CHAPTER - IV

MACRO LEVEL VIEW OF IRRIGATION IN INDIA AND TAMIL NADU AND PROFILE OF STUDY AREA
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MACRO LEVEL VIEW OF IRRIGATION IN INDIA AND
tamil Nadu and profile of study area

4.0 IRRIGATION IN INDIA A SCENARIO

Irrigation may be defined as the artificial application of water, by human agency to assist the growth of crops. Irrigation has been practised in this part of the country from time immemorial. There are several stone edicts carrying information on the interest that the local rulers took in providing irrigation facilities to the farmers. The Grand Anicut across river Cauvery built at the mouth of the delta in the 2nd century AD is claimed to be one of the most ancient structures in the world still functioning and so many dams have been constructed.

In India agriculture contributes over 40 per cent of national income. About 70 per cent of population of India live in rural areas and about 74 per cent of the work force depend on agriculture for livelihood. Water is the single most important input for agricultural production. Provision of adequate water for crops and other uses in India is usually complicated by the paradoxes of its climate and geography. The rainfall is seasonal and often erratic in timing and geographical distribution resulting in catastrophic drought or floods.

Water requirement for irrigation is a derived demand and depends upon national objectives/goals for agriculture development which inter-alia includes food self-sufficiency at national level and optimal utilisation of land and water resources for maximizing production. Following goals are considered:

➢ To satisfy food grain demand on the assumption that the country would like to remain self-sufficient in food grain production and

➢ To maximise agriculture production with the maximum possible level of irrigation.
The demand of water has been identified, as the quantity of water required to be supplied for specific use and includes consumptive as well as necessary non-consumptive water requirements of user sector. The Central Water Commission has reassessed the country's water resources at 1008 BCM during 2050.

**Tab.No.: 4.1** The food grain including feed demand estimates under three Scenarios

<table>
<thead>
<tr>
<th>SCENARIOS</th>
<th>YEAR 2010</th>
<th>YEAR 2025</th>
<th>YEAR 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand MT</td>
<td>249</td>
<td>322</td>
<td>469</td>
</tr>
<tr>
<td>Middle Demand MT</td>
<td>265</td>
<td>349</td>
<td>539</td>
</tr>
<tr>
<td>High Demand MT</td>
<td>271</td>
<td>365</td>
<td>605</td>
</tr>
</tbody>
</table>


At national level average yields in the year 1992-1993 for all food grains under rain fed and irrigated conditions were 1.0 and 2.4 tone/ha. respectively. Therefore there is an increase of about 1 per cent and 1.5 per cent per year in the yields of rain fed and irrigated crops respectively.:

**Tab.No.: 4.2** The yield levels adopted for estimating area required under food grain production

<table>
<thead>
<tr>
<th>GRAIN PRODUCTION</th>
<th>YEAR 2010</th>
<th>YEAR 2025</th>
<th>YEAR 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfed yield T/ha.</td>
<td>1.1</td>
<td>1.25</td>
<td>1.5</td>
</tr>
<tr>
<td>Irrigated T/ha.</td>
<td>3.0</td>
<td>3.4</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Table No. 4.3 Estimates of water requirement for irrigation based on foregone considerations for satisfying food grain demand

<table>
<thead>
<tr>
<th>SCENARIOS</th>
<th>YEAR 2010 BCM</th>
<th>YEAR 2025 BCM</th>
<th>YEAR 2050 BCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand</td>
<td>489</td>
<td>619</td>
<td>830</td>
</tr>
<tr>
<td>Middle Demand</td>
<td>536</td>
<td>688</td>
<td>1008</td>
</tr>
<tr>
<td>High Demand</td>
<td>556</td>
<td>734</td>
<td>1191</td>
</tr>
</tbody>
</table>


Economy in water use for irrigation and other sectors is possible through various means such as:

a. System related means
b. Technology and science related means
c. Economic interventions
d. Organisational interventions
e. Other related measures

The foregoing description suggests that the country will face serious challenge of water resources development and allocation.

4.1 Irrigation in Tamil Nadu

Tamil Nadu State is spread over 1.3 lakh sq.km. supporting a population of 55.9 million persons with average density of 428 persons/sq.km. (Census 1991). Urban population is about 34.15 per cent according to 1991 census with overall literacy of 53.31 per cent, and female literacy accounting for 40.50 per cent. The land gently slopes down North to South and West to East stepping down from the Decon Plateau to the alluvial coastal plains. Tamil Nadu State has a long coast stretching for nearly 920 Km. The average land holding of the state is about 1.08 hectares which is lower than the all India average.
The annual average rainfall is 927.38 mm. It is well known that in south India the rainfall is not evenly distributed throughout the year but it is concentrated in three or four months.

**Tab.No.: 4.4 The season-wise rainfall in Tamil Nadu**

<table>
<thead>
<tr>
<th>RAINY SEASON</th>
<th>PERIOD</th>
<th>RAINFALL</th>
<th>PER CENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest monsoon</td>
<td>June to September</td>
<td>307.60 mm</td>
<td>33.30</td>
</tr>
<tr>
<td>Northwest monsoon</td>
<td>October to December</td>
<td>438.70 mm</td>
<td>47.40</td>
</tr>
<tr>
<td>Transitional period</td>
<td>January to May</td>
<td>178.70 mm</td>
<td>19.30</td>
</tr>
</tbody>
</table>

*Source: Tamil Nadu State Water Vision Exercise 2025, WRO, PWD, and Government of Tamil Nadu, Chennai.*

Thus uneven distribution has made it necessary that permanent arrangements should be made for collecting the rainwater when available, conserving it and using it for irrigating the crops as and when required. The importance of constructing irrigation facilities was well recognized by the people of south India from the early centuries.

The surface water resources of the state are poor and it is estimated at about 1200 thousand million cusecs (TMC) including the water that flow from the neighboring states and this gives a per capita availability of 0.03 million cubic feet (m.cu.ft.) while the country average is around 0.114 m.cu.ft.

Based on the drainage pattern of the rivers, the geographical area of the state is covered by 34 river basins, which are grouped into 17 major river basins. The largest of these, the Cauvery basin, alone accounts for more than one third of the State area. Palar, Pennaiyar, Vaigai and Thamiraparani are the other major basins of the state.

Tamil Nadu has different sources of irrigation such as canal, tanks and wells. A description is given below on the different sources of irrigation.
MACRO LEVEL VIEW OF IRRIGATION AND PROFILE OF STUDY AREA

Tab.No.: 4.5 Net Area Irrigated by Sources

<table>
<thead>
<tr>
<th>SOURCES</th>
<th>NET AREA IRRIGATED Lak.ha.</th>
<th>PER CENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canals</td>
<td>8.02</td>
<td>28</td>
</tr>
<tr>
<td>Tanks</td>
<td>6.23</td>
<td>22</td>
</tr>
<tr>
<td>Wells</td>
<td>13.69</td>
<td>49</td>
</tr>
<tr>
<td>Others(Springs)</td>
<td>0.17</td>
<td>1</td>
</tr>
</tbody>
</table>


4.1.1 Canal Irrigation

Accounting for about 30 per cent of the net area irrigated, canals are a very important source of irrigation in the state next only to wells. The five districts, Thanjavur (50.5 per cent), Erode (11.0 per cent), Tiruchirappalli (9.0 per cent), Madurai (6.8 per cent), and Cuddalore (6.7 per cent) together had more than four-fifths of the total net area irrigated by canals in the State. There is no canal irrigation in Ramanathapuram, Sivagangai and Virudhunagar districts. During 1996-1997, the net area irrigated by canals had improved in 10 districts and had fallen in eight districts. The increase was more than 5000 hectares in two districts viz., Erode and Cuddalore, while Thanjavur was one among the districts where the decline was more than 5000 hectares.

4.1.2 Well Irrigation

Well irrigation has gained importance in the state with about 45 per cent of the net area irrigated being accounted for by this source. Of the total number of 17.89 lakh wells used for irrigation during 1996-1997 in the state, dug wells (16.46 lakhs) accounted for a lion’s share of 92 per cent and the rest being represented by tube wells (1.43 lakhs). As many as 97.8 per cent of the total tube wells and 99.9 per cent of the total dug wells were with in private fold. Salem district had more number of dug wells (2.30 lakhs) and the Nilgiris had the least (242). More than 70 per cent of the tube wells were located in the
three districts of Thanjavur (51854), Cuddalore (30879) and Villupuram (22266).

Paddy is the major crop irrigated in the state. The irrigated area under food crops and non-food crops is 26.90 and 6.57 lakh hectares respectively.

4.1.3 Tank Irrigation

There are 39,202 tanks in Tamil Nadu with a command area of 9.28 lakhs ha. Tamil Nadu is irrigating 21.83 per cent of the total area under tanks in the country ranking second to Andra Pradesh 23.63 per cent followed by Karnataka 9.95 per cent and Kerala 1.16 per cent. The Southern part alone claims more than 50 per cent of the area irrigated by tanks in the country (Rao Bhaskara, 1998). Thirty one per cent of the total irrigated area in Tamil Nadu is under tank source.

In Tamil Nadu, tanks irrigate about 0.84 m.ha. There are 39202 tanks in Tamil Nadu of which 8,903 tanks are maintained by the Water Resource Organization of Public Works Department and the respective Panchayat Unions maintain 20413 tanks. There are 9,886 Ex-zamin tanks, which can be taken up either by PWD or Panchayat union after standardization. Out of the 8,903 tanks under the maintenance of PWD 3,627 tanks are system tanks, and 5,276 tanks are rain fed tanks (Non-system tanks). System tanks are which receive supplementation from the nearby major streams in the watershed and serve in addition to the yield from its own catchment. These system tanks serve as balancing reservoirs enabling the farmers to raise more than one crop. Pudukkottai district stood first with 5451 tanks in the state while Erode district stood last with 52 tanks. Tank irrigation is not in practice in the Nilgiris district. The net area irrigated by tanks had gone up from 5.12 lakh hectares to 6.23 lakh hectares between 1995-1996 and 1996-1997. Nearly three-fifths of the total net area irrigated by tanks in the state during 1996-1997 cumulatively
came from Kancheepuram (18.9 per cent), Sivagangai (10.6 per cent), Ramanathapuram (9.6 per cent), Pudukkottai (9.6 per cent), Villupuram (8.8 per cent), and Thiruvannamalai (8.8 per cent). On an average, a tank irrigated an extent of 16.0 hectares during 1996-1997. Among the districts, it was the highest at 32.6 hectares in Ramanathapuram and the lowest at 5.7 hectares in Kanyakumari.

The tanks are broadly classified as system tanks and non-system tanks. The storage capacity of the tank and the number of fillings it gets during the rainy season are the basic determinants of its command area. In Tamil Nadu the tanks, which serve an ayacut of 40 hectares and above, are in the charge of the PWD. The rest are in the charge of the local Panchayat Unions. System tanks are all under the control of Water Resources Organisation (WRO) of Public Works Department (PWD) even if a few among them in the chain is having less than 40 hectares.

4.2 CROPPING PATTERN IN TAMIL NADU

Tamil Nadu State has a diversified cropping pattern. Paddy is the dominant crop in all the districts of Tamil Nadu. The net area under paddy accounts for 44.81 per cent of the total net area sown in the state. Cereals like cholam, cumbu and ragi and pulses like black gram, green gram and red gram are also found to be grown in a significant proportion of land, which account for 8.13 per cent.

4.3 MODERNISATION OF EXISTING IRRIGATION SYSTEMS

Many modernisation projects have been implemented in the state aimed at conservation and effective management of water resources through modernisation of the existing systems and improving their efficiencies. Under European Economic community (EEC) assistance, several tank modernisation schemes have been implemented. Towards economising the use of water, modern methods, like drip irrigation and sprinkler irrigation are being practised,
4.1 Photo — view of tree plantation area behind the water spread area of a tar system.
in a selective way depending upon the crop pattern and nature of terrain. The recently launched World Bank Funded Water Resources Consolidation Project (WRCP) aims at improving the sustainability and productivity of Tamil Nadu irrigation sector through multi sector water planning, integration of farmers in irrigation management and strengthening the state's institutional and technical capabilities in water resources development, management and planning.

The most important highlight of this project is the eventual transfer of the system below the distributor level to the farmers for maintenance, on the principles of Participatory Irrigation Management (PIM). The sense of ownership and the resultant psychological boost that is going to develop in the farming community, and their participation in the management planning and execution are expected to contribute in a big way to revive the age old 'Kudimaramath' system successfully practised earlier in the state.

In order to augment the storage capacity of tanks, and carrying capacity of their supply channels and feeders, a massive de-silting operation has been launched since 1997-1998 in the state whereby 200 tanks and their supply sluices were improved.

4.4 COMMAND AREA DEVELOPMENT PROGRAMME (CADP)

Besides ensuring farmers' participation in water management activities, the Centrally sponsored Command Area Development Programme (CADP) aims at improving irrigated agriculture, by means of On Farm Development Works (OFD) and Rotational Water Supply (RWS). The expenditure incurred on this programme is shared equally between the central and state government. In 1996-1997, the programme was implemented in six commands viz., Cauvery, Lower Bhavani, Cumbum Valley, Parambikulam aliyar, Amaravathi and Kodayar Chittar Pattanamkal.
4.5 TAMIL NADU WATER POLICY: TAMIL NADU FARMER MANAGED IRRIGATION SYSTEM (TNFMIS) ACT

In order to develop the state water resources, to achieve effective water management and optimal use of water and to assign the priorities for the various sector uses, a comprehensive Tamil Nadu State Water Policy has been formulated within the framework of the National Water Policy, wherein the concept of users' participation in all aspects of water planning and management is re-emphasized. This includes equitable distribution, mechanism for resolution of conflicts, augmentation measures like recycling and desalination, prevention of pollution, sea water intrusion, etc. Further, in order to give proper statutory status to the measures for the sustained maintenance of the irrigation systems, and for enforcement of the Participatory Irrigation Management Policy, the legislation of the “Tamil Nadu Farmers Management of Irrigation Systems Act” was passed in the State Legislative Assembly during the year 2000 and necessary Assent was given by the Honorable President of India.

Similarly with a view to protecting ground water resources and providing safeguards against hazards of their over-exploitation and to ensure their planned development and proper management, enactment of "Tamil Nadu State Groundwater Development and Management Act 2000" was also introduced in the State Legislative Assembly.

4.6.0 CHARACTERISTIC OF STUDY AREA

4.6.0 A - TIRUCHIRAPPALLI DISTRICT

Tiruchirappalli district is most centrally located in the state of Tamil Nadu. This district is spread over eight taluks with a total geographical extent of 4404.12 sq.km. with the head quarters at Tiruchirappalli. It is bounded on the northeast by Perambalur district, northwest by Namakkal district, east by...
4.2 Photo – view of paddy and coconut crops in the tank ayacut with modernised channel for quick distribution and economic use of water - Suriyur tank.
Thanjavur district, West by Karur district. This district lies between 78° 10' to 79° 5'.

4.6.1 Geographical Area

This district comprises eight taluks and fourteen panchayat unions. Lalgudi, Manachanallur, Manapparai, Musiri, Srirangam, Tiruchirappalli, Thottiam and Thuraiyur are the name of eight taluks. This district is spread over in 4,40,412 hectares of land. This district has 483 revenue villages. Tiruchirappalli is well connected with a network of roads, railways and airways. In this district, the total length of road is 2368 km.

It is also rich in minerals like limestone, gypsum, clay and feldspar. Tiruchirappalli district is rather irregular in shape. Barring a few hills and hillocks, the district is composed of plains, valley bottoms, undulating upland area and broken chain of eastern gates viz. Pachamalai hills. North and northwestern parts of Tiruchirappalli present a vast stretch of flat flood plain of Cauvery alluvium with morphology associated with meandering river system. The southern and southeastern parts present undulating plains to level plain topography. The western part of Manapparai taluk includes hilly reserve forests, rock hills in the central part and undulating plains in the rest of the part.

4.6.2 Social Group

The predominant communities in the district may be classified into 1. Agro-cultural Community, 2. Trading Community, 3. Weaving Community, 4. Servicing Community and Village Artisan and 5. Other Communities.

4.6.2a Agricultural Community

The agricultural communities, which are the dominating communities, are found in almost all taluks of the district. The major communities in this category of people are 1. the Ambalakarars, 2. the Kallars, 3. the Karkatha
Vellalars, 4. the Kongu Vellalars, 5. the Muthiraiyars, 6. the Reddiars, 7. the uralis and 8. the Vanniars. The Thottians or Kambalathars, the Kurumbus, the Maravas, the Vettuvans, the Cholia Vellalas and the Kamma Naidus also contribute their might to this procession though they are small in number. (District Gazetteers of Tamil Nadu, 1988).

The social life in the district is to a large extent influenced by the ethnic composition of the large village, because caste plays a vital role in the social relationship between the various sections of the village population. The Brahmins, the Muthurajas, the Kongu Vellalars, the Mudaliars, the Reddiars, the Vettuvas, the Naidus and the Muslims are the influential community of the district. The Muthurajas, the Reddiars, the Pillais, the Kongu Vellalars, etc. assert their dominance where their population is more. Main languages spoken in the district are Tamil, Malayalam, Telugu and Urdu.

In the caste ridden society, the inter-caste relationship is generally cordial. Though the different caste people live as brethren and friendly, instigation by some caste heads or provocation lead to clashes sometimes. The position of Scheduled caste (SC) and Scheduled Tribe(ST) people in the society is not still developed.

Inter-caste marriages in the district, as is elsewhere in the state are not quite common. They are rare and this rare phenomenon occurs when the boy of different community who falls in love with the girl of a different community, marries either with the concurrence of the parents or without it. The caste panchayat has a say in deciding such matters, and punishments cannot be ruled out.

While the sons generally share the properties among themselves, the daughters are given certain amount of money as dowry and jewels at the time of marriage. The institution of joint family system is fast deteriorating. Soon
after the marriage the son or for that matter, the daughter in law, wants to lead a separate life, wants to be separated from his parents. The materialistic world has influenced the mind to the extent of thinking only in terms of 'self'. This force acts as a catalyst in dividing the joint family.

The people of the district are religious minded. The pilgrim centres in this district are Srirangam, Thiruvanaika, Rockfort temple, Mariamman temple, etc. The Hindus celebrate Pongal, Adi 18, Deepavali, Navarathri etc. with great enthusiasm and in a grand manner. There are several Churches in the district that are very famous and that attract large crowd. A couple of Durghas (of Muslim Saints) can be added to the list of religious centres in the district.

Football, Hockey, Vollyball, Cricket, Kabadi and Ball badminton are some of the games played in the district. In towns, several recreation clubs, small and big are functioning where they play carromboard, table tennis, badminton etc. several non-governmental organisation are functioning in the district for he upliftment of the society.

4.6.3 Population

In Tiruchirappalli district the total population is 41.3 lakhs, among this 20.8 lakhs are male and 20.5 lakh members are female. In the total population 30 lakhs are living in rural and 11 lakhs in urban areas. The population density in this district is 373 per sq.km.. Females per 1000 is 984. The urban population is 27 per cent. (Statistical Hand Book of Tamil Nadu Government, 1996.)

The total literate persons in this district are 22 lakhs, among this male members are 13 lakhs and the male members are 8.7 lakhs. The literacy rate in the district is 61 per cent. The Scheduled Caste and Scheduled Tribe population is 0.82 lakhs and the remaining population belongs to Backward, Most Backward and Forward Communities.
4.6.4 Rivers

The important rivers flowing and substantially benefiting agricultural activities in this district are the Cauvery, Coleroon and Vellar. There are six minor river basins in this district. There are about 20 river channels with anayacut each ranging from 400 hectares to 13000 hectares. Some of the important channels are Uyyakondan, High-level Kattalai channel, Raja Ayyan, Perunvalai, South bank canal etc. Uyyakondan and High level Kattalai channels benefit part of Tiruchirappalli taluk and Manapparai taluk and the entire villages of Manikandam panchayat union (Srirangam taluk.)

4.6.5 Rainfall

In all the eight taluks of this district the precipitation is more during northeast monsoon. During northeast monsoon, Musiri and Thottiayam taluks receive more rains of 523 mm and 523 mm respectively as against least rain of 102 mm and 102 mm respectively during Southwest monsoon.

4.6.6 Climate And Temperature

The hot months happen to be April, May and June with the maximum temperature ranging from 37° C to 39° C and the cool months being December, January and February with minimum ranging from 20° C to 21° C. The mean monthly rainfall of Tiruchirappalli district over a period of 20 years (1976-1995) is 850 mm.

4.6.7 Soil And Land Capability

In this district out of the total geographical extent of 4,40,412 hectares only 1,89,141 hectares (42.94 per cent) are used for regular agricultural practices. A total of 78,703 hectares (17.87 per cent) are kept as fallow lands. The lands put to non-agricultural purposes cover 71,511 hectares. The cultivable wastelands of 28,340 hectares can be made use of by suitable package of practices.
4.3 Photo – view of paddy and coconut field in the Kottaikulam tank.
4.6.8 Sources of Irrigation
The chief source of irrigation in the district is the river Cauvery. The southwest monsoon provides the bulk of water, which is impounded at Mettur dam. Supplies are regulated therefrom to considerable extent. The details of canal length, number of wells and tanks are tabulated. Considerable extent of lands is benefited by tank irrigation in the taluks of Manapparai (384), Thuraiyur (376) and Lalgudi (151). Besides the river and tanks, the other sources of irrigation are well. The number of wells is more in Thuraiyur (14552), followed by Lalgudi (9878) and Musiri (8193) taluks.

4.6.9 Land Irrigability
Land irrigability classification is defined as an interpretative grouping based on soil and land characteristics to indicate relative suitability of land for irrigation. In addition to soil suitability, quality and quantity of irrigation water and drainage should be improved to overcome the severe irrigable limitations.

4.6.10 Cropping Pattern
In this district the principal crops grown is rice in 73,090 hectares (30.04 per cent), millets in 65,000 hectares (26.72 per cent), pulses in 33,090 hectares (13.60 per cent) and oil seeds in 30,350 hectares (12.48 per cent). The delta area of this district has a network of the river Cauvery and its tributaries. Banana and Sugarcane are grown in some parts of the delta. Pulses are grown in rice fallow. In uplands, millets like sorghum, pearl millet and finger millets, oil seeds such as groundnut and gingely are grown both under irrigated and rain fed conditions. Further cotton, chilies and coriander also are grown in some part of the district.
4.7.0 STUDY AREA TANKS: TIRUCHIRAPPALLI DISTRICT

4.7.1 Kottaikulam Tank

Kottaikulam tank is an Ex-zamin tank situated at Elankakurichi village in Manapparai taluk of Tiruchirappalli district. The tank is 100 years old. The maintenance has been carried out regularly by PWD. The Kottaikulam tank is a rain fed tank in Tiruchirappalli minor basin Uppukulam group of tanks. The tank is situated in the backward and drought prone area.

The geographical specifications are Latitude 10° 32' 08" N, Longitude, 78° 19' 0" E, Altitude 208.725 Meter AMSL. The tank lies in survey No.36 of Nerkkuppai village. Almost all people in the village are Muslims. In this village, amenities such as schools, post office, bank, hospital, transport and communication facilities are available for the people. Most of the land owners are business people. Agriculture is the secondary income source for this ayacut people.

Kottaikulam is an Ex-zamin (non-system) tank controlled by PWD. It receives water from the Uppukulam supply channel. The total catchment area of 4.048 sq.km. comprising 26.95 sq.km. of free catchment. A small dam is also constructed across Konnutru river. Hence Kottaikulam, Annasamudram, Vagaikkulam are the chain of tanks not receiving the required water in time. The tank bund of length 1430 m and the top width of bund as per standards are 2.00 m. This tank consists of two sluices. All the two sluices are in fair condition, only plug and plug rod arrangements are available. The total irrigated area of the tank is 44.24 acres. The capacity of the tank is 0.832. the main channels system, which conveys water to the blocks, is lined for the entire length. The overflow water from this tank flows through 'calingu' and reaches the next tank named Vagaikulam. The soil in command area is loamy, very deep dry loam yellowish brown. Water also suitable for irrigation. This tank
receives water during the Southwest monsoon and Northeast monsoon seasons. Paddy, cotton and coconut are the crops cultivated in these fields. Paddy is the main crop, two or three crops are raised in the ayacut during the year. There is a registered WUA formed by the ayacutdars of this tank system.

4.7.2 Mangavanam Tank

Mangavanam tank is a system tank under the control of PWD. This village is situated 17 Km. away from Tiruchirappalli town. There are two hamlets for this tank system. In this village there is only one primary school and a post office is functioning. There is no separate hospital or bank. Transport facilities are not available for this village. To get the above facilities the villagers go to the nearby village. Total number of families is 200, all community people are living in this village. There are three sluices in the tank. Shutter is used for the operation of one of the sluice and another two are operated by kulumikattai (the sluice closed by using wooden pieces) The tank gets water from the Uyyankondan canal and kattuvari. The nearby village farmers occupy the 'van (inlet channel) for cultivation. Due to the formation of silt in the Uyyakondan canal and Kattuvari the inflow to the tank was reduced considerably. The tank was de-silted 20 years back and the tank also silted up. There is only one crop (paddy) cultivated in the ayacut. There is no open well in the ayacut. There is only one bore well in the ayacut. But the water supply is also very poor during the summer season. During the past four years, the tank was breached 4 times and the village people themselves completed the works with the support of the PWD. There is a registered WUA in the village.

4.7.3 Suriyur Tank

Suriyur tank is a non-system tank situated in Suriyur village of Tiruchirappalli taluk, in Tiruchirappalli district. It is located 25 Km. towards
4.4 Photo - View of a Weekly Market (Sandai) in Elankakurichi village of Kottaikkulam tank.
Southeast of Tiruchirappalli town. The geographical specifications are Latitude 10° 39' 00'', Longitude 78° 47' 00'', Altitude 60.655 m AMSL.

In this village amenities such as schools, post office, bank, and transport and communication facilities are available for the people. Most of the land owners are agriculturist and labourers. Agriculture is the primary source of income for people of the ayacut. All community people are living in this village.

This tank receives the drainage from Pudukulam free catchment of 1.986 sq.km. and intercepted catchment of 5.19 sq.km. This tank consists of three sluices. The total irrigated area of the tank is 121.475 ha. The overflow water from this tank flows through 'calingu' and reaches the next tank named Koilkulam. The ayacut area contains red soil. Water is suitable for irrigation. Paddy is the only crop cultivated in the ayacut. After the paddy in the second season ragi, sorghum, groundnut are cultivated.

4.8 CHARACTERISTICS OF STUDY AREA - PUDUKKOTTAI DISTRICT

4.8.1 Location

Pudukkottai district was formed on 14th January 1974, covering the entire princely state of Pudukkottai and part of the area taken from the Taluks of Thanjavur and Tiruchirappalli districts and the entire Arantangi Taluk of Thanjavur. Pudukkottai is bound on the North and Northwest by Tiruchirappalli district, West and Southwest by Sivagangai district, on the East and Northeast by Thanjavur district and on the Southeast by the Bay of Bengal. It is situated between latitude 9° − 50'' and 10° − 40'' and longitude 78° − 25'' and 79° − 15''. It is almost a coastal district. The western portion is 600 feet above mean sea level and tapers towards the East and reaches the sea level.
4.8.2 Geographical Area

The total geographical area of the district as per 1991 is 4663.2 sq.km. (4,65,100 ha). The net cultivated area of the district as per Joint Directors' report is 1204.45 sq.km. (1,20,445 ha). It accounts for 25.90 per cent of the total geographical area, and 42.72 per cent of the total cultivable land. Pudukkottai district comprises of nine taluks namely Gandarvakkottai, Alangudi, Arantangi, Avudayarkoil, Thirumayam, Kulathur, and Pudukkottai, which is the district, headquarters. There are 13 blocks and 504 village Panchayat in the district.

4.8.3 Social Group

The community wise break up in Pudukkottai is Mukkulathors 17 per cent, Muthurajas 10 per cent, Scheduled castes 17 per cent, Christians 5 per cent, Muslims 8 per cent, Idaiyan/Yadavs and Vellalas around 6 per cent each. Brahmins are also present in some areas. (The Encyclopaedic District Gazetteers of India, 1996.)

The main languages spoken in the district are Tamil, Malayalam, Telugu and Urdu. There are several tourist places in the district such as Government Museum, Sittannavasal, Kudumiyanmalai, Kodumbalur, Viralimalai, Narthamalai, Avadayarkoil, etc.

Important fairs and festivals organised in different parts of the district are Panguni Uthiram, Chithra Pournami, Allavutheen Dargha festival, Chatram Weekly fair, Kanduri and Adi festival, etc.

On the social and economic sides, the Kallar community was predominating in Kulathur taluk, Udayars in Alangudi taluk and Nattukkottai Chettiars in Thirumayam taluk.

The cattle wealth of a district is important to improve its agricultural resources. The important subsidiary activities carried on by the cultivators and
agricultural labourers are dairying, sheep rearing and poultry. The livestock population of the district includes cattle, buffaloes, sheep, goats, pigs and also poultry. Alangudi, Thirumayam taluk and part of Kulathur taluk are important potential areas for development. The grazing land available in many blocks offers good scope for this activity. Though this district has a fairly large number of sheep population, scientific sheep farming is not being practised.

The small farmers' development agency and Integrated Dry land Area Development Project operating in the district are popularising sheep rearing activity among the small and marginal farmers and have made provision for subsidies to the participating farmers through bank loans.

In the urban areas of Pudukkottai, there are 0.59 higher secondary schools, 0.85 secondary schools, 1.24 middle schools and 2.02 primary schools per every 10000 population.

4.8.4 Population

In Pudukkottai district the total population is 13.2 lakhs, among this 6.61 lakhs are male and 6.65 lakh members are female. In the total population 11.3 lakhs are living in rural and 1.9 lakhs in urban areas. The population density in this district is 285 per sq.km.. Female population per 1000 is 1005. The urban population is 14 per cent.

The total literate persons in this district are 6.5 lakhs, among this male members are 4.0 lakhs and the male members are 2.5 lakhs. The literacy rate in the district is 58 per cent. The Scheduled Caste and Scheduled Tribe population is 0.22 lakhs and the remaining population belongs to Backward, Most Backward and Forward Communities.

4.8.5 Soil And Land Capability

The entire Pudukkottai area is having ferruginous red soil of loam and sandy loam with shallow depth. The water holding capacity is low and cropping
4.5 Photo – a farmer *irrigate* his *paddy field* in Mangavanam tank.
has to be restricted during the rainy season only. This prevents the percolation of rainwater and increases the runoff, even though the rain is sufficient to grow a good crop. Land capability classification shows the suitability of soil for agricultural uses.

4.8.6 Rivers

Less than a dozen rivers that serve the tract, most of them, are jungle streams. They run dry for the most part of the year. The river Vellar is the longest, traditional southern boundary of the “Chola Land”. The southern Vellar, which rises in the Vela Malai in the West, passes through Kudumianmalai, Peaiyar, Kadaykudi and Valanad. After running a course of about 130 Kilometers, it falls into the Bay of Bengal. Kundara  and Pambaru are its tributaries. The Agnivimochani the outlet of Kulathur irrigation tank has a course of 75 Kilometers before falling in to the sea. The Uyyakondan runs through Alangudi taluk; which is also served by another river, by name Ambiliyaru. The Koraiyaru is the outflow of an irrigation tank near Viralimalai.

4.8.7 Climate And Temperature

The maximum temperature ranges between 26° and 40° C reaching maximum in the month of April and May, while the minimum temperature ranges between 20° and 26° C. The mean wind velocity ranges between 6 and 16 Km. Per hour and it is high during June and July.

4.8.8 Rainfall

Pudukkottai is predominantly dry tract with a mean annual rainfall of 835.9 mm distributed in 45 rainy days mainly confined from August to November. This low average rainfall means that water is not available in sufficient quantities for irrigation. If the rainfall data and evaporation data are compared, it would be clear that the net availability of water after evaporation
for irrigation would be zero or little. Hence water from external sources is a must.

4.8.9 Sources Of Irrigation

The traditional sources of irrigation Pudukkottai are rivers, canals, tanks and wells. Of these the contribution of the first two for irrigation in this region does not amount much. The role of the rivers available is to feed the tanks with their seasonal flows and draining the surpluses of overflows of tanks in their course. The main sources of irrigation in Pudukkottai district are tanks which irrigate more than 77 per cent of the net irrigated area. Next to tanks, wells contribute 14 per cent and canals irrigate only 8 per cent.

Source-wise, the area under canal and tank irrigation has shown a steep decline over the years. From the early 1980 to the late 1990 there is fluctuation in the area under both sources with declining rate. This is due to so many factors. The rapid development of bore well irrigation in the region. There was very small land under well irrigation till 1990-1991 but after this period there is a great jump in the area under bore well irrigation. This is the result of the government policy of providing electricity free of charge for agriculture.

Source-wise, bore wells registered a higher co-efficient of variation of 140 per cent among taluks, compared to 72 per cent and 57 per cent for canals and wells respectively. This is due to the fact that bore well irrigation has increased very fast in the recent past.

Non-system (rain fed) tanks of Pudukkottai, account for 94.78 per cent of the total number of tanks in the district. The rainfall received during the Northeast monsoon period mainly decides the tank storage. With the onset of monsoon rains the tanks are filled up. Farmers take up raising of paddy nurseries with the water available in the tanks. With one filling of the tank the farmers are able to raise the nurseries and complete the transplantation of
For successful completion of one paddy crop two more fillings of the tanks are required with subsequent rainfall.

4.8.10 Cropping Pattern

Paddy, vegetables, groundnut and sugarcane are the major crops, which account for 97.19 per cent in the total crop area. Cashew, pulses, cereals, oil seeds and banana are some important crops grown in the district both area wise and population wise. Paddy occupied the first place of 80.89 per cent in 1995-1996 and 84.87 per cent in 1994-1995. But the area under paddy has declined while the area under sugarcane has increased drastically over the years, while vegetables; groundnut and sugarcane account for 6.09, 5.59 and 4.62 per cent respectively.

4.9 STUDY AREA TANKS: PUDUKKOTTAI DISTRICT

4.9.1 Parambur Tank

Parambur tank is situated in Kulathur taluk of Pudukkottai District about 1 Km. Northwest of 57 Parambur village. The latitude and longitude of the tank are 10° 26' 20" and 78° 37' 40".

There are three hamlets for this tank system. In this village the amenities such as schools, post office, bank, and transport and communication facilities are available for the people. Most of the land owners are agriculturist and labourers. Agriculture is the primary income source for this ayacut people. In this village all community people are living. In this village some small scale industries are functioning.

This tank is maintained by the Parambur tank WUA. It belongs to Pinnangudy tank group in upper vellar basin having a registered ayacut of 104.100 hectares (257.23 Acres.). This tank receives supply from its own catchment and from the surplus of 5 upper tanks. The total length of the tank bund is 1232 meters. There are four sluices. There is only one broad crested
weir for a length of 78.43 meters. The main channels are lined with stone block masonry. Paddy is the main crop, two or three crops are raised in the ayacut during the year. There is a registered WUA functioning in this tank system.

4.9.2 Thuvar Big Tank

The Thuvar big tank is situated at Thuvar village in Gandarvakkottai taluk of Pudukkottai district. The tank lies in S.F.No.7 of Thuvar village. The geographical specifications are Latitude 10° 27' 00" N, Longitude 79° 02' 43" E, Altitude 54 840 m AMSL.

In this village the amenities such as schools, post office, transport and communication facilities are available for the people. Most of the land owners are agriculturist and labourers. Agriculture is the primary income source for this ayacut people. In this village all community people are living.

Thuvar big tank is a non-system tank. It is controlled by WRO of PWD. It receives drainage from its catchment and from supply channel from Agniyar anicut. The catchment covers an area of 1.074 sq.miles of free catchment and 0.904 sq.miles of intercepted catchment. The catchment is classified as average having gentle slope and moderate vegetation. Ground water is observed in 100 to 200 m depth below ground level. The soil in the command area consists of deep brown to dark brown, calcareous. Population of Thuvar village is about 1425 inhabitants, most of them are agriculturists and labourers. The wages of labour are paid as recommended by the government. The length of the tank bund, for Thuvar big tank is 1325 m. the top width of bund as per standards is 2.00 m. Front and rear slopes 1.50 : 1 and 2.00 : 1 respectively. There are two sluices at LS 650 and 1020 m. The existing sluices are plug and plug rod arrangements. This tank has got surplus arrangements of a broad crested weir for a length of 15.00 m. and a Calingu for a length of 7.5 m. There is a registered WUA in the tank system.
4.9.3 Mirattunilai Tank

Mirattunilai tank situated in Mirattunilai village of Thirumayam taluk. It is a system tank controlled by WRO of PWD. It has four sluices and two calingu. It receives water from vellar. It is one of the biggest tanks in Pudukkottai district. It has 650 ha. ayacut.

There are five hamlets in the village. In this village the amenities such as schools, post office, bank, transport and communication facilities are available for the people. Most of the land owners are agriculturists and labourers. Agriculture is the primary income source for the people of this ayacut.

In this village all community people are living. There is a registered WUA functioning in the village. The President of the village Panchayat is holding the post of President of WUA also. He has power to organise the association in the village. Since this tank system has larger area of ayacut, frequent problem occurs among the head and tail end farmers in water sharing. Paddy is the main crop in the ayacut. Part of the ayacut farmers cultivate vegetable crops in their field by using the available water.
4.6 Photo - Tank view with poor water storage. Water not sufficient to deliver for irrigation in the ayacut.