This chapter is devoted for a statement of the research design followed and for the presentation of the quick profile of the study area. These two sections are expected to serve as purposeful background material to understand the work better.

3.1. Research Design

Generally, the research design outlines the methodology followed and the tools of analysis employed for analysing and interpreting the key variables. It consists of the other relevant aspects and the input also.

Research design is the frame-work of research conducted by the researcher. A well-defined and designed research is the essential feature of a successful investigation. This is a fact finding exploration exercise.

In this context, C.T. Kurien\(^1\) says,

Scientific research including research in Economics is not a detective story, but scientific research has much in common with the work of the detective in that both seek explanation….. The main purpose of research is to describe, interpret and explain the phenomena with a suitable methodology.

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Sadhu and Singh\textsuperscript{2} say:

Selection of proper research method is a very crucial problem. If a methodology adopted for completing a piece of research is inappropriate and insufficient then, the results are bound to be vague, implausible and unscientific.

In a similar tone, Best\textsuperscript{3} has given his opinion on methodology thus:

This part of the research design outlines the entire research plan. It describes just what must be done, how it will be done, what data will be needed, what gathering devices will be employed and how the data will be analysed and conclusion researched.

3.1.1. Statement of the Problem

Though the brick works have developed fairly well, there is a regional imbalance in the sphere of production. Of all districts in Tamil Nadu, the brick works business has been carried out on large scales in Tirunelveli and Thoothukudi districts.

Even though the demand for bricks is on the constant increase, there is a peculiar problem in this regard. That is supply exceeds demand or demand exceeds supply. Production of bricks depends on the availability of raw materials, labour and overheads. So, it is necessary to know that which variable significantly influences the production of bricks. It will enable the manufacturer to give due importance to that particular variable. So, the researcher tries to find out the


relationship between production of bricks and the variables which affect the production.

The brick works in both Tirunelveli and Thoothukudi districts face many problems. Government restrictions and climatic variations are some of the deterrent factors in this business. But, the manufacturers are now being pushed into a dilemma of finding out which problem is the crucial one so that they can find proper remedy for it. A scientific study and ranking of the problems and forces seem to be essential and needed.

Brick makers are not in a position to take advantage of the improved market conditions due to their importance in this aspect. They often give more importance to production aspects than to the most crucial aspect namely marketing. The leading objective of any firm is to make their products available at the hands of the buyer, to satisfy the needs of the buyer, to keep the price stable and to analyse the buyer behaviour.

The present study attempts to identify certain key variables and inherent desiderata relating to the topic and investigate the reasons for such disturbing trends, problems and also the correctives needed urgently. In the process a simple strength, weakness, opportunity and threat (SWOT) analysis of the brick works becomes plausible and relevant.

Though the brick works in both Tirunelveli and Thoothukudi districts face various problems pertinent to production and marketing of bricks, it becomes imperative to make an assessment of the comparative degrees of achievements of the two districts, each being treated as a distinct entity. Hence, the researcher felt
necessary to compare and analyse the performance of brick works in Tirunelveli and Thoothukudi districts. Such an analysis will throw more light on the various dimensions of the problem.

### 3.1.2. Scope of the Study

The present study attempts to study, compare and evaluate the performance, problems and prospects of brick industries which produce several types such as clamp kiln bricks, Bull’s Trench kiln bricks, hollow blocks and fly-ash bricks in Tirunelveli and Thoothukudi districts. The study covers several aspects such as production performance of brick works and marketing aspects including factors influencing buyer behaviour and price analysis. The investment and profitability aspects of clamp kiln bricks, Bull’s Trench kiln bricks, hollow blocks and fly-ash bricks of Tirunelveli and Thoothukudi districts are also analysed and compared.

### 3.1.3. Objectives of the Study

The following are the specific objectives of the study:

1. To analyse the costs and returns of production of bricks in Tirunelveli and Thoothukudi districts.

2. To study the determinants of production of bricks in the study area.

3. To examine the problems encountered in the production of bricks by the manufacturers and to suggest suitable solutions to solve them.

4. To analyze the temporal variations in prices of bricks.

5. To find out the factors motivating the pattern of behaviour of brick buyers and
6. To compare the financial and profitability performance of brick industries in Tirunelveli and Thoothukudi districts.

3.1.4. Hypotheses

The following are the hypotheses adopted:

1. There is no significant difference in the total cost of production in the manufacture of clamp kiln bricks between Tirunelveli and Thoothukudi districts.

2. There is no significant difference in the total of cost of production in the manufacture of Bull’s Trench kiln bricks between Tirunelveli and Thoothukudi districts.

3. There is no significant difference in the total of cost of production in the manufacture of hollow blocks between Tirunelveli and Thoothukudi districts and

4. There is no significant difference in the total of cost of production in the manufacture of fly-ash bricks between Tirunelveli and Thoothukudi districts.

METHODOLOGY ADOPTED

3.1.5. Data Base

In the light of the specific objectives set, all information and data were collected from the sample respondents (manufacturers) through direct personal interviews employing structured interview schedules (Appendix I). Even though the brick manufacturers did not maintain prompt and proper accounts, they were able to furnish particulars on the strength of their long association with brick manufacturing works. However, to minimize recall bias, suitable cross checks and rechecks were carried out.
Another interview schedule was also employed to collect the required information from the brick buyers. (Appendix II).

The secondary data relating to the present study were collected from:

Bricks Manufacturers’ Association of Tirunelveli and Thoothukudi districts, District Industries Centre, Tirunelveli, District Industries Centre, Thoothukudi, Corporation Office, Tirunelveli, Municipal Office, Thoothukudi, National Informatics Centre, Tirunelveli, District Statistical Office Tirunelveli, and District Statistical Office, Thoothukudi.

3.1.6. Sampling Design for Manufacturers of Brick

There are 144 registered clamp kiln units in Tirunelveli district. Out of which, the researcher selected 28 units as sample constituting about 20 per cent of the population using the multi stage sampling method. In the first stage, the researcher has fixed the criteria to select those units whose year of service is more than 15 years. It resulted into 104 units. In the second stage, from those 104 units, the researcher selected clamp kiln brick units whose capital investment is more than Rs. 5 lakh. It resulted into 43 units. In the next stage, out of 43 units, the researcher selected 28 units who satisfy the criteria that their number of workers employed is more than 20.

According to the above method, the researcher has selected 28 units as sample of Tirunelveli district clamp kiln units.

There are 98 registered clamp kiln units in Thoothukudi district. Out of which, the researcher selected 28 units as sample out of 31 units selected based on the selection criteria constituting about 32 per cent of the population using multi
stage sampling method. In the first stage, the researcher has fixed the criteria to select those units whose extent of service is more than 15 years. It resulted into 67 units. In the second stage, from those 67 units, the researcher selected country brick units whose capital investment is more than Rs. 5 lakh. It resulted into 49 units. In the final stage, the researcher fixed the selection criteria as units having more than 15 years of operation, more than Rs. 5 lakh as capital investment and employed more than 20 workers. 31 units satisfied the criteria.

To have an equal and justifiable comparison with Tirunelveli district, the researcher has selected 28 units from those 31 units of Thoothukudi district using simple random sampling method.

There are 27 Bull’s Trench kiln bricks manufacturing units in Tirunelveli District. Out of which, the researcher has selected 20 units as sample which satisfy the criteria that their year of operation is more than 15 years.

There are 46 Bull’s Trench kiln manufacturing units in Thoothukudi district. Out of which, the researcher has selected 24 units which satisfied the criteria that their year of operation is more than 15 years.

But to have an equal and justifiable comparison with Tirunelveli district, the researcher has selected 20 units from those 24 units of Thoothukudi District using simple random sampling method.

There are 10 hollow blocks manufacturing units in Tirunelveli district and 10 hollow blocks manufacturing units in Thoothukudi district. All these units are taken for the study.
There are 10 fly-ash bricks manufacturing units in Tirunelveli district and 10 fly-ash bricks manufacturing units in Thoothukudi district. All these units are taken for the study.

3.1.7. Sampling Design for Buyers of Brick

The convenient sampling technique was applied in collecting data from the buyers of bricks. The data collected from different buyers of bricks in Tirunelveli and Thoothukudi districts each included 20 private building contractors, 20 private engineers, and 20 engineers cum contractors, 10 State Government contractors, 10 Central Government contractors, 10 masons and 10 household consumers.

3.1.8. Tools of Analysis

The Cobb-Douglas type of production function is fitted to analyse the determinants of brick production and returns to scale.

Garrett’s ranking technique is adopted in order to rank the problems faced by the brick manufacturers in their production and marketing activities.

The key factors that motivate the buyers to buy bricks are analysed with the help of factor analysis.

To analyse the variation in the price of bricks over a period, time series analysis is carried out. A multiplicative model of trend, cyclical variation, seasonal variation and irregular variation of prices of bricks are used.

The strength, weakness, opportunity and threat (SWOT) analysis is applied to the brick works.
The hypotheses that whether there is significant difference in the total cost of production in the manufacture of bricks between Tirunelveli and Thoothukudi districts were tested and analysed with the help of t-test.

To analyse at what level total costs and total revenue are in equilibrium, break-even analysis is used.

Averages, ratios and percentages are also used. A few figures, charts and tables are used to make the analysis clearer.

### 3.1.9. Study Period

In order to study the behaviour of prices of bricks, 20 years year-wise data from 1987-1988 to 2006-2007 (20 years) and month-wise data from 1997-1998 to 2006-2007 (10 years) given by Brick Manufacturers’ Association are taken up for the study. Field survey was conducted from January 2007 to September 2007 for the collection of primary data. This period relates to the peak season for the brick production in Tirunelveli and Thoothukudi districts. Except price analysis, all other data sets relate to the period 2006-2007.

### 3.1.10. Significance and Justification of the Study

The present study enables the brick manufacturers to understand and solve their production problems such as scarcity of raw materials, labour problems, increased cost of production, climatic conditions and government pressure in the order of their ranking. This would be helpful to find out suitable solutions to the problems which need greater attention.

This study would also enable the brick manufacturers to enhance their quality, maintain price stability and to choose correct channels of distribution. “A
well marketed commodity is half sold” is a maxim. The present study will help
the brick works to achieve this. Businessmen who understand their buyer will
definitely succeed in their business. The present study explores the behaviour of
brick buyers and this would help the brick manufacturers/sellers to understand the
behaviour of brick buyers.

This study also enables the brick manufacturers to keep their enterprise as
profitable ventures.

The indices constructed and SWOT analysis applied is expected to serve
commendably in evaluating the performance and problems of brick works in the
study area. The present study throws light on several vital areas.

This study enjoys the necessary theoretical validity, analytical feasibility
and practical utility. Above all, it is capable of adding to the creative and
innovative types of knowledge that are imperatively essential.

Hence, the study becomes surpassingly significant and greatly justified.

3.1.11. Geographical Coverage

Of all districts in Tamil Nadu, the brick works’ business has been
popularly carried out in Tirunelveli and Thoothukudi. Even though both these
districts are adjacent, some notable differences in the production, marketing,
finance and profitability of brick works are identified. Hence, the researcher
attempts to make a comparison of the performance of brick works in Tirunelveli
and Thoothukudi districts of Tamil Nadu.
3.1.12. Limitations of the Study

The present study is time bound. The brick works are functioning throughout the length and breadth of the country. But the areas of investigation are deliberately restricted to only these two districts.

The research study exclusively pertains to the comparative analysis of the production and commercial performance of the brick works in Tirunelveli and Thoothukudi districts. Therefore adequate focus could not be given to another dimension of the industry namely labour related aspects. This area needs an indepth study on a macro level.

Since the brick industry in an unorganized one, the data supplied by the respondents are highly unofficial. No proper records were maintained regarding the information provided by them. Therefore the researcher has to largely rely upon this information only for primary source. The researcher also has to restrict the period of study only to 2006-2007 in the absence of records.

3.2. Operational Definitions

Before proceeding with the actual discussion of the present study, an attempt is made to provide a clear definition of certain concepts:

3.2.1. Brick

Brick is defined as clay moulded in a rectangular shape, baked in fire and used for building purposes.
3.2.2. Brick works

Brick works also known as brick factory, is a factory where the manufacturing of bricks are undertaken.

3.2.3. Green bricks

Bricks formed into shape but not yet fired.

3.2.4. Burnt bricks

Baked bricks that are ready for sale are called burnt bricks.

3.2.5. Kiln

Kiln is an oven in which bricks are baked.

3.2.6. Clamp kiln

Clamp kiln are those which do not have permanent kiln structure. As such, the capacity of the clamp kiln is flexible. The clamp consists essentially of a pile of green bricks interspersed with combustible material over a hard foundation. A clamp kiln is made up of several layers of bricks. Air holes or openings (50x50 cm) are kept at the bottom of two opposite sides of the kiln through which fire are initiated.

3.2.7. Hoffmann kiln

Hoffmann kiln is a multi-chamber kiln where the air warmed by the cooling bricks in some chambers pre-heats the combustion air for the fire and exhaust gases from the combustion pre-heat the green bricks. It is circular in shape and built around a central chimney.
3.2.8. Bull’s Trench kiln

A large fraction of the cost of construction of the Hoffmann kiln is in the building of the arch of the tunnel and in the provision of a chimney with connecting flues and chambers. W.Bull, a British Engineer designed an arch less kiln in 1876. Therefore, it is named after him as Bull’s Trench kiln.

3.2.9. Hollow blocks

Hollow Blocks are cement blocks that are preformed, manufactured concrete structures that are ready for on-site installation. They are manufactured, cast and cured in factories or, in other manufacturing factories. They are designed to meet specific requirements for dimensions, durability and weather resistance.

3.2.10. Fly-ash bricks

Fly-ash bricks are competitive to conventional bricks and provide enormous indirect benefits which the brick units can gain a lot by gainful utilisation of ash resulting in conservation of natural resources as well as environment.

3.2.11. Metal (Baby Jelly)

The term ‘metal’ refers to the crushed rock used for road beds and surfaces, foundations and railway embankments among other things. Blue metal jelly is further crushed into very small pieces is called baby jelly.

3.2.12. Gypsum

Gypsum is a material with thick evaporative beds in association with sedimentary rocks. It is used as one of the basic raw materials for fly-ash brick making.
3.2.13. Curing

Curing is a process where the cement in concrete is allowed to react with water over time, increasing the concrete strength and hardness.

3.2.14. Vertical Shaft brick kiln

Vertical Shaft brick kiln is classed as a continuous updraught kiln represents a comparatively new and unique method of firing bricks. It combines the simplicity and low cost of updraught firing with every impressive fuel economy plus the benefits of continuous operation.

3.2.15. Production Function

Production Function is that part of an enterprise which is concerned with the transformation of a range of inputs into the required outputs (outputs) having the requisite quality level.

3.2.16. Labour Turn-over

Labour Turn-over denotes the percentage change in labour force of an organization. It is the ratio between number of employees left during a period and average number of employees during such period.

3.2.17. Overheads

Overhead is the aggregate of indirect material cost, wages and expenses. Overhead costs are operating costs of a business enterprise which cannot be traced directly to a particular unit of output.
3.2.18. Fixed assets

Those assets which are acquired and held permanently in the business and are used for the purpose of earning profits are called fixed assets.

3.2.19. Current assets

Current assets are those assets which in the ordinary course of business can be converted into cash within a short period of normally one accounting year.

3.2.20. Fixed capital

Fixed capital are those capital which are payable to the owner on the termination of the business. It is required for financing fixed assets.

3.2.21. Working capital

Working capital refers to the capital which is required for financing short term assets or current assets.

3.2.22. Profitability

Profitability is a mark of efficiency and is the reward for the value added.

3.2.23. Fixed cost

Fixed cost is the cost which is constant within the installed capacity, irrespective of the volume of output. Fixed cost is the cost which is unaffected by the volume of output.

3.2.24. Variable cost

Variable cost is the cost which will vary according to the volume of units produced. On a change in the volume of output, the amount of variable cost varies in proportion to the volume of output.
3.3. PROFILE OF THE STUDY AREA

3.3.1. Introduction*

The name ‘Tirunelveli’ is believed to have been originated from the three Tamil words, ‘Thiru’- ‘nel’- ‘veli’ meaning “Sacred Paddy Hedge”. This has several distinctive etymological and religious features and it is no wonder that references to this district are found in epics too.

Thoothukudi district, ‘the pearl city of India’ was formed on 20th October 1986 after bifurcation from Tirunelveli district as per Government orders. It is noted for its various cultural heritages, historical backgrounds and reasonable development in the industrial sector.

The evolution of brick industry in these districts dates back to several centuries or millenniums even before Christ. Historical buildings in these districts built with bricks could prove this. Hence, the brick industry is not new to these districts, but it is traditionally older.

A few maps are provided for clarity.

* Source for Area Profile:
Tirunelveli District: http://www.tnenvis.nic.in
Thoothukudi District: http://www.thoothukudi.nic.in
3.3.2. Location of Brick Works in Study area

The brick works in Tirunelveli district are located in several parts of the district such as Sivalaperi, Panagudi, Radhapuram, Tirunelveli, Surandai and interior areas of Palayamkottai, Nanguneri, Burkitmanagaram, Ponnakudi and in the rural areas spread over the district.

The brick works in Thoothukudi district are located in several parts of the district such as Vallanadu, Srivaikundam, Eral, Muthanlankurichi, Alwarthirunagari and Mukkani and in the rural areas spread across the district.

3.3.3. Geographical Data

Tirunelveli district is having geographical area of 6823 square kilo metres, in the South – eastern portion of Tamil Nadu and is triangular in shape. It lies between 8°05’ and 9°30’ of the Northern latitude and 77°05’ and 78°25’ of Eastern longitude.

Thoothukudi district is situated at latitude 8°45’ North and longitude 78°11’ on the east coast of India. The total area of the district is 4621 square kilo metres. It is rectangular in shape.

3.3.4. Climatic Conditions

The climate of both districts is hot and dry. The territorial waters cover thousands of hectares. These climatic surroundings are suitable for brick making. One of the raw materials for brick making is water. It is abundantly available in both districts thanks to the perennial river Thamiraparani. Similarly, bricks need to be dried in sun’s heat which could also be made possible with the help of favourable climatic conditions.
Hence, as far as climatic conditions are concerned, the brick works in both these districts are adequately gifted by nature.

3.3.5. Administrative Set Up

Tirunelveli district is having three revenue divisions comprising 11 taluks, 19 development blocks, 628 revenue villages and 425 village panchayats.

In both Tirunelveli and Thoothukudi districts, the District Collectors head the district’s administration. The three revenue divisions of Thoothukudi district are Thoothukudi, Tiruchendur and Kovilpatti.

The eleven taluks in Tirunelveli district are Tirunelveli, Palayamkottai, Sankarankoil, Ambasamudram, Nanguneri, Radhapuram, Tenkasi, Shenkottai, Alankulam, Veerakeralampudhur and Sivagiri.

The eight taluks in Thoothukudi district are Thoothukudi, Srivaikundam, Tiruchendur, Satankulam, Kovilpatti, Ettayapuram, Vilathikulam and Ottapidaram.

Of all the 11 taluks in Tirunelveli district, brick works are highly concentrated in Tirunelveli, Nanguneri, Radhapuram, Alangulam and Sivagiri taluks.

Of all the eight taluks in Thoothukudi district, brick works are highly concentrated in Thoothukudi, Srivaikundam, Tiruchendur and Vilathikulam taluks.

3.3.6. Demographic Details

The population of Tirunelveli district was 27,23,988 as per 2001 Census. The density of population per sq.km is 399. Tirunelveli, Tenkasi and Ambasamudram are the most densely populated taluks in the district.
The sex ratio is 1042 female for every 1000 male for the district. The literacy rate is 76.09 percent in the district. Out of which, 55.21 per cent male are literates and 67.43 per cent female are literates.

The population of Thoothukudi district was 1572273 as per 2001 census. The density of population per sq.km is 340 as against 478 for the State. Thoothukudi, Tiruchendur and Kovilpatti are the most densely populated taluks in the district.

The sex ratio is 1050 female for every 1000 male for the district. The literacy rate is 72 percent in the district. Out of which, 77 percent male are literates and 67 percent female are literates.

3.3.7. Working Population

In Tirunelveli district, out of the total population, only 47 per cent of the population is workers and 53 per cent of the population is non-workers. Out of the total workers, 57.59 per cent are males and 42.41 per cent are female. Out of the total workers, 56.96 per cent are rural workers and 43.04 per cent are urban workers. Out of the total workers, 10.7 per cent are cultivators, 27.8 per cent are agricultural labourers, 22 per cent are engaged in household manufacturing, processing, servicing and repairs and 39.5 per cent are engaged in other activities.

In Thoothukudi district, out of the total population, only 43.17 per cent of the population is workers and 56.83 per cent of the population is non-workers. Out of the total workers, 63.61 per cent are males and 36.39 per cent are females. Out of the total workers, 63.66 per cent are rural workers and 36.34 percent are urban workers. Out of the total workers, 10.87 per cent are cultivators, 24.73 per
cent are agricultural labourers, 6.95 per cent are engaged in household manufacturing, processing, servicing and repairs and 57.45 per cent are engaged in other activities.

As far as brick workers are concerned, in both districts, majority of the agricultural and other workers are brick labourers also. The peak season for brick making is non-season for agriculture and vice-versa. Hence, it is possible for the brick workers to engage themselves in brick works in both these activities.

3.3.8. Industrial Sector

The Tirunelveli district is industrially under developed. Government has declared the following taluks as most backward taluks - Radhapuram, Tenkasi and Sankarankoil. There are 25 medium and major industries such as cement, cotton yarn, calcium carbide, sugar, cotton seed oil, printing papers and flour mills. In addition to this, there are about 14,389 small scale industries and 6,945 cottage industries registered in this district. The type of industries in this district are mainly agro-based, chemical based, mineral based, textile based and metal engineering. There are about 3985 household units engaged in activities like handloom, khadi, Mat weaving, basket making, palm leaf products, palmirah tapping, palmgur, pottery, brick baking, tiles making, black smithy, carpentry, leather tanning, handicrafts, metal and allied works.

The Handloom products are marketed in North India. So also the fine coral mats from Pattamadai have also surprised many foreigners including Queen Elizabeth, President and Prime Ministers of many countries. The exquisite quality of silk mats of Pattamadai is incomparable in quality and has won world fame.
Kallidaikurichi “Pappads”, Karukurichi mud pots and also the Tirunelveli “Halwa” are products which have earned many laurels to the district.

Out of these, brick works have come under small scale industries and makes a considerable amount of output.

Though agriculture is the main occupation in Thoothukudi district on which 70 per cent of the population depends, the recent boom in the industrial sector has put the district prominently in the industrial map of Tamil Nadu. Heavy industries and Thermal power station promise hope for a bright future. Hundreds of ancillary units have also sprung up. Textile units and match industries crowd the Kovilpatti belt. The fast growing Thoothukudi port in the changing economic scenario has added pep to the development of the district.

During the year 1576, vessels entered this port. Cargo to the tune of 1.71 crore tons are handled at the port. Certain raw materials and finished products are shipped to for about 20 foreign countries. Thoothukudi port has been issued the prestigious ISO 9002 certificate for the port operation and services and had joined the select group of World Ports by becoming the first Indian major port to get such a certificate.

Dharangadara Chemical Works(DCW), one of the earliest industrial units of Thoothukudi district, Southern Petro Industrial Chemical(SPIC) one of the Asia’s biggest fertilizer plants, Coasts Viyella earliest industrial unit are in Thoothukudi. There are a number of spinning mills in Kovilpatti, Pudhur and Vilathikulam blocks. Sterlite, copper smelter factory at SIPCOT, seafood units, readymade garment factories at Pudhiamputhur and dry flower units adorn the
industrial map of the district. Macrone, a bakery product is the specialty from this district.

Thoothukudi district is one of the major salt producing places in the South. There are about 2,208 salt producing units in the district and produce a total quantity of 20 lakh tonnes of salt and contributes 30 per cent of total salt production in Tamil Nadu. More than 100 units are engaged in iodized salt productions. Four refined free flow iodized salt manufacturing units are also functioning and they produce 70,000 MT per annum. Total salt pan extent in the district is 22,949 acres.

There are 14 large scale and medium scale industries, 951 small scale industries and 2000 cottage industries in Thoothukudi district.

3.3.9. Tertiary Sector
3.3.9.1. Transportation

In Tirunelveli district, there are 3,177 registered commercial motor vehicles and 10,107 registered non-commercial motor vehicles. This district has an excellent railway transport system facilitating both passengers and commercials. There are no sea ports and air ports in Tirunelveli district. The length of National Highways is 90.80 kilo metres, State Highways is 442.839 kilo metres and corporation and municipalities’ roads are 1001.54 kilo metres.

In Thoothukudi district, there are 14042 registered commercial motor vehicles and 91,148 registered non-commercial motor vehicles. This district has an equally good railway transport system facilitating both passengers and commercials. There is one sea port and one air port in Thoothukudi district. The
length of National Highways is 118.80 kilo metres, State Highways is 1987.83 kilo metres and corporation and municipalities’ roads are 277.15 kilo metres.

Manufactured bricks need to be transported to make them reach the buyers. In both Tirunelveli and Thoothukudi districts, transportation of bricks is made only through roadways. In this context, both the districts’ transportation system helps the brick works.

3.3.9.2. Communication

In Tirunelveli district, there are 550 post offices and 208 Telegraph offices. There are 10,432 public call offices and 81 telephone exchanges in Tirunelveli district.

In Thoothukudi district, there are 36 post offices and 406 Telegraph offices. There are 6,737 public call offices and 69 telephone exchanges in Thoothukudi district.

3.3.9.3. Education

Tirunelveli and Palayamkottai are popularly known as the Oxford of South India. All types of colleges, schools with historic background are functioning in these twin cities. There is one university, 19 arts and science colleges, one allopathy college, one Indian Medicine college, 10 engineering colleges, one law college, 6 colleges for special education and 2,686 schools are functioning throughout the district.

In Thoothukudi district, there are 14 arts and science colleges, one allopathy college, one Indian Medicine college, 5 engineering colleges, one fisheries college, one college for special education, three teacher training
institutes, two Government Polytechniques and 1,532 schools are functioning through out the district. A Government Polytechnique in the name of the greatest Tamil Poet Subramania Bharathiyar has been functioning from 1982 exclusively for girls at Ettayapuram.

3.3.9.4. Health

In Tirunelveli district, there are 17 Government hospitals, 62 Primary Health Centers, 383 health sub centers providing modern medical facilities. One Government hospital and 18 Primary Health Centers are providing Indian medicine facilities (Siddha). Homeopathy medical facilities are also provided by one dispensary.

In Thoothukudi district, there are 10 Government hospitals, 47 Primary Health Centers, 249 health sub centers providing modern medicine facilities. One Government hospital and 14 Primary Health Centers are providing Indian medicine facilities (Siddha). Homeopathy medical facilities are provided by one Government hospital.

3.3.9.5. Forest

In Tirunelveli district, the area occupied by reserved forests is 40,183.01 hectares and by unclassed forests are 129.11 hectares. The out-turn of forest product Cashew is 1.916 tonnes. The other products such as timber, fuel wood, pulp wood, sandal wood, rubber, bamboo, tea green leaves and wattle bark have no considerable out turn.
The total extent of forest in Thoothukudi district is 11,012 hectares which works out to 2.47 per cent of the total geographical area of Thoothukudi district. A deer sanctuary is maintained in the hills of Vallanad.

The fire wood which is one of the basic raw materials for brick making is out-turned in small quantity in both the districts. Brick works in both districts suffer a lot in this regard.

3.3.9.6. Social Welfare

In Tirunelveli district, there are 11,988 old age pensioners. 9,045 people availed Dr. Muthulakshmi Reddy Ammayar Ninaivu Mahaperu Udavi Thittam, 2,010 people have obtained marriage assistance under various schemes, 16,110 people have obtained aid for handicapped and 212 people obtained free sewing machine. Three Women Welfare Co-operative Societies, three training centers and 8,818 women self-help groups have been formed.

In Thoothukudi district, there are 8323 old age pensioners. 93 people have obtained marriage assistance under various schemes and 1,535 people have obtained aid for handicapped. Three Women Welfare Co-operative Societies and 408 women self-help groups have been formed.

3.3.9.7. Natural Resources

The important natural resources found in Tirunelveli district are limestone, garnet sands, rough stone, sully kankar and ilmenite.

The important natural resources found in Thoothukudi district are limestone, rough stone and sand.