CHAPTER III

METHODOLOGY AND PROFILE OF THE STUDY AREA
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3.1 INTRODUCTION

This section attempts to describe the methodology adopted in the present study and the reason for choosing Thoothukudi District as the study area which includes period of study, sampling technique, procedure for collection of data, method of analysis, tools of analysis and the measurement of variables used in the present study. Further it discusses the profile of the study area.

3.2 METHODOLOGY

Designing a suitable methodology and selection of analytical tools are important for a meaningful analysis of any research problem. This section is devoted to describe the methodology.

3.2.1 Period of Study

Field investigation works were carried out during the period, September 2011 – March 2012, and the data collected pertain to 2011-2012 which was a normal year in terms of agriculture.
3.2.2 Sampling Techniques

Thoothukudi District was chosen as the universe, taluks and blocks as the strata, the village as the primary unit of sampling and agricultural women labourers as the ultimate unit.

Thoothukudi district comprises of eight taluks, of these two taluks namely Tiruchendur and Srivaikundam constitute more than 75 per cent of paddy cultivation of the 4 blocks each 2 blocks from Tiruchendur and Srivaikundam were chosen as the study area. For each block, first 5 villages which account for the highest area under paddy cultivation in the descending order of magnitude were selected as the study unit for primary data collections.

Total of 300 sample agricultural women labourers were selected randomly by adopting proportionate random sampling to area under paddy for each village. Total 225 paddy cultivation, each 75 from small, medium and large farm sizes were selected by adopting purposive sampling method. Table 3.1 shows the name of blocks, villages and selected number of women agriculture laborers.
### TABLE 3.1

**NAME OF VILLAGES AND SELECTED NUMBER OF AGRICULTURAL WOMEN LABOURERS**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Villages</th>
<th>Area under Paddy (in acres)</th>
<th>Sample Women Labourer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Srimoolakari</td>
<td>1453.50</td>
<td>39</td>
</tr>
<tr>
<td>2</td>
<td>V.athichanallur</td>
<td>764.63</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Thiripuliyangudi</td>
<td>749.72</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Sivagalai</td>
<td>641.50</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>KilpidagaiAppankovil</td>
<td>555.32</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>Arampannai</td>
<td>454.50</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>Kalvai</td>
<td>352.50</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Nanalkadu</td>
<td>343.50</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Alwarkarkulam</td>
<td>339.16</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Kongarayakurchi</td>
<td>1095.27</td>
<td>29</td>
</tr>
<tr>
<td>11</td>
<td>Nallur</td>
<td>562.56</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>Melapudukkudi</td>
<td>561.36</td>
<td>15</td>
</tr>
<tr>
<td>13</td>
<td>Pallipathu</td>
<td>546.16</td>
<td>15</td>
</tr>
<tr>
<td>14</td>
<td>Moolakari</td>
<td>421.71</td>
<td>11</td>
</tr>
<tr>
<td>15</td>
<td>Ammanpuram</td>
<td>412.51</td>
<td>11</td>
</tr>
<tr>
<td>16</td>
<td>Paramakurichi</td>
<td>247.52</td>
<td>7</td>
</tr>
<tr>
<td>17</td>
<td>Mathavankurichi</td>
<td>196.36</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>Manadu Thandupathu</td>
<td>421.12</td>
<td>11</td>
</tr>
<tr>
<td>19</td>
<td>Semmarikulam</td>
<td>542.18</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>Lakshimipuram</td>
<td>565.27</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>11226.35</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>
3.2.3 Collection of Data

The data used in this study have been collected both from primary and secondary sources. Primary data were collected with the help of a schedule through direct interview method. Secondary data were collected from various records maintained by Agricultural and Statistical offices of Thoothukudi and Chennai. Secondary data was also collected from Agricultural Universities: Madurai and Coimbatore, Madras Institute of Development Studies, M.S. Swaminathan Institute, Chennai, Centre for Development Studies, Trivandrum, Kerala University, Agricultural Research Centers like Indian Council of Agricultural Research, Indian Agricultural Research Institute, Jawaharlal Nehru University Library and Krishi Bhavan, New Delhi.

3.2.4 Tools of Analysis

Percentage analysis is used to find out the cost of cultivation, proportion of wages and various farm activities of male and female agricultural labourers. The percentage analysis is worked out wherever it was necessary.
To examine the relationship between annual income and agricultural income of the respondents, Chi-square test has been employed. For Chi-square test, the following formula has been adopted.

\[ \chi^2 = \sum \frac{(O-E)^2}{E} \]  

......... (3.1)

Where,

\( O = \) Observed,

\( E = \) Expected frequency, i.e., \( \frac{\text{Row total x Column total}}{\text{Grand total}} \)

To analyse the relationship between the age of the female labourers and the annual income of the farm households Chi-Square test has been made use of. (3.1).

To assess the relationship between the size of the family and its influence on the annual income of the farm households Chi-Square test has been adopted (3.1).

To analyse labour participation of male and females in different activities of paddy cultivation Z-test was made use of using the following formula:
\[ Z = \frac{\left| X_1 - X_2 \right|}{SE_{X_1 - X_2}} \]  

\[ \text{where,} \]
\[ X_1 = \text{Average female participation in various activities}, \]
\[ X_2 = \text{Average male participation in various activities}. \]

To analyse farm size and output, multiple regression model has been used. The specific form of multiple regression model used for this analysis is given as:
\[ Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 \]  

\[ \text{where,} \]
\[ Y = \text{Output (kgs.)}, \]
\[ X_1 = \text{Land (acres)}, \]
\[ X_2 = \text{Crop area (days)}, \]
\[ X_3 = \text{Male labour (days)} \text{ and} \]
\[ X_4 = \text{Female labour (days)}. \]
To estimate the supply responsiveness and female labour absorption in paddy cultivation Zellner’s Normalised Profit function was employed using the following formula:

\[
\log \pi^* = \alpha_0 + \beta_1 \log W_F + \beta_2 \log W_M + \alpha_1 \log A + \alpha_2 \log C + U
\]

\[
\frac{-W_F X_1}{\pi^*} = \beta_1 + u_1
\]

\[
\frac{-W_M X_2}{\pi^*} = \beta_1 + u_2
\]

where,

\[
\pi^* = \text{Real profit in Rupees (i.e., the total revenue minus total variable cost normalized by the price of output),}
\]

\[
W_F = \text{Real wages for female labour,}
\]

\[
W_M = \text{Real wages for male labour,}
\]

\[
A = \text{Total area cultivated,}
\]

\[
C = \text{Capital flow (calculated as the sum of depreciation, maintenance and opportunity cost of capital stock,}
\]

\[
X_1 = \text{Total female labour mandays utilized,}
\]

\[
X_2 = \text{Total male labour mandays utilized,}
\]

\[
U = \text{Random disturbance.}
\]
To identify the constraints faced by female agricultural labourers, Garrett’s Ranking was employed using the following formula:

\[
\text{Per cent position} = \frac{100 \left( R_{ij} - 0.50 \right)}{N_j} \quad \text{........ (3.6)}
\]

Where,

\( R_{ij} \) = Rank given for the \( i^{\text{th}} \) reason by \( j^{\text{th}} \) respondent.

\( N_j \) = Number of factors ranked by \( j^{\text{th}} \) respondents.
3.3 PROFILE OF THE STUDY AREA

This section provides a glimpse of the physical features, agro-climatic conditions, demographic features and infra structural set up of the Thoothukudi district.

3.3.1 THOOTHUKUDI DISTRICT – A PROFILE

Thoothukudi was ruled over by the Pandya kings before the British rule. During the freedom struggle, it was the birth place of many brave patriots. The darkness of British slavery was dispelled by the selfless sacrifice of these devoted patriots. Veerapandia Kattapomman with his undaunted fighting spirit, Bharathiar with his fiery, and inspiring poems of patriotism and V.O. Chidambaranar who floated the Swedishi ship against the British were among the many brave countrymen who valiantly fought the foreign rule. They made the soil of Thoothukudi proud and rich in cultural heritage.

District at a Glance

Thoothukudi ‘the pearl city of India’ is the newly formed district formed by bifurcating the original Tirunelveli district into Tirunelveli district (western portion) and Thoothukudi district (eastern portion).
"The Government of Tamil Nadu in their G.O. Ms.No.535/ Revenue Department dated 23.04.1986 ordered the formation of a new district viz., Thoothukudi district. Thoothukudi district was inaugurated on 19.10.1986 by the chief minister of Tamil Nadu and started functioning as the 20th district with effect from 20.10.1986 with the headquarters at Tuticorin". But in 1997, it was changed as the district of Thoothukudi, with Thoothukudi as its centre.

The District covers an extent of 4,621 sq.km. in the South-Eastern portion of Tamilnadu and it is rectangular in shape. It is bounded by Virudhunagar and Ramanathapuram districts in the North, Kanyakumari district in the South, Gulf of Mannar in the east and Tirunelveli district in the west. The district is roughly triangular in shape between 8°05' and 9° - 80° of the northern latitude and 77°05' and 78°-25' of eastern longitude.
MAP

Thoothukudi District
Taluks

(Map Not to Scale)
Digital Map Source: TWAD Board, Chennai
Web Design: NIC, TNSC
**Physical features**

There are no high mountains in the district Red Mounds or small hills are found in Tiruchendhur, Srivaikundam, Sathaankulam and Vijayaramapuram. The stretch of land that tilts to the east in Srivaikundam is made fertile by the Thamiraparani river. This river flows through Punnaikayal and joins the Bay of Bengal, Malattar, Mambiaru, Vaippar and Manimuthaar.

**Mineral Resources**

Gypsum, Ilmanite, Monazite, Hyduim, Limestones, Corals from the Islands and Phosphate are some of its natural resources.

**Agriculture**

The main food crop in the district is paddy. Out of the total area of 4,50,954 hectares, 2,11,811 hectares have been brought under the cultivation of different crops, which work out to 47 per cent of the total area of the district. The important food crops in the district are paddy, Cholam, Cumbu, ragi, Varagu, Samai and commercial crops like cotton, Chillies, Sugarcane, groundnut and banana.
Irrigation

The different sources of irrigation are channels, tanks and wells which cover 45,159 hectares in the district. Out of the total area irrigated, well irrigation covers 17,709 hectares, tank irrigation 22,538 hectares and channel irrigation 4,876 hectares for the year 1991-92.

Fisheries:

This district is an important coastal district having a vast coastal line of 160km and territorial water covering thousands of hectares. Fishing, next to agriculture, is an important occupation of the district. Tuticorin is a major fishing centre. It is also considered to be the only pearl fishing centre in the whole of India. Besides, it is also noted for chunk fishing. Nearly 35,000 MT of marine fish are produced per annum.

Forestry:

The area under forestry is 12,724 hectares which occupies 2.77 per cent of the geographical area.
Population:

The population of the district as per 2011 Census was 17,50,176 of which 8,65,021 were males and 8,85,155 females. The population density in the district is 369 per sq.kms against the state average of 555 per sq.kms. The percentage of urban population is 50.10 and that of rural population is 49.90 of the total population. The literacy percentage of male is 91.14 and female is 81.33. Total literacy percentage of this district is 86.16.

<table>
<thead>
<tr>
<th>Area</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>18,13,87,871</td>
<td>19,57,17,889</td>
<td>37,71,05,760</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>1,74,58,530</td>
<td>1,74,58,910</td>
<td>3,49,17,440</td>
</tr>
<tr>
<td>Thoothukudi District</td>
<td>4,42,142</td>
<td>4,34,660</td>
<td>8,76,802</td>
</tr>
</tbody>
</table>

Source: National Informatics Centre, Thoothukudi.

From this Table it is clear that the total urban population of India is 37,71,05,760 with female population as 18,13,87,871. In Tamil Nadu female population is 1,74,58,530. Out of the total population of Tamilnadu, Thoothukudi district’s urban population is 8,76,802, and female population 4,42,142. From the Table we can say that female urban population in Thoothukudi district outnumbers the male population.
The given Table shows the literacy level in urban areas.

**TABLE 3.3**
**LITERATES ACCORDING TO 2011 CENSUS**

<table>
<thead>
<tr>
<th>Area</th>
<th>Person</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tamil Nadu</strong></td>
<td><strong>Total</strong></td>
<td>5,18,37,507</td>
<td>2,80,40,491</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>2,45,02,195</td>
<td>1,36,65,839</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>2,73,35,312</td>
<td>1,43,74,652</td>
</tr>
<tr>
<td><strong>Thoothukudi</strong></td>
<td><strong>Total</strong></td>
<td>13,49,697</td>
<td>7,03,106</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>6,42,686</td>
<td>3,39,739</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>7,07,011</td>
<td>3,63,367</td>
</tr>
</tbody>
</table>

Source: National Informatic Centre, Thoothukudi

From this Table it is obviously clear that urban female literacy is 47.41 per cent of the total population of the urban literates in Tamil Nadu. At the same time the total urban literates in Thoothukudi district are 2.59 per cent of the total population in Tamilnadu. Of this, the female literacy is 2.65 per cent.

From this Table, it is also very clear that female literacy level in Thoothukudi is more than male literacy.

The following table shows the urban working population.
### TABLE 3.4

**URBAN WORKERS TO TOTAL POPULATION - 2011 CENSUS**

(in Per cent)

<table>
<thead>
<tr>
<th>Area</th>
<th>Females</th>
<th>Males</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>13.28</td>
<td>54.96</td>
<td>68.24</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>19.45</td>
<td>59.42</td>
<td>78.87</td>
</tr>
<tr>
<td>Thoothukudi District</td>
<td>5.08</td>
<td>13.78</td>
<td>18.86</td>
</tr>
</tbody>
</table>

Source: National Informatic Centre, Thoothukudi

From Table, it is clear that the proportion of total urban workers to total population in India is 68.24 per cent. Of this 13.28 per cent are females. Out of 78.87 per cent of the workers in Tamil Nadu, 19.45 per cent are females. In Thoothukudi district out of the 18.86 per cent urban workers, 5.08 per cent are female urban workers.

From this Table it is clear that the percentage of female urban workers in Thoothukudi district is very low. This is because of the lack of employment opportunities for women.
Women Workforce in Thoothukudi District:

The given Table shows the classification of female workers in Thoothukudi district. According to 2011 Census, workers were classified into main workers, marginal workers and non-workers. Out of the total main workers of 6,89,400 female main workers are 1,95,110 and male main workers are 4,94,290. Out of 96,738 marginal workers, female workers are 58,912 and male workers are 37,826. Out of 8,96,833 non-workers, females are 5,48,112 and males are 3,48,721.

**TABLE 3.5**

DETAILS OF WORKERS IN THOOTHUKUDI DISTRICT - 2011

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Workers details</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Main workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4,94,290</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1,95,110</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,89,400</td>
</tr>
<tr>
<td>2.</td>
<td>Marginal workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>37,826</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>58,912</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>96,738</td>
</tr>
<tr>
<td>3.</td>
<td>Non workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3,48,721</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>5,48,112</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8,96,833</td>
</tr>
</tbody>
</table>

Source: Government of India, Census Year 2011.
TABLE 3.6

NUMBER OF EMPLOYEES BY SOCIAL GROUP AND SEX IN THOOTHUKUDI DISTRICT

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Social group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Other communities</td>
<td>2621</td>
<td>1450</td>
<td>4071</td>
<td>12.06</td>
</tr>
<tr>
<td>2.</td>
<td>B.C</td>
<td>11257</td>
<td>9934</td>
<td>21191</td>
<td>62.78</td>
</tr>
<tr>
<td>3.</td>
<td>M.B.C</td>
<td>1932</td>
<td>1452</td>
<td>3384</td>
<td>10.02</td>
</tr>
<tr>
<td>4.</td>
<td>S.C</td>
<td>2692</td>
<td>2123</td>
<td>4815</td>
<td>14.27</td>
</tr>
<tr>
<td>5.</td>
<td>S.T</td>
<td>192</td>
<td>102</td>
<td>294</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18694</td>
<td>15061</td>
<td>33755</td>
<td>100.00</td>
</tr>
</tbody>
</table>


The number of employees by social group and sex in Thoothukudi district is shown in the above Table. From this Table, we can say that BC group of people are more in Thoothukudi district and also female employees under BC social group are greater than the other social groups.

**Industries**

The district constitutes 70 per cent of the total salt production of the State and meets 30 per cent requirement of our country. There are two industrial estates one at Kovilpatti with 11 units and the other at Thoothukudi with 20 units. The former is managed by SIDCO and the latter by SIPCOT.
Small scale industries such as match industries, food-based and metal based industries are generally constituted in Kovilpatti and Thoothukudi taluks. There are 2200 and above small scale industries registered in the district and about 12 major industries. These are engaged in the production of cotton and stable yarn, caustic soda, PVC resin, fertilizers, soda ash, carbon dioxide gas in liquid form, etc. The important major industries are SPIC, TAC, Dharangadhara Chemical Works, Loyal Textiles Ltd., Madura Coats Ltd., Sterlite Copper Industries, Kilburn Chemicals, Ramesh Flowers, Nila Sea Foods, Deva and Co. and Transworld Granite Industries.

The public sector undertakings are the Thoothukudi Thermal Power Station Unit, Heavy Water Plant (HWP) and Port Trust. The District Industries Centre and the Tamil Nadu Industrial Investment Corporation are catering to the needs of the small and large scale industries.

The Government is also encouraging unemployed youth and others to start industries by providing financial assistance and technical guidance.
**Topography**

The river Tambirabarani flows through this district. The area under the river basin within the district is 78,698.8 hectares. According to topography, the district can be divided into three regions. The northern part consists of black soil, mostly dependent on seasonal rainfall for agriculture; the central part is irrigated by water flow from the Western Ghats; and the southern part is red loam area. The normal rainfall is 662.mm., which is less than the state normal of 1009.1mm.

**Administration**

It has two divisions, eight subdivisions and 468 villages. At the local bodies level, Thoothukudi has two municipalities, 12 Panchayat unions, 20 town panchayats 408 village panchayats and 10,121 small villages and eight taluks, one Parliament Constituency and six assembly constituencies. It has three revenue divisions and eight revenue sub-divisions.

**Educational Institutions**

Thoothukudi has one Maritime Academy, many B.Ed colleges, 10 Arts Colleges, one Medical College, six Polytechnic Colleges, one Agricultural
College, one Fisheries College, eight I.T.I Schools, 97 Higher Secondary Schools, 73 High Schools, 284 Middle Schools, 1076 Primary Schools and many education oriented courses.

**Health Department**

Thoothukudi has 19 Government hospitals, one Medical College hospital and 249 health welfare departments.

**Public Welfare Department**

For the benefit of the public, there are 164 nationalised banks. To maintain law and order there are 44 police stations. Of this, there are two women police stations remaining under the direct control of superintendents of police and 62 Theatres for entertainment.