

FOREWORD

Guruvayur is a famous pilgrim destination of international fame, located in the Thrissur District of Kerala State, which has acquired Municipal status in the year 1994. Guruvayur Sree Krishna Temple is the central and main attraction of the town. Millions of devotees visit this shrine every year with utmost faith in their hearts and Lord Guruvayurappan (Sri Krishna) never turns them away disappointed. Guruvayur town shows an urban character towards the core area and the peripheral area shows semi urban character. Since the formation of Guruvayur Township in 1962, efforts were begun to control the growth and development of the town. Haphazard growth of the central area surrounding the temple and further expansion of the town demanded the preparation of a new master plan for the present Guruvayur Municipality, and the council unanimously decided to prepare the Master Plan. Now the plan is prepared and I am sure that this plan can definitely help to transform Guruvayur town in to a more livable space for the generations to come.

Land being the most scarce and expensive resource, it is imperative to formulate and implement specific scientific measures in land use planning with a long term vision and comprehensive regional outlook. Besides, provision of urban services, management of ecologically sensitive areas, disaster management, resource mobilization etc. are to be efficiently planned. The Master Plan for Guruvayur Town, 2039 is an effort towards these. The proposals in various sectors are productive enough to strengthen the economic base of the town and to raise the town into a national pilgrim destination. I am sure that it will ensure peaceful and healthy living atmosphere for the inmates of the town.

All the members of the present council have actively participated in the discussions for finalizing the plan. Special acknowledgements to the Standing Committee Chairpersons for their guidance and involvement in the work. Members of the Special Committee and working group members also put in considerable efforts in materializing this Plan. Special thanks also goes to all the technical and non-technical staff of the municipality who gave their valuable support in this plan preparation. I also appreciate the sincere efforts put in by the officials of the Local Self Government Planning wing for materializing this Plan in its present form.

With great pleasure and faith, I present the Master Plan for Guruvayur Town, 2039 herewith. I actively exhort to implement this Master Plan in its full spirit, which would certainly help Guruvayur Municipality to ascertain its vitality in the region, in the years to come. I also use this opportunity to request the wholehearted cooperation of all the stakeholders, for the successful implementation of this plan.

M.Krishnadas
Chairman
Guruvayur Municipality

PREFACE

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme, launched by Government of India, focuses on infrastructure creation that has a direct link to provision of better services to the urban citizens. The AMRUT mission mandates a set of 11 reforms which are to be implemented by the States during the Mission period. 'Urban Planning and City level Plans' is one among the 11 reforms. For achieving one of the milestones under this reform viz.'Preparation of Geographical Information System (GIS) based Master Plans', Government of India have launched the 'Scheme of formulation of GIS based Master Plans for AMRUT cities'. The Local Self Government Department Planning was designated as State level Nodal Agency of this Scheme. The Scheme has three components viz. Geo-database creation, Preparation of Master Plans and Capacity building. In the State, Guruvayur is one of the 9 AMRUT cities/towns included under this sub-scheme.

Urban areas have been the driving force in economic and social development. Cities emerged as a focal point of transport, trade, business, education, religion and governance. Unprecedented urbanisation and migration result in multi fold growth of urban areas. Adhoc efforts neither result in better environment nor strengthen the economic base. The 74th Constitution Amendment Act envisages empowerment of the Urban Local Bodies (ULBs) with planning functions, which is enshrined in the Twelfth Schedule to Article 243 – W of 74th Amendment. The first three functions under the Twelfth Schedule are Urban planning including town planning; Planning of land-use & construction of buildings; and Planning for economic and social development.

Master Plans are expected to give impetus to the development and economic potential of the towns. There were quite a few planning efforts to tackle the development issues of Guruvayur Town. Essentially in this Master Plan, the issues that are regarded as very crucial in framing the development proposals to achieve better living and economic conditions in the urban areas, have been considered after carefully weighing the opportunities and constraints offered by the town. The comprehensive efforts have established a framework for physical and socio-economic development and upliftment of the town and a development policy mechanism by which these goals can be achieved.

I would like to appreciate the leadership provided by the Guruvayur Municipality for this endeavour under the chairmanship of Sri. M. Krishnadas. The contributions of the Master Plan Committee constituted for the preparation of the Master Plan as well as the Working Groups were significant in the task. I take this opportunity to appreciate the officials of the Thrissur District office of the Local Self Government Planning, especially Sri. K.R.Rajeev, District Town Planner and the planning team for their sustained efforts in the time bound preparation of this plan. The contributions of Shri K. M. Gopakumar, former District Town Planner is also to be mentioned at this juncture.

Definitely, the Master Plan for Guruvayur Town will provide the necessary framework for the development of this prominent pilgrim destination. I optimistically look forward to effective implementation of this plan. Certainly, the Master Plan will provide guidance for all stakeholders with an interest in the future development of this pilgrim town.

H. Prasanth
14/03/24

H. Prasanth
Chief Town Planner (Planning)
Local Self Government Department Planning.

ACKNOWLEDGEMENT

The master plan delivers a coordinated strategy to guide future development, transport and public utility investments over the next 20 years to ensure our town as safe, attractive and a continued source of pride. The preparation of the Master Plan for Guruvayur Municipality was initiated as per resolution number 11 of the Municipal Council on 06/02/2019.

I am sincerely acknowledging the valuable guidance and involvement of Municipal Chairman Sri M.Krishnadas, and former Municipal Chairpersons Smt V.S.Revathy, Smt.M.Rethy, Prof.P K Santhakumari during the preparation of Master Plan for Guruvayur Municipality. I gratefully acknowledge the contributions of all councilors of the Municipality for their support. The sincere efforts put in by the Secretary, Municipal Engineer and all staff of the municipality needs special mention here.

I express my sincere gratitude to Sri. Gigi George, former Chief Town Planner, Smt. K.S.Girija former Chief Town Planner (Planning), Sri C.P.Pramod Kumar, Chief Town Planner, Sri H.Prasanth Chief Town Planner (Planning) for their unmatched support and guidance in bringing out this draft plan. Special thanks also go to all officialss who gave their valuable support without which the compilation of this vital document would have been difficult to realize. The plan has been prepared in a participatory way having several consultations with Stakeholders at all stages. I offer special thanks to members of Special Committee, Working groups and other stakeholders for offering their views, comments and recommendations in developing the plan. I would like to extend special thanks to the residents and people of Guruvayur Municipality who provided substantial input that helped to shape the Master Plan vision for future generations to enjoy.

Master Plan preparation is the culmination of several months of dedicated work by the Planning team members. I sincerely appreciate hard work and sincerity of the planning team in the District office in completing all the works in a time bound and organized manner and bringing out the plan within the stipulated time. The services of the former District Town Planner, Sri. K.M Gopakumar is remembered with gratitude on this occasion. I sincerely appreciate the dedicated efforts of Smt.K.M.Sumathy, Smt. Jeeva Liza Xavier as Deputy Town Planners who led the planning team during each of their tenure to shape the plan. I extend my sincere gratitude to all the members of the planning team with special mention to Smt. Nimmy Kurian, Smt.Hinduja V L and Sri Pradeep P T as Assistant Town Planners who worked to contribute to this plan along with Smt. Lathika P V, Smt Prabitha P B, Smt Sruthy Vijayan 1st grade surveyors who created the GIS part of the plan. Contributions of Planning Assistant Smt. Feby Ann Varghese , Planner Associates Smt. Nighitha V S and Kum. Devika Nair and Planning Assistants(GIS)Smt. Reshma K Ravindran , Sri Ashwin Kokkat towards the successful preparation of this plan is also acknowledged here. Finally, but not the least, special thanks to all staff of District office for their tireless efforts without which this plan would not have been completed.



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ABBREVIATIONS

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
MoUD	Ministry of Urban Development
GIS	Geographic Information System
LSGI	Local Self Government Institution
ULB	Urban Local Body
SUR	State Urbanisation Report
IDDP	Integrated District Development Plan
WFPR	Work Force Participation Rate
URDPFI	Urban and Regonal Development Plan Formulation and Implementation Guidelines
KSRTC	Kerala State Road Transport Corporation
PWD	Public Works Department
NATPAC	National Transportation Planning and Research Center
PCU	Passenger Car Unit
IRC	Indian Road Congress
KWA	Kerala Water Authority
PMAY	Pradhan Manthri AwasYojana
KMBR	Kerala Municipality Building Rules
BPL	Below Poverty Line
CRZ	Coastal Regulation Zone

CHAPTER 1
INTRODUCTION

1.1 Context of the study

The Government of India launched Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in 2015 as centrally sponsored scheme with the objectives to **(i)** ensure that every household has access to a tap with assured supply of water and a sewerage connection; **(ii)** increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and **(iii)** reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling).The Mission will focus on the following Thrust Areas:

i. Water Supply,
ii. Sewerage facilities and septage management,
iii. Storm Water drains to reduce flooding,
iv. Pedestrian, non-motorized and public transport facilities, parking spaces,
v. Enhancing amenity value of cities by creating and upgrading green spaces, parks and recreation centers, especially for children.

One purpose of the Mission is to improve governance through a set of Reforms. During the Mission period, 11 reforms are being implemented. Formulation of GIS based masterplan for 500 AMRUT cities is one of the important reforms under AMRUT, which is a 100% centrally funded sub-scheme. The major objectives of the sub-scheme are: (i) To develop common digital geo-referenced base maps and land use maps using Geographical Information System (GIS) and (ii) Master Plan Formulation for 500 cities that are selected as AMRUT Cities. From Kerala, 9urban local bodies are selected as Amrut cities. The Amrut cities include Thiruvananthapuram,

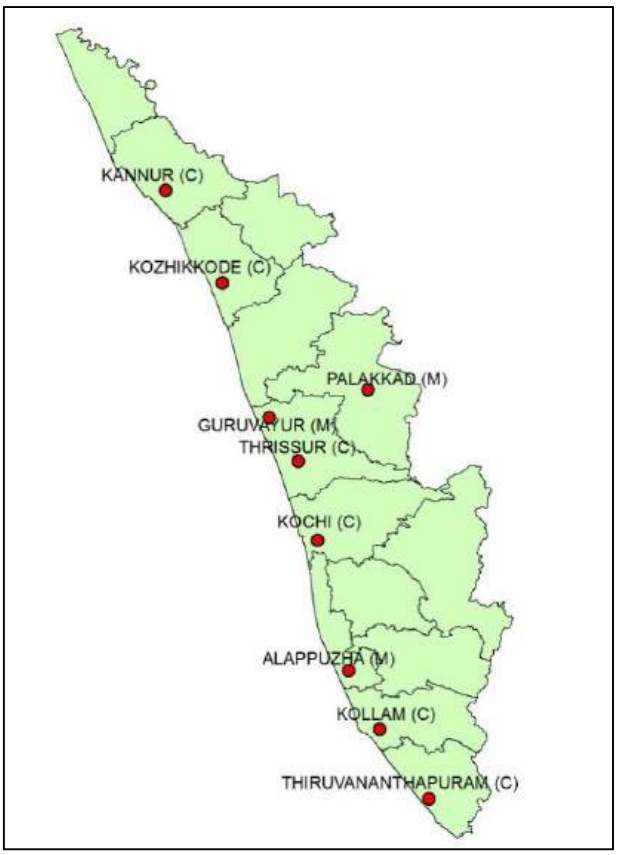


Figure 1.1 Amrut Cities in Kerala

Kollam, Kochi, Thrissur, Kozhikode and Kannur Corporations and Alappuzha, Palakkad and Guruvayur Municipalities as shown in Figure 1.1

Master Plan is the major tool for urban land management, providing detailed land use allocation for the sustainable development of city/town. Most master plans are made for 20-year periods, in phases of five years for periodic review and revision. Formulation of master plans start with base map preparation, existing land use surveys and collection of socio-economic data necessary for reviewing the existing situation and proposing the future land use plan. With the advances in remote sensing and geographic information system, the plan making process can be expedited with integration of both spatial and attribute data, which enables detailed assessment of spatial growth of towns/cities, land use status, physical infrastructure facilities, etc. in anticipation of the projected population growth.

The most crucial information for formulation of Master Plan is an accurate and updated Base Map of the planning area, showing roads and building layouts, spatial extent of development and information on the use of each parcel of land etc. Based on the Design & Standards for the preparation of GIS based masterplan for AMRUT cities, the geodatabase has been prepared, and updated and the detailed study has been conducted to prepare the masterplan.

1.2 Guruvayur – The temple town

"Guruvayur", also known as 'Dwaraka of south' is one of the National pilgrim centres of international fame, situated about 30 kms away from Thrissur Town, the Head Quarters of the Thrissur District of Kerala. The Guruvayur Temple is the central and main attraction of the town. Millions of devotees visit this shrine every year with utmost faith in their hearts and Lord Guruvayurappan (Sri Krishna) never turns them away disappointed. Every day thousands throng the temple and wait patiently for hours in a queue to catch a mere glimpse of this divine child. The temple's healing and curative powers are legendary. Most devotees commit offerings to the Lord in lieu of healing from various ailments. Figure 1.2 shows the view of Guruvayur temple.



Figure 1.2 Guruvayur Sree Krishna Temple

Since last five decades, this temple has acquired great popularity among Hindus all over the world, of late substantial number of devotees is from outside the state. During festival seasons, the crowd swells in to several lakhs each day and their present facilities become insufficient. Sabarimala devotees from other states as well as from north Kerala make it a point to visit Guruvayur temple during their Sabarimala pilgrimage.

Hence during pilgrimage months of October, November, December and January the crowd in the temple becomes uncontrollable and very often devotees have to return without getting *'darsan'* by entering the *'sanctum sanctorium'*. Moreover, vehicular and pedestrian traffic clogs all roads in Guruvayur town. In order to meet the highly fluctuating seasonal visitors from the state as well as outside, the town and its suburbs needs to be planned and developed in balanced and systematical manner. Scarcity of land and facilities are the major problem within the study area, especially within the Central Area. The available land is to be put to optimal use so that maximum benefits are derived per unit of land.

1.3 Earlier planning efforts

A town Planning Scheme was prepared for Guruvayur Township, for the then township area of 6.475 sq.km, which was sanctioned in 1976. The area and demographic feature of the town have changed much from that period. The sanctioned scheme was varied on 01.01.2010 and a new Master Plan for the then Municipal area of 7.476 sq.km was published on 05.04.2011. In 2010, the municipal area was further increased by including the adjoining Panchayats of Thaikkad and Pookode, thus arising a need for a new Master Plan. In 2015, the works for preparing a new Master Plan was initiated. It was during this period AMRUT scheme was introduced and Guruvayur was chosen as one of the AMRUT cities. The preparation of GIS based master plan under AMRUT scheme was initiated by the municipality through resolution number 11 of the Municipal Council on 06/02/2019.

1.4 Need for the plan

Guruvayur town, one of the famous religious tourism destination in the country, presently has an area of 28.72 sq. km, to host millions of devotees annually. Guruvayur town has grown as a temple town around the famous temple, of 'Lord Krishna', as its Central point. The area in the immediate vicinity of temple is congested and crowded with ribbon development of commercial and service establishments on either side of the two roads from West Nada as well as East Nada. The area within the outer ring road is heavily built up. The Nature of development in this area is like that of any typical pilgrim centre. The town lacks basic services, infrastructure supporting pilgrimage, Public transport and proper land development mechanism. Due to the growing importance and growth of pilgrims visiting the

Guruvayur town, it is essential to guide the overall development of the town in well planned manner by considering all the planning parameters.

Development plans prepared in 1976 and 2011 comprises only a part of the present Guruvayur Municipality. The provisions in the sanctioned master plan should be revised as per the present requirement. Since the town is developing as an important pilgrim center, which attracts pilgrims from all over the world; a master plan is needed for the sustainable development of the town. Development initiatives are to be done to satisfy the growing needs of pilgrims, while retaining the heritage of the town.

Arrival of pilgrims during festive seasons and special occasions causes severe stress on the basic infrastructure facilities, land, resources and amenities of Guruvayur town. Apart from this floating population, haphazard and unplanned urbanization is the result of increasing population growth and density, economic opportunities, agriculture land capture and other social compulsions. This is resulting in resources constraint due to detrimental land use patterns; diminishing water resources and greenery; increasing demand for land, shelter and infrastructure utilities; traffic congestion; narrow roads; increasing pollution levels, public health hazards and urban disasters along with an overall decrease in the quality of life of people living in the town.

Thus, the Master plan will provide for and facilitate improvement of basic infrastructure including water supply, Sewerage, drainage, transportation networks, provision of parking facilities, green and open spaces. It will help to accommodate systems for pilgrims traffic flow and management, and formulation of effective solid and liquid waste management systems for a better and bright future of Guruvayur town.

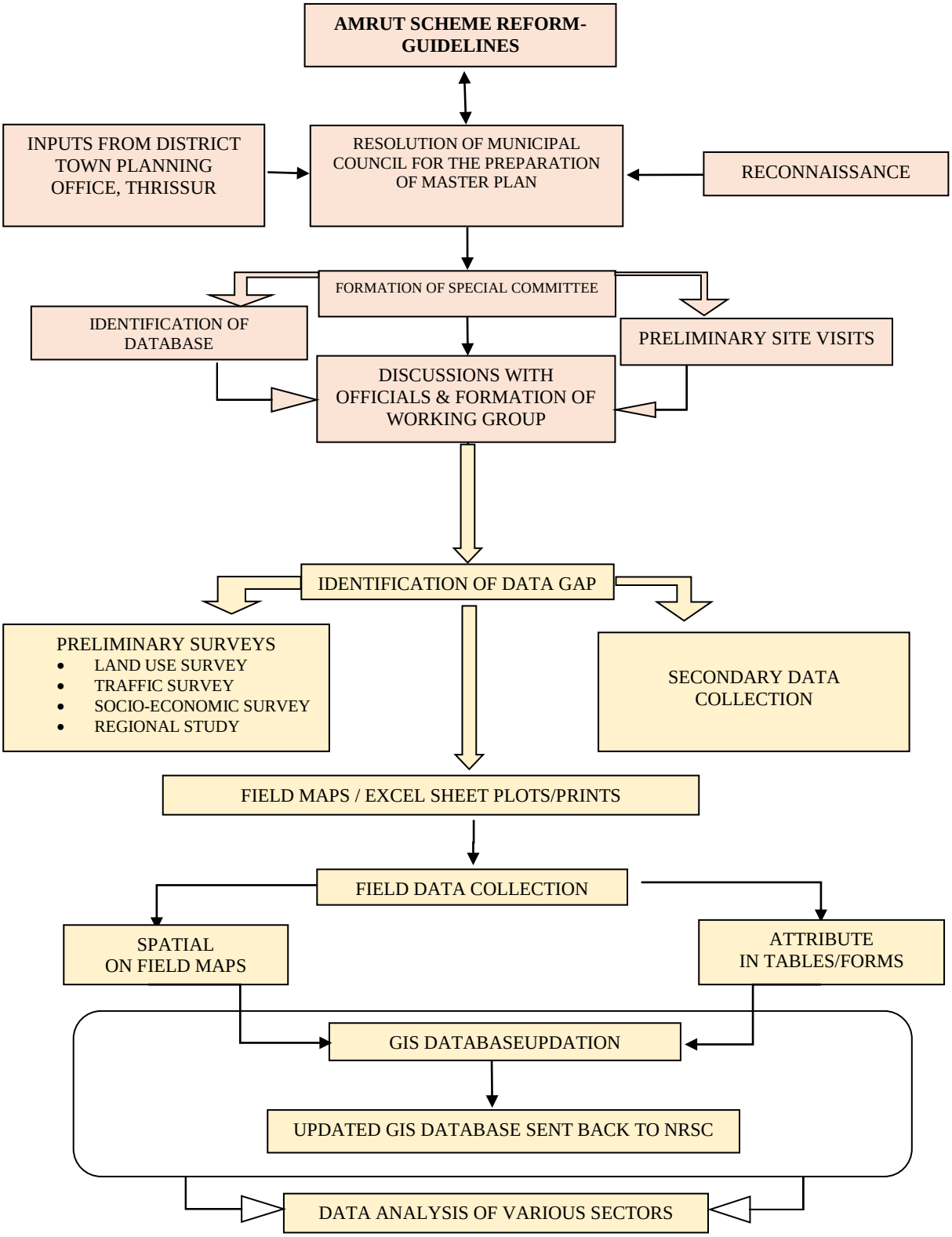
1.5 Delineation of planning area

The first stage in the preparation of masterplan is the delineation of planning area. It depends on the depth of growth and expansion towards the surrounding area. The planning area is the present Guruvayur municipality, which comprises six revenue villages of Guruvayur (part), Iringapuram, Pookode, Thaikkad, Perakam and Chavakkad with a population of 70,012 (As per 2011Census) and stretches over an area of 29.66 sq.km.

1.6 Methodology

Masterplan will provide all contents necessary for the integral development of area covered by the Plan. Planning process for the preparation of masterplan is as per the ‘guidelines for the preparation of GIS based master plan for AMRUT cities’ issued by the Government Of India. It involves enormous works in collection, compilation, analysis of

various primary and secondary data to identify issues and potentials to arrive at formulation of proposals for the horizon period. The figure 1.2 describes the methodology adopted for preparation of masterplan.



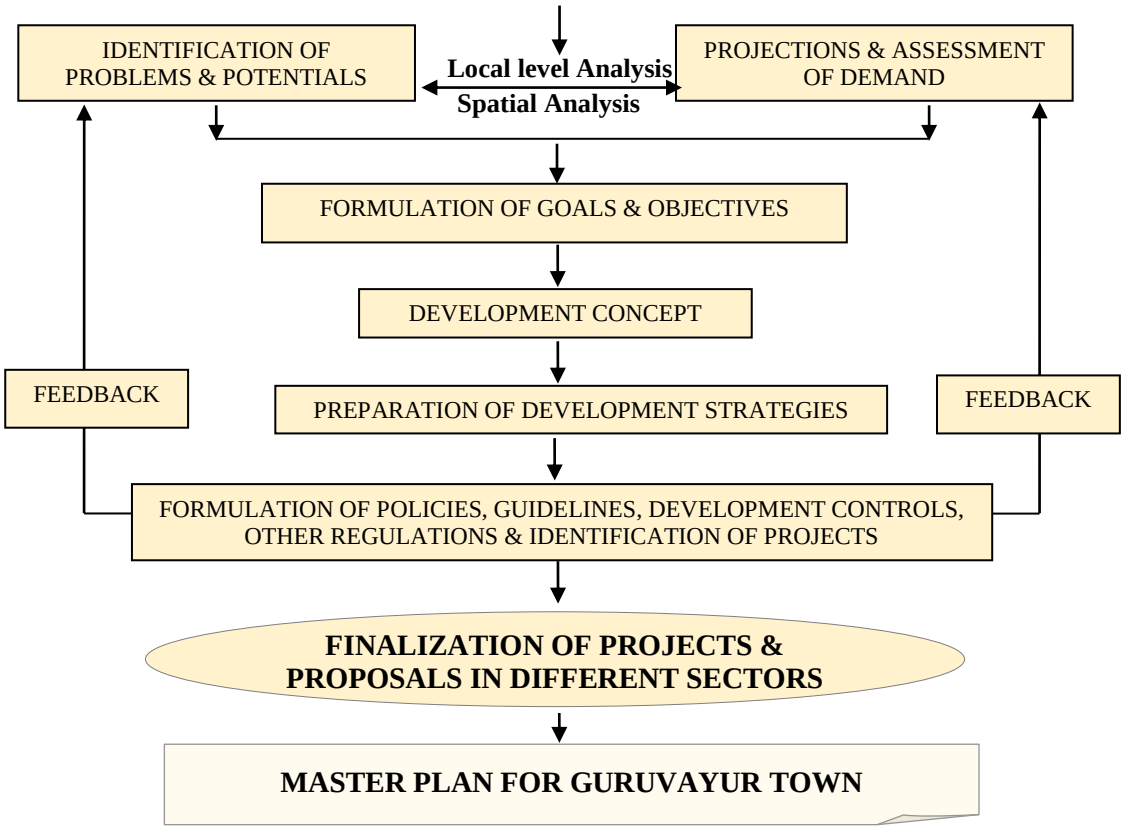


Figure 1.3 Diagrammatic representation of Methodology for preparation of Master Plan

1.7 Community Involvement

There can be no meaningful development in any society, if the people themselves are kept out of the planning process. People's participation is thus essential and must be introduced at relevant stages in the planning process, to understand their needs and to assess how their lives are affected by development projects and policies. The suggested indirect participation of the people is ensured through elected representatives in the Municipal Council / Corporation and Ward Committees (74thCAA). This kind of participation has appropriately been provided in the plan formulation process.

The Municipality had taken resolution for the preparation of GIS based masterplan under AMRUT scheme as per resolution no.11 dated 06/02/2019. A questionnaire was distributed to all the ward councillors, so that they can list out the identified issues in each divisions and incorporate suggestions or development proposals which will help in the preparation of the masterplan. The process of preparation was so elaborate and exhaustive with land use survey, updating of geodatabase, preparation of GIS based land use map, socio economic survey, Commercial survey, Industrial survey, Flat survey, Auditorium survey,

pilgrim survey, secondary data collection etc. Socio economic survey was conducted by NSS Technical cell under the supervision of the department.

Ward Sabha meetings were arranged at all wards to clearly understand the issues faced by the people and include their valuable suggestions in preparation of masterplan for the municipality. Meetings were addressed by the ward counsellors and included residents of the municipality. Due care and effort has been taken to identify the root cause of their issues through detailed analysis to evolve suitable solutions for the same.








On the formation of new council after elections in 2020, the special committee was reconstituted under the chairmanship of the Municipal Chairman Sri. M. Krishnadas. Discussions were conducted with the special committee and various stakeholders. A seminar was conducted wherein group wise discussions of different working groups were conducted to obtain development suggestions. A presentation of the draft master plan was done in the council meeting held on 30.08.2022. The suggestions received in the various meetings were consolidated by the special committee. The resolution to adopt the draft master plan with modifications was taken on 30.08.2022 and in the council meeting held on 31.10.2022 the draft master plan was approved.






The draft master plan was published in the official gazette on 01.04.2023. The objections and suggestions received on the draft master plan was considered and the draft master plan has been modified based on the decisions taken by the Municipal council. The final draft master plan was approved in the council meeting held on 24.02.2024.





CHAPTER 2
PROFILE OF THE TOWN

2.1 Location & Linkages

Guruvayur municipality, a town among the 8 urban local bodies in Thrissur district, acquired municipal status in the year 1994. The town is situated on the western side of Thrissur district. Guruvayur lies between 10° 55' to 10°64' North latitude and 76° 01' to 76° 08' East Longitude. Guruvayur is located 28 km from Thrissur, the district headquarters. The Guruvayur municipal area is bounded on the East by Kandanassery Gramapanchayath and Kunnamkulam Municipality; on the South by Elavally and Pavaratty Gramapanchayaths; on the West by Chavakkad Municipality, Orumanayur and Punnayoor Gramapanchayaths and on the North by Vadakkekkad Gramapanchayath and Kunnamkulam Municipality as shown in figure 2.1.

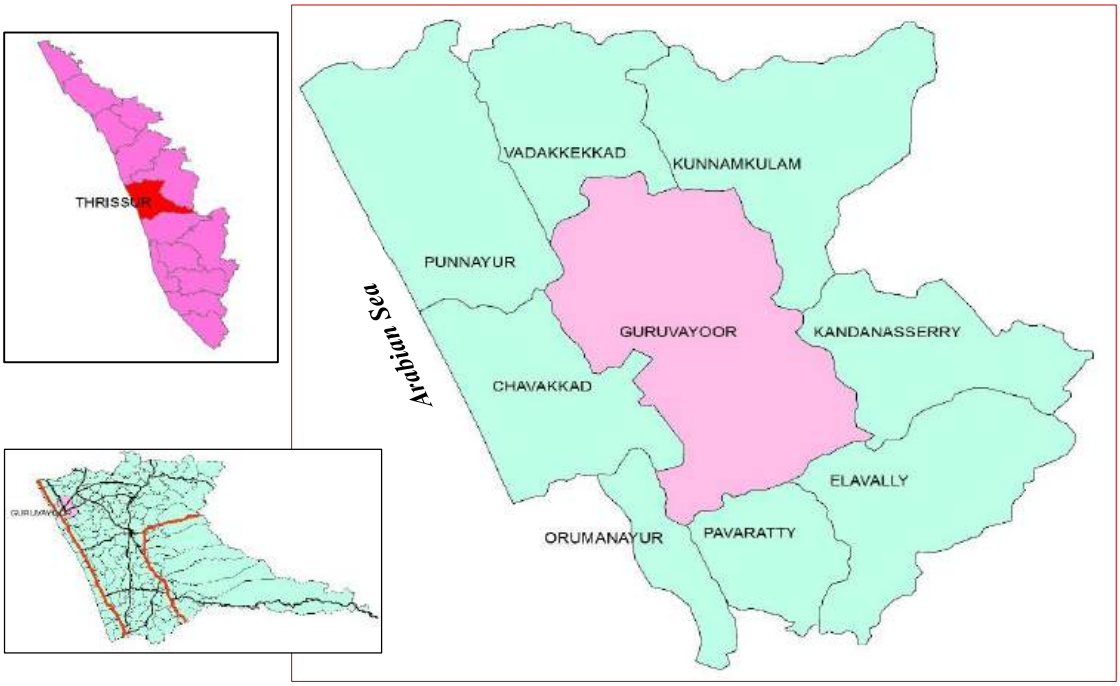


Figure 2.1. Map showing Location and Surrounding Panchayaths of Guruvayur Municipality

The town is connected to other regions through road and railway networks. The presence of state highways SH 62 (Guruvayoor – Althara – Ponnani road), SH 50 (Chavakkad – Wadakkancherry), SH 49 (Guruvayoor – Choondal) and other major district roads has contributed to the development of the town to the present status. Guruvayur railway station is situated in the town center. Thrissur Railway Station is the major railway station near to Guruvayur. The nearest airport is Cochin International Airport at Nedumbasserry at a distance

of 80 km and Calicut International Airport at Karipur is about 100 km away from Guruvayur. The transportation network of Guruvayur municipality is shown in figure 2.2.

2.2 Area and Population

Area of the Municipality is 29.66 sq.km as per Census 2011, which is 1.01% of the total area of the district. Guruvayur town comprises six revenue villages such as Guruvayur(Part), Iringapuram, Pookode, Thaikkadu, Perakom and Chavakkad. Figure 2.3 shows the revenue villages of Guruvayur Municipality. Guruvayur Municipality consists of 43 wards.

As per 2011 census, the gross population of Guruvayur Municipality is 70012. It accounts to 2.24% of the total population of the district. Total population of Guruvayur Municipality includes 32450 males and 37562 females. The decadal growth rate of population is 4.5% (2001-2011) and the average population density is 2360 persons per sq.km.

2.3 Climate

The town has a tropical humid climate with a hot summer and a fairly assured seasonal rainfall. The hot season from March to May is followed by the south west monsoon from June to September. The period from December to February is the north east monsoon season although the rains stop by the end of December and the rest of the period is generally dry.

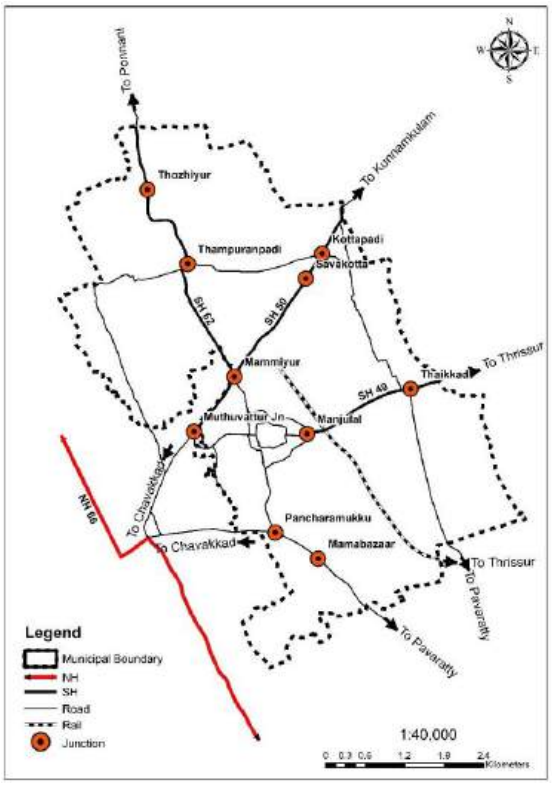


Figure 2.2. Map showing Linkages of Guruvayur Municipality

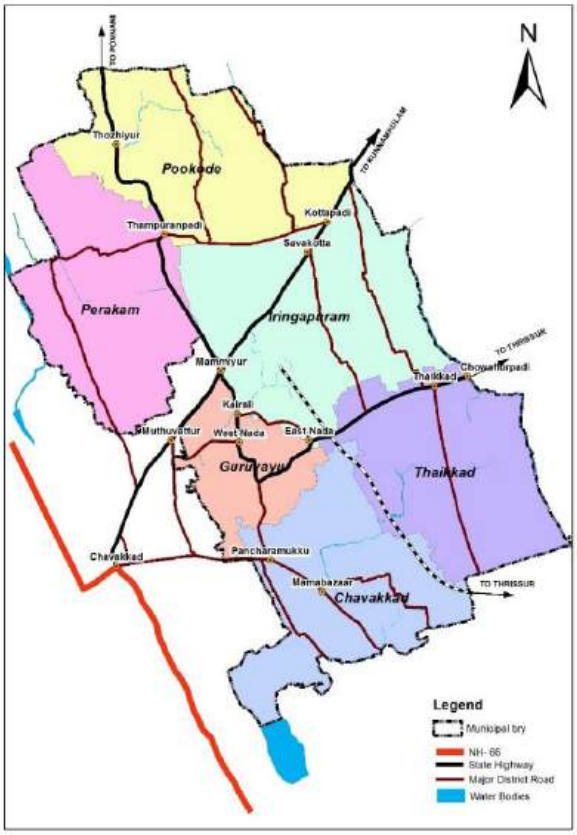


Figure 2.3. Map showing Villages of Guruvayur Municipality

The average daily maximum temperature in March-April, which are generally the hottest months, is about 29° to 35° C (88° - 90° F). The months of December and January are winter season. Though the temperature is not very high, due to relatively high humidity (74 %), it is very sultry. The '*Idavapathi' or 'Kalavarsham'* alias-South West Monsoon, begins in middle of June and ends in the month of September and the *'Thulavarsham'* alias North East Monsoon, begins in the middle of October and ends in November. The average annual rainfall is 3155 mm and the average number of rainy days (days with rain of 2.5 mm or more) in a year is 119. Winds are generally light to moderate with acceleration during the monsoon season. In the south west monsoon season the winds are mainly westerly or north westerly. During the rest of the year winds are north easterly to easterly in the mornings, and blow from directions between South West and North West in the afternoons.

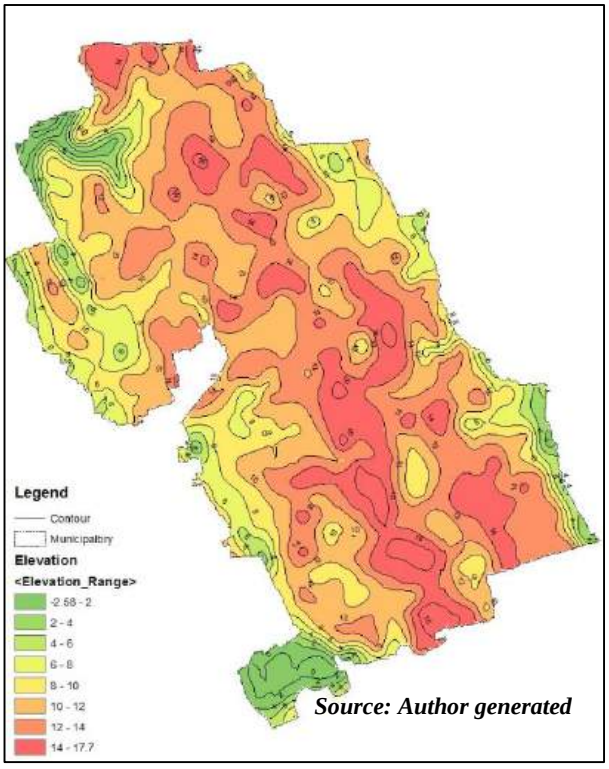


Figure 2.4. Digital Elevation Model (DEM)

2.4 Physiography

The Guruvayur Municipal town area is fairly flat terrain and lies about 11 feet above the Mean Sea Level. Guruvayur Municipal area is characterized mainly by three types of topographical areas (i) Plain which includes western and south western area (ii)Slightly higher terrain on the Eastern and southeastern sides and (iii) Low lying areas on South Western part along sides of "Valiyathod". Figure 2.4 shows the Digital Elevation Model of the town. Soil in Guruvayur belongs to the Manathala- Punnayurkulam series which is nearly level to gently sloping plains.

Soil type comes under '*sandy loam'* category. Figure 2.5 shows the geology of the town. The major watercourse in the Municipality is Chakkamkandam backwater. Even though it is an environmentally sensitive area, saltwater intrusion to the groundwater prevails in the surrounding areas of this backwater. Another water course namely *Canoli canal* is passing through the western side of the Municipality. Valiyathodu is the major drain passing through the municipality, which was flourished with water previously and is now a source of waste

water discharge from the town carrying effluent to Chakkamkandam backwater. The town is blessed with large number of ponds, most of them are not in use.

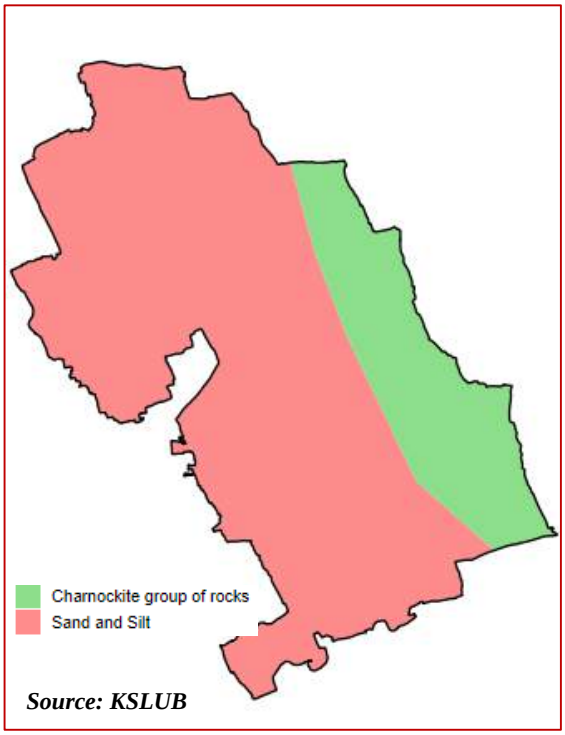


Figure 2.5. Map showing geology of the town

2.5 History of Evolution

Legendary Origin of the temple

According to tradition, the temple is the creation of Guru, the Preceptor of the Devas, and Vayu, the Lord of winds. The Mahabharatha, the foremost epic story of Puranas enumerates in detail how, King Parikshit met with his tragic end by the fatal sting of a cobra. His son Janamejaya, who succeeded him, performed a 'Sarpa Yagna' to avenge the death of his father. As a consequence of the sin derived from 'Sarpa Yagna' the young King was stricken by Leprosy of a most virulent type. The royal priests advised the King to propitiate Lord Krishna for curing the malady. A sacred idol of the Lord lay immersed in the then submerged Dwaraka. That idol had to be obtained and installed in a suitable place. The King prayed Guru, the preceptor of Devas and Vayu, the lord of the winds for their blessings and assistance to recover the idol from Dwaraka. The prayer of the King was granted. Accordingly, Guru and Vayu were set out in search of a place, where they may install and consecrate the idol. Lord Siva who had his abode at Mammiyur directed the celestial beings to install the sacred idol on the southern side of a

large lake of lotuses. The idol was installed and consecrated at this place and henceforth this place is known as 'Guruvayupuram' which later became Guruvayur.

Zamorin's Conquests in The District in 15th Century:

The 13th Century saw the rise of Calicut (*Nediyiruppu Swarupam*) under the Zamorin as an important seat of political power in Kerala. The 14th and 15th centuries constituted a period of aggressive wars and conquests by the Zamorins of Calicut. In the course of these conquests, the Zamorins of Calicut acquired a large part of the present Thrissur District. The *Rajas of Talappili* who reigned over Chavakkad were some of the earliest chieftains subdued by the Zamorin. It may be noted that the Talapilli Rajas were originally *Namboothiries*. According to tradition they were excommunicated for having committed the crime of manslaughter and were degraded as '*Nambidies'*.

The kingdom of Talapilli Rajas in its flourishing days was extensive one with rich resources extending from Ponnani in the north to Chettuvayi in the south. In the course of time, this family disintegrated into Tavazhies namely Kakkad, Punnathur, Ayinikur and Manakkulam. Chavakkad is said to have been assigned originally to the Kakkad Nambudiri, an ancestor of the Punnathur Nambidi family. The Punnathur branch separated itself from its collateral branches even in the 15th century and joined the side of the Zamorin.

In the wars between the Zamorin and the Cochin Ruler, the latter was defeated several times and consequently some of the branches of the Talapilli family, notably Punnathur, transferred their allegiance from the Ruler of Cochin to the Zamorin of Calicut. The Zamorin generously rewarded the Punnathur Thavazhi for its loyalty by giving its members large areas of territory, which he had conquered from Cochin. In fact, the Chief of the Punnathur branch became a staunch ally of the Zamorin and even enjoyed the unique privilege of being a notable invitee for the Zamorins Ariyittu Vazhcha (Coronation ceremony).

The major portion of the present Chavakkad Taluk and adjoining places like Kunnamkulam, Kakkad and Chittilappili formed part of the domain of Punnathur. Kottappadi near Guruvayur was the seat of the Punnathur family. After the eclipse of the Zamorin, consequent on the establishment of British supremacy, the Punnathur Chief represented before the East India Company, his claim to be an independent Chieftain. But it was rejected. The remains of the Punnathur fort are seen a mile north west of Guruvayur.

It is interesting to note that Tippu Sultan and his aide Haidros Kuttee Moopan evinced great interest in the affairs of the temple. During their siege of Malabar, in the 18thCentury, Haidros Kuttee who was in charge of Chavakkad area seems to have endowed under orders from Tippu Sultan, an annual grant for the Guruvayur temple for the conduct of daily poojas and offerings. Subsequently the British authorities too accepted this obligation, exempting certain temple lands from assessment and authorizing the use of the proceeds from them for the affairs of the temple.

Construction of The Shrine and its administration

Tradition attributes the construction of the shrine to a Pandya King. The temple is square in shape protected by strong walls and mounted by Gopurams on the eastern and western entrances. Writings on the granite door post of the western entrance show that the gate way was erected in 1747 A. D. The Sree Kovil or the Shrine Proper, Mandapam etc., was remolded in 1885 A.D and Koothambalam, Nalambalam etc., were constructed in 1893 A.D. The Deepasthamba in front of the gateway has two inscriptions bearing testimony to the fact that a native of Travancore erected it in 1836 A.D.

The early history about the ownership of the temple still remains obscure. But tradition shows that a few centuries ago there were 72 Illoms (Nambuthiri families) in the vicinity of the temple who exercised the right over the temple as 'Uralars'. As years wore on, those illoms became extinct one by one till only one among them, Mallissery remained. All the properties belonging to those extinct families became Devaswom properties. The Zamorin who was the overlord of the land in those days assumed suzerainty (Melkoima-ship) of the temple from 1855 A.D.

In 1970 the Temple was almost fully destroyed due to fire in Temple. The devotees constituted, a trust and collected funds from various sources and constructed the present temple without losing the heritage values.

Harijan Movement and Guruvayur Satyagraha

Guruvayur also occupies an important place in the history of our national movement as it was the scene of the famous Satyagraha movement started in 1931- 32 under the auspices of the Indian National Congress, with the blessings of Mahatma Gandhi for achieving the temple entry rights to Harijans.

The famous Guruvayur Satyagraha is a memorable episode in the history of this small town as well as of the National movement in India. With Mahatmaji's blessings, the provincial unit of the Indian National Congress decided at its meeting held on August 3, 1931 to begin Satyagraha before the famous Guruvayur temple with effect from November 1, 1931. Appeals made from all parts of the country to the Zamorin, the trustee of the temple, to throw it open to the entire Hindu Community, did not have the desired effect. The Satyagraha started from Cannanore in the north and reached the Guruvayur Temple on 31st October and the historic Satyagraha began on 1st November 1931. There were certain untoward incidents during the early period of the Satygraha. The temple authorities suspended the 'poojas' and closed the temple. The temple, which thus remained closed, was re-opened only on January 20, 1932. Thereafter a referendum was held among the Hindus of the erstwhile Ponnani Taluk of Malabar to find out their views on the question of temple entry. The Guruvayur Referendum was a highly elucidative and successful experiment. More than 77% of the Hindus expressed themselves in favour of temple entry. Though the Guruvayur Satyagraha did not immediately result in the opening of either the Guruvayur Temple or of any other Temple in Kerala to all Hindus, the movement helped to create a strong public opinion in the country in favour of temple entry and the abolition of untouchability. The Guruvayur Temple was thrown open to Harijans only in 1946 A. D., fifteen years after the agitation.

Administration of the Temple

Guruvayur Devaswom Board was formed for the administration of the activities of Guruvayur temple since 1997. An Administrator appointed by the Government of Kerala is responsible for the day-to-day administration of the temple. The managing committee includes the 'Tantri' of the temple and others.

The prime authorities of the Devaswom are: -

1) The Zamorin Rajah of Calicut who is the managing trustee of the Guruvayur Devaswom and

2) Brahmasri Mallisseri Nambudiripad, the co-trustee of the Devaswom.

Guruvayur temple is enormously rich. The income of the temple is derived from two main sources. One is through the offerings of pilgrims and the other from landed property owned by the temple. The Devaswom employ about 1200 people and the average routine expenses of the Temple per annum is Rs. 20 crores. The surplus funds of the Devaswom are

utilized for giving financial assistance to other subsidiary temples and for giving aid to colleges and other educational and cultural institution.

2.6 History of Development of Guruvayur Municipality

Guruvayur Temple was located in the eastern part of the old Chavakkad panchayat with immediate surroundings of the temple falling outside of the panchayat areas. Guruvayur development committee in 1955 itself mooted formation of separate Guruvayur Panchayat with 4 amsoms. Figure 2.6 shows the old Guruvayur town with 4 amsoms.



Figure 2.6 Guruvayur Panchayat with 4 Amsoms

Proposal for township considering the importance of Guruvayur temple was revised in 1959. Delimitation Committee setup by Government in 1960 recommended the formation of Guruvayur township including 10 desoms. The Township was constituted in 1962 with 10 desams such as Guruvayur, Karakkad, Chavakkad, Nenmini, Thaikkad, Perumpilli, Thiruvenkidam, Puthampalli, Mammiyur and Muthuvattur surrounding Guruvayur temple as per the Guruvayur Township Act 1961. Figure 2.7 shows the Guruvayur township with 10 divisions.



Figure 2.7 Guruvayur Township with 10 Divisions

It is seen that the township does not cover entire Guruvayur 'amsom' or Guruvayur village but only portion of the village. Almost all the major Governmental institutions or quasi-Governmental institutions at taluk level are located outside Guruvayur township area. As a result of subsequent Administrative

action, in the year 1994, Guruvayur Municipality was formed as a third grade Municipality with 20 divisions consisting of parts of Chavakkad, Guruvayur, Thaikkad and Iringappuram villages. In 2005 no. of wards increased from 20 to 22 numbers as the minimum number of wards stipulated by amended *Nagarapalika Act* is 22. Guruvayur municipality with 22 divisions is shown in figure 2.8.

Later in 2010, the area of Municipality was expanded by adding Pookode and Thaikkad Panchayats. At present Guruvayur is a first grade Municipality with 43 divisions as shown in figure 2.9.

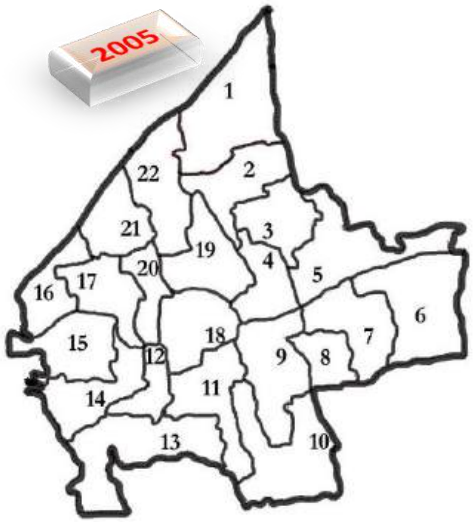


Fig 2.8 Guruvayur Municipality with 22 Divisions



Fig 2.9 Guruvayur Municipality with 43 Divisions

2.7 Socio-cultural history

Guruvayur Temple is an important and popular pilgrimage center in Kerala. Guruvayur Temple is supposed to have been 5,000 years old. In those times, it was known as "Bhooloka Vaikunta" (Abode of God on Earth). The term 'Guruvayur' is said to have been derived from two words, 'Guru' (preceptor of the gods) and 'Vayu' (god of winds). The temple is dedicated to Lord Krishna, who is also known by the name of Guruvayoorappan. Due to its reverence, Guruvayur Temple is also known as 'Dakshina Dwaraka' (Southern Dwarka). The presiding deity



Fig 2.10 Mural painting in the Guruvayur temple wall

is Lord Krishna is the form of Maha Vishnu (Lord Krishna is an incarnation of Lord Vishnu). The image is depicted in a standing posture, which has four hands holding Shankh (conch), Sudarshana Chakra (a serrated disk), Lotus and Mace. The image is worshipped as Balakrishna, an incarnation of Lord Vishnu. It is carved out of a rare stone named Patala Anjana. The walls of the main shrine are festooned with beautiful mural paintings and intricate carvings. The Guruvayur Devaswom's Institute of Mural Painting at East Nada of Guruvayur temple gives coaching in mural painting in the traditional Gurukula Pattern.



Fig 2.11 Guruvayur Satyagraha Memorial

Guruvayur is a place where many social transformations take place. Guruvayur Satyagraha is a great social revival message that gave humanistic ideas to the etire keralites. A.K.Gopalan, Krishnappilla, Kelappaji, Mannath Padmanabhan etc. are some of the great social fighters who lead the satyagraha. Guruvayur Satyagraha became nationally noticed when Mahathma Gandhi also participated in the satyagraha by considering it as a part of freedom struggle.

Here, all religious groups live together in love and harmony. Eventhough Hindu religion is the dominant, Christan and Muslim religion has a great and decisive influence in this region. There are so many churches within the municipality. Headquarters of the Malabar Independent Syrian church is located in Thozhiyur, within the Municipal boundary. Kottappady church, one of the oldest churches of Roman Catholics is located within the Municipal area.



Fig 2.12 Krishnanattam

Guruvayur is the epicentre of many cultural activities, and gave many opportunities to thrive many of the temple art forms such as Kathakali, Sopanasangeetham, Krishnanattam, Chumarchithram, Kshetravadyangal etc. and is promoted by Guruvayur Devaswom Board.

Chempai Music Festival is one of the most impressive art and cultural festival in India. Chembai Sangeetholsavam is an annual Carnatic music festival held in Guruvayur by the Guruvayur Devaswom in memory of Chembai Vaidyanatha Bhagavatar, one of the titans of

Carnatic classical music and an ardent devotee of Lord Guruvayurappan. Many of the students are coming to Guruvayur temple for their first performance in any art form, to get the blessing of Guruvayurappan, which is conducted in the Melpathur Auditorium in the temple compound. Hence Guruvayur temple premises are blessed with many of the cultural art forms throughout the year.



Fig 2.13 Chembai Sangeetholsavam

The people of Gurvuvayur are very interested in socio cultural activities. They are also very active in amateur drama arts. A flowershow is conducted during the temple festival and the Nisagandhi Sargotsava is evident of cultural significance of Guruvayur. Guruvayur has contributed many eminent persons who imprinted their knowledge and life in various aspects. Poet and Philosopher M. Govindan, Painters K.C.K.Panickar, Mammiyur Krishnankutty, Historian K.N. Panickar, Poet Puthoor Unnikrishnan, Musician Janardhanan Nedungadi etc. are some of them.

2.8 Biodiversity

Chakkamkandam lake area, a part of the sprawling Chettuva backwaters, is located at the south-west corner of the municipality. Canoli Canal is also bounding the town in the North-West portion. The presence of Chakkamkandam lake along with its mangroves, Canoli canal, various streams and ponds makes the town a probable habitat for various communities of flora and fauna. However, the severe impact of pollution from different sources is affecting the bio-diversity present here. Chakkamkandam area within the Municipal boundary is flourished with lush collection of mangroves of different types.



Fourty-one algal species coming under twenty genera were recorded from the Guruvayur Sree Krishna temple pond. Of these twenty belonging to Chlorophyceae (48.8%), eight under Euglenophyceae (19.5%), six each under Bacillariophyceae (14.6%)and

Cyanophyceae (14.6%), and one belong to Dinophyceae (2.5%). In the Guruvayur temple pond the Chlorophycean members were more diverse followed of Euglenophycean members. Scenedesmus was the diverse genera with seven species followed by Pediastrum with five species and Schroederia and Phacus represented by three species each. Fifteen pollution tolerant algal species were identified from this pond**.**

2.9 Inference

Guruvayoor is a famous pilgrim destination in Kerala, which is a first grade municipality with an area of 28.72 sq.km and a population of 70012 consists of 43 wards. Town is fairly flat terrain and lies about 3.3m above the Mean Sea Level. The town is well connected by road and rail networks. The presence of Srikrishna temple is the main attraction which contributed much to the development of the town. Guruvayur is prominent in many socio cultural activities and art forms in relation to the temple.

CHAPTER 3
REGIONAL SETTING

3.1 Regional Context

Guruvayur is a prominent pilgrimage town in the North-western part of Thrissur district. It lies about 30 km north west of Thrissur town. It is one of the eight urban local bodies of the district. It is bounded by two urban local bodies on its eastern and western sides ie, Kunnamkulam municipality and Chavakkad municipality. In 2010, the neighboring areas of the then municipal area ie, Thaikkad and Pookode panchayats were added to form the present Guruvayur Municipality having an area of 28.72 sq.km. The location of the urban local bodies in Thrissur district is shown in fig. 3.1.

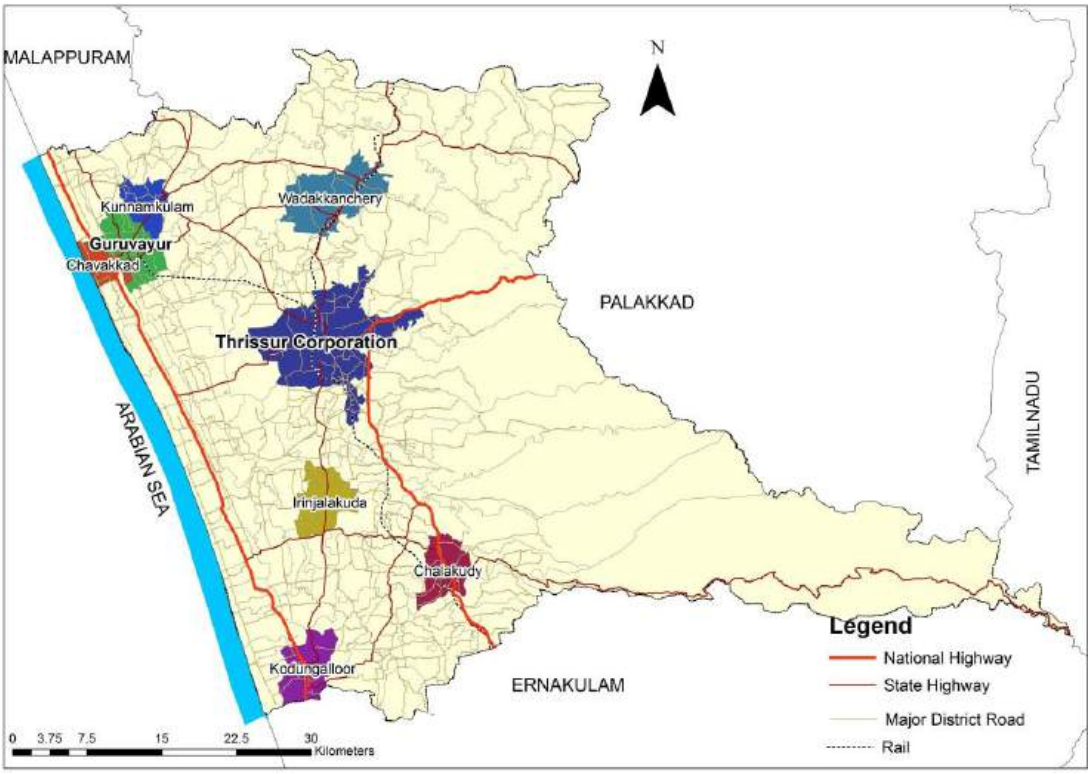


Figure 3.1 Location of urban local bodies in Thrissur District

The road network is the most important mode of transportation in the Town connecting almost all important nodes. Guruvayur is also connected to Thrissur town via rail network. The town has comparatively good connectivity due to the presence of three State Highways (SH 62 (Guruvayoor – Althara – Ponnani road), SH 50 (Chavakkad – Wadakkancherry) and SH 49 (Guruvayoor – Choondal)) and other major roads. Also State highway 50 connects the town to the National Highway 66 passing through the Chavakkad municipality in the western side.

3.2 Regional significance

The regional setting of a Town can be arrived at only from the Regional Plan which spells out hierarchy of the town in the District Scenario, the activity the town has to perform and its connectivity with different settlements. Detailed Regional Setting Studies were carried out in the State and Thrissur district, which has been documented as the State Urbanisation Report (SUR) and the District Spatial Plan (DSP) respectively. In addition, draft Integrated District Development Plan (IDDP) for Thrissur district has been prepared through a joint exercise carried out by the District Planning Committee and the Local Self Government Department Planning. The regional setting of Guruvayur town has been brought out with clarity in SUR, DSP and IDDP and is explained hereunder.

As per the State urbanization report of Kerala published in 2012, Guruvayur Urban agglomeration which includes Kunnamkulam and Chavakkad Municipality, is envisaged as a 4th order hierarchy urban center, where corridor type peri-urban development can be expected. Future urbanization profile of the state shows that, in 2021, Guruvayur cluster will be formed by incorporating Guruvayur, Chavakkad and Kunnamkulam Municipalities. Figure 3.2 shows the future urban profile of the state and district in 2021.

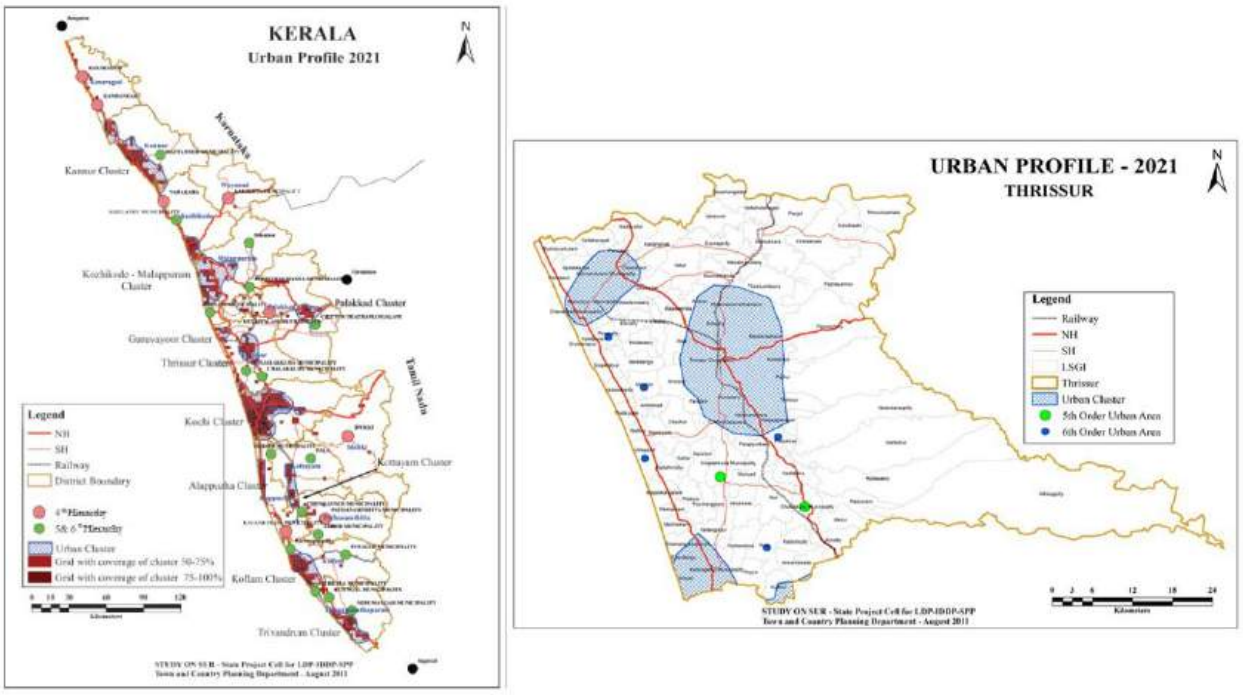


Figure 3.2 Future Urbanization Profile of State and District 2021 *(Source: State Urbanization Report, 2012)*

Guruvayur Urban cluster will further grow along Alappuzha -Ernakulam-Thrissur-Palakkad urban Corridor. Thus, in 2031 Guruvayur will become an urban agglomeration by incorporating the villages such as Pookode, Perakam, Iringapuram,Thaikkad, Paluvai, Pavaratty, Venmanad, and Brahmakulam. Figure 3.3 shows the future urbanization profile of the state and district in 2031.Thus, it is evident that the town is a part of thriving urban development corridor of the state.

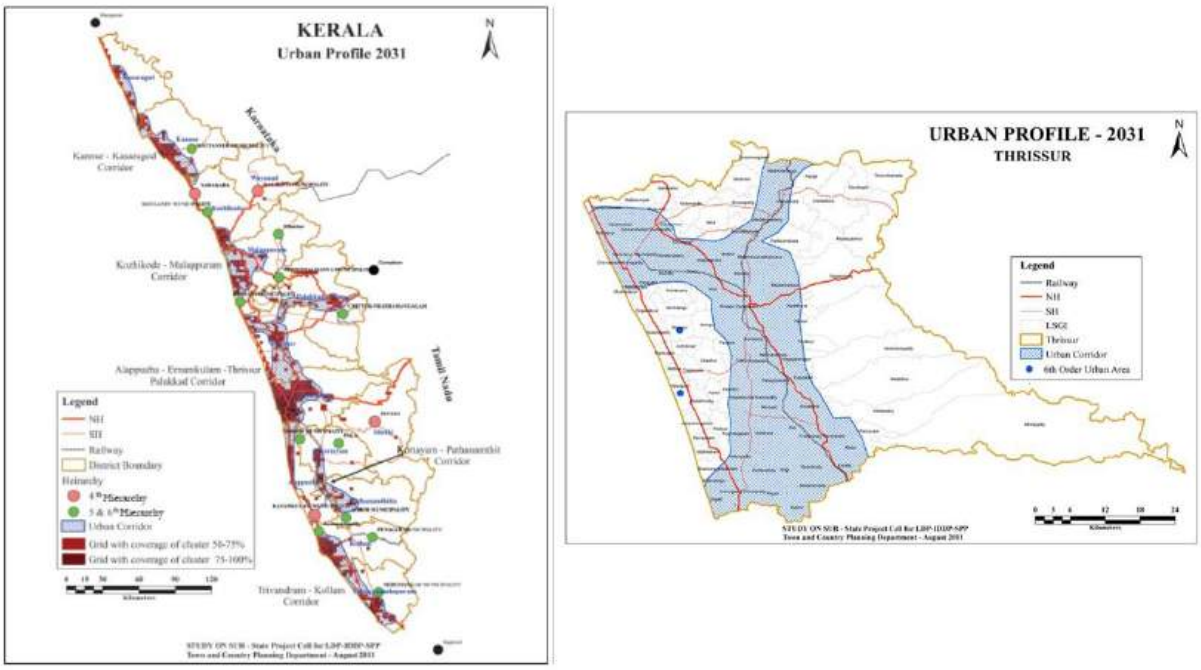


Figure 3.3 Future Urbanization Profile of State and District 2031 (Source: State Urbanization Report,2012)

The Integrated District Development Plan prepared in 2012 details the functional importance and specific role of every local body in the district, after studying various aspects and urban parameters. It includes land use concentration pattern, functional character, hierarchy of settlement and activity pattern of local bodies in the whole district. The report classifies the then Guruvayur municipality as having urban landuse concentration pattern and Thaikkad and Pookkode panchayaths as having agricultural landuse concentration pattern.

The Functional character of the then Guruvayur Municipality and Pookode Panchayat is found to be urban, whereas Thaikkad panchayat is of rural character. Figure 3.4 shows the functional character of various local bodies in Thrissur district.

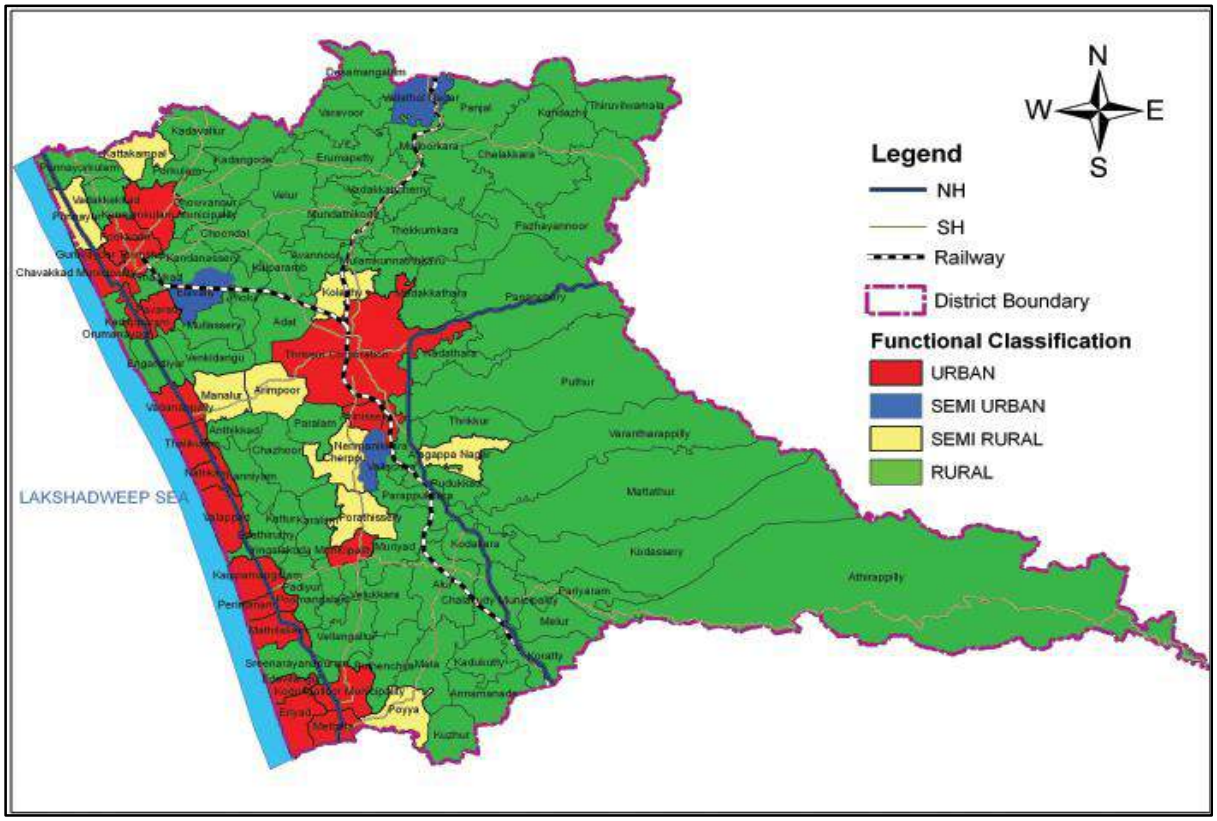


Figure 3.4 Functional classification of Settlements of Thrissur District (Source:IDDP,2012)

Analysis of the hierarchy of settlements in the district shows the extent of concentration of facilities in the town. As per the settlement analysis of District Spatial Plan, Guruvayur Municipality has third order hierarchy and Thaikkad and Pookode Panchayats have 4th order hierarchy. The town is expected to provide higher order facilities. Hierarchy of settlements is shown in figure 3.5.

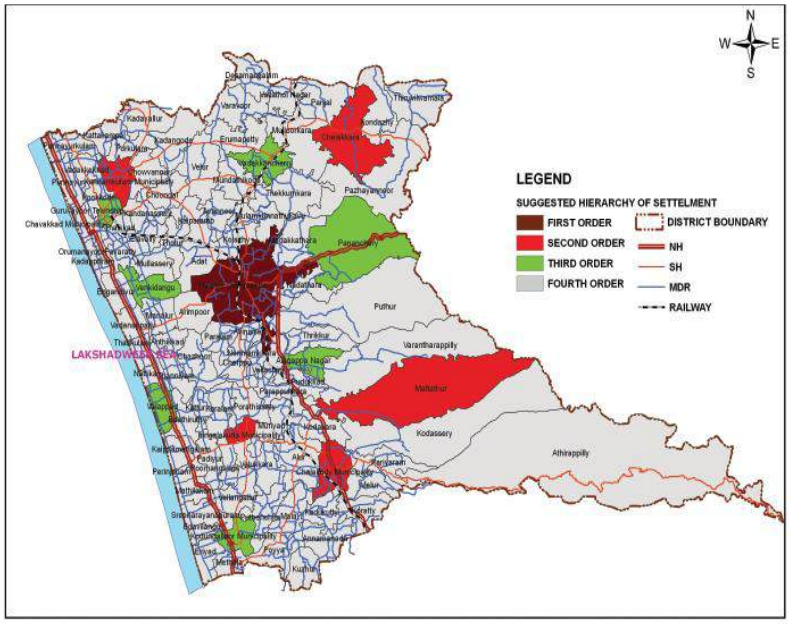


Figure 3.5 Hierarchy of Settlements of Thrissur District (Source: IDDP, 2012)

Figure 3.6 shows the activity pattern of various local bodies in Thrissur district, which is derived by considering the urban profile, landuse concentration pattern and functional character of the local body. It shows that urban activity is predominant in Guruvayur Municipality. Pookode panchayat is predominant in secondary activities and Thaikkad panchayat in primary activities.

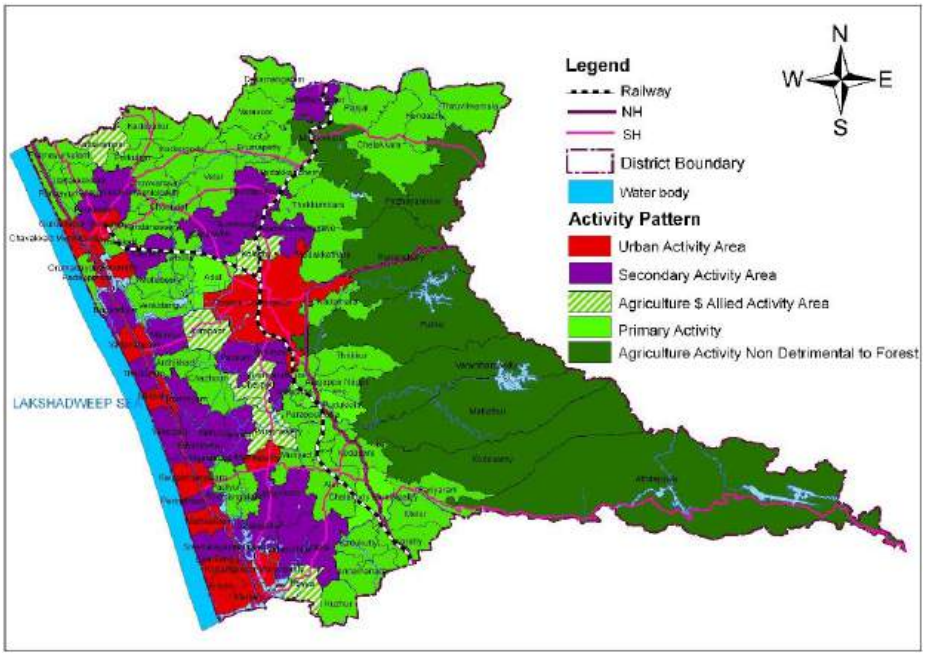


Figure 3.6 Activity Pattern of Settlements of Thrissur District (Source: IDDP, 2012)

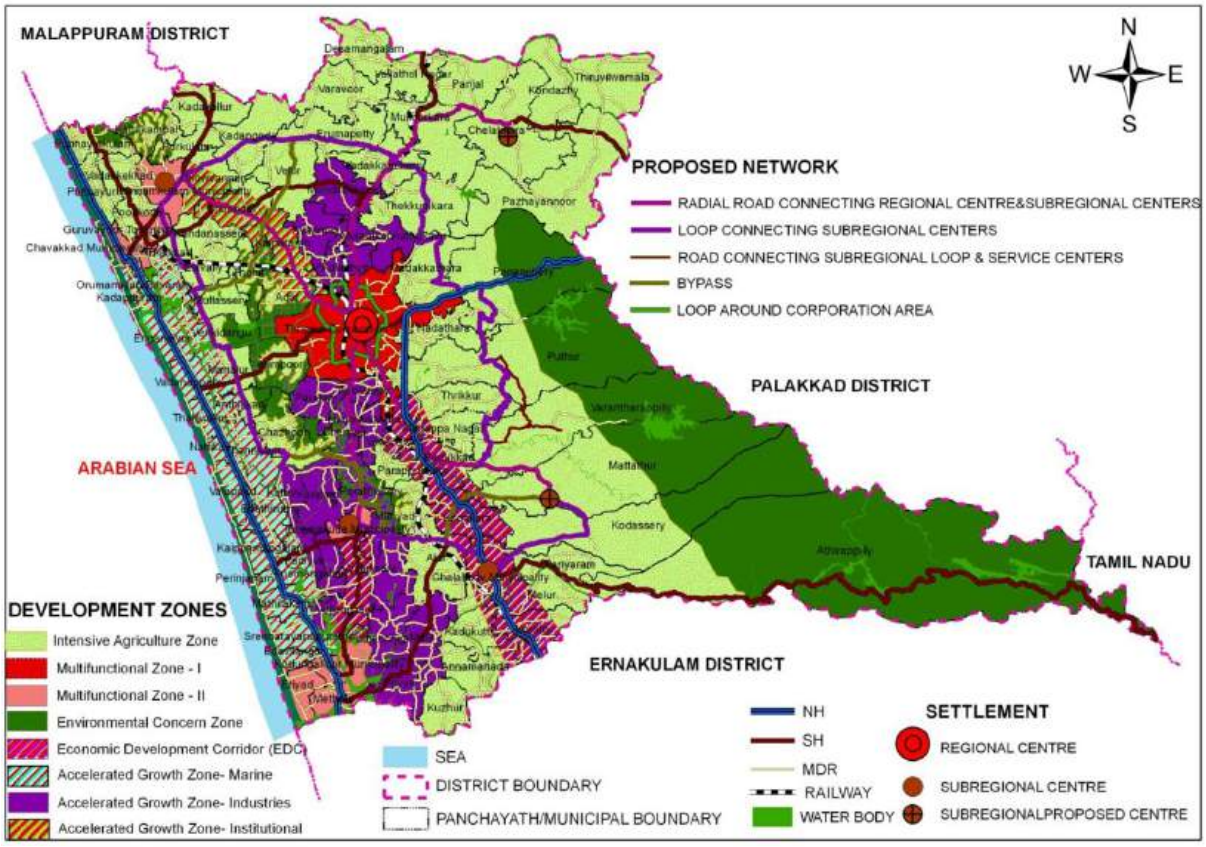


Figure 3.7 Development concept for Thrissur District (Source: IDDP, 2012)

The development concept for Thrissur district is shown in figure 3.7. It envisages that Guruvayur Municipality is to be developed as a Multifunctional Zone II. Thus, Municipality may be provided with all types of second order urban activities, educational and healthcare facilities and transportation facilities, so that it may be act as a service center for the surrounding rural hinterland. Thus, it will act as a center for industries utilizing the agricultural products of the hinterland. Thaikkad panchayat comes under Marine accelerated growth zone, where fisheries and tertiary activities are more concentrated. Hence service sector activities may be promoted which enhances the fisheries and allied activities. Pookode panchayat falls under Intensive agricultural zone, which is suitable for intensive cultivation of crops and may promote agro based industries. Priority shall be given for agriculture infrastructure facilities. Animal husbandry, Small scale industries and household industries may be promoted as supporting activities in this zone, whereas conversion of agriculture land and urbanization may be restricted.

3.3 Influence Region of the town

As a pilgrimage town, Guruvayur town has a wider influence area. The dependency and influence area of Guruvayur Municipality is studied at different levels; i) Regional level upto a radius of 45 Km (ii) Sub regional level up to a radius of 30 Km and (iii)Immediate influence region at local level up to a radius of 15 Km, as shown in figure 3.8.

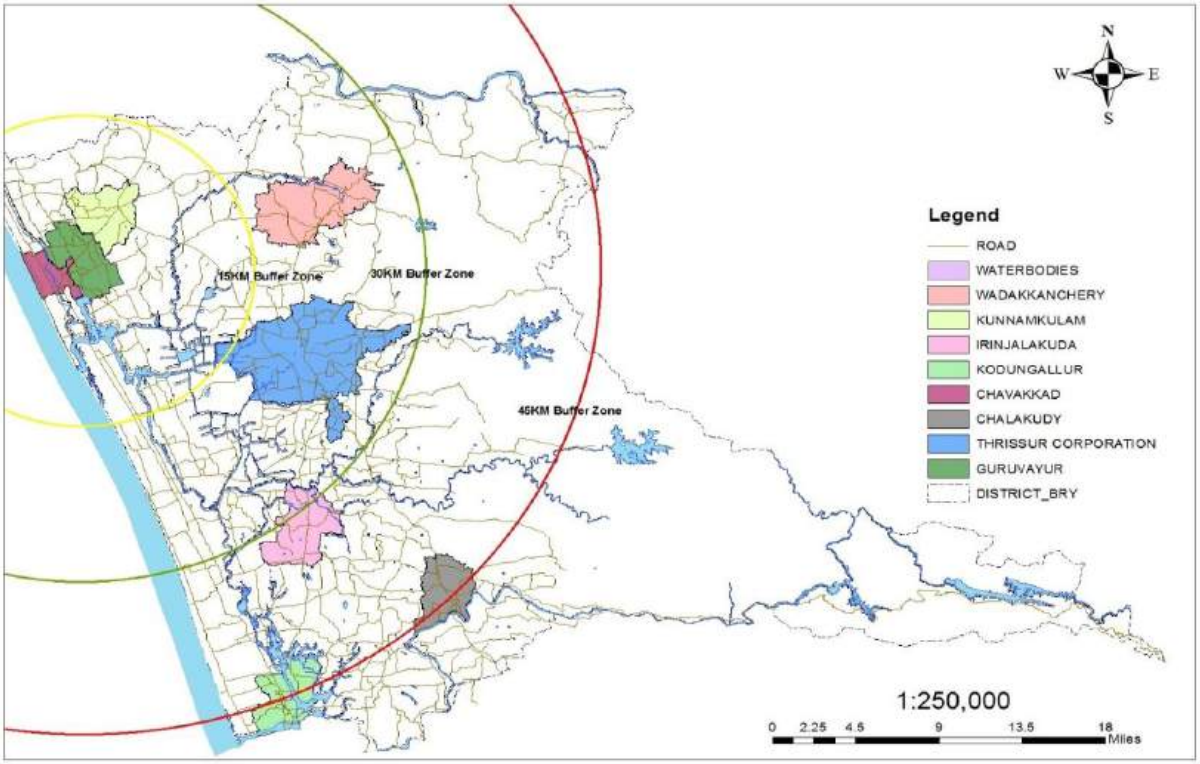


Figure 3.8 Influence Region of Guruvayur Municipality

Regional Level: Guruvayur town is well connected to far and near places through Road and Rail networks. KSRTC bus stand and Private bus stand are located within the town itself, which provide better connectivity to various places within the district as well as the state. Railway station is also situated within the town, which also attract the people from and outside the state. The town depends on Cochin and Kozhikode airport for better air connectivity. Pilgrim activities and tourism potential of the region attracts thousands of people to the town.

Sub regional Level: Thrissur corporation, Irinjalakkuda Municipality and Wadakkanchery municipality lies within 30 Km buffer zone. Thrissur town, which is the headquarters of the district, act as the parent city for Guruvayur Municipality, since most of the educational institutions and health institutions and other facilities are available.

Local Level: The immediate influence area of the town includes the Chavakkad and Kunnamkulam Municipalities and other surrounding local bodies such as Kandanisserry, Pavaratty, Punnayoor, Elevally, Vadakkekkad Panchayats. The presence of Chavakkad and Kunnamkulam Municipalities accelerated the growth of Guruvayur Municipality as well. As envisioned in the State Urbanization report, these municipalities and surrounding Panchayats became a cluster. Guruvayur lies in the center of the cluster and influences the functioning and development of the region. The major traffic corridors viz -Guruvayur – Thrissur road, Guruvayur – Kozhikkod Road, Guruvayur – Ernakulam Road passes through the Municipal towns and adjacent Panchayats. This area can be considered as a local region influenced by various pilgrimage activities of Guruvayur Temple.

Places of heritage value such as *'Anakkotta'* in Punnathore – Pookode Panchayat, 'Palayur Church', 'Manathala Mosque' in Chavakkad Municipality and temples such as 'Chowallur Siva Temple', 'Narayanankulangara Bhagavathi Temple' related to Guruvayur is situated in neighbouring Panchayaths and Municipal Towns in this region. These adjacent areas also influence pilgrims to spend their time for recreation and relaxation. Therefore, the effect of inflow of pilgrims in Guruvayur town is affecting these adjacent areas favourably and adversely in many ways. Pilgrims use this influence zone for their accommodation, shopping etc. Hence the development of these areas are inevitable for the smooth traffic flow and functioning of the pilgrim town. The crowd at temple town during pilgrim season is having its influence in these neighbouring towns and panchayats. With the introduction of innovative development tools, the congestion at the temple town can be reduced to certain limit. Table 3.1 shows the demographic details of the Guruvayur Municipality and its immediate influence zone.

The total population of the influence region is 310087 as per 2011 census. Among the other constituent local bodies of the region, Kunnamkulam municipality have the highest population of 54071 and population density 1757. Whereas, the average population density of the region is 1119 persons/sq.km. The average decadal (2001-2011) population growth rate of the region is 5%, which is near similar to that of the district.

Table 3.1. Demographic details of Guruvayur Municipality and its immediate influence zone

Name of LSGI	Area (Sq.m)	Population	Population Density (persons/sq.km)	Population Growth Rate (%)
Guruvayur Municipality	30.78	70012	2275	4.5
Kunnamkulam Municipality	34.18	54071	1757	4.8
Chavakkad Municipality	12.41	39098	1270	2.5
Kandanassery Panchayat	15.28	24452	794	4.3
Elavally Panchayat	16.47	27209	884	10.2
Pavaratty Panchayat	9.5	20676	672	0.8
Orumanayoor Panchayat	5.18	11688	380	-0.8
Punnayur Panchayat	16.6	36772	1195	11.1
Vadakkekad Panchayat	13.72	26109	848	5.2
Total/Average	**154**	**310087**	**1119**	

Source: Census 2011

3.4 Inference

Guruvayur town has an important role as a region, since it is a famous pilgrim center in the district. Town has a wider influence area, which extend outside the state of Kerala. State urbanization report of Kerala, 2011 envisages that this town will be develop as part of an urban corridor in 2031, which is mooted by the presence of Road and Rail transportation networks. Guruvayur Municipality have a 4th order hierarchy urban center, where corridor type peri-urban development can be expected. As per the perspective of Integrated District Development plan, 2012 Guruvayur Municipality is to be developed as a Multifunctional Zone II, Thaikkad panchayat as Marine accelerated growth zone and Pookode panchayat as Intensive agricultural zone. Since the immediate influence area of the municipality is formed a cluster, various supporting industries can be provided in this region.

CHAPTER 4
DEMOGRAPHY

The population parameters serve as the basis of all planning process. The estimation of future population is needed for the assessment of various needs and distribution of activities in available land. This chapter explains about the population and demographical characteristics of Guruvayur Municipality in comparison with Kerala state, neighbouring districts, and other local self-Government institutions etc. The study is based on the census reports.

4.1 Population

The total population of Thrissur District as per Census 2011 is 31,21,200 which accounts to 9.34% of the state population. Thrissur district ranks 4th position in terms of population among other districts of Kerala state. Decadal variation of total population of Thrissur District is shown in Figure 4.1.

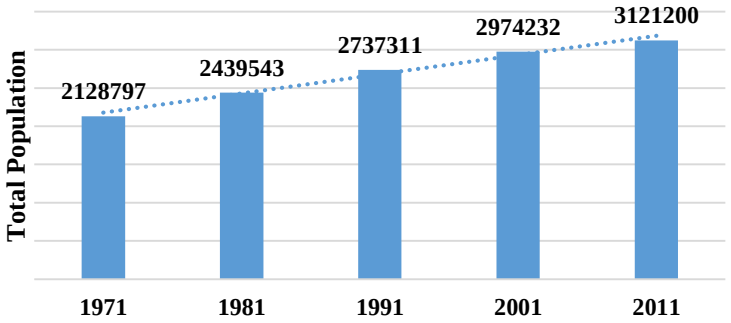


Fig 4.1 Decadal variation of population in Thrissur District (source: census data)

According to 2011 census the total population of Guruvayur is 70012. The male population is 32450 and female population is 37562. Guruvayur consists of 2.24% of population of Thrissur district. Figure 4.2 shows the decadal variation of total population from 1971 to 2011.Table 4.1 shows the ward wise population of the town.

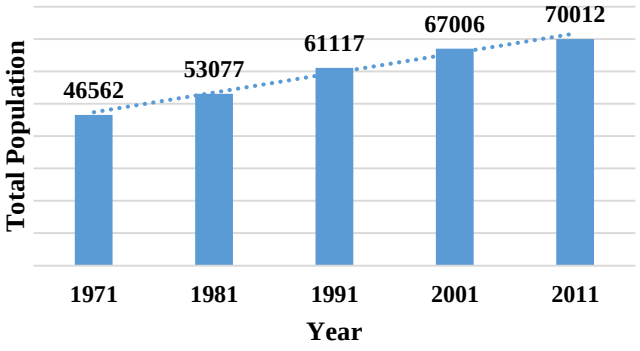


Fig 4.2 Decadal variation of population in Guruvayur Municipality (source: census data)

Figure 4.3 shows the comparison of population of Guruvayur Muncipality with nearby local bodies. It is seen that Guruvayur Municipality has the highest population compared to the surrounding local bodies, followed by Kunnamkulam and Chavakkad Municipalities. Guruvayur Municipality has 3rd highest population among the other urban Local Bodies (ULBs) in Thrissur district, as shown in figure 4.4. Thrissur corporation is having highest population and Chavakad Municipality is having the lowest.

Table 4.1.: Ward wise population of Guruvayur Municipality

Ward No	Ward_Name	Population	Ward No	Ward_Name	Population
1	Thozhiyur	1466	**23**	Nenmini	1259
2	Pillakad	2057	**24**	Thaikkad	1837
3	Pookode East	1819	**25**	Substation	2303
4	Iringapram East	2197	**26**	Iringapram South	1755
5	Manigramam	1723	**27**	Thiruvenkidam	1228
6	Chowwallurpadi	1963	**28**	Manjulal	1105
7	Brahmakulam	1783	**29**	Kandamkulam	1506
8	Palabazar	1778	**30**	Iringapram North	1750
9	Vilakkupadam	1221	**31**	Choolpuram West	1825
10	Paluvai	1926	**32**	Kottapadi	1096
11	Chakkamkandam	1204	**33**	Pookode West	1934
12	Palayur	1141	**34**	Kappiyur	1920
13	Edapully	1433	**35**	Kotta North	1488
14	High School	1136	**36**	Choolpuram East	1443
15	Mammiyur	1248	**37**	Kotta South	1646
16	College	1535	**38**	Thamarayur	2389
17	Chammundeswary	1052	**39**	Perakam	2098
18	Gurupavanapuri	726	**40**	Vazhapully	2182
19	Karakkad	1189	**41**	Kaveed South	1679
20	Pancharamukku	1473	**42**	Karayur	2056
21	Puthussery Padam	1510	**43**	Kaveed North	2067
22	Manikathpadi	1864		**TOTAL**	**70012**

(Source: Census Data)

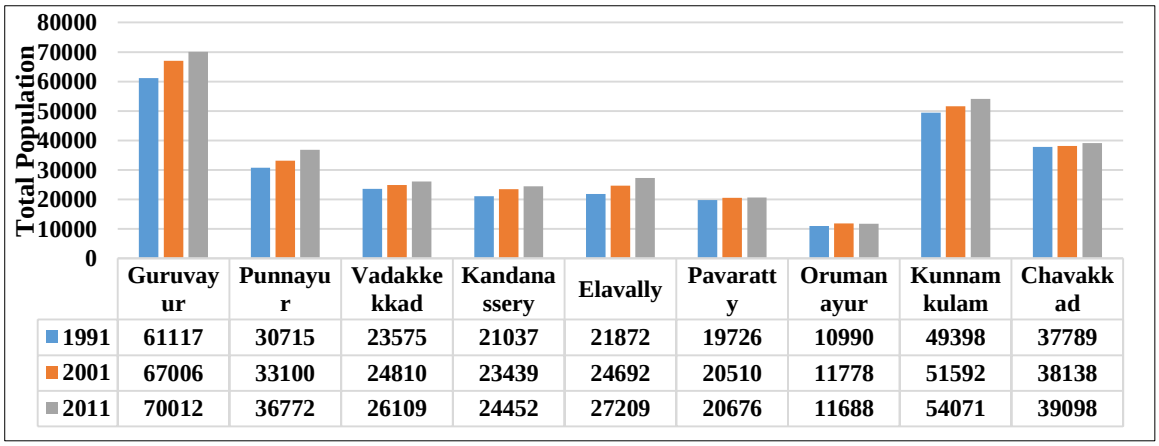


Fig 4.3. Comparison of population of Guruvayur Muncipality with nearby local bodies

(Source: Census Data)

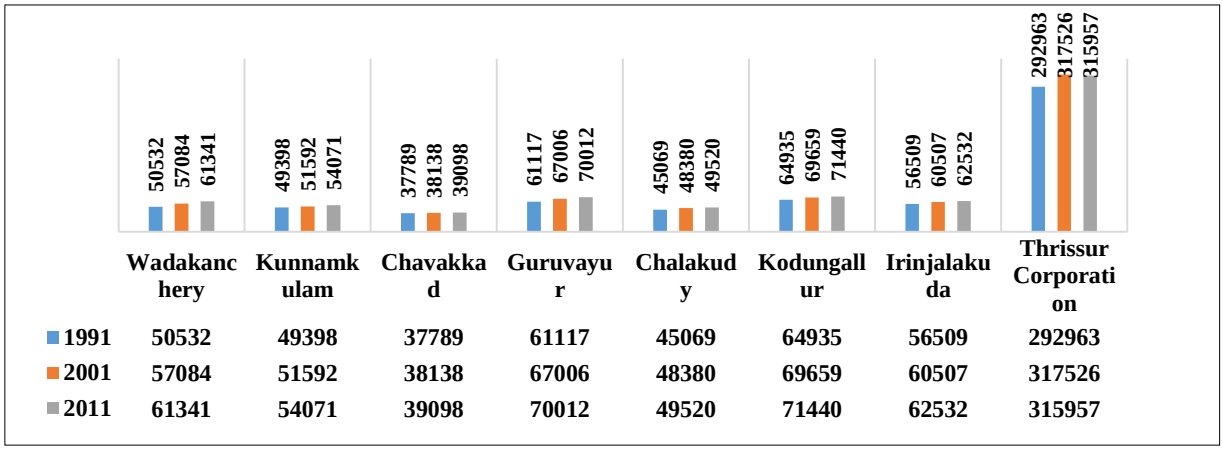


Fig 4.4 Comparison of population with other ULBs in Thrissur district (Source: Census data)

4.2 Population growth rate

The decadal growth rate from 1971-2011 has been plotted to study the population growth rate of the present municipality as shown in figure 4.5. It shows an increasing trend during 1971-1981, after that it started decreasing, even though the growth rate is still positive.

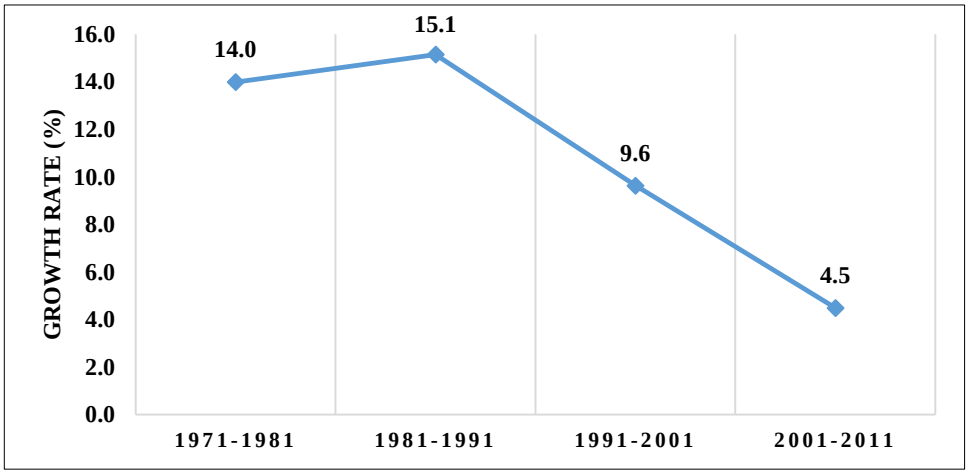


Fig 4.5 Decadal Variation of Population Growth Rate of Guruvayur Municipality (Source: Census data)

However, if the old municipal boundary of 7.48 sq.km. is considered, it shows negative growth rate in the last decade 2001-2011 as shown in figure 4.6. Hence, it can be inferred that there has been an outflow of population outside the old boundary area towards the old Thaikkad and Pookode Panchayats, that may be due commercialization of the region and increase in land value. Figure 4.7 shows the comparison of growth rate of population between Guruvayur Municipality and the surrounding local bodies. It is seen that Punnayur Panchayat, Kunnamkulam and Chavakkad Municipalities shows an increase in growth rate, whereas other local bodies have decreased growth rate including Guruvayur Municipality. Orumanayur Panchayath shows negative growth rate.

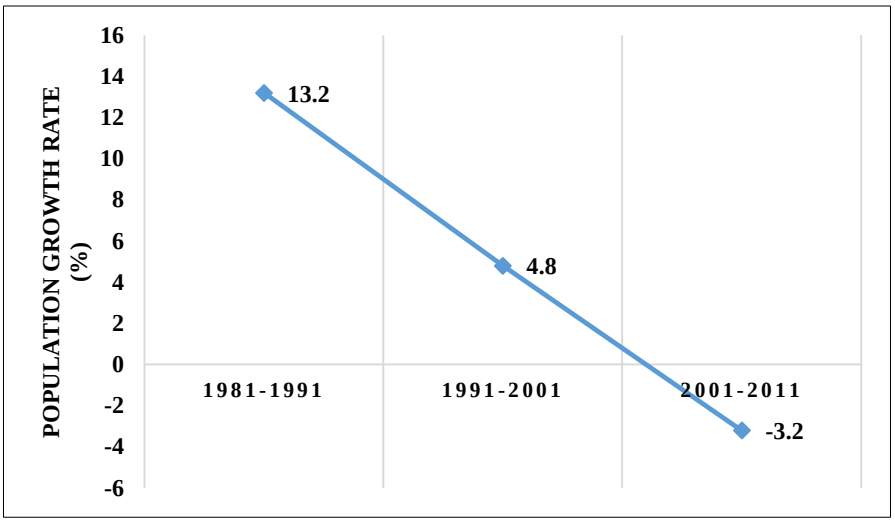


Fig 4.6. Decadal Variation of Population Growth Rate of Guruvayur Municipality within the old boundary (Source: Census data)

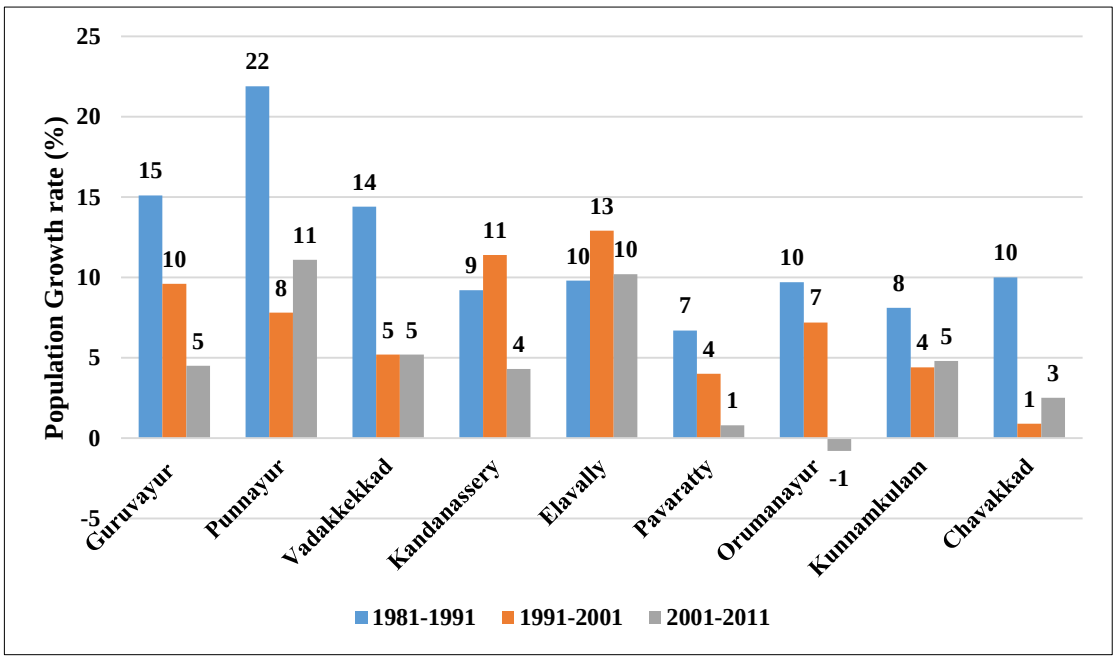


Fig 4.7. Comparison of Population Growth Rate with nearby LSGIs (Source: Census

Figure 4.8 shows the comparison of growth rate of population between Guruvayur Municipality and other Urban Local Bodies in Thrissur district. Except Thrissur, all other ULBs show a positive growth rate in the last decade. Guruvayur Municipality shows a decreasing trend in growth rate. Reason for the decrease in population growth rate may be due to out migration which may be caused by the high land values existing in the town area.

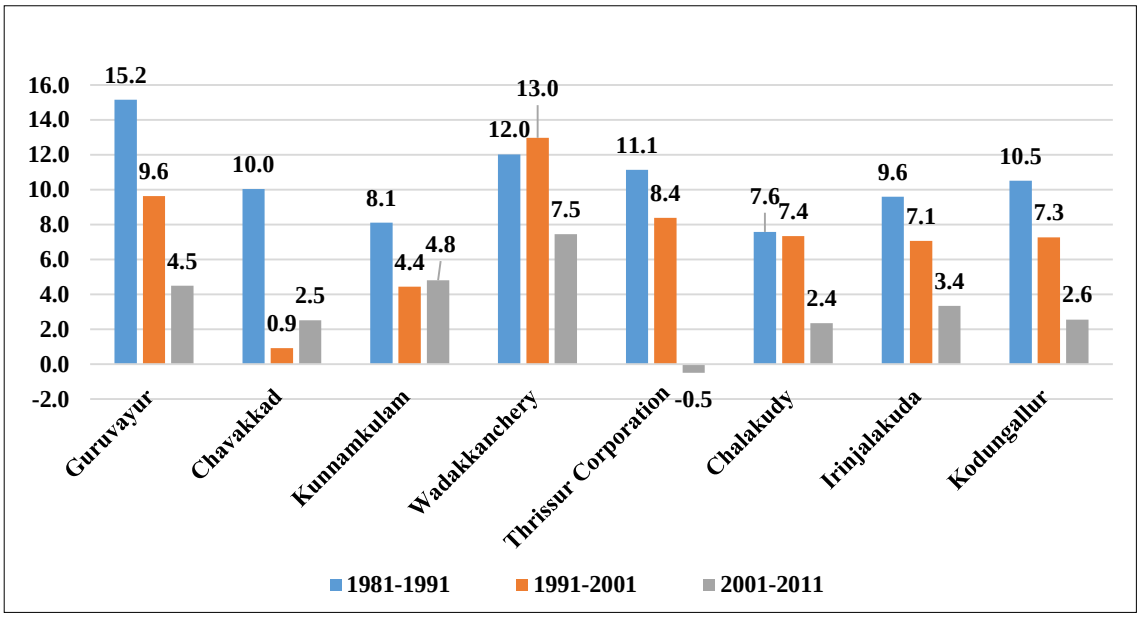


Fig 4.8. Comparison of population Growth Rate with other ULBs (Source: Census data)

4.3 Population density

Density of population is defined as the number of persons per square kilometer. It is an important index of population which shows concentration of population in a particular area. As per the census 2011, the population density of Kerala is 860 and Thrissur district is 1029. The population density of Guruvayur municipality is 2360 which is higher when compared with that of state and district is shown in figure 4.9. Figure 4.10 shows the decadal variation of population density of Guruvayur Municipality.

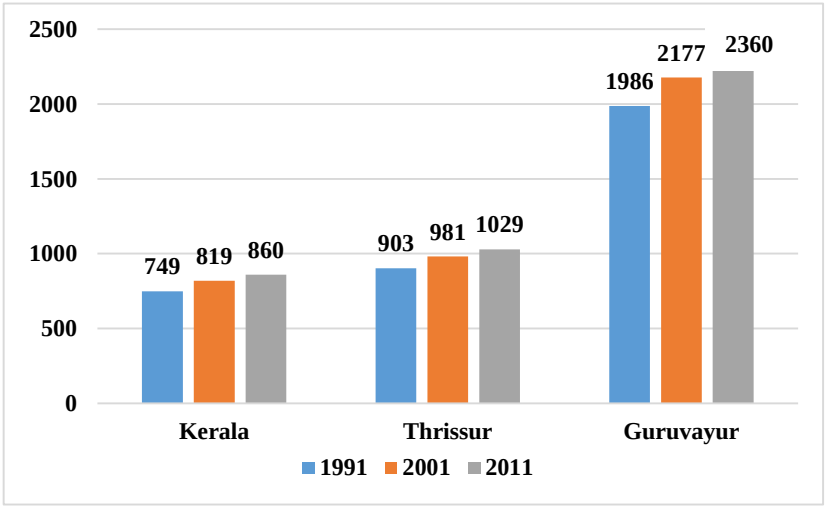


Fig 4.9. Comparison of population density of Guruvayur municipality with state and district

(Source: Census data)

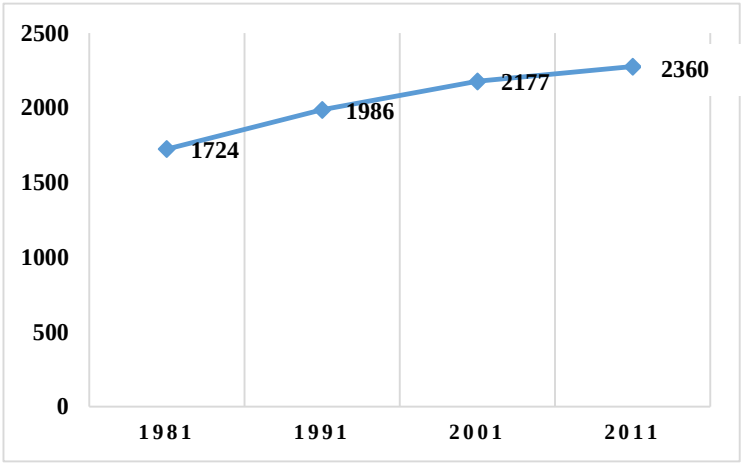


Fig 4.10. Decadal variation of population density of Guruvayur Municipality (Source: Census data)

Figure 4.11 shows the comparison of population density of Guruvayur Municipality with the surrounding LSGIs. Chavakkad Municipality is having higher population density among the nearby LSGIs and Guruvayur having the second highest.

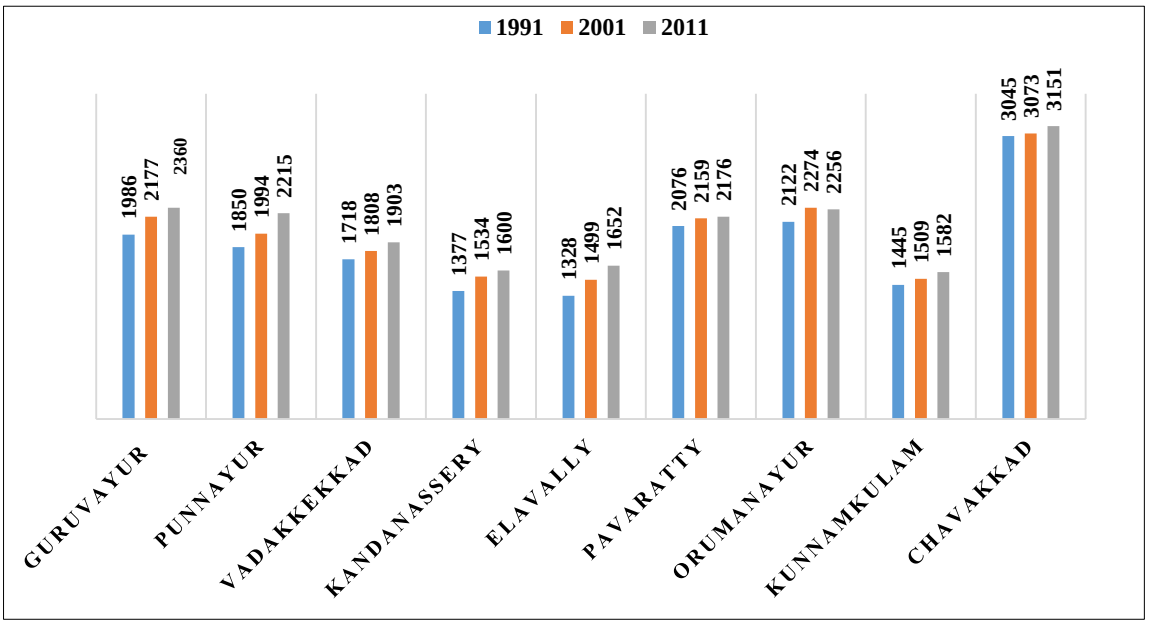


Fig 4.11. Comparison of Population Density with nearby LSGIs (Source: Census data)

Comparison of population density with other ULBs shows that Guruvayur Municipality stands at 4th position after Thrissur, Chavakkad and Kodungallur as shown in figure 4.12.

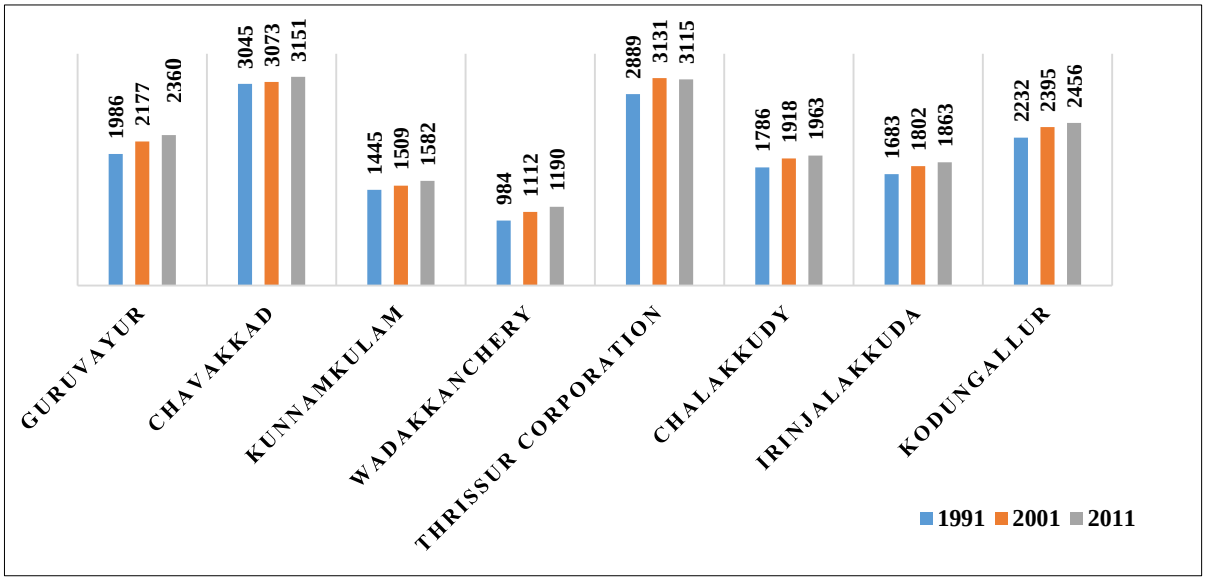


Fig 4.12. Comparison of Population Density with other ULBs (Source: Census data)

The ward wise distribution of gross and net population density is shown in figure 4.13 and 4.14 respectively.

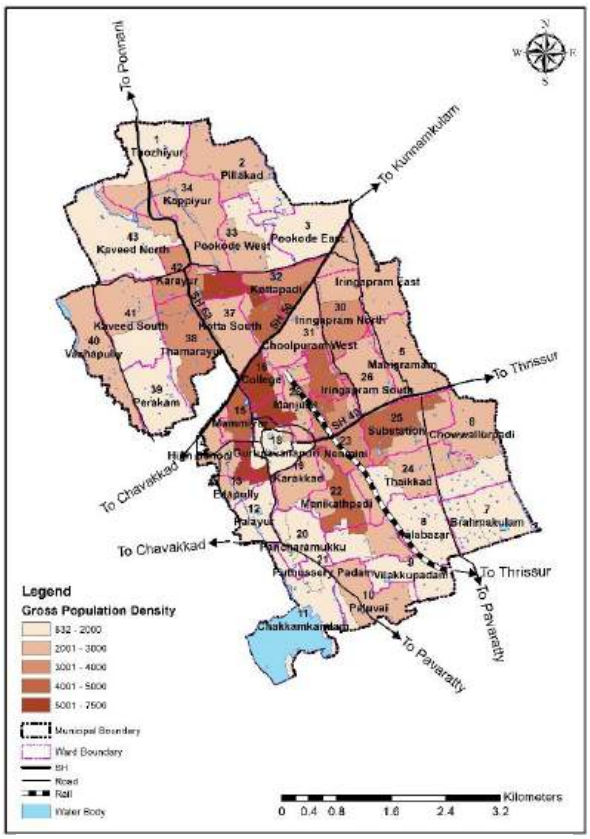


Fig 4.13. Distribution of gross population density (Source: Census data)

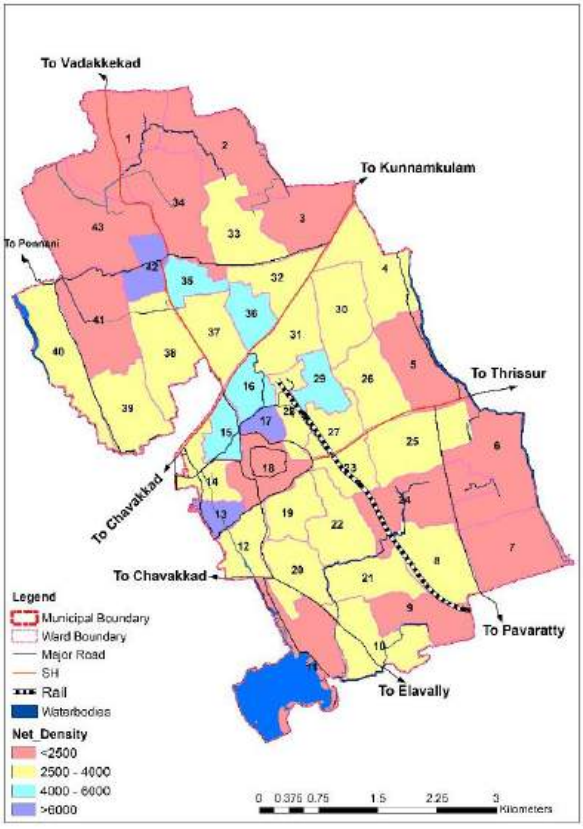


Fig 4.14. Distribution of net population density (Source: Census data)

4.4 Population Concentration Pattern

Population concentration maps help in identifying the areas where population is more concentrated and divert the population growth to some other region. Population concentration of the municipality is shown in figure 4.15. Wards around State Highways experiencing higher population concentration and this shows a chance of ribbon development in the thickly populated area around the CBD area in Guruvayur Municipality.

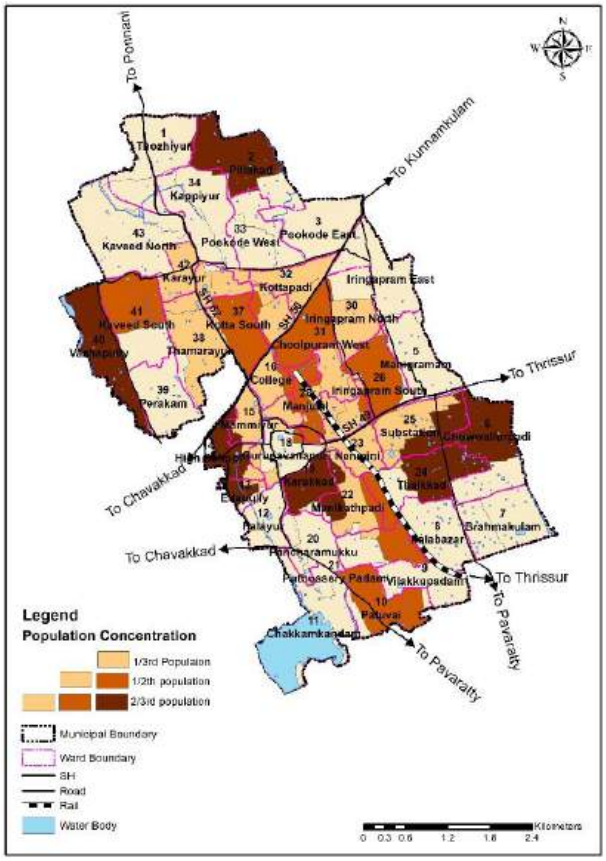


Fig 4.15. Map showing population concentration

4.5 Sex ratio

Sex ratio is a social indicator for measuring the extent of equity prevailing between males and females at a given point of time. It is counted for number of females per 1000 males. Kerala is the only female surplus state compared with rest of India. In the past decade, all districts of Kerala have shown improvement in the sex ratio. Sex-ratio of Kerala state as per 2011 census is 1084 females and it is 1108 for Thrissur district as shown in figure 4.16. Decadal variation of sex ratio of Guruvayur Municipality is shown in figure 4.17. The sex ratio was initially showing a decreasing trend during decade 1981-1991. But later on it started showing an increasing curve. But the values don't show much variation which says that the ratio has been almost nearly constant in the past decades.

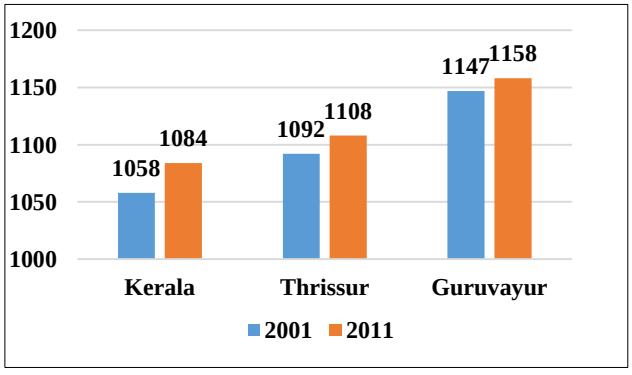


Fig 4.16. Comparison of sex ratio (Source: Census data)

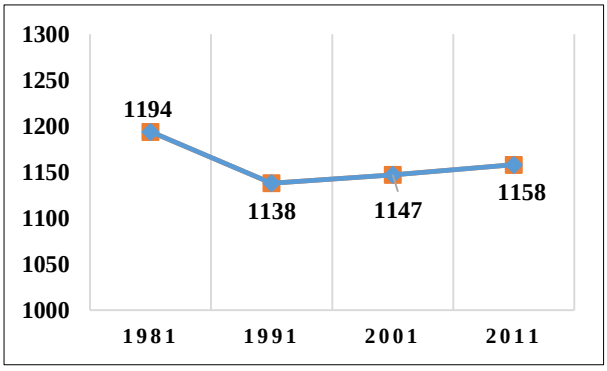


Fig 4.17. Decadal variation of sex ratio (Source: Census data)

4.6 Child Population and Sex ratio

The child population in Kerala is showing a declining trend as shown in figure 4.18. The final population totals of Census 2011 issued by the Directorate of Census Operations reveal a negative growth rate of the child population in the State (- 8.44%). The census figures show that the child (0-6 years) population is declining in all districts except Malappuram. The total number of children in Kerala is 34,72,955 (3793146 in 2001 census) with the highest number (5,74,041) in Malappuram and the lowest (92,324) in Wayanad.

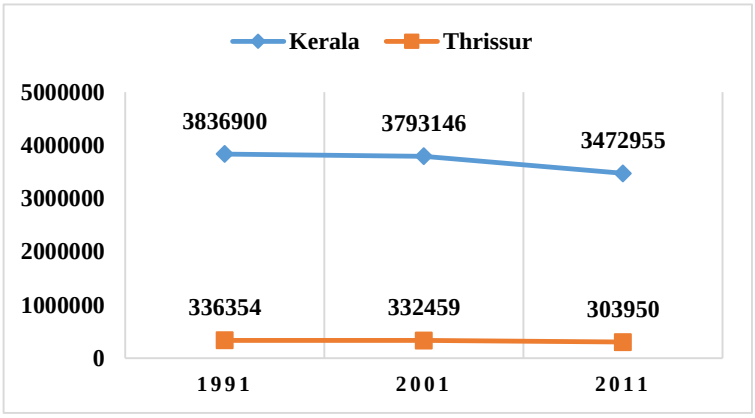


Fig 4.18. Decadal variation of Child population in state & District (Source: Census data)

Figure 4.19 shows the decadal variation of total, male, and female child population of Guruvayur Municipality. It can be observed that the share of 0-6 age group in the male category shows a slight increase, where as the total population is decreasing.

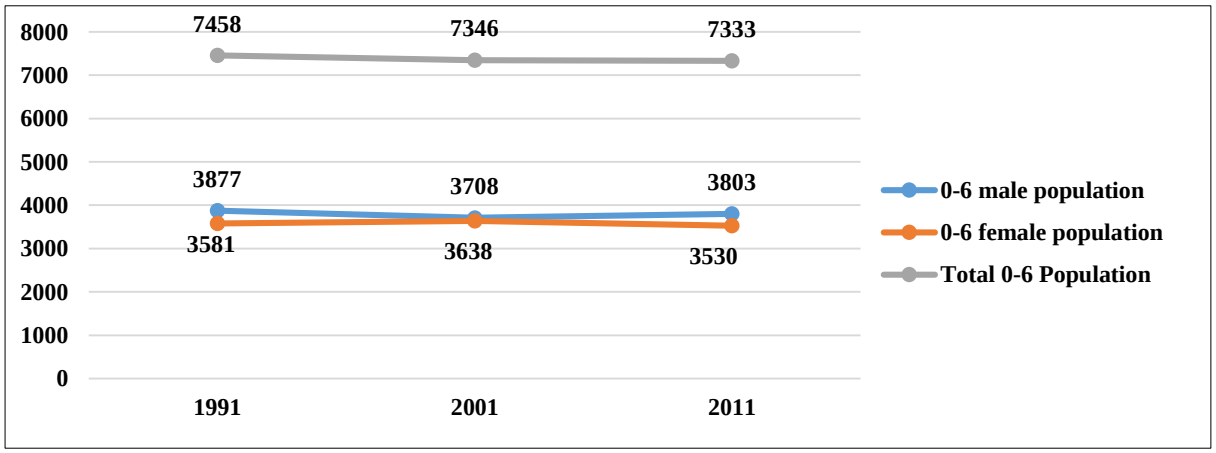


Fig 4.19. Decadal variation of total, male and female child population of Guruvayur Municipality (Source: Census data)

The data on child sex ratio is very prominent from the point of view that it is an indicator of the likely future trends of sex-ratio of the population and an indicative of the birth rate. Child sex ratio of Guruvayur Municipality shows a decreasing trend in the last decade as per figure 4.20. But it doesn't show much difference as child deaths and foeticides is not prevalent in the state compared to other parts of India.

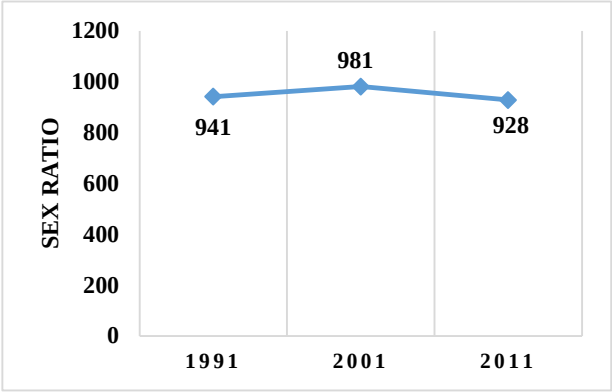


Fig 4.20. Decadal variation of child sex ratio

(Source: Census data)

4.7. Age Sex Pyramid

A population pyramid, also called an age pyramid or age picture is a graphical illustration that shows the distribution of various age groups in a population, which forms the shape of a pyramid when the population is growing. From the socio-economic survey conducted within the Muncipality in 2019, age-sex structure of the people in the Guruvayur Municipality is obtained as shown in figure 4.21. Highest number of females are in the age group of 25-30, then 45-50. In case of males, highest population belongs to the age group of 45-50 followed by 55-60. However, there is no high variation in number of males and females within the Municipality.

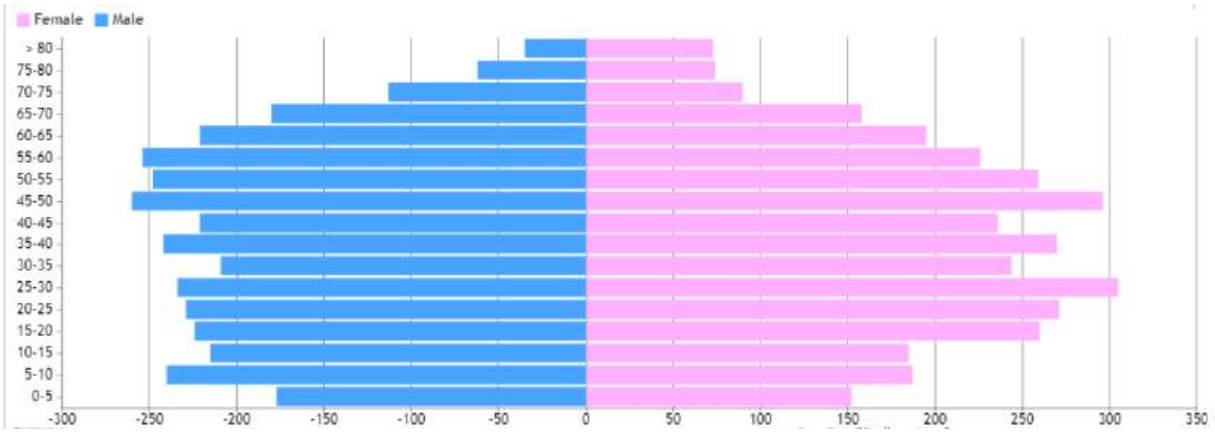


Fig 4.21. Age Sex Pyramid (Source: Socio-Economic Survey)

4.8 Literacy

Kerala is the most literate and life expectancy state in India with 94% literacy rate as per census 2011. Literacy rates of State, district and Guruvayur Municipality is shown in figure 4.22. The high literacy rate of Kerala is a result of the continuous efforts taken by pioneers/ social reforms/kings/rulers/ elected governments working towards as educational revolution.

Modern policies adopted by the government also played a key role in the aggravation of the already accelerating literacy rate.

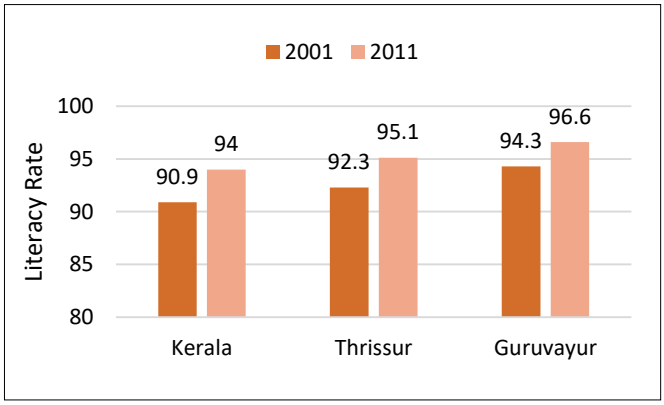


Fig 4.22. Comparison of literacy rate with State, district and Guruvayur municipality (Source: Census data)

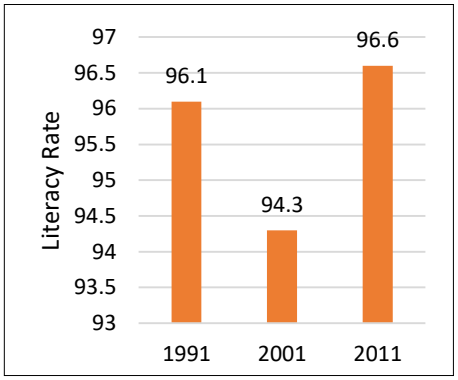


Fig 4.23. Decadal variation of literacy rate (Source: Census data)

Decadal variation of literacy rate in Guruvayur shows a growth in the past decade 2001-2011 after a slight fall which proves that the condition of education has improved. (Figure 4.23.). Comparison of literacy rate of Guruvayur Municipality with other urban local bodies in the district is shown in the figure 4.24. All the ULBs shows an increasing trend in literacy rates.

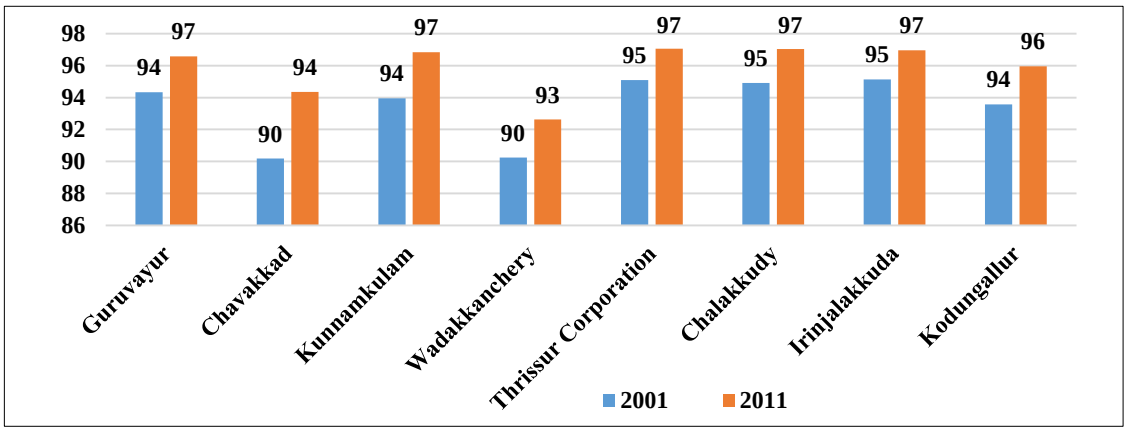


Fig 4.24. Comparison of literacy rate with other urban LSGIs (Source: Census data)

Figure 4.25 shows the decadal variation of male and female literacy rates of Guruvayur Municipality. Female literacy is less than that of male literacy but female literacy has however increased compared to last decade.

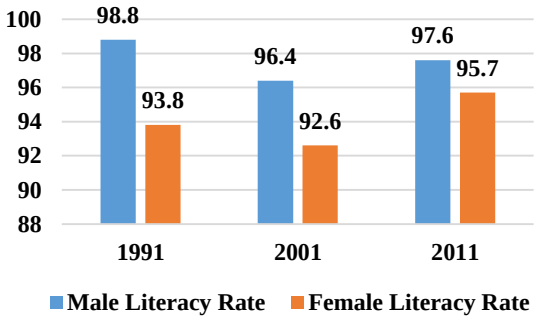


Fig 4.25. Male & Female literacy rates of Guruvayur municipality (Source: Census data)

4.9 Household size

Another important component of demography is size of household. Understanding the household size helps us to understand the ongoing trend of families being joint or nuclear. In Kerala, as against a total population of 3, 34, 06,061 persons in 2011 Census, number of households is 78, 53,754 and average household size is 4.25. Thrissur district has 759210 households with 4.11 household sizes. The district has a population of 3121200. Comparison of household size of Guruvayur Municipality with state and district is shown in figure 4.26.

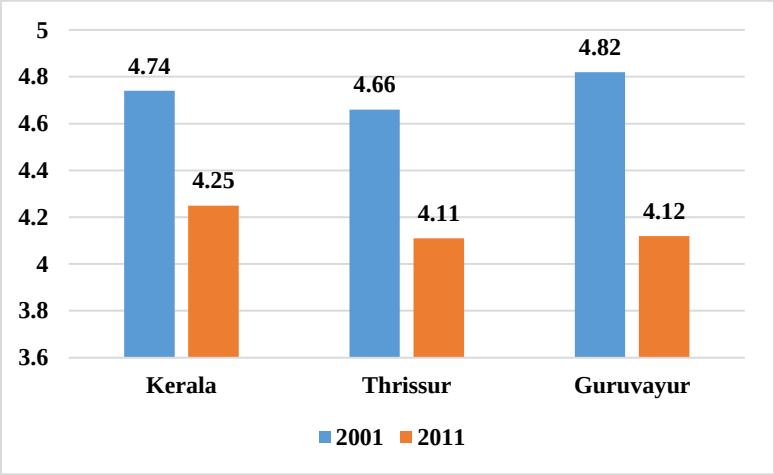


Fig 4.26. Comparison of household size (Source: Census data)

As per Census 2011, total number of households in Guruvayur Municipality is 17011. Figure 4.27 shows the decadal variation of household size in Guruvayur Municipality. Household size decreased from 6.08 to 4.12 which shows that the idea of nuclear families is prevalent in the municipality. The average household size of ULBs in the district and the nearby LSGIs is shown in table 4.2 and 4.3 respectively.

Table 4.2.: Household size of urban local bodies in Thrissur District

Area	Household size	
	2001	2011
Thrissur Corporation	4.59	4.03
Guruvayur	4.82	4.12
Wadakkanchery	4.66	4.17
Kunnamkulam	4.63	4.11
Kodungallur	4.52	3.98
Chalakkudy	4.45	3.94
Irinjalakkuda	4.51	3.92
Chavakkad	5.62	4.73

(Source: Census data)

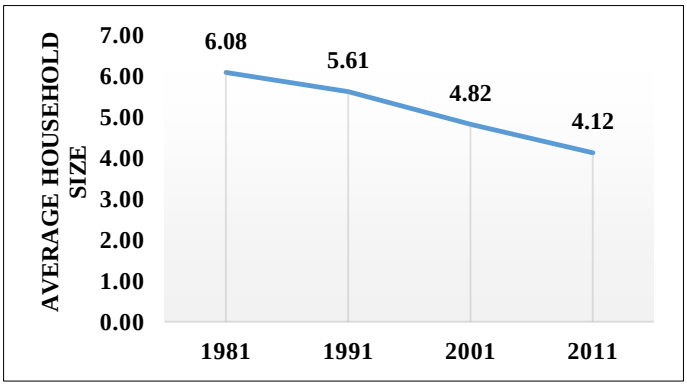


Fig 4.27. Decadal household size variation of Guruvayur Municipality (Source: Census data)

Table 4.3.Household size of nearby LSGIs

Area	Household size	
	2001	2011
Guruvayur	4.82	4.12
Kunnamkulam	4.63	4.11
Chavakkad	5.62	4.73
Punnayur	5.81	5.06
Vadakkekkad	5.26	4.53
Kandanasserry	4.75	4.12
Elavally	4.69	4.18
Pavaratty	5.25	4.50
Orumanayur	5.31	4.58

(Source: Census data)

4.10. Inference

The total population of Guruvayur Muncipality shows an increasing trend and it constitutes about 2.24% of population of Thrissur district. Guruvayur Municipality have the highest population among the nearby LSGIs and third highest population among the ULBs in the district. Population growth rate of the municipality is decreasing, even though it is still positive. Population growth rate is negative within the old municipal boundary in the last decade, which shows the shift of population outside the old boundary area towards the old Thaikkad and Pookode villages, that may be due commercialization of the region and increase in land value. The population density of Guruvayur municipality is higher when compared with that of state and district. Wards around State Highways experiencing higher population concentration and this shows a chance of ribbon development in the thickly populated area around the CBD area in Guruvayur Municipality.

CHAPTER 5
OCCUPATIONAL STRUCTURE

This Chapter reveals the existing pattern of occupational structure, analysis of the temporal changes, gender participation, duration of employment etc., as it is a major indicator of financial well-being of an area and its residents.

5.1 Workforce Participation Rate

The workforce participation rate (WFPR) is a measure of the active portion of the economy's labor force. It refers to number of people who are either employed or are actively looking for work. The participation rate is an important metric to use when analyzing unemployment data because it reflects the number of people who are participating in the work force. As per 2011 census, the WFPR of the Guruvayur Municipality is 29.57 which is lower than the state and district. The WFPR of state and district is 34.78 and 35.11 respectively as shown in figure 5.1.

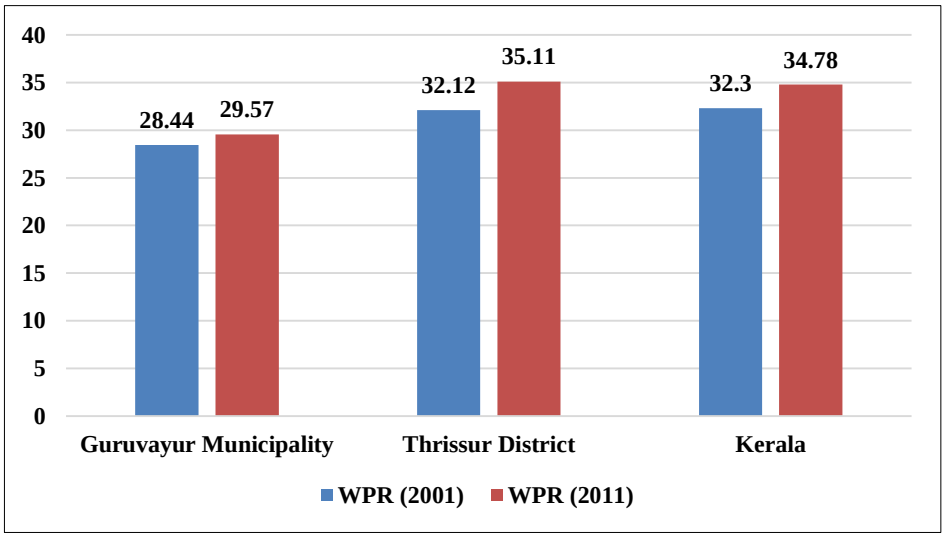


Fig 5.1 Comparison of WFPR of Guruvayur municipality with state and district (source: census data)

The decadal variation of WFPR of Guruvayur Municipality is shown in figure 5.2. The municipality shows an increase in the rate of WFPR through last decades which shows that the number of workers have increased in the past decade. The change is in trend with the condition of state and district.

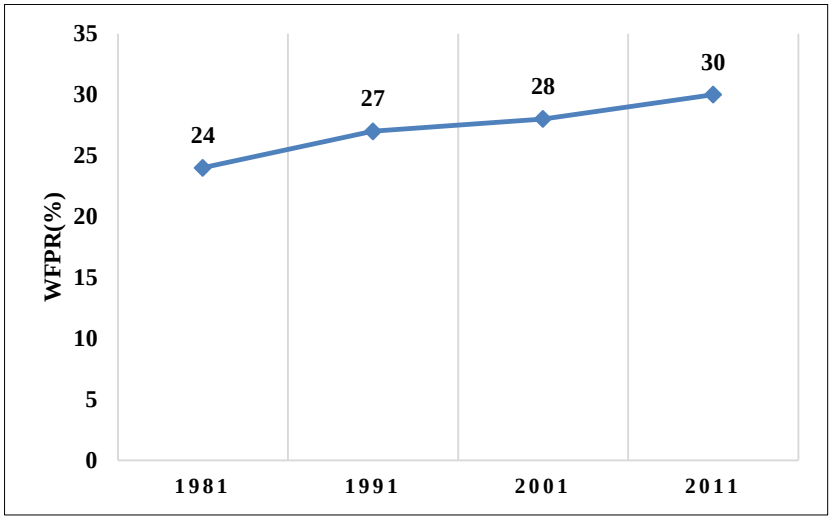


Fig 5.2 Decadal variation of WFPR of Guruvayur municipality (source: census data)

Figure 5.3 shows the comparison of WFPR of Guruvayur Municipality with other ULBs. Guruvayur Municipality have less WFPR compared to the other ULBs in the district.

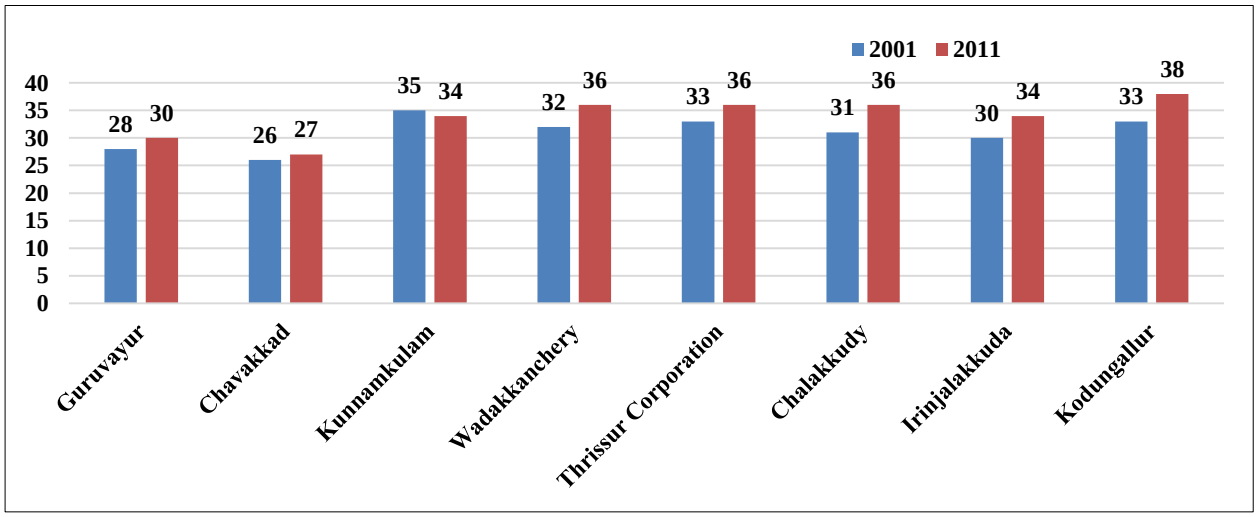


Figure 5.3. Comparison of WFPR with other ULBs in the district (Source: Census data)

5.1.1 Male and female work force participation rate

From the analysis of the decadal variation of the male and female WFPR, Guruvayur municipality shows an increase from the previous decade. As per 2011 Census, the WFPR of male and female is 48 and 14 respectively. As per census, the population of females is more compared with males in all decades, but the WFPR of females is very less when compared with males. Decadal variation of male and female WFPR is shown in figure 5.4 and 5.5 respectively.

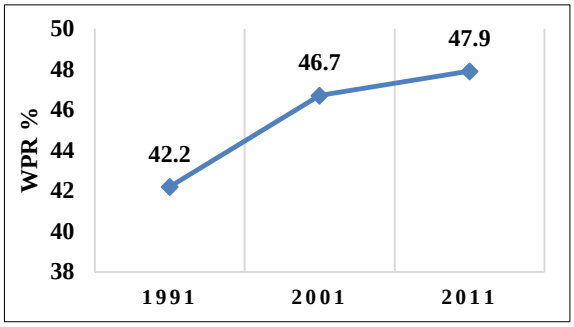


Fig 5.4 Decadal variation of male WFPR (Source: Census data)

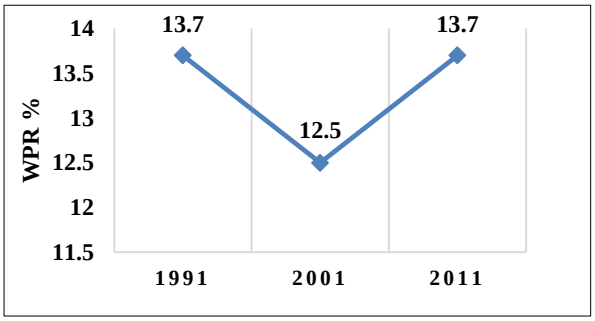


Fig 5.5 Decadal variation of female WFPR (Source: Census data)

Comparison of male and female WFPR of Guruvayur Municipality with nearby LSGIs is shown in figure 5.6 and 5.7 respectively.

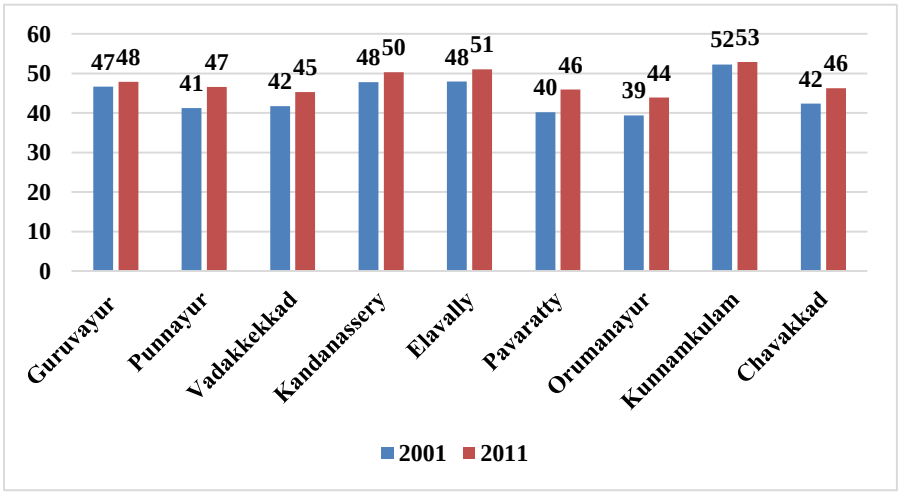


Figure 5.6. Comparison of male WFPR with surrounding LSGIs (Source: Census data)

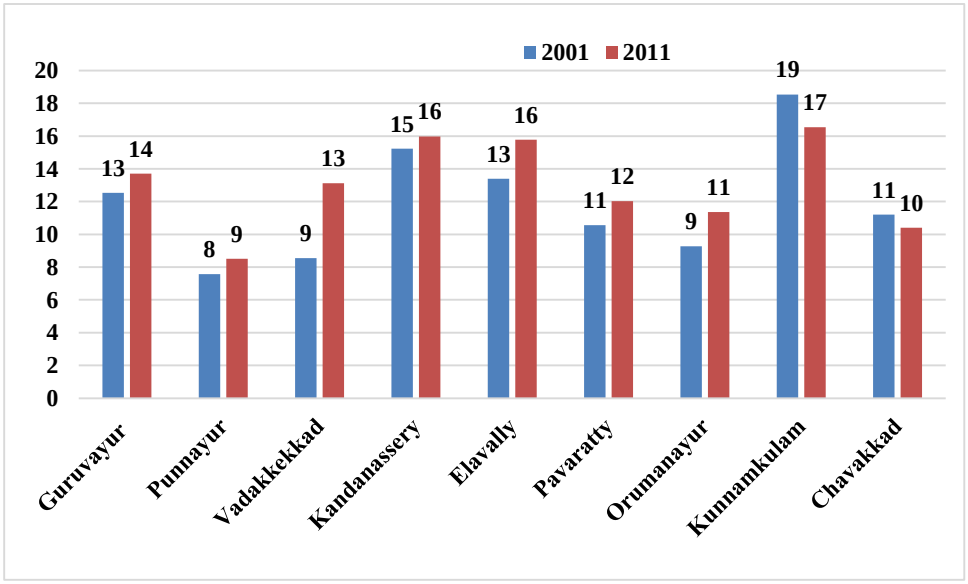


Figure 5.7. Comparison of female WFPR with surrounding LSGIs (Source: Census data)

Comparison of male and female WFPR with other ULBs in 2001 and 2011 is shown in figure 5.8 and 5.9 respectively. It shows that Guruvayur Municipality have low WFPR even though there is a slight increase in the last decade.

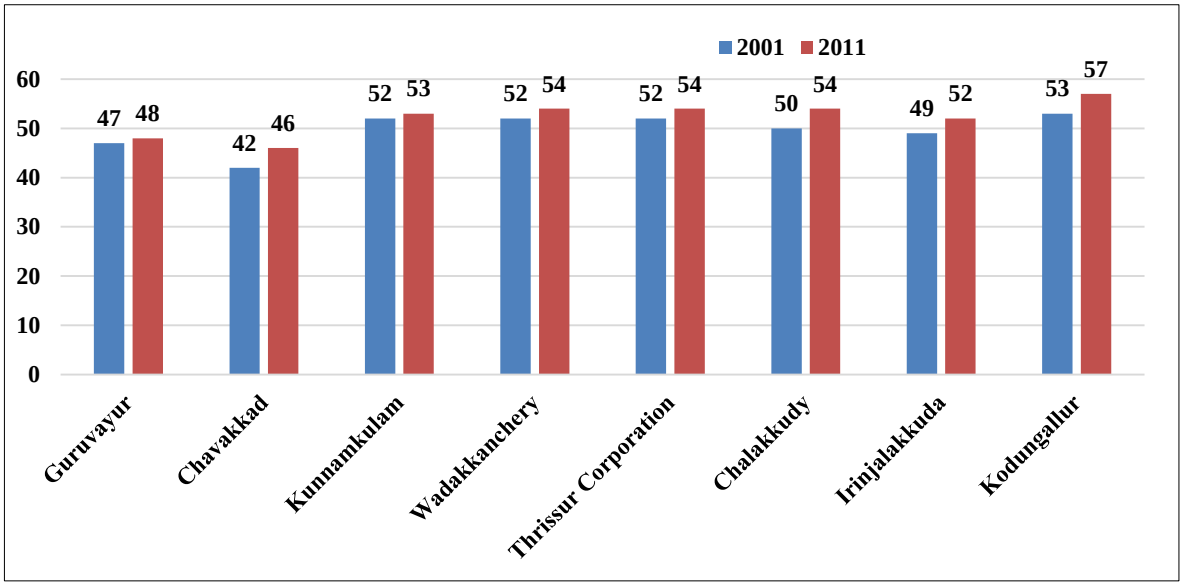


Figure 5.8. Comparison of male WFPR with other ULBs in the district (Source: Census data)

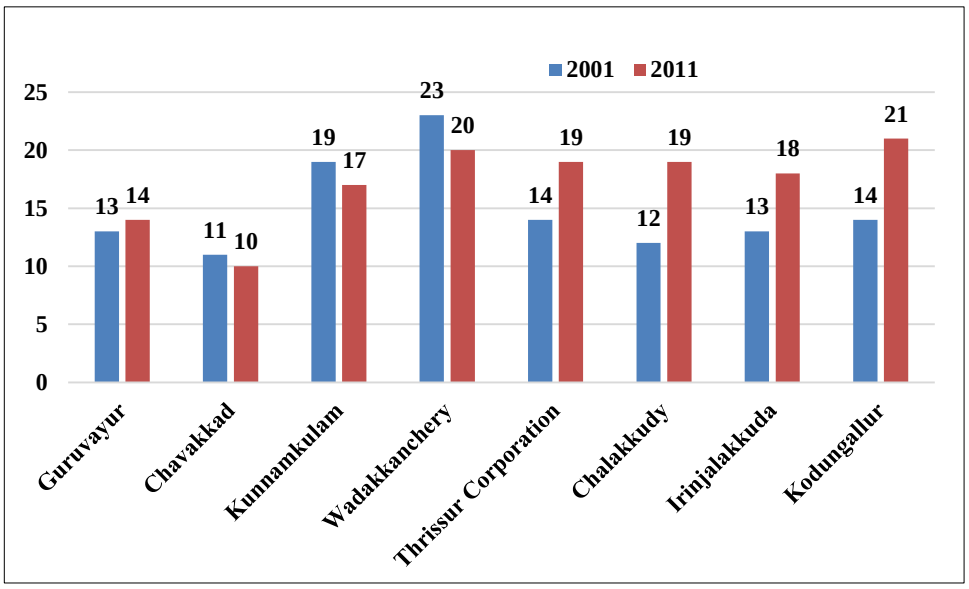


Figure 5.9. Comparison of female WFPR with other ULBs in the district (Source: Census data)

5.2 Main and Marginal Workers

The total workers in any area are classified into main workers and marginal workers. As per census those who are engaged in economic productive activity for the major part of the reference period (i.e. 6 months or more in a year) are termed as main workers while marginal workers work for less than 6 months in a year. As per Census, workers are categorized as

cultivators, agricultural labourers, household industrial labourers and other workers. This classification is generally termed as the occupational structure of planning unit (four-fold classification of workers). A person who did not work during the reference period is termed as non-worker.

Table 5.1. : Comparison of main and marginal workers of Guruvayur Municipality with state and District, 2011

	Main Workers	% of total population	Marginal Workers	% of total population	Total workers	% of total population
Guruvayur Municipality	18280	26.11	2422	3.46	20702	29.56
Thrissur District	929506	29.78	66244	5.33	1095727	35.11
Kerala State	9329747	27.93	2289316	6.85	11619063	34.78

Table 5.1 shows the comparison of workers of Guruvayur Municipality with state and district, as per census 2011. The total number of workers in the town is 20702 which include 15553 male workers and 5149 female workers. The male workers constitute 75.12% and female workers constitute 24.87% of the total works. It indicates the clear dominance of male workers in all sectors. The number of main and marginal workers is 18280 and 2422 respectively. The percentage distribution of main, marginal and non-workers is shown figure 5.10.

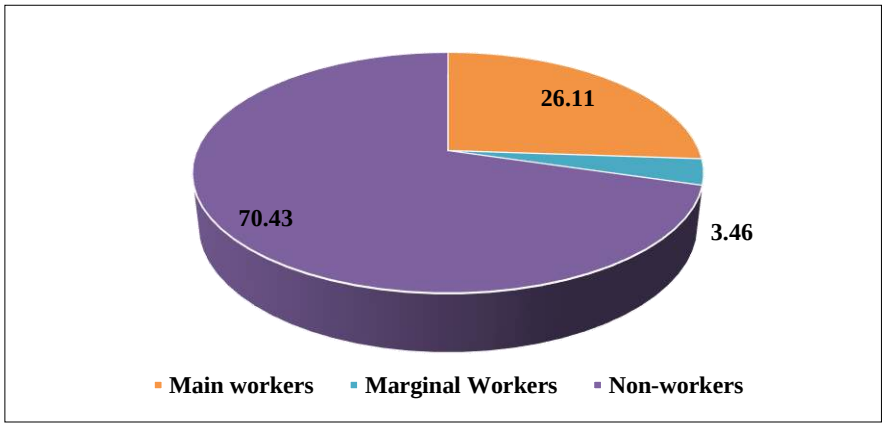


Fig 5.10. Percentage of main, marginal and non-workers of Guruvayur municipality (Source: Census data)

Figure 5.11 shows the decadal variation of Total, Main and Marginal workers in Guruvayur Municipality. Number of main workers increased, whereas the number of marginal workers decreased.

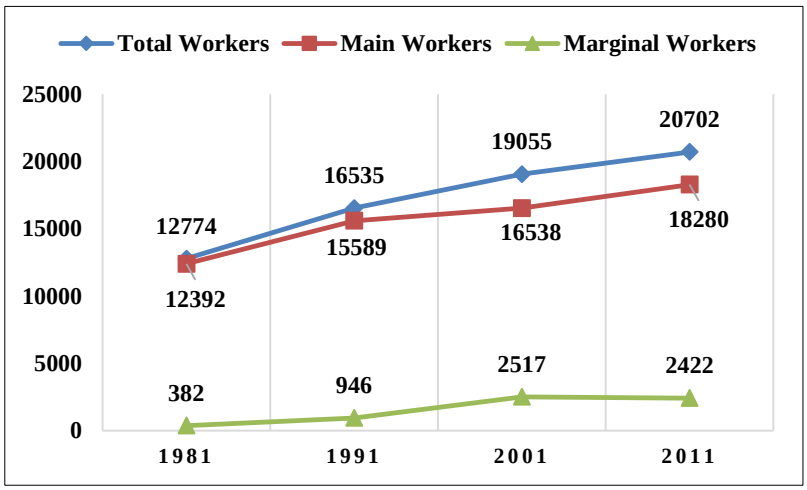


Fig 5.11. Decadal variation of Total, Main and Marginal workers of Guruvayur municipality
(Source: Census data)

5.2.1. Four-Fold Classification of workers

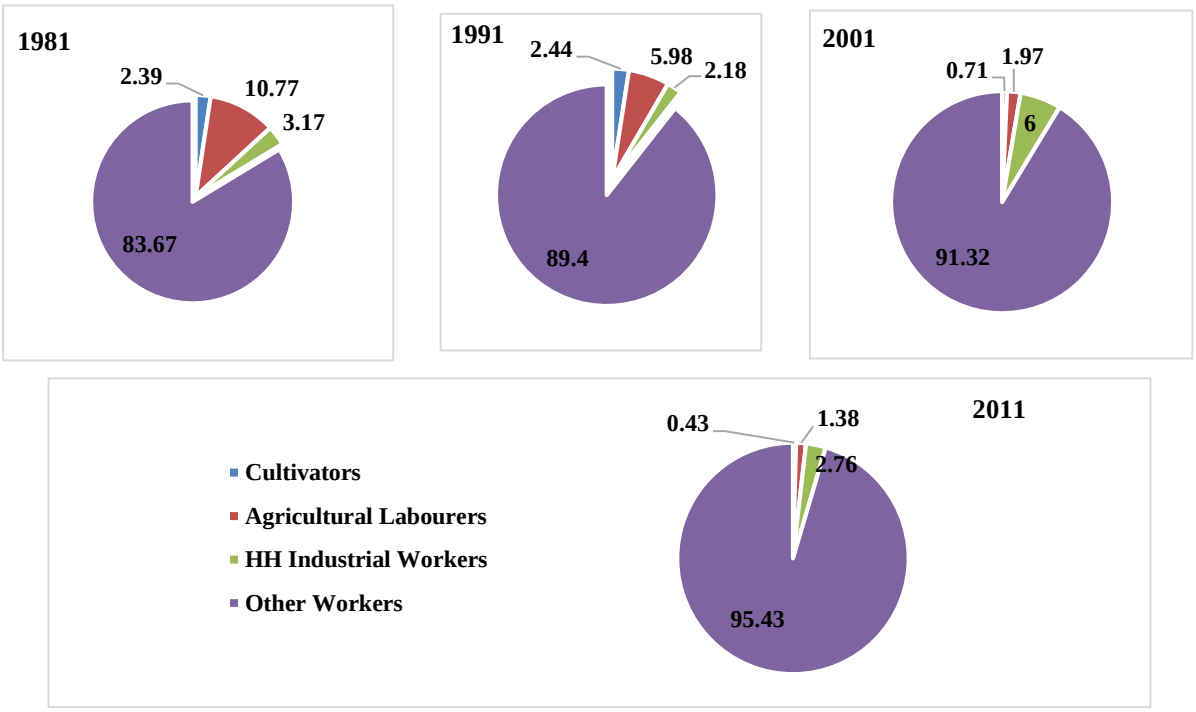


Fig 5.12. Decadal variation of four-fold classification of main workers in Guruvayur Municipality

As per Census, workers are classified into cultivators, agricultural labourers, household industry workers and other workers. Decadal variation of 4-fold classification of main workers as per census 1981, 1991, 2001 and 2011 is shown in figure 5.12. Percentage of other workers have increased in the past decades and people in the other sectors have decreased considerably which

shows a shift in the people's choice of work culture. Agricultural labourers and cultivators have been continuously decreasing among the total and main workers. People had shifted from full time jobs in primary sector to the tertiary sector, which is depicted from the consistent increase in percentage of workers in tertiary or service sector (83.67% in 1981 to 95.43% in 2011). However, in 2001, there was a sudden increase in the household industrial sector workers which again dropped from 6% to 2.76 % in 2011.

5.2.2 Socioeconomic survey results

Workers can be classified in three categories i.e. primary, secondary and tertiary. The primary occupations include all those essential activities such as agriculture and allied activities like animal husbandry, forestry, fishery, poultry farming etc. Secondary activities include manufacturing industries composed of both large and small scale and mining. Tertiary activities include all other activities like transport, communication, banking, insurance, trade etc.

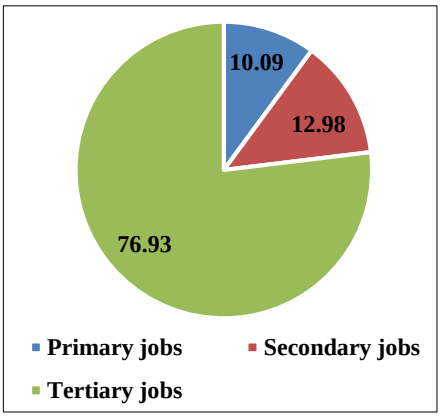


Fig 5.13. Percentage of workers in each sector
Source: Socio-Economic survey data, 2019

As per socio ecomonic survey 2019 the percentage of primary secondary and tertiary workers of Guruvayur Municipality is shown in figure 5.13. From socio-economic data analysis results, the workers in primary jobs are the least with only 10.09% contribution. The percentage of workers in tertiary sector is the highest (76.93%). Figure 5.14 shows the percentage of workers

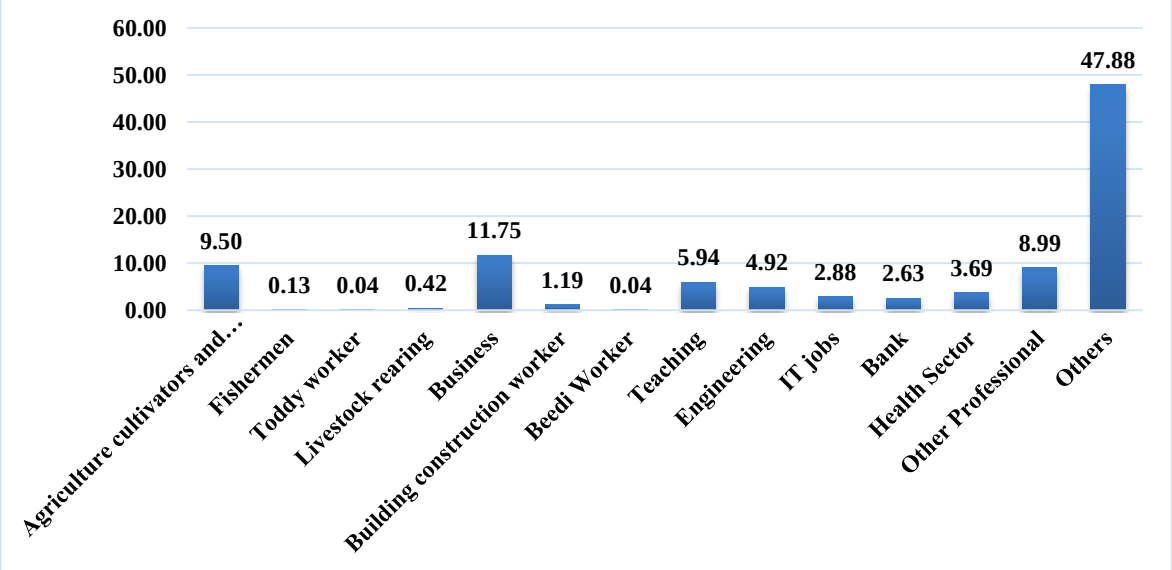


Fig 5.14. Percentage of workers in each category (Source: Socio-Economic survey data)

in each category. It can be seen that a major share of workers are involved in business and professional jobs.

Figure 5.15 shows the status of employment in Guruvayur Municipality as per socio economic survey 2019. It shows that only 3% of the people in the town are NRIs.

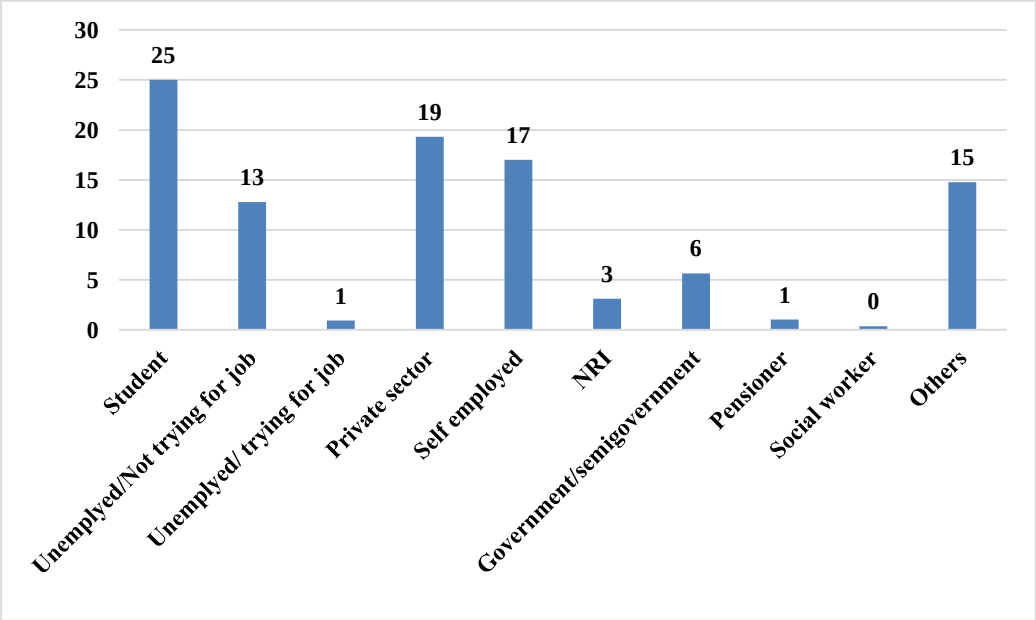


Fig 5.15. Status of Employment (Source: Socio-Economic survey,2019)

5.3 Dependency Ratio

The dependency ratio is an age population ratio of those typically not in the labour force (the dependent part) and those typically in the labour force (the productive part). It is used to measure the pressure on productive population. Dependancy ratio of Guruvayur municipality is 2.38, which is higher than that of state and district as shown in figure 5.16.

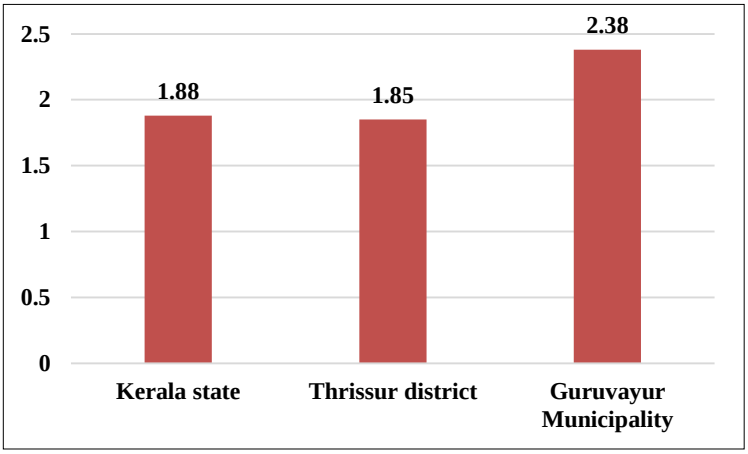


Fig. 5.16. Dependency ratio comparison with state and district (Source: Census data)

5.4. Inference

The workforce participation rate of Guruvayur Municipality shows a gradual increasing trend throughout the decades. It is observed that the town is withdrawing from the primary sector and starting to depend more on service sector. Increasing trend in WFPR shows that there

has been increase in economic development. However, the population in Guruvayur is not as economically developed as the other ULBs. Compared to other ULBs and nearby LSGIs, WFPR of the municipality is less. Whereas Male and female WFPR shows an increasing trend, but female WFPR is very less compared to male. Women participation can be made better if household industrial developments took place, hence, proposals for household industries should be given due importance. Number of main workers increased, whereas the number of marginal workers decreased. Increasing job opportunities will help in increasing the WFPR thereby creating positive sign in the economic growth and development of the town.

CHAPTER 6
LANDUSE

Land use means the major use to which a land is being used on any specified date. This chapter deals with the study and analysis of existing land use of Guruvayur Municipality area. The study is based on the land use survey conducted by Town and Country Planning Department, Thrissur in 2019 and the analysis provides an insight in to the structure of land, which can be used as a platform while planning for the future land use demands.

6.1 Existing Land use pattern

Existing land use of Guruvayur Municipality area based on land use survey conducted in 2019 is shown in figure 6.1. As per the survey findings, Guruvayur town has a geographical area of 28.72 Sq.km and is utilized for various land uses like residential, commercial, industrial, agricultural etc. The land use break-up in terms of area as well as percentage with respect to the total area is given in table 6.1 & figure 6.2. Residential land use is predominant than other land uses, which covers about 56.7% of town area, which is higher as per URDPFI standards for medium towns. The next major land use is dry agriculture, which is about 26.85% of the total area. Water bodies contribute to 4% of the total area. About 1.47% of land is lying vacant in the town. About 0.18 % of the town have Mangroves. Recreational land use is about 0.05%.

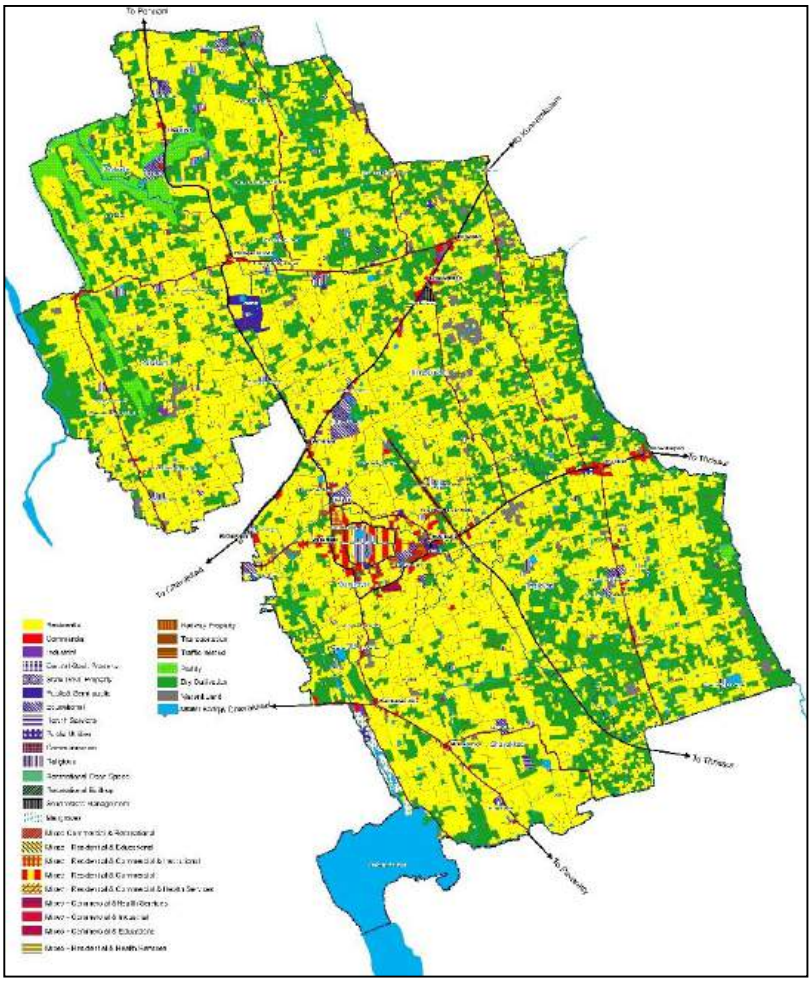


Figure 6.1. Existing land use map of Guruvayur Municipality, 2019

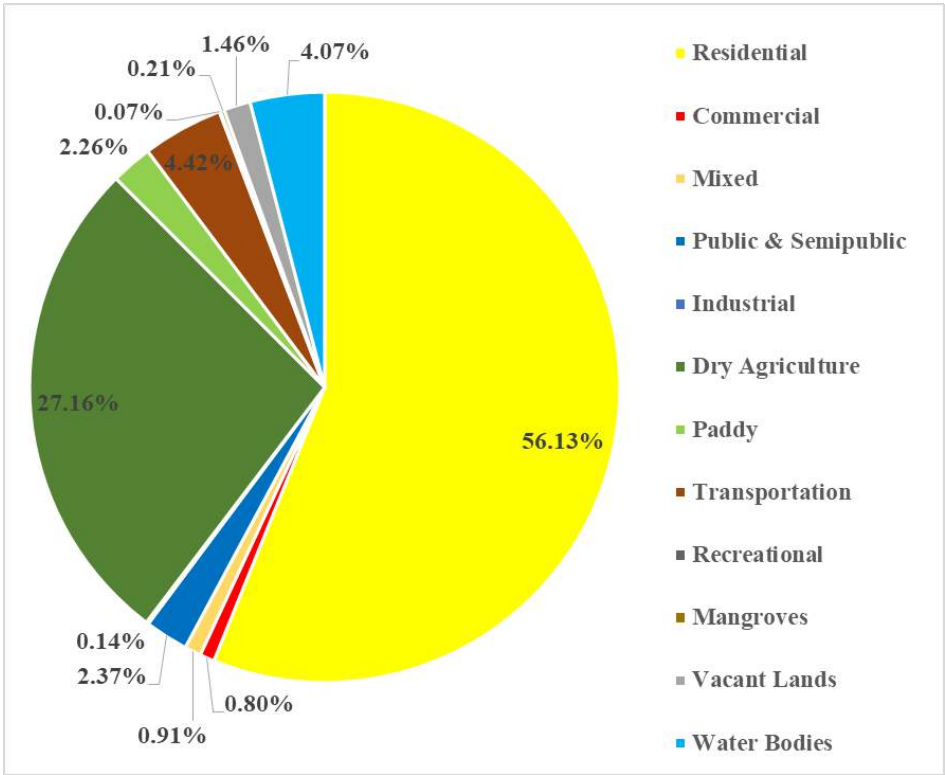


Figure 6.2 Existing land use break up of Guruvayur Municipality, 2019

Table 6.2 and figure 6.3 shows the ward wise land use break up of 43 wards of Guruvayur Municipality.

Table 6.1 Land use Break up, 2019

Land use	Existing Land use 2019	
	Area (sq.km)	%
Residential	16.08	55.99
Commercial	0.27	0.94
Mixed	0.26	0.91
Public & Semi-Public	0.70	2.44
Industrial	0.05	0.17
Dry Agriculture	7.80	27.17
Paddy	0.63	2.19
Transportation	1.27	4.42
Recreational	0.01	0.03
Mangroves	0.06	0.21
Vacant Lands	0.42	1.46
Water bodies	1.17	4.07
Total	**28.72**	**100**

(Source: Land use Survey, 2019)

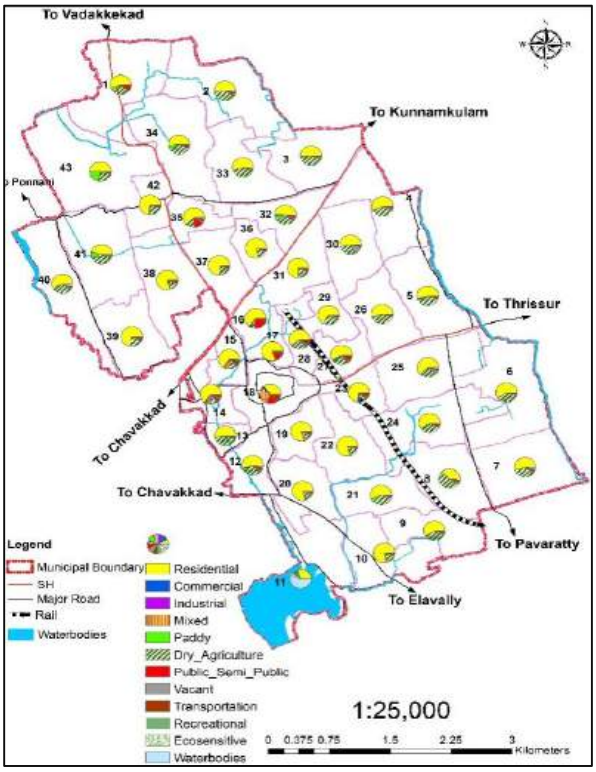


Fig 6.3 Ward wise Land Use Break Up

Table 6.2 Ward wise land use Break up, 2019

Ward No:	Residential	Commercial	Industrial	Dry Agriculture	Paddy	Mixed	Recreational	Public & Semi-Public	Vacant Lands	Transportation	Mangroves	Waterbodies
1	0.575	0.009	0.005	0.305	0.056	0.001	0.000	0.078	0.003	0.040	0.000	0.010
2	0.544	0.004	0.000	0.447	0.003	0.000	0.000	0.018	0.015	0.031	0.000	0.019
3	0.402	0.007	0.000	0.334	0.010	0.002	0.000	0.007	0.023	0.031	0.000	0.007
4	0.467	0.005	0.000	0.288	0.000	0.001	0.000	0.002	0.033	0.036	0.000	0.004
5	0.378	0.028	0.002	0.291	0.000	0.003	0.001	0.005	0.012	0.036	0.000	0.004
6	0.619	0.005	0.003	0.367	0.010	0.000	0.003	0.005	0.002	0.035	0.000	0.016
7	0.499	0.001	0.000	0.314	0.000	0.000	0.000	0.009	0.020	0.032	0.000	0.035
8	0.272	0.001	0.000	0.404	0.000	0.000	0.005	0.001	0.017	0.034	0.000	0.011
9	0.339	0.000	0.000	0.195	0.000	0.000	0.000	0.012	0.000	0.019	0.000	0.008
10	0.613	0.004	0.000	0.135	0.000	0.001	0.000	0.008	0.002	0.029	0.000	0.007
11	0.355	0.004	0.004	0.114	0.000	0.000	0.000	0.007	0.005	0.023	0.051	0.793
12	0.248	0.007	0.001	0.129	0.000	0.005	0.000	0.012	0.005	0.023	0.000	0.017
13	0.101	0.000	0.000	0.080	0.000	0.000	0.000	0.002	0.000	0.007	0.000	0.004
14	0.263	0.011	0.001	0.040	0.010	0.020	0.000	0.021	0.012	0.025	0.000	0.004
15	0.204	0.006	0.000	0.036	0.000	0.028	0.000	0.005	0.000	0.025	0.000	0.006
16	0.211	0.005	0.002	0.020	0.000	0.004	0.000	0.070	0.000	0.016	0.000	0.003
17	0.129	0.000	0.000	0.001	0.000	0.002	0.000	0.020	0.001	0.008	0.000	0.002
18	0.211	0.025	0.001	0.010	0.000	0.171	0.000	0.080	0.003	0.092	0.000	0.007
19	0.334	0.002	0.000	0.038	0.000	0.021	0.000	0.007	0.005	0.019	0.000	0.001
20	0.446	0.006	0.001	0.075	0.000	0.000	0.000	0.003	0.013	0.026	0.000	0.003
21	0.308	0.001	0.000	0.212	0.000	0.000	0.000	0.015	0.000	0.015	0.000	0.003
22	0.491	0.004	0.000	0.102	0.000	0.000	0.000	0.005	0.004	0.027	0.000	0.003
23	0.270	0.016	0.000	0.041	0.000	0.000	0.002	0.010	0.005	0.032	0.000	0.001
24	0.585	0.004	0.000	0.301	0.004	0.001	0.003	0.030	0.006	0.039	0.000	0.013
25	0.547	0.007	0.000	0.231	0.000	0.000	0.000	0.012	0.039	0.036	0.000	0.018
26	0.344	0.001	0.000	0.258	0.000	0.000	0.000	0.004	0.001	0.029	0.000	0.005
27	0.224	0.013	0.000	0.080	0.000	0.000	0.000	0.013	0.005	0.038	0.000	0.005
28	0.220	0.009	0.000	0.077	0.000	0.004	0.000	0.010	0.009	0.036	0.000	0.003
29	0.230	0.001	0.000	0.093	0.000	0.000	0.000	0.003	0.008	0.014	0.000	0.003
30	0.367	0.002	0.002	0.217	0.000	0.003	0.000	0.005	0.085	0.029	0.000	0.003
31	0.426	0.006	0.001	0.098	0.000	0.005	0.000	0.017	0.002	0.022	0.000	0.005
32	0.236	0.014	0.006	0.169	0.000	0.002	0.000	0.018	0.010	0.025	0.000	0.006
33	0.419	0.001	0.000	0.303	0.000	0.003	0.000	0.011	0.001	0.022	0.000	0.011
34	0.550	0.004	0.000	0.393	0.068	0.003	0.000	0.023	0.001	0.033	0.000	0.012
35	0.189	0.002	0.000	0.043	0.000	0.000	0.000	0.044	0.007	0.017	0.000	0.006
36	0.267	0.001	0.000	0.056	0.001	0.001	0.000	0.003	0.000	0.016	0.000	0.004
37	0.426	0.002	0.000	0.104	0.001	0.000	0.000	0.014	0.002	0.024	0.000	0.003
38	0.644	0.002	0.001	0.129	0.000	0.000	0.000	0.010	0.008	0.037	0.000	0.007
39	0.504	0.006	0.001	0.135	0.001	0.000	0.000	0.016	0.008	0.029	0.000	0.008
40	0.463	0.003	0.002	0.277	0.006	0.000	0.000	0.009	0.018	0.027	0.000	0.033

41	0.464	0.006	0.006	0.356	0.094	0.000	0.000	0.012	0.025	0.031	0.000	0.008
42	0.250	0.005	0.000	0.066	0.004	0.000	0.000	0.003	0.003	0.016	0.000	0.003
43	0.639	0.002	0.006	0.347	0.375	0.000	0.000	0.005	0.004	0.039	0.000	0.025
Total	**16.08**	**0.27**	**0.05**	**7.80**	**0.63**	**0.26**	**0.01**	**0.70**	**0.42**	**1.27**	**0.06**	**1.17**

Source: Land use Survey, 2019

6.2 Comparison of Land uses with URDPFI Guidelines

Table 6.3 shows the comparison of land use of Guruvayur Municipality with URDPFI guidelines. Percentage of residential land use is more than the URDPFI norms, whereas all other land uses are less than the norms

Table 6.3 Comparison of land use with URDPFI Guidelines

Land use	**Area(sq. km)**	**Percentage of Developable Area**	**URDPFI Standards**
Residential	16.08	60.58	43 – 48%
Commercial	0.27	0.89	4 – 6%
Public & Semi-Public	0.70	2.45	6-8%
Industrial	0.05	0.18	7-9%
Dry Agriculture	7.80	28.69	Balance
Transportation	1.27	4.54	10-12%
Recreational	0.01	0.03	12-14%
Vacant Lands	0.42	1.56	-
Mixed	0.26	1.04	-
Total Developable Area	**26.87**		

Source: URDPFI Guidelines

6.3 Comparison of Land use with other towns of Thrissur

A comparison of land use among the urban LSGIs of Thrissur district is shown in Table 6.4. From the table it is clear that Guruvayur Municipality has the least percentage of majority of the land uses except that there are Mixed development and presence of Mangroves.

Table 6.4 Comparison of land uses of different Municipalities in Thrissur District

Land use	**Existing land use area in Percentage**						
	Guruvayur	**Wadakkancherry**	**Kodungallur**	**Kunnamkulam**	**Chalakkudy**	**Irinjalakkuda**	**Chavakkad**
Residential	55.99	22	40.3	32.27	37.38	42.04	61.4
Commercial	0.94	0.48	2.12	1.72	1.85	1.56	1.29
Mixed	0.91	0	0	0	0	0	0
Public & Semi-Public	2.44	2.5	3.08	3.75	5.41	3.71	3.98
Industrial	0.17	0.85	0.35	0.68	0.77	0.79	0.19

Dry Agriculture	27.17	36.3	24.6	30.38	32.02	18.47	21.3
Paddy	2.19	14.6	7.17	23.34	14.87	25.81	4.17
Transportation	4.42	4.65	4.39	5.56	3.22	4.89	3.89
Recreational	0.03	0.04	0.17	1.09	0.02	0.39	0.34
Mangroves	0.21	0	0	0	1.02	1.39	1.34
Vacant Lands	4.07	4.09	2.65	-	2.02	2.39	2.34
Waterbodies	4.04	1.98	14.3	1.19	3.02	3.39	3.34

Source: Land Use Survey 2019

6.4 Concentration index of different land uses

The concentration index (CI) quantifies the extent of concentration of a particular land use in a ward. The concentration index of a particular land use in a ward =
(Area of land use in a ward / Total area of ward)/ (Area of Land use in the municipality/Total area of municipality)

Concentration index can be less than one, equal to one or greater than one. CI less than one indicates that there is no concentration of that particular land use in that ward. But CI equal to or greater than one indicates that there is concentration of particular land use. The concentration indices of major land uses are detailed here.

6.4.1. Concentration Pattern of Residential Land Use

As per the existing land use 2019, residential land use includes an area of 16.08 sq.km constitutes 55.99 % of the town area. As per URDPFI standards for medium towns, 43-48 % of area can be developed for residential land use, but here the present land use is more than the standards. Figure 6.4 shows ward wise spatial distribution of residential land use and its concentration index. The residential areas are developed mostly in places with easy accessibility and proximity of facilities and are mainly distributed in wards surrounding to the state highways. Analysis shows that the wards 9, 10, 14, 15, 16, 17, 19, 20, 22, 23, 24, 25, 27, 28, 29, 31, 35, 36, 37, 38, 39 show higher concentration of residential area. Wards on the outskirts of the Municipality have less residential concentration.

6.4.2. Concentration Pattern of Commercial Land Use

As per the existing land use 2019, Commercial area constitutes only 0.94% of the town area. This includes an area of 0.27 Sq.km. Mixed-use development of majorly residential and commercial uses occupy a part of the town. As per the existing land use 2019, mixed use constitutes 0.97% of the town area which covers an area of 0.28sq.km**.** The area near to the inner and outer ring roads are having mixed uses.

As per URDPFI standards 4-6 % of area can be developed for commercial land use, but here only 1.81% of area is used for commercial purposes. So there is more need for commercial development. The spatial distribution and ward wise concentration index of commercial land use is shown in figure 6.5. Analysis shows that wards 5, 18, 14, 23, 27, 28, 32 show maximum concentration of commercial activity and these wards are located around the Guruvayur Temple premises. Wards which contain the main commercial nodes and junctions show higher concentration index. Commercial developments are concentrated along major transport corridors especially on SH.

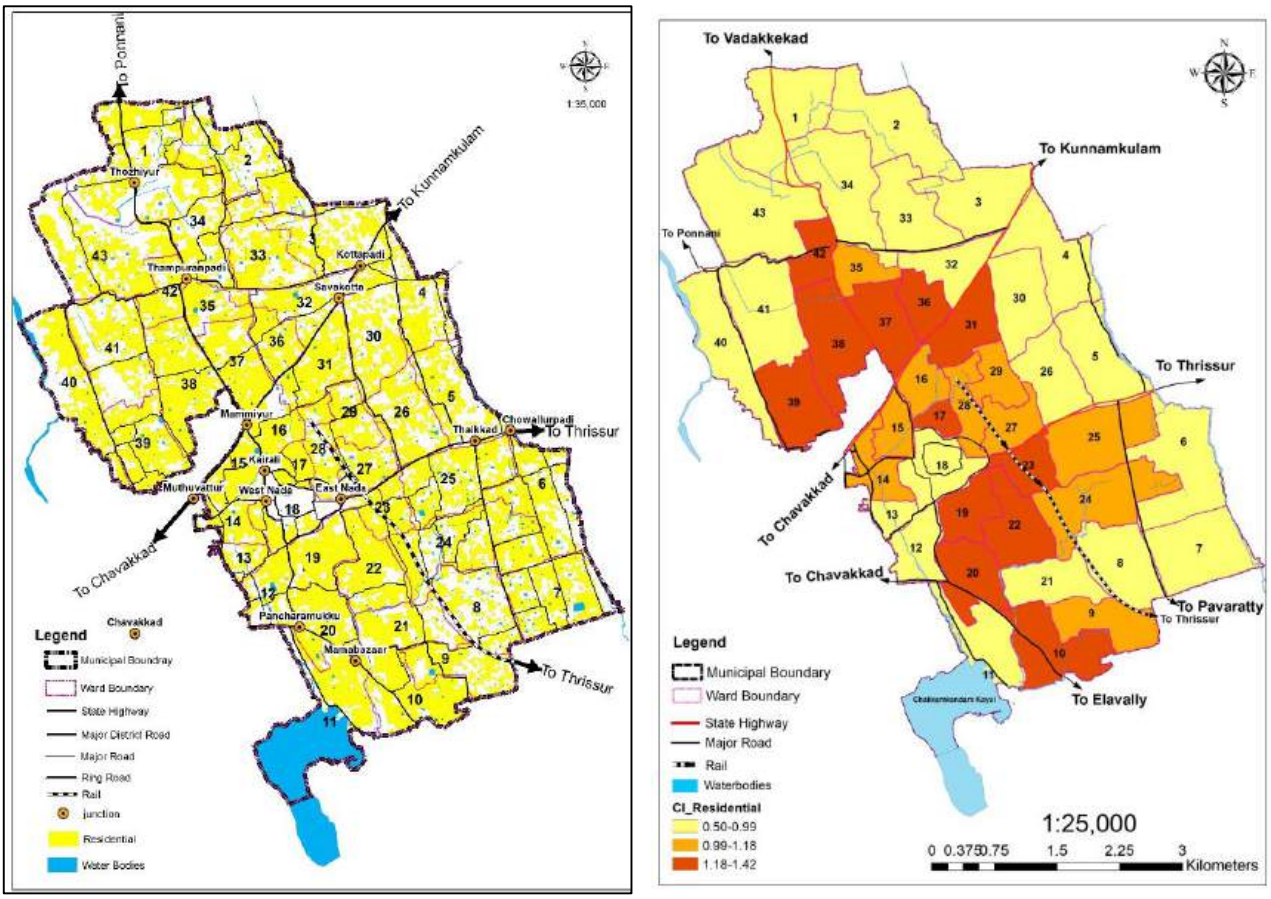


Fig 6.4. Spatial Distribution and Concentration Index of residential land use

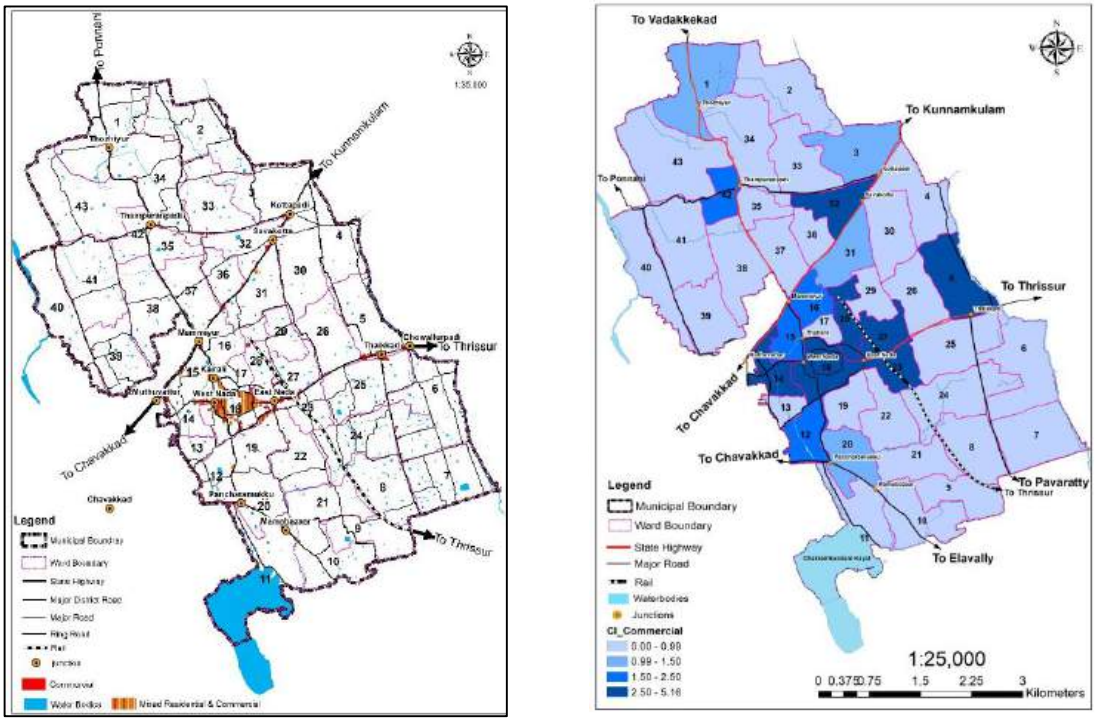


Fig 6.5. Spatial Distribution and Concentration Index of Commercial land use

6.4.3. Concentration Pattern of Public and Semi-public Land Use

Government offices, educational Institutions, hospitals, Govt. lands and religious and cultural institutions are grouped under this category. Figure 6.6 shows the spatial distribution

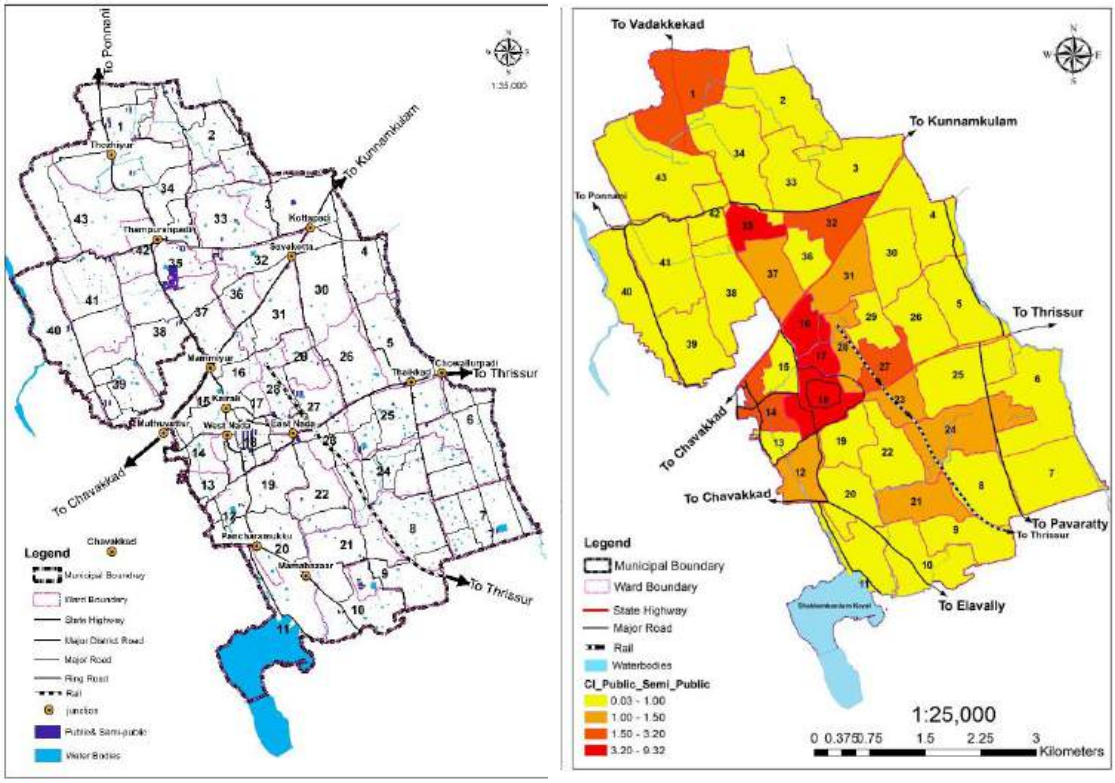


Fig 6.6. Spatial Distribution and Concentration Index of Public & Semi Public land use

and ward wise concentration index of public and semi-public land use of the town, which is 2.23 of the total town area. As per URDPFI standards 6 – 8 % of area has to be developed for public and semi-public use, but here 2.45 % of developed area is used for public and semi-public use. It is clear that the area under this land use is less than prescribed norms. The major share of public & semi-public land use is concentrated in wards 17, 18 and 16. Guruvayur Temple and other important public offices such as Municipal office, Police station, Fire station, Library, Schools, Railway station etc. are located in ward 18.

6.4.4 Concentration Pattern of Dry Agriculture

The next highest land use in the Municipality is that of dry agriculture which contributes to about 27.17% of total land use. The main crop under dry agriculture is coconut. Figure 6.7 shows the spatial distribution and concentration index of dry agriculture; from which it is evident that dry agriculture is concentrated along the peripheral wards of the Municipality. Wards 13 and 12, though very near to the core developed region still shows high concentration in dry agriculture land use.

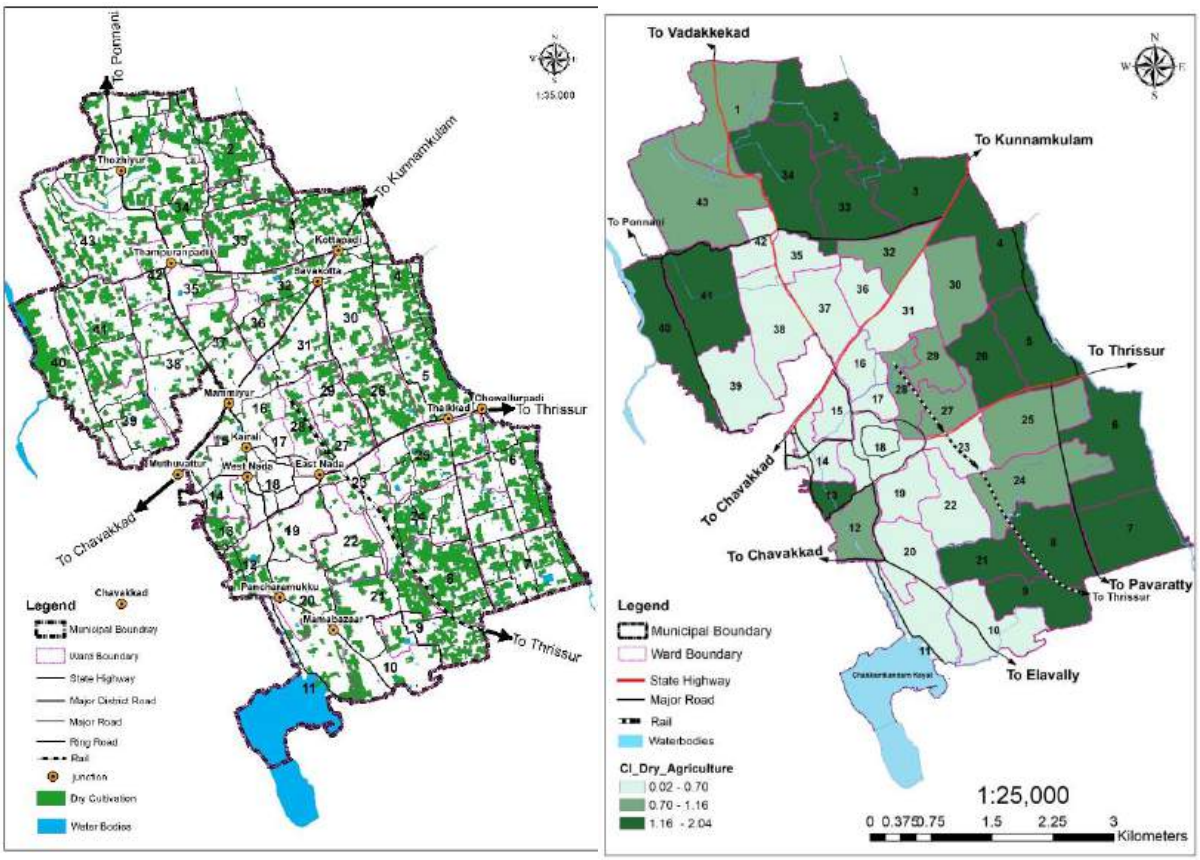


Fig 6.7. Spatial Distribution and Concentration Index of Dry Agriculture land use

6.4.5 Concentration Pattern of Industrial Land Use

Industrial land use within the Municiaplity is only 0.17%. Figure 6.8 shows the Spatial Distribution and concentration index of industries within the Municipality. Very few industries are located in the land use map scattered all over the Municipality. Wards 16, 32 and 41 show the highest concentration of industrial land use. Industrial estate is located at ward 41 and land has been acquired for industry in ward 6.

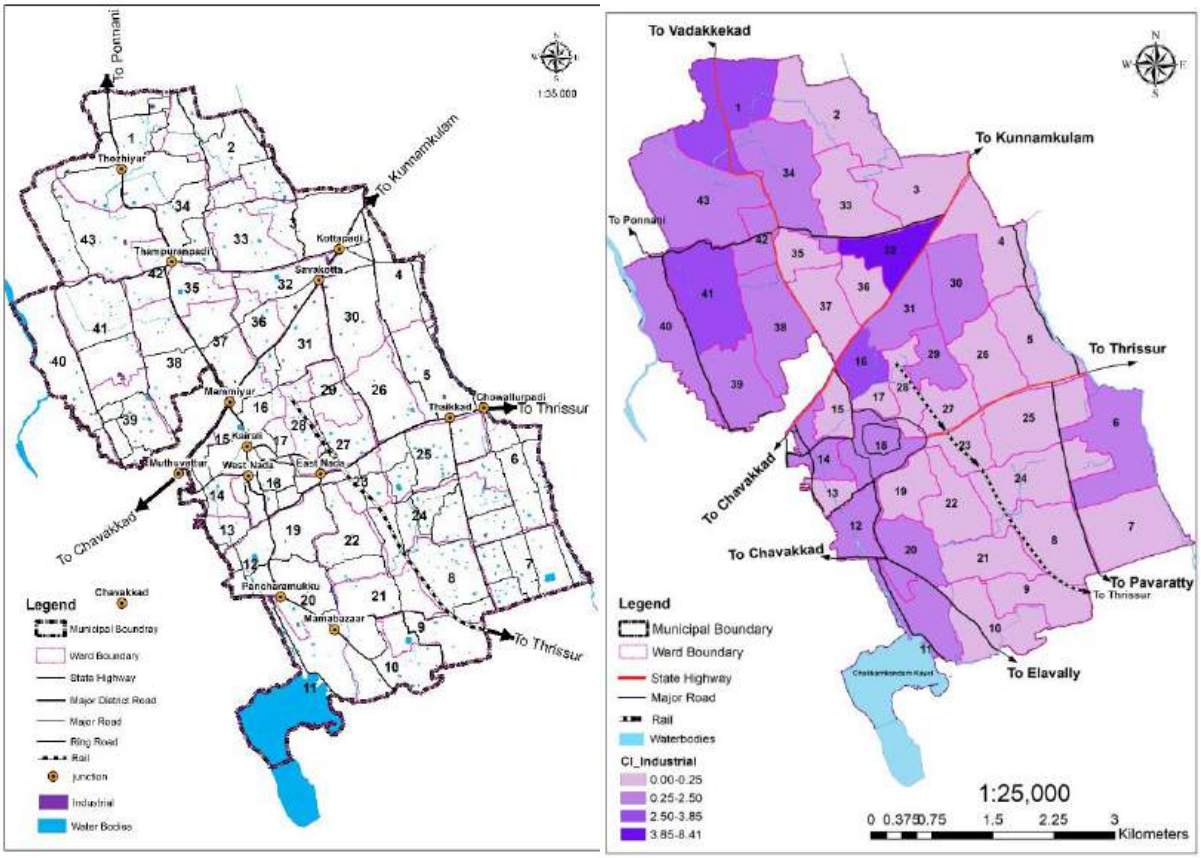


Fig 6.8. Spatial Distribution and Concentration Index of Industrial land use

6.5 Spatial Distribution of other landuses

Other land uses within the Municipality, which constitutes very less percentage of the town area are Wet agriculture like paddy, Transportation, Recreational, Mangroves, Vacant lands, Water bodies etc. The spatial distribution of these land uses are shown in figure 6.9.

Paddy is not a predominant crop in Guruvayur. Paddy area constitutes about 2.19% of the total area.

The existing road network, railway network, railway station and bus terminals are grouped as Traffic and Transportation use. The area covered by transportation use comes to

about 4.42 % of total Municipal area. As per URDPFI Guidelines it should be about 10-12% of the developed area within the Municipality. There are three State Highways passing through the Municipality, SH50 (Chavakkad – Chattukulam), SH62 (Mammiyur-Thozhiyur) and SH 49(Manjulal Jn. to Chowallurpady). Railway line is passing through town center. Two bus terminals are operating within the town center. Transport bus stand on the West Nada and a private bus stand at the East side of Guruvayur Temple.

Recreational land use includes parks, playgrounds, stadiums etc. and these places are considered to be the life giving spaces of the town. It constitutes about 0.03 % of the town area. As per URDPFI Guidelines the recreational spaces in a medium town should be 12-14% of the developed area. It is found that such spaces are considerably less when compared to planning standards. Only one Childrens Park is located at the town center ie. at Manjulal Junction.

As Guruvayur is a town which attracts thousands of people every day, it experiences huge impact on the environment. It necessitates the need for conservation of open and green spaces which act as lungs of a city. The backwaters at Chakkamkandam are home to mangrove species and wetlands which are to be protected, which constitutes 0.21% of the town area.



Figure 6.9 Spatial Distribution of other Land uses

Spatially locating vacant land is essential for analyzing the availability of land for the development of the town. Vacant lands in Guruvayur Municipality are 0.42 sq.km which is about 1.46% of the town area.

The rivers, drains, canals, irrigation canals and all ponds are grouped as water bodies. The area covered by water body comes to about 4.07% of the town area. This includes an area of 1.17 sq.km of town area.

6.6 Functional character of wards in terms of Landuse

The function of a local body refers to the major activity within the LSGI, it may be primary sector activities (rural), secondary sector/teritiary sector activities(Urban) or the combination of both. Based on land use, population distribution and average plot size the settlement can be classified into Urban, Semi Urban, Semi Rural and Rural. The Integrated District Development Plan prepared in 2012 details the functional importance and specific role of every local body in the district, after studying various aspects and urban parameters. The report classifies the then Guruvayur municipality as having urban land use concentration pattern and Thaikkad and Pookkode panchayats as having agricultural land use concentration pattern. The Functional character of the then Guruvayur Municipality and Pookode Panchayat is found to be urban, whereas Thaikkad panchayat is of rural character. Figure 6.10 shows the functional character of various local bodies in Thrissur district.

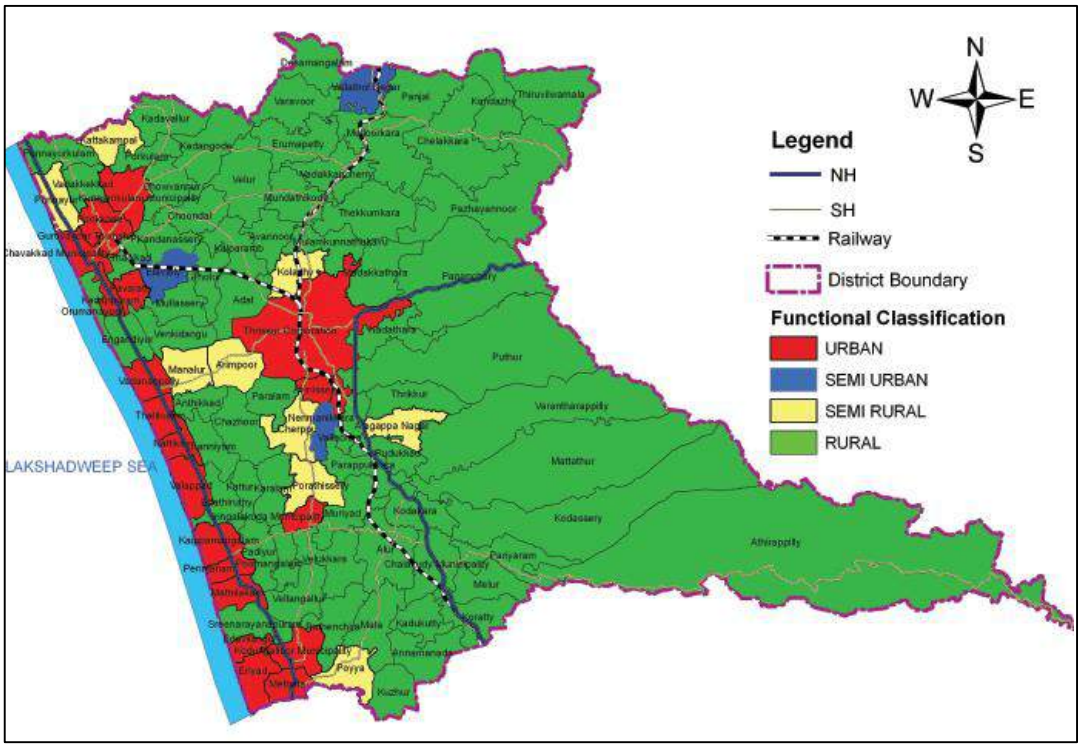


Figure 6.10 Functional classification of Settlements of Thrissur District

Source:IDDP,2012

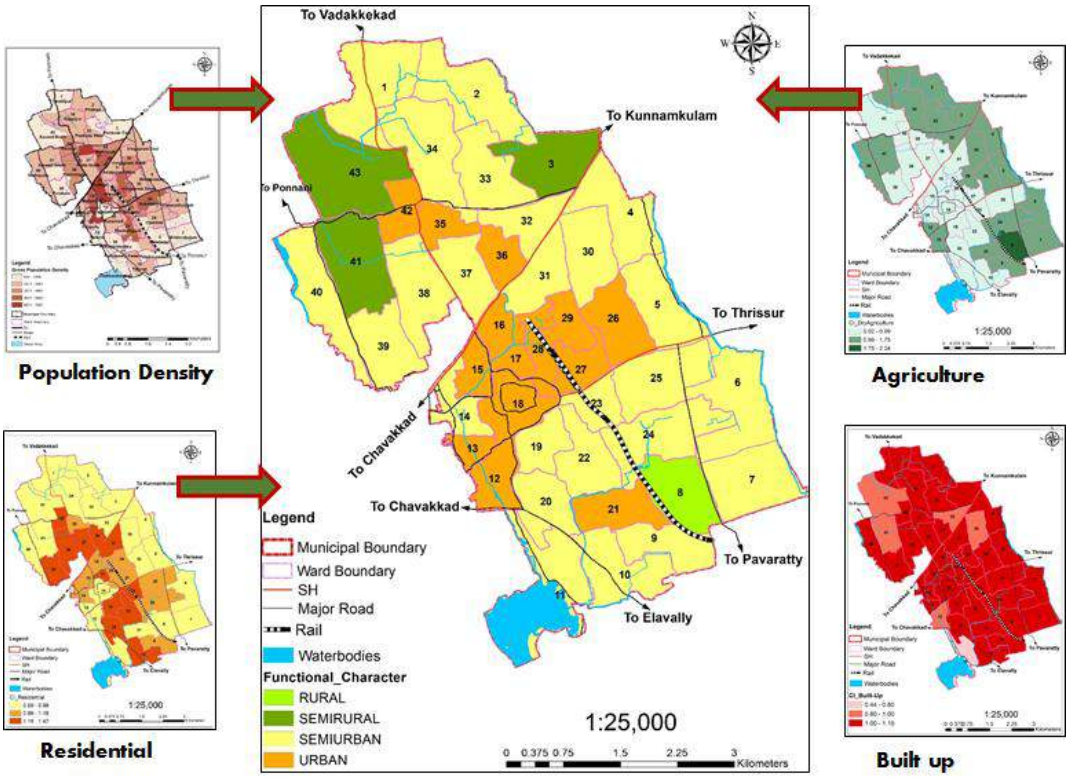


Figure 6.11 Functional Character of Wards in Guruvayur Municipality

Most of the towns in Kerala experience urban rural continuum. The settlement pattern here is scattered and Guruvayur is part of the urban corridor which needs to be developed by 2031. The ward wise functional character is arrived at based on analysis of population density distribution, plot size distribution and land use concentrations. The result of this analysis is shown in figure 6.11 which shows that the major part of Guruvayur shows semi-urban functional character, with the CBD showing an urban character. Functionally major portion of Guruvayur is experiencing rapid urbanization which calls for the need of planned growth. Already experiencing overcrowding and congestion, haphazard growth pattern could affect the quality of lives of the residents.

Wards 13,15,16,1,18,26,27,28,29,35,36,42 shows urban character. Guruvayur Temple is located in ward 18, where major commercial establishments and temple related activities are taking place. Railway station is also located nearer to the town centre. These wards are densely populated and high concentration of built up land use but very low agricultural concentration. Wards 1, 2, 4, 5, 6, 7, 9, 11, 12, 14, 19, 20, 21, 22, 23, 24, 25, 30, 31, 32, 33, 34, 37,38,39, and 40 shows semi urban character. In these wards, the concentration of residential and built up land use is moderate whereas the agriculture concentration is low. The

population density is also high. Wards 3, 41 and 43 shows semi-rural character. These wards are located on the North West and North East side of the town. High concentration of agriculture residential mix and less built up land use in these wards justifies the semi rural character. Only ward 8 shows rural character. The rural nature of the ward is justified by the high concentration of agriculture land use, low population density, low concentration of residential and built up land use and large plot size.

By analysing concentration patterns of residential, commercial, public and industrial land uses, it can be concluded that a mixed activity pattern is seen in the central area of the town and along the major traffic corridors as shown in figure 6.12.

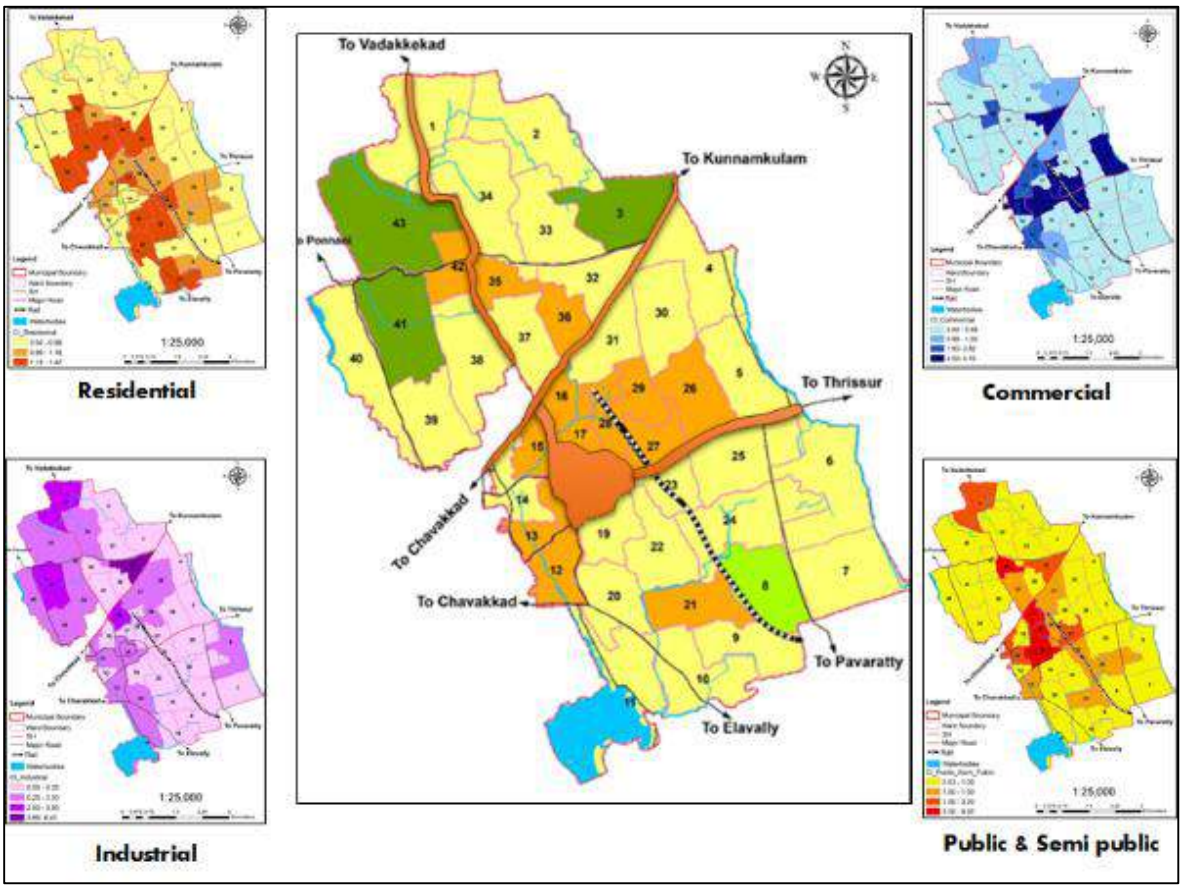


Figure 6.12Mixed activity pattern

6.7 Inference

Land use analysis of Guruvayur Municipality shows that residential land use is predominant which constitutes about 55% of the town area. It is more than the planning standards for a medium town as per URDPFI Guidelines. Next major land use is dry agriculture which covers 26% of the total area. All other land uses such as commercial, Public and semi-public, recreational, industries etc. are very less compared to the standards. Mixed land use is prevalent around the Guruvayur temple region. The temple premises are highly

built-up with commercial, public and semi-public buildings. Land for incorporating the needs for sufficient connectivity and comfort of the existing as well as floating population is to be delineated. Finding suitable locations for open space within the Municipality is important. Eco-sensitive areas must be protected. Vacant lands have been identified for suitable development.

CHAPTER 7

AGRICULTURE AND ALLIED SECTORS

Agriculture plays a critical role in the entire life of an economy. In addition to providing food and raw material, agriculture also provides employment opportunities to huge population. This chapter analyses the existing status and development issues of Agriculture and allied sector in Guruvayur Municipality.

7.1. Area under cultivation

As per landuse analysis, 29% of the land is used for agricultural purposes, out of which 26.2% is dry agriculture and 2.75 % paddy. The spatial distribution of the agricultural land is shown in figure 7.1.

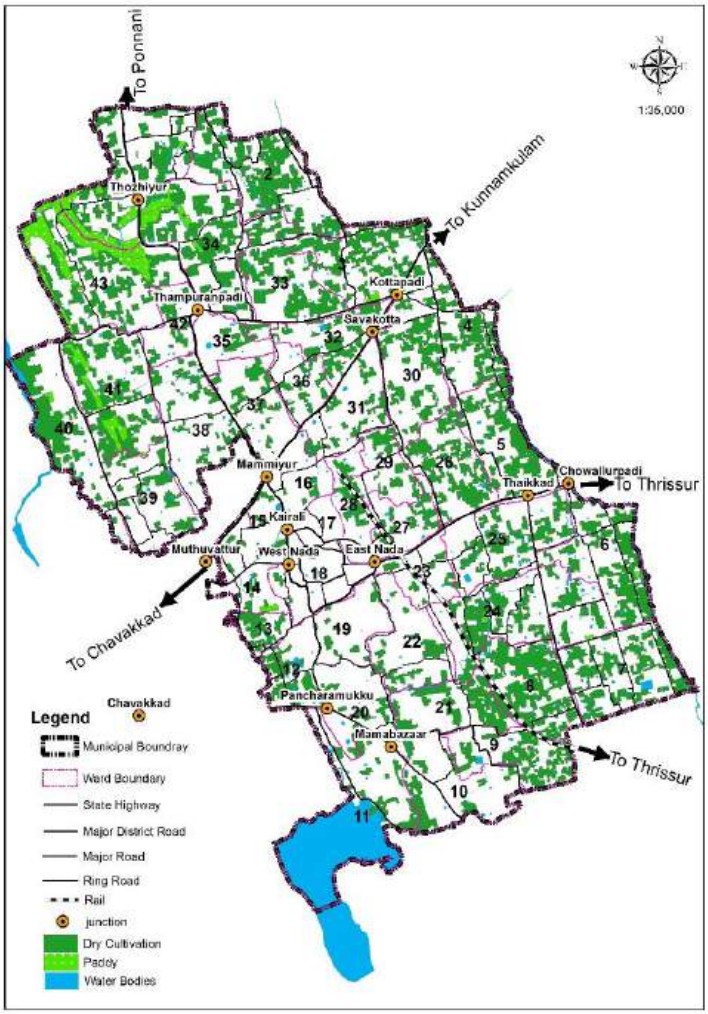


Figure 7.1. Spatial distribution of agriculture Land Use in Guruvayur Municipality

7.2. Important crops and production

The total extent of land used for cultivation in the town is 1485.76 Ha during 2017- 2018. Table 7.1. shows the area of cultivation of major crops within the municipality during 2014- 2018. Coconut is the major crop cultivated within the Municipality. Other crops include plantains, vegetables, pepper, Arecanut, Tapioca etc.

Table 7.1 % of land used for cultivation under major crops

Type of Crop	Area of cultivation in hecaters			
	2014-2015	2015-2016	2016-2017	2017-2018
Coconut	1300	1295	1340	1390
Plantains	34	34	36	37
Vegetables	15	17	19	20
Pepper	12.5	12.5	13.5	13
Tapioca	7.4	7.4	7.4	7.5
Rice	5.36	5.36	5.36	7.36
Arecanut	7	7	7	7
Nutmeg	3	3.5	4	4
Total	**1384.26**	**1381.76**	**1432.26**	**1485.86**

Source: Agriculture Office; 2018

7.2.1 Coconut

In Guruvayur Municipality, 1390 hectare land is under coconut cultivation, which comes to about 93.55% of the total cultivated area. Generally, it is cultivated as a household crop. No big plantations are seen here. Figure 7.2 shows the decadal variation in production and area of cultivation of coconut within the municipality. Even though there was decreased coconut production and area of cultivation in 2016, it considerably increased in the following years. The coconut is mostly cultivated by small - scale and marginal farmers. There are potentials to increase farmers' income. They are Intercropping, Product diversification, by-product utilization, production cost reduction, setting up of farmer's organization, establishment of efficient information exchange system etc.

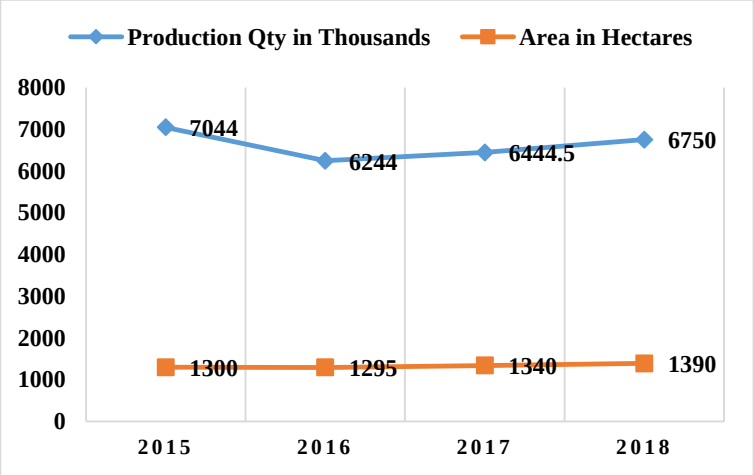


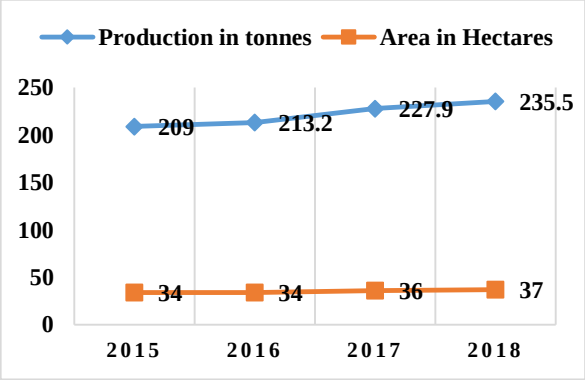
Figure 7.2. Decadal variation of coconut cultivation

Source: Agriculture Office; 2018

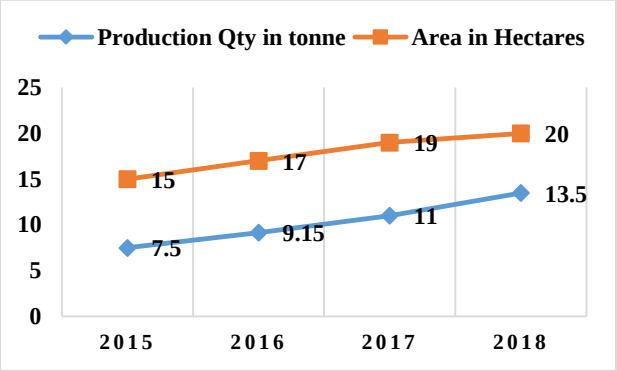
7.2.2 Other crops

Figure 7.3 shows the temporal variation of production of various crops within the municipality. Plantains are largely cultivated after coconut. It shows slight increase in production and area of cultivation during the last years. Area of cultivation and production of vegetables has considerably increased. Roof top agriculture along with ground agriculture can be promoted in house compounds. Tapioca and arecanut are also cultivated but in comparatively lower

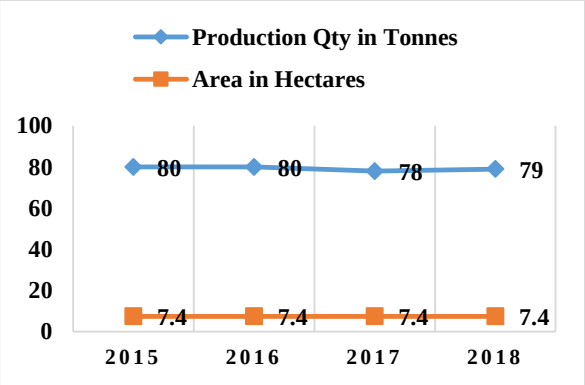
quantities. Paddy is not a major crop within the municipality. However, the area of cultivation has slightly increased. There are no padasekharasamithis.



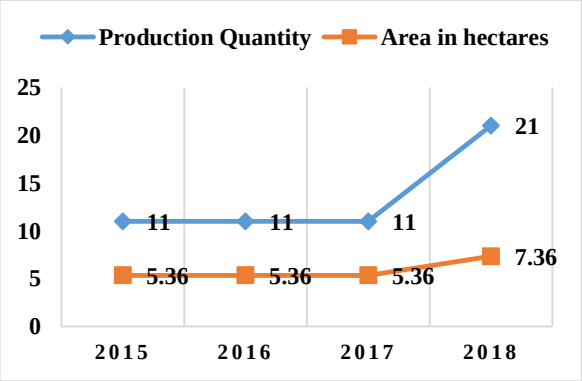
Plantains



Vegetables



Tapioca



Paddy

Figure 7.3 Temporal variation of production and area of crops within the municipality

Source: Agriculture Office; 2018

7.3 Irrigation Facilities

Coconut is the major crop cultivated within the municipality. Active paddy cultivation areas are very less. Presently there is no irrigation facilities within the municipality area. Ponds/ Chiras existing in the municipality are used for irrigation. Chakkamkandam lake area is located in the South west part of the Municipality. Majority of the public wells and ponds surrounding this lake is affected by salt water intrusion. Hence this water cannot be used for irrigation purposes. Details of the water resources for irrigation within the Municipality is given in Table 7.2.

Table 7.2. Details of irrigation facilities

Name of Thodu/Chira/Pond	Ward No.	Name of Thodu/Chira/Pond	Ward No.
Thaikkad Brahmakkulam Pond	6	LakshamVeedu Colony	5
Tharakan Lasar Kulam	33	Iringapuram Nursery	5
Kuttadan Padam	1	Moonnini Pond	24
Valiyathodu 1	4,5,6,7	Thayyaram Pond	41
Valiyathodu 2	11,12,13,14	Nooram Pond	39
Pallichira	34,35		

Source : Guruvayur Municipality, 2019

7.4 Watersheds

A watershed describes an area of land that contains a common set of streams and rivers that all drain into a single larger body of water, such as a larger river, a lake or an ocean. Watersheds are more than just drainage areas in and around our communities. Protection of the natural resources in our watershed is essential to maintain the health and wellbeing of all living things, both now and in the future. All together there are 13 micro watersheds within Guruvayur Municipality. Figure 7.4 shows the details of micro watersheds.

Table 7.3 Details of watersheds in the town

Watershed Name	Priority	W/S code	Extent (ha)
Anjur Padam Thodu	Low	19K14g	632.4
Areekkara Peragampadam Thodu	Low	18K2a	345.9
Canoli Canal	Low	18K3a	534.3
Chembran Thodu	Low	18K6a	405.8
Choolpuram Perum Thodu	Low	18K2b	474.1
Chowallurpadi Thodu	Low	18K9f	564.1
Kandanisseri Padam Valia Thodu	Medium	18K9j	570.8
Mallad Padam-Kaveed Padma Thodu	Low	18K2c	147.8
Pathirodi nilam	Low	19K20a	532.3
Poowathur Kakkasseri padam Thodu	Low	18K9e	442.3
Valiya Thodu - Cheriya Thodu	Low	18K5a	489.6
Vayalathur padam	Low	18K2d	650
Vellakaya Thodu	Medium	18K1d	193.6

Source: Ground water Department

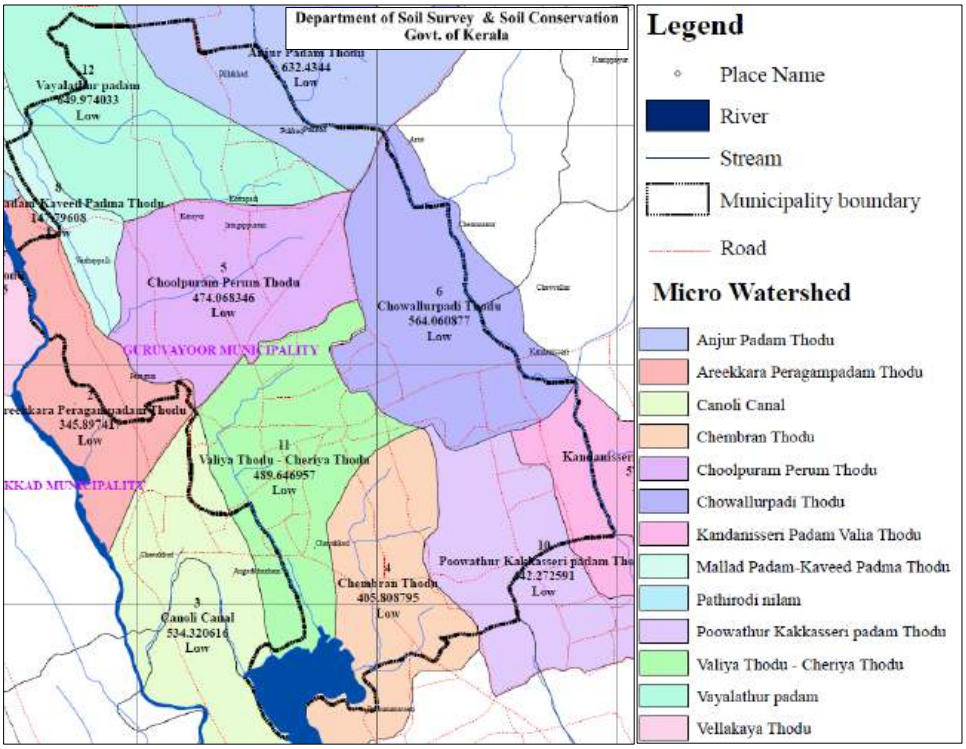


Figure 7.4 Map showing Micro water sheds in Guruvayur (Source: Dpt. Of soil survey & Conservation)

7.5 Soil Suitability

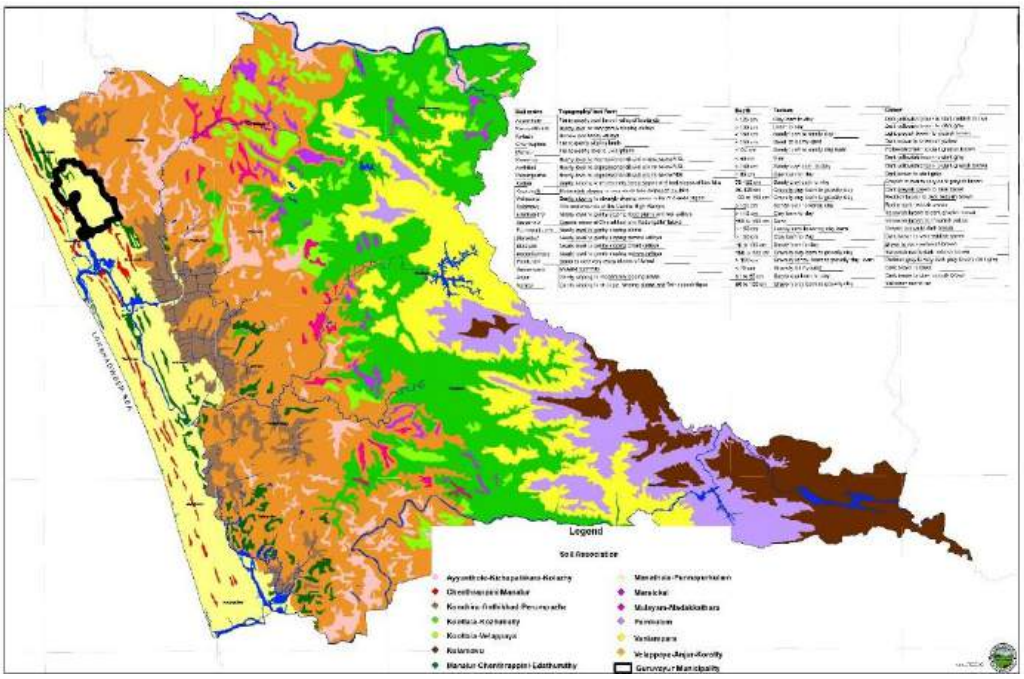


Figure 7.5 Soil Suitability Map

Soil in Guruvayur belongs to the Manathala- Punnayurkulam series which is nearly level to gently sloping plains. Soil type is generally sand or sandy loam. Coconut is most suited for this type of soil followed by other mixed crops like banana and vegetables.

7.6 Livestock and Animal Husbandry

Animal husbandry sector is of vital importance in generating additional employment opportunityand supplemented incomes of small and marginal farmers. Poultry is the main livestock in the Municipality, followed by cattles, goat. Details of livestock in the municipality is shown in table 7.4. As per socio-Economic survey, 52.74% of households have hen.

Table 7.4. Details of livestock Population

Cattles	1129
Buffalo	191
Goat	1351
Pig	7
Poultry	22365
Rabbits	182
Dogs	1800
Elephants	64

Source: Agriculture Office, 2019

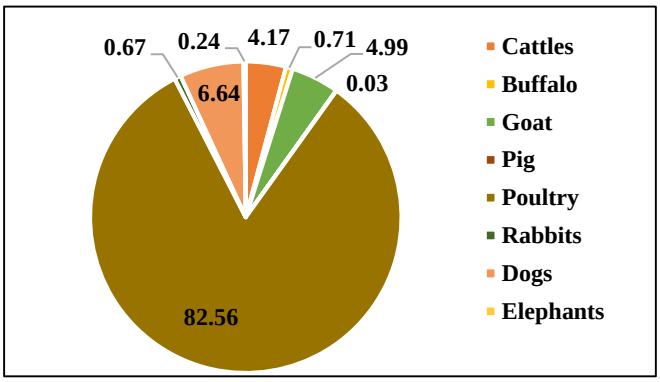


Figure 7.6. Percentage distribution of livestock

There are 9 dairy farms working within the Municipality. 2 at Guruvayur, 2 at Perakam, 3 at Nenmini, and 1 each at Paluvai and Brahmakulam. Indian council of Medical Research (ICMR) recommends 280 ml of milk, 16 gms of meat and 0.25 eggs per day/person respectively. There is a milk society at Thozhiyur with a milk collection of 53000Litres per year. The dairy society produces only 145litres of milk per day out of which only 55litres are sold. But as per ICMR, the requirement is 19603 litres per day. Hence, the remaining requirement is probably being balanced by sale of packed pasteurized milk.

7.6.1 Physical Infrastructure

There are 3 veterinary dispensaries. 1 veterinary dispensary at Guruvayur and 2 Veterinary Subsentres at Pookode and Thaikkad. Details of the veterinary dispensaries are shown in table 7.5.

Table 7.5. Details of Veterinary Dispensaries

Sl. No.	Establishment	Owned By	Location	Doctor	Technical staff
1	Veterinary Dispensary	Govt	Guruvayur	1	2
2	Veterinary sub cente	Govt	Pookode	1	2
3	Veterinary sub centre	Govt	Thaikkad	1	1

Source: District Medical office & Local enquiry

7.7 Inference

About 29% of the land is used for agricultural purposes within the municipality. Coconut is the major crop followed by plantains, vegetables, pepper, Arecanut, Tapioca etc. Paddy cultivation is not practiced much, hence, no padashekhara samities. There are no slaughter houses or hatcheries in the municipality. But poultry and other animals are grown in many households. Hence, eggs produced not for sale and only for personal use. All the milk supplied within the Municipality is not produced within the Municipality. At present only 1 milk society is there. Improvement proposals for coconut cultivations, provision of milk societies, projects to improve homestead animal husbandry practices etc. can be promoted.

CHAPTER 8

INDUSTRY

Growth in the industrial sector is one of the vital figures that influences the economic growth of an area. This chapter explains the existing situation of the industrial activities in Guruvayur Town.

8.1. Existing Scenario

As per available data, Guruvayur has 315 industrial units in the town. It constitutes 4 small scale industries and 311 Micro industries. These industries cover about 0.05sq.km land in the town which is 0.17% of the developed area. As per URDPFI guidelines industrial land use should be 7-9% of the developed area for a medium town. Figure 8.1 shows the spatial distribution and figure 8.2 shows concentration pattern of Industrial land use in Guruvayur Town.



Figure 8.1: Spatial distribution of Industrial Landuse in Guruvayur Municipality

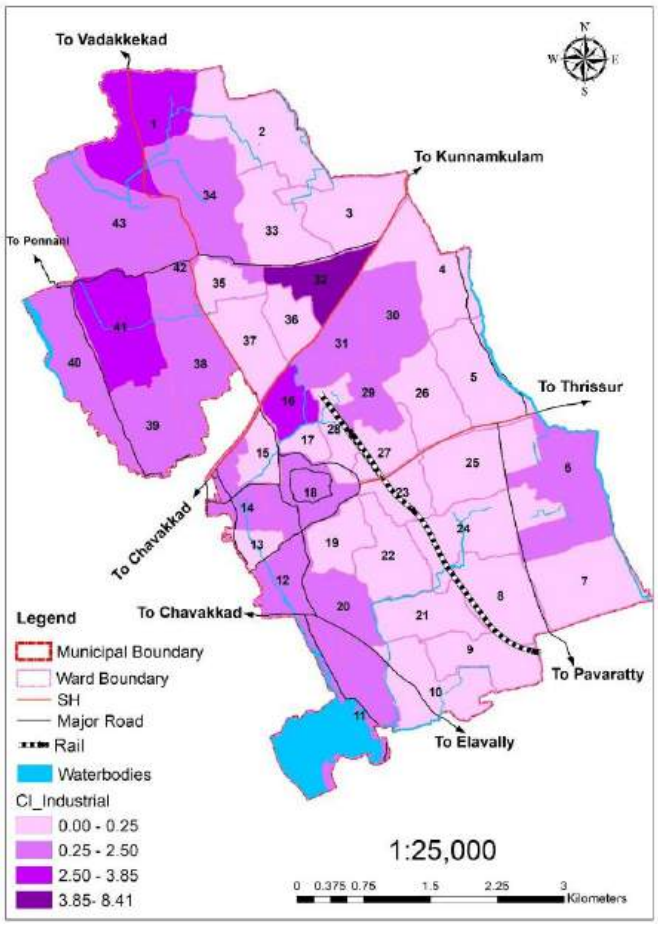


Figure 8.2: Concentration Pattern of Industrial Landuse

Analysing the concentration index of industries shows that ward nos.1, 41, 18, and 32 has higher number of industries. An industrial estate owned by the Municipality is located in ward 41.

Table 8.1 shows the number of units in each type of industry in Guruvayur Municipality. There are no large and medium scale industries in the town. Out of the 311 micro industries 46.9% contributes to Manufacturing sector and 53.1% contributes to service sector. Figure 8.3 shows the growth of micro industries in Guruvayur Municipality.

Land has been acquired by the Municipality for Industrial estates. The Industrial estate at Ward 6 is located near the park being constructed by the Municipality. It extends upto an area of about 50 cents. No units have started to function as yet due to lack of infrastructure.

The industrial estate at Thamarayoor also has an area of 113 cents as per landuse. It has3 industrial units working within it.



Industrial estate at Thamarayoor



Land for Industrial estate at Ward 6

Table 8.1: Number of industrial units in each type of industry

Category	Agro-Based	Building and Construction	Forest/Wood-based	Plastic-based	Chemical-based	Textile-based	Rubber-based	Engineering	Electronics and electrical	Others	TOTAL
Small	2		1					1			4
Micro	69	8	23	4	3	72	1	43	10	78	311
Total	71	8	24	4	3	72	1	44	10	78	315

Source: DIC, Thrissur

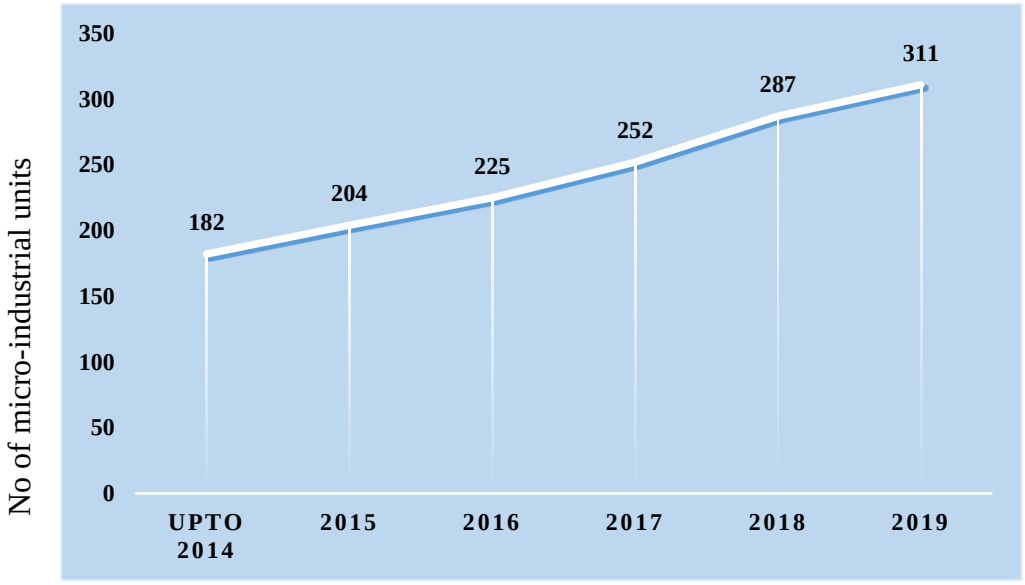


Figure 8.3: Growth of Micro Industries (Source: DIC, Thrissur)

Table 8.2 shows the details of small scale industries and figure 8.4. shows location of these industries.

Table 8.2: Details of small scale industries in Guruvayur Municipality

Sl. No	Name of industry	Type of produce	No. of employees
1	Sunfiesta Foods India Private Limited	Bakery Products	27
2	GG Food Products	Chapathy, Puri &Other Food Products	27
3	Car Care Center	Car Service	6
4	Kripa Timbers	Saw Mill	5

Source: DIC, Thrissur

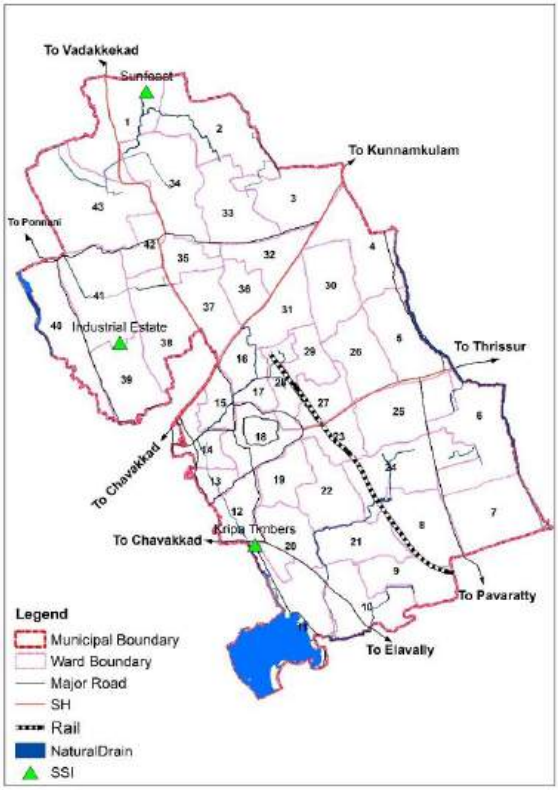


Figure 8.4: Location of small scale industries (Source: DIC, Thrissur)

8.2 Industrial Survey

The major findings from the industrial survey conducted among the existing industries in the town are as follows.

- About 60% of the industries are setup at owned land and building, and 32% on rented land and buildings as shown in figure 8.5.
- About 84% of the industries have their own storage systems.
- Most of the commodities manufactured in this industries include Coconut products, Pappadam, Banana, Tapioca Chips, Plastic Products etc. Each of the industries manufacture different kind of products. Most of the commodities imported include plastic products (Chinese Products).
- Most of the industries market the products within the district itself. Finished products are mainly transported by road. About 80% of the industries manufacture products by manual or mechanical methods. About 76% of the industries adopts value addition of products.
- Export based industries are very few. Most important commodity exported includes coconut, Beedi, Copra etc.
- About 80% of the industries buy raw materials available within the district. Agro based raw materials are used commonly as shown in Figure 8.6.

- Most of the industries manufacture products continuously.
- 84% of the industries uses well as the source of water.
- Major power source is KSEB.
- About 25% of the industries have insufficient parking facility as shown in figure 8.7.

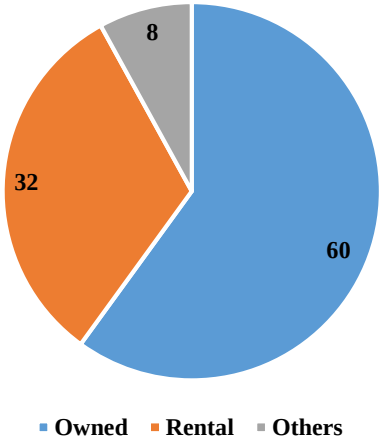


Figure 8.5: Ownership details

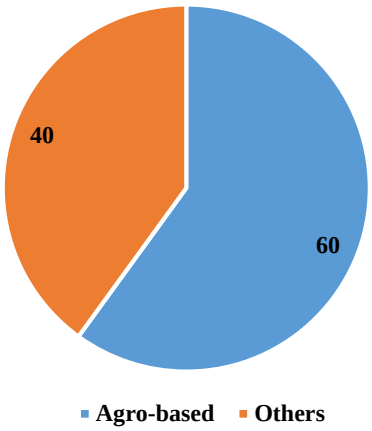


Figure 8.6: Type of Raw Materials

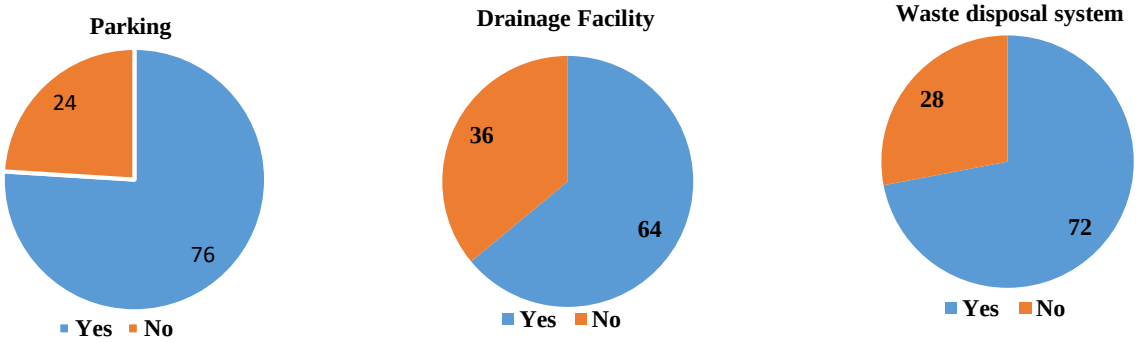


Figure 8.7: availability of Parking, Suitable drainage & waste disposal system

Source: Industrial survey by DT&CP Office, Thrissur

- 72% of the industries have suitable waste disposal system, and 64% of the industries have drainage facilities. 12% of the industries adopt burning as the method of waste disposal. 4% depends on Municipality for waste management.
- 76% of the industries are located on inner roads.
- 20% of the industries have got financial assistance from Government or Semi - Governmental institutions.

8.3. Inference

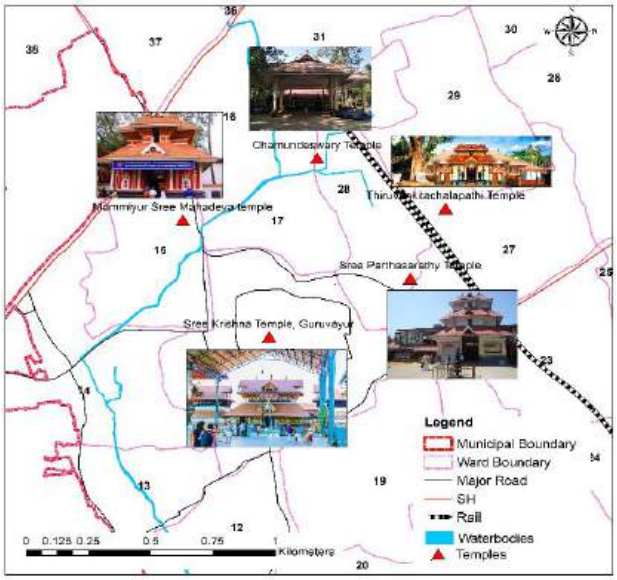
There are no major or large scale industries in Guruvayur Municipality. Micro industries are more which offers jobs to only about 1007 people that also maximum in the service sectors like beauty parlors institutes and retail shops. Agro-based, textile and small scale manufacturing engineering and electronic units are in majority. The absence of cement based, building material based large scale manufacturing units may be due to lack of raw materials and skilled labours and also unavailability of suitable land. Facilities like water and transportation are sufficient, but waste disposal, drainage and parking are to be enhanced. Many of the micro industries are on owned plots. Guruvayur being a pilgrim town has need to manufacture goods needed by the pilgrims, production of which should be enhanced under the MSMED rules. Local economic development methods to be given more focus.

CHAPTER 9
PILGRIMAGE AND TOURISM

Pilgrimage tourism is the type of tourism that entirely or powerfully motivates tourists for the achievement of religious attitude and practices. It has emerged as an instrument for employment generation, poverty alleviation and sustainable human development which promotes international understanding and gives support to local handicrafts and cultural activities. Guruvayur is rich in religious tourism activities, which is derived from the heritage assets. This chapter examines the various aspects of pilgrimage tourism in Guruvayur.

9.1 Pilgrimage Centers in Guruvayur

Guruvayur is rich in religious activities concentrated around the Sri Krishna Temple, which is located at the center of the town. On an average around 30000 people visits the temple daily. Apart from the sri krishna temple, the pilgrims also visit the nearby temples also. Major pilgrim centers within the town are: Sri Krishna Temple, Mammiyur Siva Temple, Sri Parthasarathy Temple and Thiruvenkidom Temple.



Fiaure 9.1: Location of Pilarim centers in Guruvavur

9.1.1 Sri Krishna Temple, Guruvayoor

Guruvayur Sri krishna temple, is one of the most significant pilgrim centres of India. This temple has acquired great popularity among Hindus all over the world. *Guruvayoor* is one of the most sacred and important pilgrim centres of Kerala, which has its own glory and greatness, mainly because of the divinity enshrined in the Sanctum – Sanctorum of the Temple and the unique charm of the idol installed in it.



Figure 9.2: Sri Krishna Temple, Guruvayur

Divine Presence

Guruvayur became divine on account of the "Tapas" performed by Lord Siva and the Prachetas in the Rudratheertha (Sacred tank of the temple) where lord Guruvayurappan has His annual Arattu (holy bath). Under the waters of the Rudratheertham Siva worshipped Mahavishnu. To this place came Prachetas, son of King Pracheenabarhis, to do Tapas for the darshan of Mahavishnu. Sensing the motive of Prachetas, Lord Siva emerged out of the Rudratheertha and revealed to them the "Rudra Geetha", a hymn in praise of Mahavishnu.

The Sacred Idol and its sanctity

The idol of Guruvayur Temple is unique, because it is carved out of "Pathalanjana Sila", and is therefore considered extremely sacred. This idol was once worshipped by Mahavishnu in Vaikunda. Vishnu handed it over to Brahma and the idol after passing through the sacred hands of Brahma, Sutapas, Kasyapa, Vasudeva and finally reached to Sri Krishna. Lord Krishna installed it in Dwaraka and worshipped it. At the time of his ascension to heaven, SriKrishna instructed Udhava to entrust Brihaspathy, the Guru of the Devas, with the task of taking the idol away and installing it in an appropriate place where people could worship it, so as to get salvation in Kaliyuga. Brihaspathy(Guru), and Vayu (the God of air) went around the world search of an ideal place for the installation of the idol and came across Rudratheertha. Lord Siva convinced them that this place, where he had been doing penance for ages was the ideal place for its installation. He was quite content to shift to the nearby Mammiyoor with his consort Parvathi. Therefore, Guru and Vayu performed the installation, and the place later on came to be known by a combination of their names, Guruvayur. Mahamuni Parasurama was present during the installation ceremony. As the idol was once worshipped by Mahavishnu in Vaikunda, Guruvayur is considered to be '*Bhooloka Vaikunda, the Heaven on Earth*'.

Architecture

The eastern nada is the main entrance to the shrine. In the *Chuttambalam* (outer enclosure) is the tall 33.5 m high gold plated *Dwajasthambam* (flag post). There is also a 7 m high *Deepasthambam* (Pillar of lamps), whose thirteen circular receptacles provide a truly gorgeous spectacle when lit. The square *Sree Kovil* is the sacred sanctum sanctorum of the temple, housing the main deity. Within



Figure 9.3: East Nada, Guruvayur temple

the temple there are also the images of *Ganapathi*, *Lord Ayyappa* and *Edathedathu Kavil Bhagavathy*. The temple is square in shape and is encircled by strong and hofty walls. On the eastern and western sides there are impressing *Gopurams.* The porch and its pillars are elaborately carved with heads of elephants and bulls and other sculptures in hold relief and its walls are covered with fresco paintings.

Major Offerings

Devotees makes many offerings so as to get blessings from Guruvayurappan. Major offerings include Avil Nivedyam, Udayasthamanapooja, Gajapooja, Aanayoottu, Thriputhari, Krishnanattam, Thulabharam etc. *Avil offering* is considered important on the first Wednesday of the month of Dhanu. This is based on the belief that it was on this day that Kuchela, an ardent devotee of Lord Krishna offered avil to Him and in return, attained eternal bless and material prosperity. *Udayathamanapooja* is offered for the fulfilment of the wishes in response to the devine grace received. *Gajapooja* is the traditional auspicious worship of elephants and *Anayoottu* is the feeding of the Lord's elephants with rice, jaggerry, plantain, coconut etc; which takesplace in the Elephant Sanctuary at Punnathur Kotta. Thriputhari is an important offering to Guruvayurappan, which falls in the month of Chingam (August – September).

Krishnanaattam, which is the most important art form of the temple, is performed in the temple as an offering for the fulfillment of their cherished wishes, or as a gratitude to the divine grace recieved. This devotional dance drama is a masterly blend of classical and indigenous art styles, enacting the episodes based on Lord Krishna's life. The sublime philosophy of Bhagavatham, devotion of Narayaneeyam and the sweetness of Geeta Govindam are so well combined, and with the brilliant makeup and colourfull costumes. This enchanting dance drama is performed to the recital of Sanskrit verse in sopanam style.



Figure 9.4: Krishnanattam

Important Occassions

Devotees visit the temple on various auspicious occasions such as Ashtamirohini, Vishukkani, Vaishakha, Samkramam etc. and during annual festival of the temple, Narayaneeyam day, Poonthanam Day, Guruvayur Ekadasi, Chembai Sangeethotsavam and during Bhagavatha Sapthaham, Mandala season etc. *Ashtamirohini* in Chingam(August – September) is the birthday of Lord Krishna. 'Palpayasam' and 'Appam' are considered to be important offerings on this day. Devotees throng in the temple to have "*Kani*" (First darshan of the lord) on the day of *Vishu*, the new year day. This most auspicious darshan confers year - long ease, peace and happiness on the devotees. *Vaishakha* season begins in the month of Medam (April – May). Darshan of the lord during this season is considered very auspicious.

The *Samkrama Sandhyas*, a very auspicious occasion for worship of the Lord, is observed by the devotees on the eve of each Malayalam month in a spirit of intense devotion and piety. Thousands of people stream into the temple for a darshan of the Lord at the time of Deeparadhana. Spiritual discources and various cultural programmes befitting Hindu faith are then held at Melpathur Auditorium. These audio and visual programmes, besides enlightening the devotees on spiritual lessons, strengthen them in their faith in God and religions, and impart to them spiritual consolation and mental piece.

The *annual festival* of the temple falls in the month begins of Kumbha (February – March). The festival with the famous elephant race and the festivities go on for ten consecutive days. An *elephant race* is held at the commencement of this festival. The honour of carrying the thidambu of the lord on its back during the festival goes to the elephant that wins the race. During festival seasons, crowds swell to several lakhs every day.



Figure 9.5: Guruvayur Temple Festival and Anayottam

The Devaswom organizes the Narayaneeya Sapthaham in connection with the *Narayaneeyam day* on the 28th Vrichikam month (December), the day on which the saint poet Melpathur Narayana Bhattathiri completed the composition of "Narayaneeyam". There will also the literary symposia by scholars on various aspects of Narayaneeyam.

The day of the star Aswathi in the month of Kumbham (February – March) is celebrated as the *Poonthanam day* in commemoration of Saint Poonthanam, a great devotee of Lord Guruvayurappan, who enriched Malayalam devotional literature with his renowned poetic composition Jnanappana (son of wisdom), a philosophical masterpiece of all times.

Though all Ekadasi days are generally considered auspicious at Guruvayur temple, the *Ekadasi* falling in the month of Vrischika (November – December) is considerd most auspicious. According to mythology, it was on this day that Lord Krishna imparted Shrimath Bhagavath Geetha to Arjuna at the battlefield of Kurukshetra. *Chembai Sangeetholsavam* is a fifteen-day music festival which lasts till the Ekadasi night in memory of the Great Karnatic Maestro Chembai Vaidyanatha Bhagavathar, who was an ardent devotee of Lord Guruvayurappan, and who used to offer his musica recital on the Ekadasi day every year till he left his mortal body.




Figure 9.6: Guruvayur Ekadasi and Chembai Sangeethotsavam

Sabarimala devotees from other states as well as from North and South Kerala make it a point to visit Guruvayur temple during pilgrimage. The forty-one-day long *Mandala season* commences on the first of Vrischikam.

Other Facilities for Devotees

The temple administration provides facilities for conducting Marriages, Annaprasam (Choroonu), Vidyarambham, Prasada Oottu etc. Marriages are conducted when the temple remains open, at the Kalyana Mandapam in front of East Gopuram. The Annaprasam (Choroonu) can be performed in the temple precincts. Vidyarambham is conducted on




Figure 9.7: Kalyana Mandapam and Prasada Oottu

Vijayadasami Day in the Adhyathmika hall of the temple on the west side. There are arrangements for free feeding as prasadam at the dining hall for the pilgrims every day.

Devaswom Administration and Related Amenities

The Guruvayur Devaswom provides several amenities for the devotees coming to the temple. ***Accomodation facilities*** are provided by Devaswom Board in Four places. Kousthubham, Panchajanyam and Sreevalsam are the Guest houses owned by Devaswom which accommodates 889 peoples. There were two Sathram areas owned by Devaswom on the East and South Nadas of the temple, for accommodating the devotees in the olden days. Later the Sathram in the East Nada is reconstructed and presently known as Kousthubham rest house. Other one located on the South Nada is presently used by the police officials who is in charge of the security duties within the temple. Kururamma Bhavan located on the West Nada accommodates old aged women devotees. Their location and accommodation capacity is given in table 9.1.

Table 9.1: Accomodation facilities of Guruvayur Devaswom Board

Sl.No.	Name	No. of Rooms	Capacity
1	Kousthubham Rest House (East)	86	268
2	Panchajanyam Rest House(South)	105	363
3	Sreevalsam Annexe(South)	89	258

Source: Guruvayur Devaswom Board, 2019



Kururamma Bhavanam



Kousthubham Rest House

There are ***Auditoriums*** owned by Guruvayur Devaswom for conducting cultural programmes, Marriages, Vidhyarambham etc. *Melpathur Auditorium* located on the right side of the East Gopuram commemorates the great Saint – poet Melpathur Narayana Bhattathiri, who worshipped Lord Guruvayurappan by composing the superb devotional classical Narayaneeyam. Devotional functions such as spiritual disclosure, performance of traditional forms, classical music and symposia on cultural and spiritual topics are held here. This hall accommodates more than 2000 people. Sapthaham during Ashtami Rohini and the spiritual dislosures during Vaishakha (April-May), Ramayana Masa (July-August) and Mandala Pooja

(November – December) is conducted in the Melpathur Auditorium. *Poonthanum auditorium* which is dedicated for the memory of great poet Poonthanam is also owned by Devaswom and is given for marriages or cultural programmes. Bhagavatha Sapthaham during Vaishakha season (April-May) and Vidyarambham ceremony is also conducted in the Temple Adhyathmika hall located within the temple.



Melpathur Auditorium



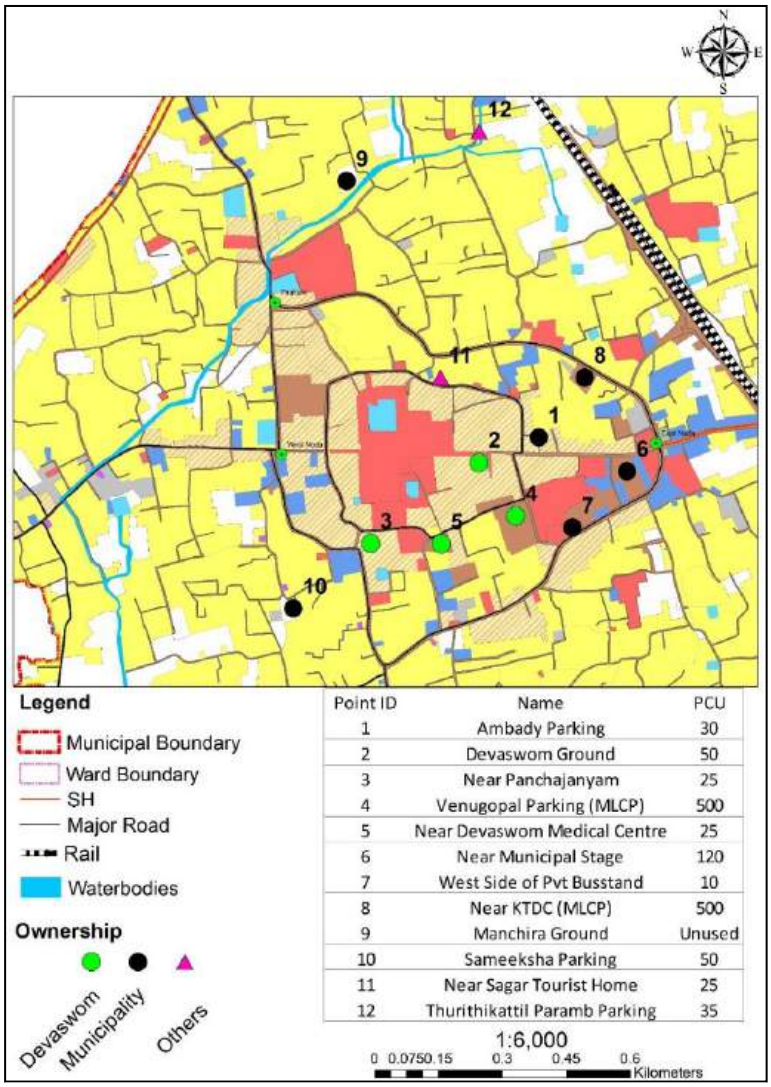
Poonthanam Auditorium

Two ***Comfort stations*** owned by Devaswom, one at East Nada and one on the west side of the temple pond, which are kept opened, day and night. Pilgrims who arrive in odd hour and those who do not find or require immediate lodging accommodation, can keep their luggage at a normal fee. Also there are lavatories on the north and south corners, away from the East Gopuram for the use of pilgrims.

With a view to control and streamline the incoming vehicular traffic, Guruvayur Devaswom has arranged Pay and Parking facility for vehicles at various locations as shown in figure 9.8.

Municipal Administration and related Amenities

Guruvayur Municipal administration also concerned about the huge influx of pilgrims visiting the temple day by day. There are provisions for accommodation of pilgrims, facilities for parking of tourist vehicles, Comfort stations etc. A Government Guest House is located on the West Nada of the temple. A Tourist Facilitation center near Private Bus Stand and Pilgrim Amenity Center at West Nada are the new projects under the Centrally-sponsored PRASAD scheme. Tourist facilitation center is expected to provide accommodation for around 150 persons. There are parking areas provided by the Municipality to control the traffic within the town, as located in figure 9.8. A multi-level car parking is being built under the supervision of Municipality near KTDC Tamarind under the AMRUT Scheme, which can accommodate 7 buses, 38 mini-buses, 363 cars and 143 bikes approximately. There are 2 Government Guest houses by KTDC namely Tamarind and Nandanam, which can accommodate 179 persons.



Point ID	Name	PCU
1	Ambady Parking	30
2	Devaswom Ground	50
3	Near Panchajanyam	25
4	Venugopal Parking (MLCP)	500
5	Near Devaswom Medical Centre	25
6	Near Municipal Stage	120
7	West Side of Pvt Busstand	10
8	Near KTDC (MLCP)	500
9	Manchira Ground	Unused
10	Sameeksha Parking	50
11	Near Sagar Tourist Home	25
12	Thurithikattil Paramb Parking	35

Figure 9.8: Parking Locations within the Municipality



KTDC Tamarind



KTDC Nandanam



MLCP near KTDC Tamarind

Figure 9.9. Facilities for pilgrims under Municipality

Other Facilities

Besides the facilities provided by the Guruvayur Municipal Administration and the Guruvayur Devaswom Board, facilities are also provided by other private agencies also. It includes private parking areas, Hotels/Lodges/Restaurants etc. There are 137 private hotels and lodges within Guruvayur which can accommodate about 7022 persons.

9.1.2 Mammiyur Siva Temple

It is located on left side of Guruvayoor – Kunnamkulam road about 300 meters west of Guruvayoor temple. This is a famous Siva temple located very near to the *Guruvayoor Sree Krishna* temple. This temple is famous for its mural paintings on the walls of *Sree Kovil.* There are two important deities; *Mahadeva* and *Lakshmi Narayana.*



Figure 9.10.: Mammiyur Siva Temple

9.1.3 Sree Parthasarathy Temple, Guruvayur

Parthasarathy Temple at Guruvayoor is situated close to the Guruvayoor Railway Station. Lord Krishna is worshiped in the form of Arjuna's Charioteer (ParthaSarathy). *It is believed that this Glorious "Idol" was the "One" worshiped by Kunthi Devi, mother of Pandavas, in Indraprastha during dwaparayuga the legend has it that their Idol was said to be picked up from the Holi Gangas by his Holiness Adhi Sankaracharya swamigal under the divine Guidance of Sage Narada and consecrated by him at the very same place at Guruvayur, where the Idol was found.*



Figure 9.11: Sree Parthasarathy Temple

9.1.4 Thiruvenkidom Temple, Guruvayur

The Thiruvenkitachalapathy Temple situated at Thiruvenkidom desom which is situated within a kilometer to the north east of the famous SreeKrishna Temple, Guruvayur is an ancient and unique shrine in many respects. The most noted worthy point is that the deity worshipped at this temple is the same Lord Thiruvenkitachalapathy (Balaji) worshipped at the world famous Tirumala Temple in Andrapradesh. As per astrological findings made by reputed astrologer, late Puduseri Vishnu Namboodiri, more than one thousand years ago, a sage from the Tirumala Temple came over to Guruvayur and wishing to establish a temple for his Lord Venkitachalapathi at Guruvayur where there is already a temple for Lord Sreekrishna, sat by the side of the present temple tank, prayed for and obtained permission of the Lord for such a temple at Guruvayur and then established this temple after bringing an idol from Tirupati.



Figure 9.12: Thiruvenkidam Temple, Guruvayur

9.2. Pilgrim count and Analysis

The daily pilgrim count taken by the Police through the scanners placed at the three nadas of the temple was obtained to analyse the pilgrim count.

Figure 9.13 shows the month wise total number of pilgrims visited Guruvayur Temple during 2019-2020. It reveals that maximum number of pilgrims visited the temple during the month of December (12 Lakhs). Least number of devotees visited the temple during July. On an Average around 30000 pilgrims are visiting daily. Figure 9.14 shows the month wise daily average number of pilgrims visited the temple.

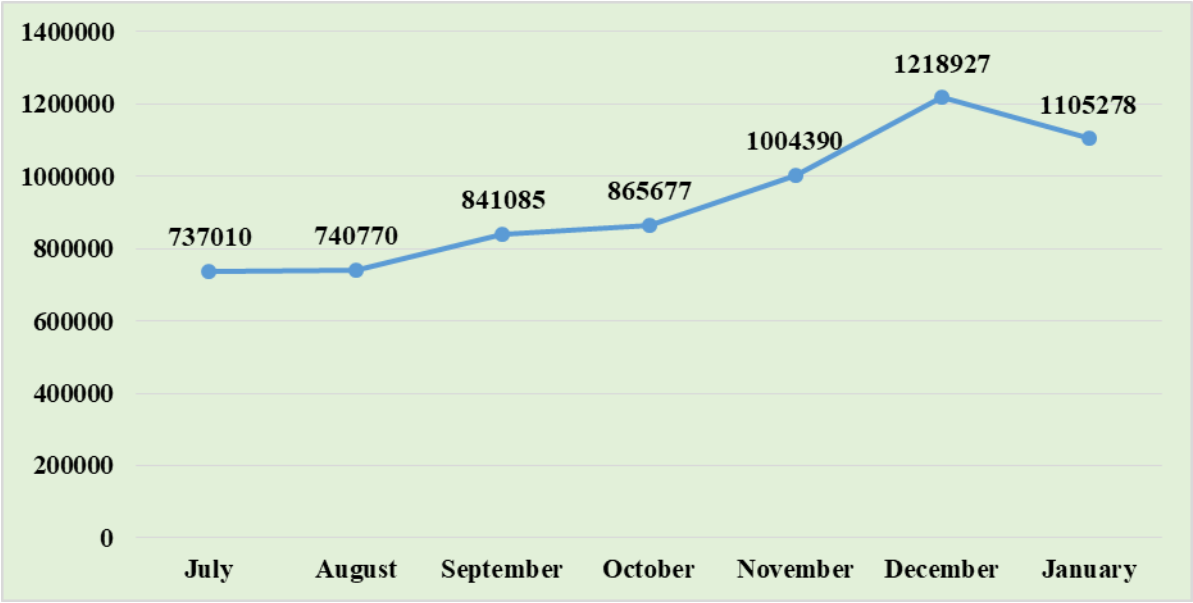


Figure 9.13: Month wise Total Number of Pilgrims visited during 2019-2020
Source: Guruvayur Temple Police Station, 2019-2020

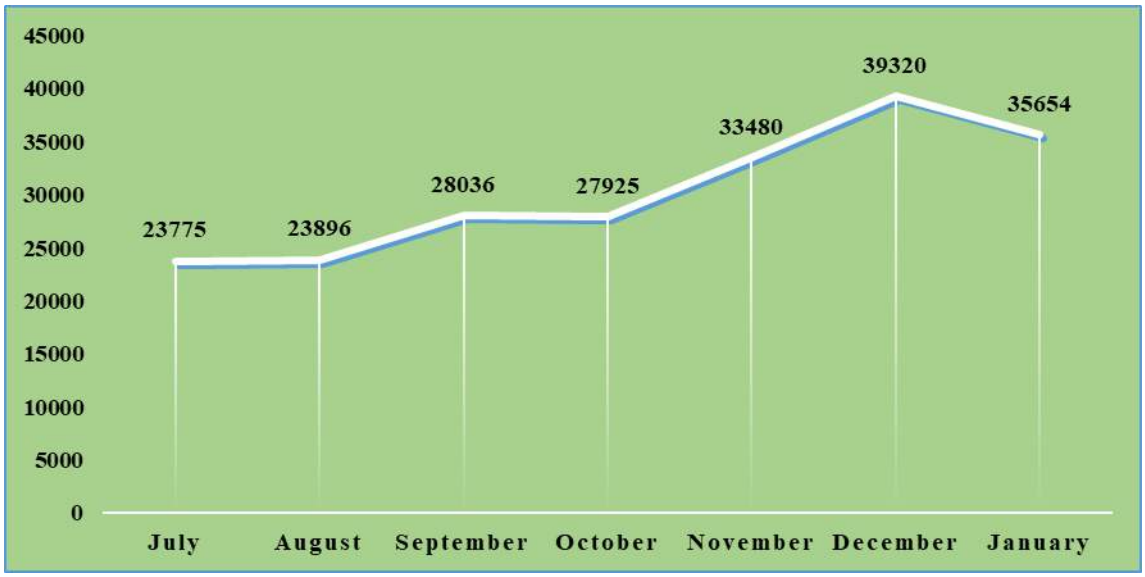


Figure 9.14: Month wise Daily Average of Pilgrims visited during 2019-2020
Source: Guruvayur Temple Police Station, 2019-2020

Table 9.2 shows the number of pilgrims visited the temple during the peak and lean days of every month. It is seen that maximum number of devotees visited the temple on Sundays and during some auspicious days such as Sreekrishna Jayanthi and onam days. Sreekrishna Jayanthi is a grand festival which is celebrated to commemorate the birth of Lord Krishna who is believed to be the eighth incarnation of Lord Vishnu. Tuesday is the day in which least number of devotees are coming in most of the months.

Table 9.2: Pilgrim count on lean and Peak days of every month

Month	Peak day		Lean day	
	No. of Pilgrims	Day	No. of Pilgrims	Day
July	40051	Sunday(14/07/2019)	16188	Tuesday(30/07/2019)
August	58747	Friday(23/08/2019) Sreekrishna Jayanthi	9981	Saturday(08/10/2019)
September	45541	Thursday(12/09/2019) Onam	16579	Tuesday(03/09/2019)
October	45868	Sunday(06/10/2019)	15349	Tuesday(22/10/2019)
November	52599	Sunday(17/11/2019)	21483	Tuesday(05/11/2019)
December	97166	Sunday(08/12/2019)	25789	Tuesday(10/12/2019)
January	49179	Sunday(05/01/2020)	22148	Tuesday(28/01/2019)

Source: Guruvayur Temple Police Station, 2019-2020

The average number of pilgrims visited during week days in peak (December) and lean (July) months is shown in figure 9.15. It is clear that most of the devotees visit the temple on Sundays followed by Saturday, Wednesday and Thursday.



Figure 9.15: Daily Average number of Pilgrims visited during peak(December) and lean (July) months
Source: Guruvayur Temple Police Station, 2019-2020

Figure 9.16 shows the comparison of the number of pilgrims visited during 2005-2006*(Data as per the Development plan for Guruvayur town published in 2011)* and 2019-2020. It shows that compared to the year 2005-2006, there is a considerable decrease in the number of pilgrims visited the temple.

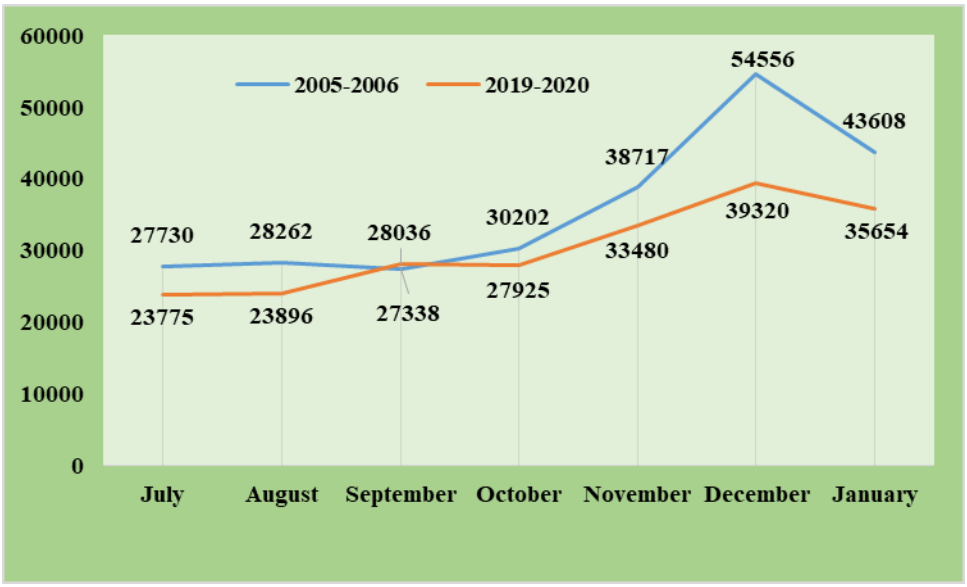


Figure 9.16: Comparison of the number of devotees (2005-2006 & 2019-2020)
Source: Guruvayur Temple Police Station, 2019-2020

9.3 Pilgrim survey and Analysis

A questionnaire survey was conducted among the people coming to the city, especially for the people visiting the temple, to understand the character and pattern of pilgrim activities concentrated around the temple area. The questionnaire was prepared in such a manner to analyse the adequacy of facilities provided in the temple premises to the pilgrims. The survey was conducted based on pilgrim count by considering peak days, lean days, special days etc. The results obtained from the detailed analysis of the pilgrim survey are as follows.

- Figure 9.17 shows the purpose of people visiting Guruvayur Town. About 80% of the people coming to the town are going to/coming from Guruvayur Srikrishna Temple. 15% is visiting the town for Job related activities or they are just passing through the town. Other 5% is visiting the town for education, business or other purposes.

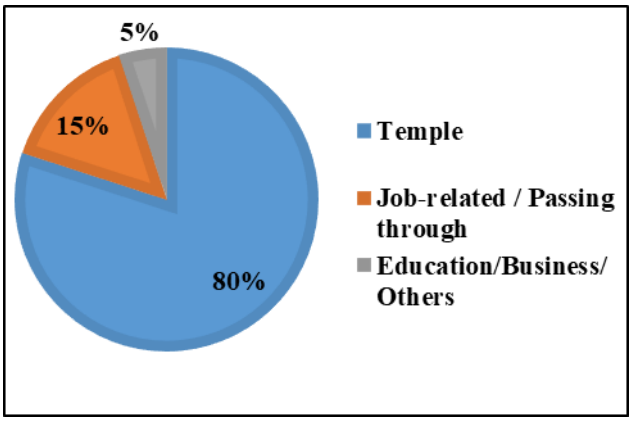


Figure 9.17: Purpose of people visiting Guruvayur Town

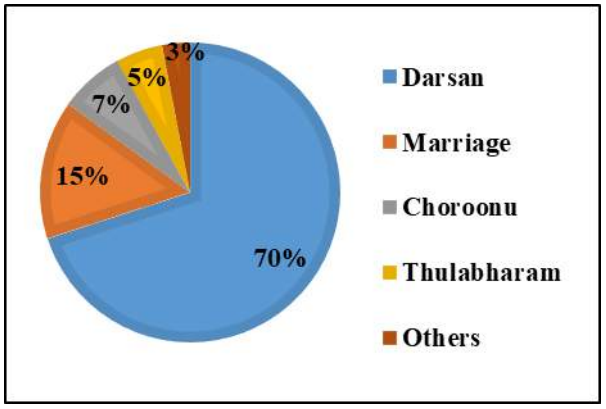


Figure 9.18: Category distribution of pilgrims visiting Guruvayur Temple

- Among the people who visits Guruvayur Srikrishna Temple, 70% is coming to get Darsan of Guruvayurappan. 15% is coming for marriage and other 7% is coming for Choroonu, 5% for Thulabharam and 3% for Vahanapooja, Arangettam etc. Category

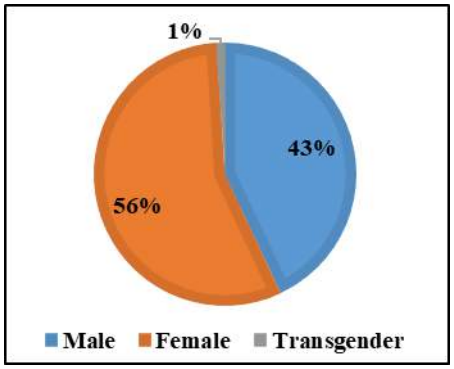


Figure 9.19: % of male/female visiting Guruvayur

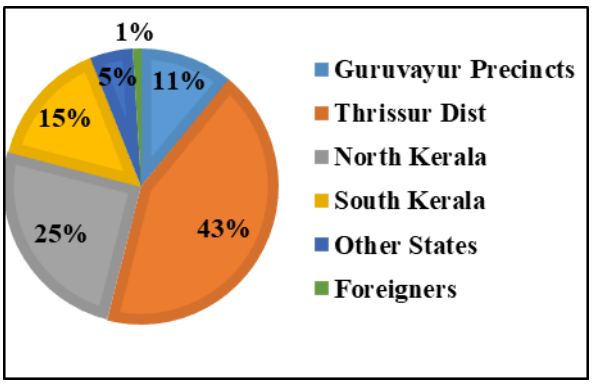


Figure 9.20: Native place of Pilgrims visiting Guruvayur

distribution of pilgrims are shown in figure 9.18.

- About 56% of the pilgrims are females as shown in figure 9.19.
- About 43% of the people who visits Guruvayur Town have their native place within the district itself and 11% is residing within the Municipality and surroundings. 25% is from North Kerala and 15% is from South Kerala. About 5% is from other states and 1% is found to be foreigners as shown in figure 9.20.
- About 42% of the pilgrims are in the age group 40 - 60years and 38% in the age group 25 - 40 years (*Figure 9.21*).
- More than half of the pilgrims arrive in groups, where as 12% are individuals (*Figure 9.22*).

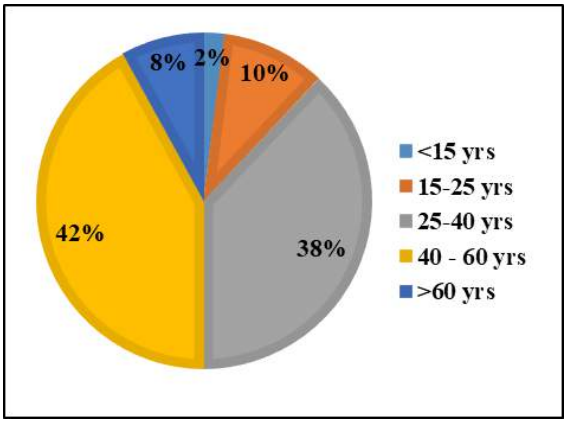


Figure 9.21: % Age distribution of pilgrims visiting Guruvayur

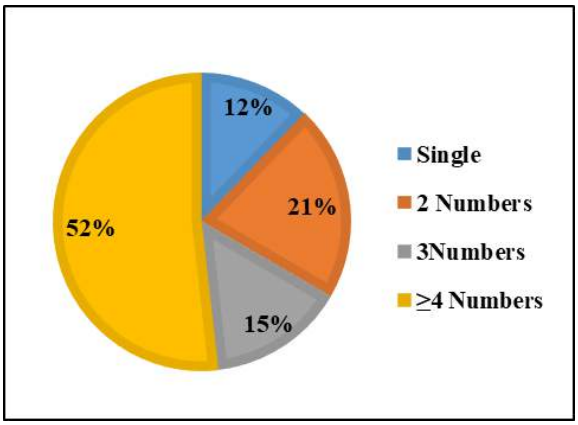


Figure 9.22: % distribution – group of pilgrims visiting Guruvayur

- About 47% of the pilgrim population depends on public transport facilities (*Figure 9.23*). As shown in figure 9.24. 75% of the pilgrims who use own/rented vehicle as the mode of transport, avails pay and parking facility provided by Municipality, Devaswom etc. It is to be noted that 22% of the pilgrims park the vehicles on roadside itself.

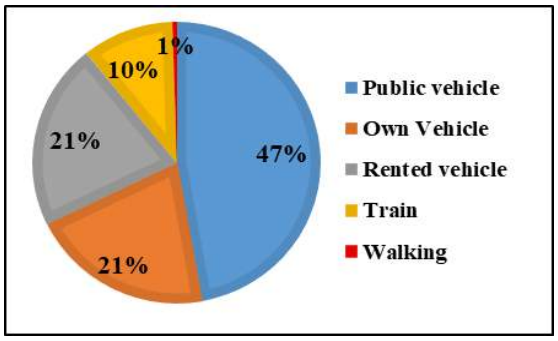


Figure 9.23: Mode of transport of pilgrims

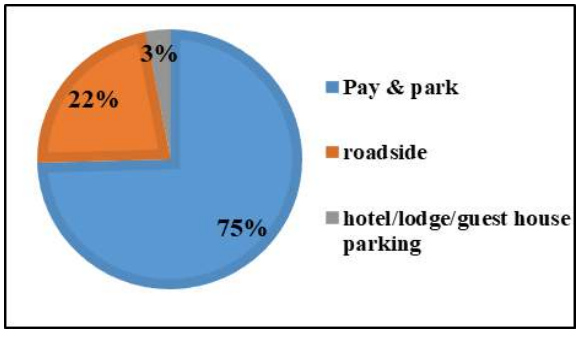


Figure 9.24: Parking opted by Pilgrims

- About 45% of the pilgrims have an expenditure pattern of less than Rs.500/- as shown in figure 9.25.
- About 76% of the pilgrims visit the temple occasionally. Among the people who visits weekly, 30% of them wish to visit the temple on Thursday, which is a special day for Guruvayurappan. (*Figure 9.26*)
- About 56% of the pilgrims spend 2 to 5 hours in the temple. (*Figure 9.27*)
- About 15% of the pilgrims are staying in the town itself. Majority of them stay in Lodges/Hotels located in the temple premises. About 10% of them got accommodation in Guruvayur Devaswom board Guest house. About 66% of them have the opinion that the room rate is reasonable. (*Figure 9.28*)

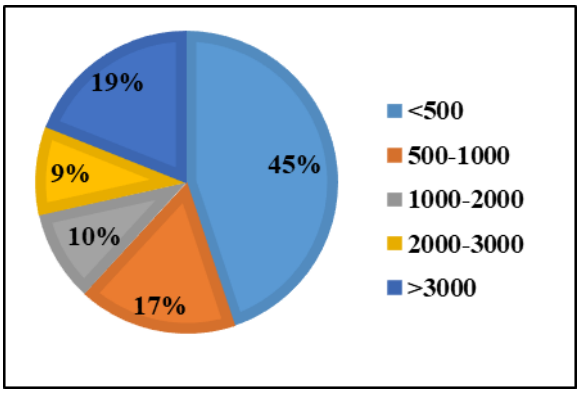


Figure 9.25: Expenditure pattern of pilgrims

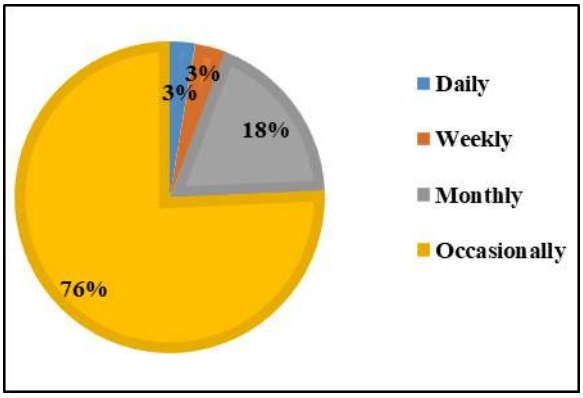


Figure 9.26: Frequency of visit of pilgrims

- About 68% of the pilgrims visits Guruvayur only. 15% of them wish to visit Mammiyur Siva Temple which is nearer to Guruvayur Temple as shown in figure 9.29.
- More than 80% of the pilgrims wish to visit the temple again.
- About 67% of the pilgrims are on the opinion that the queuing facility is good. But 30% are on the opinion that the facility is of moderate quality. They suggested that the qeueing system should be improved, Prasada counters should be improved.
- Many of the pilgrims suggested that the road conditions should be improved. Available facilities are insufficient. Bus stand or taxi stand should be improved. There are foul smell arising from the drainages. They suggested that measures should be taken to improve the cleanliness of the town.
- Many of the pilgrims reported that the attitude of Devaswom employees and security is not so good. Equal consideration should be given to all visitors. They also suggested that special consideration should be given to old age persons or senior citizens and for mothers carrying baby child.

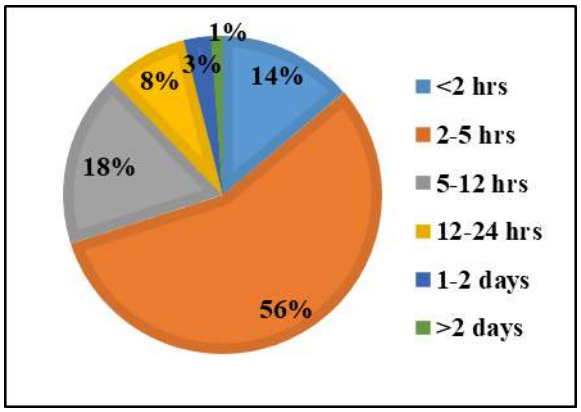


Figure 9.27: Duration of Stay of pilgrims

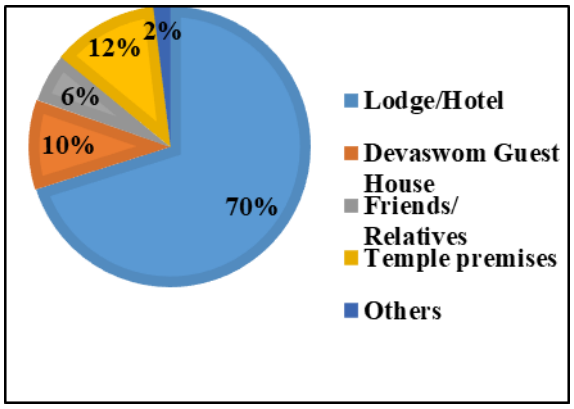


Figure 9.28: Accomodation Status

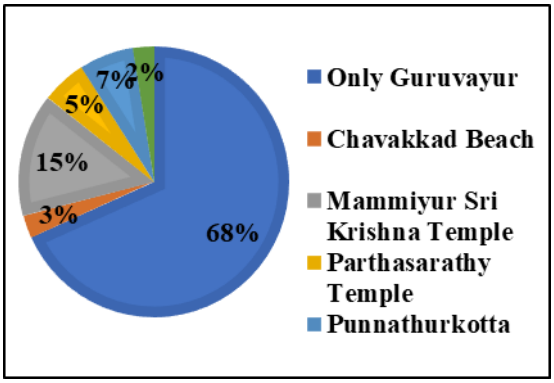


Figure 9.29: Choice of pilgrims to visit nearby places

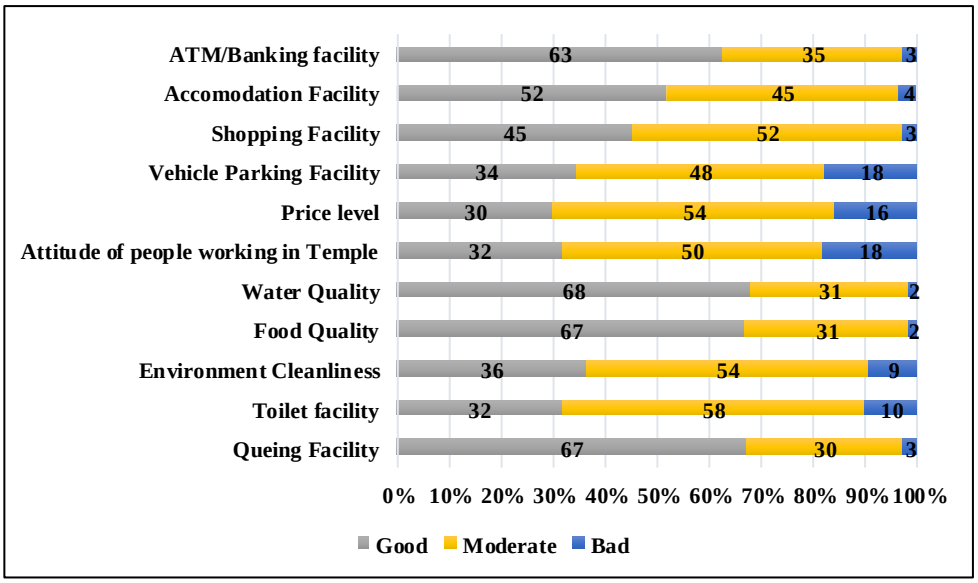


Figure 9.30: Level of satisfaction of pilgrims

- Most of them reported that the toilet facilities are not good and it should be improved. Other problems noticed include the unavailability of water in free use toilets, less number of toilets, nuisance of dogs, unavailability of waste bin near temple premises etc. Figure 9.30 shows the level of satisfaction of pilgrims on various aspects.

9.4 Tourism

Heritage areas and cities with historical and tangible / intangible cultural values; preserved, conserved and evolved by social interactions and changing economic factors have given shape to tourism in these cities. Guruvayur town is rich in its heritage and pilgrimage activities. Figure 9.31 shows the Annual variation of Domestic Tourists arrived in Guruvayur. It shows that the number of Domestic Tourists shows a decreasing trend in the last years.

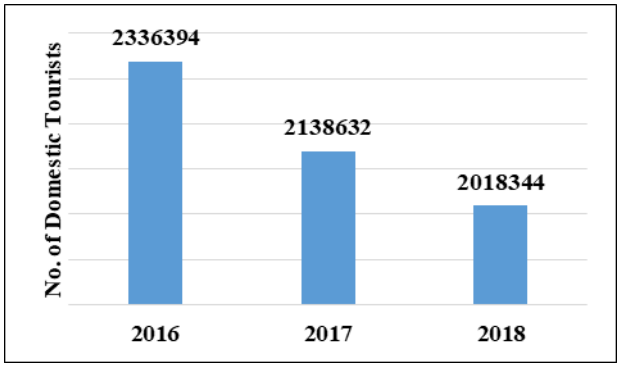


Figure 9.31: Annual variation of domestic tourists in

Source: Tourism Statistics Book, 2017, 2018

As per Tourism Statistics, Destination wise foreign tourist arrival has been increased as shown figure 9.32. Comparing the domestic tourist arrivals of Guruvayur, Thrissur District and the state it is clear that Kerala shows an increase in tourist statistics, whereas Thrissur shows a downward trend in tourism as shown in figure 9.33.

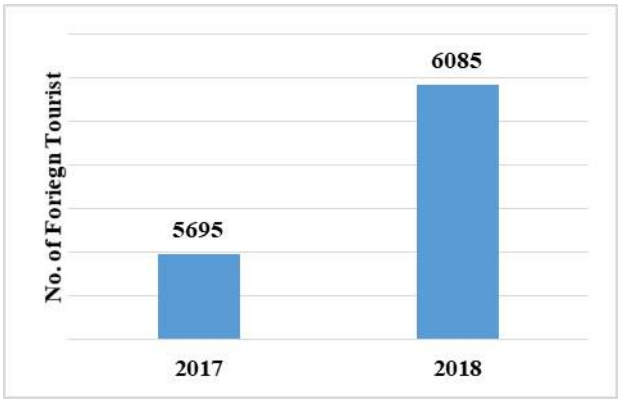


Figure 9.32: Annual variation of Foriegn tourists in Guruvayur

Source: Tourism Statistics Book, 2017, 2018

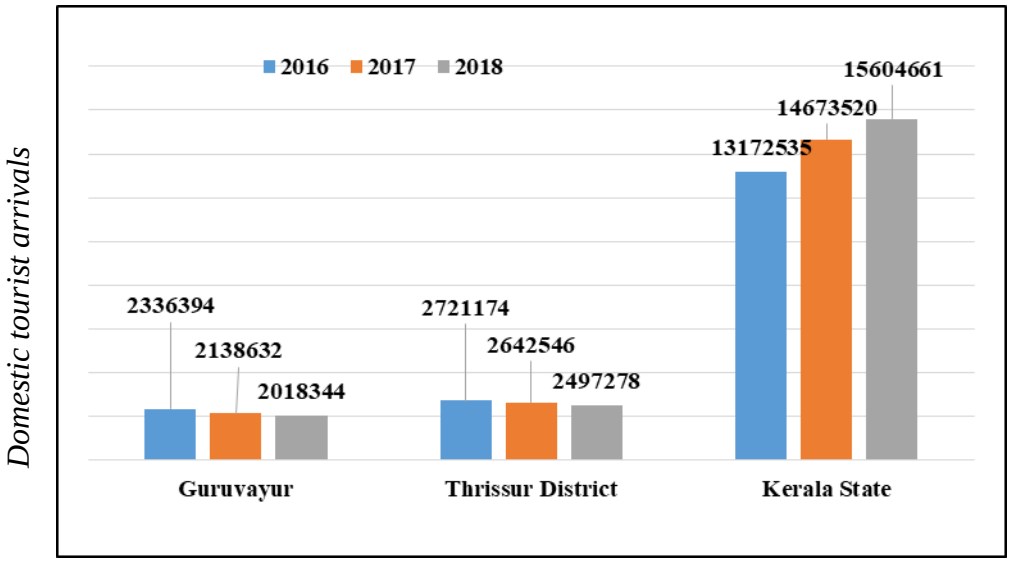


Figure 9.33: Comparison of Domestic Tourists with State and District

9.4.1 Tourism Infrastructure

Guruvayur is well connected by road and rail networks. Adequate parking facilities, accommodation facilities, Comfort stations etc. are the immediate needs. With the intention of comprehensive development of the town, effort is taken by the Municipal and Devaswom Authorities to provide the best infrastructure facilities to the pilgrim tourists, in addition to the existing facilities under PRASAD scheme. This project envisages to provide the facilities like hotels at an affordable cost, transport facilities, drinking water, sanitation, sewage system and a clean environment to the tourists who visit the temple.



Figure 9.34: Tourist Facilitation Center



Figure 9.35: Tourist Amenity Center, West Nada

The projects of Guruvayur Municipality under PRASAD scheme include Tourist Facilitation Center near Private Bus Stand and a Pilgrim Amenity center at West Nada. Tourist Facilitation center provides accommodation facility with 156 beds in the dormitory. In association with this restaurants, washing rooms, Toilet and Bathing facilities, waiting rooms, Internet facilities, ATMs etc. are also provided. The Pilgrim Amenity center at the West Nada is provided with wash rooms, clock rooms, waiting rooms etc. A multi level car parking area is also under construction, owned by the Municipality under AMRUT scheme.



Figure 9.36: Multi level Car Parking near Kousthubham

The projects of Guruvayur Devaswom Board under PRASAD scheme include the construction of a Multi-Level Car Parking area near Kousthubham Rest House (Venugopal Parking) with a total project cost of 24.5 crores having an area of 1600sq.m. Another project includes installation of CCTV cameras in and around temple premices. Around 305 cameras are

expected to be installed with a total project cost of 6 crores. Server room and equipments are located within the Devaswom Office building.

9.4.2 Tourism Potential Areas in and around Guruvayur Municipality

Guruvayur Temple is a place facilitating pilgrim tourism. Apart from that, pilgrims also visit the nearest places such as Mammiyur Siva temple, Parthasarathy temple, etc and also cultural toruism centres like Punnathur Kotta and Devaswom Museum. There are many other nearby destinations such as Chavakkad beach, Palayur Church, Vallabatta Kalari Kendra etc. which are equally important when it comes to listing tourist spots. Figure 9.37 shows the major tourism spots near Guruvayur.

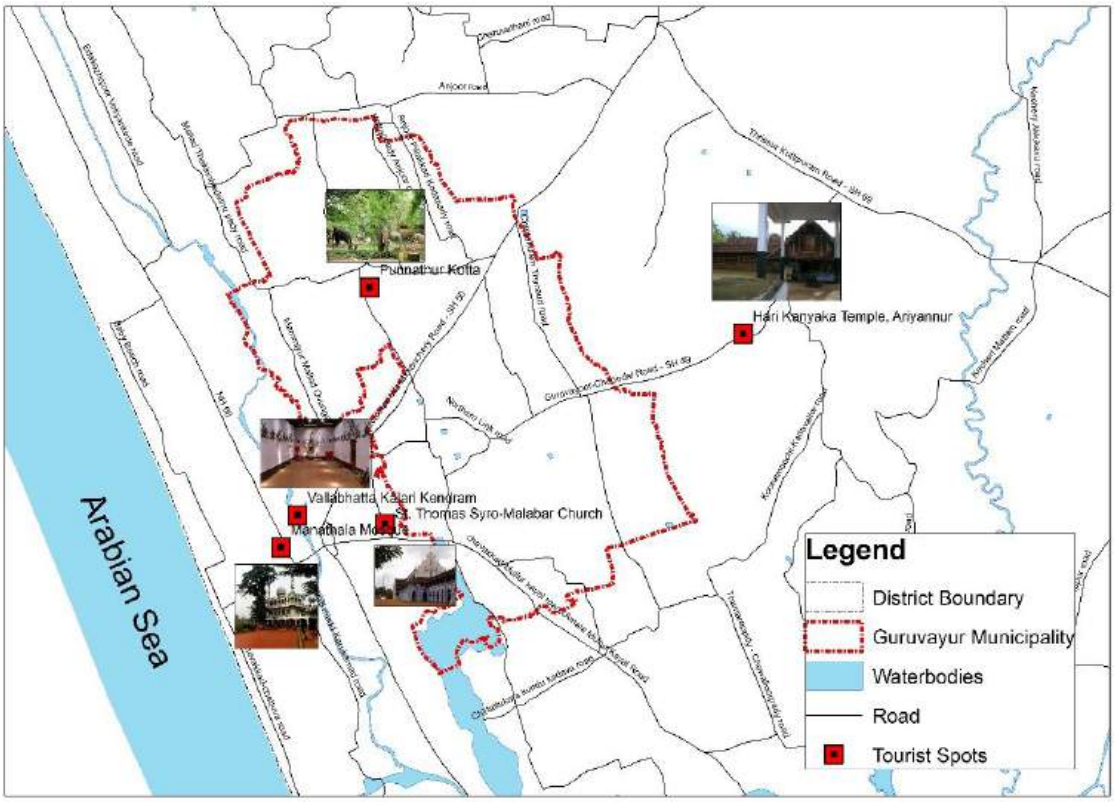


Figure 9.37: Tourism spots near Guruvayur

1. Elephent Sanctuary at Punnathur Kotta (Anakkottil)

It is located on North of Guruvayoor - Puthuponnani road, about 2 kilometers from Guruvayoor. A large number of pilgrims and tourists visit this fascinating spot every day. Punnathur Kotta is an ancient Palace of the Punnathur Rajas, now in the possession of the Devaswom. This fort was the residence of Nambidi, the Kotta erected between 1754 and 1758 AD is low tiled building enclosing an open courtyard and with it spacious garden and adjoining temples and ponds. There was a *Kalari* and *Natakasala* besides this building. The door leading into the *Nadumuttam* is adorned with the most intricate and skilful carvings. The

estate record room contains wealth of old documents written on cadjan in *Kolezhuthu* characters. There is also two ancient temples where Lord Siva and Bhagavathi are worshipped.



Figure 9.38: Punnathur Kotta (Anakkottil)

2. Chavakkad beach



Figure:9.39: Chavakkad Beach

Chavakkad beach located at 5km distance from Guruvayur town centre. The silent nature makes the beach a tourist favourite spot, Coconut-borderedseashore provides a panoramic view of rare natural scenic beautyand entices thousands of tourists. Fringed shadow of coconut lagoons and the mesmerizing atmosphere make Chavakkad Beach a tourist spot round the year. As per a study conducted by the department, about 75% visitors of the beach are the pilgrims who visited Guruvayur Temple. Apart from tourist visits, local population also relishes this beauty. Other destinations connected to this beach are the lighthouse and Azhimugam (place of confluence of sea and river).



Figure 9.40: St. Thomas Church, Palayur

3. Palayur Church

This church was established by St. Thomas in AD 52 and is believed to be the oldest church built in India. The main highlight of the church is the "Thaliyakulam" which is said to be the place where St. Thomas baptized the local people.



Figure 9.41: Vallabhatta Kalari Kendram

4. Vallabatta Kalari Kendra

Vallabhatta Kalari Kendram which is situated in Chavakkad is conducting Kalaripayatt workshop, demonstrations and Kalari exhibitions. They train people, police and those who require self-protection. They also specialise in Kalari Marma Chikilsa and Uzhichil treatment.

5. Manathala Mosque

Manathala mosque is one of the famous mosques in Thrissur District. Hydroskutty Mooper – one of the freedom fighter is buried here. Manathala Nercha is the famous festival of this mosque.

9.5 Inference

Guruvayur is rich in religious activities concentrated around the Sri Krishna Temple, which is located at the center of the town. On an average, around 30000 people visit the temple daily. It is the need of the hour to provide the necessary facilities required for the large number of pilgrims, in addition to the existing facilities in terms of accommodation, sanitation, security etc. Tourism potentials of the town and its surrounding areas should be connected and developed so as to accelerate the economic development of the town.

CHAPTER 10

TRADE AND COMMERCE

The economic development of a town depends on the commercial activities existing in the town. Since Guruvayur is a major pilgrim center, it can contribute much to the development of the town. This chapter explains the existing scenario of commercial activities in the town.

10.1. Existing scenario

One of the major economic base of Guruvayur town is Trade and Commerce especially the trading activities related to function of temple. This factor facilitates Guruvayur to become a thriving commercial centre and facilitator for economic development. Main commercial nodes of the town are Guruvayur, Thaikkad and Kottappadi. As per URDPFI standards, for medium towns, the commercial land required varies from 4 -6% of the total developed land. As per the existing land use 2019, Commercial area constitutes only 0.83% of the total area. This includes an area of 0.24 Sq.km. Figure10.1 shows the spatial distribution and figure10.2 shows concentration pattern of the commercial land use in Guruvayur Town.

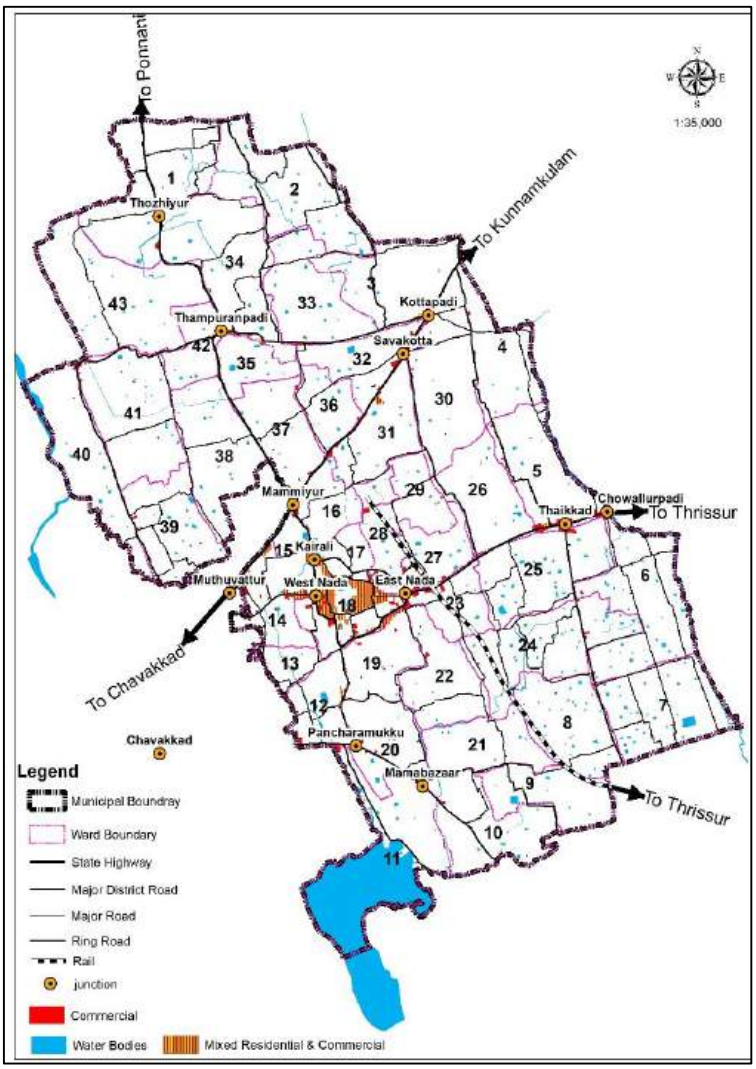


Figure 10.1: Spatial Distribution of Commercial land use

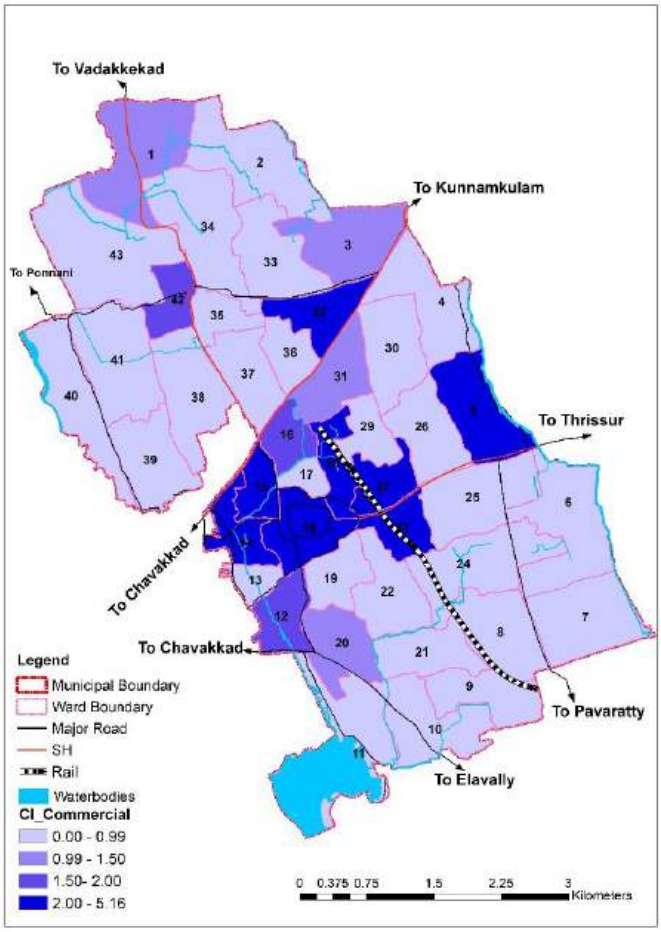


Figure 10.2 Concentration pattern of Commercial Land use

Analysis shows that wards 5, 18, 14, 23, 27, 28, 32 show maximum concentration of commercial activity and these wards are located around the Guruvayur Temple premises. Wards which contain the main commercial nodes and junctions show higher concentration index. Commercial developments are concentrated along major transport corridors especially on SH.

10.2. Important Commercial Centres & Nodes

A detailed survey regarding the commercial nodes in the town has been conducted by the department. Preliminary survey reveals that the high floating population of Guruvayur has a huge impact on the commercial activities of the municipality. Nodes in the planning area are identified on all important intersection of roads where there is a concentration of commercial activity as linear development. There are 15 major commercial nodes identified out of which 7 are located around the temple premises. The commercial activities along 7 points in the cardinal direction of the temple at Inner and Outer ring roads have been taken as separate points for Commercial survey. Altogether they form the 1st order node. The remaining commercial centers are scattered at different points within the Municipality. The details of commercial establishments in the various commercial centers and the hierarchy of the nodes are shown in table 10.1. As shown in figure 10.3, major part of the commercial establishments is retail type, followed by auditoriums, hotels and restaurants. Wholesale shops and markets are negligible in number.

Table 10.1: Details of commercial centers in Guruvayur Municipality

Sl. No.	Commercial Center	Bank/ Finance	Hotel/ Restaurant	Retail/ Wholesale	Others	Total	Hierarchy of node	Hierarchy as per URDPFI Norms
1	Guruvayur	6	18	233	10	**267**	**1st Order**	Community Centre
2	Chowallurpadi-Thaikkad	6	10	147	8	**171**	**2nd Order**	Local Shopping Centre
3	Kottapadi Junction	7	5	63	7	**82**	**3rd Order**	Local Shopping Centre
4	Muthuvattur	0	2	53	2	**57**	**4th Order**	Convenience Shopping Centre
5	Mama Bazaar	1	2	40	2	**45**	**4th Order**	Convenience Shopping Centre
6	Thozhiyur	2	2	49	1	**54**	**4th Order**	Convenience Shopping Centre
7	Thampuranpadi	2	1	44	2	**49**	**4th Order**	Convenience Shopping Centre
8	Mammiyoor	3	5	45	2	**55**	**4th Order**	Convenience Shopping Centre

Source: Primary survey by DT&CP Office, Thrissur

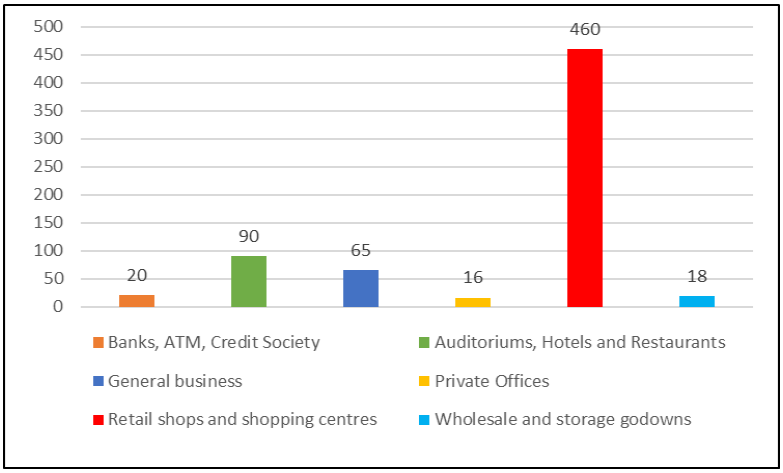


Figure 10.3: Type of commercial establishments in Guruvayur
(Source: Primary survey by DT&CP Office, Thrissur)

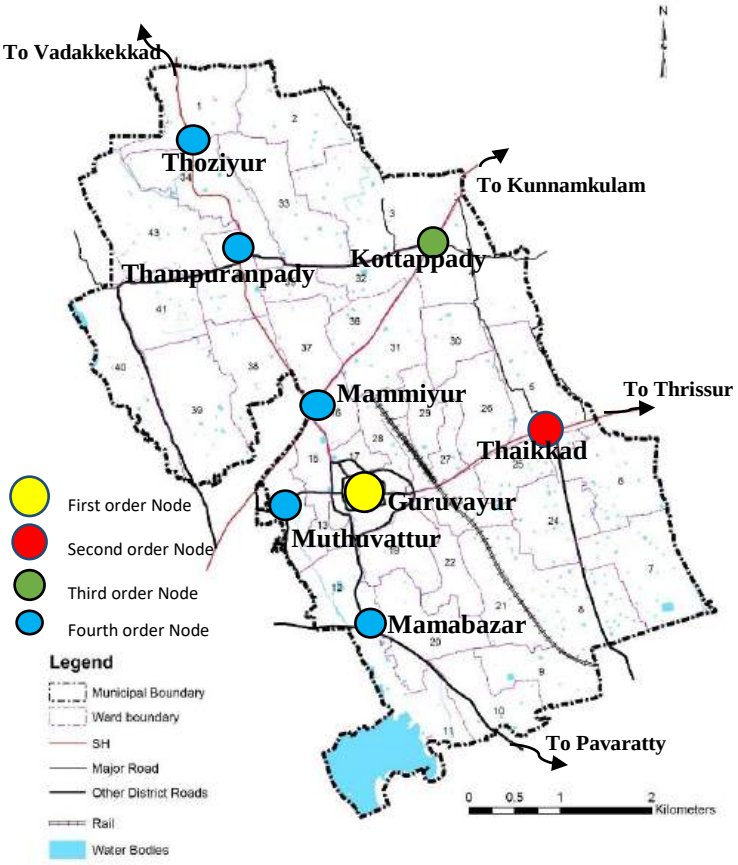


Fig 10.4 Location & Hierarchy of Commercial Centers

Figure 10.4 shows the location and hierarchy of commercial centers in Guruvayur Municipality. The various commercial establishments along the inner and outer ring roads around the cardinal directions of the Guruvayur Sreekrishna Temple makes this as the first order node within the municipality. Thaikkad junction is the second order node, along the SH49. Kottappady junction along SH 50 is the third order node. Other junction such as Muthuvattur, Mamabazar, Thozhiyur, Thampuranpadi and Mammiyur junction have 4th order hierarchy.

Figure 10.5 shows the distribution of commercial establishments in each of the selected nodes. From land use survey it is evident that around the temple area, along the outer and inner ring road, mixed land use is predominant. Mostly, residential and commercial use is prevailing. Commercial establishments along the inner and outer ring roads satisfies the needs of the floating population within the Municipality. While comparing with the URDPFI guide lines, this node can be considered as a community center. Second and third order nodes such as Thaikkad junction and Kottappady junction can be considered as local shopping centers, which cater to the needs of the floating population. Other nodes located along the state highways and major roads comes under convenience shopping centers needs to be addressed, by considering the growth of the town and need of the people visiting the town.

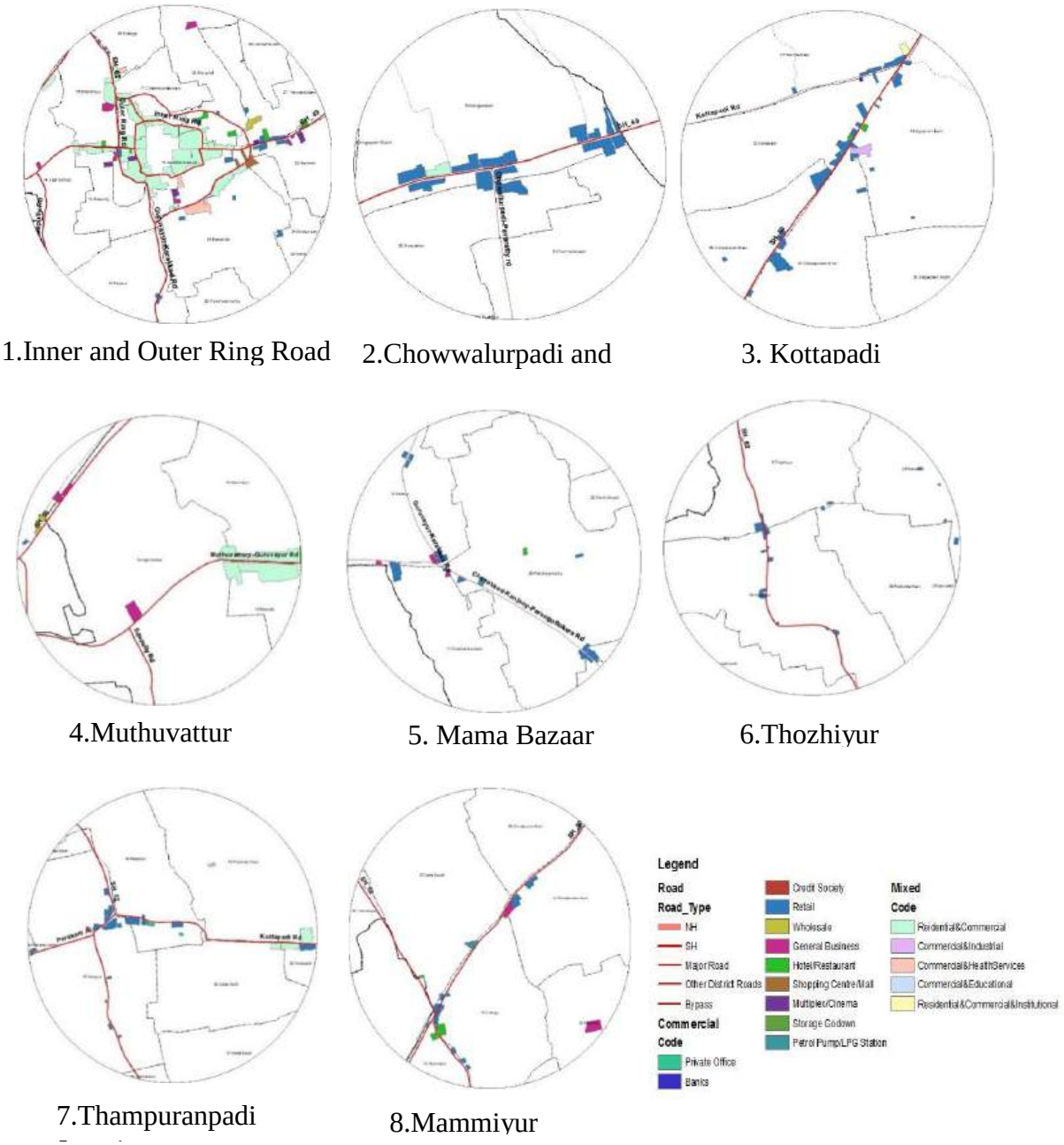


Figure10.5: Distribution of commercial establishments at various nodes

10.3. Commercial survey

Commercial survey was conducted among the shop owners at the major commercial centers. A questionnaire was filled up on the basis of queries made among the shop owners. The findings from the commercial

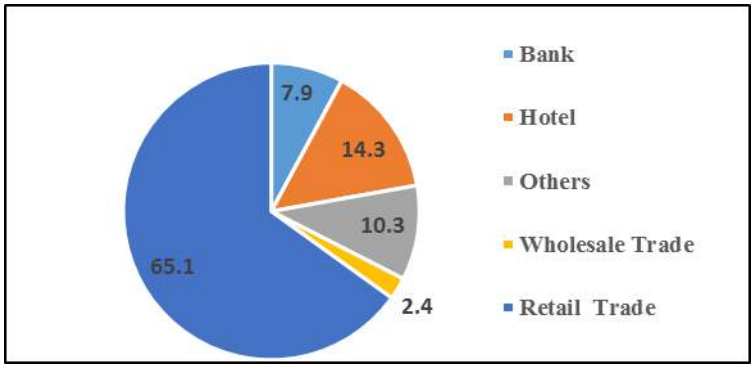


Figure 10.6: Types of business

survey are as follows:

- The various commercial shops in the nodes are found to be Retail shops, wholesale shops, banks, hotels or others. About 65% of these shops are retail type. Figure 10.6 shows the various types of business activities within the study area. Others include ironing shops, Photostat shops, repair shops etc.
- 73% of the customers in retail shops, hotels, etc. are from the locality. Remaining 27% have tourists and local community as consumers (Majority of these shops located around the temple).
- Around 38% of the shops owners are transporting goods autorikshaw, 25% in van and 23% in two wheelers.
- About 95% of the shops are private management and the remaining 5% is managed by cooperative societies, kudumbasree or by individuals in partnership.
- About 85% of the shops are in rented buildings.
- 88% of the buildings are made of RCC and 82% of the buildings are in good condition.
- In spite of showing an increasing trend in rent, 66% of shops among them have an opinion of satisfactory business for past 5 years.
- Storage facility is said to be sufficient for majority of shops.
- Commercial shops on the Inner ring road experiences parking deficiency of all the nodes surveyed followed by outer ring road as shown in figure10.7.

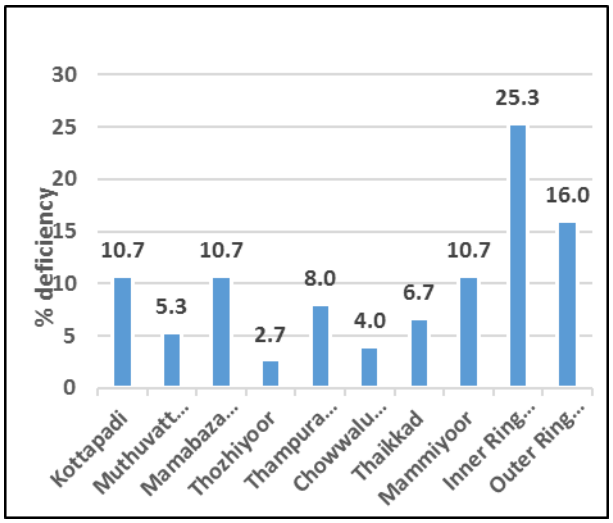


Figure 10.7: Deficiency of Parking facilities

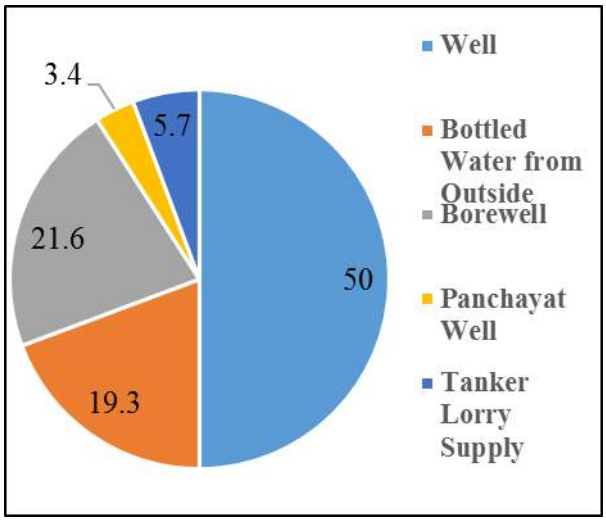


Figure10.8: Availability of water

- 50% of the shops uses well as the source of water as shown in figure 10.8.

- Most of the shop owners depends on public waste collection methods for waste management. 42.2% of the shop owners depends on Kudumbashree as shown in figure10.9.
- About 70% of the waste collection is carried out once in a month as shown in figure 10.10.

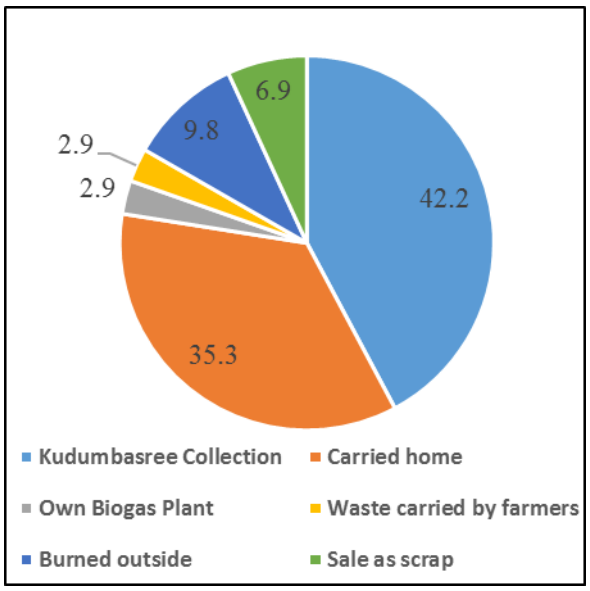


Figure 10.9: Waste collection systems

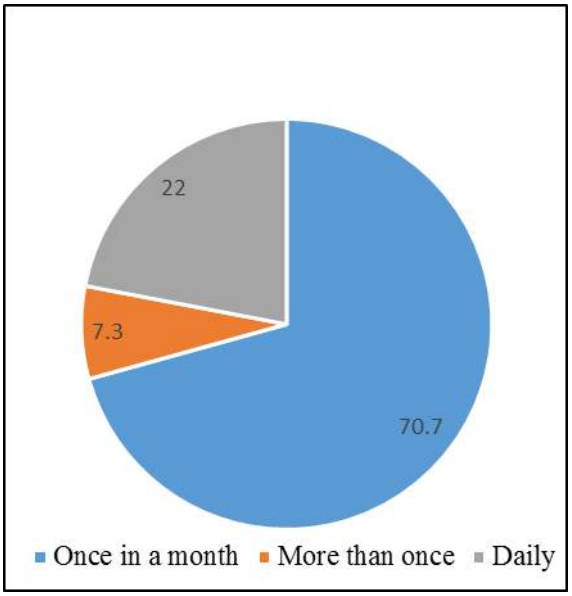


Figure10.10: Frequency of Waste collection

10.4. Markets

Even though Guruvayur has an importance in trade and commerce, there is only one market within the municipality, a mini market located on West Nada of the town. A flower market is located in West Nada of the Guruvayur Sree krishna Temple, and it is the most sold out commodity among the consumers within the central area of the town. A market is functioning at Chowallurpady Junction.



10.5 Street Vendors

Street vendors form a very important segment of the unorganised sector in many towns. As per records, 86 street vendors have been identified at various places within the municipality, as a part of the National Urban Livelihood Mission. The location wise number of street vendors is shown in figure 10.11. Maximum number of street vendors are located at East and West nadas of Guruvayur Temple and at Mammiyur Junction.

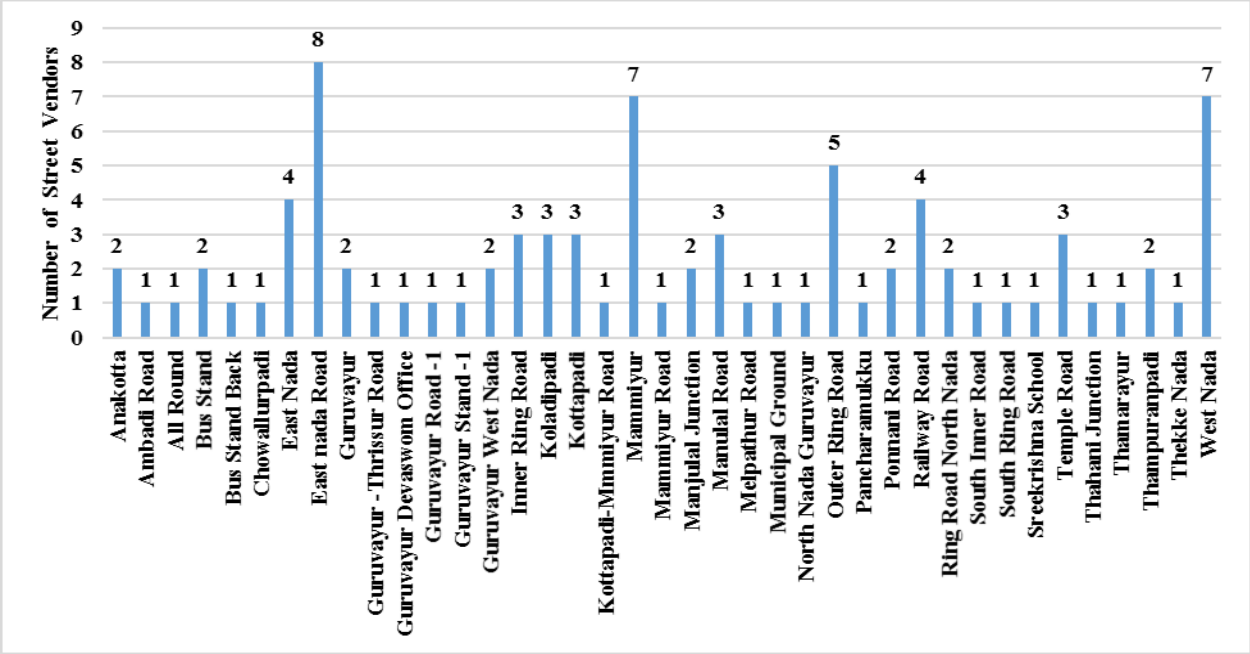


Figure10.11: Location wise number of street vendors in Guruvayur Municipality

Most number of street vendors are seen in the ward 18, where the Sri Krishna Temple is located. 52 street vendors are there in ward 18. Most of them works during day time (figure 10.12). Most of the sell food items, Lottery, Flowers etc.

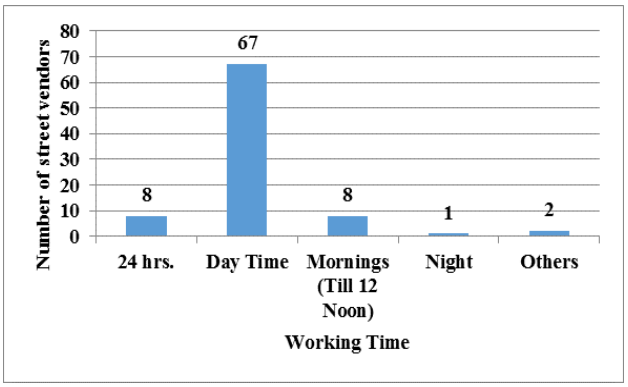


Figure10.12: Working time of street



Street Vendors in Choondal Road (SH 49)





Street Vendors at West Nada

10.6. Hotels, Restaurants and Auditoriums

One of the important type of commercial establishment in the town are auditoriums, hotels and restaurants. There are 106 hotels, 64 restaurants, 141 lodges and 30 Auditoriums within the Municipality. As shown in figure, these are mostly concentrated around the temple premises, to host the large number of pilgrims arriving daily and for conducting marriage functions.

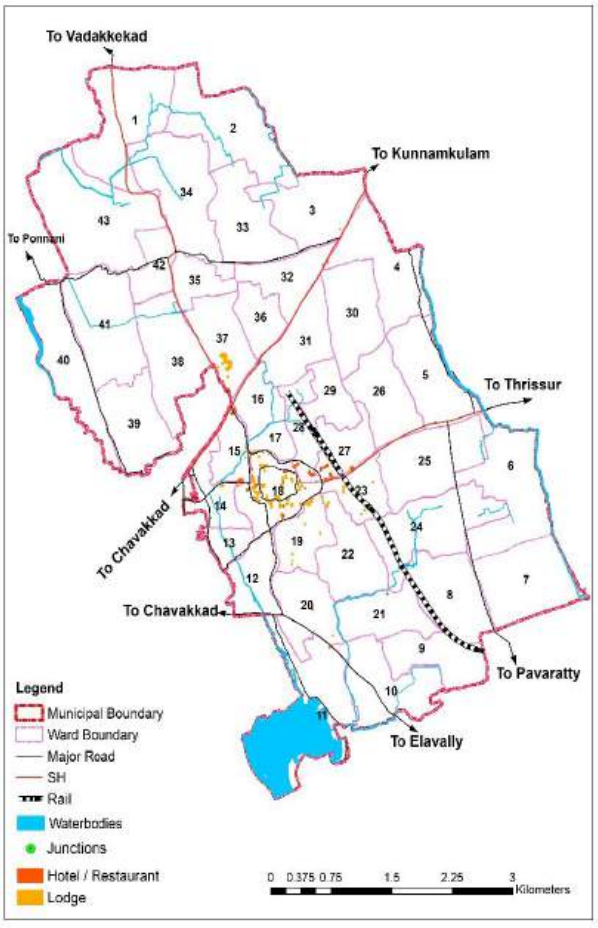


Figure 10.13: Location of Hotels/ Restaurants

10.7. Inference

Even though Guruvayur experiences a huge crowd, it is not utilized to enhance the commercial sector of the Municipality. Commercial surveys showcase the insufficient parking facilities on the inner and outer ring roads. Provision for waste management is there, but it has been noticed

that the frequency of waste collection should be improved. Marketing facilities for the trade of produces from nearby areas, and other commodities will support and enhance the economic base of the town. The presence of street vendors and the absence of markets needs to be addressed. As per URDPFI guidelines, the commercial land required varies from 4 to 6% of the total developed land for medium towns. In Guruvayur Municipality, the present commercial land use is only 0.81%. As a community center, it will be difficult to cater the needs of the growing pilgrim population in future, since the area along the inner and outer ring road is crowded, with mixed land use. Economic activities should be increased by strengthening the various commercial nodes in the town. Planning of street vending zones should be done to provide for and promote a supportive environment for the vast mass of urban street vendors.

CHAPTER 11

TRAFFIC AND TRANSPORTATION

For the balanced development of an urban centre, planned growth of spatial activities, coupled with provision of adequate transportation facility is essential. But in most of the cities and towns the available road system is not able to cater to the present traffic. A workable circulation plan ensuring efficient operation of the transportation system facilitates economic growth of the town.

11.1 Introduction

Guruvayur is well connected by road and rail. The study area is served by public transport system consisting of both State owned Kerala State Road Transport Corporation (KSRTC) and private buses. These services operate mainly to connect to the district headquarters in Thrissur, Shornur, nearby locales like Kunnamkulam, Ponnani etc. to name a few. Guruvayur is connected by a broad gauge railway line from Thrissur on which only a few trains operate as this is a cul-de-sac/ terminal station. The Guruvayur railway station located near the Outer Ring Road is easily accessible from the Guruvayur temple. Daily express trains from Guruvayur to Chennai and Trivandrum are operated in addition to passenger trains to Ernakulam, Punalur and Thrissur. The transportation network map of Guruvayur Municipality is shown in figure 11.1.

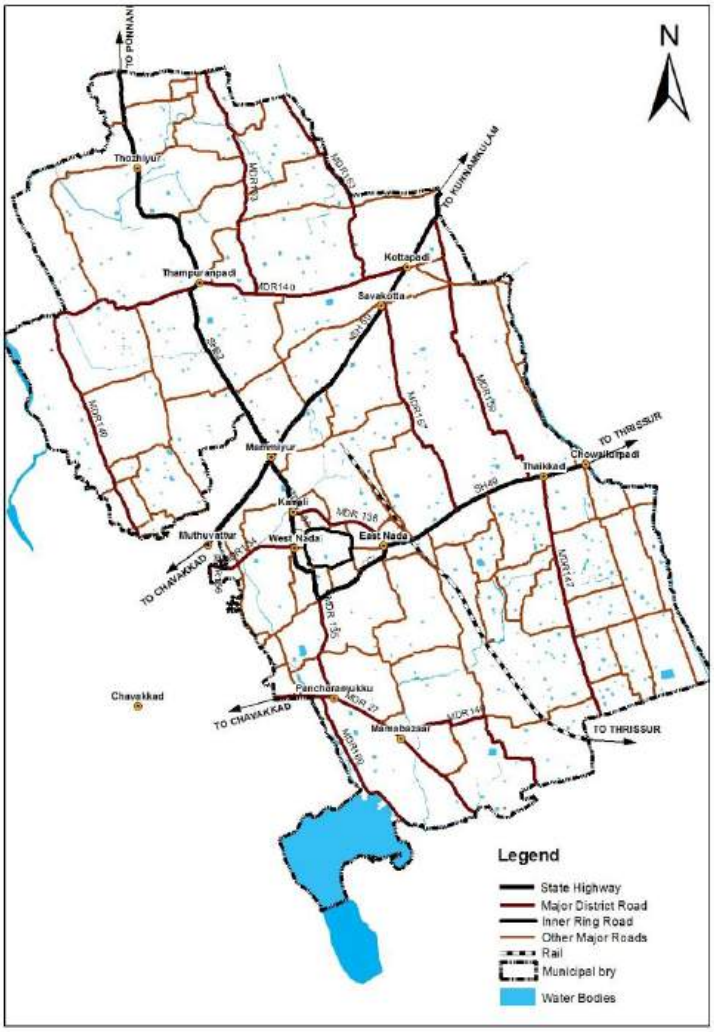


Figure 11.1: Transportation network map of Guruvayur Municipality

11.2 Road Network

The existing road network within the study area is of limited inter-linkages except for the inner and outer ring roads surrounding the Sree Krishna Temple. The roads within the municipality are maintained by both PWD and the Municipality. The National Highway does not touch Guruvayur. Major roads within the town are as follows:

(i) State Highway 50 (Chavakkad to Chattukulam)

(ii) State Highway 62 (MammiyoorJn to Thozhiyoor)

(iii) State Highway 49 (ManjulalJn to Chowallurpadi Jn)

Other roads include:

(i) Inner Ring Road

(ii) Outer Ring Road

(iii) Thampuranpadi-Kottapadi road

(iv) Chavakkad-Mullessery-Kanjany road

(v) Mallad-Kaveed road

(vi) Perakam road

(vii) Chowallurpadi-Pavaratty road

(viii) Guruvayur-Karakkad road

(ix) Guruvayur-Muthuvattoor road

(x) Guruvayur-Mammiyoor road

(xi) Guruvayur-Shavakotta road

(xii) Chemmanur-Guruvayur road

Within the town area, the road network is of concentric pattern with two circular roads, around Sree Krishna Temple. The inner circular road connects East nada, West nada, Guruvayur Temple police station and South nada. This is the closest motorable road to access the main temple. The second concentric road connects Manjulal Junction, Guruvayur railway station, Tahani hospital, KSRTC bus stand, West Nada, Edapully and Private bus stand. These two concentric roads are linked by radial roads which extend to meet the major roads that lead outside the town.

11.3 Vehicle growth in Guruvayur Municipality

The trend in vehicular growth has been phenomenal all over the State and Guruvayur is no exception to this. The growth of motor vehicles registered in Regional Transport Office of Guruvayur during the period from 2011 to 2015 is given in Table 11.1 and figure 11.2. It can be seen that the vehicle population in Guruvayur has grown by more than two times during these four years.

Table 11.1: Vehicle growth in Guruvayur Municipality

Year	2011	2012	2013	2014	2015
No. of vehicles	65,655	84,256	1,01,692	1,18,152	1,34,746

Source: NATPAC, 2017

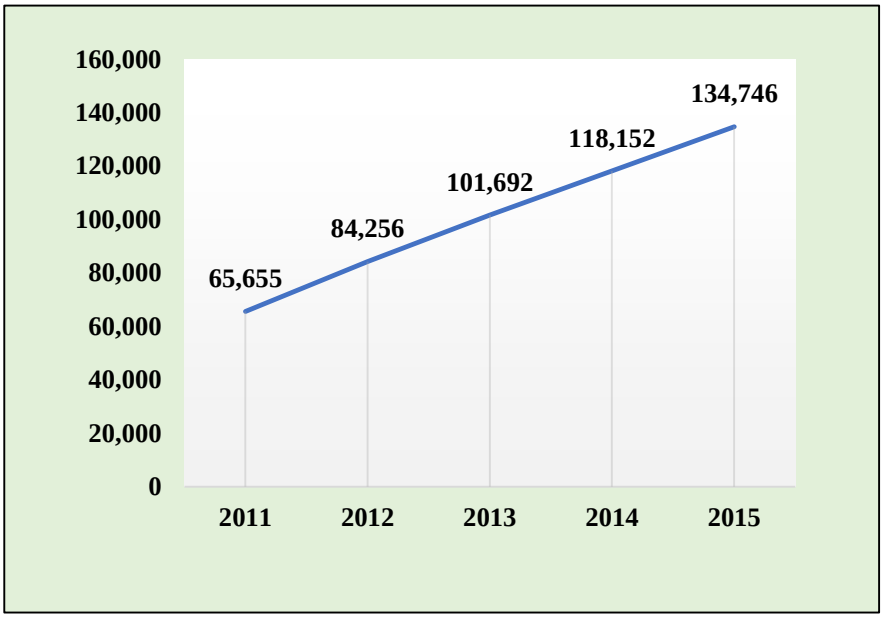


Figure 11.2: Vehicle growth in Guruvayur Municipality

11.4 Number of registered vehicles

The number of motor vehicles having valid registration under Guruvayur RTO as in December 2015 is given in Table 11.2. An analysis of the existing vehicle population shows that major share of nearly 66 percent of the total vehicle population under the RTO is two-wheelers (88,326) followed by about 21 percent of cars (28,876).

Table 11.2: Number of registered vehicles in Guruvayur Municipality

Type of vehicle	**No of Vehicles**	**Percentage**
Two wheelers	88,326	65.5
Auto Rickshaw	6,483	4.8
Car/ Jeep/ Van	28,876	21.4
Goods Auto	1,663	1.2
LCV	3,583	2.7
Bus	1,254	0.9
Truck	43	0.03
Multi Axle Truck	4	0.003
Others	4514	3.4
Total	**1,34,746**	**100**

Source: NATPAC, 2017

11.5 Traffic Surveys

Traffic studies were carried out to ascertain the internal and external travel characteristics, parking demand, pedestrian flow, goods movement, traffic flow pattern, level of service and volume-capacity of different roads. For the purpose of carrying out various primary surveys, the road network was divided into different homogeneous sections and the primary surveys considered these homogeneous sections as the basic units. The following surveys were organized in Guruvayur.

- Road inventory survey
- Speed and delay survey
- Traffic volume survey
- Parking survey
- Pedestrian survey
- Origin-Destination (OD) survey

11.5.1 Road Network Characteristics

For the purpose of presenting the traffic characteristics, major roads in the study area were divided into various homogeneous sections, as shown in Figure 11.3, based on road and traffic characteristics. Each homogeneous section has been further sub-divided. Intermediate junctions were given node numbers from 101 to 315 as shown in Figure 11.4 and 11.5.

There are 12 homogeneous sections in which,

- **Arterial Roads**: *SH 62* (HS1) – Mammiyoor Junction to Thozhiyoor (from node 305 to 309), *SH 50* (HS2) Chavakkad – Chattukulam (from node 303 to 307) and *SH 49* (HS7) Manjulal Junction – Chowallurpadi (from node 101 to 314) with two-lane two-way configuration but due to parking, uncontrolled access etc has a capacity of 1200 PCU per hour.
- **Sub-arterial roads**: *Guruvayur-Muthuvathoor road* (HS4) (from node 304 to 108), *Outer Ring Road* (HS5) (from node 101-104-107-108-110-113 to 101), Guruvayur-Karakkad road (HS6) (from node 110-310), Chavakkad - Kanjani road (HS9) (from node 301 to 311), Chowallurpadi - Pavaratty road (HS10) (from node 312-313) with two-lane two-way configuration and have a capacity of 1200 PCU per hour.

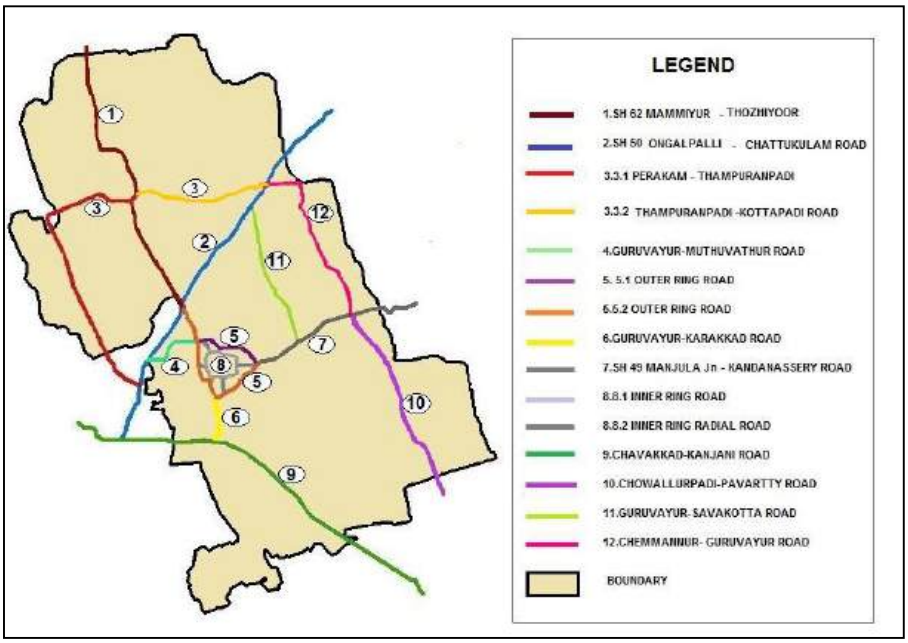


Figure 11.3 Map showing homogeneous sections in Guruvayur

Collector roads: Perakam road & Thampuranpadi-Kottapadi road (HS3) (from node 303-315-308 to 306), Inner Ring Road (HS8.1) (from node 201-203-205-208 to 201), Inner Ring Radial Roads (HS8.2), Guruvayur-Shavakotta road (HS11) (from SH 49 to SH50) and Chemannur-Guruvayur road (HS12) (from node 313 to 306). These roads also have a capacity of 900 PCU per hour.

It could be seen that 37.9 km of roads were considered for detailed road inventory in the town, of which only 19 km of road (50.1%) are having width of 6m or above. This can accommodate two

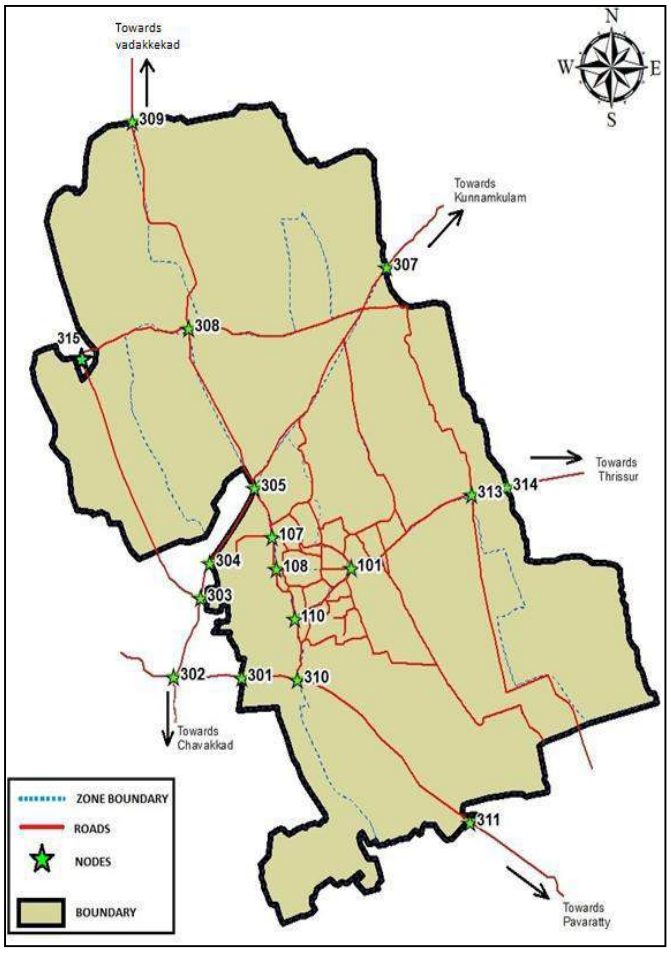


Figure 11.4 Main roads and nodes in Guruvayur

lanes of traffic. Rest of the roads have intermediate lane width or lesser. Regarding availability of paved footpath, approximately 1.2 km of roads (3%) had footpath of some kind on one or both sides of the road.

About 21 bus stops were enumerated on various bus routes in Guruvayur, on both sides, of which very few were found to have waiting sheds. They were of ordinary type without any modern facilities and also lacked uniformity. Bus bays have not been provided for any bus stops and bus stops have not been provided in a staggered manner on any of the road stretches.

11.5.2 Speed and Delay Survey

To assess the average journey speed during peak hours, speed and delay survey was

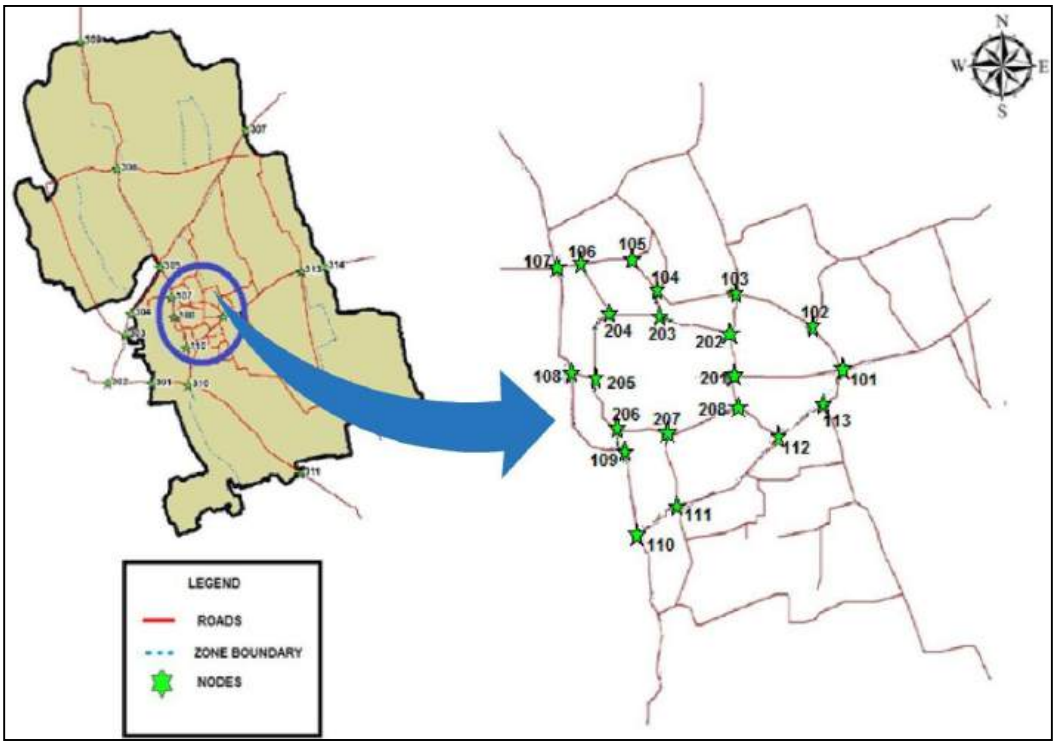


Figure 11.5 Nodes on inner and outer ring road

conducted along major roads in Guruvayur. The journey speed on various roads in the study area was found to vary between 18 and 49 kilometres per hour (kmph). A difference in journey speed and running speed of more than 5% was observed on Inner Ring road, Outer Ring road and SH 62. The main reasons for delay are slow movement of other vehicles, pedestrian crossing and bus stoppage at stops.

The State Highways leading out of the town were observed to have an average journey speed of 39.3 kmph while that on Inner Ring road and Outer Ring road were observed to be 22.5 kmph. It could be summarized that the average journey speed of travel in Guruvayur was

33 kmph with an average delay of 4.4 percent of the total travel time while the average delay on Inner Ring road and Outer Ring road was 10.6%.

11.5.3. Traffic volume survey

Knowledge of the traffic volume plying on a road network is important to understand the level of service offered to road users. Classified traffic volume counts were carried out at (i) outer cordon points, (ii) mid blocks on important corridors, and (iii) important intersections.

(i) Outer cordon volume counts:

Link volume counts on outer cordon points were required for establishing inter-city goods as well as passenger movement covering *external-internal*, *internal-external* and *external-external* trips. Outer cordon points on MDR and SH were considered for volume count survey. The survey was carried out continuously for a period ranging between eight hours to 24 hours on a normal working day depending on the importance of the road and intensity of traffic.

(ii) Mid-block volume counts: The link volume survey was carried out at carefully selected locations on major and minor roads in the town's network. The traffic categories to be considered for volume count were based on reconnaissance survey. The link volume survey was carried out continuously for a period ranging between eight hours to 24 hours on a working day depending on the importance of the roads and intensity of traffic.

(iii) Intersection turning movement counts:

The capacity of urban road network to a great extent depends on the capacity of intersections. Thus the intersections have an important role to play in efficient and smooth traffic flow in the network. The volume count at selected intersections was carried out for four hours either in the morning between 08.00 AM and 12.00 noon or for four hours in the evening between 03.00 PM and 07.00 PM to ascertain the morning and evening peak hour traffic demands. Total volume, composition of traffic and turning characteristics were recorded for different types of vehicles by trained field staff for each intersection separately. The traffic flows were converted into equivalent Passenger Car Units (PCU) by using conversion factors as suggested by Indian Roads Congress (IRC).

Traffic volume at major intersections

Based on the reconnaissance survey, turning movement surveys at 9 major intersections in the study area were conducted to ascertain the peak hour demands. Different categories of vehicles were converted into a single unit called 'Passenger Car Unit (PCU)' using conversion factors, suggested by Indian Roads congress (IRC).

Summarized traffic flow through the selected intersections is given in Table 11.3. It could be seen that Thaikkad junction near Chowallurpadi has the highest peak hour traffic volume of 2,679 PCU closely followed by mammiyoor junction with 2,612 PCU. Manjulal junction had peak hour traffic volume of 2,239 PCU. The intersections muthuvathoor, and Tahani hospital junction had peak hour traffic volume between 1,900–2,000 PCU. Out of these junctions the minimum was recorded at west nada junction on ORR with 1,267 PCU as shown in figure 11.6.

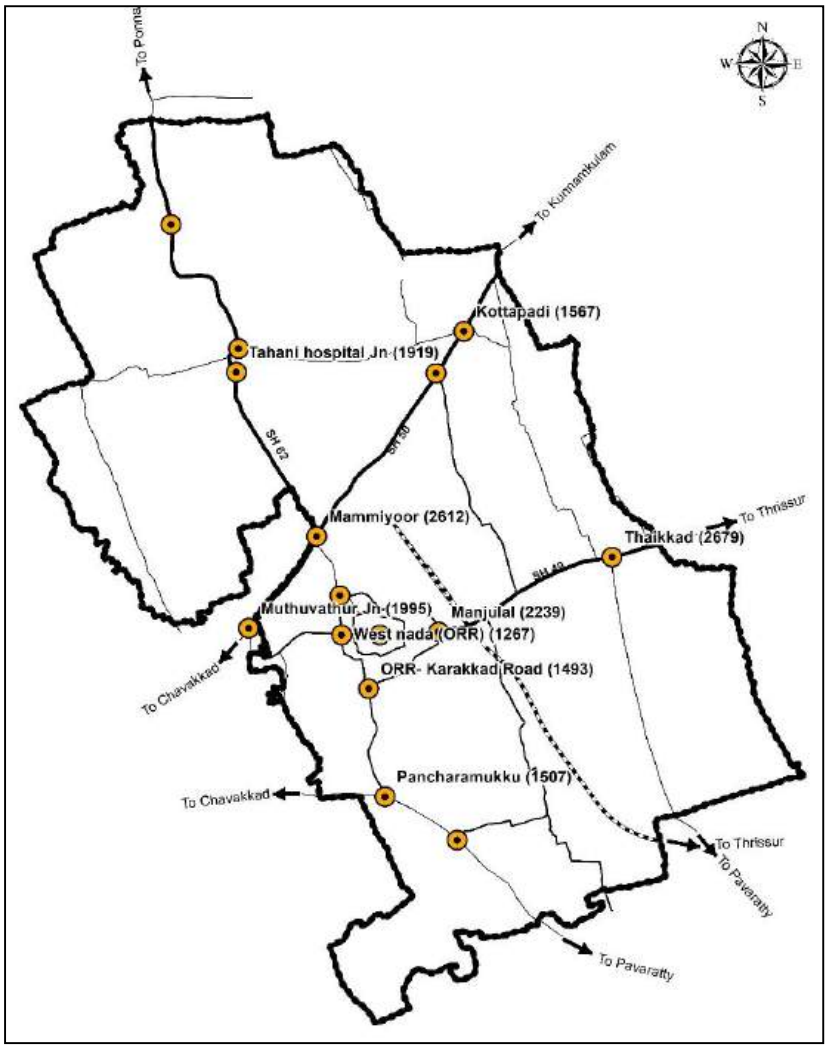


Figure 11.6 Peak hour traffic flow at major intersections

Table 11.3: Peak hour traffic flow at major intersections

Sl. No.	Name of intersection	No. of arms	Peak hour traffic(PCU)	Peak hour		
1	Mammiyoor	4	2,612	10:15	-	11:15
2	Muthuvathoor	3	1,995	16:15	-	17:15
3	West nada (ORR)	3	1,267	09:30	-	10:30
4	Tahani hospital Jn (node 107)	3	1,919	18:00	-	19:00
5	ORR-karakkad road	3	1,493	10:45	-	11:45
6	Pancharamukku	3	1,507	18:00	-	19:00
7	Manjulal	3	2,239	15:30	-	16:30
8	Kottapadi	4	1,567	18:00	-	19:00
9	Thaikkad	3	2,679	18:00	-	19:00

Source: NATPAC, 2017

11.5.3.1. Traffic Volume and Capacity Utilization

a) Traffic Volume

Volume survey was conducted at the middle point of each of the homogeneous sections in Guruvayur. Different categories of vehicles were converted in to a single unit called 'Passenger Car Unit (PCU)' using conversion factors suggested by Indian Roads congress (IRC). It could be seen that among the homogenous sections, SH 50 had the highest peak hour traffic volume of 1,715 PCU followed by SH 49 with 1,632 PCU, ORR with 1,522 PCU and Guruvayur Karakkadroad with 1,001 PCU. Chavakkad, Kanjani road and Chowallurpadi-Pavaratty road had peak hour traffic volume between 900-1,000 PCU. Other homogenous sections were observed to have peak hour traffic volume below 800 PCU. Guruvayur-Shavakotta road had the lowest volume of 63 PCU.

b) Capacity Utilization

Capacity utilization of the road stretches is measured by volume-to-capacity ratio (V/C Ratio). It is the ratio of volume of traffic plying on the road stretch to the capacity of the road stretch. For working out the capacity of different road sections, the information compiled during the road inventory survey was compared with the specifications of IRC106-1990 (Guidelines for capacity on urban roads). While working out the capacities due consideration was given to carriage- way width, junctions, parking, lateral clearance, shoulder width, surface condition etc.

The traffic volume observed at different road stretches were compared with the capacity of road sections, to calculate the volume-capacity ratio (V/C ratio) of different road sections within the study area. The volume capacity ratio of major corridors within Guruvayur is given in Table 11.4 and figure 11.7. The roads SH 50, Outer Ring road and SH 49 are over utilized as their volume surpasses their capacity. Some road stretches like GuruvayurKarakkad road and Chowallurpadi-Pavaratty road are nearing their capacity while all other roads have V/C ratio below 0.80.

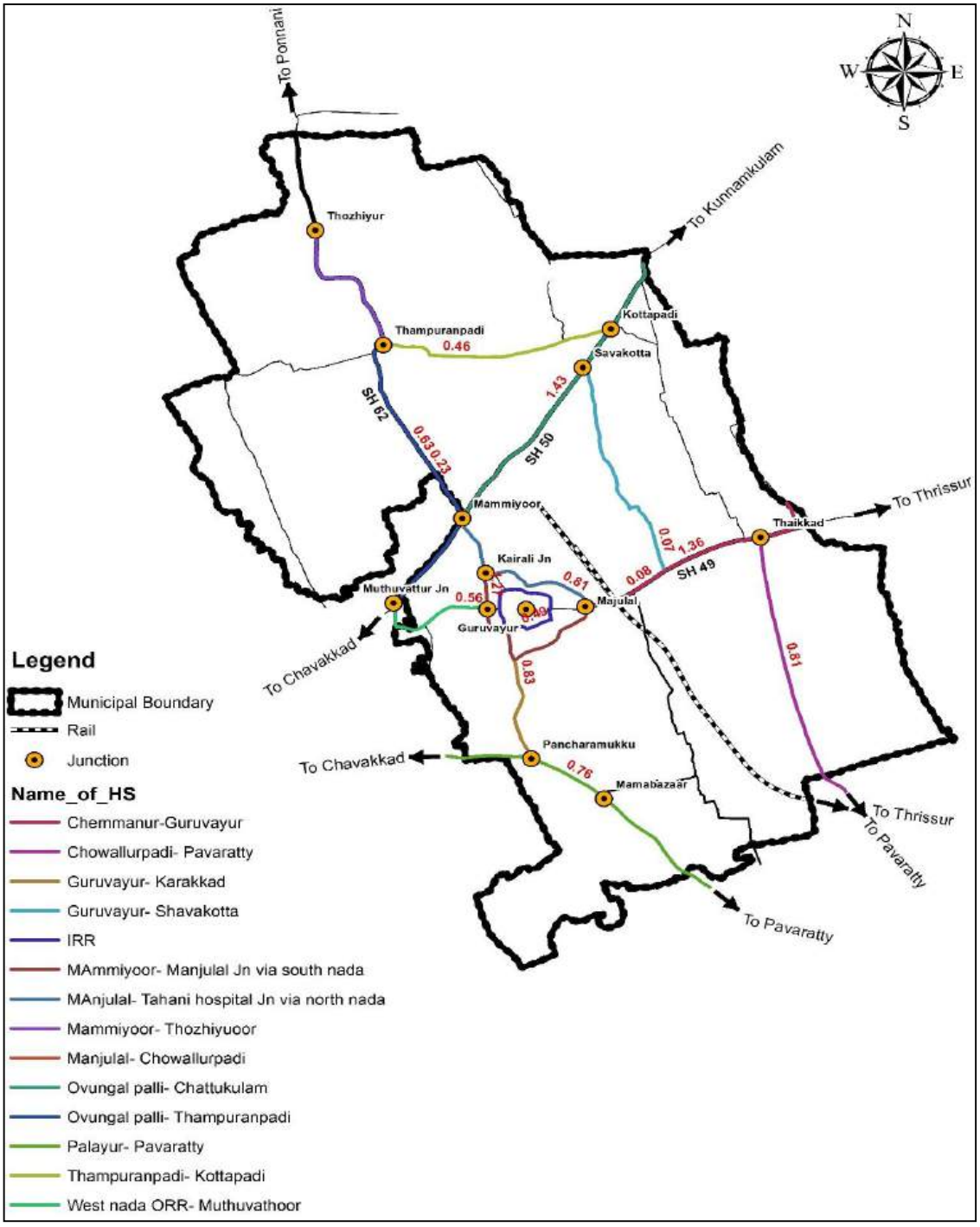


Figure 11.7: Volume Capacity ratio of major roads

Table 11.4: Traffic Volume-capacity ratio of major roads in Guruvayur

No	Name of SH		Traffic volume (PCU)	Capacity (PCU)	Volume/ Capacity
1	Mammiyoor	Thozhiyoor	758	1,200	0.63
2	Ovungalpalli	Chattukulam	1,715	1,200	1.43
3.1	Ovungalpalli	Thampuranpadi	211	900	0.23
3.2	Thampuranpadi	Kottapadi	415	900	0.46
4	West nada ORR	Muthuvathoor	667	1,200	0.56
5.1	Manjulal	Tahani hospital Jn via north nada	972	1,200	0.81
5.2	Mammiyoor	ManjulalJn via south nada	1,522	1,200	1.27
6	Guruvayur	Karakkad	1,001	1,200	0.83
7	Manjulal	Chowallurpadi	1,632	1,200	1.36
8	IRR	IRR	445	900	0.49
9	Palayur	Pavaratty	915	1,200	0.76
10	Chowallurpadi	Pavaratty	975	1,200	0.81
11	Guruvayur	Shavakotta	63	900	0.07
12	Chemmanur	Guruvayur	71	900	0.08

Source: NATPAC, 2017

11.5.4. Parking Characteristics

Parking accumulation and duration survey was carried out at all the major road stretches where the parking accumulations are found to be high. The survey was carried out for a period of four to eight hours during the peak periods. The registration plate method was used to collect data on parking duration and accumulation of all categories of vehicles on major parking corridors. In certain other corridors, only parking accumulation of vehicles was observed.

Table 11.5 below gives the parking accumulation of vehicles observed at various locations in Guruvayur (figure 11.8). For easier understanding, the space occupied by parking has been converted into Equivalent Car Space (ECS). It could be seen that Venugopal parking off Inner ring road has the highest peak hour parking accumulation of 494 ECS followed by Railway station parking with 414 ECS. Other locations with heavy parking were found to be parking area near south nada and ambady parking of Inner Ring Road. Other locations have ECS value below 100. Major share of parked

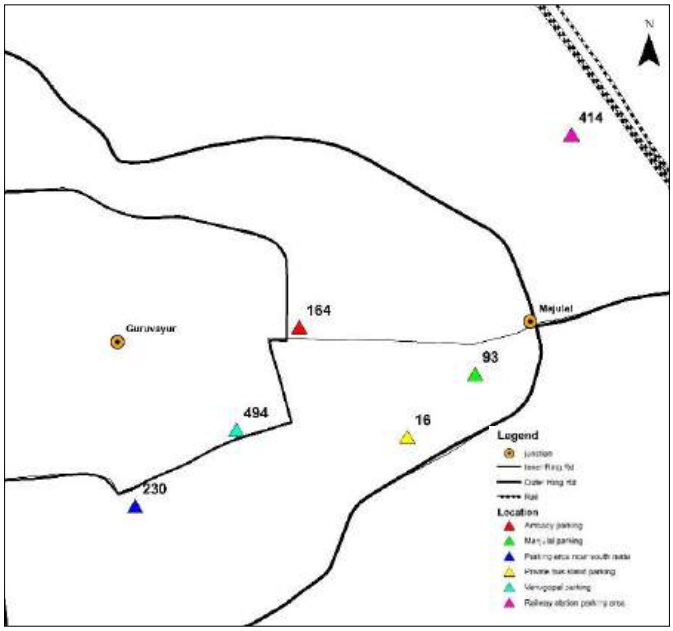


Figure 11.8: Parking accumulation of vehicles

vehicles was found to be car followed by two wheelers, tempo and bus.

The parking duration of different types of vehicles at selected areas in the town were observed. It could be seen 41.90% vehicles parked in the major parking corridors for a duration of less than 30 minutes followed by 20.82% parked for 30-60 minutes and 11.83% vehicles parked for 60-90 minutes. The vehicles parked for greater than 2 hours were very low.

Table 11.5: Parking accumulation of vehicles parked on major corridors in Guruvayur

Sl. No.	Location	Peak Time	Bus	Car	Two wheelers	Pass auto	Mini Bus	Mini Truck	Goods auto	Tempo	Total	ECS Value
1	Venugopal parking	9:15-10:15	22	283	16	0	0	1	0	68	390	494
2	Ambady parking	17:45 - 18:45	0	135	0	18	0	0	0	8	161	164
3	Parking area near south nada	7:15-8:15	0	94	0	5	0	0	0	16	115	230
4	Private bus stand parking	13:45 - 14:45	0	13	12	0	0	0	0	0	25	16
5	Manjulal parking	13:45 - 14:45	2	62	0	3	9	0	3	4	83	93
6	Railway station parking area	15:45 - 16:15	0	29	173	5	0	0	0	0	207	414

Source: NATPAC, 2017

11.5.5 Pedestrian survey

Pedestrian surveys were conducted at major locations where the pedestrian cross movements and lateral movements were found to be high. The surveys were carried out for a period of four hours between 8.00 AM and 12.00 noon in the morning and/ or between 4.00 PM and 8.00 PM in the evening.

Cross movements: Pedestrian cross movements observed at these locations are given in Table 11.6. It could be seen that Venugopal parking area had the pedestrian cross movements of 738.

Table 11.6: Peak hour cross movement of pedestrians in Guruvayur

LOCATION	Peak Time			Up	Down	Total
Near Venugopal parking	10.00	-	11.00	371	367	738

Source: NATPAC, 2017

Lateral movements: Pedestrian lateral movements observed at major locations in Guruvayur in the peak hour are given in Table 11.7 and figure 11.9. It could be seen near east nada (in front of Elite hotel) has the highest pedestrian lateral movements in the peak hour of 3,840 followed by pedestrian movements in front of Devaswom office with 2,175 pedestrian movements and Kausthubham restaurant with 2,027 pedestrian movements. Manjira road has the least pedestrian movement of 186.

Table 11.7: Peak Pedestrian Lateral Movements at major locations in Guruvayur

SL NO.	LOCATION	PEAK TIME			UP	DOWN	TOTAL
1	West nada (IRR) – side 1	9:00	-	10:00	854	373	1227
2	West nada (IRR) – side 2	10:00	-	11:00	475	213	688
3	In front of KSRTC bus stand	10:00	-	11:00	233	298	531
4	In front of Children's park	10:30	-	11:30	454	410	864
5	In front of Private bus stand – side 1	9:30	-	10:30	718	503	1221
6	In front of private bus stand – side 2	9:30	-	10:30	434	288	722
7	East nada (in front of Ambady parking) IRR	9:15	-	10:15	617	594	1211
8	East nada (in front of Elite hotel) - radial road	10:00	-	11:00	2214	1626	3840
9	East nada (in front of Kausthubham restaurant) IRR	10:15	-	11:15	1045	982	2027
10	In front of devaswom office (near south nada) IRR	10:15	-	11:15	1158	1017	2175
11	Guruvayur railway station	8:30	-	9:30	274	518	792
12	Near venugopal parking on IRR – side 1	9:15	-	10.15	952	616	1568
13	Near venugopal parking on IRR – side 2	9:15	-	10:15	464	385	849
14	Manjira road – side 1	10:45	-	11:45	284	371	655
15	Manjira road – side 2	8:00	-	9:00	80	106	186

Source: NATPAC, 2017

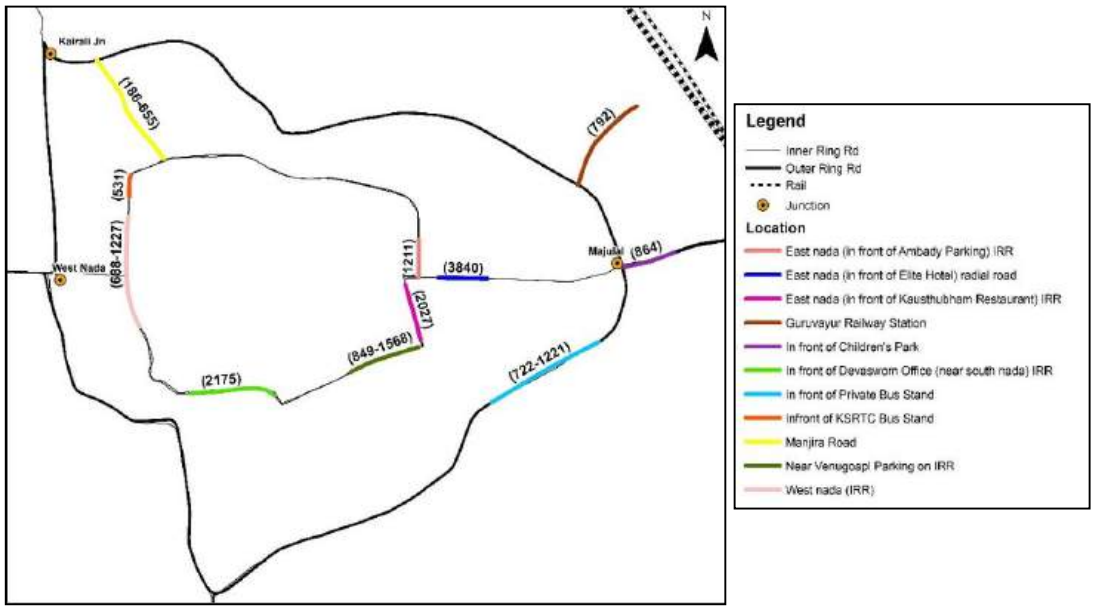


Figure 11.9: Peak Pedestrian Lateral Movements

Pedestrian vehicle conflicts: It reflects the intensity of pedestrian-vehicle conflicts on a link and is represented by PV^2 values where P is the number of pedestrians crossing a link during peak hour and V is the number of vehicles passing through the link during peak hour. For a road section with refuge, a value of PV^2 greater than $2x10^8$ and for a road section without refuge, PV^2 value greater than 10^8 indicates a higher level of conflicts and warrants grade-separated pedestrian facilities. It implies that a divided carriageway could be considered to have reduced impact of PV^2 value by 50%. Pedestrian vehicle conflicts observed at various locations in Guruvayur are presented in Table 11.8 below.

Table 11.8: Peak Pedestrian vehicle conflicts at major locations in Guruvayur

Name of Location	Peak Pedestrian movements (P)	Peak Vehicle movements (V)	PV^2 ($1x\ 10^8$)
Near venugopal parking	738	1,678	20.77

Source: NATPAC, 2017

11.5.6. Accident prone locations

Accident data for the last three years namely 2013, 2014 and 2015 were collected from State Crime Records Bureau, Thiruvananthapuram to assess the accident scenario in Guruvayur, locations of accidents and accident severity. Details of accident reported according to accident severity during the last three years are given in Table 11.9. It could be seen that 89 accidents were reported in the year 2013, which increased to 90 in 2014 and 66 in 2015. In the case of casualties, 107 victims were reported which decreased to 101 in the year 2014 and 82 in 2015. Most of the accidents were found to be Grievous ones (78.69%), followed by minor accidents (24%). Fatalities were reported in the case of about nine per cent of accidents.

Table 11.9: Trend of Accidents in Guruvayur

YEAR	No: of accidents				No of casualties			
	FATAL	GREVIOUS	MINOR	**TOTAL**	FATAL	GREVIOUS	MINOR	**TOTAL**
2013	8	67	14	**89**	8	69	30	**107**
2014	5	63	22	**90**	4	63	34	**101**
2015	3	52	11	**66**	3	52	27	**82**

Source: NATPAC, 2017

Major accident prone locations in Guruvayur in 2015 are given in Table 11.10 (Figure 11.10). It could be seen that the highest number of 11 accidents were reported at Guruvayur, i.e. CDB area, followed by Chowallurpadi with 7 accidents and Mammiyoor and Kottapadi with 6 accidents each. All other roads had recorded lesser number of accidents.

Table 11.10: Major accident prone locations

Accident location	No of accidents
Guruvayur	11
Chowallurpadi	7
Mammiyoor	6
Kottapadi	6

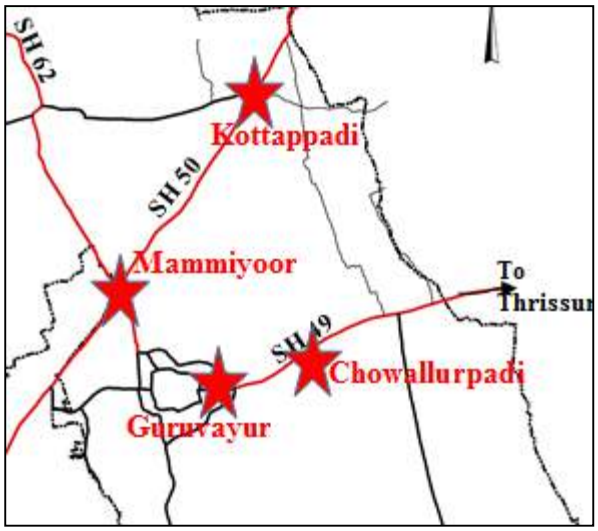


Figure 11.10: Accident Prone Locations

11.5.7 Public transport operations

Public transport services are met by both KSRTC and private buses in Guruvayur. There are two bus stations in Guruvayur viz. KSRTC bus station and Municipal bus station. While KSRTC services are operated from KSRTC bus station, private buses are operated from Municipal bus station. Destinations to which major share of trips are operated is given in Table 11.11. The maximum number of bus trips was observed towards Thrissur followed by towards Chavakkad. Data compiled from KSRTC station, Regional Transport Office at Guruvayur and Private bus operators' association reveal that highest number of buses is operated from Thrissur to Guruvayur. Other important routes served by private buses are Kodungalloor-Guruvayur, Thrissur–Chavakkad, Chavakkad-Guruvayur, Kunnumkulam-Guruvayur and Palakkad–Guruvayur.

Table 11.11 Details of private bus operations from Guruvayur

Sl No.	Towards	No of trips
1	Thrissur	93
2	Chavakkad	73
3	Kodungallor	62
4	Ernakulam	56
5	Kozhikode	51

Source: NATPAC, 2017

11.5.8. Traffic volume through outer cordon points

Volume survey of all the vehicles entering/exiting the study region was conducted at six outer cordon points of the town. Classified volume of vehicles was recorded according to their direction of travel.

The maximum daily traffic volume of 35,165 PCU was observed near Ovungal pally (SH 50) survey location, followed by 25,266 PCU near Chattukulam (SH 50) and 21,757 PCU near Mythree auditorium (SH 49). The survey locations Palayur and Pavaratty have traffic volume between 13,000-18,000 PCU, and least traffic volume was at Anjoor junction with 7,677 PCU. Traffic flow through outer cordon locations is pictorially shown in Figure 11.11.

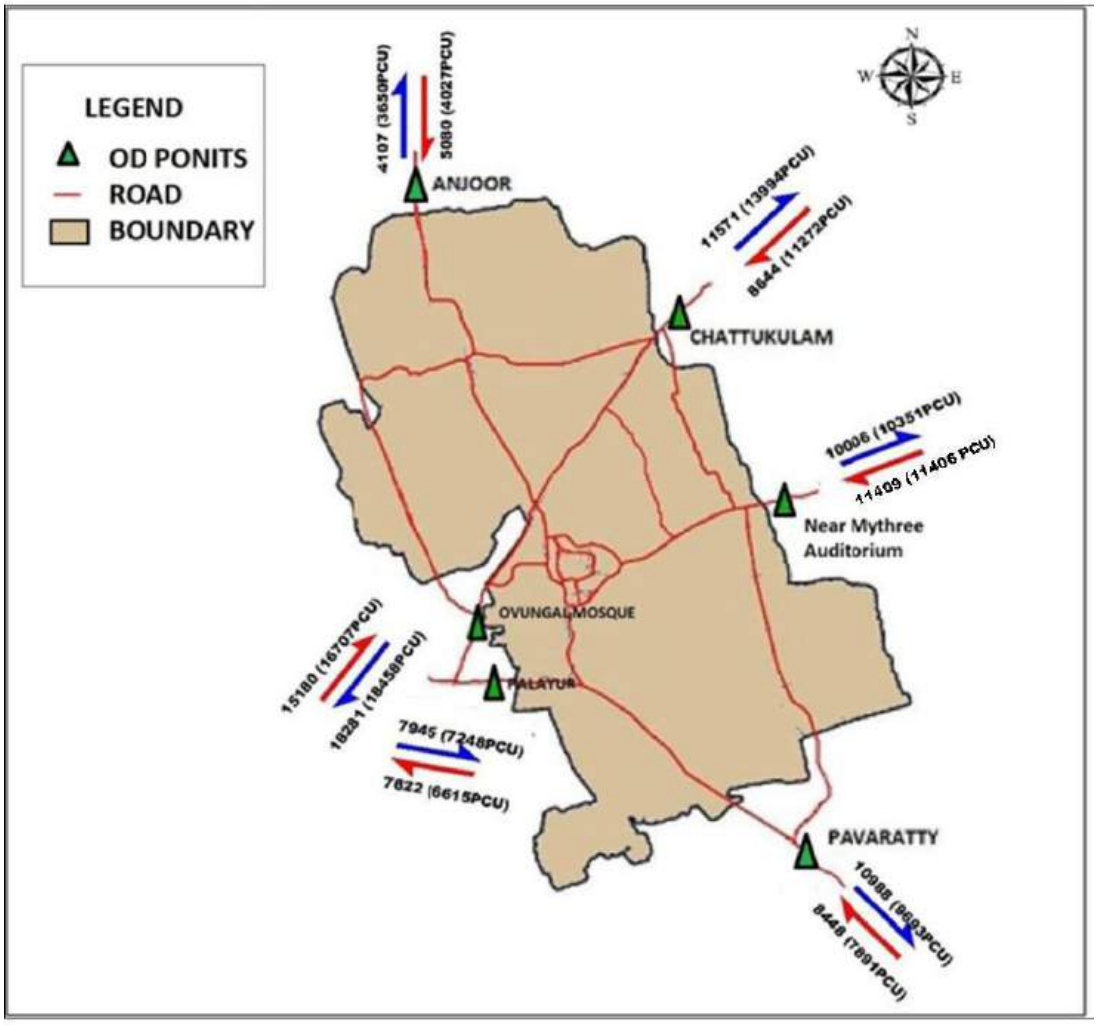


Figure 11.11: Map showing Average Daily Traffic volume (in No and PCU) at Outer Cordon locations of Guruvayur Municipality

11.6. Characteristics of Inter-city passenger traffic

For a meaningful analysis of O-D survey data, the study region was divided into 13 traffic zones, the boundaries of the zone corresponding to the boundary of one or more wards. In a similar way, outside study region was divided into 11 traffic zones, which include the immediate surrounding areas, adjoining districts and neighbouring states. The traffic-zoning pattern adopted for the study is shown in Figure 11.12.

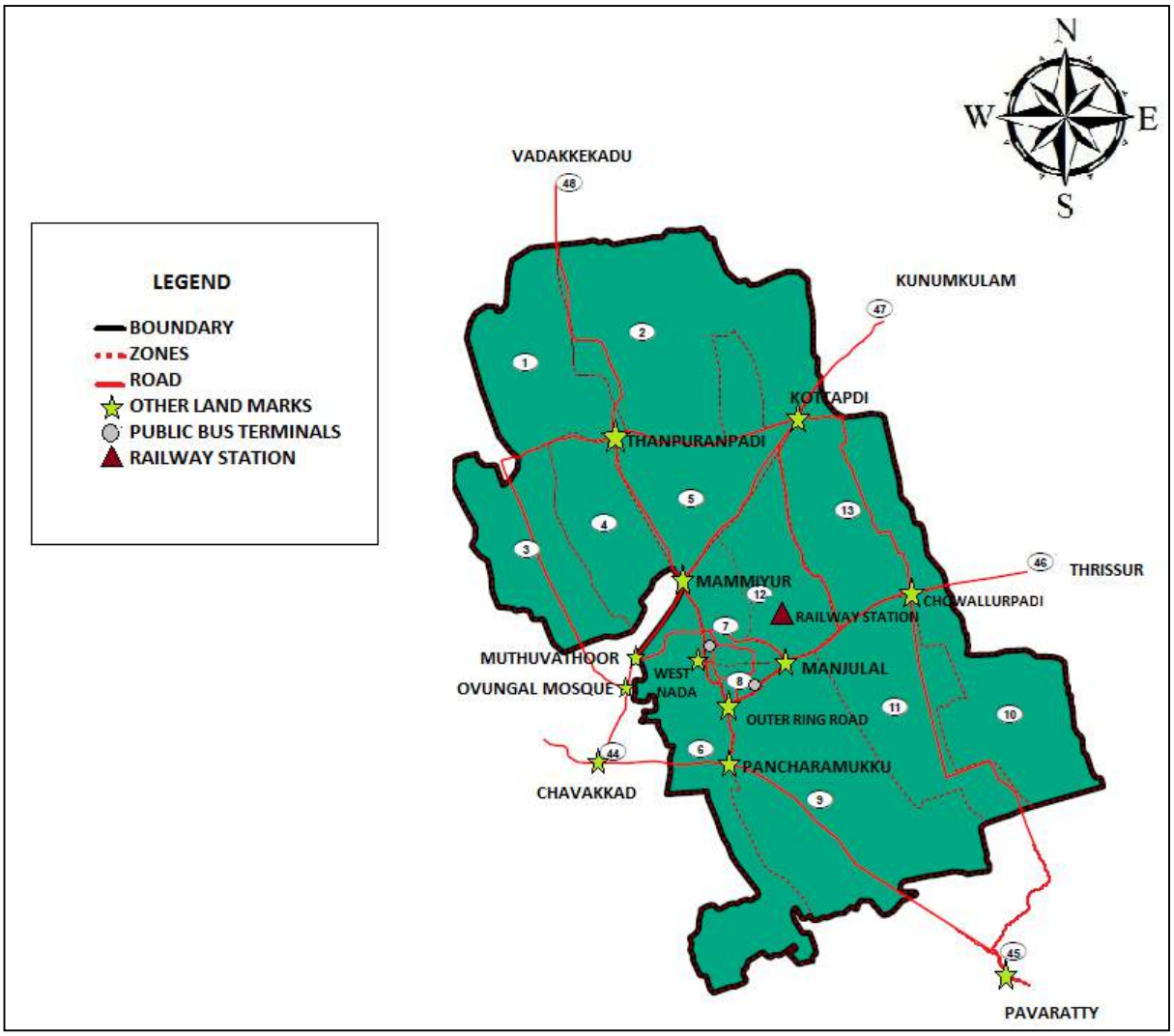


Figure 11.12: Zoning pattern adopted for the study in Guruvayur Municipality

A total of 4,310 vehicles of various categories were interviewed as part of OD survey which constituted 3.70 per cent of the total vehicles passing through the survey locations. Sample size of vehicles interviewed at various survey stations according to vehicle type are given in Table 11.12.

Table 11.12: Sample size of vehicles interviewed at outer cordon survey locations

Sl No	Type of vehicle	No. of total vehicles		No. of sample vehicles		Sample size	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
1	Car/van/jeep	18,965	18,679	421	413	2.22	2.21
2	Pass. Auto	10,267	12,947	108	137	1.05	1.06
3	Two Wheeler	18,721	22,904	1,366	1,314	7.30	5.74
4	Truck	2,028	2,213	35	26	1.73	1.17
5	Mini truck	2,531	2,456	71	129	2.80	5.25
6	Goods Auto	1,857	2,731	203	87	10.93	3.19

Source: NATPAC, 2017

11.6.1. Modal-split

The inter-city passenger transport in Guruvayur is predominantly met by road based KSRTC buses, private buses, mini-buses, and a host of personalized vehicles like four wheelers, two-wheelers etc. An analysis of the O-D survey data collected from outer cordon survey locations revealed that an estimated 4,83,999 inter-city passenger trips were performed in the study region on a reference day consisting of 3,07,558 bus passenger trips (63.55%), 75,605 car trips (15.62%), 59,029 two-wheeler trips (12.20%) and 41,806 auto trips (8.64%). It could be inferred that public transport had a significant role in meeting the inter-city passenger demand. Table 11.13gives the modal split of intercity passenger traffic in Guruvayur.

Table 11.13: Modal Split of inter-city daily passenger trips in Guruvayur

Sl No	Mode of travel	No of Passengers	% of passengers
1	Bus	3,07,558	63.55
2	Minibus/ Car	75,605	15.62
3	Auto-rickshaw	59,029	12.20
4	Two wheeler	41,806	8.64
Total		**4,83,999**	**100.00**

Source: NATPAC, 2017

11.6.2. Purpose-wise trips

Characteristics of passenger trips according to purpose of trips was analysed and it was found out that 35.87% of passenger for work purpose followed by 25.95% for personal works, 15.91% for shopping and 10.93% for social purposes. Negligent quantum of trips was carried out for other purposes. Trip purpose wise distribution of inter-city passengers is given in Table 11.14.

Table 11.14: Distribution of intercity passenger according to purpose of trip in Guruvayur

No.	Purpose of trip	No. of passengers	% of passengers
1	Work	1,65,991	35.87
2	Part of work	10,276	2.12
3	Personal business	1,25,617	25.95
4	Shopping	76,980	15.91
5	Recreation	9,417	1.95
6	Social	52,897	10.93
7	Education	42,821	8.85
Total		**4,83,999**	**100**

Source: NATPAC, 2017

11.6.3. Origin-destination of passenger trips

A total of 4.83 lakh passenger trips were performed as inter-city trips in the study region on a reference day. The major traffic generating zone within the study region was the Guruvayur temple area with 44,661 trips. Ovungal zone had traffic generation of 31,397 trips followed by Mammiyoor zone with 25,505 trips and Kottapadi zone with 13,615 trips. All other internal zones had trips less than 10,000. In the case of external zones Chavakkad zone generated 1,41,976 trips and Pavaratty zone generated 54,343 trips followed by Thrissur with 43,040 trips. Zones like Kunnumkulam and Vadakkekad generated trips between 38,000-40,000. All other external zones had trips below 19,000. Other states had a total of 1,289 generated trips.

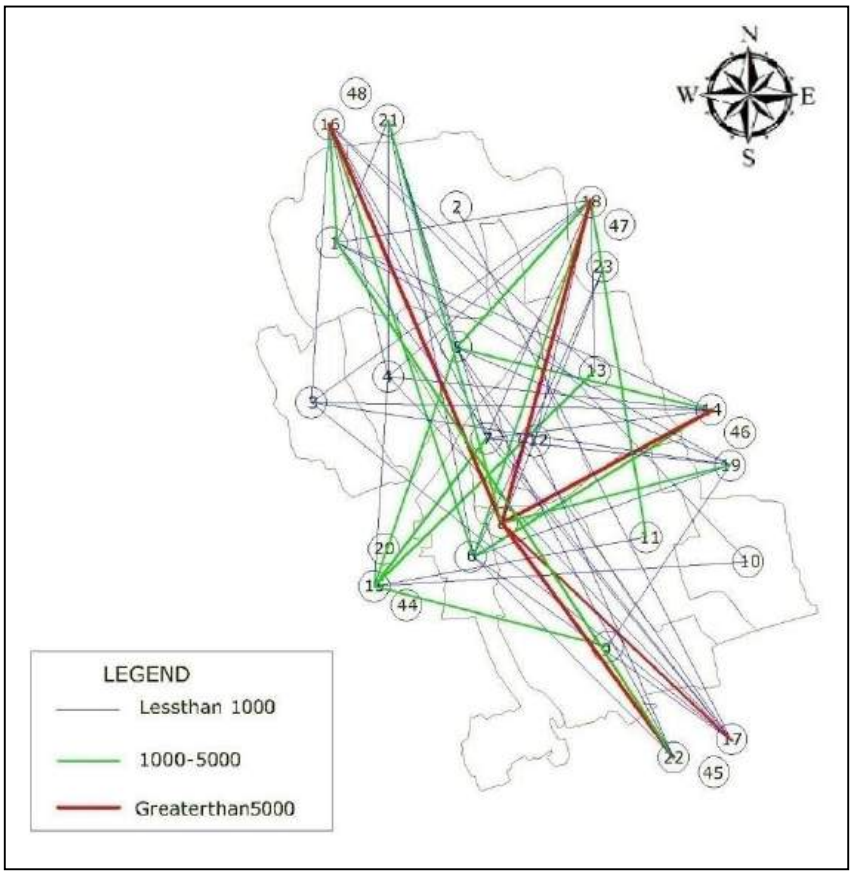


Figure 11.13 Desire lines -External - Internal

In the case of trip attraction within internal zones, Guruvayur temple area had the highest of

74,120 trips followed by Mammiyoor zone with 27,011 trips, Ovungal zone with 15,473 trips and Kottapadi zone with 10,807 trips. Other internal zone had attracted trips below 5,000. Among the zones outside the boundary but within the district, Chavakkad zone attracted 1,28,634 trips followed by Thrissur with 70,930 trips and Pavaratty zone with 44,914 trips. Other districts attracted 42,159 trips while other states attracted only 776 trips. Desire lines of inter-city passenger traffic are shown in Figures 11.13,11.14, and 11.15.

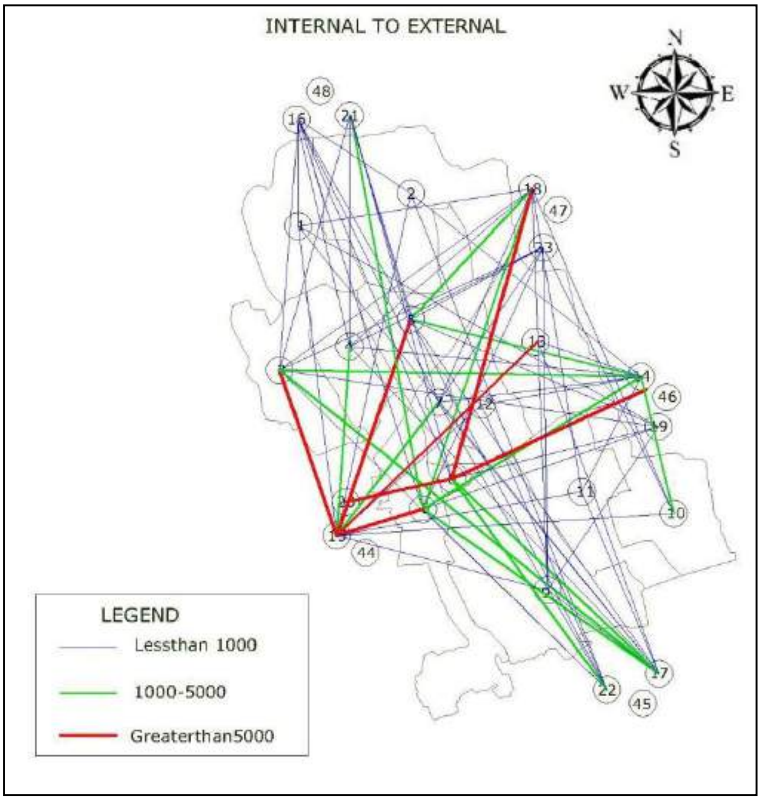


Figure 11.14: Desire lines - Internalto External

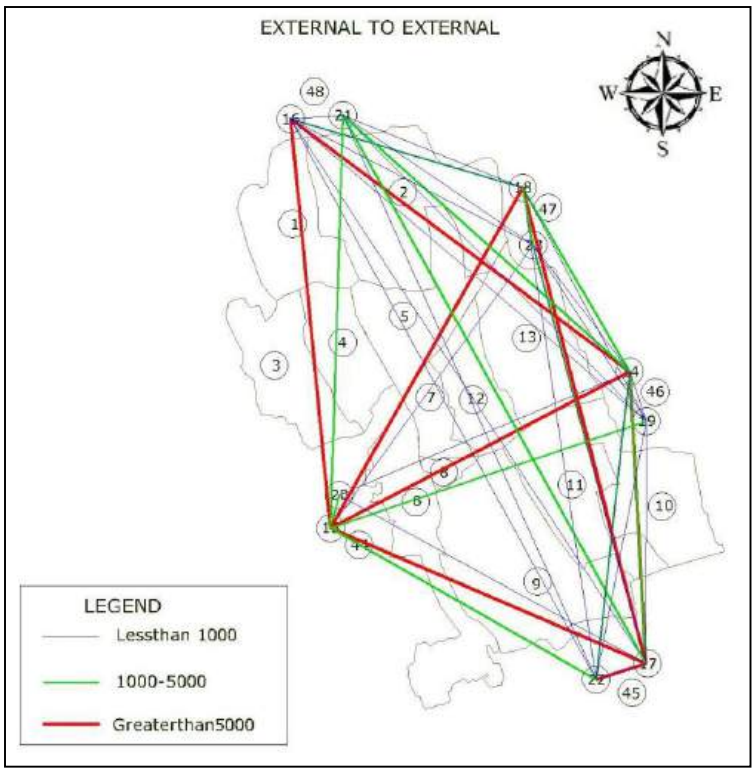


Figure 11.15: Desire lines – External to External

11.6.4. Pattern of inter-city passenger trips

The O-D pattern of inter-city passenger traffic revealed that there were 1.31 lakh internal - external trips (from within study region to outside study region) out of 4.83 lakh intercity passenger trips. They constituted 27.2 per cent of total trips. A total of 1.45 lakh trips were external – internal trips (from outside study region to within study region) constituting 30.16 per cent of the total trips. External – external trips to the tune of 2.06 lakh were performed through the study region and they were about 42.64 per cent of the total trips. Pattern of inter-city passenger trips are given in Table 11.15.

Table 11.15: Pattern of inter-city passenger movements through Guruvayur

Sl. No.	Pattern of movement	No. of passengers	% of passengers
1	Internal to Internal	0	0
2	Internal to External	1,31,659	27.20
3	External to Internal	1,45,962	30.16
4	External to External	2,06,378	42.64
	Total	**4,83,999**	**100.00**

Source: NATPAC, 2017

11.7. Inter-city goods traffic

11.7.1. Volume of goods vehicles at outer cordon points

The highest number of 3,461 tonnes of goods passed towards Chavakkad area followed by 31,338 tonnes toward Thrissur and 1,846 tonnes towards Kunnukulam. The zones towards Pavaratty and Mammiyoor had goods movement between 1,500 tonnes and 1,000 tonnes. All other zone recorded goods movements below 1,000 tonnes. Other states had 1,094 tonnes of goods movement.

11.7.2. Modal split of goods traffic

A total of 14,127 goods vehicles were found to be involved in carrying goods traffic to and from the study region, consisting of 4,322 trucks, 4,988 mini-trucks and 4,817 goods autos. The quantum of goods handled by these goods vehicles was 14,412 tonnes. Trucks carried the maximum volume of goods traffic constituting 59.09%, followed by mini-trucks with 24.76%. The remaining 16.15 percent of goods traffic was handled by goods autos as shown in Table11.16.

Table 11.16: Modal split of inter-city goods traffic in Guruvayur

Sl. No.	Type of vehicle	No. of vehicles	Quantum of goods (Tonnes)	Share (%)
1	MAT/ Truck	4,322	8,516	59.09
2	Mini-truck/ tempo	4,988	3,568	24.76
3	Goods auto	4,817	2,328	16.15
Total		**14,127**	**14,412**	**100.00**

Source: NATPAC, 2017

11.7.3. Composition of goods carried

Out of the 14,412 MT of inter-city goods traffic observed through outer cordon survey stations, agriculture products as a whole were carried in large quantities to the extent of 30.86% of total goods traffic in the region, followed by 21.45 % of industrial products, 20.45% of construction materials, 16.86 percent of other products, 9.98 percent of food grains and only 0.39% of petroleum products. In the case of individual commodities, the maximum volume of 4,448 MT movements was observed in the case of agriculture products and 3,092 MT in industrial products and construction materials with 2,947 MT. Commodity wise distribution of goods traffic in tonnes are given in Figure 11.16.

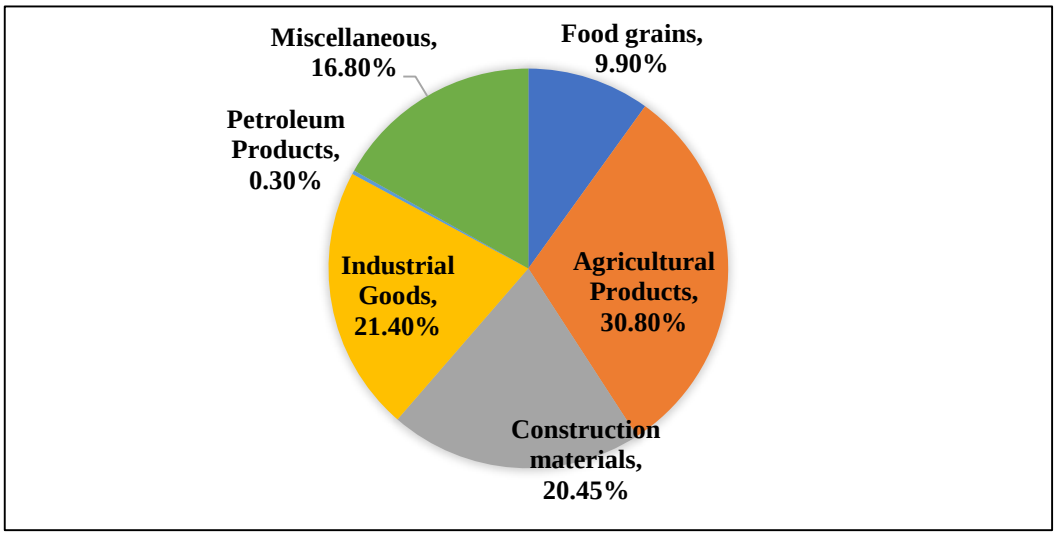
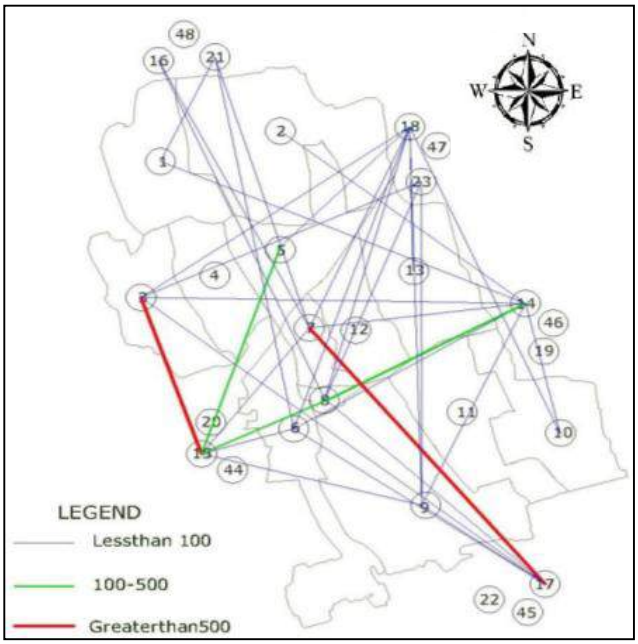


Figure 11.16: Distribution of inter-city goods carried

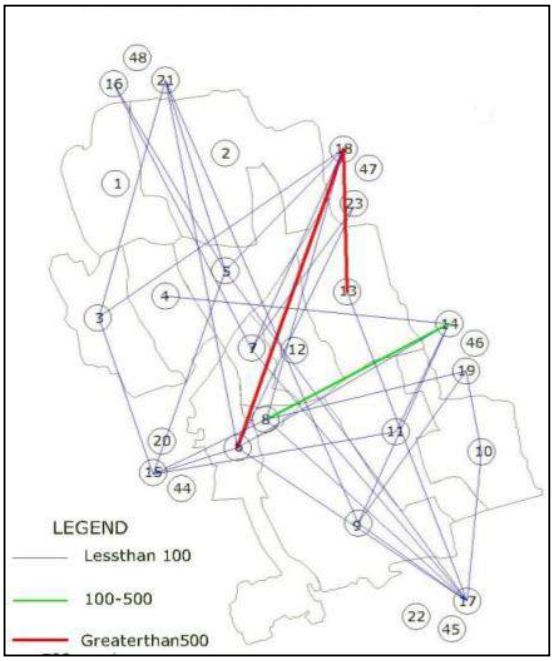
11.7.4. O-D of goods transportation

Inter-city movement of goods to the tune of 14,412 MT was carried out over the study region. The major traffic generator of goods traffic within the study region was Mammiyoor zone with 1,227 MT, and towards other districts maximum movement of goods was towards Chavakkad with 3,461 MT followed by Thrissur with 3,138 MT, Kunnumkulam and Pavaratty zones with 1,846 MT and 1,410 MT respectively. Other states constituted 1,094 MT.

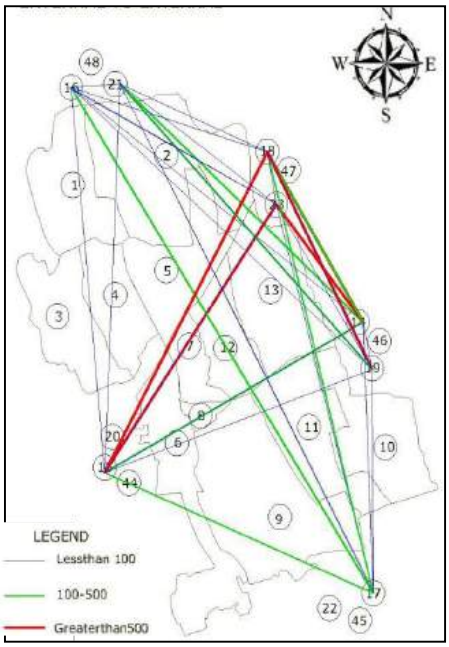
Similarly, in the case of goods traffic attraction, Thamarayoor zone attracted 24,520 MT followed by Kunnamkulam zone with 5,101 MT. All other zones recorded goods movement below 1,700 MT. Desire lines of inter-city goods traffic are shown in Figure 11.17.



External - Internal



internal-external



external-external

Figure 11.17: Desire lines of intercity goods traffic

11.7.5. Pattern of goods traffic

A further study of the goods traffic pattern, it was observed that 2,831 tonnes of traffic originated from the study region and moved outside while 2,424 tonnes originated external to the study area and terminated in the study region. Nearly 9,158 MT of traffic constituting

63.54% is of divertible nature, which, are passing through the CBD area of the town due to non-availability of bypass, as shown in Table 11.17.

Table 11.17: Pattern of goods movements through Guruvayur

Sl. No.	Pattern of movement	No. of passengers	% of passengers
1	Internal to Internal	0	0
2	Internal to External	2831	19.64
3	External to Internal	2424	16.82
4	External to External	9158	63.54
	Total	14412	100.00

Source: NATPAC, 2017

11.7.6. Inter-city vehicular movements

Pattern of inter-city vehicular movements through Guruvayur is obtained by analyzing the origin-destination movements of vehicular traffic at the outer cordon survey locations. It could be seen that 49,518 PCU of through vehicles passed through Guruvayur, out of which bulk movements were between Thrissur and Chavakkad followed by between Chavakkad and Pavaratty. Movement pattern of inter-city vehicles through various exit points of Guruvayur are presented in Table 11.18.

Table 11.18: Inter-city vehicular movements through Guruvayur

ZONES	14	15	16	17	18	19	20	21	22	23	24	TOTAL
14	0	2626	783	2475	552	179	70	111	351	51	0	**7197**
15	8192	0	1274	4914	1597	556	583	518	135	277	70	**18116**
16	2387	1507	0	213	263	10	0	46	40	0	0	**4466**
17	1468	3047	146	0	2384	182	138	325	2431	647	92	**10859**
18	600	2506	68	1344	0	76	0	7	37	294	0	**4933**
19	67	350	0	140	19	0	10	0	30	10	0	**626**
20	0	0	0	27	0	0	0	0	0	0	0	**27**
21	165	638	0	269	56	155	0	0	9	38	0	**1330**
22	56	800	17	38	40	0	25	136	0	20	0	**1131**
23	113	167	0	38	255	51	0	24	0	0	10	**657**
24	0	74	0	65	0	36	0	0	0	0	0	**175**
TOTAL	**13048**	**11714**	**2288**	**9522**	**5165**	**1245**	**826**	**1166**	**3035**	**1337**	**173**	**49518**

Source: NATPAC, 2017

11.8. Railway terminal survey

The Thrissur-Guruvayur rail line intersects Guruvayur on SH 49 near Manjulal junction. The daily inbound and outbound passengers at Guruvayur railway station were surveyed at the station gate. Table 11.19 shows travel mode used by rail commuters to access the railway station and egress from the station. Out of the daily rail passengers, largest share is for auto-rickshaw followed by walk and then by two wheelers as their first mile and last mile connectivity within the town. It can be seen that a good number of both boarding and alighting passengers still use Auto as their first mile/ last mile connectivity. An OD survey conducted at the railway station. Places of Origin and destination refer to the first origin and final destination of the passenger,

not necessarily the railway stations. It could be seen that major trips were between Guruvayur temple area and Thrissur area. Other districts and other states were the major terminating regions for the rail passengers.

Table 11.19: Distribution of rail passengers according to mode

Sl. No.	Mode	Direction (%)	
		First Mile connectivity	Last Mile connectivity
1	Bus	13	15
2	Car	7	8
3	Auto	38	26
4	Two wheeler	14	28
5	Cycle	-	-
6	Walk	29	22
Total		**100**	**100**

Source: NATPAC, 2017

11.9 Major traffic problems in Guruvayur

The configuration of the road network system of Guruvayur exhibits a ring and radial pattern wherein there exists a couple of concentric ring roads viz. Inner Ring Road (IRR) and Outer Ring Road (ORR) which encircles the Guruvayur temple. Other roads that radiate form the ORR are Guruvayur – Mammiyoor road, Guruvayur – Muthuvathoor road, Guruvayur - Karakkad road and Guruvayur-Choondal (SH 49) road. Major roads like Chavakkad-Kunnamkulam (SH 50) road and Chavakkad-Kanjani road radiate from Chavakkad which is just 600-700m away from Guruvayur municipal boundary. Guruvayur-Althara-Ponnani (SH 62) road starts from Mammiyoor. Most of the roads have low carriageway width and sub-standard geometry. The major traffic problems identified in Guruvayur are:

(i) Extensive unorganized parking, as shown in Figure 11.18, is present on all roads especially on IRR near west nada, south nada and north nada; on ORR near west nada, municipal bus stand, Manjulal and Kairali hospital junction; railway station road, manjira road, mammiyoor, thampuranpadi, muthuvathoor and ovungal pally.



Figure 11.18:Unorganized Parking in Guruvayur

(ii) Like most other parts of Kerala, pedestrians are the most vulnerable road users in Guruvayur. Most of the roads are devoid of footpath and on road stretches where covered drain serves as footpath, encroachment for commercial activities restrict the smooth flow of pedestrians. Heavy lateral as well as cross movement of pedestrians is observed near east nada, south nada, west nada, manjulal, railway station road and municipal bus stand. Lack of at grade facilities often leads to unsafe condition for pedestrians. Non-Motorised Transport (NMT) facilities have not been given due consideration in the town's transportation system.

(iii) The intersections in Guruvayur are uncontrolled as channelizing traffic islands are absent at most of the intersections. Police personnel are deployed for traffic control during peak time. The intersections are shown in Figure 11.19 from which it is clearly visible that most of them are Y intersections or staggered intersections. Difficulty is observed at these locations for turning traffic movements manoeuvring the acute angle curves.



Perakam road – SH 50



Mammiyoor junction



Kottapadi junction



West nada junction

Figure 11.19 Uncontrolled intersections in Guruvayur

(iv) Thrissur-Guruvayur railway track intersects Guruvayur-Choondal SH 49 near Manjulal junction and causes traffic congestion and chaos on both sides of this location when the gates are closed for the movement of trains. Figure 11.20 shows the congested condition at Manjulal junction due to railway gate closure.



Figure 11.20: Traffic congestion at Manjulal junction due to railway gate closure

(v) Majority of the town roads do not have adequate carriageway width. Except for SH 49, SH 50, SH 62 and a portion of Outer Ring road, all other roads have a carriageway width of less than 7.0m.

(vi) Traffic Signages and Road Markings are inadequate and the ones that are provided are scarcely maintained.

(vii) Municipal bus stand and KSRTC bus stands, as shown in Figure 11.20, are situated off the ORR. Both these bus stands have limited space for operation due to idle parking of buses.



Figure 11.21: Bus stands in Guruvayur

(viii) Inter-mixing of local traffic with through traffic in the absence of alternate road links/ regional bypass.

(ix) Thodu from chettuva lake exists which extends till Mammiyoor temple in Guruvayur. The Chettuva lake is connected to Thrissur via Puzhakkal river. This waterway has not been tapped for transportation of passengers or goods.

11.10 Inference

Guruvayur town is well connected by road and rail networks. A well connected public transportation system is also present in the Municipality. Transport development plans should be formulated so as to reduce the undesirable congestion and unsafe traffic conditions on the existing road network.

CHAPTER 12

WATER SUPPLY

Water being one of the basic requirements for survival of all living beings needs to be managed in order to ensure universal availability. Provision of water to any place is generally from a main water source like river, through arrangement of treatment plants, pumps, pipes, etc. to household level distribution. Houses may also have a well which provides ground water required for household. But it is necessary that the water demands of an urban area are catered, such that the per capita demand of water is satisfied. For this, sources of water needs to be identified, and ways of distribution to be checked to provide new connection or reroute existing connections for supply.

12.1. Existing Water Supply System

Guruvayur Municipality experiences a high number of floating population which ultimately puts stress on the water resources of the area. As per census 2011 data shown in Table 12.1, well is the major source of water used by 85.5% of the households. Figure 12.1 shows the house hold coverage of water sources in percentage.

Table 12.1. Details of coverage of water source

Zone	No. of Households covered by %						
	Tap water		Well	Hand Pump	Tube well	Spring	Others
	From treated source	From untreated source					
Guruvayoor	14.2	0.5	83.2	0.1	1.3	0	0.6
Pookkode	5.3	14.6	78.7	0.2	0.3	0.1	0.8
Thaikkad	2	0.7	94.7	0.1	1.6	0	0.9

Source: Census 2011

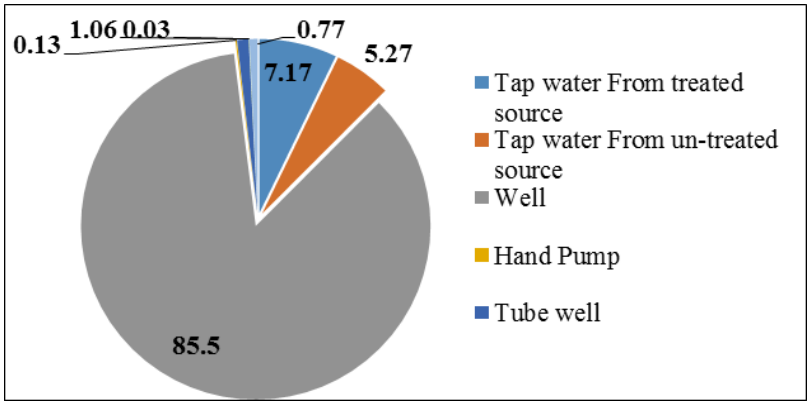


Figure 12.1. Household coverage of water sources

Taps are the next major source of water amounting to about 12.44% of the supply units out of which 7.17% is treated and 5.27% is untreated water. Other water sources like hand pumps and tube wells are negligible in use. Tap water connection is generally supplied by Kerala Water Authority (KWA).

The main surface water source for Guruvayur Municipality is Bharatapuzha River from where KWA supplies water to the Municipality. At present the drinking water demands of the Guruvayoor Municipality is met from KGWSS (Kunnamkulam-Guruvayoor Water Supply Scheme), a scheme commissioned in 1974, implemented at Thrithala. Through this scheme, 3Municipalities (Kunnamkulam, Guruvayoor, and Chavakkad) 2 Panchayaths (Orumanayur and Kadapuram) are getting water. The water from Thrithala pump house is pumped to Kootanad (4.5 MLD treatment plant) and from there to Kunnamkulam YMCA Over Head Tank (5 Lakh Litre) and finally to Guruvayoor, Kunnamkulam and Chavakkad Municipalities. Guruvayoor Municipality is getting a supply of 3 MLD from the KGWSS scheme. Fig 12.2 shows the KWA supply route.



Figure 12.2. KWA Supply Route – Thrithala to Guruvayur
Source:Water Audit Report, Guruvayur(2018)

There are 2 proposed schemes for water supply in Guruvayur Municipality: AMRUT (Atal Mission for Rejuvenation and Urban Transformation) and UIDSSMT (Urban Infrastructure Development Scheme for Small and Medium towns). Under both the schemes 22 MLD of total supply is proposed considering Karuvannur River as the main source, whose head works are located at Karuvannur and treatment plant located at Vellanikara. The project initiated under the UIDSSMT scheme was shared by Chavakkad and Guruvayur Municipality such that a total of 13MLD water will be collected, treated and stored, out of which 4.84MLD will be provided for Guruvayur.

Under the AMRUT scheme, it is proposed to pump raw water from Karuvannur river to the 15MLD treatment plant established at Kottappady and to supply through 120kilometres of distribution line.

12.2 Distribution Zones and Network

Guruvayur Municipality is divided into three zones for water supply. Table 12.2 shows the zone wise coverage of households in each zone, with and without water tap connections, as per 2011 Census. Gurvuvayur zone has the maximum number of water tap connection compared to Pookode and Thaikkad zones. 90.61% of households do not have tap water connection. Their demands are possibly being satisfied by well water.

Table 12.2. Zone wise coverage of households

Zone	Total No of Households	Households with water tap connection	Households without water tap connection
Guruvayoor	5540	1604	3936
Pookode	7970	20	7950
Thaikkad	3787	0	3787
Total	**17297**	**1624**	**15673**

Source: Census 2011

There are 2 Over Head tanks within the Municipality, details of which are given in Table 12.3. One sub-tank is also provided for Devaswom to cater to the water supply needs of the pilgrims coming to the temple.

Table 12.3. Details of overhead tanks/reservoirs within the Municipality

Number of Over Head Tanks/ Reservoirs & Capacity	Capacity of WTPs	Treated supply as % of total water supplied
2 Nos. each 5.00 LL OH Tanks at KWA Office compound and Savakkotta. One sub tank for Guruvayoor Devaswom 5.00 LL capacity.	1 MLD	100%

Source: Guruvayur Municipality,2019

Existing zone wise length of distribution network is shown in Table 12.4. Total road length of the Municipality is 250Km and the length of distribution lines is 78Km. For distribution lines CI, GI, PVC and AC pipes are mostly used. But due to old age and leakage in pipe lines, some pipes are to be replaced for reducing non – revenue water (NRW) which accounts to 43% (As per State Level Improvement Plan for Guruvayur Municipality), permissible limit as per URDPFI guidelines is 20%. By replacing these lines and introducing effective NRW management system will reduce NRW considerably.

Out of all 43 wards, KWA supply lines are mainly concentrated in Guruvayur Zone and 24 wards have KWA supply. As per KWA report total number of connections in Guruvayur Municipality is 1649. Thus less than 10% of the population is having KWA house connections. Water supply network in Guruvayur Municipality is shown in Figure 12.3. As per Water Audit Report of Guruvayur Municipality, there are 281 public taps out of which 224 taps are functioning and 57 (20%) taps are not functioning. The locations of taps are shown in figure 12.4.

Table 12.4. Zone-wise length of distribution network

Zone	Total Street Length (Km)	Street length with water distribution pipe line (Km)	Street length without water distribution pipe line
Guruvayoor	115	60	55
Pookode	93	5	88
Thaikkad	42	13	29
Total	**250**	**78**	**172**

Source: Guruvayur Municipality,2019

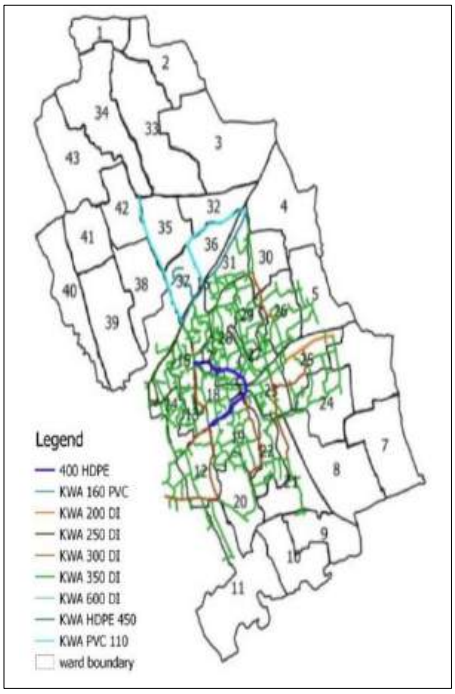


Fig 12.3. Water Supply Network

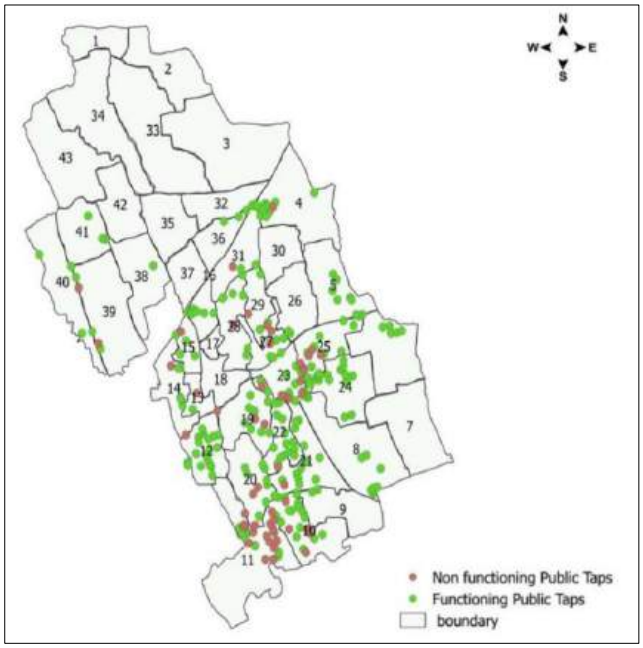


Fig 12.4. Location of public taps in Guruvayur
Source:Water Audit Report, Guruvayur(2018)

12.3 Water Supply through Imported water

As per the water audit report prepared by the SCMS Water Institute for Guruvayur Municipality in 2018, the town is passing through a phase of acute water scarcity. For meeting the increased demand for water and to tackle the problem of water scarcity the place is depending on imported water. It includes those supplied as packaged drinking water (cans and bottled water) and also water supplied through pipelines and tankers. In Guruvayur there are two classes of imported water which are government controlled imported water and private controlled imported water. Kerala water authority supply is the only kind of government controlled imported water supply in Guruvayur. Private controlled imported water supply is further divided into the unorganized sector and organized sector. Tanker lorry supply is an unorganized sector which is privately controlled, and packaged water supply is an organized sector. As per Water Audit Report 2.58 MLD water is imported to the Municipality for satisfying the present water demands.

12.3.1 Water Supply through Tankers

Guruvayoor is having more than 21 dealers of tanker supplied water, each having number of tankers. These tankers are of capacity 13000L, 12500L, 9000L, 4000L, 2000L, and 1000L.As per the household survey conducted by the SCMS Water Institute, it was found that out of 43 wards, 23 wards were depending on tanker supply of water. They were 1, 4, 5, 6, 7, 8, 9, 10, 11, 16, 20, 21, 23, 24, 25, 26, 28, 30, 31, 32, 33, 35, 37. Of these 23 wards, wards 5, 10, 11 and 28 were always depending on tanker water whereas others are depending on a seasonal basis (Figure 12.5).

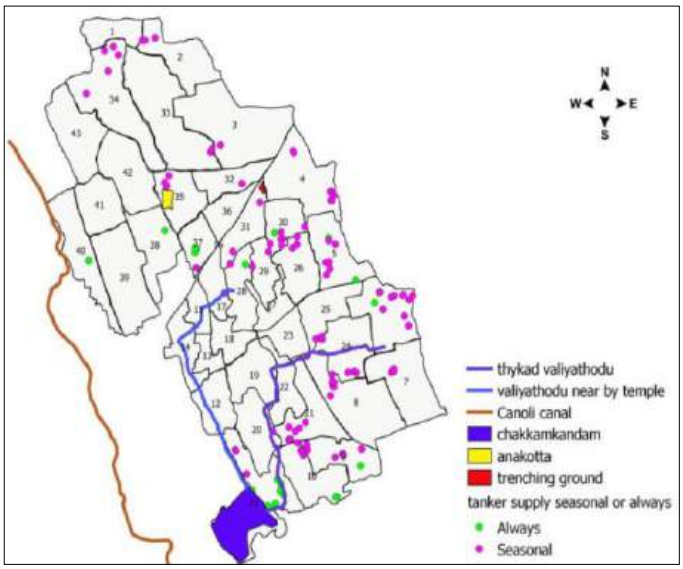


Fig 12.5. Wards with frequent supply of tanker water for households [Source:Water Audit Report, Guruvayur(2018)]

Commercial establishments such as hotels, lodges and restaurants are one of the major water consumers within the Municipality. They are seasonally or wholly depended on the tanker supply for meeting the commercial demand. Figure 12.6 shows the demand of various commercial establishments for water in Guruvayur. Hotels are the top consumer with water demand being 3 MLD and average daily consumption 15000liter per day. Hotels, lodges, and restaurants in Kizhakke nada, being more water scarce, were predominantly depending on tanker supplied water for meeting their demand.

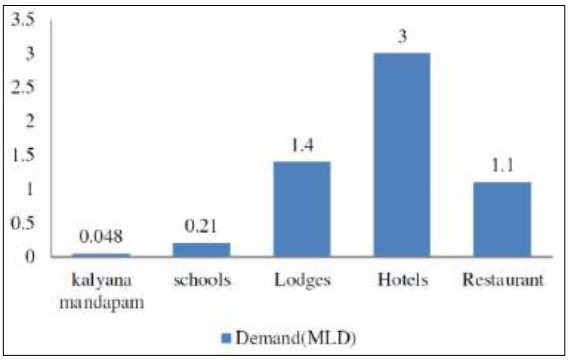


Fig 12.6. Water demand of various commercial establishments [Source:Water Audit Report, Guruvayur(2018)]

Guruvayoor Devasvom is entirely depended on imported water. They had four lines of KWA direct to temple and all other supply was through tanker lorries. Tanker lorries are taking 3,82,500 liters of water daily from Kandanissery and Dwaraka beach of Chavakkad of which Punnathoor aanakkotta alone require 2 lakh liters of water. The dealers are taking water from places within 14 km radius. The nearest place of tanker supply is from Iringaprom, an area inside municipality and distant place being Kaipparambu.

12.3.2 Packaged Water Supply

Since Guruvayur is a temple city with a floating population of 30000 per day, it is highly depended on packaged water supply. Usage of packaged water is not due to water scarcity but due to several perception factors of consumers. Lack of adequate fresh water supply, Contamination of existing water resources, bad taste, odour and colour of tap water etc. has increased the dependency to packaged drinking water. Guruvayoor has more than 25 distributors of packaged water who supply both 20L cans and1L bottles. On an average, each distributor supplies 100 cans of 20L and 60 cases of 1 Lbottles a day. 20L cans are used primarily in offices whereas 1L bottles are used in restaurants and hotels.

12.4 Availability of Rainwater

Guruvayoor Municipality having a tropical climate is dependent on the two monsoons i.e the Southwest and Northeast monsoon for rainwater. Normally the monsoon rain occurs from June to November. High-intensity rain occurs during this time all along the season and the annual rainfall of Kerala is greater than 3000 mm. The annual rainfall in the municipality was declining in the recent years. The average annual rainfall receiving in the Municipality was 2355 mm (Indian Meteorological Department). The average number of rainy days in Municipality is 122 days. As per the water audit report, the rate of runoff over the entire catchment area is 0.24 MLD. Hence, approximately 30 ML of water can be collected by avoiding a runoff in122 rainy days. As the rainfall availability was decreasing remarkably it is important to conserve the accessible rainwater in order to meet our needs during water scarce period. Rainwater harvesting is a potent method to collect rainwater and can reduce the runoff. If rainfall was effectively utilized for rainwater harvesting, the water stress in Guruvayoor Municipality could be reduced up to a good extent.

12.5 Available water resources

There are a total of 144 public wells in the Municipality out of which only 121 wells are currently being used. Fig 12.7 shows the location of all public wells in the Municipality. Among the public wells, 16 wells are not usable since they are contaminated with waste materials and dumping of plastic waste and 7 wells which are in good condition are not used since the people have their own well in that area. Mostly public wells are used by people living in colonies. The public wells which are in good condition could be used for supplying water in the water scarce areas of the Municipality or to the areas where good quality water is unavailable.

Guruvayur Municipality has a total of 33 public ponds among which only 2 of them are of good quality. The location of all the public ponds is given in the Fig 12.8. Apart from the

public ponds, there are many private ponds in the Municipality which are under the threat of contamination due to the dumping of waste and landfilling. As we know ponds are a potential source of surface water storage which can also act as a storage basin for the rainwater. If the available ponds are rejuvenated and maintained the water quality in the Municipality could be improved drastically, especially in the areas where the groundwater quality is diminishing.

Most of the ponds in the municipality are contaminated with waste or weed. Currently, there are only 2 public ponds of usable quality which is located at ward number 32(Kottapadi) and 36(Choolpuram East), both of the ponds can be used for water storage. Rejuvenation of ponds under AMRUT scheme is an ongoing project which has 15 ponds under the project to be revived in five phases.

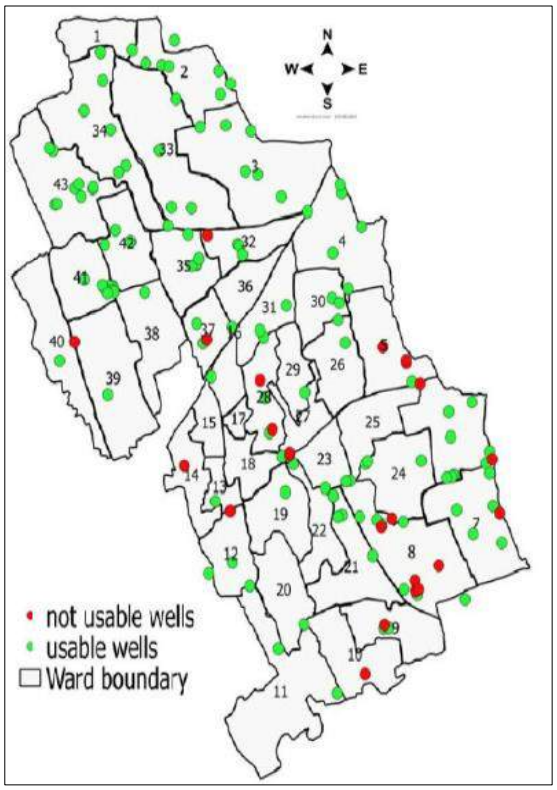


Fig 12.7. Location of public wells

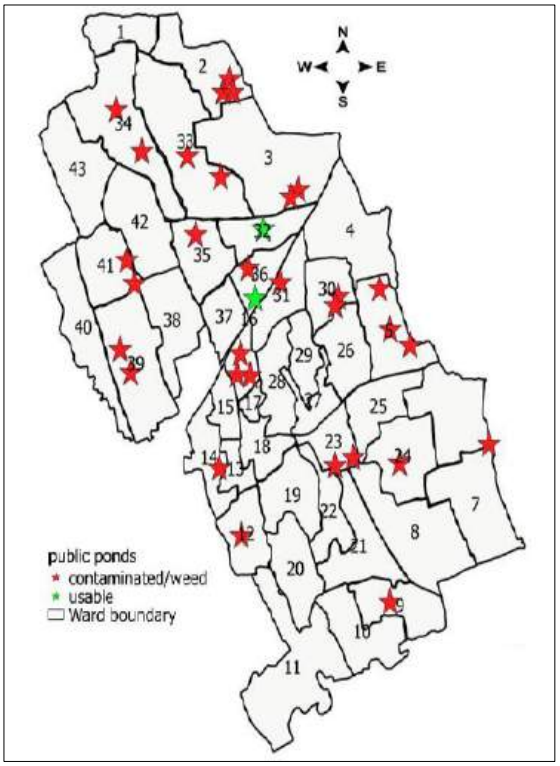


Fig 12.8. Location of public ponds

12.6 Quality of Ground water

As explained in the existing scenario of the town, maximum households depend on well as a main source of water supply. If water is available within one's own compound, utilization is generally uncontrolled, due to which ground water will reach a level depleted beyond possible recharge. Guruvayoor Municipality is located 4 km away from the seashore and hence some of the areas in the Municipality faces the problem of salinity intrusion. Even though Guruvayoor belongs to the safe zone as far as the groundwater is concerned it won't be too long before it falls into groundwater depleted zone in the near future. Therefore, Analysis of the ground water

levels is necessary. As per data from Ground water department the average Ground water level in Guruvayur Municipality is 1.68meters below ground level.

Two of the major streams in the Municipality namely Valiyathodu near to temple and Valiyathodu at Thaikkad have been converted to sewage drains due to lack of awareness and improper sanitation. Many wells and water bodies near to this have been contaminated and causing water scarcity around that regions. The outlet of grey water from many commercial establishments are open to these streams which have contributed to contaminating this over a period of time. This streams which used to be freshwater streams before the extensive commercialization took over the Guruvayur Zone have now become drains to carry wastewater to the Chakkamkandam region. Rejuvenation of these streams along with other minor streams in the Municipality would solve the groundwater contamination to a greater extent.

Table 12.5 shows the results of the assessment of ground water, conducted by the department of ground water in Pookode and Guruvayur villages. Results of ground water test shows that well located at schools in Guruvayur Devaswom and near Choondal shows the presence of coliform bacteria in it. Though the remaining parameters are within limits, presence of coliform bacteria indicates leachate of unhygienic waste into ground water. Hence proper sewerage disposal methods are required to prevent harmful leachate into ground water.

Table 12.5. Results of groundwater quality tests at wells in Pookode and Guruvayur Villages

Sl. No.	Parameter	Unit	Permissible	Well			
				W5	W6	W7	W8
1	Colour	Hazen	5	Nil	Nil	Nil	Nil
2	Turbidity	NTU	1	0.2	1.5	0.3	0.3
3	Total Dissolved Solids	mg/l	500	30.5	160.0	104.0	129.0
4	pH	-	6.5-8.5	7.5	7.2	7.7	8.0
5	Total Hardness	mg/l	200	17.0	169.0	64.0	119.0
6	Calcium	"	75	2.8	53.6	17.2	34.4
7	Magnesium	"	30	2.4	8.5	5.1	8.0
8	Chlorides	"	250	14.0	66.0	36.0	18.0
9	Sulphates	"	200	26.9	25.3	13.4	19.6
10	Nitrate	"	45	0.9	2.2	1.6	2.6
11	Flourides	"	1	0.024	0.024	0.013	0.024
12	Total Coliform	MPN/100ml	NA	Nil	Nil	50.0	70.0
W5- Well at GUPS, Peruvallur							
W6- Well at M. R. Raman Memorial School							
W7- Well at GuruvayurDevaswomSreeKrishna H. S. School							
W8-Well at Depaul H. S. School, Choondal							

Source: Ground water Department

12.7 Socio-Economic Survey - Analysis

For better understanding of the present situation of water supply, socio-economic survey conducted for 10% of the households in Guruvayur Municipality. Results of the survey is as follows:

- As shown in figure 12.9., the dependency on well water has increased from 85.5% to 92.66% in 2019. KWA water distribution has reduced to 2.17%. hence, more pressure on ground water resources calls for the need of checking ground water levels of the area.

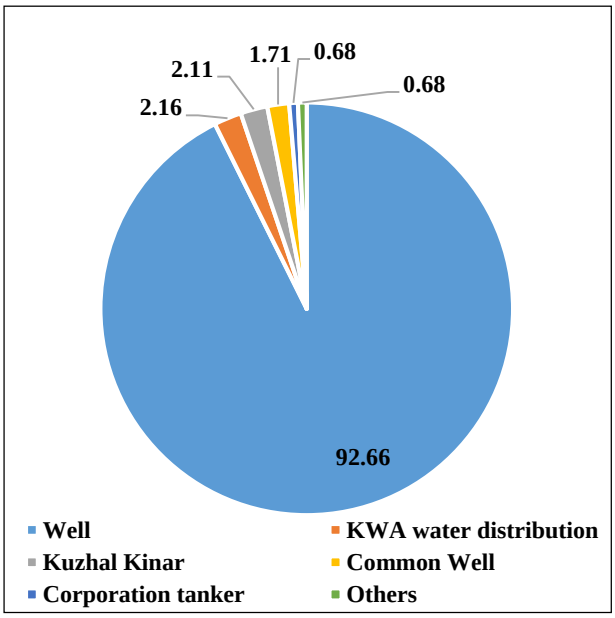


Fig 12.9. Distribution of Water Sources

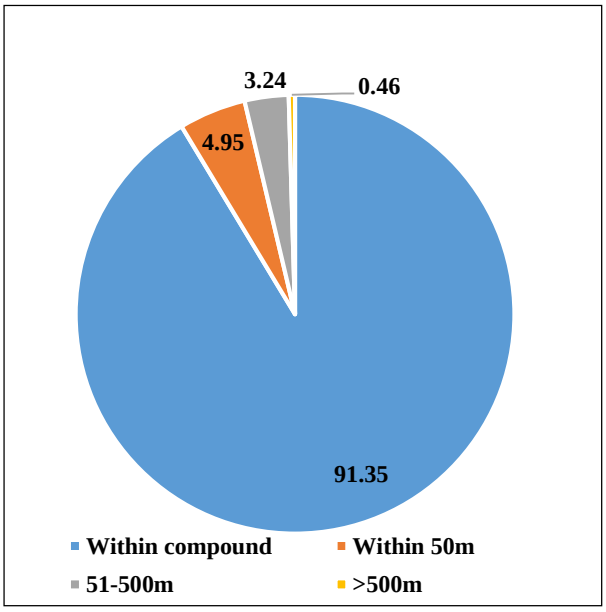


Fig 12.10. Distance from source of water

- About 91.35% of households have source of water within own compound. 3.7% households have to travel more than 50m to the nearest source of water (Figure 12.10).

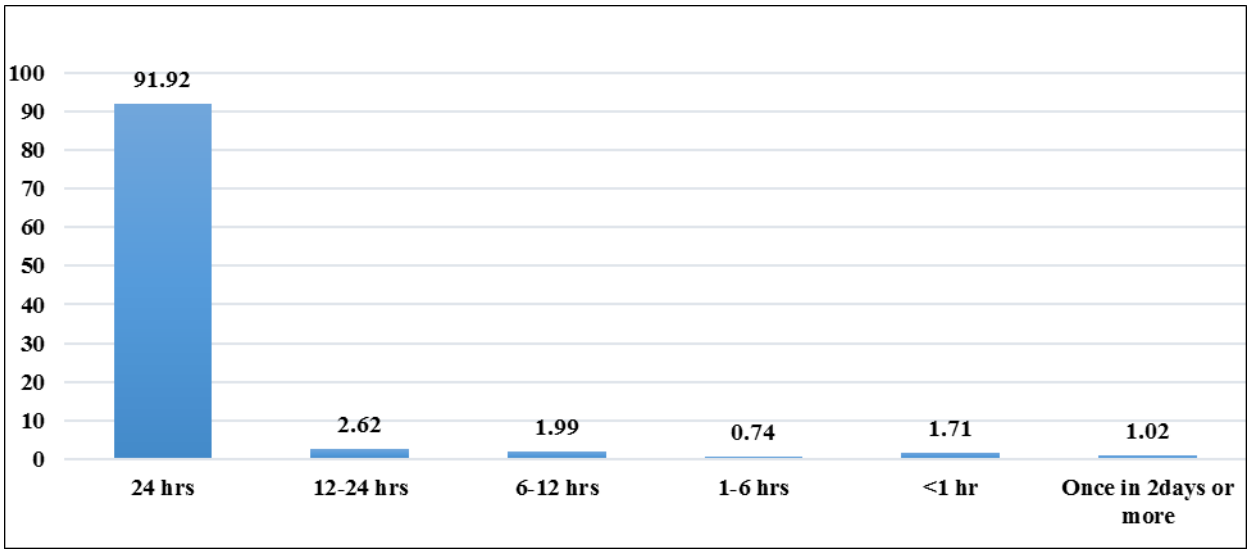


Fig 12.11. Duration of water supply

- Figure 12.11 shows the duration of water supply within the town. About 8.08% of people are affected due to intermittent water supply. 1.02% people get water only once in 2 days.
- As shown in Figure 12.12, 75% households have no shortage in water. Another 20% households experience shortage for 1-3 months which may possibly during summer. 5% face acute shortage in water supply which extends from 3 months to more than 6 months. Wards facing acute water shortage are spatially marked in figure 12.13. Wards 12, 21, 5, 33 show low water scarcity. However, the water scarcity is significant in ward 35 (Kotta North).

12.8. Demand and Deficit of Water

Guruvayur is a temple town where crores of devotees visit every year and it created a major water stress within the Municipality. It is necessary to assess the present demand and the deficit of water to suggest possible solutions to reduce the gap between demand and supply. The present total water demand is found to be 12.79MLD (Table 12.6). Total water supply within the municipality is 7.84 MLD. Hence there is deficit of 4.95 MLD water per day. Table 12.6 shows the breakup of water demand.

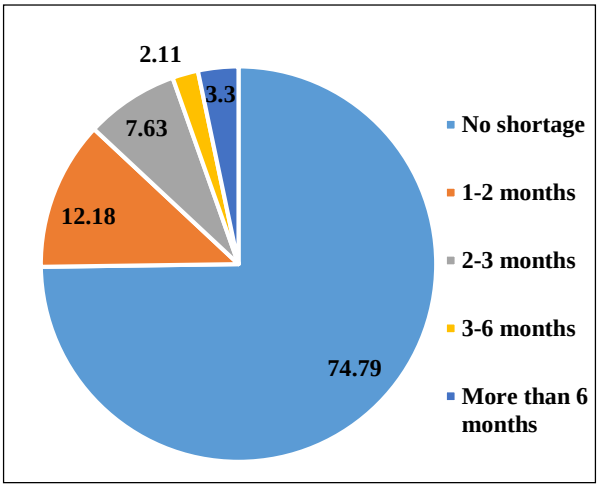


Fig 12.12. Nature of water scarcity

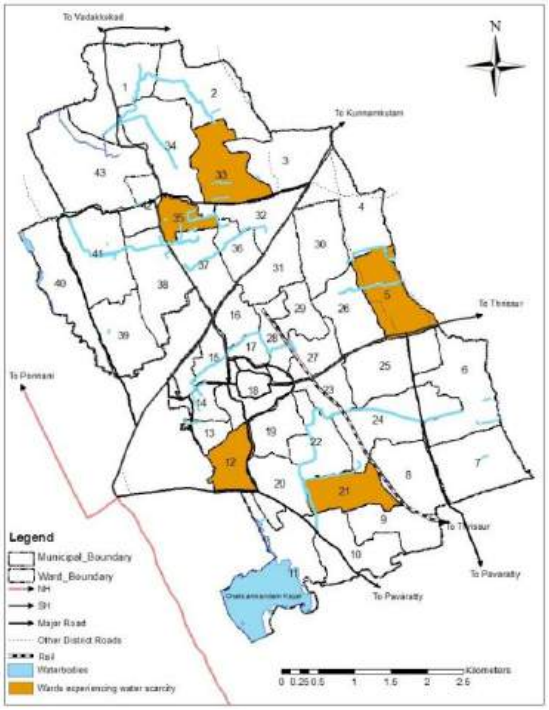


Fig 12.13. Wards with water scarcity
Source: Socio-Economic Survey,2019

Table 12.6 Total Water Demand of Guruvayur Municipality

2021				
Sl. No.	**Establishment/Population**	**Units**	**Per capita demand(L/Day)**	**Total (MLD)**
1	Population	70012	135	9.45
2	Fire fighting			0.03
3	Hospitals	125	340	0.04
4	Hotel	100		0.00
5	Schools	13607	45	0.61
6	Offices	1075	45	0.05
7	Lodges	2265	180	0.41
8	Factories	572	45	0.03
9	Theatres	600	15	0.01
10	Auditoriums	6355	15	0.10
11	Pilgrims	29632	70	2.07
				12.79

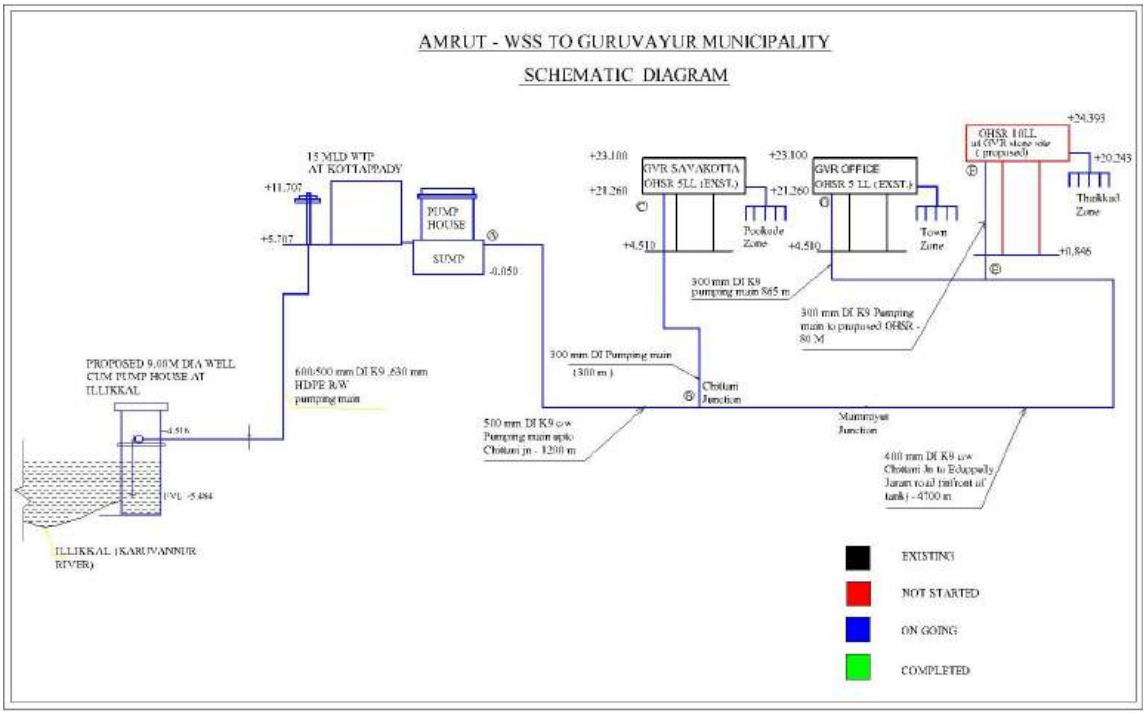
The total domestic water demand is 12.79 MLD. Out of all the wards, ward number 25 (Substation) has the highest domestic water demand and this is due to the fact that it has the second highest population among all wards and a high per capita demand as per the data obtained from the household survey. Even though ward number 18 (Gurupavanapuri) has the lowest population as the major area of the ward is occupied by Guruvayoor temple and related commercial establishments, the per capita demand is high and the ward with lowest domestic water demand is ward number 32 (Kottapadi) since it has a comparatively low population and the least per capita demand among all the wards. Other wards having comparatively high domestic demand is ward number 38 (Thamarayur), 37 (Kotta South), 31 (Choolpuram West). The total commercial/institutional demand was estimated to be 7.2 MLD and the major portion of this demand is contributed by the Hotels, restaurants, and lodges in and around the ward number 18 (Gurupavanapuri) where the Guruvayoor temple is located.

The water deficit in the Municipality is created by the commercial establishments and salt water intrusion to some extent. Most of the hotels, restaurants, and lodges have to depend on the tanker water supply due to this. Only a very few commercial establishments have their own water source like an open well and all others are dependent on the tanker supply. Hotels and lodges in the West Nada of the temple don't experience water scarcity compared to the commercial establishments situated at the East Nada, which depends solely on the tanker supply and many hotels and restaurants in that area have their own tanker lorry. Most of the households don't experience water scarcity since they have their own well. Only at some areas in the Municipality, there is good quality water unavailable like ward number 11 (Chakamkandam),

where there is salinity intrusion and households near to the trenching ground, Punnathoor aanakkotta, valiyathodu and canoli canal also faces quality problems. Hence it can be understood that the water scarcity in the Municipality is created due to the extensive commercialization which was a result of the increasing floating population in the Municipality, and the water that is being supplied through tankers can be considered the water deficit in that area since they have no other source to depend upon.

12.9. Ongoing Projects

Under the AMRUT scheme, it is proposed to pump raw water from Karuvannur river to the 15MLD treatment plant established at Kottappady and to supply through 120kilometres of distribution line.



The details of ongoing projects for improving the water supply network within the Municipality is given in table 12.7:

Table 12.7. List of Ongoing projects

SI. No	Project
1	Construction of 10 LL OHSR and Pumping Main to Guruvayur Municipality 2016-17
2	Laying Distribution network for improvement of coverage in Guruvayur and Pookkode Zone in Guruvayur Municipality 2015-16
3	Laying of Distribution network at Thaikkad Zone (Change of Project- Laying of sewerage network for 15km in Guruvayoor municipality)
4	Water Supply System to Guruvayur Municipality Package 2016-17, 2017-18 Phase I
5	Water Supply System to Guruvayur Municipality Package 2016-17, 2017-18 Phase II
6	WSS to Guruvayur Municipality in Thrssur Dist. Balance Distribution Network in Guruvayur Municipality
7	Rejuvenation of Ponds (For independent Water Supply Scheme-15 Ponds) (in 5 phases) Phase I – KottappadiPallichira, Ayyappan Kulam and MichabhoomiKulam Phase II – ThacharaparambilKulam Phase III- TharakanLasarKulam

Source: Unnathi, Kerala

12.10. Inference

As per census 2011, 85% of households were dependent on well water which has increased to 93% in 2019. There is a huge dependency on well water which makes ground water as a continuously depleting source. Well water supply at various places is also polluted by coliform bacteria. The remaining population depends on KWA water supply for satisfying daily water requirements. The KWA supply which is 1.5 MLD is only merely 7% of the total demand and also covers only the major portion of Guruvayur Zone in the Municipality. The Pookode zone and Thaikkad Zone which were Grama Panchayath initially and were added to the Municipality don't have enough KWA supply. Only a few households receive water on a regular basis and most of the households don't have enough supply at all. The KWA water supply is insufficient to meet the current and fast-growing demand of the Municipality, also the efficiency of the network is questionable which requires major infrastructure development and monitoring. Coverage of facilities is inadequate with non-revenue water accounting to 43% due to leakage in old pipes.

Guruvayur Municipality has been depending on the tanker water supply, ever since the floating population has increased and the available water resources were insufficient to cater to the needs of the devotees coming and staying near the Guruvayur temple. This has compelled the commercial establishments around the temple to depend on the tanker supply which was convenient. Comparing to the commercial establishment, dependency of households on tanker supply is very low. Even though there is tanker water supply to 23 wards out of 43 wards only

some areas in that wards are depending on it. The dependency is seasonal which is during the summer season. Use of packaged water is comparatively very low and mainly caters to the needs of the floating population. Lack of awareness and improper sanitation leads to the contamination of water bodies and consequently the quality of ground water has been affected at many locations.

CHAPTER 13
SANITATION

Sustainable Development Goal target calls for adequate and equitable sanitation for all. The target is tracked with the indicator of "safely managed sanitation services" – use of an improved type of sanitation facility that is shared or not shared with other households and from which the excreta produced are either safely treated in situ, or transported and treated off-site. Every local body ought to be self-reliant in its sanitation services and this chapter deals with study of existing scenario of the municipality in matters related to it and thus identify the gaps to be met.

13.1 Introduction

Sanitation refers to the provision of facilities and services for the safe management of human excreta from the toilet to containment and storage and treatment onsite or conveyance, treatment and eventual safe end use or disposal. More broadly sanitation also included the safe management of solid waste and animal waste. Inadequate sanitation is a major cause of infectious diseases such as cholera, typhoid and dysentery world-wide. It also contributes to stunting and impaired cognitive function and impacts on well-being through school attendance, anxiety and safety with lifelong consequences, especially for women and girls. Improving sanitation in households, health facilities and schools underpins progress on a wide range of health and economic development issues including universal health coverage and combating antimicrobial resistance.

Thus sanitation encompasses various sectors of hygiene namely solid waste management, liquid waste management, storm water drainage and receiving water bodies management. This chapter discusses the quantitative and qualitative status of Guruvayur Municipality in matters related to sanitation. This data will be compared with state level indicators to determine the gaps in services and recommendations are then provided to meet the benchmarks.

13.2 Solid waste management

Solid is the trash or garbage that is discarded day to day in a human settlement. And its management is necessary to keep the cities and town clean by processing the waste and disposing off the residual solid waste in an environmentally acceptable manner.

13.2.1 Generation

Waste generation encompasses activities in which materials are identified as no longer being of value (being in the present form) and are either thrown away or gathered together for disposal. Guruvayur Municipality constitutes a population of 70012 and manages a huge amount of floating population. It produces around 20T/day of residential refuse with a per capita of 0.3/capita/day and 35T/day of total solid waste.

13.2.2 Collection and Segregation

There exists partial collection of biodegradable waste from town centre by Kudumbashree and they imply collection charges from households and commercial establishments. They collect around 3.8T of biodegradable solid waste per day. Collection covers 5,12,13,14,15,16,17,18,19,22,23,25, 26, 27, 28, 29, 31 wards. Harithakarma Sena or The Green Army of the municipality consists of 43 people and is in charge of collecting plastic waste from all wards. Around 50 persons are involved in cleaning of the town and peak season demands around 100 persons which are dealt by the municipality. There is 1 Health Supervisor, 3 Health Inspectors, 5 Junior Health Inspectors, 2 clerks and 1 VEO in charge of the Health section of Guruvayur Municipality.

13.2.3 Transportation, Processing & Disposal

The transportation of waste from source to Choolpuram plant is done with the help of 5 tractors (3 Kudumbashree and 2 Municipality). Three vehicles are given to Harithakarma Sena from the municipality to collect plastic waste. There exists centralized and decentralized waste management systems in the municipality. Municipality has provided around 100 biogas plants, 1100 pipe compost plants, 2400 pot compost plants and vermin compost plants at subsidized rate to encourage processing of biodegradable waste at source.

There existed a trenching ground at Choolpuram with an area of 10280 sq. m which facilitates a windrow compost plant. Windrow composting is the production of compost by piling organic matter or biodegradable waste, such as animal manure and crop residues, in long rows (windrows). This method is suited to produce large volumes of compost. These rows are generally turned to improve porosity and oxygen content, mix in or remove moisture, and redistribute cooler and hotter portions of the pile. The temperature of the windrows must be measured and logged constantly to determine the optimum time to turn them for quicker compost production. A windrow compost plant (shown in figure 13.1) of 5T capacity is run in Guruvayur Municipality at Choolpuram trenching ground by IRTC (Integrated Rural Technology Centre) and the manure obtained is sold by them. Kudumbashree brings an average of 3.8T of collected biodegradable waste to windrow

compost plant for processing. There were 2 aerobic bins (shown in figure 13.2) in the municipality which is dysfunctional now. The whole collected biodegradable waste of 3.8T from the town centre is treated at windrow compost plant. Food waste from hotels and marriage halls are taken to pig farms by piggery units. The municipality has no general involvement in this. Hospital waste is taken by IMAGE of IMA (Indian Medical Association) to incinerator at Palakkad from source. Street Sweeping is confined to the town centre.



Figure 13.1: Windrow Compost Plant in Biopark at Choolpuram



Figure 13.2: Aerobic Units in Guruvayur Municipality

As per socio-economic survey (figure 13.3, 13.4, 13.5); about 85.6% of the households dispose their waste at their own house itself. In the municipality, 37.5% of them resort to pipe composting, 28.29% vermin composting and 3.87% to biogas plants to process their biodegradable waste. 8.2% of the solid waste is collected by municipal collection system and 0.45% seems to commit open dumping. As far as non- biodegradable solid waste disposal is concerned, 61.47% burns their waste and 28.29% hand over it to collection system.

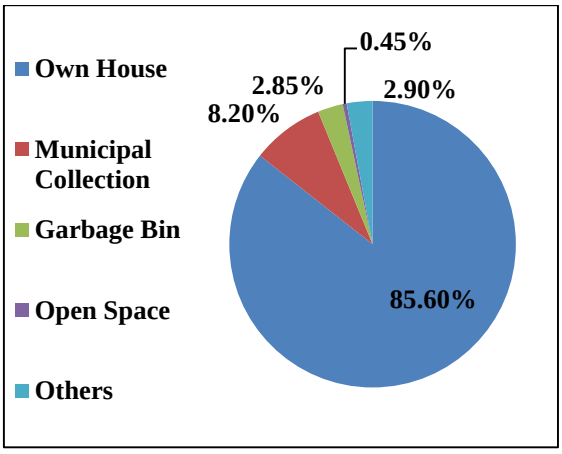


Figure 13.3: Solid Waste Disposal Methods

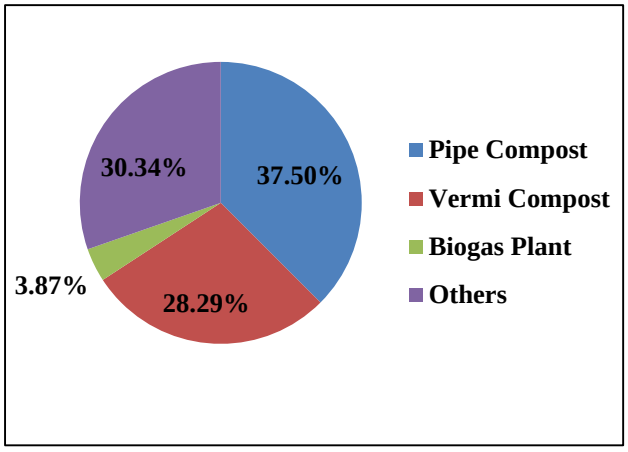


Figure 13.4: Biodegradable Solid Waste Disposal

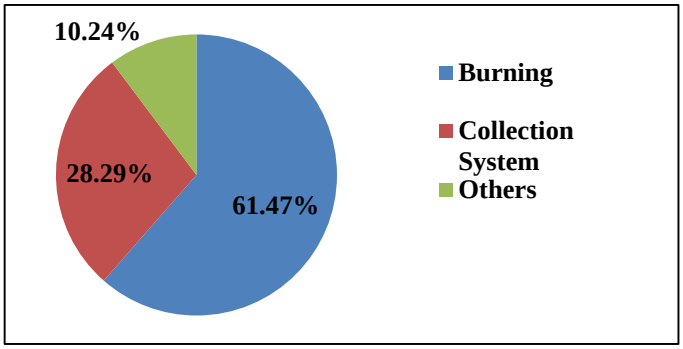


Figure 13.5: Non-Biodegradable Solid Waste (Source: Socio-Economic Survey, 2019)

Figure 13.6 shows the location of SWM plant and wards with SW collection facilities. Apart from this, Harithakarmasena collects the plastic waste from the town area and is stored at the Material Collection facility at Choolpuram. Plastic shredding unit is also functioning in the facility. Non-biodegradable waste which cannot be processed at the facility is collected by other external agencies dealing with scrap materials.

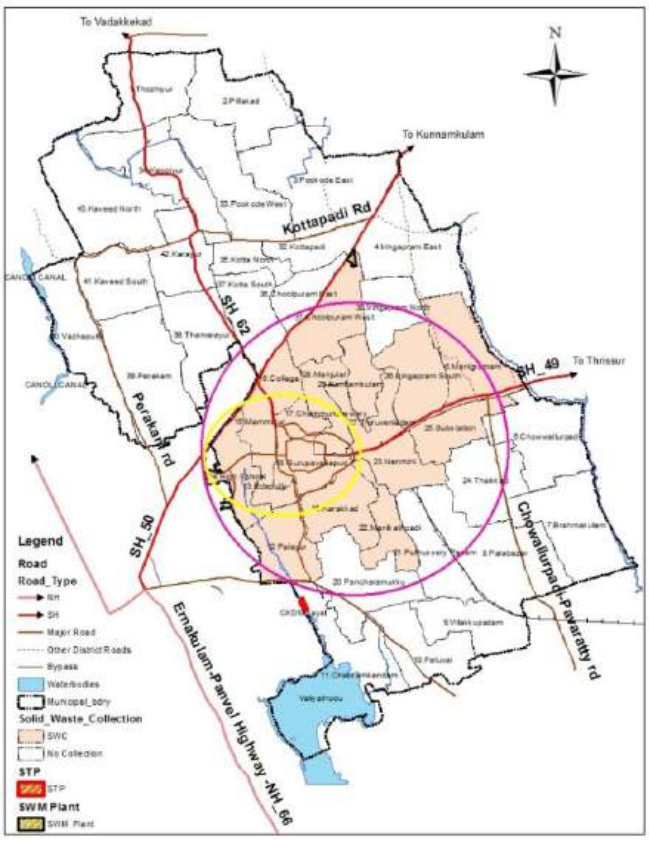


Figure 13.6: Map showing spatial location of SWM services

13.3 Liquid Waste management

Liquid waste can be defined as such liquids as wastewater, fats, oils or grease (FOG), used oil, liquids, solids, gases, or sludges and hazardous household liquids. These liquids are hazardous or potentially harmful to human health or the environment. Thus their proper management is essential.

13.3.1 Existing Liquid waste management System

11 MLD of sewage is generated in Guruvayur Municipality and there is no existing sewerage system. All houses in the municipality have latrines and they are connected to septic tanks in most of the cases. Thus management of liquid waste is generally onsite. As per socio-economic survey, 99.51% of households rely on septic tanks for disposal of liquid waste.

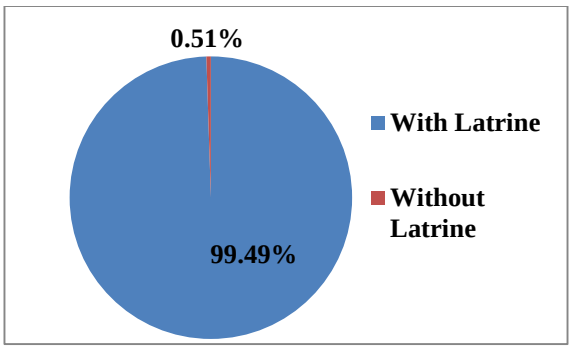


Figure 13.7: Proportion of houses with latrine

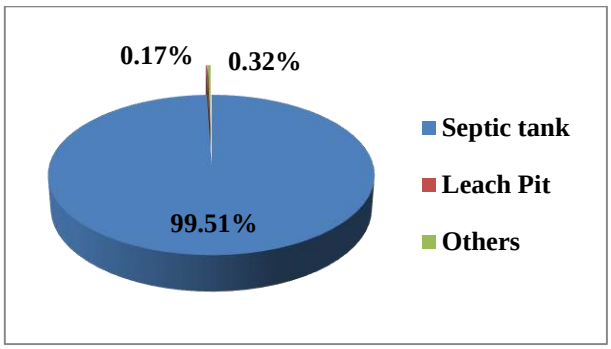


Figure 13.8: Methods of Liquid Waste Disposal
Source: Socio-Economic Survey, 2019

Table 13.1: Details of Public Toilets

Location	Bathrooms	Toilets
Comfort Stations under Municipality		
Near Pvt Bus Stand	12	40
Ambady Tourist Home	8	7
Comfort Stations under KSRTC		
Within Bus Stand		7
Comfort Stations under Devaswom		
East Nada		66
West side of Pond		20
South Nada		12

Source: Guruvayur Municipality

There are instances of sewage seeping to ground water due to high water table and surface water sources especially in temple premises. Table 13.1 shows details of public toilets in the

municipality. Apart from this; there are public toilets in parking areas also. Septic Tank is used for disposing sewage and septage in public toilets.

13.3.2 Identification of Gaps

Comparison between existing status and state level indicators are given in Table 13.2.

Table 13.2: Service Level Benchmarks

Service Level Benchmark		
Indicator	**Benchmark**	**Existing**
% population practicing OD	0	0
No. of open urination spots	0	
No. of open defecation spots	0	0
Coverage of toilets	100%	100%
Coverage of sewage network services	100%	2.80%
Adequacy of sewage treatment capacity	100%	27%

Source: URDPFI Guidelines

City has separate drainage system. At many places sewage is disposed to drains. There is no systematic and organised method to collect and treat waste from septic tank. At many places overflow of septic tank is connected with nearby drains. Main bottle neck is laying of pipes in the narrow roads. The average digging is 4 metres along the road which is affecting the adjacent private properties and traffic. Water table of the entire city area is also very high. Natural flow of water from the town carries major portion of the contaminated water to the area called Chakkamkandam and the area is heavily polluted by the waste water from the town.

13.3.3 Ongoing/Proposed Projects

The ongoing project (state assisted) being executed by the Kerala Water Authority is for laying sewerage lines for a length of 7.2 Km laying pumping main and construction of pumping stations with a 3 MLD treatment plant at Chakkamkandam. On completion of this project, 7wards (out of 43 total wards) in the city will be covered.

Additional sewerage system is not practically possible due to high water table, narrow roads and scattered households. A project was proposed under the AMRUT scheme for a Septage system of 100KLD capacity by providing a septage treatment arrangement at the ongoing treatment plant at Chakkumkandum and necessary septage collection infrastructure. Septage will be transferred to the treatment plant through tankers once installed. The proposal included

1. Construction of septage treatment arrangements with the ongoing STP at chakkamkandum.
2. Procurement of Infrastructure for Septage Collection.
3. Laying of 15km sewerage network for optimum utilisation of ongoing STP

The project has not materialised due to technical issues.

Figure 13.9 depicts the service area covered in two phases of the upcoming sewerage system in Guruvayur Municipality. The demand gap assessment of the ongoing project of 7.2 Km length sewerage network is shown in Table 13.3.

Table 13.3: Demand Gap Assessment with the Ongoing project

Component	Existing	Ongoing projects	Existing + Ongoing	2021 (Short term)	
				Demand	Gap
Sewerage network (km)	--	7.2	7.2	250	242.8
No of Households covered under sewerage system	0	4000	4000	17297	13297
Sewerage Treatment Plant (MLD)	0	3	3	11.2	8.2

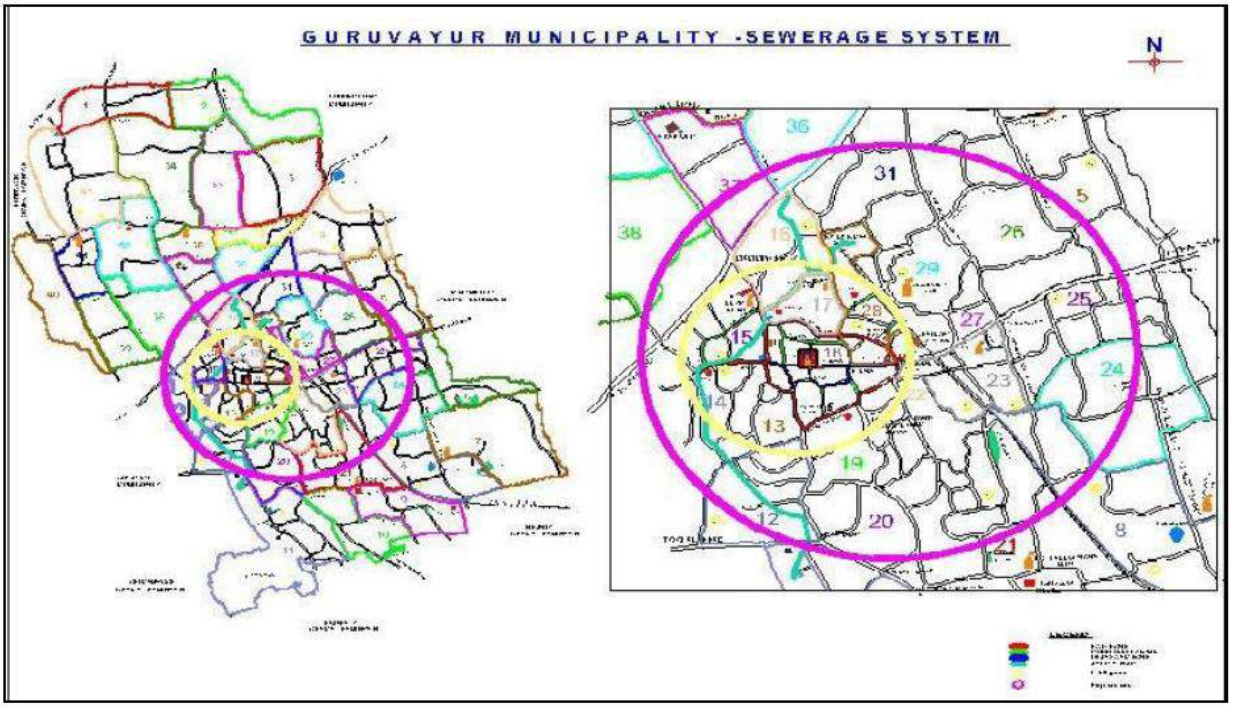


Figure13. 9: Scope of proposed Sewerage System in the Municipality

13.4 Storm Water Drainage

13.4.1 Drainage System



Natural terrain of the city helps to drain off the storm water out of the city. Major drains can cater to the existing flow from the catchment area but the smaller branch drain network is to be planned and connected properly. There is around 80 km of drains in Guruvayur Municipal area including uncovered, covered, primary, secondary and major drains. In detail, there is 25kms of natural drains and 55kms of primary and secondary drains constituting to 22% coverage out of which 6% only matches the standards. Some areas may need new drains to be constructed, in other areas widening de-silting etc. to be done. There are certain areas in the municipality where storm water gets mixed with sewer, where drains are choked due to dumping of solid waste and waterlogged areas.

Total length of the road is 357.5 Km and drain length of 80 Km with total drain coverage of 22% exists in Guruvayur Municipality. Connectivity of drains is also poor. Condition of existing drains is not proper. Most of the drains are not pucca constructed or covered. All roads cannot have drains as space is not available. Other challenge faced is disposal of solid waste into the drains causing choking of drains. Further, utility placed inside drains and crossing the drains at several points causing choking also imparts many challenges. The depth and width is not sufficient to carry the peak flow. The available drains have to be improved for carrying capacity and it must be planned for better conditions like side walls and bottom concrete. Overflow of some drains happens in peak rainy days and water logging of black water exists in that cases.



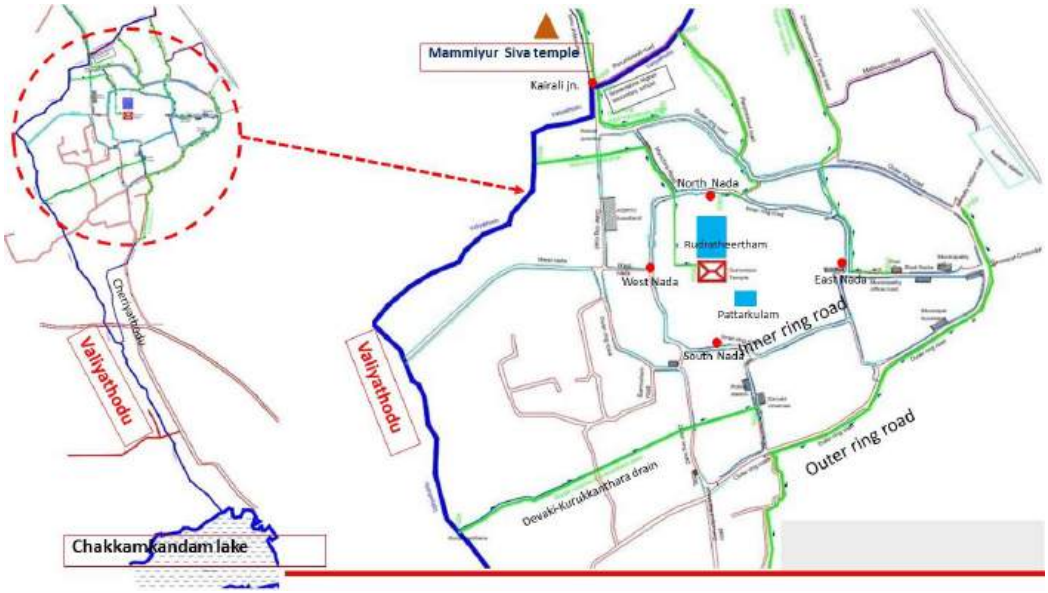








13.4.2 Proposed/Ongoing Projects



A project was executed under the AMRUT scheme for development of drainage system along Inner ring road and Outer ring road.

- DPR of the drainage network prepared by LSGD empanelled consultants (Institute For Societal Advancement)
- ULLCCS appointed as the contractors of these projects
- 9316 m drains with covering slab constructed in temple city drainage circuit project and 2518 m drains with covering slab constructed under temple city footpath scheme
- 19 culverts which were damaged or lack of carrying capacity was reconstructed to increase the flow rate
- Valiyathodu and cheriyathodu de silted and deepened for increasing carrying capacity and flow rate
- The rain water from the core portion of the Guruvayur town i.e, Inside of Inner Ring Road is drained out through 6 channels. They are East Nada Drain, Behind Radhika Tourist Home, South Nada, West Nada, Manchira and Vysakh Junction
- All above channels leading to valiyathodu by various paths
- All the drains were completed by 2019.

Issues

- Heavy rainfall within a short time creates a water discharge very higher than the carrying capacity of the drains
- High tide amplifies the magnitude of water logging
- Reduction in the capacity of Water holding/Water carrying structures due to organic growth
- Water logging seen at
    - Kairali Junction
    - Mammiyur Junction
    - Pancharamukku Junction
    - Muthuvattur Junction
    - Angadithazham
    - areas adjacents to Valiyathodu

Suggestions

- Ensuring free flow of water through the major primary drains
- Increasing the carrying capacity by widening of drains
- Assessing the scope for interconnection of drains

- Retaining the water retention structures presently available in the town-ponds, channels and wetlands through policy interventions
- Detailed study of carrying capacity of existing Valiyathodu and exploring alternate channelization of excess water from its catchment area
- Ensuring efficiency of the available drainage network
  - Size and position of inlets
  - Maintenance and cleaning of openings
  - Storage and pumping of storm water, if necessary

13.5 Water Resource Management

13.5.1 Existing Status

Crowded human settlements like colonies have the presence of coliform in their wells. Two water-drains namely Valiyathodu and Thaikkad Valiyathodu has become a source of wastewater discharge from hotels, restaurants, and lodges from the town and it carries the polluted effluent to the Chakamkandam backwater area. The surface water bodies have also become polluted due to the disposal of wastes from land. Wells in wards 30, 31, 36 are said to be affected by the leachate from the landfill sites during rainy seasons. Saltwater intrusion prevails in wards 11 and 40 up to an extent of 70 m from Canoli canal and 400 m from Chakamkandam backwaters respectively.

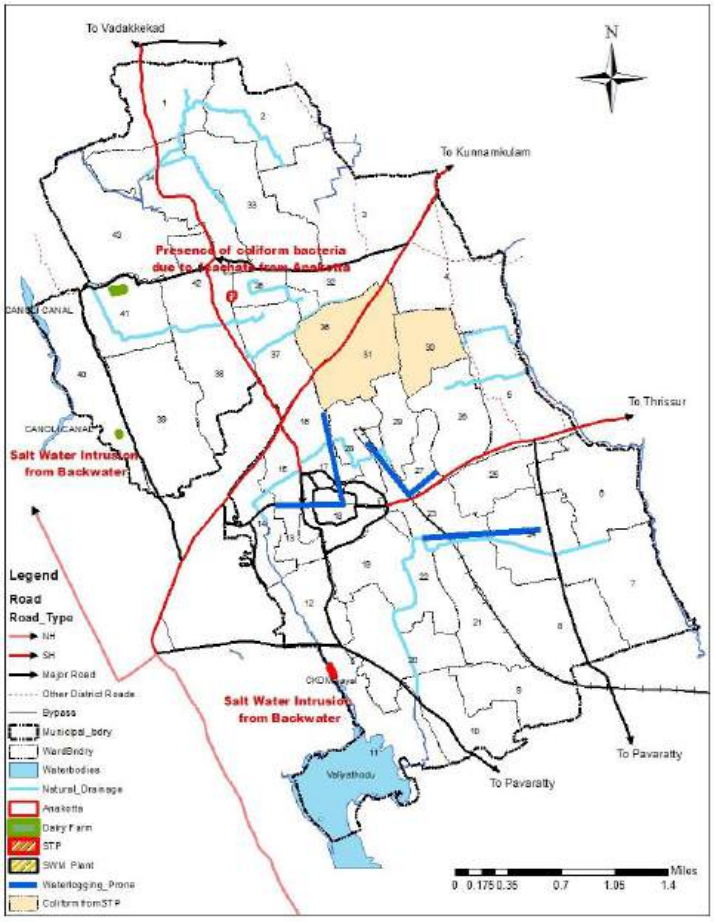


Figure 13.10 : Status of receiving water bodies

The leachate from Punathur Aanakota has also disturbed the quality of good water in the vicinity. There are around 33 public ponds in Municipality amongst which only some are usable. Rejuvenation of existing surface water bodies is

essential. Water Table in wards 5 and 7 seems to reduce at a higher rate comparatively due to commoditization of water. The same is located spatially in map in figure 13.10.

13.5.2 Prospective Projects

Restoration of the Water bodies is one of the main objectives in the AMRUT scheme. So in the Guruvayur town 8 such ponds are taken for the restoration. The details are tabulated below in table 13.4.

Table 13.4: Prospective Projects

Name of Pond	Area in cent	Status
PallichiraKulam	65	Received Technical Sanction
MichabhumiKulam	21	Received Technical Sanction
Ayyappan Kulam	160	Received Technical Sanction
AasharitharaKulam	10	Received Technical Sanction
CheerothuKulam	18	Received Technical Sanction
Tharakan Laser Kulam	22	Tender Activities Going on
SaraswathyVilasamKulam	7	Received Technical Sanction
ThacharuparambilKulam	17	Received Technical Sanction

Source: Guruvayur Municipality

13.6 Inference

Households in the town centre is around 30% of the total Households in the municipality where municipal collection is deployed. More public awareness campaigns have to be implemented to persuade more people to resort to segregation of waste to submit to collection services by paying their charges. Collection of waste has to be made more efficient. Plastic Recovery Facility can be installed at Choolpuram to manage the plastic waste collected by Green Army.

Maximum coverage should be given from the town centre to the upcoming STP. Treated effluent can be supplied for irrigation and construction purposes and revenue can be collected. Chances shall be explored by recycling and reusing of bath room and Kitchen waste water for irrigation and flushing of toilet after minimum treatment at house hold level. By this way, the production of sewage and consumption of water can be reduced. Onsite treatment facilities with better compliances may be given to reduce outlets of polluted water to storm

water drains. It is difficult to lay sewerage pipes due to congestion and high water table. By adopting trench less technology this can be addressed to some extent.

Guruvayur Municipality need a planned integrated drain system connecting existing drains and crucial areas to avoid water logging. This can be done by improving connectivity of existing drains by constructing missing links. Separating the storm water drains from the waste water will create opportunity for directly forwarding the storm water drains for cultivation. The existing drains are used to drain out the excess water to the catchment areas. But the existing drains are not sufficient. Alternative solutions like pumping and cross connecting of drains may be applied to solve the situation satisfactorily. Periodical cleaning and de-silting of drains by mechanized system should be carried out and awareness is being created for not dumping solid waste into the drains.

Existing water resources in the municipality should be conserved and restored. Rainwater should be harvested through well recharge and watershed management interventions. Well mapping and routine water quality analysis should be initiated. Effluents coming to the major canals should be treated. Leachate treatment plants should be used to treat effluents from Anakotta and Goshala. Further sanitary measures should be taken to prevent ground water contamination.

CHAPTER 14

EDUCATION

Economic development of any place is directly related to the education facilities provided by the local bodies. Provision of better educational infrastructure will lead to improved skill development and thus the generation of qualified employable individuals. Now a day since unemployment is on such a rise the question falls on the educational facilities as if the facilities are sufficient to enable the present and future generation to earn a living. Hence, a study on the existing educational infrastructure needs to be done to identify the gaps.

14.1. Literacy Rate

Guruvayur Municipality has a literacy rate of 96.58% as per 2011 Census, which is fairly high compared to the other Municipalities of the district. Figure 14.1 shows the comparison of literacy rate of Guruvayur Municipality with other urban local bodies in the district.

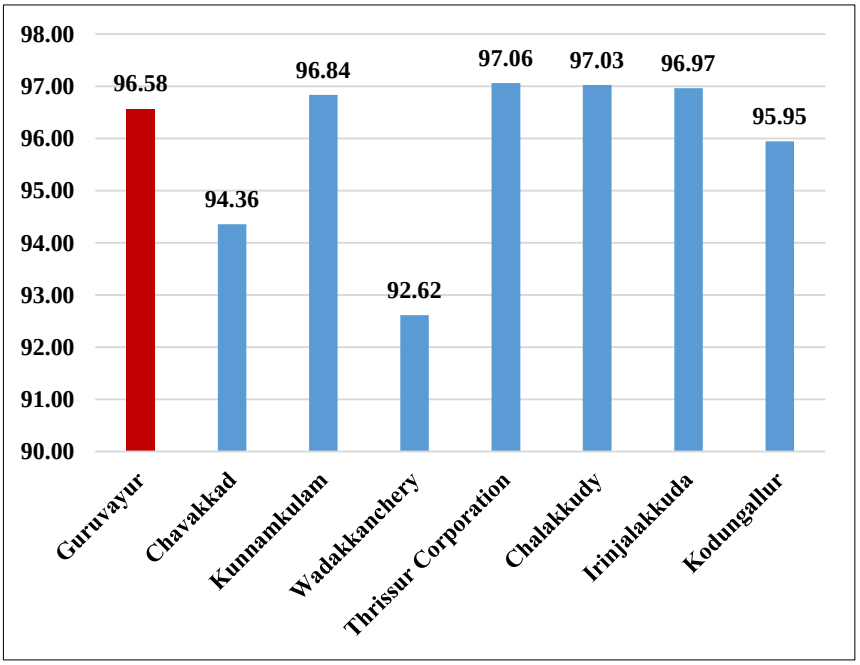


Fig.14.1. comparison of Literacy rate with nearby ULBs

Source: Census, 2011

Figure 14.2 shows the comparison of literacy rate of Guruvayur Municipality with state and Thrissur district. Literacy rate shows the same trend as that of the state and district. Decadal variation of literacy rate of Guruvayur Municipality has increased in the last two decades as shown in Figure 14.3.

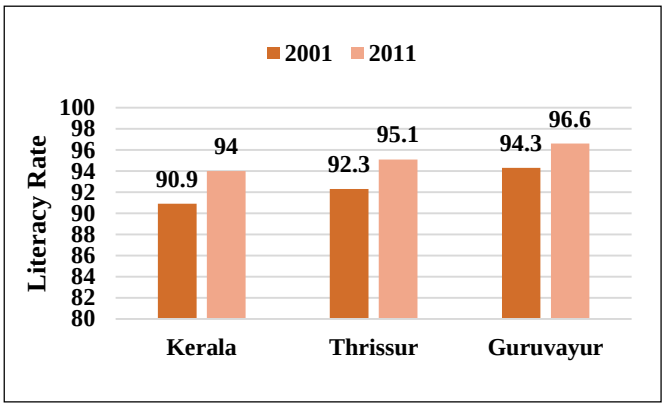


Fig14.2 Comparison of literacy rate with State, district and Guruvayur municipality

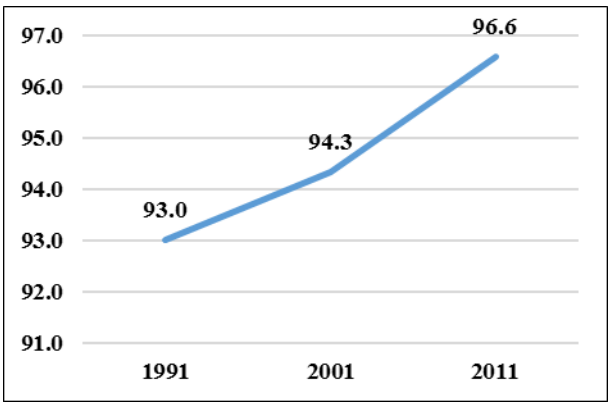


Fig.14.3. Decadal Variation of Literacy rate of Guruvayur Municipality

14.2. Schools

At present there are 27 shools in Guruvayur out of which 12 schools are aided, 4 Government schools, 2 unaided schools and 9 schools whch has unaided at pre-primary level and aided at higher classes. Figure 14.4 shows the percentage of schools and number of students in government, aided and unaided sector. Total number of Government-aided schools are more compared to government and unaided schools. Hence, students going to these schools are proportionally higher.

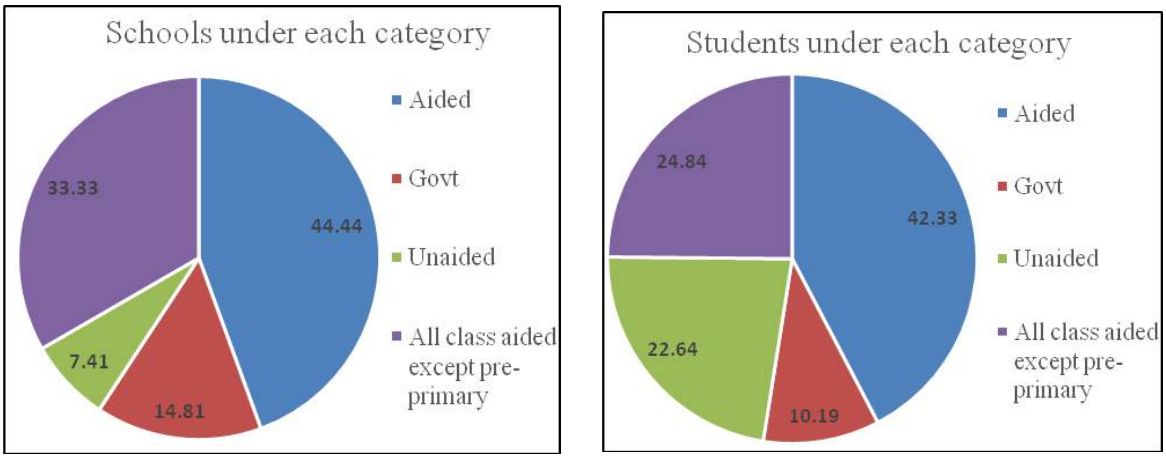


Fig. 14.4. Percentage of schools and number of students under each category

Source: Vikasana Rekha, 2017-22

Table 14.1 shows the number of schools and students under preprimary, LP, UP, HS and HSS in Government, aided and unaided sector. Figure 14.5 shows the comparison of number of schools and students at various levels. In pre-primary level, students are more in unaided schools. This trend is followed up to LP school level. But as moving to higher classes, students are more in Government and Government Aided schools. At the HSS level the student capacity of government school increased drastically, while in aided school it has shown a decline. This shows that people prefer government schools compared to unaided ones at higher classes.

Table 14.1. Total Number of Schools and Students as per category

Educational Institutions	No. of Schools				No. of Students			
	Govt	Aided	Unaided	Total	Govt	Aided	Unaided	Total
HSS (XI-XII)	1	4	2	7	573	1708	158	1926
HS (VIII-X)	1	5	2	8	85	2966	480	3531
UP (V-VII)	2	11	2	15	91	2167	532	2790
LP (I-IV)	3	19	2	24	139	1742	681	2562
Pre-Primary	2	6	2	10	52	361	328	741

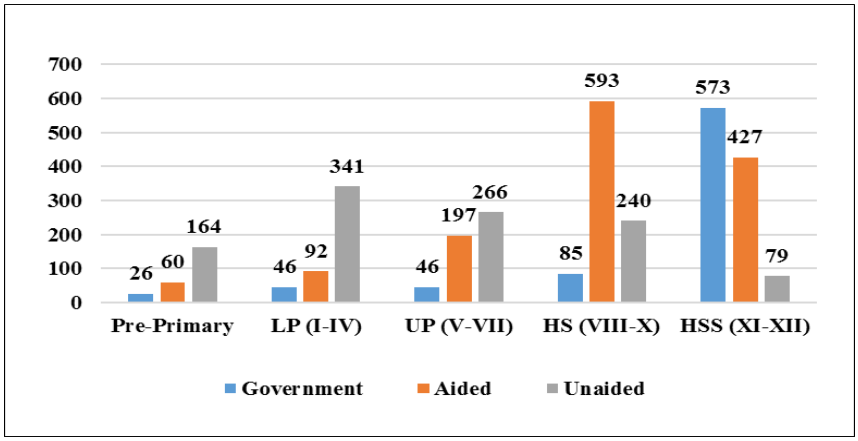


Fig 14.5. Student to School ratio *Source: Secondary data,2019*

Percentage of aided schools in pre-primary level is high (60%), unaided and government schools are 20% each (Fig.14.6). But students are higher in aided schools 48.72% followed by unaided schools with a very small percentile variation (44.26%). In aided schools, there are 6 schools with 361 students and just 2 unaided schools with 328 students. Student is more in unaided schools which is preferred during pre-primary phase.

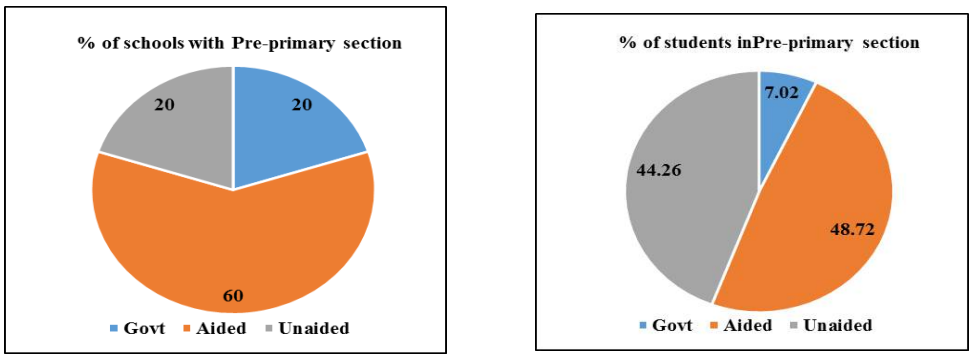


Fig. 14.6. Percenatge of schools and students in Pre-Primary section

Source: Secondary data,2019

In lower primary (LP) section, percentage of aided schools and the number of students is high. But there is a decline in the percentage of unaided schools and students. However, though government schools are 12.5% (higher than unaided school), students are just 5.43%. (Figure 14.7)

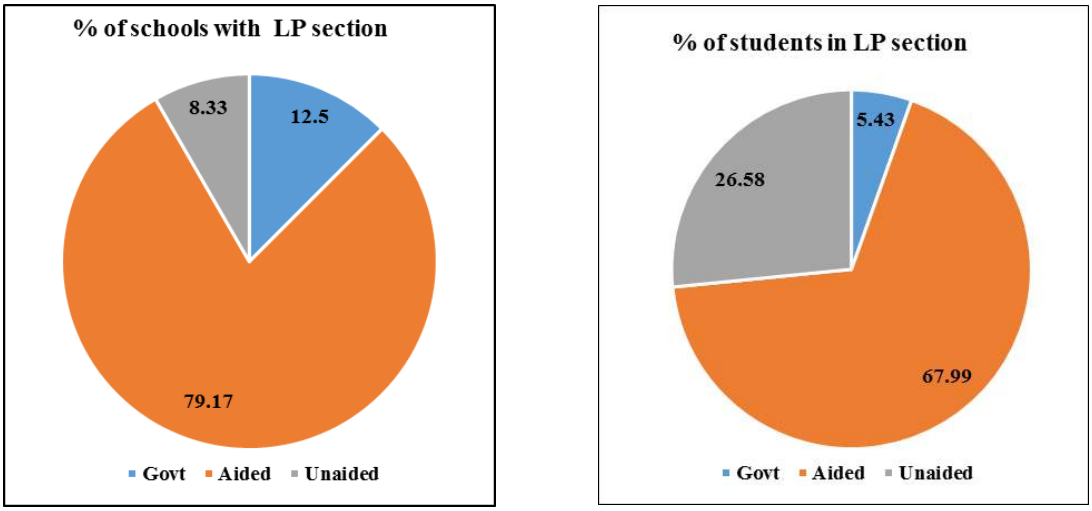


Fig. 14.7. Percentage of schools and students in LP section

Source: Secondary data,2019

Scenario of Upper Primary (UP) section is not different than the LP section with aided schools still dominating in case of number of schools and students (Figure 14.8).

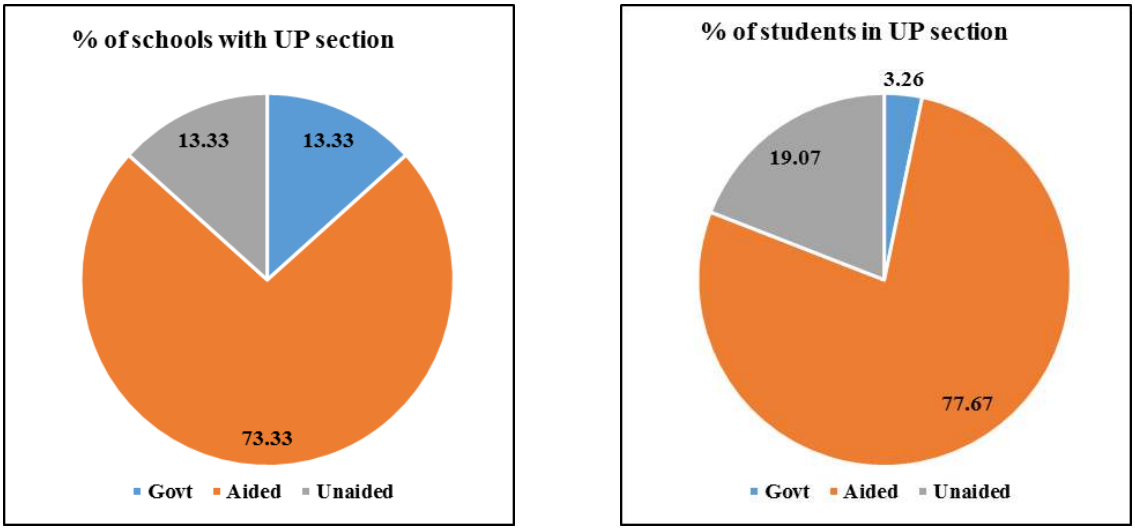


Fig. 14.8. Percentage of schools and students in UP

Source: Secondary data,2019

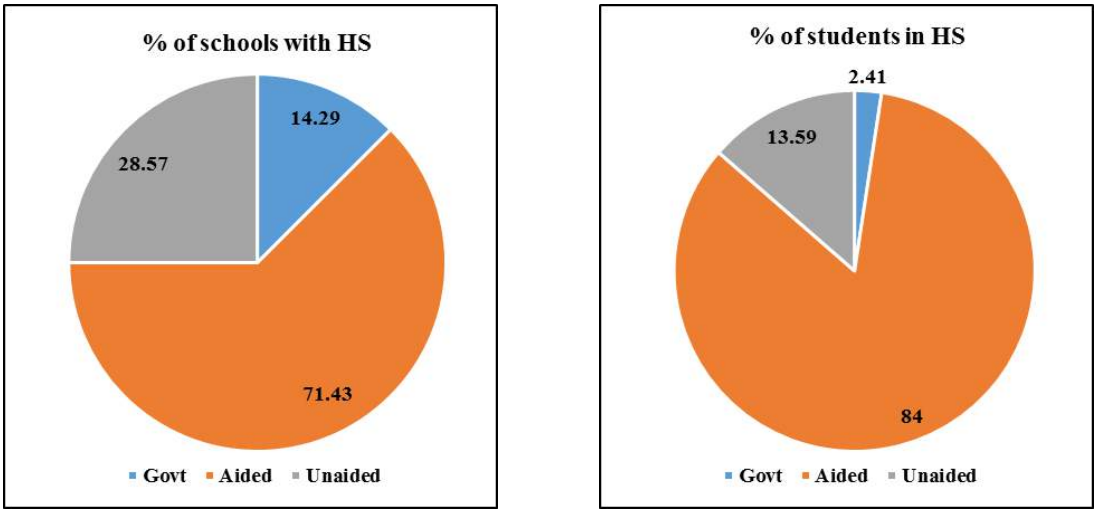


Fig.14.9. Percentage of schools and students in HS

Source: Secondary data,2019

In the High School (HS) section, aided schools are 71.43% and student distribution is 84%. Student to government and unaided schools further decreased to 2.41% and 13.59% respectively (Figure14.9).

Aided schools and Government schools are preferred for Higher Secondary (HSS) education indicated by 57.14% of government aided schools with 82.67% student capacity (Figure 14.10). Government schools are 14.29% with 9.68% students in it. Unaided schools are not preferred much shown by only 7.65% students opting for unaided school.

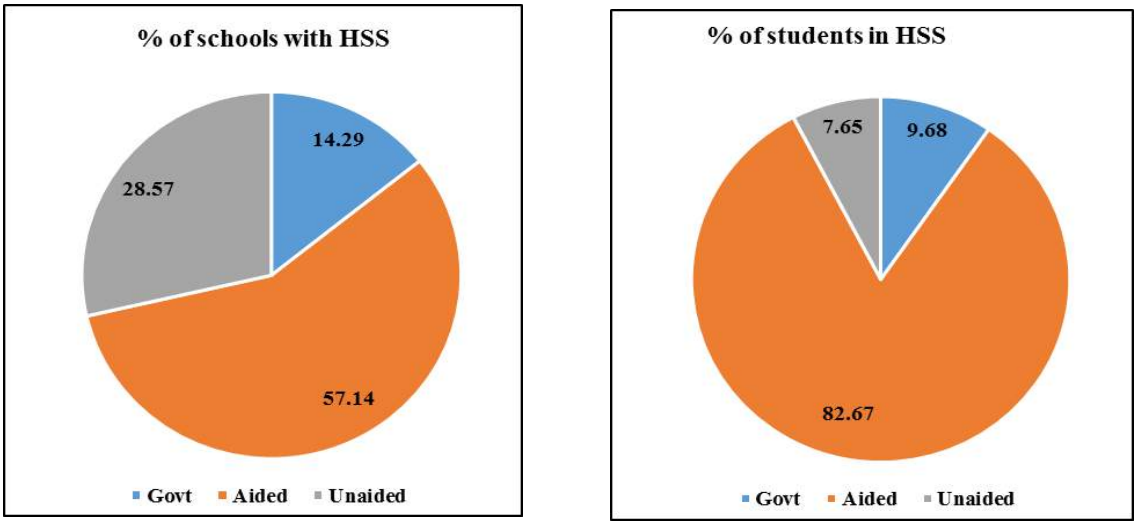
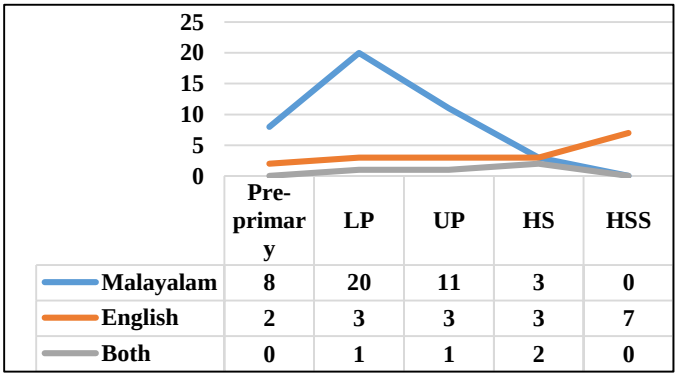


Fig. 14.10. Percentage of schools and students in HS section

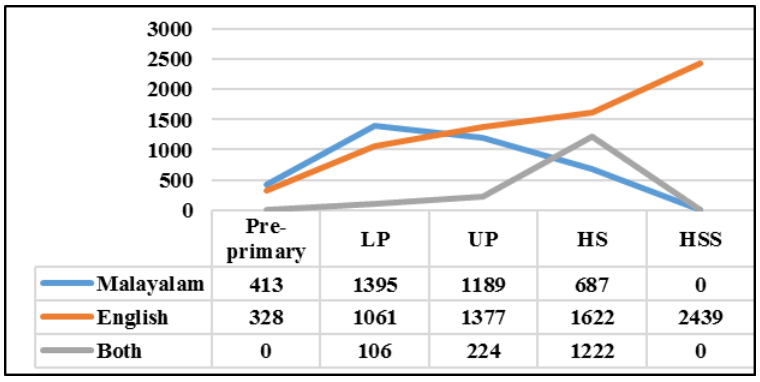
Source: Secondary data,2019

Medium of education is also a matter of concern. Considering the medium of education at all levels of education, Malayalam medium schools at pre-primary level is 8 whereas in LP level is 20, the number decreasing in higher classes and no Malayalam medium schools at HSS level. This might create an issue for those students who have been studying in Malayalam medium since pre-primary level. Figure 14.11 and Figure 14.12 shows the number of schools and students in various mediums.



	Pre-primary	LP	UP	HS	HSS
Malayalam	8	20	11	3	0
English	2	3	3	3	7
Both	0	1	1	2	0

Fig.14.11. Number of schools with various mediums



	Pre-primary	LP	UP	HS	HSS
Malayalam	413	1395	1189	687	0
English	328	1061	1377	1622	2439
Both	0	106	224	1222	0

Fig.14.12. Number of students in various mediums

14.3. Colleges

Colleges are an inevitable part of the education system. For graduation, post-graduation and professional courses, colleges with sufficient infrastructure and staff are required within the Municipality as per standards. Existing colleges within the Municipality and courses offered by them are listed in Table 14.2 and 14.3.

There are no government colleges within the Municipality. 2 arts and science colleges are present under aided management. Remaining colleges are unaided/private management. There are 5 colleges within the Municipality offering various courses. But no colleges offering degrees like fashion designing, medical or engineering were located. For these, the population has to depend on higher order towns.

Table14.2. Details of Arts and Science colleges

Sl. No.	Name of College	Location	Number of Students				Number of students course wise (PG)				Govt/ Aided /Unaided
			BA	B.Com	B.Sc	Total	MA	M.Sc	M.Com	Total	
1	Little Flower College	Guruvayur	587	150	842	1579	134	84	30	248	Aided
2	Mercy Institute of Technology	Puthenpalli	100	150	0	250	50	0	60	110	Private
3	AC Kunjimon Haji Memorial ICA College	Thozhiyur	33	147	117	347	0	33	38	71	Private
4	Aryabhatta College	Puthenpalli	460	425	35	920	90	0	90	180	Private
5	Wisdom College	Palluvai									Private

Source: Secondary data, AMRUT, 2019

Table 14.3. Details of professional colleges

Sl. No.	Name of College	Details of ownership	Location	Specify the professional course offered	Number of students course wise
1	Mercy Institute of Technology	Private	Puthenpalli	MBA,MCA,BCA,BBA, PGDCA,DCA,DCFM, DCTT	400
2	AC Kunjimon Haji Memorial ICA College	Private	Ponnani Road	BBA	50

Source: Secondary data, AMRUT, 2019

14.4 Comparison with Planning Standards

Figure 14.13 shows the location of various educational institutions in the planning area. Table 14.4 shows the comparison of existing educational facilities with planning standards.

Table 14.4. Comparison with URDPFI Guidelines

Guidelines for Schools	Population served per unit (as per URDPFI)	Total Population	Required	Existing	Gap
Pre-primary/Nursery school	2500	70012	28	74	No gap
Primary (I-V)	5000	70012	14	24	No gap
Senior secondary (VI-XII)	7500	70012	9	30	No gap

Source: URDPFI Guidelines

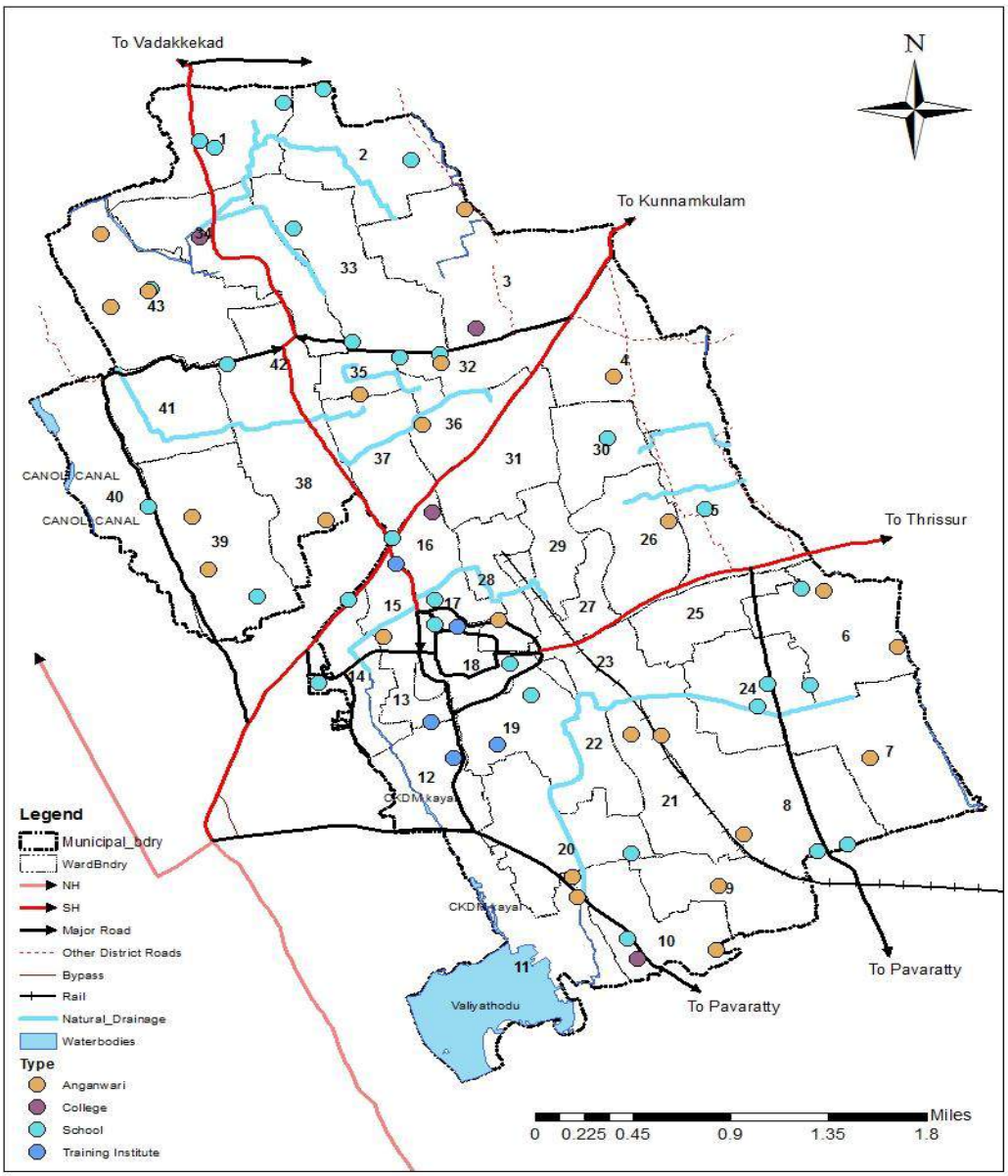


Fig.14.13. Map showing location of educational facilities

14.5 Inference

Literacy rate of Guruvayur Municipality is higher compared to other urban local bodies in the district. The educational facilities in Guruvayur are sufficient, with enough schools and colleges within the Municipality marked satisfactory as per standards. More number of Government technical institutions can be provided.

CHAPTER 15

HEALTH

The quality of life in any urban centre depends upon the availability and accessibility to quality social infrastructure. To improve the quality of life of inhabitants, the healthcare facilities are to be provided as per standards. This chapter encompasses existing healthcare facilities to check for sufficiency in health care services.

15.1 Existing Scenario

The wellbeing of a place resides in standard of living of the people in it. Health is a prime and inevitable factor influencing the life of individuals and thus making provisions for good health is essential. The following section discusses health indicators, infrastructure, spatial location of healthcare facilities and major diseases reported in the municipality. Finally, the existing status is compared with URDPFI guidelines to identify the gaps.

15.1.1 Health Indicators

The demographic indicators like birth rate, death rate, infant and maternal mortality rate throws light on general conditions of health in the local body. The state and district level indicators are available from latest vital statistics report and those for the local body are calculated from the birth and death registration in health department of the municipality. Table 15.1 shows the health indicators for state and district.

Table 15.1: Health Indicators

Health indicators	Guruvayur Municipality	Thrissur District	Kerala
Life expectancy	70-75	74	74.9
Infant mortality rate (1000 population)		7.27	6.31
Maternal mortality rate (per 1 lakh live births)		21	24
Birth rate (1000 population)	0.28	14.46	14.62
Death rate (1000 population)	3.6	8.94	7.64
Total fertility rate (children/women)	1.23	1.8	1.76
Sex ratio	1158	1108	1084
Child sex ratio	928	950	959

Source: vital statistics report 2017, guruvayur municipality data, 2019, census data 2011, socio-economic survey, 2019

15.2 Health Infrastructure

There are 5 allopathic, 5 ayurvedic and 3 homeopathic hospitals in the town. Details are shown in Table 15.2. There are 8 family welfare centres in the municipality. Out of this, 5 are in Pookode zone located at Iringapuram, Chathangad, Choolpuram, Pookode and Vazhapulli respectively. Three are located in Thaikkad zone located at Chakkamkandam, Nenmini and Thykkad respectively.

There is a mother and child welfare centre at Guruvayur near Government Ayurveda Hospital. There is a polyclinic and diagnostic centre called as Sankar Clinic at Koladipadi in Guruvayur.

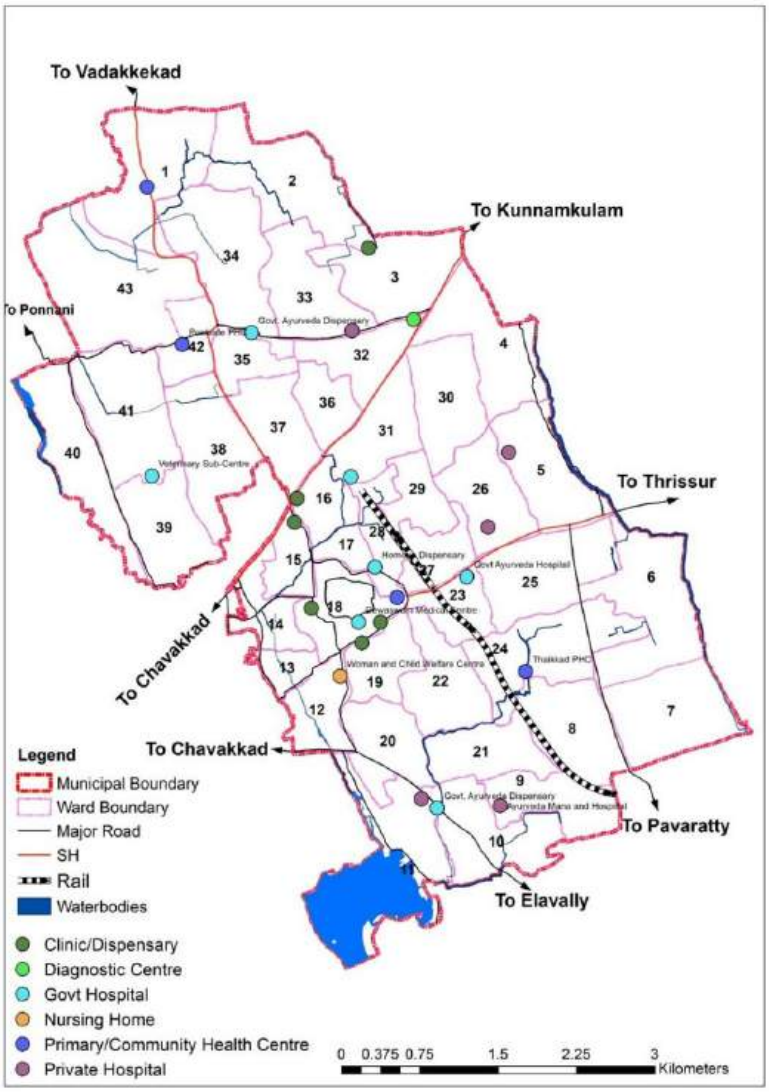


Figure 15.1: Location of Health care facilities in Guruvayur

Apart from this, there are labs and dental clinics in the municipality. Spatial location of health care facilities is shown in figure 15.1.

Table 15.2: Hospitals in Guruvayur Municipality

Type of Hospital	No. of Hospital/Dispensary	No. of Doctors	No. of Beds
Allopathic	5	13	85
Ayurveda	5	9	40
Homeopathic	3	3	0

Source: Guruvayoor Municipality

Allopathy hospitals in the town are shown in Table 15.3. In allopathic system of medicine, there are two primary health centres at Pookkod and Thaikad respectively; one mother and child welfare centre, 75 bedded Devaswom Medical Centre and 10 bedded Sankar

Clinic at Guruvayur. Devaswom Medical Centre is a charitable hospital managed by Guruvayur Devaswom for primary medical care. The hospital is very near to the temple, and provides medical care for devotees. Hospital works for 24 hours.

Table 15.3: Allopathic Hospitals in Guruvayur Municipality

Name of Hospital	Location	Number of Beds	Number of Doctors	Govt/Pvt/Cooperative Society
Primary Health Centre	Pookode	0	1	Govt
Primary Health Centre	Thaikad	0	1	Govt
Mother & Child welfare centre	Guruvayur	0	1	Govt
Devaswam Medical Centre	Guruvayur	75	9	Pvt
Sankar Clinic	Guruvayur	10	1	Pvt

Source: D.M.O. Thrissur

In ayurvedic system of medicine, there are 40 bedded Government Ayurveda Hospital at Guruvayur, Melpathur Smaraka Ayurveda Hospital at Guruvayur, Government Ayurveda Dispensary each at Thaikkad and Pookkod and Lord Krishna Ayurvedic Centre at Guruvayur. Details are shown in Table 15.4.

Table 15.4: Ayurvedic Hospitals in Guruvayur Municipality

Name of Hospital	Location	Number of Beds	Number of Doctors	Govt/Pvt/Cooperative Society
Govt Ayurveda Hospital	Guruvayur	40	3	Govt
Govt Ayurveda Dispensary (Sub centre)	Thaikkad	0	1	Govt
Govt Ayurveda Dispensary (Sub-centre)	Pookkod	0	1	Govt
Melpathur Smaraka Ayurveda hospital	Guruvayur	0	3	Private
Lord Krishna Ayurvedic Centre	Mammiyur	0	1	Private

Source: Guruvayoor Municipality

In Homeopathy, one Primary Homeo health Centre is situated in Guruvayur, one primary homeo dispensary at Pookkod and Little flower Homeo Center at Mammiyur. Further details are shown in Table 15.5.

Table 15.5: Homeo Hospitals in Guruvayur Municipality

Name of Hospital	Location	Number of Beds	Number of Doctors	Govt/Pvt/Cooperative Society
Primary Homeo Health Centre (CHM)	Guruvayur (Agathi mandiram bldg.)	0	1	Govt

Primary Homeo Dispensary (CHM)	Pookkod	0	1	Govt
Little Flower Homeo Center	Mammiyur	0	1	Private

Source: Guruvayoor Municipality

As shown in Table 15.6, there is a veterinary dispensary at Guruvayur, and a veterinary sub centre at Pookkode and Thaikkad each.

Table 15.6: Veterinary Hospitals in Guruvayur Municipality

Name of Hospital	Location	Number of Beds	Number of Doctors	Govt/Pvt/Cooperative Society
Veterinary Dispensary	Guruvayur	0	1	Govt
Veterinary sub cente	Pookode	0	1	Govt
Veterinary sub centre	Thaikkad	0	1	Govt

Source: Guruvayoor Municipality

Figure 15.2 shows the comparison of allopathic, ayurvedic and homeopathic hospitals among other municipalities in Thrissur district. In comparison, Guruvayur has lesser number of allopathic hospitals than other local bodies but has considerable number of ayurvedic and homeopathic hospitals.

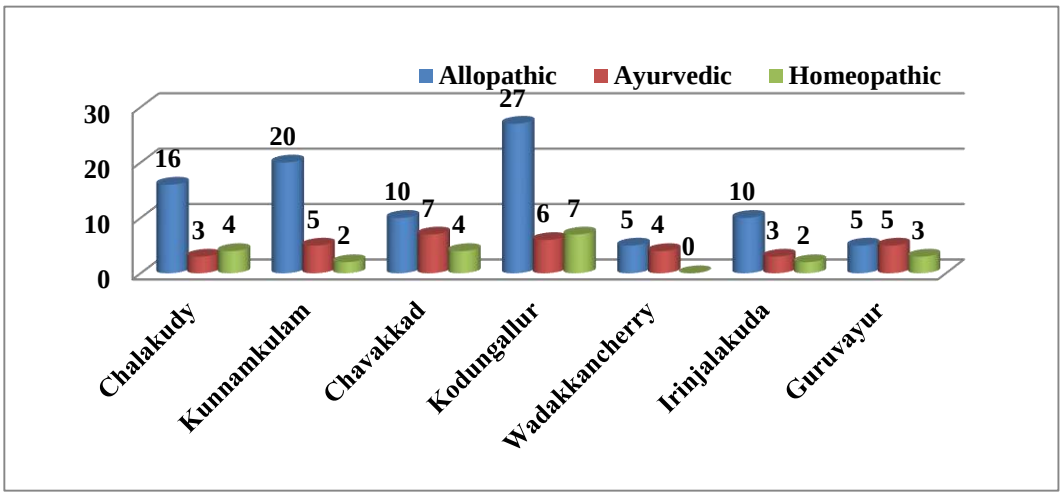


Figure 15.2: Comparison of hospitals in Guruvayur Municipality with other urban local bodies

15.3 Major Diseases

As per data, persons affected with diarrhoeal disease and dengue fever has increased through the years. Table 15.8 shows presence of coliform in well and pond water. Presence of coliform and mixing of sewage with ground water may be a reason for increase in ADD. Some wards in Guruvayur Municipality suffer from water scarcity and thus storage of water

may lead to mosquitoes breeding around and spread of epidemics like Dengue Fever in summer season also. Blocked drains and mixing of sewage to storm water which is the existing status of the town, can again lead to communicable diseases like Dengue and leptospirosis.

Table 15.7: Communicable Diseases reported in Municipality

Sl No	Diseases	2017-18	2018-19
1	Acute Diarrhoeal Disease(ADD)	201	295
2	Leptospirosis	1	4
2	Dengue Fever	8	7

Source: Public Health Centers

Guruvayur Municipality has around 100 hotels/tea stalls and 8 licensed catering units. There is around 800 other state labourers working in the municipality mainly concentrated in culinary activities and their cleanliness and sanitary measures have to be assured to regulate spread of epidemics.

Table 15.8: Details of Water Pollution in Guruvayur Municipality

BOD level	Coli form level	PH value
2.86 mg/Ltr. (3 days at 27 Degree Celsius (for Pond)	Well Water :50 MPN/100 mL Tap Water : Nil Pond Water : 20 MPN/100 ml	Well Water : 7.7 Tap Water : 7.2 Pond Water : 7.1

Source: Pollution Control Board, Thrissur

15.4 Planning Standards

Table 15.9 shows the service level benchmark as per URDPFI guidelines and this is compared with the existing status to identify the gaps. There is a gap for 1 intermediate hospital A, 1 speciality hospital and 1 multi-speciality hospital. Thrissur Corporation which is located at a distance of 25 Km from Guruvayur Municipality contains seven multi-speciality hospitals to the benchmark of three.

Table 15.9: Comparison of existing status with Service Level benchmarks

Health Care Facilities	Standards	Required	Existing
Dispensary	1 for 15000	5	9
Nursing Home, child welfare and maternity centre - 25 to 30 beds	1 for 1 lakh	1	1
Polyclinic	1 for 1 lakh	1	1
Intermediete Hospital B	1 for 1 lakh	1	3
Intermediete Hospital A	1 for 1 lakh	1	0
Multi speciality Hospital	1 for 1 lakh	1	0
Speciality hospital	1 for 1 lakh	1	0
General Hospital	1 for 2.5 lakh	0	0

Family Welfare Centre	1 for 50000	1	8
Diagnostic Centre	1 for 50000	1	1
Dispensary for pet animals & birds	1 for 1 lakh	1	3
Medical College	1 for 10 lakh	0	0

15.5 Schemes on Health

National Urban Health Mission envisages to meet health care needs of the urban population with the focus on urban poor, by making available to them essential primary health care services and reducing their out of pocket expenses for treatment. This will be achieved by strengthening the existing health care service delivery system, targeting the people living in slums and converging with various schemes relating to wider determinants of health like drinking water, sanitation, school education, etc. implemented by the Ministries of Urban Development, Housing & Urban Poverty Alleviation, Human Resource Development and Women & Child Development. NUHM would endeavour to achieve its goal through need based city specific urban health care system to meet the diverse health care needs of the urban poor and other vulnerable sections, institutional mechanism and management systems to meet the health-related challenges of a rapidly growing urban population, partnership with community and local bodies for a more proactive involvement in planning, implementation, and monitoring of health activities, availability of resources for providing essential primary health care to urban poor and partnerships with NGOs, for profit and not for profit health service providers and other stakeholders.

Kerala's achievements in the health sector have been often cited as role models for the country. Some of its health indices match with that of the developed countries. The State has a better health standard with low birth and death rate, rapidly declining growth rate, high level of acceptance of family planning methods and increased life expectancy. Government of Kerala's patient- friendly hospital mission AARDRAM provides quality services at all health levels. The objectives of the mission include transforming PHCs (Primary Health Centres) into FHCs (Family Health Centres), availing the best service of the best doctors and para medical staff, reforming out-patient management procedures with state-of-the-art facilities, facilitating with hygienic and spacious wards, rooms, beds and toilets and availing Life Saving Medicines from the hospital concerned on moderate rates. The activities of the Mission would cover three major sectors in State's health care delivery system; Government

medical college hospitals, district hospitals, taluk hospitals and alternative systems covering Ayurveda and Homoeo hospitals and Primary Health Centres (PHCs).

15.6 Inference

As a community center, the immediate health care facilities are available within the town as per the URDPFI guidelines. Devaswom Medical Centre caters to the needs of pilgrims visiting the town. There are no multispecialty or speciality hospitals in Guruvayur Municipality. The local body is situated at a distance of 25 km from Thrissur Municipal Corporation which is a major health service provider in the district. Provision of upgraded sanitary facilities like restricting mixing of water sources with liquid waste can help prevent communicable diseases to an extent.

CHAPTER 16
ENERGY

Electrical Energy is one of the most important factors in the infrastructure development of a society. In the various forms of energy, commonly used one is Electrical energy.

16.1 Existing status

Electrical energy produced from hydroelectric project is used in the planning area. The Kerala State Electricity Board (KSEB) is the licensed agency for Power distribution in the Municipality area. The Town has a 110 KV substation with 56 MVA capacity located at Thaikkad which serves the entire planning area. Year wise and category wise number of connections are shown in table 16.2 and figure 16.1.

Table 16.1. Year wise and category wise number of connections

Year	Domestic	Industrial	Commercial	Agriculture	Others	Total
2015 - 2016	559	4	60	13	73	709
2016 - 2017	505	10	77	15	182	789
2017 -2018	435	7	92	13	84	631
2018 -2019	373	6	132	11	131	653

Source: KSEB

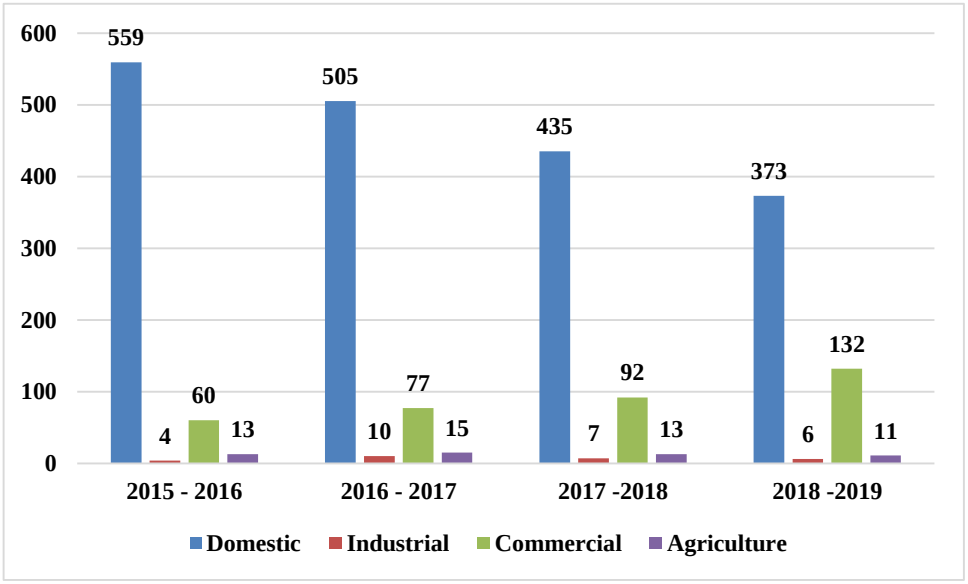


Figure 16.1. Year wise and category wise number of connections

The number of consumers in domestic category is more when compared with other categories. Consumers in domestic category were gradually decreased from 2015 to 2019, whereas number of consumers in commercial category has been increased. The trend in power consumption is shown in the table 16.2. The power consumption has been decreased from 2017 to 2015 in all the categories.

Table 16.2 . Year wise and category wise power consumption

Year	Domestic	Industrial	Commercial	Agriculture	Others
2017	80996564	375153	7205014	90921	3270587
2018	87487981	344816	7242376	97038	3212449
2019	76984350	322811	6634601	94185	2985747

Source : KSEB

Distribution network consists of an 11 KV line of length 56.57Km and low tension line of length 257.082 Km. One feeder is arranged for Guruvayur Dewaswam separately.

16.2 Non-conventional energy sources

There is a solar energy source located in the municipality, which is of 20KW. Solar panels are installed in Public Library building and in Manjulal shopping complex. No other sources are located within the planning area.

16.3 Inference

At present Guruvayur Municipality does not have major energy problems. Present distribution system of electrical energy is satisfactory. No other non-conventional energy sources except solar energy can be utilized. In the case of solar energy, the use is limited to domestic purpose only like solar lights and solar water heater etc. Solar energy is the major potential non-conventional source from which the planning area can harvest power.

CHAPTER 17

RECREATIONAL SPACES AND CIVIC AMENITIES

Recreation is an essential part of human life and it is found in many different forms i.e. either it is natural or it is manmade. Places of recreation, specialized institutes, and clubs will provide new avenues for the residents to spend their leisure time for productive purposes enhancing their capabilities as well as for specific occasions. This chapter details out the existing Recreational and Civic Amenities in the Planning area.

17.1. RECREATIONAL FACILITIES

As Guruvayur is a Pilgrim center with huge influx of pilgrims, it calls for the need of facilities that will change the ambience of the town. The figure 17.1 shows the spatial distribution of existing recreational facilities within the town.

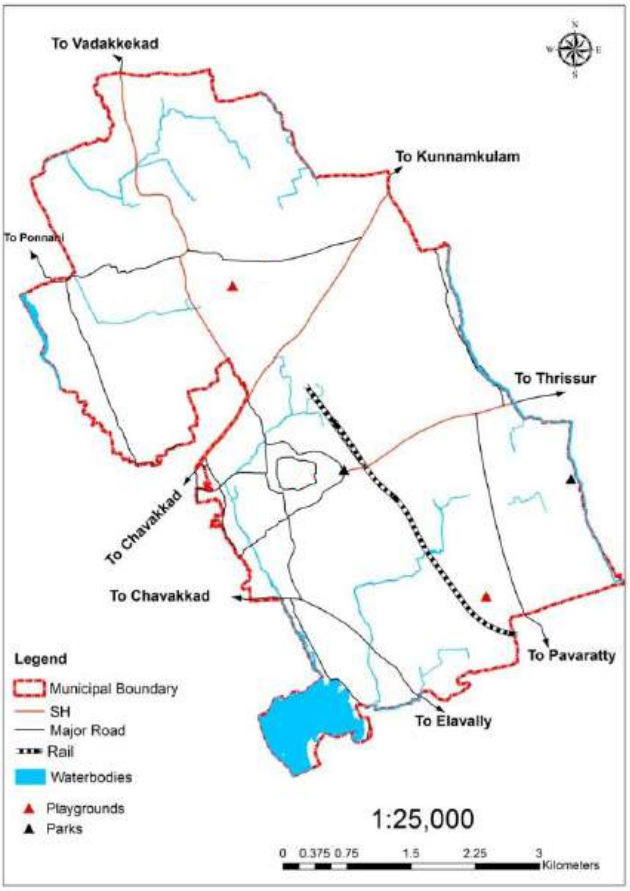


Figure 17.1. Existing Recreational Facilities

17.1.1. Parks, Playgrounds and Open Spaces

Parks, open spaces and playgrounds are one of the most important urban infrastructures required to beautify a city and something which facilitates social interaction and wellbeing.

There is only one park within the Municipality. A children's park at Manjulal Junction in Ward number 27 having an area of 26.5 cents with boundary wall, 12 numbers of play equipment, water supply facility (well water), toilet, dust bins etc. There is no open playground for public, whereas playgrounds are attached with most of the schools within the Municipality. Development of parks and playgrounds are one of the main objectives of projects under AMRUT scheme. There are 4 projects under this scheme. They include parks at Bhagat Singh Ground, Pookode Samskarika Nilayam Ground, Choolpuram and at Brahmakulam. The locations of which are shown in figure 17.2.

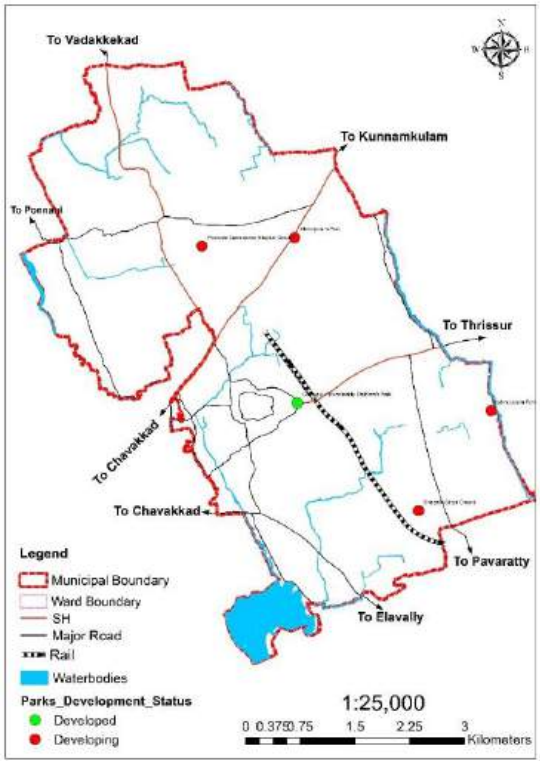


Figure 17.2. Location of Parks



Park under construction in Ward 6



Park at Manjulal

Figure 17.3. Parks at various locations

Existing facilities are compared with the URDPFI standards and the gaps identified is categorized and listed in Table17.1 as in comparison with service level benchmarks. As per URDPFI guidelines there should be 14-16 sq.m open space per person, but the present status is 0.14 sq.m per person. Even though there are ongoing projects for developing parks and playgrounds existing facilities only add up to 0.01sq. Km which is very less compared to benchmark. 11 Ha of land is to be included for recreational purposes in various locations within the Municipality.

Table 17.1. Comparison with Service level benchmarks

Sl.No.	Type with URDPFI standards	Existing	Required	Gap
1	Housing Area Park (1 for 5000)	2	14	12
2	Neighbourhood park (1 for 15000)	0	5	5

Source: URDPFI & ULB level data

17.1.2. Auditoriums

Guruvayur is a religious hub and it is one of the main temple where several marriages are conducted in the Kalyanamandapam in front of the Sreekovil. Since several marriages are conducted every day, it will be difficult to cater the needs of the people. With a view to cater the needs of people who came for the marriage ceremony, auditoriums become an inevitable part of the town. Figure 17.4 shows the spatial distribution of auditoriums, it is evident that

they are concentrated more around Guruvayur Sreekrishna Temple premises, an auditorium survey was conducted to understand the facilities provided by them. Major findings from auditorium survey are:

- Most of the auditoriums are under private ownership (45 out of 57). Hence any solution to be taken will require coordination between the private owners and the authorities (Figure 17.5).
- Booking charges of 56 % of auditoriums has been marked stable in the last 5 years, whereas 39% stated increase in booking charges. About 43.5% of the auditoriums have online booking facility.
- About 71% of auditoriums have kitchen facility. Out of the 24 auditoriums surveyed, 17 have kitchen and only one out of 17 does not have a fire fighting system.
- About 65% auditoriums have food and plastic waste, while 35% have food waste only. Most of the waste from the auditoriums are collected by the Municipality (59.1%) (Figure 17.6). Kudumbashree waste collection, Biogas plant (27.3%) and incinerators (4.5%) are other methods to tackle the issues. Many auditoriums had an opinion for a better waste disposal system and efficiency in waste collection within the Municipality which is the major issue to be addressed.

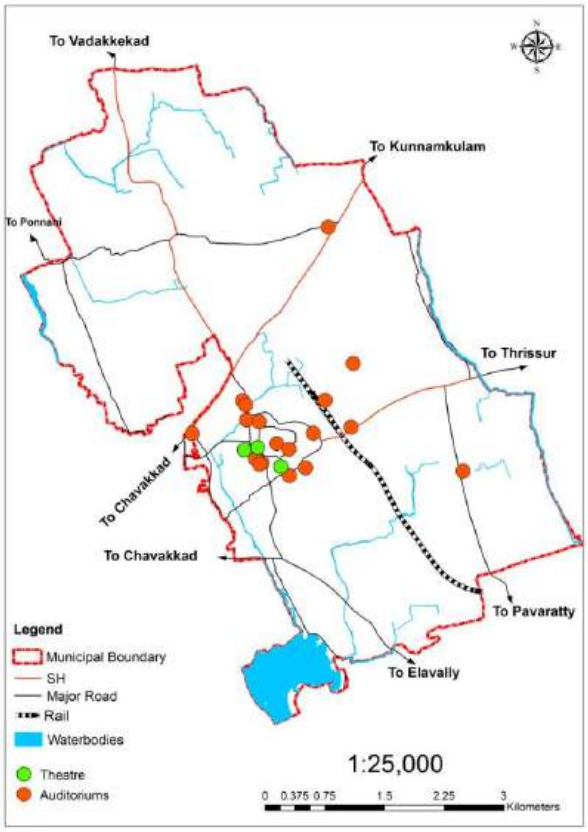


Figure 17.4. Spatial location of auditoriums and theatres (Source: ULB level data)

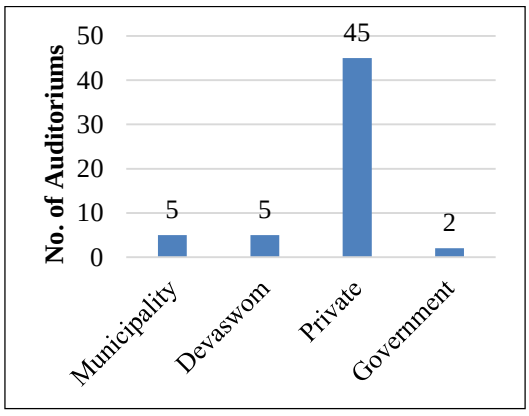


Figure 17.5. Ownership status of auditoriums

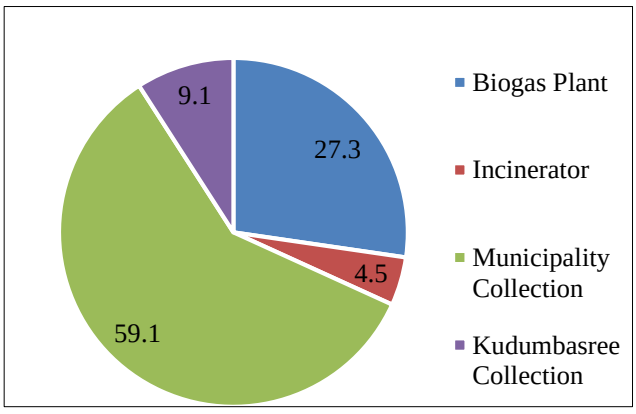


Figure 17.6. Waste disposal Methods
Source: Auditorium Survey

- All auditoriums surveyed have water supply, electricity and transportation facilities.
- Only one Auditorium surveyed (Melpathur Auditorium) does not have an attached parking facility but since it is within the temple compound, Devaswom parking can be utilized. All other auditoriums have attached or underground parking facility.

17.1.3 Theatres

There are 3 cinema theatres in the Municipality within the temple premises as shown in figure 17.4.

17.2. CIVIC AMENITIES

Civic amenities of any local body includes the Municipal or village office, police station, fire station, fuel stations, LPG godowns, post offices, comfort stations, etc. Similarly, Guruvayur Municipality has certain existing civic amenities which facilitate the population of the locality to live a better life. Figure 17.7 shows the various civic amenities within the Municipality.

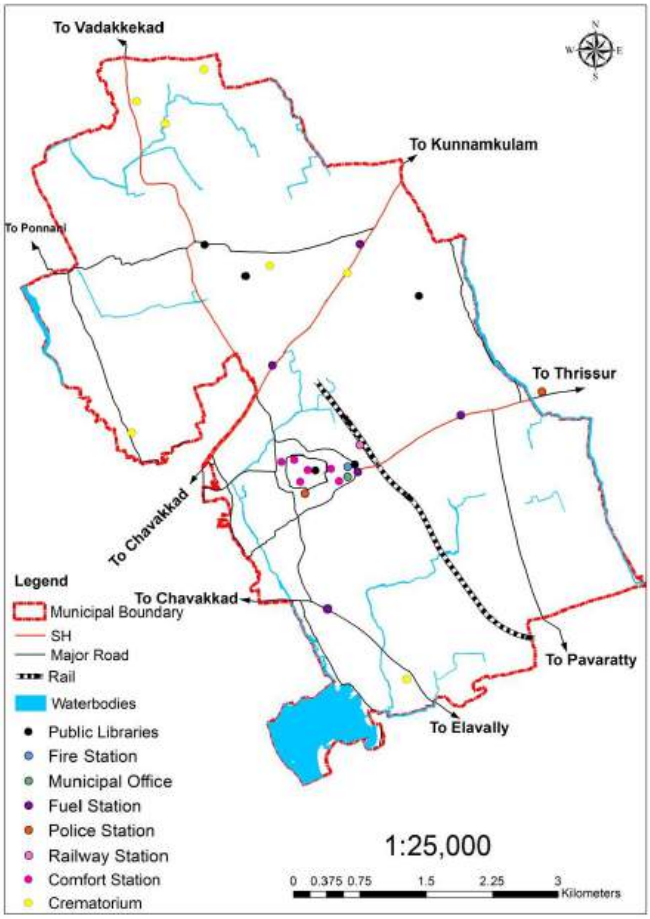


Fig 17.7. Map showing location of civic amenities

17.2.1. Municipal Office

Municipal office of any area functions as a facilitation centre for basic requirements for the existing population within the administrative boundary. Whether it is a housing permit or rural employment schemes or schemes for special concern areas, it is the Municipality where people first approach for assistance. There is a Main office located in the Manjulal Junction and 2 zonal offices at Pookode and Thaikkad.



Figure 17.8. Guruvayur Municipal office

17.2.2. Police Station

Police stations form an integral part of any local body for ensuring order and living disciplines. There are 2 police stations handling various parts of the Municipality. The administrative boundaries of Police stations in Guruvayur are shown in Table 17.2.

Table 17.2. Police stations and their Administrative boundaries

Sl. No.	Police Stations	Administrative Boundaries
1	Temple Police Station South, Guruvayur (37 employees- 1 gazetted, 36 non-gazetted)	Nenmini- Railway Station- Aryabhatta College – Muthuvattur – Mammiyur - Karekkad
2.	ACP Office at West Nada	
3	Police Station, Kandanassery	Thaikkad – Iringapuram – Kottapadi – Thozhiyur – Perakam - Kaveed

Source: Secondary Data, AMRUT



Figure 17.9. Guruvayur Temple Police station

Figure 17.10 shows the graphical representation of various incidents happened within the Municipality during the last years. Incidents against women increased over the years. There is a decrease in the number of fatal accidents. Thefts decreased whereas riots increase during 2017 - 2018.

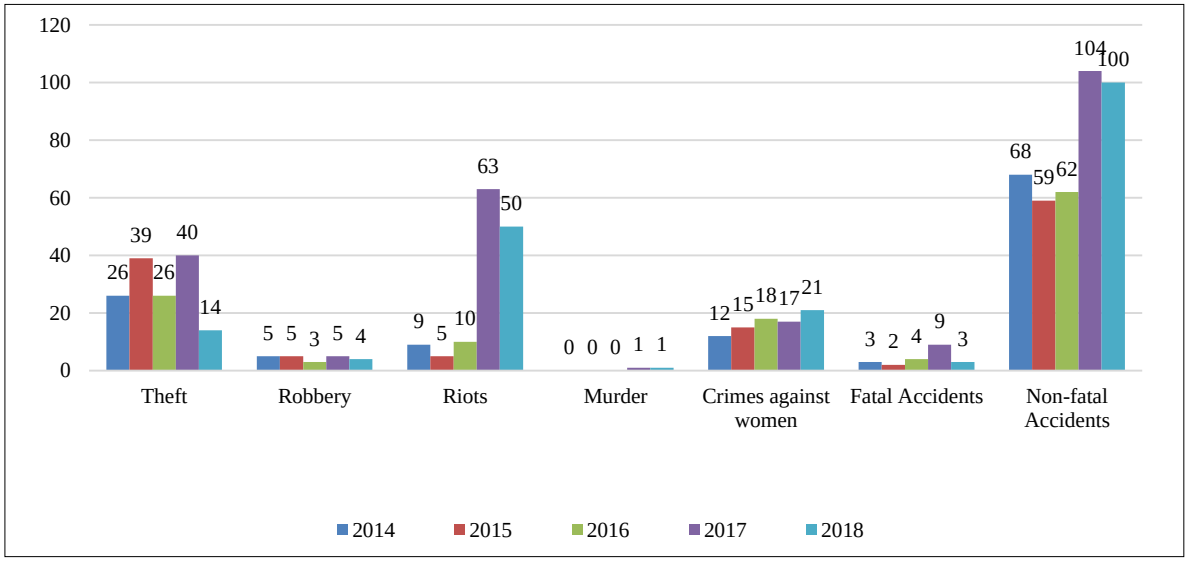


Figure 17.10. Graphical representation of incidents within Municipality

Source: Police Station, Guruvayur and Kandanassery

17.2.3. Fire Station

There is a main fire station in Guruvayur with a capacity of serving a population of 2 lakhs up to radius of 5-7 kms, the location is shown in figure 17.6. The office consists of 42 personals.

17.2.4. Fuel Stations

There are 8 Fuel Stations and 1 gas station has been located in Guruvayur Municipality (Figure 17.7).

17.2.5. Comfort Stations

Comfort stations generally consists of toilets and rest rooms for the people. Since Guruvayur Temple premises experiences a high floating population, comfort stations form an important aspect especially in the temple premises. The details of comfort stations are given in Table 17.3. There are total 152 toilets distributed in 6 comfort station points. More comfort stations are being built to cater to the requirement of the growing population. Spatial location of comfort stations is shown in Figure 17.11.

Table 17.3. Location and Number of comfort stations

Comfort stations under Municipality			
Sl. No.	Location	Toilets	Bathrooms
1	Near Pvt. Bus Stand	40	12
2	Near Ambady Tourist home	8	8
Comfort stations under KSRTC			
Sl. No.	Location	Toilets	Bathrooms
1	Within Bus stand	7	
Comfort stations under Devaswom			
Sl. No.	Location	Toilets	Bathrooms
1	East Nada	66	
2	West Side of Pond	20	
3	South Nada	12	

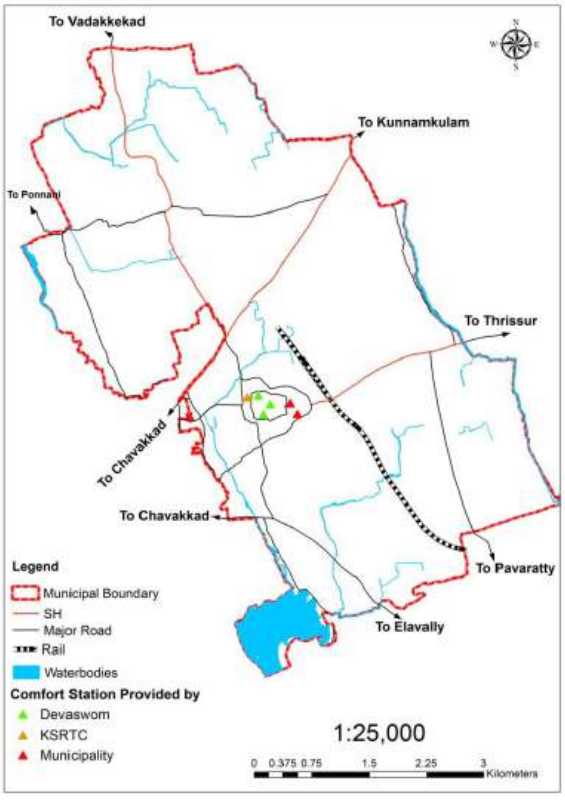


Figure 17.11. Location of comfort stations (Source: ULB level Data)

17.2.6. Public Libraries

Public libraries have always a source of literary asset but also a center for community gatherings. 5 public libraries have been spatially located in the Municipality (Figure 17.6). There are about 4300 books in all the 5 libraries.

17.2.7. Crematoriums and Burial grounds

7 crematoriums were located in the Municipality, mostly associated with churches and mosques. 1 general gas crematorium is at Guruvayur Savakotta Junction. 3 are located beside Churches and 3 beside Mosque.

17.2.8. Post Office

There are 12 post offices at various locations within the Municipality. Table 17.4 shows the list of post offices. As per URDPFI Guidelines there should be 1 post office for every 15000 population, it is seen that number of post offices are sufficient enough for the existing population.

Table 17.4. List of Post Offices within the Municipality

Sl. No.	Post Office	Sl. No.	Post Office	Sl. No.	Post Office
1	Head Post Office, Guruvayur	5	Thiruvenkidam Branch Post Office	9	Perakam Branch Post Office
2	Temple Branch Post office	6	Iringapram Branch Post Office	10	Paluvai Sub Post Office
3	Puthenpally Branch Post Office	7	Kottappadi Sub Post Office	11	Chakkumkandam Branch Post Office
4	Thaikkad Sub Post Office	8	Brahmakulam Branch Post Office	12	Nenmini Branch Post Office

Source: Guruvayur Municipality,2019

17.3 Comparison with Planning Standards

Table 17.5 shows the comparison of planning standards for various civic amenities. All civic amenities are sufficient as per planning standards. But updating the facilities as per recent technological trend can be given a thought. Public libraries are sufficient but the number of books are very less. Initiatives should be taken to improve the reading habits of residents. There are no stadiums located within the municipality. For this people depends on other towns.

Table 17.5. Comparison with planning standards

Amenities	Planning Standards	Existing	Required	Comments
Municipal Office	-			1 main office at Guruvayur, 2 Zonal Offices at Thaikkad and Pookode
Post Office	1 for every 15000 population	12	5	Sufficient
Police Station	1 for every 90000 population	1	1	Sufficient
Fire Station	1 for every 2 lakh population	1	1	Sufficient
Public library	1 for every 15000 population	6	5	Sufficient in number but number of books less.
Stadiums/District sports centre	1 for every 1 lakh population	0	1	NIL

Source: URDPFI Guidelines

17.4 Inference

As Guruvayur is a Temple town where there is a huge influx of population, it necessitates the provision of parks and open spaces. There are interventions taken by the Authority to improve the greenery of the town because the area under park and open spaces are very less. As per URDPFI guidelines the civic amenities are sufficient for the town. There are no stadiums within the Municipality.

CHAPTER 18

HOUSING

One of the basic necessities for life is shelter. Housing scenario of any area needs to be studied thoroughly to understand whether the basic need for existence is being fulfilled. This chapter explains the housing scenario of Guruvayur Municipality.

18.1. Existing Scenario

As per census 2011, there are 17011 houses within the Municipality out of which 90.25% are owned houses as shown in figure 18.1. Figure 18.2 shows the housing tenure status of various zones in Guruvayur Municipality. Pookode zone has the highest number of owned houses and Guruvayur zone has the highest number of rented houses.

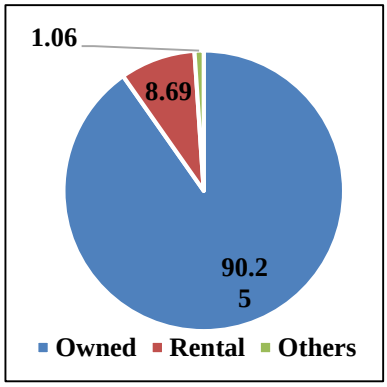


Figure 18.1. Ownership Status

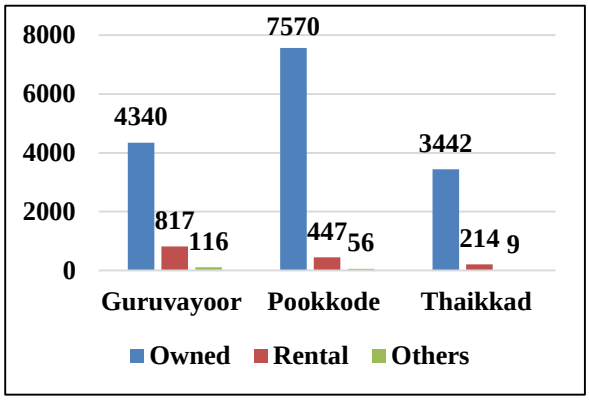


Figure 18.2. Housing tenure status in each zone

The no. of houses has increased to 20682 (As per ground truthing survey, 2019) compared to census 2011, and the present condition of houses is given in table 18.1and the percentage is shown in figure 18.3. It shows that about 13.2% of the houses are semi-pucca.

Table 18.1. Condition of Houses

Pucca	Semi-Pucca	Kutcha
17731	2728	223

Source: GroundTruthing Survey, 2019

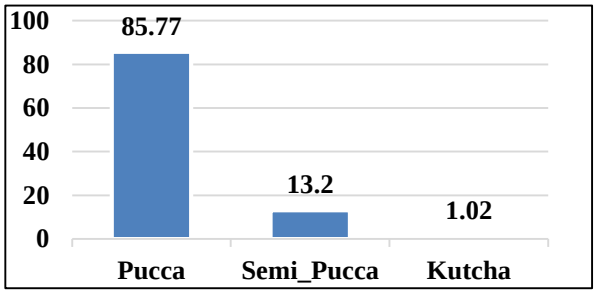


Figure 18.3. Condition of Houses(%)

Figure 18.4 shows the wardwise distribution of houses within the Municipality. Edapully, Mammiyur, Kotta South, Nenmini, Thaikkad and Substation wards have large number of houses. There are more than 800 houses in Gurupavanapuri (Ward number 18) where the Sree Krishna Temple is located. The town center is overcrowded by houses where as the wards away from core are less crowded. Semi- Pucca and Kutcha houses are not concentrated at any

particular area. Within the Town center Kutcha houses are negligible, Whereas number of Kutcha houses are more towards the periphery of the municipality. As per the 13th five year plan (2017-2022) of Guruvayur Municipality, there are 483 homeless people and 258 houses requires maintenance assistance.

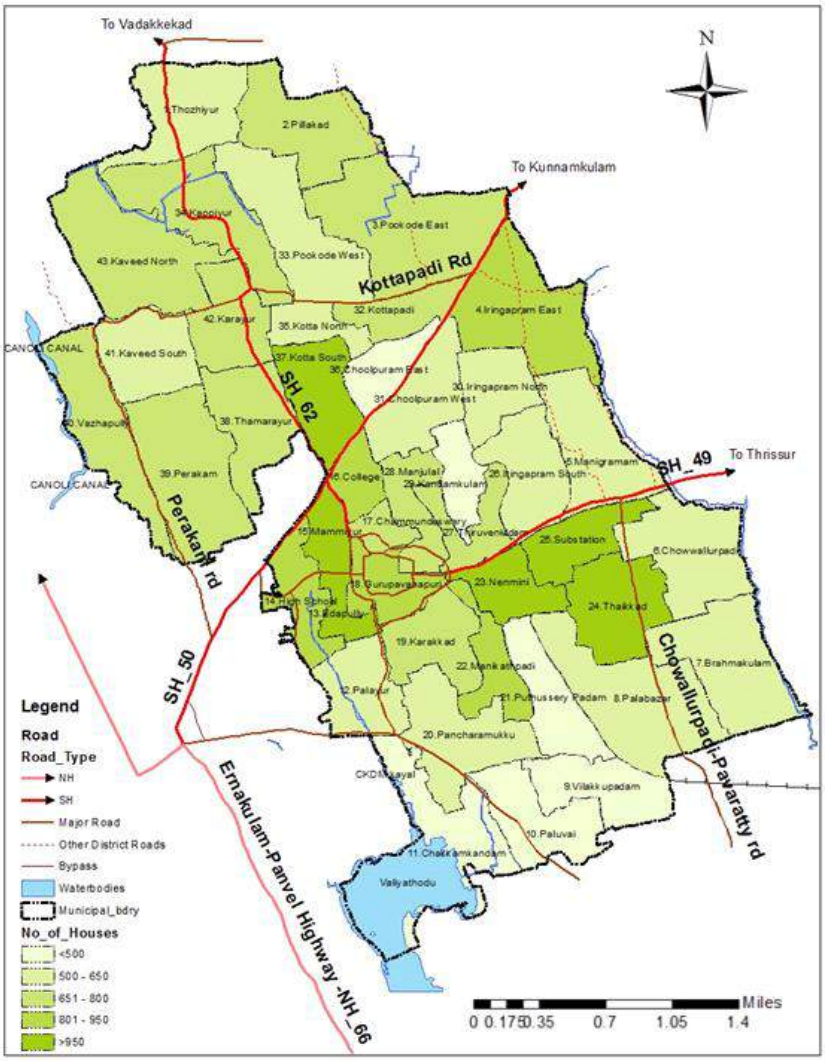


Figure 18.4. Ward wise concentration of houses

Ongoing Schemes for housing within the Municipality are as follows:

- **Asraya Scheme** –It is a destitute identification, rehabilitation and monitoring programme. Initiated in 2003 under Poverty Alleviation department through Kudumbasree, it aims at enhancing access to basic necessities and opportunities for the poor. As part of scheme implementation in Guruvayur Municipality, the beneficiaries were supposed to avail an amount of Rs.2lakhs each. But since the beneficiaries complained the amount being too less for buying land within the Municipality, there is a request for a hike in scheme amount.

- **Life Mission** –This scheme coming under Pradhan Mantri AwasYojana (PMAY) was launched in October 2018. The target beneficiaries are the homeless residents. The construction of houses, under the Life Mission scheme will continue for five years. The state government will have to spend as shell out Rs. 4 lakhs for the construction and preparation of each residential unit, before handing over the keys to the beneficiaries. The development and implementation of Life Mission has been targeted towards people who lost their home due to natural calamities. The scheme focuses on financially weaker sections. The residential units will have fully functional washrooms and lavatories. Various verticals under Life Mission are In-situ redevelopment, Credit - linked subsidy, Affordable housing in partnership and Beneficiary-Led Construction. Table 18.2 shows the details of life mission project in Guruvayur Municipality.

Table 18.2. Status of PMAY & Life Mission

	PMAY	Life Mission
Application received	1251	141
Completed	469	141

Source: Guruvayur Municipality,2019-2020

18.2. Socio-Economic survey Results

Socio-economic survey was conducted to analyze the existing housing condition of the Municipality and the results are as follows:

- 14.51% of houses have built-up area less than 20sqm. Majority of houses are within 75-150 sq. m. plinth area, which constitute 23.22% of households. 31.87% of households have plinth area between 20 to 75 sq.m (Figure 18.5).
- Analysis of data on roof and floor type of houses shows that majority houses have concrete roof with marble/tile/granite flooring as in figure 18.6. 7.11% households have Mangalore tiled roof. 1.72% has thatched, plastic or sheet roofing. Though a majority of the houses have brick and laterite walls, 4.1 % households still have thatched walls. This shows that schemes for improving household condition are required in many places.

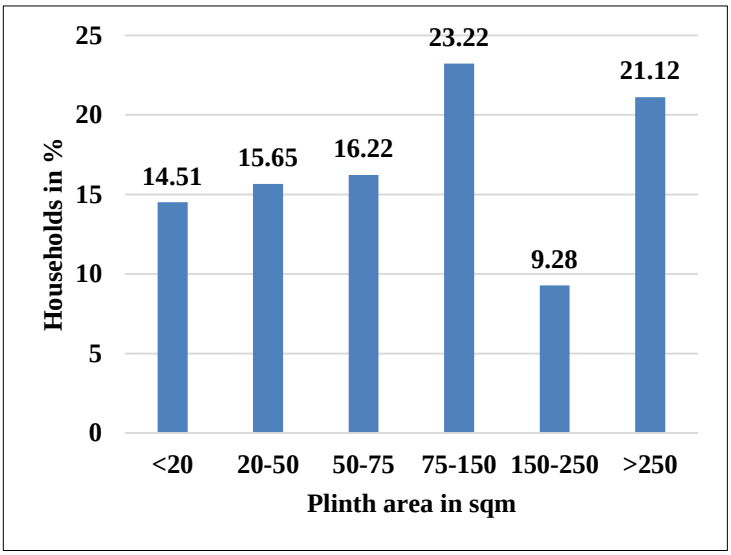


Figure 18.5. Details of Plinth area

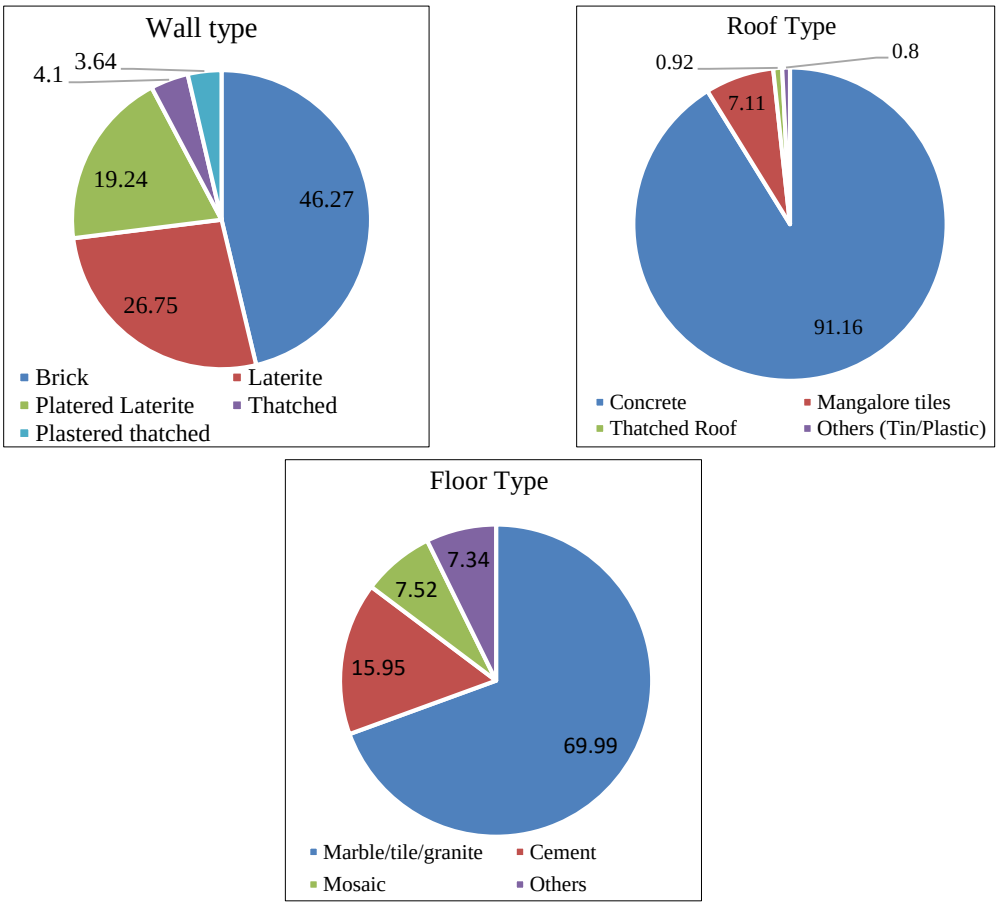


Figure 18.6. Condition of housing

Source: Socio Economic Survey,2019

18.3. Flat Survey - Results

In Guruvayur Municipality, flats are concentrated around the temple, as shown in figure 18.7. Flat survey was conducted to assess the availability facilities and the survey results are follows.

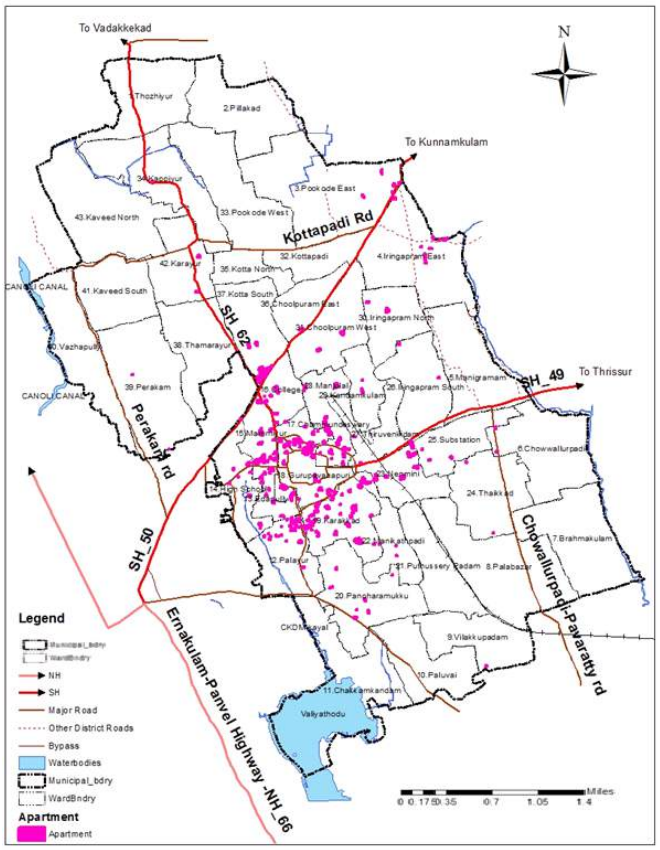


Figure 18.7. Spatial distribution of flats in Guruvayur

- Figure 18.8 shows the occupancy status of flats. 91% of flats are owned and 7.57% flats are rented. 1.39% flats are found to be vacant.

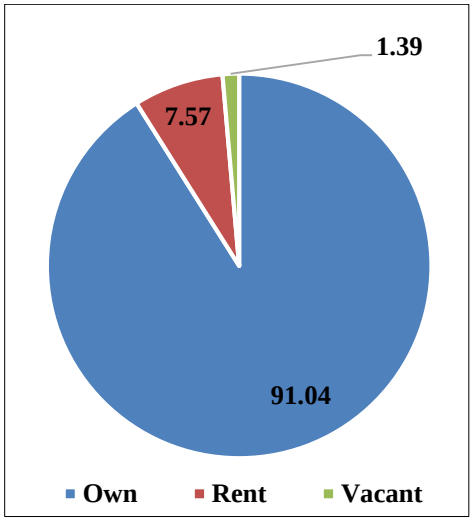


Figure 18.8. occupancy status

- Majority of the flats are low rise. ie. 61.76%. About 29.41% having G+2 no. of floors and 32.35% having G+3 no. of floors (18.9). Low-rise apartments are more in number compared to high rise, and are concentrated in the temple premises.
- About 61.76% flats are within 11-25 cents of land, located in the core area of the Municipality (Figure 18.10)

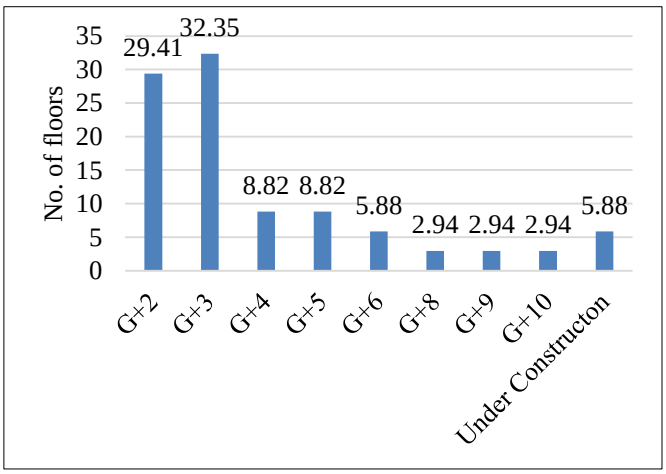


Fig 18.9. Classification based on no. of floors

Source: Flat Survey, 2019

- About 53% of flats located around the temple premises are facing problems in getting good quality water. In their opinion, they receive poor quality water (Figure 18.11.). Only 3% apartments depend on Kerala Water Authority (KWA) sources, 81% depend on borewells, 16% on both KWA and borewells (Figure 18.12.).
- About 80% of flats doesn't have any recreational spaces like play area, gym, or open space (Figure 18.13). As per Kerala Municipality Building Rules, apartments having more than 3 floors should be provided with recreational space. Hence, location for recreational space should be identified and developed within the Municipality.

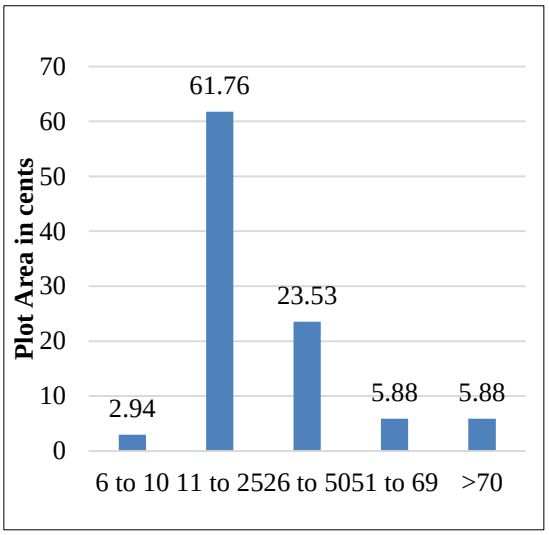


Figure 18.10. Distribution of Plot area of flats

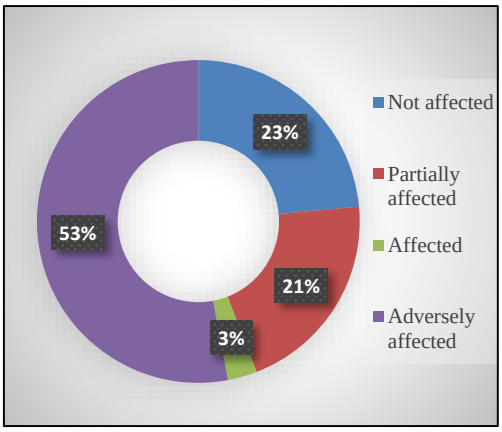


Figure 18.11. Water Supply in Flats

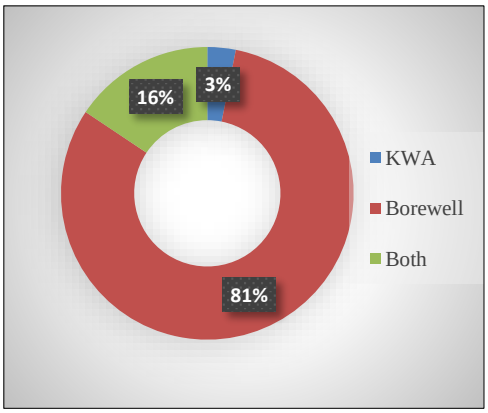


Figure 18.12. Source of water supply in flats

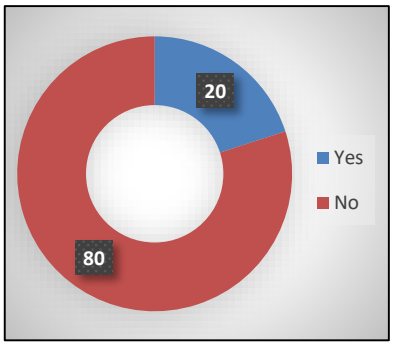


Fig 18.13. Provision for Recreational Space

- Solid waste management is an important and crucial issue of urban areas needs to be addressed at household level. It is needed to know how solid waste is handled in apartments since they have limited space around them unlike individual households. As per survey, 44% of flats have no proper waste management or waste collection systems (Figure 18.14.). About 78.13% flats have no collection system (Service level benchmark - 100%) (Figure 18.15.). Remaining 21.88% utilize Kudumbashree waste collection system. Waste segregation on household level should be

100%. But only 93.75% segregation is achieved (Figure. 18.16.). About 70% use incinerators and 5% use biogas plants which are the only reliable and safe method of solid waste management. But remaining 25% adopt open burning which is not a safe disposable method (Figure 18.17.)

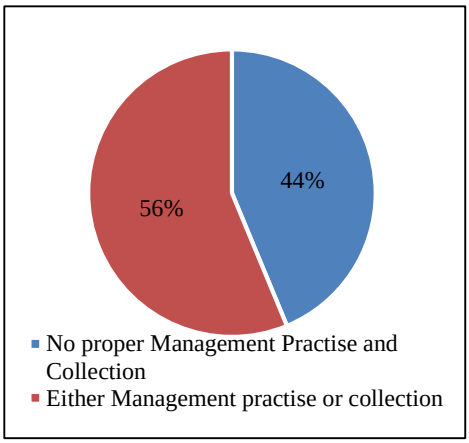


Figure 18.14. Management Practice

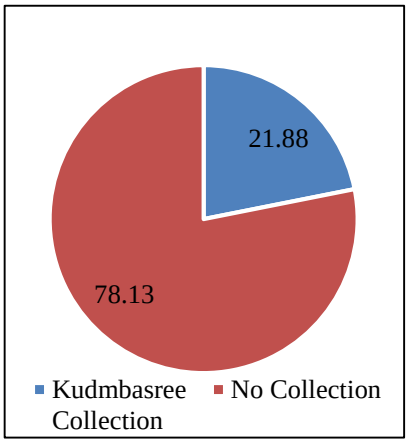


Figure 18.15. Collection Practice

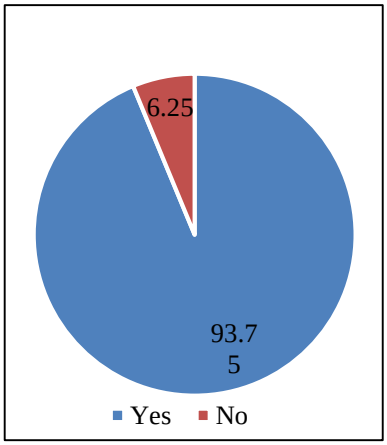


Figure 18.16. Segregation Practice

Source: Flat Survey, 2019

- All flats have septic tanks within the compound and those which did not have septic tank is provided with sewage treatment plant set up. As per KMBR, in case of buildings exceeding 2500 sq.m. built up area, special provision should be made for in-situ liquid waste management treatment plant. As per survey, 43.75% flats have built-up area above 2500sqm (Figure. 18.18). About 14.29% (Figure 18.19).of these flats have no STP which is violation of KMBR. Hence, such apartments which do not have provision as per rule should be given assistance for setting up services for effective management of sewerage.

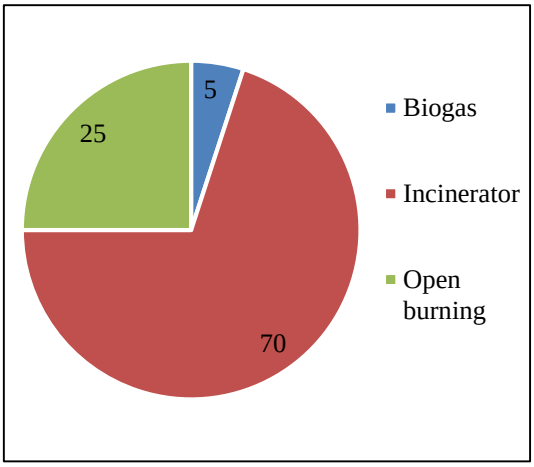


Figure 18.17. Waste Disposal Methods

- About 78.13% (Figure 18.20) of apartments do not have sufficient parking facilities as per KMBR which will ultimately result on on-street parking practices. To avoid this, facilities like community parking and multilevel car-parking can be suggested on suitable locations. Table 18.3 shows the provisions required for off street parking facilities as per KMBR.

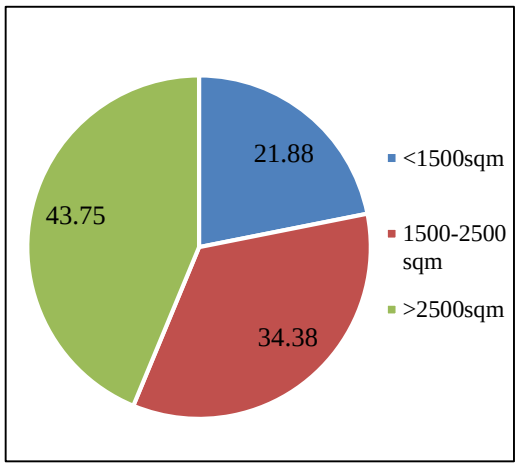


Figure 18.18.Built-up area of flats

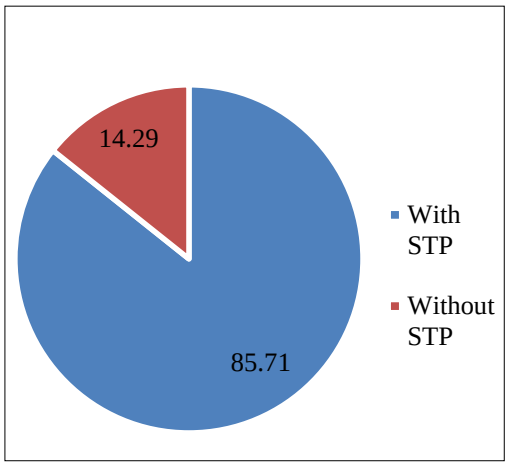


Figure 18.19. provision for STP in flats

Table 18.3. KMBR rules for off-street parking

Area of each unit	Parking Provision
For flats upto 60 sqm	1 for every 3 units
Flats >60sqm upto 150 sqm	1 for every unit
Flats >150 sqmupto 250 sqm	1.5 for every unit
Flats >250sqm	2 for every unit

Source: KMBR

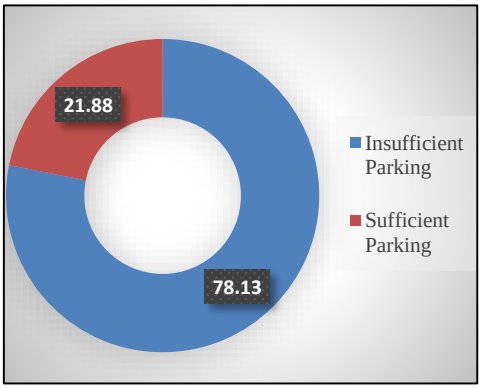


Figure 18.20. Availability of Parking

Source: Flat Survey, 2019

18.4. Colonies

There are about 41 colonies located within the Municipality. It constitutes 1262 houses. Ward 2 (Pillakkad) has more number of colonies. Table 18.4 shows the list of colonies in Guruvayur Municipality. Figure 18.21 shows the wards having colonies.



Figure 18.21: Distribution of colonies

Table 18.4. Colonies in Guruvayur Municipality

Sl. No	Name of colony	Ward no	Area in Hectare	No. of houses	Sl. No	Name of colony	Ward no	Area in Hectare	No. of houses
1	Ayiramkannisc colony	2	0.4047	35	22	Banergynagar colony	16	0.1214	12
2	Pillakkadusc colony	2	1.0118	40	23	Pulikode colony	25	0.4047	40
3	Thazhissery colony	2	0.2833	25	24	Mavinchuvadu colony	25	0.1012	10
4	Pillakkaduuppungal colony	2	0.2428	20	25	Thekkepurakkal colony	28	0.1012	8
5	Pillakkadujob colony	2	0.2428	18	26	Captain lekshminagar colony	30	1.4165	35
6	Chathankaducolony	3	0.2833	50	27	Nalanda colony	31	0.3238	30
7	Pillacolonyhridhyanagar	3	0.3238	60	28	Pattathilparambil colony	31	0.3238	28
8	Iringappuramlakshamveedu colony	5	0.2833	25	29	Nayanar road	32	0.6071	50
9	Thaikkadlakshamveedu colony	5	0.2631	20	30	Sonia Gandhi road	32	0.6071	35
10	A K Raju colony	5	0.3642	30	31	Kottapadi residential road	32	0.3035	30
11	Mannikkara colony	6	0.2428	20	32	Thampuranpadimillenium colony	34	0.2631	50
12	Mannikkarasc agriculture colony	6	0.1619	13	33	Kappiyoor school chirakkal temple	34	0.8094	70
13	Nenmini colony	8	0.1619	20	34	Choolpuramlakshamveedu colony	35	0.6071	60
14	Thekkana colony	8	0.4047	8	35	EMS road	37	0.8094	45
15	Ambedkarsc colony	8	0.2024	14	36	Nayanarsc colony	38	0.2631	30
16	Puliyamparamb colony	8	0.2428	15	37	Koladiparambilsc colony	41	0.2226	45
17	Paluvai colony	9	0.3399	28	38	Karayoorsc colony	42	0.2024	25
18	Vilakkattupadam colony	9	0.6475	40	39	Ezhuthully colony	42	0.2428	35
19	Chakkamkandamlakshamveedu	11	0.1821	18	40	Kaveedukuruvayiparambu colony	43	0.2024	25
20	Kunnathullylakshamveedu colony	11	0.3238	30	41	Kaveeduthalangattiri colony	43	0.2428	35
21	Chamundeswaripattikajathi colony	16	0.3238	35				15.1121	1262

18.5. Inference

The existing status of housing sector in Guruvayur Municipality is better as per the studies. Interventions from the side of Government and local body may be the reason for this. Housing schemes Ashraya, Life mission etc. also contributed much to this. Guruvayur has more number of rented houses and flats which may focuses on the floating population. Total housing has increased by 21.6% in the past 9 years. Flats are concentrated around the temple premises. They are constantly facing water supply and solid waste management issues as indicated by only partial coverage of collection and management systems. Parking facilities are also insufficient. As land within the core area is limited efficient and effective utilization of space is required for the above provisions. Colonies are present but notified slums have not been detected as yet. Slum survey was done last in 2010 as per USHA scheme. Resurvey of colonies to further analysis of facilities may be done.

CHAPTER 19
SPECIAL CONCERN AREAS

Social equality of a local body can be ensured by analysing living standards of the under privileged and socially backward classes and improvising schemes intended at their empowerment. This chapter focuses on enumerating the qualitative and quantitative standards of the socially backward and reserved sections of the society.

19.1 BPL Household

Households are classified as above poverty line if; owned house is more than 1000 sq. ft, land owned is more than 1 acre, monthly income of the family is more than Rs 25000, those paying income tax, those households owning a four wheeler and those with government job or getting pension. As per socio-economic survey, those below poverty line are accounted to be 22.31% of the total population of Guruvayur Municipality. The various reserved categories in the municipality are as shown below in Table 19.1.

Table 19.1: Reserved Category of Households in Guruvayur Municipality

IAY	BPL	Other reserved category
999	4825	4570

Source: Vikasanarekha(2017-2022), Guruvayur Municipality

19.2 Schedule Caste and Tribes

The population and temporal variation of scheduled caste and scheduled tribe community is shown in figure 19.1.

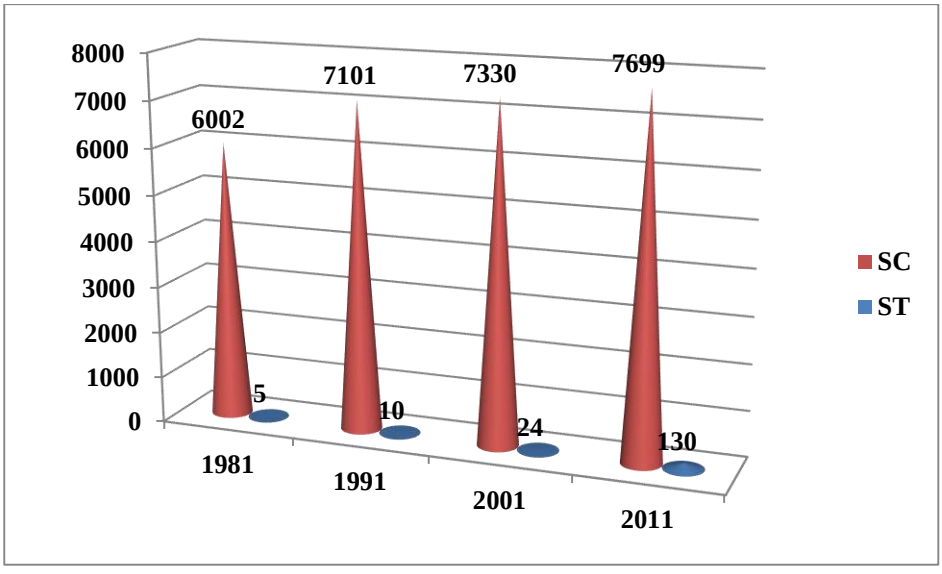


Figure 19.1: Temporal Variation of SC/ST Population, Source: Census 1981,1991,2001,2011

The male and female population of scheduled caste community are shown in Table 19.2.

Table 19.2: Scheduled Caste Population

SC Population	Female	Male	Total
	3901	3798	**7699**

Source:Vikasanarekha (2017-2022), Guruvayur Municipality

There are 83 numbers of sangethams in the municipality with a population of 3386. Population living in sangethams, isolated houses and colonies are tabulated below in Table 19.3.

Table 19.3: Distribution of SC Population

Sangethams		
	Household	736
	Population	3386
	Landless Families	112
	Homeless	289
Isolated		
	Household	609
	Population	2359
	Landless Families	137
	Homeless	340
Colonies		
	Household	577
	Population	1954

Source:Vikasanarekha (2017-2022), Guruvayur Municipality

More than 40% of Scheduled caste population lives in sangethams. Thus total landless families and homeless families account to 249 and 629 respectively. The community breakup of the Scheduled caste community is shown in Figure 19.2. The empowerment of a community vests in education and making them capable of a descent income. The numbers of unemployed individuals in various age groups among SC community are shown in figure 19.3. Their educational qualification is shown in figure 19.4.

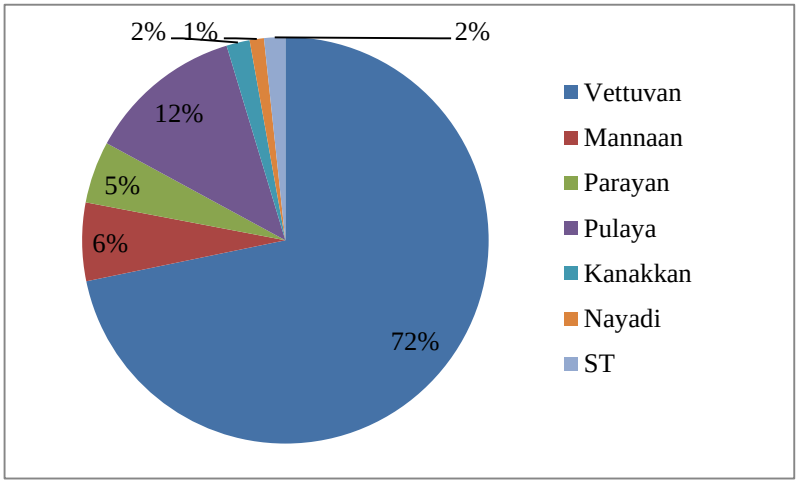


Figure 19.2: Caste wise breakup of SC/ST population,
Source: Vikasanarekha (2017-2022), Guruvayur Municipality

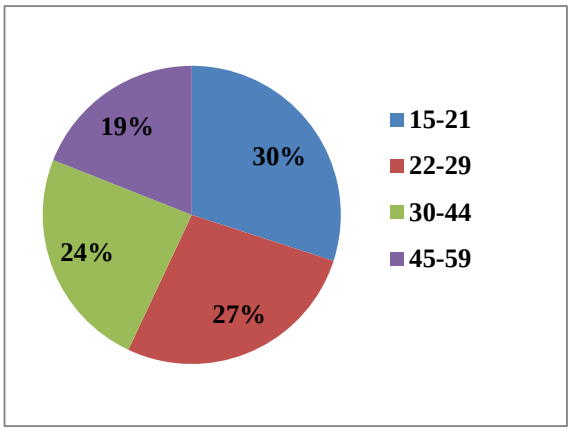


Figure 19.3: Number of unemployed in different age group

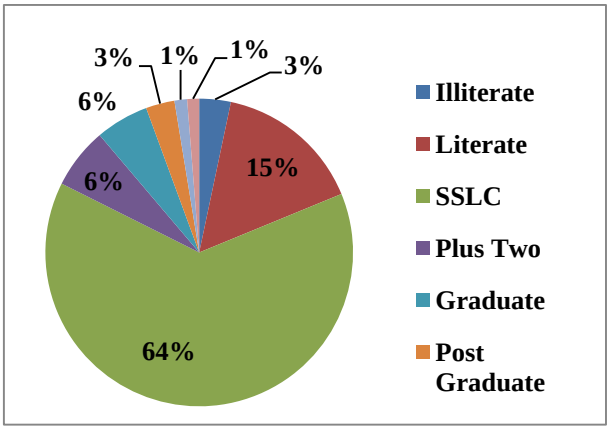


Figure 19.4: Education level of the unemployed

Source: Vikasanarekha (2017-2022), Guruvayur Municipality

There are around 20% and more of unemployed in each age group. Out of this, 64% of them are literates and have reached SSLC. Thus schemes should be implemented for skill development like tailoring and driving, which can fetch them a daily living. Moreover subsidies are given to them to start a business for self-employment and to buy lands and constructing houses. Spill over home loans are those type of loans passed to SC community in case if any shortage of funds to complete construction of their house. Local body is taking measures to provide land on lease that can be used for farming and raw materials are given to them at subsidized rates. These schemes should reach maximum beneficiaries as to bring a livelihood to backward community and thus improve their standard of living.

19.3 Social Security, Women welfare and Child development

Social security ensures protection to the people and imbibes the people with right to live their life with freedom and integrity. Table 19.4 shows the number of crimes reported in Guruvayur Municipality from 2012 to 2016. It shows a decrease in crimes and fatal accidents. Non-fatal accidents and cybercrimes are persistent. Around 22 CCTV cameras are installed in the municipality.

19.3.1 Social Welfare Programmes and Infrastructure

There are various social programmes to assist people with their living. Financial assistance is provided in the form of pensions from state or central government. The beneficiaries targeted are usually old aged people, widows, disabled persons and farmers. Table 19.5 shows details of pensions distributed to various marginalized sections in Guruvayur Municipality.

Table 19.4: Details of crimes and accidents in Guruvayur Municipality

Type	2012	2013	2014	2015	2016	2017	2018
Theft	32	35	26	39	26	40	14
Burglary	0	0	0	0	0	0	0
Kidnapping	1	0	0	0	0	0	0
Robbery	7	5	5	5	3	5	4
Riots	29	27	9	5	10	63	50
Murder	2	1	0	0	0	1	1
Crimes against women	31	26	12	15	18	17	21
Fatal Accidents	10	8	3	2	4	9	3
Non-fatal Accidents	71	66	68	59	62	104	100
Cyber crimes	1	3	0	1	2	0	1

Source: Guruvayoor Temple Police Station and Circle Police Station Kandanassery

Table 19.5: Details of pensions dispersed in the municipality

Social Security	Male	Female	Total
Old Age Pensions	2757	1959	4716
Widow Pensions		2625	2625
PH Pensions	334	283	617
Agricultural Labourers Pension	199	518	717
Pensions for Unmarried women above 50		221	221
Pensions for transgender, haemophiliac etc.	71	220	291
Unemployment allowance	12	92	104
Marriage assistance to SC girls		37	37
Marriage assistance to daughters of Widows		9	9

Source: Vikasanarekha (2017-2022), Guruvayur Municipality

Old aged are those parts of community that suffers loneliness and lacks the vigour to live. Many are challenged by income shortage and they can be helped through pensions. The age split up of old aged population is as shown in figure 19.5. They can be revitalised by providing a platform to unite and socialise such as a community cum day care centre called as Pakalveedu. There is a pakalveedu in Guruvayur municipality. There are 4 old age homes in the Municipality. One is under Government and 3 are run by private agencies. Shanthi Bhavan, Guruvayur is an old age home run by Government.

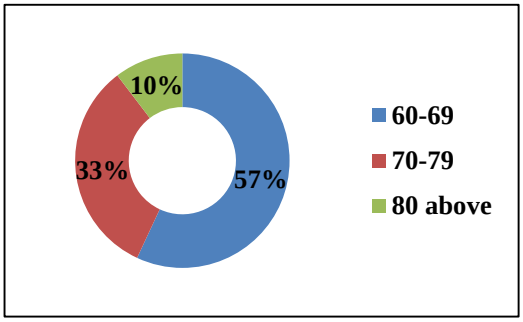


Figure 19.5: Age Breakup of Old aged

Vayomitram scheme is implemented by the state government to provide health assistance to the old aged. Physically handicapped are assisted by providing tri motor cycle, artificial

lymph and others. Mentally retarded persons, persons with cerebral palsy and autism also comprise a small part of the population. However, there is no special school in the municipality. Scholarships are made available to physically challenged students.

Women are next category of individuals where provision should be made for their education and employment along with household responsibilities to ensure self-reliance and independency. There are a number of female headed houses in Guruvayur Municipality. About 8% of women are destitute comprising of widows, disease afflicted, left alone by family, single parent etc. There are government and private women employees in Guruvayur Municipality. To assist others, afford their living in case of need, various Kudumbashree units, and self-help groups are functional. Details are given in Table 19.6 and 19.7. Other than that, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA) and Ayyankali Urban Employment Guarantee scheme aims at ensuring job to women labourers. Initiatives like poultry being distributed to women to encourage poultry farming and giving two wheeler vehicles to scheduled caste women to promote self-employment helps them earn their livelihood. There are various schemes and programmes laid out to alleviate poverty and they are detailed out in Table 19.8.

Table 19.6: Details of Kudumbasree Units

Kudumbashee Units	Nos	Members			
		General	SC	ST	Total
Ayalkoottangal	444	5683	1619		7302
JLG Groups	35	60			60
Thozhil Groups	60	180			180
Paattakrishi Groups	25	97	38		125
Groups with Linkage Loans	280	2160			2160

Source: Kudumbashree,2019

Table 19.7: Details of Self Help Groups

Self Help Groups	Nos	Female Members			
		General	SC	ST	Total
Vanitha Sangham	243				
MicroGroups		2647	998		3645
Groups with Linkage Loans	280				2160
Chavakkad Taluk Mannam SocialService Society Mammiyur	50 (women SHG)				750

Source: Guruvayur Municipality,2019

Table 19.8: Poverty Alleviation Programmes

Schemes	Potentials	Problems
Ashraya	Funds can be released to buy land for beneficiaries	No land is available at the rate recognized by the government
Construction of houses	Constructing houses for beneficiaries	Non-availability of land, insufficiency of fund, high construction cost
Maintenance of houses	Funds can be released for maintenance of dilapidated houses	Criteria for selection of beneficiaries are conventional
Self-Employment Schemes	Loans can be dispersed at reduced rates for self-employment	No adequate market facilities to sell the produced
Ashraya Food supply scheme	Supply of nutritious food to beneficiaries	Insufficient fund
Ashraya Health Assistance	Financial Assistance to ensure health care facilities to beneficiaries	Lack of proper implementation procedures

Source: Vikasanarekha (2017-2022), Guruvayur Municipality

Children are assets to be nurtured and they constitute the next generation that the local body will comprise. Those who are not properly guided ends up to be criminals and thus involved in anti-social activities. Protection of children is thus an inevitable part of any society. Population of children in different age group is detailed in Table 19.9. Rescue Bhavans and Orphanages in Guruvayur Municipality include Sandeepani Bala Bhavan West nada Guruvayoor, Darurahma Yatheemkhana Thozhiyoor and Little Flower Orphanage Paluvai.

Table 19.9: Children in different age group

Age Group	Population
0-6 months	418
6 months to 3 years	3541
3-6 years	2538
6-10 years	3937
10-19 years	8241

Source: Vikasanarekha (2017-2022), Guruvayur Municipality

In 1975 as a part of Integrated Child development service program Anganwadi started. Anganwadi are the grassroots level service delivery point of social welfare activities. There are total of 64 anganawadis in Guruvayur Municipality. Details pertaining to anganawadis in abstract are given in Table 19.10.

Table 19.10: Details of Anganawadis

Anganawadi	64					
Ownership of building	Own	48	Rented	16		
Those devoid of basic facilities	Electricity	47	Toilet	46		
	Compound Walls	40	Gas Connection	64		
Drinking water	Available for 64					
Source	Well	38	Pipe	7	Others	19
Children Friendly Furniture	Available for 64					
Play area	Inside	46	Outside	4		

Source: Vikasanarekha (2017-2022), Guruvayur Municipality

19.4 Inference

Major portion of the unemployed youth in scheduled caste population have reached SSLC. They have to be assisted in attaining a daily living by skill development programmes and training. Old aged, women and children should be taken care off to lead a decent living. There should be more community cum day care centres for the old aged to help them fight loneliness. Scholarships should be given to physically handicapped children and special schools or training centres may be started with children with autism. They should also be considered as a part of the whole lively society. The daily employment programmes should be properly monitored and supervised for the money spent on them. The implementation procedures of loans to the beneficiaries should be properly laid out and the hindrances of fund releases to buy land and homes to the marginalised are yet to overcome so that the intended funds can reach the needed.

CHAPTER 20
ENVIRONMENT AND DISASTER MANAGEMENT

Intensive development activities in cities leads to various environmental issues and it may causes the occurrence of disasters over the years. Hence, conservation of the environment is necessary for improving the quality of life of the citizens. This chapter deals with the various aspects on environment and disaster management.

20.1 ENVIRONMENT

20.1.1 Water pollution

Quality of water in Guruvayur has always been an issue in the temple city. The details of groundwater analysis are included in chapter 12. The discharge of untreated domestic and commercial effluents in to the backwater has resulted in severe environmental problems such as deteriorated water quality and health and livelihood related issues in the neighbouring areas. Coliform presence has also been detected in Sree Narayanamkulangara Bhagavathy Temple pond. This may be due to mixing of sewage with drainage water.

Enhancement of ground water needs to be done by various methods as many places are experiencing issues due to poor quality of groundwater. Over-utilization of ground water is also causing depletion of clean potable water resources. Methods of recharging groundwater are as follows:

- Rejuvenation of ponds and receiving water bodies
- Rain water collection and percolation of rainwater at household level.

20.1.2 Applicability of CRZ rules in Guruvayur

Certain areas near the Chakkamkandam lake and Canoli Canal comes under the Coastal Regulation Zone (CRZ) category. Figure 20.1 shows the various Coastal regulation zones within Guruvayur Municipality.

The Coastal regulation zones in the municipal area are

1) **CRZ-I** areas are environmentally most critical and shall be further classified as under:

CRZ-IA: shall constitute the following ecologically sensitive areas like mangroves, coral reefs, sand dunes, mudflats, salt marshes, turtle nesting ground etc***. The mangroves in the Chakkamkandam area falls under this zone***

CRZ-IB: The intertidal zone i.e. the area between Low Tide Line and High Tide Line shall constitute the CRZ-IB.

2) **CRZ-II** shall constitute the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas. ***In Guruvayur few areas near the Chakkamkandam lake and Canoli Canal fall under CRZ-II.***
3) **CRZ- IV** shall constitute the water area and shall be further classified as under:
4) **CRZ-IVB** areas shall include the water area and the bed area between LTL at the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide.

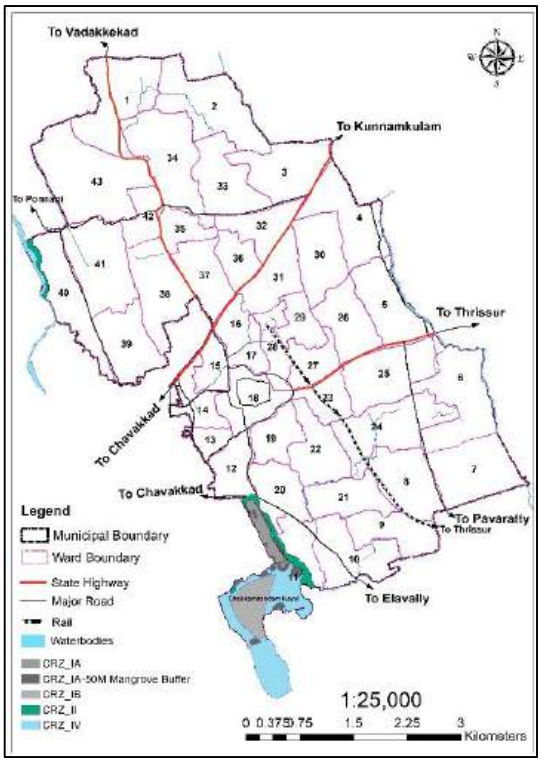


Figure 20.1. Map showing CRZ locations

20.2. DISASTER MANAGEMENT

A natural disaster is a major adverse event resulting from natural processes of the Earth like floods, landslides tsunami, earthquakes etc. A natural disaster can cause loss of life or property damage, and typically leaves some economic damage in its wake, the severity of which depends on the affected population's resilience, or ability to recover.

Disaster mitigation measures is essential in planning process. Mitigation is the ongoing effort to lessen the impact disasters have on people and property. Mitigation involves keeping homes away from floodplains, engineering bridges to withstand earthquakes, creating and enforcing effective building codes to protect property from floods, landslides etc. It describes the ongoing effort at the central, state, local and individual levels to lessen the impact of disasters upon our families, homes, communities and economy.

Mitigation can take many forms. It can involve actions such as; Promoting sound land use planning based on known hazards, Relocating or elevating structures out of the floodplains, Developing, adopting, and enforcing effective building codes and standards, Engineering roads and bridges to withstand earthquakes and floods, Developing and implementing a plan in community to reduce your susceptibility to hazards etc.

20.2.1 Types of hazards

Even though there are areas in the district which are prone to landslides and earthquake, the susceptibility details laid down in District Disaster Management Plan for Thrissur–2015 shows that the city doesn't pose any threat in terms of these hazards.

Hazard Mapping

Hazard seasonality mapping of the district, prepared based on past trends, as provided in the District Disaster Management Plan for Thrissur, 2015 is shown in Table 20.1. The table provides information regarding the seasonal variation in respect of the occurrence of various hazards.

Table 20.1 Hazard seasonality of the district

Disaster	J	F	M	A	M	J	J	A	S	O	N	D
Earthquake												
Drought												
Fire												
Lightning												
Flood												

Source: District Disaster Management Plan for Thrissur, 2015
Source: NCESS

20.2.1.1 Heat wave

Heat wave as a hazard causing disaster scenario, is little more than the physical phenomenon of high heat conditions, and is characterized as a complex of hydro-climatic risks coupled with social, occupational and public health risks. Recently, several parts of India are experiencing severe heat waves. Urban areas and cities are the places which have higher temperatures than rural places. This phenomenon is referred to as "Urban Heat Island'.

Impact on livelihood

In case of Thrissur, where majority of individuals might be working in unorganized and informal sectors that have to earn their daily livelihood. Thus, on the advent of long spells of Heat Wave they either have to stay indoors and compromise their source of income or run the risk of succumbing to Heat Wave related illness upon continuing to work. This necessitates exploring alternate options for such kind of vulnerable population for income generation to sustain a healthy life.

- Impact on Agriculture

Apart from, impact on human life and health especially, the Heat Wave has also been found to profoundly affect crop production both in terms of quantity and quality. Primarily, crop loss is encountered due to water scarcity and higher mortality in new plantations. Conservation and expansion of green areas in and around cities could be an effective mitigation strategy to counter the effects of urban heat islands

20.2.1.2 Earthquake

Whole of Kerala lies in zone III, where the expected intensity is VIII in MM scale or 5.6 M in Richter scale. There are deep-seated fault lines along with many minor faults and fractures passing through the district which has caused minor earthquake events. And the destruction levels are limited to ground cracks and damages to buildings. According to Kerala State Disaster Management Plan Profile, 2015, higher seismic activity is observed along the Kottayam Idukki region and Thrissur Palakkad Region. Figure 20.2 shows major fault lines and earth quake events in Kerala.

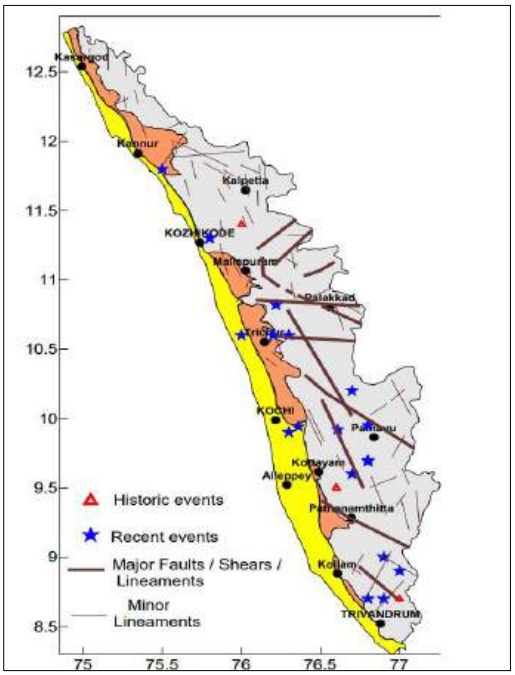


Figure 20.2: Map showing major fault lines and earthquake events in Kerala

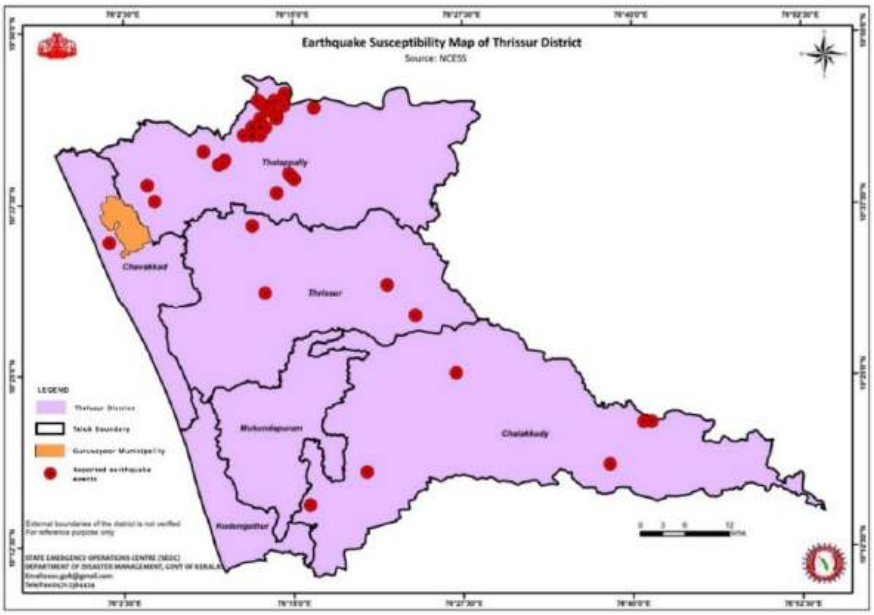


Figure 20.3 Earthquake Susceptibility Map of Thrissur District

Source: District Disaster Management Plan, 2015

Guruvayur Municipality has not reported any major earthquake events in the recent past. There has been earthquake incident close to the Municipality as well as within Thrissur district. Figure 20.3 shows the earthquake susceptibility map of Thrissur District.

20.2.1.3 Drought

Parts of the state of Kerala is affected by drought every year on a seasonal basis during the months of summer from March to May. Research shows that the occurrence of longer time scale droughts is becoming frequent in the recent decades over Kerala with the state witnessing one of the most distressing droughts in the year 2016 which imposed severe threat to both agriculture and hydrology. Drought affects the non-perennial rivers and it leads to lowering of the ground water table. Water scarcity in Kerala is determined by the changing rainfall patterns.

As per the District disaster Management Plan 2015, Thrissur district falls under the category of moderate drought area. Drought prone area map of Thrissur district is shown in figure 20.4.

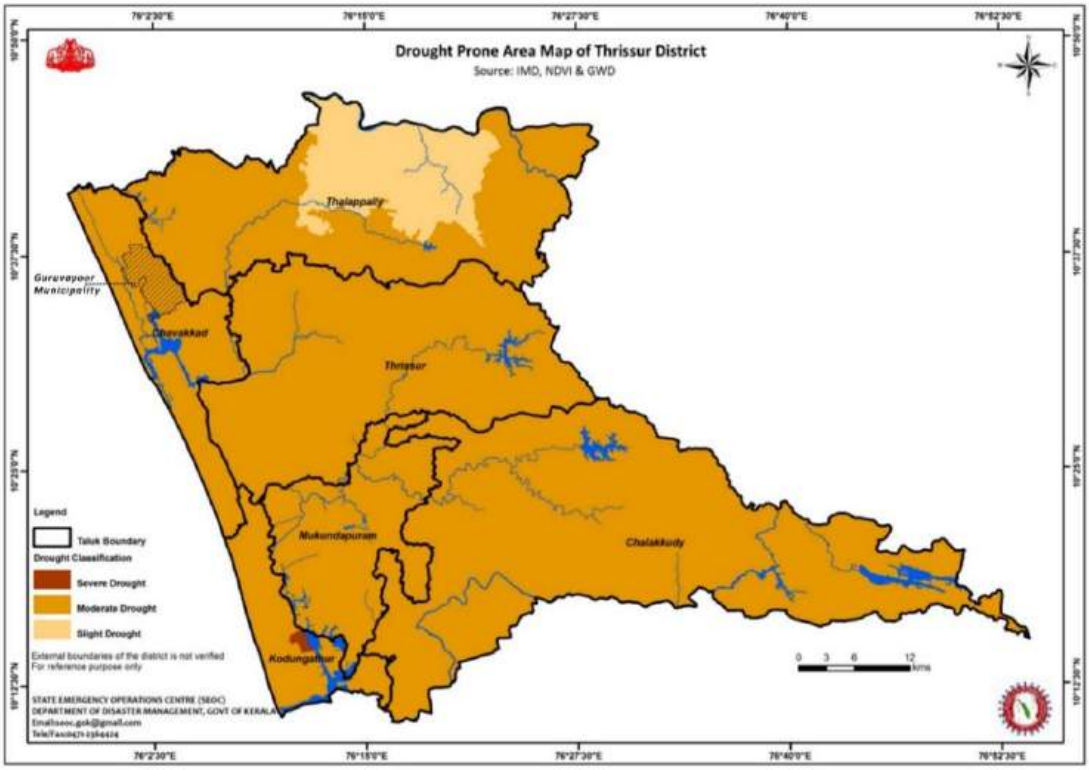


Figure 20.4 Drought prone area map of Thrissur district

Source: District Disaster Management Plan, 2015

As per the Drought - Situation Assessment Report by KSDMA 2017, regions of Guruvayur Municipality have moderate to high values of ground water departure. The use of

ground water by open/bore well is a major source of water for the people in town area. So, this alarming situation needs urgent action for ground water recharge measures.

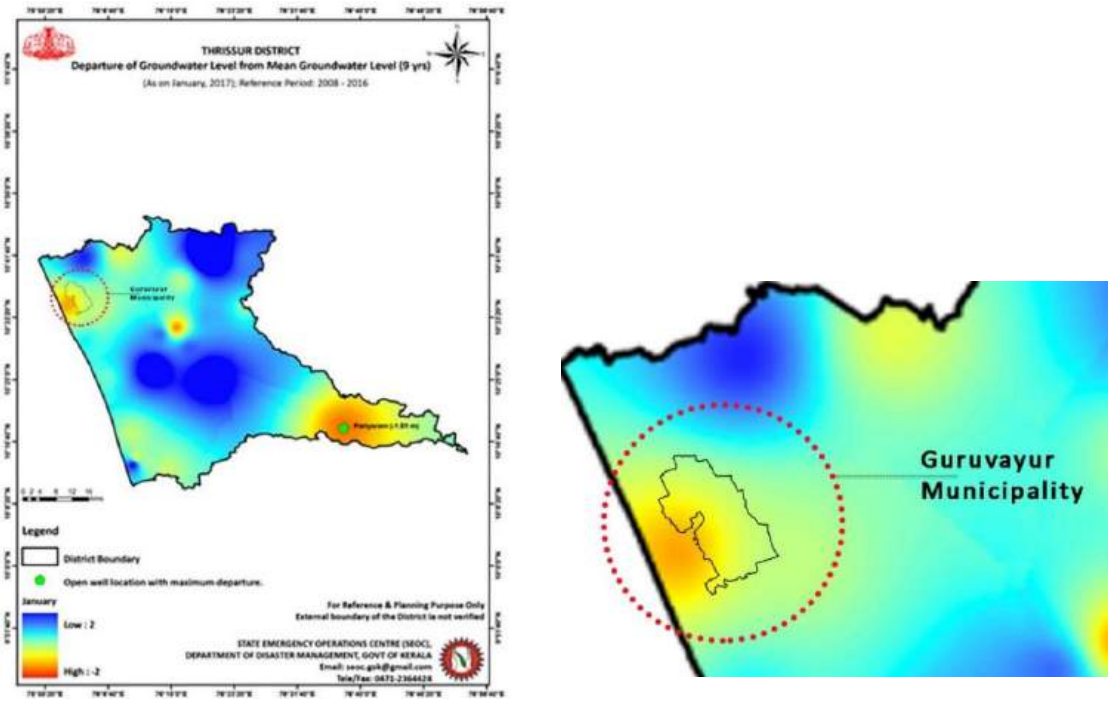


Figure 20.5 Departure of groundwater level from mean groundwater level

20.2.1.4 Lightning

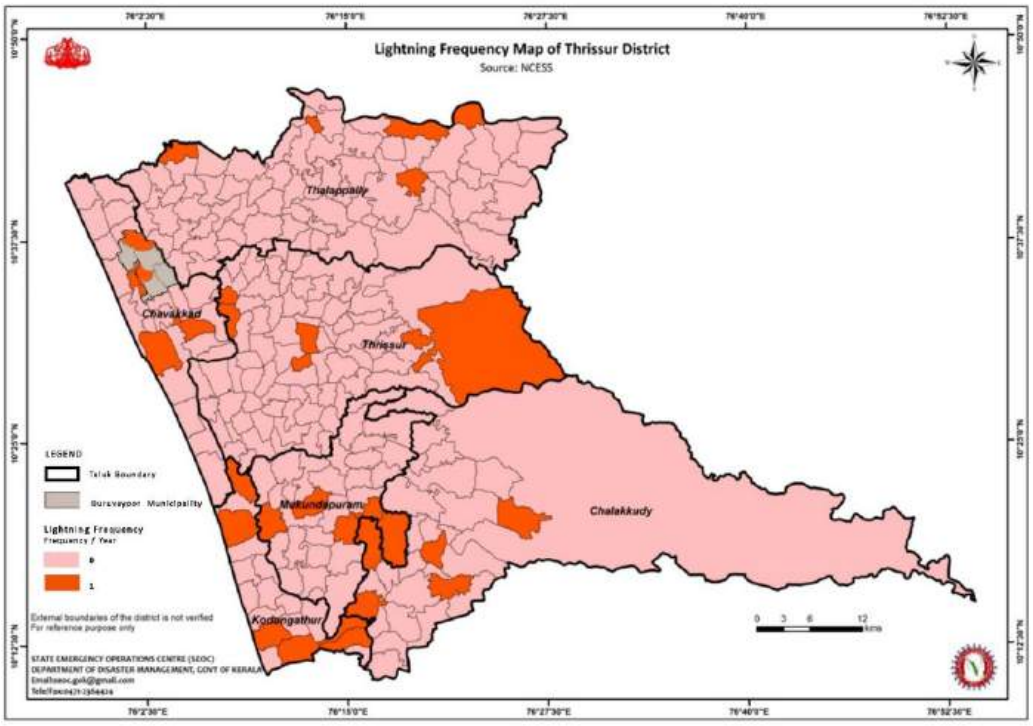


Figure 20.6 Lightning frequency map of Thrissur district

Kerala's typical topography favours frequent Cumulonimbus (Cb) cloud formation especially during the months of April-May and October-November. The lightning phenomena is observed majorly during the summer showers and the N-E monsoons in the state. The midland region of Kerala is prone to lightning Hazards. According to studies conducted, there has been on an average 71 deaths and 112 injuries due to lightning every year. Property damage due to lighting is also very high in the state. Lightning frequency map of Thrissur District and Guruvayur Municipality is shown in figure 20.6 and 20.7 respectively.

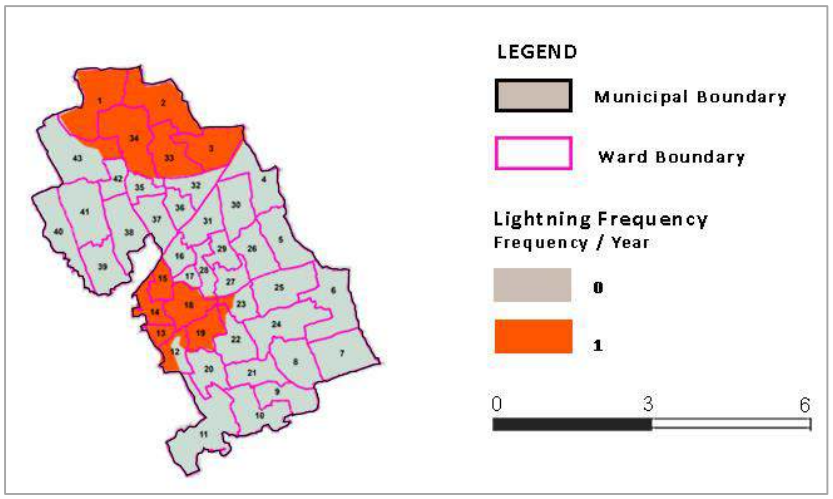


Figure 20.7 : Lightning frequency map of Guruvayur Municipality

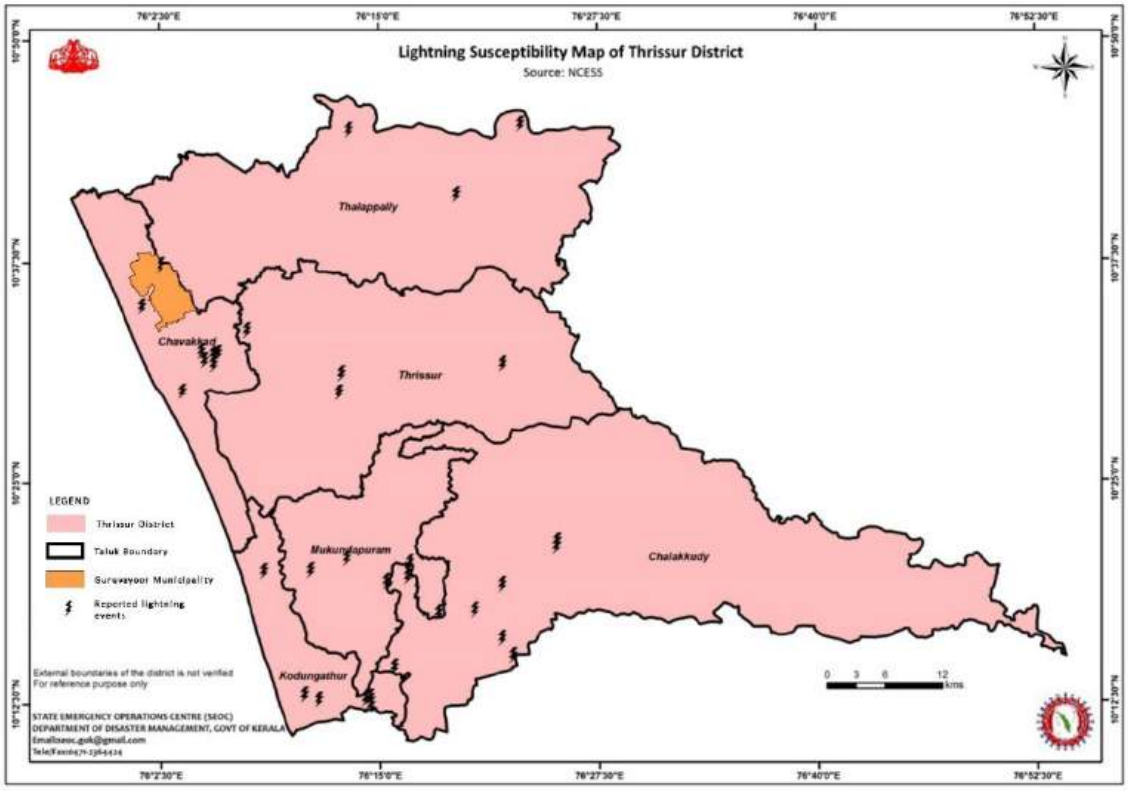


Figure 20.8 : Lightning susceptibility map of Thrissur district

Thrissur district is less prone to lightning occurrences. Guruvayur municipality has recorded only few cases of fatal/injurious lighting hazard incidents when compared to the other

regions in the state. Wards 1, 2, 3, 34, 33, 42,13, 14, 15, 18, 19, 12, 23 have a lightning frequency of one and the rest of the wards in Guruvayur municipality have a lightning frequency zero.

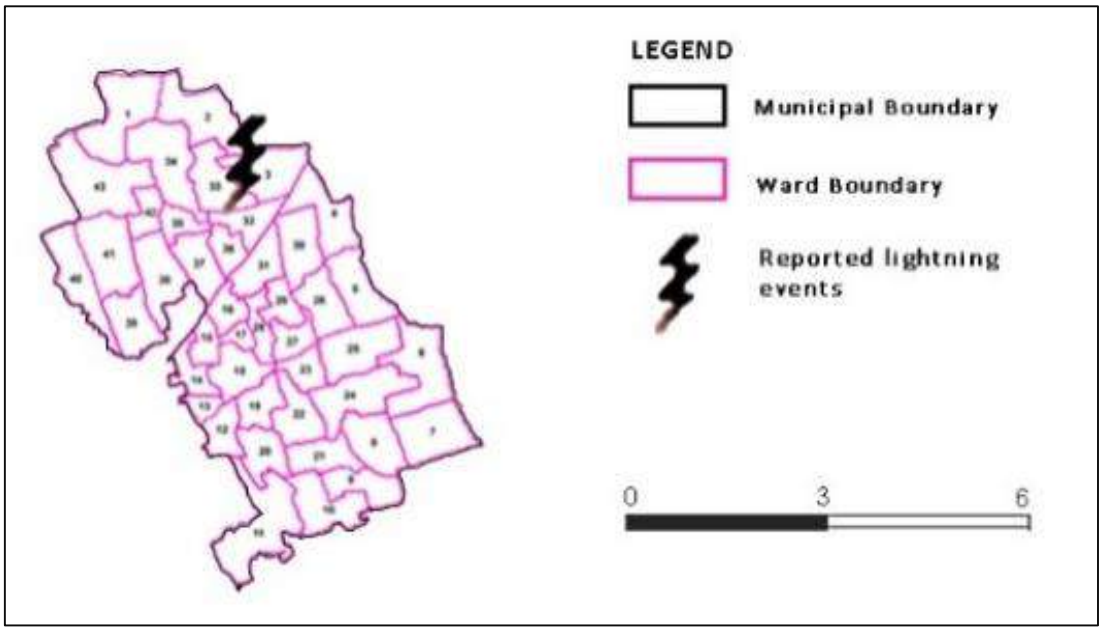


Figure 20.9 Lightning susceptibility map of Guruvayur Municipality

20.1.2.5 Festival Hazard

Kerala is a state where many festivals are celebrated every year. The state celebrates religious and cultural festivals with communal harmony. The district of Thrissur being the cultural capital of the state with many religious institutions, grand festivals are conducted every year with a massive population attending them from around the world.

Guruvayur is a popular pilgrimage centre in Kerala and Guruvayur Temple, being one of the most ancient temples in India is a famous tourist destination in the Municipality. Guruvayur Temple hosts several festivals throughout the year such as Janmashtami, Aarattu, Ekadesi, Chembai sangeetholsavam, Ulsavam. These festivals has huge nationwide participation and have a chance of becoming the hotspot for different kinds of festival hazards such as human stampedes, violent behaviour of elephants and fire work accidents.

There have been records of past incidents in Guruvayur that has led to human injuries due to havoc created by elephants during festival processions. Gathering of large crowd at a limited geographical area for short period of time and the diversity of crowd can create dangerous situations leading to such hazards.

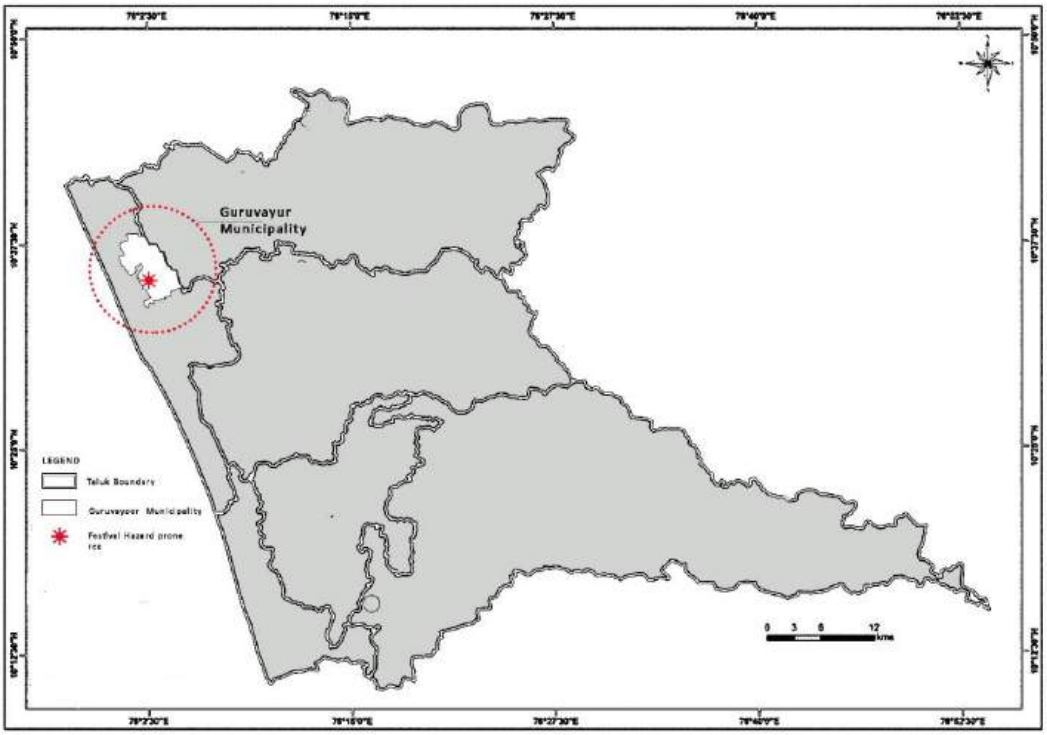


Figure 20.10 Festival hazard map of Guruvayur Municipality in Thrissur District

20.2.3 Flood

In Kerala, riverine flooding is a recurring event consequent to heavy or continuous rainfall exceeding the absorptive capacity of soil and flow capacity of streams and rivers. This causes a water course to overflow its banks onto flood plains; which by definition is a relatively flat land adjacent to a natural water course, composed primarily of unconsolidated depositional material derived from sediments transported by the related stream and subjected to periodic flooding. Reclamation and settlement in floodplain areas is a major cause of flood damage in Kerala. Defining the entire flood potential in a given area is a delicate task. Major flood events occurred in the state mainly during the years 1924, 1961, 2018 and 2019.

The 2018 floods were the most disastrous that cause severe damage and great extent of loss in Thrissur District. The floods and landslides destroyed city's private and public infrastructure including houses, roads, bridges, schools, health facilities, and other utility and production services. Flood Prone Areas in Thrissur district are mainly River Basins, Reservoir down streams and Kole lands. Certain mountainous areas of the district are prone to landslide & landslips and fall under zone IV of earthquake hazard areas. The district has a coastal line of 54kms, which is susceptible to coastal erosion, sea surges, cyclone and Tsunami.

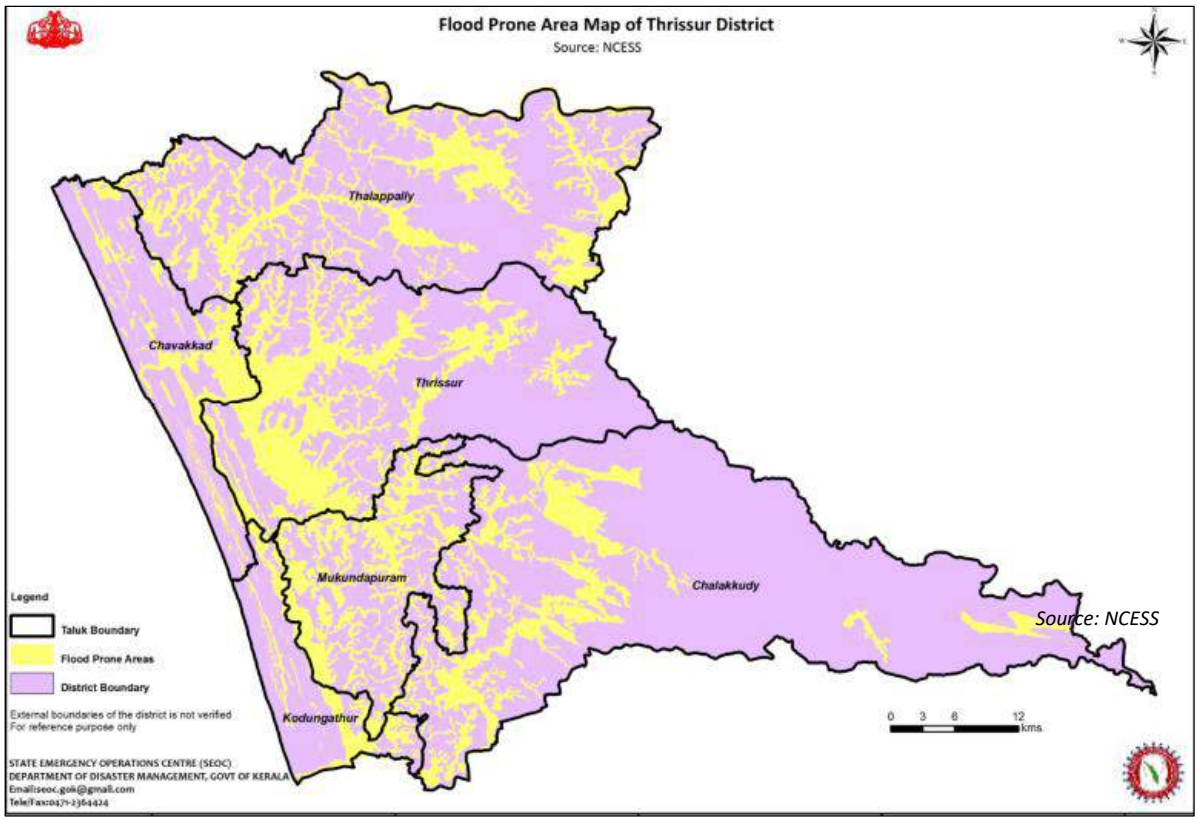


Fig. 20.11 Flood prone areas of Thrissur district

Flood prone area map of Thrissur district prepared by NCESS in 2015, for District Disaster Management Plan for Thrissur is shown in fig. 20.11. As per the report, nearly 688 sq.km area is flood prone. About 89.47 sq.km. area of Chavakkad taluk is flooded annually, i.e., 36.81% of the total area of the taluk.

One of the major disaster that has occurred in the recent past is the mega flood that happened during 2018 & 2019. Major analysis, finding and recommendation with reference to the district as well as the local body, as per the report on the Mega Flood 2018, prepared by District Town Planning Office Thrissur is briefly described below.

Mega Flood 2018 along with landslides caused several severe damages in Thrissur district including the death of 62 people. About 1,37,932 houses were affected. Among 256 villages in Thrissur district, 91 were severely affected and 140 were partially affected. The inflow of water from Peringalkuthu reservoir from Parambikulam and Upper Sholayar dam from Tamil Nadu Sholayar dam resulted in the overflow of Chalakudy River which was the root cause for flooding in Chalakudy taluk. Damage of Arattupuzha cheriyapalam bund and Illickal bund along the Karuvannur River caused flood in Mukundapuram and Thrissur taluk. Due to breach of the bund, water over flowed in the regions like Pullu, Manakkodi, Arimbur, Karuvannur, Urakam and Irinjalakuda.

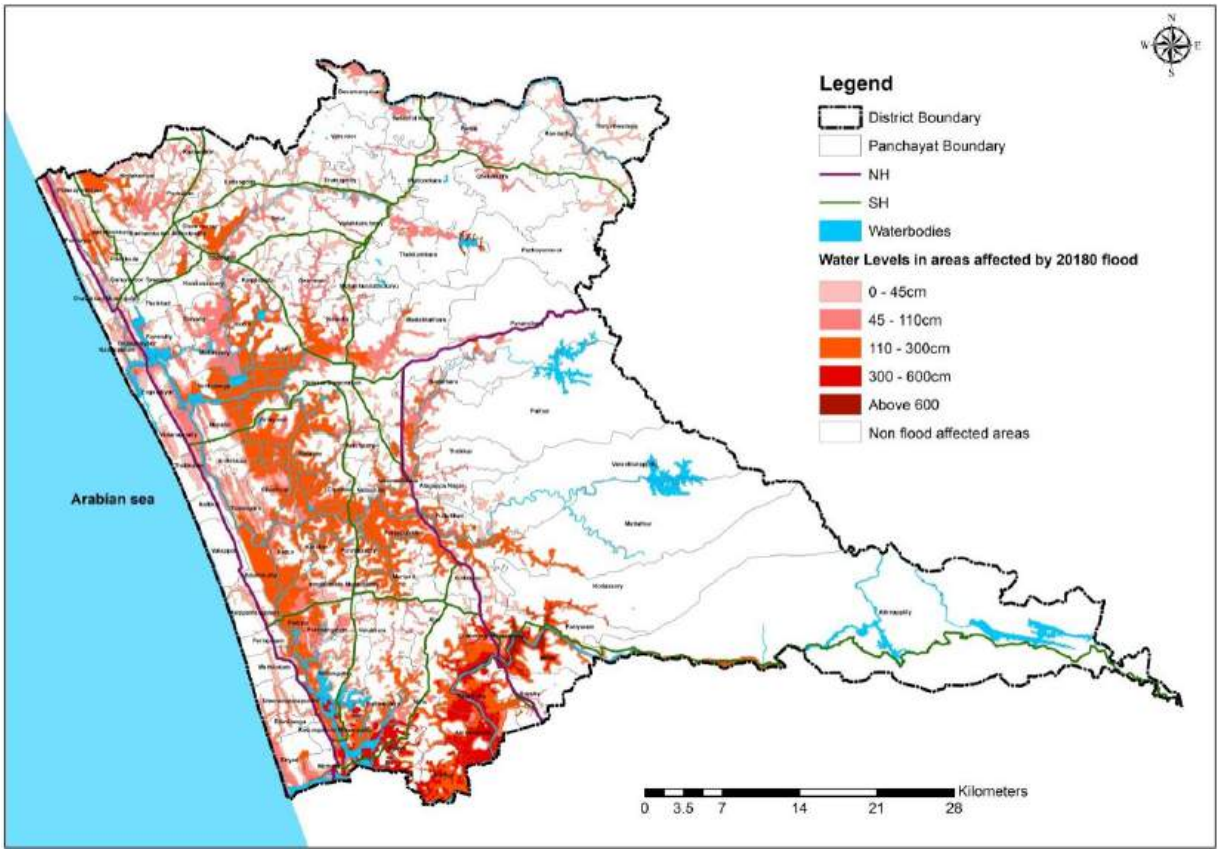


Fig. 20.12 Flood map of Thrissur 2018 (Source: 2018 flood report)

Nearly 25% of the total area of the district was affected by flood. The intensity of flood was severe in 2.5% of the total area. These were areas flooded beyond 3m depth. Chalakkudy, Kodungallur and some regions of Mukundapuram and Thalappilly taluks come under this category. Out of the total area of 3035sq.km. of the district, 751 sq.km area is affected from flood. Out of the total flooded area, 1% of the area is flooded beyond 6m depth. 9% of the flooded area is having an inundation depth of 3-6m. 40% of the flooded area is having an inundation depth of 1.1-3m. 29% of the flooded area is having an inundation depth of 0.45-1.1m. 22% of the flooded area flooded upto a height of 0.45 m.

Flood mapping of Thrissur district done as per the data of the mega flood of 2018 is given in fig. 20.12 and the village map representing the impact of the flood is given in fig. 20.13. From these maps, it can be seen that the areas near Chalakkudy River and Periyar river, Chalakkudy and Kodungallur Taluks are severely affected by the flood. These municipality areas having higher population are flooded to a height beyond 3m. Therefore the number of flood affected population as well as number of flood affected houses are found to be the maximum in these areas.

Even though the population is highest in Thrissur Municipal Corporation when compared to other local bodies in the district, the depth of inundation of the flood is found to be lesser in this area. Hence the severity of flood was less compared to other areas like Chalakkudy and Kodungallur. In certain areas with less population, flood was not severe but landslide issues were reported at these locations.

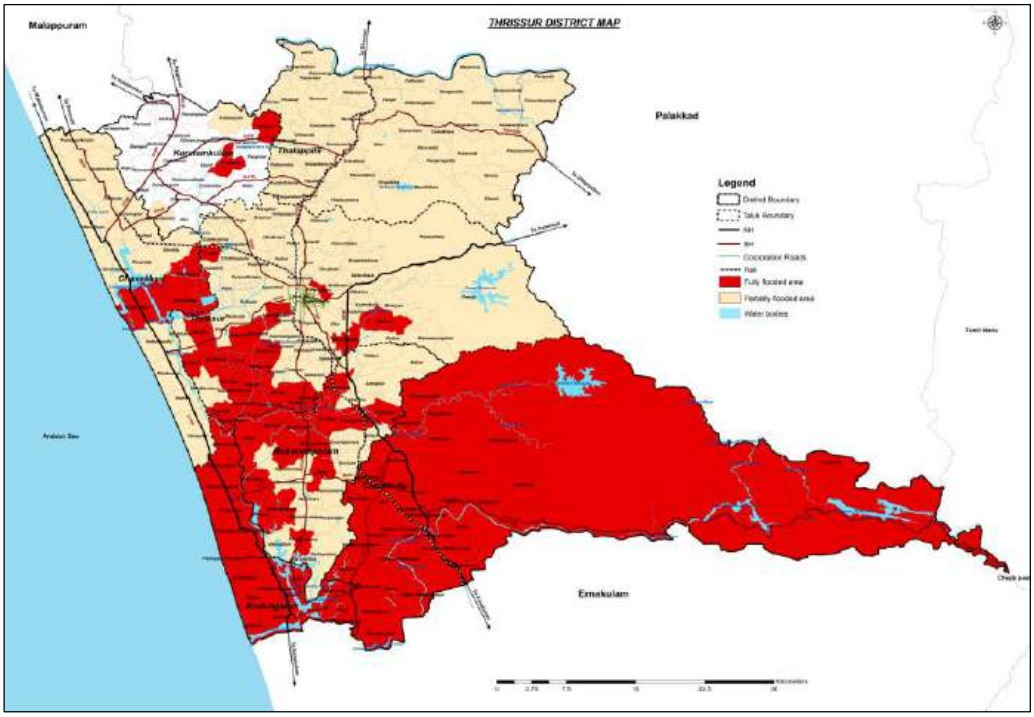


Fig. 20.13 Flood affected villages in Thrissur district ***(****Source: 2018 flood report)*

As per the Report on Modification startegy of the settlement pattern in the present flood context: Thrissur District 2018, 42% of the total area of Chavakkad taluk was affected from flood. Out of the flooded areas in Chavakkad taluk, nearly 32% of the area was flooded upto a height between 1.1-3m. 34% of the area was flooded at 0.45-1.1m. 31% of area was flooded upto 0.45m. Venkidangu, Mullassery areas in Chavakkad taluk were flooded due to overflow of Enammakkal bund. Chettuva in Engandiyur was also flooded severely.

Guruvayur municipal area and its surroundings have been prone to flooding and water logging during the previous decade. Guruvayur is characterised with a low depth of Ground water table. Also conversion of the low lying lands has created a deficiency in water holding structures in the area. Floods happen during the occurrence of sudden heavy downpours combined with the effect of high tide in the Chakkamkandam backwater. Many areas in the town was inundated during the flood event in 2018.

❖ **Hazard Risk Assessment for Guruvayur Municipality**

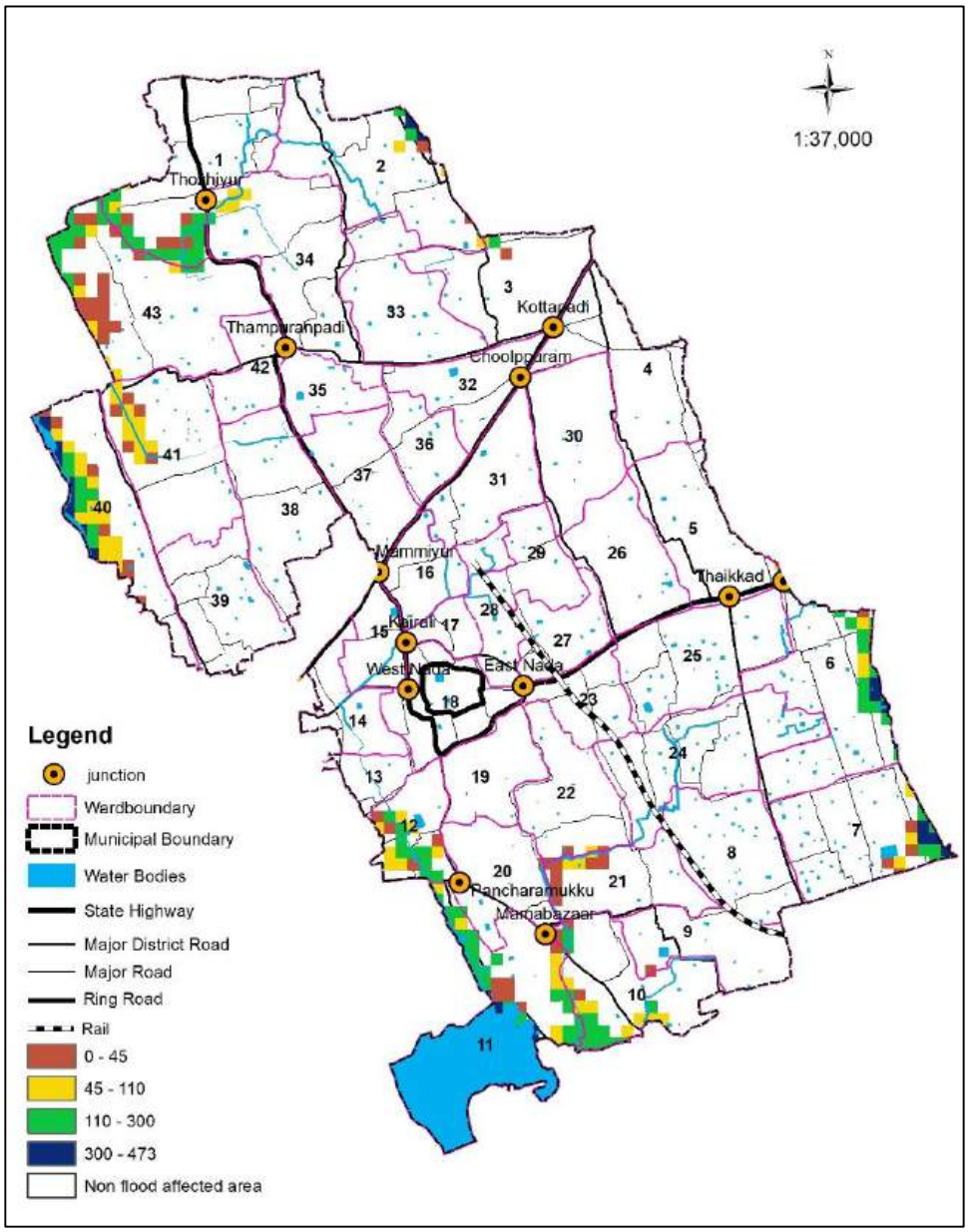


Fig. 20.14 Flood return probability map (50 years) based on historic data

Source: Kerala State Disaster Management Authority

Integrating risk information with land use planning is expected to reduce impact of hazards on life, property, and environment in a community. This risk information for Guruvayur municipality is assessed using Hazard risk matrix which is obtained through evaluation for many variables. The hazard matrix for flood is obtained by combining hazard impact and hazard vulnerability in the municipality. For the analysis Flood Hazard Probability of Kerala based on Historic Data prepared by Kerala State Disaster management Authority is adopted. The flood return probability map of Guruvayur municipality is shown in figure 20.14.

Hazard Impact in Guruvayur Municipality

The impact of flood is analysed by taking into consideration the flood inundation levels, hazard return probability and duration of hazard in the Guruvayur municipality area. Hazard impact rating map of Guruvayur municipality is shown in figure 20.15.

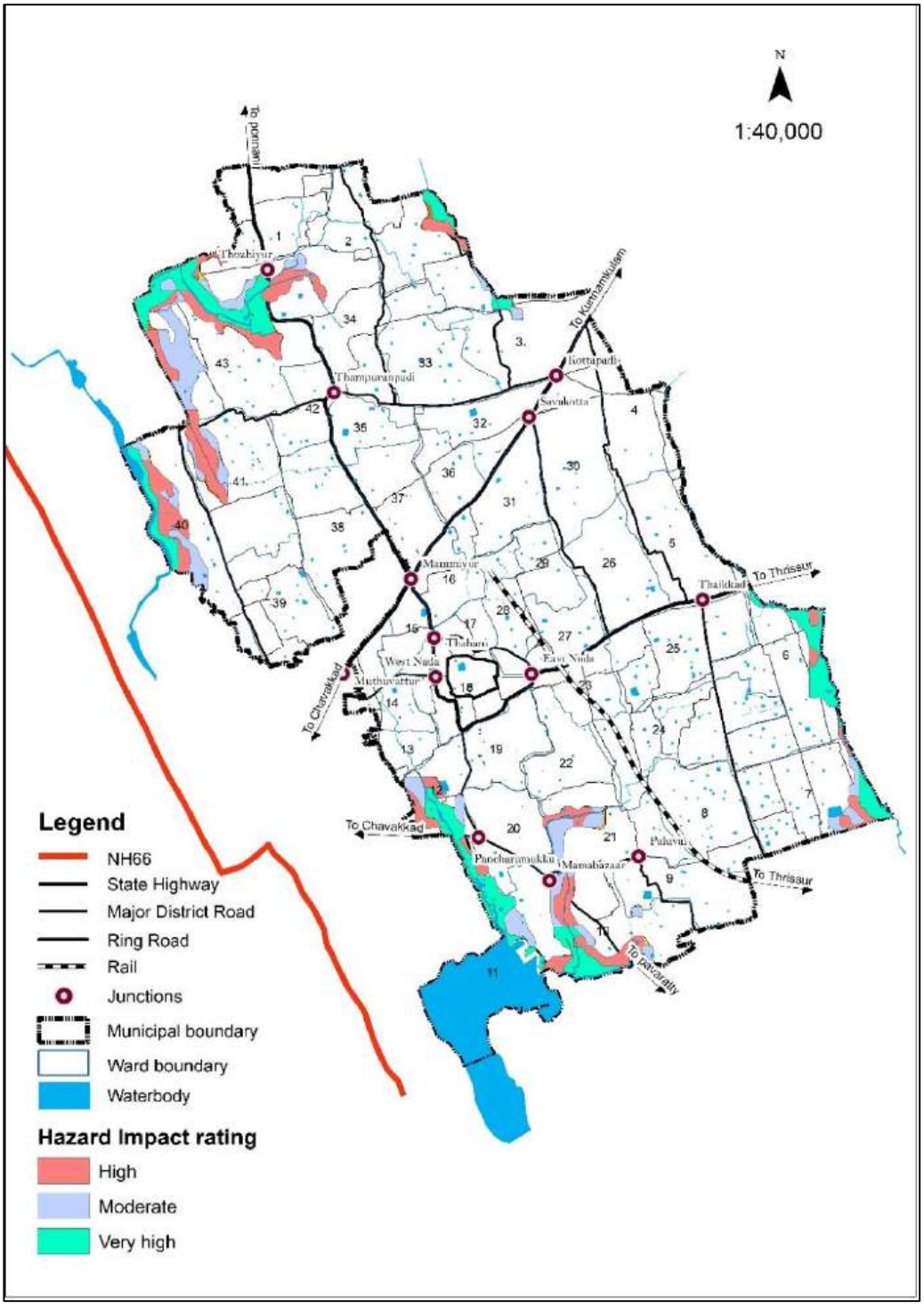
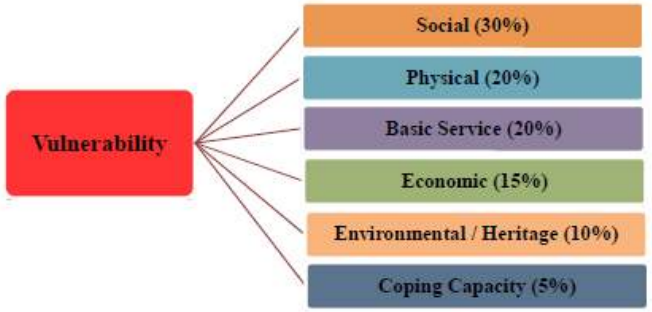


Fig. 20.15 Flood hazard impact map of Guruvayur municipality

Hazard Vulnerability in Guruvayur Municipality

Hazard vulnerability is analysed by considering certain parameters. The parameters that contribute social, physical, basic services, economic, environment/ heritage and coping capacity. Each parameter should be considered according to their weightage. Ward wise hazard vulnerability rating is shown in figure 20.16.



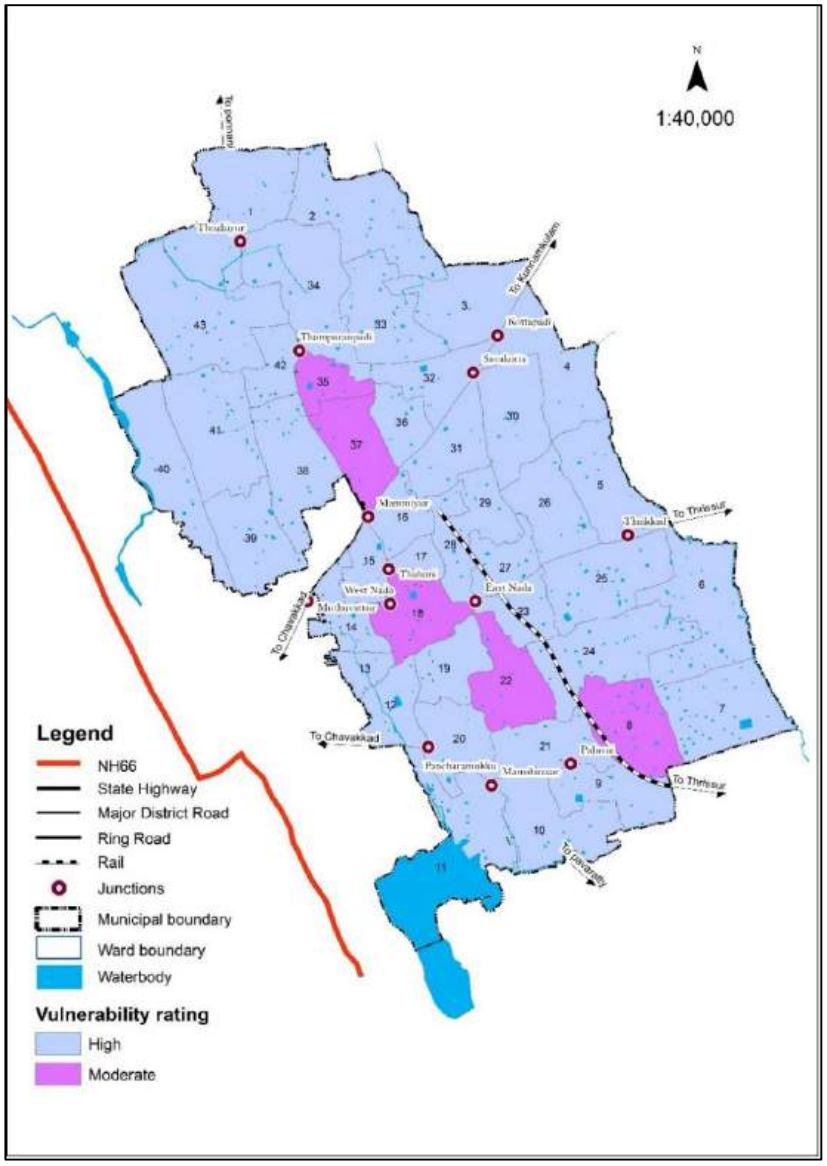


Fig. 20.16 Ward wise hazard vulnerability map of Guruvayur municipality

- ***Social vulnerability***

Vulnerability of population, socially backward population, economically backward population, children, senior citizens, transgenders etc are analysed and it can be seen that more than 80% of the population in ward 11 is likely to be affected by flood while 20-50 % population is likely to be affected by the hazard in wards 1,10,12,21, 40,41,43.

The spatial distribution of residential land use is scattered in the town area. Flood prone areas were found majorly in parts of wards 6, 7, 11, 40 & 43.

As per the Urban - Post Flood Daily status as on 01 Sept 2018, 1024 houses were affected in the 2018 flood. The low-income group colonies and other residential colonies are included in the identified flood affected residential areas and they need special care during the occurrences of any future hazard. These flood prone areas are identified as vulnerable settlements within the municipality. These settlements are close to the water bodies in the corresponding area. Figure 20.17 shows the flood prone areas with residential land use.

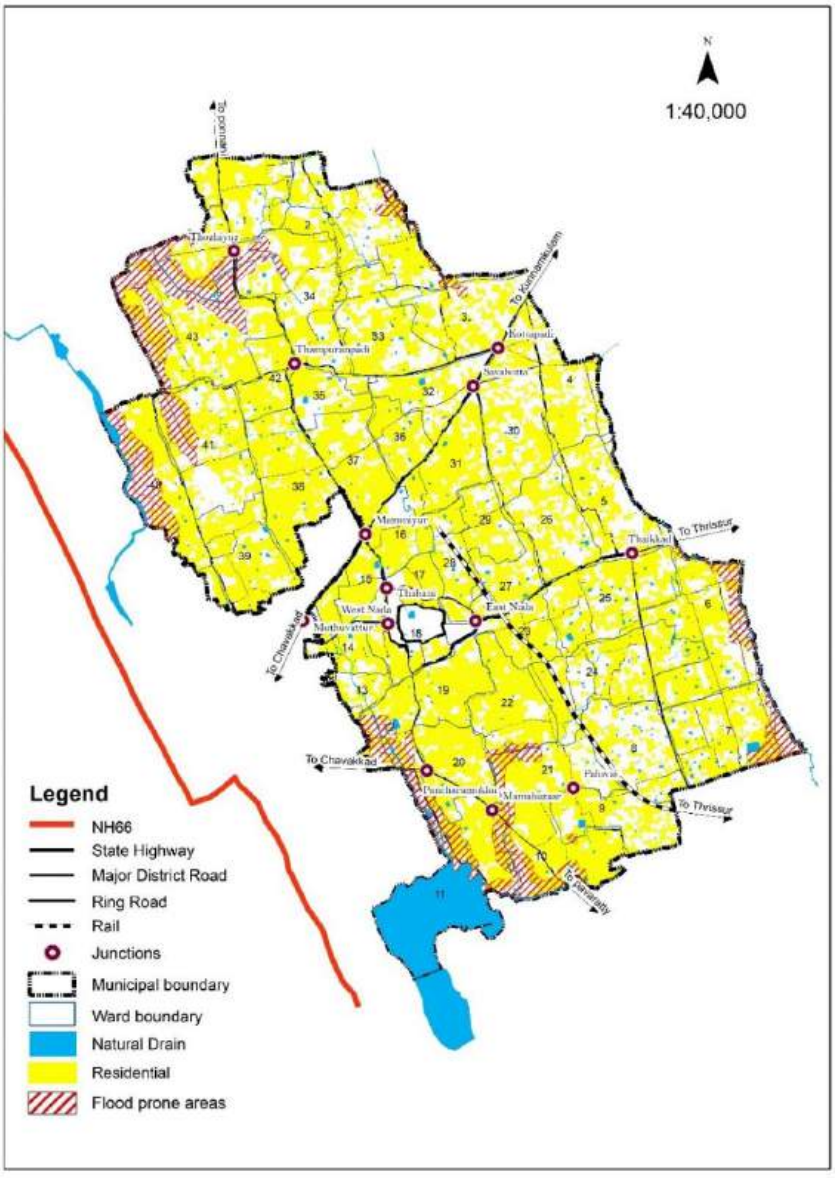


Fig.20.17 Flood prone areas with residential land use

- ***Physical Vulnerability***

Vulnerability of buildings, Transportation and land cover in the municipality region is thoroughly analysed and it is observed that most of the buildings in the wards of Guruvayur

municipality is pucca with some semi pucca and very few kutcha buildings. Hence the chances of destruction of buildings due to flood is low throughout the municipality.

Railways have nearly zero chance of being affected by the hazard but more than 50% of roads are likely to be affected in wards 11 and 12 and 20-30% of roads are likely to be affected in wards 21,40,41 and 43.

- **Basic services**

Social infrastructure such as Hospitals, Schools, Community Halls, Police Station, Fire Station, Village Office, LSG office, Pumping stations, Treatment plants, Electric sub stations, Transformers etc that are likely to be affected in each ward is analysed and it is seen that more than 50 % of these basic amenities are likely to be affected in wards 6,7and 11. Basic services in wards 1,2,10,12 also have more than 25% probability of getting affected by the hazard and hence planning must be done such that the day to day activities of citizens does not get halted during such events of flood in the municipality.

The sanitation system in all wards within the Guruvayur municipality is septic tanks and hence have a very high chance of getting affected by floods. Also, the water table being high in the region poses a threat to contamination of drinking water in wells and ponds during the event of floods.

- **Economic vulnerability**

A majority of the population within the Guruvayur municipality is employed in informal sector, daily wages, local level economic sector or agriculture sector. Flood Hazards can cause economic damage and as a result affect the livelihood of people. More than 90% of economic activities such as Tourism, Commercial, Industrial, Agriculture, Fisheries, Animal Husbandry etc. are vulnerable to damage or disruption in the event of flood in ward 11 while the chances of being affected by it is 20-60 % in wards 1,2,10 and 12.

- **Environmental and heritage factors**

The Chakkamkandam backwaters in ward 11 of the municipality comes under CRZ and is a ecologically sensitive area which is highly vulnerable to Flood hazards. The mangrove forest in the chakkamkandam backwaters is also a tourist attraction and livelihood of a large percentage of population in ward 11 depends on it.

- **Coping capacity**

Coping capacity of Guruvayur Municipality is measured by analysing the different actions that has been taken as a part of disaster mitigation such as Updating of Local Disaster Management Plan, Constitution of Steering Committee, Constitution of Emergency Response Team , Formulation of Evacuation Plan and Disaster Risk Reduction activities in the region.

Flood Risk Map

The Flood Hazard risk Map is shown in figure 20.18 and it indicates the high risk and moderately risk zones in Guruvayur municipality. The map is obtained by combining the intensity of vulnerability factors and hazard impact factors for flood hazard in the study area.

Table 20.2 Risk Matrix

			Hazard Impact			
			Low	Moderate	High	Very High
			0 - 2.5	*2.5-5*	*5-7.5*	*7.5-10*
Vulnerability	Low	*0- 25*	L1	L2	M3	M4
	Moderate	*26 - 50*	L2	M3	M4	H5
	High	*51 - 75*	M3	M4	H5	H6
	Very High	*76 - 100*	M4	H5	H6	VH7

Majority of the flood impact zones belong to high-risk category and they are located in close proximity to water bodies. Guruvayur municipal area and its surroundings have been prone to flooding and water logging during the previous decade. Guruvayur is characterised with a low depth of Ground water table. Also conversion of the low lying lands has created a deficiency in water holding structures in the area. Floods happen during the occurrence of sudden heavy downpours combined with the effect of high tide in the Chakkamkandam backwater. Many areas in the town was inundated during the flood event in 2018. The areas affected during 2018 flood are western part of ward 40 along Canoli canal, north eastern part of ward 2, eastern part of wards 6 and 7, and Chakkamkandam kayal in ward 11. Most of the flood probability areas are along water bodies and paddy areas.

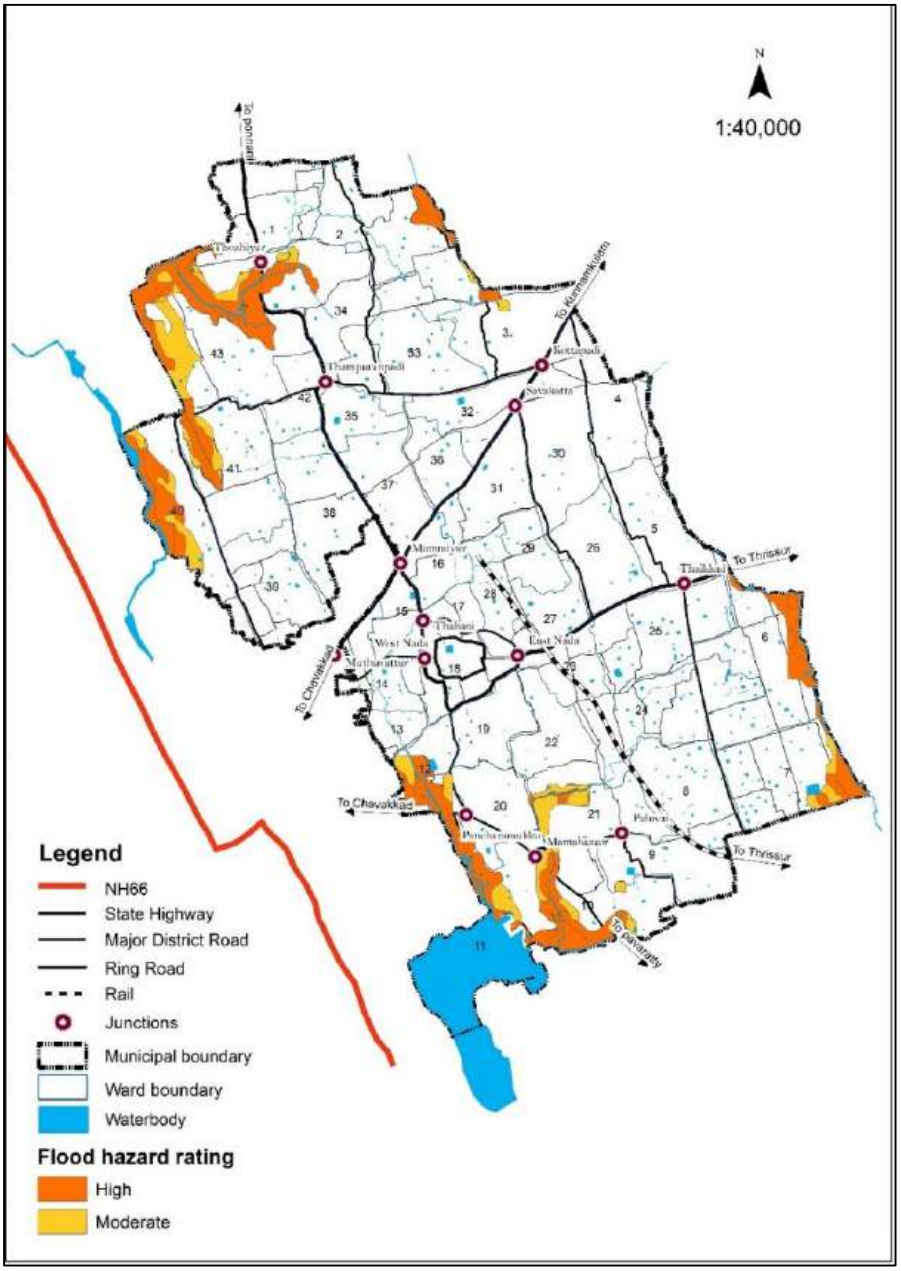


Figure 20.18 Flood Hazard zonation Map of Guruvayur Municipality

❖ ***Integrated Land use analysis***

The areas identified as clusters are near water bodies. Valiyathodu was the major water body within Guruvayur Municipality. It has become a source of waste water from hotels, restaurants etc. within the town discharging into the backwater. Also the encroachment on both sides of the Valiyathodu made it narrower. Widening and deepening water body is important to protect the area from flood. Pre monsoon desilting in canals, use of permeable paving materials in canals, rain water harvesting, ground water recharging etc. can be encouraged in the municipality to avoid water logging. Figure 20.19 shows the Flood Hazard zonation Map of Guruvayur Municipality overlaid with land use.

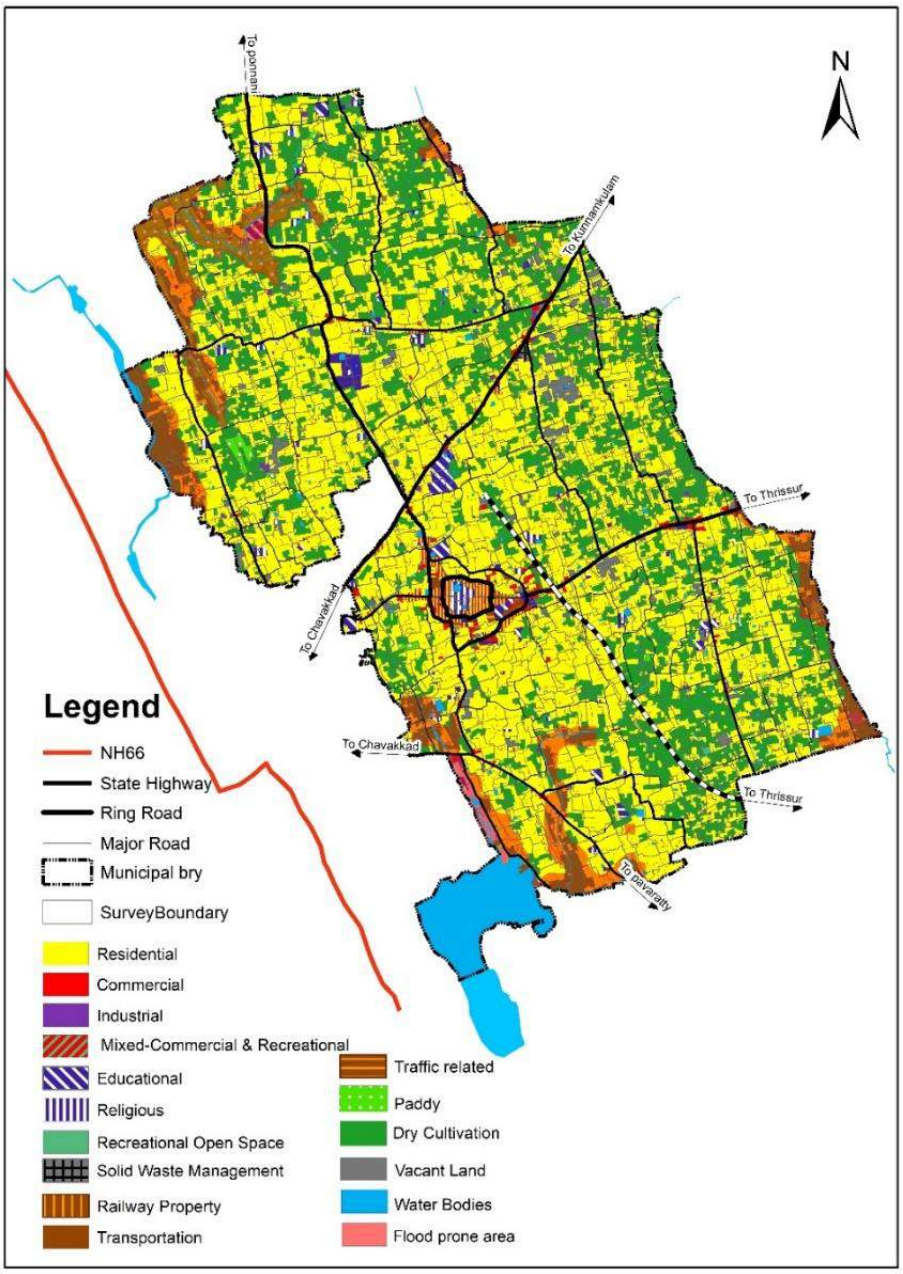


Figure 20.19 Flood Hazard zonation Map of Guruvayur Municipality overlapped with land use

❖ ***Hazard zone Vs Distribution of infrastructures***

The different available infrastructure facilities in town are plotted with the hazard zone to identify the availability of these facilities in a future possible flood event and the inter-connectivity of the available facilities. It is shown in the figure. Junctions and road stretches in SH49, SH62, major district roads like Perakam road, Chavakkad-Pavaratty road etc were inundated during the flooding in 2018. Rescue camps were made available in the nearby public institutions like church halls, madrassas, schools etc. Figure 20.20 shows flood prone areas with critical infrastructures.

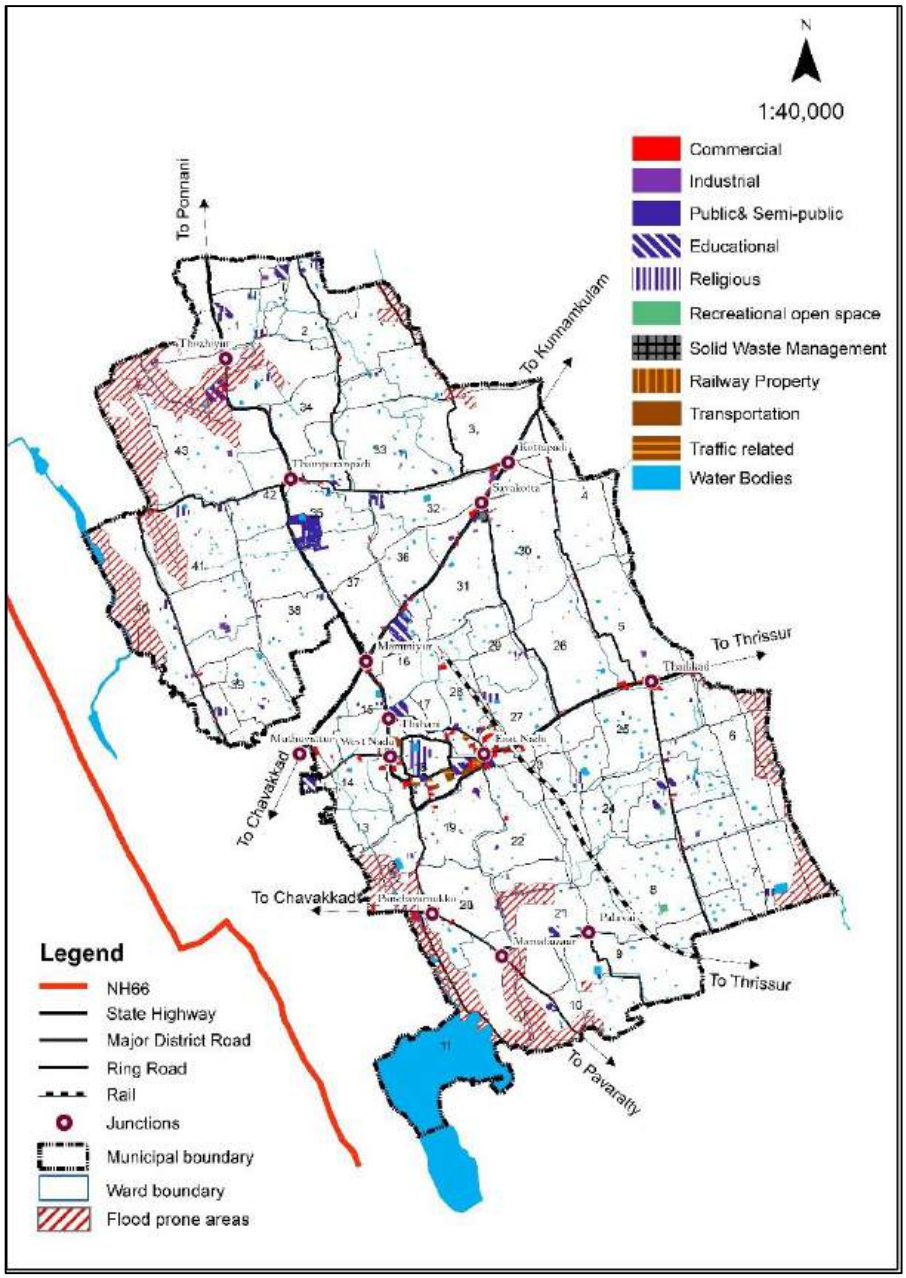


Figure 20.20 Flood prone areas with critical infrastructures

Possible flood rescue routes and relief camps, health institutions can be identified from these rescue related infrastructures.

20.3 INFERENCE

Environmental protection is very important for a healthy living. Air, water and land have to be protected from pollutants. We have to fight to preserve the world's species, resources and the beautiful diversity of nature.

Disaster management, on the other hand, is of greater importance for the protection of environment and its inhabitants. Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities. Despite the growing understanding and

acceptance of the importance of disaster risk reduction and increased disaster response capacities, disasters and in particular the management and reduction of risk continue to pose a challenge. Local body level vulnerability assessment as well as disaster management action plan has to be formulated and reviewed periodically for the effective preparedness, management and mitigation of disasters. Flood hazard risk zones identified in the municipality are near the water bodies and when considering the risk management and mitigation measures, all the risk zones should be given priority with respect to the scale of risk identified. Also, the risk of heat waves can be tackled with green city proposals and pocket forests etc.

CHAPTER 21

DEVELOPMENT ADMINISTRATION AND FINANCE

Municipal governance is an effort towards planned transformation of economy involving not only the sphere of administration but also formulation of policies that society needs. In this chapter an attempt is made to describe the development administration and finance of Guruvayur municipal council within the available data.

21.1 Development Administration

Municipalities are the urban local governments that deal with civic functions and local development functions in the municipal area. The 74th constitutional amendment provided for a national frame work for municipal governance in the country and state has been following that pattern since 1994. The Kerala Municipality Act 1994, enacted as per the constitutional amendment, govern the pattern, functions and services of the municipalities in Kerala. The 74th constitutional amendment resulted in the increased role for municipalities in every state in India, where they have been provided to be great contributors to the social and economic development of the country, they are the level of government that is closest to the citizens.

The functions of municipalities are enlisted as schedule appended to Kerala Municipality Act. The function can be divided into civic function and development function in area of agriculture, industry, health, education, infrastructure etc. Governance plays an important role in the implementation and execution of these development functions. Hence efficient municipal governance is an indicator of how the development activities are actually implemented in the local body.

21.1.1 Objectives of Administration

The main objectives of administration are;

- Application of innovative strategies for development.
- Emphasis on development at the grassroots level. Development has to be a need-oriented and self-reliant process.
- Stress on social development and human capital as a major resource.
- Development has to be viewed not merely as a technological problem but also as an ideological norm.
- Profound and rapid change in order to establish a distinct and just social order.
- Recognising and highlighting the unity, rather than dichotomy between politics and administration.

- Effective and efficient use of scarce resources.
- Creation of a politics-administrative environment which is oriented towards securing basic needs of the population.
- Freedom of administrative machinery to express its values and beliefs.

21.2. Organisation structure of Municipality

The structure of the municipality consists of two wings, i.e. the administrative wing and the executive wing. The administrative wing is headed by Chairperson and consists of the council members. The executive wing is headed by Secretary and consists of revenue, health, accounts, general, engineering and town planning department. Organizational structure in Guruvayur Municipality is shown in figure 21.1

21.2.1 Administrative Wing

The municipal council, the political arm of the municipality consists of 43 elected councilors, each representing a division. The chairperson (elected from among the councilors) heads the municipal council, which performs its duties as per the provisions of the Kerala Municipalities Act 1994. The political wing provides an overall direction to the municipality and performs its functions through a set of committees constituted for different purposes.



Fig 21.1:Organisation structure in Guruvayur Muncipality.

21.2.2 Executive Wing

The executive wing is responsible for day-to-day operations of the municipality, and is headed by the Municipal Secretary. Secretary is the administrative head of the municipality and is supported mainly by five departments in the operations. The organizational structure of the municipality comprises of five functional departments. The function of clerical staff dealing

under each department/ section of the Municipality is coded for the sake of work allocation and standardization. Various departments under the ULB share the responsibility of service delivery within the Municipality. The functions of various officials/departments, under the Administrative wing, are elucidated here under:

(i) Secretary: The Secretary is at the apex of this structure and is responsible for all activities carried out by the ULB. The Secretary is responsible for preparation and certification of all periodical records, returns and furnishes all information as may from time to time be required by the Municipal Council or the Standing committees. He is also responsible for preparation of accounts. At each general meeting, the Secretary along with some other key officials, discuss various issues with the elected representatives.

(ii) General Administration Department: The department is headed by the Secretary and assisted by Superintendents and other officers. This department is responsible for establishment, other essential matters relating to office, officers, staff and their welfare like preparation of staff pay bills, maintenance of registers for advances, GPF, pension, PF's etc.

(iii) Engineering Department: The Municipal Engineer heads the engineering department, and is assisted by Assistant Executive Engineer, Assistant Engineer and other staff. With regards to fieldwork, Scheme works are delegated to one Assistant Engineer who also looks after regular works, related to Public Works, Drains, Street Lighting. A major function of the Municipality is formulation and execution of Works- like construction and maintenance of roads, buildings and other infrastructure systems. Another major function of this department is issue of building license, preparation and implementation of development plans and eviction of encroachments, urban planning and building regulation.

(iv) Revenue and Accounts Department: The department is headed by the Revenue Inspector and assisted by junior assistant. The Accounts Section is responsible for supervising all financial transactions related to the Municipality, advising the Revenue Officers on all internal financial matters, updating financial receipts and expenditure details in accordance with the utilization of funds, reporting deviations in expenditure of funds in any of the allocated schemes, assisting preparation of the Municipality budget, maintenance of accounts regarding stamp duty, SFC Grants, MP,MLA Grants, maintenance of petty cash book and general cash book and attending to audit requirements and other such accounts-related duties. Revenue Officer, heading the Revenue Section, is responsible for collecting taxes such as, trade tax, house tax, advertisement tax, and entertainment tax; development

charges; transfer of properties collection of duty; issuing notices for recoveryof tax; and monitoring revenue collections of the ULB.

(v) Public Health Department: The department is headed by Health Officer, and is responsible for ULB services such as Solid waste management, public health related works like malaria control, family planning, mother and child health care, birth and death registration etc, and other government assisted programs related to health and poverty reduction and awareness programs. The Health Officer assisted by the Health supervisor and Health Inspectors, Junior Health Inspectors and Junior Public Health Nurse. Junior Public Health Nurse Supervisors are in-charge of works execution at the field level, which includes monitoring and supervising the work of sanitary labourers in the wards under their charge and attending to specific local complaints. Besides, this department is responsible for the enforcement of the Public Health Act. The Public Health Department is vested with the responsibility of ensuring safe sanitation and cleanliness of the town.

The department is also responsible for the maintenance of Municipal Dispensaries, Burial Grounds and slaughter houses. One of the most crucial services of the municipality is maintenance of sanitation and cleanliness in the town. This involves mainly conservancy works involving sweeping of roads, garbage collection and disposal, cleaning of drains, and disinfecting of drains. The details of staff in Guruvayur Municipality are shown in Table 21.1.

Table 21.1 Details of staff in Guruvayur Municipality

Designation	Sanctioned	Existing
Administrative wing		
Chairperson	1	1
Vice Chairman	1	1
Standing Committee Chairpersons	5	5
Total Number of Councilors	43	43
Executive wing		
Secretary	01	01
Asst. Engineer Executive	01	01
Assistant Engineer	02	02
Overseer	2-Ist Gr,3-IInd Gr, 5-IIIrd Gr	2-Ist Gr,2-IInd Gr,2- IIIrd Gr
RO	I	I
Supdnt.	4	4
RI	2	2
Senior clerk	12	12
LDC	14+3 (S.Num)	11+3 (S.Num)
Typist	2	2
Office Asst.	8	8
Chainman	2	2

Night watchman		
Librarian	1	1
LDV Driver	3	0
HS	1	1
HI-I	2	2
HI- II	2	2
JHI- I	3	2
JHI-II	6	2
JPHN	1	0
Nursery Teacher	1	1
Aaya	1	1

Source: Guruvayur Municipality

21.3 Municipal Finance

The major source of income for urban local self-governments is the property tax levied on the buildings in the municipality. This source has immense potential, but is not being tapped to the full extent at present. Irrational rates, reductions given due to various non-financial reasons, tax evasion, leakages in collection system and improper records keeping and monitoring are some of the problems faced by revenue generation through property taxes. Another source of own revenue for the municipality is entertainment tax. Municipal finance is divided into two i) Revenue Account and ii) Capital Account. Table 21.2 shows the summary of municipal finance in Guruvayur Municipality from 2015 to 2019.

21.3.1 Revenue Account

The revenue account comprises of two components, revenue income and revenue expenditure. Revenue income comprises of internal resources in the form of tax and non-tax items and external resources in the form of shared taxes/ transfers and revenue grants from the State Government. Revenue expenditure includes mainly Establishment expenses, Administrative expenses, Operation and Maintenance, Programme expenses, other liabilities, unsecured loans etc.

21.3.2 Capital Account

The account is subdivided into capital income and capital expenditure. Capital income items include loans, contributions by Government, other agencies and capital grants under various State and Central Government programs, revenue account transfer for capital works and income from sale of assets. Capital expenditure includes the expenditure incurred for public works like water supply, drainage and roads. Table 21.3 shows the temporal variation of total income and expenditure in revenue and capital account. Figure 21.2 shows the growth in income and expenditure.

Table 21.2 Summary of Municipal Finance

Item	2015-2016	2016-2017	2017-2018	2018-2019
Revenue Account (Rs. In Lakhs)				
Revenue Income	1043.8	1163.2	2980.4	3308.4
Revenue Expenditure	1339.2	1556.2	2237.8	2112.7
Gross/Surplus Deficit	-295.4	-392.9	742.5	1195.7
Capital Account (Rs. In Lakhs)				
Capital Income	1188.2	1584.9	1345.2	8380.2
Capital Expenditure	1146.7	1005.7	2195.8	8717.5
Gross/Surplus Deficit	41.5	579.2	-850.5	-337.3
Total Income	**2232.1**	**2748.2**	**4325.6**	**11688.7**
Total Expenditure	**2486.0**	**2561.9**	**4433.6**	**10830.3**

Source: Guruvayur Municipality

Table 21.3 Temporal variation of total income and expenditure

Year	Total Income (Rs. In Lakhs)	Total Expenditure (Rs. In Lakhs)	Growth in income	Growth in expenditure
2015-2016	**2232.1**	**2486.0**		
2016-2017	**2748.2**	**2561.9**	23.12	3.05
2017-2018	**4325.6**	**4433.6**	57.39	73.05
2018-2019	**11688.7**	**10830.3**	170.21	144.27

Source: Guruvayur Municipality

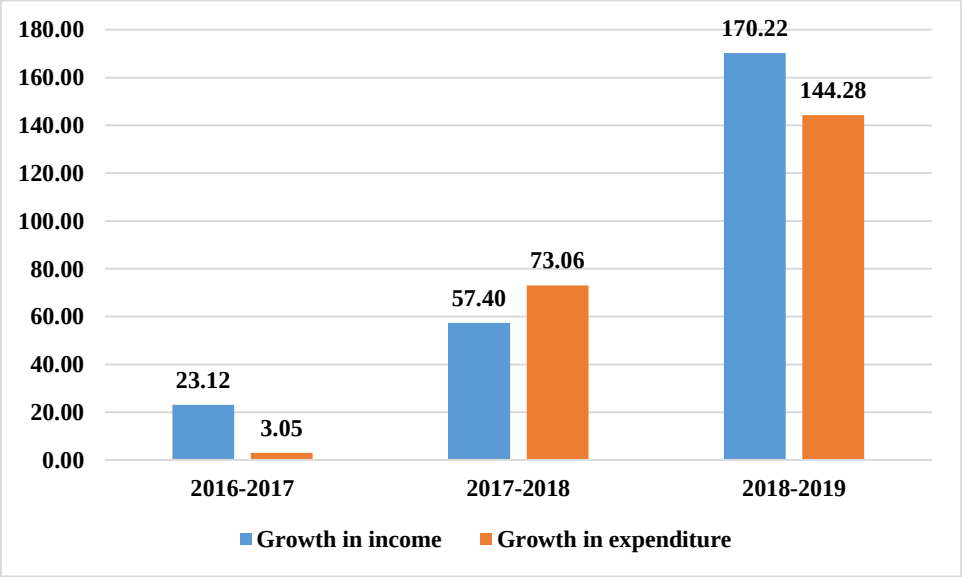


Fig 21.2: Growth in income and expenditure

From the analysis of the data it is clear that there was a deficit of revenue income in the year 2015-2016 and 2016-2017, even though the expenditure was higher. During 2017-2018 and 2018-2019, there was a deficit in expenditure. Variation of income and expenditure of revenue and capital account is shown in figure 21.3 and 21.4 respectively.

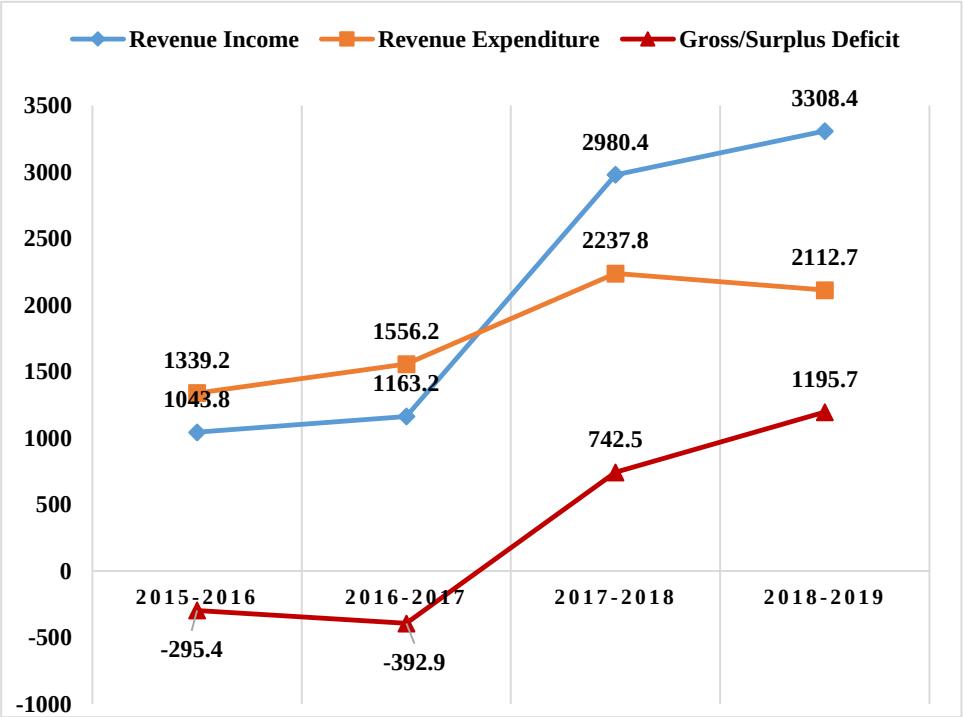


Fig 21.3: Variation in revenue income and expenditure

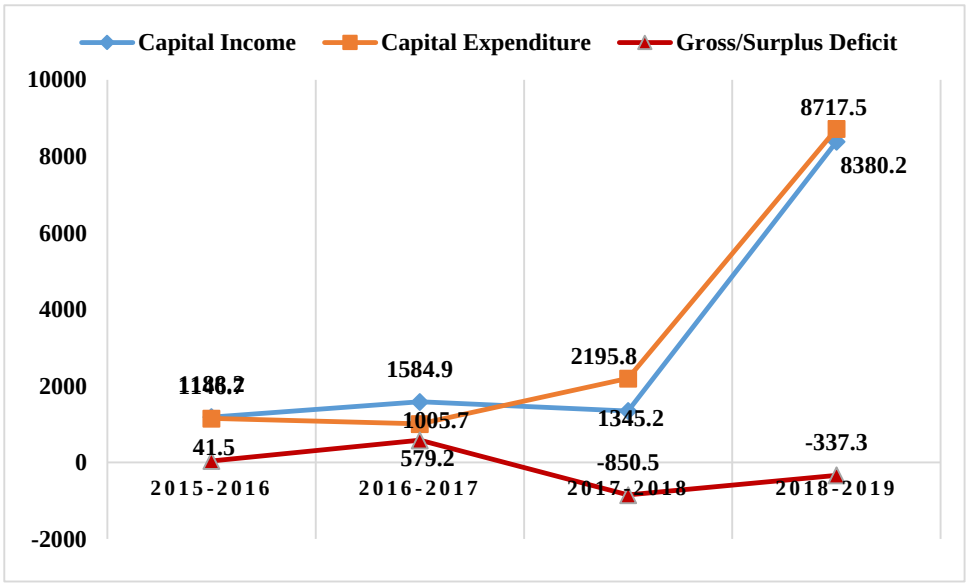


Fig 21.4: Variation in capital income and expenditure

21.4 Assets and Liability

An asset is a resource with economic value that an individual, corporation or country owns or controls with the expectation that it will provide future benefit. Assets can be broadly categorized into short-term (or current) assets, fixed assets, financial investments and intangible assets.

A liability is a legally binding obligation payable to another entity. Liabilities are incurred in order to fund the ongoing activities of a business. Examples of liabilities are accounts payable, accrued expenses, wages payable, and taxes. These obligations are eventually settled through the transfer of cash or other assets to the other party. Assets and liability details of Guruvayur municipality are mentioned in the Table 21.4

Table 21.4 Assets and Liabilities

Item	2015-2016	2016-2017	2017-2018	2018-2019
Assets	319175.58	368862.40	438772.75	633947.052
Liability	319175.58	368862.40	438772.75	633947.052

Source: Guruvayur Municipality

21.5 Key Financial Indicator

The technique of financial analysis is a useful tool to analyse the municipal corporation's financial position. Ratio analyses presented here provide information about efficiency and operational performance, and debt servicing.

21.5.1 Operating Ratio

Operating Ratio (OR) is the ratio of revenue expenditure to revenue income and it indicates financial status or "profitability" of local body operations. Sound financial management requires that this ratio should be less than unity. The average OR of Guruvayur Municipality works out to be 0.69 for the last two years. The OR less than 1.0 in Guruvayur municipality indicates that it has a surplus revenue account over the past two years.

21.5.2 Capital Utilisation Ratio

Capital Utilisation is the ratio of capital expenditure to the capital income. This ratio indicates the performance of the local body in terms of utilisation of capital income. It could also be an indicator of the local body's capacity to utilise capital resources. A capital utilisation ratio of greater than unity indicates that the revenue account surplus has been utilised for capital works, which is a positive feature. A Capital Utilisation ratio below unity indicates that either capital income is being diverted for revenue expenditure (when O.R. is also above1), or that part of the capital income was unspent during the financial year under consideration. The

Capital Utilisation Ratio (CUR) of Guruvayur municipality is 1.3 for the past two years. CUR of greater than unity refers that capital income has been fully utilized in the financial years to the complete extent.

21.6 Inference

The major problems faced by municipality are improper utilization of funds and over dependence on external sources of funds. To make the municipal finance more stable income from own sources and taxes from revenue has to be increased. Since the area is blessed more natural resources methods has to be adopted for tapering the income from these resources without causing damages to it. Other method is to promote PPP models for various development sectors.

CHAPTER 22

LINKAGES AND EXISTING SPATIAL STRUCTURE

Linkages between settlement characteristics and various sectors need to be addressed for carving out an integrated development vision. Also the existing spatial structure of the planning area which is the physical demonstration of all such linkages is to be analyzed for visualizing the most desirable spatial structure of the area which will minimize the adverse effects on the environment. The details are elaborated in this chapter.

22.1. Inter-sectoral linkages

As Guruvayur is a pilgrimage town where there is a huge influx of population, it has direct and indirect impacts on various sectors like traffic and transportation, trade and commerce, water supply, housing, sanitation, tourism, recreation and environment while other sectors like industry, education, health and agriculture sectors experience secondary impact only. From the analysis of different sectors in the planning area, the inter dependence and the impact of the above mentioned important sectors were studied.

22.1.1 Linkage between Pilgrimage, tourism and Transportation

Guruvayur town is well connected by road and rail networks, through which pilgrims are arriving in the town. Majority of pilgrims' uses own vehicles, use pay and park facilities but 22% still use road side parking which causes congestion in the outer and inner ring roads. However, Public transport system is the main mode of transportation, since there are two bus stands nearer to the temple itself. But the bus stands have limited space which makes the situation worse. Also the railway station is located within 1km from the temple. From these bus stands and railway stations, majority pilgrims will walk towards the temple as well as they return also. Most of the roads are devoid of footpaths, which affects pedestrian movements. Pedestrian movement is maximum at East Nada and Venugopal parking area, which are around the temple premises. Traffic study shows that the road cross-section in many places in inner and outer ring road is non-uniform. Hence, convenient transport network and efficient traffic management system needs to provide within the Municipality. If there is a well-developed transportation system, it will enhance the development of that town. The arriving population can contribute much to the tourism sector also, if there are facilities for connecting the nearest tourism spots; which will further enhance the economic development of the town.

22.1.2 Linkage between Pilgrimage and Water Supply

High floating population puts immense pressure on the water supply network within the area. Even though there is a separate tank exclusively for Devaswom requirements, it is not sufficient

to cater the needs of the temple. To satisfy the water demand Devaswom board depends on tanker water. It is very necessary to make sure that the water provided is not contaminated at any stage. Study shows that the temple pond and surrounding water bodies including well, are already contaminated with traces of coliform bacteria which proves that ground water and stored water both are equally unfit for consumption, main reason being the over-exploitation and unmonitored utilization of water resources. This directly affects the residing population.

22.1.3 Linkage between Pilgrimage, Sanitation, Environment& Disaster Management

Certain level of environmental quality is necessary for healthy development of a town. So maintaining environmental quality should be given top priority while providing necessary facilities for the pilgrims. Sanitation in another major issue with no functional sewerage systems present within the Municipality. One sewage treatment plant is being built at Chakkamkandam and sewage lines will be laid to pump sewage to this plant. Pilgrims coming to Guruvayur have complained about foul smell emerging from storm water drains as the sewage from all commercial and residential buildings is being let out into them due to absence of proper sewage network. Hence, resolving this issue is important as ensuring cleanliness will only increase the number of pilgrims in future as their annual count is decreasing as per tourism statistics. Disaster management initiatives are also necessary to address the problems faced by the pilgrims and residents as well.

22.1.4 Linkage between pilgrimage and commercial sector

Guruvayur temple is located within the central business district of the town, around which the various commercial establishments had been developed. Commercial sector has direct impact due to the arrival of huge number of pilgrims. It is necessary to make sure that the various commercial establishments offer good services to the pilgrims.

22.1.5 Linkage between Agriculture and allied sectors, Trade, Commerce &Industries

Coconut is the main crop cultivated within the Municipality, where dry agriculture covers about 26.2% of land use. But analyzing the trade and industrial sector, sale of agricultural goods within the Municipality is very less. Transportation studies show that out of the goods transported, percentage of agriculture goods is highest. This means that the goods produced are sold mostly outside the municipality. The commercial sector makes no significant contribution, though the place has a high floating population. No modernized and properly managed markets have been identified in any other part of the Municipality. Industrial estate in ward 41 is has few food-processing units functioning and land acquired for industrial estate in ward 6 is idle.

Hence, platform for production and sale of agro-based goods is lacking. These potentials can be harnessed for local economic development of the Municipality.

22.2 Effect of population on various sectors

Population growth has direct impact on various sectors. Increase in transport facilities causes the city center to be congested causing traffic delays and inconvenience to visitors. Large number of floating population causes water resources to get depleted. As it is, ground water of Guruvayur Municipality is polluted. Places in Guruvayur experience salt water intrusion which makes the need of fresh treated water supply necessary. Sanitation of the area is also affected with leachate from trenching ground affecting the groundwater supply. Flooding of the CBD is another issue during rainy season. The western strip of Guruvayur comes under the hazard line of CRZ which means that these areas are prone to flooding but still has residential buildings except in Chakkamkandam area. Roads in these regions could experience flooding if sufficient drainage is not provided. Collection of solid waste is also not efficient. More people should be trained and employed for making the system efficient which could not only help keeping the city clean but also provide employment opportunities to the required. People belonging to the special concern areas also require to be provided with some options for employment either related to the agro-based industries or commercial sector for helping them attain better standard of living.

22.3 Change in land use and transportation needs

Land use change and transportation are very closely linked as both are dependent on each other. In Guruvayur, the core area is congested due to urban sprawl because of better transport facilities around them. Bus stands and roads cause people to visit the temple premises not only for pilgrimage, but also for potential jobs created in the trade sector, educational purpose and offices (both private and government). But the transportation lines need to be diverted to some place away from the CBD, so that the whole municipality is utilized for the above said purposes. This might help reducing the congestion in the CBD. Once the road alignment is decided the land use could be decided to shift the activities to the outskirts of the municipality which is less congested.

22.4. Existing Spatial Structure

Existing spatial structure of the town is arrived at by considering the functional character, activity pattern, existing road network, hierarchy of nodes, hierarchy of settlements and concentration of other sectoral land uses.

22.4.1. Functional character

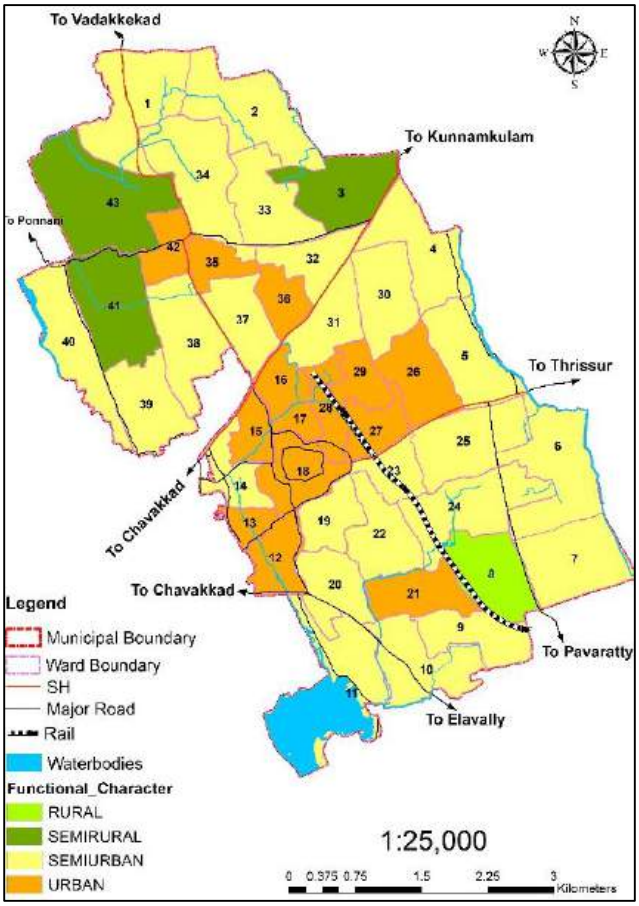


Figure 22.1 Functional character

Most of the towns in Kerala experience urban rural continuum. The settlement pattern here is scattered and Guruvayur is part of the urban corridor which needs to be developed by 2031. The ward wise functional character is arrived at based on analysis of population density distribution, plot size distribution and land use concentrations. The result of this analysis is shown in figure 22.1 which shows that the major part of Guruvayur shows semi-urban functional character, with the CBD showing an urban character. Functionally major portion of Guruvayur is experiencing rapid urbanization which calls for the need of planned growth. Already experiencing overcrowding and congestion, haphazard growth pattern could affect the quality of lives of the residents. Wards 12,13,15,16,17,18,21,26,27,28,29,35,36,42 shows urban character. Guruvayur Temple is located in ward 18, where major commercial establishments and temple related activities are taking place. Railway station is also located nearer to the town centre. These wards are densely populated and high concentration of built up land use but very low agricultural concentration. Wards 1, 2, 4, 5, 6, 7, 9, 10,11, 14, 19, 20, 22, 23, 24, 25, 30, 31, 32, 33, 34, 37,38,39, and 40 shows semi urban character. In these wards, the concentration of residential and built up land use is moderate. The population density is also high. Wards 3, 41 and 43 shows semirural character. These wards are located on the North West and North East side of the town. High concentration of agriculture residential mix and less built up land use in these wards justifies the semirural character. Only ward 8 shows rural character. The rural nature of the ward is justified by the high concentration of agriculture land use, low population density, low concentration of residential and built up land use and large plot size.

22.4.2. Activity Pattern

Activity pattern is derived from combinations of Landuse Concentration Index (CI) and functional character. From landuse CI we get the dominant landuse in each ward as shown in Fig. 22.2 It is shown that majority of the agricultural practices is in the north-eastern and south eastern part of the Municipality. Areas around the State Highways is mostly commercial and public/semi-public landuse. The combinations of land use concentration index, functional character and its corresponding activity pattern are shown in table 22.1

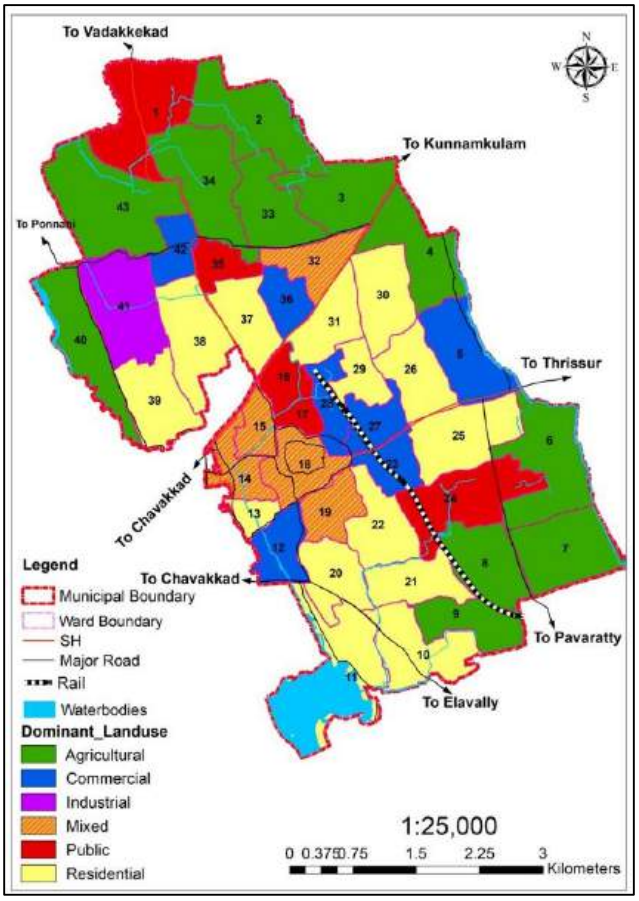


Figure 22.2 Dominant land use in wards

Table 22.1. Determination of Activity Pattern in Guruvayur Town

Sl. No.	Combination of Landuse and Functional Charater		Activity Pattern
	Functional character	Landuse CI	
1	Urban	Residential	Mixed Residential
2	Urban	Commercial	Commercial
3	Urban	Industrial	Industrial
4	Urban	Public & Semi-Public	Public & Semi-Public
5	Urban	Mixed	Mixed
6	Semi-Urban	Residential	Mixed Residential
7	Semi-Urban	Commercial	Commercial
8	Semi-Urban	Industrial	Industrial
9	Semi-Urban	Public & Semi-Public	Public & Semi-Public
10	Semi-Urban	Agricultural	Mixed Residential
11	Semi-Urban	Mixed	Mixed
12	Semi-Rural	Commercial	Commercial
13	Semi-Rural	Industrial	Industrial
14	Semi-Rural	Public & Semi-Public	Public & Semi-Public
15	Semi-Rural	Agricultural	Agricultural
16	Rural	Commercial	Commercial
17	Rural	Industrial	Industrial
18	Rural	Public & Semi-Public	Public & Semi-Public
19	Rural	Residential	Agricultural
20	Rural	Agricultural	Agricultural

On combining both functional character and landuse CI, activity pattern formed shows slight deviation in certain places. Activity pattern of each ward is as shown in Fig. 22.3. Wards around the temple premises show that activities in that area are public/semi-public or commercial which conform to the landuse concentration index. But activities in the outskirts are mostly industrial, mixed residential and only two wards show agricultural activity (wards 3&8). Hence, it is clear that though agricultural landuse is more at various wards, activities are very less related to agriculture. Area around major junctions show development indicating higher public and commercial activities.

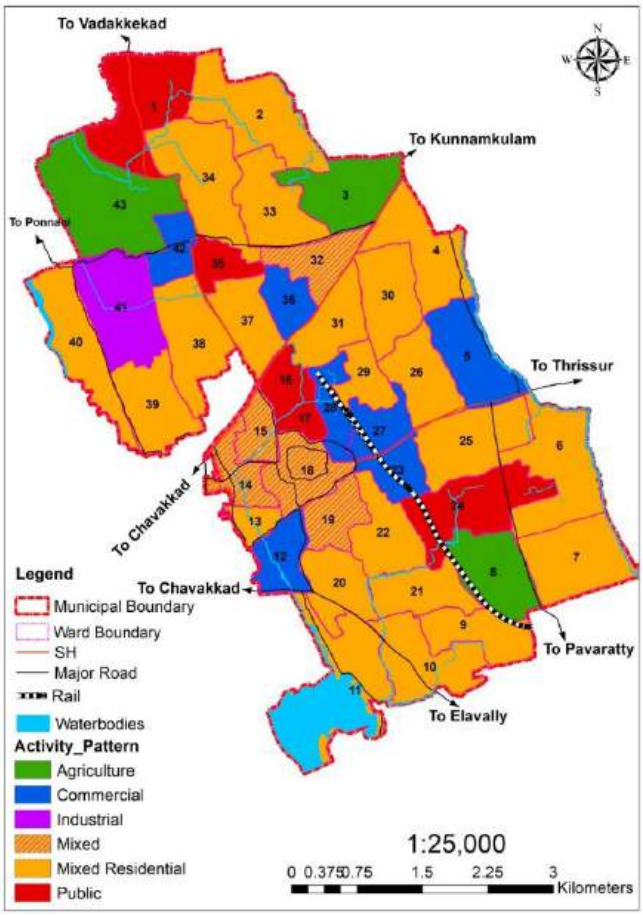


Figure 22.3 Activity Pattern

22.4.3. Existing connectivity pattern hierarchy of nodes

The Municipality has numerous road networks all ultimately connecting to major junctions. The Municipality has 3 State Highways passing through it: State Highway 49 – Manjulal Jn – Chowallurpadi, State Highway 50 - Chavakkad – Chattukulam, State Highway 62 –Mammiyoor Jn– Thozhiyoor. The existing connectivity pattern and the hierarchy of commercial nodes are shown in figure 22.4.

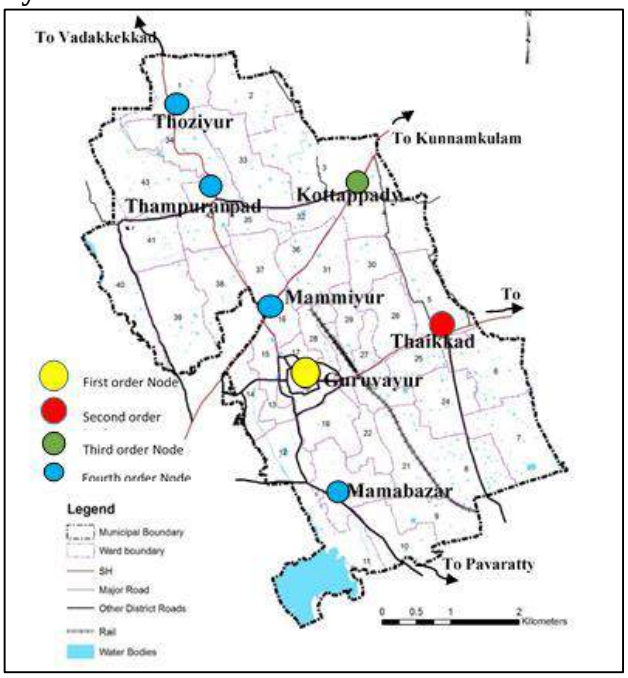


Figure 22.4 Connectivity and hierarchy of nodes

22.4.4 Spatial Structure

Existing spatial structure shows that Guruvayur is not developing as per IDDP into a multi-functional zone-II area but is a part of the growing urban corridor and cluster formation. Guruvayur as mentioned, was supposed to serve for all educational, commercial and industrial activities of the nearby local bodies, after Thrissur. But mostly public and religious activities are prevailing with commercial centres facilitating only for these pilgrims. The Municipality experiences scattered settlement pattern with activities scattered all around the area.

Landuse CI, functional character and activity pattern shows the town growing at a fast pace.

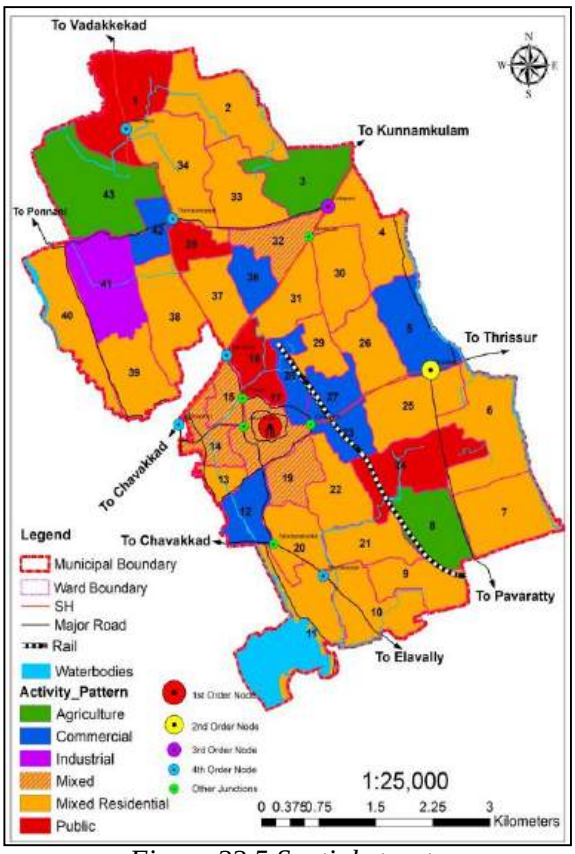


Figure 22.5 Spatial structure

22.5. Inference

Study on various inter-sectoral linkages, impact and influence on the growth of one sector on the other will be helpful while giving proposal in various sectors and developing an integrated development vision. The town is developed around the temple and its surroundings are more congested with various commercial establishments. To achieve a compact spatial structure, it is imperative to control the developments in a scientific manner promoting hierarchical development of land uses from the town to the periphery.

CHAPTER 23

SUMMARY AND FINDINGS

The major summary and findings derived from detailed sectoral analysis are given below.

23.1 Regional Setting

- Guruvayur is a pilgrimage town in the South West Indian state of Kerala. It is one of the eight urban local bodies of the district. Present Guruvayur Municipality is formed by adding Thaikkad and Pookode panchayats.
- As per the State urbanization report of Kerala published in 2012, Guruvayur Urban agglomeration which includes Kunnamkulam and Chavakkad Municipality, is envisaged as a 4th order hierarchy urban center, where corridor type peri-urban development can be expected.
- State urbanization report of Kerala, 2011 envisages that this town will develop as part of an urban corridor in 2031, which is mooted by the presence of Road and Rail transportation networks.
- As per the development concept of Integrated district development plan for Thrissur district, Guruvayur Municipality should be developed as a Multifunctional Zone II. Thaikkad panchayat comes under Marine accelerated growth zone and Pookode panchayat falls under Intensive agricultural zone.
- As per the settlement analysis of District Spatial Plan, Guruvayur Municipality has third order hierarchy and Thaikkad and Pookode Panchayats have 4th order hierarchy. The town is expected to provide higher order facilities.
- The Functional character of Guruvayur Municipality and Pookode Panchayat is found to be urban, whereas Thaikkad panchayat is of rural character.
- Guruvayur Municipality is predominant in urban activity whereas Thaikkad and Pookode panchayats are predominant in primary and secondary activities.

23.2 Demography

- The total population of the LSGI shows an increasing trend and constitutes nearly 2.24% of that of the district.
- It can be seen that during the last four decades, population growth rate is fluctuating and has come down to 4.5% at present.
- The Population density of Guruvayur Municipality is 2275 which is higher when compared with that of district and state.

- Population concentration is higher in wards around State Highways and this shows a chance of ribbon development in the thickly populated area around the CBD area in Guruvayur Municipality.
- Literacy rate shows an increase from 94.3% to 96.6% in the last decade which proves that the condition of education has improved.
- Child sex ratio is showing a sudden decrease from 981 to 928 in the last decade.
- Household size of the town is 4.12 which is greater than that of the district.
- Guruvayur is in the developing stages and hence just like any other developing area it will be facing issues of sprawl and congestion if not planned properly.

23.3 Occupational Structure

- Work Force Participation Rate of Guruvayur Municipality is 29.57% which is lower than the state and district.
- WFPR has increased from 28.44% to 29.57% in the last decades, a slight increase in the number of workers.
- Male and female work force participation increase in the last decades. Dependency ratio of the municipality is 2.38 which is higher than that of state and district. It has been decreased in the last decade.
- The town is withdrawing from the primary sector and starting to depend more on service sector.
- Increase in the number of Marginal workers shows that commercial shops and small scale business has increased. Also Seasonal work force is high.

23.4 Land use

- Residential land use is predominant than other land uses, which covers about 55% of town area, which is higher as per URDPFI standards for medium towns.
- The next major land use is dry agriculture, which is about 26% of the total area. Land use indicates that there is enough land for agriculture but commercial and industrial land use (0.81% and 0.17% respectively) is very low compared to the URDPFI standards.
- Concentration Indices of various land use were also analyzed to find which land use is prevailing in each ward.
- Higher influence of mixed (residential and commercial) and public & semi-public land use in core areas and dry agriculture and residential land use in the peripheral region.

23.5 Agriculture and Allied Sectors

- Coconut is an important crop within the Municipality followed by other crops like banana. Paddy cultivation is not practiced much, hence, no padashekhara samities.
- There are no slaughter houses or hatcheries in the municipality. But poultry and other animals are grown in many households. Hence, eggs produced not for sale and only for personal use.
- All the milk supplied within the Municipality is not produced within the Municipality. At present only 1 milk society together for 4 wards is located in Thozhiyur, inspite of 9 farms at various locations. For the remaining population, packed pasteurized milk is supplied.
- Because coconut is the main crop, agro-based industries like coir industries and oil mills can be promoted to enhance local economic development.

23.6 Industry

- Industries cover about 0.05sq.km land in the town which is 0.17% of the total area.
- Guruvayur has 315 industrial units in the town. It constitutes 4 small scale industries and 311 micro-scale industries.
- Concentration index of industries shows that ward no.41, 18 and 32 have more number of industries.
- There is a scope for developing traditional industries such as coir spinning, handicraft etc.
- Existing industries should be supported with necessary infrastructure.

23.7 Pilgrimage and Tourism

- Punnathur Kotta is a tourism site in Guruvayur. It has to be conserved and developed.
- There is a scope for developing a pilgrim circuit by combining popular temples surrounding Guruvayur Sree Krishna Temple.
- The influx of pilgrim population needs better infrastructure as per the survey.
- Tourism potential of the area needs to be explored. Chakkamkandam Kayal area can be developed as a tourism spot.

23.8 Trade & Commerce

- Commercial land use covers 0.24 Sq.km. which is about 0.81% of the town area.
- Commercial activity is more concentrated in wards 5, 18, 14, 23, 27, 28, 32 which is located around the Guruvayur Temple premises.
- Economic activities should be increased by strengthening the various commercial nodes in the town.

- Existing commercial establishments should be strengthened with the provision of parking, waste management etc.
- Markets needs to be developed.
- There is a need for regulation of street vending to ensure smooth flow of traffic, smooth movement of pedestrians and maintenance of cleanliness and public hygiene while facilitating vendors to sell goods and services at convenient locations.

23.9 Traffic and Transportation

- Extensive unorganized parking on all roads especially on IRR near west nada, south nada and north nada; on ORR near west nada, municipal bus stand, manjulal and kairali hospital junction; railway station road, manjira road, mammiyoor, thampuranpadi, muthuvathoor and Ovungal Pally.
- Most of the roads are devoid of footpath and on road stretches where covered drain serves as footpath, encroachment for commercial activities restrict the smooth flow of pedestrians. Heavy lateral as well as cross movement of pedestrians is observed near east nada, south nada, west nada, manjulal, railway station road and municipal bus stand. Lack of at grade facilities often leads to unsafe condition for pedestrians. Non Motorised Transport (NMT) facilities have not been given due consideration in the town's transportation system.
- Absence of channelized traffic islands.
- Traffic congestion at Manjulal junction due to railway gate closure.
- Majority of the town roads do not have adequate carriageway width. Except for SH 49, SH 50, SH 62 and a portion of Outer Ring road, all other roads have a carriageway width of less than 7.0m.
- Traffic Signages and Road Markings are inadequate and the ones that are provided are scarcely maintained.
- Limited spaces at bus stands due to idle parking of buses.
- Inter-mixing of local traffic with through traffic in the absence of alternate road links/ regional bypass.
- Scope for waterways through Chettuva lake.

23.10 Water supply

- The major source of water in Guruvayur Municipality is well, followed by municipality water supply by KWA. There is a huge dependency on well water which makes ground water as a continuously depleting source.

- The studies observed the presence of coliform bacteria in well water. This is to be rectified to give enough recharge time to groundwater and also ensure safe potable water to the resident as well as the floating population. Lack of awareness and improper sanitation leads to the contamination of waterbodies and consequently the quality of ground water has been affected at many locations.
- The Pookode zone and Thaikkad Zone which were Grama Panchayath initially and were added to the Municipality don't have enough KWA supply. Only a few households receive water on a regular basis and most of the households don’t have enough supply at all. The KWA water supply is insufficient to meet the current and fast-growing demand of the Municipality.
- Guruvayur Municipality has been depending on the tanker water supply, ever since the floating population has increased and the available water resources were insufficient to cater to the needs of the devotees coming and staying near the Guruvayur temple.
- Use of packaged water is comparatively very low and mainly caters to the needs of the floating population.
- There is a scope for rainwater harvesting and ground water recharging, which also helps in satisfying the water demands.

23.11 Sanitation

- Generated solid waste within the town is treated in the plant at Choolpuram. More public awareness campaigns have to be implemented to persuade more people to resort to segregation of waste to submit to collection services by paying their charges.
- There is no existing sewerage system. Onsite treatment facilities with better compliances may be given to reduce outlets of polluted water to storm water drains.
- Guruvayur Municipality need a planned integrated drain system connecting existing drains and crucial areas to avoid water logging. This can be done by improving connectivity of existing drains by constructing missing links.
- Two water-drains namely Valiyathodu and Thykadu Valiyathodu has become a source of wastewater discharge from hotels, restaurants, and lodges from the town and it carries the polluted effluent to the Chakamkandam backwater area.
- Wells in wards 30, 31, 36 are said to be affected by the leachate from the landfill sites during rainy seasons. Saltwater intrusion prevails in wards 11 and 40 up to an extent of 70 m from Canoli canal and 400 m from Chakamkandam backwaters respectively.

- The leachate from Punathur Aanakota has also disturbed the quality of good water in the vicinity. Leachate treatment plants should be used to treat effluents from Anakotta and Goshala.
- Water Table in wards 5 and 7 seems to reduce at a higher rate comparatively due to commoditization of water.
- There are around 33 public ponds in Municipality amongst which only some are usable. Rejuvenation of existing surface water bodies is essential.
- Existing water resources in the municipality should be conserved and restored. Rainwater should be harvested through well recharge and watershed management interventions.
- Construction of Sewage Treatment plant at Chakkumkandam, laying of additional 15km sewerage network, making additional arrangements such as collection sump, pump set, piping arrangements etc. for treatment of septage at the ongoing STP at Chakkumkandam, covering and repair of minor drains at various locations are projects under AMRUT.

23.12 Education

- At present there are 27 schools in Guruvayur out of which 12 schools are aided, 4 Government schools, 2 unaided schools and 9 schools which has unaided at pre-primary level and aided at higher classes.
- There are 5 arts and science colleges under aided/private management. There are no government colleges within the Municipality. 2 arts and science colleges are present under aided management.
- Present educational facilities are sufficient as per standards. No special schools.

23.13 Health

- There are 5 allopathic, 5 ayurvedic and 3 homeopathic hospitals in the town. There are 8 family welfare centres in the municipality. There is a mother and child welfare centre at Guruvayur near Government Ayurveda Hospital.
- Persons affected with diarrhoeal disease and dengue fever has increased through the years. Presence of coliform and mixing of sewage with ground water may be a reason for increase in Acute Diarroheal Disease.
- Some wards in Guruvayur Municipality suffer from water scarcity and thus storage of water may lead to mosquitoes breeding around and spread of epidemics like Dengue Fever in summer season also. Blocked drains and mixing of sewage to storm water which is the existing status of the town, can again lead to communicable diseases like Dengue and leptospirosis.

- Guruvayur Municipality has around 100 hotels/tea stalls and 8 licensed catering units. There is around 800 other state labourers working in the municipality mainly concentrated in culinary activities and their cleanliness and sanitary measures have to be assured to regulate spread of epidemics.
- As per planning standards, there is a gap for 1 intermediate hospital A, 1 speciality hospital and 1 multi-speciality hospital.

23.14 Energy

- Guruvayur Municipality is not facing major electrical energy problem.
- Present distribution system of electrical energy is satisfactory.
- The consumption of non-conventional energy like solar energy may be adopted.

23.15 Recreational facilities and Civic Amenities

- There is only one park within the Municipality. A children's park at Manjulal Junction.
- Development of parks and playgrounds are one of the main objectives of projects under AMRUT scheme. There are 3 projects under this scheme.
- There are 3 cinema theatres in the Municipality located only within around the temple premises.
- Auditorium survey conducted indicates requirement of solid waste collection and sewerage systems within the Municipality.
- There are no stadiums in Guruvayur Municipality. For stadium facility population of Guruvayur needs to depend on Thrissur, Chavakkad and Kunnamkulam.
- Civic amenities are sufficient. Comfort stations are being built to cater to the sanitation needs of the growing pilgrim population. Round-the-clock cleanliness needs to be assured.

23.16 Housing

- Guruvayur has more number of rented houses. Total housing has increased by 21.6% in the past 9 years. The population of houses within the core area is more.
- Percentage of semi-pucca and kutcha houses account up to 14%. This gap in housing needs to be addressed.
- Flats are concentrated around the temple premises. They are constantly facing water supply and solid waste management issues as indicated by only partial coverage of collection and management systems. Parking facilities are also insufficient.
- As land within the core area is limited, efficient and effective utilization of space is required for the above provisions.

- Colonies are present but notified slums have not been detected as yet. Resurvey of colonies to further analysis of facilities may be done.

23.17 Special Concern Areas

- As per socio-economic survey, those below poverty line are accounted to be 22.31% of the total population of Guruvayur Municipality.
- There are 83 numbers of sangethams in the municipality with a population of 3386.
- More than 40% of Scheduled caste population lives in sangethams. Thus total landless families and homeless families account to 249 and 629 respectively.
- It shows a decrease in crimes and fatal accidents. Non-fatal accidents and cybercrimes are persistent. Around 22 CCTV cameras are installed in the municipality.
- There is a pakalveedu in Guruvayur municipality. Shanthi Bhavan, Guruvayur is an old age home run by Government in Guruvayur Municipality.
- Major portion of the unemployed youth in scheduled caste population have reached SSLC. They have to be assisted in attaining a daily living by skill development programmes and training.
- There should be more community cum day care centres for the old aged to help them fight loneliness. Scholarships should be given to physically handicapped children and special schools or training centres may be started with children with autism.
- The daily employment programs should be properly monitored and supervised for the money spent on them.

23.18 Environment

- Parts of Guruvayur come under the CRZ delineation, thus making it an ecologically sensitive zone. North-west and south-west zones are ecologically sensitive hence huge construction activities should be prohibited in those areas.
- The areas having waste water leachate should have a decentralized leachate plants to reduce ground water pollution issues.
- Salt water intrusion can be solved by planting natural mangrove barriers along the backwater areas and Canoli Canal area at Perakam. Thus helping preserve mangroves and the soil being lost during runoff.
- Flooding cannot be stopped but the effects can be mitigated by proper drainage provisions within the Municipality.

- Proper collection, disposal and management of solid waste, especially management of plastic waste should be done in the proper manner and suitable disposal techniques should be practiced.

23.19 Development Administration and Finance

- The major problems faced by municipality are improper utilization of funds and over dependence on external sources of funds. To make the municipal finance more stable income from own sources and taxes from revenue has to be increased.
- Since the area is blessed more natural resources methods has to be adopted for tapering the income from these resources without causing damages to it. Other method is to promote PPP models for various development sectors.

CHAPTER 24

VISION, GOALS & OBJECTIVES

A vision statement is realistic and reliable which reflects the preferences & values of the city and envisages the future of the town. Goals are usually long-term and represent global visions. Objectives define strategiesor implementation steps to attain the identified goals.

24.1 Development vision

The development vision for Guruvayur Town was formulated by considering the strengths, potential, issues/ problems, future focus of development, views of the stakeholders and by considering the people's aspiration.A comprehensive development planning approach is necessary, as it is a famous pilgrim center.Considering the current situation and ground realities, the development vision for Guruvayur Municipality for the next 20 years is framed as follows:

"To protect the cultural prominence of the town and to develop Guruvayur as a national pilgrimage center with quality infrastructure supporting the pilgrim activities; by enhancing the economic base of the town promoting trade, commercial, industrial and agricultural activities; sustaining green and pollution free environment; for an accelerated economic upliftment of the town and to ensure healthy living conditions".

24.2 Development Goals and Objectives

The objective of the Master Plan is to create an Integrated Spatial Framework to achieve the desired vision for the town. The development goals are formulated based on the observations, conclusions and inferences derived from the study and analysis of various sectors. Guruvayur town has a mono centric urban pattern with temple as central point, which is surrounded by various commercial establishments that support pilgrim activities. Thus, the planning approach is to divide the planning area in to various zones for locating different activities such as religious, commercial, mixed and residential neighbourhoods etc. Along with the zonal demarcation, an integrated development of Guruvayur town by linking each zone with appropriate infrastructure facilities is also considered. From the analysis it is clear that majority of the land area is under residential use, followed by agriculture activities. As per the Integrated District Development plan (IDDP) Guruvayur zone comes under Multifunctional Zone II, Thaikkad under Marine accelerated growth zone and pookode under Intensive agricultural zone. So Guruvayur zone can be developed as a service center for the surrounding rural hinterland. Thaikkad zone should be promoted with service sector activities which enhances the fisheries and allied activities. Pookode zone should be promoted with agro based or house

hold industries by conserving the agriculture land and by restricting urbanization. The development goals and objectives are summarized as follows:

1. ***To protect the cultural prominence of the town:***

- Retain the character of town and preserve the heritage sites while providing it all basic infrastructure facilities.
- Initiate coordinated approach to heritage area conservation and planning.
- Encourage the preservation, restoration, continued use, and reuse of historic buildings and areas.
- Ensuring effective stakeholder (Devaswom, Municipality, local residents etc.) coordination in pilgrim activities.

2. ***To develop Guruvayur as a national pilgrimage center with quality infrastructure supporting the pilgrim activities:***

- To promote pilgrimage through development of related infrastructure and create a pilgrim circuit covering important destination within the town and to enhance the potential of the city.
- Provision of an efficient traffic and transportation network with regional connectivity.
- To create adequate parking spaces as an integral part of commercial, industrial and institutional planning and development.
- Ensure round the clock cleanliness in temple complexes and premises.

3. ***Enhance the economic base of the town promoting trade, commercial, industrial and agricultural activities***

- To create a well-defined hierarchy of settlements in order to achieve rational andplanned growth.
- Evolve better strategies for development of hotels and auditoriums by ensuring efficient services.
- Strengthening of the existing retail and whole sale trade and commercial activities.
- Provision of higher order facilities in order to serve the nearby local bodies.
- Promoting industrial and agriculture activities by using the available resources and by providing sufficient infrastructures and development of marketing facilities.
- Promotion of Homestead (coconut based products) agricultural activities and bio organic farming, handicrafts, handlooms, textiles etc.

4. Creation of green and open spaces; conserving water bodies and eco sensitive areas; and to make a pollution free and resilient environment.

- Create recreational spaces that can enhance bonding between inhabitants and nature.
- All environmental sensitive areas are home land of wide variety of flora and fauna, hence their conservation should be considered with utmost importance.
- Create a green buffer strip around environmentally sensitive areas like water bodies and solid waste dumping land to ensure proper encroachment and pollution protection.
- Increase public awareness in regards to the protection of the environment.
- Prevention, mitigation and preparedness of disaster through proper measures.
- Encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability.
- Developing contemporary forecasting and early warning systems backed by responsive and failsafe communication with information technology support.
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat for ensuring safer living.

5. Ensure healthy living condition with the provision of quality service and facilities.

- To rationalize the distribution of physical and social infrastructure in order to ensure appropriate quality of life.
- Improvisation of water quality to provide pure drinking water for all and to promote rain water harvesting and recycling of water.
- 100% coverage of households by sewerage connections in the city.
- Improve drainage network to prevent water logging and safeguard quality of roads. Constructing new drains integrated with the new roads development. Perforated tiles footpaths to allow penetration of rain water into ground.
- To completely stop open defecation and urination.
- Create a traffic culture that will depend more on public transportation means other than private vehicles so that traffic volume intensity can be minimized which will in turn reduce pollution of atmosphere.
- Promote use of Bicycles other than fossil fuelled vehicles to make an environmentally friendly health life style.

- To improve safety, mobility and efficiency of traffic within and outside the city. To create new road network and to improve the existing network to promote operational efficiency of traffic.
- Ensure quality and safety in all available hospitals and medical practice centres.
- Promote awareness on cleanliness and against dumping of waste on road side drains and waterbodies.
- To improve the solid waste management in the city using best practices.

CHAPTER 25
DEVELOPMENT CONCEPT

A development concept throws light into the form into which the area may develop. It also suggests an ideal future pattern of development. The development concept of a particular area is formulated based on the development goals and objectives envisaged with a spatial reference. The problems and potentials existing in the area, the conclusions and recommendations of sectoral studies are also considered for the formulation of development concept.

25.1 Overview to the concept

A people – oriented approach is the right key to the development of the town. The development concept of the town is formulated based on the findings of the spatial and sectoral analysis while remaining in the purview of the goals fixed and also in line with the broad development vision arrived at the state and district level. As per the state urbanisation report 2012, Guruvayur will become an urban agglomeration in 2031, which will be accelerated by the presence of Alappuzha -Ernakulam-Thrissur-Palakkad urban Corridor. In 2010, the neighbouring areas of the then municipal area ie, Thaikkad and Pookode Panchayats were added to form the present Guruvayur Municipality. As per the Integrated district development plan for Thrissur district (2012), the then Guruvayur Municipality is included in Multifunctional zone II, Thaikkad panchayat comes under Marine accelerated growth zone and Pookode panchayat falls under Intensive agricultural zone.

Guruvayur is a prominent pilgrim destination which attracts lakhs of devotees from all over the world. The town has comparatively good connectivity due to the presence of three State Highways (SH 62 (Guruvayur – Althara – Ponnani road), SH 50 (Chavakkad – Wadakkancherry) and SH 49 (Guruvayur – Choondal)), other major roads and Railway network. Influx of huge population in addition to the residents has increased the stress on the existing facilities within the town. Development may be oriented to tap the issues faced by the devotees and also it should not affect the residents as well. The economy of the town is dependent on the activities related to temple. So better strategies are to be formulated to enhance the economic base of the town by strengthening the potentials of tourism, trade & commerce, industry, agriculture and related sectors. In addition to this due consideration should be given to environmentally sensitive areas for proper ecological balance. All these factors are considered while formulating development concept for Guruvayur.

25.2 Spatial Distribution of Existing Development

Existing spatial distribution of the town is arrived at by considering the functional character, activity pattern, existing road network, hierarchy of nodes, hierarchy of settlements and concentration of other sectoral land uses. Existing spatial structure of Guruvayur is shown in figure 25.1. It depicts the present activity distribution in the town. The central area, where the Srikrishna temple is located have majority of the commercial establishments and this zone is clearly a pilgrim activity area. It can also be seen that majority of the municipal area is occupied by residential activity. Dry agriculture is also present along with the residential use. Commercial activity also exists along the major roads and junctions. Public and semi - public institutions are distributed at various locations. An industrial estate is located on the western side of the town.

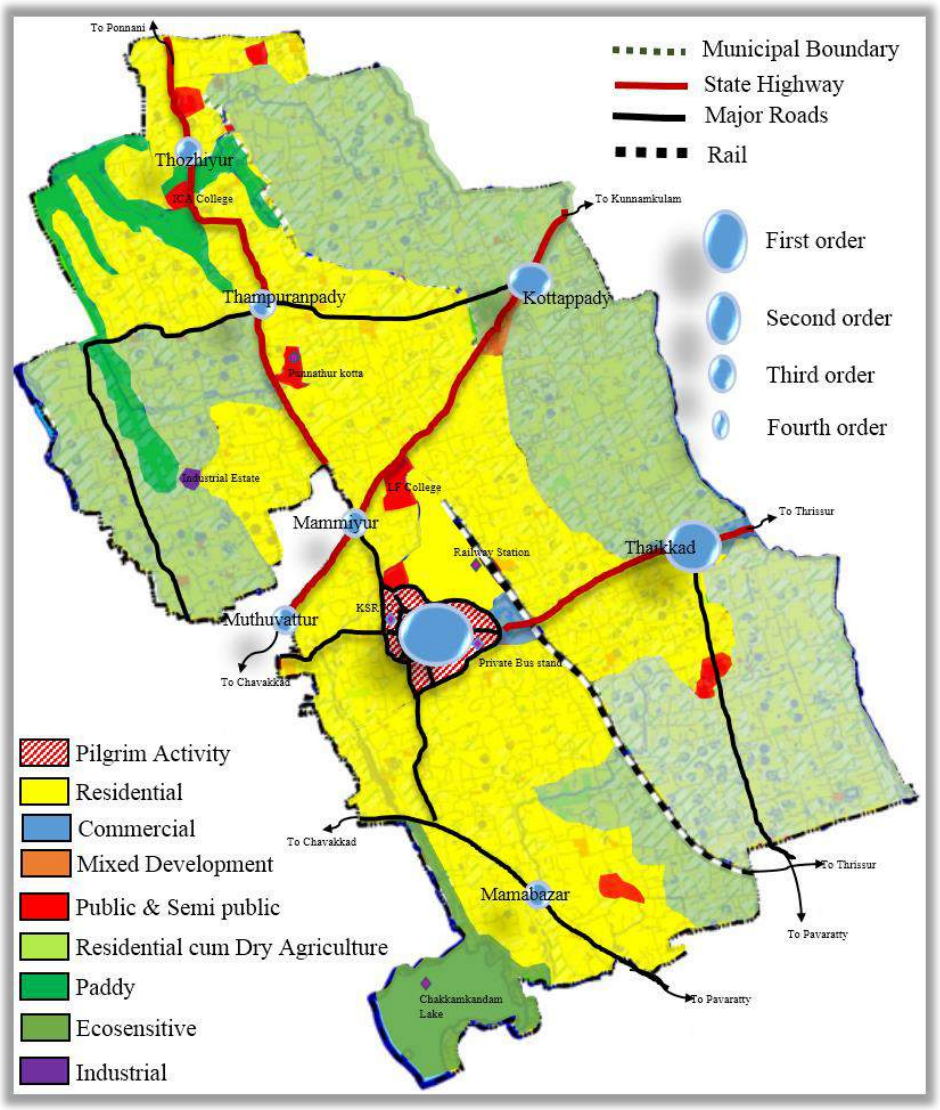


Figure 25.1 Spatial distribution of existing development in Guruvayur Municipality

25.3 Concepts based on major development sectors

The findings from the spatial and sectoral analysis of the town reveals the development direction of the town. As Guruvayur is a prominent pilgrim destination, the major activities occuring in the central business district (CBD) is more or less related to the activities of the temple. The study reveals that the existing CBD area is very congested where inadequate road width, lack of parking facilities etc. are the major problems. The planning intervention is to propose a compact development in that area. Hence the central area, which is the first order node within the town is demarcated as the Temple core zone. The URDPFI guidelines suggest that this zone is of highest ethnic value and is meant for preservation.

The Pilgrim activity zone envisioned around the temple core zone is envisioned for the conservation of culture, architecture features and for promotion of local economy. The economic benefits of pilgrimage tourism are to be reaped in this zone and improvement in the quality of life of the local population can be achieved through planned development.

The area between the state highways can be planned as a new development zone. Mixed activities can be planned in this zone for new developments to come up, to meet the requirements for the promotion of tourism and for city growth. Tourism products can be developed in this zone which includes experiential shopping, festivals, cultural get-togethers, hospitality, restaurants, accommodation, physical infrastructure etc. Considering the development trend of the town and to accommodate the increasing development needs of the town, more area has been included under this zone.

The existing commercial areas within the CBD has to be proposed to be retained as such, which is vital for the existence of the town and necessary for satisfying the needs of thousands of pilgrims arriving daily. In relation to the pilgrim activities, tourism potential of the town and its surrounding areas are to be explored so as to enhance the economic base of the town. There is a scope for developing Pilgrim tourism circuits connecting the major temples within Guruvayur itself. Also leisure tourism can be promoted at locations such as Punnathur Anakkotta, Chakkamkandam Kayal surroundings etc. This can also be connected with the tourism spots in the surrounding areas also. This tourism activity will create a potential for supporting activities like accommodation and will help in enhancing the economic base of the town.

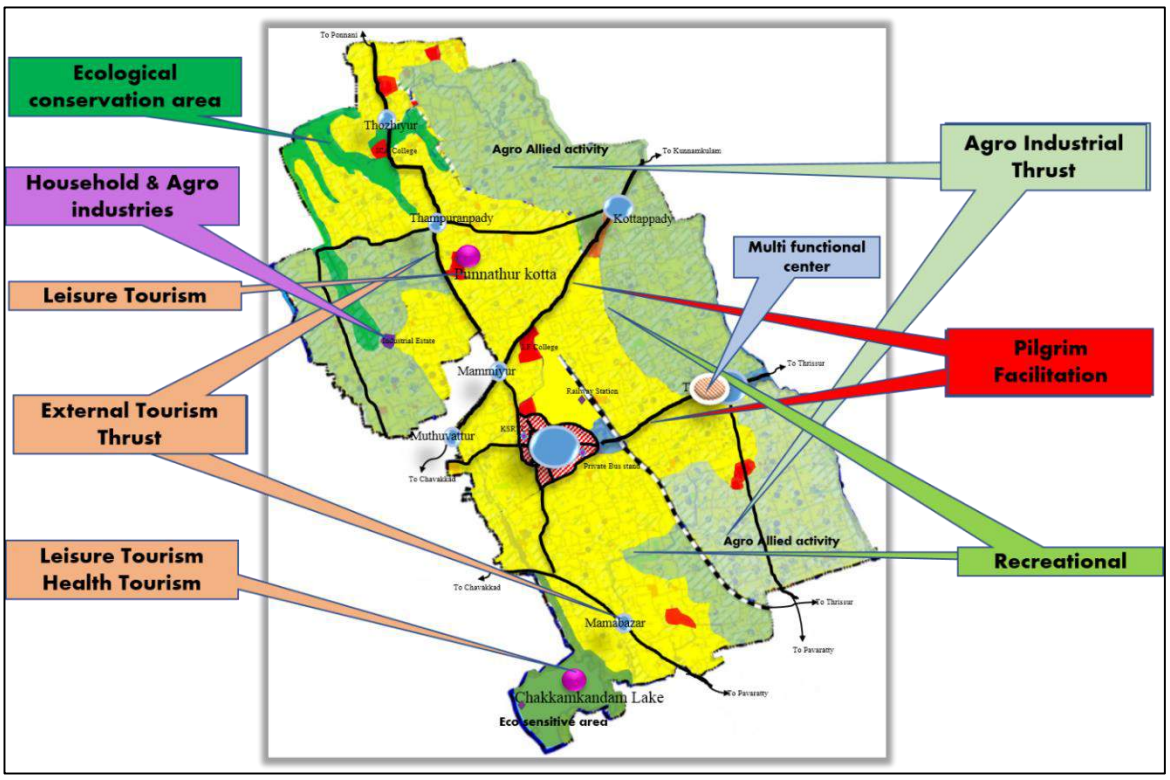


Figure 25.2 Consolidation of major factors for development concept

Health tourism is also a promising sector where there are several ayurvedic hospital to reap the benefits of Ayurveda. The age old therapy, Panchkarma Therapy and other rejuvenative and therapeutic treatments of Ayurveda can be used here for attracting tourists. Yoga and meditation centres can also be included in such centres. These centres can be planned at places with good natural surroundings so that complete "health holidays" can be planned by the tourists. Recreational facilities are unavoidable in a city as it influences the mental growth of residents to a great extent. Recreational facilities within the town are minimal as this town is a major destination point for pilgrims. There should be some open space for giving cool air and freshness to everyone in the town.

The agriculture activity area can be retained and promoted for satisfying the demand of the local economy. An industrial estate is already present within the Municipality. Effective strengthening of the existing industrial activities and provision of new agro allied and household industrial activities can also be given a thought, since dry agriculture is predominant in majority of the houses.

The ecologically important areas in the town include Paddy areas, mangrove areas, Chakkamkandam Kayal, and waterbodies like Valiyathodu. Ecologically important areas play a vital role in maintaining the ecological balance such as water infiltration, protection of

biosphere, provide liveable space for various flora and fauna, strengthen food cycle etc. Therefore, these areas have to be retained and preserved along with urban development.

In general, within residential areas, social facilities have to be provided to meet the needs for public services. The provision for social facilities at regional level has to be reasonably planned and sited for the needs of the town and its growing residential population in the new housing areas and its surrounding hinterland. All existing public and semi - public institutions are proposed to be retained in their existing locations.

25.4 Suggested road network

The integration of these zone is to be strong with networks. Road development plan should be formulated to reduce the undesirable congestion and unsafe traffic conditions on the existing road network by developing mobility corridors. Mobility corridors focus on providing mobility and aim to maximize the throughput of people. Traffic and transportation studies shows that connectivity factors are sufficient here.

The road network of Guruvayur follows a ring and radial pattern with SH 49, SH 50 and SH 62 serving as the primary mobility corridors and these corridors are supported by the major and minor roads within the Municipality. Since the growth and development of Guruvayur has been in a ring and radial pattern, it is necessary to develop a ring network of roads so that dependence on any single corridor gets fragmented into multiple corridors. Suggested road network is shown in figure 25.3. In addition to existing two ring roads, one more ring road is proposed for Guruvayur. An external ring road connecting Ovungal mosque to Thampuranpadi via Perakam road, to Kottapadi via Thampuranpadi-Kottapadi road, to Chowallurpadi via Guruvayur-Chemmanur road, to

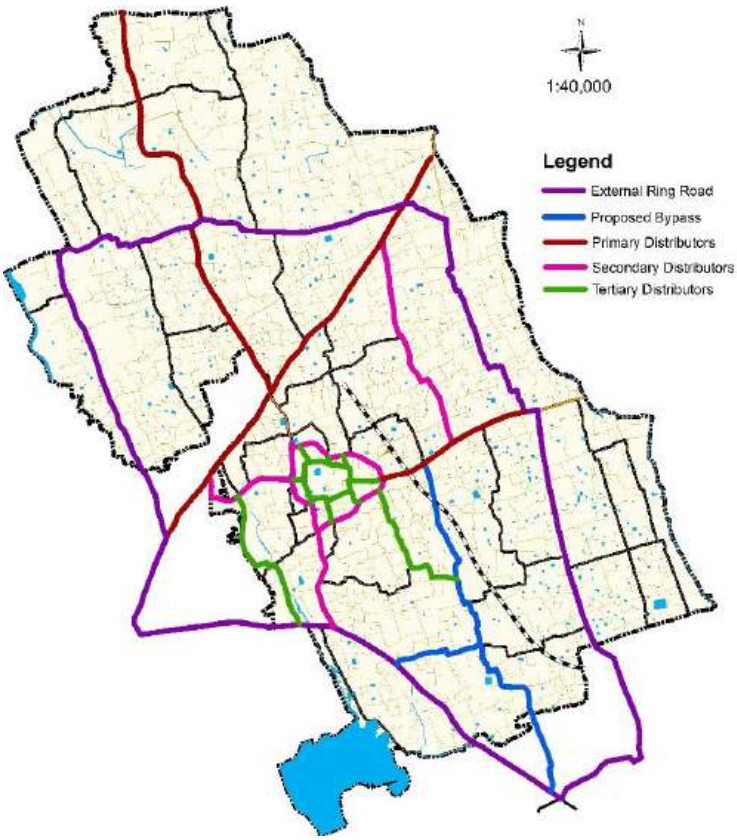


Figure 25.3 Suggested Road Network

Pavaratty via Chowallurpadi-Pavaratty road, to Chavakkad via Kanjani road and back to Ovungal mosque via SH50 (20.5 km). The main benefit of this ring road would be that it connects all the major radial roads of the municipality thereby diverting traffic to the exterior portion of the town. This would help in decongesting the core area of the town.

A bypass road is proposed between SH 49 and Pavaratty junction on Chavakkad-Kanjani road. The benefit of this bypass road would be that it would give an alternative path to the traffic between ORR/ Manjulal junction and Pavaratty junction instead of the longer route through Pancharamukku junction. The proposed External ring road and bypass road is done by mainly widening the existing roads in these areas. Widening of state highways and radial roads are also proposed along with this conceptual road network.

There should be a proper traffic management proposal to ease the traffic and reduce congestion on the Outer Ring Road, which demarcates the last motorable access to the temple for devotees. The Inner ring road can be converted into a pedestrian access for ensuring the preservation and congestion reduction. Besides this, bus stands and railway station are situated in this core area. Therefore, adequate junction improvement needs to be done at main junctions of all major roads.

25.5 Suggested Hierarchy of nodes

Analysis of the existing nodes and junctions reveals that the existing first order junction which is the CBD area and second order junction at Thaikkad will remain as first and second order node. The Kottappadi junction should remain as the third order node. The existing fourth order nodes Thampuranpadi and Mamabazar is raised to third order as an external tourism thrust, where tourism potentials of Punnathur Anakkotta and Chakkamkandam Kayal can be promoted. The

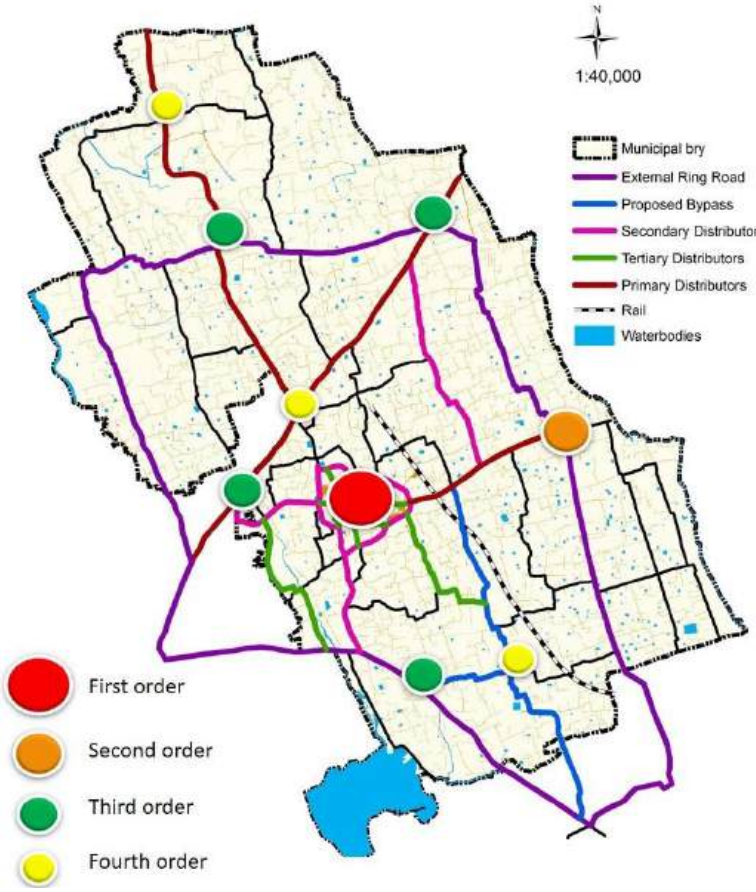


Figure 25.4 Suggested Hierarchy of nodes

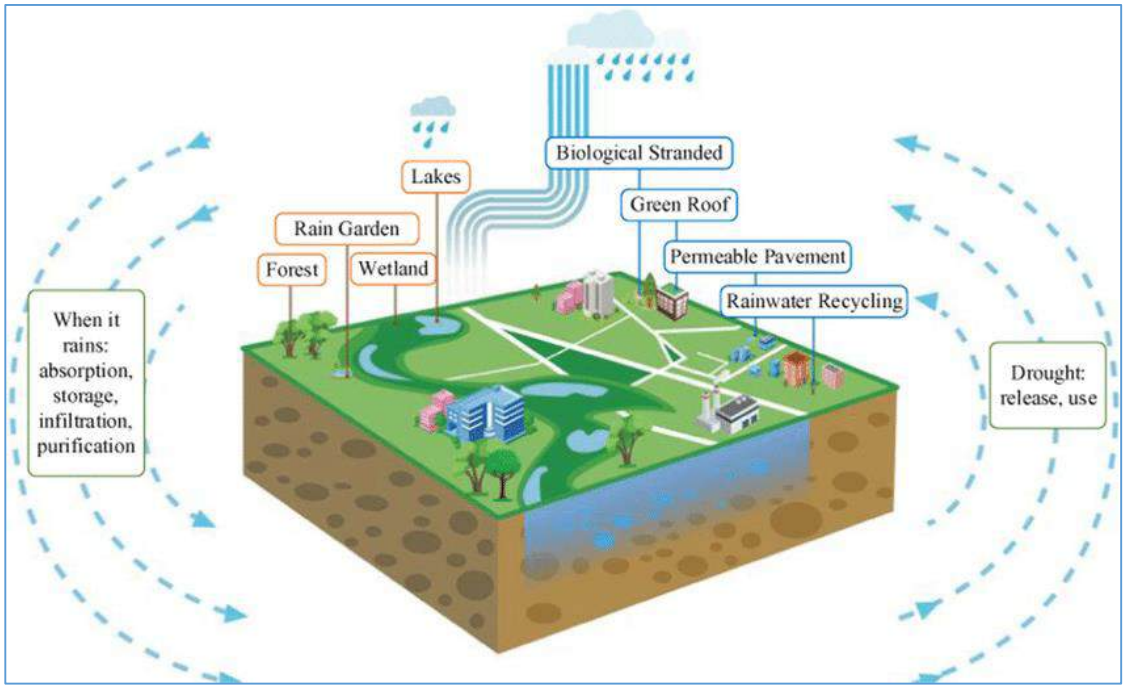
proposed bypass road creates a fourth order node at Paluvai. Other nodes such as Muthuvattur, Mamabazar and Thozhiyur remains as fourth order nodes. Figure 25.4 shows the suggested hierarchy of commercial nodes.

25.6 Disaster management and mitigation

The areas identified as flood prone are to be demarcated and guidelines/measures to mitigate the effect of flooding are to be envisioned for effective development planning of the city. For flood control, sponge city concept can be introduced for projects proposed in flood prone areas in the municipality. Sponge city is a new urban construction model for flood management, and to strengthen ecological infrastructure & drainage systems.

Sponge city aim to slow and attenuate the flow of storm water from buildings and infrastructure in urban areas, thereby reducing surface water flooding. Strategies and approaches for the application of the Sponge City concept are complex. This system helps in alleviating urban flooding, urban heat island effect and water resources shortage. It also improves the ecological environment and biodiversity by absorbing & capturing rain water and using it to reduce floods. Sponge city policies are nature-based solutions, which use natural landscapes for catching, storing and cleaning water.

Sponge City design can be improved by taking into account the local hydrogeological and geomorphological context. The various Sponge City concepts use infrastructure elements



Schematic diagram of sponge city concept

such as green roofs, rain gardens, permeable pavements, drainage swales and storage tanks

distributed throughout the city. These elements temporarily store the storm water, reducing flood peaks and volumes. The water may be released slowly into the drainage network, gathered for use as a water resource, evapotranspired by plants, infiltrated into the subsurface to increase groundwater storage, or a combination of these elements.

25.7 Green City Concept

The "Green City," is a multidimensional concept which involves economic, environmental and social aspects. A "Green City" is a city that takes responsible political and societal action in order to achieve high environmental quality, which by itself contributes to human well-being. Green cities are those where economic growth and development is fostering, that reduce negative environmental externalities, the impact on natural resources and the pressure on ecosystem services. These cities have significant synergies between environmental and economic objectives. A clean or effective production and consumption of facilities related to movement of people and goods, waste management and recycling, pollution prevention, treatment, energy, abatement, design, construction, maintenance, resource extraction, agriculture, natural resource management and other environmental services, are the prime component of a green city. Figure 25.5 shows the conceptual framework of a Green City.

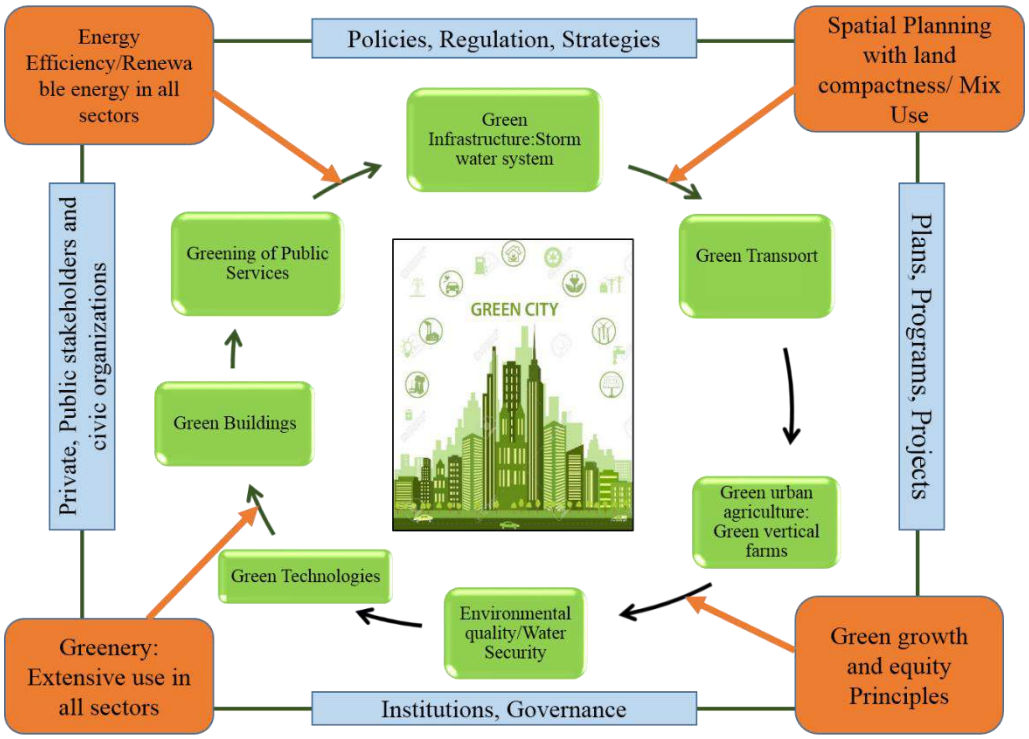


Figure 25.5 Conceptual framework of a Green City

The key benefits of the green city include the following:

- **Effective Land Use:** Green cities promote effective land use and get rid of urban sprawl by encouraging compact mixed-use developments. Higher urban densities are promoted without affecting the quality of life.
- **Habitat Prevention and Restoration:** These cities aim to prevent damage to the natural landscape, productivity of agricultural land, biodiversity and natural habitat. Such green spaces improve the quality of air and canopy covers reduces noise level.
- **Efficient Transportation Management:** Green city increases opportunities for non-motorized movement, bicycling, pedestrian friendly network, reduction in the number of automobile trips, promoting public transportation and use of vehicles with alternative fuels.
- **Effective Use of Resources:** Limits the usage of resources by incorporating efficient systems, like:
  - **Water Efficiency:** Green city includes "R3" (reduce-recycle-reuse) strategies and can save potable water to an extent of 30-40% including water harvesting.
  - **Energy Efficiency:** On-site power generation using various renewable energy technologies and other clean fuels can significantly reduce the load on grid power supply. There can be energy saving to the tune of 20-30%.
  - **Waste Management:** Waste management in Green Cities are well planned which takes into account waste reduction initiatives by planning and implementation of efficient and effective systems for collection, transportation, treatment, recycling and reuse or disposal of municipal solid waste. Also, Waste-to-energy is a key component of green city.
- **Other Benefits:** Reduced maintenance costs, resource consumption, waste generation along with higher marketability and speedy environmental clearance approvals.

25.8 Development concept

As envisioned in the vision statement, the overall concept is to develop Guruvayur into a green city so as to reduce negative environmental externalities, the impact on natural resources and the pressure on ecosystem services. The development concept is evolved by integrating all the above factors, which is pictorially represented in figure 25.6. As per development concept the town has been divided into the following policy zones such as Temple core zone, Pilgrim Activity Zone, Residential zone, mixed zone, Agriculture cum residential zone and conservation zone .

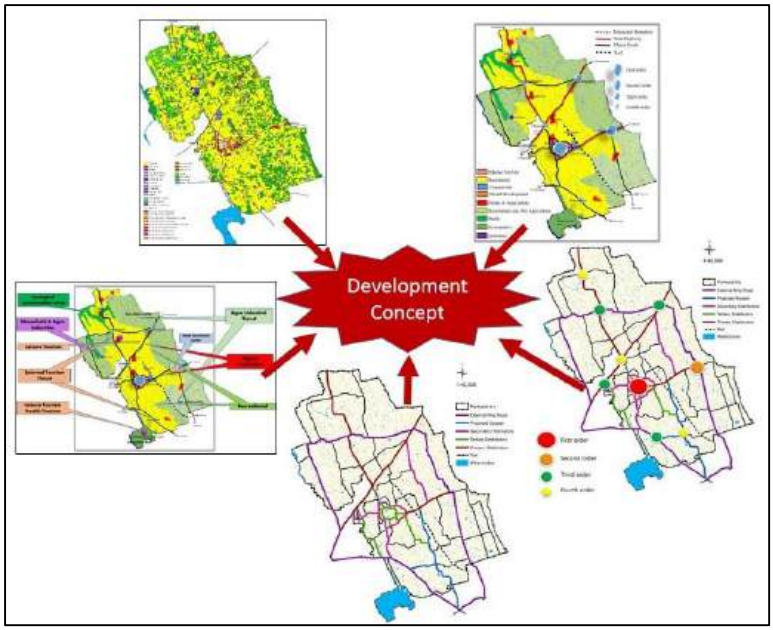


Figure 25.6 Formation of Development concept

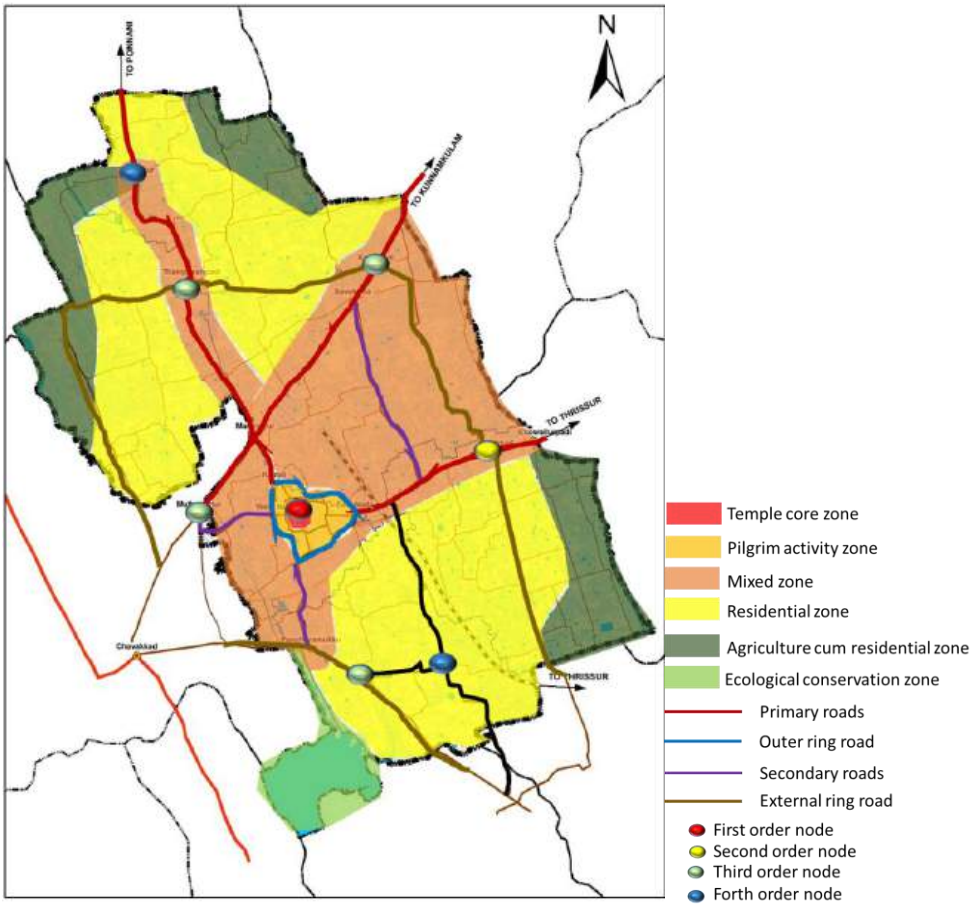


Figure 25.7 Development concept for the town

CHAPTER 26

POLICIES AND STRATEGIES

Policies and strategies are framed as a measure to ensure that the development goals are achieved without conflicts of interests among various development proposals. The policies and strategies are intended to bring in synergy to the development process by considering various aspects of the development potential, development demands and the need to conserve certain values and features.

26.1 General Development Policy

The general development policy is to streamline all the developmental activities as envisaged in the goals to attain the envisaged vision for Guruvayur Town. The spatial development envisaged is one which optimizes the utilization of resources, reduces regional, spatial and economic imbalance, protects the environment and maintains an ecological balance; as the development of the town is based on function and allied activities of the temple. The policy plan aims to achieve an urban structure in which development areas form a co-ordinating system and each area is allowed to expand in an orderly manner. Public-private partnership has to be encouraged in the development activities. The development activities are required to be in an environmentally, economically and socially sustainable manner.

26.2 Sectoral Policies and Strategies

26.2.1 Pilgrimage and Tourism

Policy: *To develop Guruvayur town as a national pilgrimage center by providing quality infrastructure supporting pilgrim activities as well as promoting tourism.*

Strategies:

- Provide adequate facilities to tourists.
- To develop an efficient transportation network with regional connectivity.
- To create and develop adequate parking spaces for the floating population as an integral part of commercial, industrial and institutional planning and development.
- To ensure round the clock cleanliness in temple complexes and premises.
- Develop Pilgrim circuit connecting the important temples with the Sree Krishna Temple.
- Development of local tourist points in the city.
- To facilitate the activities related to the arts and craft such that craft routes could be identified where tourist can see how the goods are made.

26.2.2 Traffic and Transportation

Policy: *To develop an efficient transportation network with regional connectivity considering the traffic need of the town, connecting the various activities and nodes of the town*

Strategies:

- Transportation infrastructure facilities to be improved to ensure seamless connectivity by providing/developing ring roads, fly overs, elevated corridors, scientifically designed junctions, widened roads, parking plazas, diverting through traffic from the core town through bypass roads etc.
- Development and enforcement of an integrated traffic and transportation plan is also needed.
- Facilities and safety requirements of pedestrians also should be addressed in the plan.
- Establishment of a bus terminal at appropriate location.

26.2.3 Trade and Commerce

Policy: *To develop commercial areas in hierarchal order throughout the planning area.*

Strategies:

- Provide adequate infrastructure in the newly developed commercial areas and filling the gaps of existing commercial areas.
- Enhance access to commercial areas for pedestrians and public modes of transport.
- Provide sufficient parking facilities, waste management system etc.
- Existing market need to be modernized and renovated.

26.2.4 Industry

Policy: *Promote industrial activities by using available resources and providing sufficient infrastructure and by developing marketing facilities*

Strategies:

- Micro and small industries of non-polluting nature to be allowed in all zones, moderately polluting ones in the transition areas and that of polluting nature in the outer areas with stringent pollution control norms.
- To develop and promote agriculture related industries like Agro-industrial parks.
- To expand the existing industrial units.
- To encourage woman entrepreneurs and Kudumbashree units.
- To promote industrial growth and commercial sector in the same direction.
- Promotion of handicraft and handloom industries.

26.2.5 Agriculture and allied sectors

Policy: *Promote homestead agricultural activities and bio organic farming*

Strategies:

- Cultivation of medicinal plants/spices, coconut and horticultural products are to be given thrust in this regard.
- Conservation of existing paddy cultivation areas.
- Provision of dedicated spaces for farmers in order to sell their goods directly.
- The existing potential of canal, water courses and ponds may be utilized fully for formulating viable irrigation projects.
- To promote floriculture and related industries through special groups.
- To implement organic farming through various policy initiatives.
- Integration of homestead cultivation and animal husbandry sector.

26.2.6 Water supply

Policy: *To develop additional source of water for fulfilling the present and future demands.*

Strategies:

- Ensuring 100% coverage of the town and regulate water supply.
- Restoration or conservation of existing water resources in the municipality.
- Rainwater harvesting through well recharge and watershed management interventions.
- Water quality analysis and well mapping.
- Development of water policy.

26.2.7 Sanitation

Policy: *Development of sewerage or drainage network and waste management system*

Strategies:

- Integrated scientific systems for drainage, sewage, sanitary and solid waste management including special focus on proper treatment of wastes generated from hotels, hospitals etc. are needed.
- Establishment of proper drainage network with treatment plant for recycling the waste water.
- Ensure safe, adequate, and cost-effective water supply and waste treatment to all residents.
- Promote safe and Hygienic collection, transportation and disposal of solid waste.
- To stop disposal of untreated waste water into waterbodies.
- Provide storm water drainage system in order to prevent water logging.

26.2.8 Education and Health

Policy: *Health service and education are the integral part of social services required to support the system and to enhance the livability of the place. So basic facilities considering the future population is to be ensured.*

Strategies:

- Provide technical institutions as required per planning standards.
- Improve basic infrastructure facilities in Anganwadis.
- Development and expansion of existing Primary Health centres.

26.2.9 Energy

Policy: *Providing sufficient quantity of energy is pre-requisite for the overall development of town*

Strategies:

- Promoting non-conventional source of energy like solar.

26.2.10 Environment

Policy: *To ensure clean, green and hygienic living environment and conserve the nature*

Strategies:

- Renovation of water bodies.
- Increase in town green cover.
- Developing parks and areas near to water bodies to promote tourism.
- Environmentally fragile areas including paddy fields, ponds, streams and natural drains etc. are to be preserved/protected/restored.
- Various measures for eco restoration of environmentally fragile areas are to be adopted.

26.2.11 Other Infrastructure Facilities

Policy: *Providing all, the access to basic amenities of life and maintain the high standards of Recreational and institutional facilities.*

Strategies:

- Additional areas for public and semipublic use are also not to be earmarked. Instead, policy provisions are to be framed to facilitate expansion of the existing public/semipublic facilities.
- The plan needs to facilitate affordable housing, having required quality, accessible especially to low/medium income group, including special provisions for proper accommodation for migrant laborers from other states.

26.2.12 Municipal administration and governance

Policy: *Promote better service Delivery*

Strategies:

- Promoting optimization of available municipal land for generating resources for municipality development.
- Making use of good practices in urban development for resource generation.
- Improving revenue base for the town through GIS based property tax system.
- Rationalizing the pricing of urban services on the principal of "USER MUST PAY".
- Optimizing use of available resources through better prioritization of projects and improved management.
- Improving financial management through adoption of standard accounting policies.
- Achieving continuous reduction in service delivery and overhead costs through better financial management.

CHAPTER 27

PROJECTED REQUIREMENTS

Projections are based on the assumption that the past trends will continue to operate in future as well. The reliability of projection depends on closeness it has with the reality. Population projections are treated as predictions and never to be taken as final population. Even though the plan period is 2039, the future of Guruvayur Municipality is visualized for the year 2041 to get the best available projection for planning.

27.1 Population Projection

Population projection is a statistical method to derive the future population of the planning area. It helps to develop the policy and strategies for development. To arrive at a conclusive projection figure, the projected population is found out five different methods and the result obtained is shown in table 27.1. The projected population of the following three decades are 75889, 81900 and 88093 which shows that the existing population shows a gradual increase in number.

Table 27.1. Projected population

Method of Projection	2011	2021	2031	2041
Arithmetic Method	70012	75875	81737	87600
Geometric Increase Method	70012	77585	85976	95274
Exponential Method	70012	78009	86919	96847
Incremental Increase Method	70012	77044	85246	94618
Decreasing Growth Rate Method	70012	70934	69621	66126
Average		**75889**	**81900**	**88093**

Since the town attracts a huge influx of pilgrims, it is also necessary to be included while forecasting the future population. Major drawback of the study is the unavailability of pilgrim data for the previous decades. Whereas the study shows that on an average about 30000 pilgrims are visiting the temple daily during peak seasons; especially during the months of November to January. As per tourism statistics the year wise number of domestic tourists arrived at Guruvayur shows decreasing trend.

27.2 Anticipated changes in occupational pattern

The economic activities govern the occupational structure of the area. Total expected population by 2041 is 88093. Number of workers also shows an increase to 29309.

Subsequently, the workforce participation rate will be increasing from 29.57% in 2011 to 33.27% in 2041, as per details shown in table 27.2. By introducing new development projects, the economic base will be strengthened which will further results in increasing the job opportunities in the town area.

Table 27.2. Projected Number of Workers and Workforce Participation

Year	1981	1991	2001	2011	2021	2031	2041
Total No. of Workers	12774	16535	19055	20702	23439	26253	29309
WFPR	24.07	27.05	28.44	29.57	30.89	32.05	33.27

27.3 Requirement of various Infrastructure

27.3.1 Physical Infrastructure

a) Water supply

Inadequate and low quality water supply is already a major issue in Guruvayur. With increase in future population (both domestic and pilgrim), the efficiency of the system will further deteriorate in the coming years. Water supply storage tanks and accessories needs to be designed for round-the-clock supply for the Municipality residents and commercial and institutional activities. The projected water to be supplied for the Municipality is 23.20MLD by 2041 which is nearly twice the present requirement and 3 times the present supply. The projected requirement of water for 2041 is shown in table 27.3

Table 27.3. Projected Water Supply Requirement

Year Projected	2011 (Base Year)	2021	2031	2041
Population	70012	75889	81900	88093
Floating Population	29632	35855	71710	143419
Water supply (MLD)	12.79	14.02	17.35	23.20

b) Sewerage

Sewage treatment plant is generally designed for a quantity of 80% of the total water supply. At present, work of one sewage treatment plant is in progress which has a treatment capacity of only 3MLD. By 2041, 20.42MLD sewage will be generated, as per details shown in table 27.4. This gap needs to be addressed. All related works of sewerage lines are to be setup at the earliest to treat at least the present quantity produced.

Table 27.4. Projected Sewage Treatment Capacity Requirement

Year Projected	2011 (Base Year)	2021	2031	2041
Population	70012	75889	81900	88093
Sewage Generated (MLD)	10.23	11.22	13.88	18.56

Treatment capacity @ 1.1%	11.26	12.34	15.26	20.42

c) Solid Waste Management

Presently Municipality has a trenching ground of 10280sq.m. (2.54 acres) area having a windrow compost plant of 5TPD capacity. Due to insufficient collection and segregation of biodegradable waste, only 3.8TPD is able to reach the compost plant for composting. 28.19TPD waste (biodegradable and non-biodegradable) will be produced in the end of the plan year. (Refer Table 27.5.)

Table 27.5. Projected Solid waste production and compost plant area

Year Projected		**2011**	**2021**	**2031**	**2041**
Population		70012	75889	81900	88093
Solid waste generation @ 320g/p/d	Tonnes/day	22.40	24.28	26.21	28.19
30% extra for other institutions	Tonnes/day	29.12	31.57	34.07	36.65
Composting 400 sq.m /tonne	Acres	2.88	3.12	3.37	3.62

d) Transportation

Table 27.6. Transportation and Street lighting requirement

Sl. No.	**Particulars**		**2021**	**2031**	**2041**
1	Population		75889	81900	88093
2	Road length @ 0.00096 per capita (km)		73	79	85
	Road Type	1. Concrete (km) @15% of total road length	11	12	13
		2. Bituminous (km)@ 85% of total road length	62	67	72
3	Lamp poles @ 30 m c/c		2409	2607	2805
	Street Lights	1. Tube Light @ 30% of lamp poles	723	782	842
		2. High power lamps @ 70% of lamp poles	1686	1825	1964
4	High Mast Lamps @ 0.1% of lamp poles		2	3	3
5	Parking facilities @ 0.4 Ha of land per 10000 people		3.04	3.28	3.52

e) Power

Present distribution is said to be satisfactory in spite of only one substation which is in an area of 1.27acres. As per planning standards, the substation has enough area for future. (Table 27.7.)

Table 27.7. Projected Power Requirement

Year Projected	2011 (Base Year)	2021	2031	2041
Population	70012	75889	81900	88093
Substation: One 11KV Substation for every 15000	5	5	5	6
Area requirement @ 0.05 acre/substation	0.25	0.25	0.25	0.3

27.3.2 Social Infrastructure

a) Education

Educational facilities are sufficient for the present and future population with enough schools within the Municipality. There were no special schools located for the physically or mentally challenged children. Technical institutions are present but infrastructure facilities should be enhanced. Colleges offering degree courses are sufficient whereas professional colleges are only outside the Municipality. (Table 27.8.)

Table 27.8. Educational Infrastructure

Guidelines for Schools	Population served per unit (as per URDPFI)	Required	Existing	Gap	2021	2031	2041
Population		**70012**			**75889**	**81900**	**88093**
Pre-primary/Nursery school	2500	28	74	No gap	30	33	35
Primary (I-V)	5000	14	24	No gap	15	16	18
Senior secondary (VI-XII)	7500	9	30	No gap	10	11	12

b) Health

Table 27.9. Health Infrastructure

Health Care Facilities	Standards	Required	Existing	2021	2031	2041
Population		**70012**		**75889**	**81900**	**86093**
Dispensary	1 for 15000	5	9	5	5	6
Nursing Home, child welfare and maternity centre - 25 to 30 beds	1 for 1 lakh	1	1	1	1	1
Polyclinic	1 for 1 lakh	1	1	1	1	1
Intermediete Hospital B	1 for 1 lakh	1	3	1	1	1
Intermediete Hospital A	1 for 1 lakh	1	0	1	1	1
Multi speciality Hospital	1 for 1 lakh	1	0	1	1	1
Speciality hospital	1 for 1 lakh	1	0	1	1	1

General Hospital	1 for 2.5 lakh	0	0	0	0	0
Family Welfare Centre	1 for 50000	1	8	2	2	2
Diagnostic Centre	1 for 50000	1	1	2	2	2
Dispensary for pet animals & birds	1 for 1 lakh	1	3	1	1	1
Medical College	1 for 10 lakhs	0	0	0	0	0

All health facilities are sufficient except that the Municipality lacks an intermediate hospital type A, specialty hospital and a diagnostic centre. For these, area will be required as in Table 27.10.

Table 27.10. Area Required for additional health infrastructure

Health Care Facilities	**Unit**	**Area required per institution**	**2021**	**2031**	**2041**
Population			**75889**	**81900**	**88093**
Intermediete Hospital A	Ha	3.9	3.9	3.9	3.9
Multi speciality Hospital	Ha	9	9	9	9
Speciality hospital	Ha	3.7	3.7	3.7	3.7
Diagnostic Centre	Sqm	800	800	800	800

c) Recreational Facilities and Utility services

Table 27.11. Projected Requirement for recreational facilities

Type with URDPFI standards	**Required**	**Existing**	**Gap**	**2021**	**2031**	**2041**
	70012			**75889**	**81900**	**88093**
Housing Area Park (1 for 5000)	14	2	12	15	16	18
Neighbourhood park (1 for 15000)	5	0	5	5	5	6
Community parks (1 for 1 lakh)	0	0	0	1	1	1
Public library (1 for every 15000)	5	6	0	5	5	6
Stadiums/District Sports Centre (1 for 1 lakh)	1	0	0	1	1	1

Table 27.12. Projected Requirement for utilities

Utilities	**Population served per unit (as per URDPFI)**	**Required**	**2021**	**2031**	**2041**
		70012	**75889**	**81900**	**88093**
Milk Distribution	5000	14	15	16	18

Convenience Shopping	5000	14	15	16	18
Local Shopping including service centres	15000	5	5	5	6
LPG Godown	50000	1	2	2	2
Post Office	15000	5	5	5	6
Police Station	90000	1	1	1	1
Fire Station	2 lakhs	1	0	0	0

Recreational facilities are insufficient and by 2041, 15Ha of land will be required for parks. Land for stadium needs to be identified. In case of utility services, commercial areas need to be upgraded and new junctions to be identified.

CHAPTER 28
PROPOSED LAND USE PLAN

In order to develop Guruvayur into a sustainable green pilgrimage city, by accommodating the projected requirements based on the development concept for the horizon period, requirement of land for various uses is to be determined and located spatially. The land use plan is prepared considering the existing development scenario, development trend and future requirements in the horizon period.

28.1 Proposed Land Use Plan

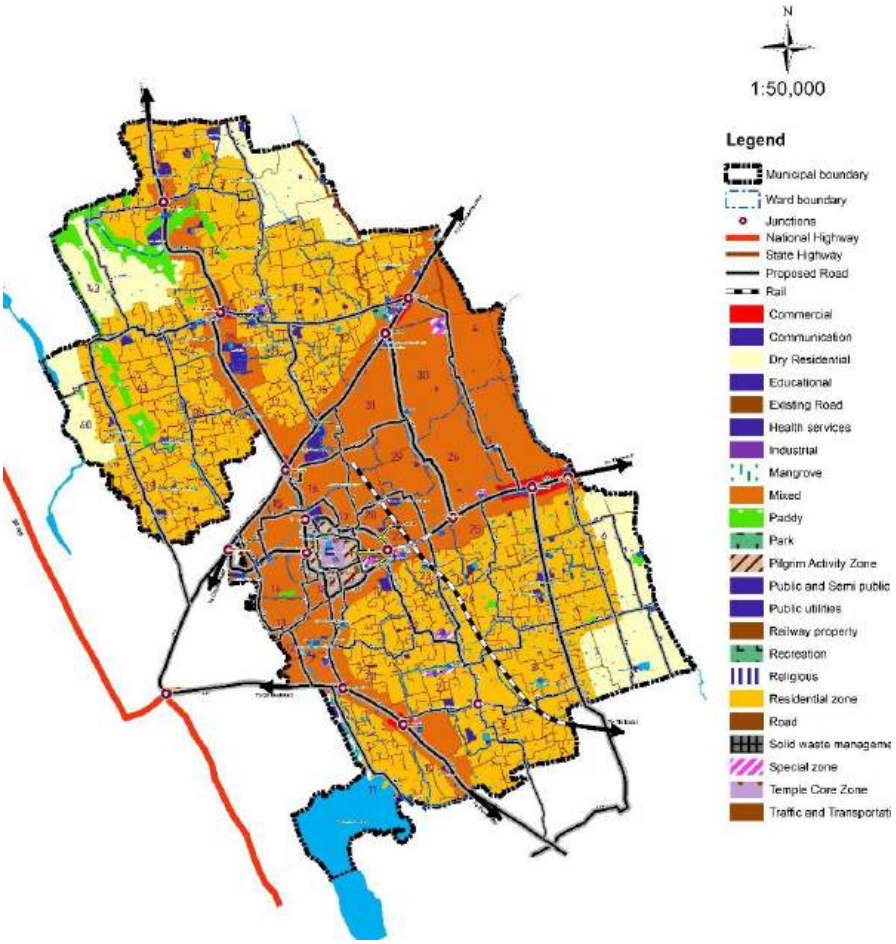


Figure 28.1 Proposed Land Use

The proposed land use plan for Guruvayur town has been prepared for the year 2039. The spatial distribution of proposed land use is shown in figure 28.1.The proposed land use break up (in terms of area and percentage of composition) is shown in Table 28.1.

Table 28.1 Proposed Land Use – Breakup

Sl. No.	Proposed Land Use	Area in Sq. Km	% of Total area
1	Temple core zone	0.08	0.28
2	Pilgrim Activity Zone	0.2	0.69
3	Residential Use Zone	13.02	45.34
4	Mixed use Zone	7.82	27.24
5	Dry Agriculture cum Residential Use Zone	3	10.45
6	Commercial Use Zone	0.27	0.94
7	Traffic and Transportation Use Zone	1.54	5.36
8	Public & Semi-Public Use Zone	0.64	2.23
9	Industrial Use Zone	0.01	0.03
10	Conservation Zone	0.63	2.19
11	Recreational Zone	0.07	0.24
12	Mangroves	0.06	0.21
13	Special Zone	0.21	0.73
14	Water bodies	1.17	4.07
	TOTAL	**28.72**	**100**

28.2 Temple Core Zone

Land surrounding Sree Krishna temple with radial distance of approximately 100m but within inner ring road is proposed as temple core zone. As per the URDPFI guidelines this zone is of highest ethnic value and is meant for preservation. This zone is reserved for constructions incidental to temple development by Guruvayur Devaswom and green temple initiatives may be permitted. Total area coming under this zone is 0.08 sq.km which constitutes about 0.28% of the total area.

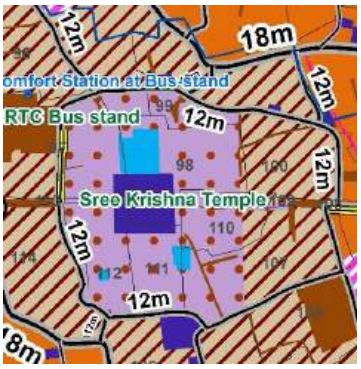


Figure 28.2 Temple Core Zone

28.3 Pilgrim Activity Zone

As Guruvayur is a prominent pilgrim destination, the major activities occurring in the central business district (CBD) is more or less related to the activities of the temple. The existing CBD area is very congested where inadequate road width, lack of parking facilities etc. are the major

problems. The planning intervention is to propose a compact development in that area. Hence areas in the inner portion of the outer ring road is proposed as pilgrim activity zone. This area is proposed to be regulated for the development of pilgrim activities and other related functions. Total area coming under this zone is 0.2 sq.km which constitutes about 0.69% of the total area. Additional architectural guidelines have been proposed in this zone for the conservation of culture, architecture features and for promotion of local economy.

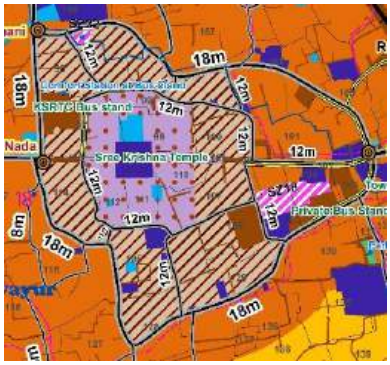


Figure 28.3 Pilgrim Activity Zone

28.4 Residential Use Zone

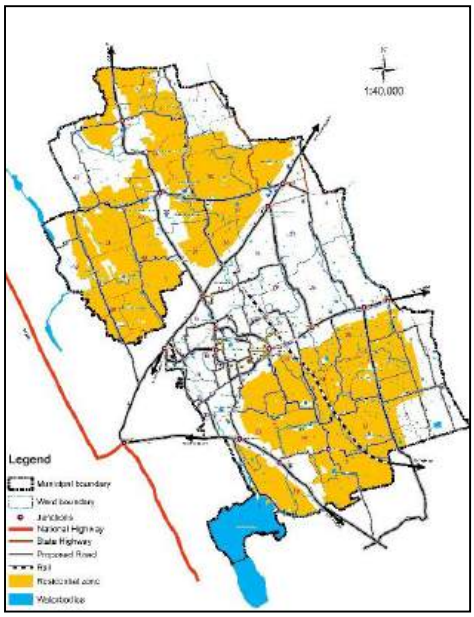


Figure 28.4: Proposed Residential use zone

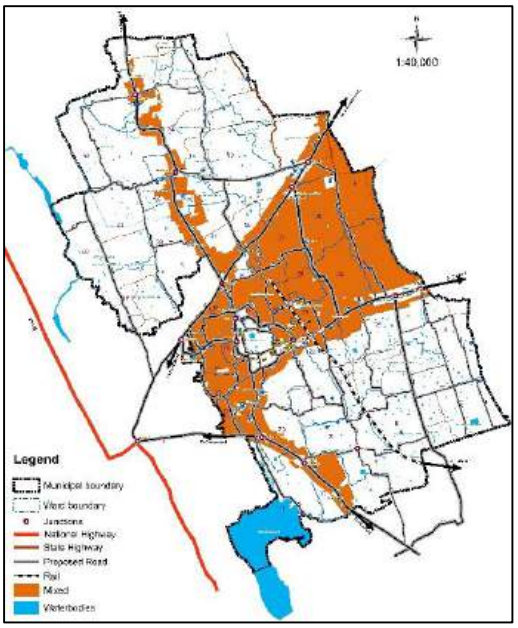


Figure 28.5: Proposed Mixed Use Zone

As per the proposed land use distribution, Guruvayur is designed to have total residential area of around 13.02 sq.km, which is 45.34% of the total area.

28.5 Mixed Use Zone

Mixed Use essentially means provision of compatible uses in a given land use, by considering its environmental impact and the socio-economic needs of the society. This helps in reducing the transportation needs, trip time and traffic movement and adequate parking considerably. Considering the development trend of the town and to accommodate the increasing development needs of the town, more area has been included under this zone. It is generally a mixed active zone where uses such as residential, commercial, industrial and public/semi public use etc. are permissible in this zone. The area between the state highways

can be planned as a new development zone. Mixed activities can be planned in this zone for new developments to come up, to meet the requirements for the promotion of tourism and for city growth. Land between SH 49 and SH50 and lying along SH62, Chavakkad - Kanjani road is proposed as mixed zone. Total area coming under proposed mixed use is 7.82 sq.km which constitutes about 27.24% of the total area.

28.6 Dry Agriculture cum Residential Use Zone

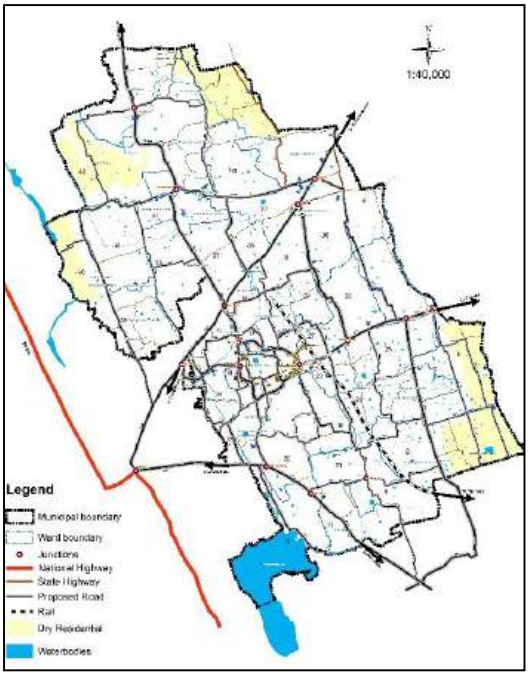


Figure 28.6: Dry Agriculture cum Residential Zone

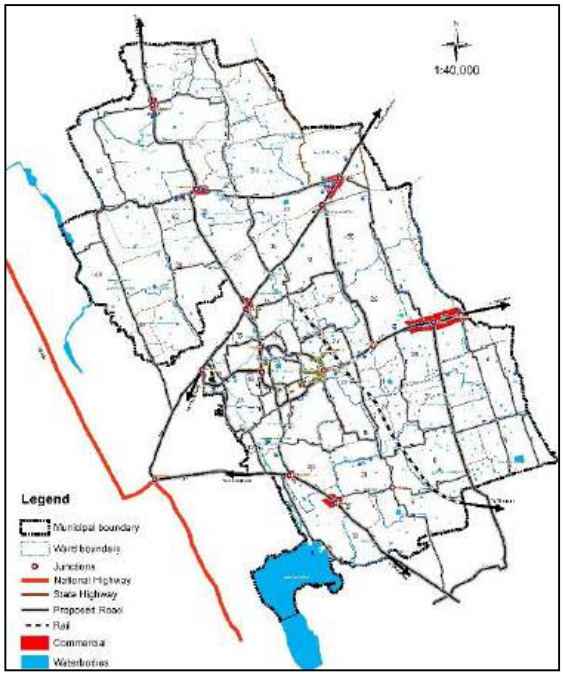


Figure 28.7: Proposed Commercial Zone

A dry agriculture cum residential zone is proposed with a total area of 3.00 sq.Km which is about 10.45 % of the total area.

28.7 Commercial Use Zone

As per the development concept, the existing commercial areas within the CBD have to be proposed to be retained as such, which is vital for the existence of the town and necessary for satisfying the needs of thousands of pilgrims arriving daily. The existing second order node at Thaikkad is proposed to be developed with a multifunctional center. It is proposed to strengthen the other important nodes by providing necessary facilities. Proposed commercial area constitutes 0.27sq.km which is about 0.94%.

28.8 Traffic and Transportation Use Zone

This zone mainly comprises all the roads and other transport related activities such as Bus stands, parking areas etc. Proposal for Widening of roads and parking area is incorporated in the land use plan. An extent of 1.54 sq.km is proposed which constitutes about 5.36% of the total area.

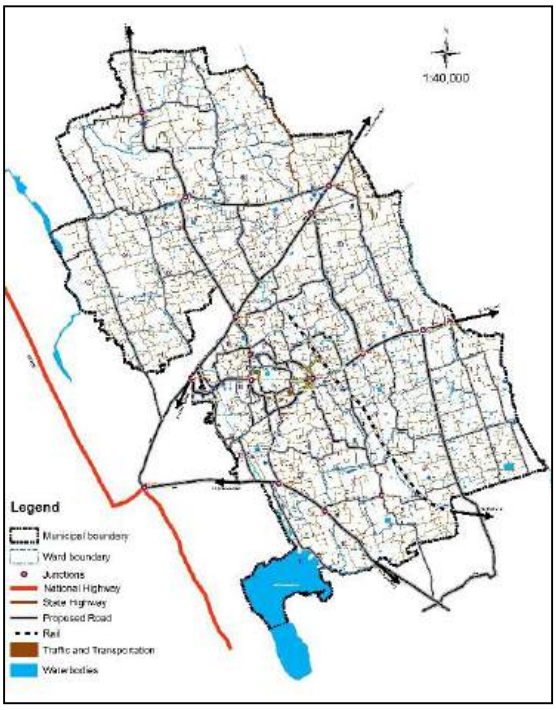


Figure 28.8: Traffic and Transportation Use

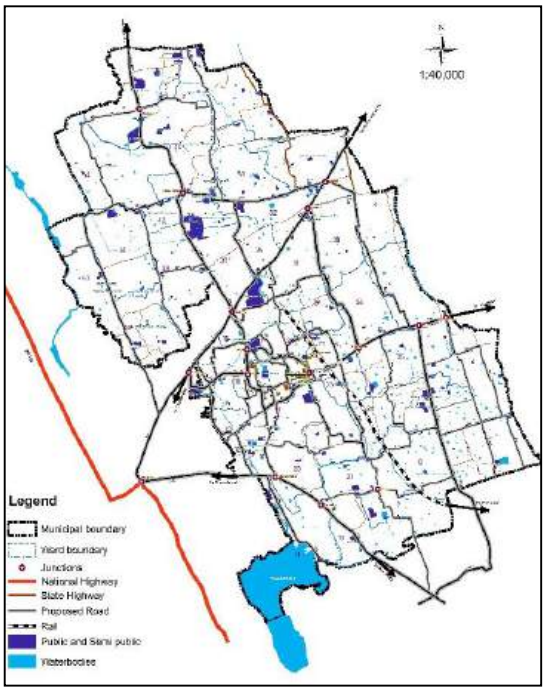


Figure 28.9: Public and Semi Public Use Zone

28.9 Public and Semi Public Use Zone

Public and semi public land use accommodate Government offices, education institutions and health related and religious institutions. It comprises of all the existing and proposed public use land and buildings. Public and semi public activities are also permitted in mixed development zone. The land under public and semi public use is 0.64 sq.km which is about 2.23% of the total area.

28.10 Industrial Use Zone

The existing industrial area constitute 0.05 Sq.km which is 0.17% of the total area. Industrial land use area constitutes about 0.01 sq.km, which is about 0.03% of the total area. The area proposed for Industrial land use is less than existing industrial landuse, whereas it is permitted in all development zones.

28.11 Conservation zone

This zone includes the present paddy active and non active areas which need to be conserved. Conservation of Paddy fields has environmental significance. Paddy fields works as water recharging measure. Conservation of paddy is proposed wherever essential for maintaining environmental quality and the land use in these areas are to be strictly regulated. It constitutes about 0.63 sq.km which is about 2.19% of the total area.

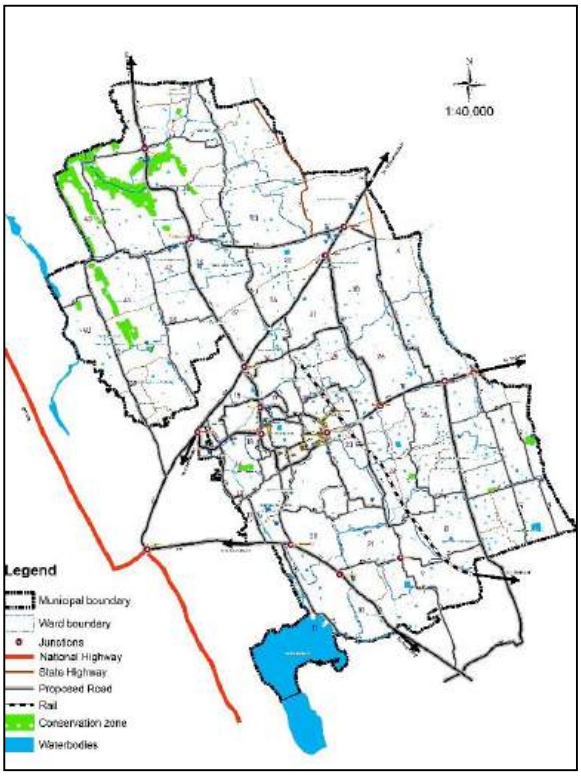


Figure 28.10: Conservation zone

28.12 Recreational Zone

It includes area for recreational activities such as playground, parks and open spaces. As it is a pilgrim town where lakhs of peoples visits frequently there is a demand for recreational spaces. Therefore parks, playgrounds are proposed. Also a stadium and a sports village is proposed as special zones It constitutes 0.07 sq.km which is nearly 0.24% of the total area.

28.13 Mangroves

Presently Municipality has Mangroves in an area of 0.06 sq.km, alongside of Chakkamkandam Lake. It is proposed to protect the existing mangrove forest area, since it is included in coastal regulation zone.

28.14 Special Zones

Special zones include the areas specifically demarcated for certain projects. The land specially demarcated for certain projects as Special Zones such as may be procured as per the provisions of the Kerala Town & Country Planning Act 2016, by Guruvayur Municipality or other agencies concerned. If the proceedings to procure such land have not been initiated within 7 years from the date of sanctioning of this Master Plan, the areas so specifically demarcated may be released and assigned to a use permitted/restricted in the surrounding land use zone in the Proposed Land Use Map by the Secretary with the concurrence of the Town Planner, based on the application for building permit received. Special uses include a total area of 0.21sq.km

which is about 0.73% of the total area. It includes proposed projects such as Pilgrim Amenity Centers, Open air Gym and Yoga Park, Tourism facilitation Centers, New markets, Integrated Agro Park, Sports Village, Bus stands, Stadium, etc.as shown in figure 28.11.

28.15 Water Bodies

It includes lake, pond, river, canal etc. extends over 1.17sq.km area which is about 4.07% of the total area.

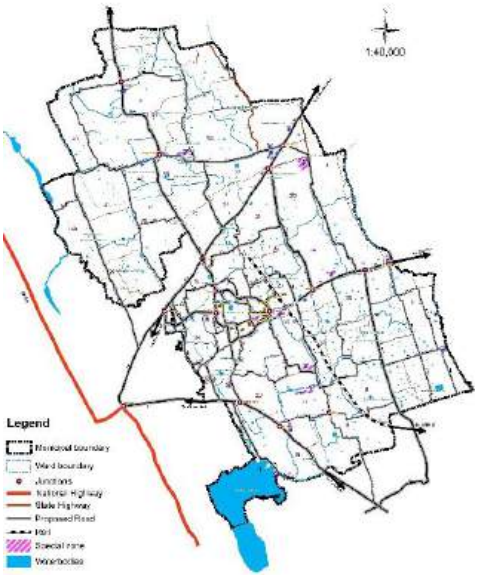


Fig. 28.11: Special zones

CHAPTER 29

TRANSPORT DEVELOPMENT PLAN

Transport development plan for Guruvayur was prepared taking into consideration the traffic characteristics as well as the infrastructure options. The plan takes into account the existing traffic scenario and is based on the projected future traffic on the base year network. Transport development schemes are formulated so as to reduce the undesirable congestion and unsafe traffic conditions on the existing road network. All committed development schemes were taken into account while formulating the transport development plan.

29.1Proposed Road Development Plan for Guruvayur

Road development plan should be formulated to develop mobility corridors for Guruvayur. Mobility corridors focus on providing mobility and aim to maximize the throughput of people. Mobility corridors give priority to public transit systems, ensuring that while designing these corridors, all modes of travel are considered and integrated. On the basis of the projected volume of traffic and alternative network development schemes considered, a road development plan has been formulated for Guruvayur. Four categories of roads are proposed.(i) primary distributor (ii) Secondary distributor (iii) Tertiary distributor (iv) Local roads as shown in figure 29.1. As per the future road development plan for the town, the proposed network comprises of ring and radial pattern of urban road network.

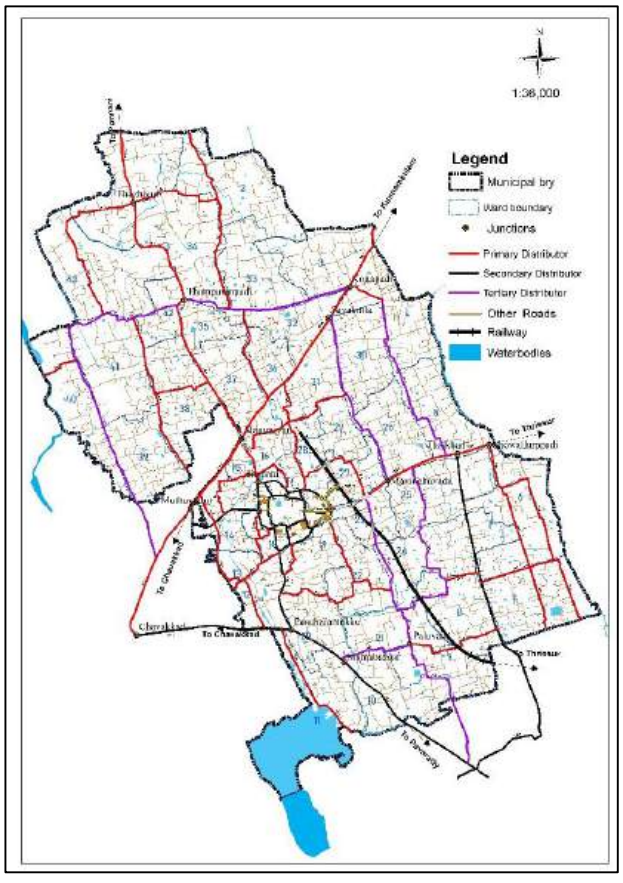
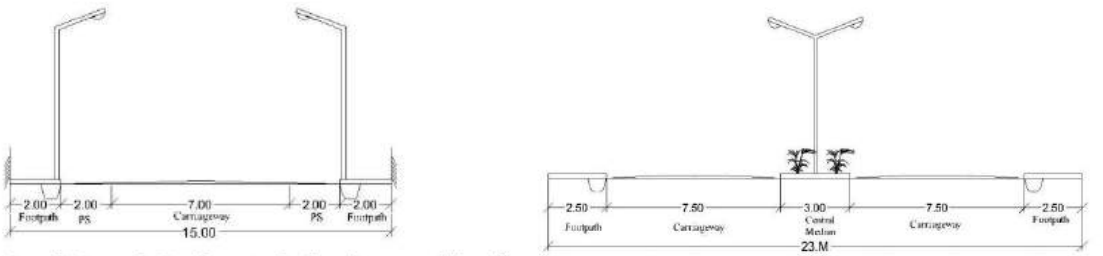


Figure 29.1:Primary Distributor Roads

29.1.1 Primary distributor – In Guruvayur, SH 49, SH 50 and SH 62 are the primarydistributors.Figure29.2shows proposed typical cross section of primary distributors of Guruvayur.



a) Cross section of 15m road -Two lane standard carriage way (Phase I) b) Cross section of 23m road - Four lane divided carriage way (Phase II)

Figure 29.2: Typical cross section of primary distributor roads

(i) **Guruvayur-Choondal (SH 49)** road is one of the radial roads in North East-South West direction and connects Guruvayur to Thrissur. This road is 7.275 km long and is the shortest State Highway in Kerala. The existing road has two lane carriageway width and ROW of about 14.5m. The road is proposed to be developed to 23m ROW with two lanes in each direction, 2.5m footpath on each side.

(ii) **Guruvayur-Kunnamkulam (SH 50)** road is another radial road of Guruvayur in North East-South West direction and connects Guruvayur with Kunnamkulam and Chavakkad. This road is part of Chavakkad – Wadakkanchery state highway. The existing road has two lane carriageway with ROW width of about 10m. The road is proposed to be developed to 23m ROW with two lanes in each direction, 2.5m footpath on each side.

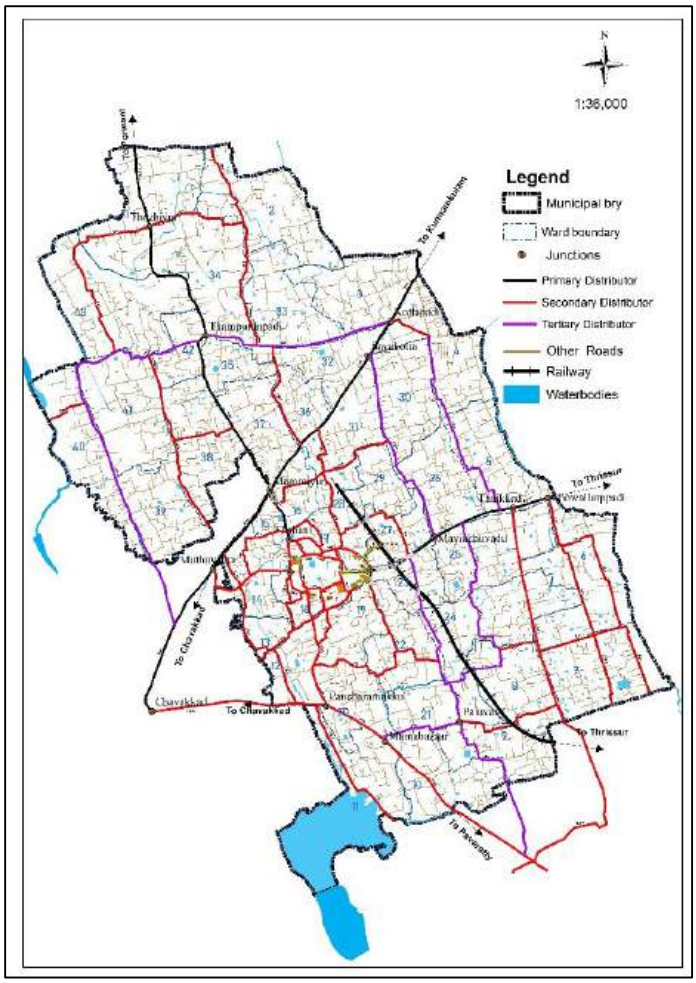
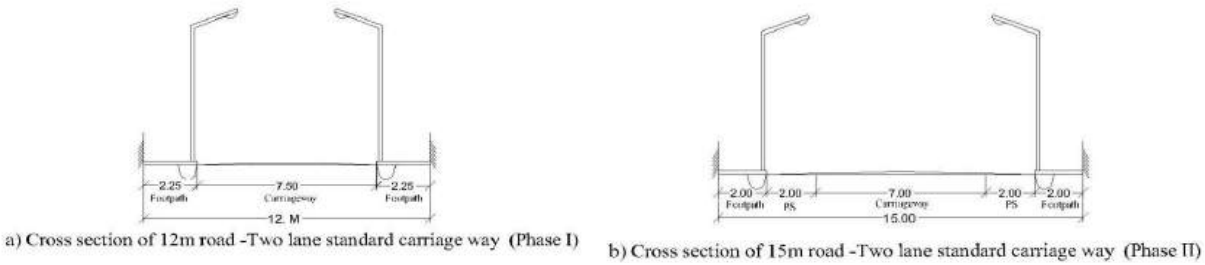


Figure 29.3: Secondary Distributor Roads

(iii) **Guruvayur- Althara (SH 62)** road is another primary radial road in North West- South East direction. This road is part of Guruvayur-Althara-Ponnani road. It has two lane carriageway with about 11m ROW. The road is proposed to be developed with 15m ROW with two lanes, 2m paved shoulder and 2m footpath on either side.

29.1.2 Secondary distributor – In Guruvayur, Chavakkad-Kanjani road, Guruvayur-Karakkad road, Guruvayur-Muthuvattoor road, Thaikkad-Pavaratty road , Outer Ring road and Guruvayur Savakotta road are the secondary distributors. Providing connectivity to neighbouring towns within and outside district, the proposed 'right of way' width ranges from 12 to 18m. Figure 29.4 shows proposed typical cross section of secondary distributor of Guruvayur.



a) Cross section of 12m road -Two lane standard carriage way (Phase I)

b) Cross section of 15m road -Two lane standard carriage way (Phase II)

Figure 29.4: Typical cross section of Secondary distributor roads

(i) **Chavakkad-Kanjani** road is a radial road of Guruvayur in North West- South East direction. This road passes through the municipality from Palayur church to near Pavaratty junction. This road has a two lane carriageway width in 8.5m ROW. This is proposed to be developed as secondary distributor road in 15m ROW with two lanes, 2m paved shoulder and 2m footpath on either side. This widening would provide a capacity at par with arterial road.

(ii) **Guruvayur- Karakkad** road is a radial road that radiates from ORR and connects Pancharamukku junction on Chavakkad-Kanjani road. The existing road has two lane carriageway in 9m ROW. This road needs to be developed as a secondary distributor road with a ROW of 12m and carriageway width of 7.5m.

(iii) **Guruvayur-Muthuvattur** road radiates from ORR and connects Muthuvattur junction on SH 50. The road is proposed to be developed as secondary distributor road in 18m ROW with two lanes, 2m paved shoulder and 2m footpath on either side.

(iv) **Chowallurpadi-Pavaratty road** runs from Thaikkad junction on SH 49 to Pavaratty junction on Chavakkad-Kanjani road. This road has two lane carriageway width in 12m ROW. The road is proposed to be developed as secondary distributor road in 15m ROW with two lanes, 2m paved shoulder and 2m footpath on either side. This widening would provide a capacity at par with arterial road.

(v) **Outer Ring Road** is circular road concentric to the Guruvayur temple. The existing road has two lane carriageway in 8m ROW. This is proposed to be developed as secondary distributor road in 18m ROW with three lanes, 2m paved shoulder and 2m footpath on either side. This widening would provide a capacity at par with arterial road.

(vi) **Mavinchodu – Bio Park road** connects SH 50 and SH 49 on the eastern side of the town. This road has about 3.3m carriageway width in 5.8m ROW. It proposed to be developed as secondary distributor road in 18m ROW with two lanes, 2m paved shoulder and 2m footpath on either side.

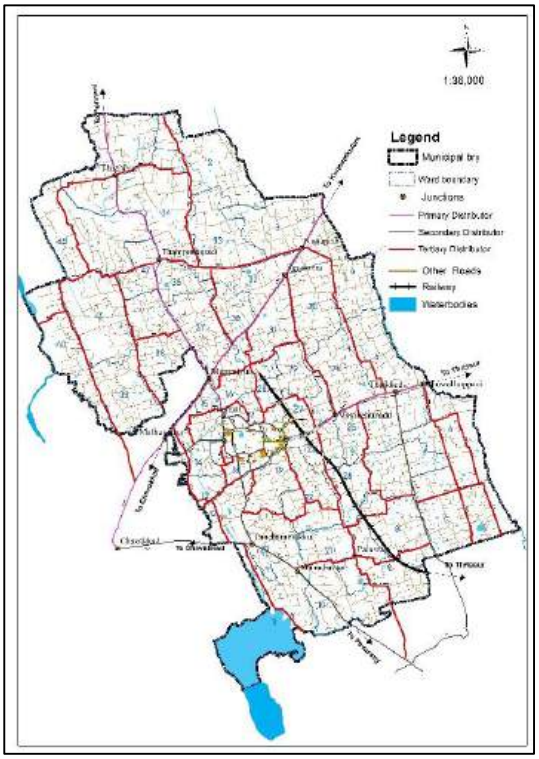


Figure 29.5: Tertiary Distributor Roads

29.1.3 Tertiary road – Inner Ring road, Perakam road, Thampuranpadi-Kottapadi road, Thaikkad-Chattukulam road, the radial roads connecting IRR and ORR and Babu lodge – proposed stadium road are the tertiary roads. Providing connectivity to town centre and growth centres– the proposed 'right of way' width is12m. Figure 29.6 shows typical cross section of tertiary road of Guruvayur.

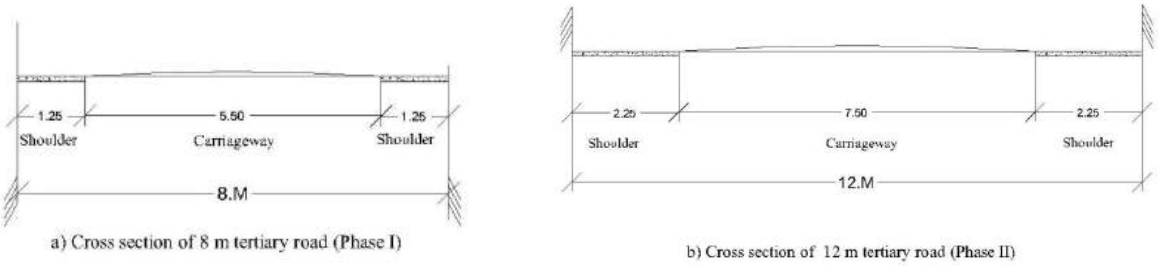


Figure29.6: Typical cross section of tertiary roads

(i) **Inner Ring Road** is another circular road concentric to the Guruvayur temple but closer to the temple than the ORR. This road marks the end of vehicular access to the temple as after this the devotees are allowed only to walk. The existing road has two lane carriageway in 8.5m ROW. This road needs to be developed as a Tertiary road of two lane carriageway 7m wide, 2m paved shoulder and 1.5m footpath on either side in a proposed ROW of 12m. Shoulder of 2m on temple side can be utilised for drop off and pick up of devotees.

(ii)**Perakam road** is a tertiary road connecting SH 50 and SH 62 bypassing Mammiyoor junction in the north western side of the town and extends up to Tampuranpadi. This road has

a two lane carriageway width in 7.2m ROW. The road is proposed to be developed as tertiary road in 12m ROW with two lane width of 7.5m carriageway.

(iii) **Thampuranpadi-Kottapadi road** is a tertiary road which connects SH 62 and SH 50 bypassing mammiyoor junction in the northern side of the town. This road has a two lane carriageway in 9.3m ROW. The road is proposed to be developed as tertiary road in 12m ROW with two lane width of 7.5m carriageway.

(v) **Thaikkad-Kottappadi road** connects SH 50 and SH 49 on the eastern side of the town farther east from Shavakotta road. This road has about 3.5m carriageway width in 6.2m ROW. It proposed to be developed as tertiary road in 12m ROW with intermediate lane width of 5.5m and 1.25m shoulder on either side.

(vi) **Radial roads connecting ORR and IRR** – there are eight radial roads connecting IRR and ORR out of which the west nada road can only be accessed by walk. They vary in carriageway width and ROW. These roads are proposed to be developed as tertiary roads in 12m ROW with two lane width of 7.5m carriageway.

(vii) **Babu lodge –proposed stadium road** which connects road from Babu lodge to the proposed stadium road. This road has about 3.5m carriageway width in 6.2m ROW. It proposed to be developed as tertiary road in 12m ROW with intermediate lane width of 5.5m and 1.25m shoulder on either side.

(viii) **Edapully Gandhi Nagar Road - Kaja Road** which connects Chavakkad Kanjani road to SH 50. It proposed to be developed as tertiary road in 12m ROW with intermediate lane width of 5.5m and 1.25m shoulder on either side.

(ix) **Angadithazham – Chakkamkandam Road -** It proposed to be developed as tertiary road in 12m ROW with intermediate lane width of 5.5m and 1.25m shoulder on either side.

(x) The following roads are proposed to be developed as tertiary roads with 9m width.

- Mammiyur Temple - Muthuvatoor Road
- Aruvipuram-Nalanda-Mammiyur
- Punnathoor Road
- Perumbilavil Road
- Thiruvenkidam Road
- Koladypadi – Kothakulangara road

(xi) The following roads are proposed to be developed as tertiary roads with 8m width.

- Outer Ring Road-Nalandha-Companypadi Road
- Chamundeswari Temple road
- Karakkadu Road

- Haridas Nagar Thamarayoor Road
- Edupully Jaram Road
- Nanoorampadi Road
- OuterRingRoad-EdupullyRoad(Bhrahmana Samooham Road
- OuterRingRoad-BrahmanaSamoohamRoad(AppasTheater)
- PalaBazar-Pattinipura-KiyaraJn-KisanRoad
- KBM-KiyyaraJn-SivaTemple Road
- KBM Road - Nalkkali Mannikkara Road
- Thaikkadu Masjid-Karuvampadi Railway Cross
- Pala Bazar - Masjid Road Connection
- Kaveedu - Muthuvattoor Road
- Panama - Sunena Nagar - Thazhiseri Road
- Kottapadi - Anjoor Road
- Chiramalpalli Road (Canoli Canal)
- Mamabazar- Paluvai - Pavartty Road
  Bhrahmakulam - Kothakulangara Amblalam Road

29.2 Road network and capacity

The road network of Guruvayur follows a ring and radial pattern, with SH 49, SH 50 and SH 62 serving as the primary mobility corridors. These corridors would be expected to have the following cross sectional elements:

- The road cross section can be proposed to at least 15m (2 lane 2 way) minimum for mixed traffic condition.
- Continuous kerb, footpath cum drain.
- Restriction or preferably prohibition of parking on the carriageway/shoulders. Parking must be shifted to off street parking locations or cross roads.
- Proper Bus bays

The Volume to Capacity ratio of major roads in the ‘Full development’ scenario when they would be developed, as proposed above, is given in Table29.1. It is evident that even after the road widening, the ORR would reach its capacity by 2026. This could be alleviated by implementing traffic management measures like one-way traffic regulation. SH 49, SH 50, SH 62, Guruvayur Karakkad road, Chavakkad Kanjani road and Thaikkad-Pavaratty road would require further widening to divided carriageway by 2036 to cater to the increase in demand.

Table 29.1: Volume-capacity ratio for the horizon years for 'Do Nothing' scenario in Guruvayur

Homogeneous sections	Road Capacity (PCU/hr)	2026		2036	
		Volume (PCU/ hour)	Volume-capacity ratio	Volume (PCU/ hour)	Volume-capacity ratio
(SH 62) Mammiyoor to Thozhiyoor	1,500	1,235	0.82	1,828	1.22
(SH 50) Mammiyoor to Chattukulam	3,600	2,794	0.78	4,135	1.15
Perakam road	900	284	0.32	346	0.38
Thampuranpadi – Kottapadi road	900	558	0.62	680	0.76
Muthuvathoor-Guruvayur road	1,200	987	0.82	1,326	0.10
Manjulal to Tahani Hospital Jn via north nada (ORR)	2,250*	1,439	0.64	1,934	0.86
Mammiyoor to Manjulal via south nada (ORR)	2,250*	2,253	1.00	3,028	1.35
Guruvayur Karakkad road	1,500	1,481	0.99	1,990	1.33
(SH 49) Manjulal to Thaikkad	3,600	2,658	0.74	3,935	1.09
Inner Ring road	1,400#	598	0.43	729	0.52
Chavakkad-Kanjani road	1,500	1,354	0.90	1,820	1.21
Chowallurpadi-Pavaratty road	1,500	1,442	0.96	1,939	1.29
Guruvayur-Savakotta road	900	85	0.09	103	0.11
Chemmanur-Guruvayur road	900	95	0.11	116	0.13

29.3 Proposed Roads in Guruvayur

Since the growth and development of Guruvayur has been in a ring and radial pattern, it is deemed necessary to develop a ring network of roads so that dependence on any single corridor gets fragmented into multiple corridors. In addition to the existing inner and outer ring roads, two more ring roads and a bypass are proposed for Guruvayur as shown in figure 29.7.

1. Intermediate Ring Road

An intermediate ring road is proposed for Guruvayur with an alignment connecting existing roads through Choolpuram Bio park –Guruvayur Savakotta road -Guruvayur Choondal road – Leisure land road –Paluvai Guruvayur road - Mama Bazar jn- Pancharamukkujn - Edapully Gandhi Nagar road –Muthuvatturjn - Mammiyurjn- Bio park.

2. External Ring Road - An External Ring Road (ERR) is proposed for Guruvayur, from Ovungal mosque to Thampuranpadi via Perakam road, to Kottapadi via Thampuranpadi-Kottapadi road, to Chowallurpadi via Thaikkad-Chattukulam road, to Pavaratty via Thaikkad-Pavaratty road, to Chavakkad via Kanjani road and back to Ovungal mosque via SH50 (20.5 km). The only road which needs to be developed in this case is the Thaikkad-Chattukulam road. These roads are proposed to be developed to 12- 15m ROW with two lanes, 2.0m paved

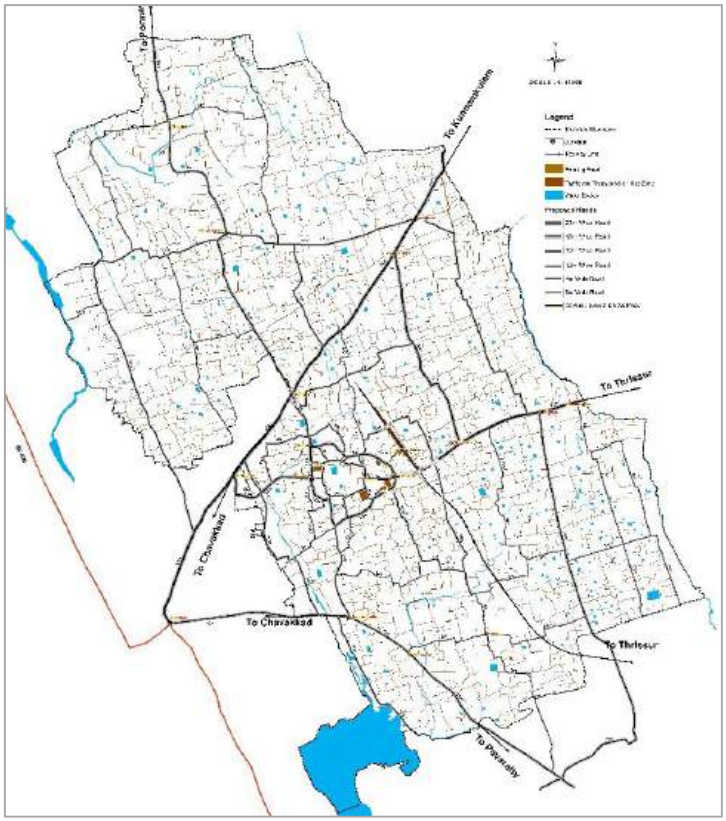


Figure 29.7: Proposed Road Network

shoulder and 2.0m footpath on each side, if these roads form part of the ERR or are envisaged as separate bypasses. The main benefit of this ring road would be that it connects all the major radial roads of the municipality thereby diverting traffic to the exterior portion of the town. This would help in decongesting the core area of the town.

2. Bypass: Bypass road is proposed between SH 49 and Pavaratty junction on Chavakkad-Kanjani road. Pavaratty-Paluvai road and Paluvai-Guruvayur road (4.0 km). This bypass road is proposed to be developed to at least 8m ROW with intermediate lane width of 5.5m and 1.25m shoulder on either side. This would cover a distance of about 4 km. The benefit of this bypass road would be that it would give an alternative path to the traffic between ORR/ Manjulal junction and Pavaratty junction instead of the longer route through Pancharamukku junction.

29.4 Intersection Improvement Proposals

Many of the road intersections in Guruvayur have legs meeting at an acute angle or staggered junctions accompanied by non- standard geometrics. Proper design of intersection is required to enable smooth, safe and efficient flow of traffic. A well designed intersection can increase the capacity of the same and also adds on to the aesthetics of the area.

The Guruvayur core area houses many commercial establishments which are avenues of trade and commerce. Besides this, bus stands and railway station are situated in this core area. Therefore, adequate junction improvement needs to be done at main junctions of all major roads. The traffic intersections in Guruvayur needs to be taken up for detailed design with first order priority and second priority considering the existing traffic flow and the need for future road widening. Table 29.2 and figure 29.8 shows the junctions which needs improvement.

Table 29.2: Junctions which needs improvement

First Priority	Second Priority
MammiyoorJn	Koya bazaar Jn
KottapadiJn	Tahani hospital Jn
ThaikkadJn	ORR-Railway Station rd Jn
Muthuvattur Jn	East nada Jn (IRR)
ManjulalJn	Manjira road Jn (IRR)
Ovungal palli Jn	ThampuranpadiJn
West nada Jn (ORR)	Pancharamukku Jn
Bio park Jn	Paluvai Jn
Mavinchuvadu Jn	Mama Bazaar Jn

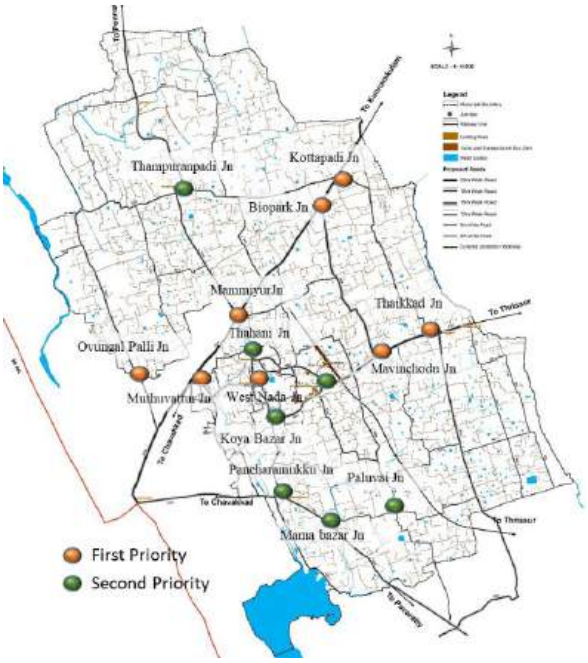


Figure 29.8: Junctions that need improvement

Conceptual junction improvement plan for Manjulal junction is provided. However, it is to be noted that these are conceptual in nature and would require detailed investigation to firm up the plans. In all the junctions, Road Markings in the form of edge lines, traffic lane lines, pedestrian crossing, stop line, chevron marking, direction arrow etc are proposed along with necessary traffic signs like side road ahead, destination sign, pedestrian crossing cautionary sign etc. To regulate the movement of pedestrians, pedestrian guardrails (open only at pedestrian crossings and extending to about 100m on all approach legs), refuge island and footpath are suggested. Road studs and proper street lighting is suggested to ensure visibility at night.

i) Manjulal junction: as shown in figure 29.9, is a four arm intersection which has a two lane two-way traffic movement on all approach legs. In the present condition, traffic movement on the road leading towards East nada is regulated as a one way towards the temple. The main problem faced at this junction is traffic congestion at least in the peak

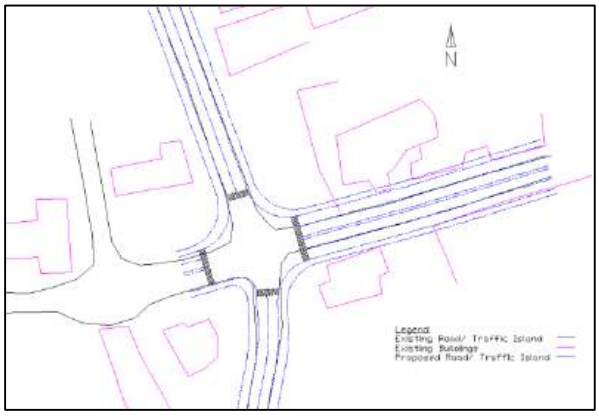


Figure 29.9: Conceptual junction improvement plan for Manjulal Junction

hours due to haphazard movement of vehicles and pedestrians. There are no traffic islands to guide the vehicles into the right direction. Moreover, there is a circular structure at the middle of the junction which is supposed to be a miniature form of a roundabout. The volume has exceeded the capacity of a roundabout. Since this junction is hardly 200m away from the railway crossing, whenever the railway gates are closed for movement of trains, this junction gets choked in no time. The junction improvement suggested takes into consideration the future carriageway configuration as per the proposed development plan. In this scenario, median is proposed so that there is controlled turning movement. Curves are smoothened with radii of 15m to allow easy turning movements. This junction would have to be regulated by traffic signals after dismantling the central circular structure.

29.5 Grade Separated Improvement Proposal

- Flyover at Mammiyur along Guruvayur Thampuranpadi road
- Rail over bridge at Koladippadi Pavaratty road
- Under pass at Thiruvenkidom road

29.6 Public Transport Plan for Guruvayur

The public transport system of Guruvayur consists of bus as well as rail transportation. Bus operation in Guruvayur is served by both private buses as well as KSRTC buses. Both private buses and KSRTC buses have separate bus stands adjacent to the ORR. The railway station can also be accessed from the ORR and all these terminals are within walking distance from the Guruvayur temple.

Private bus operation in Guruvayur is mainly based out of the municipal bus stand located near Manjulal junction while KSRTC buses operate out of KSRTC bus stand near west nada junction. KSRTC buses pass through the town while private buses serve the local areas also. Buses plying on SH 50 should be regulated in such a way that the load on Mammiyoor junction is reduced. While travelling towards Kunnamkulam, buses should make a turn at Muthuvathoor junction and access the respective bus stands. After exiting, buses should access SH 50 from Mammiyoor junction. In the reverse direction, buses should make a turn from Mammiyoor junction and exit back to SH 50 from Muthuvattur junction. This would evenly distribute the bus traffic at both these junctions.

New bus routes

Bus operation in Guruvayur mainly exists on the primary and secondary roads. However, it is found that frequency of buses is very low in certain routes and there are certain areas not

served by public transport. The bus transport system in Guruvayur need to be augmented to increase the share of public transport and to attain sustainable mobility.

- 25 seater buses need to be introduced for local town service and should be operated in the Inner ring road, Outer ring road and the proposed External ring road. This will connect under developed settlements with the town as well as to growth centres near the periphery of the town.
- These 25 seater buses plying on outer ring road should connect the bus stands and the railway station. The timing should be aligned with the train arrival/ departure time so that maximum commuters are benefited through this service.
- Bus frequency need to be increased in the following sectors;
    - Guruvayur- Kanjani,
    - Guruvayur- Althara – Ponnani road

Bus Shelter and Bus Bay

Bus shelters are not observed on any road in Guruvayur. Bus shelters have to be made mandatory at all bus stops to give ample space for the commuters to wait in all weather conditions. Another main drawback is that there are no bus bays constructed even on the main roads for the buses to stop and allow boarding and alighting of commuters. Most of the roads are narrow but allow two way movements. In this situation, stoppage of buses on the main carriageway hinders the free flow of traffic plying on these roads. It is also observed that bus stops in both directions face each other at a few locations adding to the chaos. It is therefore proposed that the following be adhered to at every bus stop:

- Location of the bus stop should be away from curves, at least 45m from any curve.
- Bus stops should be at least 75m away from signals/ intersections and should be desirably placed on the downstream side of intersections.
- Bus shelters should be provided at all bus stops to provide cover in all weather conditions.
- Ramps and platforms be designed and constructed to allow for universal accessibility to differently abled commuters
- Bus bays should be provided on all bus stops. A standard bus bay design is given in Figure 29.10, in which adequate space is also provided for pedestrians moving along the footpath.

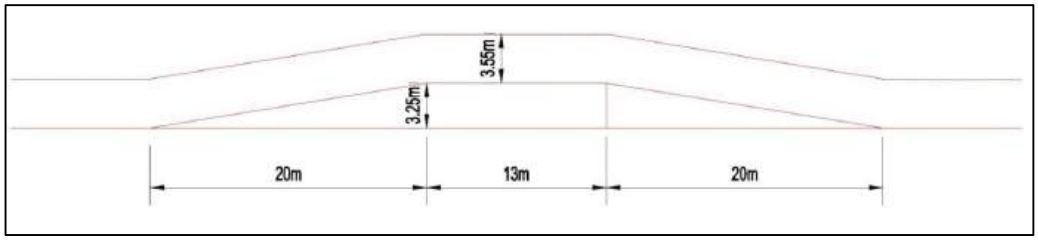


Figure 29.10: Standard Bus Bay Design

Rail Transport in Guruvayur

Guruvayur railway station is the terminal station on Guruvayur-Thrissur line. The railway track intersects SH 49 near manjulal junction and causes congestion while the railway gates are closed for movement of trains. To overcome this problem, a rail over bridge is proposed at this location. There have been proposals for extension of this railway line to meet the existing railway line between Shoranur and Mangalore since 1995. Even though various proposals were submitted, none realised mainly due to strong protests from local people. In the state wise list of projects included in the Union budget for the financial year 2016-17, 35 km line from Guruvayur to Thirunavaya has also been included. The proposal is expected to reduce travel distance by about 60 km especially from Malabar region to Kochi, Thiruvananthapuram etc. It also gives a direct link to temple town of Guruvayur and touches Ponnani. The line is proposed to be constructed in a joint venture mode between the central and state governments. However, the railway line alignment has not been fixed and therefore this extension would take a longer time duration before it gets implemented.

A preliminary look at the railway alignment till Guruvayur and the geographical location of connecting towns like Ponnani, it can be inferred that this extension line would cut across SH 50 and SH 62 within the municipality or its vicinity. Railway over bridges for traffic movement and subway/ Foot over bridges should also be designed and implemented along with the construction of this extension line.

Intermediate Public Transport and Intermodal Integration

Like other medium sized towns in Kerala, Guruvayur also has significant number of auto rickshaws serving the needs of intra city travel as well as to neighbouring panchayaths. Many remote locations in Guruvayur have poor accessibility by public transport due to which people are forced to depend on IPT modes. As Guruvayur attracts tourists, there is a considerable amount of taxis that ply in Guruvayur and its vicinity. Prepaid auto-rickshaw stands should be set up near Manjulal junction, railway station, municipal bus stand and west nada junction.

The rail based public transport, the road based public transit as well as intermediate public transport facilities should work in tandem to ensure that proper operational integration is attained. This can be achieved by providing first mile last mile connectivity to the public transport terminals/ stops through mini buses/ IPT modes. As discussed earlier, 25 seater public transport mini buses can be operated for ascertaining this integration. IPT modes can also be regulated in authorised stands near the public transport terminals for easy accessibility. Integration between the public transport modes is also essential. As the distance between railway station and municipal bus stand is only about 550m, these should be connected by an all-weather covered walkway. This path should be maintained with proper lighting, guardrails and at grade (table top) crossings so as to encourage its use and give a sense of security to its users.

29.7 Parking Facilities

Inadequate enforcement has resulted in the existing right-of-way being used for parking, thereby creating higher levels of congestion in the town's core area. A parking policy is, therefore, essential.

The essential requirements of Parking policies are:

- To discourage use of personal motor vehicles and encourage greater use of public transport and NMT.
- To realize the true value of the land occupied for parking and recover economic costs accordingly; Introduction of progressive parking fee to discourage longer duration of On-street parking.
- Act as a feeder to public transit systems, thereby increasing their attractiveness.
- Parking lots of commercial/ institutional land uses can also be availed on a revenue sharing basis for better utilization of available space.

Development of Off Street Parking Space

i. Multi-Level Car Parking (MLCP): There are 2 MLCPs developed by Municipality under AMRUT scheme and by Devaswom under PRASAD scheme. The following points should be remembered while implementing MLCPs.

- Two wheelers should also be given adequate parking spaces but they must be restricted to ground ±1 level as otherwise their use would be minimal.
- As far as possible, stack type or puzzle parking should be employed for maximum utilisation of space available.

- Valet system should be employed if stack type or puzzle parking is implemented, so that the car driver/ user need not be unnecessarily inconvenienced.
- As far as possible circular ramps must be avoided as all drivers are not comfortable with driving on such ramps.
- Higher FSI may be allowed for MLCPs which are open for public so that a few of the top floors can be allocated for commercial activities.
    - Intelligent Transportation System (ITS) should be employed to display the number of available parking spaces and to easily determine their location

iii. Improvement of Manjira Parking ground

Improvement of existing parking ground at Manjira is proposed. The parking ground can be improved by providing toilet facilities and tiled/concrete flooring. This parking facility can be used for lodging facilities near temple and beneficial for municipality.



Figure 29.11: Manjira Parking

iv. Modern Parking structure



Modern parking structures like Multi-level car parking plazas, Lift assisted high rise tower parking system may be planned at the location near Town hall. Car parking tower system mainly comprises of vertical columns, a lift for vertical movement of vehicles, and pallets for horizontal movement. As the car enters the building space through the entrance room, it is then raised onto the parking space through the main lift and then moved into empty space using pallet movement. It is completely hassle free as it's an automated system with no human intervention, making it much safer.

29.8 Non- Motorised Transport Facilities

Non-motorized trips in Guruvayur include walk trips and cycle trips. Past studies reveal that nearly 40% trips in medium sized towns in Kerala are non- motorized trips. Walking is the start and end phase of all motorized trips. There are several schools functioning in the municipal limits and considerable share of school trips are performed by cycles. The traffic and

transportation master plan should give focus on planning of NMT facilities such as provision of foot path, safe pedestrian crossing facilities and slow moving vehicle lanes.

Pedestrianization of IRR

Inner ring road (IRR) may be made fully pedestrianized and the traffic movement in the IRR can be reduced. The inner ring road can be connected to the pedestrian walkways proposed and this will create a better movement of pedestrians without traffic.

Provision of Footpath and Cycle Track

In general, one third of the total trips in a town are performed by walk and pedestrian are the most vulnerable category of road users too. Segregation of pedestrians from motor vehicle traffic is the most important part in ensuring safe and comfortable movement for them. Footpaths are scarcely available or pedestrians are forced to use covered drains/ shoulders as footpaths and hence have a 'walkability index' of close to zero for the entire town. The target fixed for Walkability Index is 100%. The following is suggested for the improvement of walkability index.

- Footpaths need to be constructed on both sides of all the primary and secondary distributor roads as a minimum requirement. Additionally, footpaths need to be provided on all school access roads and residential roads wherever possible.
- Taking into consideration differently abled persons, the absolute minimum width suggested for footpath is 1.8m.
- The height of the footpath should be not more than 15cm from the finished road level.
- Footpath should be continuous and free from any kind of obstruction.
- Guard rails should be installed on the footpath to segregate the pedestrian movement and also to restrict the entry of two wheelers onto footpaths.

To encourage use of cycles in Guruvayur, cycle lanes are suggested on all the primary and secondary distributor roads and school access roads. The minimum width of cycle track should be 2.0m.

Provision of Crossing Facilities

(i) At grade Cross Walks

At grade cross walks are marked with Zebra lines and it indicates preferred location for pedestrians to cross. Pedestrians have the right of way at zebra crossings and motorists should yield to pedestrians. The following are suggested regarding the installation of marked cross walks:

- Marked cross-walks with stop line are required at all arms of major intersections.
- Mid- block crossings shall be provided near all educational institutions and hospitals. At these locations in addition to Stop line, 'STOP' word messages also need to be marked.
- Controlled crossings are warranted at locations where the PV2 value crosses 1x108 for undivided carriageways.
- For ensuring night time visibility of these crossing facilities, road studs/ solar powered cat eyes with bidirectional yellow reflector need to be placed near all four corners of pedestrian crossing blocks.

The services of police personnel or traffic warden shall be used for controlling the traffic at these locations. Where crossings are planned on Inner Ring road they should be provided using table top pedestrian crossing to ensure comfort. This would also act as a speed calming measure.

(ii) Grade separated crossing facility

Grade separated crossing facility completely eliminates the possibility of pedestrian-vehicle conflict. However, they should be constructed only as a last resort or in rare cases to ensure safety, as it is usually more appropriate and economical to use traffic-calming measures or install a pedestrian-activated (pelican crossing) signal that is accessible to all pedestrians. Foot Over Bridges (FOB) are also visually intrusive. Such a facility must accommodate all persons and therefore should include ramps or escalators and lifts. Studies have shown that many pedestrians will not use an overpass or underpass if they can cross at street level in about the same amount of time. Overpasses work best when the topography allows for a structure without ramps. Underpasses work best when designed to feel open and accessible. Grade separation is most feasible and appropriate in extreme cases where pedestrians must cross roadways of high speed or high-volume. However, in Guruvayur in the existing condition FOBs are not required. However, FOB/ subways can be thought of in the future when the primary distributors are planned to be widened or the Guruvayur railway line gets extended. Studies should be conducted to ascertain its benefits both functionally as well as economically. In order to ensure full utilisation of such grade separators, crossing at grade should be penalised and also physically made impossible.

(iii) Pedestrian streets/ walkways

A pedestrian street already exists on the radial road that connects IRR to ORR at west nada. This is suggested to be replicated at the east nada as well. The pedestrian street would cover only the southern portion (about 2.5 – 3m width) of the radial road from Manjulal junction to east nada entrance. The northern portion of the road would be used for traffic movement

towards the east nada from Manjulal junction. The suggested pedestrian street would be covered on top for all weather protection. Access to the plots on the southern side of this road would be allowed through this covered pedestrian street. At such accesses there would be openings in the guardrail between the pedestrian street and the road for vehicular movement. The benefit of this pedestrian street is that it would cater to the heavy pedestrian traffic visiting the temple and pickup/ drop off could be made adjacent to this street.

In addition to this, a covered walkway is also proposed from the back gate of KSRTC bus stand to west nada on IRR. The proposed pedestrian street/ walkways would ensure unhindered all weather walkways on three sides of the temple viz-a-viz west nada, south nada and east nada. The afore mentioned covered walkway (at least 2m wide) connecting the municipal bus stand to railway station and parking lot near KTDC Tamarind hotel would also get connected to this proposed pedestrian street from Manjulal junction. This would ensure a covered walkway connection from temple to the public transport terminals near Manjulal junction thereby reducing the use of IPT trips for such short distances and also channelize pedestrian movements in this area reducing pedestrian-vehicle conflicts. Wherever these walkways cross roads with vehicular traffic, table top crossing facility has to be provided to ensure safety of pedestrians using it. The proposed walkways and related crossings are shown in figure 29.12.

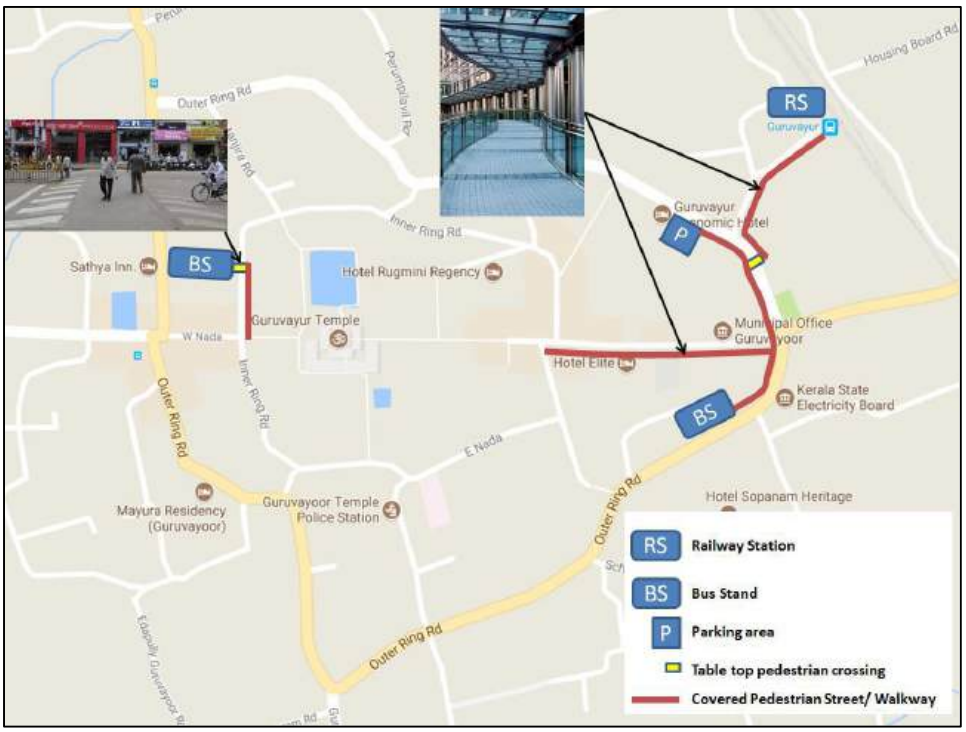


Figure 29.12: Proposed network of pedestrian street/Walkway

Universal Accessibility

Development would be complete only when it is inclusive i.e. designed after taking into consideration all sections of the society. Physically challenged citizens have to be given

facilities like accessible parking with wheelchair ramps, refuge islands with bollards etc. Likewise, the tactile pavers (guide blocks and warning blocks) are suggested to be implemented for assisting the visually challenged on the footpath. In addition to this, it is suggested that audible pedestrian signals be placed at pedestrian crossings to assist visually impaired pedestrians.

Traffic Signs and Road Markings

Traffic signages should form a significant part of road furniture which aims at giving precise information to the road users about the various regulations, warnings and information that are applicable on that road stretch. Efforts must be made to include as many relevant traffic signs as possible on the roads in the study stretch. The types of signages that are required to be implemented are:

- Regulatory signs like STOP, Give Way etc.
- Cautionary signs like Pedestrian crossing, intersection type, school ahead etc.
- Informatory signs like Hospital, Police station, parking signs etc.
- Destination signs including tourist spots, road name etc.

Road markings are also very important in guiding the road users through the network. It gives them an idea about the various facilities and presence of hazards etc. on the carriageway. The main road markings which need to be implemented are:

- Pedestrian crossing
- Stop line and word message
- Edge line, traffic lane line and continuity line
- Direction arrows
- Chevron and diagonal marking
- Kerb marking
- Painting on objects within the carriageway and adjacent to it etc.

29.9 Intelligent Transportation System (ITS) applications

ITS is a wide area and has many applications which focuses on specific fields like Enforcement, Emergency care, Road Safety, Road user information etc. Some of the useful ITS applications which can be adopted in the study area are:

- Crowd management can be done by online services for darshan time allotment system.
- Traveller Information System on board the buses and at bus stops for knowing the expected time of arrival of buses.

- GPS equipment on public transport buses for fleet management.
- Vehicle actuated signals or synchronized traffic signals to decrease overall delay.
- Red Light Violation Detection System (RLVDS).

29.10 Inland Water transport

Thodu from Chettuva lake exists which extends till Chakkamkandam in Guruvayur. The Chettuva lake is connected to Thrissur via Puzhakkal river (near Sobha city mall) and its distributary extends close to Thrissur railway station, This waterway has not been tapped for transportation of passengers or goods. Due to slow movement, this might not suit passenger transport but could be developed as a tourist attraction. However detailed feasibility studies would be required to establish the practicality of the proposal which would depend on the available draft, construction of regulators/ locks, dredging required, reconstruction of cross structures, space for boarding/ alighting facilities etc.

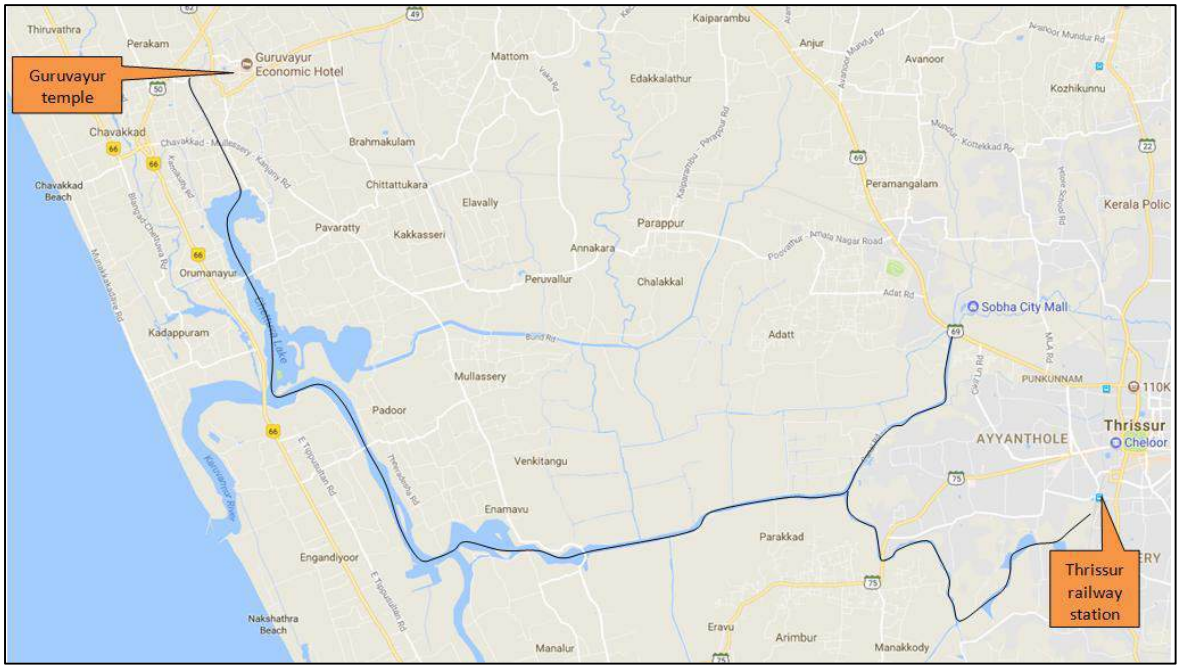


Figure 29.13: Possible route for Inland water transport between Thrissur and Guruvayur

29.11 Provision for Helipad

A helipad facility is essential for Guruvayur for air traffic facility and suitable locations can be identified after detailed studies. This will create more commercial activities in the municipality. The accessibility can be increased through this helipad facility. A minimum of 35m width and length is required for the helipad. A helipad near Chakkamkandam can be provided.



Fig 29.14 Helipad at ground and rooftop helipad

29.12 Bus stands

29.12.1 Private Bus stand – East Nada

Private bus stand at East Nada is proposed to be expanded to an area of 3.23 Acres. The new proposal for bus stand includes commercial complexes, public buildings, and parking spaces.

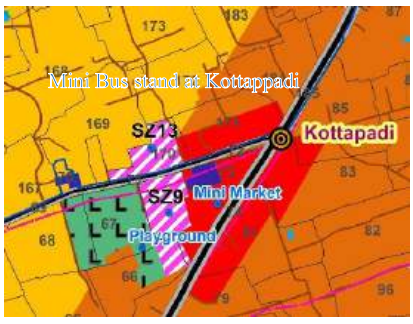


Fig. 29.15 Bus stand expansion

29.12.2 Mini bus stand at Kottappadi and Pancharamukku

A mini bus stand is proposed at Kottappadi junction with an area of 1.32 Acres along Thampuranpadi - Kottappadi road and at Pancharamukku with an area of 1.76 acres. This bus stand can cater the buses from Ponnani, Chavakkad, Kunnamkulam and Pavaratty areas. The bus stand is designed mainly for drop off and pick up service of passengers. The bus stand should have the circulation space for the buses. Basic facilities like rest rooms, parking space for private vehicles etc. can also designed with the bus stand plan.





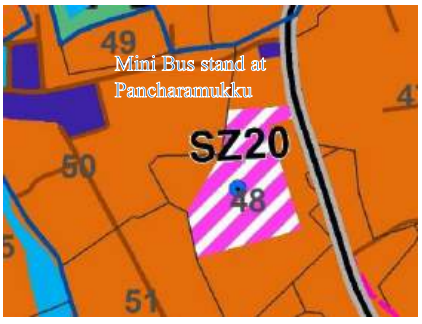


Fig. 29.16 Mini Bus stand at Kottappadi and Pancharamukku

29.12.3 Bus stand at West Nada

A bus stand is proposed near West Nada. This can cater the buses from Chavakkad, Thrissur and Ponnani areas. This bus stand is also designed with drop off and pick up service of buses.



Fig.29.17 Bus stand at West Nada

CHAPTER 30

SECTORAL PROPOSALS

Master Plan envisages integrated sustainable approach for Guruvayur to raise the religious and cultural prominence of the town and to develop it as a national pilgrimage center. Master plan encourages sustainable development giving thrust to pilgrimage tourism and related commercial activities to enhance the economic base of the town. The economic status of the residing population can be enhanced by giving thrust to trade & commerce, agriculture, industry and its related activities. To ensure better standard of living and quality of life for its people as envisaged in the development vision proposals were included in various sectors.

30.1 GREEN CITY PROPOSALS

Green City concept encourages city governments to come up with schemes to increase green areas, conserve water bodies, beautify public spaces. The green city action plan should incorporate following aspects.

30.1.1 Greening plan – (i) Urban afforestation, (ii) Parks (both creation and revival), (iii) Nurseries, Floriculture, (iv) Pocket Forests, (v) Plantation along the median of the roads.





30.1.2 Blueing plan – (i) Conservation of water bodies, (ii) Water based recreation, (iii) Canal/water front development, (iv) Hedges along water front.

30.1.3 Cleaning and Beautification programme – (i) Landscaping of important locations and buildings of the city, (ii) Placement of adequate dust bins at important locations, (iii) Construction of Pay & Use toilets, (iv) Specific measures for reduction of air, sound and visual pollution, (v) Programme for landscaping of important city landmarks, , (vi) Improvement of Solid Waste Management, (vii) Development of roadside architecture.

30.1.4 Building Energy Positive City – (i) Installation of solar panel at important buildings (ii) Use of LED lights at roads and public spaces (iii) Introducing incentives for Green Building.

30.1.5 Sustainable Public Transport – (i) Use of battery operated vehicles, (ii) Building cycle tracks, (iii) Construction of modern bus stands, (iv) Building of eco-friendly parking space, (v) Building of adequate sub ways.

30.1.6 Making city technology efficient – (i) Creating wi-fi hotspots as much as possible and coverage of important office and other public spaces with strong wi-fi network, (ii) Setting up of e-SewaKendras, (iii) Skill upgradation plan of technical wing of city administration

30.1.7 Making City safe and secure – (i) Installation of CCTV at important locations, (ii) Setting up of Web based system for centrally monitoring security aspect of the City.

30.1.8 Ensuring better quality of city life and grievance management – (i) Installation of water vending machines at important public spaces, (ii) Setting benches for citizens at Parks and Hospitals, (iii) Creation of hawker free zones.

30.1.9 The Green Temple Initiative

A temple is a place where one can offer his prayers and get god's blessings. Worship of the lord purifies the heart, generates harmonious vibrations, steadies the mind, purifies and ennobles the emotions and eventually leads to god's realization. Temples can play a vital role in meeting the environmental challenges facing today. For millions of people, these places are the gateway spiritual practice, providing guidance on how they can live moral lives in keeping with their religious beliefs. We have to ensure that the sattvic consciousness created in the temple extends beyond temple gates, into the towns and communities we serve.Green temple initiative will help us to reflect the divinity and it will transform the town into green, healthy spaces that support and honor the sanctity of life. The green temple initiatives may include the following:

- Green Poojas, worships and offerings: Organise formal times of worship, temple pujas and celebrations in ways that reminds participants of the tradition's links to nature by highlighting environmental themes. Compost sacred flower offerings.
- Awareness and education to community:
  - ✓ Put up signs within the temple grounds saying you are a green temple and telling people about the environmental issues (such as where to put waste and how to conserve water).
  - ✓ Work with the local media to raise awareness about the links between religious principles and care for nature, and look into national and international awards and recognition for good environmental practices.
- Greening the temple landscapes:

✓ Increase the space in temple complex under green cover, using native species where possible (by planning Neem, Tulsi, Ramacham etc.).

✓ Ensure that temple gardens are water-efficient and use non-chemical fertilizers for plants, fruits and vegetables.

- Improving energy efficiency:
  - ✓ Take steps to reduce energy use and introduce eco-alternatives like solar or biogas and make sure worshippers know about this. Replace ordinary bulbs with CFL/LED bulbs.
  - ✓ Install solar panels on temple buildings.
  - ✓ Use solar water heaters instead of conventional water heaters.
- Conserving water resources:
  - ✓ Collect rainwater to provide for water needs, or using recycled, non-potable water (eg grey water waste from showers) for irrigating gardens and reserve potable water for consumption.
- Waste management:
  - ✓ Introduce waste segregation into different coloured bins and recycling.

Table 30.1 Different coloured bins that can be used within temple premises

Type of waste	List of items	Recommended location of bins
Wet/ Organic	Fruits, flowers, leaves, leftover oil from lamps, kumkum, ash, turmeric chandan etc.	▪ Kitchen &Oottupura ▪ Entrance and exit of temple ▪ Inside the sanctum
Dry/ Recyclable	Plastic wrappers, plastic covers and any other recyclable material	
Reject	Earthen lamp, broken glass etc.	Small bin at the garbage collection point of temple
Electronic waste	Bulb, tube light, CDs etc.	▪ Small bin at the garbage collection point of temple ▪ Need not be accessible to general public

✓ Make the temple ground a plastic free zone.

✓ Ensure there are enough toilets for pilgrims, and that they are cleaned regularly, using eco-friendly products.

✓ Educate pilgrims on the need to keep the pilgrim town clean and green.

✓ Form partnerships with NGOs and concerned citizens to reduce litter and waste.

- ✓ Use leaf plates, bowls, clay kulhads, bagasse plates, compostable paper plates, areca nut plates as alternatives to plastic, Styrofoam or paper plates.
- ✓ Use cow dung to fuel kitchens or langar/ kitchen and garden waste.

▪ Protection of wild life and wild places:

- ✓ Ensure that religious activities do not degrade the quality of the environment or harm a plant or animal community.
- ✓ Develop a Cow/Elephant care/ protection programme.

▪ Faith and food

- ✓ Bring the principle of ahimsa into food consumption – ensure that the milk served in the temple comes from cows treated well. Plant organic vegetables and fruits on temple grounds for food needs without the use of toxic chemicals.
- ✓ Buy food and milk consciously from producers who do not use toxic pesticides. Support the growing of organic and sustainable produce. Advertise your support of organic and sustainably grown produce. Plant organic vegetables and fruits on temple grounds to supply some of your food needs. Plan a celebration with a "green" theme, featuring locally and sustainably grown foods.

30.2 SOLID WASTE MANAGEMENT

For social and economic development, adequate sanitation facilities with good hygiene and safe water are essential. Lack of proper sanitation leads to spreading of many diseases.

30.2.1 Expansion of existing waste treatment unit and development of buffer zone with suitable plantations

Presently a solid waste treatment plant is operating at choolpuram which facilitates windrow compost plant. Capacity of the compost plant needs to be increased. Along with this buffer need to be provided by planting trees around the ground.

30.2.2 Proposal for development of plastic shredding unit at Choolpuram

Plastic is a kind of product that does not dissolve naturally in the soil as it is a tough material that cannot be disposed of just like other biodegradable products. Groundwater and reservoirs are susceptible to the leaking of plastics in the ground leading to environmental toxins. Banning the use of plastic is one of the recent policies put forward by the Government of India. However, no



Figure 30.1: Plastic shredding unit

solution has been put forward for the plastic waste that has already been piled up at various plants.

On visiting site at Choolpuram, a plastic shredding unit was observed that the plant was overloaded with plastic waste which needed to be shredded and disposed. Shredding is the only mechanism that is carried out at the plant which does not assure complete disposal. This plant was established on 13th May 2015. Much fuel is not needed to run the plant, as it uses the gas which is the by-product of the process.

30.3 DRAINAGE & LIQUID WASTE MANAGEMENT

30.3.1 Expansion of existing Sewage treatment Plant

Presently a Sewage Treatment Plant is working at Chakkamkandam being executed by the Kerala Water Authority with a 3 MLD treatment plant. The capacity of existing STP can be increased.

30.4 PILGRIMAGE, TOURISM AND CULTURE

Tourism is not only a leisure and fun activity. Rather, it is also the industry which draws, accommodates and entertains tourists and helps generate income for the town. Tourism helps to explore new culture, meet new people and do fun and adventure at different places. The economic importance of tourism varies from place to place but can be seen to make a significant contribution to many countries wealth.

30.4.1 Pilgrimage circuit

Since Guruvayur town attracts huge population, an integrated pilgrim tourist circuit is proposed by connecting the temples near to Guruvayur Srikrishna Temple.

GuruvayurSree Krishna Temple, is the main attraction of Guruvayur town. Devotees coming to the temple may also be visiting *Mammiyur Siva temple, Parthasarathy Temple and Thiruvenkidam temple, ChamundeswaryTemple, Perumthatta Siva Temple, Panthayil Sree Ayyappan Temple, and Sree Narayanankulangara Thazhaekkavu temple* near to the *Guruvayur Temple* . Location of these temples is shown in figure 30.2.

A pilgrim tourism circuit can be proposed by connecting GuruvayurSree Krishna temple through Chakkamkandam Lake, to TriprayarSree Rama Swamy Temple and KodungallurBagavathyTemple via Canoli canal.

A *Rajapatha* can be proposed from Guruvayur temple west nada to Dwaraka beach in Chavakkad which will increase the potential of tourism in both the municipalities. The three municipalities(Kunnamkulam,Guruvayur,Chavakkad) can be considered as a cluster and development of the corridors connecting these can act as a stimulant for the economic development of all three towns and surrounding areas.

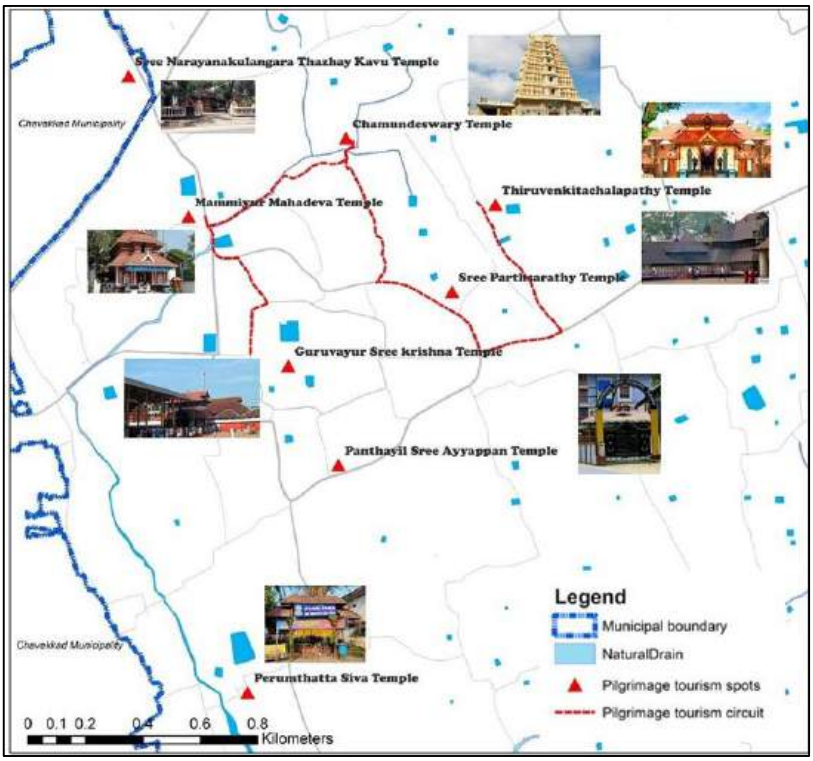


Figure 30.2: Pilgrim Circuit

30.4.2 Leisure Tourism Circuit

Guruvayur is a destination for pilgrims as well as tourists, who visit other places. So developing leisure tourism spots in connection with the pilgrim spots will help in developing tourism sector as an engine for job creation, driving force for economic growth, building synergy with various sectors to enable tourism realize its potential. Elephant sanctuary at *Punnathur Kotta (Anakkottil)*is about 2 Kilometers from Guruvayur Temple. *Chavakkad Beach* which is located at 5 Km distance from Guruvayur town is a famous tourist favourite spot. The famous *Palayur Church, Aduputty church, Arthat church Ambala Palli* and *Manathala mosque* are also situated nearer to this beach. Also Megalithic burial caves at Kakkad and Chowannurar prehistoric monuments which are situated at 12 kms from Guruvayur temple. Sree Maha Ganapathy Temple at Kakkad is situated near the burial caves at Kakkad. Also Chakkamkandam Kayal can be promoted as a major tourism spot. Other tourism spots like Vallabhatta Kalari Kendram, St. Thomas Museum, Marine world Aquarium, Kamala Surayya Smarakam, Munimada, Kovilan Smrithi Mandapam and Kalasamala, Chavakkad light house, and Nalumanikkattu Children's park are within 13 kms from Guruvayur town. Canoli canal is also used as tourism channel for water way from Guruvayur to Kunnamkulam. Major leisure tourism spots within 13 kms from Guruvayur temple is shown in figure 30.3.



Figure 30.3: Circuit connecting nearest tourism spots

30.4.3 Pilgrim Amenities center

Guruvayur is a famous pilgrim destination visited by people from various locations, it is necessary to set up pilgrim amenity centers within the Municipality. Pilgrim amenity centers are proposed along SH 49 and SH 50. An area of about 1.25 acres is demarcated in survey nos.187,188 of Pookode village which is located near to the SH50 and an area of about 2.7 acre is demarcated in survey no 10,26,27 of Thaikkad village , Sy No.258 of Iringapram Village near to the SH49.The amenities should be universal friendly so as to satisfy all the pilgrims from different parts of the world. It should be provided with amenities such as multipurpose hall, dormitory rooms, dining hall, auditorium, and interlocking pathway for parking, toilet blocks and drinking water outlet. The center can also be provided with information centers, locker facility and kiosks for devotees to buy the puja and offering articles. The locations of pilgrim amenity centers are shown in figure 30.4. Hop on- Hop off IPT transport services can be planned from these locations which will convey people to the pilgrim circuit and leisure circuit.

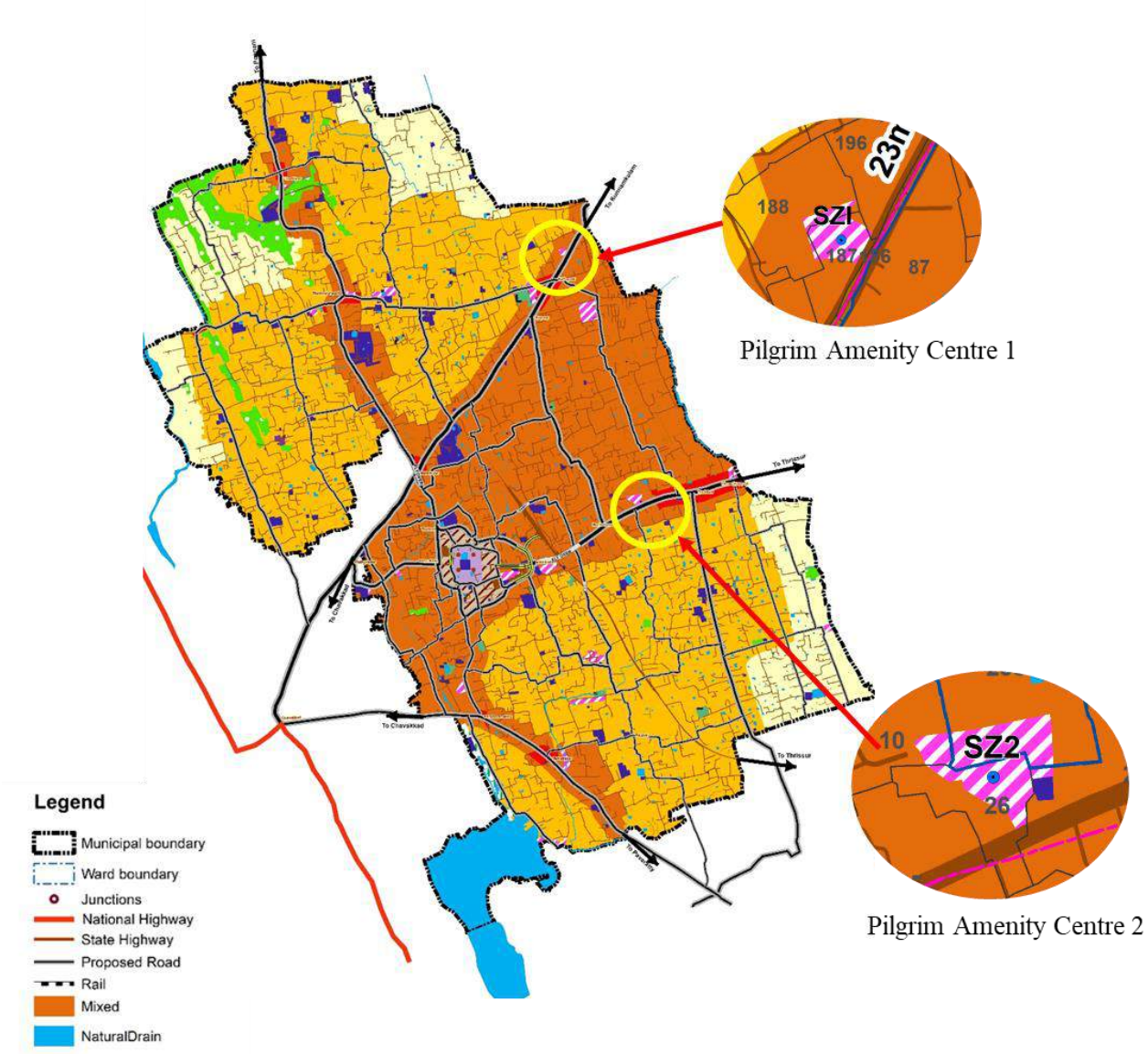


Figure 30.4: Location of Pilgrim Amenity Centres

30.4.4 Friendly amenities for women, elderly and differently abled

Since most of the temple visitors are female, there can be separate amenities for women devotees. Also there should be facilities for elderly and differently abled persons. Facilities should be provided for people dealing with visual, hearing, mobility or cognitive impairments. Specially designed ramps and non - slippery tiles can be provided on walkways or



footpaths for convenient movement to the disabled, the elderly and for those on the wheel chairs. Braillie sign boards, special toilets, medical assistance defined route and dedicated parking can also be provided.

30.4.5 Lake conservation and Lakefront development in Chakkamkandam

Lakes are cooling agents and are essential to the urban microclimate. The cool air if allowed to flow unrestricted into the surrounding urban development creates a stress free soothing environment for the citizens in the adjacent localities. It is an imperative to conserve and restore lakes, which require well planned, sustainable and scientific efforts to prevent their degradation. Chakkamkandam kayal, located on the southern part of the Guruvayur Municipality is now in a degrading stage due to the deposition of raw sewage from various commercial establishments within the town. In this scenario, it is crucial to preserve and maintain Chakkamkandam Lake for improving the quality of ground water, fulfilling irrigation needs and preserving creating a healthy environment. Hence lake conservation and lakefront development is proposed at Chakkamkandam Kayal area. Since long term operation and maintenance is required, Public Private Partnership can be given a thought and will lead to positive output if used along with awareness and legal enforcement. Feasibility of conservation and beautification of the lake and possibility of PPP model is to be studied. Since the Chakkamkandam lake area is included in Coastal Regulation Zone, proposed developments should be in accordance with the restrictions in these zones. So the conservation of lake and its development is proposed in Chakkamkandam area to enhance its tourism potential, so as to attract the pilgrims and other tourists as well. The components of lake conservation involve conservation of water body and lakefront development.

Conservation of waterbody

Lake rejuvenation essentially requires an integrated approach. The key activities in lake rejuvenation include:

- Clearing solid waste and garbage reaching the lake through channels or illegal dumping.
- Regular disinfection of the lake and surroundings including spraying of fungicides for bio remedial measures.
- Encourage mangrove protection and afforestation: The mangroves, which are in danger of eventual extinction from this area will be protected and regenerated through proper conservation programmes. The developmental agencies may be directed to attempt afforestation of mangroves as green belt along the lake margins.

- Dumping of solid and liquid wastes from resorts and private residences into the water bodies is strictly prohibited. Plastics other than certified bio degradable ones should be banned from use in the area.
- Cleaning and maintaining the waterbody with minor beautification works like jogging tracks, seating, development of park etc. will create a public facility.

Lakefront Development

Small scale and low impact environmentally sensitive tourism related infrastructure development is proposed to cater the needs. The area will be reserved as a green park. Lakefront development can be done by incorporating revenue generating activities. Entertainment activities along the urban lakefronts if promoted, can serve as a revenue generating measure. The lakes can form a part of urban aesthetics and visual links can be established by avoiding barriers like walls and high bunds along the lake.

- Development of activities such as boating facilities, jogging track, children's park, theme park, water parks, and nature walks etc. around the lake which would attract people from not only the nearby areas but also pilgrims and tourists from other distant places.
- Developing small bird parks, butterfly parks, a variety of flower beds not only maintains the flora and fauna of the area but would also add to the scenic beauty of the lake and would further enhance the attractiveness of the lake.
- Annual lake festival, sound and light show and other public gatherings can also be conducted.
- A lake is an ideal location for holding environmental conferences and other environment or nature related symposiums. This would help in accruing revenue all the year round.

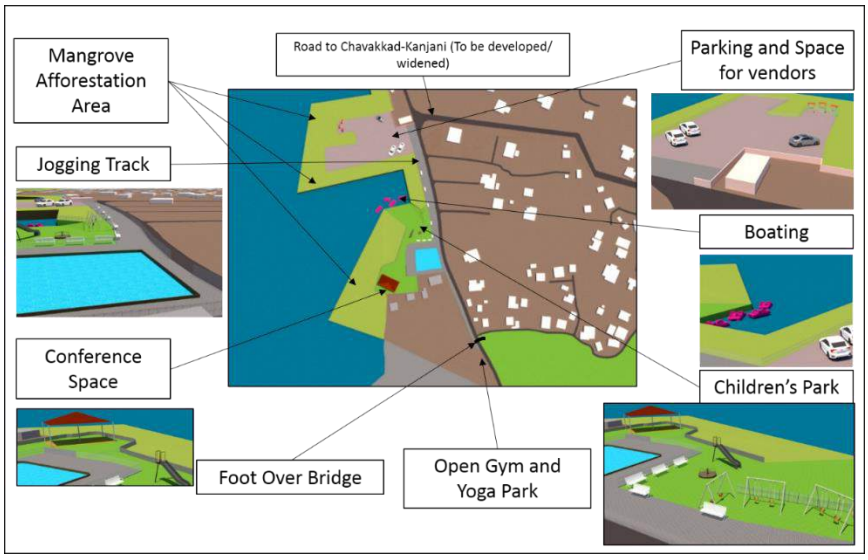


Figure 30.5: Conceptual view of lakefront development at Chakkamkandam lake area

30.4.6 Proposal for an Open Air Gym and Yoga Park

Since the surroundings of Chakkamkandam Kayal is delineated as CRZ-II, structures to be built in that area should not be affecting the ecosystem. Hence, avoiding any proposals which require building of concrete structures, an open air gym can be a good option. An area of 2.27 Acres is demarcated for open air gym and yoga park in Sy. No. 89 of Chavakkad village.

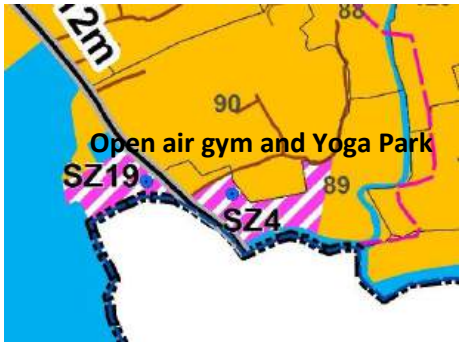


Figure 30.6: Location of Proposed Open Air Gym and Yoga Park





Anybody visiting this lake to spend some relaxing time can also opt for a workout session by the lake. In fact, this very idea surpasses the other options such as jogging or going for a walk along the lake. With the introduction of this gym, it is expected that it will not only push people to try some of the workouts, but will also be a reason to boost tourism.

30.4.7 Tourism facilitation Centers

Guruvayur town has immense opportunities to attract the pilgrim tourists, which can be connected with the surrounding tourist spots. Tourist facilitation areas are proposed along the major roads near Mamabazaar and Thampuranpadi junctions, to cater to the pilgrim tourists along this route. An area of about 4.00 acres is demarcated in survey nos.116,121,122 of Pookode village which is located near to the Punnathur Anakkotta and an area of about 4 acres is demarcated in survey no 31,113,114 of Chavakkad village near to the Chakkamkandam lake area.

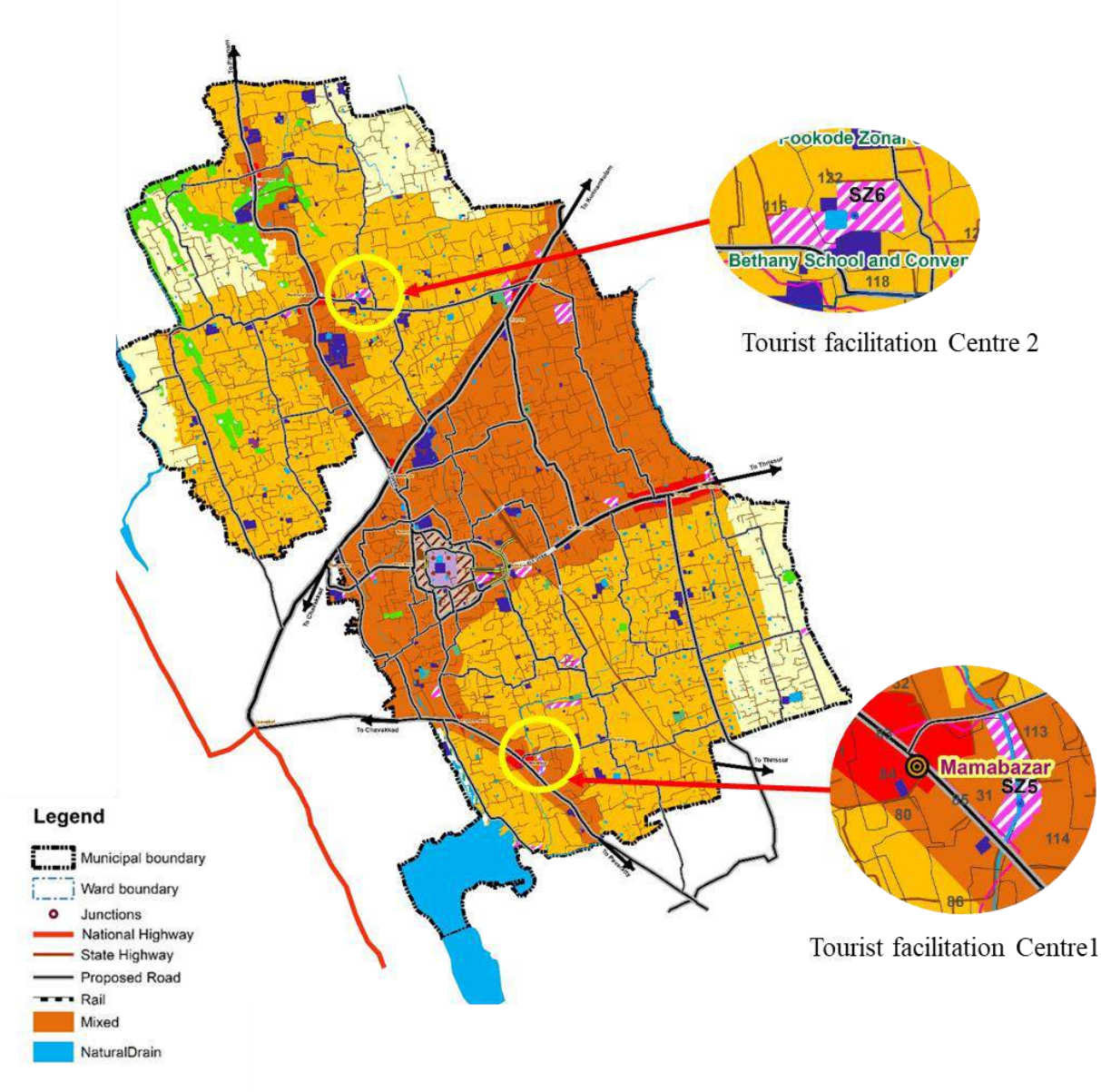


Figure 30.7 Locations of proposed tourism facilitation areas

Such tourism facilitation areas are expected to have wide range of amenities and infrastructure for the travelers. Being specific, it should comprise of motels, hotels, restaurants, convenience stores, entertainment and recreational facilities like cinema halls, children's parks, parking facilities, prayer rooms, rest rooms, diverse accommodation facilities like dormitories or home stay. This is expected to provide a safe and homely ambience for both the domestic and foreign travelers. Economic activities triggered by such developments will support the municipality financially. The proposal also highlights the importance of zero waste development in an eco-friendly manner. Figure 30.7 shows the locations of proposed tourism facilitation areas.

30.4.8 Comfort Stations / e-toilets

Comfort stations/ E-Toilets are proposed at locations near Anakotta and near Mammiyur junction.

30.5 RECREATIONAL AND CIVIC AMENITIES

30.5.1 Proposal for Sports Village

A sports village is proposed in Sy. Nos. 95,96,97,98 of Iringapuram village with an area 8.25 Acres. Sports bring cultures together and bridges gaps between countries and across generations. It is an essential element of learning through physical activities and games.

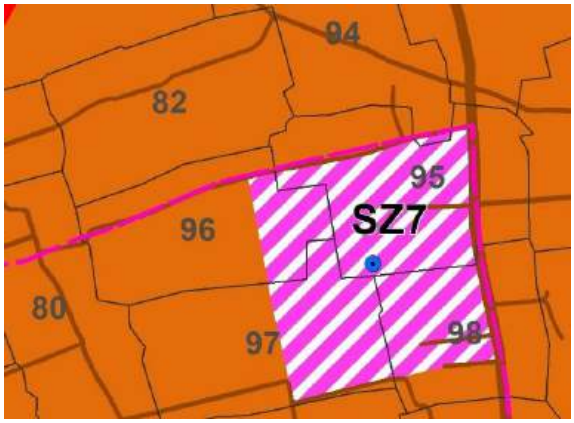


Figure 30.8: Location of proposed Sports Village

A sports village which comprises both indoor and outdoor facilities is proposed at the location shown in figure 30.8. The facilities include:



- A gym which will fulfill the health and fitness needs.
- An indoor pitch for football training or general training for all multi – sprint sports.
- Sports hall for training and for competition purposes. The hall can be used for badminton, netball, basketball, volleyball, indoor hockey and table tennis etc.
- Indoor athletic facilities.
- Meeting rooms for conducting meetings, presentations and events.
- Outdoor hockey pitch, athletic space etc. can also be provided.
- Aquatics center is also proposed so that individuals and groups from every section of the community has access.

30.5.2 Proposal for new parks and playgrounds

Proposed location for park and playground is shown in figure 30.9.

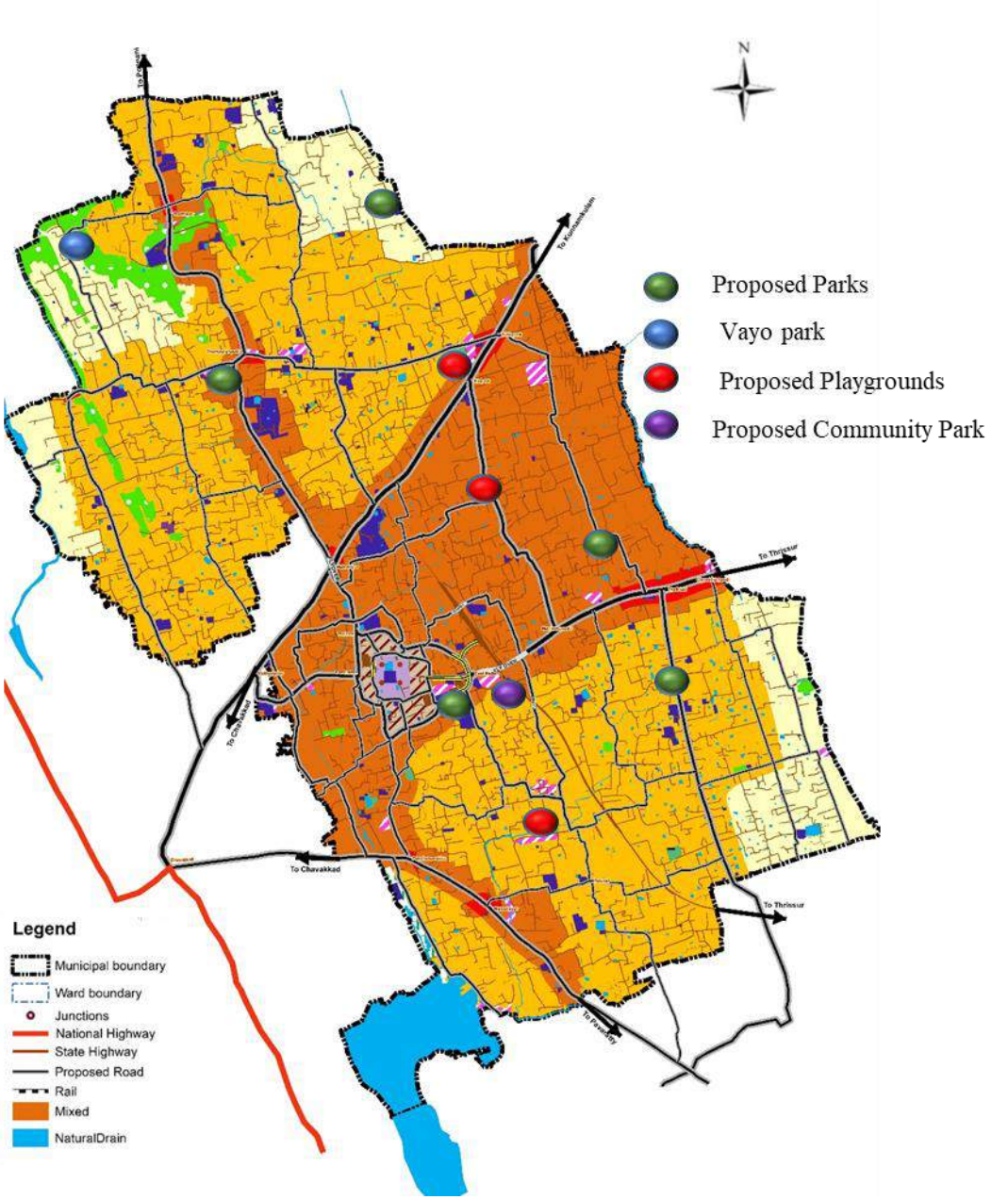


Figure 30.9: Location of proposed Park and Playground

30.5.3 Stadium

A stadium is proposed with an area of 4.26 Acres is demarcated in the southern portion of the municipality area near Manikkothupadi in Sy. Nos. 20,21,22,24,25 of Chavakkad village. This area can be utilized for temporary parking during peak seasons.

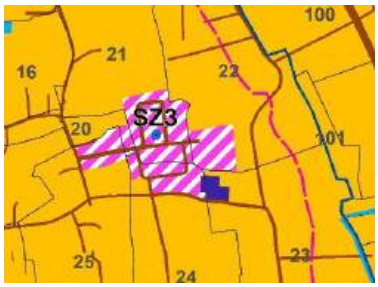


Figure 30.10 Location of stadium

A stadium is essential for the physical development of the residents of an urban area. While designing a stadium, it must be convenient and readily accessible from the strategic points and transport stations of the city and it should be comparatively level and well drained area.

In the construction of stadium the main component is the designing of field, because the proper field design is necessary in stadium construction. Different types of sports required different type of field, but most games require plane field. After complete the planning of field, greening of ground can be done.

Stadium components

- Multi purpose field
- Velodrome - A velodrome is an arena for track cycling.
- Swimming pool
- Athletic area
- Arena seating



30.5.4 Open space development near Devaswom pond at West Nada

A portion of the Devaswom pond at West nada can be covered and this portion of the pond can be used as an open space. To purify the water, addition of UV filter or a chemical filtration system can be done. Cantilever constructions can be done above the pond and this area can be used as an open space for recreational purpose.

30.5.5 Expansion and development of play grounds

Bhagat Singh and Chavakkad school ground can be expanded and developed. Bhagat Singh ground can be expanded upto an area of 2.7 Acres and Chavakkad school ground can be expanded up to an area of 0.69 Acres.



Figure 30.11 Location of Bhagat Singh Ground Expansion

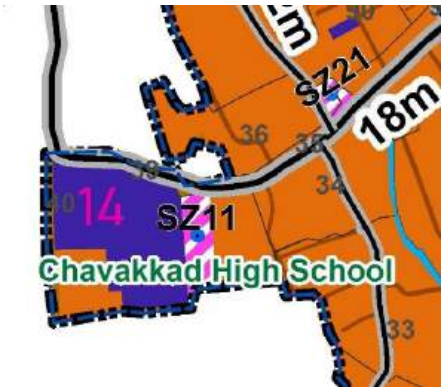


Figure 30.12 Location of School ground Expansion

30.5.6 Community hall

A Community hall can be proposed at Thampuranpadi junction in Sy.No. 115 of Pookode village with an area of 1.12 Acres. The community hall can be used for purposes

including recreation, education, and social events which can be revenue for municipality. Community centre can be designed with conference halls, exhibition space, library etc.



Figure 30.13 Location of Community hall

30.5.7 Kalakshetram near Anakotta

A Kalakshethram can be planned for Guruvayur like Kalamandalam. This Kalakshethramcan act as a cultural centre and performance theatre for the town. This Kalakshetram can be constructed with traditional architectural style. This will create a better tourism reach for the municipality.

30.5.8 Improvement of Children's park

Improvement to Children's park at Manjulal and Brahmakulam E.K. Nayanar Children's park is proposed. The location of E.K. Nayanar park is shown in figure 30.14.

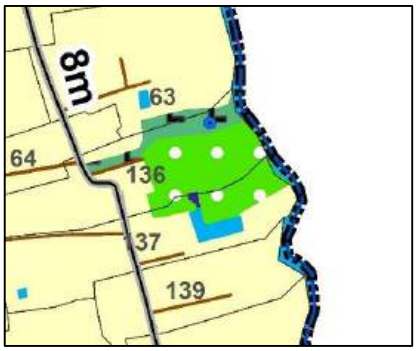


Figure 30.14 Location of Children's park

30.5.9 Permanent Exhibition Centre

A permanent Exhibition centre is proposed near town hall. Exhibition centre includes Entrance plaza, conference halls, Amphi theatre, Food court, parking area etc. The exhibition centre and modern parking ground is proposed at Sy.No. 1 of Thaikkad village with an area of 3.4 Acres.

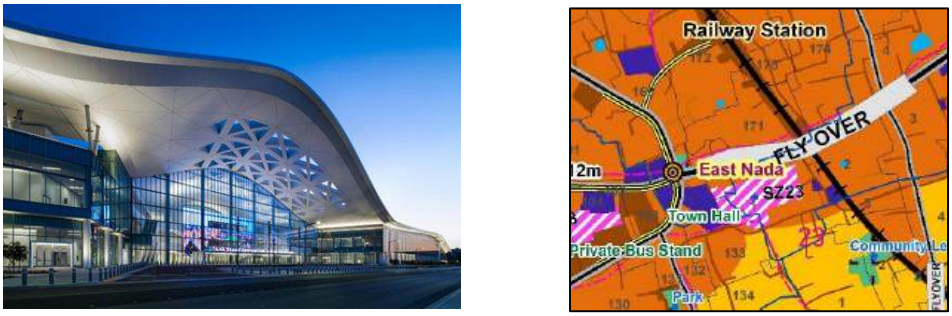


Figure 30.15 Location of Exhibition Centre

30.5.10 Ayyappankulam Beautification

It is proposed to develop the Ayyappankulam in survey no 153 of Guruvayur village and to provide recreational spaces in the area surrounding the pond.



Figure 30.16 Ayyappankulam beautification proposal

30.6 TRADE AND COMMERCE

The major commercial establishments in the town center depended on the activities related to temple.

30.6.1Multi-functional centre at Chowallurppadi

The existing market and the surrounding areas is proposed to be developed as a multifunctional center. Commercial and recreational activities can be proposed considering the presence of market. The main components of a multi-functional centre are office complexes, shopping malls, recreation areas etc. An area of 2.22 Acres is proposed for multi-functional centre in Sy. No. 43,44 of Thaikkad village.

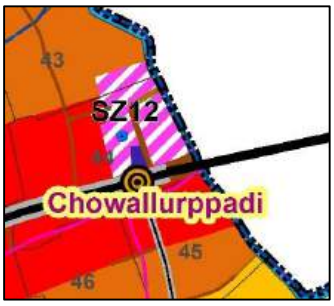


Figure 30.17: Proposed Multifunctional center

30.6.2 Proposal for new markets

New mini markets are proposed at Kottappadi junction and Thampuranpadi junction. Redevelopment of existing mini market at west nada is also proposed.



Areas that can be utilized as fish market and vegetable market is proposed near ICA college with an area of 1 Acre in Sy. Nos. 27,29 of Pookode village as shown in figure 30.18.The markets can be provided with modern facilities and cold storage. Waste processing facilities can also be planned in the area.



Figure 30.18: Location of proposed Market near ICA College

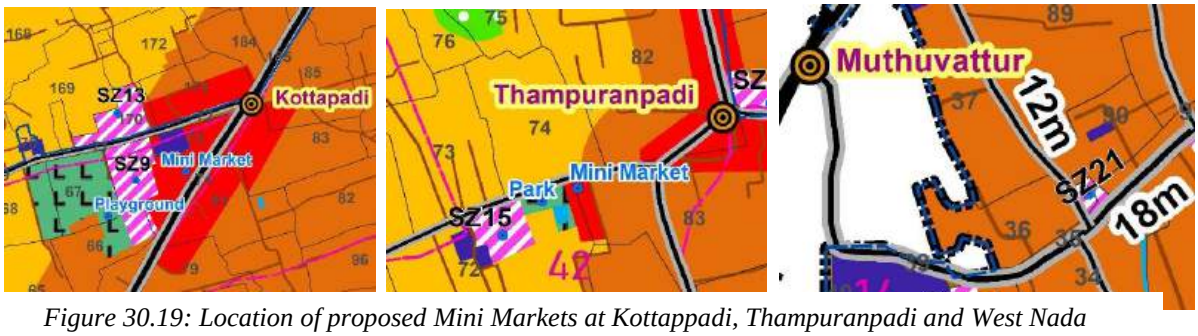


Figure 30.19: Location of proposed Mini Markets at Kottappadi, Thampuranpadi and West Nada

30.6.3 Proposal for designated vending zones

Street vendors are integral part of the town. Majority of the street vendors are located at East Nada, West Nada and at Mammiyur Junction.

- Vending activities can be regulated in the areas near Inner ring road and Outer ring road
- Vending areas can be provided under the upcoming railway overbridge at the Manjulal Junction
- Facilities such as provision for solid waste disposal, public toilets, electricity, drinking water, storage facilities, protective cover from heat, rain, dust etc. may be provided in the vendor'sareaby the Municipal authority.

30.7 WATER SUPPLY

Access to safe drinking water is important as a health and development issue at the national, regional and local level. Investments in watersupply schemes can yield an economic benefit, as it outweighs the adverse effects of health threats. The various proposals in the drinking water sector are detailed here.

30.7.1 Augmentation of water supply scheme

Present water supply scheme in Guruvayur Municipality is insufficient. Present domestic water demand is 12.5 MLD. Only 7.84 MLD is supplied even with the existing source. As per projected requirements about 23 MLD of domestic demand is expected. An additional scheme is planned for GuruvayurMunicipality withthe source of water supply asKaruvannurpuzha under the AMRUT scheme. A supply of 15MLD is proposed under this scheme.

30.7.2 Ground water recharging and enforcement of rainwater harvesting in public and residential buildings

Ground water recharging is the primary method through which water enters an aquifer. This process usually occurs in the zone below plant roots and is often expressed as a flux to the water table surface. To improve the ground water levels, the runoff water needed to be reduced. For that planting of trees needs to be promoted.

Rain water harvesting can be defined as activity of direct collection of rain water and its storage aimed at harvesting and conserving surface and ground water for most efficient utilization of rainwater towards best use for the humanity. By considering the increased water demand within the town area, measures should be taken for recharge of ground water as a futuristic approach. A policy level approach is required to promote the rain water as a massive movement. All the open wells and ponds in the Municipality may be recharged through point recharging by injection of roof top rain water directly into the well. On a long term basis, watershed management interventions such as water pits, water bunds, stone bunds, vegetative embankments etc. shall be adopted in order to increase the water table.

30.7.3 Renovation of ponds and water bodies

Ponds are an integral part of fresh water resources. Traditionally, these waterbodies played an important role in supplying drinking water, water for domestic needs and agriculture purposes etc. They have been the minor source of irrigation system also. Hence the protection of these waterbodies is of prime importance. Due to negligence and other activities majority of ponds are in dilapidated condition hence it needs to be renovated.

30.7.4 Using unused well as recharge structures

Availability and quality of water is surely an issue in Guruvayur. The municipality is studded with ponds and wells which can be utilized for storing quality water harvesting.

The quality of water in Guruvayur is of serious issue. The practice of recharge pits can be used in the Municipality by interconnecting series of potentially large ponds in a locality and connecting it to a dry well which can be dug and designed for rainwater harvesting. The excess water from the ponds can be diverted to an artificial well which would be lined with filter media. This could help restore quality of ground water in the premises. The stored water could be used for tanker lorry supply, as the main issue reported in their supply was that water source is not identified and reliable. Components of rainwater harvesting system require:

1. Catchments - rooftops, open spaces, etc.
2. Coarse mesh – to prevent passage of debris.
3. Percolation pits
4. Conduits - Conduits are pipelines or drains that carry rainwater from percolation pits to the harvesting system.
5. First flush - a valve which ensures flushing out of first spell of rain away from the storage tank
6. Filters – Gravel, Charcoal water filter, Sand filters, Horizontal roughing filter and slow sand filter.

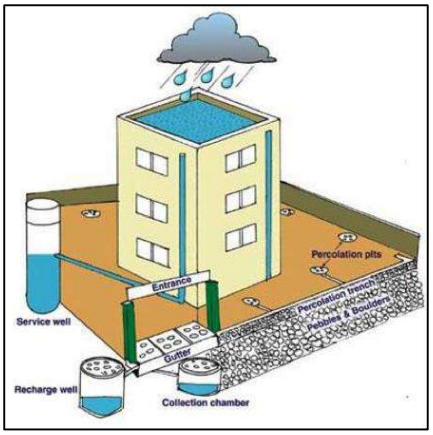


Figure 30.20: Components in harvesting system

7. Recharge structures - Rainwater Harvested can also be used for charging the groundwater aquifers through suitable structures like dugwells, borewells, recharge trenches, etc.

Unusable public wells can be used as recharge wells and contaminated public ponds can be utilised as percolation pits. Conduits from these public ponds could be diverted to nearby unused well lined with filter material like gravel, which could be used for storage and groundwater recharge purpose.

30.8 AGRICULTURE

Even though agriculture sector does not play as significant role in the economy of the town, it is the present day need to promote agricultural practices, which will also support the local economy. The aim is to make agriculture prosperous, socially inclusive and environmentally friendly. Focus will be on increasing the competitiveness and productivity in agriculture so as to raise, the income and the wellbeing of the people. Sustainable agriculture practices with specific strategies taking into account topography, soil characteristic, climate, pests and local availability of inputs should be introduced. The major proposals in this sector are follows.

30.8.1 Plant new coconut trees

Coconut is the main crop cultivated within the Municipality. But the productivity is very less. It is mainly because of the old and damaged trees. For better results removal and replantation programme should be implemented within the Municipal area. The replantation will also help to prevent the occurrence of the weather related Mite disease which affects the palms, during extended hot spells of weather.

30.8.2 Promote Organic vegetable farming

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. Many techniques used in organic farming - such as inter-cropping, mulching, and integration of crops and livestock - are practiced under various agricultural systems. What makes organic agriculture unique is that, under various laws and certification programs,



Figure 30.21: Integrated farming practices

almost all synthetic inputs are prohibited, and "soil building" crop rotations are mandatory. Properly managed, organic farming reduces or eliminates soil and water pollution and helps conserve water and soil on agricultural lands. Organic farming is one of several approaches to sustainable agriculture. Most studies have found that organic agriculture requires significantly greater labour input than conventional farms. Therefore, the diversification of crops typically found on organic farms, with their different planting and harvesting schedules, may distribute labour demand more evenly, which could help stabilize employment.

To attain self-sufficiency in case of vegetables it is proposed to select non active paddy areas for organic farming. Scheme for attaining self-sufficiency to an extent in the production ofcommonly used vegetables by extension of vegetable cultivation to more areas. Possibility of exporting vegetables also to be explored.Integrated farming practices (Fish rearing and fodder cultivation in coconut plantations, vegetable plantation on top of fish ponds) are also proposed which will assure livelihood security by integrating enterprise and resource utilization. It will enhance the productivity and profitability to the farmers.

30.8.3 Promote roof top farming

In view of the rapidly growing demand for the organic food and home grown vegetables, variety of food growing models can be adopted in high rise residents in urban areas. Vertical and homestead models of cultivation in pots, grow-bags and rows etc. should be promoted which allow families who stay in congested urban areas to grow anywhere

between 20-40 plants on a single stand that can easily be housed on balconies or small terraces. Terrace farming also innovatively use water, with sprinkle, drip and stick irrigation systems that are highly eco-friendly.



Figure 30.22: Roof top farming practices

30.8.4 Floriculture

As Guruvayur is a famous for pilgrimage, where abundant quantity of flower is required for Pooja and other purposes in temple and considering the local demands for flowers, a flower growing zone is proposed.It will also provide sustainable source of income to the farming community. Floriculture has a vital role to play in the socio economic upliftment in terms of its capacity for employment and income generation particularly for women. Commercial cultivation of high value flowers as a group activity especially in small homesteads, has lot to offer in empowering the women and youth both with sustainable income and self-employment opportunities. There should be initiatives from the Municipal administration and agriculture department to give sufficient awareness and knowhow among the farmers about the cultivation of flower crops. They should also be supplemented with sufficient infrastructure, Good quality planting materials, proper marketing channels and financial assistance. It will also help in promoting commercial cultivation of flowers in homesteads, open fields and poly houses for income generation. The flower crops such as Jasmine, Marigold (*Chendumalli*), *Parijatha* or Indian Magnolia, Different types of Hibiscus, crown flower (*Erukku*), Nerium Oleander(*Arali*), Ixoracoccinea (*Chethi/Thechi/Thetti)*,SaracaIndica *(Ashokam)*,GomphrinaGlobosa (*Vadamalli*), Chrysanthemum (*Jamanthi*), *Pichakam / Pichi*, MicheliaChempaca*(Chempakam),Leucusaspera (Thumpa), Nandyarvattam , Tulsi, Koovalam*etc. can be cultivated. Also *'Dasapushpams' (Karuka, Mukkutti, Nilappana, Krishnakranti, Povamkurunnila, Thiruthali, Kayyunyam, Cheroola, Uzhinja, Muyalcheviyan)* canbe cultivated which are used in temples during important occasions.

- The following kind of farming systems can be adopted:

1. Inside protected structures like poly houses and rain shelters

2. Open fields
3. Homesteads
4. As inter crop in coconut plantations



Figure 30.23: Floriculture

- Clusters can be formed by grouping each of the above mentioned farming systems such as poly house cluster, open field cluster, homestead cluster and grow bag / pot cluster. Each cluster should have a specific number of farmers. There should be a leader for each cluster. Preference can be given to women farmers, unemployed youths and SC/ST farmers.
- Good quality seed / planting materials should be provided to the farmers from the authorities at subsidized rate if possible.
- A flower marketing society and collection center can be established at zonal level (Thaikkad and Pookode) for the procurement and marketing of flowers. It will facilitate collection, post-harvest management, packing and marketing of flowers inside and outside the town, depending on the requirement and ensure sustainable returns to the farmers.

30.8.5 Weekly market for Agriculture produces

Weekly markets are proposed at important junctions for the farmers to sell their goods directly at affordable price. The main aim to suggest these markets is to make availability of local goods to the public without the intermingling of mediators. Locally cultivated vegetables, fruits etc. can be sold here.

30.8.6 Labour bank

Some of the major problems faced by agriculture sector is subdivision of agriculture land, non-availability of agricultural labours, machineries and noncooperation among different government agencies. For making solutions to these problems, a labour bank can be formulated at ward level to undertake the agricultural activities. The details of theagriculture labours may be kept in a register in the municipality and GramaPanchayats. The agriculture labourers may be supplied from the labour bank tothe cultivators based on demand. This programme can be implemented jointly byKrishibhavans, and the Municipality.

30.8.7 Cultivators Group / Group Farming and Implements bank

For facing the current problems in agriculture sector effectively, measures like cultivator's group / group farming may be formed. An agricultural implementsbank is also to be setup. Cultivation in the uncultivated land by leasing out theland to interested cultivator's groups may be promoted. These programme can beimplemented jointly by Krishibhavans and Municipality.

30.8.8 Fish culture in ponds and lakes

The ponds can be redeveloped by constructing side walls and cleaning the water. These ponds will be filled during rainy season and can be utilized for pisciculture.

30.8.9 Proposal for Integrated Agro Park

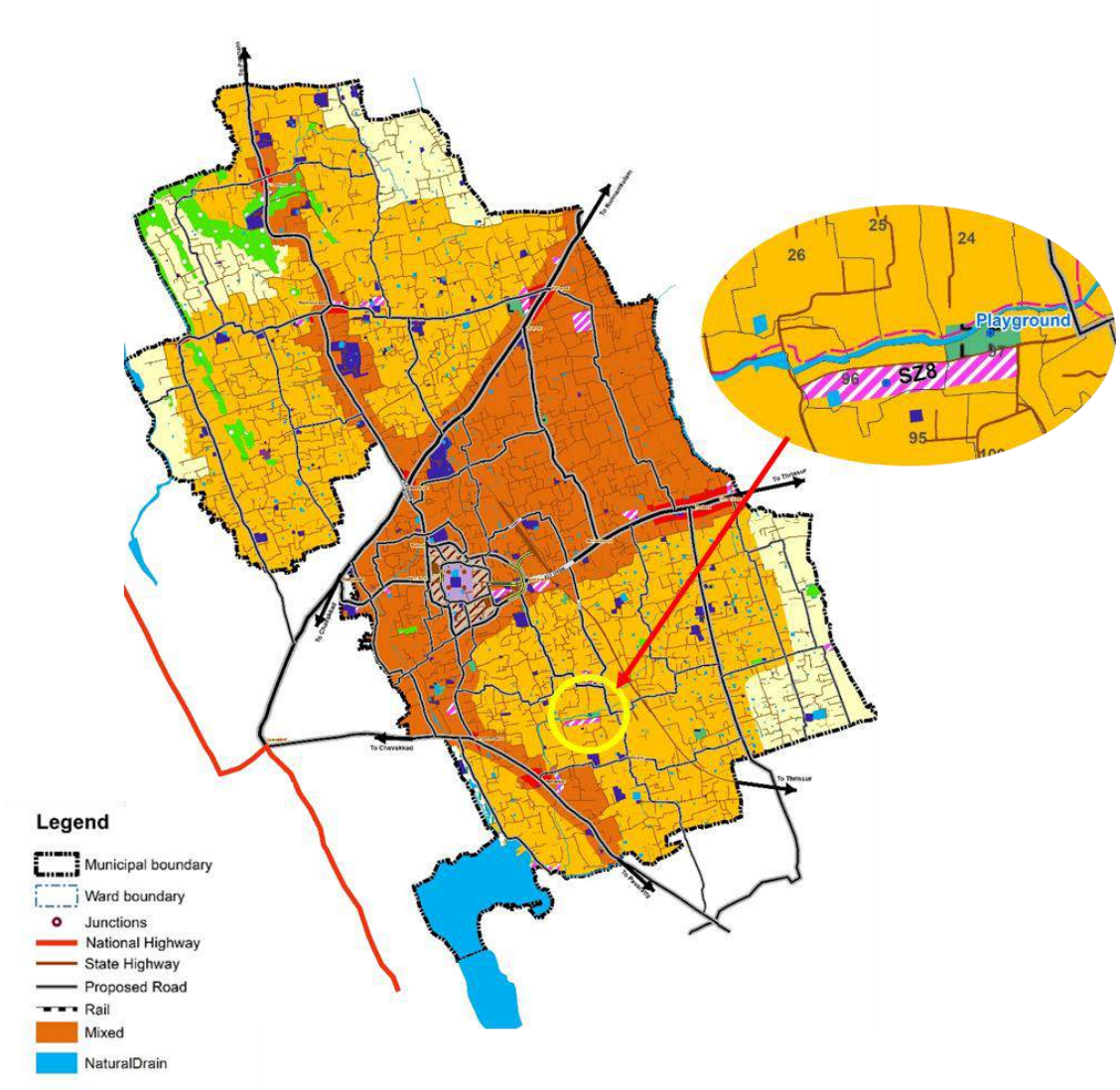


Figure 30.24: Location of proposed Agro Park

To satisfy the various requirements of farmers such as agricultural inputs, farms related information like credit, marketing etc. are to be brought under a common service centre. Integrated Agro Park is proposed in Sy.No. 95,96,97 of Chavakkad village with an area of 3.85 Acres shown in figure 30.24.The objectives of the agro service center shall be to organize, promote and develop marketing, processing and storage of agricultural produce, distribution of agriculture machinery, implements and other inputs, assistance for technical advice in agricultural production for the promotion and working of its members, setting up of cooperative marketing, processing and supply societies in the town. It should act as technology and information disseminating centres with facilitating role in field visits. A mobile farm clinic should be established to provide solution to the field problems equipped with audiovisual and online support. The agro centers should also be supported with state government schemes.

30.8.10 Farm tourism at Kuttadan paddy



Kuttadan Paddy fields in Guruvayur can be utilized for farm tourism. There is a possibility of converting potential cropped areas of municipality as tourist attractions with minimum intervention to transfer the benefits of tourism directly to the farmers. Farm tourism usually involves- accommodation, farm visits, farm shop visits, guided walks, and farm activities. The use of indigenous methods and organic farming is widely accepted and is popular among tourists.

30.9 ANIMAL HUSBANDRY SECTOR

30.9.1 Mini Diary Unit

It is proposed to establish mini diary units in the municipal area so that fresh milk will be made available to the daily use of Guruvayur Temple at fixed price. The manure from these units may be used as organic fertilizer. Dung drier units may be used for this purpose. Fortransportation of milk and transporting manure to the drier, service of Kudumbasree may be made use of. This initiative can bring together the farmers in this sector and can ensure a decent income for them. Also this can lead to self-sufficiency in this field. Here also sustainable practices can be aimed at.

30.9.2 Fodder cultivation along the sides of natural drains

Fodder cultivation has become an immediate necessity for promoting dairy development activities. Small scale fodder cultivation at individual level is to be promoted in all the possible homesteads. Assistance from the animal husbandry department should be ensured. For reasonably large scale fodder cultivation, plantations can be established along the natural drains by individuals or dairy units.

30.9.3 Elephant path way

An elephant pathway can be proposed from Anakkotta to Guruvayur temple premises. This can act as a safe and comfortable travel path to the elephants. It can also act as a walkway for the pilgrims.

30.10 INDUSTRY

Presently Industrial sector have less contribution for economic development of the town. An Industrial estate is located in ward 41, which is not in full working condition. The industrial sector needs to be strengthened, by providing skill development training and financial assistance to the unemployed persons. Since Guruvayur has coconut as the important agricultural crop, small industries for producing coconut byproducts can be developed which will serve the local economy. Similar household industries can also be promoted in agro allied activity zones.

30.10.1 Improvement to the existing industrial Estate

The existing industrial estate in ward number 41 is not in fully working condition. It is proposed to develop Kudumbashree operated special industries there. Its operation would be completely organized by Kudumbashree groups and handled by women. Various activities such as making of packaged food items, vegetable farms, Tailoring and handicraft unit etc can be carried out through this initiative, which helps in women empowerment. These industries should be supported by department of social welfare, department of agriculture and the Municipality and could also see the backing of central government scheme for the women. It will also help to increase the work force participation rate of women within the town.

30.10.2 Skill development center

For promoting the development household and agro based industrial activities, a skill development center is suggested at the existing industrial estate.

30.11 SOCIAL WELFARE

A sound social welfare system is essential for the stability and sustainable development of the society. Quality welfare services do not only support the vulnerable, disadvantaged and people in need but also enhance mutual help and support thereby preventing the occurrence of social problems. Public sanitation facilities/ comfort station and E- Toilets should be developed and maintained at public places.

30.11.1 Social amenity centers and programmes

Existing social amenity centers and its activities should be strengthened for old aged people with modern facilities like TV, Internet, Library etc. Pakalveedu and Nirbhayakendrams should be developed. Coverage of Vayomithramprogramme should be ensured within the Municipal area.

30.11.2 Improvement of Anganawadis

Necessary infrastructure should be provided to all anganawadis like compound wall, baby friendly furniture, playing areas and necessary toys for children, toilet facility etc.

30.11.3 Friendly amenities for women, elderly & differently abled

There should be facilities for the women, elderly and differently abled persons.

30.11.4 Women empowerment programmes

Women's well-being depends on their empowerment in social, cultural, political and economic aspects. Since women empowerment will lead to an improvement of the socio-economic conditions of the society in a number of ways, there should be programmes which should cover the welfare and support services, training for employment and income generation, awareness generation and gender sensitization etc. to ensure that women are empowered both economically, socially and thus became equal partners in the development of the town along with men. Improvement of existing Vanitha Vyavasaya Kendram at Thaikkad is proposed.

30.12 EDUCATION

30.12.1 Smart Class Rooms and E library

The smart classes are a modernized method of education which provides quality education to students by helping them in better concept formation, concept elaboration, improvement in reading skills and academic achievement. Computer and Internet has become

part of day to day life. Also book reading habits has reduced among the children. Hence every educational institution need to be equipped with E – library.

30.12.2 Electrical incinerators for Girls Toilets

To improve the sanitary conditions in schools, all schools should have hygienic toilets and there should be provisions for electrical incinerators.

30.12.3 Special coaching for economically backward

To improve the educational background of the students, who is from economically backward categories special coaching should be provided from the schools itself.

30.13 HOUSING

30.13.1 Development of colonies

The major suggestions to improve the existing facilities in colonies are follows:

- Connectivity and accessibility should be developed
- Development of modern sanitation system
- Parks, library, public well with pump system and open spaces should be provided as a part of colony beautification.

30.14 HEALTH

According to the planning standards, Health facilities in the town are seen to be adequate. Various other suggestions are:

- Mosquito eradication programme shall be strengthened and periodical monitoring shall be made.
- Hotel sanitation and food safety should be ensured.
- Facility to provide essential medicine at low price to economically weaker sections.
- Full utilization of Vayomithram medical camp, which facilitates free medical treatment for citizens above 65 years old, should be ensured at the local body level.

30.14.1 Proposal for PHC development

Primary Health Centres (PHCs) in Pookode and Thaikkad are to be developed and can be expanded.

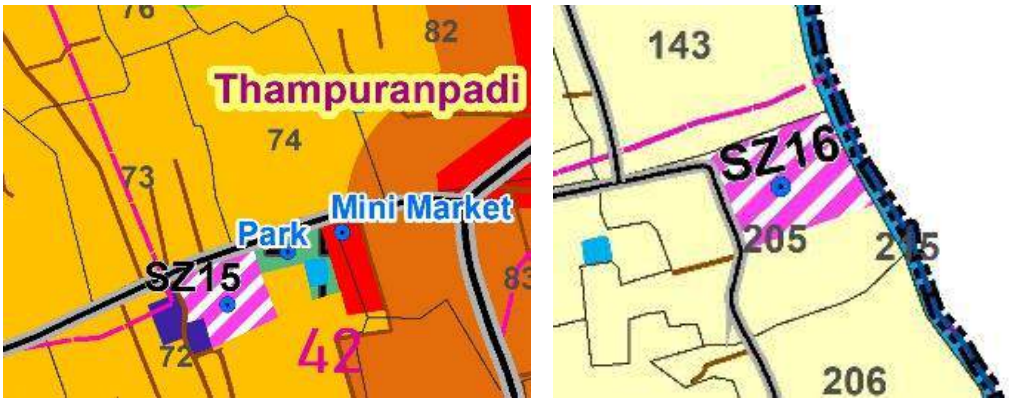


Figure 30.25: Location of PHCs in Pookode and Thaikkad

30.14.2 Development of Ayurveda Hospital and Health Centre

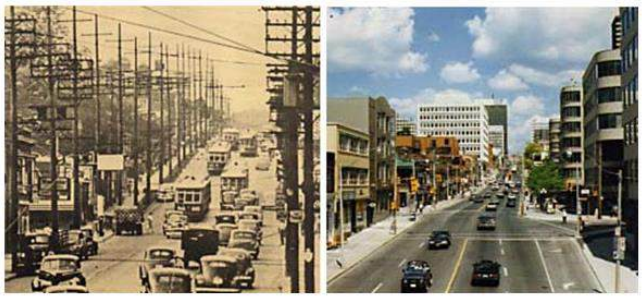
Development of Goverment Ayurveda Hospital and Urban family health center along SH 49 is proposed. The location of Government Ayurveda Hospital and Urban Family Health Centre is shown in figure 30.26.



Figure 30.26: Location of Ayurveda Hospital and Health Centre

30.15 ENERGY

30.15.1 Provision of underground electric cable



It is proposed to provide underground electric cables for major road stretches within the town.

30.15.2 Provision of solar panels

- Promotion of solar panels by giving tax reduction and subsidies and other benefits to the public. Awareness programs needs to be conducted so that people will get an idea about future energy crisis.
- Another technique which can be adopted for promoting solar energy usage is installation of Solar Panels on roads and foot paths. Thus energy produced can be utilized for street lighting and for supplying power to commercial enterprises adjacent to these roads.

30.16 Disaster Risk Management& Climate Action

Disaster management measures include flood control, measures to reduce water logging in flooded areas, Widening of drains, implementation of pocket forests to reduce heat waves etc.

30.16.1 Disaster Management Measures - flood



For reducing the risk of a region to floods, the primary step involved is to map the flood prone areas. The problem of flood management can be resolved into two aspects structural measures and non-structural measures. Structural measures are in the nature of physical measures and help in "modifying the floods" while non- structural measures are in the nature of planning and help in "modifying losses due to floods". Long-term measures are execution of watershed management, major flood control structures, land use regulations, strengthening of forecasting, monitoring and warning systems, and public awareness. Medium term measures are bank protection; river draining and flood control works. Short term measures are assessment of the vulnerability of the flood control structures, cleaning, desilting, flood plain zoning mapping etc. Community participation is of utmost importance, in prevention, mitigation and preparedness measures against flood.

The complete disaster management includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure. When properly implemented, the disaster-management can lessen the impact of a catastrophic event/disaster. The disaster management involves the following phases:

PRE-DISASTER PHASE

Mitigation

Mitigation can neither prevent a disaster nor divert it to any other place, but can only minimize its damage. A better disaster management with minimum vulnerability quotient is possible only by means of preparedness and mitigation measures. Maximum the disaster preparedness, minimum is the vulnerability. The disaster management committees constituted at local level shall play active role in this matter.

Disaster Mitigation measures are those that eliminate or reduce the impacts and risks of hazards through proactive sustained measures taken before an emergency or disaster occurs. The aim of mitigation activities is to protect people and structures during disaster and to

reduce the cost of response and recovery. Mitigation measures includes following activities like,

- **Structural Measures**

Flood mitigation in the form of physical measures to prevent the flood waters from reaching potential damage centres includes measures like:

- Widening of natural drains
- Embankments and dykes.
- Natural detention basin.
- Channel improvement.
- Drainage improvement.
- Diversion of flood waters
- Watershed Management / Catchment area treatment.
- Anti-erosion works.

- **Non-Structural Measures**

Non-structural measures strive to keep the people away from flood waters, it includes measures like:

- Identifying the type of disaster which could occur and likelihood of its occurrence.
- Risk Assessment and Vulnerability Analysis
- Recognizing the consequences of the events along with the cost of response and recovery.
- Strengthening of public infrastructure.
- Efforts to make community more resilient to a disastrous event through mitigation public awareness programs.

- **Plot level Mitigation measures**

The built environment guidelines can be introduced in the hazard prone areas.

- Site layout:

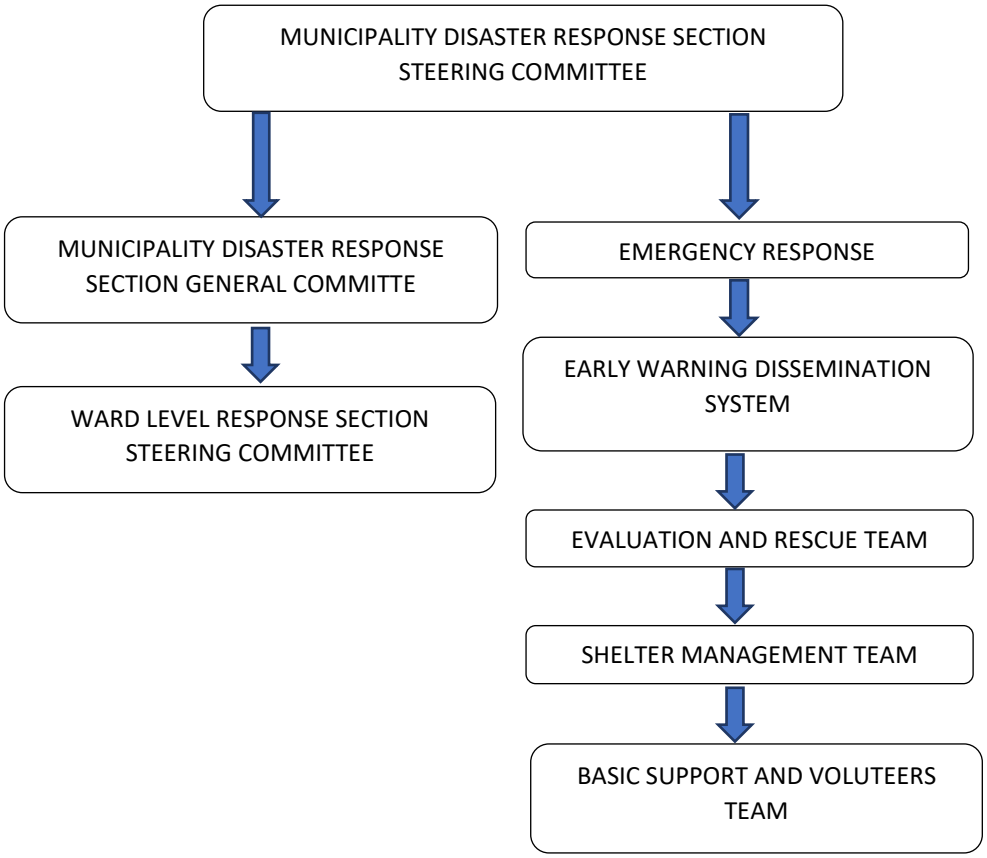
  Ground should be sloping away from the building.
- Plinth:

  The plinth level of the house must be above the most common flood level in the area and naturally above the drain level in the village as far as possible.
- Floor level Requirements:

  The finished floor level of habitable rooms must be above the flood hazard level;

Preparedness

Disaster Preparedness refers to measures taken to prepare for and reduce the effects of disasters. This is achieved through research and planning in order to try to predict areas or regions that may be at risk of disaster and where possible prevent these from occurring and/or reduce the impact those disasters on the vulnerable populations that may be affected so they can effectively cope. Disaster preparedness activities embedded with risk reduction measures can prevent disaster situations and also result in saving maximum lives and livelihoods during any disaster situation, enabling the affected population to get back to normalcy within a short time period.



Complete Disaster mitigation against any disasters may not be achieved so harmful consequences of a disaster may be reduced by taking certain actions before its occurrence. Preparedness includes planning, training and educational activities like,

- Developing disaster preparedness plans that describe measure to be taken, where to go or who to call for help in a disaster.
- Exercising emergency plans through drills and full-scale exercise.
- Establishing early warning system.
- Identifying the resources available and developing a supply list of items that are essential in a disaster.

- Allocation of responsibilities to the individual Actors/ Groups/Institutions/Organizations-Different teams had been constituted and documented in 'NammalNamukkayi' plan. The various actors are given below:

➢ **Relief Camps**

Relief camps shall be set up in order to accommodate people affected by a disaster. The camp shall be temporary or permanent in nature, with basic necessities. People in the camp shall be encouraged to return to their respective accommodation once the normalcy has returned. Currently, there are 13 potential relief camps are identified in Guruvayur shown in table 30.2.

Table 30.2 Details of Potential relief camps identified

Sl.No.	Relief camp details	Ward	Village	Survey No
1	GuruvayurDevaswom English Medium School	19	Guruvayur	135
2	V.R Appu master memorial Higher Secondary School	24	Thaikkad	125
3	St. Teresas Girls High School	24	Thaikkad	75
4	St. Thomas Church parish Hall	24	Thaikkad	126
5	Littile Flower College	16	Iringapuram	146
6	Chavakkad High School	14	Guruvayur	40
7	RCUP school	32	Iringapuram	28
8	Rahmath English Higher Secondary School	1	Pookode	8
9	St.George HSS Thozhiyur	1	Pookode	39
10	GuruvayurDevaswomSree Krishna HSS	17	Iringapuram	158
11	St. George CUP School,Mamabazar, Paluvai	21	Chavakkad	108
12	ICA College Thozhiyur	1	Pookode	93
13	Town hall	23	Iringapuram	133

➢ **Alternative routes**

Safe routes and alternate routes have to be mapped and communicated to the citizens through effective media to help the rescue operations. The proposed alternative road network should ensure reaching of every nook and corner of the planning area in

case of a calamity. Proper drainage network shall be prepared and implemented especially along the arterial roads that are taken as the alternative routes to reach the destined relief camps.

Safe routes are identified and these roads provide access to the potential relief camps. Safe routes are shown in figure 30.27.

The following roads are identified as safe routes:

- SH 49-Chowallurpadi - Thaikkad - East Nada – Pancharamukku
- SH 50 – Kottappadi – Choolpuram – Mammiyur – Muthuvattur - Chavakkad
- SH 62 – Thampuranpadi – Thozhiyur – To Ponnani
- Kottapadi – Thampuranpadi – Perakam road
- Thaikkad – Pavaratty road
- Chavakkad – Pancharamukku – Mamabazaar – Pavaratty road

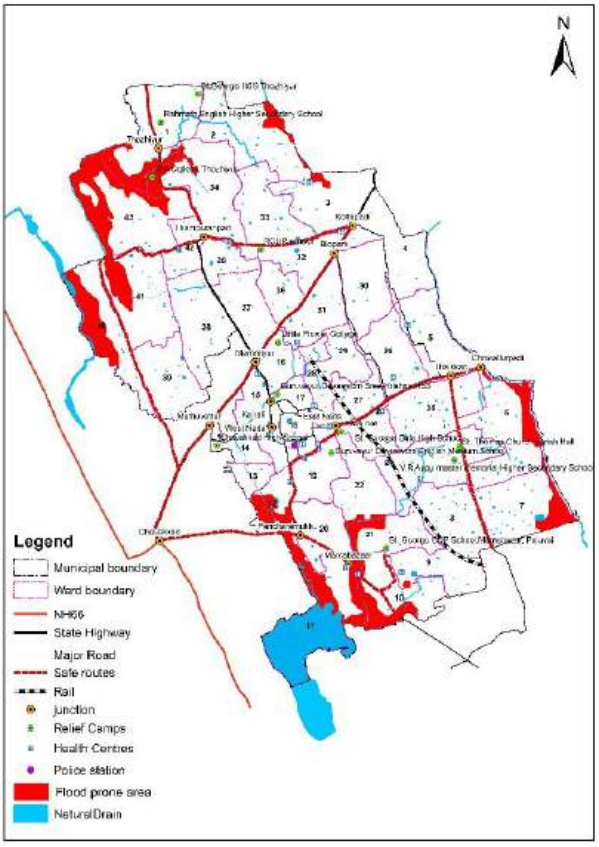


Figure 30.27: Safe routes identified

- **Supporting amenities**

Ensure adequate supporting amenities like food, water, health, sanitation & hygiene and waste management as per the Kerala State minimum standards of relief.

- **Safe zone parking**

During the time of floods and heavy rains the vehicles are to be protected and to be prevented with proper prior precautions to reduce the loss and damage of vehicles. Parking the cars on elevated grounds at the time of warning would be beneficial, and when the condition gets worse people could be evacuated in an orderly manner to the respective relief camps without being worried about their vehicles, cattle and other pocessions. Safe zones for parking are to be identified within the corporation. These may be areas which are open grounds of public or semipublic institutions, which are outside flood prone area that can be used as parking lots in case of floods. Multilevel parking proposals outside the flood prone areas could be utilized for this purpose in addition to these identified spots.

- **Livestock Shelter**

  Floods can often lead to loss of livestock but this loss can be drastically reduced by prior planning and evacuation of the animals. Various vacant areas in the vicinity of relief camps and outside the flood prone zone can be identified to shelter the livestock of the corporation.

- **Multi-purpose Rescue shelter**

  During the flood time, public institutions like schools, colleges, auditoriums and worship places are selected for functioning as rescue shelters. The regular functioning of these institutions will get affected if the relief camps prolong for a long time. More over some of these shelters may not have sufficient facilities like kitchen and toilets. Multi – purpose rescue shelter proposals outside the flood prone are necessary to meet the requirement.

- **Modifying Critical Infrastructure**

  Critical infrastructures in the high hazard zones can be modified relocated to safer areas. Upgradations can be done to critical infrastructures that cannot be relocated out of the hazard zones. Typical upgrades include raising floor levels, changing infrastructure materials, improving drainage networks in the surrounding areas etc.

IMPACT STAGE

Response

Disaster Response phase occurs in the immediate aftermath of a disaster as an immediate action or relief. It consists of a number of elements like; warning/evacuation, search and rescue, providing immediate assistance, assessing damage, continuing assistance and the immediate restoration or construction of infrastructure. The aim of emergency response is to provide immediate assistance to maintain life, improve health and support the morale of the affected population.

Disaster Response measures includes following activities like,

- Implementation of Disaster Response plan.
- Taking action to protect the community and animals.
- Conducting lifesaving missions like evacuation, search and rescue.
- Providing assistance for relocation to safe zones
- Allocating temporary shelter for the needy.
- Ensuring provision of food, water and emergency health care to the affected.
- Providing emergency assistance and critical services to victims.
- Conduction of a rapid situation assessment.

Recovery

The recovery phase is the restoration of an organization following any impacts from a disaster. The best outcomes are achieved by ensuring recovery strategies align with community need and are led by the affected community. A community-led approach supports the rapid restoration of services essential to human wellbeing and presents an opportunity to build resilience and improve community circumstances and preparedness beyond their pre-disaster status.

This phase occurs after the disaster to return the community's system and activities by rebuilding or restoration efforts beyond the provisions of immediate relief like;

- Rehabilitation.
- Rebuilding of damaged structures
- Taking actions to Prevent and reduce stress related illness.
- Providing financial support to people affected.
- Development of practices and policies to reduce the vulnerability and to avoid or mitigate similar situation in future.

POST-DISASTER PHASE

Post-disaster recovery planning is defined as developing a set of strategies to assist a community in rebuilding after a disaster occurs. Recovery planning can also be thought of as building the blueprint for reconstruction of the community after a disaster. There are a number of activities that communities can engage in to address post-disaster recovery. These strategies may include developing and implementing:

- Post-disaster recovery plans
- Post-disaster buildable lands inventories
- Utility recovery and reconstruction plans
- Temporary shelter and housing plans, and
- The establishment of a coordinating organization and guiding principles for reconstruction.

Loss in green cover and increased concretization in urban areas has led to cities becoming 'urban heat islands', which pose significant threats to not just human populations but also contribute to global climate change. The effect of these heat wave can be reduced with the greening of the area. This can be achieved by methods like pocket forests, Miyawaki forests etc.

30.16.2 Measures to reduce waterlogging in town area

Major flood prone areas exist in the core areas. The built up density is very high in the town area. Also the paved or concreted yards reduce the chances for infiltration of storm water. This will lead flooding in these areas.

Existing drains by the municipality were reconstructed and inter connected under AMRUT project. Inner & Outer sides of inner ring road and outer ring road are almost completely networked and connected to 'Valiyathodu'.



Fig. 30.28 Water logging areas – Temple premises, Mammiyur jn.

Short term measures:

- *Regular pre-monsoon de-silting*
- *Scope for Rainwater recharging pits at salient locations can be explored.*
- *Permeable paving materials to be adopted*

Medium & Long term measures:

- *Alleviation of water logging at Mammiyur area:* The following measures can be adopted
  - ✓ Canal rejuvenation
  - ✓ Removal of encroachments on Valiyathodu and maintaining minimum width of 3m. Green strip of 3m should be provided on both sides.

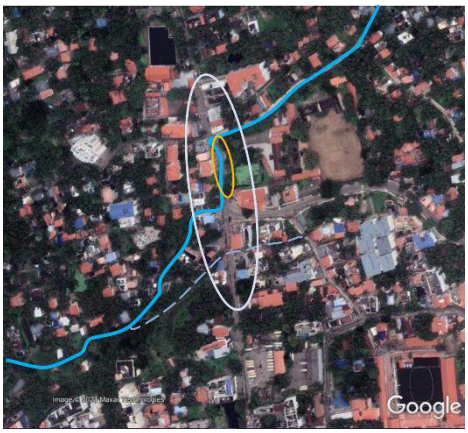


Fig.30.29 Mammiyur – Kairali Area

- ✓ Slabs for access across thodu / drains by private individuals – deep beams underneath, abutments, Old Water supply pipes hindering flow during heavy rains.
- ✓ Channel connection adjacent to ISKON property to be materialized, to ensure direct flow of water to Valiyathodu.
- ✓ Pre-monsoon cleaning and desilting.
- ✓ Protecting thodu – Fencing to avoid littering.

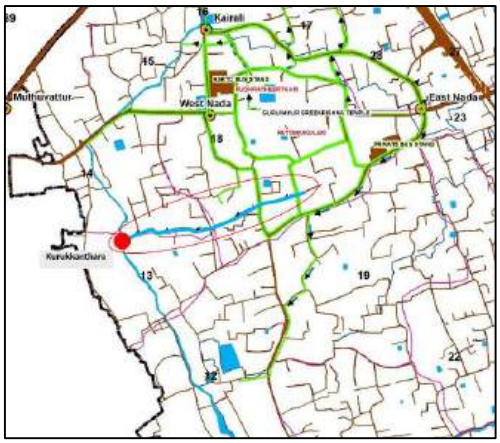


Fig. 30.30 Core area

- *Alleviation of the water logging at Core areaof the town:* The drain from the core area to Valiyathodu can be improved for carrying capacity and encroachment along the drain could be cleared. This will reduce the water logging issues in the core area of the municipality.
- *Alleviation of water logging at Guruvayur central areas*
  - ➢ **Clearing encroachment, widening and deepening of Valiyathodu**

Valiyathodu was the major water body within Guruvayur Municipality. Presently this water body has become a source of waste water from hotels, restaurants etc. within the town discharging into the backwater. Also the encroachment on both sides of the Valiyathodu made it narrower. So clearing of the water body and its deepening is important to protect the area from natural disasters. By clearing of the encroachments in Valiyathodu, the carrying capacity of the drain can be increased.

Measures to be adopted

- ✓ Encroachments and obstructions to flow to be removed
- ✓ Proper designing and redevelopment
- ✓ Protection from encroachments and littering
- ✓ Desilting/ cleaning at regular intervals

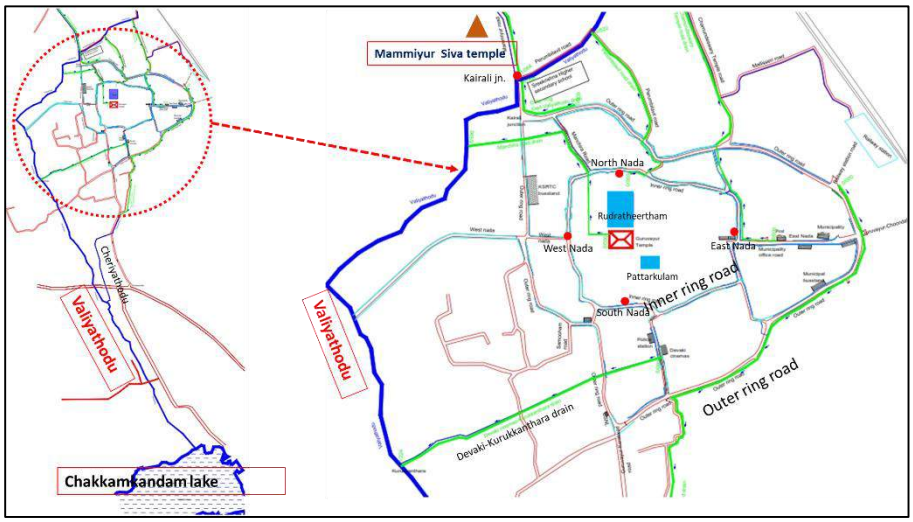


Fig. 30.31 Location of Valiyathodu

- *Proper documentation, clearing of encroachments & obstructions to flow, steps for improving carrying capacity*
- *Insisting Arrangements for recharging with rainwater to be explored for existing and proposed residential apartments & non- residential/ commercial buildings.*
- *Impermeable paving of open yards around buildings and open spaces to be discouraged.*
- *Provisions of rainwater harvesting and Groundwater recharge to be strictly enforced, with specific thrust on the core town area, during post occupancy audit.*
- *Alternate methods for mitigating the tidal effects to be explored.*
- *Wetlands and water bodies in the tidal flood-prone area to be conserved.*

30.16.3 Disaster Management Measures – Heat waves

Pocket forests - Miyawaki technique



Fig. 30.32 Miyawaki forest plantation in Bangaluru

Miyawaki is a technique pioneered by Japanese botanist Akira Miyawaki, that helps build dense, native forests. The approach is supposed to ensure that plant growth is 10 times faster and the resulting plantation is 30 times denser than usual. It involves planting dozens of native species in the same area, and becomes maintenance-free after the first three years. Miyawaki technique can create such forests in small urban spaces, as small as 30 square feet.

CHAPTER – 31

PRIORITY PROJECTS, ACTION PLAN & PHASING

As per the development concept for the town, it was envisaged to develop the town into a Green city having all the facilities catering to the pilgrims arriving at the town. Hence action is required in the Tourism, Sanitation and infrastructure development sectors. Projects are to be designed for the economic upliftment of the town which will create a better living environment for the residents of the town. In this chapter projects are prioritized and an action plan for the projects is suggested.

The components or elements and implementation methods described here are suggestions, and any suitable or essential components required can also be included in the project during the stage of preparation of DPR or during implementation stage. The fiscal requirement calculated for each project is by rough estimate only, and the actual amount shall be calculated while preparing DPR (Detailed Project Report) during implementation stage.

Master Plan has a time period of 20 years and this is divided into 4 phases. Each phase has 5 year time period. Suggestions for phasing of the selected priority projects are enlisted in the table given at the end of the chapter.

31.1DISASTER MANAGEMENT

31.1.1 Drainage measures

Valiyathodu is a major natural drain within Guruvayur town. Presently this water body has become a carrier of waste water from hotels, restaurants etc. within the town discharging into the backwater. Also the encroachment on both sides of the Valiyathodu has made it narrower. So clearing of the water body and its widening and deepening is important to protect the area from natural disasters like flooding. A green strip is also proposed along the sides of the water body. Also fencing can be provided to avoid littering.

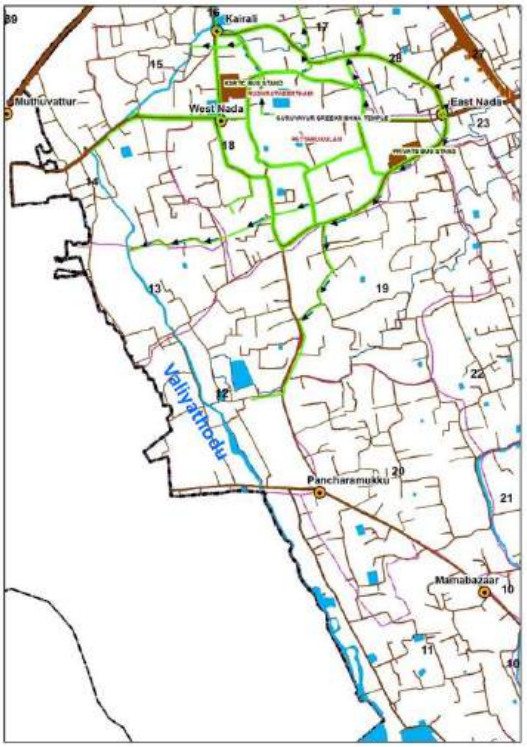


Fig. 31.1 Valiyathodu location

31.1.1.1 Location and ownership details

Water logging is a problem found in different areas of the town presently. The blockages caused in the water carrying capacity and flow of water through Valiyathodu is a major reason for this issue. Also other waterbodies existing in the area which can carry water away have to be rejuvenated. Tidal effects are also a major reason for the seasonal waterlogging. Valiyathodu passes through wards 11,12,13,14,15,16,17 of the town.

31.1.1.2 Project brief

Short term measures:

- Regular pre-monsoon de-silting
- Scope for Rainwater recharging pits at salient locations can be explored.
- Permeable paving materials to be adopted

Long and Medium term measures:

- Rejuvenation of Valiyathodu and Devaki-Kurukkanthara canals
- Proper documentation, clearing of encroachments & obstructions to flow, steps for improving carrying capacity
- Insisting Arrangements for recharging with rainwater to be explored for existing and proposed residential apartments & non- residential/ commercial buildings.
- Impermeable paving of open yards around buildings and open spaces to be discouraged.

31.1.1.3 Responsible agencies

Valiyathodu is the main water body that presently carries storm water and waste water discharged from the establishments within the town. The possible agencies responsible for the project is listed in table 31.1.

Table 31.1 Responsible agencies involved

Components	Responsible Agencies/Mode
Funding and implementation	Irrigation dept/Municipality/PPP/Govt
Operation and maintenance	Municipality/PPP

31.1.1.4 Need for the project

Water logging is a problem found in different areas of the town presently. The blockages caused in the water carrying capacity and flow of water through Valiyathodu is a major reason for this issue. Tidal effects at the Chakkamkandam backwater is also a major reason for the seasonal waterlogging. The built up density is very high in the town area. Also the paved or concreted yards reduce the chances for infiltration of storm water. This will lead

to flooding in these areas

31.1.1.5 Suggested implementation mechanism

Discharge of raw sewage from houses and commercial establishments is to be prevented. Pre monsoon desilting in the canal can be done. Along with that the encroachment along the thodu shall be removed. 2 to 3 m wide walkway can be made along the sides of the thodu wherever practical. With the help of irrigation department, permeable paving can be given to these canals for better performance.

31.1.1.6 Approximate project cost and funding

Detailed estimate is to be prepared after conducting detailed surveys and analysis.

31.2 INFRASTRUCTURAL FACILITIES

31.2.1 Markets

31.2.1.1 Location and Ownership details

The economic development of the town is mainly dependent on the trade and commerce, especially the trading activities related to temple. A new market is proposed near ICA college in survey number 27,29 of Pookode Village with an area of about 1 acre . The land is under private ownership. Figure 31.2 shows the location of the proposed markets.



Fig 31.2 Proposed Market

31.2.1.2 Project brief



Markets are places where people go to buy their daily needed commodities. Markets should have stalls for various commodities, parking areas, loading and unloading facilities, restaurants, and toilet facilities. In the market the stalls/shops are may be permanent or temporary. Permanent Shopping complex buildings can be constructed in the area. The upper floors of these buildings can be used as a remunerating component as part of the value capture mechanism.

31.2.1.3 Responsible agencies

The main responsible agency is municipality. The funding for essential facilities in these markets has to be met by the municipality. Options like PPP may also be explored.

Operations and maintenance to be done by municipality.

Table 31.2 Responsible agencies involved in the projects

Components	Responsible Agencies/Mode
Funding and implementation	Municipality/PPP/Govt
Operation and maintenance	Municipality/PPP

31.2.1.4Need for the project

Markets are essential for city. Especially for Guruvayur, apart from the population in the municipality floating population to the temple is also important factor. To cater the needs of these population trade and commerce should be strengthened. The need for proper markets are essential in the municipality.

31.2.1.5 Suggested implementation mechanism

The proposed site for market are private vacant lands. The municipality can purchase/acquire the land parcel and set up the basic infrastructure facilities in the proposed area through own/Govt funding or through PPP mode. The area can be rented out to retailers by the municipality. Proper value capture mechanism can be promoted for extra income from the project.

31.2.1.6 Approximate project cost and funding

Table 31.6 shows approximate project cost for the project.

Table 31.3Approximate cost for market

Sl. No.	Items	Amount in Crores
1	Land procurement and development	2
2	Construction of Infrastructure facilities	8
	Total	10

31.3 PILGRIMAGE AND TOURISM

31.3.1 Pilgrim amenity centers

Pilgrim amenity centers should be provided with amenities such as multipurpose hall, dormitory rooms, dining hall, auditorium, and interlocking pathway for parking, toilet blocks and drinking water outlet. The center can also be provided with information centers, locker facility and kiosks for devotees to buy the puja and offering articles.

31.3.1.1 Location and ownership details

Pilgrim amenity centers are proposed along SH 49 and SH 50.The land is under

private ownerships. The location details of pilgrim amenity centre is shown in table 31.7. The location of Pilgrim amenity centres is shown in figure 31.3.

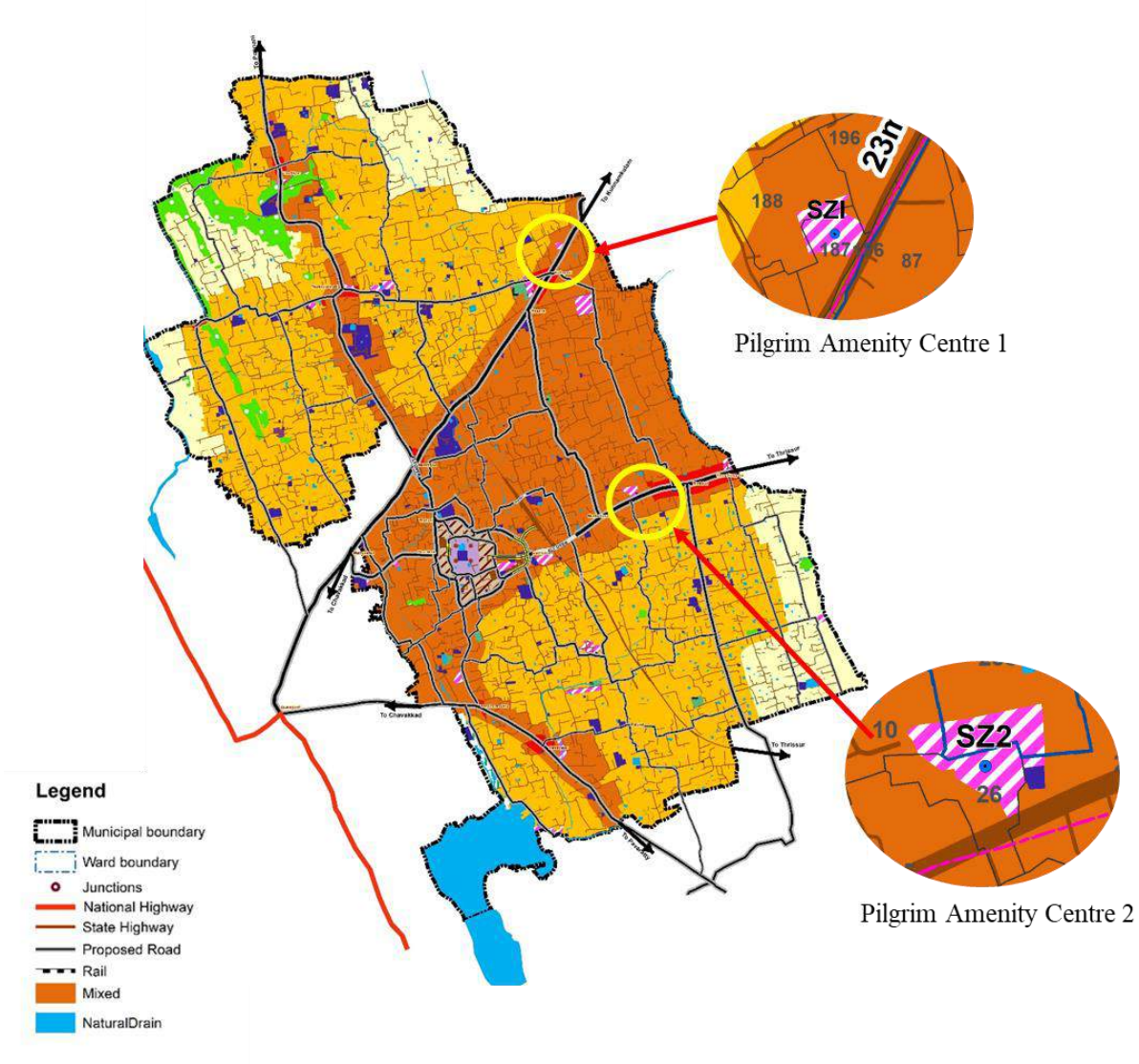


Fig. 31.3 Location of Pilgrim amenity centers

Table 31.4 Location details of Pilgrim Amenity centre

Project	Location details	Area
Pilgrim amenity center I (Near Kottappadi Junction)	survey nos.187,188 of Pookode village	1.25 acres
Pilgrim amenity center II (Near Mavinchodu – Thaikkad)	survey no. 10,24,27 of Thaikkad village, Sy.No. 258 of Iringapram Village	2.7 acre

31.3.1.2 Project brief

Amenity centres enroute major circuits can ensure hassle-free journey for the pilgrims. Each centre can have cafeteria, medical store and shops with essential commodities. They should have a separate ramp for people with disabilities, a feeding room for babies and separate toilets for men and women. Amenity centers can also have free WiFi and parking space. It can be developed under public-private partnership model. Commercial and recreational areas may be included in the center as a remunerating component as part of the value capture mechanism.



31.3.1.3 Responsible agencies

The need for pilgrim amenity centers is essential for Guruvayur, a town is visited by lakhs of devotees every year. The project involves development of land parcel, proper designing and implementation of project and providing infrastructure facilities comprising road, power, water, sanitation & drainage. The agencies may involve in the execution of the project are listed in the table 31.8.

Table 31.5 Responsible agencies for the construction of Pilgrim amenity centres

Components	Responsible Agencies/Mode
Funding and implementation	Municipality/GuruvayurDevaswom/PPP/Govt
Operation and maintenance	Municipality/GuruvayurDevaswom/PPP

31.3.1.4 Need for the project

Guruvayur is a temple town, attracts thousands of pilgrims each day and in demand of pilgrim amenity centres. Guruvayur temple has already have pilgrim amenity center near temple which has multi-level car parking complex which accommodate 300 vehicles with lifts and ramp facilities. There are 20 toilets, including four for the differently abled, in the complex constructed in the northern side of the temple. The amenity centre provides a place to rest for those visiting the temple town. In order to avoid the congestion and vehicular volume in the core area of the temple and smooth and serene flow of pilgrims in the pilgrim activity zone, the pilgrim amenity centers to be shifted outside the pilgrim activity zone along SH 50 connecting Kunnamkulam and SH 49 connecting Thrissur, from where majority of the pilgrims entering the municipality.

31.3.1.5 Suggested implementation mechanism

Municipality can purchase/acquire the land. Municipality along with Devaswom, can assess demand and arrange the funds for the project. Municipality may explore state / central government funding for the construction of these pilgrim amenity centre. The table shows an approximate cost of the pilgrim amenity center. Proper value capture mechanism can be promoted for extra income from the project.

31.3.1.6Approximate project cost and funding

Table 31.6 The approximate cost for the project

Project	Pilgrim Amenity Centre 1	Pilgrim Amenity Centre 2
Land procurement and development	Amount in Crores	Amount in Crores
	3.0	5.0
Construction of Infrastructure facilities	5.0	10.0
Total	8.0	15.0

The operation and maintenance cost need to be financed by the ULB and can be recovered from fees and other charges.

31.3.2 Tourist facilitation centers

Guruvayur town has immense opportunities to attract the pilgrim tourists, which can be connected with the surrounding tourist spots. Tourist facilitation areas are proposed near to the areas of leisure tourism potential.

31.3.2.1 Location and ownership details

An area of about 4.00 acres is demarcated in survey nos.116,122 of Pookode village which is located near to the Punnathur Anakkotta and an area of about 4 acres is demarcated in survey no 31,32,113,114 of Chavakkad village near to the Chakkamkandam lake area.

The land is under private ownerships. It can be developed under public-private partnership model. Figure 31.4 shows the location of proposed Tourism facilitation centres in the municipality.

31.3.2.2 Project brief



It should comprise of motels, hotels, restaurants, convenience stores, entertainment and recreational facilities like cinema halls, children's parks, parking facilities, prayer rooms, rest rooms, and diverse accommodation facilities like dormitories or home stay. This is expected to provide a safe and homely

ambience for both the domestic and foreign travelers. The proposal also highlights the importance of zero waste development in an eco-friendly manner. Commercial and recreational areas may be included in the center as a remunerating component as part of the value capture mechanism.

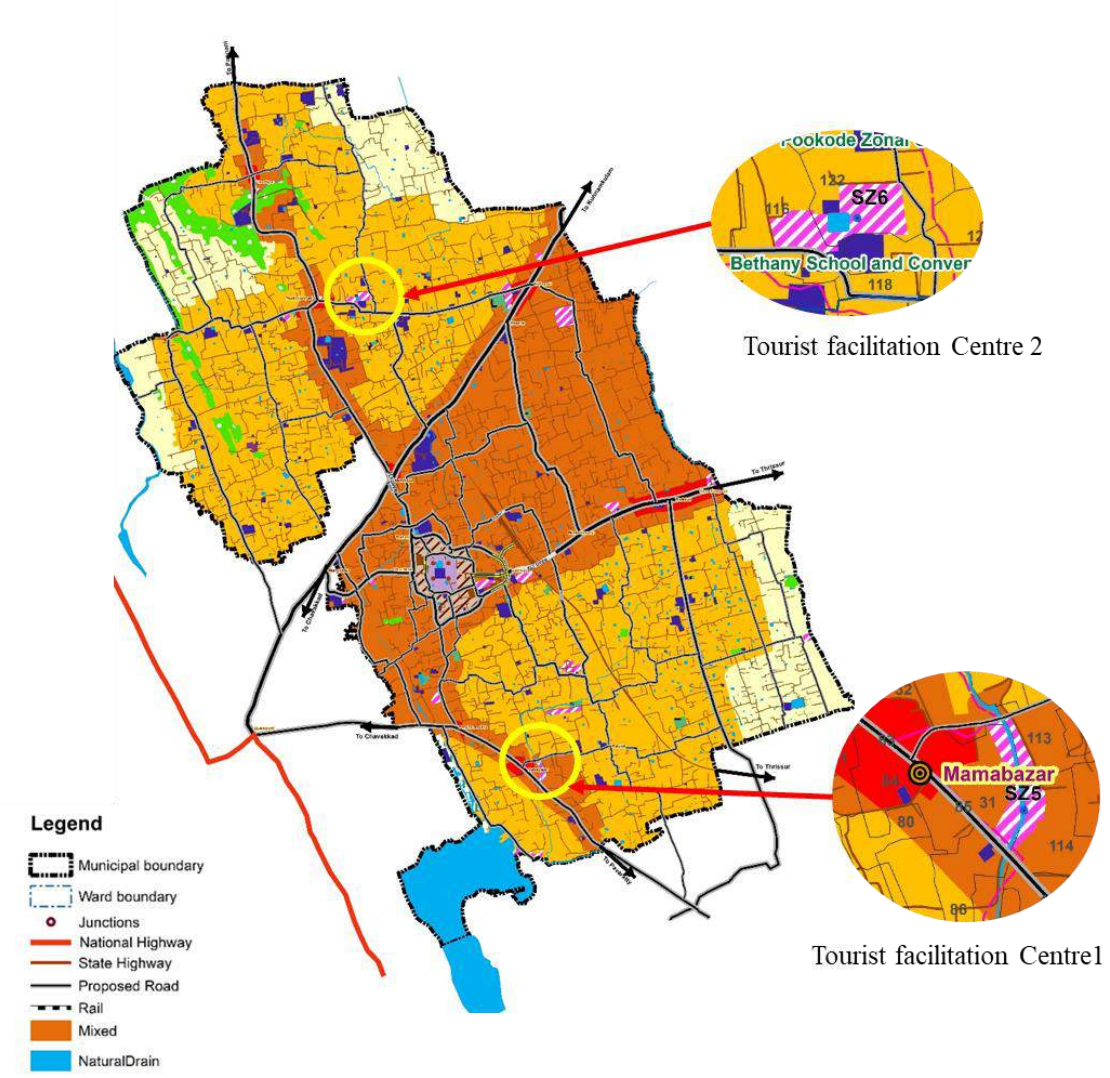


Fig. 31.4 Location of Tourist facilitation centers

31.3.2.3 Responsible agencies

The agencies involved in the project execution is listed in the table 31.10.

Table 31.7 Responsible agencies for the construction of tourist facilitation centre

Components	Responsible Agencies/Mode
Funding and implementation	Municipality/GuruvayurDevaswom/PPP/Govt
Operation and maintenance	Municipality/GuruvayurDevaswom/PPP

31.3.2.4 Need for the project

The project aimed at infrastructure development such as entry points, basic tourism facilities like information centers, ecofriendly modes of transport, parking, drinking water, waiting rooms, first-aid centers, souvenir shops, telecom facilities, internet connectivity, etc. TFCs are located outside this pilgrim activity zone and the huge influx in this zone can be regulated. The development of the town is shifted outside this zone.

31.3.2.5 Approximate project cost and funding

Municipality can purchase the land from private owners. Municipality can finance the project and execute it through civil contractors selected through open tendering. The fund for the project can be arranged from Central Government/ State Government funds. Also companies/MLA, MPs funds also can be diverted to the implementation of the project. The approximate cost for the project is shown in table 31.11.

Table 31.8 Approximate cost for Tourist facilitation centre

Project	Tourism facilitation centre 1	Tourism facilitation centre 2
Item	**Amount in Crores**	**Amount in Crores**
Land procurement and development	5.0	5.0
Construction of Infrastructure facilities	10.0	10.0
Total	15.0	15.0

31.4 RECREATIONAL & CIVIC AMENITIES

31.4.1 Sports village

A Sports Village will have basic sports facilities with a focus on athletics and a few Olympic-related sports. It will also focus on the development of schools and will help in providing proper teaching facilities. A sports village comprise of gym, indoor and outdoor facilities, swimming pools etc.

31.4.1.1 Location and ownership details

Sports villages are designed and executed where students and sports aspirants can live, learn and work across a wide range of sports venues. A sports village which comprises both indoor and outdoor facilities is proposed at the location in Ward 30 in land falling under survey nos. 95, 96, 97, 98 of Iringapram village with an area of 3.69 Acres. The location of proposed sports village is shown in figure 31.5.

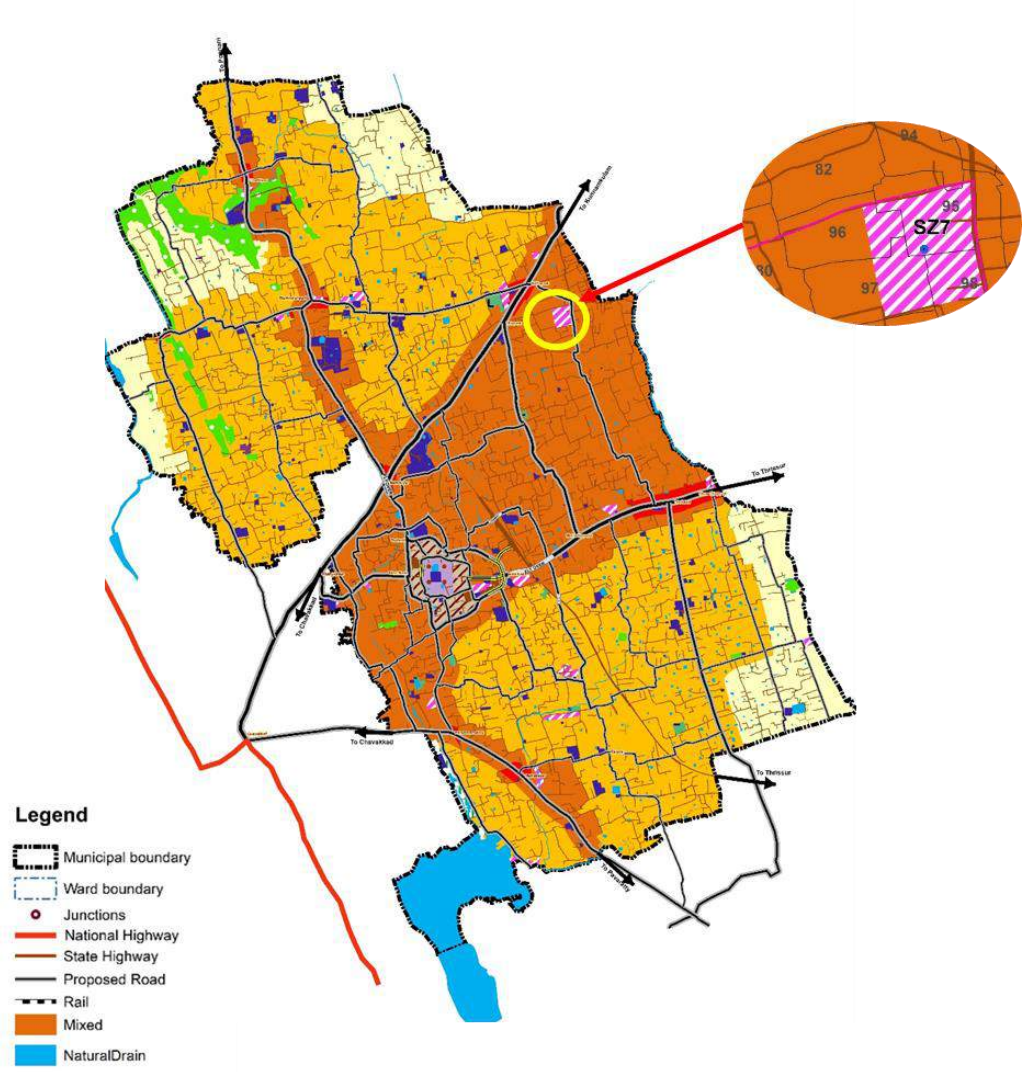


Fig 31.5 Location of Sports Village

31.4.1.2 Project brief

The facilities may include:



- A gym which will fulfill the health and fitness needs.
- An indoor pitch for football training or general training for all multi – sprint sports.
- Sports hall for training and for competition purposes. The hall can be used for badminton, netball, basketball, volleyball, indoor hockey and table tennis etc.
- Indoor athletic facilities
- Meeting rooms for conducting meetings, presentations and events.

- Outdoor hockey pitch, athletic space etc. can also be provided.
- Aquatics center is also proposed so that individuals and groups from every section of the community has access.
- Remunerating components as value capture mechanism.

31.4.1.3 Responsible agencies

The responsible agencies associated with the development of sports village includes Kerala sports and youth affairs department, municipality. The possible agencies associated with the development of the project is listed in the table 31.12.

Table 31.9 Responsible agencies involved in Sports village project

Components	Responsible Agencies/Mode
Funding and implementation	Municipality/Sports and youth affairs department/PPP/Govt
Operation and maintenance	Municipality/PPP

31.4.1.4 Need for the project

Presently venues for sports training and conducting sports events is very minimal in the town. Few private investments like football turfs are existing in the town. Activities related to sports are conducted in school grounds and Bagat singh ground where facilities are very less.

Proposed sports village aims to develop facilities for imparting high quality training to aspiring sports talents and hosting events. This will greatly contribute in development of sports sector of the region and attract more and more aspirants towards sports and bring more achievements in this field. Sports village may lead to more employment opportunities, boosts tourism, increase in tax contributions and community development.

31.4.1.5 Suggested implementation mechanism

Municipality can purchase/acquire the land parcel and act as an implementing agency for the project, this will increase the revenue of the municipality from sports and tourism. The funding may be sourced from own fund or state/central government schemes. Operation and maintenance of the sports village can be done by municipality along with organisations like Sports Kerala foundation or any private consultants. Proper value capture mechanism can be promoted for extra income from the project.

31.4.1.6Approximate project cost and funding

Approximate cost for the project is shown in table 31.13. Public-private partnerships have been used to fund the project and also project stakeholders will determine an appropriate funding plan that is mutually acceptable to each party.

Table 31.10 Approximate cost for Sports Village

Sl.No.	Item	Amount in Crores
1	Land procurement and development	10.0
2	Construction of Infrastructure facilities	15.0
	Total	25.0

31.4.2 Open Air Gym and Yoga Park

Outdoor recreation systems contributes a high quality of life for the community. With increasing urbanization, communities are continuously seeking new ways to provide outdoor spaces and activities to residents, and outdoor exercise is one ideal option. Outdoor Fitness Parks can be located by new and existing recreation centers, allowing users to exercise while enjoying natural and designed landscapes in an open air environment.

31.4.2.1 Location and ownership details

Open air gym and yoga park is proposed near Chakkamkandam Kayal which is demarcated at CRZII. Structures to be built in that area should not be affecting the ecosystem. An open air gym and yoga center can be a good option. The area falls under the survey nos. 89, 90 of Chavakkad village. It is situated in ward no. 11 Chakkamkandam in the municipality. The proposed land has a total area of 2.27 Acres demarcated for open gym and Yoga Park. The location of open air gym and yoga park is shown in figure 31.6.



Fig.31.6 Location of Open air gym and Yoga park



31.4.2.2 Project brief

Open air gyms and Yoga parks boosts the mood, improves the health and save money of the



community. For the better outlook of the gym and park proper landscaping is an essential factor. Equipments can be used in open gyms are air skier, air walker, arm & pedal bike, sit-up bench, twist and step, upper body workout, cross trainer etc. These yoga parks can be developed by planting trees, walk ways and providing lawns with sitting benches for resting, etc. Temporary commercial facilities conforming to the CRZ regulations may be included in the center as a remunerating component as part of the value capture mechanism.

31.4.2.3 Responsible agencies

The responsible agencies for this proposal are Municipality, Kerala Tourism Development Corporation.

31.4.2.4 Need for the project

Well-defined and innovative open air gyms and yoga parks can serve a diverse range of users while also contributing to overall community health. The addition of nature and fresh air helps make exercising fun and therefore more effective. Also the equipment used requires no electricity, is of low maintenance, and uses very little human resources. These type of open fitness parks strengthen the community and interpersonal relationships. This is a cost effective gym and also improves health of the community.

31.4.2.5 Suggested implementation mechanism

Municipality can purchase/acquire the land parcel identified for the open air gym and yoga center. The open air gym and yoga center can be developed from using the funds of central or state government grants.

31.4.2.6 Approximate project cost and funding, Project Periods and Priority

The project proposed is near Chakkamkandam Lake which is under CRZ II zone. The area can be maintained as an eco-friendly open space. The approximate cost for the development of open air gym and Yoga Park is shown in table 31.14.

Table 31.11 Approximate cost for Open air gym and Yoga Park

Sl.No.	Item	Amount in Crores
1	Land procurement and development	5.0
2	Construction of Infrastructure facilities	5.0
	Total	10.0

31.5 PHASING OF PRIORITY PROJECTS

Based on the demand and necessity priority for each project is fixed. Phasing for each project is given below. Also period required for the completion of project and approximate project cost for the project is also included in the table 31.15.

Table 31.12 Phasing

Sl.No.	Name of the project	Project Phasing			
		0-5 year	5-10 year	10-15 years	15-20 years
1	Tourism facilitation centre	✓	✓	✓	
2	Open air gym and yoga park	✓			
3	Sports village	✓	✓	✓	
4	Clearing encroachments,widening, and deepening of Valiyathodu(in phases)	✓	✓	✓	✓
5	Markets	✓	✓	✓	
6	Pilgrim amenity centres	✓	✓	✓	

CHAPTER 32

ZONING REGULATIONS

A. GENERAL GUIDELINES

1. All future development shall be in conformity with the provisions of the Master Plan for Guruvayur Town - 2039.
2. For the implementation and enforcement of the proposal envisaged in this Master Plan, areas have been zoned under various zones such as Temple core zone, Pilgrim Activity Zone, Residential Use Zone, Mixed Use Zone, Dry Agriculture cum Residential Use Zone, Commercial Use Zone, Traffic and Transportation Use Zone, Public and Semi-Public Use Zone, Industrial Use Zone, Conservation zone, Recreational Zone, Water bodies, Mangroves and Special Zone. Details regarding the nature of uses *'permitted'* and uses *'restricted'* in each zone are given in Table 32.1 These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the Master Plan.
3. Uses *'permitted"* in a zone cover the uses that can be normally accommodated in the relevant zone. Such uses may be permitted by the Secretary, Guruvayur Municipality (hereinafter referred to as Secretary). In some cases it may be possible to permit some other uses also, which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually examined based on their performance characteristics and special locational factors. Such cases which come under this category are classified as "*Uses Restricted*".
   a. Uses restricted- 1 Category deals with the restricted uses that may be permitted by the Secretary with the concurrence of the District Officer of the Local Self Government Department (Planning) having jurisdiction over the area (hereinafter referred to as Town Planner).
   b. Uses Restricted- 2 Category deals with the restricted uses that may be permitted by the Secretary with the concurrence of the Chief Town Planner of Local Self Government Department (Planning).
4. **"**Uses prohibited" are various objectionable uses in each zone which shall not be permitted under normal circumstances. All uses which does not come under 'Uses Permitted' or 'Uses Restricted' shall be considered as 'Uses *prohibited'.*

5. Any use not specified either in the 'uses permitted' or 'uses restricted' category of a particular use zone but which is of a similar nature to any use 'permitted' or 'restricted' in that particular use zone, may be permitted by the Secretary with the concurrence of the Town Planner.
6. If any portion of a zone is put to a *"Use Prohibited"* as stated in Para 4, before coming into operation of this Master Plan, such use shall be termed as *non-conforming use*. A non-conforming use may be allowed to continue in its existing location and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary with the concurrence of the Town Planner. The total built up area of such non-conforming use shall not exceed 1.25 times the existing built up area.
7. Zoning regulations are not intended to prohibit existing uses and constructions that have been lawfully established prior to the enforcement of these regulations, unless otherwise specifically mentioned in this Master Plan. Zoning Regulations are essentially intended to help the competent authority in taking decisions regarding granting or refusal of permits for land development and construction of buildings/ structures.
8. Existing areas and structures of archaeological importance and religious uses may be permitted to continue in all the zones and shall be treated as permitted uses.
9. Subject to the zoning regulations of the respective use zones, more than one use may be combined in a building/ plot, provided that the area of individual uses shall be limited to that prescribed for each such use in the zoning regulation for the respective zone.
10. All future developments shall also be in conformity with the provisions of Kerala Municipality Building Rules, unless otherwise specified in these regulations or in any Detailed Town Planning Scheme in force.
11. Provisions/regulations under the Kerala Conservation of Paddy Land & Wetland Act 2008, Disaster Management Act, Coastal Zone Regulations, Environment Protection Act 1986 and any other applicable statutes as amended from time to time shall prevail over the respective provisions of this Master Plan.

12. Silence zone, as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000 as amended from time to time, shall be applicable to such areas under this Master Plan.
13. Regulation of constructions and land developments on the sides of new roads / roads proposed for widening as per the scheme shall be governed by the distance from the centre line of the road, unless otherwise specified in the Master Plan or Detailed Town Planning Scheme in force or any Detailed Road Alignment approved by Government. If widening on one side of any stretch of the road is constrained due to the physical barriers of water bodies zone, mangroves zone, the road widening in that stretch shall be accounted from the other side.
14. Operational constructions as defined in the Kerala Town & Country Planning Act 2016 shall be treated as permitted use in the Master Plan Area.
15. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required on any of the provisions of the Master Plan in consultation with the Chief Town Planner concerned of the Local Self Government Department (Planning).
16. Expansion of existing Public and Semi Public Institutions and existing Industrial units including their incidental uses to adjacent plots shall be treated as permitted use irrespective of the zone in which such adjacent plot lies, except in Water bodies zone and Mangroves zone.
17. Only the existing areas under Public and Semi Public uses , Industrial uses, Mangroves, and Water bodies are intended to be included under Public and Semi Public zone , Industrial use zone, Mangroves, and Water bodies respectively. If any private property put under uses other than those permitted or restricted in the above zones has got included within such zones, the Secretary may, with the concurrence of the Town Planner, after verification of the revenue ownership documents, accord sanction for development by adopting the regulations of the adjacent land use zone in the proposed land use map, subject to the provisions as per applicable Acts, Rules and Government Orders in force in the State.
18. If public activity or industrial activity ceases or do not exists in a private land, uses permitted/ restricted in the adjacent land use zone shall be allowed in the plot with the concurrence of the Town Planner, if no records are available with Guruvayur

Municipality regarding any proposal for acquiring that particular land for any public use at the time of application for building construction or land development.

19. Uses Permitted in Mixed use Zone may also be permitted by the Secretary, if not allowable otherwise as per the zoning regulations applicable, on both sides of the following roads (as per this Master Plan) in residential use, commercial use, dry agriculture cum residential use , public & semipublic use zones in land upto a depth shown against each road in the table below.

    Uses restricted in Mixed use Zone may also be permitted by the Secretary if not allowable otherwise as per the zoning regulations applicable, but with the concurrence of the Town Planner or the Chief Town Planner as the case may be, on both sides of the following roads (as per this Master Plan) in such applicable zones as mentioned above in land upto a depth shown against each road in the table below:

Sl. No.	Category of Road	Depth from the proposed road boundary (in metres) on both sides of the road upto which provisions of Mixed use Zone is applicable
1	All roads having an existing or proposed width of 12 metres or more	100m
2	All roads having an existing or proposed width of 15 metres or more	200m

If more than 50% of the area of a plot is included within the Mixed use Zone**,** the entire plot shall be deemed to be included under such Mixed use Zone

20. Disaster mitigation projects by competent authorities shall be permitted in all zones.
21. Transmission / telecommunication towers, wireless station, ATMs, water tanks, waste management units and public utility buildings/structures shall be treated as permitted uses in all zones except in Water bodies zone, Mangroves zone
22. Projects of Central/ State Government, Local Self Government Institutions, Public Sector Undertakings and other Government Institutions may be permitted with concurrence of the Town Planner in all built up zones such as Residential, Commercial, Industrial, Public & Semi Public, Dry Agriculture cum residential, Mixed use zones ,

if such uses are not included in the permitted uses or restricted uses as per the zoning regulations applicable.

23. A minimum width of 3metres is to be maintained for Valiyathodu at all points. Also, no building construction other than compound wall, shall be allowed upto to a certain width on the landward side of the following water bodies.

Sl. No.	Name of Water Body	Width of land on the landward side where no constructions are allowed
1	Valiyathodu	3m
1	Other Streams/ Thodu having width of 2m to 5m	2m
2	Other Streams/ Thodu having width of 5m or more	3m

24. In case of uncertainty in identifying the alignment and boundary of thodu, canal, river, existing public road, railway line and in the absence of survey boundaries for the same in the Proposed Land Use Maps, it shall be referred to the actual position on ground as well as revenue records and decision taken by the Secretary in this regard shall be final.
25. The land specially demarcated for certain projects as Special Zones such as Pilgrim amenity centres, Stadium, Open air Gym and Yoga Park, Tourist Facilitation centres, Sports Village, Integrated Agro Park, Agro Center, Bus stands, Ground expansion, Multi functional centre,Community hall, Market,Mini markets, PHC development, Lakfront development may be procured as per the provisions of the Kerala Town & Country Planning Act 2016, by Guruvayur Municipality or other agencies concerned. If the proceedings to procure such land have not been initiated within 7 years from the date of sanctioning of this Master Plan, the areas so specifically demarcated may be released and assigned to a use permitted/restricted in the surrounding land use zone in the Proposed Land Use Map by the Secretary with the concurrence of the Town Planner, based on the application for building permit received.

26. The land demarcated as Temple core zone may be procured by Guruvayur Devaswom. If the proceedings to procure such land, if not owned by Guruvayur Devaswom, have not been initiated within 7 years from the date of sanctioning of this Master Plan, then all uses permitted or restricted in the Pilgrim Activity Zone shall be applicable for considering application for building permit , in the areas so demarcated as Temple Core Zone.
27. If different land use zones fall within a single plot, all uses permitted as per zoning regulations of such land use zones may be permitted by the Secretary in the plot. If application submitted includes any of the restricted uses and not included in such permitted uses, the Secretary shall issue permit with the concurrence of the Town Planner/Chief Town Planner, as the case may be. However, for the part of the plot which comes under water bodies zone, conservation zone, mangroves zone, special zone this provision shall not be applicable.
28. Electric charging stations for vehicles may be permitted in all zones other than water bodies zone, conservation zone, mangroves zone.
29. In Conservation zone, permitted and restricted uses in adjacent land use zone may be permitted with the concurrence of the Town Planner if that particular land in Conservation zone is not classified as paddy land or wetland as per revenue records at the time of issuance of permit.
30. In recreational zone, the Secretary may, with the concurrence of the Chief Town Planner, accord sanction for development by adopting the regulations of the adjacent land use zone in the proposed land use map.
31. In zones other than Temple core zone, in lands owned by Guruvayur Devaswom as on the date of publication of Master Plan, constructions may be permitted with the concurrence of the Chief Town Planner and in conformity to prevailing rules and statutes, irrespective of zoning prescribed in this Master Plan.
32. Large Scale development projects in an area 1 hectare or more, exceeding an investment of Rs.100 Crores, which provide direct employment (after commissioning of the project) to the tune of not less than 500 may be permitted in all zones other than water bodies zone, mangroves zone if not included in the permitted uses or restricted uses as per zoning regulation applicable. In such cases, the recommendation of a committee with constitution as below shall be obtained, subject to satisfying the

procedures laid out here under and the Secretary shall comply the same while issuing permit.

Also, Adequate provision shall be made for supporting infrastructure such as water supply, sewerage, solid waste management, power supply etc. Separate systems for management of solid waste and sewage shall be provided and maintained by the developer at his cost. The project shall be completed within a period of 5 years or as suggested by the Committee.

31.1 Procedure to be followed

(a) The developer shall submit the project report, detailing the demand, feasibility and Environmental Impact Assessment aspects of the project, together with the approval, if necessary, obtained from the Ministry of Environment and Forests, Government of India to the Convener of the committee and the Convener shall make all arrangements for convening meeting of the committee at the earliest and the committee shall consider and dispose of the project report within a period of one month from the date of receipt of the same.

(b) The constitution of the committee shall be as given under:

Principal Secretary/Secretary to Government, Local Self Government Department	-	Chairperson
The Director, Local Self Government Department (Urban)	-	Member
The Chief Town Planner, Local Self Government Department (Planning)	-	Convenor
The District officer of the LSGD (Planning) having jurisdiction over the district concerned	-	Member
Secretary(s) of Local Self Government(s) concerned	-	Member(s)

(c) The Convener shall fix the venue, date and time of the meeting in consultation with chairperson and shall be responsible for safe custody of records and communications thereof.

(d) The meeting shall be presided over by the Chairperson or in his absence by a member to be authorised by him.

(e) The quorum of the meeting shall be majority of the total number of members of the committee for the project.

(f) The developer shall also produce before the committee, all required clearances from the State and Central Government agencies concerned.

B. ZONING REGULATIONS

Table 32.1 Zoning regulations

Para No.	Uses Permitted	Uses Restricted - 1	Uses Restricted - 2	Uses Prohibited
1	2	3	4	5
1	**Temple Core Zone**			
1.1			Constructions incidental to Temple Development by Guruvayur Devaswom with maximum height of building limited to 18m.	
2	**Pilgrim Activity Zone**			
	The uses permitted and uses restricted listed out in this zone are subject to the following additional architectural guidelines for such buildings, except structures like water treatment plants, fuel filling station canopies etc. : ***i. FAR is limited to 3 or as per KMBR without additional fee whichever is minimum.*** ***ii. The overall height of the construction upto the topmost point of the ridge of the roof shall not exceed 10 metres from the average ground level*** ***iii. The slope of roof in facades shall be at an angle between 35 to 45 degrees from the horizontal and shall be finished with mangalore pattern (MP) or palace type terracotta colour tiles.*** ***iv. The exterior wall surfaces in facades shall generally be finished with white or off-white colour. In addition, mural paintings and similar decorations are permitted.***			
2.1	Single Family Residences upto 300 sq.m built-up area, Homestays Night Shelters, Guest Houses/ Lodges. Ashram/Mutt Retail/Wholesale shops, Professional Offices, Commercial Offices / Establishments, Dispensaries, clinics (Out Patient), Diagnostic Centres –all upto 200 sq.m built-up area. Banking and Financial Institutions up to 1000 sq m built-up area,	Hotels, Restaurants/ Canteens Water treatment plants Fuel Filling Stations	Uses permitted/Restricted specified in Clause 2.1 Column 2 & 3 with maximum height of building between 10m and 18m.	Any other uses not specified

	Hotels, Restaurants/ Canteens – all upto 500 sq.m built-up area. Auditorium/ Wedding Halls/ Community Halls/Cultural Information Centers. Parking Plaza, Parks Police Station, Fire Station			
3	**Residential Use Zone**			
3.1	Residential buildings consisting of single or multifamily dwellings, residential flats / apartments, residential quarters, night shelters, orphanages, hostels and boarding houses, old age homes, Dharmasala, Ashram, Mutt, Madrasa, Places of Worship. Shops, Professional Offices, Commercial Offices, Commercial training institutes, Banks & other Financial Institutions, Restaurants, Canteen, Hotels - built-up area **limited to 500 m^2.** Cottage Industries including coir, Service Industries of non nuisance Nature (See Annexe-I) Educational institutions essentially serving the needs of residential community such as Day Care, Crèche, Nursery Schools, Kindergartens and schools offering general education (up to High school level). Health institutions essentially serving the needs of residential community such as dispensaries, clinics (Out Patient), Diagnostic Centres etc. - built-up area **limited to 500m^2**. Community facilities such as Community Halls, Recreational Clubs, Social Welfare Centres, Gymnasium /Yoga Centers, Movie halls, Libraries and reading rooms etc. having a built-up area **limited to 500 m^2.** Utility Installations and Civic Amenities essentially serving the needs of residential community such as post office, police station, police	Vehicle Fuel Filling Stations. Cremation Ground/ Crematorium, Burial Ground/ Common Vault.	Multiplex complex	Any other uses not specified

	post, telephone exchange, fire station, tot lots, parks, play grounds, water treatment plants below 5 MLD and weekly markets. Plant Nurseries. Public utility areas and Public Utility buildings			
3.2	**Provided that the access road has an existing width of 5m minimum.**			
	Automobile workshops for two / three wheelers – built-up area **limited to 200 m^2.**			
3.3	**Provided that the access road has an existing width of 8m minimum.**			
	Hospitals with 5 beds, Higher Secondary Schools. Shops/Professional Offices, banking and financial institutions, Commercial training institutes – built-up area **limited to 3000m^2** Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Movie halls, Exhibition Centers and Art Gallery, Libraries and reading rooms - built-up area **limited to 3000 m^2.**	LPG distribution centres. (excluding bottling plants and bulk storage) the built-up area **limited to 50 m^2.**		
3.4	**Provided that the access road has an existing width of 15m minimum.**			
	Shops/Professional Offices, banking and financial institutions, Commercial training institutes above 3000 sq.m Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Movie halls, Exhibition Centers and Art Gallery, Libraries and reading rooms above 3000 sq.m			
4	**Mixed Use Zone**			
4.1	All uses that are permitted in Residential Zone and Commercial Zone	All uses that are restricted-1 in Residential Zone and Commercial Zone	All uses that are restricted-2 in Residential Zone and Commercial Zone	Any other uses not specified
5	**Dry Agriculture cum Residential Use Zone**			
5.1	Agriculture, horticulture and fodder cultivation, pastures, grazing ground, and other types of cultivation including social forestry. Dairy Farms, Fish farms, Seed farms, Poultry farms, Plant nursery, Piggery farm, Fish/Meat processing centres	Cremation ground / crematorium, burial ground, common vault Slaughter Houses		Any other uses not specified

	Single Family Residential Buildings Orphanages, old age homes, dharmasala, ashrams, mutts, madrasa. Clinics (Outpatient) and diagnostic centres - built-up area limited to 2**00 m2.** Shops, professional offices, commercial offices and establishments, Commercial training institutes, banking & financial institutions, Gymnasium, Yoga Centres, restaurants, canteens – built-up area limited to **300 m2.** Police Post/Police Station, Post and Telegraph office, Fire Post /Fire station, Telephone Exchange, wireless stations and Tele communication towers, Day Care and Creche, Nursery / Kinder Garten / Primary & Upper primary schools. Library and Reading Rooms, Godowns/ ware houses/ Storage – non hazardous – built-up area limited to **100 m2.** Storage of Agricultural produces and seeds, Green houses. Cottage industries, Service industries of non-nuisance Nature (See Annexe -I) Automobile workshops for 2/3 Wheelers Tot Lots/Parks/Play Grounds, Camping sites Public utility areas & buildings Parking Plazas Places of worship	Saw mills Dumping Yard Storage of explosive & fireworks,Gas Godowns Sewage treatment plants		
5.2	**Provided that the access road has an existing width of 8m minimum**			
	Residential buildings consisting of single or multifamily dwellings, residential flats / apartments upto a height of 16 metres			

	Clinics (Outpatient) and diagnostic centres - built-up area limited to 4**00 m^2.** Shops, professional offices, commercial offices and establishments, Commercial training institutes, banking and financial institutions, Gymnasium, Yoga Centres, restaurants, canteens – built-up area limited to 4**00 m^2.**	Indoor stadium, Convention centres etc Junk yards, Timber yards		
	Library and Reading Rooms, Social welfare centres– built-up area limited to **200 m^2.** Godowns/ warehouses/ Storage – non hazardous – built-up area limited to **200 m^2.** Auditorium/Wedding Halls/Community halls built-up area limited to **500m^2.** Hospitals & Health Centres **with number of beds limited to 5.**			
5.3	**Provided that the access road has an existing width of 12m minimum**			
	Residential buildings consisting of single or multifamily dwellings, residential flats / apartments, residential quarters. Auditorium/Wedding Halls/Community halls Godowns/ Warehouses/ Storage - non hazardous materials.	Stacking yards, Fuel Filling Stations Higher Education Institutions. Health Care Facilities		
6	**Commercial Use Zone**			
6.1	All shops including shopping complexes, shopping malls, hypermarkets, restaurants, hotels, markets. Professional offices, commercial offices & establishments, Commercial training institutes, banking and financial institutions, IT software units, Movie halls, Auditorium, Wedding Halls, Community Halls Godowns / warehouse / storage of Non-hazardous materials, stacking yards. Gymnasium/ Yoga centres	Fuel filling stations. Saw Mills with Timber Yards. Slaughter Houses. Saw mills	Multiplex complex Transport terminals.	Any other uses not specified

	Cottage industries, automobile workshops, automobile service stations, cold storage, service industries of non-nuisance nature (See Annexe-I), , printing press, IT hardware/electronic industries Expansion of existing residential buildings,Single Family Residences Residential flats/apartments with atleast the street facing portion in two lower floors put under E and F occupancies of KMBR in force Night shelters, orphanages, old age homes, dharmasala, hostels and boarding houses, lodges and guest houses, Ashram, Mutts, Madrasa. Public utility areas and buildings Day care,Creche,Nursery/ Kinder garten, Expansion of existing educational institutions Social welfare centres, Library and reading rooms, Exhibition centres, Art gallery museum, convention centres,. Clinics, diagnostic centres and hospitals with number of **beds limited to 50.** Tot lots, Parks & playgrounds, fair grounds, open air theatres, amusement parks. Parking plaza, Plant nursery, Storage of agricultural produces and seeds			
6.2	**Provided that the access road has an existing width of 12m minimum**			
	Educational Institutions other than those mentioned in clause 6.1. Hospitals & Health centres			
7	**Industrial Use Zone**			
7.1	All industries other than obnoxious and nuisance type industries, Automobile Workshops & Auto mobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish & Meat Processing Units, Printing Press, Water Treatment Plants, Industrial Estates.	Fuel Filling Stations Storage of Explosives and Fire Works, Gas Godowns, Crusher Units. Sewage Treatment Plants, Dumping Yard.		Any other uses not specified

	Shops, Professional offices/Banking and financial offices, Commercial training institutes - built-up area limited to 100sqm IT Software units Godowns/Warehouses/Storage of non hazardous material, stacking yards, weigh bridge. Dairy and Dairy Farms, Dairy related Industries, Poultry Farms, Piggery Farm, Smoke House. Dry Cleaning Plants, Power Plants, Sub Stations, Transport Terminals incidental to industrial use. Residential Uses incidental to the Industrial Use. Any other activity essentially incidental to Industrial use. Tot lots, Parks and Play Grounds attached to incidental residential use.	Slaughter House		
8	**Public and Semi Public Use Zone**			
8.1	Local/State/Central Government/ Public Sector Offices and Other Related Public Buildings. Educational Institutions, Library and reading rooms, Social welfare centres Clinics, Diagnostic centres and hospitals, Civil defence and home guard Residential Quarters incidental to public and semi public use, Ashram/Mutts. Tot lots/ parks/ Playgrounds Places of worship Museum, Indoor games stadium, Open air theatre, Exhibition centres & Art gallery, Camping sites. Public Utility Areas and Buildings, Additions and alterations to the existing public and semipublic buildings including addition of new blocks without altering the use.	Cremation ground / Crematorium, Burial Ground, Common Vault. fuel filling stations.	Bus terminals/ stand lorry stand,	Any other uses not specified

	Auditorium, Wedding halls/Community halls incidental to public & semi-public uses, Convention centres, Outdoor games stadium, Parking plazas. Solid waste management and uses incidental to solid waste management.			
9	**Traffic and Transportation Use Zone**			
9.1	Transport terminals such as bus terminals/stand, truck/ lorry stand, auto rickshaw stands, taxi/jeep stands Any incidental uses to the transport terminals such as Retail Shops, Restaurants, Canteen, movie halls, recreational facilities etc. Staff Quarters, Offices, Night Shelters, Guest Houses etc incidental to the transport terminals Parking Plazas Public Utility Areas and Buildings	Fuel Filling Stations		Any other uses not specified.
10	**Recreational Zone**			
10.1	Any construction/land development essential for the development/ improvement of recreational facilities. Watch Towers, Eco Walk Ways, Fair Grounds and similar uses. Tot Lots, Park, Play Grounds, , Open Air Stadium, Open Air Theatre, Zoological and Botanical Garden, Eco Walk Way and similar uses Public Utility Areas and Buildings			Any other uses not specified
11	**Conservation zone**			
11.1	Paddy cultivation Agriculture/Horticulture/Fodder cultivation/ Fish Farms/ Seed Farms/ Constructions/ land developments in conformity with the Conservation of Paddy Land and Wet Land Act in force in lands designated as paddy land or wet land under the said Act.	Minor Public Utility areas & Public utility buildings which will not affect the character of the area.		Any other uses not specified
12	**Water Bodies**			

12.1	All existing water bodies shall be conserved. Bridges, Side protection walls, Bathing Ghats, Floating jetty etc. may be permitted based on community level requirements. Water landings, Pump Houses.	Fish farms		Any other uses not specified
13	**Mangroves**			
13.1	All existing Mangroves shall be conserved. Mangrove cultivation		`	Any other uses not specified
14	**Special Zone**			
	Special zones include the areas demarcated for specific uses or projects. No other activity unless otherwise specified shall be permitted in such zones.			
14.1	**Special Zone 1 : Pilgrim amenity center I (Near Kottappadi Junction)**			
	Multipurpose Hall, Dormitory rooms, dining hall, auditorium, toilet blocks, information centers, locker facility, Convenience Stores, Tea stalls/Cafeteria and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.2	**Special Zone 2 : Pilgrim amenity center II (Near Mavinchodu – Thaikkad)**			
	Multipurpose Hall, Dormitory rooms, dining hall, auditorium, toilet blocks, information centers, locker facility, Convenience Stores, Tea stalls/Cafeteria and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.3	**Special Zone 3 : Stadium at Manikkathpadi**			
	Uses permitted in recreational zone and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.4	**Special Zone 4 : Open air Gym and Yoga Park**			
	Open air Gym facilities and Yoga center and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.5	**Special Zone 5 : Tourist Facilitation center I**			
	Information centers, Hotels/Restaurants, Convenience Stores, Entertainment and recreational facilities like cinema halls, children's park, parking facilities, prayer rooms, rest rooms, dormitories or home stay and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.6	**Special Zone 6 : Tourist Facilitation center II**			
	Information centers, Hotels/Restaurants, Convenience Stores, Entertainment and recreational facilities like cinema halls, children's park, parking facilities, prayer rooms, rest rooms, dormitories or home stay and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.7	**Special Zone 7 : Sports Village**			
	Gym, Indoor pitch, sports hall, indoor athletic facilities, Meeting rooms, Outdoor Pitch, Athletic Space, Aquatic Center and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.8	**Special Zone 8 : Integrated Agro Park – Puthucherry Padam**			
	Facilities for storage, processing and marketing of agricultural produces, Agricultural machinery and equipment and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			
14.9	**Special Zone 9 : Agro Center at Kottappady**			
	Facilities for storage, processing and marketing of agricultural produces, Agricultural machinery and equipment and other incidental uses, Repair and maintenance of existing buildings without increase in plinth area.			

14.10	**Special Zone 10 : Bus stand at west nada**
	Transport terminals such as bus terminals/stand, truck/ lorry stand, auto rickshaw stands, taxi/jeep stands. Any incidental uses to the transport terminals such as Retail Shops, Restaurants,Canteen,movie halls,recreational facilities etc. Repair and maintenance of existing buildings without increase in plinth area.
14.11	**Special Zone 11 : Muthuvattur school ground expansion**
	Playground, Any construction/land development essential for the development/ improvement of recreational facilities, Repair and maintenance of existing buildings without increase in plinth area.
14.12	**Special Zone 12 : Multi-functional centre, Chowwallurppadi**
	All uses permitted in commercial zone, recreational zone and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.13	**Special Zone 13 : Mini Bus stand, Kottappady**
	Transport terminals such as bus terminals/stand, truck/ lorry stand, auto rickshaw stands, taxi/jeep stands. Any incidental uses to the transport terminals such as Retail Shops, Restaurants,Canteen,movie halls,recreational facilities etc. Repair and maintenance of existing buildings without increase in plinth area.
14.14	**Special Zone 14 : Community hall, Thampuranpady**
	Auditorium, Wedding halls/Community halls, Convention centres and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.15	**Special Zone 15 : Pookkode PHC development**
	Clinics, Diagnostic centres and hospitals, incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.16	**Special Zone 16 : Thaikkad PHC development**
	Clinics, Diagnostic centres and hospitals, incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.17	**Special Zone 17 : Market**
	All uses permitted in commercial zone and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.18	**Special Zone 18 : East Nada bus stand expansion**
	Transport terminals such as bus terminals/stand, truck/ lorry stand, auto rickshaw stands, taxi/jeep stands. Any incidental uses to the transport terminals such as Retail Shops, Restaurants,Canteen,movie halls,recreational facilities etc. Repair and maintenance of existing buildings without increase in plinth area.
14.19	**Special Zone 19 : Chakkamkandam Lakefront development**
	Mangrove afforestation, Beautification works such as jogging tracks, seating arrangements, walkways, and parks. Boating Facilities, Theme parks/ water parks, nature walks, small bird parks/butterfly parks, fishing, Flower park, Lake festival etc. and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.20	**Special Zone 20 : Mini bus stand at Pancharamukku**
	Transport terminals such as bus terminals/stand, truck/ lorry stand, auto rickshaw stands, taxi/jeep stands. Any incidental uses to the transport terminals such as Retail Shops, Restaurants, Canteen, movie halls, recreational facilities etc. Repair and maintenance of existing buildings without increase in plinth area.
14.21	**Special Zone 21 : Redevelopment of mini market at West Nada**
	All uses permitted in commercial zone and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.22	**Special Zone 22 : Improvement of Manchira Parking ground**
	Parking plaza, any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.
14.23	**Special Zone 23 : Exhibition centre, Modern Parking ground**

	All uses permitted in commercial zone, recreational zone and any incidental uses ,Parking plaza and any incidental uses, Repair and maintenance of existing buildings without increase in plinth area.

FLOOD HAZARD OVERLAY FOR FLOOD PRONE ZONES

Flood prone Zones: These are areas which are exposed to floods and are classified into various Zones (High and Medium) based on the intensity of likely Floods in the design scenario of 50-year return period(Source: KSDMA)

High risk areas are areas likely to be inundated to a depth between 1.5m and 3m in the design flood scenario. Moderate risk areas are areas likely to be inundated to a depth between 0.6m and 1.5m in the design flood scenario. For the purpose of reducing Disaster Risk, proposed land use and the developments in various hazard zones are further modified by Flood Hazard Overlay regulations in Table 32.2. These additional regulations are aimed at reducing damages and losses to people and assets in the flood prone areas. Flood Hazard Overlay regulations have to be read in conjunction with the zoning regulations in Table 32.1 and wherever a conflict occurs the additional regulations in the Flood hazard overlay shall prevail.

Table 32.2 Flood Hazard Overlay regulations

Sl.No.	USES PERMITTED	USES RESTRICTED	USES PROHIBITED
1	**High Risk Area: (inundation depth between 1.5m and 3m)**		
	Constructions in respective zones as in the proposed Land use Plan.		
	Basement floors are not allowed for any use other than parking.		
	Plinth levels of all buildings should be at a height of minimum 0.75 metre above the existing ground level or on stilts of height minimum 0.75 metre from existing ground level.		
	No sharp-edged projections shall be fixed over the compound walls or gates, for facilitating easy evacuation.		
	All new single storeyed buildings should have a stairway to the roofs so that temporary shelter can be taken there		

	All new buildings shall have a minimum of one-third of the roof terrace kept open to sky subject to a minimum of 15sq.m, which shall be accessible to facilitate easy evacuation.		
	New constructions shall have at least one balcony or open verandah or open terrace in the upper floor(s) or open stair connecting the upper floor(s) to the ground. Such balcony or open verandah or open terrace or open stair shall face the yard abutting the adjoining street to facilitate easy evacuation.		
	Percolation of water in plots shall not be restricted by impervious paving. If essential, only 25% of the mandatory open space required for the building shall be paved with such pavings.		
	All Existing ponds shall be preserved.		
	No construction/ land development shall obstruct/ reduce drainage capacity in the area.		
2	**Moderate Risk Area: (inundation depth between 0.6m and 1.5m)**		
	Constructions in respective zones as in the proposed Land use Plan.		All other uses not specified
	Basement floors,if any are not allowed for any use other than parking.		
	Plinth levels of all buildings should be at a height of minimum 0.60 metre above the existing ground level or on stilts of height minimum 0.60 metre from existing ground level.		
	No sharp-edged projections shall be fixed over the compound walls or gates, for facilitating easy evacuation.		
	All new single storeyed buildings should have a stairway to the roofs so that temporary shelter can be taken there		
	New constructions shall have at least one balcony or open verandah or open terrace in the upper floor(s) or open stair connecting the upper floor(s) to the ground. Such balcony or open verandah or open terrace or open stair shall face the yard abutting the adjoining street to facilitate easy evacuation.		
	Percolation of water in plots shall not be restricted by dry paving. If essential, only 25% of the mandatory open space required for the building shall be dry paved.		
	All Existing ponds shall be preserved.		

	No construction/ land development shall obstruct/ reduce drainage capacity in the area.		

ANNEXURE - I

List of non-obnoxious and non-nuisance type of service or light industries

1. Aerated water and fruit beverages
2. Apparel making
3. Assembly of air coolers and conditioners
4. Assembly of bicycles, baby carriage and other small non motorized vehicles.
5. Atta - chakks
6. Ayurvedic medicinal formulations, Ayurvedic health club
7. Bakery products, biscuits, confectionaries
8. Bamboo and cane products (only dry operations)
9. Block making for printing
10. Card board or corrugated box and paper products (paper or pulp manufacturing excluded)
11. Carpet weaving
12. Cement and concrete products (where crusher is not used)
13. Chilling plants and cold storage
14. Coir (without bleaching / dyeing)
15. Concrete batching plants
16. Cotton and woolen hosiery/ Cotton and silk printing
17. Electro plating
18. Electronics and electrical goods
19. Electronics equipment (Assembly)
20. Engineering workshop and general fabrication works (without any chemical treatment)
21. Embroidery and lace manufacturing
22. Flour mills (job work only)
23. Foam bed, latex thread
24. Foot wear (rubber and PVC)
25. Furniture making
26. Fountain pens
27. Garment stitching, tailoring
28. Gold and silver smithy
29. Gold and silver thread sari work
30. Ice- cream or ice making
31. Insulation and other coated papers (paper or pulp manufacturing excluded)

32. Jobbing and machining
33. Light engineering
34. Laundry, dry cleaning and dyeing
35. Manufacturing of formulated synthetic detergent products
36. Manufacture of soaps involving process without generation of trade effluents(saponification of fats and fatty acids only)
37. Mineralized water
38. Musical instruments manufacturing
39. Oil ginning/expelling
40. Optical frames
41. Paint (by mixing process only)
42. Paper pins and U- clips
43. Power looms / hand looms (without dyeing & bleaching)
44. Photo and picture framing
45. Pressure testing units
46. Printing press
47. Rice mills
48. Rope (cotton and plastic)
49. Rubber gloves other than that for surgical and medical purpose
50. Rubberized coir mattresses
51. Scientific and mathematical instruments
52. Sports goods
53. Steeping and processing of grains
54. Small foundries
55. Tissue culturing
56. Toys
57. Water softening and demineralization plants
58. Watch, pen and spectacles repairing.

ANNEXURE - II

List of obnoxious and nuisance industries subject to Objectionable sounds, dust, odours, fumes, effluents or processes constituting hazardous use and which are to be located in hazardous zones (grouped)under Indian Standard Industrial classification(vide Regulation 7- 1, 7 - 2 and 13-2)

Manufacture of Food Stuff:

(1) Slaughtering, preservation of meat and fish and canning of fish

Manufacture of Beverages:

(2) Production of distilled spirits, wines, liquor etc. from alcoholic fruits and salts in distillery and brewery

(3) Production of country liquor and indigenous liquor such as toddy, liquor from mahua, palm juice

Manufacture of textiles:

(4) Dyeing and bleaching of cotton

Manufacturing of wood & wooden products, sawing and planning of wood:

(5) Wood seasoning

(6) Manufacture of veneer & plywood

(7) Paper, pulp and straw board

Manufacture of leather and leather products:

(8) Currying, tanning and finishing of hides and skins and preparation of finished leather

Manufacture of Rubber petroleum & local products:

(9) Manufacture of tyres and tubes and tyre retreading

(10) Manufacture of industrial and synthetic rubber

(11) Reclanation of rubber

(12) Production of petroleum, kerosene and other petrol products in refineries

(13) Production of chemicals and chemical products

Manufacture of chemical and chemical products:

(14) Manufacture of basic industrial chemicals such as acids, alkalies and their salts, not elsewhere specified(specially sulphurious, sulphuric, nitric, hydrochloric etc. acids, ammonia chlorine and bleaching powdermanufacture.)

(15) Manufacture of dyes, paints, colours, ink powder, varnishes, printing ink etc.

(16) Manufacture of fertilizers (specially from organic materials) (17) Manufacture of disinfectants andinsecticides

(18) Manufacture of Ammunition, explosives and fire works

(19) Manufacture of matches

Manufacture of Nonmetallic mineral products other than Petroleum and coal:

(20) Manufacture of cement

(21) Manufacture of lime

(22) Manufacture of plaster of paris

Manufacture of Basic Metals and their Products:

(23) Manufacture of iron and steel including sheeting, refining, rolling and conversion into basic forms

(24) Manufacture including smelting, refining etc. of nonferrous metals and alloys in basic forms

(25) Manufacture of ornaments

Manufacture of machinery (other than transport) and electrical equipment:

(26) Manufacture of all kinds of battery, Miscellaneous items not covered above

(27) Incineration, dumping and reduction of offal, dead animals, garbage or refuse

(28) Manufacture of gelatin and glue

(29) Fat, tallows, grease of lard refining of manufacture

(30) Bone meal, bone girst and bone powder (31) Manufacture of cashewnut shell oil and

(32) Other similar types of nuisance industries.

ANNEXURE - III

STAKE HOLDERS OF GURUVAYUR MUNICIPALITY-2022

Ward no	Name of Ward	Name of Member
1	Thozhiyur	Sri. Faisal Pottathayil
2	Pillakad	Smt. Suhara Hamsamon
3	Pookode East	Sri. Dinil
4	Iringapram East	Smt. Latha Sathyan
5	Manigramam	Sri. Vyshnav Pradeep P
6	Chowwallurpadi	Smt. Ajitha Ajith
7	Brahmakulam	Sri. B.V Joy
8	Palabazar	Smt. Rahitha Prasad
9	Vilakkupadam	Smt. Bindhu Ajithkumar
10	Paluvai	Sri. Mehroof K.M
11	Chakkamkandam	Sri. A.M Shafeer
12	Palayur	Smt. Muneera Ashraf
13	Edapully	Sri. C.S Sooraj
14	High School	Smt. Jyothi Ravindranath
15	Mammiyur	Smt. Renuka Sankar
16	College	Prof. P.K Santhakumari
17	Chammundeswary	Sri. M. Krishnadas (Chairman)
18	Gurupavanapuri	Smt. Sobha Harinarayanan
19	Karakkad	Sri. R.V Shareef
20	Pancharamukku	Sri. P.K Nowfal
21	PuthusseryPadam	Smt. Ajitha Dineshan
22	Manikathpadi	Sri. Madhusoodanan P V
23	Nenmini	Sri. K.P.A Rasheed
24	Thaikkad	Smt. Vincy Joshy
25	Substation	Smt. Bindhu Purushothaman
26	Iringapram South	Smt. Subitha Sudheer
27	Thiruvenkidam	Sri. V.K Sujith
28	Manjulal	Sri. K. P Udhayan
29	Kandamkulam	Smt. Devika Dhileep
30	Iringapram North	Smt. Deepa Babu
31	Choolpuram West	Smt. Sindhu Unni
32	Kottapadi	Sri. A.S Manoj
33	Pookode West	Smt. Aneeshma Shanoj
34	Kappiyur	Smt. Jeeshma Sujith
35	Kotta North	Smt. Shylaja Sudhan
36	Choolpuram East	Smt. Maggie Albert
37	Kotta South	Smt. Bibitha Mohanan
38	Thamarayur	Smt. Nishi Pushparaj
39	Perakam	Sri. Abilash A V
40	Vazhapully	Smt. Shefeena Shanir
41	Kaveed South	Smt. Divya Saji
42	Karayur	Sri. A.Sainadhan
43	Kaveed North	Sri. A.Subramanian

ANNEXURE IV

SPECIAL COMMITTEE-2022

Chairman Of The Committee	:	Sri. M. Krishnadas, Chairman, Guruvayur Municipality
Convenor Of The Committee	:	Municipal Secretary, Guruvayur Municipality
Joint Convenor	:	Municipal Engineer, Guruvayur Municipality
Member	:	Smt. Aneeshma M.P.
	:	Sri. A.M Shafeer
	:	Smt. Shailaja Sudhan
	:	Sri. A.S Manoj
	:	Smt. Bindhu Ajithkumar
	:	Sri. Sainadhan
	:	Prof. P.K Santhakumari
	:	Sri. R.V Shareef
	:	Smt. Devika Dhileep
	:	Sri. K.P.A Rasheed
	:	Sri. Mehroof K.M
	:	District Town Planner
Expert Member	:	Dr. Ajith Kaliyath, Urban Chair Professor, KILA, Thrissur