CHAPTER III

METHODOLOGY, PROFILE OF THE STUDY AREA AND GROWTH OF CONSTRUCTION WORKERS

This chapter attempts to discuss the methodology adopted for the present study and describes the profile of the study area. Further it analyses the growth of construction workers in Virudhunagar district. For a better exposition, the discussion of the present chapter has been classified under the heads namely,

(i) Methodology
(ii) Profile of the Study Area and
(iii) Growth of Construction Workers in Virudhunagar district.

3.1. METHODOLOGY

The study is an empirical research based on the survey method. First hand data have been collected from the construction workers with the help of interview schedule. The interview schedule has been administered in the vernacular. The primary data was obtained from the direct respondents of 600 workers out of 15,000 workers in 120 work sites in 6 Taluks of Virudhunagar District using simple random sampling method.
Choice of study area

The study area Virudhunagar District is the native place of the researcher. Collection of Primary data is within the reach of the researcher and so it could be elaborated and detailed. As the study area is an industrial district there is an ample scope for the development of construction workers. The modern trend of “owning one's house” naturally increased the demand for construction workers. Hence the economic conditions of the labourers involved in such a modern and developing sector deserve a thorough study.

Sample Design

The present study has been undertaken from the point of view of construction workers employed in building industry in Virudhunagar District. There are 13,683 workers out of which 12,877 are male and 806 are female workers according to 2001 census. This study was made during 2006-2007. The total construction workers would have been raised to 15,000 approximately. The researcher has selected 600 workers randomly from 15,000 workers in 120 work sites from 6 Taluks (100 each) in Virudhunagar District. As the workers are large, the sample workers have been selected by using simple random sampling method. The sample has been chosen in such a way to represent from 120 large, medium and small construction sites which were identified by the researcher with the help of workers unions, recognized building contractors, office of the Labour and
Employment and district officials. This study covers the sample units of workers of Masons, Mazdoors, Carpenters, Painters Electrical workers in 6 taluks of Virudhunagar District.

**Construction of Tools**

The Primary data with the help of interview schedule has been structured by the researcher himself. The various elements and items included in the interview schedule were identified with the help of trial interview with some selected and experienced construction workers working individually and under the minor and major contractors.

The elements and items thus identified have been used to prepare the interview schedule. The drafted interview schedule was circulated among a few construction workers for a critical review with regard to working format sequence. Then the interview schedules are redrafted in the light of their comments.

**Field work and Data Collection**

A field study was conducted among respondents and based upon feedback information, some of the questions were suitably altered. As the researcher happened to be at a place nearest in Virudhunagar District, the respondents were directly contacted to collect the necessary data. This study is based on Primary data and it is of the descriptive type. As this study is about unorganised workers a
questionnaire has been used for collecting the primary data. The questionnaire is of objective type. The primary data was obtained from 600 workers out of 15,000 workers in 120 work sites from 6 Taluks of Virudhunagar District namely Rajapalayam, Srivilliputhur, Sivakasi, Sattur, Virudhunagar and Aruppukottai, using simple random sampling method. The sample comprises the construction workers under the contractors in the building industry.

The details of construction workers in Virudhunagar District were gathered from National Information centre. The secondary data have been collected from the profile of Virudhunagar District Collectorate, Talukwise data was collected from the statistical office, Virudhunagar, Office of the Construction board, Chennai, Inspector of Labour Office, Virudhunagar, Office of the Deputy Commissioner of Labour, Madurai, Office of the Directorate of Census operation, Tamilnadu Census 2001, Chennai, from Primary census abstracts, website from www.census.tn.nic.in, www.labour.nic.in

Data Processing

After completing the interview schedule through check up of the data which has been collected, the information obtained from the respondents were verified by cross checking. Reliability of data was ensured by test and retest method the respondents were subjected to the editing of the data has been done. Afterwards a master table has been prepared by which all information collected
has been passed through transcription cards. With the help of the transcription cards the master table has been prepared. An analysis has been made with the help of this master table.

Period of the study

The reference period of the survey was during 2006-2007. The secondary data were obtained for 15 years from 1991 to 2005.

Tools of analysis

For analysing the data collected during the investigation, the following statistical tools were used based on the nature of data and relevance of information required.

Consumption Function

In order to examine the hypotheses a consumption function is specified with annual household income and the size of the family of the construction workers ‘as explanatory variables’. Further, the Marginal Propensity to Consume (MPC) and Marginal Propensity to Save (MPS) are derived.

In order to study the factors which influence the standard of living of the workers, the multiple regression model was estimated.
Chi-square Test

In order to study the general features of the construction workers in terms of age, marital status, community, level of literacy of the construction workers, Chi-square test has been adopted.

Factor Analysis

To examine the relationship between the working condition, wage rate and sub variables of the construction workers, factor analysis was adopted.

Likert Method of Scaling

In order to find out the living, economic condition and motivation of the construction workers, Likert Method of scaling was used for the present study.

Semi-Log Model

To find out the growth rate of construction workers, semi log - model has been employed.

Garrets Ranking Technique

In order to analyse the problems faced by construction workers, Garrets ranking techniques was applied.
3.2. PROFILE OF THE STUDY AREA

In this section, an attempt is made to describe the profile of the study area, Virudhunagar District, in terms of origin, location, administrative set up, area classification on the basis of industrial backwardness, human resources, agricultural resources, forest resources, trade and commerce, industries and other infrastructure facilities.

Tamil Nadu is the southernmost state in the Indian sub-continent. It is bound on the north by Andhra Pradesh and Karnataka States, on the south by the Indian Ocean, on the west by the State of Kerala and the Western Ghats and on the east by the Bay of Bengal. Tamil Nadu covers a little over 1,30,000 sq.km., representing about four per cent of India’s geographical area. In terms of area, Tamil Nadu ranks eleventh in the country.
According to the 2001 census, Tamil Nadu had a population of 62.1 million which makes it the seventh largest state in the country. Tamil Nadu is one of the most densely populated states in India, with 378 persons per square kilometer, as against the all-India figure of 324. As regards the density of population, Tamil Nadu stands fifth among the States of India.
VIRUDHUNAGAR DISTRICT

3.2.1 Origin

The erstwhile Ramanathapuram District was formed on first June, 1910 by carving out certain portions from Madurai and Tirunelveli districts. The Government of Tamil Nadu decided to bifurcate large districts into small districts in order to ensure an effective, and transparent administration. To fall in line with the above policy, the Government trifurcated the erstwhile Ramanthapuram, district into Kamarajar, Ramanathapuram and Pasumpon Thevar Thirumaganar district.

Kamarajar district was formed on 15th July, 1984 and was named after the freedom fighter and former Chief Minister of Tamil Nadu, Sri. K. Kamaraj. The district started functioning on 15th March 1985. Later, there was a continuous class struggle among the various sections of the people in the southern regions of Tamil Nadu. Hence, the Government of Tamil Nadu changed the name of Kamarajar District into Virudhunagar District on 1st July, 1997. Now, the district is functioning with Virudhunagar as its head quarters.

3.2.2 Location

Virudhunagar District is located between 9°07 and 10°22 north latitudes and 77°22 and 79°25 east longitudes. It has an area of about 4270.3 square kilometers. It is bound on the east by the Western Ghats, on the North by Madurai
district, on the North–East by Sivagangai district, on the East and the South-East by Ramanathapuram district and on the South by Thoothukkudi District.¹

3.2.3 Physical Features

Virudhunagar District is landlocked on all sides with no direct access to the sea. It is bound on the north by Madurai, on the northeast by Sivaganga, on the east by Ramanathapuram and on the south by Tirunelveli and Tuticorin districts.

Physiographically it consists of two distinct regions. The eastern slopes of the Western Ghats in Srivilliputtur and Rajapalayam taluks and the black soil plains of Sivakasi, Virudhunagar, Sattur, Aruppukottai, Tiruchili and Kariapatti. The average height of the hills of the eastern slopes of the Western Ghats is 1500m, though a few peaks rise to 1700m. The highest peaks are Peyimalai Mottai and Kottamalai. The foothills have rich loamy soil with good vegetation cover. The plains with black cotton soil (locally known as karisal) have underlying calcarious formations.

Virudhunagar does not have any perennial rivers. The Vaippar, Arjuna nadi, and Gundar constitute the river network of the District. Numerous streams and rivulets, activated by the monsoon, feed these rivers. The Mandiri odai and Girudhamal nadi flow into the Gundar, which irrigates the northeastern region of the District. The Sengundrapuram odai, Kausika manadi, Uppodai and Mannarkottaiyar are feeder streams of the Arjuna nadi, which flows through the central portion of the District. The Kayalkudiyar and Nichepa nadi join the Vaippar, which runs through the southern part of the District. The Arjuna and the Vaippar meet at Irukkangudi.
3.2.4 Administrative Set-up

For administrative convenience, Virudhunagar District has been divided into two revenue divisions, one at Sivakasi comprising Srivilliputhur, Rajapalayam, Sattur and Sivakasi Taluks and the other at Aruppukottai comprising Aruppukottai, Kariapatti, Virudhunagar and Thiruchuli Taluks. It has 11 community development blocks namely, Rajapalayam, Sivakasi, Virudhunagar, Sattur, Aruppukottai, Vembakottai, Srivilliputhur, Watrap, Thiruchuli, Narikudi and Kariapatti, six municipalities namely, Aruppukottai, Virudhunagar, Sattur, Sivakasi, Srivilliputhur and Rajapalayam, 600 revenue villages, 464 village panchayats, 11 panchayat Unions and 10 town panchayats. It covers one parliamentary constituency and six assembly constituencies.²

3.2.5 Area and Population

According to the Director of Statistics, Chennai, the district covers an area of 4270.3 square kilometers or 1648.8 square miles. Virudhunagar district occupies the fifteenth rank among the districts of the State of Tamil Nadu with regard to its size. Table 3.1 clearly indicates the total geographical area of the district.

TABLE 3.1
TOTAL GEOGRAPHICAL AREA OF THE DISTRICT

<table>
<thead>
<tr>
<th>Status</th>
<th>Area in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sq.km.</td>
</tr>
<tr>
<td>Rural</td>
<td>4179.4</td>
</tr>
<tr>
<td>Urban</td>
<td>90.9</td>
</tr>
<tr>
<td>Total</td>
<td>4270.3</td>
</tr>
</tbody>
</table>

Source: Director of Statistics, Chennai.

The population of the district is 15,65,037. Of this total population, 7,84,912 (50.15 per cent) are males and the remaining 7,80,125 (49.85 per cent) are females. In the district 9,79,333 persons constituting 62.58 per cent of the total population live in rural areas and the rest of 5,85,704 persons constituting 37.42 per cent of the total population live in urban areas. The population of scheduled castes and scheduled tribes is 2,91,879 persons accounting for 18.64 per cent of the total population. The density of the population of the district is 363 persons per square kilometer. The total number of literates is, 8,48,127 (54.19 per cent). Workers constitute 47.9 per cent of the total population.\(^3\)

From the above statistical figures, it is noted that more than 60 per cent of the population is living in rural areas and the educational level of the district has improved to a considerable extent. Above half of the population is able to read

\(^3\)Statistical Hand Book, Virudhunagar District, 2006, p. 23.
and write. Further, even today more than two-thirds of the workers derive employment from agriculture and its allied activities.\(^4\)

### 3.2.6 Resources – Human Resources

The total population of Virudhunagar district is 15,65,037 according to the 2001 Census.

### 3.2.7 Education

According to the 2001 census the percentage of literate population in the District is 62.91. The percentage of male literacy is 75.67\% and female literacy is 50.17\%.

### TABLE 3.2
**EDUCATIONAL INSTITUTIONS**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>No. of Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Primary Schools</td>
<td>1426</td>
</tr>
<tr>
<td>2.</td>
<td>Middle Schools</td>
<td>171</td>
</tr>
<tr>
<td>3.</td>
<td>High Schools</td>
<td>58</td>
</tr>
<tr>
<td>4.</td>
<td>Higher Secondary Schools</td>
<td>107</td>
</tr>
<tr>
<td>5.</td>
<td>Colleges for Arts &amp; Science</td>
<td>11</td>
</tr>
<tr>
<td>6.</td>
<td>Teacher Training Institutions</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Engineering Colleges</td>
<td>5</td>
</tr>
<tr>
<td>8.</td>
<td>Polytechnics</td>
<td>8</td>
</tr>
<tr>
<td>9.</td>
<td>No. of Industrial Training Institute</td>
<td>15</td>
</tr>
</tbody>
</table>

#### 3.2.8 Health

The District has fully equipped Government and Private hospitals. There are 9 Government hospitals with combined bed strength of 772 beds. There are 36 Primary Health Centres and 284 Sub-Centres attached to Primary Health Centres in various blocks of the District.
3.2.9 Agricultural Resources and Irrigation

Agriculture is the predominant occupation of the district. Nearly 66.3 per cent of the total population of the district is dependent on agriculture and its allied occupations.

The district is a drought prone district. The most striking feature of the district is the absence of dependable irrigation sources like perennial rivers. Assured irrigation through wells comes only 57 per cent of the target. The remaining area is irrigated by rainfed tanks. The reservoirs namely Periyar and Kovilar at Pilavakkal in Watrap irrigate about 3000 hectares through 40 tanks. There are also a number of irrigation schemes like Anaikuttam, Kullursandai, Vembakottai and Golwarpatti.

More than half of the total geographical area of the district is being utilised for cultivation and the net cultivated area amounts to 2,70,800 hectares. About 7.4 per cent of the cultivated area falls under double cropping; 5.82 per cent is covered by forests; 2.8 per cent is not suitable for cultivation. The permanent pasture and other fallow land constitute 15.67 per cent of the total area.\(^5\)

Paddy, cumbu, sugarcane, groundnut, cotton, cholam, maize, ragi, varagu, plantain, samai, chillies, greengram, blackgram, horsegram, and gingelly are the

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\(^5\)Lead Bank Section, Indian Overseas Bank, Credit Plan for Virudhunagar District, 2005-06, Madurai Regional Office, 2006, p. 46.
important crops of the district. Paddy is the most predominant crop and it is cultivated in 27,892 hectares. Cotton is the next important crop grown in 38,859 hectares. Cotton is intensively cultivated in Rajapalayam, Srivilliputhur and Aruppukottai taluks. Teak and other trees are grown in some parts of the Western Ghats. The plains of Sattur taluk have black soil which is locally known as Karisal. This soil is suitable for cotton cultivation.

Another important commercial crop in the district is chilli. Sattur Chilli is very popular in Tamil Nadu. Food crops are cultivated in 46.95 per cent of the total area in the district and in the rest of the cultivable area commercial crops are cultivated.

The district is generally hot and dry with a low degree of humidity. Normally the temperature varies from 20°C in December – January to 37°C in April-June. The average annual rainfall is only 386.7 mm. The district receives scanty rainfall. March-July are the hottest months (Summer). The South-West monsoon season is from June to September. The North-East monsoon season is from October to December. The district receives the bulk of its rainfall from the North-East monsoon which often sets late besides being irregular and scanty. However, the upper slope of the Srivilliputhur Hills has the benefit of both the South-West and the North-East monsoons.
3.2.10 Activities Allied to Agriculture

The activities allied to agriculture assume great significance by virtue of their nature and closeness to agricultural activities as they supplement the income of the farming community and also provide gainful employment during the agricultural off-seasons. The important activities carried out by the cultivators and agricultural labourers are dairying and sheep-rearing. There are milk chilling plants at Virudhunagar and Srivilliputhur. The district offers considerable scope for the development of sheep-rearing. The district has a sizeable sheep population of 1,67,078, but they are often of low genetic potential. Further, they suffer from malnutrition on account of the poor quality of available forage and the excessive pressure on the grazing land. Sheep population is large in Aruppukottai, Sattur and Srivalliputhur taluks. The Regional Agricultural Research Centre at Aruppukottai is doing research to improve the genetic potential of the sheep. The development of poultry farming is not significant in the district owing to hot climate, high mortality rate of birds and high cost of feed. However, Poultry Development Programmes are formulated and implemented in Narikudi block. Marketing booths are opened at Pulvakkarai.

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3.2.11 Fisheries

As Virudhunagar is land-locked with no coastline, fishing is restricted to inland water sources. Fish farms have been established at Periyar and Vembakottai dams. Around 8.09 lakh fingerlings were reared in these farms. The fish catch in these reservoirs during 1999-2000 was 3558 tonnes. Fishponds have been developed at the Pilavakkal dam under the drought area development programme.

3.2.12 Forest Resources

The forest area in the district is negligible. Forests are found in Srivilliputhur and Rajapalayam taluks. The area under forest is 25,634 hectares, which is 5.82 per cent of the total area of the district. The reserved forest in Srivilliputhur taluk contains jungle and deciduous species. Palmarah trees are found everywhere, especially in Sattur, Aruppukottai and Srivalliputhur taluks. The mountains in Srivalliputhur and Rajapalayam taluks have teak trees and valuable timber of several kinds. Cardamon Plantation, Mango, Orange and Lime are also found in Srivilliputhur taluk. Cashew, fuel, eucalyptus, sandal and casuarinas trees are the chief forest products of the district.

3.2.13 Animal Husbandry

As per 2001 census, there are 5 veterinary hospitals, 28 veterinary dispensaries, 70 Govt. veterinary sub-centres, 70 visiting centres and 11 mobile
veterinary dispensaries engaged in rendering service to the livestock. An Intensive Cattle Development Project with 39 artificial insemination centres was launched to improve the quality of the cattle.

There are two milk-chilling plants one at Virudhunagar and another at Srivilliputur.

This District offers considerable scope for development of sheep rearing. This District has a sizeable sheep population, say at 165416 but they are often of low genetic potential. Sheep population is rich in Aruppukottai, Sattur and Srivilliputur Taluks. Hot climate, high mortality rate of birds high cost of food etc. are some of the significant factors that arrest the development of poultry in this district.

3.2.14 Mineral Resources

The soils of the district are mainly red loam, black soil and red sand. Most of the areas in the district are mainly covered by black loomy soil. The important minerals available in the district are lime stones of different grades, gypsum, fire clay and graphite. Lime stone is the most important mineral available in this district. In Sattur area, cement grade lime stone is available in plenty which is the primary raw material for the cement industry. Nearly 12 million tonnes of lime stone deposit have been estimated in Alangulam area. Another reserve of about 2.5 million tonnes of lime stone has been recorded at Kakkivadanpatti. The
reserves at Pandalgudi, Chettypatti and Velayuthapuram villages of Aruppukottai taluks are estimated at 12 million tonnes. Similar deposits to the tune of 0.5 million tonnes have been estimated near Virudhunagar.⁷

Owing to the great potential of lime stone reserves available in the district, there are already two large scale cement factories, one at Thulukkapatti in the private sector and the other one at Alangulam in the public sector. According to the geographical findings, red clay is available in the district, which is suitable raw material for brick industry.

Besides lime stone, there is a small occurrence of gypsum deposit in Thenkarai and Kovinathampatti village of Rajapalayam and Sattur taluks respectively.

3.2.15 Trade and Commerce

Internal trade of the district is developing on a large scale. Fireworks, matches, polythene articles, litho-printed calendars, posters, diaries and the like are manufactured in Sivakasi. These products enter the markets situated in the different parts of the country. The products, which are produced in the district, have got insignificant local market. Market Committees are functioning in the district for the purchase and sale of cotton, groundnut, jaggery, chilli and other

products. A number of studies are held in the district at various places for helping the rural folk to purchase and sell their products such as food grain, vegetables, groceries, textiles, cattle and the like.

There are two warehouses in this district, one at Virudhuangar and other at Rajapalayam. The commodities of the chief wholesale trading in the district are pulses, cotton, groundnut and coffee (Virudhuangar block), cotton and groundnut (Rajapalayam block) and chillies (Sattur block).

3.2.16 Banking

Virudhunagar district is served by a network of banking giving an average of 15,680 persons per branch. These branches are located at 58 centres. Eleven public sector banks, 6 private sector banks and one regional rural bank are operating in the district. Indian Overseas Bank (IOB) is functioning as the Lead Bank of the district. There are 164 banks, both nationalized and scheduled, taking care of the banking needs of the district.

The Virudhunagar District Central Co-operative Bank Ltd., (VDCCB) is the central financing agency of the co-operative sector in the district catering to the short-term and medium-term credit needs of the co-operative institutions established there. The bank also finances the Handloom Weaver’s Co-operative Societies. The VDCCB Ltd., with its head office at Virudhunagar, has 16 branches in the district which are located mostly at the block headquarters. Urban
Co-operative Bank is also operating in the district with five branches. Besides, the Tamil Nadu State Co-operative Bank, Land Development Bank Ltd., has five branches functioning in the district for advancing long-term loans to the farmers for the purpose of land-levelling, minor irrigation and horticulture crops.

3.2.17 Infrastructure

All taluks in the district are well connected by transmission network and the overall position of power supply to industries is satisfactory. Industrial feeders are available in eight out of the 11 blocks in this district.

Six hundred and fourteen villages in the district are covered under rural electrification scheme. The total length of metalled roads is 329.9 kms., while the total length of non-metalled road is 601.6 kms. Virudhunagar, an important commercial centre of this district, is well connected with other places by rail. The total length of railway tracks is 153 kms. There are 349 post offices serving 538 villages. The number of telegraph offices is 48 and they cater to the needs of 108 villages.

There are 392 cloth shops, 934 provision stores, 408 general merchants, 178 stationery shops, 368 hotels, 1206 tea stalls, 2874 petty shops, 436 cycle hiring shops, 206 fruits and vegetables shops, 89 medical shops, 57 utensils merchants, 468 barbers/laundries and 973 tailors in the district.
The total number of regulated markets in the district is only seven and they serve 146 villages. There are 21 co-operative marketing societies, four regulated recognized markets covering 52 villages, 28 villages mandi or weekly shandy and two recently, established Uzhavar Sandhais (Farmer’s Fair Shops) in the district.

3.2.18 Small Scale Industries – At a Glance

The importance of the development of Virudhunagar District has to be viewed against the background of the twin characteristics of the area.

i) It is a dry district with a low annual rainfall, with neither too fertile soil for agricultural purposes, nor blessed with a surfeit of river water potential.

ii) The people of the district have a low standard of living and are obliged to eke out their living by very hard work, often migrating to more prosperous neighbouring districts and quite often to far away places as well.

The industrial growth is significant and it contributes much to the economic development of the district in providing employment for many people. There is ample scope for the development of resource-based and demand-based industries in this district. Sivakasi and Sattur are well known for their chemical-based industries like match industry and fireworks industry and these areas have the highest number of match factories in the country. It is reported that the production of safety matches in the district accounts for about one-third of the all
India output. In fact, Sivakasi is the most important centre on which the whole country depends for the supply of fireworks. This industry provides employment for thousands of people in and around Sivakasi.

Sivakasi is also famous for off-set printing. The development of match industry and their dependence on printing presses for the supply of trade mark labels, and fireworks labels gave an impetus to the printing industry. Printing industries are concentrated in Sivakasi, Thiruthangal and Sattur.

There were 34 large scale industrial units in the district as on March 31, 2001, comprising 16 textile units, 10 printing units, two cement factories, one cement product industry, two automobile industries, one food product, one chemical product and one engineering industry. There were 5,226 cottage and 4,548 handicraft industries in the district as on March 31, 2006.\(^8\)

In addition to the large scale units, there were 20,040 small scale units in Virudhunagar district. As per the DIC, Virudhunagar, small scale industries are classified into 10 categories. The industry-wise distribution of small scale units is shown in Table 3.3

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\(^8\)Unpublished Records of DIC Virudhunagar, DIC Action Plan for Five Years from 2001-02 to 2005-06, p. 5.
### TABLE 3.3

**INDUSTRY-WISE DISTRIBUTION OF SMALL SCALE INDUSTRIES IN VIRUDHUNAGAR DISTRICT AS ON MARCH 31, 2006**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Nature of Industry</th>
<th>No.of Units</th>
<th>Percentage to Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agro-based Industries</td>
<td>1941</td>
<td>9.69</td>
</tr>
<tr>
<td>2.</td>
<td>Forest-based Industries</td>
<td>3112</td>
<td>15.53</td>
</tr>
<tr>
<td>3.</td>
<td>Mineral-based Industries</td>
<td>695</td>
<td>3.47</td>
</tr>
<tr>
<td>4.</td>
<td>Textile-based Industries</td>
<td>2269</td>
<td>11.32</td>
</tr>
<tr>
<td>5.</td>
<td>Engineering-based Industries</td>
<td>1202</td>
<td>6.00</td>
</tr>
<tr>
<td>6.</td>
<td>Electrical and Electronic-based Industries</td>
<td>954</td>
<td>4.76</td>
</tr>
<tr>
<td>7.</td>
<td>Chemical-based Industries</td>
<td>4451</td>
<td>22.21</td>
</tr>
<tr>
<td>8.</td>
<td>Animal Husbandry-based Industries</td>
<td>857</td>
<td>4.28</td>
</tr>
<tr>
<td>9.</td>
<td>Building Material-based Industries</td>
<td>968</td>
<td>4.83</td>
</tr>
<tr>
<td>10.</td>
<td>Miscellaneous Industries</td>
<td>3591</td>
<td>17.92</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>20040</td>
<td>100.00</td>
</tr>
</tbody>
</table>


Table 3.3 shows that out of 20,040 units, chemical-based industries account for 22.21 per cent. Miscellaneous industries, mostly including printing and paper industries account for 17.92 per cent. Forest-based industries account for 15.53 per cent while textile-based industries account for 11.32 per cent. Agro-based industries account for 9.69 per cent and engineering-based industries
account for 6.00 per cent, while building material-based industries account for 4.83 per cent, animal husbandry-based industries account for 4.28 per cent. Electrical and electronic-based industries account for 4.76 per cent and mineral-based industries account for 3.47 per cent.\(^9\)

### 3.2.19 Agro-based Industries

These include rice, flour, and dhal mills, oil mills, industries producing cattle feed and poultry feed, confectionery units, bakery units, vermicelli units, units engaged in manufacturing appalam, potato chips, pickles, fruit jams, mango pulp, jaggery; masala powder, chilli, oil, desiccated coconut, groundnut cake and the like. Fruit jam and Masala powder produced in these regions have a good demand both in internal and external markets. Project profiles and technical know-how can be had from food and nutrition centre, Madurai, at free of cost.

### 3.2.20 Forest-based Industries

These include saw mills, industries connected with the production of match-boxes, splint and veneers, wooden furniture, wooden building materials, cardboard, defibred coconut, charcoal and the like.

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3.2.21 Mineral-based Industries

These include industries producing polished granite, lime powder, gem powder, bricks and the like. Lime stone is an important mineral available in plenty in this district. The estimated lime stone deposit is 27.0 million tonnes. Though there are two large scale cement factories functioning at Alangulam and Tulukakkapatti, cement-based small scale industries also have a vast scope. As per the geographical findings, red clay is available in this district which is a suitable raw material for the brick industry. Hence, there are 656 brick industries operating in this district to cater to the needs of the local people.

3.2.22 Textile-based Industries

These include units connected with cotton ginning, willowing of waste cotton, dyeing of yarn, winding and warping handlooms and powerlooms engaged in the production of terry towels, lungis, grey cloth, sarees (including art silk sarees), surgical cotton cloth, hosiery, ready made garments, tailored garments and the like. These industries are mostly located in the areas like Rajapalayam, Srivilliputhur and Aruppukottai. These products have a good demand both in the domestic and foreign markets.
3.2.23 **Engineering-based Industries**

Engineering-based industries are the most modern ongoing industries in the district. These include units engaged in the manufacture of steel furniture, fountain pens and nibs, bolts and nuts, domestic utensils, metal screws, rivets, door handles, locks, agricultural implements, gates and grills, stoves and tin containers. There are general engineering units and units connected with servicing printing machines and automobiles (both two wheelers and four wheelers).

3.2.24 **Chemical-based Industries**

These include units producing safety matches, fireworks, plastic containers, printing ink, offset plates, insulation tapes, agarbathies, camphor, tablets, soaps and soap oils, P.V.C. pipes, polythene bags, potassium chlorate, varnish coating, wax coating, de-processing of plastic wastes and the like.

3.2.25 **Animal Husbandry-based Industries**

These include units producing leather chappals and leather products, animal glues, fancy leather goods, and the like.

3.2.26 **Electrical and Electronic-based Industries**

These include units connected with television servicing and repairing, motor rewinding, data processing and software development, chokes and starters, emergency lamps, voltage stabilizers, T.V. boosters and the like.
3.2.27 Building Material-based Industries

These include brick kilns, units engaged in the manufacture of mosaic tiles, floor tiles, cement moulded articles and cement hollow blocks.

3.2.28 Miscellaneous Industries

These include industries engaged in the manufacture of paper envelopes, paper cartons, paper cones, paper bags, paper tubes, playing cards, posters and corrugated paper boards, printing press, tredle printing, screen printing, offset printing, xerox copying, lamination, job typing, ornamental gold cutting, ice factories and the like.

3.2.29 Industrial Estates

There is one Industrial Estate in Sulakkari, Virudhunagar. Besides, there is one co-operative industrial estate managed by the Director of Industries and Commerce at Sivakasi. SIDCO has also constructed tiny Industrial Sheds at Watrap, Tiruchuli and Kariapatti. The detailed sketch of the number of estates and sheds is given in Table 3.4.
TABLE 3.4
PLACE-WISE DISTRIBUTION OF INDUSTRIAL SHEDS IN
VIRUDHUNAGAR DISTRICT

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Places</th>
<th>Number of Sheds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SIDCO Industrial Estate at Sulakkari, Virudhunagar</td>
<td>49</td>
</tr>
<tr>
<td>2.</td>
<td>Co-operative Industrial Estate, Sivakasi</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>SIDCO Tiny Industries Shed:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Watrap</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ii) Tiruchuli</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>iii) Kariapatti</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>109</td>
</tr>
</tbody>
</table>


3.3 GROWTH OF CONSTRUCTION WORKERS IN VIRUDHUNAGAR DISTRICT AND TAMIL NADU

The first main objective of the study is to find out and analyse the trend and growth of the construction workers of each taluk of Virudhunagar District.

The Analytical Framework

In order to find out the compound growth rate of each taluk, the researcher has applied the semi log growth model of the following form:
Log \( Y = a + bt \) ................. (3.1)

where

\( Y \) = The total construction workers

\( t \) = The number of years

\( a \) and \( b \) are the parameters to be estimated. The above equation (3.1) was estimated by the method of least squares for 15 years periods from 1991 to 2005 (Vide in Appendix) separately for Virudhunagar district and Tamil Nadu.

The computed results of model (3.1) for six taluks separately are given in Table 3.5.

**TABLE 3.5**

TALUK WISE TREND AND GROWTH RATE OF MALE CONSTRUCTION WORKERS IN VIRUDHUNAGAR DISTRICT

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Taluk</th>
<th>Trend Co-efficient</th>
<th>( R^2 )</th>
<th>Compound Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( a )</td>
<td>( b )</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rajapalayam</td>
<td>908.28</td>
<td>1.09*(29.68)</td>
<td>0.98</td>
</tr>
<tr>
<td>2</td>
<td>Srivilliputhur</td>
<td>599.96</td>
<td>1.09*(15.44)</td>
<td>0.92</td>
</tr>
<tr>
<td>3</td>
<td>Sivakasi</td>
<td>905.52</td>
<td>1.08*(18.66)</td>
<td>0.94</td>
</tr>
<tr>
<td>4</td>
<td>Sattur</td>
<td>722.67</td>
<td>1.08*(17.79)</td>
<td>0.93</td>
</tr>
<tr>
<td>5</td>
<td>Virudhunagar</td>
<td>955.10</td>
<td>1.09*(42.16)</td>
<td>0.98</td>
</tr>
<tr>
<td>6</td>
<td>Aruppukottai</td>
<td>702.79</td>
<td>1.08*(39.17)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Figures in brackets represent \( t \)-values.

* Indicates that the trend co-efficient are Statistically significant at 5% level.
From Table 3.5 it is understood that among the six taluks 9 per cent of growth rate is exist in Rajapalayam, Srivilliputtur and Virudhunagar. 8 per cent of growth rate is prevailing in remaining other Sivakasi, Sattur and Aruppukottai Taluks.

The above Table 3.5 shows that the trend co-efficients of male construction workers are found to be statistically significant at 5 per cent level. The trend coefficients in Rajapalayam, Srivilliputtur and Virudhunagar Taluks are higher while compare to the other 3 taluks namely Sivakasi, Sattur and Aruppukottai (1.08).

It is concluded that there is a significant growth of construction workers of all taluks namely Rajapalayam, Srivilliputtur, Sivakasi, Sattur, Virudhunagar and Aruppukottai.
TABLE 3.6

TALUK WISE TREND AND GROWTH RATE OF FEMALE CONSTRUCTION WORKERS IN VIRUDHUNAGAR DISTRICT

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Taluk</th>
<th>Trend Co-efficient</th>
<th>R²</th>
<th>Compound Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rajapalayam</td>
<td>65.49</td>
<td>1.07*(15.73)</td>
<td>0.88</td>
</tr>
<tr>
<td>2</td>
<td>Srivilliputhur</td>
<td>43.36</td>
<td>1.07*(16.00)</td>
<td>0.89</td>
</tr>
<tr>
<td>3</td>
<td>Sivakasi</td>
<td>49.87</td>
<td>1.11*(33.00)</td>
<td>0.99</td>
</tr>
<tr>
<td>4</td>
<td>Sattur</td>
<td>54.35</td>
<td>1.06*(12.00)</td>
<td>0.78</td>
</tr>
<tr>
<td>5</td>
<td>Virudhunagar</td>
<td>55.37</td>
<td>1.10*(24.93)</td>
<td>0.97</td>
</tr>
<tr>
<td>6</td>
<td>Aruppukottai</td>
<td>44.93</td>
<td>1.11*(20.42)</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Figures in brackets represent t-values.
* Indicates that the trend co-efficient are Statistically significant at 5% level.

It is understood from Table 3.6 that the trend coefficients of female construction workers are higher in Sivakasi (1.11) and Aruppukottai (1.11) taluks while compared to other 4 taluks namely Rajapalayam (1.07), Srivilliputtur (1.07), Virudhunagar (1.10) and Sattur (1.06). The trend co-efficients of female construction workers in almost in all Taluks are statistically significant at 5% level and they are positive. It is concluded that there is a significant growth of construction workers of all taluks in Virudhunagar District for the period of 15 years since 1991 to 2005.
TABLE 3.7

TALUK WISE TREND AND GROWTH RATE OF TOTAL CONSTRUCTION WORKERS IN VIRUDHUNAGAR DISTRICT

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Taluk</th>
<th>Trend Co-efficient</th>
<th>R²</th>
<th>Compound growth rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rajapalayam</td>
<td>973.08</td>
<td>1.09* (29.12)</td>
<td>0.98</td>
</tr>
<tr>
<td>2</td>
<td>Srivilliputhur</td>
<td>643.05</td>
<td>1.09* (15.55)</td>
<td>0.92</td>
</tr>
<tr>
<td>3</td>
<td>Sivakasi</td>
<td>954.60</td>
<td>1.09* (19.84)</td>
<td>0.95</td>
</tr>
<tr>
<td>4</td>
<td>Sattur</td>
<td>776.34</td>
<td>1.09* (17.44)</td>
<td>0.93</td>
</tr>
<tr>
<td>5</td>
<td>Virudhunagar</td>
<td>1010.52</td>
<td>1.09* (41.48)</td>
<td>0.99</td>
</tr>
<tr>
<td>6</td>
<td>Aruppukottai</td>
<td>748.05</td>
<td>1.09* (40.14)</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Figures in brackets represent t-values.
* Indicates that the trend co-efficient are Statistically significant at 5% level.

From Table 3.7 it is seen that the growth rate of construction workers is found the same (9 per cent) in all six taluks namely Rajapalayam, Srivilliputtur, Sivakasi, Sattur, Virudhunagar and Aruppukottai. The taluk-wise trend and growth rate of construction workers in Virudhunagar District are statistically significant at 5 per cent level. It is concluded that there is a significant growth of construction workers of all taluks in Virudhunagar District.
TABLE 3.8
TREND AND GROWTH RATE OF TOTAL CONSTRUCTION WORKERS IN VIRUDHUNAGAR DISTRICT LEVEL.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Trend Co-efficient</th>
<th>R²</th>
<th>Compound growth rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>4798.26</td>
<td>1.09* (27.90)</td>
<td>0.97</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>150.44</td>
<td>1.09* (23.14)</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>5108.82</td>
<td>1.09* (27.73)</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Figures in brackets represent t - values.

* Indicates that the trend co-efficient are Statistically significant at 5% level.

It is clear from Table 3.8 that the trend and growth rate of construction workers are found to be statistically significant in all the categories of male, female and overall in Virudhunagar district. It means that on an average the rate of increase in the construction workers 1.09 per cent in each male, female and overall per annum in the district. It is concluded that there is a significant growth of all variables namely Male, Female and Total construction workers.
TABLE 3.9

TAMILNADU STATE WISE TREND AND GROWTH RATE OF TOTAL CONSTRUCTION WORKERS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Trend Co-efficient</th>
<th>R²</th>
<th>Compound growth rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>340.00</td>
<td>1.04 * (82.66)</td>
<td>0.98</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>899.95</td>
<td>1.03 * (43.41)</td>
<td>0.93</td>
</tr>
<tr>
<td>3</td>
<td>Total</td>
<td>4300.25</td>
<td>1.04 * (98.89)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Figures in brackets represent t-values.

* Indicates that the trend co-efficient are Statistically significant at 5% level.

It is evident from Table 3.9 shows that trend and growth rate of construction workers in Tamilnadu State level is higher (04%) in Male Construction workers while compared to other two categories namely Female and total construction workers.

The trend co-efficients of male, female and total construction workers in Tamilnadu State are statistically significant at 5% level. It is concluded that there is a significant growth of all variables namely male, female and total construction workers in Tamilnadu State level.