CHAPTER – III

AGRICULTURAL DEVELOPMENT SINCE INDEPENDANCE

The declaration of Independence to India on 15\textsuperscript{th} August 1947 marked a turning point in the economic history of Tiruchirappalli region. Government of India and the State government of Tamil Nadu have taken several measures to improve the agriculture. The policy measures of the state government including various scientific development schemes and irrigation system led to the growth of agriculture in Tiruchirappalli region rapidly.

1. National Agricultural Policy

From the dawn of civilization, India has primarily been an agricultural country where about 70\% of the population is engaged in agricultural pursuits. Agriculture in India is the life blood of the nation. Agriculture is the largest sector of economic activity and plays a crucial role in the country’s economic development by providing food and raw materials and employment to a large proportion of the population. Agriculture is not merely an occupation it is a way of life, which for centuries has shaped the thoughts and outlooks of many millions of public. While agriculture held an important place in Indian economy, its efficiency remained at a low level over vast areas in the country. Agriculture has continued to be traditional in character, resulting in low yields, limited income and consequent low capacity for reinvestment. However, modern agricultural sector has been developing on a limited scale based on new technology.\(^1\) Notable success

\(^1\) Ramakrishna reddy, K., \textit{Irrigation and Agricultural Development in India}, A shish Publication, Delhi, 1995, p.8.
has been achieved in yield rates, income generation and investment. This has a considerable impact on the life and economic activity of the people.

At the time of independence, India’s agriculture was in a state of backwardness. Productivity per hectare and per worker was extremely low. The techniques employed were age old and traditional. There were 7 tractors per lakh hectares of gross cropped area in 1950-51. The number of oil engines and irrigated pump sets per lakh hectares was 62 and 16 respectively in that year. The use of fertilizers was also negligible; being only 0.66 lakh tons in 1952-53. Due to low productivity agriculture merely provided subsistence to the farmers and had not become commercialized. Approximately 45 per cent of the total consumption of farmers came from their own production in 1951-52. This highlights the low importance of money in the village economy. This was the state of affairs of the nature of India’s agricultural sector. The acceleration in agricultural growth requires action, on several fronts including raising the level of investment, resolving problems of land tenure, increasing availability of credit, ensuring appropriate pricing policies and developing new technologies to increase productivity.

When India launched the First Five Year Plan, (1951-56) there was no clear-cut strategy with regard to the development of agriculture. The emphasis till the end of Third Plan was to use traditional techniques and skill to meet the needs of the people. Productivity capacity was sought to be increased through the extension of irrigation, agricultural extension and community development programmes. These measures failed to make a breakthrough in agricultural

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production and it was the adoption of the new strategy of agricultural development in 1966-67 that heralded the era of the Green Revolution in the Country.

2. Agricultural Policy of the Government of Tamil Nadu

(A). Grow More Food Campaign

Agricultural policy has been framed mainly to (i) increasing production (ii) bringing about a structural transformation in the agrarian economy and (iii) reconciling the interests of producers and consumers of food grains. Policy to stimulate agricultural production goes back to the Grow More Food Campaign launched in the Madras Province in 1942-43, which marked the beginning of a drive to attain self-sufficiency in food. After Independence Five Year Plan of Grow More Food Campaign was introduced in 1947-48 with a view to intensify food production in the Madras Province. Fifteen Agricultural schemes were included in the plan. The total estimated additional yield as a result of operation of the several schemes during the year was about 197,365 tons of food grains. The important schemes of the Grow More Food Campaign are summaries below.

1. Soil and Water Conservation by Contour Bundling.
2. Land Development by Mechanical cultivation and installation of Pumpsets.
4. Rural compost making from waste vegetable matter.
5. State Trading scheme for the purchase of manures seeds.
6. Comprehensive scheme for the multiplication and distribution of imported seeds of paddy, millets, groundnut and gingelly and green manures.

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7. Control of pests and diseases of crops.
8. Distribution of manures and seeds free for cost of poor and deserving ryots.
9. Increase of production of vegetables in urban centres.
10. Free distribution of vegetables seeds to schools.
11. Multiplication of seeds of imported vegetables.
12. Development of fruit vegetables.

After the completion of two years period of the five year plan of Grow More Food Campaign it was converted into Three Year Intensive Cultivation Plan and executed in the Madras state during the year 1949-50. The plan aimed at increasing the total production of food grains in the state by 6.8 lakhs tons by the end of 1951-52 by the means of the efforts of Agricultural, Public works and Revenue Department. The schemes of the Agricultural Department have to contribute 5.4 lakhs tons of extra foodgrains towards the total additional production of foodgrains. The main agricultural schemes under the Three Year Intensive Cultivation Scheme were; (1) Irrigation Aids (2) River Pumping Scheme (3) Mechanical Cultivation. (4) Supply of Fertilizers (5) Rural Compost (6) Urban Compost (7) Supply of Improved Seeds (8) Green Manure Seeds Distribution (9) Control of Pests and Diseases (10) Cotton Extension Plant (11) Propaganda and Publicity (12) Vegetables. (13) Vanamanotsara (14) Agricultural Education (15) Agricultural Research (16) Agricultural Chemistry (17) Plant Physiology (18) Agricultural Entomology (19) Agricultural Mycology (20) Agricultural Engineering (21) Agricultural Marketing (22) State Trading Schemes and (23) State Trading Schemes.

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Iron and Steel. In 1951-52, the three year intensive cultivation scheme was merged into the five year plan of the planning commission.\(^8\)

The Intensive Agricultural District Programme (IADP) was introduced in Thanjavur district, the criteria of selection of the district being the existence of assured irrigation facilities and relative non occurrence of natural hazards. So that maximum results could be obtained from a package of inputs for the supply of which Government was mainly responsible. Thus a regional approach to intensive agricultural development came to be adopted. In 1964-65 a dilute form of IADP known as Intensive Agricultural Area Programme (IAAP) with emphasis on improved practices and extension services and credit supplies was introduced in Changalpatu, Madras, Coimbatore and Tirunelveli districts. It was subsequently extended to all the districts of the state other than Nilgris and Thanjavur. This programme was however, limited in its application to specific crops [food grains, groundnut and cotton] unlike the Intensive Agricultural District Programme. The IADP and IAAP operated under the limitation imported by the use of existing crop varieties and strains and hence could not bring about break through the productivity and production. This limitation was remained till the High Yielding Varieties (HYV) programme launched in the State in 1966 – 67 which heralded in the Green Revolution.\(^9\)

(B) Green Revolution in Tamil Nadu

No State was more closely identified with the gains of Green Revolution than Tamil Nadu and within Tamil Nadu; no district was more enthusiastically advanced as a model for emulation by the other parts of the region than Thanjavur. With the extensive irrigation system together with the fine alluvial soil in the large parts of the Cauvery delta that marked Thanjavur as one of the districts with the

\(^8\) M.S.A.R 1951-1952, Madras, 1953, p.162.
\(^9\) Malcom S Adiseshish, op.cit., p.140.
highest potential for development. When the Indian Agricultural Development Programme was first introduced in 1960-61, there were 9,41,000 cultivators and farm labourers dependent on a total cropped area of 14.58 lakh acres for their livelihood. The availability of land per adult worker was only 1.5 acres, one of the lowest land-man ratios in any region of India.

As a result of Green Revolution, the yield of paddy on treated plots increased by about one fourth. It was estimated that for each additional rupee spent on the package of practices, the return to the cultivator was Rs. 2.62. During the period 1960-61 to 1964-65 the off take of nitrogenous fertilizer increased by only 140 per cent and that of phosphates fertilizer by 230 per cent. But the vagaries of annual water supply played a large role in damping down the average yield levels over a period of years.

The dramatic achievement of the 1966 Karif season provided the foundation for a projection of the Green Revolution in Thanjavur. The advent of ADT 27 presented the opportunity to convert most of the single-cropped are into double-cropped land from the proportion of 1:2 to 3:1 i.e., from 3 lakh acres out of 12 lakh acres to 9.0 lakh acres out of 12 lack acres. This programme of “mass conversion” which was started in 1967 not only caught the public imagination, but also attracted the ingenuity and resources of the Ford Foundation and FCI and within a short period, 30 mechanical dryers were installed in different centres of the district to guarantee drying facilities for the wet paddy harvested. All of this had its effect.
(i) Maximum Land Utilisation

Out of the total geographical area of 130 lakh ha available in 1981-82, the net area sown, accounted for 57.40 lakh ha as against 58.01 lakh ha in 1950-51\textsuperscript{10}. The total cropped area had declined to 69.09 lakh ha in 1981-82 as against 76.41 lakh ha in 1971-72. Area sowed more than once increased from 9.3 lakh in 1970-71 and to 11.69 lakh in 1981-82. In Tamil Nadu, the average annual net sown area increased million hectares in 1970-79. Area sowed more than once want up from an average of 1.07 million hectares in the 1960 to 1.3 million hectares in 1970-79\textsuperscript{11}.

(ii) Plant Protection

One of the agriculture policies of the government was the Plant Protection Programme. The Department of Agriculture implements a number of plant protection programmes such as Mass Ground Spraying for the control of paddy steam borer, control of Brown Plant Hopper in paddy, units for servicing plant protection equipments, running of pesticides testing laboratories to safeguard the quality standards of chemicals marketed privately and training village school teachers in identifying the incidence of commonly occurring pests and diseases in the crops. The aerial spraying of pesticides was a new technique adopted in Tamil Nadu was a big way with commendable success. An Agro Aviation Division with five helicopters was proposed to set up by the Tamil Nadu Agro-Industries Corporation at a cost of Rs. 40 lakh to extend the programme of aerial spraying in the state.\textsuperscript{12} The Project would be the first of its kind in the country in the public sector. Aerial spraying of pesticides on food and other crops by means of helicopter and fixed wing aircraft, which was first implemented in the state during

\textsuperscript{10} Adisesheiah S Malcolm, Some Notes on Tamil Nadu Economy 1983-84, MIDS, Madras, 1985, pp. 104 -130.
\textsuperscript{11} Gandhi, P. Jegadish, Economic Development of Tamil Nadu, Madras, 1985, p.110.
1961-62 was continued year after year covering major areas under various crop. In the actual purchase and distribution of pesticide chemicals, however, the state was engaged to an extent only, since private agencies were attracted to it in a big way. During 1968-69 about 2.87 lakh acres was covered by aerial spraying. Tamil Nadu led in aerial spraying in the country with half the total average done in India being in Tamil Nadu. An area of 4.14 lakh acres, (1.78 lakh hectares) under groundnut and 1.89 lakh hectares under paddy crops were covered under aerial spraying during the 1971-72. While no significant charges had been in the supply of dust plant protection chemicals, the distribution of liquid chemicals through the Government depots almost doubled from 5.52 lakh liters in 1970-71 to 10.74 lakh liters in 1971-72 and remained more or less static at this enhanced level up to the end of 1973-74. This was doubled once again during 1974-75. Bring a transitory setback during 1975-76, the distribution of liquid chemical estimated at 20.00 lakh liters in during 1976-77 might be much lower than the 1974-75 level of 20.93 lakh liters. Distribution of dust chemicals at 0.46 lakh tons against the requirements estimated at (0.42 lakh tones) and liquid chemicals at 23.56 lakh liters had been reported at 1983-84. In the total area covered under plant protection of the area of 85.82 lakh hectares in 1989-90, food crops, accounted for 64 per cent, the rest going to non-food crops. Pest control and disease control were the two more important activities undertaken, the proportion of area covered stood at 72.28 in 1989-90. In either case food crops had received a larger attention of 60 per cent. Plant protection activity in the state also included seed-treatment. An extent of 23.5 lakh hectares was covered with treated seeds in 1989-90 it accounted for 36 per cent of the gross cropped area.

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14 Ibid., p.18.
15 Ibid., p.21.
(iii) Promoting High Yielding Varieties

Introduction of High Yielding Varieties, being the cornerstone of the policy relating to agricultural development, had no doubt resulted in a significant breakthrough in the sphere of cereals production, especially in the rice during the recent years. Among the various factors that had contributed to an impressive programme of the agricultural sector in the State, introduction and popularisation of High Yielding Varieties were by far the most important. The protection in respect of all agricultural commodities namely cereals, pulses, and commercial crops had been registering a continuous and sustained increase in recent years.

The High Yielding Varieties programme was introduced in Tamil Nadu during 1966-67 in a small extent of 5.28 lakh acres with the view to bring about a rapid maximisation of agricultural production from crop especially rice and hybrid millets. New varieties with high yield potentials like ADT. 27, Co 25, Co 29, IR 8, IR 5, IR 20, IR 22, and hybrid Maize had been popularised by intensive education through various audio visual aids including the radio and farmers training centers besides conducting large scale demonstration on farmers fields. This programme achieved a spectacular success during the subsequent years resulting in rapid breakthrough in agricultural production. Revolutionary changes have been brought about in the cultivation practices, increased use of manures and in cropping pattern of Tamil Nadu agriculture. It is significant to note that the rice production in Tamil Nadu increased from 35.24 lakh tons during 1965-66 to 45.32 lakh tons in 1968-70\(^\text{18}\). The programme was implemented in an area of 12.80 lakh acres during the year 1967-68 and in an area of 17.70 lakh acres during the year 1968-69. It is a matter of great satisfaction that even this target was not only fully reached but also exceeded due to favorable seasonal conditions and intensive extension efforts of

the Agricultural Department. The coverage area during the year 1970-71 was 44.93 lakh acres 19.

It must be noted that the coverage under paddy as a percentage to the total area under cultivation had enormously increased between 1969-70 and 1972-73. While the scope for extending high yielding varieties under paddy was very limited, there was a greater scope under other crops. Larger emphasis on this had been proposed in the course of the next plan period. The extension of high yielding varieties cultivation was made possible through the state seed farms which had been established with a view to multiplying the improved seeds for distribution to ryots. The programme laid the emphasis on the production and distribution of certified seeds for cereals. This scheme had been modified to supply 5 per cent of the total seed requirements every year 20. Hence, the introduction of high yielding varieties of seeds further helped to promote to the agriculture in the state.

(iv) Cropping Pattern

Cropping pattern means the most efficient use of land and other resources they should provide alternative plans for the farmer to maximize his production per unit of area, per unit of time. No crop pattern would be good for all times to come. It ended to change as and when new varieties come into existence. The market forces and economic of crops at any point of time would determine the most profitable cropping pattern 21. Of the total cropped area in Tamil Nadu, food crops accounted for 72.9 per cent in 1950-51 and 76.3 per cent in 1981-82. There had been a relative decline in the area under food crops since 1969-70, when it formed 77 per cent of the cropped area. The area under food crops accounted for

21 Arora, R.C., Development of Agricultural and Allied Sectors, S.Chand Limited, New Delhi, 1976, p.48.
56.81 lakh hectares in 1973-74. While the area under non-food crops occupied 19.67 lakh hectares out of the total cropped area 76.48 lakh hectares. Cereals and pulses took a share of 50.65 lakh hectares. However, the annual average growth rate for area under food grains during 1950-51 to 1973-74 was only 0.51 per cent and for cereals it was 0.42 per cent. When we compare the distribution of cultivated land area in 1973-74 with that of 1982-83, the area under paddy declined from 27.04 lakh hectares to 19.27 lakh hectares. Cambu from 4.01 lakh hectares to 2.96 lakh hectares and Ragi from 3.72 lakh hectares to 2.97 lakh hectares. In general, the cropping pattern in Tamil Nadu coincides with the basic features of crop pattern in India. Like all over India, there were a wide variety of crops, dominance of food crops preponderance of cereals among food crops and importance given to inferior cereals in Tamil Nadu\textsuperscript{22}. Of the total cropped area of 60.56 lakh hectares in 1982-83, nearly 76 per cent was under food crops and the remaining 24 per cent under non-food crops as against the all India level of 80 per cent and 20 per cent respectively.

(v) Multiple Cropping

There were practical limitations in extending the cultivation to new acres to increase agricultural production. This problem was sought to be tackled through the scheme of multiple cropping, i.e. (i) raising of two crops as against the usual practice of raising one crop (ii) raising of two / three crops is the place of one/two crops respectively, (iii) raising of crops like pulses and (iv) sinking of new wells and raising more than one irrigated crop in place where originally one crop was raised under dry conditions in the absence of wells\textsuperscript{23}. With a view to demonstration to the farmers the various components were necessary for a sound and realistic multiple cropping programme in terms of organization, physical


\textsuperscript{23} T.E.A. 1970-71, Madras, 1972, p.11
inputs, financial resources, technical support and infra-structure. The pilot project for multiple cropping was introduced in select blocks. The area covered under the multiple cropping programme had progressively increased from one lakh hectares in 1967-68 to four lakh hectares in 1969-70. This coverage would go up to 4.9 lakh hectares in 1970-71 and 5.3 lakh hectares in 1971-72. The pilot block would demonstrate the suitability of extending such a programme to a larger area. The pilot project would be taken up in 1971-72 in three agricultural division namely Pattukottai in Thanjavur district representing IADP, Musiri in Tiruchirappalli district representing IAAP and Cuddalore in South Arcot district representing Small Farmers Scheme.

(vi) Improved Seeds Certification and Distribution

The Seed Act, 1966 was enacted with the object of controlling the quality of seeds supplied to the farmers. Important varieties of cultivated crops were notified for different states by the Government of India. The Government had established with effect from 1st April 1970, Certification Agency under the control of the Director of Agriculture consisting of one Seed Certification Officer and two Assistant Seed Certification Officers at Tiruchirappalli and Coimbatore and 24 Seed Certification Assistants. The harvest, drying, cleaning, serving and bagging were also supervised by the certification staff to ensure the quality of seeds. The foundation seeds produced by the State Seed Farms and Secondary Seeds certified seeds] produced by the private seed growers were subject to rigid supervision both in cultivation and processing stage and quality seeds which confirm to the standards fixed under the Seed Act, 1966 above were certified for distribution. The Certification Agency was functioning with the twin objects of (1) quality control of the improved seeds offered to the growers for cultivation and (2)

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building up seed trade in the private and co-operative sector. It was expected that the major quality of seeds handled by the department was likely to be transferred to the seed trade\textsuperscript{26}. Production of certified seeds went up from 11,983 tons in 1980-81 to 19378 tons in 1982-83\textsuperscript{27}. The area registered under seed certification saw an impressive rise during 1989-90 to cross 33,000 hectares. The seed certification department scrutinizes sowing reports, verifies the seed source; undertakes field inspection to verify conformity to the prescribed field standards as per “Indian Minimum Seed Certification” and supervises the post-harvest seed crops. It also engaged in seed processing and seed sampling details of area registered, seed processed and seed certification in the district from the year 1981-82 to 1990-91\textsuperscript{28}.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area Registered (in. hectares)</th>
<th>Seed Processed (in. million. Tons)</th>
<th>Seed Certified (in million. Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82</td>
<td>1970.08</td>
<td>2475.221</td>
<td>2016.704</td>
</tr>
<tr>
<td>1982-83</td>
<td>1011.60</td>
<td>2934.678</td>
<td>2389.482</td>
</tr>
<tr>
<td>1983-84</td>
<td>1637.68</td>
<td>1055.609</td>
<td>2036.512</td>
</tr>
<tr>
<td>1984-85</td>
<td>2166.93</td>
<td>1440.375</td>
<td>1316.969</td>
</tr>
<tr>
<td>1985-86</td>
<td>1517.90</td>
<td>2172.413</td>
<td>1258.979</td>
</tr>
<tr>
<td>1986-87</td>
<td>1766.12</td>
<td>2144.718</td>
<td>1650.737</td>
</tr>
<tr>
<td>1987-88</td>
<td>2004.20</td>
<td>2711.270</td>
<td>2519.669</td>
</tr>
<tr>
<td>1988-89</td>
<td>2285.58</td>
<td>3109.466</td>
<td>222.742</td>
</tr>
<tr>
<td>1989-90</td>
<td>3538.48</td>
<td>2175.223</td>
<td>2016.704</td>
</tr>
<tr>
<td>1990-91</td>
<td>4616.37</td>
<td>3017.495</td>
<td>2766.471</td>
</tr>
</tbody>
</table>

\textsuperscript{26} T.E.A. 1972-73, Madras, 1974, p.23.
\textsuperscript{27} T.E.A. 1980-81, Madras, 1982, p.11.
\textsuperscript{28} Report of the Assistant Director of Seed Certification, Tiruchirappalli, dt 31 October 1994.
In the new agriculture strategy adopted by the Government of Tamil Nadu, seeds of quality and improved variety have an important role to play. The actual production of quality seeds for food grains and non-food grains have always been the targeted level since 1985-86. The later has been more conspicuous in its gap between targeted and actual productions. The quality of goods distributed in 1986-87 and 1987-88 at 28,589 tons and 30,491 tons respectively was lower than the 1985-86 level of 32,177 tons. The seed distributed on work was endorsed with the Primary Agricultural Co-operatives. The table given below indicates the quality of seeds distributed between 1985 and 1987.

<table>
<thead>
<tr>
<th>Crop</th>
<th>1985-86</th>
<th>1986-87</th>
<th>1987-88</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>15,416</td>
<td>15034</td>
<td>17545</td>
</tr>
<tr>
<td>Millets</td>
<td>1,610</td>
<td>1,627</td>
<td>1296</td>
</tr>
<tr>
<td>Pulses</td>
<td>2729</td>
<td>2683</td>
<td>2418</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>12,065</td>
<td>9001</td>
<td>8953</td>
</tr>
<tr>
<td>Cotton</td>
<td>357</td>
<td>244</td>
<td>275</td>
</tr>
</tbody>
</table>

Seed quality assurance has become an enforcing necessity in the face of spurious seeds distribution an easy priory seeds distribution becoming on the increase and ignorant farmers often became an easy prey to the fraud. It begins with the verification of authenticity of seed source and continues till tagging and sealing of the seed container.

The Improved seeds production under food grains had registered an impressive increase from 19,384 tons in 1985-86 to 29.886 tons in 1988-89. The

1988-89 level of production was also well above the target 22,541 tons\textsuperscript{30}. The seed certification agency and testing laboratories took care to maintain the quality of seeds. In 1977-78, 49 State Seed Farms, 3 Zonal Farms, 6 Seed Centers and 10 Model Orchard and Nurseries were engaged in the production and distribution of seeds and seedling conforming to the standards enforced by the certification agency attached to the Department. The Department also maintained 5 large seed processing units with a total capacity to process 8750 tons of seed supplemented by 36 small units capable of processing in all 10,800 tons of seeds\textsuperscript{31}. In 1978-79, 8651 tons of paddy seeds and 851 tons of millets seeds were distributed\textsuperscript{32}. The quantity of quality seeds distributed in the 1986-87, was 28589 tons and 1967-88, 30,491 tons\textsuperscript{33}. The seed distribution activity was handled by State Department of Agriculture and private agencies, a smaller 25 per cent being the coverage outside the Government fold.

\textbf{(C) Observation about Green Revolution}

Highlighting the effects of the Green Revolution, M.S.Randhawas\textsuperscript{34} observes that stable and restructured rural base with an equitable tenurial system paved the way to Green Revolution and can be accredited with its blooming to the present stage. It created a highly responsive agricultural and rural society which had absorbed the elements of improved agricultural technology. R.N. Chopra added that there was a serious regional imbalance in the impact of the Green Revolution in that less than 15 per cent of the area under food grains accounts for 50 per cent of the increasing in food grains production in the post Green Revolution period. Greater efforts were required for improving rice yields, particularly in the eastern regions, and for enhancing the productivity of rain fed

\begin{thebibliography}{99}
\bibitem{31} T.E.A. 1977-78, Madras, 1979, p.22.
\bibitem{32} T.E.A. 1978-79, Madras, 1980, p.20
\bibitem{34} Randhwas, M.S., \textit{Green Revolution}, 1974, p.45.
\end{thebibliography}
and dry land agriculture. M.S. Swaminathan has stated that slowly but surely the yellow colour of seeding of various crops started turning green due to increased development of chlorophyll as a result of better nutrition and this changed in colours popularly referred as Green Revolution.

S.C. Tewari has said that it solved the food problem, removed our dependence on food imports considerably, brought higher incomes to farmers and has given fillip to general economic development though its forward and backward linkages. Kahban and Bal have stated that as a result of the green revolution number of farm families in the lower income groups declined and higher income groups increased. Green Revolution though it has well advanced with its impact on production in Tamil Nadu it has own short comings as it covered only higher income groups. K. Deb said that it was confirmed only to the technological field and it brought, at best in technological revolution in agriculture. Its production potential has worn off in very recent years with growth rate of output not rising very far. The worst impact was the distribution of grains and even on employment. Therefore it was a gray revolution and not green revolution.

K. Venkatasubramaniyan argued that technology was adopted in the most assured irrigation areas and carried out on an experimental basis. Francine claimed that the introduction of Modern technology and the HYV programme had not only quickened the process of economic polarization in the rural areas but had

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38 Kahban and Bal, Factors Associated with Farm Family Investment Patterns", *Agricultural Development of India*, 1986, p.18.
also contribution to increasing enmity between landlords and tenants and land owners and landless labours\textsuperscript{41}. The careful analysis of the dimensions of the Green Revolution, revealed that it had a limited capacity to transform the agricultural economy of the region. The thrust of the Green Revolution was impeded by several factors as the problems of poor drainage, inadequate water, alkaline and saline nature of soil, non-availability of seed, fertilizer, plant production chemicals and in adequate quantities of farm equipments. A number of small farmers had no money to grow a second crop. In several areas the farmers could not raise platform for thrashing the paddy and others grains.

(D) Regulated Markets

Regulated markets play in important role in marketing of agricultural produce. The Madras Commercial Crops Markets Act, 1933 covered a few crops like tobacco, cotton, groundnut, turmeric, ginger or any other crop or product notified by the government as commercial crop for the purpose of this act. Subsequently, in 1959 Madras Agricultural Produce Market Act was exacted covering the entire agricultural produce\textsuperscript{42}. The purpose of the Act was to provide for better regulation of buying and selling of agricultural produce and the establishment and proper administration of markets in Tamil Nadu. Correct weighing and almost payments were ensured to the cultivators at the market yards. Apart from this, they had been provided with expert advice regarding market trend by the staff and temporary storage facilities in the yards\textsuperscript{43}.

The number of Regulated Markets functioning under the 13 District Level Market Committees increased from 209 in 1979-80\textsuperscript{44} to 270 in 1991-92\textsuperscript{45}.


\textsuperscript{42} Saravanan, K.R., \textit{op.cit.}, p.52


Including the 36 markets and the 305 market yards offer organised marketing facilities to the farmers. Agricultural produce handled at these ‘Market Yards’ during the year up to December 1991 was of 3.11 lakh tons\(^{46}\).

A steady rise in the quantum of agricultural produce transacted from 3.6 tons on an average per day by a vegetable market in 1989-90 to 5.5 tons in 1990-91 and further to 6.4 tons in 1991-92. Infrastructural facilities available in the market yards of the regulated markets were being improved with central assistance\(^{47}\). With a view to helping producers to get remunerative prices, commercial grading of agricultural commodities was being done at select assembling centers. During 1979-80, 25 centers were established. There were 77 commercial commodities graded in these centers which rose from 1.84 lakh tonnes in 1979-80 to 3.90 lakh tonnes in 1985-86\(^{48}\). To prevent adulteration in food stuffs and ensure quality of commodities to consuming public, 36 Agmark laboratories were functioning in Tiruchirappalli region. The quantity of agricultural commodities graded in commercial grading centers rose from 30.76 lakh quintals in 1983-84 to 38.96 lakh quintals in 1985-86. There were 11 kapas grading centers in the State to help cotton growers to get remunerative prices. The quantity of cotton kapas graded in these centers increased to 2.650 lakh quintals in 1991-92\(^{49}\).

(E) Co-operative Marketing

Although Co-operative marketing is accepted as a desirable goal, it has not attained wide adoption. Except a few marketing societies like Salem Co-operative Marketing Society, others failed to attract agricultural produce to their markets.

\(^{45}\) Ibid., p.29.
There were several reasons for the slow growth of Co-operative Marketing\(^{50}\). The majority of the marketing Co-operatives were functioning as commission agents and they were not in a position to serve the farmers with small marketable surplus and seeds. So the farmers preferred to sell in the villages on outright basis. Co-operative marketing involved more formalities than those sold to a money lender or traders. It might involve waiting for final settlement until sometime after the produce was delivered. The spirit of Co-operation was frequently lacking and individuals did not prove loyal. Competition from existing private agencies was strong and the people involved were influential. At present, there is an effective linking between the Co-operative marketing structures and the Co-operative consumers’ structure\(^{51}\).

The State had 114 Co-operative marketing societies which assisted their members in the marketing of agricultural produce and was securing a fair and reasonable return. In collaboration with these primary co-operative marketing societies and intension with the Tamil Nadu Consumer’s Co-operative federation, the Tamil Nadu Co-operative Marketing Federation undertook massive procurement of agricultural produce directly from the growers. The total value of agricultural produce marketed by co-operatives increased from Rs. 89.98 crore in 1981-82 to Rs. 149 crore in 1990-91\(^{52}\). The Tamil Nadu Co-operative Marketing Federation which was appointed as the agent of the government for a procurement of paddy under the price support scheme during 1980-81\(^{53}\) procured 2862 tons of paddy during the kuruvai season. During the samba season, it purchased from the open market 96,170 tons of paddy. The entire quantity of paddy thus procured by the federation had been taken over by the Tamil Nadu Civil Supplies Corporation for the use in the public distribution system.

\(^{50}\) Ibid., p. 54.

\(^{51}\) Ibid., p. 55.


(F) Agricultural Credit

The agriculture credit was sanctioned by Agricultural Credit Societies Government and Commercial Banks. The Co-operative Agencies, viz., Agricultural Credit Societies and Land Development Banks are the principal contributors to agricultural credit. In the composition of institutional farm credit, the share of these agencies has steadily increased from 43 to 58 per cent during the Fourth Plan and further to 63 per cent during 1974-75. Agricultural Credit Societies which are affiliated institutions to the District Co-operative Central Banks. The short and medium term credit required for agriculturists were met by these societies. The amount of credit disbursed by the institutions increased from Rs.78.82 crore in 1973-74 to 90.23 crore in 1978-79. Provisions of long-term credit to farmers for purpose of digging new wells, deepening existing wells, purchase of tractors, reclamation of waste lands etc, came within the preview of the 223 primary land development banks in the state. The loans issued by these banks could be brought under the categories of loans under normal programme under non-IDA, ARDC schemes and under IDA schemes.

With the emergence of specialized co-operative agencies for the provision of credit to the farm sector, the State Government started direct lending to agriculture in 1968. During 1974-75 Government credit to agriculture dropped to Rs. 1.41 crores from 1.88 crores in 1973-74. Government direct loans to agriculture constitute less than one per cent of the organised financial assistance to this sector. The increasing participation of commercial banks in farm credit has been quite pronounced with the spread of banking activity in rural areas since nationalization. But a sharp setback in the commercial bank credit to the farm...
sector was evidenced during 1974-75 and the total assistance by these institutions had dwindled to Rs. 58.40 cores in 1974-75 from Rs. 66.51 core in 1976-77\textsuperscript{58}.

(G) Relief Measures
The Government announced various concessions to agriculturists in May 1979\textsuperscript{59} on the basis of the recommendations of a high-level committee which went into their problems. These concessions relate to waiver of penal interest on all agricultural loans outstanding between 30\textsuperscript{th} June 1978 and 30\textsuperscript{th} June 1979, collection of normal interest on all medium-term conversion loans outstanding as on 30\textsuperscript{th} June 1978, consolidation of two or more conversion loans of a farmer outstanding as on 30\textsuperscript{th} June, 1978 into a single loan repayable over a period of 3 to 6 years and relation with the rate of interest on all medium term conversion loans with effect from 1\textsuperscript{st} January, 1979. Even with all these concessions, the recovery performance of co-operative was not encouraging\textsuperscript{60}.

(H) The Agro Engineering Services.
The Tamil Nadu Agro-Industries Corporation was incorporated in 1966 and has been functioning from 1968 with the broad objectives of encouraging industries which would help the growth and modernization of agriculture, animal husbandry, pisci-culture poultry farming and food processing industries\textsuperscript{61}.

The Tamil Nadu Agro Engineering and Service Co-operative Federation [ENCOFED] is functioning as an apex body with 155 block level Agro Engineering and Service Co-operative centers and 12 Districts Co-operative Agro Services Societies providing a package of Agro Engineering Services to rural farmers like custom-hiring of agricultural machineries and implements, service of

agricultural machinery and supply of Agricultural inputs like seeds, fertilisers, pesticides, agricultural implements and plan protection equipments, etc.

Besides the above normal programme, Tamil Nadu Agro Engineering and Service Co-operative Federation has been implementing the Government Special Schemes, like channelisation Scheme, under which diesel engine pumps sets and electrical motor pump sets were supplied to farmers under loan schemes. Under Save Grain Campaign Programme, Tamil Nadu Agro Engineering and Service Co-operative Federation was manufacturing and distributing Grain Storage Bins to the farmers with 25 per cent subsidy. Under Centrally Sponsored Scheme Farmers’ Agro Service Centre, Tamil Nadu Agro Engineering and Service Co-operative Federation was manufacturing and distributing improved agricultural implements and hand tools to the small marginal and Scheduled Caste / Scheduled Tribe farmers, under subsided rates.

(I) Special Schemes

The Small Farmers Development Agency (S.F.D.A) and the ‘Sub-marginal and Agricultural Labours Development Agency were constituted in 1970-71 based on the recommendations of the All-India Rural Credit Review Committee are in operation in five districts, namely Madurai, South Arcot, Salem, Tirunelveli and North Arcot. Those holding between two and three acres of wet lands or three and five acres of dry lands were defined as small farmers Marginal farmers were those owned one to two acres of wet or two to four acres of dry land. Those who own one acre and less of wet land or two acres of dry land come under the category of sub-marginal farmers. Agricultural labours were comprise those having a home-stead and earing 50 per cent or more of their income.

\(^{64}\) T.E.A. 1972-73, Madras, 1974, p.22.
The S.F.D.A is expected to benefit 50,000 small farmers and the other agency 20,000 marginal and Sub-marginal farmers and agricultural labours. The Scheme was aimed at enabling these farmers to maximise production on their small holding and to take up subsidiary occupations like poultry and sheep breeding which would generate additional income. The credit would be channelised through Co-operative institutions at the apex and the primary levels. The scheme also envisages the development of Co-operative marketing by linking up cultivation credit with marketing.\(^{65}\)

**(J) Dry Farming Schemes**

The main Objectives of this Scheme were:

1. Carrying out research in dry farming.
2. Practical application of the results on soil and moisture conservation practices.
3. Cultivation of drought tolerant and short duration crops.
4. Adoption of new techniques of fertilisation like foliar spraying of area and
5. Adoption of timely plant protection measures.\(^ {66}\)

The technical know-how and the inputs were made available on easy terms. Under this programme costly machinery items like power sprayers were kept in a pool and lent to ryots on normal rates. The Agriculture department extended

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advisory work on plant protection. Soil reclamation and water conservation were intensively undertaken with a view to improve the yield potentials considerably. A similar project for the benefit of red soil was being implemented in Pudukkottai taluk Tiruchirappalli district\(^67\). This the agricultural policy of the Government of Tamil Nadu was to promote the High Yielding Varieties of seeds and helping the farmers especially the small and marginal farmers through special schemes for increasing the agricultural production and to help the farmers in general to sell their products for reasonable prices through the regulated and Cooperative marketing.

3. AGRICULTURE IN THE REGIONAL CONTEXT OF TIRUCHIRAPPALLI

(a) Irrigation Development

Agriculture depends on irrigation and it is carried through natural and artificial means. Irrigation in Tamil Nadu dates back to several centuries. The river Cauvery and its distribution networks has been an ancient system and the branch channels were dug even 2000 years ago. In the past, irrigation was carried out to the fields by digging channels from the rivers without having any regulatory system to control the flow of water and the surplus being drained into the sea. In 1836, Major H.C Cotton constructed an Anicut across the Coleroon where the Coleroon flood carrier bifurcates from Aganda Cauvery\(^68\).

The major sources of irrigation in this district are canals covering 44.6 per cent of the total net area irrigated. Surface water schemes constitute 55.5 per cent of the total net area irrigated and of which canals cover 44.5 per cent and tanks supports 10.4 per cent. While wells (all types) cover 44.5 per cent of area irrigated

\(^68\) Refer Chapter II
to total net area irrigated. The irrigation schemes benefiting the district are Kattalai scheme, Cauvery Mettur Project, New Kattalai High Level Canal, and Kalingarayan Anicut.

The irrigation schemes are divided into Major, Medium and Minor Irrigation Schemes all irrigation schemes casting more than Rs.5 crore are classified under major schemes, schemes casting more than Rs. 50 lakh and less than Rs. 5 crore come under medium schemes and up to Rs.50 lakh are classified under special minor irrigation works. The financial limit of Rs. 50 lakh fixed in 1981 for all execution of minor irrigation works was enhanced to Rs. 100 lakh in1992\(^6^9\). There are 93 canals, 40 main river canals 9 drainages, 2 river basins, 103 anicuts and 3 reservoirs in the district. There are 246 tanks maintained by the PWD, 1266 Panchayat Union tanks and 1166 ex-zamin tanks in the district. The Public Works Department is mainly responsible for planning, execution and management of the irrigation system. The other rivers, which are tapped for irrigation in the district, are the Ayyan, Nandiar, Marudiyar, Vellar and Chinnar. Since these rivers originate within the district or from the hills in the adjoining district, they get their freshes during the north-east monsoon. Together these entire river channels including the Cauvery system benefit the district to the extent of 1.97 lakh acres\(^7^0\).

(i) Canal System

The greatest breadth of the river Cauvery in the district is about 15Km near the Upper Anicut. The total length of the river in the district is about 150 Km, nearly one-sixth of its length from source to sea. From the Cauvery, many

\(^6^9\) Report of the Chief Engineers (Minor irrigation) Chennai, dt 16 September 1991 and 13 March 1995 and Perment Works Department (Mis), G.O.No.1553, 6\(^a\) November 1995.


**New Katalai High Level Canal**

The New Katalai High Level Canal was built in the year 1959. It has an ayacut of 20622 acres, of which 12,284 acres are under indirect ayacut fed by 107 tank lying both in Tiruchirappalli and Thanjavur districts and the remaining 8328 acres are under direct irrigation lying entirely in Tiruchirappalli district\(^2\). The length of the canal is 133km and takes off from the right side of the Cauvery River above the Kattalai bed regulator. It derives the maximum benefits from the rains in the ayacut area. The crop season, both for direct and indirect irrigation, is fixed from 1 August to 15 December\(^3\).

During the period the surplus flows from Cauvery due to North East monsoon rains is also available for the filling of tanks. The supply for direct irrigation is given only in good normal years when the storage in Mettur reservoir is favorable. The feasibility of allowing supplies to this direct ayacut is notified every year after taking into account the monsoon conditions and Mettur storage.

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position in the last week of July. The supply of indirect ayacut is given whenever more than adequate supply is available at the Grand Anicut which may otherwise go to waste, provided that the normal and full irrigation requirements under the Cauvery in Thanjavur and Tiruchirappalli districts are met. Whenever the surplus, flow is less than 2150 c/s, the available surplus after deducting the requirements of the direct ayacut under the 2 canals, is divided between New Kattalai High level canal and Pullambadi canal in the ratio of 1:1. The order of priority of filling up the tanks in the tail end and lance, supply in the canal is to be maintained till all the tanks under the canal got filled up subject to the availability of surplus water. The canal is normally opened for direct irrigation during 1 August of every year when the level and storage in Mattur reservoir are 94’and 57431M.cft respectively. The canal is usually closed for irrigation on 15 December. Canal was opened on 15th August 1968 and supply was allowed from 23rd Feb 1969.

**Pullambadi Canal**

The Pullambadi Canal work was completed in the year 1959. It has an ayacut of 22,114 acres, of which 13283 acres are under indirect ayacut fed by 23 tanks and the balance of 8831 acres are under direct irrigation in Tiruchirappalli district. The canal is about 83 Km long and the crop season, both for direct and indirect irrigation, is fixed from 1 August to 15 December. During this period the surplus flow from the Cauvery is also be available for diversion to supplement the rainfall in the fields. The supply for direct irrigation is given only in good normal years when the storage in Mettur reservoir is favorable. The feasibility of allowing supplies to this direct ayacut is notified every year after taking the monsoon conditions and the storage position of Mettur reservoir in the last week of July. The supply to indirect to indirect ayacut is given whenever more than adequate supply is available at the Grand Anicut which may otherwise go to waste provided

that the normal and full irrigation requirements under the Cauvery in Tiruchirappalli and Thanjavur district are met. For this purpose, certain gauge levels at Kattalai bed regulator are fixed for each month and above which the supply is diverted to fill up the tanks to its full capacity of 1050 c/s. This supply, after meeting the requirements of direct ayacut, fills up the tanks once in nine days. The order of priority for filling up the tanks is from tail end and hence, supply in the canal is maintained fill all the tanks under the canal Jet filled up subject to the availability of water\textsuperscript{76}.

On those occasions the inlet and outlet regulators at Manodai and Andiodai and Vettakudi and drop-cum-regulator at M.5/1-4 are opened clear and closed as soon as the lower down tanks get filled up. Whenever there is scarcity of supply in respect of indirect ayacut, the available of surplus is utilised by regulating the tanks supply sluice by turn system. The canal is opened for direct irrigation on 1 August every year when the level and storage in Mettur reservoir are 94’ and 57431 M.cft respectively. The canal is closed for irrigation on 15 December.

(ii) Reservoirs

\textbf{Upper Reservoir Project}

Upper River, a distributor to Coleroon, originates from the surplus of Pulivalam taluk and Omandur big tank and small streams flowing from the high lands of Sathanur and Pulivalam reserve forests join with Upper. After traversing a distance of 48 Km towards South-East direction, it changes its course towards east and joins the Coleroon, near Alambodi village in Lalgudi taluk. Two major distributaries namely Kattaiyar and shanmuganadhi, originate in the Edumalai reserve forest and Manijakurichi reserve forest respectively, with the upper river below the Upper reserve site. Upper reservoir has a capacity of 80M.cft (2.265M.cm) and it benefits the dry tracts in Tiruchirappalli district. This project

\textsuperscript{76} M.S.A.R. 1956-57, Madras, 1958, p.86.
was sanctioned in 1980 and commissioned in 1986. The catchment area of the reservoir is 44.40 sq.km and the yields 176.69M.cft. The annual capacity of the project is 160M.cft and it has an ayacut area 1,785 acre.\footnote{Angadu Mohanakrishnan, \textit{History of Irrigation Development in Tamil Nadu}, Chennai, 2001, p.87.}

**Ponnaniar Reservoir Project**

The Ponnaniar is a jungle stream, which originates from Kadavur hills in Manapparai taluk, west of Tiruchirappalli district. It traverses towards east in Manapparai taluk from 32km and joins Ariyar which finally joins the river Cauvery. Since the area around Mugavanur Village in Manapparai taluk was barren land, this scheme was thought of and taken up for implementation in 1970 and commissioned in 1975 at a cost of Rupees one crore. This reservoir is located in Mugavanur village across the Ponnaniyar in between Semmalai and Perulmalai. The total catchment area is 33.60 sq.m and the total yield available is 362M.cft. The length of the spillway is 88.8’. The maximum flood discharge is 88.8 and the full reservoir level is 82.1. The total length of river bed is 770.\footnote{Velmani, K.S.K., \textit{op.cit.}, p.454.} The total ayacut is 850ha and the capacity is 119.7M.cft. The lands in Mugavanur village, had previously, no irrigation facility and had to depend solely on rain for raising dry crops. The scheme provides irrigation facilities for raising wet crops. By the construction of this reservoir, an extent of 1,830 acre of new lands and 271 acre of old lands were benefited\footnote{\textit{Ibid.}, p.309.} in the year 1970-71.

**Sidhamalai Reservoir Project**

The Sidhamalai reservoir was constructed across the Sidhamalai Odai near Kargudi Village in Udaiyarpalayam taluk. The construction work was taken up in February 1981 and completed in March 1990. Sidhamalai Odai originates in the high lands of Sennivanam Village of Ariyalur taluk. After traversing a distance of
27.2 Km through Ariyalur and Jayankondam taluks, it joins with river Coleroon near Anakkudi Village. The capacity of the reservoir is 6.422M.cm (226.86 M.cft). The catchment area is 216.2sq.km and the yield available is 923 M.cft. The reservoir has an ayacut of 5080 acre. The length of the dam is 5050 feet. The F.R.L., M.W.L., T.B.L. is 33.25cm. 33.25mm and 35.35mm respectively.

(iii) Underground Water Resources

Assessment of ground water potential involves evaluation of multidisciplinary aspects such as geology, hydrology and meteorology. Occurrence and movement of ground water is mainly controlled by geologic factors. Tiruchirappalli district has a unique character of having all geologic formations encountered in Tamil Nadu. Taking into consideration of hydrologic characteristics of various formations, the ground water potentials have been worked for the entire district. As in January, 1992 the utilisable ground water recharge was 1893.8 mcm, net draft (extraction) was 984.6 mcm and the balance of ground water potential available 902.20 mcm. The ground water level in the district has been monitored since 1971 through observation wells and bore holes. The ground water potential in the district is extracted by 49890 electrically energized wells, 23807 wells fitted with diesel pump sets, 52131 wells with bullock bailing system, 121 medium and deep tube wells and 10330 shallow tube wells. The balance of ground water potential indicated above is for the purpose of macro level planning.

b. Agricultural Research Activities

Farm Research

A Farm Science centre was started in the year 1977 when the Kumaraperumal Junior Polytechnic Trust donated a sum of Rs.2,00,000. The

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81 Ibid., p.11.
centre was named after the founder of the trust. The Tamil Nadu Agricultural University provided necessary infrastructural facilities for the establishment of Krishi Vigyan Kendra under the aegis of Indian Council of Agricultural Research (ICAR) with 100 per cent assistance. This is the first Krishi Vigyan Kendra established in Tamil Nadu\(^\text{82}\).

The Farm Science Centre is situated on the Tiruchirappalli-Dindigul National Highway in Navalur Kuttapattu village, 14km. away from Tiruchirappalli. The farm attached to the centre has 60 hectare of land divided into north and south blocks. Wet, garden, orchard and forage crops are raised in the northern block spreading over 40 ha. In the southern block, this spreads over 20 hectaer rain fed crops are raised. New High Level Kattalai Canal, fed from the river Cauvery supplies water for one season (August-December) to major part of northern block fields. Six open wells in the northern block have been used for the rest of the period for irrigation. Rice, Maize, Milliets like Sorgum, finger millet, and fox tail millet, pulses like cowpea, blackgram, greengram, and oil seeds like sunflower, castor, gingelly and groundnut and different types of gross and leguminous fodder are grown. A model orchard in an area of 7.5ha is maintained. Mango, Guava, Sappota, Pomergranate, Jack, acid line West Indian Cherry, wood apple, etc, are grown. A model dairy, jellicherry, goat and a poultry unit are maintained on scientific lines along with a model biogas plant\(^\text{83}\).

**College of Agricultural Engineering at Kumulur**

Training and testing institute started functioning from 1993 at Tiruchirappalli to impart training to farm youth in operation and maintenance of agricultural equipments and for providing testing facilities for new farm

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\(^{82}\)Report of the Principal, ICAR, Farm Science Centre, Tiruchirappalli, 1992.

\(^{83}\)Ibid.
machineries manufactured in the state. The changing Socio-economic situations prevailing in the state warrant the selective mechanization of agricultural operations to increase production and productivity. In order to develop technical manpower and improved agricultural technology in the fields, the College of Agricultural Engineering has been established. This was the only institution of its kind in the whole of Tamil Nadu. It was located at Kumulur, on Laligudi-Padalur road, which are 7km from Laligudi and 25km from Tiruchirappalli. Research activities on crop improvement, crop management and crop production were going on in this college to keep on with the advance in agricultural engineering. This centre concentrated on the developments of varieties with high yield and quality fruits and ability to withstand the diseases. Subsequently, this college was shifted to Navalur Kuttapattu and elevated as an Agricultural University, Tiruchirappalli.

**National Research Centre on Banana, Podavur (NRCB)**

The National Research Centre on Banana was established in 1993, at Podavur, 15km from Tiruchirappalli Junction. The water from the Cauvery makes this district fertile which facilities banana cultivation. The district is noted for popular varieties like nendran, poovan, rasthali, Karpuravalli and robusta. Which are raised in abundance with a total area of 22,000 ha. and with the highest productivity of 40-45 tons per hectares. Considering the vital role that the district plays in banana cultivation the Indian Council of Agricultural Research (ICAR) was established at Podavur. Long periods of domestication and varying growing conditions resulted in the development of a wide range of banana varieties in the country. The first task of National Research Centre on Banana, (NRCB) is to collect and conserve the valuable genetic resources which are not fully utilized and well documented and use them for improvement through conventional breeding and biotechnology. Many commercial varieties have faced serious threats from diseases like wilt bunched, top and leaf spot apart from pests and bad weather. The centre concentrates on the development of varieties with high yields and quality
fruits and ability to withstand the above threats. The NRCB has been recognised as one of the centre in the world for testing the hybrids developed at international level in collaboration with the International Network for Improvement of Banana and Plantation (INIBAP), France. Initially four hybrids from hundreds are resistant to major diseases like panama wilt and sigatoka leaf spot are being multiplied for testing at NRCB. The centre also aims at enhancement of productivity by developing cost effective production technology\textsuperscript{84}.

**State Horticultural Farm, Mudalaipatty**

This farm was started on 1 February 1978 in an area of 23.96 ha. It is situated 20 km from Tiruchirappalli Junction towards west Ettarai road. The farm is under the control of the Assistant Director of Horticulture, Tiruchirappalli. The farm services as a source for production and supply of good quality fruit plant, Houser, Ornamental plants and certified vegetable seeds to farms. Coconut, Casuarinas, Babul, Cruava and Paddy seeds are cultivated in the farm\textsuperscript{85}.

**Sugarcane Research Station, Sirugarmani**

The Sugarcane Research Station was originally started in Kumaramangalam village in Kulithalai taluk on 5 September 1957 in an area of six acres and the area was expanded to 24.93 ha, in stages. The alkaline nature of soils and lack of proper drainage facilities necessitate the shift of the site to Sirugamani from December 1959. This Research station located in the Cauvery Delta Zone is the only station in Tamil Nadu to cater to the needs of flow irrigation tract. Periavaikal and Kalluvaikkal are the main irrigation sources which irrigate an area of 22.66 ha here. The Sugarcane Research Station caters to the needs of the Sugarcane growers in the delta zone by providing sugarcane varieties suitable for cultivation in the heavy soils and selection of new varieties evolving

\textsuperscript{84} Velmani, K.S.K. *op.cit.*, p.420.
new economic practices for delta area. This helps the farmers increase their production through inter-disciplinary approaches including scientific pealing, canopy management, recycling of nutrients, efficient water management, bio-control and intergrated management of pest and diseases. The use of tissue culture techniques has the unique advantage of faster multiplication of elite and high yielding banana mother plants, developing disease-free plants with uniform flowering and overall reduction in the crop duration by 30 to 40 days\textsuperscript{86}.

c. Agricultural Development

Land Utilisation Pattern in Tiruchirappalli

The total geographical area of the district in the year 1975-76 was 1112090 ha and it continued to be so till 1978-79. A negligible decline was noticed in the year 1979-80, the area totaled to 1112089 ha and it was the same during the year 1980-81. The total geographical area increased to 1112563 ha in 1981-82 and continued to be so till 1988-89. In the year 1989-90, the total area decreased by 0.08 per cent and again during 1990-91 the area, further decreased by 1.14 per cent, and it was 1099011ha\textsuperscript{87}.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Forest</td>
<td>77974</td>
<td>55391</td>
<td>75615</td>
<td>79534</td>
</tr>
</tbody>
</table>

\textsuperscript{86} Report of the Professor and Head, Sugarcane Research Station, Sirugamani, dt, 18 November 1992.
\textsuperscript{88} Report of the Joint Director of Agriculture, Tiruchirappalli, 1991.
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Barren and uncultivable land</td>
<td>40528</td>
<td>36331</td>
<td>35565</td>
<td>33687</td>
</tr>
<tr>
<td>3.</td>
<td>Land put to Non-agricultural uses</td>
<td>145910</td>
<td>160963</td>
<td>155832</td>
<td>160197</td>
</tr>
<tr>
<td>4.</td>
<td>Cultivatable Waste land</td>
<td>45529</td>
<td>44586</td>
<td>25914</td>
<td>34825</td>
</tr>
<tr>
<td>5.</td>
<td>Permanent pasture and other grazing land</td>
<td>40693</td>
<td>27625</td>
<td>26237</td>
<td>17025</td>
</tr>
<tr>
<td>6.</td>
<td>Small under miscellaneous tree crops and groves not included</td>
<td>16697</td>
<td>13134</td>
<td>137200</td>
<td>14558</td>
</tr>
<tr>
<td></td>
<td>into the net area sown.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Current fallow</td>
<td>133498</td>
<td>247918</td>
<td>158773</td>
<td>203981</td>
</tr>
<tr>
<td>8.</td>
<td>Other fallow</td>
<td>32301</td>
<td>26743</td>
<td>91972</td>
<td>34415</td>
</tr>
<tr>
<td>9.</td>
<td>Net area sown</td>
<td>878660</td>
<td>499398</td>
<td>528935</td>
<td>533498</td>
</tr>
<tr>
<td>10.</td>
<td>Total geographical area</td>
<td>1112090</td>
<td>1112089</td>
<td>1112563</td>
<td>1112570</td>
</tr>
<tr>
<td>11.</td>
<td>Area sown more than once</td>
<td>79368</td>
<td>60816</td>
<td>41259</td>
<td>N.A</td>
</tr>
</tbody>
</table>

**Size of Agriculture Holdings**

The size group wise distribution of agricultural holding according to agricultural census 1985-86 in Tiruchirappalli district as follows.\(^9\)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Size Class</th>
<th>Holding No</th>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.02-0.50</td>
<td>242551</td>
<td>62454.56</td>
</tr>
<tr>
<td>2</td>
<td>0.50-1.00</td>
<td>153200</td>
<td>105476.03</td>
</tr>
<tr>
<td>3</td>
<td>1.00-2.00</td>
<td>127657</td>
<td>181074.88</td>
</tr>
<tr>
<td>4</td>
<td>2.00-3.00</td>
<td>49074</td>
<td>119004.16</td>
</tr>
<tr>
<td>5</td>
<td>3.00-4.00</td>
<td>23526</td>
<td>80733.51</td>
</tr>
<tr>
<td>6</td>
<td>4.00-5.00</td>
<td>12530</td>
<td>55944.54</td>
</tr>
<tr>
<td>7</td>
<td>5.00-7.50</td>
<td>13165</td>
<td>78963.36</td>
</tr>
<tr>
<td>8</td>
<td>7.50-10.00</td>
<td>4613</td>
<td>39199.53</td>
</tr>
<tr>
<td>9</td>
<td>10.00-20.00</td>
<td>3470</td>
<td>44926.08</td>
</tr>
<tr>
<td>10</td>
<td>20.00-30.00</td>
<td>307</td>
<td>7236.10</td>
</tr>
<tr>
<td>11</td>
<td>30.00-40.00</td>
<td>41</td>
<td>1359.19</td>
</tr>
<tr>
<td>12</td>
<td>40.00-50.00</td>
<td>12</td>
<td>525.50</td>
</tr>
<tr>
<td>13</td>
<td>50.00-and above</td>
<td>12</td>
<td>1027.63</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>630158</strong></td>
<td><strong>777929.79</strong></td>
</tr>
</tbody>
</table>

**Total Production of Dry Crops**

Paddy, Cholam, Cumbu, Varagu, Samai, and Ragi are important cereals being cultivated during Kharif and Rabi seasons in the district. Maize is also cultivated as a single crop. Korra is mainly grown in certain pockets of the
Cauvery river bed and is raised during Kharif and Rabi seasons. Redgram, Blackgram, Greengram, Mochai and Bengal Gram are important pulses grown during Khaif season. Horsegram is an important crop grown during Rabi season. Avarai is a minor crop cultivated during Rabi season. Under condiments and spices, coriander and chilies are important crops followed by turmeric and tamarind. Garlic is cultivated in small area and sugarcane is an important crop cultivated in large areas. Palmyra is grown in small area. Under fresh fruits, Banana occupies major areas followed by Mangoes, Jack fruits, Guava, Grapes and Pineapple are grown in small area. Under fibre, cotton is grown in large areas. Groundnut is grown in large areas during winter period. Mustard, Sunflower and Soya bean are minor crops. Among non-edible oil seeds castor is cultivated in large areas. Indigo is cultivated here and there. Betel vine and tobacco are raised in some areas in the district. Eucalyptus, Casuarinas, Bamboo, Mulberry, Babul crops, which were not popular in the district till 1985, are being cultivated as a result of various schemes introduced by Government.

Paddy is cultivated in three seasons in a year from 1987-88 onwards Kari Kuruvai / Seravari/ come under first season. Samba thalady / aishanam and Navarai / Kodai come under second and third respectively. Total area in which Paddy was cultivated during the year 1975-76 was 160482 ha and it increased to 187325 ha in 1979-80. The total area decreased to 102077 ha, and 92682 ha during the years 1985-86 and 1990-91 respectively. Cholam is another major crop was cultivated in 149152 ha. The area decreased to 106086 ha during 1980-81 and should a fluctuation in area and it was 142713 ha in 1985-86 and 12903 ha in 1990-91. The total area under cumbu during 1970-71 was 94300 ha and it decreased to 73179 ha in 1980-81 and 67914 ha in 1985-86 and it was 61012 ha in

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93 Ibid., p. 66.
1990-91. Ragi was cultivated in an area of 7479 ha in 1975-76 and the area decreased to 3952 ha in 1980-81. After variations in area, it decreased to 1199 ha in 1990-91. Varagu, millet, was cultivated in an area of 46268 ha in 1975-76 and the area came down to 42734 ha in 1980-81. The area under the crop varied 1980-81 to 1990-91 and it was 16450 ha in 1990-91. The total area under cereals was 460063 ha in 1975-76, which decreased to 377324 ha in 1980-81, 358085 ha in 1985-86 and 303546 ha in 1990-91. The total area under pulses during 1975-76 was 34341 ha and it decreased to 21755 ha in 1980-81. After variations in area between 1981-82 and 1989-90, the total area was 43157 ha in 1989-90 and 39476 ha in 1990-91. Total area under food grains during 1970-71 was 494404 ha and it decreased to 3990979 ha in 1980-81; 380661 ha in 1985-86 and 343022 ha in 1990-91. Total area under condiments and spices was 24622 ha in 1975-76, 31378 ha in 1980-81 and 31350 ha in 1990-91. The area under food crops totaled to 566646 ha in 1975-76 and it decreased to 485208 ha in 1980-81. After fluctuations in area, between 1980-81 and 1990-91, the total area under food crops was 450670 ha in 1990-91. Area under both edible and non-edible oilseeds totaled 83638 ha in 1980-81 and 80318 ha in 1985-86. During 1975-76, the total area under food crops was 566646 ha, and non-food crops were 91382 ha. The area during 1980-81 was 485208 ha under food crops and 75006 ha under non-food crops. In 1990-91, the area under food crops was 450670 and 124241 ha in 1990-91. Area cropped more than once and net cropped area during 1975-76 was 79368 ha and 578860 ha respectively. The area cropped more than once 29338 ha and net cropped area 545578 ha in 1990-9194.

Major crops cultivated under irrigation are Paddy, Cholam, Cumbu, Ragi, Blackgram etc. Area irrigated under Paddy, Cholam, Cumbu, Ragi was 144913 ha 12604 ha 4809 ha and 144 ha respectively during 1975-76. The total irrigated areas under cereals during 1975-76 were 174128 ha. It increased to 199184 ha in

The total irrigated area for pulses during the year 1975-76 was 294 ha and it increased to 1201 ha in 1978-80. The irrigated area under pulses varied between 1981-82 and 1985-86 and afterwards it showed an upward trend. Actually, the irrigated pulse crop land in 1990-91 was 5367 ha. The total irrigated area under food grains during 1975-76 was 174422 ha which increased to 200385 ha in 1979-80. The total irrigated area varied between 1980-81 and 1990-91. The area during the years 1983-84, 1986-87, 1989-90 and 1990-91 was 138128 ha, 94401 ha, 106919 ha and 89663 ha respectively.

**Yield of Crops per Hectare**

The yield of rice under first, second and third season during 1975-76, was 2138 kg, 2016 kg, and 2016 kg respectively. This shows that the normal yield was high during the second season. The yield under rice-combined was 2016 kg in 1975-76. The yield of Cholam and Combu was high during the rabi season, recording 1774 kg and 1225 kg respectively. The yield of the above crops during the kharif season of the same year was 638 kg and 535 kg. The yield of ragi was high under irrigated condition the crop yielded 796 kg/ha in 1975-76. The yield of maize was 1064 kg. In 1975-76 and Korai yield was the same during kharif and rabi there was a marked increase in yield rate of rice during the years 1985-86 and 1990-91.

The yield of rice in the first season of the years 1985-86 and 1990-91 was 2540 kg and 4080 kg respectively. In the second season, it was 2739 kg and 3118 kg and under the third season it was 2573 kg and 3527 kg. The yield of Cholam during 1985-86 under kharif season was 944 kg and under rabi season it was 1315 kg. During 1990-91 it was 933 kg and 1500 kg under kharif and rabi season.

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96 Velmani, K.S.K., op.cit., p.402.
respectively. A detail of area under important crops in the district during 1979-80 is given below.

<table>
<thead>
<tr>
<th>Crops</th>
<th>Area under Crops (in Hectares)</th>
<th>Area irrigated (in Hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>1,87,325</td>
<td>1,69,056</td>
</tr>
<tr>
<td>Cholam</td>
<td>1,30,012</td>
<td>12,750</td>
</tr>
<tr>
<td>Cumbu</td>
<td>80,070</td>
<td>13,516</td>
</tr>
<tr>
<td>Ragi</td>
<td>4,711</td>
<td>3,077</td>
</tr>
<tr>
<td>Varagu</td>
<td>53,434</td>
<td>522</td>
</tr>
<tr>
<td>Pulses</td>
<td>36,718</td>
<td>1,201</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>13,708</td>
<td>13,708</td>
</tr>
<tr>
<td>Gingelly</td>
<td>22,788</td>
<td>2,372</td>
</tr>
<tr>
<td>Groundnut</td>
<td>66,825</td>
<td>26,206</td>
</tr>
<tr>
<td>Cotton</td>
<td>5,670</td>
<td>2,394</td>
</tr>
<tr>
<td>Total</td>
<td>601261</td>
<td>244802</td>
</tr>
</tbody>
</table>

**Horticulture**

Tiruchirappalli district has good potential for horticulture development. Wide range of horticulture products such as mango, guava, sapota, banana, citrus, cashew, chillies, coriander and all types of plain vegetables are cultivated in the district. Of them Banana, Citrus fruit mangoes and cashews are the major fruit crops. For increasing the production of horticulture crops, government is implementing Integrated Horticulture Development Programme from 1989 onwards and Integrated Tribal Development Programme since 1980. The Government Horticulture Farm at Mudalaipatti was monitored by the Deputy Director of Horticulture at Tiruchirappalli, functioning from 20 April 1988. Under
the Integrated Horticultural Development Programme, good quality fruit saplings are distributed to the small and marginal farmers. Technical advice on the maintenance of the orchards in a better way is also offered. To improve the production of vegetables governments have supplied vegetable privileges containing seeds of high yield variety. It helps those who grow various kinds of spices to produce improved varieties of spices.

Out of the total cultivable land, (5.30 lakh ha) 20 per cent (13 ha) is under horticultural crops in the district. Failure of monsoon and non-involvement of farmers render more than 1.75 lakh ha as current fallow. Horticulture Development Department is taking steps to convert the permanent fallow lands as well as the possible current fallow under productive one through horticulture crops. The table given below indicates the area under different horticulture crops.  

81 Ibid., p.409.
98 Report of the Deputy Director of Horticulture, Tiruchirappalli, 1992

113
### Area Under cultivation of Horticulture Crops from the year 1980-81 to 1989-90 (In Hectares)

<table>
<thead>
<tr>
<th>Year</th>
<th>Chilies</th>
<th>Coriander</th>
<th>Turmeric</th>
<th>Banana</th>
<th>Mango</th>
<th>Jack</th>
<th>Guava</th>
<th>Grapes</th>
<th>Acidime</th>
<th>Cashew</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>26626</td>
<td>Na</td>
<td>N.A</td>
<td>32403</td>
<td>3776</td>
<td>384</td>
<td>182</td>
<td>72</td>
<td>1199</td>
<td>42176</td>
</tr>
<tr>
<td>1981-82</td>
<td>11233</td>
<td>14237</td>
<td>941</td>
<td>10855</td>
<td>1573</td>
<td>113</td>
<td>73</td>
<td>44</td>
<td>533</td>
<td>17203</td>
</tr>
<tr>
<td>1982-83</td>
<td>13381</td>
<td>27856</td>
<td>556</td>
<td>10425</td>
<td>1459</td>
<td>139</td>
<td>76</td>
<td>35</td>
<td>552</td>
<td>11572</td>
</tr>
<tr>
<td>1983-84</td>
<td>10436</td>
<td>21957</td>
<td>719</td>
<td>10444</td>
<td>1459</td>
<td>144</td>
<td>76</td>
<td>34</td>
<td>602</td>
<td>17841</td>
</tr>
<tr>
<td>1984-85</td>
<td>11750</td>
<td>22040</td>
<td>1300</td>
<td>12115</td>
<td>1522</td>
<td>150</td>
<td>79</td>
<td>32</td>
<td>662</td>
<td>18862</td>
</tr>
<tr>
<td>1985-86</td>
<td>14239</td>
<td>21689</td>
<td>1595</td>
<td>12611</td>
<td>1587</td>
<td>161</td>
<td>85</td>
<td>30</td>
<td>751</td>
<td>20908</td>
</tr>
<tr>
<td>1986-87</td>
<td>11197</td>
<td>13666</td>
<td>17782</td>
<td>12857</td>
<td>1570</td>
<td>151</td>
<td>74</td>
<td>33</td>
<td>731</td>
<td>21882</td>
</tr>
<tr>
<td>1987-88</td>
<td>10342</td>
<td>25166</td>
<td>997</td>
<td>12557</td>
<td>1063</td>
<td>540</td>
<td>70</td>
<td>31</td>
<td>777</td>
<td>23427</td>
</tr>
<tr>
<td>1988-89</td>
<td>11848</td>
<td>18850</td>
<td>1280</td>
<td>12740</td>
<td>1145</td>
<td>555</td>
<td>71</td>
<td>36</td>
<td>605</td>
<td>24068</td>
</tr>
<tr>
<td>1989-90</td>
<td>16103</td>
<td>17539</td>
<td>751</td>
<td>13259</td>
<td>1253</td>
<td>540</td>
<td>76</td>
<td>30</td>
<td>607</td>
<td>24453</td>
</tr>
<tr>
<td>1990-91</td>
<td>10948</td>
<td>18752</td>
<td>457</td>
<td>16092</td>
<td>1287</td>
<td>522</td>
<td>78</td>
<td>30</td>
<td>585</td>
<td>25204</td>
</tr>
<tr>
<td>1991-92</td>
<td>12272</td>
<td>16077</td>
<td>585</td>
<td>14388</td>
<td>1390</td>
<td>484</td>
<td>87</td>
<td>21</td>
<td>590</td>
<td>25394</td>
</tr>
</tbody>
</table>

Among the fruit crops, banana occupied a prime position both because of its economic value and the vastness of the area in which it has been cropped. Banana is essentially a humid tropical plant, coming up well in regions with temperature ranges of 10 to 40°C and an average of 23°C. In cooler climate the duration is extended. Sucker production is affected and bunches smaller low temperatures (less than 10°C) are unsuitable since they lead to a condition called choke or impeded inflorescence and bunch development. Heavy rainfall and huge temperature throughout the year is suitable for banana.

Normally banana plantation is done in three seasons June-July, November-December and March-April. However June-July plantation, which gives about 1 ½ times yield, is more preferred than any other period. Winter plantation gives the lowest yield. Banana suckers can be planted throughout the year especially during the rainy season. The soil factors that affect banana cultivation are depth and drainage. Clay soils that are compact drained and badly aerated are deficient in nutrients and unresponsive to fertilizers. In such soils banana growth is very poor. The minimum depth necessary is about a meter. Plant space is also vital for healthy growth and good yield of banana crop. The common spacings for different banana crops are given below.

<table>
<thead>
<tr>
<th>Crop variety</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poovan</td>
<td>2.13m x 2.13m</td>
</tr>
<tr>
<td>Poovan</td>
<td>-</td>
</tr>
<tr>
<td>Monthan</td>
<td>2.1m x 2.1m</td>
</tr>
<tr>
<td>Rasthali</td>
<td>2.1m x 2.1m</td>
</tr>
<tr>
<td>Dwarf</td>
<td>1.7m x 1.7m</td>
</tr>
<tr>
<td>Nendran</td>
<td>1.8m x 1.8m</td>
</tr>
<tr>
<td>Hill banana</td>
<td>2.4m x 3.0m</td>
</tr>
</tbody>
</table>


Research conducted on the yield of important varieties normally Nendran, Poovan and Rasthali suggest the application of the following fertilizer combination:

(a) **Nandran**: NP and K at 210, 35 and 450kg/plant in 3 splits on 3\(^{rd}\), 5\(^{th}\) and 7\(^{th}\) months after planting.

(b) **Rasthali**: NP and K at 210,50 and 350g/plant in 3 splits or 3\(^{rd}\), 5\(^{th}\) and 7 months after planting.

(c) **Poovan**: NP and K at 160, 50 and 350g/plant in 3 splits or 3\(^{rd}\), 5\(^{th}\) and 7 months after planting.

Crop yield varies according to season, crop, variety, climatic factors and soil conditions. The following table indicates the yield of different varieties per acre.

**Harvesting of Bunches (per acre) during different seasons\(^\text{100}\)**

(No of mean Bunches)

<table>
<thead>
<tr>
<th>Banana Variety</th>
<th>Massi Pattam</th>
<th>Adi Pattam</th>
<th>Karthi Pattam</th>
<th>Chitarai Pattam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poovan</td>
<td>850</td>
<td>700</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td>Rasthali</td>
<td>750</td>
<td>600</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>Nendran</td>
<td>1000</td>
<td>-NA-</td>
<td>-NA-</td>
<td>-NA-</td>
</tr>
</tbody>
</table>

Marketing channels are pre-harvest sale on contract basis, post-harvest private auction and government sponsored auction sale. Among the three types pre-harvest sale on contract basis is the most desired from the producer’s point of view. The season cited for opting the pre-harvest channel are: (1) fear of risk, (2) contingency requirements, (3) time factor, (4) hazards of post-harvest sale, (5) fear of fluctuating market price, (6) shortage of time to spare on market searching and (7) too small crop size. Thus Tiruchirappalli region is famous for various types of fruit crops particularly the banana fruits.

\(^{100}\) Velmani, K.S.K., *op.cit.*, p.420.
Sericulture

Sericulture is a major income generating sector in which a large number of people earn their livelihood. Since the early 1980 sericulture in Tamil Nadu has been undergoing a significant transformation. Expansion of the Mulberry cultivable area under irrigation with improved varieties of Mulberry and silkworm and provision of services like input supply, extension credit and marketing support for the farmers have contributed significantly to the development of sericulture in Tamil Nadu. The Government is creating infrastructure facilities and strengthening existing ones. The total new areas under mulberry cultivation in Tiruchirappalli district in March 1985 was 1,711.5 acres and the total cocoon production was 1,58,634 kg. They account for 5.58 per cent of the total mulberry area and 2.12 per cent of the total cocoon production in Tamil Nadu. Sericulture is usually a rural based activity. The early stages of mulberry cultivation and cocoon production are labour intensive. Sericulture provides a source of income to marginal and small farmers and landless labourer. Tiruchirappalli district is one of the ten World Bank Project Districts selected for the implementation of sericulture scheme. This project which was started during the year 1989-90 envisages bringing additional 1000 acres under mulberry cultivation in the district. During 1991-92 about 600 acres were brought under mulberry cultivation with the involvement of 875 Sericulturists in silkworm rearing.

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The year wise area under mulberry cultivation from 1984-85 to 1991-1992 is given in the following table.\(^{102}\)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the taluk</th>
<th>Area in acres.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Musiri</td>
<td>80.95</td>
</tr>
<tr>
<td>2</td>
<td>Kulithalai</td>
<td>37.90</td>
</tr>
<tr>
<td>3</td>
<td>Manaparai</td>
<td>70.10</td>
</tr>
<tr>
<td>4</td>
<td>Perambalur</td>
<td>39.15</td>
</tr>
<tr>
<td>5</td>
<td>Karur</td>
<td>213.40</td>
</tr>
<tr>
<td>6</td>
<td>Tiruchirappalli</td>
<td>23.65</td>
</tr>
<tr>
<td>7</td>
<td>Thuraiyur</td>
<td>91.20</td>
</tr>
<tr>
<td>8</td>
<td>Lalgudi</td>
<td>23.30</td>
</tr>
<tr>
<td>9</td>
<td>Ariyalur</td>
<td>18.00</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>597.65</strong></td>
</tr>
</tbody>
</table>

The planting of the mulberry commences in the months of June and leads up to November of every year. During September and October mulberry is cultivated in large areas. In summer, the temperature in the district is maximum and most of the farmers are advised to adjust the pruning schedule of mulberry garden so as to avoid silkworm rearing in the months of August and May.

The agricultural policy framework adopted by the government of Tamil Nadu along with the development of irrigation, introduction of new fertilizers and seeds, and the promotion of agricultural research activities led to the increase in the production of paddy, other food grains and fruits. Tiruchirappalli supplied paddy, other food grains and the varieties of banana fruits to the neighboring districts and sometimes to the neighboring states like Kerala. The excessive utilization of fertilizer and feticides affected the fertility of the soil. The utilization of natural manure and environmental friendly pesticide would protect the productivity of the soil and promote sustainable agricultural development.

\(^{102}\) Ibid.,