Over Exploited
34.	Kolianur	Over Exploited
35.	Kanai	Semi Critical
36.	Thiruvannainallur	Over Exploited
37.	Thirukovillur	Semi Critical
38.	Mugaiyur	Over Exploited
39.	Rshivandiyam	Over Exploited
40.	Sankarapuram	Over Exploited
41.	Kalarayan Hills	Safe
42.	Ulundurpet	Over Exploited
43.	Thilyagaidurgam	Semi Critical
44.	Gingee	Over Exploited
45.	Thirunavalur	Critical
46.	Annagranam	Semi Critical
47.	Panruti	Semi Critical
48.	Cuddalore	Semi Critical
49.	Vridachalam	Semi Critical
50.	Kurinchipadi	Semi Critical
51.	Kammapuram	Semi Critical

Source: GW, PWD, WRO, Taramani.

8. Land use/ Land cover

S.no	Description	Area (ha)
1	Geographical area	125700
2	Forest	8500
3	Barren and uncultivable waste	---
4	Land under non - agricultural use	3700
5	Cultivable waste	---
6	Permanent pastures and other crazing land	---
7	Current fallows	29750

8	Other fallows	722300
9	Land under Misc. use	28700
10	Net area sown	65000

Source: State Framework resources plan PWD/WRO

9. Cropping Pattern and Crop Calendar

Ist Crop	IInd Crop	IIIrd Crop
Paddy (Aug.-Jan.)		Ragi, Millet, Bajra & Pulses (Jan to April)
Paddy (Oct.-Feb.)		
Paddy (Feb.-Jun.)	Groundnut (Nov.-Feb.)	
Paddy (Dec.-Apr.)	Groundnut (Jul.-Oct.)	
Banana (Jan.-Dec.)		
Sugarcane (Jan.-Dec.)		
Sorghum (Jan.-Apr)		

10. Disease Prevalence

A. Diarrhoea

(In Nos.)

S.no	District	Year									
		1999		2000		2001		2002		2003	
		Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds
1.	Dharmapuri	2258	24	1386	10	1876	31	1433	17	1797	7
2.	T.V.Malai	8891	15	5733	3	7441	2	8909	7	8167	1
3.	Vellore	9675	20	7706	26	6014	23	5781	20	5884	16
4.	Villupuram	3940	33	2498	8	1601	8	2620	7	2121	0
5.	Cuddalore	4733	4	5359	17	3724	12	3862	11	3176	5

B. Cholera

(In Nos.)

S.no	District	Year									
		1999		2000		2001		2002		2003	
		Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds
1.	Dharmapuri	14	0	4	0	12	0	18	2	30	1
2.	T.V.Malai	8	0	11	0	6	0	11	0	3	0
3.	Vellore	37	0	33	0	20	0	13	0	8	0
4.	Villupuram	20	0	8	0	15	0	10	0	5	0
5.	Cuddalore	6	0	6	0	7	0	4	0	1	0

C. Dysentery

(In Nos.)

S.no	District	Year									
		1999		2000		2001		2002		2003	
		Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds
1.	Dharmapuri	5457	0	3869	0	4016	0	4016	0	4691	0
2.	T.V.Malai	3888	0	1678	0	1200	0	1636	0	2024	0
3.	Vellore	4293	0	4723	0	6202	0	3598	0	3476	0
4.	Villupuram	4439	1	1742	0	0	0	0	0	0	0
5.	Cuddalore	3343	0	310	0	1790	0	834	0	314	0

D. Typhoid

(In Nos.)

S.no	District	Year									
		1999		2000		2001		2002		2003	
		Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds
1.	Dharmapuri	126	0	46	0	83	0	349	0	201	0
2.	T.V.Malai	149	0	82	0	272	0	229	0	169	0
3.	Vellore	66	0	143	0	279	0	305	0	122	0
4.	Villupuram	1	0	0	0	0	0	0	0	0	0
5.	Cuddalore	23	0	0	0	0	0	0	0	0	0

E. Jaundice

(In Nos.)

S.no	District	Year									
		1999		2000		2001		2002		2003	
		Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds	Cs	Ds
1.	Dharmapuri	14	0	36	0	0	0	11	0	10	0
2.	T.V.Malai	55	0	10	0	17	0	65	0	13	0
3.	Vellore	16	0	2	0	85	0	25	0	104	0
4.	Villupuram	11	0	2	0	0	0	0	0	0	0
5.	Cuddalore	56	0	0	0	0	0	0	0	0	0

Source: DMS, Chennai.

11. Population Details

Districts	Region	Population		
		Persons	Male	Female
Vellore	Total	3026432	1529944	1496488
	Rural	2066718	1048055	1018663
	Urban	959714	481889	477825
Dharmapuri	Total	2442179	1244756	1197423
	Rural	1429610	724502	705108
	Urban	1012572	520257	492315
Tirvanamalai	Total	2042979	1030052	1012927
	Rural	1800051	907424	892627
	Urban	242928	122628	120300
Cuddalore	Total	2280530	1148729	1131801
	Rural	1527936	770160	757776
	Urban	752594	378569	374025
Villupuram	Total	2943917	1484573	1459344
	Rural	2517447	1269889	1247558
	Urban	426470	214684	211786

Source: Statistical handbook of Tamilnadu 2002

12. Literacy level

Districts	Literate		
	Persons	Male	Female
Vellore	1572292	950943	621349
Dharmapuri	1376328	-	-
Tirvanamalai	917548	580423	337125
Cuddalore	1443851	834940	608911

Villupuram	1675027	991886	683141
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Source: Statistical handbook of Tamilnadu 2002, DES of TamilNadu

13 Tourist attractions

S.no	District	Tourist Place/Pilgrim center
1	Vellore	Vellore fort, Elagiri, Rathinagiri and Sholingur
2	Dharmapuri	Hogenakal, Krishnagiri dam, Vanniyar dam and Teerthamalai
3	Tiruvanamalai	Sattanur, Javvadu Hills and Tiruvanmalai temple
4	Cuddalore	Pitchavaram, Chidambaram and Vadalur
5	Villupuram	Tiruvakkarai, Kalrayan Hills, Mylam Temple and Tirukoilur Temple

Source: Statistical handbook of Tamilnadu – 2002

14. Industries

S. No.	Name & Location of Industry	Raw materials used	Production capacity	Water consumption m ³ /day	Quantity of effluent m ³ /day	ETP/STP details	Solid waste details
1.	Premier Mills Ltd. Lathur Village Hosur Taluk Dharmapuri Dist.	Cotton - 190 T/m Polyster fibre - 25 T/m Textile dyes - 5 T/m Acetic acid - 3.7 T/m Common salt - 18 T/m etc.	Yarn : 200 T/m Cotton, Synthetic and polyster Fabric : 25 lakhs mts/m	Domestic : 400 Process : 950 Cooling & Boiler Blow down : 250	Sewage : 300 KLD Effluent: 950 KLD	ETP constructe d as per TNPCB norms	ETP sludge: 927 T/year
2.	Lakshmi Ring Travellers Ltd. Peramdepalli Village Hosur Taluk Dharmapuri Dist.	Ammonia gas- 36 m ³ /day Nitrogen- 12 m ³ /day Methanol - 30 Lts/day LPG - 24 m ³ /day	Ring travellers	Domestic : Not available Process : 28	Sewage : Not available Effluent : Not available	ETP constructe d as per TNPCB norms.	Nil
3.	Kallakurichi Cooperative Sugar Mills Ltd. Moongithuraipattu	Sugar cane - 7.5 lakh T/month Lime - 150 T/m Sulphur - 30 T/m	Sugar - 7500 T/m Molasses - 2700 T/m	Process : 650 Domestic : 100	Effluent : 650 Sewage : 50	ETP constructe d as per TNPCB	Ash - 12 T/day dumped in low lying areas.

S. No.	Name & Location of Industry	Raw materials used	Production capacity	Water consumption m ³ /day	Quantity of effluent m ³ /day	ETP/STP details	Solid waste details
	Kallakurichi Taluk Villupuram Dist.		Bagasee - 22500 T/m			norms.	
4.	Chemplast Sanmar Ltd. Marigampalli Village, Krishnagiri Taluk, Dharmapuri Dist.	Not available	Not available	Not available	Not available	ETP installed as per TNPCB norms	i) Yeast - 1.6 T/day used as manure ii) ETP sludge 87/day disposed as land fill iii) Fly ash - IT/day disposed as land fill
5.	Mira Textiles & Industries (India) Ltd. (Paper Division) Vadakkunemili Village, Thirukoilur Taluk Villupuram Dist.	Waste kraft - boxes & cuttings - 28 T/day Alum - 0.85 T/day Rosin - 0.08 T/day Starch powder - 0.1 T/day	Kraft paper - 750 T/m	Domestic : Not available Process : 200	Sewage : Not available Effluent : 200	ETP installed as per TNPCB norms.	Not available
6.	Arunachala Milk	Cow milk - 30000	Processed milk -	Domestic : 1.5	Sewage : 1.2	ETP	Not available

S. No.	Name & Location of Industry	Raw materials used	Production capacity	Water consumption m ³ /day	Quantity of effluent m ³ /day	ETP/STP details	Solid waste details
	Product Nallavanpalayam Thiruvannamalai	Its/day	25000 Its/day	Process : 50	Effluent : 50	installed as per TNPCB norms	
7.	K.C.V. Milk Firm Pudukoilur Village Chengam Taluk T.V.Malai Dist.	Milk - 5000 Its/day	Processed milk - 4000 Its/day	Domestic : 2.0 Process : 15	Sewage : 1.5 Effluent : 15	ETP installed as per TNPCB norms	Not available
8.	Arunal Milk Products Thiruvadai Street Thiruvannamalai	Milk - 12000 Its/day	Processed milk - 10000 Its/day	Domestic : 2.0 Process : 25	Sewage : 1.5 Effluent : 25	ETP installed as per TNPCB norms	Not available
9.	Heritage Foods India Ltd., Thirunamanallur Thiruvannmalai Dist.	Milk - 5000 Its/day	Processed milk - 400 Its/day	Domestic : 2.5 Process : 30	Sewage : 2.0 Effluent : 30	ETP installed as per TNPCB norms	Not available

S. No.	Name & Location of Industry	Raw materials used	Production capacity	Water consumption m ³ /day	Quantity of effluent m ³ /day	ETP/STP details	Solid waste details
10.	Arunachalam Sugars Ltd. Malapambadi Village T.V.Malai Taluk	Not available	Not available	Domestic : 10 Process : 610	Sewage : 9 Effluent : 610	ETP installed as per TNPCB norms	Not available

15. Solid Waste Details

A. Dharmapuri District

S. No.	Name of urban local body	Popula-tion	Solids waste T/day		Collection efficiency	Workers for solid waste management		Availability of compost yard Yes/No	Recycling as manure Yes/No	If yes, quantity of annual production in T
			Genera-tion	Collect-ion		Total No.	No/1000 population			
a.	Municipalities									
1.	Dharmapuri	64696	45	38	84%	90	1.39	Yes	Yes	48
2.	Krishnagiri	64587	30	25	83%	68	1.03	No	No	-
3.	Hosur	84394	12	9.5	79%	35	0.78	No	No	-

	Total	213677	87	72.5	82%	193	1.04			
b.	Town Panchayats									
1.	Harur	21523	3.5	3.4	100%	35	1.59	Yes	Yes	4.5
2.	Palacode	18667	4.5	4.5	100%	20	1.1	No	No	-
3.	Karimangalam	12035	0.8	0.8	100%	25	1.35	Yes	Yes	0.8
4.	Pennagaram	15306	3	3	100%	20	1.18	No	No	-
5.	Kaveripattanam	14378	4	4	100%	25	1.51	No	No	-
6.	Kelamangalam	11052	3	3	100%	9	0.9	No	No	-
7.	Uthangarai	15443	2.5	2.5	100%	19	1.31	No	No	-
8.	Papireddipatti	8583	0.25	0.25	100%	6	0.7	No	No	-
9.	Bargur	12582	1.8	1.8	100%	12	1.0	No	No	-
10.	Mathur	15257	3	3	100%	7	0.69	No	No	-
	Total	165437	30.35	30.35	100%	196	1.11			5.3

Source: District Environmental Profile, Dharmapuri District.

B. Thiruvannamalai District

S. No.	Name of urban local body	Popula-tion	Solids waste T/day		Collection efficiency %	Workers for solid waste management		Availability of compost yard Yes/No	Recycling as manure Yes/No	If yes, quantity of annual production in T
			Genera-tion	Collect-ion		Total No.	No/1000 population			
a.	Municipality									
1.	Thiruvannamalai	130567	18.0	15.0	83.3	4	0.03	Yes	No	-

	Total	130567	18.0	15.0	83.3	4	0.03	Yes	No	-
b.	Town Panchayats									
1.	illpennathur	12468	1.0	1.0	100	7	0.56	Yes	No	-
2.	Chengam	23223	5.0	5.0	100	25	1.29	Yes	No	-
3.	Pudupalayam	10005	1.0	1.0	100	11	1.67	Yes	No	-
	Total	45696	7.0	7.0	100%	43	1.17	-	-	-

Source: District Environmental Profile, Thiruvannamalai District.

C. Villupuram

S. No.	Name of urban local body	Popula- tion	Solids waste T/day		Collection efficiency %	Workers for solid waste management		Availability of compost yard Yes/No	Recycling as manure Yes/No	If yes, quantity of annual production in T
			Genera- tion	Collect- ion		Total No.	No/1000 population			
a.	Municipalities									
1.	Villupuram	95455	7.2	6.0	90	66	1.2	Yes	No	Nil
	Total	95455	7.2	6.0	90	66	1.2	Yes	No	Nil
b.	Town Panchayats									
1.	Kallakurichi	36793	4.8	4.0	83.3	34	1.11	No	No	Nil

2.	Thiyagadurgam	13633	2.4	2.0	83.3	18	1.26	No	No	Nil
3.	Sangarapuram	12263	1.2	1.0	83.3	8	0.72	No	No	Nil
4.	Thirukoilur	27197	3.6	3.0	83.3	36	1.26	No	No	Nil
5.	Thiruvonnainallur	8582	1.2	1.0	83.3	9	1.02	No	No	Nil
6.	Ulundurpet	19258	3.6	3.0	83.3	15	0.8	Yes	No	Nil
	Total	117726	16.8	14	83.3	120	1.03	-	-	-

16. Raw Water Quality Data of Kelavarapalli Dam for the year 2003 - 2004

S. No.	Parameter	April 2003	May 2003	June 2003	July 2003	Aug. 2003	Sep. 2003	Oct. 2003	Nov. 2003	Dec. 2003	Jan. 2004	Feb. 2004
1.	Turbidity	27	31	27	22	21	16	20	21	21	19	25
2.	Electric Conductivity	1026	1047	1041	993	916	824	843	872	995	1013	1044
3.	Total Dissolved Solids (mg/l)	718	733	729	965	641	612	590	610	697	709	731
4.	pH	7.7	7.9	7.9	7.9	7.6	7.8	7.8	7.5	7.8	7.6	7.7
5.	Total Hardness (mg/l)	242	248	254	244	242	216	211	225	245	254	259
6.	Iron (mg/l)	0.34	0.32	0.32	0.34	0.32	0.18	0.34	0.2	0.3	0.3	0.4
7.	Nitrates (mg/l)	2	2	7	7	12	9	7	8	7	7	4

8.	Chlorides (mg/l)	134	149	152	145	130	124	120	120	126	128	144
9.	Fluorides (mg/l)	0.45	0.45	0.45	0.5	0.45	0.45	0.45	0.4	0.35	0.4	0.5
10.	Sulphates (mg/l)	7	6	9	33	15	12	8	8	10	10	12
11.	Phosphates (mg/l)	6.2	7.9	5.0	5.9	8.7	10.6	7.8	6.3	7.6	9.6	8.5
12.	COD (mg/l)	83	76	-	81	50	-	-	41	-	50	-
13.	Total coliform	9000	900	-	16000	1600	-	-	1600	-	3000	-
14.	Fec. Coliform	220	10	-	240	23			130	-	120	

Source: TWAD Board, Krishnagiri

17. Treated Water Quality Data of Kelavarapalli Dam for the year 2003 - 2004

S. No.	Parameter	April 2003	May 2003	June 2003	July 2003	Aug. 2003	Sep. 2003	Oct. 2003	Nov. 2003	Dec. 2003	Jan. 2004	Feb. 2004
1.	Turbidity	4	4	4	4	5	5	4	4	4	4	5
2.	Electric Conductivity	1067	1093	1084	1037	970	916	874	904	1031	1044	1074
3.	Total Dissolved Solids (mg/l)	747	766	759	726	679	641	612	633	722	731	755
4.	pH	7.7	7.7	7.7	7.7	7.6	7.7	7.7	7.6	7.7	7.7	7.7
5.	Total Hardness (mg/l)	258	255	274	254	240	227	216	234	256	260	267
6.	Iron (mg/l)	0.07	0.1	0.1	0.07	0.13	0.08	0.06	0.06	0.1	0.1	0.1
7.	Nitrates (mg/l)	2	3	6	8	12	12	6	7	7	6	4

8.	Chlorides (mg/l)	159	162	171	157	150	138	130	132	140	143	146
9.	Fluorides (mg/l)	0.4	0.4	0.45	0.45	0.4	0.4	0.4	0.35	0.35	0.4	0.45
10.	Sulphates (mg/l)	159	67	70	65	59	39	36	38	40	44	52
11.	Phosphates (mg/l)	1.7	0.7	0.7	0.6	1.5	2.0	2.4	2.1	2.1	2.1	2.5
12.	COD (mg/l)	50	55	-	-	25	-	-	25	-	30	-
13.	Total coliform	4	0	-	-	0	-	-	0	-	0	-
14.	Fec. Coliform	2	0	-	-	0	-	-	0	-	0	-

VARAHANADHI BASIN

1. Geographical Area and Coverage

S.No.	Villupuram	Thiruvanamalai	Kancheipuram
Total area of the districts (Sq.Km.)	7217	6191	4433
Basin area in the districts (Sq.Km.)	3138	306	770
Percentage areas of the districts	43.48	4.94	17.37
Percentage of areas of basin in each district	74.47	7.28	18.27

2. Geographical Spread– Taluks and Blocks

Name of River Basin	Area (Sq.Km.)	District	Taluk	Block
Varahanadhi	4214	Villupuram		
			Melmalayanaur	Melmalayanur
				Vallam
				Gingee
			Tindivanam	Mailam
				Marakkanam
			Vanur	Vanur
			Villupuram	Vikkavandi
				Villupuram
				Kandamangalam
		Thiruvanamalai	Thiruvanamalai	Kilpenathaur
		Kancheipuram	Cheyyar	Chittamur
			Maduranthagam	Achrapakkam

3. Projected water demand and water balance for various uses in Mcm.

S.No.	Purpose	1999	2004	2019	2044
1	Domestic uses	43.1	47.13	59.22	79.38
2	Agriculture	1604	1604	1364	1204
3	Industries	30.15	40.2	70.35	120.6
4	Livestock	28.68	28.68	28.68	28.68
7	Total	1705.93	1720.01	1522.25	1432.66
8	Water Balance	192.07	177.99	375.75	465.34

Source: State framework resources Plan

4. Total Water Demand

S.No.	Purpose	Total Water Demand			
		2004	2019	2044	2050
1	Agriculture	1604.00	1604.00	1604.00	1604.00
2	Domestic	127.82	160.64	215.33	228.37
3	Industrial	40.2	70.35	120.6	132.7
4	Livestocks	28.68	28.68	28.68	28.68
	Total	1720.01	1762.25	1832.66	1849.59
	Balance (potential is 1898)	177.99	135.75	65.34	48.41

5. Ground water exploitation in 2003

Over-Exploited (> 100 %)	Critical (90 and 100 %)	Semi Critical (70 and 90 %)
Gingee Kandamangalam Villupuram Mailam Marakanam Melmalaiyanur Vallam	Vanur Vikravandi	None

6. Drought Prone Areas

S.No	District	Block	Name of Habitation affected
1	Villupuram	Melmalaiyanur	1. Pinnalur 2. Porkunam
		Vallam	1.Sengamedu 2. Melkalavai
		Vikravandi	Sivaperumalpalayam
		Vannur	Elayandipattu Kadagampattu & Mettu Street

7. Waste Lands

District	Block	Waste Land	% to total Land
Villupuram	Melmalaiyanur	3084.33	8.97
	Gingee	526	1.42
	Vallam	1991.9	7.10
	Mailam	1038.27	3.64
	Marakkanam	2790.25	6.57
	Vannur	5322.18	11.83
	Vikravandi	1787.67	7.48
	Villupuram	504.06	2.55
	Kandamangalam	364.04	1.81
	Kilpenathaur	2501.59	9.22
	Chitamur	5552.02	16.79
	Achrapakkam	3663.61	10.69
		3084.33	8.97

8. Catchments areas

S.No.	Catchment Area	District	Taluk	Block
1.	Varahanadhi	Villupuram	Gingee Tindivanam Vanur Villupuram	Melmalayanur Gingee Vallam Mailam

				Marakkanam Vanur Vikkravandi Kandamangalam Villupuram
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9. Forest Coverage – Catchment Area

Classification	Extent in Ha.	Percentage to total Forest Area
Geographical area	4,21,700	
Forests	32,757	7.70
Current fallow area	48,327	77.24
Other fallow area	15,168	15.06
Total		100.00

10. Major soil types

District	Taluk	Red soil	Sandy Loam	Clayey Loam	Brown clayey
Villupuram.	Villupuram	15	40	45	-
	Vanur	30	40	3	
	Gingee	60	40	-	-
	Tindivanam	40	40	20	-
Tiruvanamalai	Tiruvanamalai	55	42	3	-
Kancheepuram	Cheyyur	10	-	-	90
	Madurantagam	10	-	25	65

11. Land use classification

S. No	Description	Area (ha)
1	Geographical area	421400
2	Forest	32757
3	Barren and uncultivable waste	29805
4	Land under non - agricultural use	66910

5	Cultivable waste	11200
6	Permanent pastures and other crazing land	4342
7	Current fallows	48327
8	Other fallows	15168
9	Land under Misc. use	13482
10	Net area sown	194409

12. Seasons of Cropping

S.N	Ist Crop	Season	II nd Crop	Season
I. Irrigated Crop				
1.	Paddy-Samba	Aug/Sep to Dec/Jan	Paddy-Navarai	Jan/Feb to Mar/Apr
2.	Paddy-Samba	Sep/Oct to Jan/Feb	Paddy-Somavari	Mar/Apr to Jun/Jul
3.	Paddy-Samba	Jul/Aug to Nov/Dec	Groundnut/Millet/Pulses/Gingelly	Dec/Jan to Mar/ Apr
4.	Paddy-Samba	Aug/Sep To Dec/Jan	Chillies/Cotton/Vegetables/Onion	Feb/Mar to Jul/Aug
5.	Sugarcane planted	Jan to Nov	Sugarcane planted	Nov to Oct
II. Un Irrigated Crop				
6.	Groundnut/Pulses	Jun/Jul to Sep/Oct	Pulses/Gingelly/Ragi	Oct/Nov to Dec/Jan
7.	Millet/ Pulses	Jun/July to Sep/Oct	Pulses/Gingelly	Oct/Nov to Dec/Jan

13. Area under Crop Cultivation

District	Blocks	Cropping pattern	Area (hect.)
Villupuram.	Melmalayanur	Paddy, Groundnut, Cumbu or ragi,	8.97
	Gingee	sugarcane, Gingely, Cotton, Pulses	1.42
	Vallam		7.10
.	Mailam	Paddy, Groundnut, Cumbu or ragi,	3.64

	Marakkanam	sugarcane, Gingely	6.57
	Vannur	Paddy, Groundnut, Cumbu or ragi, sugarcane, Gingely	11.83
	Vikkravandi	Paddy, Groundnut, Cumbu or ragi,	7.48
	Kandamanaglam	sugarcane, Gingely	2.55
	Villupuram		1.81

14. Population details

Districts	Region	Population		
		Persons	Male	Female
Tirvanamalai	Total	2042979	1030052	1012927
	Rural	1800051	907424	892627
	Urban	242928	122628	120300
Villupuram	Total	2943917	1484573	1459344
	Rural	2517447	1269889	1247558
	Urban	426470	214684	211786
Kanchipuram	Total	2442179	1244756	1197423
	Rural	1429610	724502	705108

15. Literacy level

Districts	Literate		
	Persons	Male	Female
Tirvanamalai	917548	580423	337125
Villupuram	1675027	991886	683141
Kanchipuram	1980898	1096992	883906

16. Tourist attractions

S. No	District	Tourist Place/Pilgrim center
1	Dharmapuri	Hogenakal, Krishnagiri dam, Vanniyar dam and Teerthamalai
2	Cuddalore	Pitchavaram, Chidambaram and Vadalur
3	Villupuram	Tiruvakkarai, Kalrayan Hills, Mylam Temple and Tirukoilur Temple
4	Trichy	Mukkombu Anicut, Puliyoncholai, Rock fort Temple and Sri Rangam
5	Salem	Yercaud, Sangagiri, Kolli Hills, Tiruchengodu and Taramangalam

Source: Statistical handbook of Tamilnadu – 2002

17. Water Quality Analysis -2003

District	Tahsil / Taluk	Village	Well No	Date of collection	EC_GE N	PH_G EN	Ca	Mg	Na	K	HCO3
Villupuram	Chenji	Chinnanolambai	33002	1/6/03	1140	8.2					
Villupuram	Chenji	Alampundi	33017	1/6/03	820	8.5					
Villupuram	Chenji	Melmalayanur	33005	1/8/03	1410	8.4					
Villupuram	Chenji	Melmalayanur	33005	7/7/03	2040	8	104	83	191	13	543
Villupuram	Chenji	Kilmampattu	31518	7/15/03	2300	8.1	48	83	258	28	470
Villupuram	Chenji	Alampoondi	31520	7/15/03	800	8.5	20	50	74	5	243
Villupuram	Chenji	Sathampadi	31526	7/15/03	2660	8.4	28	126	368	15	311
Villupuram	Tindivanam	Salai	33014	1/6/03	710	8.3					
Villupuram	Tindivanam	Vadasiruvalur	33008	1/8/03	2230	8.3					
Villupuram	Tindivanam	Kilsevir	33012	1/8/03	1300	8.3					
Villupuram	Tindivanam	Omandur	31523	7/14/03	3640	7.9	164	173	322	8	177
Villupuram	Tindivanam	Vadasiruvalur	33008	7/14/03	2440	8.2	24	92	285	98	397
Villupuram	Tindivanam	Kilsevir	33012	7/14/03	1040	8.5	20	36	124	38	220
Villupuram	Tindivanam	Salai	33014	7/15/03	750	8.5	14	43	97	5	243
Villupuram	Tindivanam	Avanipur	31528	7/16/03	970	8.4	30	36	127	8	183
Villupuram	Tindivanam	Saram	31529	7/16/03	730	8.7	30	39	55	32	162
Villupuram	Vanur	Perumpakkam	33030	1/6/03	890	8.4					
Villupuram	Vanur	Bommayapalayam	33045A	1/11/03	890	8.4					

Villupuram	Vanur	Bommayapalayam	31555	7/14/03	220	8.2	20	21	5	5	64
Villupuram	Vanur	Kiliyanur	31530	7/16/03	860	8.3	22	60	87	5	294
Villupuram	Vanur	Perumpakkam	33030	7/16/03	1030	8.6	14	43	131	98	275
Villupuram	Vanur	Bommayapalayam	33045A	7/16/03	990	7.7	32	21	104	149	189
Villupuram	Villupuram	Orathur	33042	1/8/03	1250	8.2					
Villupuram	Villupuram	Kilperumpakkam	31532	7/7/03	1430	8.1	50	61	159	5	311
Villupuram	Villupuram	Orathur	33042	7/7/03	3190	8.1	312	83	225	196	482
Villupuram	Villupuram	Esalam	31531	7/10/03	2430	7.8	40	95	414	5	537
Villupuram	Villupuram	Athanurvinayagapura m	31533	7/10/03	1000	7.8	76	51	92	3	403
Tiruvannamalai	Tiruvannamalai	Thatchampattu	23038	1/4/03	1210	7					
Tiruvannamalai	Tiruvannamalai	Kilpennathur	21515	1/7/03	1860	8					
Tiruvannamalai	Tiruvannamalai	Polagunam	23112	1/7/03	1180	8.2					
Tiruvannamalai	Tiruvannamalai	Kilpennathur	21515	4/21/03	1850	8					
Tiruvannamalai	Tiruvannamalai	Thandarai	21516	7/10/03	590	8.5	32	16	69	6	116
Tiruvannamalai	Tiruvannamalai	Nachanendal	21559	7/10/03	450	8.4	20	22	53	4	122
Tiruvannamalai	Tiruvannamalai	Palayanur	21560	7/10/03	800	8.7	16	43	87	6	165

ai	ai										
Tiruvannamalai	Tiruvannamalai	Thatchampattu	23038	7/10/03	2000	7.9	76	83	219	9	311
Tiruvannamalai	Tiruvannamalai	Thiruvannamalai	23005	7/11/03	1210	8.2	48	54	120	6	305
Tiruvannamalai	Tiruvannamalai	Kunnamurinj	21513	7/12/03	1040	8.1	10	26	189	9	433
Tiruvannamalai	Tiruvannamalai	Kolakkaravadi	21514	7/12/03	1650	8.6	40	22	288	22	214
Tiruvannamalai	Tiruvannamalai	Kilpennathur	21515	7/14/03	1780	8.4	20	75	235	9	195
Tiruvannamalai	Tiruvannamalai	Mangalam	21565	7/14/03	1030	7.8	50	39	101	10	268
Tiruvannamalai	Tiruvannamalai	Poyyanandal	21566	7/14/03	740	8.3	48	34	51	5	116
Tiruvannamalai	Tiruvannamalai	Keekalur	21568	7/14/03	1300	8.3	38	55	147	7	238
Tiruvannamalai	Tiruvannamalai	Keekkalur	23111	7/14/03	1340	8.3	20	69	143	7	195
Kancheepuram	Madurantagam	Acharapakkam	13244	1/23/03	1000	8.3					
Kancheepuram	Madurantagam	Mugaiyur	13251	1/23/03	1050	8.3					

Kancheepura m	Madurantaga m	Puthirankottai	13002	1/24/03	370	8.8						
Kancheepura m	Madurantaga m	Sitravadi	13005	1/24/03	900	8.3						
Kancheepura m	Madurantaga m	Sitravadi	13005	4/25/03	570	8.2						
Kancheepura m	Madurantaga m	Acharapakkam	13244	4/25/03	860	7.6						
Kancheepura m	Madurantaga m	Mugaiyur	13251	4/25/03	900	7.4						
Kancheepura m	Madurantaga m	Orathy	02036	7/21/03	580	8.4	58	13	48	9	98	
Kancheepura m	Madurantaga m	Salaiyur	02014	7/27/03	2920	7.4	240	66	334	3	336	
Kancheepura m	Madurantaga m	Chithamur	02015	7/27/03	4890	7.8	272	185	460	59	281	
Kancheepura m	Madurantaga m	Thennampattu	02035	7/27/03	1150	8.8	28	22	202	7	415	
Kancheepura m	Madurantaga m	Kadugupattu	13004	7/27/03	330	7.8	30	5	39	2	183	
Kancheepura m	Madurantaga m	Malaivaiyavur	13009	7/27/03	700	8.6	36	21	71	41	268	
Kancheepura	Madurantaga	Vinayaganallur	13240	7/27/03	1500	7.2	124	29	150	23	342	

m	m											
Kancheepura m	Madurantaga m	Ammanur	13242	7/27/03	380	7.6	32	13	37	3	171	
Kancheepura m	Madurantaga m	Acharapakkam	13244	7/27/03	800	7.4	62	29	74	3	183	
Kancheepura m	Madurantaga m	L.Endathur	13246	7/27/03	680	7.8	64	28	39	6	238	

VELLAR BASIN

1. District Wise River Basin Details

S.no.	District	Area of the District in Km ²	Area covered by Vellar Basin Km ²	%age area of the district covered in the basin	%age area of the basin covered by the district
a.	Dharmapuri	9622	69	0.72	0.90
b.	Salem	5205	2439	46.85	31.84
c.	Perambalur	3691	1545	41.85	20.17
d.	Trichy	4404	113	2.56	1.48
e.	Villupuram	7222	1855	25.68	24.22
f.	Cuddalore	3678	1638	44.53	21.39
	Total		7659		100%

2. Revenue divisions and taluks of the basin

Name of the district	Name of the revenue division	Name of the taluks
Dharmapuri	Dharmapuri	Harur
	Krishnagiri	Hosur
	Hosur	Palacode
		Pennagaram
		Dharmapuri
		Krishnagiri
		Denkanikottai
Villupuram	Kallakurichi	Villupuram
	Thirukoilur	Thirukoilur
	Tindivanam	Ulundurpet
	Villupuram	Vanur

Cuddalore	Chidambaram	Cuddalore
	Cuddalore	Panruti
	Virudhachalam	Vridhachalam
Salem	Salem	Yercaud
	Attur	Salem
	Mettur	Attur
	Sankari	Gangavalli
		Omalur
		Edapadi
Trichy	Trichy	Trichy
	Lalgudi	Sri Rangam
	Musiri	Manapparai
		Musiri
		Thottiyam
		Manachennalur

3. Land use/ Land cover

S. No	Description	Extent in sq. km.
1	Total Geographical Area	7659.00
2	Forest	369.86
3	Barren and Uncultivable waste	1914.86
4	Land put to non-agricultural use	
5	Cultivable waste	
6	Pastures & Other Grazing lands	617.22
7	Land under tree and groves	28.29
8	Current fallow	
9	Other fallow	638.29
10	Net area sown	4090.66
	Total (2 to 10)	7659.00
11	Area sown more than once	1433.42
12	Gross area sown	5524.08

13	Irrigated area	1427.64
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4. Ground Water Assessment

S.no.	Zone	Recharge MCM	Discharge MCM	Balance MCM
1.	Zone 1 (Swedanadhi, Kallar river subbasins upto Tholudur regulator)	308	274	34
2.	Zone 2 (Manimuktha, Gomukhi subbasins upto Vridachalam)	435	370	65
3.	Zone 3 (From Tholudur to Sethiathope anicut)	232	213	19
4.	Zone 4 (below Sethiathope anicut to sea)	47	42	5
	Total	1022	899	123

5. Population

(In Millions)

Area	2004	2009	2014	2029	2054
Urban	1.123	1.325	1.563	2.411	3.259
Rural	3.519	3.828	4.164	5.517	6.87
Total	4.642	5.153	5.727	7.928	10.129

6. Crop Water Demand

S.no	Crop	Duration	NIR in mm	Area cultivated in ha @ 40%	Area cultivated in ha @ 75%	Total area in ha	Water Demand MCM
1.	Paddy	Aug-Jan & Oct-Feb	790	81637.25	3483.75	85121	1559.02
2.	Cholam	Feb-May	408		2602	2602	14.15
3.	Cumbu	Feb-May	408		6474	6474	35.22
4.	Ragi	Feb-May	458		2257	2257	13.78
5.	Greengram	Feb-May	300		113	113	0.45
6.	Blackgram	Feb-May	300		147	147	0.59

	m						
7.	Sugar cane	Jan-Dec	1800		14471	14471	347.30
8.	Cotton	-	650		1136	1136	9.85
9.	Groundnut	Sep-Feb	500		17010	17010	113.40
10.	Gingelly	Sep-Feb	400		2142	2142	11.42
11.	Sunflower	Jan-May	500		2	2	0.01
12.	Chillies	Sep-Feb	850		6063	6063	68.71
13.	Onion	Sep-Feb	400		2977	2977	15.88
14.	Turmeric	Sep-Dec	850		1145	1145	12.98
15.	Banana	Jan-Dec	1800		1104	1104	26.50
	Total			81637.5	71309	142764	2229.26

7. Present and Future Water Demand (In MCM)

S.no.	Sector	2004	2009	2014	2029	2054
1.	Domestic					
a.	Urban	36.89	43.52	51.34	79.2	107.05
b.	Rural	51.37	55.89	60.79	80.54	100.3
	Sub Total	88.26	99.41	112.13	159.74	207.35
2.	Agriculture	2229.26	2229.26	2229.26	1938.87	1745.36
3.	Livestock	51.17	51.17	51.17	51.17	51.17
4.	Power generation	0.5	0.5	0.5	1.0	1.0
5.	Industries					
a.	Small Scale	15.16	19.34	24.67	51.28	173.65
b.	Large Scale	40.55	51.74	66.02	137.23	464.7
	Sub Total	55.71	71.58	90.69	188.51	638.35
	Total	2424.9	2451.92	2483.75	2339.29	2643.23

8. Ground Water Exploitation

S.No.	Block Name	Classification as on January 2003
1.	Papireddipatti	Over Exploited
2.	Thalaivasal	Over Exploited
3.	Gangavalli	Over Exploited
4.	Attur	Over Exploited
5.	Pethanayakampalayam	Over Exploited
6.	Ayothipattinam	Safe
7.	Valapadi	Over Exploited
8.	Pammarathupatti	Over Exploited
9.	Namagiripettai	Over Exploited
10.	Kollimalai	Safe
11.	Vennandurai	Over Exploited
12.	Sendamangalam	Over Exploited
13.	Sendurai	Safe
14.	Veppur	Over Exploited
15.	Veppanthatti	Over Exploited
16.	Perambalur	Over Exploited
17.	Alathur	Over Exploited
18.	Ariyalur	Semicritical
19.	Thirumanur	Safe
20.	Andimadam	Safe
21.	Thuraiyur	Over Exploited
22.	Uppliyapuram	Over Exploited
23.	Thiyagadurgam	Semi Critical
24.	Sankarapuram	Over Exploited
25.	Rischivandhiyam	Over Exploited
26.	Kallakurichi	Critical
27.	Chinnasalem	Semi Critical
28.	Kalrayanmalai	Safe
29.	Ulundurpet	Over Exploited
30.	Parangipettai	Semi Critical
31.	Bhuvanagiri	Semi Critical
32.	Keerapalayam	Safe
33.	Kammapuram	Semi Critical

S.No.	Block Name	Classification as on January 2003
34.	Vridachalam	Semi Critical
35.	Kurinjpadi	Semi Critical
36.	Nallur	Semi Critical
37.	Kattumannar Koil	Semi Critical
38.	Mangalur	Semi Critical
39.	Portonovo	Safe

Source : GW, PWD, WRO, Taramani

9. Fisheries

S. No.	District	Total Coastal line in Kms	Total Inland Fresh Water Spread Area in Ha	Estuaries and Brackish Water Area in Ha	Inland Quantity in Ton/Annum	Marine Quantity in Ton/Annum
a.	Dharmapuri	Nil	1628	Nil	160	Nil
b.	Salem	Nil	15346	Nil	213	Nil
c.	Perambalur	Nil	10400	Nil	4637	Nil
d.	Trichy	Nil	10634	Nil	225T	Nil
e.	Villupuram	41	1881	Nil	68	1.1
f.	Cuddalore	57.5	18866	9100	5240	28345

10. Land Use Classification

S.No.	Classification	Area
1.	Aquaculture	1.56
2.	Barren Rocky / Stony waste	124.74
3.	Coastal wet lands	0.33
4.	Deciduous	375.16
5.	Dry Crop	979.05
6.	Ever Green / Semi Ever Green	129.78
7.	Fallow	219.51
8.	Forest - Blanks	18.36
9.	Forest - Plantations	265.6
10.	Gullied / Ravenous land	38.96
11.	Industrial area	0.39
12.	Land with scrub	207.9
13.	Land without scrub	114.32
14.	Marshy/Swampy land	2.13
15.	Other Forest land	109.65
16.	Plantation	1043.86
17.	Reservoirs/Lakes/Tanks	253.82
18.	River/Stream	100.64
19.	Rural Settlements villages	223.92
20.	Salt affected lands	57.39
21.	Salt pans	0.18
22.	Sandy area	5.52
23.	Scrub forest	363.38
24.	Town and cities	26.1
25.	Unnotified forest area	299.12
26.	Water logged	0.68

27.	Wet crop	2418.26
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11. Live Stock Population

S.no.	Block	Plough Animals	Buffaloes	Cows	Goat	Sheep	Pig	Poultry
A.	Salem District							
1.	Attur	-	3742	14456	23653	6546	6914	48200
2.	Ayodyapatinam	-	1474	1552	569	925	2754	1139
3.	Gangavalli	-	7330	3669	37763	4709	4132	16065
4.	Panamarathupatti	5901	-	5256	15438	4399	2476	89190
5.	P.N.Palayam	-	14795	23703	32149	8634	6798	133486
6.	Talaivasal	-	9860	18043	36072	10996	6734	234725
7.	Valapadi	-	7720	18852	21814	8597	4690	45714
B.	Villupuram District							
1.	Chinnasalem	21298	17752	40313	22300	-	13315	36320
2.	Kallakurichi	29089	9668	28384	32100	-	20398	35914
3.	Kalavayan Hills	10683	2884	15102	6300	-	4143	88233
4.	Rshivandiyam	4130	1086	7318	7200	-	1740	53430
5.	Sankarapuram	30250	6342	18565	10500	-	1835	80300
6.	Thigadurgam	18878	11332	22439	36000	-	5230	45340
7.	Ulundurpet	28114	2937	35430	25300	-	10130	-
C.	Cuddalore District							
1.	Bhuvanagiri	9650	4520	9725	6136	-	2100	23330
2.	Kammapuram	14760	6468	32689	7340	-	4300	13713
3.	K.M.Koil	63848	45060	40464	52000	-	15212	61926
4.	Keerapalayam	7226	12343	12622	8302	-	3200	22661
5.	Kumaratchi	6642	6807	7329	4401	-	2100	26600

S.no.	Block	Plough Animals	Buffaloes	Cows	Goat	Sheep	Pig	Poultry
6.	Mangalur	18630	7979	34984	12336	-	4500	8073
7.	Nallur	16234	11822	40482	23229	-	5600	38388
8.	Portonova	5732	2863	4397	2067	-	1200	28424
9.	Vridachalam	14105	10893	42365	18124	-	8300	38636

Source : District Statistical Hand Book

12. Industries

S. No.	Name & Address of Industry	Category	STP/ETP Status	APC Measures Status	Distance from Water Source	Mode of Disposal
1.	India Cement Ltd. Alathiyur Senthurai Taluk Perambalur Dist. (Cement)	Red - Large	STP Installed	Installed	Within 1 km from Annaivari Odai	Treated effluent on their own land
2.	Madras Cement Ltd Alathiyur Senthurai Taluk Perambalur Dist. (Cement)	Red - Large	STP installed	Installed	Within 1 km from Annaivari Odai	Treated effluent on their own land
3.	Ambica Sugars Ltd. Perambalur Dist. (Sugar)	Red - Large	ETP Provided	Installed	On the banks of Vellar river	On land adjacent to river
4.	Supreme Renewal Energy Ltd. Perambalur Dist.	Red - Large	ETP Installed	Installed	On the banks of Vellar river	On land adjacent to river

Source: TNPCB, Trichy.

13. Population details

Districts	Region	Population
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		Persons	Male	Female
Dharmapuri	Total	2442179	1244756	1197423
	Rural	1429610	724502	705108
	Urban	1012572	520257	492315
Cuddalore	Total	2280530	1148729	1131801
	Rural	1527936	770160	757776
	Urban	752594	378569	374025
Villupuram	Total	2943917	1484573	1459344
	Rural	2517447	1269889	1247558
	Urban	426470	214684	211786
Salem	Total	2992754	1551357	1441397
	Rural	1605726	841200	764526
	Urban	1387028	710157	676871
Trichy	Total	2388831	1194133	1194698
	Rural	1274516	636558	637958
	Urban	1114315	557575	556740

Source: Statistical handbook of Tamilnadu 2002

14. Literacy level

Districts	Literate		
	Persons	Male	Female
Dharmapuri	1461245	872014	589231
Cuddalore	1443851	834940	608911
Villupuram	1675027	991886	683141
Salem	1752966	1033301	719665
Trichy	1689780	927388	762392

Source: Statistical handbook of Tamilnadu 2002

VAIGAI BASIN

1. The distribution of the basin area in different districts

S.no	Name of the district.	Area of the district in Sq. km.	Area covered by the basin in sq. km.
1.	Madurai	6565	3913
2.	Dindigul	6058	1587
3.	Ramanathapuram	4232	770
4.	Sivagangai	4086	761
	Total		7031

2. List of blocks and taluks

Blocks	Taluks	Districts
Cumbum Uthamapalayam Chinnamanur Bodinayakanur Theni Periyakulam Andipatty Mayiladumparai	Uthamapalayam Bodinayakanur Theni Periyakulam Andipatty	Theni
Dindigul Athoor Battalagundu Nilakottai Natham Kodaikkanal	Dindigul Nilakottai Natham Kodaikkanal	Dindigul
Vadipatti Alanganallur Madurai East Madurai West Thirupparankundram	Vadipatti Madurai North Madurai South	Madurai

Melur Kottampatti	Melur	
Sivagangai Thiruppuvanam Manamadurai Ilaiyangudi	Sivagangai Manamadurai Ilaiyangudi	Sivagangai
Paramakudi Nayinarkovil Bogalur Ramanathapuram Thiruppullani Mandapam	Paramakudi Ramanathapuram Rameswaram	Ramanathapuram

3.List of sub basins and their areas

S.No	Name of Sub-basin	Area (Sq. Km.)		Total area (Sq. Km.)
		Plains	Hills	
1	Upper Vaigai	244.02	532.75	776.77
2	Suriliar	564.92	151.54	716.46
3	Theniar	386.96	237.74	624.70
4	Varattar – Nagalar	512.78	122.92	635.70
5	Varahanathi	234.91	155.38	390.29
6	Manjalar	241.76	228.24	470.99
7	Sirumaliar	474.20	51.04	525.24
8	Sathiyar	667.27	151.73	819.00
9	Uppar	847.36	5.34	852.70
10	Lower Vaigai	1212.74	7.86	122.60
TOTAL		5386.92	1644.54	7031.46

3. Land Use / Land Cover

S.no	Category	Area Extent in sq. km.
1.	Sparsely irrigated Crop land	1037
2.	Dry crop land	1086
3.	Intensively irrigated Crop land	2192
4.	Semi Deciduous Forest	662

5.	Dry Deciduous Forest	481
6.	Scrub Forest	855
7.	Low Evergreen Forest	49
8.	Urban built up land	27
9.	Water spread area of Vaigai dam	26
10.	Plantations	150
11.	Coconut groves	61
12.	Coastal plantations	39
13.	Swamps	45
14.	Barren rocky outcrop	107
15.	Uncultivable waste	225
	TOTAL	7042

4. Surface water potential

zone	Dependability		
	50%	75%	90%
Zone 1	993.75	814.89	729.41
Zone 2	266.37	192.30	170.50
Zone 3	279.86	224.22	184.24
Zone 4	112.34	86.56	79.38
Zone 5	373.50	261.04	209.19

5. Projected water demand for various uses in Mcm.

S. No.	Purpose	1999	2004	2019	2044
1	Domestic uses	142.09	151.99	181.61	231.03
2	Agriculture	3840	3840	3966	3966
3	Industries	46.82	62.42	109.24	187.26
4	Livestock	28.08	28.08	28.08	28.08
5	Environment	12	12	12	12

6	Total	4068.99	4094.49	4296.93	4424.37
7	Water Balance	-1496.99	-1522.49	-1724.93	-1852.37

6. Classification of forest area

S.No	Category	Area Extent Sq. Km.	Area %
1	Semi deciduous forest	662.36	9.42
2	Dry deciduous forest	480.94	6.84
3	Scrub forest	854.96	12.16
4	Low Evergreen forest	49.31	0.70
5	Plantations	149.88	2.13

7. Solid Waste Collection In Major Towns

S.no	Name of the Local Body	Civic Status	Population	Daily Generated garbage (M.T)
1	2	3	4	5
1	Cumbum	M	58713	23.400
2	Pudupatty	T.P	9977	0.170
3	Kamayagoundanpatty	T.P	12165	0.225
4	Highwavys	T.P	7028	-
5	Gudalur	T.P	35442	0.500
6	Hanumanthanpatty	T.P	9436	0.045
7	Uthamapalayam	T.P	22871	0.125
8	Kombai	T.P	12820	0.400
9	Pannaipuram	T.P	8924	0.110
10	Thevaram	T.P	14501	0.665
11	Markayankottai	T.P	5829	0.805
12	Kutchanur	T.P	6118	0.088
13	Odaipatti	T.P	13116	0.062
14	Chinnamanur	M	38327	4.500
15	Bodinayakkanur	M	73430	7.300
16	Melachokkanathapuram	T.P	11661	0.110
17	B. Meenachipuram	T.P	7207	0.076
18	Boothipuram	T.P	9623	0.110
19	Theni	M	85424	20.000
20	Palanichettipatti	T.P	11750	0.551
21	Veerapandi	T.P	14248	0.350
22	Periyakulam	M	42039	7.300
23	Vadugapatti	T.P	12353	0.455
24	Thamaraikulam	T.P	10264	0.986
25	Thenkarai	T.P	11616	1.085
26	Devathanapatti	T.P	13772	0.135
27	Genguvarpatti	T.P	10569	0.115
28	Andipatti	T.P	22992	1.254
29	Vathalakundu	T.P	20032	NA
30	Pattyveeranpatty	T.P	7744	NA
31	Pannaikadu	T.P	9396	NA

32	Ayyampalayam	T.P	21221	NA
33	Nilakottai	T.P	19630	NA
34	Sevugampatty	T.P	9521	NA
35	Vadipatty	T.P	21750	0.480
36	Sholavandan	T.P	21661	0.350
37	Alanganallur	T.P	11064	0.445
38	Palamedu	T.P	8187	1.180
39	Paravai	T.P	16346	0.115
40	Vilangudi	T.P	21073	0.790
41	Anaiyur	T.P	38302	1.160
42	Madurai	C	922913	350.000
43	Thirupparankundram	T.P	39009	1.982
44	Melur	M	33743	6.160
45	A. Vellalapatty	T.P	7068	0.410
46	Thiruppuvanam	T.P	21435	0.825
47	Manamadurai	T.P	26284	0.950
48	Ilayankudi	T.P	19100	0.850
49	Paramakudi	M	84299	14.100
50	Ramanathapuram	M	61974	11.800
51	Mandapam	T.P	15779	1.000
52	Rameswaram	T.P	7560	4.870

* NA – Not Aailed M – Municipality TP – Town Panchayat C - Corporation

8. Industries

Industries - year 2005				Water requirement – mcm		
S. No	Sub basin	Large	Small	Large	Small	Total
Growth rate/ per capita in cum		0.08	0.08	2500	2.50	
1	Upper Vaigai	9	1264	8054	1.15	9.69
2	Suriliar	0	872	0.00	0.80	0.80
3	Theniyar	3	702	2.85	0.64	3.49
4	Varatar and Nagalar	14	1053	12.81	0.96	13.77
5	Varahanadhi	6	1064	5.69	0.97	6.66
6	Manjalar	12	1437	11.39	1.31	12.70
7	Sirumalaiar	20	3256	18.51	2.97	21.48

8	Vaigai –Sathiar	37	7568	34.16	6.91	41.07
9	Vaigai – Uppar	33	7190	29.89	6.56	36.45
10	Lower Vaigai	5	2047	4.27	1.87	6.14
Total		140	26451	128.12	24.14	152.24

Industries - year 2020				Water requirement – mcm		
S. No	Sub basin	Large	Small	Large	Small	Total
Growth rate/ per capita in cum		0.08	0.08	2500	2.50	
1	Upper Vaigai	17	2236	15.11	2.04	17.15
2	Suriliar	0	1543	0.00	1.41	1.41
3	Theniyar	6	1242	5.04	1.13	6.17
4	Varatar and Nagalar	25	1863	22.67	1.70	24.37
5	Varahanadhi	11	1882	10.07	1.72	11.79
6	Manjalar	22	2542	20.15	2.32	22.47
7	Sirumalaiar	36	5760	32.74	5.26	38.00
8	Vaigai –Sathiar	66	13389	60.44	12.22	72.66
9	Vaigai – Uppar	58	12721	52.89	11.61	64.50
10	Lower Vaigai	8	3621	7.56	3.30	10.86
Total		248	46799	226.64	42.70	269.37

9. Land use pattern

S.no	Category	Area Extent Km ²	Area %
1	Sparsely irrigated Crop land	1037	15
2	Dry crop land	1086	14
3	Semi Deciduous forest	662	9
4	Dry Deciduous forest	481	7
5	Scrub forest	855	12
6	Low evergreen forest	49	1
7	Intensively irrigated crop land	2192	31
8	Plantations	150	2

9	Water spread area of Vaigai dam	26	1
10	Coconut groves	61	1
11	Barren/ rocky out crop	107	1
12	Urban built up land	27	1
13	Coastal plantations	39	1
14	Swamps	45	1
15	Uncultivable waste	225	3

10. Population Details

Districts	Region	Population		
		Persons	Male	Female
Theni	Total	1094724	553118	5411606
	Rural	502509	255241	247268
	Urban	592215	297877	294338
Madurai	Total	2562279	1295124	1267155
	Rural	1129028	569988	559040
	Urban	592215	297877	294338
Dindigul	Total	1918960	966201	952759
	Rural	1246956	627672	619284
	Urban	672004	338529	333475
Ramnad	Total	1183321	582068	601253
	Rural	883508	433090	450418
	Urban	299813	148978	150835
Sivagangai	Total	1150753	565594	585159
	Rural	826427	404561	421866
	Urban	324326	161033	163293

Source: Statistical handbook of Tamilnadu 2002

11. Literate Statement

Name of the District	Name of the Block	Total Population	Literate	Agriculturist	Agricultural Labourers	No. of households
1	2	3	4	5	6	7
Theni	Cumbum	101211	51573	3866	23209	16367
	Uthamapalayam	111453	60784	5994	29834	20976
	Chinnamanur	72660	34781	6144	29922	17120
	Bodinayakkanur	167751	106392	7282	43809	NA
	Theni	173985	121300	6405	28897	18125
	Periyakulam	188318	120609	7496	43988	32453
	Andipatty	103703	43110	12876	29393	20970
	K.Myladumparai	69278	24310	9082	23231	16404
Dindigul	Batlagundu	96346	4816	9462	21098	21860
	Kodaikanal	98598	53006	5020	9932	23415
	Athur	136099	72001	10174	34004	32813
	Dindigul	302507	198007	10668	24029	65954
	Nilakotai	196833	34705	16790	29568	26497
	Natham	119222	48396	1441	2565	25488
Madurai	Vadipatty	96807	56182	6069	31832	25300
	Alanganallur	95934	36576	8493	30163	21593
	Madurai west	127108	76484	6201	20353	27940
	Madurai east	122235	65130	8280	27552	45104
	Thirupparankundram	213399	124262	8769	21798	26852
	Melur	115006	56712	21413	27121	26830
	Kottampatti	98944	42324	19972	22630	22802
Sivagangai	Thiruppuvanam	102005	52022	15178	15485	22279
	Sivagangai	124879	62977	19496	11856	27620
	Manamadurai	106866	34084	17368	13819	21018
	Ilayankudi	NA	NA	NA	NA	NA
Ramanathapuram	Paramakudi	137700	103528	16139	7097	15348
	Nainar kovil	49349	21602	19334	9805	9060
	Bogalur	39107	18098	9597	4220	8791
	Ramanathapuram	109609	62989	94430	5379	12722
	Thiruppullani	102448	43418	12830	6415	21364

	Mandapam	156267	89976	6452	4437	21440
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12. Tourist Attractions

S.no	Place	Tourist / Pilgrim Centre, Festival
1	Suruli falls	Tourist spot
2	Veerapandi Gowmariamman kovil	Pilgrim centre
3	Kuchanur Saneeswaran kovil	Pilgrim centre
4	Vaigai Dam	Tourist spot
5	Sothuparai Dam	Tourist spot
6	Kumbakarai falls	Tourist spot
7	Devathanapatti – Moogilanai Kamatchiamman kovil	Pilgrim centre
8	Kodaikanal	Tourist spot
9	Kutladampatti falls	Tourist spot
10	Madurai	Tourist spot / Chittirai Festival
	a) Meenakshiamman kovil	Pilgrim centre
	b) Koodal Alagar kovil	Pilgrim centre
	c) Vandiyur Mariamman kovil	Pilgrim centre
	d) Alagar kovil	Pilgrim centre
	e) Thirupparankundram – Murugan kovil	Pilgrim centre
	f) Gandhi Muesium	Tourist spot
	g) Thirumalai Naicker Mahal	Tourist spot
11	Megamalai (Chinna suruli falls)	Tourist spot
12	Paramakudi	Chittirai Festival
13	Rameswaram	Tourist spot
14	Devipattinam	Tourist spot
15	Thiruppullani	Pilgrim centre
16	Thiru Uthirakosamangai	Pilgrim centre

13. Details of Sewage Disposal In Major Towns

Sno	Name of the Local Body	Civic Status	Population	Daily water supply (lakhs/ltr/day)	Daily generated sewage (lakhs/ltr/day)

1	Cumbum	M	58713	39.00	31.20
2	Pudupatty	T.P	9977	4.09	3.27
3	Kamayagoundanpatty	T.P	12165	5.47	4.38
4	Highways	T.P	7028	4.29	3.43
5	Gudalur	T.P	35442	16.30	13.04
6	Hanumanthanpatty	T.P	9436	3.30	2.64
7	Uthamapalayam	T.P	22871	9.38	7.50
8	Kombai	T.P	12820	5.13	4.10
9	Pannaipuram	T.P	8924	4.19	3.35
10	Thevaram	T.P	14501	6.24	5.00
11	Markayankottai	T.P	5829	2.45	1.96
12	Kutchanur	T.P	6118	3.01	2.41
13	Odaipatti	T.P	13116	5.25	4.20
14	Chinnamanur	M	38327	36.52	29.22
15	Bodinayakkanur	M	73430	55.69	44.55
16	Melachokkanathapurm	T.P	11661	4.66	3.73
17	B. Meenachipuram	T.P	7207	3.60	2.88
18	Boothipuram	T.P	9623	5.77	4.62
19	Theni	M	85424	93.00	74.40
20	Palanichettipatti	T.P	11750	4.23	3.38
21	Veerapandi	T.P	14248	6.41	5.13
22	Periyakulam	M	42039	38.00	30.40
23	Vadugapatti	T.P	12353	3.71	2.97
24	Thamaraikulam	T.P	10264	2.98	2.38
25	Thenkarai	T.P	11616	3.95	3.16
26	Devathanapatti	T.P	13772	6.20	4.96
27	Genguvarpatti	T.P	10569	5.18	4.14
28	Andipatti	T.P	22992	8.74	6.99
29	Vathalakundu	T.P	20032	NA	NA
30	Pattyveeranpatty	T.P	7744	NA	NA
31	Pannaikadu	T.P	9396	NA	NA
32	Ayyampalayam	T.P	21221	NA	NA
33	Nilakottai	T.P	19630	NA	NA
34	Sevugampatty	T.P	9521	NA	NA
35	Vadipatty	T.P	21750	10.66	8.53
36	Sholavandan	T.P	21661	14.06	11.25

37	Alanganallur	T.P	11064	6.74	5.39
38	Palamedu	T.P	8187	5.28	4.22
39	Paravai	T.P	16346	10.88	8.70
40	Vilangudi	T.P	21073	9.27	7.42
41	Anaiyur	T.P	38302	13.45	10.76
42	Thirupparankundram	T.P	39009	15.60	12.48
43	Melur	M	33743	10.43	8.34
44	A. Vellalapatty	T.P	7068	4.73	3.78
45	Thiruppuvanam	T.P	21435	13.00	10.40
46	Manamadurai	T.P	26284	14.82	11.86
47	Ilayankudi	T.P	19100	5.74	4.59
48	Paramakudi	M	84299	16.71	13.37
49	Ramanathapuram	M	61974	11.45	9.16
50	Mandapam	T.P	15779	4.60	3.68
51	Rameswaram	T.P		14.00	11.20

M – Municipality

TP – Town Panchayat

NA – Not Availed

14. List of Observation Wells

S.No	Well No	Location	Co-ordinates			District	Depth in Meter (BGL)	Water Level in Meter (July 99) (BGL)
			Latitude	Longitude	Toposheet No			
1	83046	Kullappagoundanpatti	09 39 44	77 16 35	58 G / 06	Theni	12.30	07.50
2	83045B	Cumbum	09 44 07	77 17 52	58 G / 06	Theni	18.20	15.40
3	83053A	Erasakkanaickanur	09 47 31	77 23 55	58 G / 05	Theni	32.00	27.75
4	83054	Uthamapalayam	09 48 15	77 19 44	58 G / 05	Theni	12.00	09.90
5	83069A	Sangarapuram	09 54 34	77 20 05	58 G / 05	Theni	25.05	19.10
6	830554A	Kombai	09 50 21	77 17 49	58 G / 05	Theni	23.10	17.45
7	83070	T.Meenakshipuram	09 53 00	77 16 54	58 G / 05	Theni	23.10	16.20
8	83068A	Seelayampatti	09 52 17	77 23 36	58 G / 05	Theni	14.50	05.10
9	83085	Kodangipatti	09 59 33	77 26 31	58 G / 05	Theni	08.70	02.10
10	83010A	Bodinaickanur	10 00 14	77 21 26	58 F / 08	Theni	10.85	06.30
11	83011A	Theni	10 01 58	77 29 23	58 F / 08	Theni	20.40	07.20
12	83009	Venkatachalapuram	09 55 00	77 28 29	58 G / 05	Theni	28.40	07.80
13	83553	Kadamalaikundu	09 48 44	77 30 29	58 G / 09	Theni	11.45	07.60
14	83067	Kandamanur	09 55 21	77 31 29	58 G / 09	Theni	19.90	05.20
15	83084	Arappadithevanpatti	10 00 27	77 32 06	58 F / 12	Theni	17.24	06.80
16	83086A	Lakshimipuram	10 04 56	77 31 25	58 F / 12	Theni	21.55	06.05
17	83087	Vaigaiputhur	10 03 31	77 35 26	58 F / 12	Theni	09.35	06.40

18	83501	Gandhipuram	10 07 40	77 33 17	58 F / 12	Theni	09.64	04.28
19	83500	Kottarapatti	10 08 17	77 42 04	58 F / 12	Theni	08.81	06.30
20	83088	Gullapuram	10 03 52	77 38 36	58 F / 12	Theni	09.55	04.52
21	83023	Devathanapatti	10 08 34	77 38 50	58 F / 12	Theni	11.01	02.62
22	83100	Vengadasastrikottai	10 09 13	77 47 23	58 F / 06	Dindigul	11.10	05.50
23	83021A	Pallapatti	10 08 25	77 54 40	58 F / 16	Dindigul	15.43	04.82
24	83092A	Neerathan	10 03 09	77 58 35	58 F / 16	Madurai	10.65	03.38
25	83014	Solavanthan	10 01 14	77 57 46	58 F / 16	Madurai	07.10	03.90
26	83080	Nagari	10 01 04	78 02 04	58 J / 04	Madurai	06.50	02.85
27	83094B	Thavacheri	10 04 23	78 06 56	58 J / 04	Madurai	08.63	Dry
28	83020A	Valayapatti	10 08 54	78 07 10	58 J / 04	Madurai	06.00	04.20
29	83079	Koolapandi	10 00 37	78 09 00	58 J / 04	Madurai	04.60	05.28
30	83027	Puliankulam	09 52 59	78 11 02	58 K / 04	Madurai	06.10	05.15
31	83076	Varichur	09 54 30	78 15 30	58 K / 05	Madurai	07.60	04.75
32	83075	Karuppaiyurani	09 56 00	78 11 30	58 K / 01	Madurai	08.35	05.15
33	83019	Parali	10 08 54	78 11 05	58 J / 04	Didigul	06.80	04.72
34	83095	Pulipatti	10 05 04	78 17 20	58 J / 08	Madurai	07.00	05.30
35	83017	T.Palaiyur	09 57 08	78 18 32	58 K / 05	Madurai	09.65	06.85
36	83078	Melapathinettankudi	09 59 45	78 19 52	58 K / 05	Madurai	08.40	04.96
37	83077A	Urakanpatti	09 59 50	78 25 44	58 K / 05	Madurai	09.65	05.45
38	83096	Thumbaipatti	10 05 06	78 21 34	58 J / 08	Madurai	05.34	01.70
39	83233	Thirumansolai	09 51 09	78 19 50	58 K / 05	Sivagangai	08.64	05.21
40	83236	Nallakulam	09 51 35	78 23 20	58 K / 05	Sivagangai	08.64	02.91

41	83124B	Rajakambeeram	09 43 05	78 25 10	58 K / 06	Sivagangai	09.80	07.85
42	83123B	Manamadurai	09 42 00	78 27 00	58 K / 06	Sivagangai	08.60	05.50
43	83129B	Ilaiyankudi	09 37 35	78 37 35	58 K / 10	Sivagangai	11.00	08.00
44	83128B	Paramakudi	09 32 40	78 35 40	58 K / 10	Ramnad	05.70	02.47
45	83275	Bogalur	09 24 25	78 42 50	58 K / 11	Ramnad	11.66	05.63
46	83277	Vairavanendal	09 24 35	78 46 05	58 K / 15	Ramnad	03.50	02.06
47	83136A	Devipattinam	09 28 00	78 54 00	58 K / 15	Ramnad	05.45	02.20
48	83279A	Sathrakudi	09 25 40	78 54 00	58 K / 15	Ramnad	04.17	02.78
49	83134A	Ramanathapuram	09 22 15	78 49 50	58 K / 15	Ramnad	09.35	06.70
50	83280	Valantharuvai	09 20 10	78 54 50	58 K / 15	Ramnad	08.64	05.73
51	83281	Chembadaiyarkulam	09 20 00	78 58 00	58 K / 15	Ramnad	04.98	03.34
52	83282	Uchipuli	09 18 20	79 01 10	58 O / 03	Ramnad	02.98	01.75
53	83132A	Thiruppulani	09 17 00	78 49 50	58 K / 15	Ramnad	06.60	04.24

AGNIYAR BASIN

1. Details of Taluks in the Basin

S.No	District	Taluks
1	Pudukkottai	Alangudi
2		Arathangi
3		Avudayarkoil
4		Gandarvakkottai
5		Kulathur
6		Pudukkottai
7		Thirumayam
8	Thanjavur	Pattukottai
9		Peravurani
10	Tiruchirapalli	Viralimalai

2. Anicuts present in the Sub Basins of Agniyar

Agniyar Sub Basin	Ambuliyar Sub Basin	South Vellar Sub Basin
Sinayakkudi	Pallathividuthy	Kilikudi
Andakulam	Kothamangalam	Pinnakudi
Agniyar (or) Pulavankadu	Senthangudi	Visalue
Maniyavayal	Chithathikkadu	Keemanakanmoi
Madathukkadu	Nelhadikkadu	Sundarapatti
Poovanam	Adaikkathevan	Senthamangalam
Kollukkadu		Holdsworth
Pumping scheme		Sethukanmoi
		Kothamangalam
		Narpavalakudi
		Veeramangalam
		Avudayarkoil
		Karunkadu
		Manalur

		Keeranur Manamelkudi
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3. Land use / Land cover

Description	Area (ha)
Geographical area	4,56,600
Forest	2,3743
Barren and uncultivable waste	9,132
Land under non - agricultural use	1,09,584
Cultivable waste	14,155
Permanent pastures and other crazing land	4,109
Current fallows	64,381
Other fallows	27,853
Land under Misc. use	8,218
Net area sown	1,95,425

(Source: Environmental Status report of the Agniyar River Basin)

4. Projected water demand and water balance for various uses

S No	Purpose	1999	2004	2019	2044
1	Domestic uses	29.55	31.48	37.29	46.98
2	Agriculture	2344	2344	1916.86	1631.81
3	Industries	25.64	34.18	59.82	102.54
4	Livestock	14.8	14.8	14.8	14.8
6	Total	2413.99	2424.46	2028.77	1796.13
7	Water Balance	-409.99	-420.46	-24.77	207.87

5. Crop Productivity

S.No	Description of crop	Area (in hectares)	Productivity in Kg/hec
1	Paddy	83500	3158
2	Cholam	326	1306
3	Cambu	30	2796
4	Ragi	278	2316
5	Maize	180	2068
6	Varagu	209	918
7	Green gram	37	543
8	Black gram	2140	518
9	Red gram	1390	505
10	Horse gram	210	0
11	Ground nut	27549	1448
12	Gingelly	1481	453
13	Chillies	181	569

6. Diseases prevailing in the basin

S.No	Name of the disease	No. of patient treated
1	Fever	2458
2	Typhoid fever	410
3	Tuberculosis	1691
4	Leprosy	480
5	Twakrogam	0
6	Verinam	95
7	Vatham	15957
8	Hypertensive disease	414
9	Isehemic heart disease	857
10	Sivorogam	0
11	Nasrogam	234
12	Others	43744

7. District wise area and population details

Districts	Region	Population		
		Persons	Male	Female
Trichy	Total	23,88,831	11,94,133	11,94,698
	Rural	12,74,516	6,36,558	6,37,958
	Urban	11,14,315	5,57,575	5,56,740
Thanjavur	Total	22,05,375	10,91,557	11,13,818

8. District wise literacy level

Districts	Literate		
	Persons	Male	Female
Trichy	16,89,780	9,27,388	7,62,392
Thanjavur	14,90,568	8,25,006	6,65,562
Pudukottai	9,19,086	5,25,743	3,93,343

9. Tourist attractions

District	Tourist Place / Pilgrim center
Trichy	Mukkombu Anicut, Puliyoncholai, Rock fort Temple and Sri Rangan
Thanjavur	Darasuram, Grand Anicut, Thanjavur Temple, Thiruvaiyaru, Thirukandiyur and Kumbakonam
Pudukottai	Viralimalai, Avudayiarkoil, Kudumiammalai, Pudukottai, Sittanna vassal, Narthamalai

PAMBAR BASIN

1. Taluk wise Basin Area

Name of District	Name of Taluk of the Basin	Area Sq.Kms
Pudukottai	Tirumayam	385.39
	Aranthangi	19.27
	Avadayarkoil	83.50
Trichy	Manapparai	54.60
Sivagangai	Tiruppathur	789.13
	Devakottai	346.85
	Karaikudi	452.83
	Sivagangai	35.33
Madurai	Melur	356.49
Ramnad	Tiruvadanai	353.28
Dindigul	Natham	475.32
	Dindigul	22.48
Total		3374.47

2. Land use

S.No	Description	Area in ha	Area as a % of Total Area of the basin
1	Total area of basin	337447	100
2	Forest	31864	9.44
3	Barren and Uncultivable land	10650	3.16
4	Land put to non-agricultural use	53164	15.75
5	Cultivable waste	14577	4.32
6	Permanent pasture and grazing land	1547	0.46
7	Land under miscellaneous trees groves not included in net sown area	6759	2.00
8	Current fallows	48688	14.43
9	Other fallow lands	57688	17.09

10	Net Area sown	112510	33.35
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3. Surface water potential

Season	Calculation	Yield Mcum
SW Monsoon	$0.15 \times 3374.47 \times 100 \times 152.74 / 1000$	152.74
NE Monsoon	$0.15 \times 3374.47 \times 100 \times 206.65 / 1000$	206.65
Summer	$0.15 \times 3374.47 \times 100 \times 149.414 / 1000$	149.414
	Total	508.8

4. Ground water Potential

Name of Taluk	Name of Block	Ground Water Potential for the whole Block			GW potential of the Basin portion of the block		
		Total ha-m	Available for Irrigation	Basin area in the block ha	GW Available for irrigation	GW Available for industry	GW Total potential available ha-m
1) Sivagangai Dt.							
Devakottai	Devakottai	4562	4481	34685	5043	83	5126
	Kannanur	3888	3833				
Karaikudy	Sakkottai	4818	4706	45283	5972	157	6129
	Kallal	6358	6185				
Tiruppathur	Tiruppathur	5501	5345	78913	11695	350	12045
	Singampunari	4180	4083				
	S.Pudur	2364	2267				
Sivagangai	Sivagangai	9563	9364	3533	689	13	702
	Kalayar koil	12298	12090				
2) Ramnad Dt.,							
Tiruvadani	Tiruvadani	5874	5673	35328	2611	173	2784
	RS Mangalam	1000	775				
3) Pudukottai Dt.,							
Tirumayam	Tirumayam	6221	6069	38539	6635	196	6831
	Arimalam	5251	5098				
	Ponnamaravathi	5478	5296				

Aranthangi	Aranthangi	9745	9463	1927	456	13	469
Avadayarkoil	Avadayarkoil	10462	10302	8350	2169	34	2203
4)Trichy Dt.							
Manapssparai	Marungapuri	9054	8825	5460	1059	27	1086
5)Madurai Dt.							
Melur	Melur	12902	12609	35649	9682	148	9830
	Kottampatti	6607	6589				
6)Dindigul Dt.							
Natham	Natham	5936	5716	47532	4606	177	4783
Dindigul	Sannarpatti	5193	4981	2248	285	12	297
				337447	50902	1383	52285

(1 ha-m = 0.01Mcum) or 509.02 13.83 522.85Mcum

5. Projected water demand and water balance for various uses in MCM

S No.	Purpose	1999	2004	2019	2044
1	Domestic uses	35.21	37.31	43.6	54.07
2	Agriculture	1960.73	1960.73	1815.28	1637.52
3	Industries	51.89	69.18	121.07	207.54
4	Livestock	24.98	24.98	24.98	24.98
6	Total	2072.81	2092.2	2004.93	1924.11
7	Water Balance	-443.81	-463.2	-375.93	-295.11

Source: State framework resources Plan of Tamilnadu

6. Places of Fluoride contamination

S.No	Name of Taluk	Name of Village	Fluoride content in ppm
1	Melur	Pulipatti	2.0
		Kottampatti	2.5

7. Places of Nitrate contamination

S.No	Name of Taluk	Name of Village	Nitrate content in ppm
1	Melur	Pulipatti	66

2	Tiruvadanai	Tondi	1302
3	Karaikudy	Karaikudy	128
4		Vetriyur	177

8. Cropping Pattern

Sl. No	Name of Crop	Name of District				
		Pudukottai	Dindigal	Sivagangai	Ramnad	Madurai
1	Rice	Sep-January	Aug-Dec June-Oct	Aug-Nov to Jan-March	Nov- March	June-Oct Aug-Dec
2	Groundnut (oil Seeds)	July-Sep	Jan-May	Throughout the year		
	Rice	Oct-January				
	Cumbu or Ragi	Feb-May		Jan-July to Aug-Sep		Mar-June June-Sep
3	Groundnut	July-October				June-Oct July-Nov
	Chilles	Oct-Feb				
	Maize	March-June	Jan-May	Aug-Sep	Feb-June Aug-Jan	
4	Ragi	July-Oct				June-Oct
	Rice`	Oct-Feb				
	Cotton	Feb-June	Aug-Sep to Jan-Feb	Feb-March to Sep-Oct	Feb-Aug	Feb-Aug June-Dec
5	Groundnut	June-Oct				Dec-April
	Black gram	Nov-Feb		June-Aug	Mar-May	
	Horse gram,Ragi	Aug-Nov				
	Gingelly	Dec-March				
6	Sugarcane		Throughout the year			Jan-Dec

9. Crop Yield

S.No	Name of Crop	Yield in Kg/ha				
		Pudukotttai	Sivagangai	Dindigul	Ramnad	Madurai
1	Rice	2825	2680	3200	2552	3932samba 6100kuruvai
2	Millets	1201	1680	1000	1103	1039
3	Pulses	587	570	620	491	416
4	Groundnut	724	690	950	885	1505
5	Gingelly	370	610	-	404	-
6	Cotton	358	2720	2200	2.4 bales	848
7	Sugarcane	9700	-	-	12400	8900
8	Chillies	-	-	-	808	-
9	Sunflower	-	-	-	351	-

10. Water Demand for agriculture

Sl.no	Name of crop	Area under tank irrigation	Area under well irrigation	Net CWR cm	NIR Mcum	Field efficiency	GIR Mcum
1	Rice (1)	67764		86.05	583.11	0.44	1325.25
2	Rice (2)		7529	86.05	64.79	0.75	86.38
3	Irrigated dry		5582	31.85	17.78	0.75	23.70
						Total	1435.33

CWR – Crop Water Requirement, NIR – Net Irrigation Requirement

GIR – Gross Irrigation Requirement.

11. Diseases in Sivagangai District during January-March 2004

S. No	Name of block	ADD	Malaria	Chickenpox	Measles	TB	Leprosy
1	Thirupathur	5	-	-	-	-	1
2	Sakkottai	1	-	4	-	15	13
3	Devakottai	7	-	-	2	7	1
4	Kannankudi	1	-	-	-	1	-
5	Kalayarkovil	6	1	1	-	4	2
6	Kallal	5	-	-	-	21	2
	Total	25	1	7	-	48	19

12. Abstract of district wise population

Sl.No	Name of Districts	Name of Taluk	No of Villages situated in the basin	Area of the basin Sq.km	Population (2001 Census)		
					Male	Female	Total
1	Dindigul	Dindigul	4	22.48	6074	6042	12116
		Natham	43	475.32	74258	72486	146744
		Total	47	497.80	80332	78528	158860
2	Madurai	Melur	38	356.49	64878	65615	130493
3	Sivagangai	Tiruppathur	96	789.13	118753	125942	244695
		Sivagangai	5	35.33	2697	3241	5938
		Karaikudy	70	452.83	67969	70094	138063
		Devakottai	55	346.85	31523	29107	60630
		Total	216	1624.14	220942	228384	449326
4	Trichy	Manapparai	8	54.60	8677	8724	17401
5	Ramnad	Tiruvadana	43	353.28	41133	43094	84227
6	Pudukottai	Tirumayam	73	385.39	74426	77719	152145
		Aranthangi	8	19.27	5800	4252	10052
		Avudayarkoil	22	83.50	9299	9419	18718
		Total	104	488.16	89525	91390	180915
GRAND TOTAL			465	3374.47	505487	515735	1021222

13. Literacy Population

S.No	Name of Districts	Name of Taluk	Literacy (2001 Census)		
			Male	Female	Total
1	Dindigal	Dindigal	4207	3033	7240
		Natham	49792	32447	82239
2	Madurai	Melur	45596	31758	77354

3	Sivagangai	Tiruppathur	84088	35305	119393
		Sivagangai	1989	1770	3759
		Karaikudy	55313	49418	104731
		Devakottai	25589	20011	45600
4	Trichy	Manapparai	5907	3885	9792
5	Ramnad	Tiruvadana	29472	28696	58168
6	Pudukottai	Tirumayam	53874	39621	93495
		Aranthangi	4340	2338	6678
		Avudayarkoil	7174	5197	12371
Total			367341	253479	620820

14. Category of Tourist spots

S. No.	Name of the Place	Category	Location
1	Pillayar patti Temple	Pilgrimage Centre	Pillayar Patti village
2	Thirukoshttiur Temple	Pilgrimage Centre	Thirukoshttiur village in Thiruppathur taluk.
3	Kundrakudi Temple	Pilgrimage Centre	Kundrakudi (v) near Karaikudi
4	Oriyur church	Pilgrimage Centre	Oriyur in Thiruvaadani taluk.
5	Vettangudi Bird Sanctuary	Bird Sanctuary (Tourist spot)	In between Thiruppathur and S.S. Kottai
6	Thirumayam Fort	Tourist Spot	Thirumayam

GUNDAR BASIN

1. Sub basin area

S.No.	Sub Basins	Area Sq.km
1	Terkkar	894
2	Goundanadhi	714
3	Upper Gundar	867
4	Lower Gundar	1638
5	Palar	312
6	Kottakkudiar	770
7	Vembar	717
	Total Area	5912

2. Surface Water Potential

S.No	Sub Basins	Surface Water Potential in Mm ³		
		S.W. Monsoon	N.E. Monsoon	Annual
1	Terkkar	33.93	53.80	87.73
2	Goundanadhi	25.98	44.47	70.45
3	Upper Gunder	28.00	49.55	77.55
4	Lower Gunder	52.70	97.59	150.29
5	Palar	6.00	21.38	27.38
6	Kottakkudiar	15.38	51.08	66.46
7	Vembar	14.13	41.59	55.72
	Total	176.12	359.46	535.58

3. List of villages having fluoride value > 1.50 mg/l

S.no	Taluks	Village	Fluoride mg/l
MADURAI DISTRICT			
1	Madurai south	Avaniyapuram	1.70
		Chinnakattalai	1.80
2	Thirumangalam	Kollarampatti	1.60
3	Usilampatti	Veppanental	1.90
		Uthappanaickanur	1.90

		T.Meenakshipuram	2.80
4	Thiruchuli	Narikudi	3.70
5	Aruppukkottai	P. Pudupatti	3.60
		Ramanujapuram	2.50
		Kovilankulam	2.40

4. Industries

Taluk	Type				Total
	G	O	R	DO	
VIRUDHUNAGAR DIST					
Aruppukkottai	0	15	8	0	23
Kariyapatti	0	2	2	0	4
Thiruchuli	0	1	1	0	2
	0	18	11	0	29
MADURAI DIST					
Madurai South	36	447	223	0	706
Usilampatti	0	41	1	0	42
Peraiyur	0	1	2	0	3
Thirumangalam	13	212	106	0	331
	49	701	332	0	1082
SIVAGANGAI DIST					
Manamadurai	1	86	11	4	102
	1	86	11	4	102
RAMANAD DIST					
Paramakudi	0	24	0	0	24
Mudukulathur	0	3	0	0	3
Kadaladi	0	6	1	0	7
Kamudhi	0	15	1	0	16
Ramnad	4	17	0	0	21
	4	65	2	0	71
THOOTHUKUDI DIST					
Vilathikulam	0	3	6	0	9
	0	3	6	0	9
Total	54	873	362	4	1293

5. Pilgrimage Centers, Tourist Spots And Sanctuaries

Location	Pilgrimage Centers/Tourist spots / Sanctuaries	Festivals	Period
Pilgrimage centers & Temples			
Madurai	SriMeenakshi Sundaeswarar Temple	Chithirai festival Festival of cradle Navaratri festival	April April September
Madurai	Koodal Azhargar temple	Masi Magam Float Festival	February/March
Thirupparakundram	Lord Subbramaiya Temple	Panguni Uthiram	March – April
Madurai	Mariamman teppakulam Mariamman Temple	Adi krithigai Float faestival	July – August January– February
Thiruchuli	Thirumeninathan swami Temple Birth place of Sri Ramana Maharishi	Bhramotchavam festival	April – May
Uthirakosamangai	Natarajar Temple	Arudhra festival	December
Thiruppullani	Adi Jegannatahaperumal Temple		
Erwadi	Ibrahim syed Aulia Dargha	Annual festival	
Tourist spots			
Madurai	Mannar Thirumalai Naikar Mahal	-	Through out the year

KALLAR BASIN

1. Taluk wise area

S.No	Taluk	Area covered by basin (Hectares)	% of area of the basin covered by the Taluk
1.	Kovilpatti	32227.375	40.77
2.	Ottapidaram	36195.36	45.79
3.	Vilathikulam	10619.265	13.44

2. Details of Anicuts

S.No	Name of the Anicut	Length of channel (m)	Channel fed tanks	Ayacut (acres)
Kallar river basin				
1.	Ketchilapuram	780	Kilavipatti	112.02
2.	Sivanthipatti	2750	Erachi	45.45
3.	Thuraiyoor	2500	Semmaputhur	154.25
4.	Athikinar	1900	Athikinar	318.00
5.	Kattaboman (Left)	1000	Kalmedu (Therku and Vadaku)	443.80
6.	Kattaboman (Right)	300	Pattinamaruthur, Tharuvaikulam (new)	700.22
7.	Pattinamaruthur	4000	Pattinamaruthur	299.80
8.	Melaarasaradi	1000	Tharuvaikulam (old)	388.00

3. Surface water potential of Kallar basin including Korampallamaru

Period	Surface water potential
Southwest monsoon	12.96 MCM
Northeast monsoon	66.79 MCM
Annual	124.56 MCM
Diversion from Tambiraparani basin for irrigation	6.59 MCM

4. Dominant crops

S. No	Taluk	Irrigation	Predominant crops
1.	Vilathikulam	Irrigated	Paddy, Cumbu, Coconut, cotton, Vegetables, chilli and Onion
		Unirrigated	Cholam, Cumbu, Valli, Black gram, Green gram, Maize, Gingily, Sunflower, Caster, Cotton, Tamarind, Chenna, Coriander, Fodder cholam and Drychilli
2.	Ottapidaram	Irrigated	Paddy, Cumbu, Coconut, Vegetables, Chilli (Dry), Onion, Gerry leaves and Flowers
		Unirrigated	Cholam, Cumbu, Black gram, Maize, Green gram, Gingily, Sunflower, Cotton, Chenna, Coriander, Fodder Cholam, Chilli (Dry) and Onion
3.	Kovilpatty	Irrigated	Paddy, Maize, Coconut, Cotton, Vegetables, Dry chilli, Onion and Flowers
		Unirrigated	Cholam, Cumbu, Maize, Valli, Black gram, Green gram, Sunflower, Cotton, Coriander, Fodder cholam And Tamarind

5. Crop yields

S.No	Crops	Average yield (kg/ ha)
I.	Food grains	
	Cereals and Millets	
	1. Paddy	3990
	2. Cholam	889
	3. Cumbu	1434
	4. Ragi	1930
	5. Pulses	
	6. Black gram	288
7. Green gram	440	
II	Oil seeds	
	8. Cotton (in terms of lint)	131
	9. Ground nut	1650
	10. Gingily	182

	11. Sunflower	434
III	Other crops	
	12. Chillies	434

6. List of Industrial units, their Category, Type and Size

Sl. No	Name of the Industrial unit	Category	Type and Size
1.	Sahaya matha salt refinery, Kallurani	Salt	O/L
2.	Kavin chemicals, Subramaniapuram	Chemicals	R/S
3.	Sujana power limited (Gangai kondon), Keelarasadi	Power plant	R/L
4.	Arasan syntax limited, Ottapidaram	Spinning	O/L
5.	South India Bromine & chemical (P) limited, Veppalodai	Chemical	R/S
6.	VPS Spinner, Eppodumvendran	Spinning	O/M
7.	Krithiga spinning mill, Eppodumvendran	Spinning	O/M
8.	Kalpage chemicals, Melarasadi	Chemical	R/S
9.	Sona Chemicals, Nagampatti	Chemical	R/S
10.	Sree Venkateswara carbides, Pasuvanthanai	Chemical	R/S
11.	Alex match works, Ottapidaram	Match	R/S
12.	Sri Palani andavar match works, Ottapidaram	Match	R/S
13.	Pearl city spinning mills, Melarasadi	Spinning	O/S
14.	Sri Murugan spinning, Eppodumvendran	Spinning	O/S
15.	Sujana power limited (Thoothukudi), Keelarasadi	Power plant	R/L
16.	Loyal textiles mills limited, Koilpatti	Spinning	O/L
17.	Lakshmi Mills Limited, Koilpatti	Spinning	O/L
18.	Arasan Fertilizer's (P) Limited, Kadambur	Fertilizer	R/M
19.	K.R. Exports (P) Ltd., Nalattinpodur	Spinning	O/M
20.	Arasan Phosphates (P) Ltd., Kadambur	Chemical	R/S
21.	Madurai Agro – Chemical And Fertilizers, Koilpatti	Pesticide	R/S
22.	Thangam Match Works, Keelaeral	Match	R/S
23.	Appolo Match Company, Koilpatti	Match	R/S

24.	Perfect Match Company, Koppampatty	Match	R/S
25.	Liberty Match Co. (P) Ltd., Kadambur	Match	R/S
26.	Golden Chemical, Koilpatti	Chemicals	R/S
27.	East India Match Factory, Kovilpatti	Match	R/S
28.	Jayam Match Works, Kovilpatti	Match	R/S
29.	Vennus Match Factory, Kovilpatti	Match	R/S
30.	Maheswari Match Factory, Kovilpatti	Match	R/S
31.	Victory Match Factory, Kovilpatti	Match	R/S
32.	Antony Match Factory, Kovilpatti	Match	R/S
33.	Meenatchi Match Factory, Kovilpatti	Match	R/S
34.	The Hindu Match Factory, Kovilpatti	Match	R/S
35.	Annamalai Match Factory, Kovilpatti	Match	R/S
36.	Victory Steel Rolling Mill, Kovilpatti	Steel rolling	R/S
37.	Kirasan Fire Works, Kovilpatti	Match	R/S
38.	Ananth Match Industries, Kovilpatti	Match	R/S
39.	Aruna Match Industries, Kovilpatti	Match	R/S
40.	Alaguram Match Industries, Kovilpatti	Match	R/S
41.	Baskaran Match Industries, Kovilpatti	Match	R/S
42.	Country Match Industries, Kovilpatti	Match	R/S
43.	Eswari Match Industries, Kovilpatti	Match	R/S
44.	Jagath Match Industries, Kovilpatti	Match	R/S
45.	Jaya Match Industries, Kovilpatti	Match	R/S
46.	Kadalai Match Industries, Kovilpatti	Match	R/S
47.	Kamatchi Match Industries, Kovilpatti	Match	R/S
48.	Lakshmi Match Industries, Kovilpatti	Match	R/S
49.	Yesesde Match Industries, Kovilpatti	Match	R/S
50.	Mahalakshmi Match Industries, Kovilpatti	Match	R/S
51.	Liberty Match Industries, Kovilpatti	Match	R/S
52.	Mahanath Match Industries, Kovilpatti	Match	R/S
53.	Pope teaking Match Industries, Kovilpatti	Match	R/S
54.	Prabhath (Ettayapuram) Match, Kovilpatti	Match	R/S
55.	Liberty Match Co. Pvt. Ltd, Pandavarmangalam, Kovilpatti	Match	R/S
56.	Ranganathan Match Works, Kovilpatti	Match	R/S

57.	Srilakshmi Match Industries, Kovilpatti	Match	R/S
58.	Sri Palaniandavar Match Works, Kadambur	Match	R/S
59.	Sundaravel Match Industries Kovilpatti	Match	R/S
60.	The Comerin Match Works, Kovilpatti	Match	R/S
61.	The Kisan Match Works, Kovilpatti	Match	R/S
62.	The Original Wax Industries, Kovilpatti	Match	R/S
63.	Vishwanathan Match Industries, Kovilpatti	Match	R/S
64.	TNSTC, Kovilpatti	Engineering	O/S
65.	Ponnay Cotton Willow Industries, Kovilpatti	Ginning	O/S
66.	K. Velayutham Chetty Farm, Kovilpatti	Oil mill	O/S
67.	Industrial Chemicals, Kurukkuchalai	Lime	O/S
68.	Vishala Knit - Wear (P) Limited, Kovilpatti	Garments	G/S
69.	Valli Garments (P) Limited, Kovilpatti	Garments	G/S
70.	TVT And Sons, Keelaeral	Ginning	G/S

7. Taluk wise population details

S.no	Taluk	Population
1.	Kovilpatti	54475
2.	Ottapidaram	58732
3.	Vilathikulam	12749

8. Literacy details

S. No	Village	Literacy rate %	Male %	Female %
Kovilpatty				
1.	Achankulam	90	70	30
2.	Edaiseval	90	70	30
3.	Kannakattai	25	50	50
4.	Koppampatti	40	50	50
5.	Manthitoppu	50	70	30

6.	Nalatinpudur	60	50	50
7.	Pungavarnatham	25	50	50
8.	Thottampatti	80	60	40
9.	Kadumbur	10	50	50
10.	Keelairal	55	75	25
11.	Kurumalai	70	30	70
12.	Mudukalankulam	15	70	30
13.	Cholapuram	75	70	30
14.	Uthupatti	15	70	30
15.	Semmapudur	55	75	25
16.	Vadakuvandanam	25	50	50
17.	Therkuvandanam	40	30	70
	Ottapidaram			
18.	Adanur	50	70	30
19.	Eppothumvendran	50	80	20
20.	Dalavaipuram	50	40	60
21.	Kuttanayakanpatti	90	70	30
22.	Kollanparambu	90	50	50
23.	Meenachipuram	15	50	50
24.	Mullur	55	70	30
25.	Ottapidaram	50	70	30
26.	Pasuvanathanai	50	70	30
27.	Tharuvaikulam	20	50	50
28.	Vedanatham	60	60	40
29.	Chandragiri	25	60	40
30.	Jegaveerapandiyapuram	80	50	50
31.	Shanmugapuram	99	50	50
32.	Keelamangalam	60	50	50

9. Chemical Analysis of Water Samples (Ground Water)

*KALLAR RIVER BASIN**TALUK: KOVILPATTI**VILLAGE:KADAMBUR*

S. No	Date	E.C	pH	Ca	Mg	Na	K	HCO ₃	CO ₃	SO ₄	Cl	NO ₃	TDS	TH	RSC	SAR	SSL	GCT
1.	1/91	6700	8.4	488	353	460	49	67	18	1512	1400	137	4451	2670	-	3.9	High	CaCl
2.	7/91	No sample																
3.	1/92	6400	8.3	464	335	437	47	61	18	1440	1333	180	4235	2535	-	3.8	High	CaCl
4.	7/92	6600	8.2	380	389	368	39	110	0	1075	1453	161	3920	2550	-	3.2	High	CaCl
5.	1/93	7000	7.9	480	450	575	39	67	0	1728	1595	291	5192	3050	-	4.5	High	CaCl
6.	7/93	8900	9.2	620	353	828	55	146	0	1872	1843	242	5886	3000	-	6.6	High	CaCl
7.	1/94	1400	8.8	60	69	69	117	244	24	86	216	124	987	435	-	1.4	C3S1	CaCl

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8.	7/94	500	8.5	30	28	23	26	79	24	6	89	32	298	190	-	0.7	C2S1	CaCl
9.	1/95	6600	8.1	464	399	529	47	177	0	1574	1446	236	4748	2800	-	4.3	High	CaCl
10.	7/95	8000	7.9	220	693	437	59	92	0	1392	1879	298	5024	3400	-	3.3	High	CaCl
11.	1/96	9000	8.4	440	369	920	90	122	30	1872	1773	254	5829	2700	-	7.7	High	CaCl
12.	7/96	1000	8.0	40	51	78	47	214	0	149	145	2	619	310	-	1.9	C3S1	CaCl
13.	1/97	670	8.1	28	58	12	1	171	0	24	121	0	330	310	-	0.3	C2S1	CaCl
14.	7/97	3190	7.9	144	182	202	8	98	0	178	766	248	1777	1110	-	2.6	C4S1	CaCl
15.	1/98	7100	8.4	176	516	69	39	73	18	374	1432	112	2773	2560	-	0.6	High	CaCl
16.	7/98	No sample																

KODAIYAR BASIN**1. Reservoirs**

S No	Name of Dam / Reservoir	Capacity (MCM)	Annual Storage (MCM)	Normal Opening of Reservoir	Ayacut area in (ha)
1	Pechiparai Dam	152.36	152.36	1 st June	Combined Ayacut of Kodaiyar system is 36836 Ha
2	Perunchani Dam	81.84	81.84	1 st June	
3	Chittar Dam – I	17.28	17.28	1 st June	
4	Chittar Dam –II	28.55	28.55	1 st June	
5	Kodaiyar (Upper Dam) I	118.50	118.50	-	
6	Kodaiyar (Lower Dam) II	0.883	0.883	-	-
7	Kuttiyar Dam	0.227	0.227	-	-
8	Chinna Kuttiyan Dam	2.776	2.776	-	-
9	Poigaiyar Reservoir	2.700	2.700	-	250
	Total	405.116			37086

2. Land use / Land cover

S. No	Description	Area (ha)
1	Geographical area	153300
2	Forest	45543
3	Barren and uncultivable waste	2980
4	Land under non - agricultural use	22801

5	Cultivable waste	128
6	Permanent pastures and other crazing land	63
7	Current fallows	762
8	Other fallows	1066
9	Net area sown	79699

3. Total Demand of Kodaiyar Basin & Pazhayar Sub Basin

Sector	Kodaiyar Basin	Pazhayar Sub Basin
Domestic	31.33 MCM	18.22 MCM
Irrigation	728.33 MCM	297.97 MCM
Live stock	3.40 MCM	1.56 MCM
Industries	2.31 MCM	10.58 MCM
TOTAL	765.37 MCM	328.33 MCM
OR	765 MCM	328 MCM
Water Budget	1267-765 = 502 MCM	Net deficit 328-213= 115MCM

4. Surface water quality- February 2004

	1	Station Code	KOD 1	KOD 2	KOD 3	KOD 4	KOD 5	KOD 6	KOD 7	KOD 8	KOD 9	KOD 10
	2	Station Code No	1701 01	1701 02	1701 03	1701 04	1701 05	1701 06	1701 07	1701 08	1701 09	1701 10
	3	Date of Collection	27.0 2.04	27.0 2.04	27.0 2.04	27.0 2.04	27.0 2.04	27.0 2.04	27.0 2.04		27.0 2.04	27.0 2.04
o	4	p ^H	-	-	-	-	-	-	-		-	-

	5	EC µmho/ cm	-	-	-	-	-	-	-	-	-	-
	6	Do mg/t	4.41	5.98	4.88	3.70	3.78	4.13	2.88		2.31	4.41
	7	Temp. °C	27	27	28	28	27	29	28		29	28
	8	Colour Code	7	7	7	7	7	7	7		7	7
	9	Odour Code	1	1	1	1	1	1	1		1	1
General	10	P ^H	9.9	9.5	9.4	9.0	9.1	9.3	9.5		9.9	9.6
	11	EC µmho/ cm	5.77	8.34	16.37	5.45	23.75	4.49	14.44		7.38	10.91
	12	TDS mg/l	0.036	0.052	0.102	0.034	0.148	0.028	0.090		0.048	0.068
	13	TSS mg/l	1.0	1.2	1.0	0.4	0.6	0.4	0.6		0.2	0.8
Nutrients	14	NH ₃ mgN/l	-	-	-	-	-	-	-		-	-
	15	NO ₃ ⁻ mgN/l	0.46	0.52	0.69	0.92	0.52	1.33	0.99		0.57	0.55
	16	Total P mg/l	-	-	-	-	-	-	-		-	-
Org. msvvrt	17	BOD mg/l	0.85	0.56	1.13	2.86	1.86	1.96	2.31		1.96	0.86
	18	COD mg/l	6	6	12	18	20	20	24		18	14
Alkalinity	19	Phen. Mg caco 3/l	0	0	0	0	0	0	0		0	0

	20	Total mg CaCO_3/l	6	3	10	18	8	35	40		37	10
Hardness	21	Total mg CaCO_3/l	22	22	34	60	28	120	114		114	38
	22	Ca $^{++}$ mg CaCO_3/l	-	-	-	-	-	-	-		-	-
Major Ions	23	Ca $^{++}$ mg/l	5.61	3.21	10.42	10.42	11.22	24.05	28.06		21.64	5.61
	24	Mg $^{++}$ mg/l	5.27	9.23	5.27	22.42	12.36	39.56	29.01		39.56	15.82
	25	Na $^{+}$ mg/l	-	-	-	-	-	-	-		-	-
	26	K $^{+}$ mg/l	-	-	-	-	-	-	-		-	-
	27	Cl mg/l	15.82	8.52	9.94	12.78	14.21	44.02	35.50		45.44	18.46
	28	So ₄ ⁻ mg/l	0.37	0.16	0.27	0.17	0.04	0.25	0.04		0.05	0.01
	29	Co ₃ ⁻ mg/l	-	-	-	-	-	-	-		-	-
	30	Hco ₃ ⁻ mg/l	6	3	10	18	8	35	40		37	10
Other inorganics	31	Sl mg/l	-	-	-	-	-	-	-		-	-
	32	F mg/l	-	-	-	-	-	-	-		-	-
	33	B mg/l	-	-	-	-	-	-	-		-	-
Coli forms	34	Total MPN/100ml	7	2	4	4	8	6	2		9	4

	3 5	Faccal MPN/ 100ml	2	<2	<2	2	4	2	2		6	2
E.Coli	3 6	Chloro phyll – A mg/l	-	-	-	-	-	-	-		-	-
Iron	3 7	Fe – mg/l	-	-	-	-	-	-	-		-	-

5. Industrial effluent contributors in Kanniyakumari District

S No S.no	Name of Industry	Nature	Sewage (KLD)	Trade effluent (KLD)	Solid Waste (KLD)
1	Arasu Rubber Corporation, Mylar	Rubber	1.50	100	15
2	Indian Rare Earth Ltd, Manavalakurichi	Rare Earth	230	1170	5
3	Arasu Rubber Industries, Manalodai	Rubber	250.00	2400	15
4	Arasu Rubber Corporation, Keeriparai.	Rubber	5.00	70	50
5	Anusm Rubber Industries, Vellamadam	Rubber	0.75	100	Nil
6	Coromandal Prochlorite Ltd. Kariakonam	Rubber	1.60	20	Nil
7	Cormarin Latex Products, Nagercoil.	Rubber	0.40	0.20	Nil
8	Kurian Abraham Ltd. Thucklay.	Rubber	0.10	5.00	Nil

6. Crops grown

SNo	Soil Series	Crops Grown	
		Rainfed	Irrigated
1	Thalakudi	Pulses	Banana
2.	Kanyakumari, Thengaipattinam	Coconut	Coconut
3.	Kumarakovil, Muzhucode	Tapioca	Banana
4.	Kalkulam, Aramboly, thengampudur, Suchindram, Kottaram, Therur, Dharmapuram	Pulses	Paddy, Banana
5.	Thiruvattar, Navalkadu, Thuckalay	Pulses	Paddy, Banana, Coconut
6.	Marthandam	Spices	Paddy, Coconut Rubber, Spices
7.	Thovalai, Colachal	Cashew	Orchard crops, Coconut

7. Normal area and productivity of major crops

S.No.	Crop	Area in hectare	Normal yield in Kg/Ha.
1.	Paddy	31000	6900 kgs. of paddy
		(Both Crops)	
2.	Tapioca	9000	15000 kgs
3.	Coconut	22586	10000 Nuts
4.	Banana	5100	25000kgs
5.	Pulses	3500	250kgs
6.	Rubber	18327	1200kgs
7.	Cashew	1800	2000kgs
8.	Mango	1750	20000kgs.
9.	Arecanut	750	500000 Nuts
10.	Pepper	113	1500 kgs/ha

11.	Glove	518	1250-2500 kgs /ha
12.	Pine apple	81	50 M.T. ha
13.	Jack	754	30.40 M.T. /ha
14.	Tamarind	1731	5.6 M.T. / ha

8. Main forest types

Main Types	Extent (ha.)
Tropical Wet evergreen	–
Tropical Semi evergreen	35600
Tropical Moist evergreen	5233
Littoral & Swamp	215
Tropical dry deciduous	6385
Tropical dry thorn	548
Tropical dry evergreen	450
Sub-tropical broad leaved	–
Montane Wet Temperate	–
Others	805
Total	49236

9. Location and area affected by soil erosion

Level of Erosion	Slight Erosion (e1)	Moderate Erosion (e2)	Severe Erosion (e3)
Areas affected by erosion	Kalkulam, Aramboly, Thengampudur, Suchindram, Kottaram, Therur, Navalkadu, Thuckalay, Dharmapuram	Thalakudi, Kumarakovil, Marthandam, Thiruvattar, Thovalai, Colachal Mullucode	Kanniyakumari, Thengaipattinam.
Total Area affected by Erosion	Area (ha) 37,400	49,791	3,830

10. Water logging

S No	Taluk	Village	Extent (ha)
1	Agastheeswaram	1. Chettikulam	2.73
		2. Melakulam	2.00
			4.73
2	Vilavancode	1. Pandiapuram	2.54
		2. Melanadarkulam	3.58
		3. Kelenadarkulam	3.45
		4. Tamaraikuklam	5.47
			15.04
3	Thovalai	1. Aralvaimozhi	2.33
		2. Kavalkinaru	3.71
		3. Vadakankulam	4.09
			10.13
4	Kalkulam	1. Thiruvettor	2.17
		2. Vinadu	1.09
		3. Pandiapuram	4.40
		4. Alagiamandapam	3.96
		5. Megamandapam	4.01
			15.63

11. Solid Waste Management in Municipalities

S.No	Category	Municipality			
		Nagercoil	Colachel	Padmanabhapuram	Kuzhithurai
	Population	208751	23535	20051	20326
	No. of wards	51	24	21	21
	Quantity of Municipal Solid Waste generated per day	62.5 M.T.	5.25 M.T.	4 M.T.	5.13 M.T.
	Percentage of collection of Municipal Solid Waste	59.3	90%	100%	77% by Municipal 33% collected by market lease and others
	Mode of disposal (whether disposed on land or roadside or water bodies etc)	At Compost Yard	Disposed on land	Disposed at Municipal Compost Yard	On land in compost yard
	Whether Source segregation started and if so in how many wards	Yes 51 Wards	Yes. 24 Wards	Yes 21 Wards	Yes 21 Wards
	How the source segregated waste is being disposed at present?	Aerobic Heap method	Stored in bags	By making compost at compost yard	The segregated Waste are being disposed by heaping method
	Whether door to door collection has been started, if so in how many wards	Yes 51 wards	Yes. 24 Wards	Yes 21 wards	Yes 21 wards

	wards				
	Whether site has been identified for compost yard. If so whether NOC has been obtained from TNPCB	The Site has been identified for compost yard and also visited by A.E.E.T.N.P.C. Board, Nagercoil. NOC will be obtained.	Site has been identified and NOC yet to be obtained	Present compost yard is being maintained for the last 50 years	No. Suitable promboke site in and around 5 KM radius of the Municipal limit
	Whether site for secure landfill has been identified? If so, whether NOC has been obtained from TNPCB	Site to be ascertained	No	Proposed to one portion of existing compost yard may be convert as landfill site.	-do-
	IF NOC has been obtained for compost year/secure landfill, what is the status of site? Whether any activity for composting is carried out? Or whether any dumping of waste is carried out in the new site	NOC will be obtained. Site for land fill to be ascertained At present dumping of waste is carried out in the existing compost yard.	No. The Joint Inspection of RDO, AEE of Pollution Control Board and Municipal Commissioner is in progress. The date to be fixed by RDO after the inspection of site. NOC proposals to be sent	Compost making is done as aerobic method.	Action is being taken to purchase new compost yard.

	Any remediation activity has been started for the old landfill site. If so furnish the details	There is no existing land fill site	No. Landfill site available for this Municipality	Proposed to improve the compost and with road, light water supply fence and watchman shed.	Nil
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12. Population growth during the last century

Year	Growth and Variation		
	Total population	Increase in numbers	Increase in %
1901	359248	-	-
1911	422260	63102	17.56
1921	494125	71865	17.02
1931	581851	87726	17.75
1941	676975	95124	16.35
1951	826380	149405	22.07
1961	996915	170535	20.64
1971	1222549	225634	22.63
1981	1423399	200850	16.43
1991	1600349	176950	12.43
2001	1669763	69414	4.34

13. Area, Population, Literates:2001-2002

Sl. No	Name of the Blocks/ Municipalities	Area (km ²)	Population			Literate		
			Persons	Male	Female	Persons	Male	Female
1.	Agastheswaram	143.35	115188	56778	58410	85970	44282	41688

2	Rajakkamangalam	135.49	127325	63980	63345	92573	48516	44057
3.	Thovalai	360.91	97802	49117	48685	71075	37722	33353
4.	Kurunthancode	109.54	168810	85460	83350	119818	63016	56802
5	Thuckalay	127.41	162019	81739	80280	117437	61607	55830
6	Thiruvattar	88.37	159182	80261	78921	109262	57402	51860
7	Killiyoor	138.86	151034	76515	74519	105231	55695	49536
8.	Munchiri	71.45	175454	88584	86870	116522	61656	54877
9	Melpuram	27.57	173426	86422	87004	120296	63380	56916
10.	Nagercoil Municipality	19.37	190084	94834	95250	152274	78393	73881
11	Padmanabapuram	6.47	19269	9680	9589	14961	7875	7086
12	Colachel	5.18	24305	12320	11985	16822	8731	8091
13	Kuzhithurai	5.15	19226	9467	9759	14740	7513	7227

14. Tourist attractions

S.No	District	Tourist Place/Pilgrim center
1	Kanniyakumari	Circular fort Vattakottai, Padmanabhapuram, Thiruparappu, Udayagiri, Muttam, Kanniyakumari, Suchindram

15. Disease Prevalance

S.No	Name of Taluk	Name of Disease	No. of persons affected in last 10 year
1	Agasthesevaram	1. Malaria	927
		2. Diarrthoea	154
		3. Jaundice	433
		4. Japanese encephalitis	31
		5. Chloera	374
			1919
2	Kalkulam	1. Malaria	464
		2. Diarrthoea	37
		3. Jaundice	573
		4. Japanese encephalitis	12
		5. Chloera	241
			1327
3	Thovalai	1. Malaria	379
		2. Diarrthoea	43
		3. Jaundice	141
		4. Japanese encephalitis	201
		5. Chloera	248
			1012
4	Vilvancode	1. Malaria	272
		2. Diarrthoea	93
		3. Jaundice	343
		4. Japanese encephalitis	12
		5. Chloera	241

16. Soil erosion

S No	Taluk	Villages prone to Soil Erosion	Quantum of Soil Eroded (ha)
1	Agastheeswaram	1. Rajakkamangalam	4.33
		2. Suchindrum	2.96
		3. Theroor	4.42
		4. Dharapuram	3.01
			15.72

2	Kalkulam	1. Thuckalay	4.56
		2. Thiruvattar	3.88
		3. Padmanabapuram	5.55
		4. Korthankode	4.94
			18.93
3	Thovalai	1. Pothapandy	5.45
		2. Manavalakurichi	2.65
		3. Vattakottai	3.10
			11.20
4	Vilvancode	1. Kuzhithurai	2.96
		2. Killiyoor	5.01
		3. Melpuram	5.66
		4. Munchirai	11.33

17. Quality of ground water (Selected wells from the Kodaiyar river basin during Jan-Feb-2004)

S. No.	Name of the Site	pH	EC	CO ₃	HCO ₃	CL	SO ₄	Total	Ca	Mg	Na	K	Total	RSC	SAR	Classification
1.	Nagercoil (047)	7.96	0.8	0.4	0.8	8.0	-	9.2	1.0	2.0	5.4	0.02	8.42	-	6.27	C ₁ S ₁
2.	Pothayari	8.09	0.32	0.4 1.2	0.2	1.5	-	2.1	1.6	.2	0.96	0.012	2.772	-	1.01	C ₁ S ₁
3.	Therekal-puthoor	8.66	2.62	2.8	4.0	21.0	-	26.2	0.8	.4	27.8	0.012	29.012	0.4	36.1	C ₃ S ₃ R ₁
4.	Athithapuram	8.62	2.57	1.6	3.2	20.0	-	26.0	0.8	.2	25.2	0.07	26.27	5.0	35.6	C ₃ S ₃ R ₃
5.	Kristhu Nagar	8.12	0.61	1.6	2.6	3.0	-	7.2	1.2	2.2	4.9	0.057	8.357	0.8	3.76	C ₁ S ₁ R ₁
6.	Thovalai	8.27	2.02	0.8	1.2	18.0	-	20.8	1.8	7.8	13.9	0.95	24.45	-	8.96	C ₂ S ₁
7.	Thevasakayam	8.29	1.22	0.8	0.4	10.5	-	11.7	2.8	2.8	5.0	0.012	10.612	-	2.99	C ₂ S ₁
8.	Aralvaimozhi	8.39	1.18	0.8	1	10.5	-	12.3	3	2.8	5.08	0.0	11.88	-	2.98	C ₂ S ₁
9.	Mupanthal	8.09	0.76	1.2	0.8	6.5	-	8.1	3	2.0	2.52	0.58	8.1	-	1.59	C ₁ S ₁
10.	Aralvaimozhi	8.12	1.58	0.4	1.2	14.5	-	16.9	3.4	7.2	4.94	0.012	15.552	-	2.14	C ₂ S ₁
11.	Kavalkinaru	8.45	0.79	-	1.6	4.5	-	6.5	2	1.0	4.42	0.06	7.48	-	3.62	C ₁ S ₁
12.	Anjugramam	7.82	14.5	1.2	0.8	161	-	161.8	3.8	79.2	85.2	3.53	171.73	-	13.22	C ₅ S ₃
13.	Levanjipuram	8.05	1.1	1.2	2	10.5	-	13.7	2.2	4.8	4.59	0.08	11.67	-	2.45	C ₂ S ₁
14.	Azhahappapuram	8.48	0.66	0.8	1.2	4	-	6.4	1.8	2.2	4.13	0.04	8.17	-	2.92	C ₁ S ₁
15.	Myladi	8.26	1.82	1.2	1.0	16.0	-	17.8	4	3.0	14.9	0.05	21.95	-	7.96	C ₂ S ₁
16.	Suchindram	8.52	1.1	0.8	0.2	9.5	-	10.9	2.4	4.4	5.0	0.44	12.24	-	2.71	C ₁ S ₁
17.	Nesamony Nagar	8.66	0.45	0.8	0.2	3.5	-	4.5	1.6	1.2	1.59	0.26	4.65	-	1.34	C ₁ S ₁
18.	Asaripallam	8.47	0.35	1.6	0.2	2.5	-	3.5	0.4	0.8	2.48	-	3.68	-	3.22	C ₂ S ₁

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19.	Santhapuram	8.47	1.08	0.8	0.4	9	-	11.0	4.0	2.4	5.28	0.73	12.41	-	2.96	C ₁ S ₁
20.	Friday Market	8.51	0.8	0.4	0.2	7.5	-	8.5	3.0	1.2	4.64	0.33	9.17	-	3.22	C ₁ S ₁
21.	Mootharuni	8.44	0.22	0.8	0.2	2.0	-	2.6	0.8	0.8	1.0	0.03	2.603	-	1.12	C ₁ S ₁
22.	Monday Market	8.09	1.03	0.4	0.4	9.0	-	10.2	3	1.4	5.11	0.48	10.59	-	3.23	C ₂ S ₁
23.	Thickanamcode	8.04	0.28	0.2	0.2	2.5	-	3.1	1.0	0.8	1.65	0.05	3.5	-	1.75	C ₁ S ₁
24.	Karungal	8.3	1.12	0.6	1.6	10.0	-	11.8	5	1.4	4.69	0.19	11.28	-	2.62	C ₂ S ₁
25.	Paloor Kulakari	8.45	0.28	0.6	0.4	2	-	3.0	0.6	1.4	1.04	0.05	3.09	-	1.04	C ₁ S ₁
26.	Killiyoor	8.32	0.25	0.8	0.2	2	-	2.6	0.4	1.0	0.59	0.07	2.06	-	0.70	C ₁ S ₁
27.	Kaichoondi	7.95	1.73	0.8	0.8	18.0	-	19.6	3.6	1.4	13.9	0.14	19.04	-	8.79	C ₂ S ₁
28.	Nambali	7.76	0.53	-	0.6	5.0	-	5.6	1.6	1.2	2.52	0.14	5.46	-	2.14	C ₁ S ₁
29.	Venkanchi	7.88	0.38	-	0.4	3.5	-	3.9	1.2	.6	2.5	0.12	4.42	-	2.63	C ₁ S ₁
30.	Choozhal	7.92	0.11	-	0.4	1.0	-	1.4	0.4	.4	0.73	0.05	1.58	-	1.15	C ₁ S ₁
31.	Chengavilai	8.52	0.66	0.6	0.4	6.0	-	7.0	1.4	2.4	3.78	0.35	7.93	-	2.82	C ₁ S ₁ R ₁
32.	AVM Canal East	8.03	26.5	0.4	1.0	329.5	6.0	336.9	16.6	65.0	240.43	8.15	330.18	51.59	-	C ₅ S ₃ R ₁
33.	Colachel	8.40	1.94	1.6	1.0	15.5	-	18.1	2.6	3.4	16.30	0.25	22.5	9.42	-	C ₂ S ₁ R ₁
34.	Kurumpanai	8.49	0.84	0.8	0.5	7.5	-	8.8	1.8	2.2	4.47	0.06	8.53	3.16	-	C ₁ S ₁ R ₁
35.	Inigo Nagar	8.40	0.68	0.8	0.4	6.0	-	7.2	1.2	0.8	4.62	0.05	6.67	4.62	-	C ₁ S ₁ R ₁
36.	Mel Midalam	8.34	0.51	0.4	0.6	4.5	-	5.5	0.6	0.6	4.17	0.14	5.37	6.97	-	C ₁ S ₁ R ₁
37.		8.02	1.15	0.8	0.4	10.0	-	11.2	3.4	1.8	5.17	0.14	10.51	3.2	-	C ₂ S ₁ R ₁
38.	Keezhkulam	8.16	0.68	0.4	0.2	6.5	-	7.1	1.6	0.6	4.22	0.16	6.58	4.02	-	C ₁ S ₁ R ₁
39.	Thengapattanam	8.20	1.17	-	1.4	12.5	-	13.9	2.6	2.0	9.30	0.14	14.09	6.11	-	C ₂ S ₁ R ₁
40.	Virivilai	8.09	1.34	0.8	0.4	13.0	-	14.2	2.4	2.4	11.3	0.49	16.59	7.29	-	C ₂ S ₂ R ₁
41.	Thoothoor	8.16	0.48	0.8	0.2	4.0	-	5.0	1.8	1.4	1.96	0.35	5.51	1.55	-	C ₁ S ₁ R ₁

Annexure-I

42.	Kirathoor	7.95	1.31	0.8	0.4	15.0	-	16.2	2.8	0.4	13.04	0.54	16.78	10.35	-	C ₂ S ₂ R ₁
43.	Kannanagam	7.00	0.50	-	0.6	5.5	-	6.1	0.6	1.4	3.0	0.05	5.05	3.0	-	C ₁ S ₁ R ₁
44.	Kozhivilai	7.50	0.88	-	1.0	9.0	-	10.0	2.2	0.2	4.76	0.85	8.01	3.37	-	C ₁ S ₁ R ₁
45.	Kuzhithurai	7.58	0.57	-	0.8	5.5	-	6.3	2.4	0.4	3.48	0.19	6.47	2.95	-	C ₁ S ₁ R ₁
46.	Marthandam	7.63	0.43	-	0.4	4.0	-	4.4	0.2	1.6	2.61	0.107	4.51	2.75	-	C ₁ S ₁ R ₁
47.	Eraviputhoor Kadai	7.60	0.83	-	0.4	9.0	-	9.4	5.2	0.6	4.60	0.468	10.668	2.75	-	C ₁ S ₁ R ₁
48.	Mulagumoodu	7.80	0.42	-	0.8	3.5	-	4.3	0.6	1.6	1.96	0.12	4.28	1.88	-	C ₁ S ₁ R ₁
49.	Manali	7.95	0.32	-	0.2	3.0	-	3.2	1.4	0.2	1.96	0.16	3.72	2.20	-	C ₁ S ₁ R ₁
50.	Muttichanparai	7.89	0.14	-	0.6	2.0	-	2.6	0.5	1.5	0.59	0.05	2.65	0.59	-	C ₁ S ₁ R ₁
51.	Villukuri	6.30	0.69	-	0.8	7.0	-	7.8	1.2	1.2	4.61	0.58	7.57	4.23	-	C ₁ S ₁ R ₁
52.	Parvathipuram	8.84	1.65	9.6	1.6	8.5	1.6	21.3	12.0	2.0	19.56	0.012	23.572	19.56	8.5	C ₂ S ₂ R ₂
53.	Chunkankadai	8.34	1.28	2.4	2.6	10.0	-	12.5	5.0	0.2	5.05	1.067	11.317	7.14	-	C ₂ S ₁ R ₁
54.	Thottiyode	8.36	1.02	1.2	2.0	8.0	-	11.2	3.6	2.8	5.21	0.04	11.65	2.92	-	C ₂ S ₁ R ₁
55.	Azhakiamandapam	8.22	0.67	1.2	0.6	6.0	-	7.8	3.0	2.2	2.91	0.176	8.286	1.82	-	C ₂ S ₁ R ₁
56.	Verkilambi	8.30	0.40	1.2	0.4	4.0	-	5.6	2.8	0.6	2.47	0.149	6.019	1.90	-	C ₂ S ₁ R ₁
57.	Thiruvattar	7.96	1.18	0.8	4.0	8.5	-	13.3	4.6	0.2	4.59	3.51	12.90	2.96	-	C ₁ S ₁ R ₁
58.	Cherupaloor	7.84	0.94	-	1.6	8.0	1.5	11.1	2.0	4.8	4.61	0.346	11.756	2.505	-	C ₁ S ₁ R ₁
59.	Kulasekaram	6.75	0.60	-	0.8	5.5	-	6.3	2.2	0.6	3.29	0.203	6.293	2.79	-	C ₁ S ₁ R ₁
60.	Thirparappu	6.18	1.28	-	0.8	11.5	-	12.3	3.4	0.2	8.08	0.67	12.35	6.03	-	C ₂ S ₁ R ₁
61.	Kalial	6.49	0.22	-	1.6	2.0	-	3.6	2.0	0.4	0.93	0.26	3.39	0.85	-	C ₁ S ₁ R ₁
62.	Melpuram	6.38	1.15	-	1.2	11.0	-	12.2	4.8	1.4	5.08	0.302	11.582	2.88	-	C ₂ S ₁ R ₁

KOTTAKARIYAR BASIN

1. Taluks in the basin

S.No	Name of District	Names of Taluks lying in the Basin
1	Madurai	Melur Total for the District
2	Sivagangai	Sivagangai, Devakottai, Karaikudy, Ilayangudy, Manamadurai, Total for the district
3	Ramnad	Thiruvadanai Paramakudi Ramnad Total for the district Grand Total for the basin

2. Ground Water Potential

Name of Taluk	Basin area ha	Total Potential available for the taluk		GW Potential of the basin taluk ha.m		
		Total ha m	For irrigation ha m	Total Qty	Irrigation Requirement	Industrial Requirement
Sivagangai	73867	21861	21454	14682	14409	273
Devakottai	8671	8450	8314	1281	1261	20
Manamadurai	12204	6158	5542	1145	1030	115
Karaikudy	11883	11176	10891	1608	1567	41
Ilayangudy	Full			6157	5985	172
Melur	4175	19509	19216	1151	1134	17
Tiruvadanai	56203			4090	3837	253
Paramagudy	16700	1158	1042	264	237	27

Ramnad	1606	1472	1325	91	82	9
Total			30469	29542	927	

(or) **304.89 295.42 9.27 Mcum**

3. Depth to water level below ground level in observation wells

S.No	Well No.	Name of Station	1975	1980	1985	1990	1995	2000	1976	1981	1986	1991	1996	2001
		Sivaganagai Dt												
1	83163	Sembanur	7.62	4.75	6.07	8.2	6.95	6.2	4.81	6.2	6.55	6.1	6.55	3.22
2	83122	Sivaganai	9.61	1.6	6.65	9.6	9.65	10.2	2.73	1.77	4.8	8.2	8	10.2
3	83237	Tamarakki	7.71	4.9	5.19	6.3	5.85	7.9	3.1	3.4	2.27	5.52	5.3	2.55
4	83243	Naatrasankottai	7.87	5.4	7.08	8.75	9.9	7.8	7.3	5.9	6.75	5.4	7.9	4
5	83242	Satharasankottai	9	4.05	5.65	6.65	4.65	5.8	4.42	1.75	5.65	4.32	4.5	3.55
		Madurai Dt												
6	83077	Uranganpatti	6.09	4.1	4.75	5.5	8.12	-	1.4	1.25	1.7	2.8	3.4	
		Ramnad Dt												
7	83140C	Tondi	5.3	-	-	4.55	4.8	2.6	3.65	-	-	3.6	4.4	2.1
8	83141A	RS Mangalam	4.2	3	3.29	3.86	3.9	3.3	3.9	3.3	3.36	2.42	3.2	3.6

4. Category of industries in the basin

S.No	Category of the Industry	Total No of Industries
1	Stone crusher	1
2	Rice, Oil, Flour Mill	2
3	Weaving and textile Industries	9
4	Auto work shop	2
5	Agro Industries	1
6	Plastic industry	1
7	Brick Kilns	9
8	Auto spares Industry	1

9	Wood industry	1
10	Food and allied food products	2
11	Chemical industry	1
12	Others	5
	Total	35

5. Details of Percolation Ponds Constructed

S.No	Name of Taluk	Name of Reserve Forest	No Of Percolation Ponds
1	Sivagangai	Kollangudi (N)	1
		Allur	1
2	Karaikudi	Panagudi	1
		Keelapoongudi	1
		Ilandaikulam	1

6. Cropping Pattern

S No	Name of Crop	Name of District				
		Pudukottai	Dindigal	Sivagangai	Ramnad	Madurai
1	Rice	Sep-January	Aug-Dec June-Oct	Aug-Nov to Jan-March	Nov- March	June-Oct Aug-Dec
2	Groundnut (oil Seeds)	July-Sep	Jan-May	Throughout the year		
	Rice	Oct-January				
	Cumbu or Ragi	Feb-May		Jan-July to Aug-Sep		Mar-June June-Sep
3	Groundnut	July-October				June-Oct July-Nov
	Chilles	Oct-Feb				
	Maize	March-June	Jan-May	Aug-Sep	Feb-June Aug-Jan	
4	Ragi	July-Oct				June-Oct
	Rice`	Oct-Feb				

	Cotton	Feb-June	Aug-Sep to Jan-Feb	Feb-March to Sep-Oct	Feb-Aug	Feb-Aug June-Dec
5	Groundnut	June-Oct				Dec-April
	Black gram	Nov-Feb		June-Aug	Mar-May	
	Horse gram,Ragi	Aug-Nov				
	Gingelly	Dec-March				
6	Sugarcane		Throughout the year			Jan-Dec

7. Average Yield of the Crops

S. No.	Crop	Normal area Ha	Average Production M.T.	Average Productivity KG / Ha
1.	Paddy	1,30,373	242101	1857
2.	Cholam	2,118	1851	874
3.	Cumbu	807	976	1210
4.	Ragi	1,351	1140	844
5.	Total Millets	4,893	4883	998
6.	Minor millets	617	316	512
7.	Pulses	3,623	1909	527
8.	Cotton	2867 Bales	7282 Bales	2.54 Bales
9.	Groundnut	6,039	5423	898
10.	Sunflower	168	101	601
11.	Gingeily	1,540	653	424
12.	Chillies	16,163	15306	947

8. Population Details

S.No	Name of Districts	Name of Taluk	No of Villages situated in the basin	Area of the basin Km ²	Population (2001 Census)		
					Male	Female	Total
1	Madurai	Melur	4	41.75	12349	12463	24812
2	Sivagangai	Sivagangai	96	738.67	77219	81708	158927
		Manamadurai	13	122.04	7867	8085	15952
		Karaikudy	12	18.83	8671	9178	17849
		Devakkottai	34	86.71	18865	19847	38712
		Ilayankudy	52	378.97	47656	51457	99113
		Total	207	1445.22	160278	170275	330553
3	Ramnad	Paramakudy	27	167.00	20033	21438	41471
		Thiruvadanai	59	562.03	54951	55415	110366
		Ramnad	6	16.06	2450	2394	4844
		Total	92	745.09	77434	79247	156681
Grand Total			303	2232.06	250061	261985	512046

9. Disease prevalence- January to March 2004

S.no	Name of Block	Add	Mal-aria	Chicken -pox	Measles	TB	Leprosy
1	Manamadurai	8	2	27	1	3	2
2	Ilayangudy	32	5	-	-	-	2
3	Kallal	5	-	-	-	21	2
4	Devakottai	7	-	-	-	-	3
5	Sivagangai	49	1	-	4	2	4
6	Kalayarkovil	6	1	1	-	4	2
	Total	137	9	28	5	30	15

10. District wise literacy level

Districts	Literate		
	Persons	Male	Female
Madurai	1795751	1003506	792245
Ramnad	760819	422992	337827
Sivagangai	745735	419480	325895

11. District wise Tourist attractions

1	Tuticorin	Kattabomman Memorial Fort, Jain cave Temple, Thiruchendur temple
2	Tirunelveli	Mundanthurai, Papanasam, Courtallam, Manimuthar, Uvari ,Kalakadu, Ancient Shiva Temple an Vaishnava Temple Sculptures

NAMBIYAR BASIN**1. Area of the sub basins**

S.No.	Name of Sub –Basin	Area in Sq. Km		Total
		Plain	Hill	
1.	Hanumanadhi	316.61	61.39	378
2.	Nambiyar	959.21	86.79	1046
3.	Karumeniar	660.00	Nil	660
	Total	1935.82	148.18	

2. Hydrology of the river

Basin	Origin	Length Km	Tributaries	Reservoirs
Hanumanathi	Marathan Odai	43.5	Kallandi Odai Sooravali Odai Kuthirapanchan Odai	Nil
Nambiyar	Thirukarankudi	48.0	Thamaraiyar Parattaiyar	2
Karumaniyar	Manimutharu Channel	46.5	Nil	

3. Block wise Ground water Potential (in MCM)

S.No	Name of Blocks	Ground water Recharge	Utilizable Ground water Recharge	Net Ground water Recharge	Balance ground water draft	Wells feasible for devolvement
01	Nanguneri	88.02	74.82	18.29	56.33	3062
02	Radhapuram	43.81	37.24	27.26	9.98	541
03	Valliyur	64.09	54.47	27.61	26.86	1455
04	Kalakkadu	5.74	38.88	20.90	17.98	974
05	Sathankulam	41.65	34.56	24.45	18.91	523
06	Tiruchendur	43.23	32.43	22.76	16.67	521

4. Water Quality :- Radhapuram

Name of the village	Electrical Conductivity	pH	Calcium	Magnesium	Sodium + Potassium	Bicarbonate		Sulphate	Chlorine	Nitrate	Total Solids
						HCO ₃	CO ₃				
Kavalkinaru	2000	8.3	20	6.3	327	140	36	125	447	81	1169
Radha puram	2350	8.4	48	44	404	92	18	106	496	298	1160

Valliyur

Name of the Village	Electrical Conductivity	pH	Calcium	Magnesium	Sodium + Potassium	Bicarbonate		Sulphate	Chlorine	Nitrate	Total Solids
						HCO ₃	CO ₃				

Annexure-I

Nallur	690	8.1	18	33	85	214	0	24	110	7	384
Panagudi	4700	8.3	232	156	473	31	12	240	1007	589	2725
Valliyoor	5900	8.0	384	141	619	61	0	269	1319	806	3569

S No	Location	Ec	NO ₃	Fe	F
1	Valasaikinaru	1300	15.0	0.32	0.3
2	karungadal	950	15.0	0.48	0.1
3	Alakinaru	1060	11.0	0.16	0.2
4	Mudalur	2050	4.0	0.16	0.1
5	Periatalai	660	2.0	0.16	-
6	Tiruchendur	4050	3.0	0.16	0.8
7	Kayamozhi	330	4.0	0.16	0.2
8	Udankudi	1920	5.0	0.32	0.6

PARAMBIKULAM ALIYAR PROJECT BASIN (PAP)

1. Number of blocks and taluks

S.No	Taluk	Block	No. of villages
1	Pollachi	Anamalai	19
		Pollachi(n)	48
		Pollachi(s)	29
		kinathukadavu	35
2	Udumalpet	Gudimangalam	24
		Madathukulam	18
		Udumalpet	51
3	Valparai	Valparai	71
4	Palladam	Palladam	21
		Sulthanpet	21
		Sulur	
		Pongalur	
5	Tiruppur	Tiruppur	
6	Dharapuram	Mulanur	21
		Dharapuram	28
		Kundadam	22
7	Kangeyam	Kangeyam	20
		Vellakovil	16

2. Land use classification

Description	Area (ha)
Geographical area	346200
Forest	77894
Barren and uncultivable waste	4609
Land under non – agricultural use	36478
Cultivable waste	937
Permanent pastures and other crazing land	755

Current fallows	59292
Other fallows	7333
Land under Misc. use	1623
Net area sown	157279

3. Salient Features of the dams

Name of Dam	River	Catchment (miles ²)	Yield in TMC	Height of Dam from foundation(ft)	Active storage depth (ft)	Capacity in Tmct	Cost (Rs Lakhs)
Upper Nirar	Nirar	29	9.0	90	--	0.039	178
Lower Nirar	Nirar	39	2.5	165	45	0.274	547
Sholayar	Nirar	47	2.5(TN)	345	160	5.392	1125
Parambikulam	Thunakadavu	88.2	14.0	240	72	17.820	405.4
Thunakadavu	Thunakadavu	16.7	--	85	22	0.557	60
Peruvaripallam	Peruvaripallam	6.10	--	111	--	0.20	34.3
Aliyar	Aliyar	76	9(upto Manakadavu)	145	120	3.864	294.9
Thirumoorthy	Palar	31	1	122	60	1.935	237.80

4. Details of Canals and Ayacuts

S.No	Name of Canal	Length in km	Ayacut in Acres
1	Pollachi Canal	48	23488
2	Vettaikaranpudur Canal	17.2	11181

3	Aliyar Feeder Canal	13.15	4665
4	Udumalpet Canal	30.50	58292
5	Sethumadai Canal	8.20	5044
6	High Level Canal	2.00	2477
7	Old Aliyar Ayacut	5 Anicuts	6400
8	Parambikulam Main Canal	125.4	316383
9	Dhalai Channel	River and Tank	2800
10	Indirect ayacut in three tanks	Tanks	93.4
			431664
	Sub-Basin wise Ayacut		
1	Aliyar dam old and new ayacut	--	51588
2	Thirumoorthy dam Old and new ayacut	--	380106
			4.32 Lakhs Acres

5. Projected water demand and water balance for various uses in Mcm.

Sl. No.	Purpose	1999	2004	2019	2044
1	Domestic uses	44.6	47.89	57.74	74.16
2	Agriculture	1558	1558	1558	1558
3	Industries	33.21	44.28	77.49	132.84
4	Livestock	11.81	11.81	11.81	11.81
6	Total	1647.62	1661.98	1705.04	1776.81
7	Water Balance	-480.62	-494.98	-538.04	-609.81

6. Physico Chemical Characteristics

S.No	Characteristics	Kadamparai dam surface water	Upper Aliar dam surface water	Nirar dam surface water	Sholayar dam surface water
1	Electrical	20-40	60-85	16-55	25-55

	conductivity Reciprocal meg ohms per Cm 3@ 20°C				
2	Total Solid @ 105°C mg/l	20-27	39-68	14-50	20-54
3	Total Hardness as CaCO ₃ mg/l	9-20	23-44	5-22	10-24
4	Total Alkalinity as CaCO ₃ mg/l	9-13	18-24	7-26	8-22
5	PH	7.2-7.8	6.8-7.8	6.2-8.6	6.4-8.5
6	Nitrate Nitrogen as N mg/l	0-0.3	0.2-1.0	0-0.3	0-1.0
7	Chloride as Cl mg/l	3-5	4-8	2-10	4-8
8	Iron as Fe mg/l	0.05-0.30	0.15-0.70	0.05-0.35	0.05-1.40

7. District wise area and population details

Districts	Region	Population		
		Persons	Male	Female
Coimbatore	Total	4224107	2156280	2067827
	Rural	1435036	727610	707426
	Urban	2789071	1428670	1360401
Erode	Total	2574067	1306039	1268028
	Rural	1384746	704855	679891
	Urban	1189321	601184	588137

8. District wise literacy level

Districts	Literate		
	Persons	Male	Female
Coimbatore	2916996	1621164	1295832
Erode	1532258	894339	637919

9. Heritage Resources

1	Coimbatore	Coimbatore, Sengupatti, Bhavani sagar dam, Thirumoorthy hills, Perur and Maruthamalai
2	Erode	Bhavani, Kasturibagram, Kodumudi and Bannari

TAMBRAPARANI BASIN

1. The distribution of the basin area in different districts

S.No.	Districts	Area of the District (Sq. Km)	Area covered by the Basin (Sq. Km)
1.	Tirunelveli	6780	5317
2.	Thoothukudi	4649	625

2. Water balance statement

S. No.	Purpose	1999	2004	2019	2044
1	Domestic uses	48.72	51.44	59.63	73.25
2	Agriculture	2645	2645	2645	2645
3	Industries	34.86	46.48	81.34	139.44
4	Livestock	21.32	21.32	21.32	21.32
6	Total	2749.9	2764.24	2807.29	2879.01
7	Water Balance	-680.9	-695.24	-738.29	-810.01

3. Cropping Pattern

Crop Kar	II Crops Pishanam	Advance Kar	Annual Crop	Single Crop	Crop Kar
Paddy (Jun-Sep)	Paddy (Oct-Feb)	Paddy (Apr-July)	Banana Sugarcane	Paddy (Oct-Feb) Sugarcane (Annual) Banana (Annual)	Sorghum Cumbu Ragi Maize Millets Groundnut

					Thinai Samai Varagu Etc.
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4. Crop Rotation (Taluk wise)

	Taluk	Wet Land	Garden	Dry Land
1.	Tirunelveli	Paddy-Paddy-Pulses-Gingelly	Paddy-Pulses	Pulses
		Paddy-Pulses	Paddy-Pulse	Pulses
		Paddy-Cotton	Paddy-Cotton	Gingelly
		Paddy-Sholam	Paddy-Sholam	Cholam
		Paddy-Groundnut	Banana	Avuri
		Banana	Paddy-Vegetables	
		Sugarcane	Paddy-Groundnut	
2.	Palayamkottai	Paddy-Paddy-Pulses-Gingelly	Paddy-Pulses	
		Paddy-Pulses	Paddy-Cotton	Pulses
		Paddy-Sholam	Paddy-Sholam	Gingelly
		Paddy-Groundnut	Banana	Cholam
		Banana	Paddy-Vegetables	Avuri
		Sugarcane	Paddy-Groundnut	
3.	Alangulam	Paddy-Paddy-Pules	Paddy-Pulses	Pulses

		Paddy-Pulses	Paddy-Cotton	Groundnut
		Paddy-Cotton	Paddy-Chilly	Gingelly
		Paddy-Chilly	Paddy-Groundnut	
		Paddy-Vegetables	Paddy-Vegetables	
		Banana	Banana	
4.	Ambasamudra m	Paddy-Paddy-Pulses	Paddy-Pulses	Pulses
		Paddy-Pulses	Paddy-Cotton	Gingelly
		Banana	Paddy-Chilly	Cholam
		Sugarcane	Banana	
			Vegetables	
5.	Tenkasi	Paddy-Paddy-Pulses	Paddy-Groundnut	Cholam-Pulses-Gingelly
		Paddy-Paddy-Gingelly	Paddy	Cholam-Pulses
		Paddy-Pulses-Banana	Paddy-Cotton/Chilly	Groundnut-Pulses
		Paddy-Chilly-Cotton		
		Banana		
		Sugarcane		
6.	Shenkottai	Paddy-Paddy-Pulses/Gingelly	Paddy-Pulses/Gingelly	Cholam-Pulses
		Paddy-Pulses	Paddy-Cotton/Chilly	Cholam
		Paddy-Chilly/Cotton	Groundnut-Paddy	Pulses
		Sugarcane	Banana	

		Paddy-Vegetables	Sugarcane	
7.	Sankarankoil	Cotton-Paddy	Pules-Paddy	Pulses
		Chilly-Paddy	Cotton-Paddy	Cotton
		Vegetables-Paddy	Gingelly	Cholam
		Sugarcane	Sugarcane	Gingelly
		Banana	Banana	Sunflower
			Sunflower	

5. List of Industries in Chittar sub basin

S.No	Name of the Industry	Location	Category
1	Oil mills	Alankulam	Green
2	Modern Rice mills	Alankulam	Orange
3	Fibre industry	Pattakurichi	OR
4	Modern rice mill	Tiruchitrambalam	Orange
5	Vaigai Agro products	Poolankulam	Green
6	Yogambigai Chemicals	Andipatti	SR
7	Thatha soap company	Andipatti	Green
8	Saw mill	Pettanadarpatti I	Orange
9	Stone Crusher	Pettanadarpatti I	OR
10	Stone Crusher	Thippanampatti	OT
11	15 Nos. of Modern rice mill	Keelapavoor	Orange
12	Chunnambu powder Industry	Keelapavoor	SR
13	Pot making Industry	Keelapavoor	Green

6. List of industries in Tambraparani river basin

S.No	Name of the industry	Location	Category
1	Chamber Brick making Industry - 5 Nos.	Thirukkolure	Orange
2	Attai Industry	Angamangalam	Green
3	Ricemill	Angamangalam	Orange

4	Brick Maal	Alikkudi	Orange
5	Brick Maal-6l	Kilpidagai Varadarajapuram	Orange
6	Spinning Mill	Parpankulam	Orange
7	Krishna chemicals	Nochikulam	SR
8	Bell Pins	Sivanadiyarkulam	OR
9	Paper (Attai) Company	Mela Tiruvengadanadapuram	Green
10	Polytheen Preparing company	Munnerpallam	SR
11	Soap making industry	Munnerpallam	Green
12	Chunnambu making industry	Munnerpallam	SR
13	Kathiravan chemicals	Munnerpallam	SR
14	Steel plate company	Munnerpallam	SR
15	New Indian Hume Pipe	Ponnakudi	SR
16	Lazza Ice Cream company	Ponnakudi	OT
17	Stone Crusher company	Ponnakudi	OR
18	Chemical cleaning powder	Ponnakudi	SR
19	Brick works	Vilagam	Green
20	Brunda Cotton mill	Mannar kovil	Orange
21	Bigayan Industries-Chunnambu powder	Mannar kovil	SR
22	Ragavendra spinning mill	Sutthamalli	Orange
23	Kompu mill	Kodaganallur	Orange
24	Nellai Concrete construction Ltd.	Alangarapperi	Orange
25	Chunnampu powder industry	Madavakurichi	SR
26	Attai mill	Kondanagaram	SR

7. Cottage Industries

S. No	Item of Manufacture	Total
1	Appalam	158
2	Bee Keeping	7
3	Confectionery	11
4	Artificial flowers	6
5	Aloe Fibre extraction Palm yarn and	10

6	Coconut fibre	64
7	Laundry	45
8	Leather goods making	63
9	Ornamental and jewellery	6
10	Ornamental leather crafts	197
11	Weaving cotton wool textiles	329
12	Tailoring	11
13	Cane furniture	11
14	Agar bathis making	269
15	Korai mats, dates baskets, hand bags,	276
16	window screens	10
17	Palmyra leaf-fancy utility articles	89
18	Palmyra rafters, stoma, furniture cots, etc.	57
19	Wood Turning Industry, other wood works	69
20	Winding of silk, thread, cotton thread and	45
21	artificial yarn	52
22	Coconut leaf	34
23	Beads	19
24	Plastic wire knitting to furniture	147
25	Pickles and mixture making	131
26	Puffed Rice	65
27	Basket (Eathel-Kambu)	129
28	Brass, Copper Vessels	23
29	Country Bricks	19
30	Pottary	6
31	Blacksmithy	1
32	Wet Grain Pounding	12
33	Photo framing	24
	Silk cotton pillow and mattress	
	Homemade snacks	
	Total	2395

8. Water Logging

S. No.	Name of the Village	Location	Period - Seasonal / throughout the Year
1.	Melapattam	South of the Essakkiyamman koil / Kalvettankuli	All through the year
2.	Parpankulam	Kalvettankuli-2	All through the year
3.	Krishnapuram	West of the village (kalvettankuli)	All through the year
4.	Paraikulam	Near Paraikulam & South of Uthamapandiyakulam	All through the year
5.	Brammadesam	Near main road (Upto 15-20m)	Rainy Seasons only
6.	Athalanallur	Survey No. 94	Return flow water
7.	Kabaliparan	Near Urvalnthankulam	Rainy Seasons only
8.	Pappakudi	Nanthan thattai	Throughout the year, Return flow water.
9.	Menaparanallur		Return flow water, 15-20 m
10.	Suthamalli	Near Veterinary Hospital	Rainy Seasons only
		Near Palvoor bus stand	Rainy Seasons only
		Pattankallur	Rainy Seasons only
11.	Mangalakurichi		During rainy seasons
12.	Karunkulam	Way to Karunkulam, west side water weeds are in the area.	During rainy seasons

9. Diseases

Authoor kasba	Polia, Uterus Tumor		
Avanpperi	Fever		Seasonal
Chettiyapattu	Jaundice, Dysentery	Waterborne	Seasonal
Kachinavilai	Cholera, Jaundice, dysentery	Waterborne	
Khansahipuram	Typhoid fever		Seasonal
Kilpattam	Typhoid, fever		Seasonal
Kilanattham	Fever		Seasonal
Kodarankulam	Diarrhoea	Waterborne	Seasonal

Krishnapuram	Elephantiasis, Thyroid Deficiency & fever		
Laksmipuram	Jaundice,Dysentry,	Waterborne	Seasonal
Manapadaiveedu	Fever		Seasonal
Marudur	Disease due to Climate only		
Melapattam	Fever		Seasonal
Melaputhaeri	Fever		Seasonal
MelaTiruvengadanadapuram	Cholera,Jaundice,		Seasonal
Mookuperi	Typhoid,Jaundice, Cholera	Waterborne	
Mutur	Typhoid fever		Seasonal
Nalumavadi	Cholera,Jaundice, dysentery	Waterborne	
Nangaimozhi	Jaundice,Dysentry	Waterborne	
Nochikulam	Chicken-Pox, Typhoid, Jaundice, fever	Water Born	Seasonal
Palyamchettikulam	Fever		Seasonal

10. Population details

Districts	Region	Population		
		Persons	Male	Female
Tirunelveli	Total	2801194	1372082	1429112
	Rural	1499062	729830	769232
	Urban	1302132	642252	659880
Thoothukudi	Total	1565743	764087	801656
	Rural	903811	437599	466212
	Urban	661932	326488	335444

Source: statistical handbook of Tamilnadu 2002

11. Literacy level

Districts	Literate		
	Persons	Male	Female
Tirunelveli	1917238	1041964	875274
Tuticorin	1140959	598669	542290

Source: statistical handbook of Tamilnadu 2002

12. Tourist attractions

1	Tuticorin	Kattabomman Memorial Fort, Jain cave Temple, Thiruchendur temple
2	Tirunelveli	Mundanthurai, Papanasam, Courtallam, Manimuthar, Uvari, Kalakadu, Ancient Shiva Temple an Vaishnava Temple Sculptures

13. Water Quality

Sl. No	Quality/Paramater	Mukkudal	Keelaseval	Ramanadhi-Pottal-pudur	Gadana nadhi-Dam site	Gopala samudram	Vellankuli	Cheran madevi	Gopala samudram river	Aladiyur	Mukku dal I	Mukku dal II	SR No.227/2004 ???
1	pH	6.8	6.7	6.7	7	6.6	6.5	7.7	7.9	7.9	7.7	8	7.8
2	Ec	0.13	0.15	0.74	0.07	0.13	0.09	0.15	0.13	0.1	0.32	1.46	1.45
3	Carbonate (dsm-1)	0	0	0	0	0	0	0	0	0	8.6	1	0
4	Bicarbonate (m eg/lit)	0.8	1	5	0.2	0.8	0.4	1	0.8	0.6	2.2	8.6	5.8
5	Chloride (m eg/lit)	0.5	0.5	2	0.5	0.5	0.5	0.5	0.5	0.5	1	3	6.5
6	Sulphate (m eg/lit)	0	0	0.4	0	0	0	0	0	0	0	2	2.2
7	Calcium (m eg/lit)	1	1.2	1.8	0.6	1	0.6	1	0.6	0.8	1.8	4	2.8
8	Magnesium (m eg/lit)	0	0	4	0	0	0	0.2	0.4	0	0.6	1	6.8
9	Sodium (m eg/lit)	0.3043	0.3478	1.652	0.1739	0.2391	0.2173	0.3043	0.3043	0.1956	0.8695	9.345	3.978
10	Pottasium (m eg/lit)	0.0128	0.0256	0.0256	0.0128	0.0128	0.0128	0.0128	0.0128	0.0128	0.0256	0.2051	0.9743
11	Sodium Absorption Ratio (m eg/lit)	0.3043	0.449	0.97	0.3174	0.2391	0.3967	0.3928	3043	0.3092	0.7937	5.91	1.815
12	Residual Sodium carbonate (m eg/lit)	0	0	0	0	0	0	0	0	0	0	0	0
13	Classification	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C1S1R1	C2S1R1	C2S1R1
14	Major salt	Calcium bicarbonate	Calcium bicarbonate	Magnesium bicarbonate	Calcium chloride	Calcium bicarbonate	Calcium chloride	Calcium bicarbonate	Calcium bicarbonate	Calcium bicarbonate	Calcium bicarbonate	Sodium bicarbonate	Magnesium chloride

15. Water requirement for different uses

S.No	Uses	Water Requirement (Quantity KI ³)			
		1997-98	2010	2025	2050
(a) Surface Water					
1	Irrigation	318	339	366	463
2	2. Domestic	17	24	36	65
3	3. Industries	21	26	47	57
4	4. Power	7	15	26	56
5	5. Inland Navigation		7	10	15
6	Environment		5	100	
7	Evaporation losses	36	42	50	76
	Total	399	458	635	732
(b) Ground Water					
1	Irrigation	206	218	245	344
2	Domestic and Municipal	13	19	26	46
3	Industries	9	11	20	24
4	Power	2	4	7	14
	Total	230	252	298	428
	Grand Total(a+b)	629	710	933	1160

16. Surface water and ground water potential

S No	Description	2001 (TMC)	2010 (TMC)	2025 (TMC)	2050 (TMC)	% of the total in 2050
1	Domestic	2222	2438	2791	3460	6.00
2	Irrigation	49978	49978	49978	49978	86.58
3	Industries	1555	1633	1757	1985	3.44
4	Power	118	138	162	180	0.31
5	Live Stock	519	519	519	519	0.90
6	Aquaculture	2	2	2	2	-
7	Recreation	1	1	1	1	-
8	Navigation	-	-	-	-	-
9	Minimum Flows	-	-	800	1600	2.77
10	Total	54,395	54,709	56,725	57,725	100.00

17. List of reserve forests in the Tamirabarani

S.No	Name of the Dist	Name of the Taluk	Name of the District	Area in ha (as per register of RF)
1	Tirunelveli	Tirunelveli	TIRUNELVELI RANGE: Thalaiyuthu R.F Gangaikondan R.F	585.11 441.16
		Palayamkottai	1. Sivalapperi R.F 2. Melapattam R.F 3. Muthur R.F	87.87 404.86 343.37
2	Thoothukudi	Tiruchendur	1.Kuthiraimozhi R.F	5152.31
		Srivaikuntam	1. Vallanad R.F 2. Kaliyavoor R.F	2054.85 68.45
3.	Tirunelveli	Shenkottai	SHENKOTTAI RANGE: 1. Puliurai R.F 2. Vellakal Teri R.F 3. Vadakarai Kilpidagai 3 (b) 4. Vadakarai Kilpidagai North 5. Vadagarai Kilpidagai 6. Achampudur Grazing Block I 7. “ Block II 8. Ayikudi Grazing Block	4106.94 346.84 176.26 28.74 235.87 58.38 88.89 92.34
			Kadayanallur Upper Slopes portion	580.37
			COURTALLAM RANGE: 1. Courtallam Upper slopes 2. Extension No.I & Lower slopes 3. Extension No.II & Lower slopes 4. Extension No.III & Lower slopes 5. Vasudeva Estate 6. Panchanhangi Estate 7. Old Sy.No.1357 of Ilangi 8. Addition to CTM, RF , T. Parvatham Estate 9. Hope Estate 10. Extn. IV to CTm RF 11. Kadayanallur Upper slopes 12. Chinnakadu R.F	2974.43 687.96 93.87 58.20 65.61 29.48 12.76 10.78 74.26 2.52 1459.54 562.46 474.34 66.03 0.36 13.41

			13. Kadayanallur Upper 3 Cz Slopes	1480.03 788.83
			14. Alkondal Nethiyuthu, Shermadevi	5.03 357.70
			15. Addition to Chinnakadu	7.80
			16. Kadayanallur addition 9 bits	55.73
			17. Krishnapuram Upper slopes	150.34
			18. Krishnapuram Upper slopes Extn.	227.60 891.21
			19. “ Addition	1598.21
			20. Kottamalai reserve	1284.94
			21. ” addition	48.00
			22. “ Extension	
			23. Kavalkattu parambu	
			24. Mayamankurichi	6495.55
		SankaranKovil	25. Chokkampatti	4250.88
			26. Vairavankulam	130.19
			27. Uthumalai	158.08
			28. Vellakal Parambu	7.41
				0.90
			SANKARAN KOVIL	3.58
			RANGE:	2.42
			1. Vasuduvanallur Upper slopes	2.86 21.28
		Tenkasi	2. “ Lower slopes	1157.35
			3. Chinthamani block A+B	6964.18
			4. Narayanapuram	
			5. Addition to Vasudevanallur	
			6. Addition to Thirumalapuram	59115.00
		Ambasamudram	7. Addition to Mealpulaiangudi	
			8. ,, Melachinthimani	
			9. ,, Narayanapuram	106643.72
			10. Konamparambu	
			11. TN. Pudukudy	
			12. Sivagiri	
			R.F. wise details available with W.W Mudanthurai Sanctuary	
			TOTAL	

18. Land use

S No	Taluk	Forest (ha)	Barren uncultivable land (ha)	Land but non-agriculture (ha)	Cultivable waste (ha)	Grazing Land (ha)	Land under miscellaneous trees (ha)	Current fallows (ha)	Other fallows (ha)	Net area sown (ha)	Total area (ha)
1	Tirunelveli	1026	1337	12989	11490	3094	591	2189	13439	9924	56079
2	Palayamkottai	836	2193	7762	2861	388	593	806	9931	5056	30426
3	Nanguneri (Part)	22359	6873	14114	19892	2094	666	4588	11723	12044	94353
4	Ambasamudram	59153	3602	13051	13455	1288	1425	2061	5019	19412	118466
5	Tenkasi	6762	833	8285	640	155	155	2472	9350	17735	46327
6	Alangulam	3351	995	2923	2388	256	510	1501	14670	6576	33170
7	V.K. Pudur	38	409	3651	1035	30	510	1666	12183	6559	26081
8	Shenkottai	9045	251	3531	176	157	403	81	688	10997	25329
9	Sankarankoil		1018	15797	1392	106	370	12292	48176	28830	107981
10	Srivaikundam	2520	2023	12420	5289	5235	774	4667	4519	22058	59495
11	Thiruchendur	5554	977	8313	7896	3	-	2864	6055	15946	47608

VAIPPAR BASIN

1. Reservoirs, Anicuts, Channels, Tanks and Ooranies

S.No.	Sub Basin	Anicuts No.	Direct chann el Ayacu t in ha	Supply Channel		System		Non system		Ooranies
				No.	Length in km	Tan k	Ayacut in ha	Tan k	Ayacut in ha.	
1.	Nichabanadhi	18	--	24	39.48	15	1709.81	151	3973.90	71
2.	Kalingalar	5	77.41	9	14.00	6	1129.07	25	1244.74	3
3.	Deviar	24	--	27	44.14	26	3454.50	90	4423.53	31
4.	Nagariar	15	92.38	11	14.83	16	1672.90	15	370.49	6
5.	Sevalperiyar (Mudangiyar)	6	--	6	14.27	15	982.78	24	598.52	37
6.	Kayalkudiar	9	42.10	8	15.30	8	559.62	34	968.91	24
7.	Vallampatti Odai	1	--	1	3.80	1	27.04	17	652.23	45
8.	Sindapalli Uppodai	--	--	--	--	--	--	25	842.60	52
9.	Arjunanadhi	32	532.15	65	124.24	62	4359.52	173	5564.27	327
10.	Kousiganadhi	1	--	1	4.5	1	122.07	121	3425.01	73
11.	Sinkottaiyar	--	--	--	--	4	239.80	36	740.20	94
12.	Uppathurar	4	--	4	4.79	--	--	37	2105.82	76
13.	Vaippar	** 3	--	3	14.65	5	699.42	54	2741.17	377
	Total	11 7	744.04	159	294.00	159	14956.5 3	802	27651.3 9	1216

2. Land use pattern in the Vaippar river basin

S.No	Land Use Type	Area (hectares)
1	Forest area	62105
2	Barren and Uncultivated (Including wasteland)	10711
3	Cultivated wasteland	6215
4	Permanent pastures and grazing land	1080
5	Current Fallows	36677
6	Other Fallows	48945
7	Net area sown	286479
8	Gross area sown	295281

3. Categorization of Blocks –January 2003

Over-exploited greater than 100%	Critical between 90 and 100 %	Semi critical 70 and 90 %	Safe less than 70 %	Saline
Virudhunagar District (11 Blocks)				
	1. Rajapalayam	1. Kariapatti	1. Aruppukottai	
	2. Watrap	2. Sivakasi	2. Narikudi	
		3. Srivilliputhur	3. Sattur	
		4. Vembakottai	4. Trichuli	
			5. Virudhunagar	
Tirunelveli District (3 Blocks)				
		1. Kuruvikulam 2. Vasudevanallur		
1. Sankarankoil				
Thoothukudi District (3 Blocks)				
1. Kovilpatti 2. Vilathikulam	1. Pudur			
Madurai District (2 Blocks)				
		1. Kallikudi 2. T. Kallupatti		

4. Ground Water Development - January 2003

S. No.	Category	Total Number
1	Over exploited	138
2	Critical blocks	37
3	Semi critical blocks	105
4	Safe blocks	97
5	Saline blocks	8
	Total	385

5. Total Water Requirement

S. No	Purpose	1999	2004	2019	2044
1.	Agriculture	1457.51	1457.51	1373.49	1261.65
2.	Domestic	55.01	66.02	98	152.01
3.	Industrial	30.93	41.24	72.17	123.72
4.	Live Stocks	13.76	13.76	13.76	13.76
5.	Power	-	-	-	-
	TOTAL	1557.21	1578.53	1557.42	1551.14
	Water Balance	225.79	204.47	225.58	231.86

6. Cropping pattern

S.No.	Crop	Season
1.	Paddy	Pishanam (September-October)
2.	Paddy	Samba (August)
3.	Paddy	Kar (May-June)
4.	Cotton	Irrigated (February-March).
5.	Cotton	Un-irrigated (September-October)
6.	Sugarcane	Mid Season (February-March)
7.	Groundnut	Un-irrigated (July-August)

8.	Pulses	Un-irrigated (October-November)
9.	Cumbu	Un-irrigated (September-October)
10.	Cholam	Un-irrigated (September-October)
11.	Chillies	Irrigated (February-August)

7. Cropping pattern

S. No.	Name of Taluk	Cropping pattern	
		Under irrigated condition	Under rainfed condition
I.	Tirunelveli District		
1.	Sankarankovil (part)	Paddy, Banana, Sugarcane, Chillies, Cotton, Vegetables	Millets, Pulses, Cotton, Sunflower
2.	Sivagiri	Paddy, Banana, chillies, Onion, Sugarcane, Vegetables	Cotton, Millets, Pulses,
II	Virudhunagar District		
1.	Rajapalayam	Paddy, Banana, Chillies	Millets, Pulses, Cotton
2.	Srivilliputhur	Paddy, Sugarcane, Chillies, Banana	Pulses, Millets, groundnuts, Gingelly
3.	Virudhunagar	Paddy, Chillies, Cotton	Millets, Pulses, Cotton
4.	Sattur	Paddy, Groundnut, Millets, Pulses, Chillies, Cotton	Cholam, Millets, Cotton, Coriander.
5.	Aruppukottai (part)	Paddy, Chillies, Groundnut, Cotton	Millets, Pulses, Groundnut, Cotton.
III.	Thoothukudi District		
1.	Kovilpatti, Ettayapuram, Vilathikulam (part)	Paddy	Cotton, Pulses, Millets
IV.	Madurai District		
1.	Peraiyur (part)	Sugarcane, (lesser extent)	Cotton, Pulses, Cholam
2.	Tirumangalam	Paddy, Cotton	Cotton, Pulses, Groundnut, Cholam

8. Water quality analysis

S.No	Parameter	Vnr BW	CP u/s v17	V17	V15	VRP Kondan eri Tank	VRP Periadhi Tank
1.	PH	7.4	7.1	7.0	7.0	7.2	6.7
2.	Ec.umho/cm	3000	700	400	250	1200	1700
3.	TDS, mg/l	1823	386	221	141	727	1015
4.	TSS, mg/l	4.5	3.5	2.5	2	4.5	5
5.	NH ₃ , mg/l	0	0	0	0	0	0
6.	NO ₃ +NO ₂ , as N mg/l	16	3	1	0	12	15
7.	Total P, mg/l	0	1.06	0.64	0.84	0.73	2.3
8.	BOD, mg/l	3.0	3.2	1.8	0.8	1.2	1.4
9.	COD, mg/l	11	26	11	3	28	20
10	Phen, mg CaCO ₃ /l	0	0	0	0	0	0
11	Total, mg CaCO ₃ /l	630	205	145	105	315	400
12	Total, mg CaCO ₃ /l	580	190	135	100	300	450
13	Ca mg CaCO ₃ /l	160	75	50	50	125	200
14	Ca mg/l	64	30	20	20	50	80
15	Mg, mg/l	102	28	21	12	42	61
16	Na, mg/l	460	67	23	14	92	161
17	K, mg/l	5	20	14	7	90	68
18	Cl, mg/l	525	78	32	11	184	266
19	So ₄ ² , mg/l	211	23	17	12	24	67
20	Co ₃ ² , mg/l	0	0	0	0	0	0
21	HCO ₃ , mg/l	769	250	177	128	384	488
22	Si,mg/l	85.4	4.6	23.5	13.9	25.7	66
23	F, mg/l	1.00	0.88	0.49	0.48	0.51	0.52
24	B, mg/l	0.47	0.11	0.13	0.02	0.12	0.14
25	Total MPN/100 ml	2800	900	800	2800	2800	800
26	Faecal, MPN/100ml	1100	500	260	2800	1100	260
27	SAR	11.7	2.98	1.22	0.85	3.27	4.67

9. Major and medium industries	76 No.
Cement industries	3 nos.
Sugar industry	1 no.
Textiles / spinning	24 nos.
Chemical and chemical products Including match industries	5 nos.
Metal and metal powder industries	6 nos.
Printing industries	31 nos.
Rubber industry	1 no.
Other industries manufacturing, Electronics, etc.	5 nos.
Small Scale Industries	9486 Nos.
1. Food products	702
2. Tobacco products	47
3. Cotton Textile products	441
4. Wool, Silk, Fibre products	88
5. Jute, Henfo, Mesta textiles	5
6. Textile products	260
7. Wood products	822
8. Paper products	1143
9. Leather products	26
10. Petroleum, Rubber products	365
11. Chemical products	3966
12. Non metal, mineral products	191
13. Basin metal Alloys products	24
14. Metal products	458
15. Machine tool products	251
16. Electrical machinery products	173
17. Transport Equipment products	218
18. Other products	306

10. Weeds

S. No.	Location	Taluk	Plant identified
1.	Kondaneri tank	Rajapalayam	Water hyacinth
2.	Periyathikulam tank	Rajapalayam	Water hyacinth
3.	Valaikulam	Srivilliputhur	Ipomea carnea
4.	Vasudeva nallur Periyakulam tank- left flank surplus course of Kalingalar river, a tributary of Nichabanadhi	Sivagiri taluk Vasudevanallur block	Ipomea carnea (Veli Kathan)
5.	Melapannandhikulam tank fed by Rasingaperikal of Ullar river	“	“
6.	South of Panaiyur village in	Sankaran koil	“

	Nichabanadhi river	taluk	
7.	South of Ammankulam village	“	“
8.	South of Thamarai anicut at Pandyan Nagar hamlet.	“	“
9.	Chinthalakurai, Meenakshipuram Karuppur, Thalaikattupuram and Vilathikulam	Vilathikulam taluk	Water hyacinth, Water lilly and Ipomea carnea

11. Soil Alkalinity, Salinity and Acidity

Sl.No.	Types of soil	Taluks Covered	Area in Hectare
1.	Alkaline	Rajapalayam & Srivilliputtur Sattur & Virudhunagar Aruppukkottai & Tiruchuli Kovilpatti Vilathikulam	610 1119 678 1270 440
Total			4117
2.	Saline	Rajapalayam & Srivilliputtur Sattur & Virudhunagar Aruppukkottai & Tiruchuli Kovilpatti Vilathikulam	1827 1224 155 1600 440
Total			5246
3.	Acidi	Rajapalayam & Srivilliputtur	290

12. Soil erosion

S.No	TALUK	Water shed Name	Extent	Villages Covered
1.	Rajapalayam	Solaiseri	High	Mettupatti, Solaiseri, Sundarajapuram.
		Sundarajapuram	High	Sundarajapuram, Solaiseri
		Mettupatti	High	Mettupatti, reserve forest
2.	Srivilliputtur	Khansapuram	Very High	Khansapuram

		S. Kodikulam	Very High	S. Kodikulam
3.	Sattur	Gangarkottai	High	Gangarkottai, Panduvarpatti
		O. Reddiapatti	High	O. Reddiapatti, Muthandipuram, Elayirampennai Gangarakottai
		Panayadipatti - I	High	Panayadipatti, Achankulam, Servaikkaranpatty, Elayirampennai, Gangarakottai.
		Panayadipatti - II	Very High	Panayadipatti, Vijayakaraisalkulam, Thayilpatti, Ehirkottai, Kangarseval, Vembakottai.

13. Population

Districts	Region	Population		
		Persons	Male	Female
Madurai	Total	2562279	1295124	1267155
	Rural	1129028	569988	559040
	Urban	1433251	725136	708115
Virudhunagar	Total	1751548	870820	880728
	Rural	974186	482821	491365
	Urban	777362	387999	389363
Tirunelveli	Total	2801194	1372082	1429112
	Rural	1499062	729830	769232
	Urban	1302132	642252	659880
Thoothukudi	Total	1565743	764087	801656
	Rural	903811	437599	466212
	Urban	661932	326488	335444

14. Literacy level

Districts	Literate		
	Persons	Male	Female
Madurai	1795751	1003506	792245
Virudhunagar	1152516	650601	501915
Tirunelveli	1917238	1041964	875274
Thoothukudi	1140959	598669	542290

Population details of Tamil Nadu

District wise population of Tamil Nadu

State/District	Area (Sq. km)	Population								
		Total			Rural			Urban		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Tamil Nadu	130058	62405679	31400909	31004770	34921681	17531494	17390187	27483998	13869415	13614583
Chennai	174	4343645	2219539	2124106	----- Not Arise -----			4343645	2219539	2124106
Kancheepuram	4433	2877468	1457242	1420226	1342502	676095	666407	1534966	781147	753919
Thiruvallur	3424	2754756	1397407	1357349	1244674	629052	625622	1500082	768355	731727
Cuddalore	3678	2285395	1150908	1134487	1531034	771786	759248	754361	379122	375239
Villupuram	7217	2960373	1492442	1467931	2533456	1277415	1256041	426917	215027	211890
Vellore	6077	3477317	1741083	1736234	2169319	1088090	1081229	1307998	652993	655005
Thiruvannamalai	6191	2186125	1095859	1090266	1785364	895738	889626	400761	200121	200640
Salem	5220	3016346	1563633	1452713	1626162	852453	773709	1390184	711180	679004
Namakkal	3429	1493462	759551	733911	948230	482365	465865	545232	277186	268046
Dharmapuri	9622	2856300	1473597	1382703	2400354	1240122	1160232	455946	233475	222471
Erode	8209	2581500	1309278	1272222	1387537	705436	682101	1193963	603842	590121
Coimbatore	7469	4271856	2176031	2095825	1451653	734699	716954	2820203	1441332	1378871

The Nilgiris	2549	762141	378351	383790	307532	151874	155658	454609	226477	228132
Tiruchirappalli	11096	2418366	1208534	1209832	1279204	638617	640587	1139162	569917	569245
Karur		935686	465538	470148	624430	310922	313508	311256	154616	156640
Perambalur		493646	24614	247505	414426	206807	207619	79220	39334	39886
Ariyalur		695524	346763	348761	616539	307670	308869	78985	39093	39892
Thanjavur	3397	2216138	1096638	1119500	1467577	726493	741084	748561	370145	378416
Nagapattinam	2716	1488839	739074	749765	1158557	576010	582547	330282	163064	167218
Thiruvarur	2161	1169474	580784	588690	932231	463502	468729	237243	117282	119961
Pudukottai	4651	1459601	724300	735301	1211217	600511	610706	248384	123789	124595
Madurai	6565	2578201	1303363	1274838	1134025	573036	560989	1444176	730327	713849
Theni		1093950	552986	540960	502109	255152	246957	591841	297834	294007
Dindigul	6058	1923014	968137	954877	1249762	629073	620689	673252	339064	334188
Ramanathapuram	4232	1187604	583376	604228	885210	433290	451920	302394	150086	152308
Virudhunagar	4288	1751301	870376	880925	973956	482626	491330	777345	387750	389595
Sivagangai	4086	1155356	566947	588409	829272	405093	427179	326084	161854	164230
Tirunelveli	6810	2723988	1333939	1390049	1415742	388797	726945	1308246	645142	663104
Thoothukudi	4621	1572273	766823	805450	907500	439254	468246	664773	327569	337204
Kanyakumari	1685	1676034	832269	843765	582107	289516	292591	1093927	542753	551174

Source: Statistical Handbook of Tamil Nadu 2005

District wise literates in Tamil Nadu

State/District	Literates								
	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Tamil Nadu	40524545	22809662	17714883	20319498	11835689	8483809	20205047	10973973	9231074
Chennai	3336695	1799981	1536714	----- Not Arise -----			3336695	1799981	1536714
Kancheepuram	1952198	1088943	863255	791700	457846	333854	1160498	631097	529401
Thiruvallur	1865707	1047763	817944	736374	427393	308981	1129333	620370	508963
Cuddalore	1420488	820726	599762	872343	521901	350442	548145	298825	249320
Villupuram	1650528	977374	673154	1347727	809944	537783	302801	167430	135371
Vellore	2203552	1245076	958476	1276373	741671	534702	927179	503405	423774
Thiruvannamalai	1297151	761403	535748	1014930	605600	409330	282221	155803	126418
Salem	1734442	1021772	712670	819312	506149	313163	915130	515623	399507
Namakkal	903802	526412	377390	538212	320242	217970	365590	206170	159420
Dharmapuri	1516221	906943	609278	1204910	733162	471748	311311	173781	137530
Erode	1521955	887907	634048	726792	440042	286750	795163	447865	347298
Coimbatore	2945278	1648814	1296464	847250	493911	353339	2098028	1154903	943125
The Nilgiris	541099	296573	244526	202668	113834	88834	338431	182739	155692

Tiruchirappalli	1673478	926354	747124	787843	455246	332597	885635	471108	414527
Karur	566728	328103	238625	345850	206907	138943	220878	121196	99682
Perambalur	286197	167406	118791	230818	137385	93433	55379	30021	25358
Ariyalur	388605	232385	156220	334760	202879	131881	53845	29506	24339
Thanjavur	1476256	814354	661902	912445	515621	396824	563811	298733	265078
Nagapattinam	996580	548142	448438	751618	418324	333294	244962	129818	115144
Thiruvarur	788302	435421	352881	608297	340202	268095	180005	95219	84786
Pudukottai	907376	520281	387095	719477	419697	299780	187899	100584	87315
Madurai	1776654	991010	785644	673502	397156	576346	1103152	593854	509298
Theni	692797	398150	294647	2932508	174522	118686	399589	223628	175961
Dindigul	1181746	681698	500048	710461	421948	288513	710461	421948	288513
Ramanathapuram	757344	421041	336303	534155	302194	231961	223189	118847	104342
Virudhunagar	1136574	641062	495512	586525	339594	246931	550049	301468	248581
Sivagangai	738000	414755	323245	491768	283769	207999	246232	130986	115246
Tirunelveli	1829064	997278	831786	891282	490721	400561	937782	506557	431225
Thoothukudi	1131406	593868	537538	622745	329518	293227	508661	264350	244311
Kanyakumari	1308322	668667	639655	446153	228311	217842	862169	440356	421813

Source: Statistical Handbook of Tamil Nadu 2005

District wise Scheduled Castes population

State/District	Scheduled Castes								
	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Tamil Nadu	11857504	5932925	5924579	8308890	4159182	4149708	3548614	1773743	1774871
Chennai	598110	301835	296275	----- Not Arise -----			598110	301835	296275
Kancheepuram	721989	362097	359892	496932	249258	247674	225057	112839	112218
Thiruvallur	600658	301316	299542	400496	200050	200446	200362	101266	99096
Cuddalore	634479	318713	315766	514729	359264	255465	119750	59449	60301
Villupuram	810931	408234	402697	740441	373085	367356	70490	35149	35341
Vellore	714054	354551	359503	505677	251749	253928	208377	102802	105575
Thiruvannamalai	467532	233572	233960	412993	206740	206253	54539	26832	27707
Salem	475738	244391	231347	288559	149374	139185	187179	95017	92162
Namakkal	280776	143014	137762	212849	108271	104578	67927	34743	33184
Dharmapuri	416951	212136	204815	363285	185061	178224	53666	27075	26591
Erode	422204	213312	208892	273677	138667	135010	148527	74645	73882
Coimbatore	630675	315869	314806	310714	156044	154670	319961	159825	160136
The Nilgiris	238014	117792	120222	85485	42423	43062	152529	75369	77160
Tiruchirappalli	399493	197917	201576	261417	129181	132236	138076	68736	69340
Karur	190260	94194	96066	144327	71518	72809	459933	22676	23257
Perambalur	149145	73866	75279	128590	63753	34837	20555	10113	10442
Ariyalur	151220	75326	75894	140236	69792	70444	10984	5534	5450
Thanjavur	399653	198820	200833	332385	165344	167041	67268	33476	33792
Nagapattinam	441231	219933	221298	399441	199346	200095	41790	20587	21203
Thiruvarur	378314	188682	189632	342530	171053	171477	35784	17629	18155
Pudukottai	249471	123701	125770	221161	109583	111578	28310	14118	14192
Madurai	323252	162595	160657	223475	112697	110778	99777	49898	49879
Theni	211800	107109	104691	116509	59274	57235	95291	47835	47456
Dindigul	376170	189066	187104	269809	135694	134115	106361	53372	52989
Ramanathapuram	216312	107381	108931	186059	92158	93901	30253	15223	15030

Virudhunagar	332297	164930	167367	239324	118805	120519	92973	46125	46848
Sivagangai	188857	92590	96267	159256	77886	81370	29601	14704	14897
Tirunelveli	481052	233605	247447	294885	142786	152099	186167	90819	95348
Thoothukudi	288954	143013	145941	216801	107116	109685	72153	35897	36256
Kanyakumari	67712	33365	34347	26848	13210	13638	40864	20155	20709

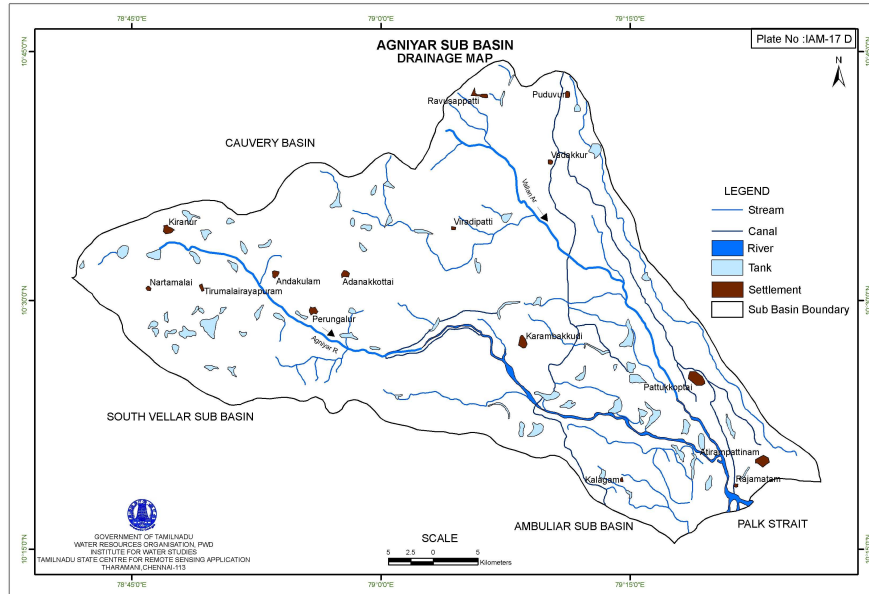
District wise Scheduled Tribes population

State/District	Scheduled Tribes								
	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Tamil Nadu	651321	328917	322404	551143	278746	272397	100178	50171	50007
Chennai	6728	3368	3360	----- Not Arise -----			6728	3368	3360
Kancheepuram	26508	13267	13241	18062	9066	8996	8446	4201	4245
Thiruvallur	37858	18880	18978	28885	14466	14419	8973	4414	4559
Cuddalore	11773	5920	5853	7241	3641	3600	4532	2279	2253
Villupuram	63920	32294	31626	61687	31149	30538	2233	1145	1088
Vellore	63040	31860	31180	58237	29455	28782	4803	2405	2398
Thiruvannamalai	72760	36928	35832	69198	35129	34069	3562	1799	1763
Salem	103921	52693	51228	98722	49988	48734	5199	2705	2494
Namakkal	51416	26039	25377	50454	25552	24902	962	487	475
Dharmapuri	59549	30520	29029	57763	29592	28171	1786	928	858
Erode	17693	8933	8760	15120	7573	7547	2573	1360	1213
Coimbatore	29103	14738	14365	19559	9880	9679	9544	4858	4686
The Nilgiris	28373	14017	14359	19600	9753	9847	8773	4261	4512
Tiruchirappalli	18912	9596	9316	14383	7324	7059	4529	2272	2257
Karur	1450	711	739	1075	533	542	375	178	197
Perambalur	3307	1708	1599	2768	1423	1345	539	285	254
Ariyalur	8529	4228	4301	7907	3926	3981	622	302	320
Thanjavur	3641	1773	1868	1302	649	653	2339	1124	1215
Nagapattinam	3420	1734	1686	1618	824	794	1802	910	892
Thiruvarur	2673	1310	1363	971	493	478	1702	817	855

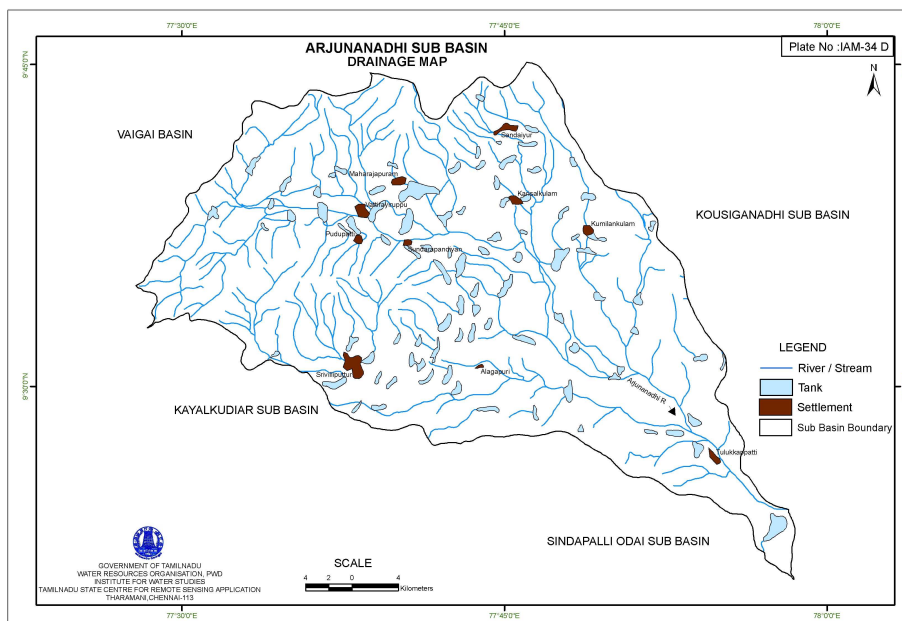
Pudukottai	792	398	394	432	214	218	360	184	176
Madurai	5972	3060	2912	2054	1074	980	3918	1986	1932
Theni	1686	855	831	1046	531	515	640	324	316
Dindigul	6484	3320	3164	3512	1773	1739	2972	1547	1425
Ramanathapuram	1078	556	522	396	212	184	682	344	338
Virudhunagar	2357	1158	1199	953	485	468	1404	673	731
Sivagangai	1083	536	547	375	190	185	708	346	362
Tirunelveli	8358	4080	4278	3202	1574	1628	5156	2506	2650
Thoothukudi	3494	1762	1732	1060	504	556	2434	1258	1176
Kanyakumari	5443	2678	2765	3561	1773	1788	1882	905	977

SUB BASIN MAPS

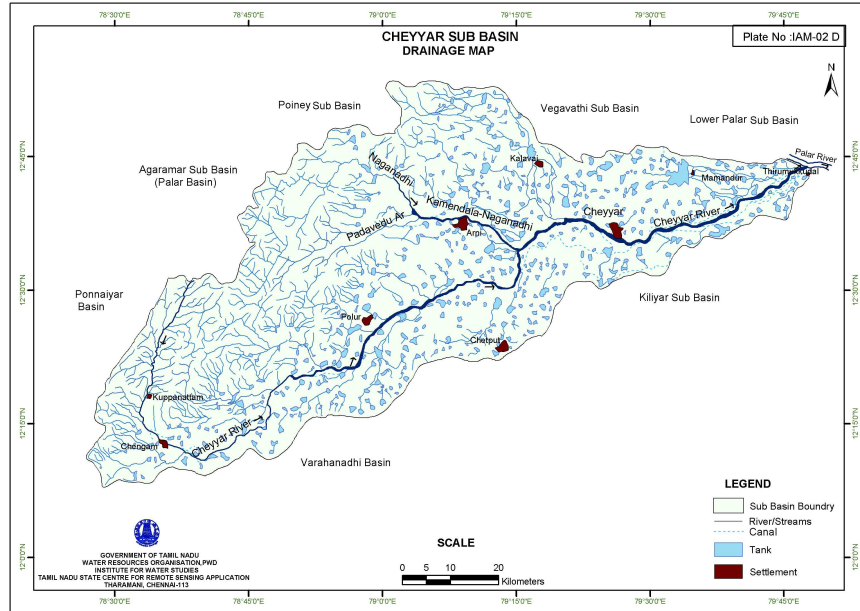
Agniyar Sub Basin (Drainage Map)



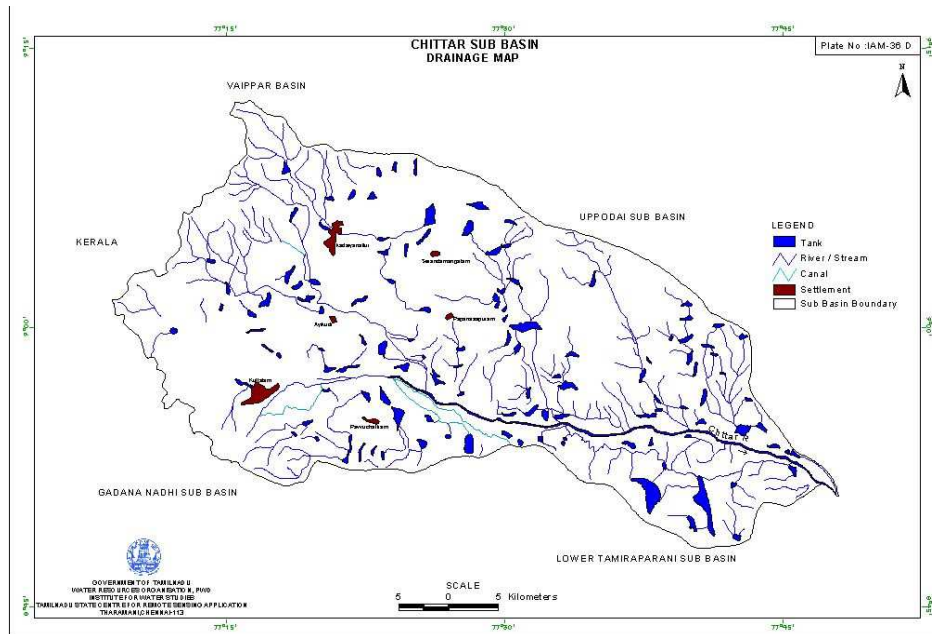
Arjunanadhi Sub Basin (Drainage Map)



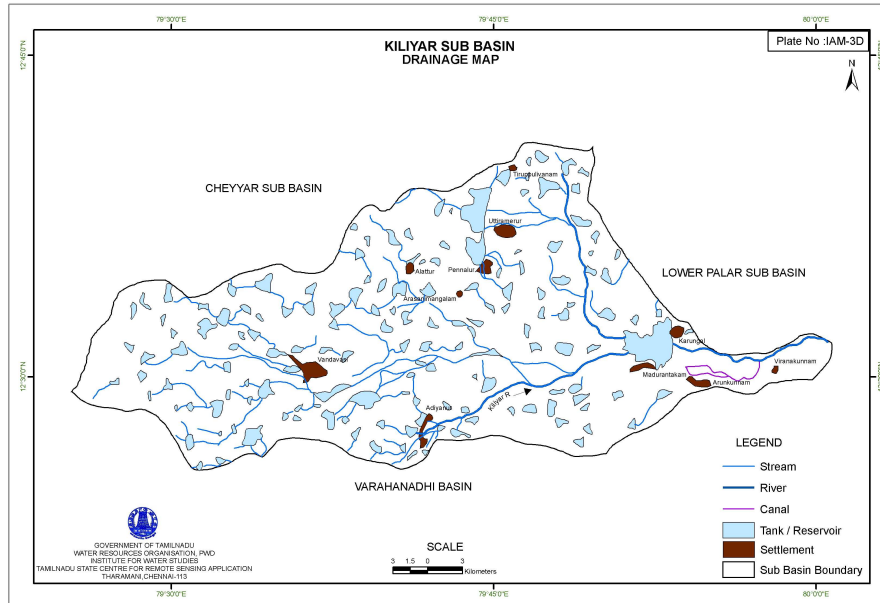
Cheyyar Sub Basin (Drainage Map)



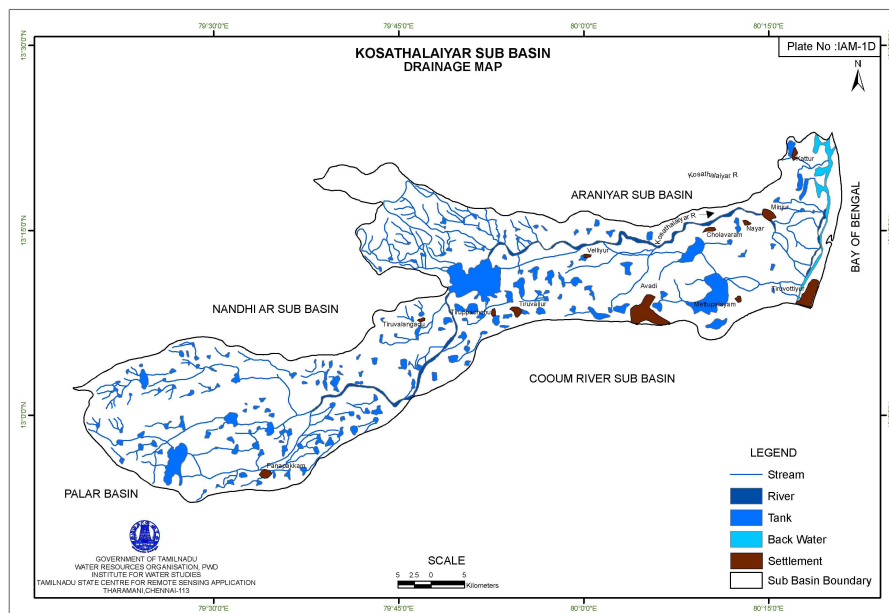
Chittar Sub Basin (Drainage Map)



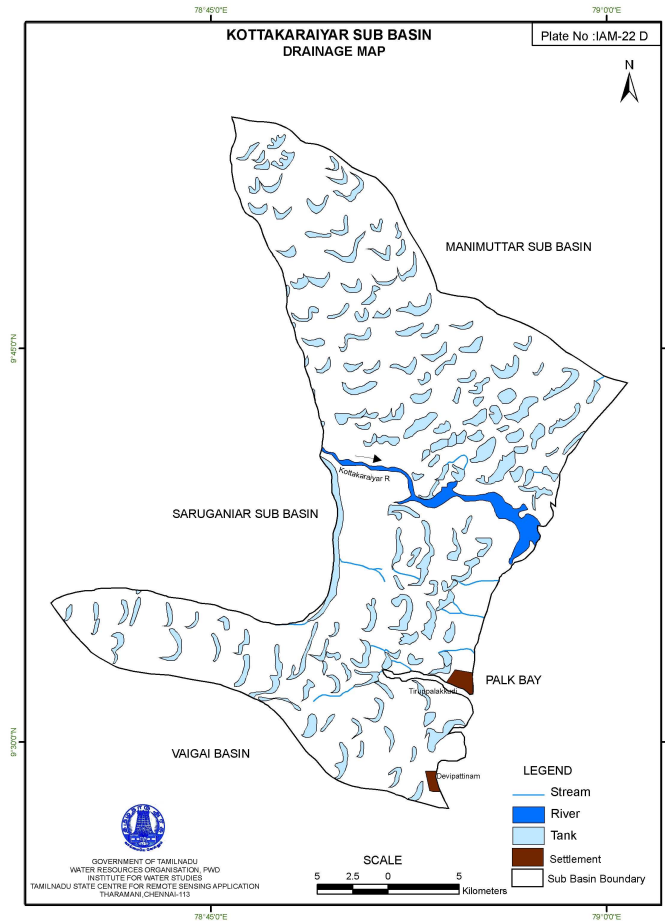
Kiliyar Sub Basin (Drainage Map)



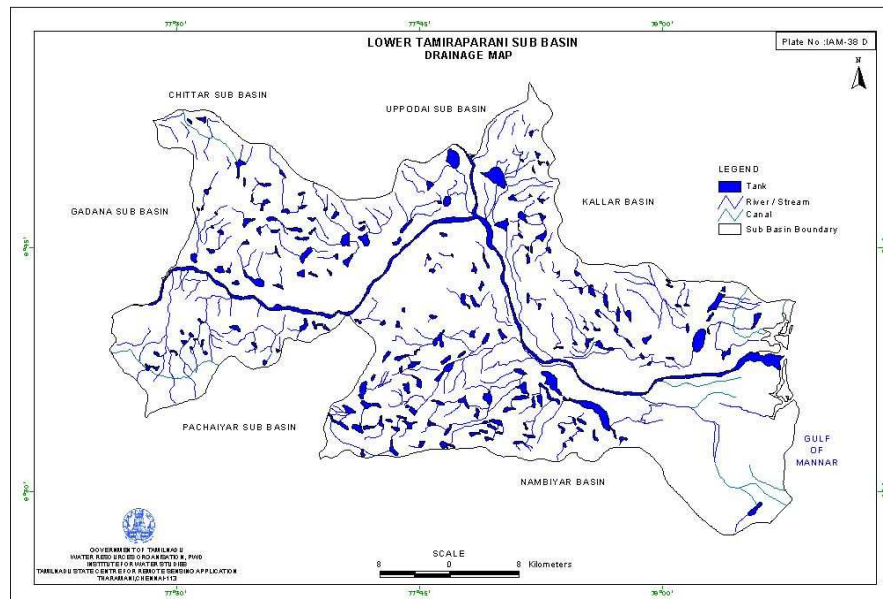
Kosathaliyar Sub Basin (Drainage Map)



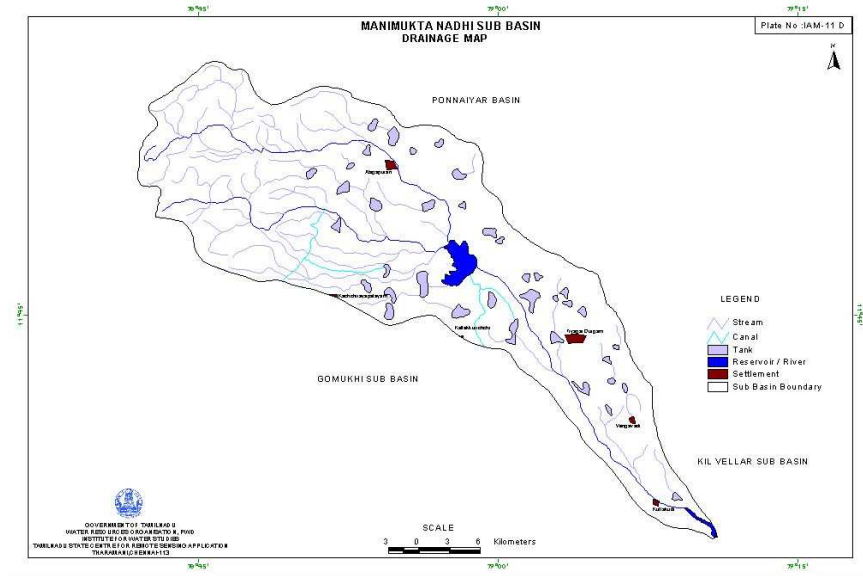
Kottakaraiyar Sub Basin (Drainage Map)



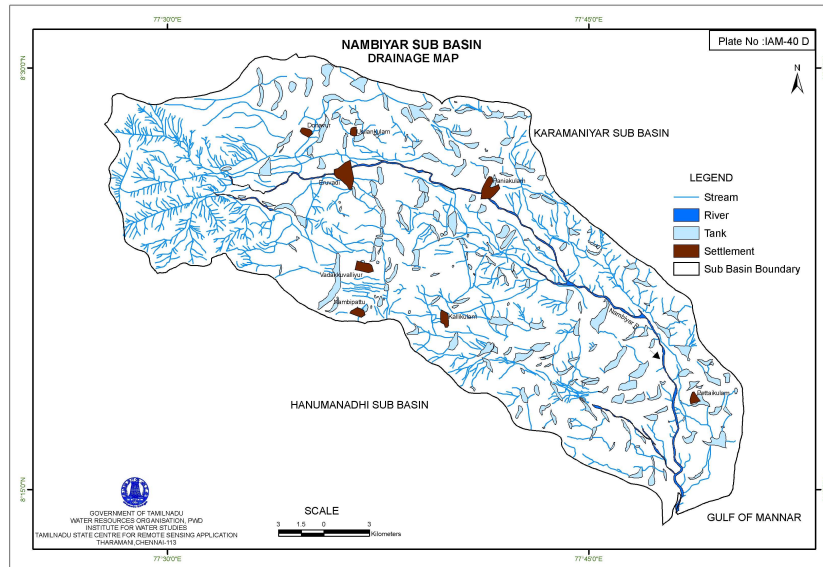
Lower Tamiraparani Sub Basin (Drainage Map)



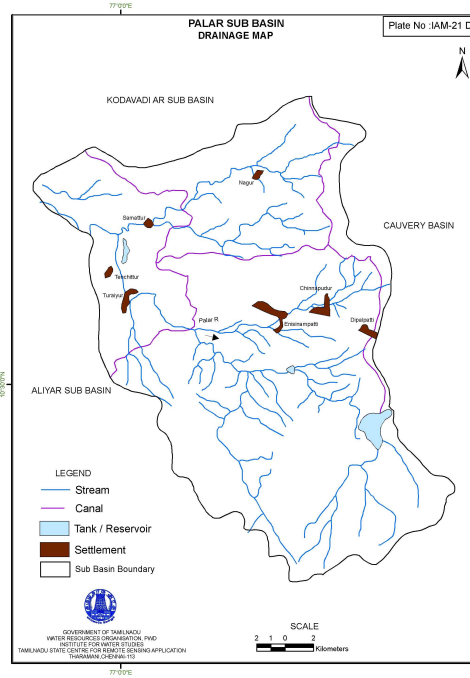
Manimukthanadhi Sub Basin (Drainage Map)



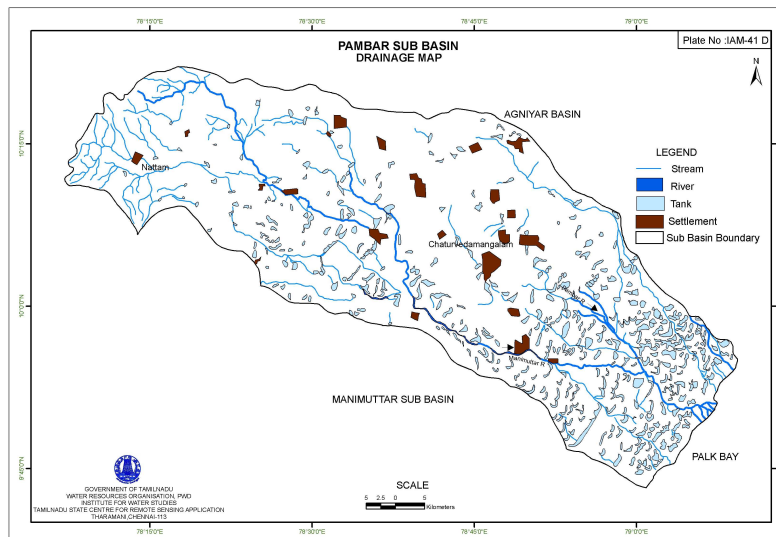
Nambiyar Sub Basin (Drainage Map)



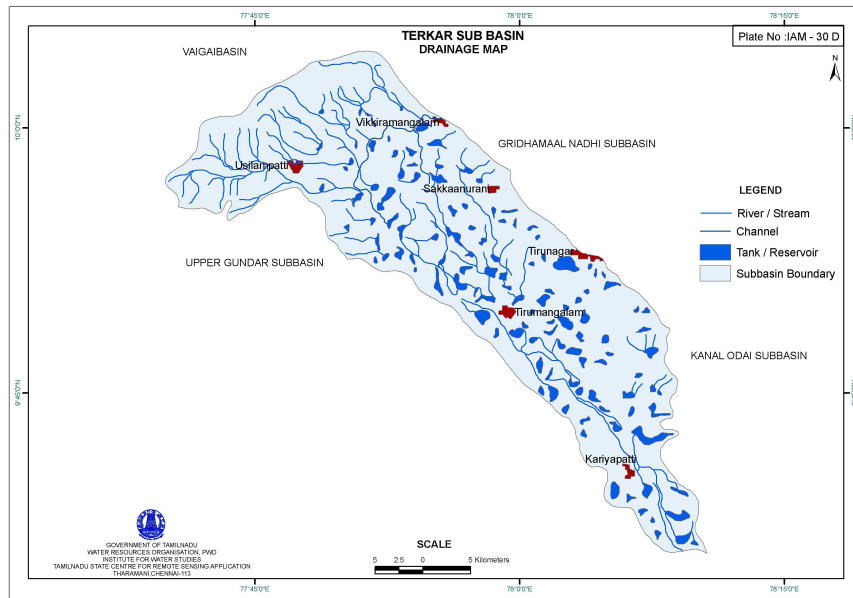
Palar Sub Basin (Drainage Map)



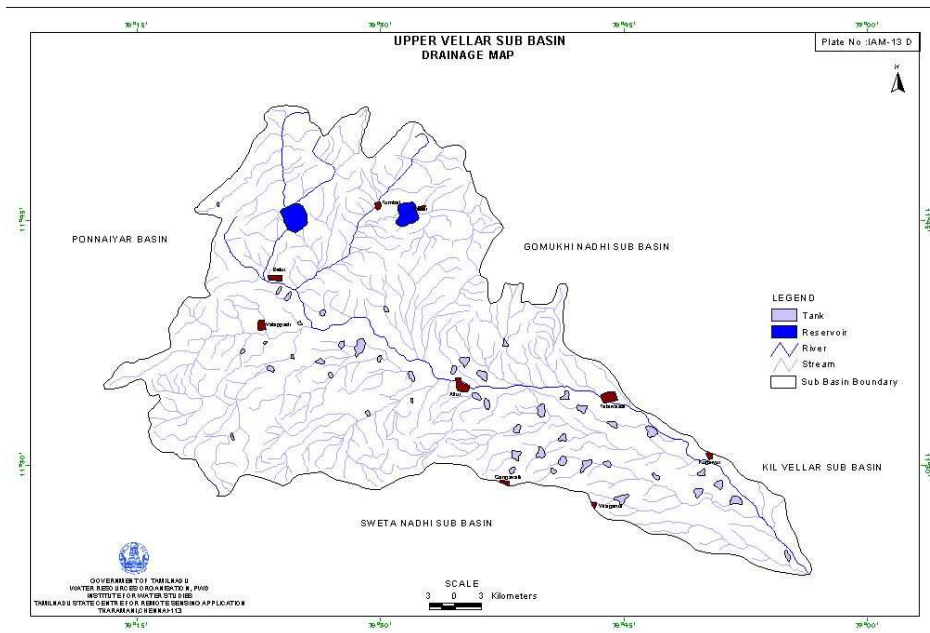
Pambar Sub Basin (Drainage Map)



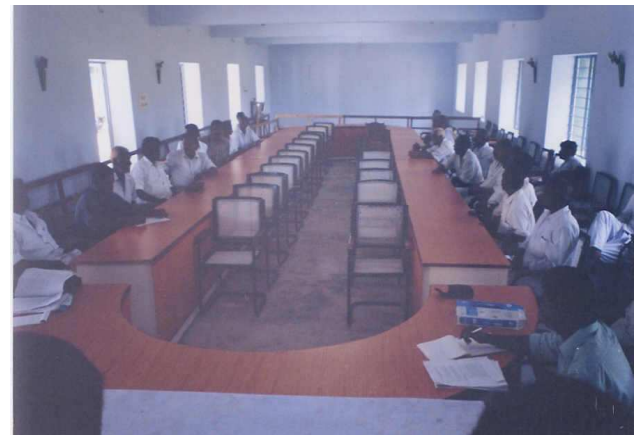
Terkar Sub Basin (Drainage Map)



Upper Vellar Sub Basin (Drainage Map)



ANNEXURE II STAKEHOLDER CONSULTATIVE WORKSHOPS AT RIVER BASINS OF TAMIL NADU







ANNEXURE III

DAM SAFETY

Introduction

In pursuance of the resolution of the first conference of State Ministers of Irrigation held at New Delhi during July 17-18, 1975, Dam Safety Organization was established in the Central Water Commission in June 1979 to assist the State Governments to identify causes affecting safety of dams and allied structures and to render advise in providing suitable remedial measures. After carrying out detailed studies the organization has issued guidelines for Safety Inspection of dams.

Rationale For Dam Safety Plan

Dams are major structures storing large quantities of water and any out right failure may cause serious damage to Jives and property on the downstream. Even a partial failure may gradually lead to destruction and loss of effectiveness of the structure to hold water and provide benefits for which it was built. It is therefore, essential that the Dams are designed and constructed with meticulous care and maintained as stipulated in the O & M Manuals. In spite of this, it is possible that they develop conditions of distress or failure due to factors such as excess flow and deformations and failures due to improper evaluation and consequent design of foundations or unprecedented seismic conditions. To meet the normal day-to-day operational conditions and to account for unexpected conditions of water flow, the geology and seismicity, institutional capacity, work procedure and plan are essential.

Tamil Nadu Dam Safety Directorate

Dam safety Directorate in Tamil Nadu was established in 1991 to carry out regular monitoring works of all large dams for both PWD & TNEB as per the guidelines of the CWC.

Dam Safety Assurance & Rehabilitation Project (Dam Safety Project – 1) funded by the World Bank was carried out during the years 1991-98. Some of the important works carried out by the Sam Safety Directorate are as :

1. Preparation of Health Status Report of PWD & EB dams for 106 nos. for 4 monsoon periods in a year viz Pre Monsoon, Monsoon-I, Monsoon-II and Post Monsoon periods and sending them to Government and all the Regional Chief Engineers of PWD & TNEB for carrying out remedial works to the deficiencies pointed out therein and follow up action
2. Carrying out Phase-I inspection of all dams in a cycle of five years, by a Dam Safety Panel of five members headed by the Director, Dam Safety Directorate. Atleast 25 dams are to be covered in a year and inspection reports are to be prepared for taking follow up action on them.

3. Carrying Phase-II detailed investigation by an independent panel of experts for the required distressed dams.
4. Form the Health Status Reports of the four monsoon periods, Annual Consolidated Health Status Report is prepared and sent to Central Water Commission every year.

Now the Dam Safety and Improvement Project (DRIP) is likely to be approved by the World Bank in March 2006. Tamil Nadu is also included in the project. The total project cost is USD 400 million and the project period is six years. The implementation of the project is to be monitored by Dam Safety Directorate.

Dam Rehabilitation & Improvement Project (DRIP)

The following works are proposed under this project which is to be implemented with the World Bank assistance.

1. Adopting modern design tools in the dam safety works.
2. Carrying out dam safety status inventory & updating on a GIS platform.
3. Conducting Dam Brake analysis, Emergency Action Plan & preparation of inundation maps for few selected dams.
4. Organizing training in dam safety.
5. Arranging and accompanying with the Dam Safety Expert Committee inspection and interacting with them. Arranging collection of field particulars called for by them, follow up action on their inspection reports etc are to be carried out by the Dam Safety Directorate.
6. Getting approval of the World Bank for the bids in time.
7. The project shall be carried out as per Central Water Commission guidelines and their vetting are to be obtained them and there.
8. Consultancies are to be field for hydrology and review of for dams if not already done.
9. Prompt monitoring of execution of works by the Regional Chief Engineers are to be done by Dam Safety Directorate.
10. Any other dam safety works which will be taken in the course of the project.

The following project proposals are included under the project.

Project proposals under the Dam Rehabilitation and Improvement Project (DRIP)

Component – I: Institutional Strengthening

Sl.No.	Description	Estimated Cost Rs. in Million
1.	Strengthening the Dam Safety Directorate with total staff strength of 34 nos. (staff salary for the project period of six years)	26.60
2.	Organising Training on Dam Safety to the WRO personnel both National and International.	6.40
3.	Cost of Dam Safety Expert Committee (National Expert Team) visits for the project.	11.00
Total		44.00

Component – II : Revised proposals for Dam Rehabilitation and Improvement

Sl.No.	Name of Dam and works proposed	Amount Rs. in Million	Identified rank
1.	Pechiparai Dam Providing upstream face treatment	90.00	1
2.	Manimuthar Dam Providing upstream face treatment	81.70	2
3.	Perunchani Dam i. Providing additional spillway. ii. Gates & hoists for additional spillway iii. Providing backing concrete.	200.00	3
4.	Ponnaiar Dam Providing fuse plug	35.00	4
5.	Manimukthanadhi Dam i. Standardization of earthen bund ii. Rehabilitation of stilling basin iii. Providing surplus regulator	39.00	5
6.	Siddhamalli Dam Providing breaching section	25.00	6
7.	Amaravathy Dam Rehabilitation of Amaravathy Dam with the following works: i. Special repairs to the Right side apron and revetments of Amaravathy River bridge below Amaravathy Dam. ii. Special repairs to the left side ghat road and Dam top road left flank of earth dam of Amaravathy Dam. iii. Special repairs to the right side ghat road and Dam top road right flank of earth dam of Amaravathy Dam iv. Special repairs to approach road from (D/S side of Dam) entrance gate to AMC culvert @ Amaravathy Nagar. v. Special repairs to approach road from AMC culvert (D/S side of Dam) to Kallapuram Regulator at Amaravathy Nagar. vi. Construction of additional Generator room @ Amaravathy Dam. vii. Providing lightening arrester and lighting arrangement in the earth dam portion of Amaravathy Dam. viii. Providing Additional 70 KVA Generator set in Amaravathy Dam. ix. Replacement of rubber seals in spillway, River sluice and canal sluice etc. in Amaravathy Dam. x. Rehabilitation of Earth Dam of Amaravathy Dam (raising the right flank bund, filling the cracks, reconstructing parapet wall, and forming black topped road etc.)	7.00	7
8.	Vaigai Dam Rehabilitation and strengthening measures to masonry dam, earth dam pick up anicut and link canal	60.00	8
9.	Parambikulam Dam Rehabilitation of Parambikulam Dam and earth saddle dam at Parambikulam in Palghat District	10.65	9
10.	Aliyar Dam Rehabilitation and modernisation of Aliyar Dam and its appurtenant structures under PAP system.	13.625	10
11.	Kodaganar Dam Rehabilitation of shutters of old regulator and stilling basin and leading channel of right and left main canal.	13.95	11
12.	Karuppanadhi Dam	4.50	12

	Rehabilitation to embankment, river sluice gate and parapet wall.		
13.	Gundar Dam Rehabilitation to embankment and access road	1.00	13
14.	Gomukhi Dam Rehabilitation to stilling basin and providing flood bank	4.00	14
15.	Thirumoorthy Dam Rehabilitation of earth dams	20.60	15
16.	Kudhiraiyar Dam Rehabilitation of Kudhiraiyar Dam	11.00	16
17.	Lower Nirar Dam and Upper Nirar Weir Rehabilitation of Lower Dam and Upper Nirar weir with the following works: Lower Nirar Dam i. Reaming of drainage shafts and uplift pressure holes. ii. Rehabilitation of spillway oghee portion, tunnel entry revetment and downstream revetment iii. Rehabilitation of ghat road leading from lower Niar Dam to Cinchona I.B. and road lead to left flank of lower Nirar Dam. Upper Nirar Dam i. Rehabilitation of oghee spillway portion entry revetment and cone rap revetment at upper Nirar Weir. ii. Rehabilitation of revetment to the right flank of leading channel to upper Nirar tunnel from 74 M to 110 M downstream left flank and right flank side revetment at Upper Nirar Weir.	6.80	17
18.	Noyyal-Athupalayam Reservoir Rehabilitation of Noyyal-Athupalayam Reservoir	6.74	18
19.	Thunnakkadavu & Peruvari Pallam Rehabilitation of Thunnakkadavu and Peruvari Pallam Dams with the following works. i. Special repairs to spillway pointing and construction of a gauge weir at Thunnacadavu Dam. ii. Special repairs to roads of Thunacadavu Dam.	10.30	19
	iii. Special repairs to Chutes and revetment of Thunacadavu Dam. iv. Construction of masonry retaining wall above rock level from LS 1220 m to 3673 m ('4000 to 12050') of leading channel from Thunacadavu Reservoir to SPT entry. v. Desilting the leading channel from Thunnacavadu Reservoir to SPT entry. vi. Providing power supply arrangements @ 4000' of leading channel from Thunacadavu Reservoir to Sarkarpathy Tunnel Entry. vii. Supply of 12.5 KVA generator stand by to Thunacadavu Dam. viii. Special repairs to chutes, revetment and top drain of Peruvaripallam Dam. ix. Special repairs to roads of Peruvaripallam Dam.		
20.	Ramanadhi Dam Rehabilitation to access road, revetment, sluice shutter and parapet wall	13.00	20
21.	Gatana Dam Rehabilitation to access road, revetment and parapet wall	5.00	21
22.	Polar Porundalar Dam	5.70	22

	Rehabilitation of parapet wall, pointing the masonry and painting structures.		
	Total	664.565 or 665.00	

Total cost for Component I & II = Rs. 709 Millions.

Action Plan

"Guidelines for Safety Inspection of Dams" issued by CWC gives a detailed description of works related to inspection and analysis for assessing safety of an existing dams. These are to be followed in conjunction with the CWC publication, which describes all the items in detail.

Size Classification

Size classification is done based on storage or height whichever gives the large size category as per Table

Table: Size classification

Category	Storage (ha)	Height (m)
Minor	<12.5 and ≥ 6	<12 and ≥ 8
Medium	≥ 12.5 and <6250	≥ 12 and <30
Major	≥ 6250	≥ 30

Selection of Dams to be investigated

The selection of dams to be investigated should be based upon an assessment of existing developments in flood hazard area. Dams that are high or having a significant hazard potential should be given first and second priorities, respectively. Inspection priorities within each category should be developed from a consideration of factors such as size class, age of the dam, population size in the downstream flood area and potential developments anticipated in flood hazard areas. Engineering data for all the dams in a basin/sub-basin should be collected as per Format 1.

Field inspection

The field inspection of the dam, appurtenant structures, reservoir area, and downstream channel in the vicinity of the dam should be conducted in a systematic manner to minimize the possibility of any significant feature being overlooked. Based on the guidelines issued by CWC and the findings of the field works conducted for ESA-TN-IAM WARM, a checklist is prepared and presented in Format 2.

Evaluation of Hydraulic and Hydrologic features

The spillway capacities and free board allowances of a very vulnerable dam should be adequate to insure against failure of the dam during the most severe flood or sequence of floods considered reasonably possible irrespective of the apparent

infrequency of occurrence of controlling conditions

Evaluation of Structural stability

This should be based on design and construction data, operating records post construction changes and seismic stability. If required more detailed investigation and analysis should be carried out as per "Phase II- Investigation" In addition, accessibility of the dam sites and control structures should be assessed. Proper public awareness programmes should be implemented for the population may be affected by any catastrophic condition or failure of dam. Representatives of population residing downstream of the dam should be involved in operation and maintenance of the dams.

Action plan for dam safety at different stages

Keeping in view the foregoing, a summary action plan is suggested as below:

(A) New Dams

New Dams shall be investigated, designed and constructed as per the guidelines, procedures, IS codes and the state-of-the art dam engineering. However, the designs can also be verified by the Dam Safety Organization of the state. It is necessary that a complete report giving all the details of hydrological evaluations, geological data and analysis, Construction material quality and construction details and all data and drawings be prepared along with the completion of the project. Work on this should be commenced by the Chief Engineer in-charge when 50% of the project work is completed. The report should contain all important drawings of the dam as constructed, including geological features, technical and quality control data that need to be kept for posterity. Preparation of design memorandum of all the aspects of design is a good practice, which should be applied to major and medium projects. It is desirable that all major and medium projects are guided by a panel of experts even from the stage of design, if not investigation, till the project is completed. Each project should have an operation and maintenance manual prepared in consultation with the design and construction engineers. In addition, for each project, a disaster preparedness plan is to be prepared.

(B) Old Dams

(i) Pre- Planning Stage

All dams should have completion reports giving all requisite topographical, hydrological and geological details and construction drawings with details of foundations and superstructures and foundation treatment and other special provisions built in. These should be carefully preserved in the office of the Executive Engineer who should inspect once in a year all the dams above 30 m in height under his charge. The Assistant Engineers should inspect every year all the dams in their charge and prepare reports in Format 1 and also indicate, if in their opinion, any malfunction is observed so that the senior officer could look into the same. All inspection reports prepared by the Executive Engineer should be submitted to the Superintending Engineer who will examine these and forward the reports of those dams to the Chief Engineer. The Chief Engineer after considering the recommendations of Superintending Engineer and after making a detailed site visit may recommend these cases to the State Dam safety Organizations for their

opinion and further action.

(ii) Planning Stage

Before planning the remedial measures, the dam would be inspected in detail by the Chief Engineer and / or the Experts in the State Dam Safety organization who will suggest further surveys and investigations, if required. Based on the data of the surveys and investigations, the rehabilitation works will be designed under the supervision of Chief Engineer or the Dam Safety Organization. Thus the planning phase will cover both planning, designs as well as the preparation of specifications and Tender documents

(iii) Implementation Stage

Implementation may be under contract or by department itself depending on the nature and quantum of work that will be executed according to the design. The work will be supervised by the officers In charge of the Dam. As far as major dams are concerned, the rehabilitation works would also be inspected by the Chief Engineer at as close intervals as he considers fit and by other junior officers at time intervals fixed by the Chief Engineer.

(iv) Post Implementation Stage

If the Rehabilitation works are done properly as per specifications under close departmental supervision, the structure is expected to provide benefit for a long time. Still, regular annual inspection is required and minor problems if any, should be attended to immediately.

Knowledge base and Information disclosure

All details of dams shall be incorporated into the knowledge base and used for planning and allocation of investments related to dam safety. This information shall be supplied with simple easily identifiable indicators to the people at risk as a part of information disclosure. This information shall be maintained at the WUA and sub project WRO offices. The contents should include:

- General details and status of the Dam, in terms of safety
- Indicators to identify safety hazards
- The people responsible for the effective functioning, their addresses and phone numbers
- Emergency plan, in case of dam break.

Record Maintained at Site

Records that may be required for proper inspection and maintenance shall be available at site. These should be properly maintained and kept up to date by including latest information available. Data in respect of upstream gauging stations, flood warning system and communication channels, if installed should be properly maintained.

General

1. Final detailed Project Report and details of modifications done during construction and a set of final drawing (as executed)
2. Index Plan of the area in which the dam is located showing important towns, roads, rail routes and communication facilities
3. Index Plan of downstream area showing natural flood zone, flood zones corresponding to spillway design, flood and dam break flood and all important towns/villages and properly laying in these flood zones
4. Contour map of dam site extending up to 200 m or 10 times the dam height (whichever is less) on upstream and downstream, showing all features of the dam like toe lines, fills, drains, relief wells, access roads etc.
5. Record drawings of longitudinal section of dam foundation or cut off trench showing details of foundation stratigraphy, stage wise construction of COT filling and raising of dam, section embankment, zoning details and foundation treatment.
6. Record drawings of cross-sections of dam showing details of foundation treatment, under seepage control, zoning, internal and external drainage all protective arrangements and stage-wise construction
7. Contour plan of dam site with foundation trench showing details of foundation treatment and foundation drainage
8. Contour plan of reservoir basin
9. Contour capacity and area capacity curve
10. Reservoir maps showing silted basin, if observed
11. Plan of the catchment area showing rain gauge stations and capacities of upstream storages
12. Material properties adopted for design
13. Details of design criteria followed
14. Design report on flood studies and spillway design flood
15. Design reports of outlets, power outlets, river sluices, intake, conduit, energy dissipation arrangements and details of gates of hoists
16. Geological data on the foundation and abutments
17. Copies of reports, details of special foundation and abutment treatment carried out
18. Record of tail channel geology and tail channel erosion
19. Instrumentation drawing with details
20. Instrumentation data and behavioural record
21. Details of communication systems such as telephones, wireless etc., directory of important key officers, flood-warning procedures
22. Flood forecasting system
23. Photographs showing various phases of construction, pre-construction etc.

Earth-Rock-fill Dams

1. Stage wise construction record of the dam showing volumes and heights achieved in each season and rate of progress
2. Record of special compaction done near concrete/masonry structures, abutment contracts and outlet locations, if available
3. Summarized records of compaction control, sampling and complete laboratory and field-test results on all recorded samples
4. Foundation details and geology as observed
5. Data of water intake test

6. Detailed drawings and record of relief well observations
7. Design report for the earth dam, covering the under seepage control, stability of embankments and junctions with masonry dam, instruments installed etc.
8. Drawings showing the typical cross sections including zoning, drainage arrangements, and details of slope protections provided for etc., as per actual construction
9. Details and location of instruments embedded / installed in and around the structures
10. Record of corrective measures, repairs and treatment that have been done subsequent to construction
11. Details of design criteria followed
12. Photographs showing all phases of construction
13. Important inspection reports and reports of consultants

Concrete/Masonry Dams

1. Details of construction history including stages of construction particularly in low blocks where considerable time has elapsed prior to resumption of work
2. Summarized data on control tests carried out during construction in respect of concrete, mortar and their constituent materials, if available
3. Reports on hydraulic model studies
4. Drawings showing the details of energy dissipation arrangements including foundation levels of apron, wells and end weir.
5. Details and location of instruments embedded/installed in and around the structure.
6. Summarized data collected by embedded/installed instruments
7. Detailed drawings of all service facilities like internal lighting, emergency lighting, drainage etc.
8. Drawing showing the uplift measurements and pressure relief arrangements
9. Summarized data of uplift pressure observed
10. Summarized data of seepage, leaching in the drainage gallery downstream face of the dam and their locations etc.
11. Record of corrective measures, repair treatment that have been done subsequent to completion
12. Important inspection reports and reports of consultants
13. Details of design criteria followed
14. Photographs showing all phases of construction

Operation and Maintenance

1. Gauge data of the river prior to and after completion of work
2. Detailed observations on flood discharges
3. Detailed observations of hydraulic performance of energy dissipation basins
4. Record of past performance stating briefly the defects developed and remedial measures carried out
5. Drawings of outlets, maximum discharge capacity, maximum design operating head
6. Standing orders regarding operation of the dam
 - a. Designers operating criteria

- b. Standard operating procedure
- c. Flood forecasting procedures
- d. Gate operation procedures
- e. Emergency action plan

Format 1: Engineering Data Format

(A) General

- Name of the Dam - Project
- Location - River, Sub-basin, Basin, Village/Tehsil/District/State
- Type of Dam
- Year of completion
- Height of Dam (Elevation, Deepest foundation, River bed, FRL, MWL. Top of Dam)
- Impounding capacity at F.R.L., at M.W.L
- Index map showing location of dam, catchment area, downstream area subject to potential damage due to failure of dam or failure of operating equipment.
- Nearest downstream city, town, village which can be located on the map. Its distances from dam and population.
- Extent of economic development in downstream area.

(B) Project Features

- Salient features,
- Construction drawings indicating plans, elevation and sections of the dam and appurtenant structures including the details of the discharge facilities such as outlet works, spillways and operating equipment
- Emergency preparedness – Communications, Downstream Warning Systems Auxiliary power, Remote Operation and Security of the site

(C) Hydrology

- Description of Drainage basin-Drainage area and basin runoff characteristics
- Design flood-design assumptions and analysis, storage of flood control zone
- Spillway capacity and flood routing criteria
- Area capacity curves
- Elevation of crest, type, width, crest length, location of spillway. Number, size and type of gates
- Type, location, capacity, entrance and exit levels of other outlet works
- Emergency draw down capacity
- Type, location, observations and records of hydro meteorological data

(D) Geology and Foundation

- Rock types, logs of borings of geological maps, profiles and cross-section, location and special problems (fault. shear zones, solutions, channels, etc.)
- Effects of geology on design,
- Adequacy of investigation.

- Foundation treatment, grouting, drainage, etc.
- Cut-off

(E) Construction

- History-including diversion scheme, construction sequence, construction problems, alterations, repairs.

(F) Operation and regulation

- Plan under normal conditions and during floods and other emergency conditions

Flood Warning Systems

(G) Operation record

- Experience during past major floods.

(H) Stability and stress analysis of the dam

- Spillway and appurtenant structures and features including the assumed properties of materials and all pertinent applied loads

(I) Instruments and records of performance observations

- Any known deficiency that may pose a threat to the safety of the dam or to human life and property

FORMAT 2

Proforma for Periodic Inspection of Dams with Ungated Waste Water

Name of Dam :

District :

Circle :

Basin :

SRLD No :

Division :

A. General

Date of inspection

S No.	Item	Remarks
1.	Name of Project	
2	Purpose of project: water supply / power / multipurpose / irrigation	
3	Name of Dam	
	(a) Latitude and longitude	
	(b) catchment area	
4	Year of completion	
5	First filling (year / levels)	
6	A . Benefits assured:	
	(a) Irrigation (RABI / KHARIF)(Hect)	
	(b) Water supply (Cum)	
	© Other benefits	
	B. Benefits achieved preceding year	
	(a) Irrigation (RABI / KHARIF)(Hect)	
	(b) Water supply	
	© Other benefits	
7.	Important controlling levels (in meters)	
	(a) Top of dam	
	(b) Maximum	
	© Full reservoir level	
	(d) Sill level of irrigation sluice	
	(e) Spillway crest level	

	(f) Minimum draw down level	
	(g) Lowest river bed level	
	(h) Deepest foundation level	
8.	Salient Features	
	(a) Dead storage capacity	
	(b) Area of foreshore at FRL	
	© Design flood adopted (PMF/SPF/ any other)	
	(d) Design spillway discharge capacity. Type and length of spillway with location	
	(e) Location still level and capacity of low level outlets and scouring sluices	
	(f) Height of the dam Above deepest foundation Above lowest river bed	
	(g) Gross storage capacity At FRL At MWL	
	(h) Length of the dam (at crest) in meters	
9	Name and designation of the inspecting officer	
10	Date of inspection and the corresponding reservoir water level	
11	Maximum and minimum water level reached during the fast season with dates	
12	Maximum overflow during proceeding monsoon with dates	
13	History of past distress, if any, and brief details of remedial measures carried out	
14	Does the officer in charge of the operation and maintenance of dam possesses all the records as given in the guidelines by the Dam Safety Organisation	
15	When and by whom was the dam inspected immediately preceding this inspection?	
16	Are the items pointed out during the fast inspection properly attended to? If not, state deficiencies yet to be corrected	
17	Whether catchment area has been verified on the basis of latest toposheet? If yes, state the out come	

Proposed Dams for Rehabilitation and Improvement

1. Pechiparai Dam
2. Manimuthar Dam
3. Perunchani Dam
4. Ponnaniar Dam

5. Manimukthanadhi Dam
6. Siddhamalli Dam
7. Amaravathy Dam
8. Vaigai Dam
9. Parambikulam Dam
10. Aliyar Dam
11. Kodaganar Dam
12. Karuppanadhi Dam
13. Gundar Dam
14. Gomukhi Dam
15. Thirumoorthy Dam
16. Kudhiraiyar Dam
17. Lower Nirar Dam & Upper Nirar Weir
18. Noyyal – Athupalayam Reservoir
19. Thunnakkadavu & Peruvvari Pallam
20. Ramanadhi Dam
21. Gatana Dam
22. Palar Porundalar Dam

ANNEXURE IV

INTEGRATED PEST MANAGEMENT PLAN

Introduction

Pests and diseases cause enormous loss to agricultural production all over the world. Farmers use plant protection chemicals to control the insect / pests and disease to protect the crops. However, farmers use plant protection chemicals indiscriminately due to lack of knowledge and ignorance. Many a time, when the required chemicals are not available locally, the farmers have to manage with poor substitutes. Unwarranted and indiscriminate use of insecticides / pesticides results in developing resistance in the crop pests.

Although the use of pesticides is low in India as well as in the State of Tamil Nadu, the potential health hazards are enormous due to their widespread and persistent use and multiple exposures. Many a time, the residues of harmful pesticides are found in the food grains, fruits and vegetables beyond the permissible limits. It has been estimated that 20 per cent of all foodstuff in India contains pesticide residues above permissible limits compared to 2 per cent globally. The agro-chemicals / pesticides also serve as a source of non-point pollution of water sources. Pesticides also kill beneficial insects (predators), which are natural checks for many crop pests.

Rationale for Pest Management Plan

Constitutional and Legal Provisions

The Government of India and the State Government are striving hard to discourage the use of hazardous Plant Protection Chemicals (PPC) and to promote the use of environment friendly techniques under the Integrated Pest Management (IPM) programme. It encourages the use of botanicals, pheromones, bio-control agents and microbial pesticides, The “ Prevention of Food Adulteration (PFA) Act ” is the policy tool which regulates the quality of food products manufactured, sold and consumed in India.

Pesticides are noted contaminants and are defined as harmful to human health. Many of the formulations such as BenzeneHexaChloride (BHC), Carbofuran, Dimethoate, Endosulphan, Lindane, Monocrotophos, which are banned in the developed countries are still used as PPC in India and account for a sizable proportion of the PPC used. Thus, it is imperative to promote the awareness about the health impacts of these chemicals and the need to adopt more sustainable IPM techniques. Moreover, large quantities of spurious pesticides are sold in the market taking advantage of farmer's ignorance and illiteracy. The Insecticide Act of 1968 has been suitably amended by the Parliament during 2000 to ensure supply of quality pesticides to farmers and to deal with offenders. Under the Insecticide Act 1968 and Rules 1971, there is a provision for analyzing farmers' samples free of cost to discourage dealers of spurious pesticides.

World Bank provisions

The World Bank Safeguard Policy OP 4.09 on Pest Management aims to avoid excessive use of pesticides and promote environmentally sound and sustainable pest management. The frameworks shall encompass IPM and integrated nutrient management

with the overarching purpose of developing the project areas as organic - based production model. The IPM technique promotes to manage pest populations through use of biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to pests.

Pests, Diseases and Nutrient Deficiencies

Depending upon crops grown and farming practices adopted in the project basins, pest problems occur in a variety of forms. Pre-eminence of certain crops in specific river basins and agro-climatic zones imparts eco-specificity of the pest problems.

Borer/cutworm caterpillar: Borer/cutworm caterpillar seriously affects Soybean and gram crops grown in most of the river basin areas.

Leafhoppers, grasshoppers and bugs: All pulses and oilseed crops grown in various river basins are affected to a varying extent by the hoppers and bugs.

Rats: They affect all kinds of field crops and storage products.

Storage pests: There are varieties of storage pests that affect stored grains.

Diseases: They occur in various forms and are caused through seed-borne/ soil-borne/ air-borne sources. Seed-borne diseases such as rusts and smuts affect mostly the wheat crop that is grown in most irrigated river basins. Soil-borne diseases such as wilts affect mostly pulses like gram. Air-borne diseases include powdery mildews, blasts and leaf spots, which affect both cereal and pulse crops.

Weeds: They cause serious limitations to achieving optimum crop yields by offering competition to crop plants for water, nutrients and light and also by serving as hosts to several pests.

Weed pressure is greater and more serious in competition to direct seeded rice because of the preponderance of Carbon 4 cycle (C4) weed species, while rice plants are Carbon 3 cycle (C3). Weed pressure is not serious in transplanted rice. Direct seeding of rice is a more common crop establishment practice in the rice growing areas. More than native weeds, exotic weeds like *Phalaris minor* and *Avena ludoviciana* (Wild oats) are highly menacing to the wheat crop.

In many basins other exotic weeds such as *Parthenium hysterophorus* (Congress grass), *Lantana camara*, *Ipomea carnea*, Water hyacinth. etc. have invaded uncultivated areas including grazing lands, irrigation and drainage channels and ponds causing ecological/environmental problems.

Nutrient disorder in soils and crops: Even under the present sub-optimal agricultural development scenario, the crop uptake of nutrients (macro, secondary and micro) far exceeds the amounts supplied through application of fertilizers, which is grossly inadequate and unbalanced. The results are multiple nutrient deficiencies in soils amounting to degradation of the productivity potential associated with nutritional disorder in crop plants consequent to lack of supply of depleted nutrients. Generally, secondary and micronutrients become more growth limiting.

The incidence of insect pests and disease problems as well as other problem manifestations (weed pressure. nutrient disorder. etc.) are likely to intensify with increased agricultural intensification in terms of enhanced cropping intensity and crop

diversification with inclusion of fruits, vegetables and other high-value plants, requiring more stringent solution framework.

The existing remedial practices include, application of chemical pesticides, manual weeding techniques and application of chemical fertilizers to augment the productivity levels. The application levels are low as compared to the national average figures due to non-affordability *in lieu* of the marginal returns. This may well be considered as a potential for introducing sustainable pest management techniques.

Some of the experiences in the Tamil Nadu region in the use of appropriate pesticides and eco-friendly pest control are as below. These are concerned with paddy and grams.

- Paddy. The pests that infest paddy are stem borer, brown plant hopper (BPH), sheath blight and blast. Stem borer is effectively controlled by spraying chloropyriphos, and mixing carbofuran granules in the soil two weeks before transplantation. Brown plant hopper is effectively controlled by spraying thiomethaxame. Monocrotophos and imidacloprid are also found to be effective in pest control.
- Grams. The most common pest for grams is helicoverpa (Green Pod Borer). A spray of neem oil mixed with endosulfan or quinalphos is found to be effective in controlling this pest.
- Biological control. Use of bio-agents such as Nuclear Poly Hedrosis Virus (NPV) and Bacillus thuringensis (BT insecticides) is found to be quite effective in pest control.
- Non-insecticidal Pest Management. Spraying cow slurry (cow dung, cow urine and non-edible green leaves soaked together and fermented for three weeks) is one of the efficient methods for pest control for all crops. Further the residual cow slurry is also used as manure.

Support for IPM

As mentioned earlier improved access to water resources as a result of sub-project activities shall lead to intensification of agriculture, consequently leading to increased usage of plant nutrients and pesticides. The project proposes to increase farmers' awareness towards benefits of Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) techniques through training in the sub-project region, and thus wean them away from excessive usage of chemical fertilizers and pesticides to environmentally benign organic substitutes and sound management measures.

Procedures for Preparation of IPM

The proposed activities related to IPM and INM are to be taken up by an external agency including monitoring and evaluation (facilitated by the MDPU and Agriculture Specialist). This team would evaluate the IPM component for effectiveness and scaling-up implications.

Integrated Pest Management (IPM)

IPM involves carrying out management activities that result in the density of the

potential pest population being maintained below the problematic pest level, without endangering the productivity and profitability of the farming system, the health of humans and animals and the quality of the adjacent and downstream environments. The interventions underlying IPM address the following:

- Increasing biological diversity to disrupt pest habitat through periodic replacement of cultivated crop varieties, intercropping, crop rotation and crop diversification oriented to disruption of pest habitat and consequential minimization of pest incidence
- Adoption of farming practices to escape pest incidence through appropriate tillage practices, trash management and optimizing sowing date such that possibility of pest / disease occurrence is minimized
- Cultivating crop varieties resistant to pests and diseases
- Adoption of bio-control agents such as application of plant / bio-products (bio-pesticides) and augmenting insect pathogens or other natural enemies (including birds)
- Increasing the farmers' awareness levels on IPM through conduct of technical training courses at village level. The training should focus on philosophy and principle of IPM, identification of different insect pests and diseases, and application of different IPM strategies including selection and usage of chemical pesticides. Extension agencies and NGOs shall be involved in organizing the training courses.
- Extension agencies shall organize regular field demonstration activities pertaining to application of IPM technology.
- Mass Media such as TV and Vernacular Newspapers should transmit information and knowledge on IPM
- Pesticide retailers at village level should be provided with information materials to increase their knowledge on selection and usage of pesticides since farmers seek their advice on pesticide usage

Measures to Increase Farmers' Preference to IPM

- Making quality biocontrol agents/ bio pesticides available at village level through the involvement of local NGOs.
- Making available the seeds of improved pest/disease resistant HYVs (High Yielding Varieties)
- Encouraging farmers to adopt IPM practices including use of chemical pesticides based on proper understanding of farmers resources, knowledge, attitudes and perceptions with respect to IPM
- Monitoring and forewarning farmers of pest and disease situations

- Providing subsidies to farmers for adopting IPM technology
- Allowing price premiums on agricultural produces based on IPM technology
- Facilitating certification and marketing of IPM - based products.
- Help create institutional arrangements for IPM enforcement
- Securing NGOs' involvement in persuading farmers to opt for adoption of IPM technology

Integrated Nutrient Management (INM)

Public consultations at various levels indicated that under the existing cropping systems, the nutrient outputs grossly exceed the nutrient inputs and the fertilizer use efficiency is sub-optimal. The most appropriate strategy for reducing the scale of mining and for increasing fertilizer use efficiency is to practice INM. The basic principle of INM is the maintenance of soil fertility, sustaining agricultural productivity and improving farmers' profitability through judicious and efficient use of mineral fertilizers, organic manures and bio- fertilizers. The INM package has area-specific implications depending upon the availability and performance of the various components.

The interventions underlying INM shall:

- Adopt soil-tests based optimum nutrient use levels, ensuring adequacy of Phosphorus level to meet the competitive demands of crops and P-fixation capacity of soils
- Working model for integration of organic manures and NPK fertilizers for sustainable high yields/farmers' resource - based target yields
- Inoculation of soybean and other legume seeds
- Inclusion of legumes in rotation
- Adopt improved (modern) crop management practices to ensure cultivation of HYV, timely sowing and adequate crop stand establishment, timely weed control and plant protection and proper water management.
- Accelerate the adoption of INM through:
 - Technical training courses at village level for improving farmers' knowledge base. The training shall focus on concept and contents of INM, integration of organic and inorganic resources in consideration of farmers' resource base for mobilizing various nutrient sources, improvement of quality and quantity of FYM making use of NADEP compost system. Including vermiculture and use of bio - fertilizers. (Extension agencies and NGOs shall be involved in organizing training courses).
- Involved in NGO's:
 - Orienting farmers to organic and biodynamic farming approach involving the use of FYM, green manures, crop residues, vermicompost, biofertilizers and biopesticides while understanding their resources and targeted yields.

- Facilitating certification and marketing of certified organic produces with appropriate price premiums through Government Departments
- Create institutional mechanism for facilitating adoption of INM in general and organic farming in particular, and for monitoring of practices adopted in producing organic products, keeping full track of production processes and products from field to sale point as well as for arranging organic certification and marketing

In addition to the above-mentioned interventions, the implementing agency shall ensure that the Pest Management Plan shall:

- Document the list of all pest control products and confirm that they comply with the selection criteria in OP 4.09
- Under the existing practices and pest management concerns to ascertain that, the project planning and implementation stages address the issues.
- Ensure that main elements of the plan are reflected in the work contractor

The implementing agency shall review the same periodically for effective implementation including the post implementation monitoring after one year to appreciate the level of achievement.

Monitoring and Evaluation (M & E)

The M & E will involve establishing a base line on the current status to evaluate the impact of project interventions. The M & E of IPM will be based on pre-defined parameters such as adoption of companion cropping system, planting of trap crops, following crop rotation, adoption of biological and mechanical methods of pest control, use of parasites and predators, adoption of bio-pesticides.

IPM & INM Training Costs

As a part of the TN-IAM WARM, several programmes have been devised to generate awareness towards IPM and INM practices. The tentative costs of such programmes are given in following Table.

Table: Costs of IPM & INM programmes

Sl. No.	Item	Institution	Units	Total quantity for 6 years	Unit cost (Rs. '000)	Total cost (Rs. '000)
1	Farming Demonstration (INM)	Agricultural Department	Hectare	5,700	4	22,800
2	IPM village	Agricultural Department	No. of Villages	500	100	50,000

3	NADEP composting demonstrations	Agricultural Department	Numbers	40,000	15	60,000
4	Vermiculture demonstrations	Agricultural Department	Numbers	40,000	1	40,000
5	Demonstration for vegetable production clusters	Horticulture Department	Numbers	550	50	27,500
	Total					2,00,300

Organic Farming

Organic farming means a process of developing a viable and sustainable agro-ecosystem. In general, farming practices in these areas are geared to mono crop (usually paddy) in river basins and alluvial tracts, and poly crop agriculture (grams, millets, oil seeds etc) in the up lands. Watershed management also leads to increase in ground water resources in the river basins and sub basins. As this should facilitate more assured irrigation, crop diversification and selecting suitable crops according to soil and agro climatic conditions would be beneficial in getting income from a variety of crops.

The other aspects related to increased crop production/diversification is greater use of pesticides, insecticides and fertilizers. Excessive use of this chemicals leads to the development of resistant pests. This can be counteracted by laying equal importance to bio-fertilizers and manures (refer Integrated Pest Management Plan, Annex – II).

ANNEXURE V

CULTURAL PROPERTY MANAGEMENT PLAN

Introduction

Cultural properties of significance in the State of Tamil Nadu may consist of one or more of the following: Religious Centers, Cultural heritage sites, Archaeological monuments, Sacred groves etc. Cultural property could also include sites, structures, objects and natural landscapes with archaeological, pale ontological, historical, architectural, and religious or other cultural significance. There exists a strong linkage between religious cultural properties and water bodies, be it a pond, a lake, a dam, a stream or a river in India. Over the years religious and cultural values develop surrounding such cultural properties. Thus, the project should not only include provisions to protect and enhance such properties, if impacted by physical interventions, but also address the religious sentiments and values attached to any physical feature or structure of the irrigation infrastructure

Rationale for Cultural Property Management

Legal Provisions

Certain Legal provisions exist with regard to the rehabilitation policy of the State of Tamil Nadu. The Archaeological Survey of India has its own guidelines regarding the development of any activity in vicinity of the monuments etc of archaeological importance. The plan for protection/relocation has to be made along with measures to deal with chance finds during project implementation according to the State and Central laws applicable to such finds. Requisite studies, investigations and consultations with local people have to be held. This may include study of available data and maps, carrying out of additional surveys as may be required, examination of possible alternatives and determination of mitigation measures which may be protective works around the site or relocation of the object in another location in similar surroundings as per local law in force. Specific consultations have to be held with project affected groups and local NGOs based on prior information of findings to be furnished to them.

Impacts on archaeological or other cultural sites of significance are remote in the proposed project. However, the centuries-old tanks mostly have associated cultural property that may be impacted during rehabilitation. This, and other potential cultural property issues should be further studied in detail with respect to the physical investments and an appropriate cultural Property Action Plan or a framework for such a plan should be developed that will include screening, mitigating and enhancing affected sites, as well as including chance finds and procedures for civil works contracts.

World Bank Provisions

The World Bank Policy on cultural property (OP/BP/GP4.11) aims to assist in the preservation of cultural property where part of a bank -financed operation, and to avoid its elimination. If any of the cultural properties are to be relocated or constructed afresh due to proposed additional works under the TN-IAM WARM, then an inventory of the properties of cultural significance have to be made and measures suggested for their

protection, enhancement or elimination after consulting the appropriate Authorities and the Stakeholders.

Cultural Property Management

The project procedures shall follow a consultative approach for the identification of cultural properties and religious and cultural values of the people in the sub-project region. Based on the intervention measures proposed, all concerned stakeholders should be consulted to adequately address any adverse impacts on cultural properties or on access to properties to which values are attached. In case of unavoidable relocation of such properties, agreement with relevant authorities shall be undertaken for replacement.

Procedures

Procedures to be followed for identification of cultural properties and values of significance attached to irrigation schemes have been presented in the following table. A Cultural Property Expert shall be hired as per requirement for cultural property assessment in the sub-projects

Table: Procedure and Indicators for Cultural Property Management

S.No.	Stages	Procedures	Coordinator	Process & Outcome Indicators
1		Stakeholders Consultation for identification of values & possible impacts	MDPU with the help of Cultural Property Expert	Number of Consultations. List of Issues (MDPU)
		Classification of cultural properties into: <ul style="list-style-type: none"> • National Archaeological significance • State Archaeological Significance • Regional Cultural Significance • Local Cultural Significance 	MDPU with the help of Cultural Property Expert	List of Cultural Properties with associated significance (MDPU)
		Inclusion of issues and impacts into the SC1 and SC2 screening Matrices of the SEMF	MDPU with the help Cultural Property Expert	Requirement of clearances or detailed consultations for Planning Stage (MDPU & Cultural Property Expert)
2	Planning Stage	Stakeholders consultations for identification of impacts due to sub project	MDPU with the help of Cultural Property Expert	Inclusion list of agreed safeguard measures in the

		interventions, agreement over mitigation, compensation and enhancement measures		draft plan (MDPU)
		Approval of Stakeholders on the final plan proposals	MDPU with the help of Cultural Property Expert	Signed Minutes of Meeting (MDPU)
3	Implementation Stage	Implementation of compensation, relocation and impact mitigation measures before initiating physical sub-project activities	MDPU with the help of Cultural Property Expert	OK card on implementation of all listed safeguard measures (MDPU)
		Monitoring for possible impacts during construction	MDPU with the help of Cultural Property Expert	Number of grievances (MDPU & Cultural Expert)
4	Post implementation Stage	Stakeholder Consultations to ensure proper implementation of safeguard measures for preparation of ICR	MDPU with the help of Cultural Property Expert	ICR (MDPU & Cultural Expert)

Criteria for selection of cultural properties – pre planning stage

The criteria for the selection of sites suitable for enhancement have to be based on four factors:

- The historical importance
- Importance for the local people
- The religious significance
- Scope for enhancement, if any

The importance of the site for the local people as well as the historical significance has to be identified through extensive discussions with the local community and general observations of the sites and structures. The scope for enhancement includes the possibility of any further improvement, availability of space for enhancement and the likely benefits for the local community. Poor condition of some historical structures could be a constraint in selecting sites for enhancement. Such sites though having high historical values may exist in a very bad physical condition. At such places, enhancement measures have no meaning without restoring the main structure, which is beyond the scope of the enhancement works.

Categorization of Properties - Pre-planning Stage

In case of non-avoidance of negative impacts, consultation with the communities and the various stakeholders including the Governmental and Non-governmental organizations in the project area has to be conducted as an integral part of the project preparation. Further, the properties have also to be categorised into different types based on their *usage*, social importance and historical /regional / national significance.

The information gathered should include the age of the structure, importance for the local people, religious significance, historical importance, the size of the population

using it, suggestions for enhancements, willingness of people to participate, etc. The site observation also provides vital inputs in concept formulation. It provides the general information about the condition of the main structure and the surrounding, visibility of the enhancement site from the project area, the scenic beauty of the site as well as the surrounding area etc.

All relevant information like consultations, documentations, etc. of the Cultural Properties should be incorporated into the GIS Knowledge Base.

Consultation Process - Planning Stage

Community consultation has to be undertaken to make explicit the social factors that remain behind the importance of the site for the local people. Also, it may be carried out to know the associated social/historical significance, in discussions with the local community and general observations of the sites and structures. The consultation process includes the socio-cultural analysis and specifically addressed issue of how the community can get best benefit out of it. The consultations are normally held at local (community) level. The objective of the consultation is to minimize the negative impacts in the project area and their involvement in the enhancement process. The process further has to try to identify and assess all major economic and sociological characteristics of the village to enable effective planning and implementation. During the process, efforts may be made to ascertain the views and preferences of the stakeholders. Suitable Questionnaire should include formats for documenting the community consultations carried out, especially at the enhancement/relocation sites bringing out the key concerns of the stakeholders and actions/modifications taken with regard to those suggestions. Valid reasons should be placed in the documentation if certain suggestions are not incorporated in the plan proposals.

The likely impacts at different stages have to be documented along with corresponding mitigation measures and the responsible agency for undertaking the implementation of mitigation measures. The WRO shall be responsible for the monitoring of the activities that are implemented as part of any sub-project by the works contractor.

Proposed Actions / Mitigation Measures - Implementation Stage

Proposed actions refer to the positive actions to be undertaken during the implementation stage of the sub-project for the benefit of the stakeholders. The mitigation measures proposed for religious/cultural property/space shall be part of the project and will be solely finalized based on the concerns of the stakeholders.

In case of property having historical importance, wherein Archaeological Survey of India comes into picture, and procedures of the ASI along with World Bank requirements as mentioned earlier shall be complied.

Post Implementation Stage

Reconnaissance visits after a year to the completed sub-project sites by WRO for assessment and rectifications of any long-term impacts due to sub project interventions should be carried out. The department shall also review the outcome of the interventions, as documented in the previous stage of the project implementation to be aware of the accomplishments.

ANNEXURE VI

CULTURAL PROPERTY MANAGEMENT PLAN

Introduction

Cultural properties of significance in the State of Tamil Nadu may consist of one or more of the following: Religious Centers, Cultural heritage sites, Archaeological monuments, Sacred groves etc. Cultural property could also include sites, structures, objects and natural landscapes with archaeological, pale ontological, historical, architectural, and religious or other cultural significance. There exists a strong linkage between religious cultural properties and water bodies, be it a pond, a lake, a dam, a stream or a river in India. Over the years religious and cultural values develop surrounding such cultural properties. Thus, the project should not only include provisions to protect and enhance such properties, if impacted by physical interventions, but also address the religious sentiments and values attached to any physical feature or structure of the irrigation infrastructure

Rationale for Cultural Property Management

Legal Provisions

Certain Legal provisions exist with regard to the rehabilitation policy of the State of Tamil Nadu. The Archaeological Survey of India has its own guidelines regarding the development of any activity in vicinity of the monuments etc of archaeological importance. The plan for protection/relocation has to be made along with measures to deal with chance finds during project implementation according to the State and Central laws applicable to such finds. Requisite studies, investigations and consultations with local people have to be held. This may include study of available data and maps, carrying out of additional surveys as may be required, examination of possible alternatives and determination of mitigation measures which may be protective works around the site or relocation of the object in another location in similar surroundings as per local law in force. Specific consultations have to be held with project affected groups and local NGOs based on prior information of findings to be furnished to them.

Impacts on archaeological or other cultural sites of significance are remote in the proposed project. However, the centuries-old tanks mostly have associated cultural property that may be impacted during rehabilitation. This, and other potential cultural property issues should be further studied in detail with respect to the physical investments and an appropriate cultural Property Action Plan or a framework for such a plan should be developed that will include screening, mitigating and enhancing affected sites, as well as including chance finds and procedures for civil works contracts.

World Bank Provisions

The World Bank Policy on cultural property (OP/BP/GP4.11) aims to assist in the preservation of cultural property where part of a bank -financed operation, and to avoid its elimination. If any of the cultural properties are to be relocated or constructed afresh due to proposed additional works under the TN-IAM WARM, then an inventory of the properties of cultural significance have to be made and measures suggested for their

protection, enhancement or elimination after consulting the appropriate Authorities and the Stakeholders.

Cultural Property Management

The project procedures shall follow a consultative approach for the identification of cultural properties and religious and cultural values of the people in the sub-project region. Based on the intervention measures proposed, all concerned stakeholders should be consulted to adequately address any adverse impacts on cultural properties or on access to properties to which values are attached. In case of unavoidable relocation of such properties, agreement with relevant authorities shall be undertaken for replacement.

Procedures

Procedures to be followed for identification of cultural properties and values of significance attached to irrigation schemes have been presented in the following table. A Cultural Property Expert shall be hired as per requirement for cultural property assessment in the sub-projects

Table: Procedure and Indicators for Cultural Property Management

S.No.	Stages	Procedures	Coordinator	Process & Outcome Indicators
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		Inclusion of issues and impacts into the SC1 and SC2 screening Matrices of the SEMF	MDPU with the help Cultural Property Expert	Requirement of clearances or detailed consultations for Planning Stage

				(MDPU & Cultural Property Expert)
2	Planning Stage	Stakeholders consultations for identification of impacts due to sub project interventions, agreement over mitigation, compensation and enhancement measures	MDPU with the help of Cultural Property Expert	Inclusion list of agreed safeguard measures in the draft plan (MDPU)
		Approval of Stakeholders on the final plan proposals	MDPU with the help of Cultural Property Expert	Signed Minutes of Meeting (MDPU)
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Criteria for selection of cultural properties – pre planning stage

The criteria for the selection of sites suitable for enhancement have to be based on four factors:

- The historical importance
- Importance for the local people
- The religious significance
- Scope for enhancement, if any

The importance of the site for the local people as well as the historical significance has to be identified through extensive discussions with the local community

and general observations of the sites and structures. The scope for enhancement includes the possibility of any further improvement, availability of space for enhancement and the likely benefits for the local community. Poor condition of some historical structures could be a constraint in selecting sites for enhancement. Such sites though having high historical values may exist in a very bad physical condition. At such places, enhancement measures have no meaning without restoring the main structure, which is beyond the scope of the enhancement works.

Categorization of Properties - Pre-planning Stage

In case of non-avoidance of negative impacts, consultation with the communities and the various stakeholders including the Governmental and Non-governmental organizations in the project area has to be conducted as an integral part of the project preparation. Further, the properties have also to be categorised into different types based on their *usage*, social importance and historical /regional / national significance.

The information gathered should include the age of the structure, importance for the local people, religious significance, historical importance, the size of the population using it, suggestions for enhancements, willingness of people to participate, etc. The site observation also provides vital inputs in concept formulation. It provides the general information about the condition of the main structure and the surrounding, visibility of the enhancement site from the project area, the scenic beauty of the site as well as the surrounding area etc.

All relevant information like consultations, documentations, etc. of the Cultural Properties should be incorporated into the GIS Knowledge Base.

Consultation Process - Planning Stage

Community consultation has to be undertaken to make explicit the social factors that remain behind the importance of the site for the local people. Also, it may be carried out to know the associated social/historical significance, in discussions with the local community and general observations of the sites and structures. The consultation process includes the socio-cultural analysis and specifically addressed issue of how the community can get best benefit out of it. The consultations are normally held at local (community) level. The objective of the consultation is to minimize the negative impacts in the project area and their involvement in the enhancement process. The process further has to try to identify and assess all major economic and sociological characteristics of the village to enable effective planning and implementation. During the process, efforts may be made to ascertain the views and preferences of the stakeholders. Suitable Questionnaire should include formats for documenting the community consultations carried out, especially at the enhancement/relocation sites bringing out the key concerns of the stakeholders and actions/modifications taken with regard to those suggestions. Valid reasons should be placed in the documentation if certain suggestions are not incorporated in the plan proposals.

The likely impacts at different stages have to be documented along with corresponding mitigation measures and the responsible agency for undertaking the implementation of mitigation measures. The WRO shall be responsible for the monitoring of the activities that are implemented as part of any sub-project by the works contractor.

Proposed Actions / Mitigation Measures - Implementation Stage

Proposed actions refer to the positive actions to be undertaken during the implementation stage of the sub-project for the benefit of the stakeholders. The mitigation measures proposed for religious/cultural property/space shall be part of the project and will be solely finalized based on the concerns of the stakeholders.

In case of property having historical importance, wherein Archaeological Survey of India comes into picture, and procedures of the ASI along with World Bank requirements as mentioned earlier shall be complied.

Post Implementation Stage

Reconnaissance visits after a year to the completed sub-project sites by WRO for assessment and rectifications of any long-term impacts due to sub project interventions should be carried out. The department shall also review the outcome of the interventions, as documented in the previous stage of the project implementation to be aware of the accomplishments.

ANNEXURE VI

RESETTLEMENT FRAMEWORK

Introduction

The Government of Tamil Nadu through the WRO has initiated the TN-IAM WARM with an aim to pilot reforms options for enhancing the productivity of water, through crop diversification and over all well being of the people. The project would seek to restructure the Water Sector to significantly improve performance in water resources planning, allocation and management for sustained multi-sectoral use by adopting a river basin approach.

Sub-Project interventions proposed under TN-IAM WARM are limited to rehabilitation of existing structures and introduction of other software measures like extension works related to agriculture, fisheries, livestock development, etc. Since no new schemes are being proposed, resettlement issue will not crop up. However, as a safeguard measure a Resettlement Framework has been prepared to address any displacement as a result of any sub-project activity. Tamil Nadu State Policy on Rehabilitation (SPOR), 2002 also recognizes the need for a special focus on the resettlement and rehabilitation of affected people in the water sector.

Rational For Resettlement Framework

The ESA study looks into the likely resettlement impacts due to the TN-IAM WARM that follows a Programmatic approach wherein various sub projects shall be identified and taken up for improvement in different years. In the absence of precise sub project intervention measures at the present stage a Resettlement Plan or an Abbreviated Resettlement Plan (if impacts are minor or displaced persons are <200 as per WB OP 4.12) is not feasible. It is proposed that as per the Screening Exercise sub projects requiring Resettlement / Abbreviated Resettlement Plans shall be identified and such plans shall be prepared in conformity to the Resettlement Policy Framework for the present study. The Resettlement Policy Framework is an amalgamation of the SPOR and World Bank Policy on Involuntary Resettlement (OP/BP)

Based on the study, it is concluded that activities that may result in involuntary resettlement are:

1. Relocation of structures
2. Up gradation / Additional physical for improving and expanding the water storage or supply coverage
3. New physical works (if found necessary)
4. The interventions may require displacement of persons depending on the scale of the work and level of encroachments. The probable impacts include:
5. Impact / Loss of land and other immovable assets
6. Impact / Loss of livelihood systems/income opportunity (due to loss of productive land, due to impact to structure where livelihood activity is being carried out; etc.)

7. Impact / Loss of Community Property Resources (religious structures, grazing land etc.)
8. Impact / Loss of Access (between settlements, to agriculture lands, to markets etc.)

Support for Project Affected Persons-Broad Principles & Objectives of R&R framework

Both the TN State Policy on Rehabilitation 2002 and the OP/BP 4.12 in combination shall form the guidelines for the Resettlement & Rehabilitation Framework for this project. Resettlement Plans shall be prepared in accordance with this R&R Framework.

Principles (State Policy on Rehabilitation 2002)

Given below are the major Principles for Rehabilitation as laid down in the State Policy on Rehabilitation 2002.

1. Improve or at least regain the standard of living the displaced families had been enjoying prior to their displacement.
2. Special attention will be paid to rehabilitation of the displaced families belonging to scheduled castes and scheduled tribes as well as those of small and marginal farmers. There will be no discrimination between families displaced from revenue and from forest villages.
3. Compensation will be paid to land owners and lease holders within the specified time limit, as far as possible. Allotment of land to them as per their eligibility under the policies of the Government will also be considered. Allotment of land to non-lease holders will also be considered, on availability of land, as per the policy of the Government.
4. The oustees will be paid, suitable compensation for their agricultural land, residential plot and other properties. If land is allotted to them at the new place, appropriate price will be taken thereof from them.
5. Adequate civic facilities will be provided in the new settlement. As far as possible, efforts would be made to provide necessary physical and social infrastructures at the time of settlement itself.
6. In the process of rehabilitation it will be ensured that the families who were living in social groups in the affected village, are settled, as far as possible, in the same manner. If possible oustees shall be rehabilitated within the command area or near about the submergence area. Efforts will be made to ensure that the rehabilitated families get mixed up with the families already living at the new place.
7. Priority will be given to members of displaced families in jobs in the project's construction works and other works, as per their skills. They will be the first claimants for allotment of any surplus land within the command area of the

ongoing projects. In view of their number, reservation of land for them may also be considered. A certain percent will be set aside for allotment / distribution of shops in the township developed for the project area.

8. A grant scheme will be chalked out for the rehabilitation of agricultural labourers and non-agricultural families at the new place, to help them start self-employment. After completion of an irrigation project, the work of fishing and its sale will be given to cooperative societies of the oustees, as far as possible.
9. The work of land acquisition and rehabilitation will go side by side to minimize the inconvenience to the oustees. Land acquisition will be done phase-wise and first those areas will be acquired that are needed the first. Land more than necessary should not be acquired in any case.
10. In case any building etc remains unaffected after completion of the irrigation project, these can be used for community purposes for the new settlements.
11. Availability of food grains will be ensured at both old and new places right from the time the process of re-settlement starts.

Procedure for Preparing Resettlement Plan

Resettlement Plan Process

Planning for Project Affected Persons (PAPs) should be initiated in the Pre-Planning stage through regular consultations with the affected persons. Voluntary relocation should be encouraged to the extent possible, as most of the relocation shall pertain to encroachers. If the likely impacts are more the Resettlement Plan should be prepared for the project. The activities that will guide the preparation of such a Resettlement Plan are presented in table below:

Table: Procedure & Indicators for Resettlement

Sub project stage	Procedure	Coordinator	Process & Outcome Indicators (Monitoring Agency)
Pre-Planning	Identify locations in the sub-project that might lead to displacement of people affecting either private lands, encroached government lands, structures or assets linked to livelihood	MDPU helped by Resettlement Expert	List of issues that trigger Resettlement Plan (Resettlement Expert)
	Stretches where land acquisition is likely to be transferred on to the land revenue maps and alternatives sought to minimize acquisition	MDPU helped by Resettlement Expert	Maps showing land acquisition locations (MDPU)
	Consultations with the affected communities to arrive at agreeable solutions and encourage voluntary eviction from encroached areas	MDPU helped by Resettlement Expert	Video records, Photographs, Signed minutes of meeting (MDPU Resettlement Expert)
	Revision of sub-project intervention activities incorporating the outcomes of consultations	MDPU helped by Resettlement Expert	List of modified sub-project activities (MDPU Resettlement Expert)
	Inclusion of issues and unavoidable impacts identified into the SC1 and SC2 screening Matrices of the SEMF.	MDPU helped by Resettlement Expert	Requirement of Resettlement Plan (MDPU, Resettlement Expert)
Planning	Super imposition of Total Station Drawings of Irrigation Schemes on Revenue Maps.	MDPU helped by Resettlement Expert	List of tribal villages on sub-project map (MDPU, Resettlement Expert)
	Identification / location project interventions on the sub-project drawings and demarcating the area that would be required for implementing the interventions.	MDPU helped by Resettlement Expert	List of tribal villages on sub-project map (MDPU Resettlement Expert)
	Identification of the plots to enlist the project-affected families.	MDPU helped by Resettlement Expert	Maps showing land acquisition locations (MDPU,

			Resettlement Expert)
	Baseline survey that consists of 100% census survey of the affected families and the types of loss shall be undertaken. The day of such survey shall be treated as the 'cut off' date.	MDPU helped by Resettlement Expert	Final List of PAPs (MDPU, Resettlement Expert)
	Socio economic survey consisting of 20% sample of total affected families to establish the socio-economic status of the families affected.	MDPU helped by Resettlement Expert	List of key issues (MDPU, Resettlement Expert)
	Formulating compensation and assistances that need to be provided to compensate the loss the affected families	MDPU helped by Resettlement Expert	Budget for compensation & assistance by type and numbers (MDPU, Resettlement Expert)
	Preparation of the Land Acquisition Plan and Schedule required as per the Land Acquisition Act.	MDPU helped by Resettlement Expert	Number of households notified (MDPU, Resettlement Expert)
Implementation	Disbursement of compensation and Assistance as per the Rehabilitation Plan/Framework	MDPU helped by Resettlement Expert	Number of households compensated & assisted (MDPU, Resettlement Expert)
	Preference for jobs in the project as per RP	MDPU helped by Resettlement Expert	Number of persons offered jobs MDPU, Resettlement Expert)
Sub project stages	Procedure	Coordinator	Process & Outcome Indicators (Monitoring Agency)
	Training on agriculture and allied activities as a part of TN-IAM WARM	MDPU helped by Resettlement Expert	Number of persons trained (MDPU, Resettlement Expert)
	Implementation of safeguards measures as per Resettlement Plan proposals	MDPU helped by Resettlement Expert	OK card of implemented measures (MDPU, Resettlement

			Expert)
Post Implementation	Evaluation of the success of programs & safeguard measures undertaken & Follow up activities based on lessons learnt	MDPU helped by Resettlement Expert	See Table 9.2

The following table lists the Impact Indicators to be monitored in the Planning (through Socio-economic surveys) and Post Implementation Stages of the sub-project cycle to monitor and evaluate the impacts of the project.

Table: Impact Indicators for evaluation of PAP's

Item	Impact Indicators	Frequency	Responsible Agency
Economic Conditions	Income Project related & Independent means but assisted by the project Housing Changes in quality over a period of time. Changes in occupation Skill portfolio Migration profile	Planning Stage Post Implementation Stage	Independent agency/Internal monitoring by MDPU
Social Conditions	Verification of cases of voluntary donation of land, Representation in Community based institutions, Indicators of participation Empowerment, School enrolment Health and morbidity Household infrastructure, electricity, potable water, living space etc.	Planning Stage Post Implementation Stage	Independent agency/Internal monitoring by MDPU

Additional Details Related To Resettlement Plan

Resettlement Plan Contents

In accordance with the Social and Environmental Management Framework prepared to integrate Environmental and Social Safeguard measures in the main project, all sub projects should be screened for their likely adverse impacts, in the Pre-Planning Stage. If the issues related to resettlement are triggered, a Resettlement Plan or an Abbreviated Resettlement Plan has to be prepared for the concerned sub project. Such a plan should be prepared at the Planning and Design Stage of the project preparation, wherein physical intervention measures shall be planned and designed.

The contents of the Resettlement Plan to be prepared for individual sub projects consistent to the Resettlement Framework are as follows:

- Baseline census and socio-economic survey information
- Specific compensation rates and standards
- Policy entitlements related to any additional impacts identified through the census or survey
- Description of resettlement sites and programs for improvement or restoration of livelihoods and standards of living
- Implementation schedule for resettlement activities
- Detailed cost estimate

Approval of Resettlement Plan

The following Committees as per the scale of Resettlement (Major or Minor) may review and approve the Resettlement Plan.

- State Level Committee (in case of Major Projects- those which necessitate transfer of 100 acre or more land due to land acquisition or for any other reason)
- District / Division Level Committees for minor projects

Likely Categories of Displaced persons

Involuntary Resettlement is remote in TN-IAM WARM given nature of project interventions that pertain to mere up gradation and modernization of existing irrigation schemes and other small physical works like improvement of ponds for fisheries development, canal and dam, hydro etc. Additional submergence in reservoirs shall only be restricted to projects where possibilities of creating additional storage exist. Thus estimated population displacement shall be limited in the present project.

The likely categories of displaced persons based on eligibility for entitlements as per the framework are given in table below:

Table: Eligibility Criteria

Sl. No.	Affected Population Category	Definition
		SPOR Definitions
1	Project Affected Person (PAP) / Project Displaced Person (PDP)	A person who has been ordinarily living in the area, which is likely to be submerged temporarily or permanently due to a project or which is required for a project, for at least one year from the date of publication of the notification Under Section 4 of the Land Acquisition Act, and has been practicing a business or occupation for a living there or has been cultivating a land for at least three years.
	Project Displaced Family (PDF)	A family comprising displaced persons as defined above includes the husband, wife and minor children and others such as window mother, widow sister, unmarried sister, unmarried daughter or aged father, depending on the head of family. Every major son/ daughter of a displaced family (who has become major on the date of notification Under Section 4 of the Land Acquisition Act, will be considered a separate family)
2	(a) Landless person / Agricultural laborer	A person who holds no agricultural land himself or a joint land with his family member or who has no other land for agriculture. Persons who work as agricultural laborers will also be placed under this category.
	(b) Small farmer	A person who owns 2 hectares un-irrigated or 1 hectare or less irrigated land.
	(c) Marginal farmer	A farmer who owns 1 hectare un-irrigated or 0.5 hectare or less irrigated land.
		Additional Definitions
3	Urban Oustees	Displaced families in urban areas (Areas identified as Urban by the Census of India, 2000)
4	Rural Oustees	Displaced families in rural areas (Areas identified as Rural by the Census of India, 2000)
5	Encroacher	A person who has trespassed into Government/ private/ community land to which he/ she is not entitled to
6	Squatters	Person who has unauthorized by settled on the land or building for shelter or livelihood
7	Below Poverty Line (BPL)	The subsistence level of income is called the Poverty line. BPL is a sum fixed by the Planning Commission, Government of India and families that have an income below this sum fall within the vulnerable or poor or disadvantaged class

8	Vulnerable Persons / Groups	All category of people who are socially distressed or economically backward fall under this group. They may include, but not limited to the following: People living Below Poverty Line and or are earning 25% above the poverty line Members of the Schedule Caste/ Tribe community/ Other Backward Caste Women headed households Orphans and destitute Disabled and aged Land less person
9	Title holder	This includes the persons who can establish their usufruct rights of the property they claim to be their own. Cut off for titleholder is the date of issuing notice under section 4(1) of the Land Acquisition Act (Amended) of 1984.
10	Non-title holder	Any person unable to establish his/her right to the property he/she is occupying without a legitimate evidence for being the owner is called a non-title holder. Cut off Date for Non titleholder refers to the date of Census Survey which should be completed 2 years prior to the section 4 (1) notice under the L A Act.

The present policy framework is a combination of the State Policy on Rehabilitation, 2002 and the World Bank Policies on Involuntary Resettlement, OP/BP 4.12. The State Policy on Rehabilitation, 2002 is a model policy for the state, provisions of which are minimum and mandatory in the respective policies of different departments. The SPOR provisions are similar in spirit to the WB Policies though, at places, certain provisions and entitlements are not explicitly spelt out. The Summary Entitlement Framework adopted for the TN-IAM WARM is given in the following table. Any other unforeseen impacts shall be documented and mitigated based on the principles agreed upon in this policy framework.

Table: Summary Entitlement Framework

Category of Impacts	Impacts and assistance criteria	Entitlement as per SPOR				Additional Entitlements conforming to WB Policies			
		Titleholders		Non Titleholders		Titleholders		Non Titleholders	
		V*	NV*	V	NV	V	NV	V	NV
LAND									
Loss of Agricultural Land	Compensation for land at full replacement cost, free of fees or other charges	Yes	Yes	Yes (If revenue or forest land occupied for min. 3 years from date of project sanction)	Yes (If revenue or forest land occupied for min. 3 years from date of project sanction)				
Agricultural Land	Land based resettlement options (if >25% and subject to availability)	Yes	Yes	No	No				
Loss of Residential Land (Rural / Urban)	Alternative Residential Plot	Yes	Yes	No	No				
Loss of Urban Land	Compensation for land at full replacement cost, free of fees or other charges	Yes	Yes	No	No				
OTHER IMMOVABLE ASSETS									
Loss of Structures	Replacement or compensation for structures and other non-land assets	Yes	Yes	Yes	Yes				
Loss of	Compensation					Yes	Yes	No	No

trees	for perennial crops and trees, calculating as annual net product value multiplied by number of years required for new crop to start producing								
Loss of crops	Advance notice to harvest non-perennial crops, or compensation for lost standing crop					Yes	Yes	Yes	Yes
Loss of reusable assets	Rights to salvage materials from existing structures, trees, and other assets					Yes	Yes	Yes	Yes
PHYSICAL RELOCATION									
Uncertainty of resettlement site	Consultation, counseling regarding resettlement alternatives and assistance in identifying new sites and opportunities and option of housing in resettlement sites in cases of cluster relocation	Yes	Yes	Yes	Yes				
Hardships in immediate reestablishment	Grant for accessing housing schemes, or other support to assist poor and vulnerable	Yes	Yes	Yes	No				

	tenants in reestablishing their homes								
Shifting hardships	Shifting (transportation) assistance	Yes	Yes	Yes	Yes				
LIVELIHOOD									
Hardships during Transition period	Transition Assistance – agricultural extension services, cooperatives, Employment Assurance Scheme, Insurance Scheme, etc.	Yes	Yes	Yes	Yes				
Lack of financial support during transition	Rehabilitation Grant in aid for 1 year	Yes	Yes	Yes	Yes				
Loss or diminished livelihood	Special support (financial) for additional 3 years	Yes (only landless)	No	Yes (only landless)	No				
Loss of original livelihood	Additional support mechanisms for vulnerable groups in reestablishing livelihood	Yes	No	Yes	No				
COMMUNITY RESOURCES									
Loss of Community Resources	Re-establishment or development of Community Resources like grazing lands, religious structures, etc.					Yes	Yes	Yes	Yes
ACCESS									
Loss of access to Facilities	Creation of new Civic Facilities and Transportation routes	Yes	Yes	Yes	Yes				

V* - Vulnerable

NV** - Non Vulnerable

Valuation of Assets

The Valuation of assets lost as a result of Involuntary Resettlement should be calculated on the following basis:

- Valuation of lands in private possession - possible market price will be paid to the concerning person
- Valuation for house – The amount of compensation for all other properties like house, will be equal to the expenditure that would have been incurred on restoring it to its original condition. The compensation for house will be equal to the cost of a house under any Housing Schemes
- Valuation for trees – The price of fruit bearing trees will be determined on the basis of the annual income from fruits of the tree and the value of its wood

Organizational procedures for RP Implementation

The organizational procedure for implementation of the Resettlement Plan after its approval by the concerning administrative department is as follows:

- The outline of the project along with the Resettlement Plan after its approval by the concerning administrative department will be published in local dialect for public information in the project area and will also be presented before the gram sabhas and in case of urban areas before the urban units for their information. The same system will be followed in private schemes also
- Under section – 4 of the Land Acquisition Act, the process of primary notification may be started. During this process, and otherwise, too, people and their organizations will have the right to seek information about any aspect of the project. In case it is decided to retain the information for some reason, a notification to this effect should be issued giving the reason
- The resettlement sites will be selected in consultation with the affected as well as the host communities. For this, first the potential affected persons will be properly informed about the new area and their visits to the new areas will be organized to acquaint them with the families already living there. Any action for new settlement will be taken only as per the advice of the affected as well as the host communities
- Entitled persons, their eligibility and entitlements as identified in the RP shall be verified and the Project Authorities in co-ordination with the Revenue Department should disburse their entitlements

Grievance redress mechanism

The grievance redress mechanism as detailed in the SPOR is as follows:

- In small plans, where one fourth of the concerning people, particularly members of scheduled castes and schedule tribes do not agree to the plan presented for them, the cases will be considered by district / division level committee
- Such cases of major plans, too, will be first considered by district/ division level committee and in case the matter is not resolved, then alone these will be referred to the state level committee and its decision will be final
- Disputes pertaining to any matter within the ambit of the Resettlement Framework / SPOR and its implementation, such as identification of the beneficiaries, the benefits to them etc., will be, as far as possible, resolved by the district/ division level committee
- Special land acquisition courts will be established for disposal of cases pertaining to acquisition of lands, to avoid delay in their disposal through normal judicial process

Funding through Project

All resettlement funding shall be through the main project. Separate Resettlement Plans or Abbreviated Resettlement Plans shall be prepared for each sub project during the Planning & Design Stage. Detailed Cost Estimates based on intervention measures proposed shall be prepared and approved by the State or the District / Divisional Committees. The document shall then be submitted to the Bank for its approval and subsequent release of funds.

Contingency Fund

A special fund with an initial amount of Rs.50 crores will be created to help those in distress due to displacement or related reasons that cannot be provided assistance under the general procedures. For this, a special cess will be levied on mineral, power and forest based industries and the industries with heavy investment. (*Refer Section 27 of the SPOR*). This fund can be used by the rehabilitation department, in consultation with the state level committee as a contingency measure. The Bank in the next disbursement shall replenish this additional amount.

State Requirements of Consultations

As per the State Policy on Rehabilitation, the following consultations are pre-conditions for any development work (Refer Section 14 of the SPOR):

- Gram Sabha should be consulted for acquisition of land for public purpose like construction of any project or for any other work and / or alternative use of other resources
- All economic establishments will require presenting their stand in an open forum.

The State government in such a situation shall stand for the weaker sections and to protect their interests. In case of tribal societies it will be specially seen that any step

of the State or any action of the parties concerned does not create a rift in the society.

Guidelines for Implementation and Monitoring

The general features of implementation and monitoring mechanism includes the following:

Basic responsibility of R&R for these water resources projects is vested with the WRO. This should be carried in consultation and support from the concerned line departments. The project authorities shall constitute R&R cells within the department for timely preparation and effective implementation of the R&R program.

As the whole activity under R&R is multi-disciplinary in nature, it is an absolute necessity to have effective participation, cooperation and involvement of most of the basin level and project level officials to prepare and execute suitable rehabilitation plans. In case of any grievances regarding the rehabilitation, the project affected persons shall approach the R&R Cell that will be established at the head office level of the WRO.

ANNEXURE VII

TRIBAL DEVELOPMENT STRATEGY

Introduction

Tribal communities represent a vulnerable section of the community who are prone to exploitation and marginalization in the process of development, due to low levels of literacy and awareness. They are intimately dependent on the forest for almost all-human activities. At times, these tribal population centers become central points for activities, damaging their eco-system. Fire, grazing, shifting cultivation, smuggling and poaching are such activities.

The Government of India has identified tribal populations in Trichi, South Arcot, North Arcot, Dharmapuri and Salem who requires Integrated Tribal Development Programme for their upliftment. In order to improve the economic conditions of the tribals living in the above districts, Hill Area Development Programme (HADP) and other schemes were implemented. They have helped create forest-based assets in tribal areas besides providing employment opportunities at their doorsteps.

The concentration of tribal population in various blocks varies considerably with most of the tribal area being concentrated in different pockets in the State of Tamil Nadu. The Directorate of Tribal Welfare, GoTN, have identified 36 Scheduled Tribe communities in 13 districts. Of these, 6 Tribal communities, i.e., Toda, Kota, Kurumbas, Irular, Panian and Kattunayakan have been identified as Primitive Tribal Groups.

Rationale for Tribal Development Strategy

Constitutional and Legal provisions

Several legal provisions have been provided in the Indian Constitution and legislative organs, to ensure protection and assistance to the tribal communities of the Country. The Constitution of India in its 244 (1) and (2) in part X has listed Scheduled Areas and Tribal Areas under the Fifth and Sixth Schedules envisaging special system of administration. The provisions are meant to assist tribal populations in utilizing their rights and to develop their economic, educational and social status.

The 73rd Constitutional Amendment Act, 1992 has made provisions for reservations for Vulnerable Groups such as SC, ST and women for effective participation and involvement in decentralized governance. The tribal population is given opportunity for participation through reservation at three levels of Panchayats. Panchayats (Extension to Scheduled Areas) Act (PESA), 1996 has given control of land, forests and water in the hands of tribal through Gram Sabha (Village Assembly). Land tenancy act, controls marginalization of tribal household through restriction of transfer of land from tribal to non-tribal persons.

The Applicability of PESA provisions in Tribal Areas is as follows.

- The Gram Sabha shall be involved during the identification and planning of land uptake and resettlement in view of the mandatory provisions under the act that includes:
- Approval of development plans and programmes
- Acquisition of land for development projects and rehabilitation of persons affected in consultation with Gram Sabha or Panchayat. At the planning and implementation stage it will be coordinated at state level
- Consensus for any legislation with customary laws and practices for management of resources
- Panchayat to manage water bodies
- Ownership of minor forest produce
- Prevention of alienation of land

World Bank Operational Policy, (OP 4.10)

This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects dignity, human rights, economies and cultures of indigenous peoples. For all projects that are proposed for Bank financing and affect Indigenous Peoples, the Bank requires the borrower to engage in a process of free, prior and informed consultation. Such Bank financed projects include measures to (a) avoid potentially adverse effects on the Indigenous Peoples' communities: or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender intergenerationally inclusive.

- Because of the varied and changing contexts in which indigenous peoples live and because there is no universally accepted definition of "indigenous Peoples", this policy does not define the term. Indigenous Peoples may be referred to in different countries by such terms as "indigenous ethnic minorities," "aboriginals", "hill tribes", "minority nationalities", "scheduled tribes" or "tribal groups".

For purposes of this policy, the term "Indigenous Peoples" is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- (a) Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;

- (b) Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- (c) Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- (d) An indigenous language, often different from the official language of the country or region.

A group that has lost "collective attachment to geographically distinct habitats or ancestral territories in the project area"; (paragraph 4 (b)) because of forced severance remains eligible for coverage under this policy.⁸ Ascertaining whether a particular group is considered as "Indigenous Peoples" for the purpose of this policy may require a technical judgment (see paragraph 8, OP 4.10).

In addition to the provisions under constitutional and legal provisions, several entitlements have been provided as appropriate mitigation measures. These are based on participatory approaches envisaged by the Center and State Governments involving tribal population in addressing the social issues accruing from the projects.

Socio Economic Profile of Tribals
Distribution of Tribals

Table: Tribal Population in Tamil Nadu

Sno	Name of the District	Name of the Tribal Area	Area (Sq.Km.)	Total Population of the area	Tribal Population
	Namakkal	Kolli Hills	224.85	38,449	30,665
2	Salem	Yercaud Hills	147.50	33,353	21,676
3	Salem	Kalrayan Hills	319.21	21,395	20,665
4	Salem	Arunuthumalai	29.02	11,879	6,604
5	Salem	Pachamalai	109.92	24,161	6,583
6	Tiruvannamalai	Jawadhu Hills	310.35	59,448	49,962
7	Villupuram	Kalrayan Hills	600.00	32,756	29,991
8	Dharamapuri	Sitheri Hills	188.00	29,890	14,353

9	Trichy	Pachamalai	128.83	13,397	7,894
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Source: Annual Tribal Sub-Plan, 2003 – 04, Commissionarate of Tribal Welfare, Go TN.

Out of 5.74 lakhs of Tribals, 2.78 lakhs are non-workers and the remaining 2.96 lakhs workers, 1.34 lakhs are cultivators, 0.93 lakhs are Agricultural Labourers, 0.04 lakhs are House – hold workers, 0.47 lakhs are other workers and 0.18 lakhs are Marginal workers.

Characteristics of Tribal areas

Tribal people mostly live in hills and forests. The coverage of forest varies from one area to the other, but it can be said that about half of the tribal area is covered with forests. In such a situation, any programme of economic development must rest on the use and exploitation of the forests. The terrain, which the tribal cultivate, is hilly and undulating. With the increasing pressure on land, undulating areas and steep slopes have been brought under cultivation with consequent loss of fertility and soil erosion. In addition to this, no irrigation facilities are available. Agriculture is carried out in tribal areas under these conditions and circumstances. Sparseness of population is another special feature of tribal areas. Communication facilities are scanty and difficult in tribal areas. Such a situation raises a real problem as to how the benefits of the development programmes should be extended to a majority of the tribals living in interior areas.

Even today, the social customs and way of living of the tribals remind us of their dependence on natural environment. The most distinct aspect is their community-centered way of life and their social customs (like marriages, dispute resolution or celebration of festivals). Though development in some forms has reached their settlements, it has not influenced their dependence on natural resources and occupation. They still maintain their distinct way of life with a majority of their household tasks and livelihood dependent on the existing natural resources.

The following activities represent the dependence of the tribals on the natural resources:

Livelihood: The main economic activity of the tribal population is agriculture on which they are completely dependent for their only source of income. The land is cultivated once or twice a year, depending on the terrain, soil and monsoon. Almost all the tribal populations depend on animal husbandry for their secondary source of income, if not primary.

Animal Rearing: Rearing of animals has been the oldest form of subsistence and prime activity of many of the tribal groups. It provides additional income to the tribal households. The natural forestland, wasteland and natural vegetated area have been the most easily accessible source for fodder and grass for their animals. Though there has been a shift from the nomadic life to a settled agriculture based life, the tribal population is dependent on the natural vegetation and land for animal rearing.

Minor Forest Produce: The tribal groups were chiefly engaged in hunting / gathering or in sustenance agriculture. Access to their traditional resources like forests, streams and animals has been severely restricted with the Government's measures to reserve the

forests with an intention to protect them. For the household tasks and other activities, the tribal people are dependent on the forest and its produce. Gathering of forest wood is an important activity, engaging the women folk of the tribal village. The nearby forest area provides the fuel for cooking and heating purposes.

Water: The main source of water for the tribals has been the rivers and streams along with other water bodies in proximity to the settlement. These provide water for the household and agricultural activities. In many areas, these water bodies provide food for the tribal people. In some cases, ground water extracted through tube wells also provides drinking water to them.

Irrigation: Though the agricultural activities are rain fed, other main sources of irrigation are ponds, tanks and wells. The tribal farmer depends on these sources for irrigational purposes when monsoon fails.

Grazing lands used by tribal people should not be impacted due to the project. Every single case acquisition of forestland for the project has to be studied and requisite clearances from the concerned departments have to be sought. State departments under the Forest Conservation Act will be responsible for providing the clearances in such cases. Any take over of lands belonging to other Government Departments should be carried out through the requisite clearance procedures of the concerned departments.

Support for Tribal Groups

Special measures should be undertaken for upliftment of the tribal communities residing in each sub-project area. In the Sub-projects where the tribal people form a part of the beneficiaries, steps should be undertaken to include them in all the stages of the project. Where existing schemes of the government are operational, effective linkages with the programmes shall be established to maximize project benefits to the tribes.

Tribal groups if directly affected by the project should be compensated and assisted as per the entitlement provisions laid down in the Resettlement Framework of the project. The project should endeavor to mainstream people from the tribal households residing in the sub-project area. An early consultation with such groups should be undertaken to identify measures to provide benefits of the intervention measures to tribal communities.

Special Measures for Tribal upliftment can be taken up through the following programs:

- Designing the sub-projects on a participatory framework where consultation with stakeholders at every stage remains the main focus of project activity
- Separate Focus Group Discussions for identification of opportunities for the tribes through sub-project physical and institutional interventions
- Provision of access to local resources like ponds for fisheries, grazing grounds for livestock development, minor forest produce for economic returns, handicrafts, etc.

- Inclusion mechanisms for adequate representation into Local Decision making bodies like Panchayats, WUAs, etc.

Procedure for Preparing Tribal Development Plan

Involvement of Tribal groups in problem identification and design of solutions has to be ensured through the entire cycle of sub-project interventions. Table 7.9 presents the activities to be undertaken by the implementing agency to ensure inclusion of tribal issues in the main project.

Table: Activities and Indicators for inclusion of Tribal issues

Sub project stage	Procedure	Coordinator	Process & Outcome Indicators (Monitoring Agency)
Pre planning	Identify locations of State declared Tribal pockets and villages with Tribal population above 25% through GIS database	EE, WRO helped by Information Management cell	List of tribal villages on sub-project map (Tribal Expert)
	Identification of Tribal community stakeholders at site	EE, WRO with Gram Sabhas	List of all Tribal community heads in the sub-project (Tribal Expert)
	Sensitization and consultation through PRA and Focus group discussions with Tribal groups.	EE, WRO helped by PR & Media Experts, MDPU, WRO.	No. of discussions and minutes of the meeting (Tribal Expert)
	Identification of environmental and social issues of the tribals and possible impacts as a result of the project	EE, WRO helped by the Environmental, Social & Tribal experts, WRO	Documentation of the issues (Tribal Expert)
	Inclusion of issues and impacts identified in the previous row into the SC1 and SC2 screening Matrices of the SEMF.	EE, WRO helped by the Environmental, Social & Tribal experts, WRO	Justifications for preparing, Tribal Development Plan (Tribal Expert)
Planning and Design	Joint walk through, Consultations and PRA techniques to establish existing concerns related to: <ul style="list-style-type: none"> ▪ Land availability and 	EE, WRO helped by the Environmental, Social Tribal experts, WRO & Gram Sabhas	List of Spatial & Non spatial issues (Tribal Expert)

	<p>Tenure</p> <ul style="list-style-type: none"> ▪ Access to irrigation ▪ Representation in WUA's ▪ Existing Government schemes ▪ Dependency on Minor Forest Produce (MFP) and common property resources 		
	<p>Discussions on possible intervention measures through the project, their likely impacts and safeguard measures (mitigation and monitoring) to be incorporated into the project activities.</p> <ul style="list-style-type: none"> ▪ Loss of agricultural & homestead land ▪ Loss of structure & immovable assets ▪ Loss of livelihood ▪ Loss of common property resources 	EE, WRO helped by the Environmental, Social & Tribal experts.	List of Safe guard measures (Tribal Expert)
	<p>Consultations with tribal groups on the Draft Plan & Tribal Development Plan Proposals for further suggestions.</p>	EE, WRO helped by the Environmental, Social & Tribal experts.	List of safeguard measures into the Draft Plan.
Implementation	<p>Disbursement of Compensation and Assistance as per the Rehabilitation Plan/Framework.</p> <p>Preference for jobs in the project as per RP.</p> <p>Training on agriculture and allied activities as a part of MPWSRP</p>	EE, WRO, Other line agencies helped by the State / District Level Committee & Tribal expert	Measures undertaken as per Checklist suggested in Tribal Plan (Environmental, Social & Tribal experts)
	<p>Implementation of safeguards measures as per Tribal Development Plan proposals</p>	EE, WRO helped by the Environmental, Social & Tribal experts	Measures undertaken as per Checklist suggested in Tribal Plan (Environmental, Social & Tribal experts)

Post Implementation Stage	Evaluation of the success of programs & safeguard measures undertaken	EE, WRO helped by the Environmental, Social & Tribal experts	(See Relevant Table for Impact Indicators)
	Follow up activities based on lessons learnt	EE, WRO, Other line agencies helped by the Environmental, Social & Tribal experts	List of modified Programs implemented (Tribal Expert)

The following table lists the Impact Indicators to be monitored throughout the sub-project cycle to monitor and evaluate the impacts of the project.

Table 7.10 Indicators for evaluation

Items	Impact Indicators	Frequency	Agency
Economic Conditions	Income Project related & Independent means but assisted by the project Housing Changes in quality over a period of time Food Security Changes in occupation Skill portfolio Migration profile	Planning Stage, Post Implementation Stage	Independent agency/Internal monitoring by MD
Social Conditions	Representation in Community based institutions: Indicators of participation Empowerment, School enrolment, Health and morbidity Household infrastructure: electricity, potable water, living space etc.	Planning Stage Post Implementation Stage	Independent agency/Internal monitoring by MDPU

Displacement of Tribes

Given below are some key aspects to be considered for tribal groups affected by displacement. While addressing key issues pertaining to compensation to the PAPs or group belonging to a tribal community the following are to be considered: Their socio-economic characteristics, type of land, land ownership, dependence of tribal population on such lands, tenure rights and access to various categories of lands. The following are key aspects to be addressed during the finalization of entitlement framework:

- Land has to be looked upon not only as source of livelihood but also as inevitable nexus for tribal identity.
- Special prerogative and rights of tribal communities associated with territories inhabited by them has to be considered.
- Recording of community rights on land has to be ensured.
- Failure of record of rights over land under cultivation or any other usage has to be eradicated.
- Faulty recording of chief as owner of land when he only manages community land has to be replaced by community ownership.
- Recording of actual usage of land has to be ensured.

The mitigation measures suggested for the various impacts identified during to the project should be in accordance with the various constitutional and legal provisions. These should have to be duly incorporated in preparation of entitlement framework for the PAP from tribal communities. The following part gives the options for entitlement framework for tribal population. The following are the options for entitlement framework:

- Compensation for Loss of Land
- Compensation for Loss of structures and assets
- Compensation for Loss of Livelihood
- Compensation for Loss of common property resources
- Compensation for Loss of Grazing/camping/passage/minor forest produce
- Compensation for Clearance of Encroachers / Squatters

At the project planning stage, approval of selected projects, assessment of land requirement, ascertaining land ownership, identification of affected population, tenurial rights, etc. should be undertaken and approved by the Gram Panchayat. This should be compulsory for the final selection of projects and prior to preparation of the DPR. Suitable administrative framework consistent with traditional practices to safeguard traditions and customs of tribal communities to protect the tenurial rights and access to the MFP should also be complied with. This should be as per the conferring rights of the MFP on Panchayats or Gram Sabhas considered under PESA. Grievance redress should be in conformity with that proposed in the Resettlement Plan.

Institutional Arrangements

The WRO is the main responsible agency for identification of the impacted persons belonging to the indigenous groups. The WRO is accountable in terms of incorporating the existing traditional systems of these groups for the effective

implementation of the projects. Involvement of Panchayats becomes important for incorporating and management of the impacts within the existing Joint Forest Management (JFM), approaches of rural decentralization and development. The Panchayats should also be engaged in carrying out the surveys and consultations with the tribal people.

The Gram Panchayat at the grassroots level may take care of land acquisition following PESA Act. At the District Level, an Assistant Engineer may look into aspects of land acquisition. Introduction a Social Cell within the WRO structure will strengthen it in taking care of redressing grievances and mitigating negative social impacts caused by the project, especially on indigenous peoples. The Cell should have staff fully aware of provisions of IPDP, adequate understanding on norms and customs of and respect to the indigenous peoples.

Implementation Strategy

The main guiding principle of the IPDP should be finalized to provide compensation mechanisms and measures required for the project. The Social Cell of the MDPU, WRO should appraise the plan and ensure proper implementation including grievance redressal. The MoU among all stakeholders before implementation should ensure that interests of the tribal population within the sub-project region are duly addressed.

Information pertaining to the schedule of the IPDP activities shall be provided to the community in advance, following Land Acquisition Act adopted by the State and the WRO. The rehabilitation measures shall continue during the construction stage. Some of the key aspects to be incorporated within the sub-project activities include:

- Building a knowledge base within the WRO to effectively plan for Tribal development
- Preparing a sound Monitoring and Evaluation Framework to assess the project impacts
- Training Programs for Tribals towards capacity enhancement and awareness building
- Effective implementation of the identified safeguard measures.

ANNEXURE VII

GENDER ISSUES

Introduction

Gender is one of the central determinants of differential access to, use of, and control over economically productive resources (land, labor, technology, capital, training, information). This in turn has implications on the productivity, flexibility, responsiveness and dynamism of the economy. The gender imbalance as regards access to and control of economically productive resources leads to a lower response to economic incentives than would be the case if these differentials were reduced. Women are excluded or benefited in a limited way, or some times even negatively impacted by projects. Past experiences have revealed that the magnitude of impacts of development projects is significant on women if simultaneous efforts are not undertaken to mainstream them into the project. Thus, there is an urgent need for providing social justice and welfare measures for reducing such impacts on probable project affected women.

Rationale for Gender Action Plan

Constitutional & Legal Provisions

The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. Accordingly, the Constitution not only grants equality to women but also empowers the State to adopt measures of positive discrimination in favor of women. The National Commission for Women was set up by an Act of Parliament in 1990 to safeguard the rights and legal entitlement of women and the 73rd and 74th Amendments (1993) to the Constitution of India require seats to be reserved for women in local bodies at Panchayat and Municipal levels, thereby laying a strong foundation for their participation in decision making at the local levels. The National policy for the Empowerment of Women (2001) is intended to create a positive environment for the overall development of women.

In line with the National Policy, the GoTN too has formulated a Women's Policy, which aims at ensuring visibility to women in all spheres by strengthening their role, increasing self-confidence and empowering them. The policy has identified 14 major areas and concerns and defines concrete actions to address the issues related to the empowerment of women.

Support for Gender Issues

Special measures should be undertaken for the upliftment of the women in each sub-project area. In all Sub-Projects, conscious efforts shall be made to include the following provisions:

- Provision of equal voting rights to wives of farmers entitled to vote for WUAs.

- Parallel WUA Committees (of women members only) to manage supportive agricultural activities like vermin-compost, canal management, rights to turf on canal and dam embankments, etc.
- Support to Self Help Groups engaged in dairy, food processing, etc.
- Empowering women for sustainable income generation on their own
- Creating alternative livelihoods for women has to be integrated with project formulation
- Creating facilities for financing of women entrepreneurs
- Trainings on alternative livelihoods to women
- Encourage provision of inheritance rights to women
- Social justice to oppressed women members of rural societies
- Social protection measures have to for vulnerable women of the rural societies
- Encouragement of Women’s participation in developmental process

Procedure for Preparation of Gender Action Plan

Involvement of women groups in identification of impacts and opportunities through sub-project activities shall form the basis for preparation gender sensitive sub-project activities. The procedure to be followed and Process and Outcome Indicators for constant monitoring are presented in the following table:

Table: Activities and Indicators for Inclusion of Gender Issues

Sub-Project Stage	Procedure	Process & Outcome Indicators
Pre-Planning	Identify Gender likely Issues of the project region through GIS database.	List of issues (Gender Expert, MDPU)
	Organize women stakeholders meeting to sensitize and discuss the preliminary findings	Number of consultations (Gender Expert, MDPU)
	Identify key areas of constraints that may be improved through the project such as access to Food, Water, Fuel wood, Fodder, Physical & Social Infrastructure, Decision Making Bodies, etc.	Number of consultations & signed minutes (Gender Expert, MDPU)
	Incorporate and highlight the issues in the Screening Formats SC1 & SC2	List of issues mentioned (Gender Expert, MDPU)
Planning	Joint Walkthrough (if possible), Consultations and PRA exercises with	List of issues identified on sub-project map and their

	women groups to identify possible impacts and opportunities for preparation of Sub-Project Gender Action Plan	inclusion in Sub-Project Gender Action Plan (Gender Expert, MDPU)
	Consultations for fine tuning the proposals of Sub-Project Gender Action Plan	Number of meetings & signed minutes (Gender Expert, MDPU)
Implementation	Implementation of safeguard measures and grievance redress mechanism on compensation, assistance and training, etc. of Project Affected Women Headed Households	Measures undertaken as per Checklist to be prepared under in the Sub-Project Gender Action Plan. (Gender Expert, MDPU)
Post Implementation	Implementation of Awareness Building, Training, Assistance in availing Credit facilities, etc. to create an enabling environment of equal opportunities to women	See Table 7.3 for Impact indicators

Table: Impact Indicators of Post Implementation Stage

Items	Impact Indicators	Frequency	Agency
Economic Conditions	Income Project related & Independent means but assisted by the project Housing Changes in quality over a period of time Food Security Changes in occupation Skill portfolio Migration profile Wages obtained	Planning Stage Post Implementation Stage	Independent agency/Internal monitoring by MDPU
Social Conditions	Representation in Community based institutions Indicators of participation Empowerment School enrolment Health and morbidity Household infrastructure electricity, potable water, living space, etc.	Planning Stage Post Implementation Stage	Independent agency/Internal monitoring by MDPU

Implementation Strategy

The implementation and monitoring mechanism should be designed to look into the benefit of women stakeholders through the following measures:

- Stakeholders' consultation process has to be opted for all the stages of planning and implementation of the projects under consideration where women as an important stakeholder group should be consulted for finalizing strategies for their welfare.

- All the strategies related to gender development actions for the water resources projects are vested with the MDPU (WRO). This should be carried out in consultation and support from the concerned line departments. The project authorities should constitute Social Cells with gender experts within the department for timely preparation and effective implementation of the gender action programmes.
- Basic responsibility of gender development actions for the water resources projects is vested with the MDPU (WRO). This should be carried out in consultation and support from the concerned line departments. The project authorities should constitute Social Cells for timely preparation and effective implementation of the gender action programmes.
- Activities under gender action programme should necessarily have effective participation, cooperation and involvement of most of the basin level and project level officials to prepare and execute suitable action plans. In case of any grievances regarding the gender action plan the project-affected women may approach the Social Cell that will be established at the basin and head office of the WRO
- It is proposed that Gender Experts be nominated at the level of CE in all the project basins.

Development of Consultative Strategies

Introduction

Purpose of consultation is to increase participation in the project, especially of those who have not been traditionally excluded an active role. Women and vulnerable persons and families have to participate more effectively. Consequently, there would be higher participation of women and decreased gender disparity with respect to access, usage and fulfillment derived from water Increased participation would also help reduce poverty. Participation would generate awareness, enhance knowledge and allow for better income generating practices. Reorganized water sector would directly impact agricultural productivity that can be optimized by participative processes.

Purpose of participation is to increase productivity of water. Insufficient availability of water is only a part of the water problem. Water productivity does not stop at storage or conservation; it extends to its effective utilization. The utilization can be made more efficient by combining efforts of all those using or managing water. The conclave is fairly encompassing and includes a number of stakeholders. These stakeholders should be consulted to improve efficiency of usage and productivity.

Target Participants

Consultations should be held at different levels, starting from the community to key programme functionaries. Intermediary level would be Members of Water Users' Associations, NGOs, and elected representatives, especially those belonging to the Panchayati Raj Institutions, among others.

Time of Consultations

Consultations should be carried out at all stages of the project life cycle.

Process of Consultations

The process of consultations should be kept very simple and largely informal. The consultations should always be a two-way process between facilitators and the constituents of the consultative groups. The facilitators and the group members should not be pitched against each other and also not for cross purposes. Consultations should be carried out in a congenial environment at a venue, which is amenable to the participants. It is important to ensure that group composition is as per the purpose of consultations. For instance, an all male group is hardly likely to throw sufficient light on gender Issues or only-women group may not be able to come up with final solutions on water usage tariff. There is a need to debate the purpose of consultation before forming the group. These pre-consultative discussions should be carried out with key-informants of the area. It is important to familiarize with the group before the consultations. Usage of local language and phrases is highly recommended All group consultation facilitators must undergo training prior to initiating the process Consultations need to be recorded faithfully and analyzed without prejudices.

Forms of Consultations

There could be several forms that a consultation could take. The forms of consultations are tied to the purpose. Some possible examples are given in the following table.

Table: Consultative Type and Purpose

Consultation type	Purpose
Meetings (general , special)	Information generation or dissemination
Group discussions/Focus group discussions	To arrive at consensus or debate merits of issues in a focused manner
In – depth interviews	To prove concepts

Principles of Consultations

Consultations are norms of participatory management tools but it is essential to base project related consultations on some principles. Consultations for TN-IAM WARM was based on principles mentioned here and are proposed that these principles should serve as thumb rules for later phases of the project too.

- Water has infinite value (but finite potential/usage?)
- Women/Gender

- Poverty

Phase Wise Need of Consultations

The project life cycle has been divided several phases for effective management. Briefly the need for consultations through the phases is outlined here.

Preplanning Stage

The foremost requirement of this stage is Disclosure of Project Interventions to all concerned stakeholders in the sub-project area. This phase is for identification and prioritisation of the projects. Consultations here would be largely with the community and WUA to identify needs and concerns to identify appropriate projects and assign priorities. These consultations would be more to establish demand rather than what can be provided. Some official consultations could also be carried out to provide feedback from the community and also to fix priorities.

The foremost requirement of this stage is Disclosure of Project Interventions to all concerned stakeholders in the sub-project area.

Planning and Design Stage

It is necessary to develop a stakeholders' participation plan, eventually leading to consultations at this stage would be to develop physical plan for proposed projects. Some consultations here would be carried with the community but most should be with WUA, DC and PCs. If the project is to become more participatory then it is necessary to carry out extensive consultations during this phase. The design phase would require technical inputs and thus primary consultations would be with project functionaries and design consultants. However, here also people should be a part of the consultations as the project is going to affect them. Some situation requiring extensive consultations with the people would include: preparation of Dam Safety Plan, Pest Management Plan, Cultural Property Management plan, Resettlement Policy framework. Tribal Development Strategy & Action Plan and Gender Action Plan.

The foremost requirement of this stage is to undertake a Joint Walk through with all concerned stakeholders in the sub-project area.

Implementation and Operational Stages

At the implementation phase, primary tasks would be rehabilitation of structures and strengthening of structures. There would be a need to enhance stakeholders' involvement during these processes. This phase would ensure maximized participation of all stakeholders. Consequently, at the operational stages, participation would ensure improved project performance and equitable distribution of project benefits. Regular consultations would decrease possibilities of conflicts.

Post Implementation Stage

Once the project has been implemented and peoples' demands have been factored

in, occasional consultations would provide constant feedback as a project monitoring tool. There is need for consultations as a tool of agriculture extension. Consultations would help in agricultural diversification. A community monitoring system should be developed and implemented.

Village Immersions (an overnight stay in sub- project villages) to adequately record the success and shortfalls of the project should be undertaken as a lesson learning exercise.

ANNEXURE IX

INSTITUTIONS WORKING ON WATER RELATED ISSUES IN TAMIL NADU

Roles and Responsibilities of government organizations involved in utilization / management of Water Resources in Tamil Nadu

Table: Roles and Responsibilities of Government Organizations

Agency / Department	Roles and Functions
WRO – PWD	Water Resources Organization is in charge of the water bodies, its maintenance and operation and regulation mainly on irrigation
Agricultural Engineering Department (AED)	It is responsible for Command Area on farm development activities including establishing Farmers' Organizations, Catchment (water shed) Stabilization and Soil Conservation
Tamil Nadu Water Supply and Drainage Board	It is responsible for developing and implementing programmes for drinking water supplies and drainage facilities throughout Tamil Nadu except Chennai
Electricity Board	It is responsible for developing hydroelectric and other electric power and providing it to users
Pollution Control Board	It is responsible for prevention and control of water pollution and for restoring water quality to desirable levels
Agricultural Department	It provides extension services to farmers, soil testing, input on supply of seeds, fertilizers, pesticides and agricultural research
Revenue Department	It collects levy and water charges from farmers. The Collectors coordinate closely with PWD with respect to water deliveries
Forest Department	Responsible for protection of forest and enhancing the watershed
Department of Municipal Administration	Look after supply of drinking water to several municipalities and provision of sewerage facilities. It also provides for sinking bore wells and maintenance of all systems
Rural Development Department	Responsible for some tanks having a command area of less than 100 acres, related to irrigation only
Chennai Metropolitan Water Supply and Sewerage Board	Responsible for planned development and operation and maintenance of water supply and sewerage systems for the city of Chennai. It also prepares long term plans to meet future water supply and sewerage disposal needs

Transport Department	Takes care of transport facilities, mainly road transport and other inland water transport
Industries Department	Takes care of development activity in the field of Industry and also increases the marketing facilities of the market produced
Fisheries Department	The activities involved exploration and exploitation of marine resources, inland and brackish water fish and fish production. Activities also cover preservation of fish produced, export and extension and education of fishermen community
Tourism Department	Takes care of improving tourism facilities and development of Tourist Centers
Director of Animal Husbandry	Looks after the Welfare of animals
Department of Environment	Deals with the Environmental Management issues concerning the State

List of Universities/Educational Institutions

Alagappa Chettiar College of Engineering and Technology	Madurai Kamaraj University
Anna Institute of Management, Chennai	Madurai Kamaraj University : Directorate of Distance Education
Anna University	Manonmaniam Sundaranar University
Annamalai University	National Institute of Technology, Tiruchirappalli (Formerly REC, Trichy)
Bharathiar University	Online Courses of Animal Sciences Academy
Bharathidasan Institute of Management	Periyar University
Bharathidasan University	Sarasvati Mahal Library, Thanjavur
Connemara Public Library	Stanley Medical College
Dr. MGR Medical University	Tamil Nadu Agricultural University
Gandhigram Rural Institute (Deemed University)	Tamil Nadu Dr. Ambedkar Law University
Indian Institute of Technology, Chennai (IIT, Madras)	Tamil Nadu Open University (TNOU)
Institute of Child Health and Hospital for Children	Tamil Nadu Science City
Institute of Community Medicine, Madras Medical College	Tamil Virtual University (TVU)

Institute of Mathematical Sciences, Chennai	University of Madras
Madras Medical College (MMC)	Universities in TN
Madras Institute of Development Studies	Veterinary & Animal Sciences University

List of NGOs

Thiruvallur

- | | |
|--|---|
| <p>1 Integrated Rural Community Development Society (IRCDS)
Post Box No . 7
44/11, Thanthai Periyar Road,
Rajajipuram
Pin - 602 001</p> | <p>2 Integrated Women Development Institute (IWDI)
14/57, Thiru Nagar
Villivakkam
Pin - 600 049
6280970/6190489</p> |
| <p>3 Rural Institute Of Community Education Trust
31, Mettu Street
Periya Kuppam
Thiruvallur - 602 001</p> | <p>4 Thirupani Trust Associaton
No. 13-43/440, Cholan Street
New Rajaji Puram, Periya Kuppam
Thiruvallur - 602 001
04116-64416</p> |

Vellore

- | | |
|---|---|
| <p>5 Village Education And Development Society (VEDS)
7 B Pillaiyar Kovil Street,
Sankaranpalayam,
Vellore North Arcot – 632 001
Phone No- 0416-227102</p> | <p>6 Exnora Green Cross,
1/15 Keseav Pillai Street,
I Cross, Dkm College Road,
Vellore – 632001
Phone No. 0416-2263500
Web :- www.exnora.org Email.
exnora_vellore@hotmail.com</p> |
| <p>7 Centre For Environment Friendly Technologies
8, Maligai Kandappa Chetty Street
Ambur
Pin - 635 802
04174-47962</p> | <p>8 Centre For Rural Education And Economic Development For Oppressed Mass Trust (CREEDM)
15/19, Shivsakthi Nagar
Pudupet Road, Tirupattur Post
Pin - 635 601
04179-21307</p> |

- 9** Gandhian Guild For Rural Education Employment And Nature (GREEN) Trust
9, Kangeyanellore Road
Municipal Colony, Gandhi Nagar
Pin - 632 006
0416-246838
- 10** Guru Samrat Trust (GST)
No.4, New Street
Chenguttai
Katpadi - 632 007
0416 - 242494, 244763
- 11** Integrated Human Development Society (IHDS)
No.141, Kilvadugunkuttai
Karasamangalam, Latteri, 0416 – 212301
- 12** Integrated Rural Development Society (IRDS)
No.2, Tiruppur Kumaran Street
Selavanpet
0416- 227019
- 13** Tribal Rural Urban Service Society (TRUSS)
79, S.R.P. Nagar
Karai Village And Post, Ranipet
Via
Pin - 632 404
04172-23174
- 14** Trust In The Area Of Social Activities
No. 1, Polachi Amman Koil Ii Street
Arakkonam
Pin - 631 001
04177-30150
- 15** Victory Youth Association - Vicya
No. 8/1, Kanagadurgai Amman Koil Street
Palanipet, Arakonam
Pin - 631 002
04177-24346
- 16** Women's Awareness And Rural Development (Ward)
Chinnalampakkam
Vellore
Pin - 632 113
04173 – 41507
- 17** Women's Welfare Association For Rural Development
Near Udayam Weigh Bridge,
Anna Nagar
Salem Road, Tirupattur
Pin - 635 601
- 18** Radhakrishnan Educational Fountion Trust
4/ 56 Vadokankuti Anna Nagar
Archamagalam Post, Lithari-
632202.
245354 / 245142
- 19** Neru Youth Welfare Association
Srigaravel Manikagar Street
Viruthapitu Post – 632006.
16 Tribal Rural Arabian Severe Society
79, S.R.P,Kari Post, Via
Ranipati-6032404.

Chennai

- 20** Aquaculture Foundation Of India,
Old No- 4, New No-40,
Kapaleeswarar Nagar,
Neelankarai,
Chennai – 41
URL:
www.Aquaculturefoundation.In
- 21** Eco Science Research Foundation,
98, Baaz Nagar, 3/621 East Coast Road,
Chennai- 600 041
URL: www.Erfindia.Org
- 22** Madras Naturalist Society,
No-8, Janaki Avenue,
Abirampuram,
Chennai – 600 018
URL: www.Blackbuck.Org
- 23** Worldwide Fund For Nature India
123/5, New No.297, I St Floor,
T.T.K. Road, Alwarpet,
Chennai – 600 018
Phone No-044-24997107
Email: www.ftnso@Sify.Com
- 24** Trust For Restoration Of Ecology And Environment
12, First Cross Street,
V.P.Colony,
Chennai – 600 023
Phone No – 044-24721444
- 25** Ryuan Foundation International (RYFO),
8, West Mada Street,
Srinagar Colony,
Chennai – 600 015
Phone No: 044-2351993
Email: Felixryan@Sify.Com
- 26** National Water Harvesters Network Tn Unit,
162 B, Greems Lane,
Thousand Lights,
Chennai -06
Phone No: 044-28290038
Email:
Sara2551970@Yahoo.Co.In
- 27** Madras Naturalists Society (MNS)
8, Janaki Avenue,
Abhirampuram,
Chennai – 600 015
Phone: 044-24347943
- 28** Group For Nature Preservation And Education (GNAPE)
New No.30, Block Ii
Gandhi Mandapam Road,
Kotturpuram,
Chennai – 600 085
Phone No: 044-52016406
URL: www.Gnape.Org,
- 29** Citizen, Consumer And Civic Action Group (CAG)
6, Ii Cross Street,
Karpagam Gardens,
Adayar, Chennai – 600 020
Phone No- 044-24914358
Email: Bj@Cag.Ilmas.Ernet.In

- 30** Toxics Links
8, Fourth Street,
Venkateshwara Nagar,
Adayar,
Chennai – 600 020
URL: www.Toxicslink.Org
- 31** Centre For Indian Knowledge
Systems,
30, Gandhi Mandapam Road,
Kotturpuram
Chennai – 600085
Phone No: 044- 24471085,
24475862
URL: www.cliks.org,
- 32** Madras Crocodile Bank Trust,
Post Bag No – 4,
Mamallapuram – 633 104
Phone No: 04114-272958
URL:
www.Madrascrocodilebank.Org
- 33** The Centre For Research On New
International Economic
Order, (CRENIEO), Muthukadu,
Mahabalipuram, Chennai
Email: crenieo@vsnl.net
- 34** Amm Murugappa Chettiyar
Research Centre,
Tharamani, Chennai – 600 113
Phone No. 044-22430937
URL: www.amm.org
- 35** C.P.R. Environmental Education
Centre,
No. 1 Eldams Road, Alwarpet,
Chennai – 600 018
Phone No: 044 – 24320756
URL: www.cpreec@vsnl.com
- 36** Green Peace
New No.47, 2nd Cross Street,
Ellaiyamman Colony,
Gopalapuram, Chennai –
600086
URL: www.Greenpeace.Org
- 37** Centre For Action Research On
Environment, Science And
Society - CARESS
160, Sivananda Road
Gill Nagar Ext 2, Choolaimedu
Chennai - 600 094
Phone No: 4727691, 4725870
- 38** Centre For Women's
Development And Research
5/359, Annai Indira Nagar
Okkiyampet
Thuraiyakkam,
Chennai - 600 096
Phone: 4482821,4963621
- 39** Ramanujam Foundation For
Agriculture And Human
Potential Development
8/4, I St Cross Street
Logiah Colony, Saligramam
Chennai - 600 093
- 40** M S Swaminathan Research
And Foundation
3rd Cross Street
Tharamani
Industrial Area
Chennai -600 013
Phone. No.044-
22541229,22541698,
URL: www.mssrf.org
- 41** Society For Social Forest Research
9,East Bogar Road
T.Nagar Chennai –17.
4343092.

42 Chennai Eco Club(CEC)
57,4th Street,Pathbanaba Nagar.
Adyar, Chennai – 600020.
Fax :4864095 / 4865938
Email: ushaven@vsnl.com

43 Pasumai Thaayagam
Pasumai Thaayam,
No: 9, Lathawood Anenue,
Mahalingapuram, Chennai – 34.

Kanchipuram

44 Madras Crocodile Bank Trust,
Post Bag No – 4,
Mamallapuram – 633 104
Phone No: - 04114-272958
Web: -
www.Madrascrocodilebank.org,
Email: - mcbtindia@vsnl.net

45 Humanitarian Organisation For
Rural Development
6, G.S.T. Road, 1st Floor
Madurantakam
Pin - 603 306
04115-52835,52319

46 K-Nelvoy Womens
Development Society
(KNWDS)
Mudugarai Village
New Mampakkam Post
Madurantakam Taluk - 603 306

47 Rural Education Development
Society (REDS)
1a, Brahmin Street
Old Mampakkam Post
Madurantakam Taluk - 603 306

48 The Rural Development Project
Post Bag. 3, Koman Nagar
46, Thaiyur Post
Pin - 603 103

49 ‘C Aims’
3,West Mada Street, Acharapakkam
603301.
04115-22019.

50 Rural Education And Economic
Development Society (REDS)
16,Selvavinagar Temple Street,
Mathuratham –603306.

51 Social Education Development
Society (SETS)
56,La.Endathure. Post,
Vuithramalur Via
603406.

Dharmapuri

52 Rural And Environemnt
Development Centre,
280, New Oddapatty Quarters,
Valluvar Nagar, Collectorate
Post, Dharmapuri – 636 705
Phone No – 04342-284868
EMAIL-
redcdp@rediffmail.com

53 Bommanur Society For Village
Development
Bommanur Post
Palacode Taluk
Pin - 636 805 Phone 04348 – 38288

- 54** Dharmapuri Rural Management And Advancement Society (DHARMAAS)
No.H.11 Tnhb Colony
Eranahalli Post
Palacode - 636 808
- 55** Rural And Environment Development Centre (REDC)
280, New Oddappatty Quarters
Valluvar Nagar
Pin - 636 705
- 56** Social Transformation Economic Progress Society (STEPS)
Nadupatty Village And Post
Mathur(Via)
Potchampalli Taluk - 635 203
- 57** Rural And Environmental Development Center
280,Puduoathampati Quarters
Vailvarnagar
Dharmapuri – 636705.
04342- 30868
Fax : 04342- 61240
- 58** Thehamallai Environmental Awareness Moment
5/96 Nellinagar, Pedamanarri
Dharmapuri – 636703.
04342-63573,
Fax : 04342-60459 pp
- Salem**
- 59** Social Education And Environmental Development,
101-A/10, Kalimammanpandel
St, Annathanapatty,
Salem – 636 002
- 60** Bureau Of Rural Environmental And Development Service
Thumbal Post
Attur Taluk
Pin - 636 114
- 61** Karippatty Rural Organisation for Peoples Education
A.N. Mangalam Post
Karippatty Via
Pin - 636 106
- 62** Omalur Block Women Welfare And Uplift Organisation
11/9, Telephone Exchange Road
Omalur Post
Pin - 636 455
04290-20509
- 63** Poolavari Agaraharam Mahalir Sangam
Poolavari Post
Pin - 636 010
0427-872253
- 64** Rural Education And Development Project (Read Project)
20, Opp Chitra Theatre Lane
Attur Post, Pin - 636 141
04282-42847

65 Social Education And
Environmental Development
10/4/10-Kaliamman
Pandal Street
Annathanapatty
Pin - 636 002

67 Society For Ecological
Development
Nalukkalpalam
Sakkarachesttypatty Post,
Omalur Taluk
Pin - 636 05

66 Society For Development Of The
Oppressed (Sdo)
40, Avaiyar Street
Mullaivadi, Attur Taluk - 636 141

Erode

68 Agitation Committee Air And
Water Pollution
Vellankadu Post
Thindal,
Erode – 638 009
Phone No: - 0424-76246

70 Swami Vivekananda Sevashram
(SVS)
Kanakkampalayam
Kallipatty Via
Pin - 638 505.
04285-63431

72 Sugam Gramiya Valrchi
Niruvanam
Kadampur Post- 638503
Sathiyamangalam Taluk

74 Agar Social Service Centre
109, N G O Colony
Tharapuram-638666
Phone:04258-20541

76 Rural Educational And
Environment
Development Service
Plot No 10 Sivasakathi Nagar,
Tharapuram-638657, Phone
04258-24479

69 Peoples Society For Rural Education
And Environmental
Development (PSREED)
1/24, North Street
Gobipalayam, Alukuli Post
Gobichettypalyam Taluk - 638 453
04285-54754

71 Human Integrated Life And
Learning
Kadampur Post 638503
Sathiyamangalam Taluk

73 Centre For Education And
Environmental Development
Puthovatalli Post
Sathiyamangalam Via – 638401

75 Womens Organisation In Rural
Development
442, Thiruchengodu Road
Pallipalayam, Erode-638006
Phone: 04288-40212

77 Rajendra Foundation For
Agricultural
Research And Rural Development
Kasarimangalam Post
Chitthur-638302
Phone:04256-39258

78 Environmental Production
Centre
Shikayanagar College
Erode
Phone: 0424-222271, 21348

Nilgiris

79 Save Nilgiris Society,
Nilgiri Centre,
Ootacamund,
Nilgiris – 0423-442530
EMAIL –
beejaykay@sifymail.com

80 Nilgiri Wildlife And Environment
Association ,
C/o District Forest Officer,
Nilgiris North Division,
Mount Stewart Hill,
Ootacamund – 643 001
EMAIL – lamons@vsnl.com

81 Keystone Foundation,
Kotagiri – 646 217
Phone – 04266-272277,2722977
Web : - www.keystone-
foundation.org,
Email:- sneh@keystone-
foundation.org

82 Malayaha Makkal Maruvazhvu
Manram
No:14-56, Club Road
Kotagiri
Pin - 643 217

83 Network Of Education
Environment Development
Society - NEEDS
23, Sterling Road
Bishop Town, Ooty
Pin - 643 001

84 Rural Development Society
Nallakotta, 643225
Phone: 68217

85 Village Development Centre
Gramiya Bhavan
Aruvangadu-643202
Nilgiris
96285 12800
rdocnr@giasmd01.vsnl.net.in

86 Gris Wild Life Environment
Association
District Forest Officer
Mounts Start Hill
Uthagamandalam

87 Rajendra Foundation For
Agriculture Research Rural
Development
Chettair-638302
Kesimangalam Post, Bhavani
Taluk

Namakkal

- 88** India Vision Charitable Trust,
Punjaipudhupalayam,
Koothampoondi Post,
Thiruchengode Tk,
Namakkal – 637 202
Phone No – 04288-230833
Email – nalls1@sify.com
- 89** Foundation For Health Education
And Economic Development -
HEED
30, Subramaniapuram
Mohanur
Pin - 637 015
Off: 04286-55303
Res.: 04286-55603
- 90** Human Mirror Trust
Thuraiyur Main Road
Alanganatham Village And Post
Pin - 637 061
04286-20594,21309
- 91** Mahathma Gandhi Elainger Narpani
Mandram
1a, Muniyan Shandu
Rasipuram Taluk
Pin - 637 408
04287-20895
- 92** Scientific Education And Art
Development Society
2/4, Selliyae Palayam Village
Oduvankurichi Post, Rasipuram
Taluk
Pin - 637 406
- 93** Women's Organisation For Rural
Development (Word)
Post Bag No. 1
Pandamangalam, P.Velur Taluk
Pin - 637 208
7 Meras
Poinusawmy Illam, West Kalvai
Vatapari,Kumarpaliam
- 94** Women's Village Development
Organisation (World)
Post Box No:1, Padamangalam,
637208.
04268 – 22960.
- 95** Rotary Community Caries For
Environment
32 –L –2 ,V.K.S Complex , 2nd
Mokanular Road ,
Namakal – 637002.
04286 – 26007
- 96** Womens Organisation In Rural
Development,
442, Tiruchengode Road,
Pallipalayam,
Namakal – 638 006
Phone No= 04288-240212

Ariyalur

- 97** Gandhi Gramodhaya Society
Velayuthanagar,
Jayankondam (Post)
Pin - 621 802
04331 – 50183
- 98** Rural Education And Action
Development - READ
1926, 8/58, Sakthi Vinayagar Street
Viilandai- Andimadam
Pin - 621 801
04331-42583, 42483

Nagapattinam

- 99** Nehru Social Education Centre
Ayakkaranpulam - 2
Sethi (P.O.)
Pin - 614 707
04369-74431
- 100** Tamil Nadu Dalit Educational
Development Trust
(TANDET)
Patthar Building
Manalmedu & Post, Mayiladuthurai
Taluk
Pin - 609 202
- 101** Women's Association For Rural
Development
No.39, Keelavadambokki
Street(Upstair)
Kilvelur Taluk
Kilvelur - 611 104

Coimbatore

- 102** Zoo Outreach Organisation,
79, Bharathi Colony,
Peelamedu,
Coimbatore – 0422-2573629
- 103** Annamalai Environmental Society
15, Udumalai Road,
Pollachi, Coimbatore – 642 001
Phone No- 04259-28872
Email- ksureshn@hotmail.com
- 104** Salim Ali Centre For
Ornithology And Natural
History,
Anaikatty P.O, Coimbatore –
641 108
Phone No.0422-2657102,
2657088
URL: www.saconindia.org
- 105** Siruthuli,
Iii Floor, Raheja Apartments,
Avinashi Road, Coimbatore –
641018
URL: www.siruthuli.org
- 106** Centre For Environment
Education ,
Tamil Nadu State Office,
734, Presidents Hall, Avinashi
Road,
Coimbatore – 641018
Phone: 0422-2215885
URL: www.cceindia.org
- 107** People's Education For
Development Organisation (PEDO)
188, Elango Street, A.N. Palayam
Kaniyur, Udumalaped Taluk
Coimbatore - 642 203
- 108** Rural Health and Environment
Development
Trust (RHEDT)
25, Main Vilas Street
Karamadaai, Coimbatore - 641
104
- 109** Non Conventional Energy And Rural
Development
78 A Cithi Vinagar Colony
Vadavalli
Coimbatore 641041

- 110** Nature Conservation Foundation Field, Ropeway, Valparai – 642 127
Web:- www.ncf-foundation.org
email:- podocarp@vsnl.net
- 111** Centre Of Environment Education
9 Valipalayam
2 Nd Street
Thirupur-641602
Phone 702276 Fax: 01-0421-743543
- 112** Tamil Nadu Green Centre
5/1/338 Main Road
Mettupalayam-641301
Phone 04254- 22166, 04266-72247
E-Mail: greentn@hotmail.com
- 113** Mettupalayam Wildlife Preservation Society
250, Main Road,
Metuupalayam – 641 301
- 114** Wildlife Preservation Society (WPS),
65, Velankani Temple,
Opp. Petrol Bank,
Karamadai Road,
Mettupalayam – 641 301

Karur

- 115** Inba Seva Sanga,
P.O Sevapur,
Tharangampatti,
Karur – 621 311
- 116** Gramium
38, M.B.S. Agraharam
Gopal Mahal (Near)
Kulithalai - 639 104
04323-22842,23709
- 117** Snekithi
V. Puthur,Sathiyamangalam
Post
Kulithalai Taluk
Pin - 639 120
04323-45620
- 118** Social Welfare Organisation of Rural Development (SWORD)
13/25, South Street
Mylampatty Post
Kulithalai Taluk - 621 301
04551-73490
- 119** Society for Community Organisation and Rural Education - SCORE
Kosur Post
Thogamalai Via
Pin - 621 313
04323-52482
- 120** Society For Education And Environment Development - SEED
Puthur Village And Post
Thogamalai Via
Pin - 621 313

- 121** Society For Education And Peoples Action For Development (SEPAD)
Panchayat Union Office Road
K.Paramathy
Pin - 639 111
04324 - 383388
- 122** Society For Women Action And Rural Development (SWARD)
Mahadanapuram Post
Pin - 639 106
04323-42616
- 123** Village Improvement Association (VIA)
Post Box No. 14
Kulithalai
Pin - 639 104
- 124** Village People's Education For Rural Development Association - VPERDA
16/A/2 East Mudaliyar Street
Kadambarkovil, Kulithalai
Pin - 639 104
04323-24739
- 125** Society For Community Organisation And Rural Education
Thondaman Sinam Post
Thogaimalai Via-621313
- 126** Inba Seva Sangam
Annai Genetic Garden
Savapur Post
Karur-621311
Phone: 04332- 79228, 79227, 79229

Thiruvarur

- 127** National Mother And Child Welfare Organisation
142/27, South Street
Tiruturaipoondi
Pin - 614 713
04369-20409
- 128** Pirabavathi Jeyappakash Narayanan Women Welfare And Development Association (PIRAJEWEDA)
Kudoor, Mangudi Post
Tiruvarur Taluk
Pin - 610 103
- 129** Society For Community Organisation And Rural Development
Alangottai Post
Mannargudi Taluk
Pin - 614 018
4367-70420
- 130** Jawarhalal Rural Centre For Economic Development Social Change
Mettupalayam Post-614715
Phone: 04369-32423
Thanjavur
- 131** Rural Development Federation (RDF),
1/52, South Street,
Thirunageswaram,
Thanjavur – 612 204
Phone No – 0435 -60352
- 132** Centre For Ecology And Research
538, Ranivaikkal Street,
Thanjavur – 613009

133 Centre For Ecology And
Research
No.538, Ranivaikkal Street
Pin - 613 009
04362 – 50410

134 Chackratees Educational Society
53, Attumanthai Anjalkara Street
East Gate
Pin - 613 001

135 Earth
4/108, Main Road
Thippirajapuram, Kumbakonam
Pin - 612 402

136 Guild For Integrated Development
Education (GUIDE)
158, Parvathi Nagar
Nanchikkottai Road
Nanchikkottai Post

137 Margarat Social Development
Society
1345/4, New Vanakkara Street
Manampuchavadi
Pin - 613 001

138 Rural Institute For Community
Health Trust (Rich Trust)
Post Bog No.1,
Pandanallur, Thiruvaidaimaruthur
(Tk)
Pin - 609 807
0435-50781

139 Centre For Ecology And
Research
538, Rani Vaikkal St
Thanjore-613001
Phone: 04362-21410, Fax:
40459, Email richisoft@gemini

Theni District

140 Vidiyal
Kariyappan Post,
Theni – 625 528
Phone No.04546-229215
Email.
vidiyal386@rediffmail.com

141 Thiyana Malai Trust
3/66 Devidrapuram
Keezha Vadakarai
Periyakulam-625601
Theni District

142 Society for Rural Development
and Protection Of Environment
(SRDPE),
1588, periyakulam road,
allinagaram,
Theni – 625 531
phone no- 04546-74973
email- srdpe@hotmail.com

143 Association for Needy Growth and
Environmental
Liberation - ANGEL
8-7/16a, Agraharam Street
Aundipatty
Pin - 625 512
04546-42738

- 144** Community Development Centre (C.D.C.)
Near Primary Health Centre
Devadanapatti
Pin - 625 602. 0456-35269
- 145** Kamala Nehru Mahalir Mandram
Anaaimaalaianpatti Post
Pin - 625 526
- 146** Literates Welfare Association (Law)
Main Road
Kadamalaikundu Post
Aundipatti Taluk - 625 579
04554-27324
- 147** Rural Education Environment Awareness and Development Society
5-3/5, Kumarapuram 2nd Street
Aundipatty
Pin - 625 512 04546-43948
- 148** Vidiyal (Centre For Social Interaction)
Kariyappanpatti
Rasingapuram Post
Pin - 625 58
- 149** Vinoba Rural Development Sevalaya - Vrds
Karkkayankottai
Chinnamanur Via
Pin - 625 552
- 150** **Ganthi Sava Samithi**
19 B Rathakrishnan Ricemil St
Cinnamannur-625515
- 151** Vaigai Natural Centre
V. Nee. Govt. Hr. School
Periyakulam-625601
Phone: 32968
- 152** Dhanam Trust
82 V O C Nagar
Cinnamanur-625515
Phone: 04554-47497

Madurai

- 153** Sustainable Agriculture And Environemntal Voluntary Action
43, T.P.M. Nagar,
Virattipathu,
Madurai – 625 010
Phone No- 0452-604082
- 154** Institute Of Environmental Education
M-329 Ropw Type,
Ellis Nagar,
Madurai – 625 010
- 155** Environemnt Production And Improvement Council (EPIC),
Anbu Manai, Dr. Radhakrishnan Street,
Bibikulam, Madurai – 625 002
Phone No- 0452-531545
- 156** Seva (Sustainable Agriculture and Environmental Voluntary Action)
45, T. P.M. Nagar,
Virattipathu,
Madurai – 625 010.
Phone No – 0452-2380082
Web : - www.seva-ngo.org, Email:-
numvali@sancharnet.in

- 157** Development Of Humane Action Foundation,
18, Pilayar Kovil Street, S.S. Colony,
Madurai – 625 016
Phone.No. 0452-2610794,
2610805
Web. www.dhan.org Email.
dhan@md3.vsnl.net.in
- 158** Annai Mary Foundation - AMF
A. Vethamuthu Illam
Bharathi Nagar
Pin - 625 018, Phone No- 69115
- 159** **Association For Gramarajyam and Rural Integrated**
Development - AGRID
"Sarvodaya Illam", M.P. Nagar
Vadipatti Taluk
Pin - 625 218, Phone No-04543-54343
- 160** Centre For Rural Education And Development
3-1-309, Main Road
T. Vadipatty
Pin - 625 218 , 04543-54453
- 161** Institute Of Environmental Education
M-329, Row Type
Ellis Nagar
Madurai - 625 010
0452 – 608558
- 162** Integrated Rural People Development Society
23, Jj Street
Thiruppalai Post
Pin - 625 014
- 163** Madurai Institute Of Peace Science
Gandhi Museum
Pin - 625 020
91-452-530291
- 164** National Institute Of Women Child and Rural Health Trust
1, North Street
Mudhichiyam
Pin - 625 020
0452-520821
- 165** Organisation For Rural Development - ORD
5/22, Puliagoundampatty
Karumathur Post,
Thirumangalam Taluk
Pin - 625 514
20952 Pp
- 166** People Association For Growth And Education - Page
No. 9, Sahayamatha Street
Gnanaoliviipuram
Pin - 625 016
0452-608805
- 167** People's Association For Rural Women Development Trust (PARWD)
Valayankulam (Village & Post)
Via Postal Training Centre
Pin - 625 022
0452-601713
- 168** People's Organisation For Rural Health, Education And Economic Development (PREED)
5/165, Gandhi Nagar
Kappalur Post
Pin - 625 008
04549-24365

- 169** Power Project
7-1-59, Kallar Street
Cholavandan
Pin - 625 214
04543-59236
- 170** Recard Society
Gsms Illam, 33/50a21, Ochathevar
Street
Keelapudur, Usilampatti
Pin - 625 532
04543-27409
- 171** Reform Trust
Oviya Campus
Keeripatti, Usilampatti Taluk
Pin - 625 532, Ph: 04552-41156
- 172** Rural Action for Cooperation and
Economic
Development Trust - Race Trust
Valanadu Kaikatti, Pirampatti Post
Kovilpatti Via, Manaparai Taluk
Pin - 621 305, Ph: 04332-74330
- 173** Rural Development Society
6/126, Main Road, Kalligudi
Post
Tirumangalam
Pin - 625 701
- 174** Rural Development Trust
Plot No. 3/379a, Muneeswaran
Nagar
Thiruppalai Post
Pin - 625 014, 682882
- 175** Shepherd (Society For Human
Equality People's Health
Education And Rural
Development)
97, Ayyinar Colony
Thanakkankulam Post
Pin - 625 006
0452-882438,98431-12453
- 176** Social Development And Peace
Trust - SDPT
Vellaimalaipatti,
Uthappanayakkanur Post
Usilampatti Taluk
Pin - 625 537
- 177** Society For Training, Education
And Motivation - Stream
Sadiyandi Mooper Street
Kallikudi Road, T. Kalluppatty
Pin - 625 702
- 178** Society For Women's Education
Economic Development
328-B, Pandian Nagar
Melur
Pin - 625 106, 0452 - 816294
- 179** Socio Economic And
Educational Trust - See Trust
Post Box No. 8
Pin - 625 020
0452-538509
- 180** Socio Human Resource
Development Centre
43, Nalliah Naicker Street
Alanganallur
Pin - 625 501
- 181** Voc Rural Development Centre
Katchaikatty Post
Vadipatty Taluk
Pin - 625 218
04543/54164
- 182** Women's Action For Rural
Development - Ward
12, Nellaiappan Lane
Tirumangalam
Pin - 625 706
04549-20038/21219

- 183** Women's Emancipation And Development Trust
Gandhinagar
Usilampatti (Tk)
Chellampatti - 625 566
- 184** Mother Thersa Jeen Rural Women Development Association
Selva Vinayagam Kovil St
Parasana Colony
Avinapuram
Madurai-625012
- 185** Sool Nilai Eyal Kulu
O G P M Girls Hr. Sec. School
Thallakulam
Madurai-625002
Phone 530031
- 186** Institute of Environmental Education
M 329 Row Type
Ellis Nagar
Madurai-625010
Phone: 0452-608558
- 187** Mma Pengal Munatra Sangam
8/73 P G S M Avenue
Solavanthan Main Road
Thengalpatti-625514
- 188** Rural Education and Comprehensive Activities For Rural Development
Oothadevar Vedi
Killaputhor
Uchilampatti-626532
- 189** The Govanet Centre for Development
2/43 Kottai St
Nagamalai Puthokottai
Madurai-625019
Phone 0452-85457
- 190** Sugam Social Service
A Thotiyapatti
Thi Puthupatti Post
Madurai District-655704
- 191** Sathana Vigas
Kattachananthal
Kathakinaru Oët
Madurai-625107
Phone:0452-822846
Fax 0452 531451
- 192** Sarvathiya Trust
52 Rajive Steet
Muniswara Nagar
Thirupanai-625014
- 193** Peoples Association for Rural Development
Main Road
Valayankulam
Postal Trainning Centre
Madurai-625022
- 194** Educational Trust of India
Jeeva Streer
Pethoniyapuram
Madurai-625016
Phone: 0452-605927
- 195** **Pandiyuor Ramasamy Pillai Trust**
Kurungi Street
Bharathiyar Nagar Main Road
Krishnapuram Colony
Madurai-14
Phone: 532905/46380
- 196** Youth And Rural Development Centre
24 B Kasthuribai Nagar
Malur-625101
Phone: 0452-815947

197 Good Will Social Work Centre
No.5 South Streer Extn
Singarayar Colony
Madurai-2

198 **Society for Training and Rural Reconstruction**
7-5 6 A Suthanthira Pavanam
Podinakkanpatti Road
Vadipatti-625 218

199 Volandury Social Service Organisation
Kachaikatti Post
Vadipatti-625 218

200 Society for Education Action and Environment
12 Bharathi Nagar
Sigganthar Savadi
Madurai-625018

201 Integrated Rural People Development Society
23, J J Street
Thirupavai Post
Madurai
Phone: 682429

Virudhunagar

202 Annai Dr. Muthulakshmi Reddi Rural Women's and Child Development Society
Kottaipatti
Vembakottai Post, Sivakasi
Taluk
Pin - 626 131

203 Institute For Social Awareness And Rural Development (INSARD)
13, Shanmugavel Nagar Main Road
Aruppukkottai
Pin - 626 101

204 Rose Institute Of Development Services (RIDS)
3/27, M.R. Pudur
M.Reddiapatty
Pin - 626 118
04566-84467

205 Sri Vivekananda Seva Sangam
1/1545, Pandian Nagar
Rosalpatti
Pin - 626 001
04562-365035

Ramanathapuram

206 Village Education for Action and Development Trust (VEAD)
21, P.O. Nagaram,
Via Nainarkoil,
Paramkudi Taluk,
Ramanatahpuram – 623 705

207 Bharatha Matha Seva Sangam (BHAMA)
Kottaiyour, Mandapasalai
Kamuthi Via
Pin - 626 118

208 Grama Makkal Munnetra
Maiyam
Kalloor
Tiruvadanai Taluk
Pin - 623 407
04561-379241

209 Nehru Ilaingar Mandram
4/224, St. Oriyur Road
L.K. Nagar, Thiruvadanai
Pin - 623 407
04561-54415

210 Reconstruction of Economic
Vision and Emancy Fashion of
Women
Trust
2/4 2 C3 Punmadai Road
R S Mangalam Post-623 525

211 Mayill Nature Club
No 41, Theniyursaliyr St
Vinayakar Colony
Koranad
Mailaduthurai

Tirunelveli

212 Tirunelveli Wild Life
Association,
Abcoy Gardens,
Madurai Road N.H.7
Sankaranagar – 627 357
Phone No – 0462-300113
Email – tvl-radhika@sanchar.in

213 Smart Environmental Science Cell,
Ambai Road,
Araikulam, Munnirpalam,
Tirunelveli – 627 356

214 Action Group For Rural
Organisation (AGRO)
336,S.R.R Nagar
Sethurayan Pudur Post
Tirunelveli – 627 358
Email:
agroganesan@yahoo.com

215 Samaritans
2/133, Maruthakulam And Post
Tirunelveli
Pin - 627 151
04635-56332

216 Society for Women Education
and Economic
Transformation (SWEET)
54, South Street
Perumbathu, Nanguneri
Pin - 627 108

217 Sri Manonmani Rural Development
Society
Main Road
Alangulam
Pin - 627 851
04633-70275

218 Women and Child Development
Society
26 Main Road
Nanguneri
Pin - 627 108

219 Womens' Renaissance Centre
9, Srinivasagam Nagar B Colony
V.M. Arockianathapuram, Maharaja
Nagar Post
Pin - 627 011

- 220** Arumpugal Arakattlai
H 109 Anbu Nagar
Thirunelvali-627011
Phone: 0462-584373
- 221** Rural Association for Community
Education Society
Chettiyar St
Rathapuram Post- 627111
Phone: 04637-35538
- 222** Thirunelvali Mavatta Exnora
International Mayatta Kilai
4 A Minnagar
Thenkosi- 627818
Phone: 04633-24497
- 223** Indira Ganthi Educational Youth
And Rural Development Society
1 T 3 Rd Street
N G O Colony
Mellagaram-627818
Phone: 04633-26274
- 224** Mahathama Ganthi Save
Mandram
4/69 Main Road
Vannikonangal Post
Sangaran Kovil T K-627957
Phone: 04636-86186
- 225** Ammar Rajive Ordesen Welfare
Association
3/52 Main Road
Mannuoor
Thirunelveli-627201
Phone: 0462-85105
- 226** Integrated Development
Inciavatives
And Alternatives Foundation
7 Perumal Kiol St
Krishnapuram
Kadayanullur-627759
Phone : 04633- 42026
Fax: 04366-4120

TUTICORIN

- 227** Programme For Rural Education
And Social Service
Trust (Press)
Shanmugasigamani Nagar
Koivilpatti
Pin - 628 501
- 228** Society for Education, Action and
Development (SEAD)
1, 2nd Floor, Vsr Compound
Madurai Road, Vilathikulam
Pin - 628 907
- 229** Society For Rural Development
Organisation
74/4, North Street
Pannikulam (Via Kayathar)
Pin - 628 952
04632-61738
- 230** Rural Economic Development
Society
9 Dr Edison Compuntor
Thiruchanduoor-628215
Phone: 04639-45612
Fax: 04639-45393

231 Suganthi Devathanan Marine
Research Institute
44 Katarkarai Salai
Thoothoogudi-628001
Phone: 0431-340350
Fax: 91- 461- 340550
WEB:- www.sdmri.org
EMAIL:- jkpatti@sancharnet.in

232 Chevalier Roche Society,
Derose Centre, Nehru Nagar,
Old State Bank Colony,
Thoothukudi – 628 002
WEB- www.chevaliar.org

233 Community Eco Balance
Construction Network
Post Box No: Nazareth
628617
Phone: 91-4639-77553

KANYAKUMARI

234 Young Men's Christian
Association
P.O Mullankinavilai,
Kanniyakumari – 629 157
Phone No -04652-232700
Email –
deema_smal@rediffmail.com

235 Natural Resources Development
Project
Vivekananda Puram,
Kanniyakumari – 629 702
Phone No- 04652-246296
Email –
ngc_vknapdep@sancharnet.in

236 Society for Environmental
Education and Development ,
52, F, Nanjil Nagar,
Nagercoil – 629 002
Phone No – 04652-203924

237 Conservation Of Nature Trust,
43-C, Lagrace Water Tank Road,
Nagercoil – 629 001
Phone No- 04652-23527
Email- manian@md2.vsnl.net.in

238 Vivekananda Kendra – Nardep,
Vivekanandapuram,
Kanniyakumari – 629 702
Phone:- 04562-246296
Web: - www.vkendra.org Email.
ngc_vkendra@sancharnet.in

239 Action Group For Rural
Organisation(AGRD)
1/239 Periyar Nagar
Suthumalai, Thirunelveli-627604
04362-342302
Fax: 331035
ualagam@md3.vsnl.com.in

CUDDALORE

240 Association for Integrated Rural
Welfare
2/86, North Street
C. Kotthangkudi Thopu,
Chidambaram
Pin - 608 002

241 Health Education Association For
Rural And Tribals - Heart
Annapoorna Illam
1-A, Indira Nagar, Vridhachalam
Pin - 606 001
04143-63123

- 242** Manushe
49, Kottathangarai Street
Parangipettai
Pin - 608 502
04144-53247, 23326
- 243** Swami Ramakrishna Educational
Society
Omampuliyur Village And Post
Via - Ayyangudi, Kattumannarkoil
Taluk
Pin - 608 306
- 244** Womens Education and
Economic Development Society
- WEEDS
No. 49/365,
4th North Cross Road
Mariyappa Nagar,
Chidambaram
Pin - 608 002
- 245** Pace Organization Center
Post Bag No: 54,
Sethaparam – 608001
- 246** Trust run by D.Murugaiyan
D.Murugaiyan, 3/261,
Thirumalai Illam, Madappuram,
Thiruthuraipoondi, Thiruvarur
- 247** Vairam Thelisis Education Centre
K.Vairakannu, 32, Kannuthoppu
street, Thiruthuraipoondi 614 713
- 248** Trust run by A.Ganesan
A.Ganesan, Nalangattalai,
Vishnupuram post, Iravancheri
via, Thiruvarur-609506
- 249** Thiruvalluvar Uzhavar Mandram
S.Balashanmugam, Sembangudi
post, Thiruvarur-612603

Krisnagiri

- 250** Jayabharathi educational trust
M.Theerthagiri, Thiruvanapatti
village, Uthangarai, Krishnagiri
635 304,
- 251** Trust run by K.Poongodi
K.Poongodi, 308 Nethaji road,
Pazhaiyapettai post, Krishnagiri-
635001

Sivagangai

- 252** Viva Organic farm
P.R.V. Varadharajan,
Kamaleshvari Illam, Rajendra
Prasad St., Paganeri, 630 558.

Virudhanagar

- 253** Action for Rural integration and
social education (ARISE)
A.Selvakumar, Sivalingapuram,
Mudukkankulam post
Kariyapatti via, Virudhunagar,
626 106
- 254** Rural Institute for community
Health (RICH)
P.Srinivasa raghavan,
Krishnapuram, P.Thottiankulam
(Po), Thiruchuli 626 129

- 255** Sun Bio tech,
S.Mukesh, 2/181 A North street,
Sethu Narayanapuram,
Vathira irruppu via,
Virruthunagar 626 132.
- 256** People's Organisation and Social
institution of transformation
Development
POSITIVE TRUST No.16, TNHB
Colony, Madurai road, Palayampatti
626 112
- 257** Rehoboth Agribusiness
Consultancy
R.Nakkeeran, 4/323 Thangam
Nagar, Vathirayiruppu post,
Virudunagar-626132
- 258** Trust run by
S.Ramar, 34, Perumalpatti nadar, Ist
East street, Srivilliputhur,
Virudhunagar 626 125.
- 259** JEYPEE Biotechs
R.Palaneeshwar, 25, Chinnaiah
school street, Virudunagar-
626001
- 260** VISION Trust
Vision, 44, D.M.P. Kittangi street,
Virudunagar

Namakkal

- 261** Women's organisation for Rural
Development
R.Sivakamavalli,P.O.Box
No.1. Pandamangalam
Post,P.Velur Taluk, Namakkal
District. 637 208
- 262** Radio Farmer's Association
R.Thangamani, M.A. 36. Paraiyur
Ayyampalayam, Kumarapalayam,
Trichengode, 638 183
- 263** Heals Rural Training Centre,
Opp. To Sugar Mills,
Moganaur, 637 015
- 264** Vasantham Iyarkai Velan Pannai
S. Manivannan,
3/116,Kannimarkadu,Samayasangili,
Pallipalayam, Namakkal-638008
- 265** Sustainable life trust
S.Prathapan, 19/20,
S.B.M.Compound, Semmedu
Village Post, Kolli hills,
Namakkal 637 411

Coimbatore

- 266** Imayam Social Welfare
Association
S.Jayakumar,10/35 K.Sathya
Nagar, Ganapathy, Coimbatore -
6 41 006
- 267** Positive sign foundation
8A/12. 10th. Street cross, Anna
Nagar, Peelamedu, Coimbatore 641
004

- 268** Sulabha Agriculture organisation
Sulabha Agriculture Organisation, Oorupannadinivas, Kottur, Malayandipattinam, Pollachi 642114,
- 270** Coimbatore Eco Farmers Association
CEFA, 25 Periyannan Nagar, Thadagam road, Coimbatore - 25.
- 272** Indian society for certification of organic products
ISCOP, RASI building 162/163, Ponnaiah rajapuram Coimbatore 641 001
- 269** National Agricultural Development Trust.
M.shanmugam, Lawyers Garden, Eripatti post, Pollachi 642 205.
- 271** Kalpaviruksha
Dr. B.A. Uma, Thekupalayam, Coimbatore 641 020
- 273** Green Kovai, AIM for Seva
D.S.Raman, Arsha Vidya Gurukulam Anaikatti Coimbatore-641108
- Erode**
- 274** Eden Organic Farm creators
21, Arulagam Building, Udumalai Road, Dharapuram 638 656
- 275** Sri Amman Organic Farm,
Vengiyampalayam, Pasur, Erode 638 154
- 276** Rajendra Foundation for Agrl. Research and Rural Development,
Kesarimangalam P.O, Bhavani Taluk, Erode
- 277** Pasumai Angadi,
Shop No. 65, Velayuthasami Complex, Muthur Road, Vellakovil 638 111
- 278** The Falcon Bio control (Selvi B. Vanathi)
Tamil Nadu Vermi culture Hatcheries, Reliance Tower Road, Mettankattuvalasu, Erode 638 109
- 279** Trust run by
C. Loganathan, 55, Nethaji street, Vairapalayam, Erode 638 003
- 280** Ever Agro Corporation, 122, Park Road, Vaiyapuri complex, Moolapattarai, Erode 3.
- 281** Trust run by
A.S.Kumar, 44 Mariamman koil street, Iyyampalayam, Kavunthapadi, Bhavani taluk, Erode.
- 282** P.Dhanasekaran,
Maniampalayam, Iyyampalayam post, Kavunthapadi via, Erode
- 283** Service unit for development activities in rural areas
SUDAR, 435 A, Rangasamuthram, Murthy tyres building, Upstair, Sathyamangalam 638 402

284 Trust run by
S.P. Ramalingam, Annur
Gounder Thottam, Uthandiyur
post, Sathyamangalam, Erode
638 402

286 Thalaimurai Organic farm
M.Kumar, 69, Kenchanur post,
Sathyamangalam,
Erode 638 401

288 Iyarkai Agricultural Farmers
Group
Iyarkai Agricultural Farmers
Group, 5/339, Ramapuram
Thottam, Thalavadi, Erode-
638461

Karur

289 R.N.Agro Farms
Chinnadharapuram,
Karur -639202

291 Cherur trust
E. Vellaichamy, Panikampatti,
Kulithalai taluk, Karur

Madurai

292 Kokila Hospital and Herbal
Training Centre
Dr. J.Jeyavenkatesh,
Kokila Hospital 27/1D -1,
Jaihindpuram
Ist Street,
Madurai - 625 011

294 Association for rural
development
K. Joseph Binsant, 41 D, 7/800,
Jawahar street, Melakuilkudi
road, Nagamalai pudukottai,
Madurai 625019

285 Trust run by Elanchezhian
S.Elanchezhiyan Athanikarar
thottam Uthandiyur post,
Sathyamangalam, Erode 638 402

287 Iyarkai Organic farm
M.V.Shanmugah raj
3/250 K.K.Thottam,Mangalapatti
Post, Muthur via, Erode 638105

290 Centre for Human Resource
Development Trust, (CHRD)
N. Subramanyan, CHRD Trust,
8/139 B, Kumarapalayam,
Chellandipatti post, Vellianai, Karur
639 118

293 Indian Medicine and herbal
promoters organisation
Kokila hospital and Herbal training
centre campus, 27/1D-1
Jaihindpuram
1st street,
Madurai 625 011.

295 Annai mary Foundation
Haven for positives
V.Denes Amaladevi
Vethamuthu Illam, Bharathi nagar,
Madurai-625018

296 Rural Development Trust
S.Chinnasamy,
Agro Project Coordinator,
Anaikaraipatti,
Vandari post, Peraiyur taluk,
Madurai 625 705

298 SUMAREES Trust
B.Rajagopal
66, Devarayan street,
Thirumagal Nagar,
Madurai-625009

Thiruvannamalai

299 Sugarcane grower Farmers
Welfare Association, 17/A CC
Road, Pollur 606 803.

301 Rural Development Society,
(RDS), Kanji.
M.Kannabiran, Pillaiyar koil
chetty street, Kanji village,
Thiruvannamalai 606 702.

303 Trust run by R.Krishnamoorthy
R.Krishnamoorthy, North street,
Veeranur post, Adhamangalam
post, Polur Taluk,
Thiruvannamalai

305 Voice of nature
V. Ramakrishnan, HIG 507/75,
TNHB, Tamarai Nagar,
Thiruvannamalai

307 Thiruvannamalai Taluk farmer's
Exnora
S.Natarajan, 62 A, Krishnan
street, Thiruvannamalai

Trichy

308 Community Organisation and
Rural Education (CORE)
Secretary, CORE,
28 Thuraiyur Road,
R.S.Complex,
Musiri 621 211

297 Sakthi Vermicompost unit
K.Sivaswamy
Sanampatti
Pandiarasapuram post, Madurai-
625209

300 Rural Health and Economic
Development Society (RHEDS)
Meyyur Village and Post,
Vanapuram, Thiruvannamalai 606
753.

302 Trust run by P.Dhandapani, 3/520,
Vaiyapuri chetty street,
Melsozhankuppam, Adhamangalam
via, Polur Taluk, Thiruvannamalai

304 Sai Jothi Charitable trust
Sai Jothi Charitable Trust, No. 3
Poomalai Sales Complex, Anna
Salai, Thiruvannamalai 606 601

306 Association for Rural Tribes
582/3, Bharathiyar street, Mullipet,
TNHB opposite, Thiruvannamalai-
632316

309 Association For Human Integrated
Massive Social Action (AHIMSA)
1-207 C, Sona Complex, Tiruchy
Road, Vaiyampatti 621 315.

- 310** Srimath Andavan Arts and Science College,
108, Ganapathy Nagar,
Thiruvanaikovil Trichy 5.
- 311** G.B. Food Oils private Ltd, 108,
Ganapathy Nagar, Thiruvanaikoil,
Trichy-5.
- 312** Mavalipatty Nanbargal Narpani Mandram & Youth Development Centre.
K.Jeya Thirupathi, Mavalipatty (Po) Musiri, Trichy 621 205
- 313** Bringing Integration and Rural Development
P.Ramasamy, 4/44. Nadupaty (Po),
Vaiyampattu (via), Trichy, 621 315.
- 314** Awareness and Community transformation foundation.
ACT, 144 Main road,
Kovilpatti, Manaparai taluk,
Trichy 621 305.
- 315** Sarvodhya Foundation
B. Sathya. 158/1 13th cross. Anbu Nagar, Crawford, Trichy 620 012.
- 316** PENI-'EL' Educational trust
S. Johnson, Peniel Nagar,
Angarai post, Lalgudi taluk,
Trichy 621 703
- 317** Tamil Nadu Agri Clinic
N.Rajasekaran, 14 Premier Towers,
Karur road, Trichy 620 002
- 318** Individual Development Foundation
Nangil Vedha, Room No.2, 3rd floor, N.S. Building, Opp. To Premier towers, Trichy 620 002.
- 319** Rajiv Gandhi Social Service Trust,
A.R.Velu, 58/1Kovilpatti road,Manapparai,Trichy 621 306
- 320** Integrated Rural Development Foundation
S.R. Naveen Balaji
104, Raja colony, First cross,
Cantonment, Trichy-620001

Thanjavur

- 321** KKM Bio tech
C/o. Chitra Agency, 74
Abraham Pandithar Street,
Thanjavur 613 001.
- 322** A. Veeraya Vandayar Memorial Sri Pushpam College
Sri Pushpam College,
Poondi 613 503 Thanjavur Dist.
- 323** Periyar Maniyammai College of Technology for Women
Periyar Maniyammai College.,
Vallam, 613 403, Thanjavur
- 324** MENS Service trust
S.G. Selvi, Padapannar Vayal,
Sornakadu post, Peravurani taluk,
Thanjavur 614 804
- 325** Integrated Women Development Centre
K.Murugaiyan, 135 Main road,
Ammanpettai, Vethiyapuram
post, Thanjavur 613 205
- 326** Organic farming awareness association
Thiruvankadam, Irandingattalai post,
Kumbakonam-612202

Dharmapuri

- 327** Development Education and environment protection society (DEEPS)
M. Sankar,
BDO Office Road, Pennagaram
636 810
- 329** R. Dharmalingam, Rural Development Society, 4/9 A, Agraharam st., Kadathur, Pappireddypatti 635 303.
- 331** ARIMA Service trust
V. Kirubanandham, FTC
Convenor, Mookareddi patti, A Pallipatti, Pappireddi patti taluk, Dharmapuri 636 905
- 333** Institute of Entrepreneurship Development (IED)
IED
5/1358, T.A.M.S
Colony, Elakkiampatti,
Dharmapuri-636705
- 328** Council for Integrated Development, A.Pallipatti post, Pappireddypatti Taluk, Dharmapuri 636 905.
- 330** Heritage Herbs India
1/213 A1. Aishwaryam Nest,
Vivekananda colony, Near Silk Farm, Avalapalli Road, Hosur, 635 109
- 332** Tribal Health Initiative
Dr. Lalitha Regi, Theerthamalai Post, Dharmapuri District 636 906.

Nilgiri

- 334** Centre for tribals and rural development trust, Ealamanna, Mango range,
The Nilgiris 643 220
- 336** A.M.Agro Products
A.M.Abibulla, Panthalur post,
Panthalur taluk,
Nilgiris 643 233
- 338** Bacto Agro Culture care PVT Limited
E. Radhakrishnan, Bharatha Nagar, Kolapally post, Nilgris-643253
- 335** The Earth Trust,
13/19 A6 Hema College, Bharathi Nagar, Kethi post, Nilgiris.
- 337** Jeyam Agrotech
6/440, Isaac lane,
Aruvankadu,
Nilgris-643202

Tuticorin

- 339** Kokulam Arakattalai, Jamin Kodankipatti, Kuruvarpatti post, Vilathikulam, Tuticorin dist.
- 340** Women's Education and Employment Development Society. S.Charles, Mudalur post, Tuticorin Dt. 628 702.
- 341** Centre for education social welfare and agricultural rural development
L.Rajan, S.D.A. Church street, Muthugai nagar, Nalathinpuhur, Tuticorin 628 716
- 342** Rural Agroservice and institute of Natural farming
P.Rosari, 8/74, Rajapalayam, Arockiapuram post, Tuticorin-628002
- 343** Rural Service Trust
V.Ganapathi raman, Masarpatti Nenmeni, Tuticorin 626 202
- 344** Paathai Trust
V.Kennady 1/42. South Street, Kamanayakkanpatty Thoothukkudi Dist. 628 720
- 345** Vishwa export,
5/322, E.P. Colony, Alampatti, Kovilpatti 628 501.

Theni

- 346** Agent for Organic Fertiliser and Herbal pesticide T.Tamilselvan, Vinobaji nagar, Karuppasamy Koil street, Bodi
- 347** Malar social society,
M.Shanthi 4/9 Ramugowdar street, Kamayakoundanpatti, Theni

Pudukottai

- 348** Pasumai Thangam Arakattalai, 275, North street, Pokishakaranpatti, Vaithur post, 622 203
- 349** Indian Microbial Agricultural centre, Anandha solai Pisanathur village, Kandharvakottai 613 301
- 350** Rural Development Organisation, 45, Meenakshipuram road, Arimalam post, Pudukottai 622 201
- 351** Goshakthi Arakkattalai Bharathipuram, Vaithur post Pudukkottai 622203
- 352** Rights Trust
A.Kanagavalli, 1/81, Vamban Nal Road, Kalyanipuram, Kotthakottai post, Thiruvarangulam via, Pudukkottai dist-622303

Dindigul

- 353** Trust run by M.Jayaseelan. Sengulam post, Natham taluk, Dindigul
- 355** Village Welfare trust, 5/199, Teachers Quarters, NGO Colony, Dindugal 624 005,
- 357** Rural organization for social education trust. M.Palaniammala, West Street, Old Batlagundu, Dindigal Dist. 624 202
- 359** Child Trust Chandra Saravanan, No.4-12-2 Arunaslapuram, Dindigul Road, Batlagundu, 624 202
- 361** Jaya Bharath Agro Agencies S. Kandasamy, 246/9 B2 Balu complex, Gandhi Market, Ottanchatram 624 619
- 363** Rural social Education & Welfare Centre C.R.Tamilvanan 5/166 St.Marys Teachers Colony, N.G.O.Colony Post, Dindigal 624 005
- 365** Rural Integrated Development Organisation RIDO, 9-3-56, North street, Sithayankottai-624708
- 354** Trust run by K. Subrarayan, Chellakuttiyur, Kovilur post, Vedasanthur taluk 624706
- 356** Serene Secular Social Service Society, S. James Victor, South Street, Kosavapatti post, Sanarpatti via Dindugal 624 304
- 358** Sirumalai Evergreen Multipurpose community Development society G.F.Viswasam, 7-8, Little Flower Home, A.Vellodu, 624 307
- 360** The Health Wealth Social Service trust 17/3 /5 Aarthi Theatre road, YMR Patti. Dindigul 624 005
- 362** RELIEF Trust 23 NGO Colony, Dindigul 624 005
- 364** Peace Trust, Thasaripatti, Kuttam post, Vedasanthur 624 711
- 366** Peoples Welfare Trust T.Perumal 69, East car street Dindigul-624001
- Chennai**
- 367** Medi herbal nature and food products, 41/31, Manickam Nagar, Ajax, Thiruvotriyur, Chennai 600 019.
- 369** Service civil International 193/8 Asiad Colony, Anna Nagar West Exten, Chennai 600 101
- 368** Bio track technology pvt. Ltd. 32, Ist floor, C 60, Anna Nagar Plaza, Iind Avenue, Anna Nagar, Chennai 600 040.
- 370** Bharat Krishak Samaj 37, Lake view Road, Adambakkam, Chennai-600088

- 371** Madras social service society,
Kolping tower, IInd floor, 329,
T.T.K road, Alwarpet,
Chennai-18
- 372** EVERGREENS Agency for Natural
Resources
N.K. Shanmugam, 36, 18 th Avenue
Ashok Nagar, Chennai- 6000083
- 373** Chinu Exports
Bio Products Division
26/636 27th.St.Korattur
Chennai.80

Kanyakumari

- 374** Green mark Agro inputs
Ltd.,No.3, Ist floor, Lakshmi
Complex, Aralvoimozhi,
Kanyakumari
- 375** Green land Organic manure,
Bersil & Co., 78, New Assist
building Muthamil Street,
Nagercoil 1
- 376** Trust run by
T. Glori bai, Kakavilaiparambu,
Moovatrumugam post,
Kanyakumari 629 177
- 377** Jayam united service trust,
13/15 A, Krishna Illam, Thamburan
Koil street, Vadakur,
Thovalai 629 302
- 378** Kumari Eco-Friendly Farming
Services (P) Ltd.,
G.C.Prateep, Kumari Eco
Friendly Farming Services (P)
Ltd., Chankai, Kanjiracode
Martandam 629 155
- 379** TSUNAMI Trust
A.Dimon Arul
Kodimunai post, Colachel via,
Kanyakumari-629251
- 380** Rural Uplift Centre
S.Chrishtopher
Theepam Dhumpali Iranipuram
Kanyakumari 629197
- 381** Victory Organic farm
Dr.C.Thirumaranganathan
A.155, N.G.O Colony
Kottar post
Kanyakumari-629002

Cuddalore

- 382** Centre for Agricultural
awareness and rural development
(CAARD)
CAARD,
S. Bharathi Raja,M.Sc.(Ag),
CAARD, Vilathur,
Thirupaniyapuram,
Melavanniyur post, Cuddalore
608 302.
- 383** EID Parry Ltd.,
Nellikuppam Sugarcane factory,
Cuddalore

- 384** Indo European Institute for Natural Medicine
Indo European Institute for Natural Medicine,
No. 5, Bharathithasan
Street, Manjakuppam, Cuddalore
607 001.
- 385** V.V.V Club
Nabard, district dev. Office, 223,
nethaji road, manjakuppam,
cuddalore
- 386** Basarass Biocon(India)
PVT.Limited
Basarass Biocon LTD
3/320, MainRoad, Eraiyur,
Pennadam, Cuddalore-606111
- 387** RA Agro Traders
JP Rajasekar, 7 first cross, Friends
Nagar, Opp. To Employment Office,
Cuddalore 607 001
- 388** Mega Agricultural Service
Trust, 240 East street,
Karmangudi post,
Cuddalore 606 110
- 389** Biodynamic trust
V.R. Raaja Murugan
Biodynamic Association, 19, south
street, Vridachalam, Cuddalore-
606110
- 390** Biodynamic trust
A.K.V.Raja Inthren,
Biodynamic Association, 19,
South street, Vridachalam,
Cuddalore-606110
- Salem**
- 391** Trust run by
R.Sivam, Virudhampatti P.O.
Mecheri via, Mettur taluk,
Salem
- 392** Mettur Nature Society, 83 A, Pudu
Colony, Karumalaikudal,
Metturdam, 636 402
- 393** Green Star Agri.consultancy
K.Shanmugavel, B.Sc(Ag),
Founder & Director, Green Star
Agi consultancy, Muthampatti,
Tholasampatti(via), Mettur (Tk)
Salem, 636 503
- 394** Rural Education and Development
Project
READ, 37 A Avvaiyar street,
Mullaivadi, Athur post, Salem
636141.
- 395** SAMRAT,
172/1, Sukkampatti, Salem-
636122
- 396** Jai Agro Service,
Opposite to Ponni Co- peratives,
Middle Street, Thammampatty,
Salem-636113

- 397** Rural awareness of Environment and social organization
RAESO, 77-5/2-39-C9, 4th cross, Shivayanagar, Salem 636 004
- 399** Omalur block women welfare uplift organization
K.Saroja, 11/9, Telephone exchange road, Omalur post, Salem-636455
- 398** Trust run by Manigandan,1/1, M.Perumapalayam, Salem-636111
- 400** Trust run by C.Nallathambi,4/11, New street, Kadaiyampatti post, Omalur taluk, Salem-636351
- Kancheepuram**
- 401** Rasi Agricultural Consultancy Centre, 154/2, GST Road, (Rattinakinaru) Chengalpet 1
- 402** Foundation for organic agriculture, 348/166, Anna salai, Chengalpet 603 002.
- 403** Tamil Nadu Organic farming and Herbal farmers Association N.Dhayanidhi, 21 Devarajan street, Vedhachalam Nagar, Chengalpet, Kancheepuram
- 404** Natural Educational Environmental Agricultural Development Society. G.Gopalakrishnan, 66 B, Sengazhuneerodai Street, Kancheepuram 631 502.
- Thirunelveli**
- 405** Organic farming association St. Fathima Annai Agricultural farm
Organic farming association St. Fathima Annai Agricultural farm, South Kuniyur, Cheranmagadevi 627 426
- 406** "Ilayabharatha" (M) Guidance Centre, 1/271, Youth Club building, North St., Mannur 627 201.
- 407** Sri Parasakthi Trust, 226, LRS Palayam St., Tenkasi 627 811.
- 408** Viswa Export 5/322 EB Colony, Alampatti, Kovilpatti, 628 501
- 409** Health Trust 6-121. Esckiamman Koil St., Sanganapuram (Po), Tirunelveli, 627 114
- 410** Brindhha Agro FarmService, 18, St. Xavier's Shopping Complex, St. Johna's College Road, Palayamkottai, Tirunelveli 627 002.

411 TANWA Self Help Group
C. Ramathilagam, Shenbaga kal
Oadai street, Vasudevanallur,
Sivakiri Taluk,
Tirunelveli 627 758

412 Sri Ganga Seva Sangam
A. Ponnuvel, 49/3, Middle street,
Duraismiyapuram, Sivakiri taluk,
Tirunelveli

413 ESR Chairtable trust, 82, Sanror
North street, Chinthamani,
Puliyangudi post, Sivakiri taluk,
Nellai dist. 627 855

414 Iyarkai Velanmai Mempattu
sangam,70/2, South
street,Sanarpatty, Tirunelveli-
627201

Villupuram

415 Village Development Society.
F. Joseph, Village Development
Society Nilayam, Karunanidhi
Chettiyar Illam, Valathi Post,
Villupuram 604 208

416 Pasumai Farmers Association,
Thirukovilur Road,
Devapandalam 606 402

417 Paasumai Thamilagam, 1
Nattarmangalam, Vallam post,
Gingi, Villupuram 604 206

418 Sri Bio Natural India, KK Nagar,
Salamedu, Villupuram 605 602

419 Udayam Trust, Kakanoor Post,
Kedar Via,
Villupuram 605 402

420 Greenworld Agri Clinic,10 Town
panchayat vanigavalagam,
Salem main Road,
Chinnasalem-606201

Nagapattinam

421 Farm women discussion group
Poornima Mary kanth, Farm
Women discussion group,
PUshpavanam 614820

422 Annai Indira Social Education
centre.
1/249. Sumaykha Eazilaham,
pushpavanam, Vedaranyam (TK)
Nagapattinam Dist. 614 809

423 Trust run by V.Sadasivam
V.Sadasivam, Elumichampatty,
Kodangudy post,
Mayiladuthurai, Nagapattinam-
609314

424 K.P.T. Organic farm
K.S. Ramiyan, Konari Rajapuram,
Mailaduthurai taluk, Nagapattinam
612201

Vellore

425 Gramapura Magalir Muligai
Vivasaya Mempattu Sangam
Vadagarai ,
Minnur (P.O)-635807.

426 Velanmai Vithai Mayam.No.5,
IELC Complex, MC Road, Ambur-
635 802

- 427** SOLAI PROGRAM,
Dr. R.D.Rajan,
Christian pet village, Post,
Vellore - 632 059
- 428** Organic farming and Vermiculture
Hatcheries CAH College.R.Yusuff
Sheriff, Technical Section, CAH
College, Melvisaram.
- 429** Rajiv Gandhi Educational and
Charitable Trust.
G.Anbalagan, 63/1 Maniyakara
street, Arakonam,
631 001. Vellore District
- 430** REACH trust,
71/50 Chellaperumal street,
Sholingar 631102.
- 431** Trust run by M.Ramamoorthy
M.Ramamoorthy,
Sokkalampatti, Vettapattu post,
Nattrmpalli via, Vellore-635852
- 432** Guru Samrot Trust
V.Dakshinamurthy, No. 4, New
Street, Senguttai, Katpadi post,
Vellore 632 007
- 433** Maha Organic Inputs private
Ltd.,
M. Mahalingam, 1/367 Katpadi
Road,
Latteri, Katpadi Taluk.
Vellore 632 202.632 509.

ANNEXURE X
LIST OF OFFICIALS CONSULTED DURING THE STUDY

Sri. M.Palaniappan, Chief Engineer (PF)Retd WRO, PWD, Chennai	Sri Rajagopalan, World Bank Consultant, MDPU,Chennai
Sri Vibhu Nair, IAS Director, MDPU Chennai	Sri Muthaiah Chief Engineer,(O&M), Inter State Water Resources, PWD,WRO, Chennai-6
Er. Abrantham, Incharge Chief Engineer (PF) WRO, PWD, Chennai	Dr. K.Abrantham, Joint Chief Engineer(PF), WRO, PWD, Chennai
Dr. Paul.P.Appasamy, Professor, Madras School of Economics, Chennai	Sri.S.Janakarajan, Professor, Madras Institute of Developmental Studies, Adayar, Chennai.
Sri S. Rajasekharan Executive Engineer, WRO, PWD, Tiruvannamalai	Sri R.Goplakrishnan Executive Engineer, WRO, PWD, Kanchipuram
Sri A.P. Jaya Prakash Executive Engineer, WRO, PWD, Tindivanam	Sri V. Balasubramaniam Assistant Engineer WRO, PWD, Athur
Sri S. Sundara Murthy Assistant Executive Engineer WRO, PWD, Pudukottai	Sri R. Radhakrishnan Assistant Executive Engineer WRO, PWD, Pudukottai
Sri S. MohanRaj Assistant Executive Engineer WRO, PWD, Pudukottai	Sri S. Prabhakar Junior Engineer WRO, PWD, Pudukottai
Sri K.Gopalakrishnan Executive Engineer, WRO, PWD, Sivagangai	Sri S.Ayub Khan Assistant Executive Engineer WRO, PWD, Sivagangai
Sri Md. SalimBabu Assistant Executive Engineer WRO, PWD,	Sri V. PushpaRaj Assistant Executive Engineer WRO, PWD,

Sivagangai	Madurai
Sri P.Nandakumar Assistant Executive Engineer WRO, PWD, Madurai	Sri A.T. Narasimhan Assistant Executive Engineer WRO, PWD, Paramakudi
Sri K.S. Abdul Rashid Assistant Executive Engineer WRO, PWD, Paramakudi	Sri R.Sampath JE, WRO,PWD Paramakudi
Sri M.Chinnappan P.A. to EE WRO, PWD, Paramakudi	Executive Engineer, WRO, PWD, Madurai
Sri V.Sugumaran Assistant Engineer WRO, PWD, Madurai	Sri R.Pandy Assistant Engineer WRO, PWD, Madurai
Sri Selvaraj Assistant Engineer WRO, PWD, Madurai	Sri Rustham Ali Executive Engineer, WRO, PWD, Srivalliputtur
Sri G.Rajesh Assistant Engineer WRO, PWD, Madurai	Sri C.Chelladurai Assistant Executive Engineer WRO, PWD, Srivalliputtur
Sri C.Ayyasamy Assistant Engineer WRO, PWD, Srivalliputtur	Sri M.Gnana Sekhar Assistant Executive Engineer WRO, PWD, Srivalliputtur
Sri Rajbandra Bose Assistant Executive Engineer WRO, PWD, Srivalliputtur	Sri R.M. Subramanian Assistant Executive Engineer WRO, PWD, Perambalur
Sri K.Chandrasekharan JE,PWD, Perambalur	Sri P.S. Rajamaniakam JE,PWD, Perambalur
Sri V.Anantham Assistant Engineer WRO, PWD, Perambalur	Sri V.Sundaram Assistant Engineer WRO, PWD, Perambalur
Sri Nirmalan Christudas Assistant Executive Engineer WRO, PWD, Tirunelveli	Sri A.Subramanian Assistant Executive Engineer WRO, PWD, Tirunelveli
Sri P.Siva Pragasam Section Officer WRO, PWD, Tirunelveli	Sri P. Pugalendhi Assistant Engineer WRO, PWD, Tirunelveli

Sri Narayana Murthy Executive Engineer WRO, PWD, Nagercoil	Sri A.MohanDas Assistant Engineer WRO, PWD, Nagercoil
Sri P.Sasikumar Assistant Engineer WRO, PWD, Nagercoil	Sri M.M.Layarasan Assistant Executive Engineer WRO, PWD, Nagercoil
Sri M.Subramaniam Executive Engineer WRO, PWD, Valliyoor	Sri R.Selvarajan Assistant Engineer WRO, PWD, Valliyoor
Sri N.Ganeshan Executive Engineer WRO, PWD, Tiruvallur	Sri K.Manickachari PA to EE WRO, PWD, Tiruvallur
Sri G.Kartikeyan Assistant Engineer WRO, PWD, Tiruvallur	Sri Khaleel Ahmed Assistant Executive Engineer WRO, PWD, Tiruvallur
Sri M.Venkateswarlu Assistant Engineer, AE dept Tiruvallur	Sri Oorkhavalan Assistant Executive Engineer WRO, PWD, Srivalliputtur
Mr.John, Assistant Executive Engineer, MDPU, Chennai	Sri. Ganesan Junior Engineer,Retd Plan Formulation,WRO, PWD, Chepauk, Chennai-6.
Sri Thirumalai Deputy Chief Engineer, WRO, PWD, Chennai	Sri Mahalingam, GIS Dept, IWS Tharamani, Chennai
Sri Pasumalaithavan, Consultant, Technical Secretariat, IWS, Taramani, Chennai.	Sri.Santhanam' GIS, Consultant, Technical Secretariat, Taramani, Chennai
Sri Siva Subramaniam Assistant Executive Engineer Dam safety dept. PWD, Chennai	Ms. Seethalakshmi, Joint Coordinator,Marketing TN Women Development Corporation Chennai
Sri Subramanian Murugesan HR & Admn	Dr. Raja Ram, IAS, Director,

TN Social welfare Dept TN Pudhu vazhvu Society Chennai	Department of Rural Development, Saidapet, Chennai
Sri Gandhi System Manager,CDD, Social welfare Dept Chennai	Sri Thyagi, Additional Director, Dept. of Environment, Saidapet, Chennai
Dr. Thomson Jacob Dept. of Environment Saidapet Chennai	Dr. Vidyasagar Consultant, Dept. of Agriculture MDPU, Chennai
Sri M.SeethaRaman Dept. of Agriculture MDPU, Chennai	Ms. Mangalam Balasubramanian Coordinator, Women SHG's T.Nagar, Chennai
Ms. Mangala Agriculture Officer Dept. of Agriculture Chennai	Ms. Valarmati Agriculture Officer Dept. of Agriculture Chennai
Sri M.Kesavulu Assistant Executive Engineer MDPU, Chennai	Sri Vijay Anand Assistant Engineer WRO, PWD, Chennai
Sri Mariappan Assistant Executive Engineer MDPU, Chennai	Sri Chakravarthi Assistant Engineer WRO, PWD, Chennai
Sri Sakkarji Assistant Engineer WRO, PWD, Chennai	Ms K.Vani Assistant Engineer WRO, PWD, Chennai
Ms Vijayalakshmi Assistant Engineer WRO, PWD, Chennai	Ms. Susheela Assistant Engineer WRO, PWD, Chennai
Sri Arivelagan Assistant Engineer, ICRP dam WRO, PWD, Krishnagiri	Sri S. Ayyappan Assistant Engineer, ICRP dam WRO, PWD, Krishnagiri

Sri A.Rajendran JE, WRO, PWD Athur	Sri D. Shanthinathan JE, WRO, PWD Tindivanam
Sri N.Jayaraj JE, WRO, PWD Kanchipuram	Sri Elangovan Executive Engineer WRO, PWD, Coimbatore
Dr. SundaraRaj Rtd.Dean.Fisheries College, Tuticorin Chennai	Dr. Samuel Pal Raj Prof & HOD, Natural Resource and waste recycling dept. Madurai
Dr. Manimaran Associate Professor Fisheries Research Institute Tuticorin	Sri P. Anbazhagan IDA,Chennai
Sri M.Ramadasu IDA,Chennai	Sri.Edgar, Agricultural Engineer, Agriculture Engineering Department, Valliyoer, Chennai.
Sri.M.Mali Arasan, Assistant Executive Engineer, WRO/PWD, Nagercoil, Chennai.	

ANNEXURE X1

SCHEMATIC PRESENTATIONS

ANNEXURE X11

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