CHAPTER – II

SOCIO-ECONOMIC PROFILE OF THE KANYAKUMARI DISTRICT,
SIGNIFICANCE OF THE PROBLEM, REVIEW OF LITERATURE
AND METHODOLOGY OF THE STUDY
CHAPTER - II

SOCIO-ECONOMIC PROFILE OF THE KANYAKUMARI DISTRICT,
SIGNIFICANCE OF THE PROBLEM, REVIEW OF LITERATURE AND
METHODOLOGY OF THE STUDY

This chapter attempts to explain socio-economic profile of the Kanyakumari District, and makes a brief review of studies made on the para-transit operations. The methodology adopted for the present study has also been discussed.

2.1 Socio Economic Profile of the Kanyakumari District

2.1.1 Physical Features

Kanyakumari district, named after the Goddess 'Kanyakumari' lies at the southern most tip of Indian Peninsula, where three seas viz., Indian Ocean, Arabian Sea and Bay of Bengal confluence. It has an area of 1672 square kilometer. The district is bounded by Tirunelveli District in the north east, Kerala state in the north-west, Indian Ocean in the south and Bay of Bengal in the east. Nagercoil is the district’s headquarter. The district consists of four taluks, nine blocks, four municipalities, 154 panchayats (66 Town Panchayats and 88 village panchayats), one township, and 1207 hamlets.

2.1.2 Soil

Soil in the district is mostly of the red loam variety. In the seacoasts, however, the sandy type of soil prevails and gravel soil is seen in the mountain regions. In the low lands there is neither white sand or sand loam while in the midlands and high lands there prevails fairly fertile soil of fine type particularly in the valleys.
2.1.3 Minerals

Ilmienite sand are seen in Leepuram and Vattakottai along the west coast for a distance of about 2.4 km. Of these, one near Manavalakurichi is world renown. A total reserve of 15,200 tonnes ilmenite, and zircon sands was estimated with a minor fraction of monazite sand. Small deposits of shell limestone occur near Kovalam, Capecomerin, Leepuram, Vattakottai, Kanagappapuram. Total reserve calculated is about 1.68 million tones. A zone of sulphite mineralization with copper ore and minor amounts of Molybdenite, Nickal and Cobalt was located in Arumanalloor. Grahite occurs in Thovalai.

2.1.4 Rainfall and Climate

This is the only district in Tamil Nadu getting both South-West (June to September) and the North-East (October to December) monsoons. Generally, October is the rainiest month followed by June and November. The average rainfall for the year 2000 is 1237 mm as against the normal rainfall of 1465 mm with a total deficiency of 15.5 percent. South-West monsoon and North-East monsoon contribute to 38.1 percent and 37.5 percent of the annual rainfall respectively. The contribution of rainfall during the pre-monsoon season that is, summer is 21.7 percent. In winter season (January and February), rain fall (2.7 percent) is quite insignificant.

The district has a typical tropical climate, May and June being the hottest months. The maximum temperature varies from 29 to 32 Celsius and minimum temperature between 25 and 23 Celsius.
2.1.5 Population

Kanyakumari district is known for its high density of population. The population of the district is 16,69,763 lakhs (Male 8,29,542, Female – 8,40,221) of people, as per 2001 census. Among the total population 5,82,761 live in rural area and 10,87,002 live in urban area. The density of population implies 992 per sq.km.

2.1.6 Agriculture

The district was once known as the granary of Travancore State. A variety of crops is raised. In the hills plantain, tea, coffee, rubber coconuts and pepper are being cultivated. In the plains, paddy, tapioca, coconut and vegetables are the main crops raised. Out of the total area 167,214 hectare, forest accounts for 54,643 hectare. The area for cultivation is 88,558 hectare. The agricultural cultivation in the district reads as: Nanjai (wet lands 19,346 ha.) Punjai (dry land 62,981 ha.) and puramboke (Govt. land 6,210 ha.). Paddy is cultivated in 23,000 hectare (single crop) tapioca in 12,000 hectare, banana in 3,000 hectare, cashew in 2,420 hectare, rubber in 13,290 hectare, arecanut in 1754 hectare, clover in 571 hectare, mango grove in 1769 hectare, Tea in 433 hectare, and coffee in 42 hectare, pepper in 80 hectare.

2.1.7 Irrigation

Two major irrigation projects viz., the Kodayar and the Chittar-Pattanamkal serve the irrigation needs of the district. One medium project viz. Neyyar project across river Neyyar located in Kerala state extends the irrigation facilities to certain areas of the district. The important minor schemes viz. Aruvikkara weir system,
Thirparappu weir system and Vilathurai lift irrigation scheme and 2429 irrigation tanks (618 under Panchayat unions and 1811 P.W.D.) meet the additional irrigation needs of the district. Of 54.143 hectare gross irrigated area, 53,688 hectare utilize surface water resources through canals, tanks and other sources while 684 hectare utilize ground water sources through open wells and tube wells.

Pechiparai and Perunchani dams come under Kodayar project located in Kalkulam taluk. Pechiparai dam is constructed across the river Kodayar and Perunchani across paraliyar, both dams are masonry and gravity type.

Chittar Pattanamkal Project consists of two earthen dams viz., Chittar I and Chittar II constructed across the river respectively.

### 2.1.8 Industries

Kanyakumari District is industrially backward. There are, at present only six major industries. However, there are variety of small scale and cottage industries. Tiles industry, Cashew Kernel processing industry, Fibre Industry, Bell Metal works, safety match, Rice hulding, Tapioca Flour, Foot wear are some important small scale industries.

### 2.1.9 Education

This district is educationally advanced. Of 881 schools, there are (408 Primary, 149 Middle, 124 High Schools and 117 Higher Secondary Schools. There are four teacher training schools, 16 Arts and Science Colleges, One Teacher Training College, Nine Polytechnic colleges, four Industrial Training Institutes and five Engineering Colleges. In literacy, this district ranks first in the state with 87.75 percent literacy rate.
2.1.10 Transport

a) Road: This district is fairly well served by a network of roads. The National Highways No.7, connecting Varanasi (U.P.) and Kanyakumari, passes through the Agasteeswaram taluk. The National Highways No.47, connecting Kanyakumari and Trivandrum passes through the Agasteeswaram, Kalkulam and Vilavancode Taluks. The State Highways No.14 also passes through the above three taluks. There are number of major district roads, panchayat union roads and panchayat roads. The total length of roads in the district is 3107 kilometer of which 53 kilometer of cement concrete, 1135 kilometer bituminous road, 846 kilometer of National Highways, 48.9 kilometer of State Highways, NH 47 kilometer. 56 (599/0-655/0), NH 7, KM 7 (222/4 – 231/6) and the balance come under other types.

b) Railways: Broad gauge railway line in the district is laid to 74.01 kilometer. The line is a part of the main railway lines connecting other parts of the country.

c) Post & Telegraphs: This district is well served by a network of Postal and Telecommunication Department. The Gazetted Head Office Grade I & II are located at Nagercoil and Thuckalay respectively. There are 13 LSGSO, 10 class I SO, 25 class II, SO, 27 class III SO, 30 EDSO and 141 EDBOS.

2.1.11 Electrification

This district gets its power from Kodayar hydroelectric project I and II with installed capacity of 60 MW and 40 MW respectively. There are five substations – Nagercoil with the voltage of 110/33-11 K.V. & 110/11 KV. Thuckalay 110/11 KV and 110/66 KV, Pechiparai 110/11 KV Kuzhithurai 110/11 KV Kottaram 38 /11
Maximum power is used for domestic, commercial and other purposes, only four percent of the total power is used by agricultural sector. All the villages and towns are electrified in this district.

### 2.1.12 Unemployment

The number of unemployed who have registered their names with the employment exchange crossed over two lakhs in 1999 itself.

### 2.1.13 Labour Force

As per the census 2001, there are 4,64,087 main workers, 24,044 marginal workers and 11,12,218 non workers.

### 2.2 Significance of the Problem

Kanyakumari district by its location occupies a unique place among the tourist centers in India. High population density, better literacy rate, rural urban continuum pattern of settlement, improved economic condition and affordability are the major distinct characteristics of Kanyakumari district, and these have resulted in the emergence of a dominant 'middle income group'. The new generation middle-income groups of people usually allocate a portion of their income for pilgrimage and visiting nearby tourist centres nowadays. They organize themselves into small groups and visit nearby tourist spots. Further, the people of the district, along with their families, are in the habit of attending religious, cultural and other functions of their relatives. For these purposes, they usually hire maxi cabs.
The State Transport is not viable to cater to the need of the rural masses. In Kanyakumari district, till 2001, the state government did not permit the operation of private buses both in rural and urban areas. At the same time, the state government failed to increase the number of buses corresponding to the population of the district. Further, the services of the state transport for the rural areas are very limited, and it is operated only in peak hours. The frequency of bus services is deplorable between 11 a.m. and 4 p.m. in certain rural areas. In urban areas, even though, bus transport facilities are slightly better there is always heavy rush in buses. Therefore, people prefer para transit operations like auto, taxi and maxi cabs as alternative for their mobility. In rural areas, maxi cabs are substituting the general transport system. But, in urban areas it plays only a complementary role to the main transport system. In addition to this, the maxi cab operation is the main mode of transport system in the district for pilgrimage, tours and excursion. Further, maxi cab operators provide unofficial transport services to the rural areas of the district, and connect villages to the markets of semi urban and urban areas of the district.

Due to the high demand for the maxi cab operations over the last 20 years, investment in this field has grown to a considerable extent. So, banks and private financiers lend huge amounts of money to the operators of the maxi cabs. The banking sector ensures a steady flow of income to the owners, drivers, cleaners and mechanics of maxi cabs. It also provides indirect employment opportunities to painters, tyre rethreading houses and owners of spare parts stores. Maxi cabs also contribute income to the Government exchequer through the road tax.
But the large-scale introduction of mini bus operations in the district affects the maxi cab operations, particularly in the rural areas. Further, maxi cab operators face stiff competition from tourist taxies and auto rickshaws. The competition creates a severe economic problem for the maxi cab operators, and at the same time, it affects the employment opportunities of thousands of the people in the district. If maxi cab operations fail, the banks and private financiers will not be able to collect the money due from the owners of the maxi cabs. This study, therefore, takes into consideration on these problems and aims at analyzing the various hardships faced by maxi cab owners as well as others whose lives solely depend upon the maxi cab operations.

The present study analyses the economic viability of this sector on the basis of its physical and financial performance. This may also be helpful to analyse and understand the utility of the maxi cabs by the extent of its positive or negative influence on the economic improvement of the maxi cab operators, drivers and cleaners and, also find out the viability of maxi cab operations in future. Thus, the findings of the study, it is hoped will sensitize the Government to the problems and enable it to come up with solutions for the smooth and viable functioning of maxi cabs in the district, which is very much essential for the security, and economic stability of the lives of the thousands of families in Kanyakumari District.
2.3 Review of Literature

A review of research literature is necessary to understand the role of para transit in the different aspects of socio-economic development. Such an attempt is useful also to identify the existing research gaps. It also provides the basis for the conceptualization of the problem. The present exercise is not exhaustive in its coverage, but provides an insight into the remarkable studies on the area concerned.

Since the review of literature for para transit operations is scanty, only two important reviews of literature on para transit operations are included.

The article entitled, “Para Transit System in Indian cities”, by Mahesh Chand\(^1\), consists of eight parts. In the first part, he defines the term para transit. The para transit like taxi provides flexible door-to-door services. The article also attempts to study some of the aspects of para transit modes. In short, the objectives of the study are to

i) Identify and study the characteristics of para transit modes.

ii) Analyse and study various current issues regarding para transit like, organizational set-up, policy and planning, impact on employment, co-ordination and competition and cost of service and,

iii) Develop models to estimate the demand of para transit.

\(^1\) Mahesh Chand, “Para Transit System in Indian Cities”, Indian High Ways, February 1981, pp. 5-12.
In the second part, he explains three types of services provided by para transit system. They are (i) flexible services (ii) hybrid services and (iii) point deviation services.

In the third part, he explains various characteristics of para transit modes (11 characteristics), and compares it with mass transit.

In the fourth part, he explains organizational set up. It is stated that para transit system is included under the unorganized sectors. In addition to that, he finds that the para transit vehicles are operated in two-tier system, namely owner and owner cum driver.

In the fifth part, he gives suggestions to achieve the objectives mentioned in the first part. In the sixth part, he gives the statistics of the growth in para transit modes in India during the year 1971-76. Auto rickshaw is one of the most important para transit modes, in big cities like Delhi, Bangalore, Ahmedabad and Hyderabad.

In the seventh part, he estimates the para transit demands by using multiple regression, simultaneous equation and conventional growth models.

The findings of the study reveal that the demand for the para transit will be met more satisfactorily by an optimum competition of various para transit models. While concluding he finds that the para transit modes occupy an important place in urban transportation. These modes have many distinguishing characteristics like, low carrying capacity, low speed, high cost, and low fuel efficiency. The para transit modes offer significant facilities to commuter and as a result, they grow fast.
The study by National Transportation Planning and Research Centre on "Role of auto rickshaw in medium sized cities in Kerala"\(^2\), states that the Intermediate Public Transport System (IPT), operated by vehicles like auto rickshaw, taxi, and van is meant to support the public transport system available. In recent years, the rate of growth of IPT system in Indian cities is increasing disproportionately. In particular, the growth of auto rickshaws in the cities of Kerala is astonishing. The low occupancy rate and the increase in auto rickshaw population cause more traffic problems in the urban roads. Apart from these reasons, the dominant role of IPT system in Indian cities can be attributed to the inadequacy and inefficiency of the public transport system. This is more relevant in medium sized cities, where public transportation system is generally inadequate and not planned.

Normally, an urban centre will experience differences in the traffic demand and density in its linking corridors, due to the differences in the land uses and activities. Arterial and sub-arterial roads, which connect major activity centres experience heavy traffic congestion than the local streets connecting the less dense residential areas. Most of the Indian cities were historically developed over the years with their inherited road network. This leads to the concentration of activities and limitations for the expansion of

\(^2\) A Study Report 'Role of Autorickshaw in Medium Sized Cities in Kerala', National Transportation Planning and Research Centre, Thiruvananthapuram, September 1997, pp.1-98.
the road capacity in the central areas. Physical expansion of urban area, population explosion, change in life style, technological improvements in automobile industry, increased vehicle ownership and so on have altogether altered the urban transportation structure in Indian cities. It is similar to the experiences of the cities in the western hemisphere in the recent past. Now, private automobiles and public transportation together dominate the urban transportation. This results in the ever-increasing traffic pressure on the 'inelastic' nature of the city roads.

Because of the inelastic nature of road network, the available public transport system becomes inadequate and confined mostly to the major road network of the Indian cities. This leaves the major portion of the interior parts of the cities without public transportation. Moreover, economic conditions of urban community do not permit private vehicle ownership by large segment of people, who are deprived of public transport facilities. Thus in almost all Indian cities, a large section of people are found without both accessibility to public transport and owning of private vehicles for their use. In such a situation, the IPT system, in its various forms and manifestation, emerges as a major critical component of the urban transport system and provides service to the above category of people. Further, to a large extent, the absence or inadequate public transport system, and the lack of proper transport connectivity in residential areas result in the need
for an alternative transport system. On the other hand, the poor economic conditions of the majority urban group (but with aspiration for better transport services) have contributed as major causes for the emergence of the IPT mode in India. Though IPT scenario varies from cyclerickshaw at one end of the spectrum to taxi car at the other end, autorickshaw has emerged as the popular IPT mode in Indian cities.

**Situation in Kerala**

High population density, better literacy rate, rural urban continuum pattern of settlement, improved economic condition and affordability are the major distinct characteristics of Thiruvananthapuram district. And, these have resulted in the emergence of a dominant middle income group and their patronage in particular for IPT mode like maxi cabs.

**Autorickshaw availability pattern**

During the period 1986 to 1994, all vehicles in Thiruvananthapuram district were increased by 124 percent, against 146 percent in Kerala State and 176 percent in India. In the same period the growth of autorickshaws, was estimated as 103 percent in Thiruvananthapuram district 202 percent in Kerala state against 132 percent in India.

Regarding vehicle composition, the share of auto rickshaws in 1994 was found to be eight percent in Thiruvananthapuram district, 10.4 percent in Kerala State and 11.76 percent in all India. Strangely enough, in 1986
the share of auto rickshaw population was 8.8 percent in Thiruvananthapuram 8.45 percent in Kerala and 13.95 percent in all India. This indicates that the share of auto rickshaw population is decreasing in India, but increasing in Kerala state, whereas it is stable in Thiruvananthapuram district.

The availability of auto rickshaw per square kilometer in Thiruvananthapuram district is 4.68 in 1994, which is about two times higher than that of Kerala state (2.37) and 4.5 times higher than that of All India (0.97). Similarly, the availability of all vehicles per one kilometer, road length and per lakh of population were also found much higher than that of state and national averages. This indicates higher concentration of motor vehicles including auto rickshaws in Thiruvananthapuram district. Thiruvananthapuram, the state capital is the only city in the district. Hence, the concentration of motor vehicles including auto rickshaws in Thriuvananthapuram city is a natural phenomenon. This is evident from the fact that, 81 percent of the 1.04 lakh vehicles registered in the entire district found registered in Thiruvananthapuram city between the years 1987 and 1996. Thus, the vehicular pressure in the city is very high, compared to its district, state and national averages. Since the other components have rural segments, it will be appropriate to compare the vehicle availability pattern with the other urban centres within and outside Kerala.
In order to make a comparison of the Thiruvananthapuram situation with another city, six major roads with adequate city bus in Chennai were selected. The roadwise peak hour traffic volume count in PCUs and their share in the total fast moving passenger vehicles in 1992 are presented.

Projection of Auto rickshaws

Yearwise vehicle population, in terms of registered vehicles, consisting of autorickshaws, buses and all vehicles during the period 1982-1996 for all India, Kerala State and Thiruvananthapuram district is elaborated. Since auto rickshaw details were not separately available for all India, 'others' group includes auto, tractor and trailer. In addition, in this group, the auto rickshaw is the major component. Linear regression technique has been adopted for future vehicle projection, considering the year and vehicle population as variables. Results of the projection statistical parameters are given. Vehicular projection upto 2020 AD is also presented. It is estimated that by 2010 AD, the auto rickshaw population is expected to reach 62.64 lakhs in all India, 2.18 lakh in Kerala and 0.23 lakh in Thiruvananthapuram district. With regard to the share of auto rickshaw to the total vehicles, for all India it is shows a decreasing trend from 11.76 percent in 1994 to 10.85 percent in 2010 AD. Except in Kerala and all Thiruvananthapuram district, the auto rickshaw share was found to be increasing from 10.39 percent to 11.62 percent in Kerala, and from 7.97
percent to 8.58 percent in Thiruvananthapuram district. In the case of
buses, unlike all India and Kerala State, Thiruvananthapuram district
witnessed increasing trend in the vehicle composition share.

Assuming the share of auto rickshaws in 1996 with respect to
Thiruvananthapuram city to its district (49.27%) the autorickshaw population
in Thiruvananthapuram city is expected to be doubled by the year 2015 AD.

Income generation capacity

With the objective of estimating the monthly income generation capacity,
the prevalent three types of auto rickshaw operation, age of vehicle (old and new)
and vehicle type (petrol and diesel driven) are considered. Factors and
assumption discussed in the analysis are summarized.

Based upon the factors considered, average monthly income and
expenditure under various components are worked out for different types of
vehicles. Considering these factors, the average monthly cash outflow, cash
inflow and net income for different types of operation/vehicle type / age of vehicle
combinations are worked out.

The average daily income generation potential in auto rickshaw operation in
a working day is found varied between Rs. 36.62 and Rs. 56.64 for hiring
operation. In the case of owner driven operation, it is varied between Rs. 118.44
and Rs. 199.64, and in hired driver operation, it is between Rs. 81.82 and Rs.
143.00. This is found to be quite attractive comparing to the prevalent wage
condition for skilled/unskilled labour rate in the city. This may be the main reason for more number of vehicles entering into the operation in the city.

**Societal Impact**

Para transit as a travel mode in the urban society has both positive and negative impacts on the society and the economy. The positive impact includes income generation, employment generation, travel demand served, providing accessibility and fair and healthy competition to the advantage of vehicle users. Similarly, the negative impact to the society includes road congestion, road accidents, high rate of fuel consumption and air pollution.

**Income generation**

The annual income generation capacity for different type of para transit operation is found varied from vehicle to vehicle. It excludes the income generated in the related fields of para transit operation like workshop, sales, lending services and so on.

**Travel demand served**

Auto rickshaws fulfill a considerable portion of the demand in intra-city travel and establish themselves as an integral part of the city transport system. While on their occasional strikes the absence of auto rickshaws on the road is very much felt and it causes much inconvenience to the city travellers.

**Road congestion**

Road congestion is caused by road factors, traffic volume, type of vehicles, and vehicles behaviour. Auto rickshaw operation in Thiruvananthapuram causes considerable traffic congestion. Twenty-five auto road space can be substituted by
one bus road space for transporting same amount of passengers. An exclusive bus lane can handle 550 buses and 27,500 passengers in an hour. However, 1500 autos transport only 3000 passengers with great difficulty. It underscores the fact that IPT modes like auto rickshaws are advocated for sub-arterial and connecting roads to provide linkage to the public transport system.

**Fuel consumption**

The average of daily and annual fuel consumption of the city buses and the auto rickshaw were estimated. City buses to transport 4.81 lakh passengers in a day consumed Twenty-five kilo litres of diesel. However, an auto rickshaw consumes 26 kilolitres of petrol and 0.71 kilolitres of diesel to transport only 1.99 lakh passengers in a day.

**Air Pollution**

Vehicle emission, pollutes the atmosphere. Carbon monoxide (CO), Hydro Carbon (HC), Nitrogen Oxide (NOx), Sulphur, Lead and particulates are the major air pollutants by the vehicles. It was estimated that 31 tonnes of air pollutants were emitted daily in the city by auto rickshaws. Of which 56.22 percent was carbon monoxide, 39.89 percent hydrocarbon, 2.20 percent lead particulates and 1.69 percent nitrogen oxide. Regarding vehicle type, the diesel auto rickshaws share in the air pollution is 2.36 percent.
2.4 Objectives of the Study

The following are the objectives of the present study.

Primary Objective

The present research aims at analysing the role and performance of maxi cabs in the road transport industry in Kanyakumari District.

Other Objectives
1. To examine the various indicators of physical performance of the maxi cab operations in Kanyakumari District.
2. To analyse the financial performance of the maxi cab operations in Kanyakumari District.
3. To identify the factors that influences the profit of the maxi cab operations in Kanyakumari District.
4. To explore the views of the maxi cab owners so as to promote maxi cab operations in Kanyakumari District.
5. To find out the wage structure and working conditions of the labourers in maxi cab operations in Kanyakumari District.
6. To find out the future prospects of maxi cab operations in Kanyakumari District.

2.5 Design of the Study

The study consists of preparation of schedule, pre-testing, execution, classification, tabulation and analysis of data, interpretation of analysed data and policy options.
2.6 Methodology of the Study

The study is based on both primary and secondary data.

2.6.1 Collection of Primary Data:

The investigator himself through two separate schedules; one for maxi cab owners and the other for cab drivers/cleaners directly collected the primary data pertaining to the maxi cab operations, owners' views and wage structure of drivers and cleaners.

2.6.2 Collection of Secondary Data:

National level data relating to the growth of transport system, operation of the Indian railways, development of Indian roadways, growth of para transit in India, growth of maxi cabs in India, state wise transport motor vehicles in India and share of motor cabs and maxi cabs in India are collected from various Economic surveys of the Government of India and the publications of Infrastructure Center for Monitoring Indian Economy.

The State level data relating to the growth of road transport vehicles, details about district wise para transits, growth of maxi cabs and operation of maxi cabs in Tamil Nadu were collected from various Statistical hand books published by Government of Tamil Nadu, State Transport Department Chennai and the publications from Institute of Road Transport, Chennai.

The district level data relating to population, tourist places, growth of para transit vehicles, growth of maxi cabs and share of maxi cabs in para transit vehicles in Kanyakumari district were collected from the various issues of Kanyakumari District Statistical Hand Books published by the Department of

2.7 Sampling Technique

Stratified Random Sampling Method was adopted for the study with Kanyakumari District as the universe and the block as a stratum. For selecting sample from each stratum, the researcher applied Proportionate Random Sampling Method.

The researcher has selected 20 percent samples from each stratum under stratified Random Sampling Method because the total number of maxi cab available in all the nine blocks of the Kanyakumari district is 1130. It includes both the drivers and the cleaners. Therefore, total respondents are 3,000, excluding owner-cum-driver and it is spread length and breath of the district. It is difficult for a single researcher to cover all the areas, and to meet all the respondents individually. Due to time constraint, a sample of 20 percent is selected for the study.

The details of the number of maxi cabs operating in Kanyakumari District were collected from the records of the Regional Transport Office, Nagercoil.

Table 2.1 gives the details of the selection of samples from the nine-panchayat unions (Blocks) of Kanyakumari District.
Table 2.1 Details about the selection of samples from panchayat unions of Kanyakumari District

<table>
<thead>
<tr>
<th>Name of the Block</th>
<th>Total No. of maxi cabs operated in blocks</th>
<th>No. of respondents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Owners (20%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drivers (20%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaners (20%)</td>
<td></td>
</tr>
<tr>
<td>Thovalai</td>
<td>72</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Agasteeswaram</td>
<td>114</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Rajakamangalam</td>
<td>96</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Kuruthencode</td>
<td>82</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Thuckalai</td>
<td>123</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Tiruvattar</td>
<td>176</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Killiyoor</td>
<td>153</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Munchirai</td>
<td>166</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Melpuram</td>
<td>139</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1130</td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td></td>
<td></td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td></td>
<td></td>
<td>678</td>
<td></td>
</tr>
</tbody>
</table>

A total of 226 maxi cabs were selected for the study. For collecting primary data, the researcher selected a total of 678 samples, that is, 226 samples from maxi cab owners consisting of four different makes, namely, Mahindra (123), Tata 407 (52), Matador (31) and Tempo Traveller (20), and 226 samples from the drivers and 226 samples from cleaners engaged in the operation of above said maxi cabs.

2.8 Period of Study

The field survey was carried out from December 1999 to March 2000. The data collection pertains to the year 1999-2000.

2.9 Tools of Analysis

The statistical tools used for the present study are as follows,
2.9.1 Correlation Analysis

The correlation analysis is used to know the association between pairs of characteristics in each group. It is computed by

\[ r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}} \]

and the significance is tested by the formula

\[ t = \frac{r \sqrt{n - 2}}{\sqrt{1 - r^2}} \]

2.9.2 Regression Analysis

In order to know the functional relationship of the different variables involved, different forms of multiple regression equations were fitted for each section and the choice of the best was made on the basis of $R^2$-square maximum and the proper signs and significance of the coefficients. The form of the equation used here is

\[ Y = b_0 + b_1 x_1 + b_2 x_2 + \ldots \ldots + b_n x_n \]

when $Y$ is the dependent variable and $x_1, x_2, \ldots, x_n$ are the set of independent variables. The estimation of co-efficient was based on ordinary least squares (OLS). Standard SPSS 8.0 package was used in the estimation.

2.9.3 Strength and Limitations of the Correlation and regression analysis

**Strength:**

Most of the variables show some kind of relationship. For example, there is relationship between price and supply, and income and expenditure. With the help of correlation analysis, we can measure in one figure the degree of relationship
existing between the variables. Once we know that two variables are closely related, we can estimate the value of one variable given the value of another. Correlation analysis contributes to the economic behaviour, aids in locating the critically important variables on which others depend, may reveal to the economist the connection by which disturbances spread and suggest to him the paths through which stabilizing forces become effective.

Progressive development in the methods of science and philosophy has been characterized by the increase in the knowledge of relationships of correlations. In nature also one finds multiplicity of interrelated forces.

Regression analysis is a branch of statistical theory that is widely used in almost all the scientific disciplines. In economics, it is the basic technique for measuring or estimating the relationship among economic variables that constitute the essence of economic theory and economic life. For example, if we know that two variables, price (X) and demand (Y) are closely related, we can find out the most probable value of Y for a given value of X. Similarly, if we know that the amount of tax and the rise in the price of a commodity are closely related, we can find out the expected price for a certain amount of tax levy. Thus we find that the study of regression is of considerable help to the economists and businessmen.

The uses of regression are not confined to the economics and business fields only. Its applications are extended to almost all the natural, physical and social sciences.
Limitations:

The correlation coefficient always assumes linear relationship regardless of the fact whether that assumption is correct or not; Great care must be exercised in interpreting the value of this coefficient as very often the coefficient is misinterpreted. The value of the coefficient is unduly affected by the extreme items; As compared with other methods, this method takes more time to compute the value of correlation coefficient.

In making estimates from a regression equation, it is important to remember that the assumption is being made that relationship has not changed since the regression equation was computed. Another point worth remembering is that the relationship shown by the scatter diagram may not be the same if the equation is extended beyond the values used in computing the equation. For example, there may be a close linear relationship between the yield of a crop and the amount of fertilizer applied, with the yield increasing as the amount of fertilizer is increased. It would not be logical, however, to extend this equation beyond the limits of the experiment for it is quite likely that if the amount of fertilizers were increased indefinitely, the yield would eventually decline as too much fertilizer was applied.3

2.9.4 Kendall's Coefficient of Concordance

Kendall's Co-efficient of Concordance was used to assess the consistency or otherwise of the problem faced by the owners and drivers of the four types of vehicles separately. The formula used is

\[ W = \frac{s}{(1/12) k^2 (N^3 - N)} \]

Where \( s \) = sum of square of observed deviation from the mean \( R_j \)

\[ s = \sum (R_j - \bar{R}/N)^2 \]

\( k \) = no. of sets of ranks (types of vehicle)

\( N \) = no. of entities ranked (problems)

\( R_j \) = sum of ranks for each item.

In the case of tied observations Where

\[ T = \frac{\sum (t^3 - t)}{12} \]

\[ W = \frac{s}{(1/12) k^2 (N^3 - N)} - K \sum T \]

The significance is tested by

\[ \text{Chi-square} = \frac{s}{(1/12) kN (N + 1)} = k (N - 1) W \]

\[ \text{Chi-square} \sim k (n - 1) W \text{ with degrees of freedom} = N - 1 \]

2.10 Concepts Used

1) Effective Kilometres

Kilometres actually operated by vehicles (cabs) for purposes of earning revenue are known as effective kilometres.

2) Dead Kilometres

Kilometres covered by the vehicles in the following circumstances are considered as dead kilometres:

a. Movement between stands and sheds and vice versa.
b. Movement from stands and sheds to the fueling point and back.
c. Movement of vehicles as relief in case of accidents and breakdowns.
d. Movement of vehicles sent to continue the operation of breakdowns and accidents up to the breakdown / accident point.
e. Movement of vehicles sent to start operations from some other operating point.
f. Movement of vehicles sent to docking, for repairs and reconditioning.
g. Movement of vehicles resulting in such other coverage of non-revenue earning kilometres.

3) **Gross Kilometres**
   
   It is the sum total of the effective kilometres and dead kilometres.

4) **Cab Utilisation**

   Kilometres performed per cab per day are cab utilisation.

5) **Average Cab Utilisation**

   Average cab utilisation is worked out as under

   \[ \text{Average cab utilisation} = \frac{\text{Effective kilometres run per day}}{(\text{Total number of cabs (make wise) on road per day})} \]

6) **Average Age of a Cab**

   The life of a vehicle is the period from the date of its commissioning up to date in years. The average age of vehicles at any point of time in years is arrived at by dividing the sum total of such periods form the date of their commissioning up to date for all the vehicles by the total number of such vehicles.
7) Carrying Capacity of Cab

Carrying capacity means the number of seats offered in a cab, authorized as a part of carrying capacity and excluding the seats allotted to the driver and conductor. The carrying capacity is known as the “pay load” of the vehicles.

8) Occupancy Ratio

Occupancy ratio is the percentage ratio of passenger kilometres (seat kilometres sold) to seat kilometres offered.

\[
\text{OR} = \frac{\text{Passenger kilometres (seat kms sold)}}{\text{Seat kilometres offered}} \times 100
\]

9) Passenger Kilometres

Passenger kilometres or seat kilometres sold represent the volume of traffic in terms of seat kilometres actually occupied or booked. It is the sum total of the length of journeys performed by all the passengers carried.

10) Seat Kilometres Offered

Seat kilometres offered is the average carrying capacity multiplied by the effective kilometres operated.

11) Breakdowns

A Breakdown is defined as stoppage of vehicle on road due to mechanical defects or other failures rendering the vehicle immobile or unfit for the continuation of revenue earning trip.

12) Accidents

An accident is an occurrence in the use of a vehicle on revenue earning trip resulting in injury to or death of passengers or damage to property.
13) **Fuel Consumption during Operation**

Total quantity of fuel (Diesel + Oil) consumed by the vehicles during operation.

14) **Operating Revenue**

Income realized from transportation of passengers and incidental sources related to transportation of passengers constitute operating revenue.

15) **Operating Cost**

The total working cost incurred in connection with the business of transportation of passengers is termed as the cost of operation. The cost of operation includes all items of expenditure incurred in connection with the operation of services including depreciation, interest on the capital invested and so on.

16) **Operating ratio**

The operating ratio is the percentage ratio of the total cost of operations or operating costs to the total traffic or operating revenue.

The operating ratio is arrived at as under

\[ \text{OR} = \frac{\text{Total operating cost}}{\text{Total operating revenue}} \times 100 \]

17) **Seating Capacity**

The number of seats offered in a vehicle excluding the seat allotted to the operating crew.
18) Kilometre Efficiency
The ratio between effective service or run kilometres and scheduled kilometres.

19) Stand
It is a common place where cabs/vehicles are parked for hiring.

20) Shed
Shed is a place where cabs/vehicles are kept for maintenance.

2.11 Limitation of the Study
This study is confined to the maxi cabs and their performance in Kanyakumari district. The information collected is mostly recorded. However, the validity cannot be assured hundred percent. A peculiar situation exists in Kanyakumari District. Here, the villages lie scattered. As a result, even in short runs van are always filled to their capacity, or even more persons. This condition is not applicable to other districts of Tamil Nadu. Hence, the results obtained from this study will be applicable to only those districts wherein this compactness exists.