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CHAPTER - III

METHODOLOGY AND PROFILE OF THE STUDY AREA

3.1 INTRODUCTION

This chapter attempts to discuss the methodology adopted for the study. Further, it describes the profile of the study area.

3.2 METHODOLOGY

In this section an attempt has been made to describe the methodology of the present study. It includes Choice of the study area, Sampling technique, Procedure for collection of data, Period of the study, Method of analysis, Tools for analysis and the Measurement of variables used in the present study.

3.2.1 Choice of the Study Area

Tirunelveli district is one of the most important districts of Tamil Nadu, where there has been a significant progress in agricultural development since the year 1960. The main food crop in the district is paddy and 68 per cent of ayacat is double cropped land in Tirunelveli District that comprises 19 blocks. Paddy is mainly cultivated in almost all the blocks. Among the 19 blocks in Tirunelveli District, Ambasamudram block, Cheranmahadevi block, kadayam block and Pappakudi block shows the largest area under paddy cultivation. As per statistical records of the block, more than 60 per cent of the farmers have adopting new farm technology in their paddy cultivation. Hence, the researcher has chosen the sample respondents in the highest paddy cultivating areas of Tirunelveli district.
3.2.2 Sampling Technique

The Proportionate random sampling method has been adopted for the present study with Tirunelveli District as universe. Tirunelveli District comprises of 19 blocks. All 19 blocks were assigned in a descending order according to the area of agricultural land under cultivation of paddy. Among these first four blocks were chosen for the study namely Ambasamudram block, Cheranmahadevi block, Kadayam block and Pappakudi block. The panchayat villages of these four blocks were assigned in descending order according to the area under cultivation in each village. Out of the total number of villages listed, the first 4 villages were selected from each of four blocks namely Ambasamudram, Cheranmahadevi, Kadayam and Pappakudi block for the purpose of the study, thus making the total number of selected villages are 16. In all 16 villages, farmers were divided into Mechanized and Non-Mechanized. Among the Mechanized farmers, 250 farmers were selected by adopting proportionate random sampling method. Similarly, 250 Non-Mechanized farmers were chosen randomly from the group of Non-Mechanized farmers. Thus, the total sample of 500 farmers each 250 sample farmers from the total number of mechanized and non-mechanized farmers were randomly chosen separately for the purpose of the study.

3.2.3 Mechanized and Non-Mechanized Farm(er)s

The mechanized farm(er)s who have adopted mechanization in all the stages of cultivation activities till harvesting of paddy are considered as Mechanized farm(er)s for the present study.

The non-mechanized farm(er)s who have not adopted mechanization fully in their various stages of cultivation of paddy are treated as Non-mechanized farm(er)s.
3.2.4 Categorization of Small and Large Farmers

As per management studies in India, the farmers who are cultivating less than 5 acres are categorized as small farmers, and those who are cultivating 5 and above acres are categorized as large farmers for the present study. Sample farmers were post-stratified into two categories namely small and large groups. Out of 250 mechanized farmers, 162 farmers (64.8 percent) came under small farmer category and the remaining 88 (35.2 percent) farmers fall under large farmer group. In the case of non-mechanized farmers, out of 250, 170 farmers (68 percent) belong to small farmer group and 80 farmers (32 percent) fall under large farmer category.
## TABLE 3.1

**NAME OF THE VILLAGE AND NUMBER OF FARMERS SELECTED**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Block and Villages</th>
<th>Mechanized farmers</th>
<th>Non-mechanized farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total number of farmers</td>
<td>Sample respondents</td>
</tr>
<tr>
<td>I</td>
<td>AMBASAMUDRAM (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Aiyansingampatty</td>
<td>456</td>
<td>25</td>
</tr>
<tr>
<td>2.</td>
<td>Bramadesam</td>
<td>344</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>Vellanguli</td>
<td>298</td>
<td>17</td>
</tr>
<tr>
<td>4.</td>
<td>Mannarkovil</td>
<td>167</td>
<td>9</td>
</tr>
<tr>
<td>II</td>
<td>CHARANMAHADEVI (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Moolachi</td>
<td>235</td>
<td>13</td>
</tr>
<tr>
<td>6.</td>
<td>T.arivyanayagipuram</td>
<td>401</td>
<td>22</td>
</tr>
<tr>
<td>7.</td>
<td>Vadakku Karukuruchi</td>
<td>328</td>
<td>18</td>
</tr>
<tr>
<td>8.</td>
<td>Koniyoor</td>
<td>254</td>
<td>14</td>
</tr>
<tr>
<td>III</td>
<td>KADAYAM (23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Keela Ambur</td>
<td>196</td>
<td>12</td>
</tr>
<tr>
<td>10.</td>
<td>Siva Sailam</td>
<td>421</td>
<td>23</td>
</tr>
<tr>
<td>11.</td>
<td>Pappankulam</td>
<td>146</td>
<td>8</td>
</tr>
<tr>
<td>12.</td>
<td>Adaichani</td>
<td>167</td>
<td>9</td>
</tr>
<tr>
<td>IV</td>
<td>PAPPAKUDI (15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Arikasavanallur</td>
<td>396</td>
<td>22</td>
</tr>
<tr>
<td>14.</td>
<td>Sattupathu</td>
<td>262</td>
<td>15</td>
</tr>
<tr>
<td>15.</td>
<td>Thirupudaimaruthur</td>
<td>244</td>
<td>14</td>
</tr>
<tr>
<td>16.</td>
<td>Pallakal</td>
<td>166</td>
<td>9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>4481</td>
<td>250</td>
</tr>
</tbody>
</table>

Source: Block Agricultural Development Office - Ambasamudram, Cheranmahadevi, Kadayam, Pappakudi - 2012-2013
3.2.5 Collection of Data

A reconnaissance survey of the study area was undertaken to develop comprehension of the process and activities involved in paddy cultivation under actual farming conditions. Based on the information gathered a farm level detailed questionnaire was drafted, pre-tested and used in the field survey.

The Direct Personal Interview Method has been adopted to collect the data regarding the farm structure, size of holding, cropping pattern, costs and return and other aspects relating to the overall objectives of the study.

Secondary data relating to the location, climate, rainfall, soil type, land utilisation pattern, operational land holding, sources of irrigation, area, production, yield of major crops, marketing infrastructural facilities and the like were collected from the district and the taluk level from the District Collectorate, Taluk Office, Block Office, Agricultural Joint Director Office-Palayamkottai, Agricultural Engineering Department - Cheranmahadevi, Block Agricultural Development Office - Ambasamudram, Cheranmahadevi, Kadayam and Pappakudi, Assistant Director’s Statistical Office - Tirunelveli and Block Statistical Officers from Tirunelveli.

3.2.6 Period of the Study

The primary data were collected in the main crop season of paddy from October 2012 to March 2013 of agricultural year 2012-2013.

3.2.7 Method of Analysis

Analysis of variance (ANOVA) technique was used to test the homogeneity or non-homogeneity of two categories and villages. Table 3.2 shows the homogeneity test of two categories of Mechanized and non-mechanized farms.
TABLE 3.2

HOMOGENEITY TEST OF TWO CATEGORIES OF MECHANIZED AND NON-MECHANIZED FARM

<table>
<thead>
<tr>
<th>Source</th>
<th>T.S.S</th>
<th>D.F.</th>
<th>M.S.S</th>
<th>Calculated F Value</th>
<th>Critical F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Sample</td>
<td>2247200</td>
<td>1</td>
<td>2247200</td>
<td>242.60*</td>
<td>4.38</td>
</tr>
<tr>
<td>Between Village</td>
<td>204000</td>
<td>19</td>
<td>10736.84</td>
<td>1.16NS</td>
<td>2.23</td>
</tr>
<tr>
<td>Error</td>
<td>176000</td>
<td>19</td>
<td>9263.16</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>2627200</td>
<td>39</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note:  T.S.S. = Total Sum of Squares
D.F. = Degrees of Freedom
M.S.S. = Mean Sum of Squares
* Significant at 5% level
NS - Not significant

It was found from the above Table 3.2 that there existed a significant difference between the Mechanized and Non-mechanized farm. It implies that there is a difference in net income per acre regarding Mechanized and Non-Mechanized using farms. So they were treated as separate units for further analysis. There is also no evidence of significant difference among the sample villages in the above categories.

3.2.8 Tools for Analysis

In order to analyze and compare the cost and return structure of mechanised and non-mechanised, cost A and cost C concepts used by farm management studies have been adopted for the present study.
In order to examine the nature and extent of inequality in net income of mechanised and non-mechanised farms in the study area frequency distribution and Histogram, Lorenz Curve, Gini Co-efficient, Logarithmic Variance ratio and disparity ratio were used.

In order to identify and to compare the factors influencing yield of paddy for mechanised and non-mechanised farms, the following form of Multiple Linear Regression Model was used.

\[
Y = \alpha_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + U \ldots (3.1)
\]

Where

\[
\begin{align*}
Y &= \text{Per acre yield in kgs} \\
X_1 &= \text{Fertilizer per acre (in Rs.)} \\
X_2 &= \text{Bullock labour per acre (in Rs.)} \\
X_3 &= \text{Human labour per acre (in Rs.)} \\
X_4 &= \text{Pesticides per acre (in Rs.)} \\
X_5 &= \text{Capital flow per acre (in Rs.) and} \\
U &= \text{Disturbance term}
\end{align*}
\]

The structural difference between the two sample farmers, small and large, was tested by using Chow’s test.¹

\[ F = \frac{\Sigma e^2 - (\Sigma e^2_1 + \Sigma e^2_2)}{\frac{\Sigma e^2}{n_1 + n_2 - 2k}} \] 

\ldots (3.2)

Where,

\( k \) = The number of parameters including the intercept term.

\( \Sigma e^2 \) = Unexplained or residual sum of squares of the sample corresponding to both small and large farmers.

\( \Sigma e^2_1 \) = Unexplained or residual sum of squares of the sample corresponding to small farmers.

\( \Sigma e^2_2 \) = Unexplained or residual sum of squares of the sample corresponding to large farmers.

\( n_1 \) = Sample size of small farmers and

\( n_2 \) = Sample size of large farmers.

The ‘F’ test was carried out and if the computed value of ‘F’ was less than the Table value of F at 5 per cent level of significance with \((k, n_1 + n_2 - 2k)\) degrees of freedom, the null hypothesis that there was no structural difference between the two groups of farmers could be accepted. If there was a structural difference between the two groups, the test whether the difference occurs and at the intercept or at the slope level or at both had to be conducted by incorporating the dummy variables at the intercept and slope levels in the regression model.

The structural difference between the two groups of farmers was tested by using the regression model of the following form:
\[ \log Y = \alpha_0 + \alpha_1 D + \sum_{i=1}^{5} \beta_i \log X + \sum_{i=1}^{5} \gamma_i D \log X_i + u \]  
\[ \ldots (3.3) \]

In the model D was the dummy variable. The dummy variable D stood 0 for the small farmers and 1 for the large farmers.

In order to compute demand and supply elasticities and to study absorption of labour and returns to scale, the normalized profit function was jointly estimated along with the four variable inputs demand functions with random disturbances of the following form:\(^2\)

\[ \log \Pi = \alpha_0 + \beta_1 \log W + \beta_2 \log F + \beta_3 \log P + \beta_4 \log B + \alpha_1 \]
\[ \log A + \alpha_2 \log C + U \]  
\[ \ldots (3.4) \]

\[ \frac{WX_1}{\Pi} = \beta_1 + U_1 \]
\[ \frac{FX_2}{\Pi} = \beta_2 + U_2 \]
\[ \frac{PX_3}{\Pi} = \beta_3 + U_3 \]
\[ \frac{BX_4}{\Pi} = \beta_4 + U_4 \]

\[ \Pi = \text{Real profit in Rupees (that is the total revenue minus total variable cost normalized by the price of output).} \]
\[ W = \text{Real Wages for Labour} \]
\[ F = \text{Real Fertilizer Price} \]
\[ P = \text{Real Pesticides Price} \]
\[ B = \text{Real Bullock Pair day price} \]

A = Total Area Cultivated
C = Capital Flow

(Calendar as the sum of depreciation, maintenance and opportunity cost of capital stock)

X₁ = Total Labour Man days Utilized
X₂ = Total Quantity of Fertilizers used
X₃ = Total Quantity of Pesticides used
X₄ = Total Bullock Pair days and
U = Random disturbance

The above models were estimated jointly by Zellner’s seemingly unrelated regression method.

3.2.9 Measurement of Variables

3.2.9.1 Farm Land

To include the share of land in the stock flow the existing rental value of the owned land in the study area was considered. For leased in land, the actual rent paid was taken into account.

3.2.9.2 Farm Human Labour

Human labour was measured in mandays units of eight hours of work for each man days. All the permanent, family and hired labour were considered alike and valued at existing wage rate.
3.2.9.3 Bullock Labour

The prevailing wage rates charged for both owned and hired bullock power in the study area were considered.

3.2.9.4 Irrigation

Consumption of electricity oil was calculated at purchase price.

3.2.9.5 Seeds

Actual purchase cost of seed was considered. In the case of produced seed it was valued at market price.

3.2.9.6 Manures, Fertilizers and Plant Protection Chemicals

Those were valued at purchase cost. In the case of owned manure, market value per cart load was taken into account.

3.2.9.7 Depreciation

Depreciation was calculated by straight line method. As given by the Directorate of Economics and Statistics, the following depreciation rates were followed\(^3\).

1. Terraced Building - 2 per cent
2. Irrigation Structure (Wells) - 2 per cent
3. Others - 5 per cent

(b) Tools

1. Minor - 50 per cent
2. Major - 25 per cent

(c) Implements

1. Minor - 20 per cent
2. Major - 10 per cent

(d) Machinery - 10 per cent
(e) Live Stock - 10 per cent

(Productive Line period has been taken as 10 years)

3.2.9.8 Interest on Fixed Capital and Working Capital

Interest on fixed capital was worked out at 11 per cent per annum*. Interest on working capital was worked out at 12 per cent per annum for six months.⁴

3.2.9.9 Land Revenue, Cess and other Taxes

The actual payments were considered.

3.2.9.10 Capital Flow

Capital flow is calculated as the sum of depreciation, maintenance cost, and opportunity cost of capital stock.

3.2.9.11 Capital Input

Capital Input is measured in terms of service flows in rupees of paddy production. It included capital stock flows plus working capital which refers to the sum total of the costs of seeds, fertilizer, pesticides, manuers and other items.

⁴ The Interest Rate for Long Term Loan changed by Land Development Bank.
* The Interest Rates for Short Term Loan changed by Co-operative Banks.
3.2.9.12 Total Revenue per Farm

It included sum of all main and by products valued at the market price at the time of harvest.

3.2.9.13 Yield

It was measured in terms of physical quantity of paddy produced in kilos as well as in its monetary value prevailing at harvest time.

3.2.9.14 Wage Rate

Total labour cost divided by total Man days worked and further divided by the prevailing price per kilo of paddy gave normal wage rate.

3.2.9.15 Bullock Labour Price

Total expenditure on bullock pairs divided by bullock pair days employed and further divided by the prevailing price per kilo of paddy gave normalized bullock pair day price.

3.2.9.16 Output (per acre)

Total output divided by the total farm size operated gave output per acre.

3.2.9.17 Fertilizer Price

Total expenditure on inorganic fertilizers divided by its total quantity purchased and further divided by the prevailing price per kilo of paddy gave normal fertilizer price.
3.2.9.18 Pesticides Price

Total expenditure on pesticides divided by its total quantity purchased and further divided by the prevailing price per kilo of paddy gave normal pesticides price.

3.2.9.19 Profit

Total revenue minus total variable cost, divided by the prevailing price per kilo of paddy gave normal profit.

3.3 PROFILE OF THE STUDY AREA

This section discusses mainly profile of the study area (Tirunelveli District). The present study was conducted in Tirunelveli district of south Tamil Nadu in India. A brief description of the history and the geographical characteristics of Tamil Nadu are presented below.

Tamil Nadu has a very ancient history of language, culture and civilization which dates back to 6000 years. The State represents the nucleus of Dravidian culture in peninsular Southern India. The present state of Tamil Nadu was a part of Madras Presidency during the period of British rule in India. After India’s Independence, the state of Madras was formed during the reorganization of states on linguistic basis in 1956. In 1969 Madras state was renamed as Tamil Nadu.

The State of Tami Nadu is situated on the eastern side of the southern extreme of peninsular India. The state lies between $8^\circ 5'\text{N}$ and $13^\circ 5'\text{N}$ North latitudes and $76^\circ 15'$ and $80^\circ 20'$ East longitudes. It is bounded on the East and south by the long sea Coast of the Bay of Bengal and the Indian Ocean, in the west by the states of Kerala and
Karnataka and in the North by the states of Andhra Pradesh and Karnataka (National Family Health Survey, 1992).

At Present, there are 32 districts in Tamil Nadu. Among the 32 districts, Tirunelveli a district was formed in 1790 by the East India company, later came under the direct control of the British Crown Queen Victoria. The name Tirunelveli has been composed from the three Tamil words i.e. Thiru-Nel-Veli’ meaning Sacred Paddy Hedge with effect from 20.10.1986 the district was bifurcated and new Tuticorin District was formed.

Tiunelveli, the penultimate southern most district of Tamil Nadu, is described as a microcosm of the State, owing to its mosaic and diverse geographical and physical features such as lofty mountains and low plains, rivers and cascades, seacoast and thick in land forest, sandy soils and fertile alluvium, a variety of flora, fauna, and protected wild life.

3.3.1 Puranic Association

The Tirunelveli Sthalapurana prescribes a tradition for the origin of the name unelveli. The puranic version goes that one Vedasarma, a staunch devotee of Shiva, on his pilgrimage from the North to the South was invited by Lord Shiva in his dream to his abode on the banks of the sacred river Tamiraparani. The delighted devotee came to Sindupoondhurai on the banks of the river and stayed there with his family. Once there was a famine which forced Vedasarma to collect paddy by way of begging and continuing his daily prayers. One day he spread out the paddy to dry under the sun before the Lord, and went for his ablutions in Tamiraparani. He prayed to the Lord for

---

rain which he thought could be a remedy for the famine. His prayer was answered and when he was bathing, a thunder storm broke-out and it rained heavily. Vedasarma rushed to the place where he had spread the paddy. He witnessed a miracle. Despite rain around the area, the paddy that he had spread did not get even a single drop of rain and did not get soaked. Since then according to the purana the town is called as “Tiru-nel-veli”.

3.3.2 Origin of the District

On acquisition from the Nawab of Arcot in 1801, the British named it as Tiunevelly district though their headquarters was first located in Palayamkottai the adjacent town, where they had their military headquarters during their operations against the Palayakars. Two reasons may be attributed for naming it after Tirunelveli. One is because, it was and is the chief town of the district and the other is that it was already called Tirunelveli Seemai under the Nayaks and Nawabs. Both Tirunelveli and Palayamkottai grew as the twin towns of the district.

3.3.3 Geographical data

Tirunelveli District having geographical area of 6759 sq.kms, in the South eastern portion of Tamil Nadu is triangular in shape. It lies between $8^\circ.05'$ and $9^\circ.30'$ of the Northern latitude, $77^\circ.05'$ and $78^\circ.25'$ of Eastern longitude

3.3.4 Topography

The district is located in the southern part of Tamil Nadu and surrounded by Virudhunagar District on the north, Western Ghats on the West, Kanniyakumari District on the south, Tuticorin District on the East. The lifeline of the district river Tamiraparani feeds the district and quenches the thirst of residents of Tuticorin district too.
FIGURE 3.1
TIRUNELVELI DISTRICT MAP

Tirunelveli District Blocks

Vasudevanallur
Kuruvikulan
Sankarankovil
Kadaiyanallur
Shencottah
Keelapavoor

1. Ambasamudram
2. Kadayam
3. Pappakudi
4. Cherenmahadevi

Manur

Pappakudi
Palayankottal

Ambasamudram
Cherannahadevi

Kalakadu
Manguneri

Radhapuran

Study Area
3.3.5 Administrative Setup of Tirunelveli District

3.3.5.1. District Administration

The district administration is headed by the District Collector with his office at the district collectorate. The responsibilities of the District Collector include maintenance of law and order, coordinating various development and welfare activities in the district. A detail of other administrative setup in Tirunelveli District is given in Table 3.3.

TABLE 3.3

ADMINISTRATIVE SETUP OF TIRUNELVELI DISTRICT IN 2011

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Firkas</td>
<td>61</td>
</tr>
<tr>
<td>Number of Villages</td>
<td>615</td>
</tr>
<tr>
<td>Number of Village Panchayats</td>
<td>425</td>
</tr>
<tr>
<td>Number of Town Panchayats</td>
<td>36</td>
</tr>
<tr>
<td>Number of Municipalities</td>
<td>8</td>
</tr>
<tr>
<td>Number of Municipal corporation</td>
<td>1</td>
</tr>
<tr>
<td>Number of Taluks</td>
<td>11</td>
</tr>
<tr>
<td>Panchayat Unions(Blocks)</td>
<td>19</td>
</tr>
<tr>
<td>Revenue Divisions</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Assistant Director of Statistics, Tirunelveli, 2011-2012.
FIGURE 3.2
ADMINISTRATIVE SETUP OF TIRUNELVELI DISTRICT

REVENUE DIVISION - 3

TIRUNELVELI  CHERANMAHADEVI  TENKASI

TALUKS 11

Tirunelveli, Palayamkottai, Sankarankoil
Ambasamudram, Radhapuram, Nanguneri
Tenkasi, Shencottai, Sivagiri, V.K.Pudur, Alangulam

DEVELOPMENT BLOCKS 19

Palayamkottai
Manur
Melaneelithanallur
Sankarankoil
Kuruvikuklam

Ambasamudram
Kadayam, Pappakudi
Cheranmahadevi
Kalakadu, Nanguneri
Radhapuram, Valliyoor

Tenkasi Shencottai
Kadayanallur, Vasudevanallur, Keelapavoor, Alangulam

CORPORATION: TIRUNELVELI

MUNICIPALITIES 7

Sankarankoil, Puliyangudi, V.K.Puram
Ambasamudram Tenkasi
Kadayanallur, Shencottai
3.3.5.2 Revenue Divisions

At the divisional level, the Sub Collectors/Revenue Divisional Officers assist the Collector in running the administration. In Tirunelveli district, there are three Revenue Divisions. They are namely, Tirunelveli, Cheranmahadevi, and Tenkasi.

3.3.5.3 Taluks

Tahsildars are the officers’ in-charge at Taluk level. In Tirunelveli, there are 11 taluks namely Tirunelveli, Palayamkottai, Sankarankovil, Ambasamudram, Nanguneri, Radhapuram, Tenkasi, Shenkottai, Alangulam, Veerakeralampudur and Sivagiri.

3.3.5.4 Panchayat Unions (Blocks)

Panchayat Union Commissioners at block level are the Officers in-charge for implementing all the developmental activities recommended by the Government at the Block level. There are 19 Panchayat Unions (Blocks) namely Palayamkottai, Manur, Melaneelithanallur, Sankarankovil, Kurivikulam, Cheranmahadevi, Ambasamudram, Pappakudi, Kadayam, Kalakadu, Nanguneri, Vallioor, Radhapuram, Alangulam, Keelapavoor, Tenkasi, Shenkottai, Kadayanallur and Vasudevanallur.

3.3.5.5 Taluk Administration

Tahsildars are in charge of revenue administration at taluk level. He is assisted by Head Quarters Deputy Tahsildar, Taluk Supply Officer and Zonal Deputy Tahsildars. Each taluk is divided into a number of firkas which comprises a number of revenue villages. Revenue Inspector at firka level and Village Administrative Officer at village level assist the Tahsildar. The details regarding taluks, firkas and revenue village are given in the following table.
### TABLE 3.4

**LIST OF FIRKAS/VILLAGES IN EACH TALUK OF TIRUNELVELI DISTRICT IN 2011**

<table>
<thead>
<tr>
<th>Name of Taluk</th>
<th>No. of Firkas</th>
<th>No. of Revenue Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tirunelveli</td>
<td>6</td>
<td>85</td>
</tr>
<tr>
<td>Palayamkottai</td>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td>Sankarankoil</td>
<td>10</td>
<td>88</td>
</tr>
<tr>
<td>Ambasamudram</td>
<td>8</td>
<td>105</td>
</tr>
<tr>
<td>Nanguneri</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>Radhapuram</td>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>Tenkasi</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>Shencottai</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Sivagiri</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Alangulam</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Veerakeralampudur</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>61</strong></td>
<td><strong>615</strong></td>
</tr>
</tbody>
</table>

Source: Assistant Director of Statistics, Tirunelveli, 2011-12

#### 3.3.6 Demographic Details

In census enumeration, data regarding child under 0-6 age were also collected for all districts including Tirunelveli. There were total 3,01,275 children under age of 0-6 against 320,175 of 2011 census out of total 301,275 male and female were 1,53,437 and 1,47,838 respectively. Child Sex Ratio as per census 2011 was 964 compared to 957 of census 2001. In 2011, Children under 0-6 formed 9.80 percent of Tirunelveli District compared to 11.75 percent of 2001. There was net change of -1.95 percent in this compared to previous census of India.
The growth rate of Tirunelveli District population constituted 8.93 percent in 2001 census. In 2011 census, this figure was increased at 12.97 percent 6.

All details regarding Tirunelveli District have been processed by us after receiving from Govt. of India. We are not responsible for errors to population census details of Tirunelveli District.

The population of this District was 27,23,988 as per 2001 Census and 30,72,880 as per 2011 census. The Density of Population per s.km. was 399 as per 2001 census and 455 persons as per 2011 census. Tirunelveli, Tenkasi and Ambasamudram are the most densely populated Taluks in the District as per 2001 census.

The Sex ratio is 1024 females for every 1000 males in the District as per 2011 census. The Literacy rate is 76.09 percent in the District as per 2001 census.

Out of the total population, males are 13,33,939 and females 13,90,049 as per 2001 census. Out of the total population, males are 15,18,595 and females 15,54,285 as per 2011 census. The district has Schedule caste population of 4,81,052 which represents 17.66 percent to total population as per 2001 census. Schedule Tribes are found to be very small in number 8358 which is 0.31 percent of the Total population. 4.36 percent of State population lives in Tirunelveli district, 14,15,742 live in Rural area and 13,08,246 live in urban area forming 52 percent and 48 percent respectively as per 2001.

6 www.census2011.co.in
3.3.7 Occupation

Agriculture plays a vital role in the District’s economy. The total cropped area was 171155 hectares, which worked out 25.32 per cent of the total area of 675850. The important food crops are Paddy, Cholam, Ragi, Cumbu Maize and other minor millets. The commercial crops are Cotton, Chillies, Sugarcane and Groundnut. Of the total cultivated area of 145047 hectares in the district, 26108 hectares were sown more than once.

3.3.7.1 Agriculture

Tirunelveli district is predominantly an agricultural district. The district has mainly two cropping seasons, viz., Kar, the first crop (June to September) and Pishanam, the second crop (October to February). Tirunelveli has fertile soils only in scattered regions. Less fertile red soils are found distributed over most of the regions. The network of the irrigation system makes full use of the water resources; the natural deficiency has been overcome to a greater extent. The cropping pattern of the district is essentially of the type characterizing dry regions. It normally varies from taluk to taluk. In dry regions, diversified cropping patterns exist and no single crop claims a large share of the gross cropped area. Dry cultivation, which characterizes these regions is also basically millet and cash crop cultivation even in dry regions wherever water is available, it is the paddy crop that is sown by the farmers. Paddy occupies the largest area of cultivation, followed by cotton. Paddy is cultivated mainly in Tirunelveli, Palayamkottai, Tenkasi, Shenkottai, Ambasamudram and Nanguneri Taluks. Other crops grown in the district are cumbu, ragi, pulses, groundnut, gingelly, coconut, chillies and indigo. Portions of Sankarankoil Taluk have the rich, fertile black soil, which is highly suitable for cotton cultivation. Factors such as type of soil,
climatic conditions, irrigation facilities, etc., determine the cropping pattern in a region.

Most of the rainfed areas are cultivated in both the seasons. Most of the crops are on the ground for three or four months, except chillies and cotton which take more than five months. Details are given below in Table 3.5.

**TABLE 3.5**

**MAJOR CROPS AND THEIR AREA IN TIRUNELVELI DISTRICT 2011**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (in ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>82000.00</td>
</tr>
<tr>
<td>Cotton</td>
<td>17000.00</td>
</tr>
<tr>
<td>Groundnut</td>
<td>12000.00</td>
</tr>
<tr>
<td>Pulses</td>
<td>33000.00</td>
</tr>
<tr>
<td>Millets</td>
<td>18000.00</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>3500.00</td>
</tr>
<tr>
<td>Fruit crops</td>
<td>13605.00</td>
</tr>
<tr>
<td>Vegetables</td>
<td>3644.00</td>
</tr>
<tr>
<td>Species</td>
<td>7330.00</td>
</tr>
<tr>
<td>Plantation crops</td>
<td>1650.00</td>
</tr>
</tbody>
</table>

Source: District Collectorate Office, Tirunelveli and Census of India 2011.
3.3.7.2 Occupation on Structure of Labour Force

The occupation structure of the working population of the district is given in Table 3.6.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type of Workers</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cultivators</td>
<td>251257</td>
</tr>
<tr>
<td>2.</td>
<td>Small and Marginal Farmers</td>
<td>206252</td>
</tr>
<tr>
<td>3.</td>
<td>Agricultural Labourers</td>
<td>349069</td>
</tr>
<tr>
<td>4.</td>
<td>Artisans</td>
<td>23687</td>
</tr>
<tr>
<td>5.</td>
<td>Household / Cottage Industries</td>
<td>190122</td>
</tr>
<tr>
<td>6.</td>
<td>Allied agro-activities</td>
<td>734828</td>
</tr>
<tr>
<td>7.</td>
<td>Other Workers</td>
<td>315595</td>
</tr>
</tbody>
</table>

Source: District Collectorate Office, Tirunelveli and Census of India 2011.

3.3.8 Irrigation

The District is blessed with the Western Ghats from which all the perennial rivers follow and drain towards the east. The surface water of the District is drained into major river basin viz Thamiraparani, Vaippar, Nambiar and Hanumanathithi. Thamiraparani is the major river basin in the District. The other Streams which are seasonal in nature are Servallar, Manimuthar, Ramanathi, Pachayar, Chittar and Uppodai rivers which drain into the Tamiraparani basin. The sources of irrigation are Canal, Tank and Well, which covers 133106 hectares. Among the total area irrigated, Well irrigation covers 50096 hectares, Tanks 55382 hectares and Canal 27128 hectares.
TABLE 3.7

AREA IRRIGATED BY DIFFERENT SOURCES IN TIRUNELVELI DISTRICT 2009 – 2010

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Area (in Hectares)</th>
<th>Percentage to Total Area Irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cropped Area</td>
<td>161976</td>
<td>-</td>
</tr>
<tr>
<td>1.</td>
<td>Net Area irrigated</td>
<td>38080</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Irrigation by</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Canal</td>
<td>18720</td>
<td>49.16</td>
</tr>
<tr>
<td></td>
<td>ii) Tank</td>
<td>16648</td>
<td>43.72</td>
</tr>
<tr>
<td></td>
<td>iii) Well</td>
<td>2712</td>
<td>7.12</td>
</tr>
<tr>
<td>3.</td>
<td>Total area irrigated</td>
<td>38080</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Records of District Statistical Office, Tirunelveli.

Table 3.7 shows that, in Tirunelveli district, 1,61,976 hectares of land were cultivated during 2009-2010 of that area, as much as 38,080 hectares were irrigated by canal, tank and well sources. Canal and tank were the primary sources of water covering 49.16 per cent and 43.72 per cent respectively. Well irrigation was about 7.12 per cent. The gross area irrigated was 1,61,976 hectares and net area irrigated was 38,080 hectares.

3.3.9 Area under principal crops

In Tirunelveli district, paddy is the predominant crop cultivated in 72121 acres - 52.77 percent of the net area sown. The details of area and percentage of net area sown are given in Table 3.8.
It is seen from Table 3.8 that among the principal crops, paddy, occupies 52.77 percent of the net area sown in the district, followed by banana, sugarcane and cotton.

### 3.3.10 Soil type

The soil condition of the district can be grouped into two main varieties namely, red soil and black soil. The black soil is of a higher value compared to the red soil. In the south-east coast, the soil is deep, loose red loam surfaced by sand with its depth varying from a few inches to 20 feet.
3.3.11 Utilization of land

Table 3.9 presents the distribution pattern of land-use in Tirunelveli district.

**TABLE 3.9**

**LAND UTILIZATION IN TIRUNELVELI DISTRICT - 2009-2010**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Area (in Hectares)</th>
<th>Percentage of Total Geographical Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Net area sown</td>
<td>136659</td>
<td>20.03</td>
</tr>
<tr>
<td>2.</td>
<td>Area under forest</td>
<td>122055</td>
<td>17.88</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Area not available for cultivation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Land put to non-agricultural use</td>
<td>96291</td>
<td>14.12</td>
</tr>
<tr>
<td></td>
<td>ii) Barren and uncultivable land</td>
<td>27191</td>
<td>3.98</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>123482</td>
<td>18.10</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Other Cultivated Land Excluding Fallow Land</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Permanent pastures and other grazing lands</td>
<td>9851</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td>ii) Miscellaneous tree crops and groves not included in net sown area</td>
<td>8883</td>
<td>1.30</td>
</tr>
<tr>
<td></td>
<td>iii) Cultivable land</td>
<td>79423</td>
<td>11.64</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Fallow Land</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Current</td>
<td>29466</td>
<td>4.32</td>
</tr>
<tr>
<td></td>
<td>ii) Fallow land other than current Fallow</td>
<td>17269</td>
<td>2.53</td>
</tr>
<tr>
<td>6.</td>
<td>Total geographical area</td>
<td>682308</td>
<td>100.00</td>
</tr>
<tr>
<td>7.</td>
<td>Area sown more than once</td>
<td>30163</td>
<td>4.42</td>
</tr>
<tr>
<td>8.</td>
<td>Total Area Cultivated</td>
<td>161976</td>
<td>23.74</td>
</tr>
</tbody>
</table>

Source: Records of the District Statistical Office, Tirunelveli, 2009-10
3.3.12 Size of land holdings

The distribution of land holdings in Tirunelveli district for the year 2009-10 is presented in Table 3.10.

**TABLE 3.10**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Size of Holdings (in Hectares)</th>
<th>Number of Operational Holdings</th>
<th>Percentage to total Holdings</th>
<th>Total Area Owned (in Hectares)</th>
<th>Percentage to Total Area Owned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0 – 0.5</td>
<td>173759</td>
<td>58.78</td>
<td>48720</td>
<td>16.19</td>
</tr>
<tr>
<td>2.</td>
<td>0.5 – 1.0</td>
<td>55559</td>
<td>18.80</td>
<td>39572</td>
<td>13.15</td>
</tr>
<tr>
<td>3.</td>
<td>1.0 – 2.0</td>
<td>35285</td>
<td>11.93</td>
<td>54516</td>
<td>18.11</td>
</tr>
<tr>
<td>4.</td>
<td>2.0 – 3.0</td>
<td>13191</td>
<td>4.46</td>
<td>33680</td>
<td>11.19</td>
</tr>
<tr>
<td>5.</td>
<td>3.0 – 4.0</td>
<td>6419</td>
<td>2.17</td>
<td>22926</td>
<td>7.62</td>
</tr>
<tr>
<td>6.</td>
<td>4.0 – 5.0</td>
<td>3505</td>
<td>1.18</td>
<td>15901</td>
<td>5.28</td>
</tr>
<tr>
<td>7.</td>
<td>5.0 – 7.5</td>
<td>4065</td>
<td>1.38</td>
<td>25541</td>
<td>8.49</td>
</tr>
<tr>
<td>8.</td>
<td>7.5 – 10.0</td>
<td>1711</td>
<td>0.58</td>
<td>15082</td>
<td>5.01</td>
</tr>
<tr>
<td>9.</td>
<td>10.0 – 20.0</td>
<td>1676</td>
<td>0.56</td>
<td>21466</td>
<td>7.13</td>
</tr>
<tr>
<td>10.</td>
<td>20.0 – above</td>
<td>470</td>
<td>0.16</td>
<td>23549</td>
<td>7.83</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>295560</td>
<td>100.00</td>
<td>300953</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Records of District Statistical Office, Tirunelveli

It is found from Table 3.10 that the total number of operational land holdings in Tirunelveli district was 2,95,560 hectares in 2009–10. The total area owned was 3,00,953 hectares. The distribution of land according to the size of the holdings suggests that 89.51 per cent of the holdings are of the size 0 to 2 hectares and 7.81 per cent of the holdings is between 2 and 5 hectares. Holdings above 5 and below 10 hectares form 1.96 per cent and holdings above 10 hectares form 0.72 per cent. Hence,
it is inferred that the majority of the holdings in the district lies between 0 and 2 hectares. The percentage to total area is also found to be higher for small holdings than for large holdings.

3.3.13 Climatic Condition

3.3.13.1 Temperature

In the daytime the coastal regions are cooler than the interior parts by about a degree in summer and southwest monsoon seasons and warmer by one to two degrees during the rest of the year. From about the middle of February, temperature increases steadily. In May, which is usually the hottest month in the interior, the mean daily maximum temperature is 37.1 degree Celsius. The weather is quite hot in May and June and the maximum temperature sometimes reaches 45 degree Celsius. With the onset of the southwest monsoon by the end of May or beginning of June, there is some drop in temperature. By about the middle of October, both day and night temperatures decrease appreciably. The period from November to January is the coolest period of the year with the mean daily maximum temperature of about 30 to 31 degree Celsius in the interior parts. The mean daily minimum in these months is about 22 to 23 degree Celsius in the district in general.

3.3.13.2 Humidity

The relative humidity, in general, during the year is between 55 and 65 per cent in the interior parts of the district, except during the northeast monsoon season, when it is over 65 per cent. The coastal parts are comparatively more humid.

3.3.13.3 Winds

Winds are generally light to moderate in strength. Between May and September
winds are mainly north westerly or westerly. From October to February winds are mainly north easterly or northerly.

3.3.13.4 Rainfall

Main rainy season is from October to the middle of January. During these southwest monsoon seasons the rainfall is more in the western parts of the districts. November is generally the rainiest month. The heaviest rainfall in 24 hours recorded in the district was 371.5 mm at Sivagiri on 19.10.1929. The average rainfall in the district is 814.8 mm per annum. The details regarding the rainfall between 1996 and 2013 are given in Table 3.11.

TABLE 3.11
RAINFALL IN TIRUNELVELI DISTRICT DURING 1996-2013
(in mm)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>729.01</td>
</tr>
<tr>
<td>1997</td>
<td>1091.96</td>
</tr>
<tr>
<td>1998</td>
<td>793.06</td>
</tr>
<tr>
<td>1999</td>
<td>653.72</td>
</tr>
<tr>
<td>2000</td>
<td>826.16</td>
</tr>
<tr>
<td>2001</td>
<td>765.40</td>
</tr>
<tr>
<td>2002</td>
<td>816.83</td>
</tr>
<tr>
<td>2003</td>
<td>900.37</td>
</tr>
<tr>
<td>2004</td>
<td>994.48</td>
</tr>
<tr>
<td>2005</td>
<td>971.49</td>
</tr>
<tr>
<td>2006</td>
<td>1179.66</td>
</tr>
<tr>
<td>2007</td>
<td>920.54</td>
</tr>
<tr>
<td>2008</td>
<td>1339.76</td>
</tr>
<tr>
<td>2009</td>
<td>958.93</td>
</tr>
<tr>
<td>2010</td>
<td>879.69</td>
</tr>
<tr>
<td>2011</td>
<td>971.69</td>
</tr>
<tr>
<td>2012</td>
<td>768.87</td>
</tr>
<tr>
<td>2013</td>
<td>777.87</td>
</tr>
</tbody>
</table>

Source: District Collectorate Office, Tirunelveli.
3.3.14 Rivers in Tirunelveli District

There are a number of rivers in Tirunelveli district. The following are the rivers flowing through this district. Tamiraparani, chaiyar, Korayar, Chittar, Aluthakanniar, Aintharuviar, Jambunathi, Ramanathi, Gadananathi, Harumannathi, Karuppanath, Gundar, Mottaiyar, Manimuthar, Nambi, Karunaiyar, Vedamaliyaru, Kothaiyaru, Rajasingiyaru and Mundhal Odai.

3.3.15 Animal Husbandry

Animals are a form of wealth and a good source of income to the people. The details of animal husbandry are given in Table 3.12.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Plough Animals</td>
<td>64814</td>
</tr>
<tr>
<td>b. Dairy Animals</td>
<td></td>
</tr>
<tr>
<td>1. Cows</td>
<td>309691</td>
</tr>
<tr>
<td>2. Buffaloes</td>
<td>145221</td>
</tr>
<tr>
<td>3. Sheep</td>
<td>375274</td>
</tr>
<tr>
<td>4. Goat</td>
<td>226638</td>
</tr>
<tr>
<td>5. Pig</td>
<td>26998</td>
</tr>
<tr>
<td>c. Poultry</td>
<td>664703</td>
</tr>
</tbody>
</table>

Source: District Collectorate Office, Tirunelveli.

3.3.16 Industry

There are 25 medium and major industries such as Cement, Cotton yarn, Calcium carbide, Sugar, Cotton seed oil, Printing papers and flour Mill etc. Among the
other industries in the District Pin, Clip, Matches, Beedi, Vessels making and Engineering industries are important. The important Village industries functioning in the district are Handloom, Poultry farming, Brick making, Jaggary production. The Handloom products Lungi, Sarees etc are marketed in north India. So also the fine Korai mats from Pathamadai have won world fame. Kallidaikurichi Pappads, Karukurichi mud pots, also Tirunelveli “Halva” are specialites which earned many laurels to the District.

3.3.17 Tourist spots

Courtallam is situated at the Western Ghats in Tenkasi Taluk. The famous waterfalls on rocks and tiny droplets are sprinkled in the air. The water falls of Courtalam have medicinal value as they run through forest and herbs before their decent. Pappanasam Agasthiar falls also attracts tourist and pilgrims. There is a Wild life sanctuary at Mundanthurai and Kalakadu. Spotted deers, Liontailed monkeys, Elephants and Tiger are plenty.

3.3.18 Religious Significance

The Nellaiappar temple at Tirunelveli, Sankaranainar temple at Sankarankoil, Kasiviswanathar temple at Tenkasi and Vanamamalai Temple at Nanguneri are the land marks of the District signifying the Hindu Culture. Palayamkottai has many Christian missions and Athankaraipallivasal and Pottalpudur Darga have considered being important sacred places for Muslims.

7www.nellai.tn.nic.in/handbook 2011.