MASTER PLAN

FOR

CHERTHALA TOWN

2041

Prepared by

CHERTHALA MUNICIPALITY

&

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING

GOVERNMENT OF KERALA

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FOREWORD

Cherthala is a beautiful town, with its eastern borders embracing the serene backwaters of Lake Vembanad. Cherthala town occupies a prominent position as an important town between Kochi and Alappuzha. Cherthala is relatively a new town formed on the 1st of January, 1953. Cherthala has the potential to develop as an agro-based industrial town. Agricultural activities like cultivation of coconut and paddy and agro-based industries using these products are the predominant activities in the suburbs of the town. The nearness of the town to the port towns of Kochi and Alappuzha will have great influence on its future development especially in light of the coastal railway line having become a reality.

An attempt to prepare a development plan for Cherthala town was made in early 1990s. But the effort had not achieved the goal. A detailed Town Planning Scheme for Muttom Bazar area was prepared and published in 1993 under section 9 of the Travancore Town Planning Act, 1108. This is in force in the area. However, processing for sanctioning of the scheme could not be completed at that time and the plan is still in the publishing stage. Later in the year 2000, an Interim Development Plan was prepared for the town. But the action was not completed and the plan was not published.

Now the town needs an integrated approach to development encompassing all the issues whether it is infrastructure, environmental conservation, service delivery in various social sectors etc. These requirements can be addressed only through preparation of a comprehensive Master Plan for the town with a long range vision. Recognising the immediate need for such planning interventions in our urban sector, Government of Kerala has initiated a scheme for preparation of Development Plans for Municipalities and Cherthala Municipality was included in the second phase of the scheme. Adhering to the guidelines of the scheme, this new Master Plan is prepared jointly by the Municipality and the State Local Self Government Department Planning. I appreciate the concerted efforts exerted by the Local Self Government Department Planning under the notable leadership of Smt. Sheeba Rani Y, Chief Town Planner (Planning) in the time bound preparation of this comprehensive Master Plan taking the ground realities into consideration. I also appreciate the members of the Master Plan Committee and also members of various working groups who took sincere efforts in getting the plan prepared through a process of people's participation, carefully understanding the aspirations and expectations of the citizens of the town.

I hope this Master Plan shall be the road map for the development of Cherthala Town for years to come.

Sherly Bhargavan

Chairperson
Cherthala Municipality

Cherthala
November 2024

PREFACE

A Master Plan is a perspective for the future development of a city. It provides a framework and vision within which projects need to be identified and implemented. The endeavour to make towns better places to live in entails the participation of those who have a stake in town, particularly the community at large that resides in the town. Master Plans are therefore to be prepared through a "continuous participatory CONSULTATIVE PROCESS".

Cherthala is a town blessed with canal and backwaters. This rare gift of the nature helps this place to flourish with agriculture and tourism. It is only 42 km apart from Kochi, the economic hub of Kerala, and there are ample opportunities for development of the town as a satellite town of Kochi. Agriculture and coir industry are the prime and traditional source of livelihood for the people of Cherthala.

To keep pace with development of Kochi, the connectivity point for selling the agro products of Cherthala, more facilities are required to be provided to have a sustained development of the town and the region. Also, there are resources, which are either unutilized or underutilized. In this context, it is necessary to identify various development requirements and to plan for the future for ensuring a healthy, physical development and a progressive economic growth in the years to come. The Master Plan for Cherthala is an attempt towards this and provides a comprehensive picture of the town for the years to come.

A Detailed Town Planning Scheme for Muttom Bazar area was prepared and published in 1993. This scheme is in force at present. Considering the need for a master plan, the task was taken up under the Scheme for preparation of Master Plan and DTP schemes. The Cherthala Municipality and the Local Self Government Department Planning took concerted efforts in this regard that made possible the preparation of this Master Plan.

I take this opportunity to appreciate the Cherthala Municipal Council for taking initiative in the preparation of this plan. The contributions by the Master Plan Committee and the Working Groups constituted for the preparation of the Master Plan were significant in this respect. I take this opportunity to appreciate the officials in the Office of the Joint Director Planning, Alappuzha especially Sri. Joseph K.F, Town Planner for his sustained efforts in the preparation of this plan. I also appreciate the team in the head office, for their efforts in vetting and finalizing the Master Plan for Cherthala Town.

Indeed, the Master Plan for Cherthala will offer a frame work for sustainable development of the town.

Sheeba Rani Y

Chief Town Planner (Planning)
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November 2024

ACKNOWLEDGEMENTS

The preparation of Master Plan for Cherthala municipality was kicked off as a joint effort of Cherthala Municipality and LSGD Planning. Various activities were coordinated by Master Plan Committee constituted specially for the purpose, under the guidance and supervision of the State Project Cell attached with the office of the Chief Town Planer, Thiruvananthapuram and under the overall guidance of Local Self Government Department of Kerala.

The dynamic leadership and co-operation rendered Sri. V T Joseph, Sri. Isaac Madavana and Sri. Unnikrishnan former Chairmen of Cherthala Municipality require special mention. The team headed by the present Chairperson Smt. Sherly Bhargavan also require special mention for the whole hearted support to finalise the plan. The members of Master Plan Committee and the working groups played remarkable role in shaping this report. As the planning exercise encompassed various sectors, it required the support and positive interaction with, many public and private agencies/departments. I thankfully acknowledge their contributions.

I acknowledge with gratitude the guidance and support of Smt. Sheeba Rani Y., Chief Town Planner (Planning) for the timely guidance and technical support given by the Office of the Chief Town Planner, especially Sri. Prasanth H, former Chief Town Planner (Planning), Late Smt. Ushakumari P R, former Senior Town Planner, Smt. Sindhu K M, Smt. Mitzie Thomas, former Town Planners and Smt. Raji S. S., Town Planner. Let me place on record, with sincere thanks, their valuable contributions to materialize this report.

We have heavily relied on statistical data from various departments. Their readiness to share the data is gratefully acknowledged. Untiring effort of all staff members of the Office of the Joint Director Planning, Alappuzha was an important factor in the preparation of this plan. I appreciate the planning team consisting of Smt. Gladis William, Smt. Hinduja V L, Deputy Town Planners, Smt. Remya V, Sri. Vishnu Prasad U, Assistant Town Planners, Smt. Harsha H, Planner Associate and Miss. Namitha Vimal Raj, Planning Assistant(GIS) for their involvement and contributions. I thankfully acknowledge the sincere and dedicated efforts given by Smt. Indu Vijayanath, former Town Planner, Smt. Nimmy Kurian, Smt. Rahana H., Smt. V.K. Jayasree former Deputy Town Planners, Sri. M.B. Vinodan, Sri. V. Sajikumar, former Assistant Town Planners, Smt. Shyma S., former First Grade Draftsman and Smt. Poornima Rajan former Planning Assistant(GIS) of this office. The assistance offered by the statistical wing of this office and Chainmen are remarkable. All staff members of this office contributed their best in various stages of the study, without which this work would not have been completed in the present form and time frame. I sincerely acknowledge their earnest efforts.

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PART I
STUDY AND ANALYSIS

Chapter-1

Introduction

Urban Planning can be defined as the design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it. Planning is essentially a tool in achieving the justifiable wants and equitable distribution of the requirements of the population. People are the ultimate beneficiaries in any development endeavour. Planning is aimed at providing maximum good for the maximum number of people. Planning intervention is required for the strengthening of local economy and as a regulatory mechanism for guiding the physical development for ensuring the sustainable development of the area.

Master Plan aims at improving the urban environment as the efficiency of urban settlements largely depend upon how well they are planned, how economically they are developed and how efficiently they are managed. The Master Plan provides the contours of a shared vision and identification of key issues facing the town. It identifies development pattern, infrastructure gaps and deficiencies, project and reform priorities together with implementation schedule that would be both fiscally realistic and innovative. The preparation of the Master Plan is a partnership with community through consultation and active participation of citizens, stake holders and officials. The Master Plan is a basis for reservation of land for various uses. Success of a Master Plan depends on peoples 'will and willingness' to adhere to certain disciplines in the use of land, roads and public places and also on the level of civic awareness in general. The Master Plan lays down the space requirement for the coming years based on future quantity of land needed for various activities for the additional population that is expected to arrive in coming years.

Realising the need and urgency of guiding the developments of our urban centres, Government of Kerala have introduced the Scheme for preparation of Master Plans and Detailed Town Planning Schemes. The Scheme aims to prepare Master Plans for all statutory towns in the state in a time bound manner. Preparation of Master Plan for Cherthala Town is included in the second phase of the Scheme.

An attempt to prepare a master plan for Cherthala town was made in early 90's. But the effort had not become fruitful. A Detailed Town Planning Scheme for Muttom Bazar area was prepared and published in 1993. This is in force in the area. However, the process was not carried forward to the approval of the Plan by Government under Town Planning Act.

Later in the year 2000, an Interim Development Plan was prepared for the town. But legal processing for sanctioning of this plan also could not be taken up. Also later developments in the area call for development strategies different from those envisaged in this Plan.

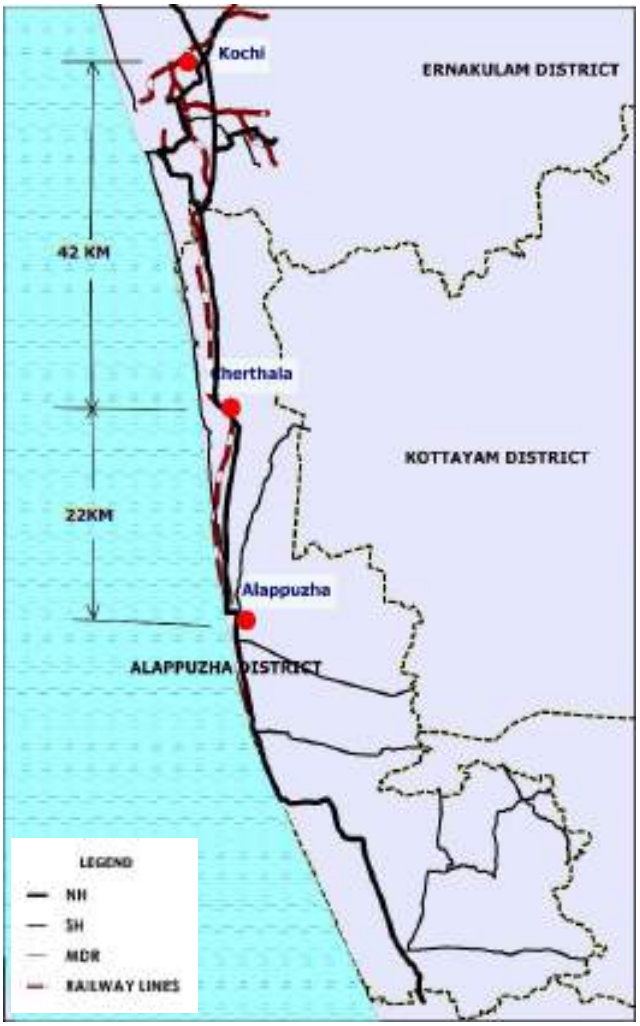


Fig. 1.1 Location: Alappuzha District & Cherthala Town

Present development trends and influence of Kochi region further call for guided development of the town. Regional level studies revealed that Cherthala acts as a second order settlement in the district, with a wider service area. Besides, as per the State Urbanisation report prepared by the Department of Town and Country Planning in the year 2012, Cherthala falls in the delineated Alappuzha-Kochi-Thrissur-Palakkad Urban Corridor. Hence it is of no doubt that the town is part and parcel of a thriving development corridor of the state. The town has very good connectivity by road, and rail to Kochi and other major centres in the region. The proximity to National Waterway-III adds to the growth potential of the town. It is in the above contexts that the Municipal Council of Cherthala resolved to prepare a new Master Plan for the Town as per ResolutionNo.13 dated 05.01.2013.

Accordingly, preparation of this Master Plan was initiated as a joint exercise of the Cherthala Municipality and the Department of Town and Country Planning. The organisational structure and planning process adopted for the preparation of this Master Plan is governed by the Guidelines for preparation of Master Plans issued by Government vide G.O.(Rt) No. 2766/2009/LSGD dated 24-10-2009.

Chapter-2

Need for the Plan

2.1. Introduction

A Master Plan is a blue print for the city's future, for its spatial elements and density. This provides a long-term vision and strategy to sustainably manage the renewal of the area.

2.2. Earlier Planning Efforts

An attempt to prepare a Master Plan for Cherthala town was made in early 1990s. But the effort had not become fruitful. A Detailed Town Planning Scheme for Muttom Bazar Area was prepared and published in 1993 under section 9 of the Travancore Town Planning Act, 1108. This is in force in the area and is deemed to be a DTP Scheme published under the Kerala Town and Country Planning Act 2016. However, statutory processing for sanctioning of the scheme could not be completed at that time and the Plan is still in the published stage. Later, in the year 2000, even though an Interim Development Plan was prepared for the town, further legal processing could not be completed for publishing the Plan.

2.3. Need for the Plan

The preparation of a new Master Plan is necessitated by the change in focus of development planning brought about by the 74th Constitutional Amendment Act, 1992 and subsequent legislations in the country. The Kerala Municipality Act, 1994 enacted subsequent to the constitutional amendment, prescribes that every municipality shall prepare a master plan for its development in the prescribed manner with focus on scientific spatial planning. The Town and Country Planning laws in force in the state provides for the preparation of such a Master Plan.

As per the Kerala Town and Country Planning Act, 2016 every Municipality shall prepare or get prepared for the Local Planning Area or part thereof;-

(i) A master plan, taking into account the Plans, if any, prepared under this act which have relevance to the Local Planning Area

According to the Kerala Town and Country Planning Act, 2016, the Master Plan shall be prepared through a participatory process and shall generally indicate the manner in

which development of the Local Planning Area or part thereof shall be carried out and also the manner in which the use of land shall be regulated.

Cherthala is one among the six municipal towns in Alappuzha District. It is the Head Quarters of Cherthala Taluk. Regional setting studies revealed that Cherthala is a second order settlement in the district that serves a wider region covering grama panchayats of Pattanakkad, Thannermukkom, Vayalar, Kadakarappally and Thuravoor in its service area. Hence the town has to serve the higher order requirements of these settlements also in addition to the requirements of its own resident population.

As per the delineated future urban profile of the state for 2021 in the State Urbanisation Report prepared by the Department of Town and Country Planning, Cherthala forms part of the Alappuzha urban cluster in 2021. Also, as per the delineated urban profile for 2031 Cherthala forms part of the Alappuzha-Ernakulam-Thrissur-Palakkad Urban Corridor. Thus, it is evident that Cherthala Town forms part of a thriving urban development corridor in the state. As per the State Urbanisation Report (SUR) Cherthala UA comes under 4th order settlement. That means Cherthala is an urban centre with service area as Cherthala municipality and the surrounding local bodies.

Since Cherthala lies closer to Kochi, the first order urban centre of the state, and being the start point of the Kochi TOD corridor that is envisaged in the draft master plan for Kochi City Region, this town has a high potential to serve as the development hub of Kochi also. And the IT corridor of Kochi is also fast expanding into neighbouring regions with Infopark at Pallippuram near Cherthala shaping up as a major hub for IT companies. It was also understood from general enquiry and rail passenger statistics that the commuting population is very high in Cherthala, (from Cherthala to Kochi and vice versa). Thus Cherthala has immense potential for future development interlinked to the development of Kochi. All the above factors point to the need for planned development of the Town.

The preparation of Master Plan for Cherthala Town, 2031 is being attempted in this backdrop.

Chapter-3

Methodology

As per G.O (Rt) No.1376/2012/LSGD dated 17.05.2012 Government accorded Administrative and Financial Sanction for the preparation of Development Plans for 29 towns, Cherthala is one among them. The guidelines issued by the Government as per G.O (Rt) No. 2766/2009/LSGD dated 24.10.2009 for the Scheme for the preparation of development plans for municipalities aim to prepare statutory town planning schemes for towns as per Town Planning Act in force in a time bound and a participatory manner. The General process of preparation of Master Plan involves four major steps.

I. Data Collection
II. Analysis
III. Envisioning process
IV. Detailing

The process in detail is shown in figure below.

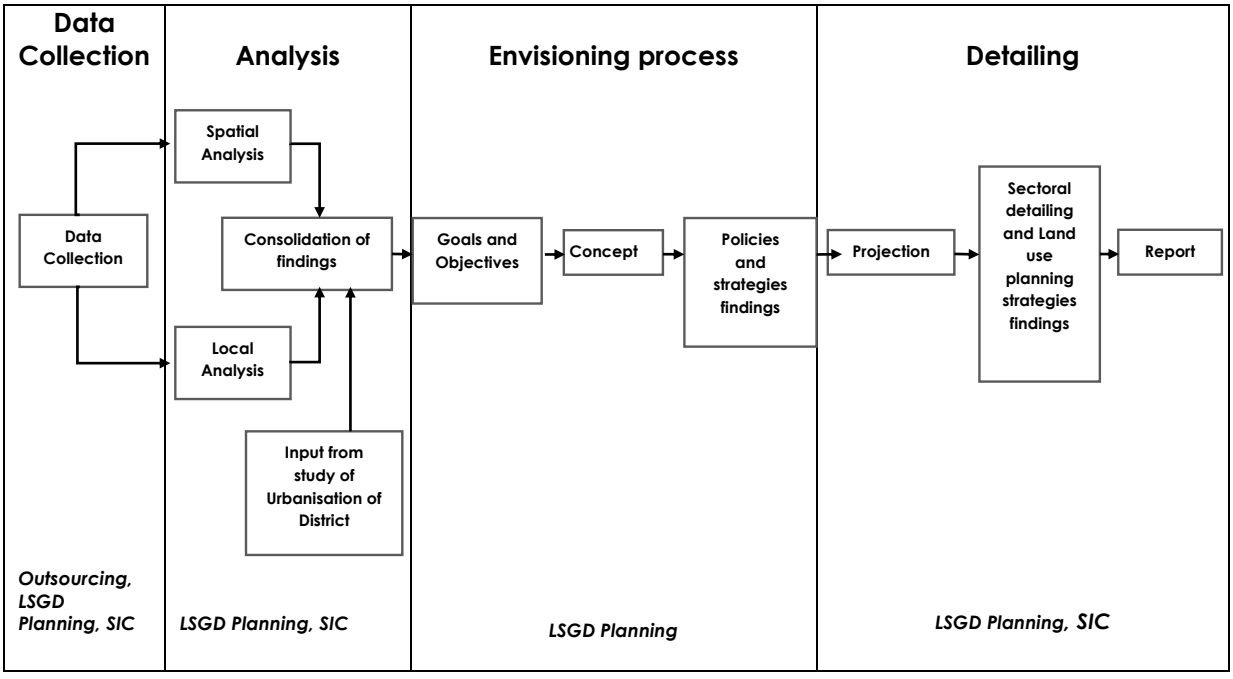


Fig. 3.1 General Process of Preparation of Master Plan

I – Data collection and compilation

The primary data required for the preparation are land use survey, socio-economic

survey and traffic survey. The land use survey was conducted by surveyors engaged on daily wages basis under the supervision of departmental surveyors and cross checked by officers of the department. Socio-economic survey was conducted on a format prepared at the state level for all the towns. The data collection was conducted by the enumerators on daily wages under the supervision of the Statistical wing of the Town & Country Planning office, Alappuzha and verified by the officers of the department. The traffic survey and studies were conducted with the assistance of National Transportation Planning and Research Centre, Thiruvananthapuram.

II – Analysis

The analysis is done in two stages. The local level analysis focuses on the development trend of each sector, its potential and development problems associated with each sector. This includes development aspirations of the people also. The Spatial Integration Committee constituted by the municipality was responsible for this analysis. The Town Planner of the State Town & Country Department provided technical guidance for the same. The spatial analysis concentrates upon regional setting of the settlement, distribution pattern of activities & population, land use and infrastructure network within the town. The findings of both the analysis and findings from the urbanization study (conducted by the Town & Country Planning Department for all the districts in the state) of the district are then integrated to form consolidation of findings in order to facilitate the envisioning process.

III – Envisioning process

The envisioning process starts with the identification of development issues from the consolidated findings of the study and proceeds with formulation of development goals and objectives for the town. Once the objectives are identified, development policies and strategies for fulfilling the objectives, be it in the form of land use policy or specific projects for addressing the issues identified, are developed. The detailing of the Master Plan follows these policies and strategies.

IV – Detailing

The detailing of the Master Plan is done at this stage. The detailing includes preparation of sector level proposals to be taken up during the plan period, a detailed land use plan giving out the land use policy for the town during the plan period, zoning regulations for regulating the land use, costing and phasing of the projects proposed in the Master Plan and details of implementation and monitoring including the provisions for monitoring of the Master Plan.

The municipal council of Cherthala resolved to prepare a new master plan for the town as per resolution no.13 dated 15.01.2013. In connection with materialising the plan preparation a Spatial Integration Committee (SIC) was constituted as per the same resolution by the Municipal Council with Chairperson of municipality as the Chairperson, Secretary as the convenor, Municipal Engineer as Joint convener, Sri. Appukuttan Nair, Kothakattu as Resource person, Councillors, Sri. Balachandra Babu, Sri. C.S.Pankajakshan, Sri. Sasibhushan, Sri. K.C.Rameshan, Sri. Sibi Panjikkaran, Sri. T.K.Purushan, Smt. V.K.Annamma, Sri. K.E.Thomas, Sri. Issac Madavana, Sri. K.Vishwambharan, Sri. Dasappanikar, Sri. K.N. Syed Muhammed, Sr. P.K.Surendran, Sri. P.Unnikrishnan, Sri. K.C.Antony and Sri. K.J Michael, Asst. Executive Engineer PWD (bldg), Asst. Executive Engineer Water Authority and District Town Planner as members. The SIC played crucial role in collection of secondary data, conducting sectoral studies as well as in sectoral detailing etc. and also extended support to the planning team constituted in the office of the District Town Planner Alappuzha in connection with preparation of this Master Plan.

People's participation is inevitable in the preparation of a meaningful Master Plan. In the preparation of master plan for Cherthala, the first level of consultation with the stake holders was through questionnaire and interviews. The household survey conducted using a well framed questionnaire helped to extract the citizens vision regarding the development priority in wards as well as the town as a whole.

The initial seminar conducted to give awareness of citizen's participation in framing the development plan of the town got very good response. Presence of Municipal chairperson, Plan Co-ordinator and other personalities gave significant suggestions about their vision of the town. The participants of the seminar pin pointed the issues unresolved for the long time.

The formulation of Spatial Integration Committee incorporating experts from various sectors helped to collect data as well as analysis of data from various sectors. The working group along with SIC helped to finalize the findings in various sectors. The experts from line department in the group discussion prioritized the findings of respective sectors. The participative approach in planning gave considerable momentum in shaping the development plan.

The meeting with chairperson on 23-02-2010 decided to conduct a seminar to familiarize the need for a master plan and to collect people's aspiration. The seminar held on 12-03-2013 inaugurated by chairperson and several prominent members of the society, officials of line departments and NGO's representatives shared their opinion.

A format for collecting the views and suggestions of councillors in preparing the master plan was distributed among the councillors. These were consolidated and added in the report. A working group meeting was held on 20-11-2013 to discuss the issues in various sectors and the suggestions from the working groups to solve these issues were also incorporated in the proposed master plan.



Fig 3.2 Draft Master Plan Discussion with Municipal Council

After repeated discussions on the Master Plan proposals with the Sub Committee of Cherthala Municipal Council for the finalisation of master Plan a presentation of the draft Plan was done on 31.01.2020 by the Office of the District Town Planner Alappuzha, before the Municipal Council of Cherthala headed by the Chairman Sri V T Joseph, the draft plan was finalised. Since the statutory procedures for publication of the master plan were delayed, the Draft master plan was again presented before the new Council headed by Chairperson Smt. Sherly Bhargavan and Masterplan committee was reconstituted. After repeated discussions with the master plan committee, the final draft of Cherthala master plan has been formulated.

In this plan, the concept evolved is based on the surveys, studies, analysis and consultations with the concerned stake holders, concerned departments and public in general who used the town as daily commuters. The present trend of development is considered for evolving the concept plan. The jurisdiction of the Cherthala Municipality at present is limited for an area of 1796 Hectare, whereas the service population of this town spread along the peripheral local bodies. The influence of the activities in these local bodies is also considered to formulate the final plan.

Chapter-4

Earlier Planning Efforts and Studies

The earlier town planning attempts in the Cherthala Municipal Area include the preparation of a draft Development Plan for Cherthala in early 1990s (not published or sanctioned), attempts for an Interim Development Plan in 2000, a Detailed Town Planning Scheme for Muttom Bazar Area published in 1993.

A draft Development Plan for Cherthala was prepared by the Department of Town and Country Planning in the early 1990s. However, the process was not carried forward to the ultimate approval by the Municipal Council and subsequent Government sanction under Town Planning Act to enable the Master Plan to become a statutory document for implementation. The planning area selected for the preparation of this development plan in 1990s was the Municipal town with an area of 17.96 Sq.km. which is the present municipal limits itself.

The major proposals of the draft plan were:

- Southern Boundary road starting from NH 66 and ending at western boundary road was proposed to be widened to 18m.
- A portion of the western boundary road from Arthunkal Junction to Kanichukulangara Junction was proposed to be widened to 18m.
- The old NH starting from NH 66 Junction towards south upto S.N.M Hospital was proposed to be widened to 18m.
- Part of Thanneermukkam road from Bhagavathy Temple Junction upto Manaveli road was proposed to be widened to 18m.
- Existing Eastern boundary road was proposed to be widened to 18m.
- All other major roads were proposed to be widened to 12m.
- 6.5 Hectares of land was proposed for stadium in Kokkothamangalam village on the eastern side of X-Ray junction road.
- 0.5 Hectares of land acquired by Municipality on the western side of A C Canal near Iron bridge was proposed for park.

Two mixed zones had been earmarked in the development plan. One permitting mixed use of residential, commercial and industrial use and other permitting residential and commercial use.

An attempt to prepare an Interim Development Plan was made in 2000. A draft report was prepared with existing landuse map. However, further processing of this Plan for its completion was not taken up at that time.

The most congested area of Cherthala Municipal Town is the Muttom bazar area. A Detailed Town Planning Scheme for Muttom Bazar area was prepared and published by the Municipality in 1993. The scheme envisages control of development over the scheme area by exercising land use zoning regulations and also by limiting the Floor Area Ratio along the major transportation corridors passing through the existing built up areas. No large-scale acquisition was contemplated in this scheme.

The scheme also envisaged the acquisition of 0.3 Hectares of land contiguous to the municipal office, for the expansion of the Municipal Office in future. Vacant land of about 53 cents belonging to the municipality and lying contiguous to the existing godown near Municipal bus stand was proposed to be developed into a park. The landing space on the eastern side and western side of A.S Canal was proposed to be conserved as linear recreational walkway with necessary landscaping.

In the studies conducted for the preparation of Master Plan for Kochi City Region it is revealed that the influence region around the city extends up to the Cherthala town, in Alappuzha district, in the south. Although Kochi is well connected to Cherthala with rail and road linkages, the quality of transport infrastructure and mobility standards require further improvement. In the above context, a Transit Oriented Development Corridor connecting major development hubs around Kochi city was proposed in the draft Kochi City Region Master Plan that starts from Cherthala and ends at Kodungallur. The inherent development potentials and the influence of Kochi region calls for planned development of the town. It is in this context that preparation of this Master Plan was initiated.

Inference

Planning attempts were done earlier to prepare Development Plan for Cherthala in1990, which contained several proposals to improve road sections and new proposals like parks, stadium etc. As this plan was not published or sanctioned none of these proposals were implemented. Detailed Town Planning Scheme for Muttom Bazaar Area published in 1993, is the only statutory town planning scheme in force in Cherthala Municipal Area. As on date, Cherthala town does not have a Master Plan to prevent haphazard development within the town. The inherent development potentials and the influence of Kochi region call for planned development of the town. Hence, preparation of a Master Plan for ensuring planned development of the Town is an immediate requirement for Cherthala Town.

Chapter-5

Profile of the Town

5.1. Location

Cherthala town is located in Cherthala Taluk of Alappuzha district and occupies a prominent position as an important town between Kochi and Alappuzha. It is 42 km from Kochi and 22 km from Alappuzha on the Kochi – Alappuzha section of NH 66 and Railway Route.

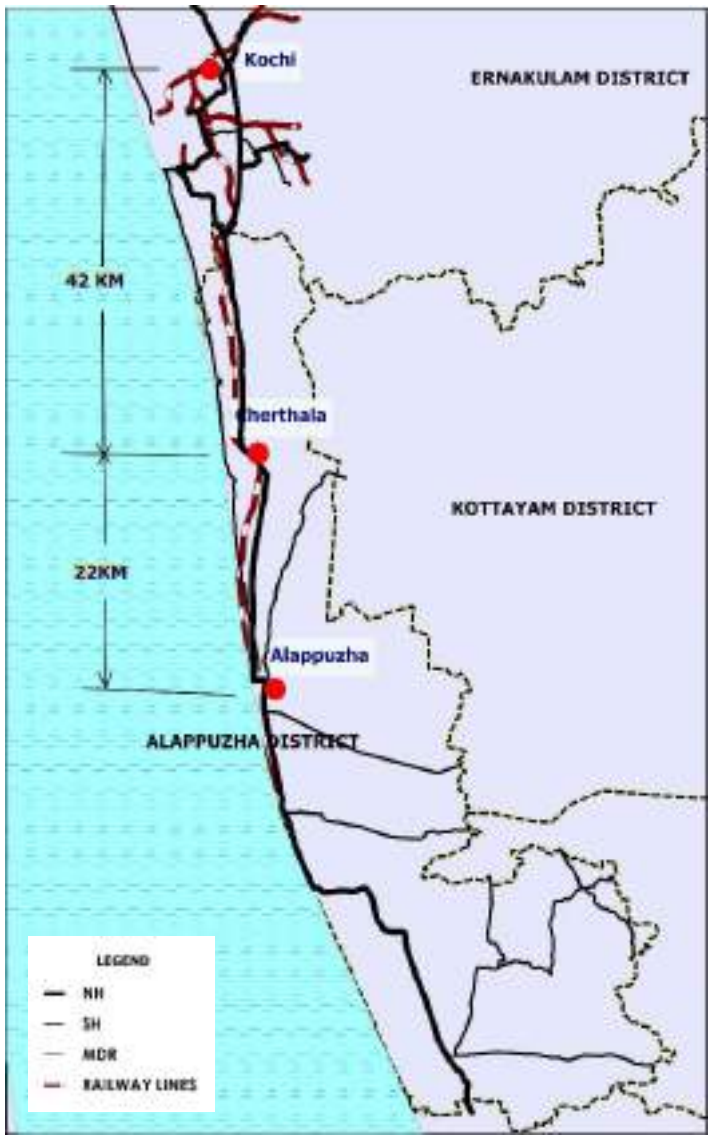


Fig. 5.1 Location: Alappuzha District & Cherthala Town

Cherthala has the potential to develop as an agro-based industrial town. Agricultural activities like cultivation of coconut and paddy and agro-based industries using these products are the predominant activities in the suburbs of the town. A large number of Government factories are well established on the immediate proximity of the town and several oil mills are functioning in and around the town. The nearness of the town to the port towns of Kochi and Alappuzha will have great influence on its future development especially in light of the coastal railway line having become a reality. The railway line links Cherthala town with Alappuzha town and Kochi city.

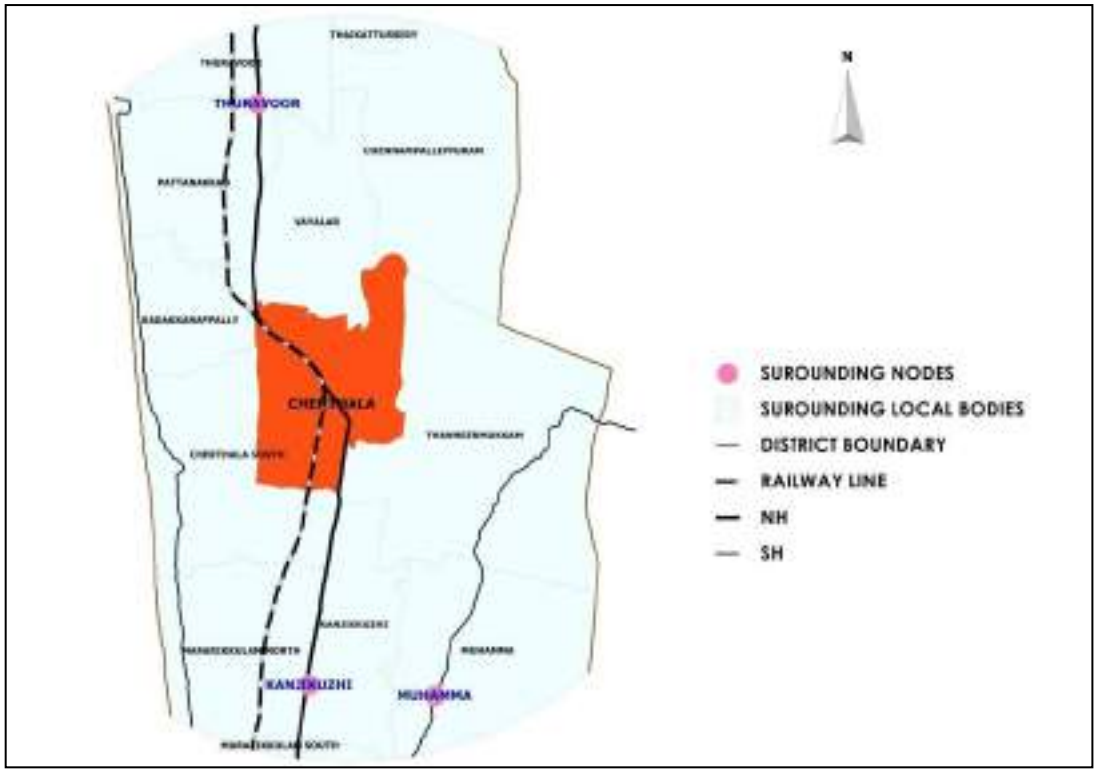


Fig. 5.2 Cherthala Municipality, Surrounding LSGs & nearby commercial nodes

Cherthala town lies on 9°41'13'' North latitude and 76°20'10'' East longitude. On the town's northern boundaries are Vayalar and Chennam Pallippuram Grama Panchayats and on the southern boundary are Cherthala south and Thanneermukkom Grama panchayats. On the eastern side of the town is Thanneermukkom Grama panchayat and on the western side is Kadakkarappally and Cherthala south Grama panchayats.

5.2. Area and Population

Cherthala town was formed on the first of January, 1953. Cherthala town had 19 wards at the time of its formation in 1953. Presently, the limits of the Municipality extend to an area of 17.96 sq.km with 35 wards having a population of 45,827 as per Census of India 2011.

Cherthala Municipality consists of the revenue villages of Cherthala North (part), Cherthala South (part), Kokkothamangalam (part) and Vayalar East (part).

As per census handbook, the Municipal area is 16.19 sq.km. But it is different with respect of revenue records as 17.96 sq.km. This area change is mainly due to the reclamation of Muttom kayal in Vayalar East Village. The northern boundary of the town is taken as the centre line of the Muttom kayal.

The population details of Cherthala Town from 1981 to 2011 as depicted in the table 5.1 does not show any considerable growth in population. In 1981, Cherthala was a Municipality with a population of 40492. In 1991, it became an Urban Agglomeration with 7 Census Towns and an area of 92.59 sqkm with a population of 1,32,883. The area of Cherthala Agglomeration in 2001 was 91.61 sqkm including 4 census Towns and 2 Out Growths with a total population of 1,41,558, which in 2011 grew to 15 Census Towns with a population of 4,55,408. This data reveals an Urban Spread around Cherthala Town. The details of Cherthala Urban Agglomeration during 1991-2011 are given in Table 5.2.

Table 5.1 Population details of Cherthala from 1981 - 2011

Year	Population
1981	40492
1991	43326
2001	45105
2011	45827

Table. 5.2 Details of Cherthala Urban Agglomeration(UA)

Census Year	UA	Statutory Town				
		Municipal Town	**Non Municipal Town**	**Census Town**	**Area sqkm**	**Population**
1991	Cherthala	Cherthala		Vayalar	92.59	**1,32883**
				Kokothamangalam		
				Thanneermukkam		
				Muhamma		
		Kayamkulam	Aroor	Mannanchery		
		Mavelikkara		Arookutty		
		Chengannur		Kodamthuruth		
2001	Cherthala	Cherthala	Vayalar OG	Kokothamangalam	91.61	**1,41,558**
			Thannermukkam OG	Muhamma		
		Kayamkulam	Arookutty	Aroor		
		Mavelikkara		Kanjikuzhi		
		Chengannur				

2011	Cherthala	Cherthala		Arookutty		**4,55,408**
				Aroor		
				Ezhupunna		
				Kodamthuruth		
				Thaikattussery		
				Kuthiathode		
				Vayalar		
				Pallippuram		
				Thanneermukkam		
				Kokkothamangalam		
				Kanjikkuzhi		
				Muhamma		
				Mannanchery		
				Pathirappally		
				Komalapuram		

5.3. Climate

The climate of Cherthala is as that of any other coastal town of Kerala. The temperature in the town varies between 22^0C and 32^0C and a more or less moderate temperature exists throughout the year. Because of the nearness to the sea and the vast area of backwaters the humidity is high all round the year.

Cherthala town also experience only two major seasons viz. the dry season and the wet season. The wet season is usually associated with the south west and north east monsoons. The north-east monsoon commences in October and continues till November. The rainfall varies from 1500 to 2000mm during south-west monsoon and 400 to 800mm during the north east monsoon.

5.4. Physiography

The stretch of land in Cherthala is classified as flat coastal belt – low land based on the natural classification. The paddy fields are mostly made by lowering the level of the land digging the earth out. This is evident from the fact that many of the paddy fields have small sandy hillocks by their sides. Cherthala has the best white silica sand in Asia, similar to that found in Hawaii.

5.5. History / Evolution and growth

According to the local legend, once Vilwamangalam Swamiyar, the well-known Kerala Hindu saint, while travelling through Cherthala, found an idol of the Devi with its head immersed in a muddy pond. The swami understood the divinity of the idol, took it out from the mud, cleaned it and consecrated it in a temple near the pond. Thus the place is believed to have got its name as Cher meaning mud and Thala meaning head in Malayalam and the deity of the temple got the name as Cherthala Karthiyayani. The word

put together means Head from the mud. Unlike in other Kerala temples, the idol of Cherthala Karthiyayani Devi is consecrated in the Sreekovil just below the ground level and cannot be directly viewed by the devotees.

There is another story that says that the former name was Karappuram and that this piece of land was given by the erstwhile State of Cochin to the erstwhile State of Travancore for protecting it from enemies. The place got its name as Chertha(joined) Thala (abutting land).

Cherthala town was formed on the Ist of January, 1953. It does not have much historical background. The name of the town is derived from the word 'Ala Cherthathu 'meaning land formed by waves. It is believed that this area was part of the sea before the land was formed by sea waves. The waterways, sandy hillocks and paddy fields in the area support this legend behind the name of the town.

Cherthala Town had 19 wards at the time of its formation in 1953. Now it has 35 wards and an area of 17.96 Sq.Km. Unlike many other towns in the state, the town was formed not through a natural growth of any Panchayath or Township. In fact, there was no local body of any kind in Cherthala before it was raised to the status of a Municipal Town, even though it was known as the administrative Headquarters. And hence in the beginning, it was under the control of a special officer who was also the local Tahsildar. First election to the municipal council was conducted on the 23rd of May 1953. Cherthala is the Headquarters of Cherthala Taluk and the seat of many Government offices and, as NH 66 passes through Cherthala a major node of traffic too.

In olden days, water bodies played an important role in the transport and communication of Cherthala with the neighbouring settlements. The navigable canals and Vembanad Lake contributed a lot to this extent. Transportation was cheap, though time consuming. But time becoming a major factor in economic terms and with development of road network, the role of water bodies in transportation has declined now. The proposed National Waterways No.3 with one of its terminals near the Thanneermukkom Bund is expected to enable Cherthala, exploit the possibilities of inland water transportation.

5.6. Biodiversity

Cherthala depicts a typical Kerala town. Of the total area of 17.96 Sq.Km, the developed area comes to only 13.24 Sq. Km, the remaining area being occupied by water bodies and vegetations. The prominent crop in the municipal area is coconut. The paddy field area has largely been filled up for construction purposes and the dry cultivation area is also converted. Besides this there are sacred groves called "Kavu" which contain rich and

characteristic flora and fauna and ponds accompanied with major temples. The lakes and canals in the municipal area are now polluted.

5.7. Inference

Cherthala Town extends to an area of17.96 sq.km with 35 wards having a population of 45,827 as per Census of India 2011. The stretch of land in Cherthala is classified as flat coastal belt – low land based on the natural classification. Cherthala has the best white silica sand in Asia, similar to that found in Hawaii. Cherthala is a major centre of coir industry. There are large coir exporting industries located in the immediate vicinity of the town with a few of them along the NH 66.

The possibility for high intensity development in and around the town is very evident from the current urbanization trend within the town. This is mainly due to the influence of Kochi and hence connectivity to Kochi town has to be improved. The inter-linkages to other major towns shall also be improved.

As agricultural activities are predominant there is also a potential to develop Cherthala as an agro-based industrial town. Hence the existing paddy lands may be retained as such to the extent possible, so as to conserve as well as to support and develop the town as a sustainable one. Cherthala town has the potential for developing, taking advantage of the proximity to the ever expanding Kochi metropolitan city

Waterway transport, the eco-friendliest and cheapest mode of transport, which played an important role in the olden days can be revived through new proposals. The possibility of developing a waterway transport in the town has high potential due to its proximity to the National Waterway-III. The temperature is moderate throughout the year in Cherthala, but humidity is high and the topography is fairly flat. This is suitable for cultivation.

Chapter-6

Regional Setting

The regional setting of a Town can be arrived at from the Regional Plan which spells out hierarchy of the town in the Regional Scenario, the main activity that the town has to perform and its connectivity with different settlements in the region. In the case of Cherthala Town, the outcomes of the detailed Regional Setting Studies carried out in the district in connection with the 'Scheme of Preparation of Master Plans and Detailed Town Planning Schemes', which has been documented as the District Urbanisation Report (DUR) has been made use of for this purpose. In addition, the draft (preliminary) Integrated District Development Plan (IDDP) for Alappuzha District, prepared through a joint exercise by the District Planning Committee, Alappuzha and the School of Planning and Architecture New Delhi as well as the State Urbanisation Report (SUR) prepared by the Department of Town and Country Planning that spells out the state level hierarchy of urban centres along with delineated urban profiles for the state for 2021 and 2031 are also referred to. The regional setting of Cherthala Town has been brought out with clarity based on the SUR, DUR and IDDP and is explained hereunder.

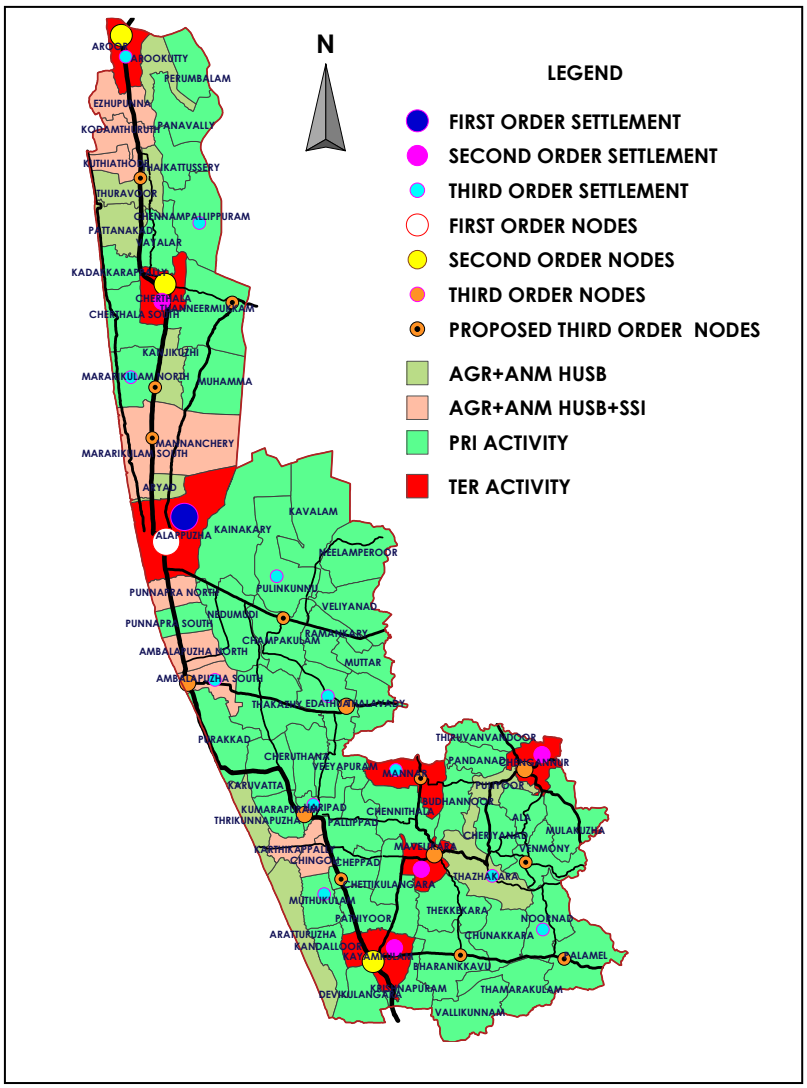


Fig. 6.1 Spatial Structure of Alappuzha District

Source: District Urbanisation Report 2011

6.1. Spatial structure of the District

Spatial structure of the district is a derivative of the inputs from the analyses on settlement hierarchy, connectivity and activity pattern of the district. Activity pattern of the district is evolved from land use concentration pattern, functional character and future urban profile. Functional character is determined from population distribution and landuse, urban profile is derived considering occupational structure and hierarchy of settlements and the landuse concentration pattern is evolved from the landuse analysis and real ground scenario. The various findings from the analyses of each of these aspects are overlaid to evolve the spatial structure of the district. The spatial structure of the district evolved as per District Urbanisation Report of Alappuzha is represented in Fig.6.1.

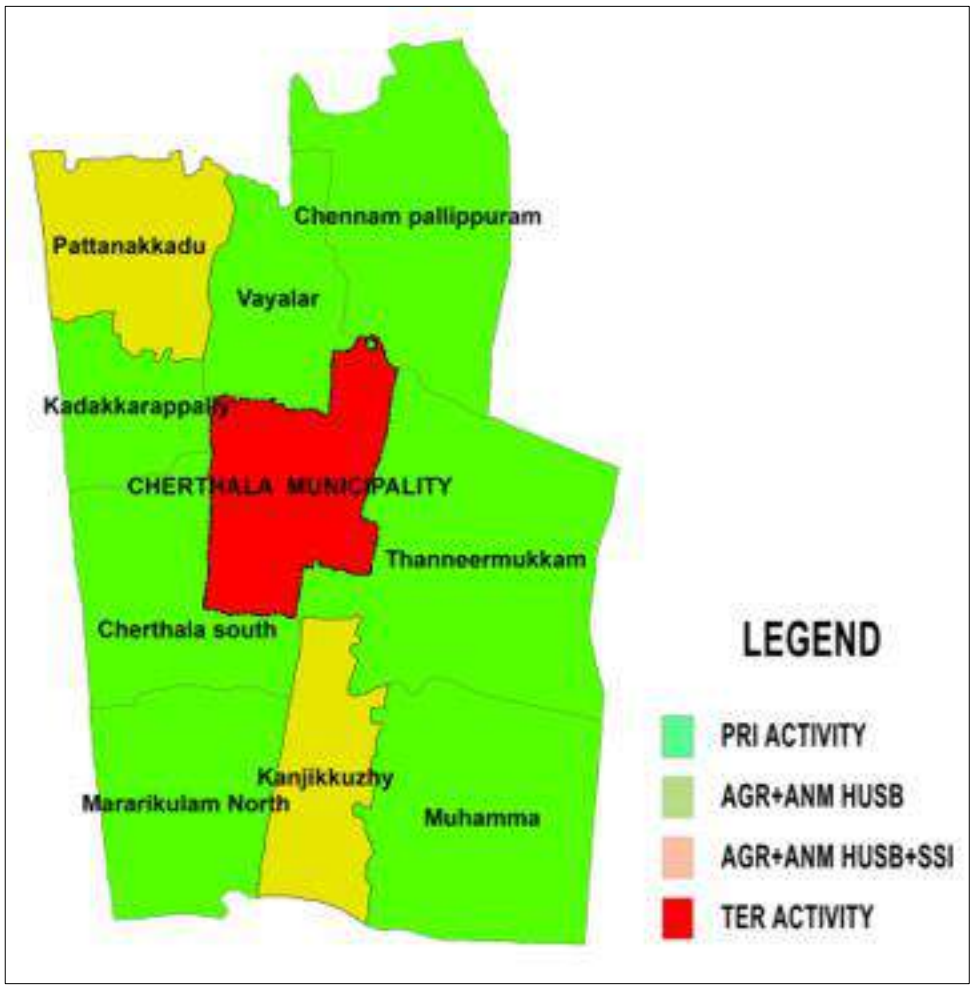


Fig. 6.2 Activity pattern of Cherthala town & Surrounding LSGs

6.2. Activity pattern of the Town

According to the Spatial Structure of Alappuzha District, the activity pattern of Cherthala town is tertiary activity whereas all the Grama Panchayats surrounding the town

exhibit either 'primary activity' or 'Agriculture+ Animal husbandry'. Thus, the Cherthala town has concentration of non-agricultural land uses and the functional classification of the town is urban. *Fig.6.2* shows the activity pattern of the town and LSGs surrounding.

6.3. Hierarchy of the town

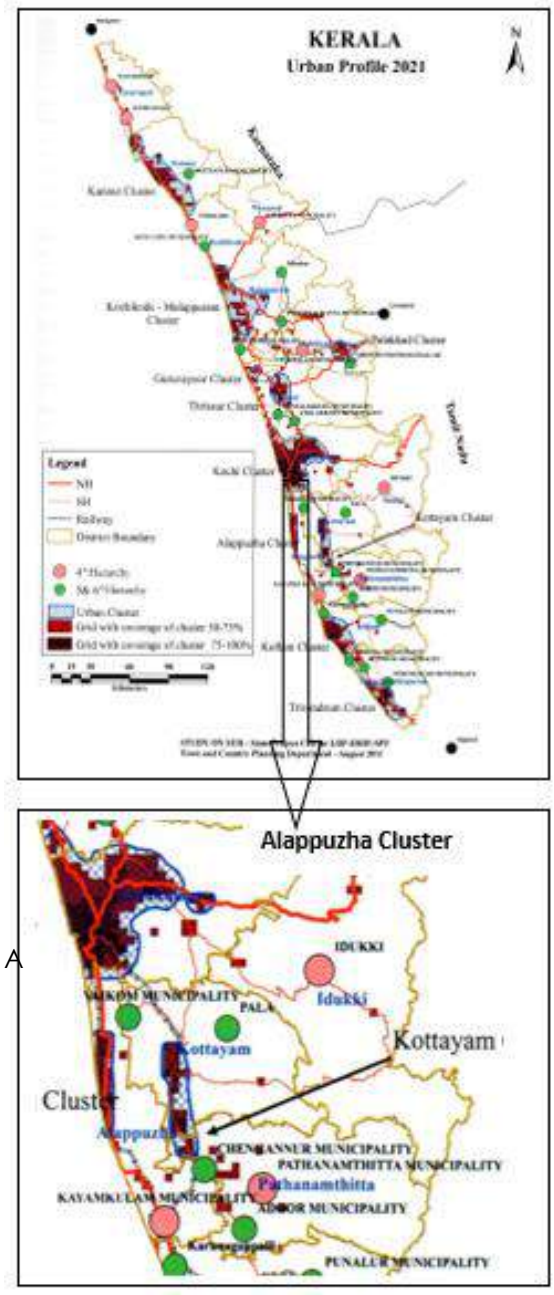


Fig. 6.3 Urban profile 2021 – Urban Clusters and other urban areas

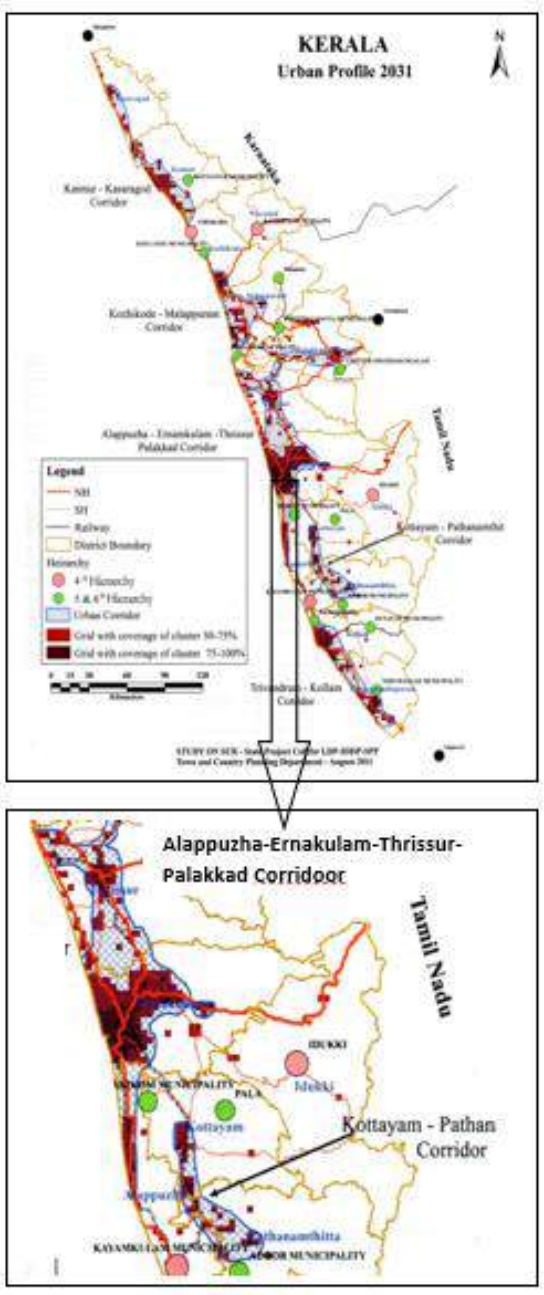


Fig. 6.4 Urban profile 2031 – Urban Clusters and other urban areas

Source: State Urbanisation Report 2012

Cherthala is a 4th order urban centre in the state as per the State Urbanization Report prepared by the Department of Town and Country Planning in the year 2012. Cherthala town forms part of the Alappuzha Urban cluster as per the future urban profile delineated in

the State Urbanisation Report for 2021. Considering the future urban profile for the state, delineated in the State Urbanisation Report for 2031, Cherthala falls in the delineated Alappuzha-Kochi-Thrissur-Palakkad Urban Corridor. Urban Profile 2021 & 2031 as per SUR are shown in figure 6.3 & 6.4 respectively.

As per the draft (preliminary) Integrated District Development Plan for Alappuzha District, Cherthala has been categorized as 2nd order settlement in the district. In this respect, the hierarchy of settlements is derived using Cumulative Functional Index (CFI) method based on the number and type of facilities available. Because of higher CFI this town is assigned the status of 2nd order in the hierarchy.

Cherthala town is a Second Order settlement in the district as per the District Urbanisation Report also and the service area of Cherthala town when considered as a second order settlement extents to the entire northern portion of the district. The service area of Cherthala town, when considered as a third order settlement, includes the neighbouring LSGs of Pattanakkad, Thanneermukkam, Vayalar, Kadakkarapally and Thuravoor. Service area and service population of the town when considered as a 3rd order settlement is listed in the Table 6.1.

Table. 6.1 Service area and Service population of Cherthala town

Sl. No.	Local governments served	Service Area (sqkm)	Population		Density p/sqkm	
			2001	2021	2001	2021
1	Cherthala	111.8	189265	199434 (future population as per DUR)	1693	1783
2	Pattanakkad					
3	Thanneermukkam					
4	Vayalar					
5	Kadakkarapally					
6	Thuravoor					

Source: District Urbanisation Report 2011

6.4. Regional Connectivity

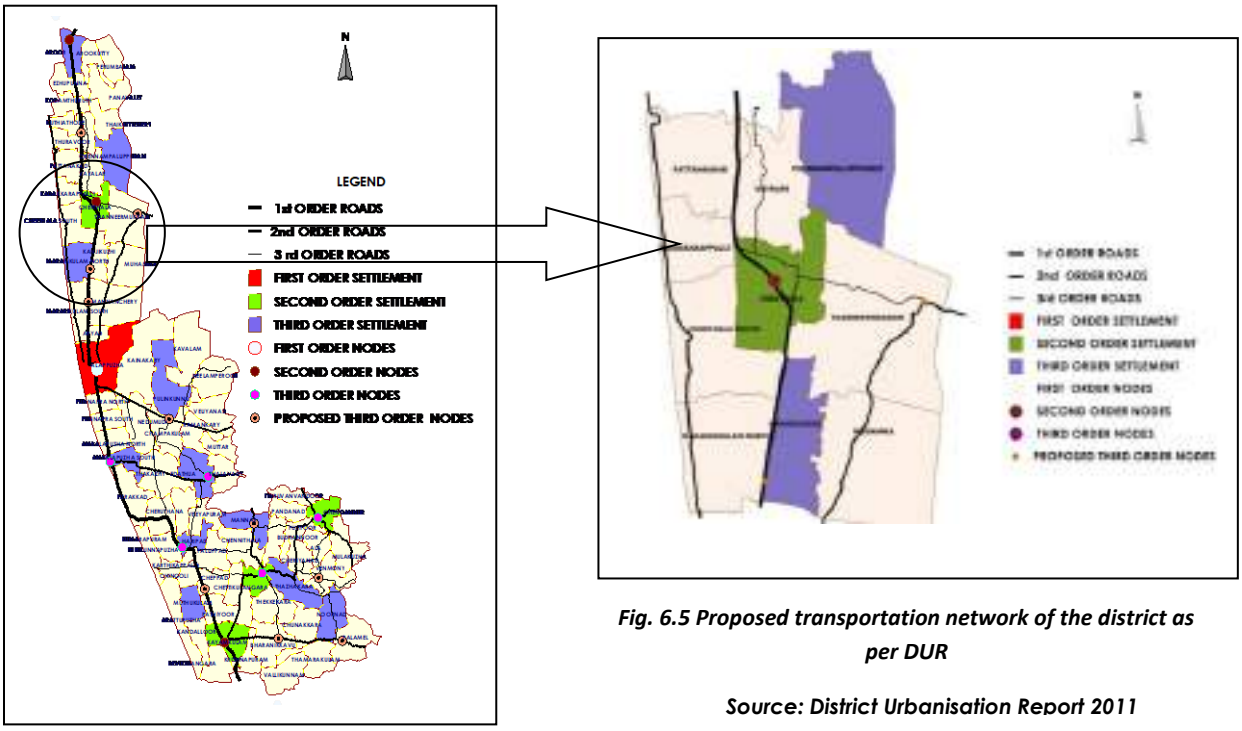


Fig. 6.5 Proposed transportation network of the district as per DUR

Source: District Urbanisation Report 2011

Connectivity is a term to denote how well an area is connected to other regions (inter regional) or within the region (intra-regional). This may be by air, road, rail or water. Cherthala Town is a major transportation node in the District, (second order node as per the District Urbanisation Report) as the National Highway-66 and the railway line passes through the town with the Cherthala railway station located in the heart of the town. Besides, many tourist destinations can be reached via Cherthala, which makes it important with respect to the transportation scenario.

The Proposed transporatation network of the district as in the district urbanization report is shown in *Fig. 6.5. Accordingly, Cherthala enroute the first order road in the district viz. the NH-66, and is also connected to the region by the 3rd order road connecting to Thanneermukkam.*

The regional setting of the town indicates that the town has potential to develop in to a service centre having commercial nature, as many tourist destinations are available within and near to Cherthala, having transit routes through the town centre. It is also a welcome centre for waterway tourism through the development of Nedumbrakkad ferry and the AS canal, considering the possibility of linking to National Waterway-III passing through Vembanad Lake.

6.5. Inference

Cherthala is a 4rth order urban centre in the state as per the State Urbanization Report. As per the Regional Setting study, documented as District Urbanisation report, Cherthala town is a Second Order settlement in the district and also acts as a second order node. There is also a high potential for development for this town as it forms the part of the thriving urban corridor in the state i.e. the Alappuzha – Ernakulam- Thrissur - Palakkad Urban Corridor *as per the delineated future urban profile for the State for 2031 in the SUR*. The spatial structure of the district depicts that the activity pattern of Cherthala is tertiary while the activity pattern of all surrounding settlements are primary. *Cherthala exhibits urban character whereas all the surrounding Grama Panchayats of the town exhibit rural or semi-rural character. Hence the planning area for Cherthala town is delineated as the Cherthala Municipal Area.*

Chapter-7

Demography

Planning is essentially a tool in achieving the justifiable wants and equitable distribution of the requirements of the population. People are the ultimate beneficiaries in any development endeavor. Planning is aimed at providing maximum good for the maximum number of people. Hence, it is imperative to analyse the population by studying parameters-like size of population, its growth rate, population density, population concentration pattern, migration details etc, so as to assess the requirements of the present population and to have a realistic estimate of the future population and their requirements. This is attempted in this chapter.

7.1 Population and its growth pattern

Total population of Alappuzha district as per 2011 Census is 2127789, which is 6.37 % of total population of the state and the district is placed at the 9th position as far as population size is considered. Alappuzha being the smallest district in the state in terms of area (3.64% of area of the state), the district is characterized by high density of population. The population density of Alappuzha District is 1505 persons per sq.km which is highest among all districts in the state.

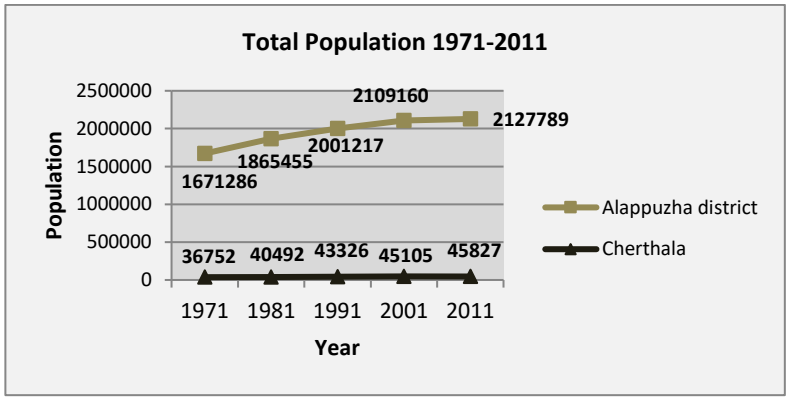


Fig. 7.1 Temporal variation of population

Source: Derived from Census data

As per 2011 census the total population of Cherthala Town is 45827. This is 2.15% of the total district population of Alappuzha (2127789) and 4% of the total urban population of Alappuzha district (1148146).The population growth from 1971 to 2011 of the district and Cherthala town is shown in *Fig. 7.1*.

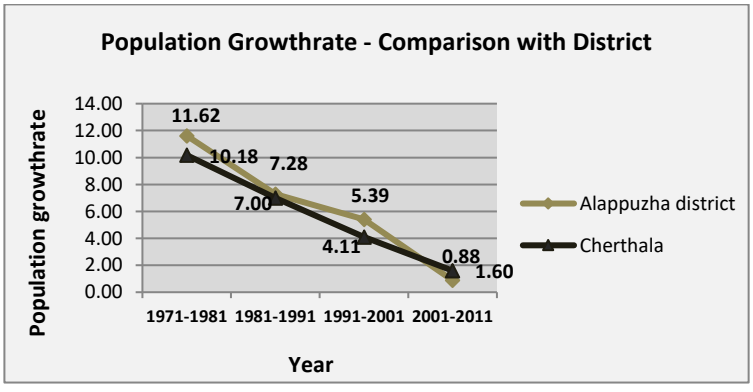


Fig. 7.2 Population Growth rate- Comparison with district

Source: Derived from Census data

During 2001-2011 the decadal growth rate of population of Cherthala town is 1.6 % which is high when compared to the district average of 0.88%. Considering the period from 1971-81, 1981-91, 1991-01 and 2001-11 the growth rate is gradually decreasing (*Fig.7.2*). Comparing with other urban centres of the district, the town has the highest growth rate during the period 2001-2011. This is shown in *Fig. 7.3.*

Table 7.1 Population - Comparison with other urban local bodies

Name of the Municipality	Population				
	1971	1981	1991	2001	2011
Cherthala Municipality	36752	40492	43326	45105	45827
Alappuzha Municipality	160166	169940	174666	177029	240991
Chengannur Municipality	13316	24862	25872	25397	23466
Kayamkulam Municipality	54102	61327	67151	68585	68634
Mavelikkara Municipality	25648	26598	28299	28439	26421
Total Urban Population	**289984**	**323219**	**339314**	**344555**	**405339**

Source: Census of India *Source: Derived from Census data*

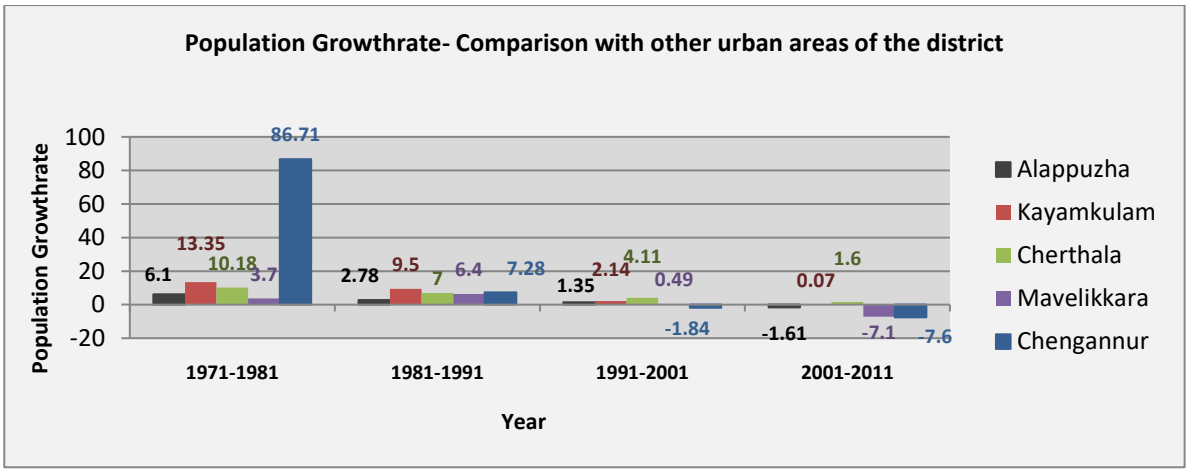


Fig. 7.3 Population Growth rate- Comparison with other urban areas of district

Source: Census of India 2001, 2011

Compared to the neighbouring LSGs the town has very low population growth rate as shown in *Table 7.2.*

Table 7.2 Population Growth rate- Comparison with neighbouring LSGs

Name of LSG	Population 2001	Population 2011	Growth rate
Cherthala	45105	45827	1.60
Kadakkarappally	19331	20487	5.98
Vayalar	24216	24804	2.43
Thanneermukkom	41176	48572	17.96
Cherthala south	37797	40102	6.10
Chennam pallippuram	27307	28276	3.55

The gross population density of urban areas of Alappuzha district is 2977 persons per sq.km. as per 2011 census which is almost double the average density of the district (1501 pp sq.km). The gross density of

population in Cherthala town is 2552 persons per sq.km which is the third position among the urban centres of the district (*Fig 7.4*). Compared with the surrounding LSGs Cherthala town has the second highest gross density. Kadakkarapally Gramapanchayat (*Fig.7.5*) having a population density of 4502 persons per sq.km stands in the first position. The high population

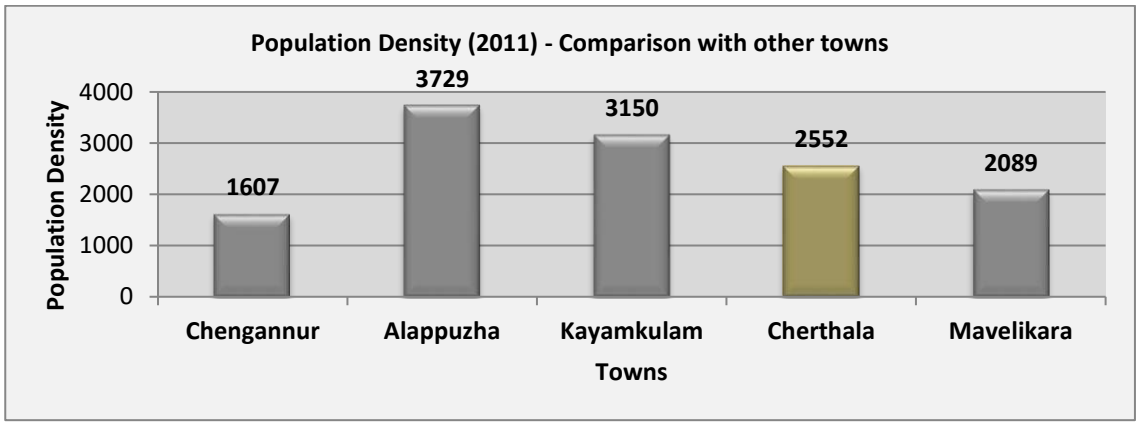


Fig. 7. 4 Population Density- Comparison with other urban areas of the district *Source: Derived from Census data*

density of Kadakkarapally Gramapanchayat may be attributed to the fact that it is a coastal region. In fact, Kadakkarapally Grama Panchyat has the highest population density among all Local Self Governments in the district.

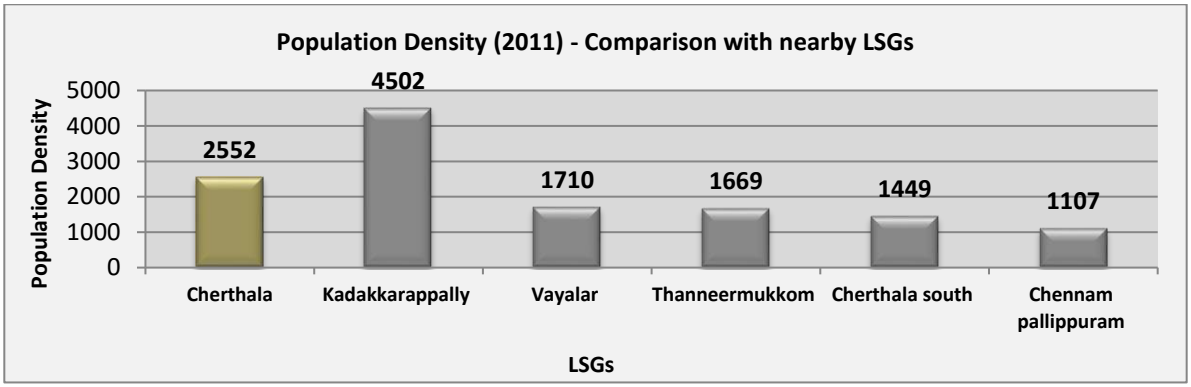


Fig. 7.5 Population Density- Comparison with neighbouring LSGs *Source: Derived from Census data*

7.2. Spatial distribution of Population

The municipal area has been divided into 35 electoral wards as per the ward division in 2010. The ward wise distribution of population is shown in *Table 7.2*. Population in the wards ranges from 504 to 1942. Cherakulam (ward no:17), Nedumbrakkad (ward no:5), Muttom Bazar (ward no:30) and Kuttikkat (ward no:32) are the most populous wards. The spatial distribution of population is shown in *Fig. 7.6*.

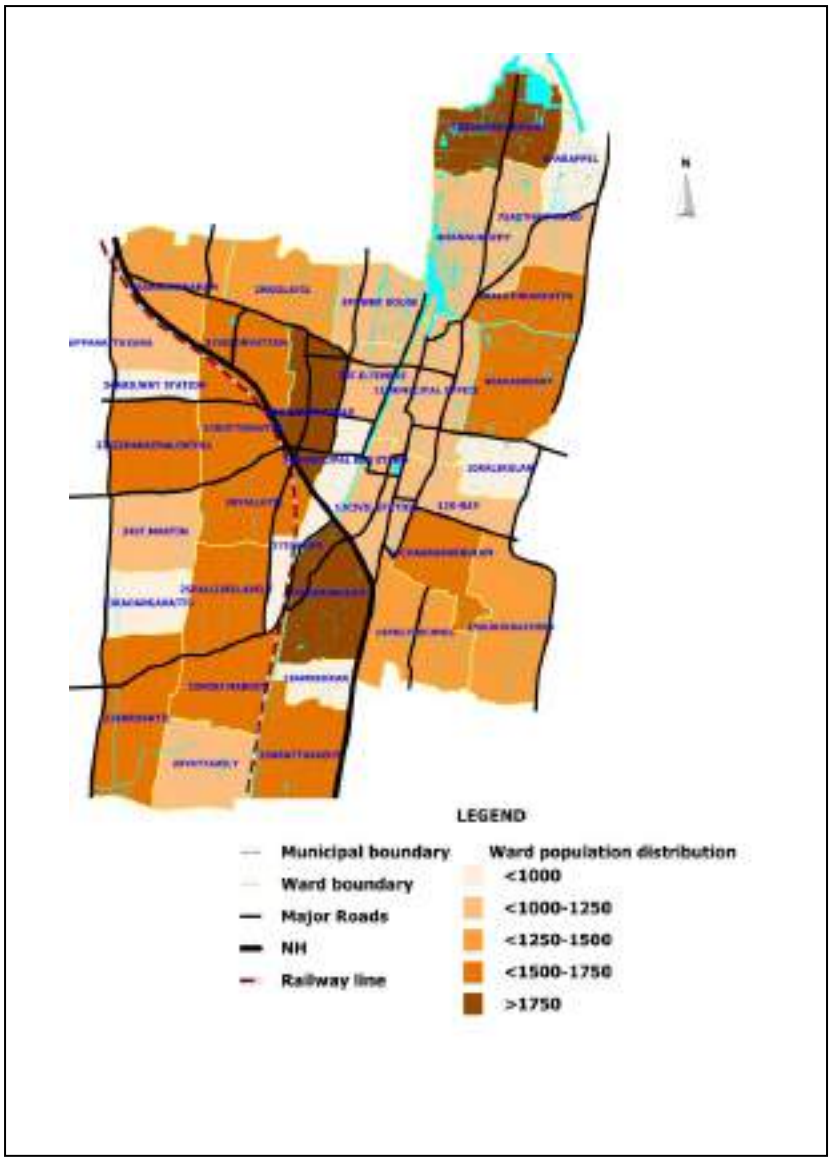


Fig. 7.6 Ward wise population distribution in Cherthala Town

Source: Derived from Census data

The density of population is an indicator of pressure of population on land which in turn is influenced by factors like accessibility, proximity to facilities etc. Higher population density puts more pressure on infrastructure and environment but reduces the per capita costs of supply of public goods and services.

Kulatharakkad ward has a population density of 4151 persons per sq. km where as the Municipal Office ward has the least population density of 1670 persons per sq.km. The highest density of above 3500 is seen in ward numbers 8, 14, 27, 28, 29 and 31 (Kulatharakkad, Chakkarakkulam, Edathil, Municipal Bus stand, T.D Ambalam and Velorvattam wards). The density and population of the wards are tabulated in *Table.7.3*.

Table. 7.3 Ward wise population in Cherthala Municipality

Ward no	Ward name	Area of ward (SQKM)	Population	Population density (Persons per sq.Km)
1	Saktheeswaram	0.746	1342	1799
2	Moolayil	0.561	1380	2460
3	Power House	0.456	1209	2651
4	Mannukuzhy	0.722	1208	1673
5	Nedumbrakkad	0.639	1940	3036
6	Parappel	0.333	983	2952
7	Sastham	0.500	1239	2478
8	Kulatharakkad	0.403	1673	4151
9	Savassery	0.683	1671	2447
10	Kalikulam	0.338	818	2420
11	Municipal Office	0.739	1234	1670
12	X-Ray	0.350	1050	3000
13	Civil Station	0.408	1147	2811
14	Chakkarakkulam	0.453	1605	3543
15	Kurikkachira	0.799	1457	1824
16	Polytechnic	0.714	1405	1968
17	Cherakulam	0.712	1942	2728
18	Ambedkar	0.221	549	2484
19	Arattuvazhy	0.713	1527	2142
20	Vattavely	0.567	1165	2055
21	Karuvayil	0.822	1704	2073
22	Mini Market	0.572	1505	2631
23	Kattanganattu	0.365	745	2041
24	St.Martin	0.501	1092	2180
25	Palluvallyvely	0.567	1565	2760
26	Vallayil	0.559	1692	3027
27	Edathil	0.204	726	3559
28	Municipal Bus stand	0.247	890	3603
29	T.D.Ambalam	0.276	1001	3627
30	Muttam Bazar	0.505	1759	3483
31	Velorvattam	0.450	1652	3671
32	Kuttikkat	0.526	1732	3293
33	Kizhakke Nalpathu	0.589	1557	2643
34	Railway Station	0.168	504	3000
35	Kuruppanattukara	0.385	1160	3013

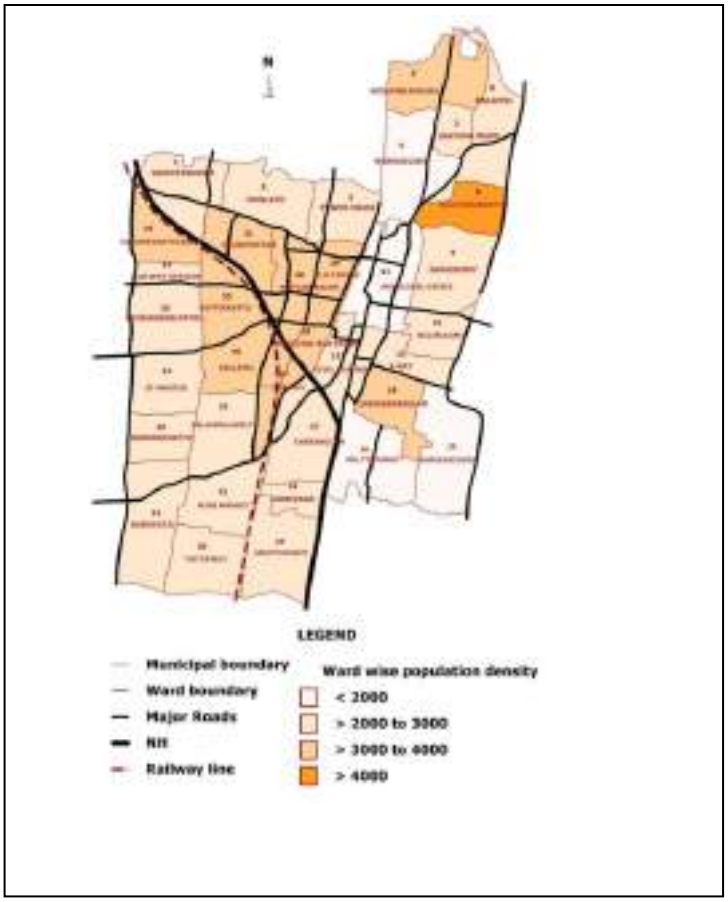


Fig. 7.7 Ward wise distribution of population density in Cherthala Town

Source: Census of India

The ward wise density varies from 1670 to 4151 persons per sqkm. The ward wise distribution of density is shown in *Fig.7.7*. From the figure it is seen that the wards with high density are located adjacent to the major transportation corridors.

7.3. Sex ratio

The growth and development of women have direct impact on the general well-being of the society. Sex ratio is the most credible pointer towards the status of women in a society. Kerala has a unique position with regard to sex ratio. According to 2011 census sex ratio of Cherthala town is 1065; whereas the sex ratio of the district is 1100. Variation of sex ratio for Cherthala town in the previous decades is given in *Table 7.4*

Data indicates that sex ratio of Cherthala town is gradually increasing over the last three decades. Sex Ratio for population in the age group 0-6 in 2011 is 911. The age sex pyramid is given in figure 7.10.

Table. 7.4 Decadal variation of sex ratio

Source: Census of India

Year	1971	1981	1991	2001	2011
Sex ratio in Cherthala Town	1023	1011	1048	1057	1065

Sex ratio of Cherthala Town is the lowest comparing with the other towns in the district. But when compared to the neighbouring LSGs, Cherthala has the highest sex ratio. Sex ratio comparison with urban areas and adjacent LSGs are shown in *Fig 7.8* and *Fig. 7.9. respectively*.

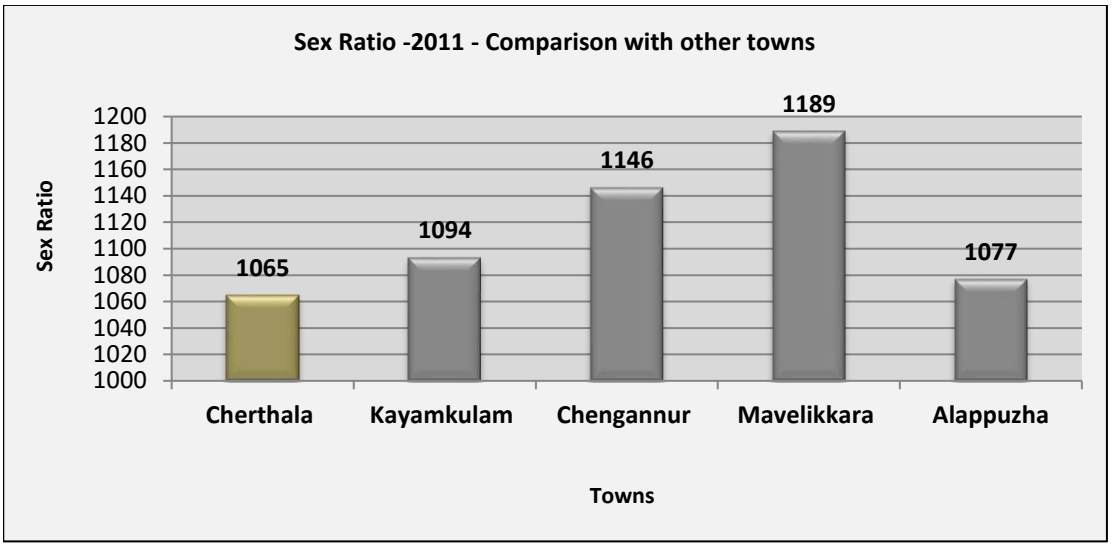
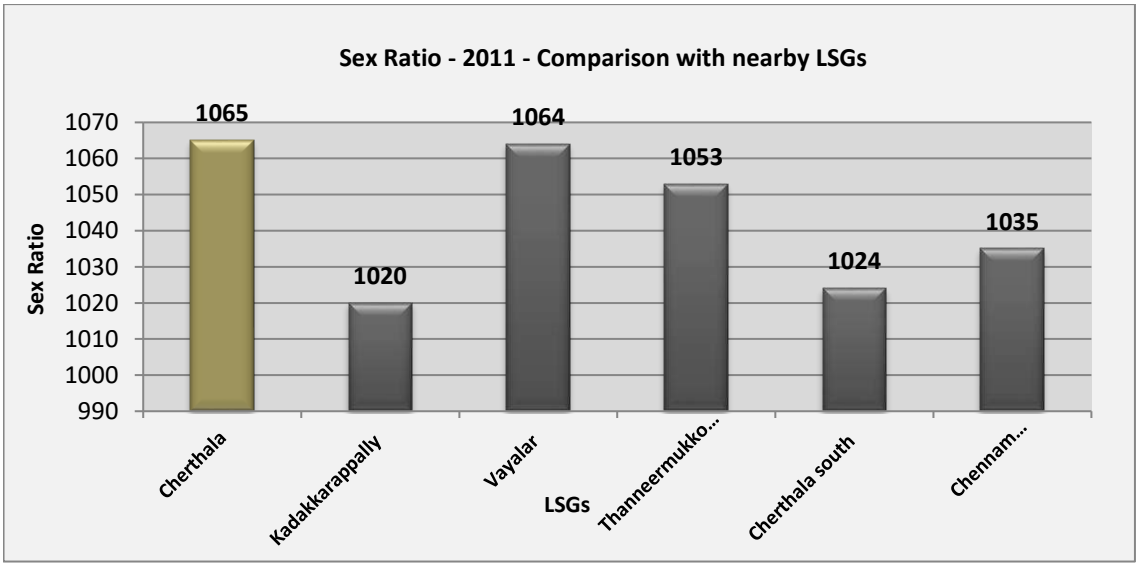


Fig. 7.8 Sex ratio – Comparison with other towns *Source: Census of India 2011*



Source: Census of India 2011

Fig. 7.9 Sex ratio – Comparison with neighbouring LSGs

7.4. Age - Sex Ratio

From the socio economic survey, the age structure of people is obtained. The values suggest that majority of people are within the age group of 20-60.

From figure 7.10 it can be derived that the percentage of working population within the age group (20-60) is about 59%.

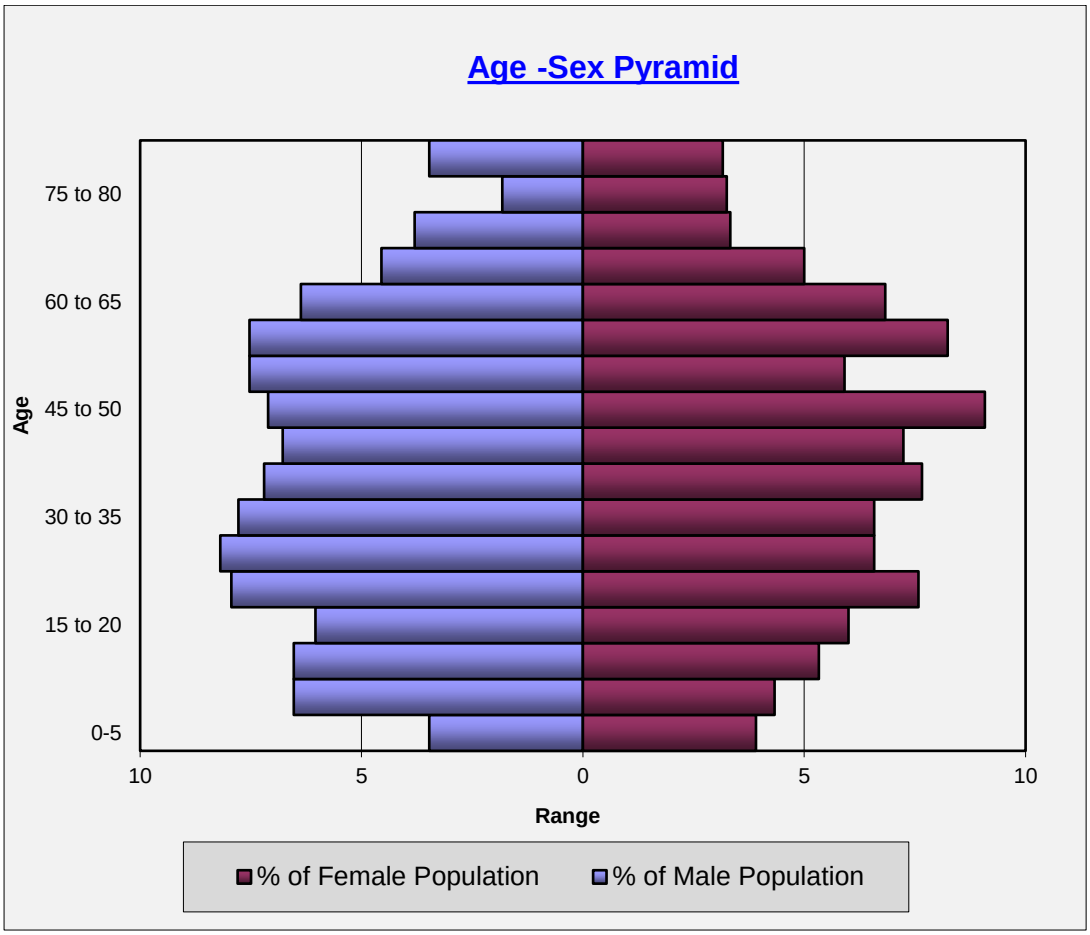


Fig. 7.10 Age – Sex pyramid

Source: Socio economic survey conducted for the preparation of the Master Plan in 2013

7.5. Literacy

Literacy is one of the important social characteristics. Children in the age group of 0-6 are considered illiterate and are excluded from the calculation of literacy rate. Kerala is the most literate state in the country with a literacy rate of 94. Alappuzha district is also having a high rate of literacy, with literacy rate of 95.72 which is higher than the State figure. The town shows a higher literacy rate compared to the state / district average. The literacy rate of town in comparison with the State and District is shown in *Fig.7.11*.

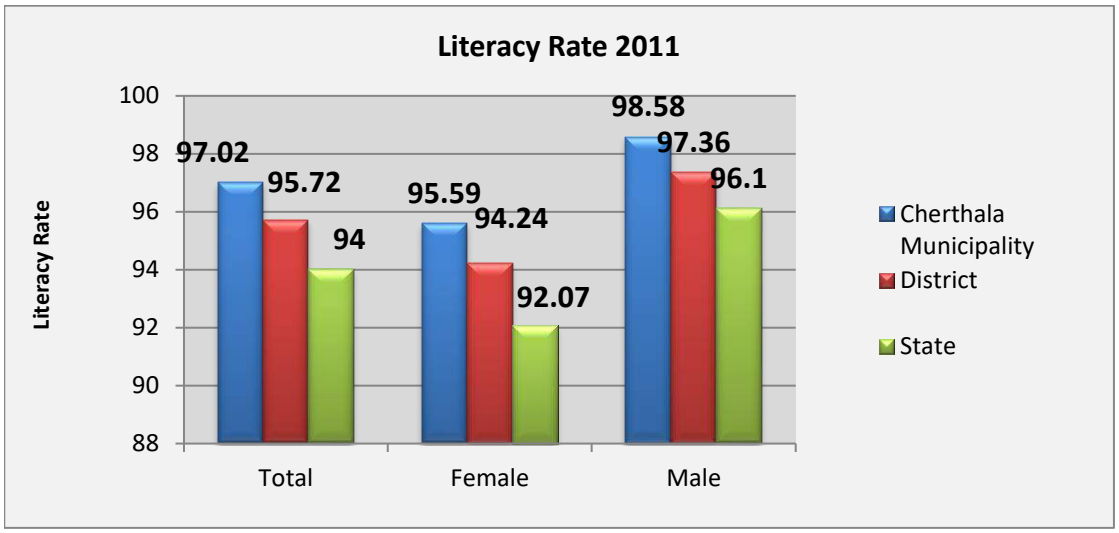


Fig. 7.11 Literacy rate – Comparison with district & state *Source: Derived from Census data*

The literacy rate of Cherthala town is 97.02% as per census 2011; the male literacy rate is 98.58% and the female literacy rate is 95.59%. The literacy rate has increased over the past decades.

Cherthala has the highest rate of literacy among the surrounding LSGs. Compared with the other towns in the district, Cherthala has the second highest literacy rate. The comparison of literacy rate with other urban areas and adjacent LSGs are shown in *Fig 7.12* and *Fig. 7.13* respectively. The literacy rate of Cherthala Town is highest in the immediate surrounding region.

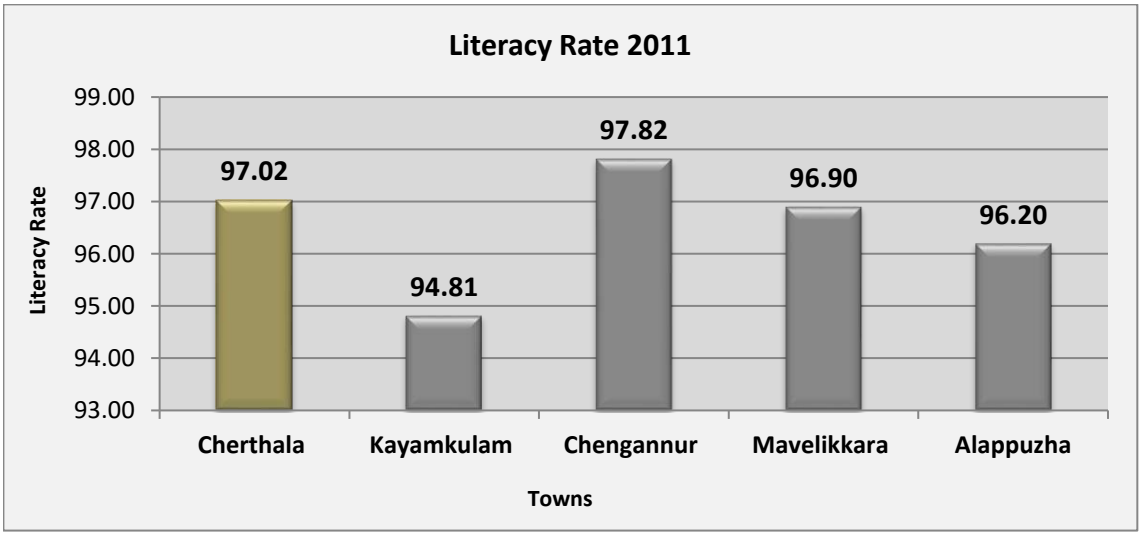


Fig. 7.12 Literacy rate – Comparison with other urban areas *Source: Derived from Census data*

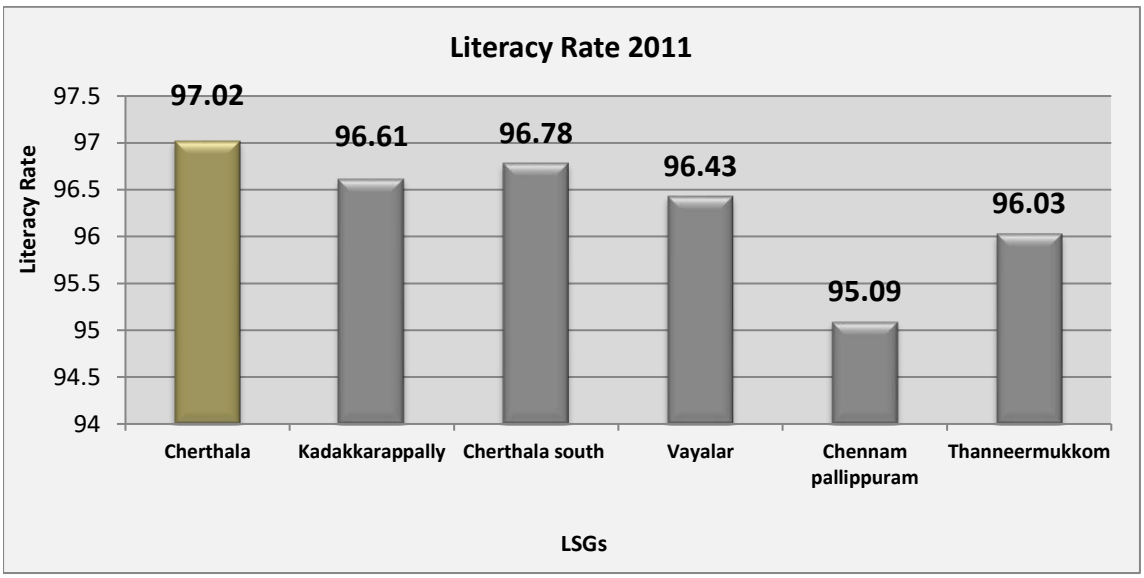


Fig. 7.13 Literacy rate – Comparison with nearby LSGs *Source: Derived from Census data*

7.6. House hold size

Total number of households in Cherthala town in 2011 is 11416. The total population being 45827, the average house hold size is 4.01. (From the socio economic survey conducted in 2013, it is observed that the average house hold size is 4). This is lower than the state average (4.25), but higher than average household size for the district which is 3.97. The town has the lowest house hold size compared to nearby LSGs along with Thanneermukkam Grama Panchayat. Compared to other municipal towns in the district, the house hold size of Cherthala is lower than that of Kayamkulam and Alappuzha, where as Chengannur and Mavelikkara towns has even lower household sizes.

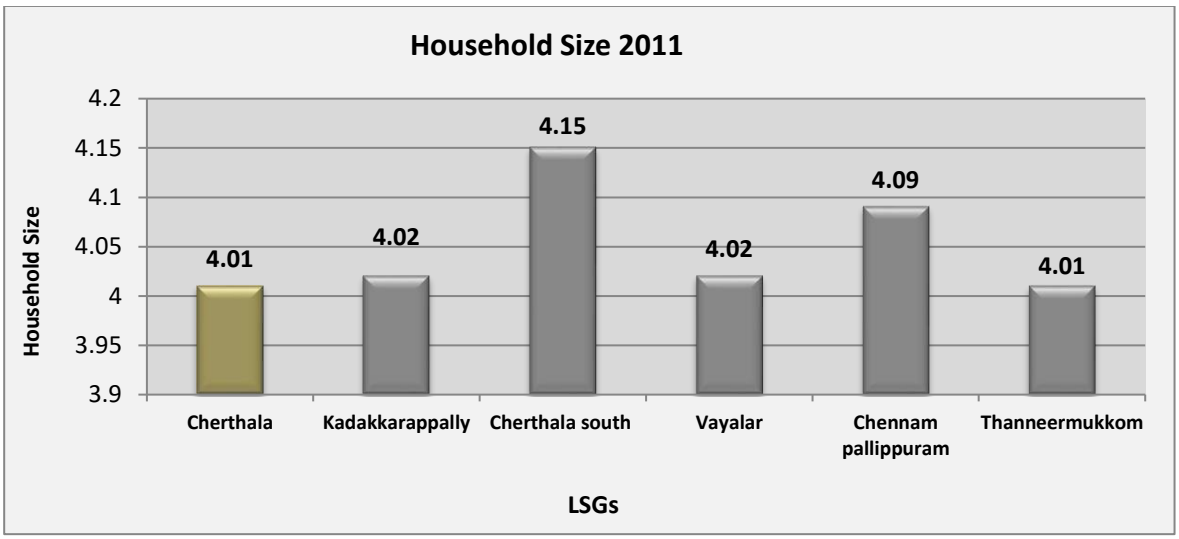


Fig. 7.14 House hold size – Comparison with nearby LSGs *Source: Derived from Census data*

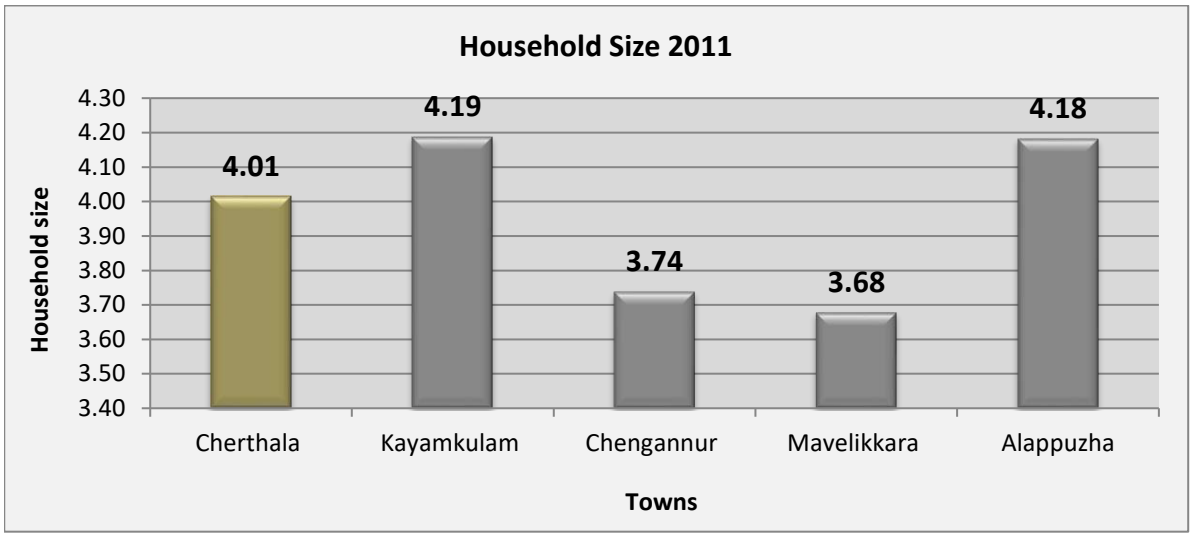


Fig. 7.15 House hold size – Comparison with other towns *Source: Derived from Census data*

7.7. Inference

From 1971 to 2011 there is no considerable increase in the population of Cherthala town. The rate of growth of population of the town shows a sharp decline over the previous decades. This may be due to the lack of required level of facilities and developments within the town to serve its population. While, the growth rate is showing a decreasing trend likewise other towns in the district, it is very low compared to growth rate of neighbouring LSGs. However, when compared with other urban centres in the district, the town holds first position in population growth rate during 2001-2011 decade. Meanwhile, when compared with the surrounding LSGs, Cherthala town is in the last position during the same period with respect to rate of growth of population. During 2001-2011 the decadal growth rate of population of Cherthala town is 1.6% which is high when compared to the growth rate of population of the district which is 0.88%. The gross population density of the town is 2977 persons per sq.km. With respect to population density, the town occupies third position among Municipal towns in the district after the District Head Quarters town Alappuzha and the Kayamkulam town. The ward wise population density varies from 1670 to 4151persons per sq.km. It can be seen that the town is characterized by medium density of population.

Majority of population in the town are found to be concentrated near bus stand area, Velorvattom and Chakkarakulam near X-ray junction. They are also showing high concentration of population, which may be due to the influence of infrastructure facilities. The concetration of educational and health facilities are attracting more population towards these wards. Sex ratio of Cherthala is the lowest when compared to other towns in the district, while it has highest value when compared to the neighbouring LSGs. The household size of the town is 4.01 which is lower than the household size state, but higher than the household size district.

The socio-economic survey reveals that about 59% of the population is within the age group (20-60). The more the share of population in the age group (20-60) the stronger the work force. The literacy rate of Cherthala town is 97.02 which is on the higher side compared to that of the state and the district. When more people are attracted towards the town, there will be considerable growth in the economic activities also. Hence developing more opportunities within the town will support the town grow in all respect.

Chapter-8

Employment

In this chapter the economic base of Cherthala town is analysed to assess the major economic activities in the district and also to identify how people and resources are geographically distributed with regard to these economic activities. This helps in identifying the economic sectors which can be taken as activity sectors where attention is to be focused to enhance local economy. Moreover it helps in estimating the under utilisation or over utilisation of resources in various economic activities as well as the demand for facilities and services required for these economic activities. Hence within the framework of the study, the analysis of economic base has a significant role.

8.1. Workers

The percentage of population engaged in economic activities is an indicator of the economic development and urbanization in an area. The total number of workers in Cherthala town as per 2011 census is 19972. The total workers are further divided into main and marginal workers. The main and marginal workers constitute 36.9% and 6.68% respectively of the total population. This is shown in *Fig 8.1*.

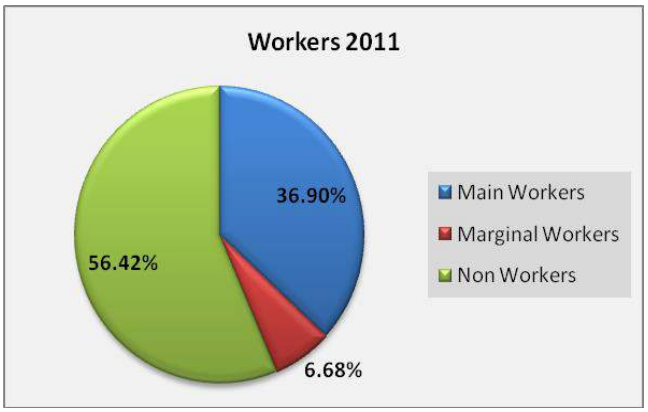


Fig 8.1 Main, marginal & non workers – Cherthala Town

Source: Derived from Census data

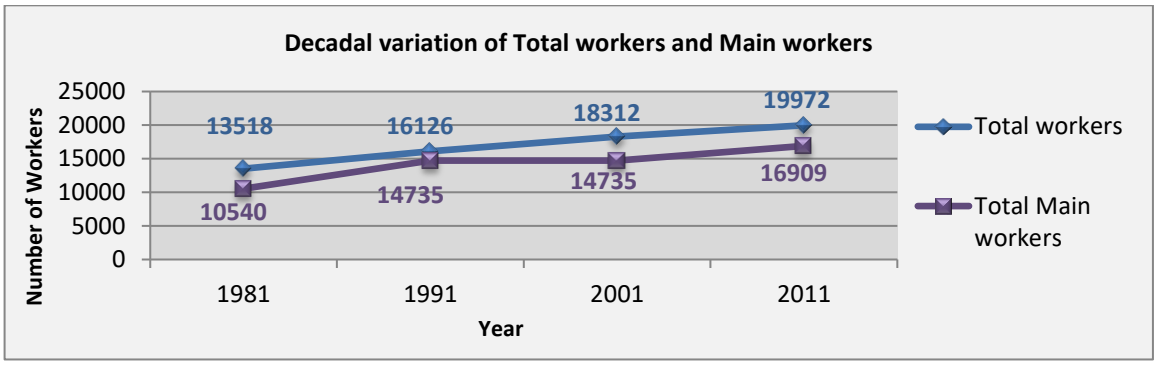
There is a significant increase in the total workers and the work participation rate of the town as per the census figures from 1981 to 2011 as the work participation rate has increased from 33.38 in 1981 to 43.58 in 2011. But another fact to be noted is the significant share of workers from other states like Tamil Nadu, Orissa, and Bengal etc in the tertiary sector, which is not included in

Table 8.1 Decadal variation of workers in Cherthala Town

Year	Population	No of workers	Main workers	WPR
1981	40492	13518	10540	33.38
1991	43326	16126	14735	37.22
2001	45105	18312	14735	40.60
2011	45827	19972	16909	43.58

Source: Census data

the census data. More than 20% of the workers in this sector are from this group, but no clear cut statistics is available to substantiate this.



Source: Census data

Fig 8.2 Decadal variation of total workers & main workers

The share of female workers is 37.55% in Cherthala. There is a clear dominance of males in all the sectors. According to cen sus 2011, the male workers constitute 62.45% of the total workers. Females are mostly engaged in household industrial sector which has to be the major economic base of Cherthala.

Table 8.2 Gender based Work Participation of workers in Cherthala Town and surrounding LSGs

Name of LSG	Total workers	Male workers	Female workers
Cherthala	19972	12473	7499
Kadakkarappally	10214	5978	4236
Cherthala South	12114	7581	4533
Vayalar	11972	6974	4998
Chennam Pallippuram	13405	8042	5363
Thanneermukkam	15302	8864	6438

Table 8.3 Gender based Work Participation of workers in Cherthala Town and other urban local bodies

Name of LSG	Total workers	Male workers	Female workers
Cherthala	19972	12473	7499
Alappuzha	59232	44778	14454
Kayamkulam	22088	17125	4963
Mavelikkara	8013	5626	2387
Chengannur	7262	5165	2097

A comparison of the work force participation of Cherthala with the surrounding local bodies is given in table 8.2. and that with other urban local bodies is given in Table 8.3. from tables it is seen that the work participation of females in cherthala town is very high when compared to the other urban local bodies of the district. Comparing with the neighbouring local bodies, the percentage of females in the working population is low.

8.2. Work Participation Rate

The work participation rate of Alappuzha district (37.8%) is higher than that of the state (34.78%) in 2011. The WPR of Cherthala town is 43.58%. *Fig.8.3* shows the comparison of the WPR with that of district and state. It is seen that town has high WPR compared to District and State.

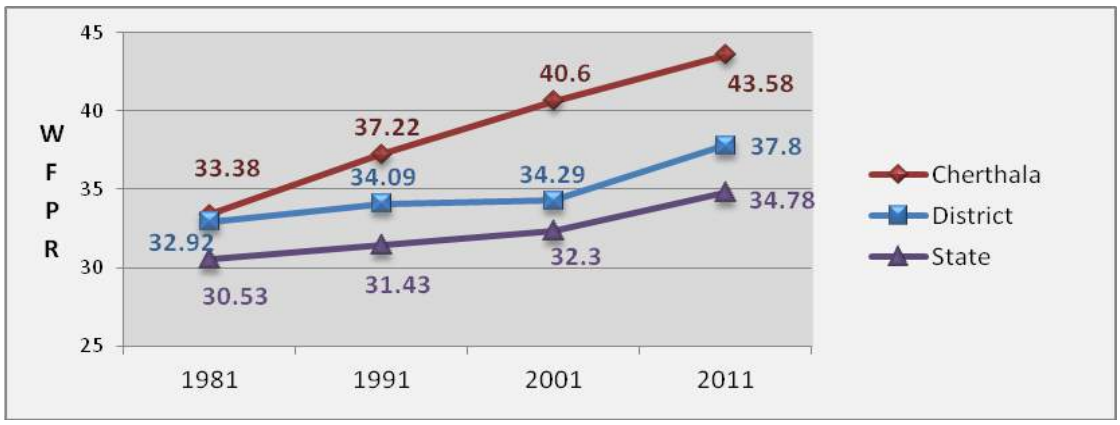


Fig 8.3 Comparison of WPR with district and state

Source: Derived from Census data

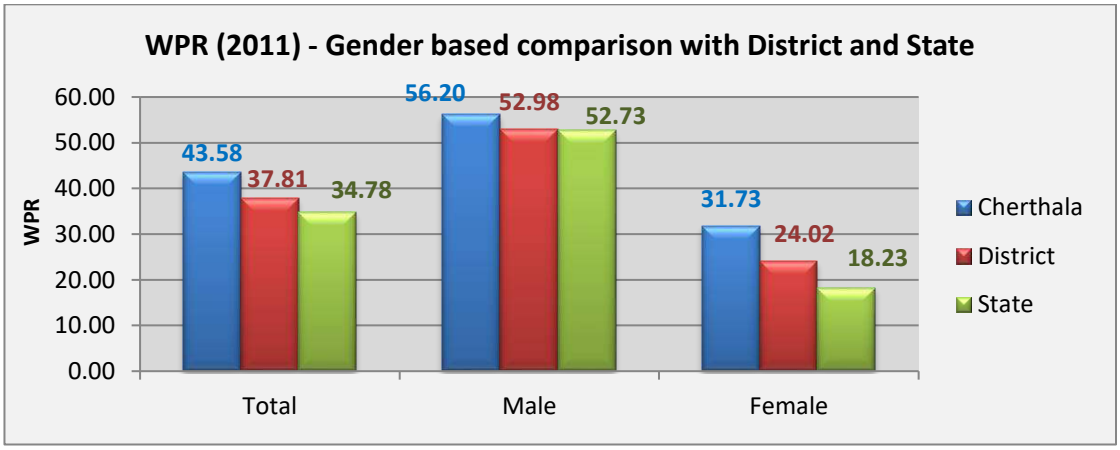


Fig 8.4 Gender based Comparison of WPR with district and state

Source: Derived from Census data

Cherthala has a high WPR than that of District and State in case of male workers and female workers. Female work participation rate of Cherthala town is 31.73 which is far high compared to the district average of 24.02 and state average of 18.23.

WPR value of Cherthala town is highest compared to other urban local bodies but lower when compared to the nearby local bodies. Comparison of WPR of Cherthala town with other urban local bodies and adjacent local bodies is shown in *Fig.8.5, and 8.6* respectively. Female WPR of Cherthala town is very high when compared to other urban local bodies of the district. Comparing with the adjacent local bodies work participation rate of female

workers is low. Kadakkarappally gramapanchayth is aving the highest WPR among the neighbouring local bodies.

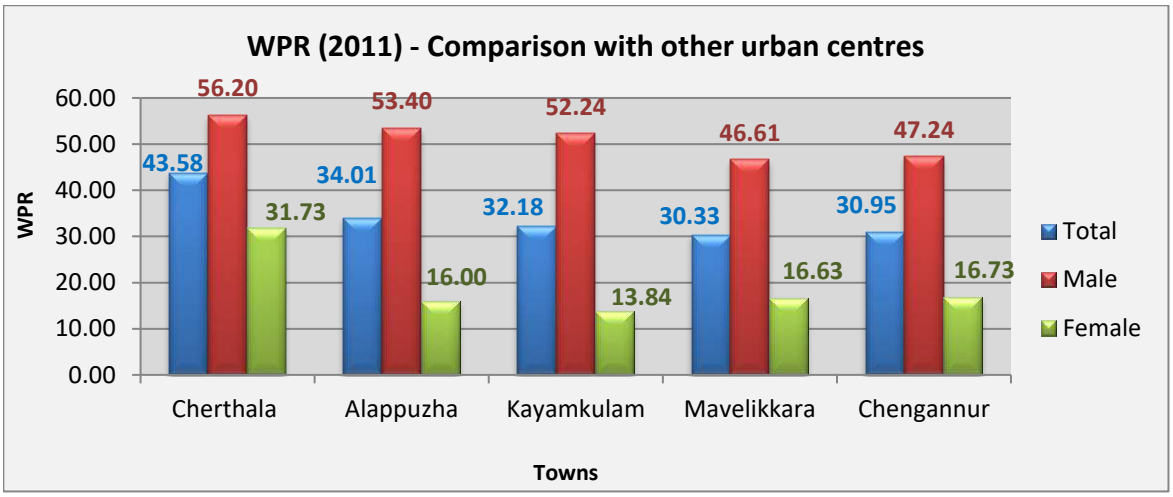


Fig 8.5 Comparison of WPR with other urban local bodies

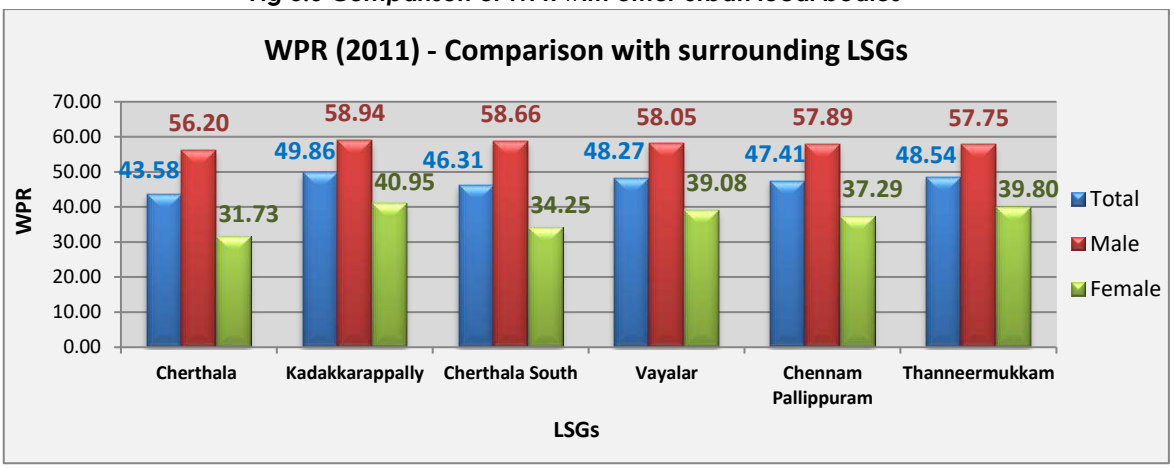


Fig 8.6 Comparison of WPR with surrounding local bodies

Source: Derived from Census data

Higher employment opportunities for skilled and unskilled labourers in Kochi region is one of the main reason for the higher WPR in Cherthala and surrounding LSGs. Higher participation of female workers in coir related industries and better performance of kudumbasree units in the region also added WPR in the locality.

A comparison of the work force participation in the house hold industrial sector of Cherthala with the surrounding local bodies is given in table 8.4 .

Table 8.4 Comparison of work participation of house hold industrial sector with surrounding local bodies

Local Self Governments	HHI Workers (Total)	HHI Workers (M)	HHI Workers (F)
Cherthala (M)	1022	376	646
Kadakkarappally	623	288	335
Cherthala South (Part)	539	252	287
Vayalar (CT)	1107	368	739
Pallippuram (CT)	862	222	640
Thanneermukkam (CT)	1483	598	885

The table clearly depicts the importance of House Hold industries in Cherthala and it is also revealed that the female work participation is more in the House hold industrial sector.

Table 8.5 shows the comparison of the work participation of Cherthala in the household industrial sector with other Urban Local Bodies. The work participation in this sector is seen to be more in Cherthala. The female work participation rate is also higher. This may be the reason for high work participation rate of Cherthala when compared to the other urban local bodies, including Alappuzha.

Table 8.5 *Comparison of work participation of house hold industrial sector with other urban local bodies*

Towns	HHI Workers (Total)	HHI Workers (M)	HHI Workers (F)
Cherthala (M)	1022	376	646
Kayamkulam (M)	815	530	285
Chengannur (M)	193	144	49
Mavelikkara (M)	199	151	48
Alappuzha (M)	1010	773	237

Regional setting of the town, as revealed from the District Urbanisation Report, shows that the Cherthala town and surrounding region are characterized by high value for work participation rate. Concentration of House hold industrial workers and other workers are conspicuously high in this region. The female work participation is more in this sector. In contrast, the concentration of Cultivators and Agricultural labourers are low in this region. The reason may be attributed to the presence of coir industry in the region as well as the fisheries related activities in the region blessed with back waters. Another aspect, to be taken into account is the nearness to Kochi, the commercial capital of the state.

8.3. Occupational structure

As per census 2011, the main workers are classified into four categories viz. cultivators, agricultural labourers, household industrial workers and other workers. The number of workers in each category is shown in *Table 8.6* and its variation is shown in *Fig 8.7*.

Table 8.6 Decadal variation of main workers

Year	1981	1991	2001	2011
Cultivators	201	444	100	96
Agricultural Labourers	340	963	353	295
HH industrial workers	1361	3204	1681	1412
Other workers	8638	10124	16178	18169

Source: Derived from Census data

Majority of the workers are coming under 'Others' category and their number is increasing at a constant rate. The number of Agricultural labourers is showing a sudden decline after 1991. This is due to the weakening of agricultural sector. Agricultural labourers and Cultivators constitute only 1.96% of the total workers as per 2011 census, where as other workers forms about 90.97% of total workers. This shows an inclination of people towards service sector. In the case of Alappuzha district the share of other workers is 83.49% and Agricultural labourers and Cultivators is approximately 12.05% of total workers. Household industrial workers in the Municipal area constitute 7.07% of the total workforce which is higher than the district average of 4.46%.

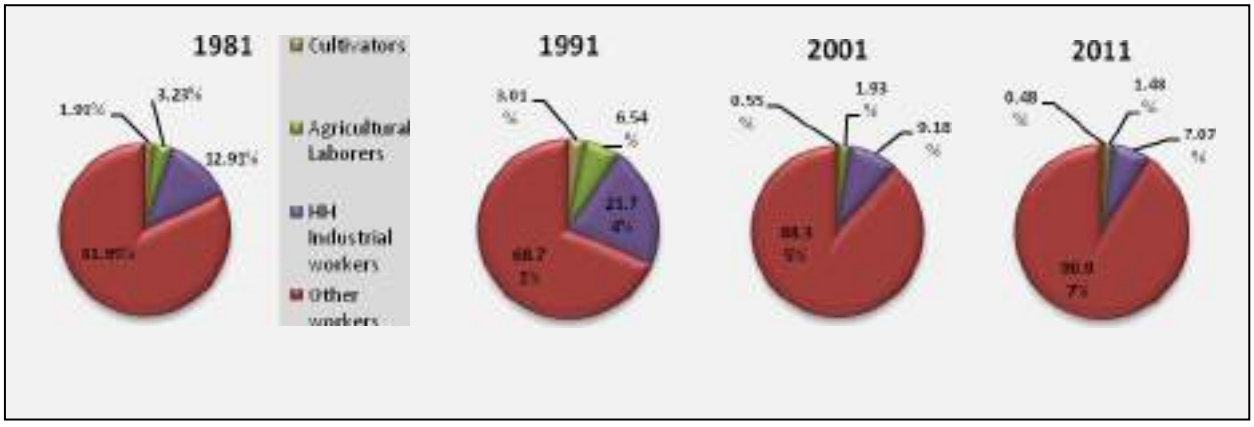


Fig 8.7 Decadal variation of workers

Source: Derived from Census data

As per the four fold classification as given in figure 8.7, the cultivators, agricultural laborers & House Hold Industrial workers, show a decreasing trend over the years. Whereas the other workers show an increasing trend. The disparity shown in the chart for the year 1991 may be due to differences in classification and this trend is seen all over Kerala.

Workers are also classified into Primary, Secondary and Tertiary workers. The workers in others category can be considered as tertiary workers, therefore the increase in the total number of workers is due to an increase in the number of tertiary workers. From Socio economic survey analysis it was found that majority of workers are engaged in Tertiary sector work. The percentage of workers as per the outcomes of the survey is shown in *Fig. 8.8.*

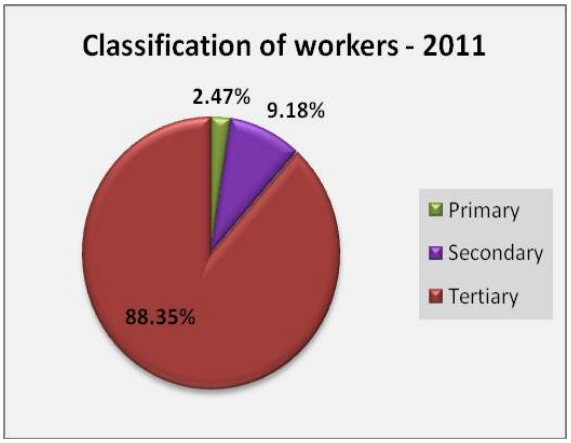


Fig 8.8 Classification of workers

Source: Socio economic survey conducted in connection with the preparation of the master plan



Fig 8.9 Concentration pattern of cultivators

8.4. Spatial distribution

Fig 8.9 & 8.10 gives the ward wise concentration of cultivators and agricultural labourers. The maximum concentration of cultivators is seen in the ward numbers (30,24,22,32) (of Muttom Bazar, St.Martin, Mini Market and Kuttikkatt) and agriculture labourers are mostly concentrated in the ward numbers (26 &24) of Vallayil and St.Martin).



Fig 8.10 Concentration pattern of Agricultural labourers

From the maps it can be seen that both the category of workers are concentrated within the same or nearby wards and is distributed mainly on the western side of the Highway. The distribution of agriculture land as obtained from land use survey is shown in *Figure 8.11*

From the Spatial Distribution of Agricultural landuse shown in fig 8.11, it is evident that the majority of paddy lands, paddy lands without cultivation and lands under dry cultivation are distributed towards the western side of the railway line.

Figure 8.12 & 8.13 gives the ward wise concentration of household industrial workers and other workers respectively. House hold industrial constitute to about 7.07% of the total

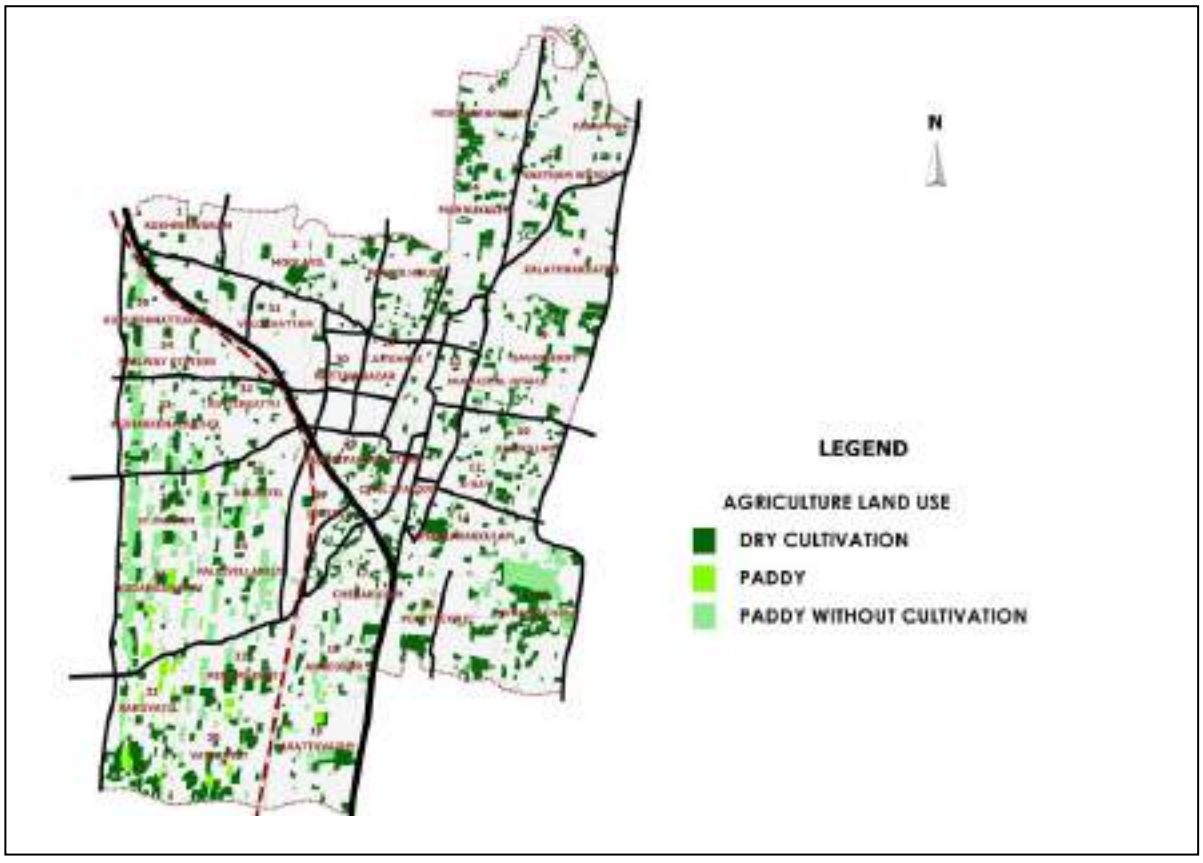
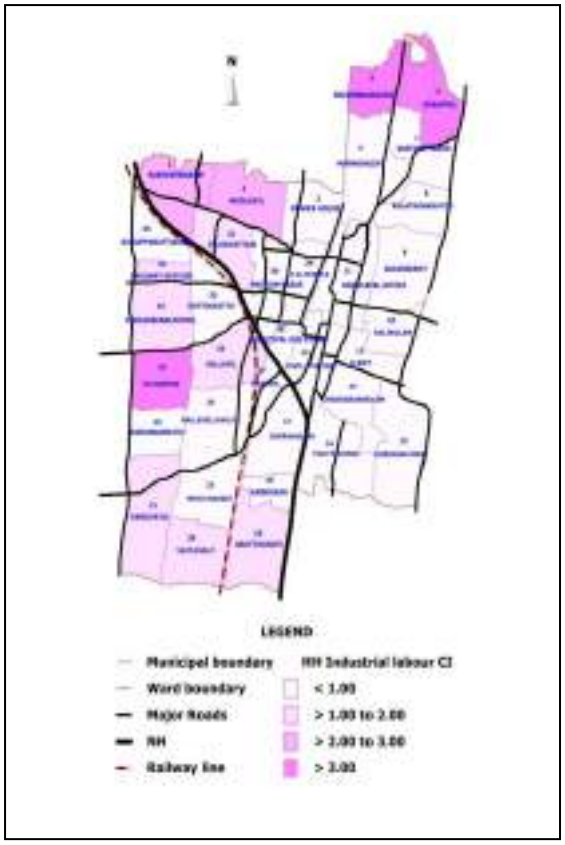


Fig. 8.11 Spatial distribution of Agricultural land use



workers. Their concentration is more in the wards of Nedumbrakkad, Parappel, St.Martin, Shaktheeswaram and Moolayil. The concentration index shows the concentration of house hold industries more near water bodies. This is due to the fact that the major house hold industry in the town is coir or coir related industries. However, the industry shows a declining trend. From 9.10% in 2001 the share of House Hold industrial workers reduced to 7.07% in 2011. Though always coir is mentioned as uniqueness to Alappuzha, this coir comes from Cherthala. The concentration index of other workers is greater than 1 in almost all the wards.

Fig 8.12 Concentration pattern of Household Industrial labourers



Fig 8.13 Concentration pattern of other labourers

8.5. Inference

The Work Participation Rate (WPR) of Cherthala town is very high compared to the WPR of the District and the state. But the surrounding LSGs of the town have even high values of WPR. From the analysis of decadal variation in Work Participation Rate it is understood that the WPR is increasing over the years. In other words, more job opportunities are available for the residents of Cherthala Town.

The backbone of the economy of any region shall be the production sector. However, the analysis of the occupational structure of the town shows a declining trend of growth in agricultural and industrial sectors. The service sector which supplements the production sector shows growth. The house hold industrial workers constitute to about 7.07 % of the total workers. A study on the concentration Index and the type of industries show that the major household industry in the town is the coir/coir related industry. As this is unique to Cherthala, promoting coir related industries need serious consideration as this will contribute greatly to the economy of the region and furthermore, for sustainable development, empowerment of women is a must and as the work participation of women is high in this sector, strengthening this uniqueness will definitely lead to a more sustainable development. As far as the primary sector is considered, large parcels of uncultivated paddy are present in the town. As large chunks of uncultivated paddy land and agricultural land are present in the area, suitable proposals may be provided in these locations, which can promote agricultural production sector, which will in turn strengthen the economy of the town. *The economic base of the town is analysed in detail in the coming chapter.*

Chapter-9

Landuse

Land and use thereon form a major determinant in spatial planning. The entire process of planning is focused finally at preservation or regulated change in landuse of the constituent parcel of land in the area for which planning is conceived. To understand the existing situation and to plan for the future, the exact share of the land to which each of the predominant activity (use) such as agriculture, residential, commercial, etc, are put to, has to be determined. The analysis of the existing landuse is inevitable in understanding the predominant economic activities of an area and the availability of land for future economic activities.

Land undergoes tremendous transformation due to urban sprawl, industrialization, and agriculturalization even though the impacts of these have varying effects. The changes in landuse affect the ecosystem in terms of land cover, land quality and capability, weather and climate, quantity of land that can be sustained and in short the whole population and socio-economic determinants.

9.1. General Analysis of Existing land use

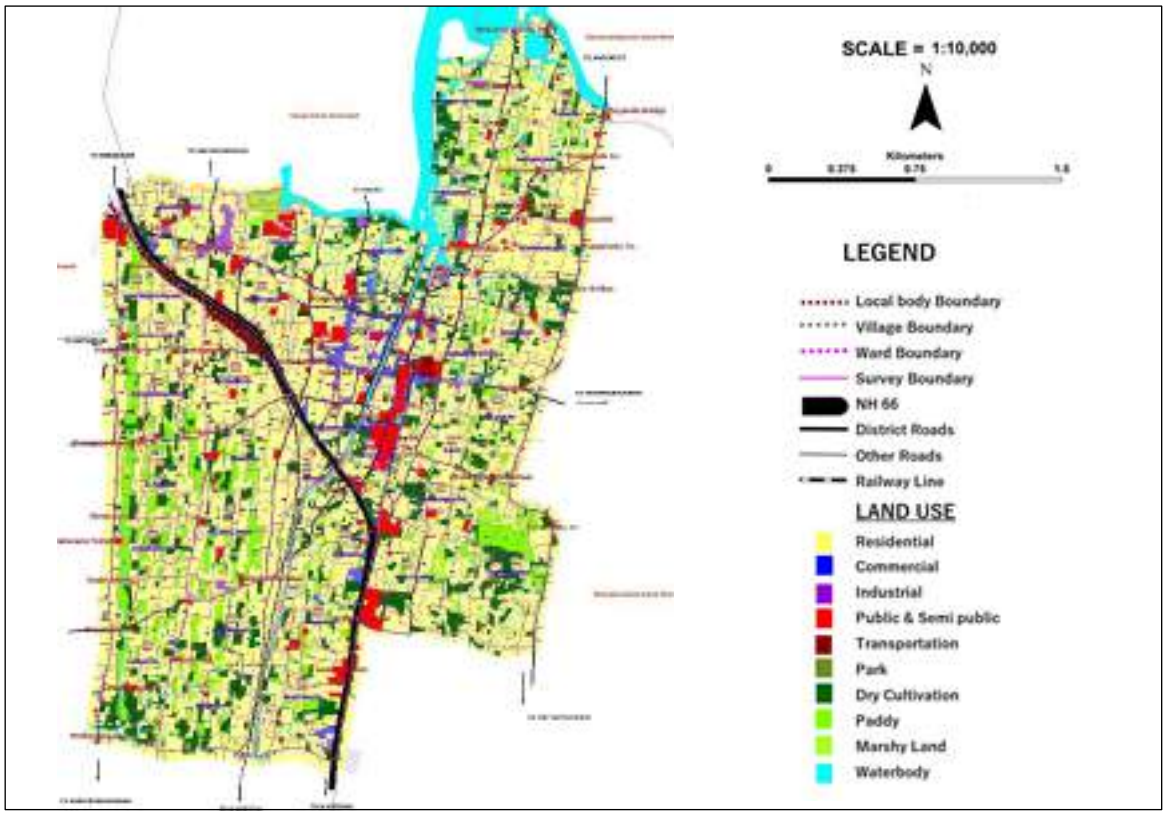


Fig. 9.1. Existing landuse map

While studying the Existing Land use pattern of the town it is seen that the major share of the geographical area is covered by residential area, with an area of 1071.43 hectares. And it constitutes about 60.25% of the total town area. The existing land use map of Cherthala town is shown in *Fig.9.1*; the land use break up in terms of percentage is shown in *Fig.9.2*; the land use break up in terms of area as well as percentage with respect to total area is given in *Table 9.1*.

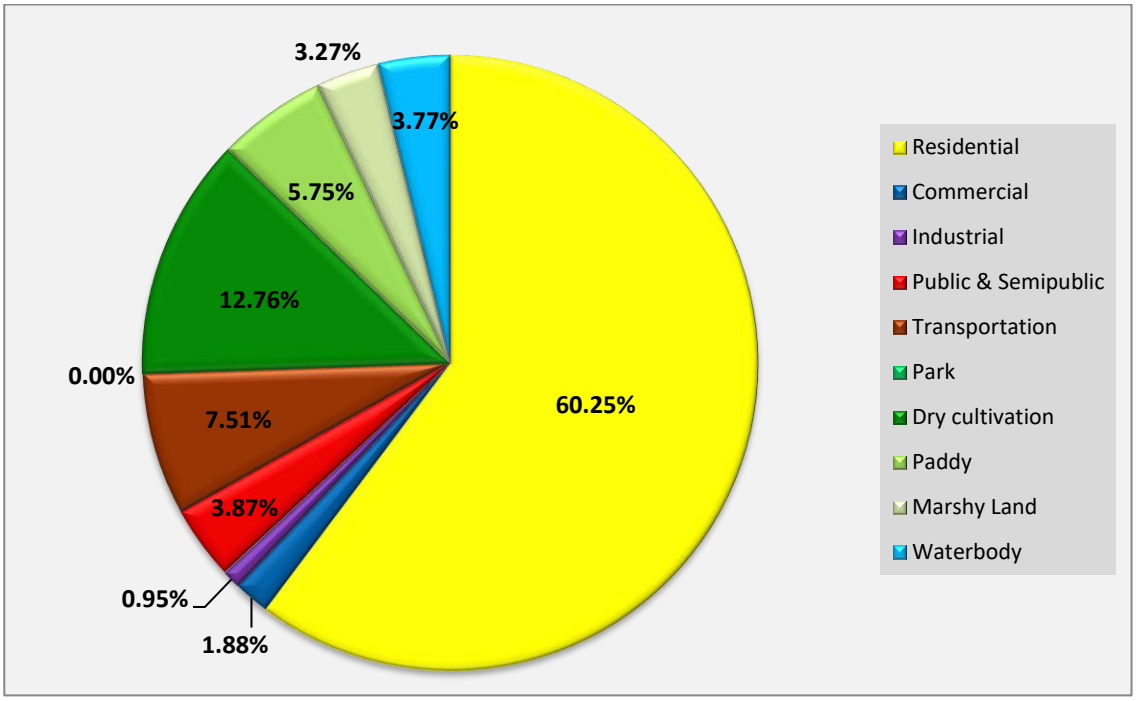


Fig. 9.2 Existing landuse breakup 2013

Table. 9.1 Landuse breakup of CherthalaTown

Landuse	Area (Ha)		% of Total area	
	1990	2013	1990	2013
Residential	1440	1071.43	80.18	60.25
Commercial	10.43	33.35	0.58	1.88
Industrial	7.42	16.90	0.41	0.95
Public & Semipublic	25.8	68.80	1.44	3.87
Transportation	68.8	133.56	3.83	7.51
Park	1	0.02	0.06	0.00
Dry cultivation		226.84		12.76
Paddy	182.46	102.24	10.16	5.75
Marshy Land		58.23		3.27
Waterbody	59.94	66.96	3.34	3.77

The total extent of land coming under agriculture use is 329.08 hectares which accounts 18.51% of the total town area. Of which 12.76% is under dry cultivation and only 5.75% of agriculture land is coming under the category of paddy land. Paddy fields are located mostly on the western parts of the town. Currently majority of the fields are not under paddy cultivation.

The transportation use of the town mainly consists of roads and terminal areas. 133.56 hectares of land is coming under transportation use, which is about7.51% of the total town area.

Majority of the Public & Semi-public use areas like Government offices, educational institutions, shopping malls, religious centres etc. are seen along the NH and the eastern side near the Bus stand and it constitutes to about 3.87% of the total land use.

66.96 hectares of land in the town are water bodies, which forms about 3.77% of the town area. The town lacks park and open spaces, which need keen attention while planning, as parks are essential part of any town for social interaction and development. Marshy land constitutes about 3.27% of the whole area (58.23 hecters).

Commercial centres in the town constitute only 1.88% of the town and its area is about 33.35hectares. They are concentrated mainly near bus stand area and along the transport corridors. Eventhough there are many industries in Alappuzha town, only 0.95% of Cherthala town is coming under industrial use (16.90 hectares).

A comparison of the existing landuse of 1990 with that of 2013 gives the following inferences. The area under residential use has decreased from 80.18% to 60.25%. In 1990, the dry cultivation landuse was included in residential landuse area. But in 2013, the dry cultivation area is separated from residential landuse. This may be the reason for decrease in residential use.The commercial activities have increased from 0.58% to 1.88%. Industrial activities also increased from 0.41% to 0.95%. Paddy field area has shown a significant decline from 10.16% to 5.75% which shows the tendency of land reclamation.The area of water courses has slightly increased from 3.34% to 3.77%. This is due to the water bodies in the land area added to the existing Municipal land. Area under transportation has increased from 3.83% to 7.51%. The table and figures show that the major land use is residential which covers 60.25% of the municipal area. The second major land use is dry cultivation covering about 12.76%. *Table* 9.2 shows the ward wise distribution of different types of land uses.

Table. 9.2 Ward wise distribution of landuse-2013

WARD No	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	PUBLIC & SEMI PUBLIC	TRANSPOR-TATION	AGRICULT-URE	WATER BODIES	TOTAL
1	41.400	0.890	6.630	1.569	7.150	5.440	1.175	64.254
2	34.000	0.210	0.412	4.244	1.865	13.580	1.753	56.064
3	25.900	1.770	1.100	1.730	1.850	9.740	3.433	45.523
4	38.000	0.312	0.750	2.394	2.501	15.260	12.934	72.151
5	44.200	0.058	2.075	0.420	2.240	9.950	4.895	63.838
6	21.500	0.187	0.168	0.351	2.031	7.400	1.631	33.268
7	32.400	0.256	0.170	2.255	3.492	10.090	1.430	50.093
8	34.300	0.163	0.040	0.859	1.989	2.290	0.669	40.31
9	41.500	0.602	0.341	1.194	3.169	17.920	3.569	68.295
10	21.700	0.303	0.081	0.168	2.309	8.890	0.346	33.797
11	37.100	7.420	0.362	7.570	8.584	9.750	3.027	73.813
12	24.700	0.611	0.083	0.489	2.299	6.440	0.379	35.001
13	18.400	1.720	0.153	10.126	2.960	6.430	0.985	40.774
14	30.200	0.260	0.080	1.652	2.629	9.670	0.752	45.243
15	42.200	0.061	0.138	0.444	3.088	32.130	1.836	79.897
16	40.900	0.375	0.017	8.555	3.625	16.780	1.060	71.312
17	41.400	2.396	0.372	0.702	8.558	14.650	3.098	71.176
18	12.500	0.207	0.000	1.180	2.297	5.500	0.410	22.094
19	45.200	1.530	1.020	3.346	6.206	11.510	2.506	71.318
20	33.100	0.070	0.458	0.100	3.726	18.430	0.839	56.723
21	45.900	0.500	0.064	1.249	4.789	27.180	2.415	82.097
22	37.700	0.175	0.019	0.502	4.388	14.350	0.096	57.23
23	18.700	0.154	0.054	0.468	2.009	14.800	0.365	36.55
24	26.400	0.147	0.006	0.093	2.327	20.860	0.344	50.177
25	36.400	0.079	0.919	1.106	1.950	15.570	0.638	56.662
26	35.200	0.079	0.240	1.480	4.757	13.580	0.658	55.994
27	17.100	0.082	0.000	0.314	1.680	1.150	0.076	20.402
28	12.800	1.911	0.152	1.283	3.845	3.020	1.702	24.713
29	13.700	5.616	0.246	1.532	3.077	1.760	1.720	27.651
30	32.900	3.924	0.316	4.663	6.111	2.090	0.514	50.518
31	31.400	0.710	0.128	3.050	5.454	3.620	0.627	44.989
32	33.500	0.230	0.017	0.989	11.380	6.270	0.194	52.58
33	35.700	0.083	0.042	0.906	2.184	19.480	0.455	58.85
34	11.700	0.101	0.214	0.405	1.143	3.170	0.156	16.889
35	22.600	0.126	0.014	1.330	5.953	8.320	0.180	38.523
Total	1072.300	33.318	16.880	68.718	133.615	384.070	56.867	

Source: Landuse survey -2013 conducted by Department of Town and Country Planning

9.2. Land use concentration pattern

In order to arrive at a reasonable picture of the distribution of the various landuses and their intensities, and to compare these on a platform, the concept of concentration index is made use of. The concentration index helps in evaluating the relative intensities of various landuse among the various local governments in the district.

Concentration index is an index of the concentration of a particular activity/landuse in the area under consideration to that under a larger area. The concentration pattern of a landuse gives a clear picture on the relative intensity and concentration of the particular landuse among the wards within the town. Ward with Concentration Index greater than one indicates that the intensity of the landuse under consideration is on the higher side in the ward when compared to other wards in the district.

Table. 9.3 Ward wise concentration index of landuse-2013

Land use Concentration Index								
Ward no	**Residential**	**Commercial**	**Industrial**	**Public**	**Agricultural**	**Park**	**Transportation**	**Water bodies**
1	0.92	0.41	6.95	0.29	2.97	0	1.14	3.61
2	1.01	0.14	0.56	1.05	0.99	0	3.95	4.51
3	0.94	1.42	1.89	0.53	0.87	0	0.49	1.75
4	0.87	0.16	0.82	0.46	0.86	0	0.41	4.18
5	1.15	0.03	2.46	0.09	0.63	0	0.41	1.8
6	1.07	0.11	0.47	0.15	0.93	0	0.71	1.12
7	1.07	0.15	0.31	0.62	0.82	0	0.83	0.66
8	1.41	0.15	0.19	0.29	0.23	0	0.56	0.41
9	1.01	0.33	0.35	0.24	1.07	0	0.56	1.23
10	1.06	0.34	0.23	0.07	1.06	0	0.81	0.21
11	0.83	3.81	0.43	1.43	0.54	0	1.36	0.95
12	1.17	0.65	0.22	0.19	0.75	0	0.78	0.27
13	0.75	1.6	0.39	3.43	0.64	0	0.84	0.52
14	1.11	0.22	0.17	0.49	0.86	0	0.68	0.36
15	0.88	0.03	0.1	0.08	1.64	0	0.46	0.53
16	0.95	0.21	0.11	1.67	0.96	12.46	0.6	0.36
17	0.97	1.28	0.44	0.14	0.84	0	1.43	1.02
18	0.94	0.34	0	0.75	1.01	0	1.23	0.42
19	1.05	8.17	1.1	0.66	0.61	0	1.03	0.82
20	0.97	0.07	0.69	0.02	1.24	0	0.77	0.33
21	0.93	0.23	0.57	0.39	1.04	0	0.69	0.68
22	1.09	0.13	0.14	0.12	0.96	0	0.91	0.04
23	0.85	0.21	0.22	17.45	1.47	0	0.65	0.26
24	0.87	0.08	0.16	0.03	1.66	0	0.54	0.14
25	1.07	0.07	1.25	0.27	1.1	0	0.4	0.25
26	1.04	0.07	0.28	3.67	0.99	0	1	0.29
27	1.38	0.19	0	0.2	3.44	0	0.93	0.11
28	0.86	2.93	0.64	0.67	0.5	0	1.82	1.61
29	0.82	7.72	0.57	0.75	0.27	0	1.33	1.44
30	1.08	2.94	0.47	1.29	0.17	17.62	1.43	0.23
31	1.16	0.59	0.17	0.95	0.33	0	1.45	0.31
32	1.06	0.14	0.15	0.24	0.49	0	2.57	0.09
33	1.01	0.06	0.13	0.21	1.22	0	0.44	0.2
34	1.15	0.23	0.94	0.33	0.61	0	0.78	0.28
35	0.98	0.1	0.2	0.47	0.72	0	1.82	0.12

Using the above concept, concentration indices of major categories of landuse (Water Bodies, Marshy Land, Residential, Agriculture, Resi/Agri Mix, Other built up landuse and others) are analysed.

Table 9.3 shows the land use concentration index of various types of land uses, ward wise. This concentration of major categories of land uses (residential, commercial, industrial, public and semi-public and agricultural) are studied and details of distribution of other land uses are discussed in detail in the following paragraphs.

9.2. A. Residential

Residential land use constitutes 60.25% of the municipal area. Its distribution is shown in *Fig* 9.3.

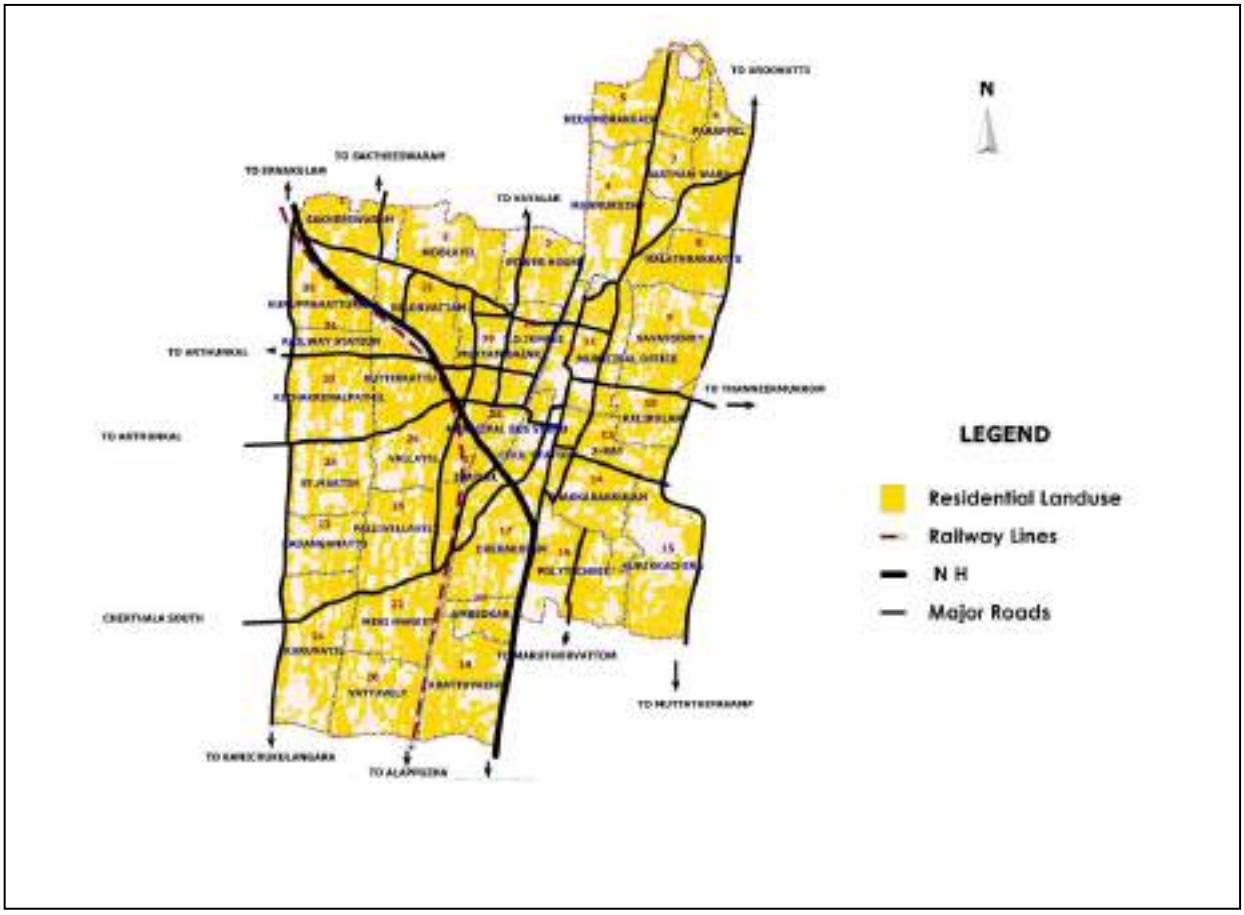


Fig. 9.3 Spatial distribution of residential landuse

The density in the already developed residential areas is not high providing scope for accommodating more population. The land value poses restriction on this forcing people to seek other options such as shifting to the dry agriculture lands or to nearby LSGs. The concentration index of residential land use is shown in *Fig.* 9.4.Higher concentration of residential landuse is seen in Kalatharakkad, Idathil wards. An analysis of the concentration

pattern of the residential use shows that most of the wards having CI>1.2 and CI>1, are a long the slide of major transport corridors. An overlay analysis of the concentration index of residential land use and concentration index of population density shows that Kalattarakkattu has the highest concentration index of residential land use and population. This may be due to the presence of a brewery at the marby LSG, and the laboureres in this brewery reside at Kalatharakkattu. Though, as per wardwise population distribution, rattavely (population 1751 to 2000) is one of the wards showing highest population concentration. The residential landuse is seen to be very low.

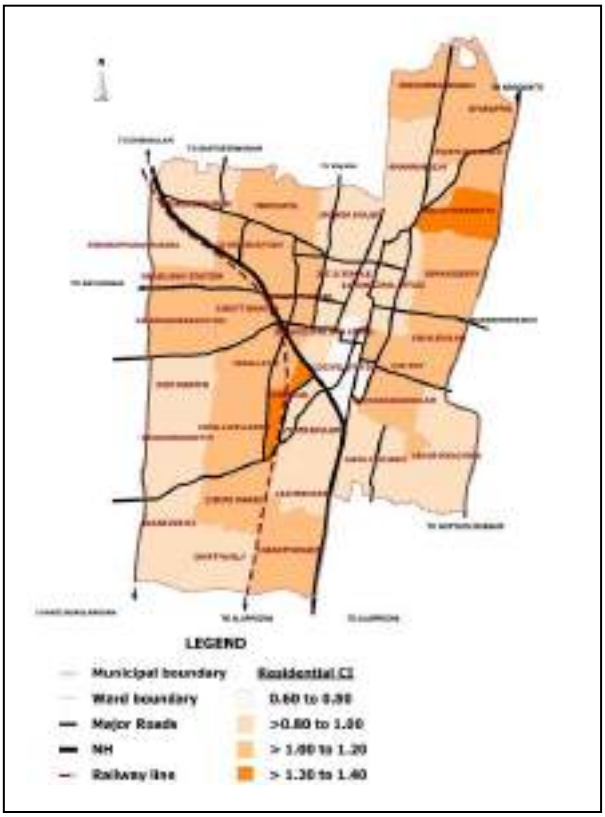


Fig. 9.4 Concentration pattern of Residential landuse

9.2. B. Commercial

Commercial area constitutes only 1.88% of the Municipal area, the spatial distribution of which is shown in *Fig.9.5*.

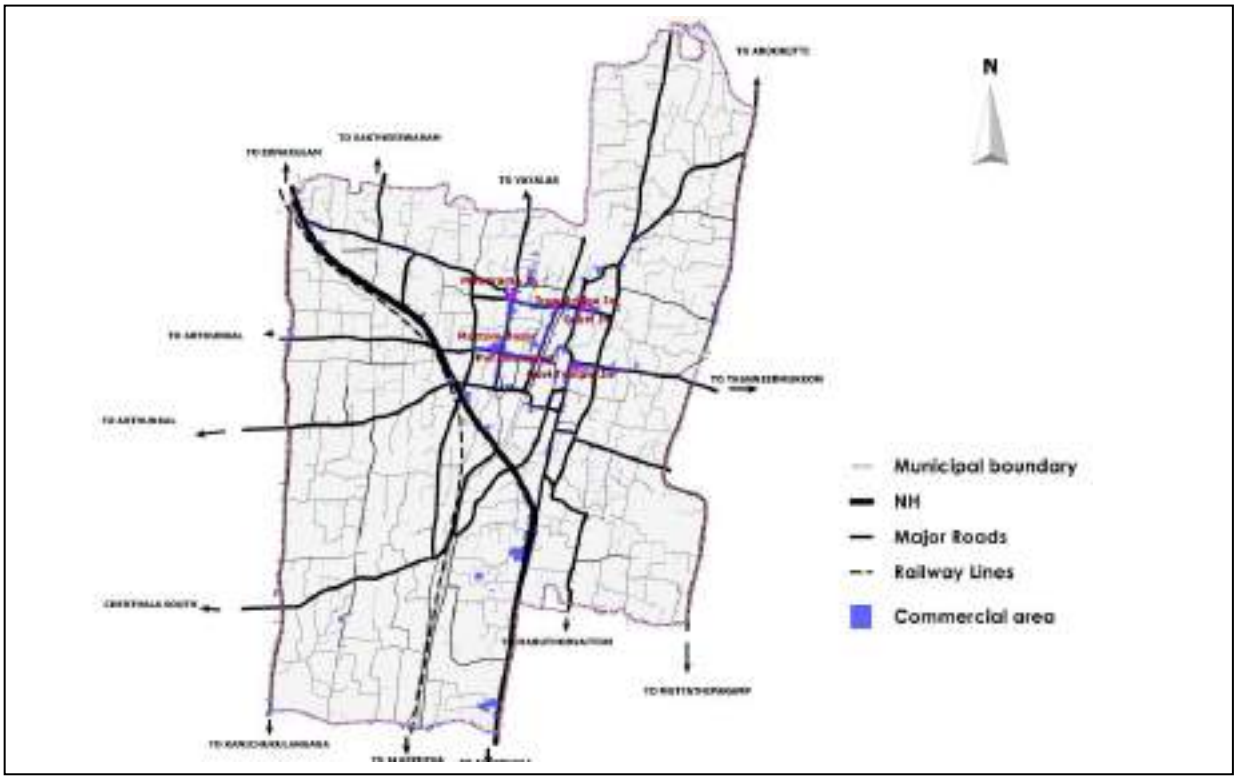


Fig. 9.5 Spatial distribution of Commercial landuse

The figure shows that the commercial nodes are concentrated in the central area of the town. Most important commercial nodes are Temple Junction, Court Jn, Muttam Bazar, Private Bus stand, Manorama Jn and Iron Bridge .The concentration pattern of commercial land use is shown in *Fig.*9.6.Some commercial establishments exist along the major travel corridors also.

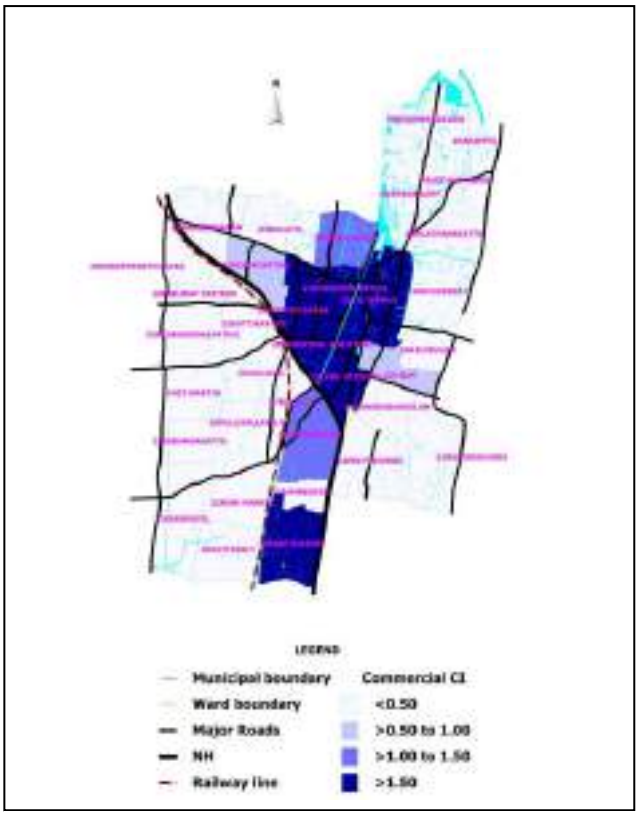


Fig. 9.6 Concentration pattern of Commercial landuse

9.2. C. Industrial



Fig. 9.7 Spatial distribution of industrial landuse

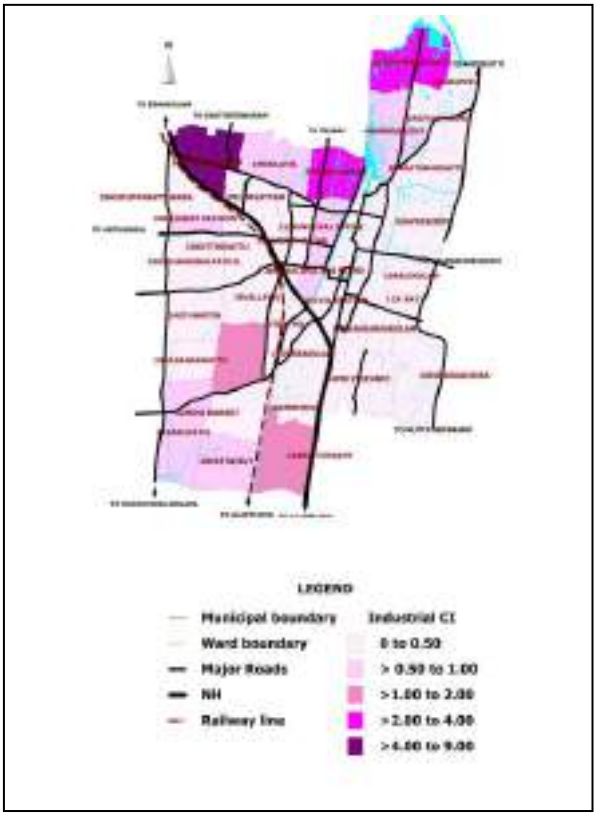


Fig. 9.8 Concentration pattern of industrial landuse

Industrial land constitutes only 0.95% of the Municipal area.There is no major industry in the town. But there are three medium industries and 24 small scale industries. In the town most of which are coir based. The spatial distribution of industrial land use and its concentration pattern are shown in *Fig 9.7 & 9.8* respectively.

The higher concentration in Saktheeswaram and Nedumbrakkad wards is due to the medium scale coir industries in these wards.

9.2. D. Public & Semi public



Fig. 9.9 Spatial distribution of public & semipublic landuse

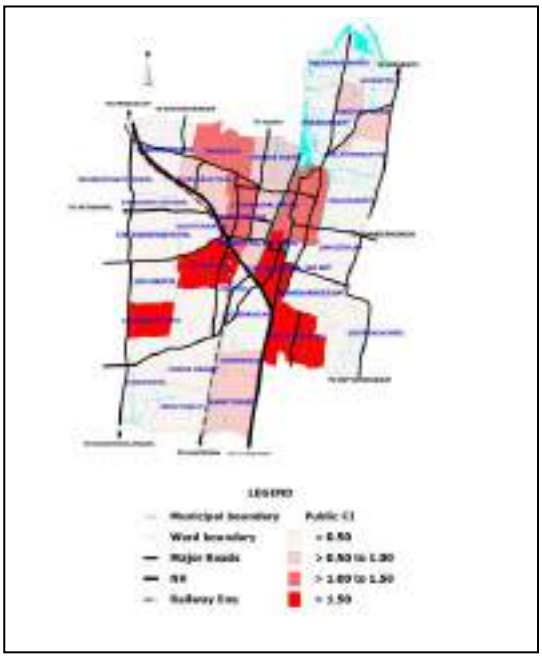


Fig. 9.10 Concentration pattern of public & semipublic landuse

Offices, educational institutions, hospitals and religious and cultural institutions are grouped under this category. There are a large number of government offices concentrated in the town centre including the civil station.

The total extent of land occupied by public and semi public use comes to 3.87% of the Municipal area. The spatial distribution of public and semi public use is shown in *Fig.*9.9 and its concentration pattern is shown in *Fig. 9.10*. The concentration is seen mostly along the major transportation corridor (NH 66)

9.2. E. Civic Amenities

Recreation includes Park & Open Spaces and the civic amenities include Stadium, open air theatre, community halls, Public libraries and cinema halls. But there is no stadium and open air theatre in the town. There is a municipal library and 2 cinema halls in the town.

9.2.F. Park and open spaces (Recreation)

There is no park and open space developed as such in Cherthala town at present. But there is an area of 0.02 hectares of land owned by municipality available near Govt. Polytechnic which was used as a recreational space but at present it is left abandoned.Locations of recreational facilities are shown in Figure 9.11.



Fig. 9.11 Location of Recreational facilities

9.2. G. Transportation

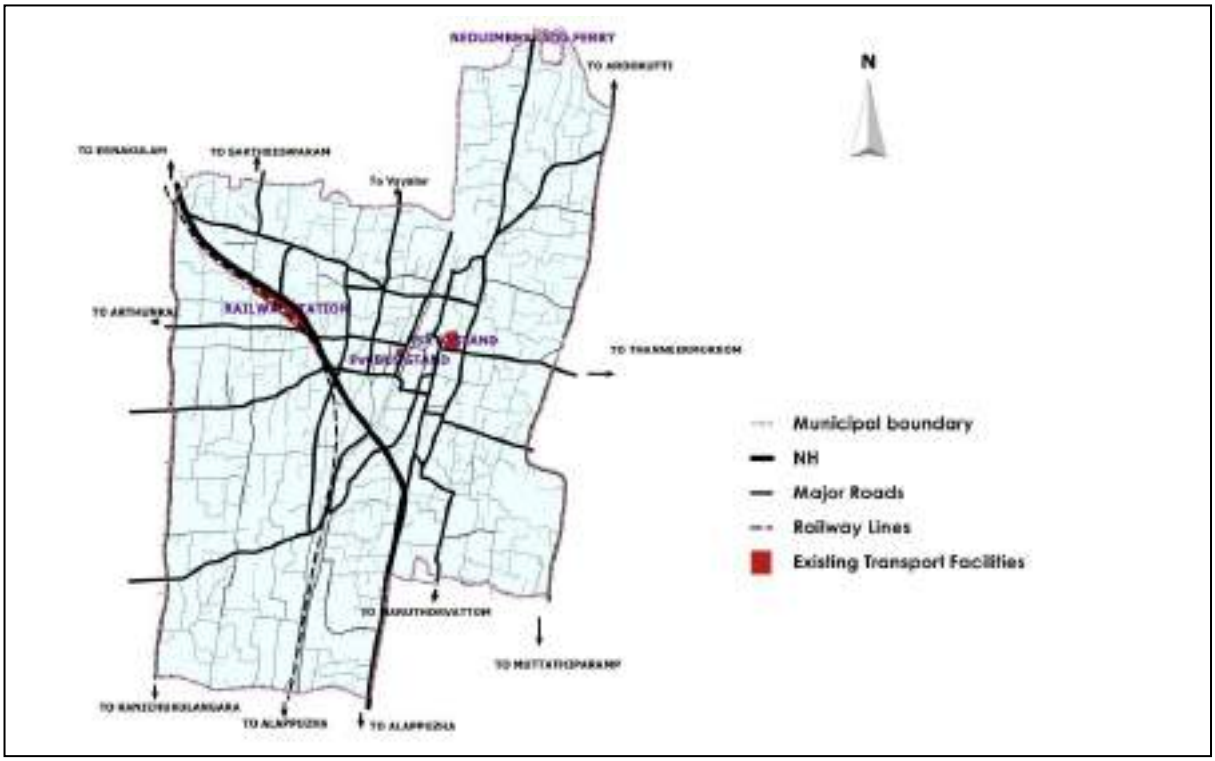


Fig. 9.12 Spatial distribution of Transportation facilities

The area covered by transportation network comes to 7.51% of the Municipal area.The study area is served by public transport system consisting of both State owned Kerala State Road Transport Corporation (KSRTC) and private buses. KSRTC runs inter-State and inter –District services. A bus station is located along the Kottayam road in the heart of Cherthala town, from where KSRTC buses are operated. There are fairly large numbers of private buses meeting the travel demand of Cherthala people and these are operated through a private bus stand located along Canal bund road near Muttam Bazar. Intermediate public transport modes (IPT) like auto, taxi are also serving the travel needs of Cherthala town.The spatial distribution of transport facilities is shown in *Fig. 9.12*.

9.2. H. Agricultural

Paddy field constitutes about 5.75% and Dry Land (mixed Crop and Coconut) constitutes 12.76% of Municipal Area.The paddy lands exist mainly in Kurikkachira, Karuvayil, Mini Market and Kadanganattu wards. The extent of paddy land comes to 102.24 Ha large parcels of paddy are left uncultivated.

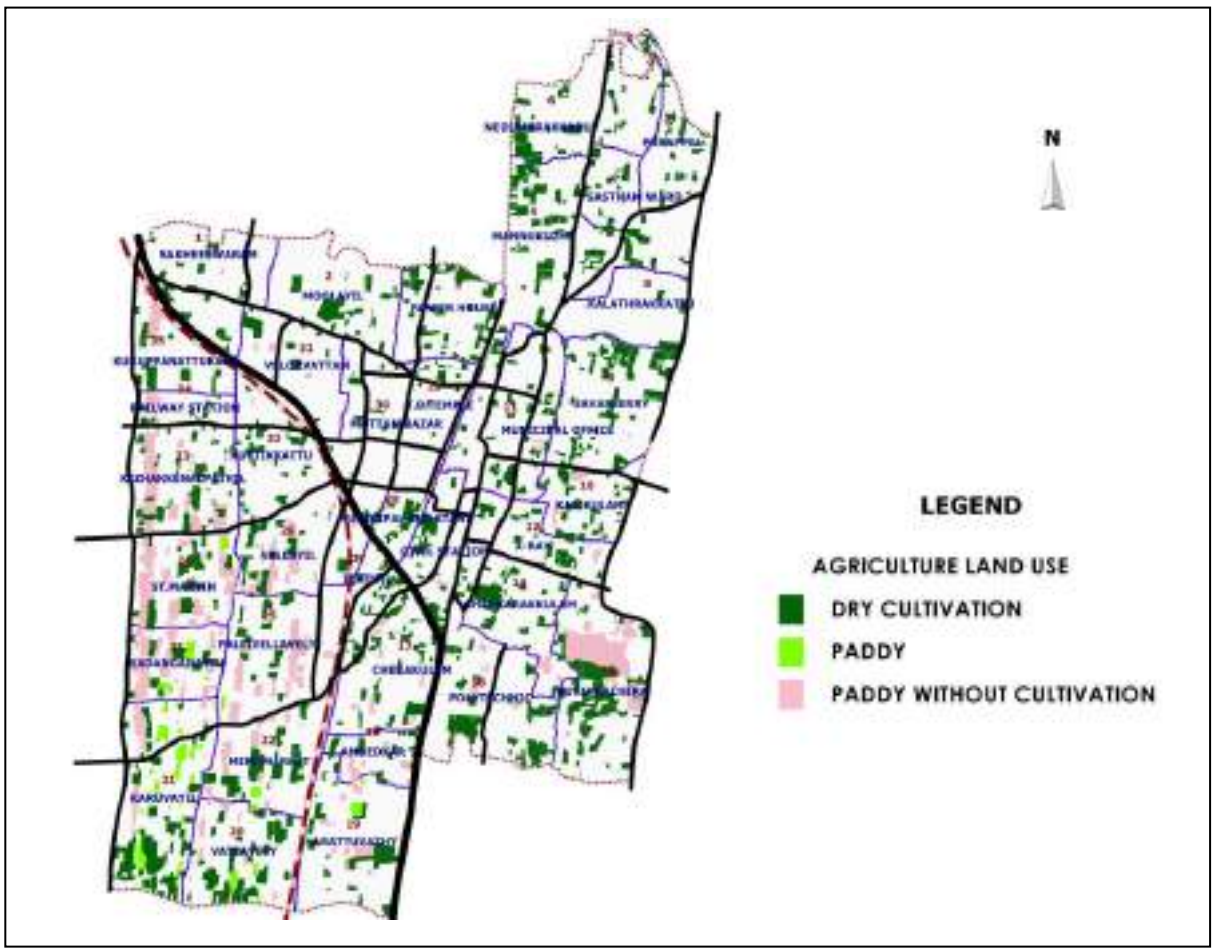


Fig. 9.13 Spatial distribution of Agricultural landuse

The spatial distribution and the concentration of agricultural lands are shown in *Fig. 9.13* and *9.14* respectively. Coming to the dry cultivation coconut is the most important crop in the town. Other agricultural activities includebanana, tapioca, vegetables, tuber crops, sesamum arecanut and other crops to a very limited extent.This constitutes 14.17% of the total agricultural area (source: Agricultural Department).

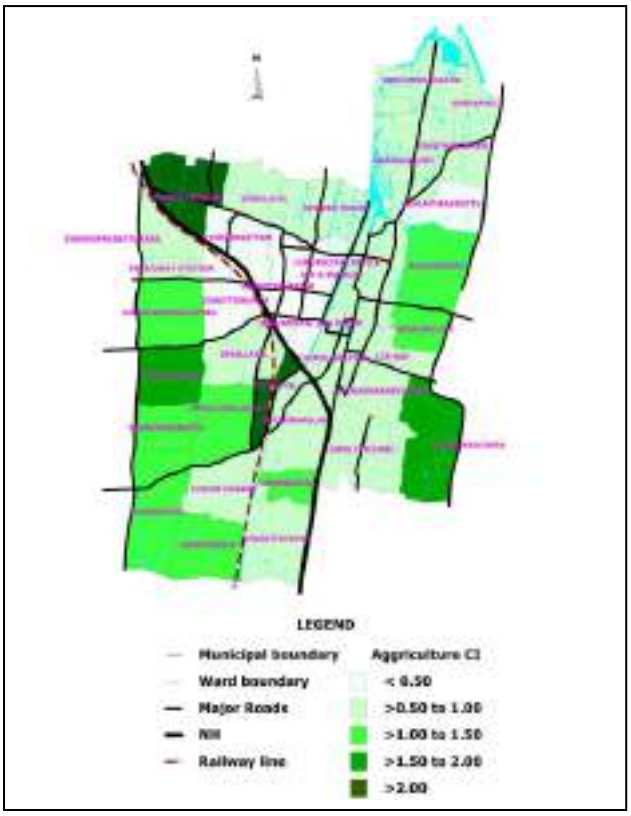


Fig. 9.14 Concentration pattern of Agricultural landuse

9.3. Comparison of existing landuse with Planning Standards

Comparison of existing landuse break up of planning area of Cherthala town with UDPFI guidelines has been made and is shown in the table 9.4.

Table 9.4 Existing landuse breakup

Sl.No.	Landuse	Area of existing landuse in sqkm	Landuse as per UDPFI in sqkm
A.	Developed area		
1	Residential	10.71	5.94 to 6.61
2	Commercial	0.33	0.26 to 0.4
3	Industrial	0.16	1.06 to 1.32
4	Public & Semipublic	0.68	0.79 to 1.06
5	Transportation	1.33	1.32 to 1.59
6	Park	0.0002	
B.			
7	Dry Cultivation	2.26	
8	Paddy	1.02	
9	Marshy Land	0.58	
10	Waterbody	0.67	

9.4. Functional character of wards

The function of a settlement is a derivative of the major activity in the settlement, be it primary activities (rural), secondary sector/tertiary activities (urban activities) or a combination of these. The activities in a settlement are interrelated with the landuse pattern. Here an attempt is made to determine the major function of a ward by studying the major land use and the average plot size of the ward.

It can be pucca urban area, pucca rural area or mixed (Residential cum agricultural) use area. The mixed land use area can be further classified into Urban, semi urban, semi rural or rural. When the total area of LSG is concerned, the predominance of wards of any of the four (urban, rural, semi-urban or semi-rural) characters determine the character of the area. While this holds good, certain other conditions, from the practical point of view, are also incorporated for refining the process of categorising the area. This is to account for the ground realities.

Table 9.5 Functional characters of wards

Ward No.	Name of Ward	Functional Character	Ward No.	Name of Ward	Functional Character
1	Mannukuzhy	Rural	19	Arattuvazhy	Urban
2	Saktheeswaram	Urban	20	Vattavely	Rural
3	Moolayil	Semiurban	21	Karuvayil	Rural
4	Power House	Semiurban	22	Mini Market	Semiurban
5	Nedumbrakkad	Semirural	23	Kattanganattu	Rural
6	Parappel	Semiurban	24	St.Martin	Rural
7	Sastham	Semiurban	25	Palluvallyvely	Semiurban
8	Kulatharakkad	Semiurban	26	Vallayil	Semiurban
9	Savassery	Semiurban	27	Edathil	Semiurban
10	Kalikulam	Semiurban	28	Municipal Bus stand	Urban
11	Municipal Office	Urban	29	T.D.Ambalam	Urban
12	X-Ray	Semiurban	30	Muttam Bazar	Urban
13	Civil Station	Urban	31	Velorvattam	Urban
14	Chakkarakkulam	Urban	32	Kuttikkat	Urban
15	Kurikkachira	Rural	33	Kizhakke Nalpathu	Rural
16	Polytechnic	Urban	34	Railway Station	Semiurban
17	Cherakulam	Urban	35	Kuruppanattukara	Urban
18	Ambedkar	Urban			

Analysis based on landuse and average plot sizes reveal that there are wards exhibiting, urban semi-urban, semi-rural or rural character. The functional character of all the settlements of the town as derived is shown in *Fig. 9.16.* As per this 14 wards show urban

character, other 13 wards show semi urban nature, 1 ward shows semi rural nature and 7 wards show rural character.

Saktheeswaram, Municipal Office, Civil Station, Chakkarakkulam, Polytechnic, Cherakulam, Ambedkar, Arattuvazhy, Municipal Bus stand, T D Ambalam, Muttam Bazar, Velorvattam, Kuttikkat and Kuruppanattukara are the wards which show urban character. In these wards the urban landuse is more predominant.

The ward which shows semi urban character are Moolayil, Power House, Parappel, Sastham, Kulatharakkad, Savasserry, Kalikulam, X- Ray, Mini Market, Palluvalltvely, Vallayil, Edathil and Railway Station.

Nedumbrakkad is the only ward showing semi rural nature. Mannukuzhy, Kurikkachira, Vattavely, Karuvayil, Kattanganattu, St. Martin and Kizhakkee Nalpath are the wards in the town which show rural character.

9.5. Inference

From the analysis of landuse it is observed that about 60.25% of the municipal area is used for residential activities.It is also observed that the commercial landuse is concentrated at the core of the town and along the major transportation corridors. There is no major industry in the town. But there are three medium industries and 24 small scale industries in the town most of which are coir based. The industrial landuse constitute only 0.95% of the municipal area. More than one third of the residential land in town has potential for dry land cultivation. Dry cultivation is predominant than paddy cultivation in Cherthala municipal area. From the studies it is observed that Cherthala town lacks parks and open space, which is an essential part of any town or city for its social development. As the population is showing an increasing trend it is necessary to provide sufficient parks and open spaces within the town for the recreational activities of the existing as well as future population. From the analysis is it revealed that the functional character of the town is urban.

Chapter-10

Economic Aspects

10. A TRADE AND COMMERCE

10. A.1 Present scenario

Cherthala town, with its good connections with major centers like Alappuzha, Kochi, Vaikom and Kottayam through road and waterways, serves a vast hinterland for trade and commerce. Cherthala town and surrounding region are mainly dominated by coir and coir products. There are so many coir factories within Cherthala taluk. Coir industries here are run under both private and cooperative sectors. Politically well-organised coir workers and availability of raw coir fibre are the basic resources of coir industry in Cherthala. Major portion of coir factories in Alappuzha district exists in this locality. Some of the major coir manufactures in Cherthala are TMMC group Cherthala, Travancore Cocotuft (P) Ltd, Koncherry Coir Exporters, Maithara Coir house, Loomcraft, Charangattu Mats and Coir, Shertallai Coir Cooperative Society, MC Mills, Kalavamkodam, COMET Exports, LORDS Exports etc.





Fig 10.A.1 Existing coir industries in town

Since Cherthala had been a collection centre for coir and coir products of the region, the commercial requirements of the hinterland were also met by Cherthala town. As a result, the town attracted commercial activities also, adding to the commercial importance of the town.

The commercial area in the town comes to 33.35 Ha of land concentrated in a linear agglomeration along Muttom Bazar road from Manorama Junction, to NH Bypass, old NH from Manorama junction to Taluk office junction and part of Arthunkal and Thanneermukkam road. The concentration is highest along the Muttom Bazar road. Wholesale commerce and trade are mainly concentrated in the Muttom Bazar area. Location of bus terminals has also influenced the development of certain commercial nodes. In Cherthala Town most of the

commercial nodes are characterized by inadequate space for efficient circulation of pedestrian and vehicular traffic.

10. A.2 Cherthala Town - Hierarchy in the district/State

Regional Setting studies revealed that, Cherthala town is a Second Order settlement in the district and the service area of Cherthala town when considered as second order settlement, extends to the entire northern portion of the district. In this respect, the hierarchy of settlements is derived using Cumulative Functional Index (CFI) method based on the number and type of facilities available viz:

1. Educational facilities
2. Health Facilities
3. Market
4. Facilities in Agriculture and allied sector
5. Physical infrastructure facilities
6. Transportation facilities

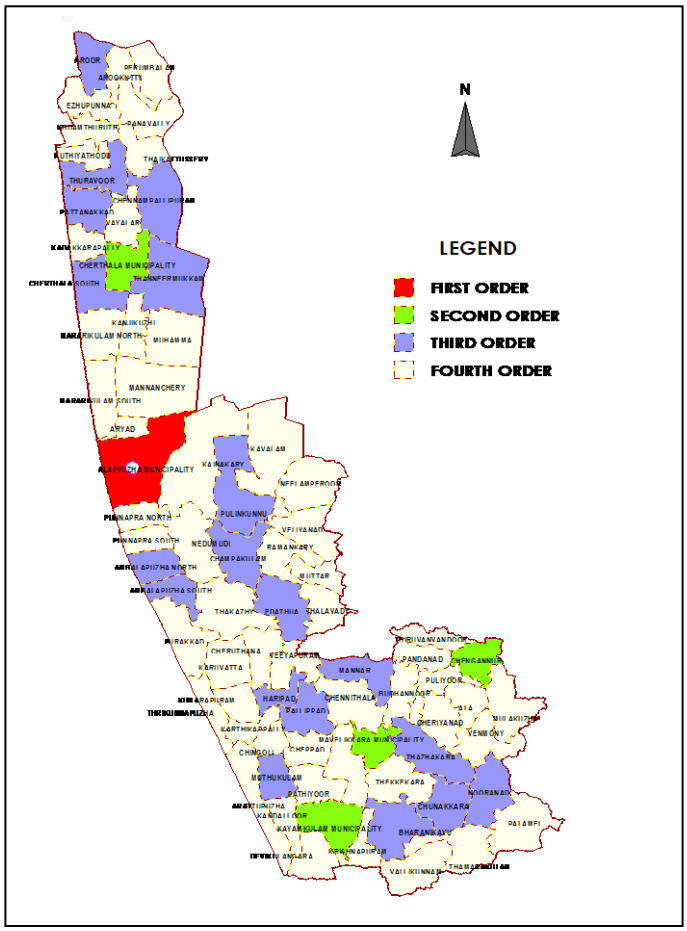


Fig 10.A.2 Hierarchy of settlements in Alappuzha District

Source: District Urbanisation Report, Alappuzha

Because of higher CFI Cherthala town is assigned the status of 2nd order settlement in the district in the hierarchy. Other 2nd order settlements in the district are Kayamkulam, Chengannur and Mavelikkara. Alappuzha is the only first order settlement in the district. Hierarchy of settlements in the district is shown in *Fig.10.A.2*.

The service area of Cherthala town, when considered as a third order settlement, includes the neighbouring LSGs of Pattanakkad, Thanneermukkam, Vayalar, Kadakkarapally and Thuravoor with a total area of 111.80 sq.km and a service population of 193851. Also, Cherthala is a 4th order urban centre in the state as per the State Urbanization Report prepared by the Department of Town and Country Planning in the year 2012.

10. A.3 Important centers and nodes

Commercial nodes are located along the straight stretch of road. The nodes are characterized by high concentration of commercial units. Nodes are identified on all important intersections of roads where there is a concentration of commercial activity and in case of linear development, commercial activity or physical development for a distance of 250m. Most important commercial nodes in Cherthala Town are Manorama junction, Iron bridge, Court junction, Nadakkavu, Ottapunna junction, Devi temple junction and X-Ray junction. Important nodes and their hierarchy in Cherthala Town are shown in *Table.10.A.1 and Fig 10.A.3. There are 7 first order 5 second order & 5 third order nodes in Cherthala Town.*

Table10.A.1 Hierarchy of nodes

Sl No	Category of commercial node/centre*	Hierarchy
1	Manorama junction	1st order
2	Iron Bridge	1st order
3	Court junction	1st order
4	Nadakkavu	1st order
5	Ottappunna junction	1st order
6	Devi Temple junction	1st order
7	X-Ray junction	1st order
8	Kanichukulangara bypass	2nd order
9	Police station	2nd order
10	Taluk office junction	2nd order
11	Arthunkal bypass	2nd order
12	Hospital junction	2nd order
13	Girls High school junction	3rd order
14	Kampikal junction	3rd order
15	Saktheeswaram junction	3rd order
16	Padayanipalam	3rd order
17	Kalikulam junction	3rd order

Source: *Primary Survey*

10. A.4 Markets

At present the main market dealing mainly in agricultural and marine produces in Cherthala town is Muttom bazar near Muttom Church. This market trades Vegetables, Fruits, Cloths, Grocery, toys, C.D Shops, tea, drinks and Chappels. One feature of the Muttom bazar is that both wholesale and retail activities are mixed. The present market area is very congested with both men and women selling the produce within the space.

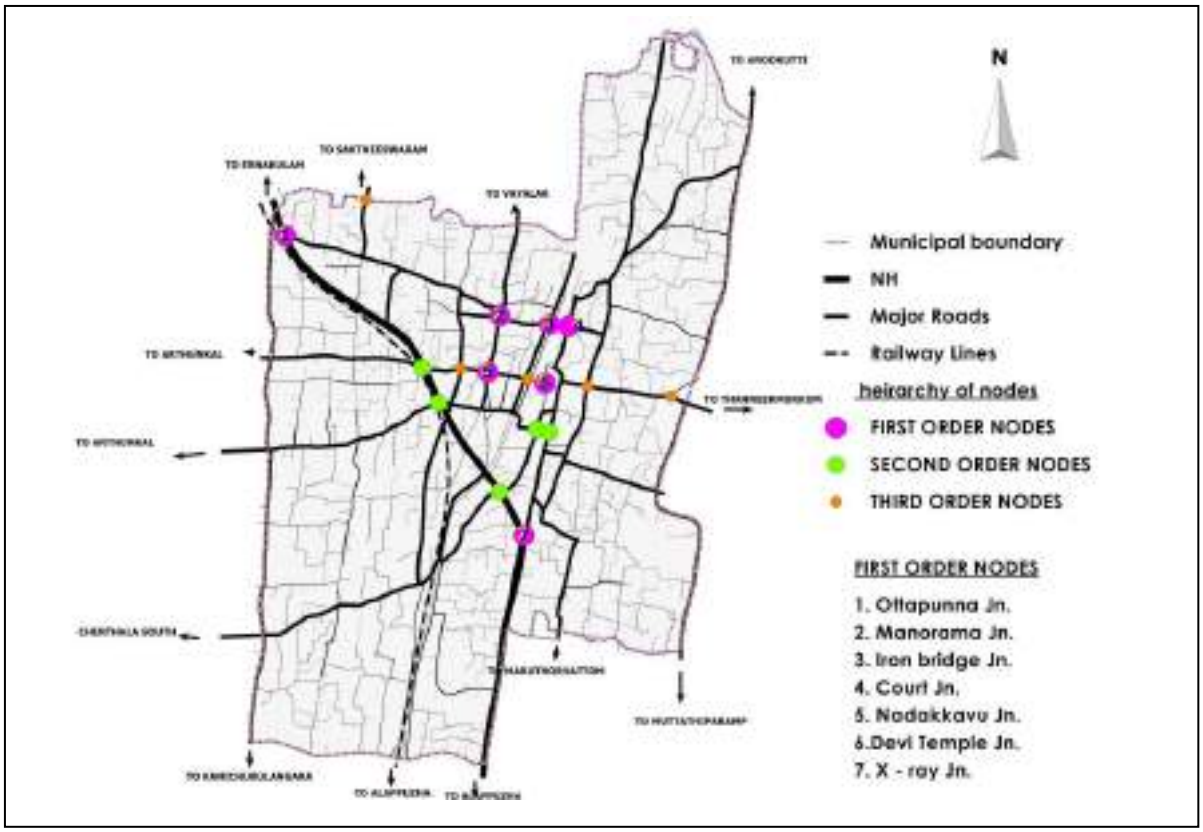


Fig 10.A.3 Hierarchy of nodes

10. A.5 Street vendors / Informal Sector

Street Vendors are a common sight in many towns. The National Policy on Urban Street Vendors, 2009 recognizes the positive role of street vendors being an integral and legitimate part of the urban retail trade and distribution system for daily necessities of the common man. The policy views street vending as a source of self employment to the poor which gives affordable and convenient services to a majority of the urban population.

There are about 54 street vendors throughout Cherthala Town. Majority of them trade CD's, toys, clothes, chapels, fruits, vegetables etc. Some have teashops also.

Higher concentration of street venders is seen in

1. Muttam Bazar
2. Manorama Jn
3. Court Jn
4. Iron Bridge
5. KSRTC Jn
6. X- Ray Jn



Street vending

Tendency of Street vendors is to settle in areas where there is constant movement of people, especially near bus terminals. *Table.A.2* shows the details of street vendors in Cherthala town.

Table10.A.2 Details of street vendors in the town

Sl No	Area of concentration of informal sector activities	Type of activity – fruits and vegetables, garments, tea and snacks, home appliances, books etc	Extent of informal sector activity in each area (no of shops/cart), no of street Vendors	Labour force (man, women, children separately) in informal sector		
				M	F	C
1	Muttam Bazar	Vegetables, Fruits, Cloths, Grocery, toys,. C.D. Shops, tea/drinks, Chappels	15 Carts, 17 vendors	23	14	-
2	Manorama Jn	Tea, Snacks, Vegetables & Fruits	1 Carts , 2 Ape	4	-	-
3	Court Jn	Vegetables , Fruits &Tea	3 Carts	3	-	-
4	Iron Bridge	Tea, Vegetables, C.D.& Fruits	2 Carts , 2 Vendors	4	-	-
5	KSRTC Jn.	Fruits, Vegetables,Tea,Chappels,C.D.	4Carts , 2 Vendors	7	-	-
6	X – Ray Jn.	Tea & Fruits	4 Carts , 2 Vendors	5	-	-

Source: Primary Survey

10. A.6 Distribution and hierarchy of Commercial nodes

Fig.10.A.4 shows the spatial distribution of commercial centers and nodes. The figure shows that the commercial facilities are distributed along the major transport corridors.

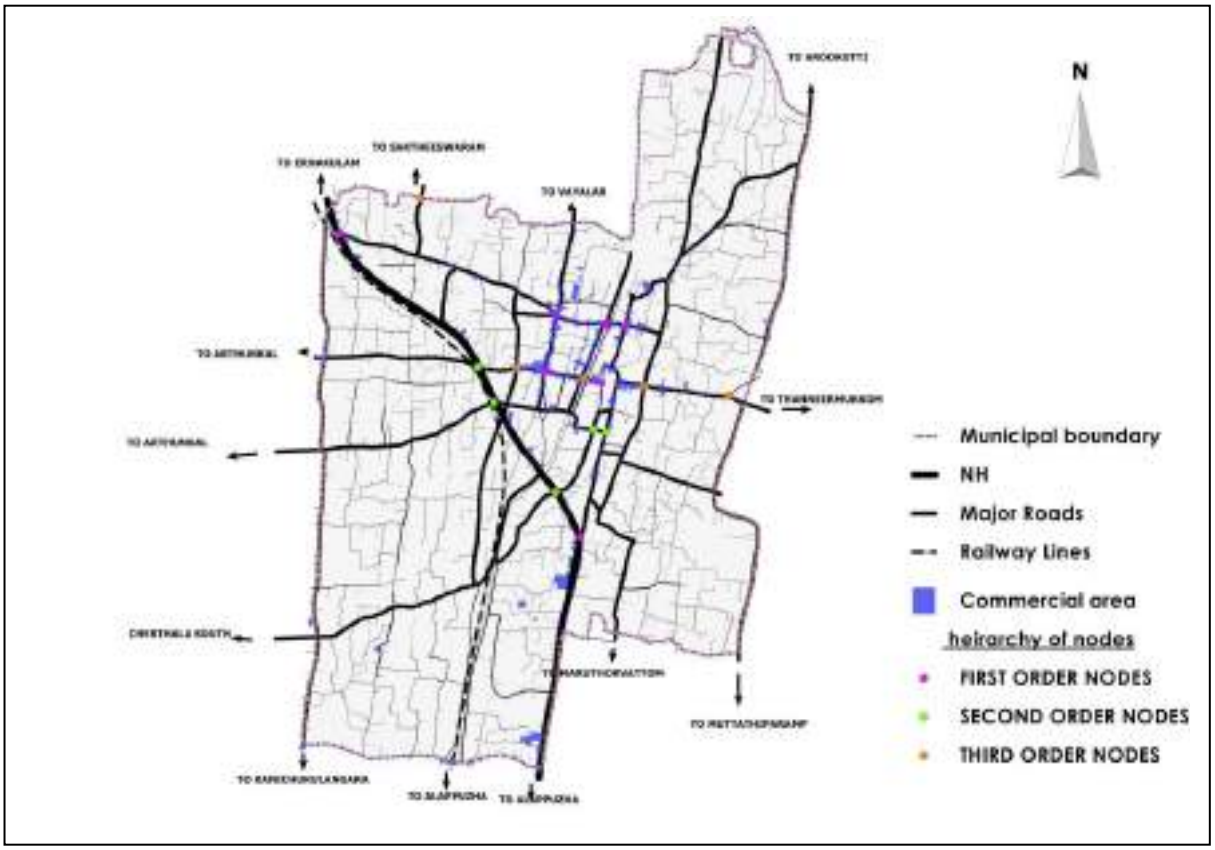


Fig 10.A.4 Spatial distribution of commercial area

10. A.7 Problems and potentials

Cherthala Town is a second order settlement in the district. The town therefore has to cater the higher order requirements of a wider service area, covering immediate surrounding Grama Panchayats of Pattanakkad, Thanneermukkam, Vayalar, Kadakkarapally and Thuravoor, with a service area of 111.8 Sq.Km and the service population as per 2011 census is 193851.

Commercial facilities are seen mainly in the town centre and as ribbon development along the major transport corridors. Problems faced by the town are insufficient space for parking, storage and for loading & unloading. Market area which is the main centre of trade for commodities like vegetables, fruits and fish is very congested. The primary issue identified is the lack of proper drainage facilities and waste disposal system from these markets. The impetus given to trade and commerce sector of the town due to the presence of considerable number of commuting population (due to the proximity to Kochi) in the town is not utilised to the full extent due to lack of proper facilities like shopping malls, adequate parking space etc.

10. A.8 Inference

Cherthala town is a second order settlement in the district. The town therefore has to cater the higher order requirements of a wider service area, and a large service population. The development of commercial sector has therefore to be planned considering such higher order commercial requirements of its service area also in addition to the requirements of the resident population. Improving the connectivity to the service region is also important in this context. Commercial nodes within the town are mostly characterized by congestion due to vehicular and pedestrian traffic beyond the capacity of the existing facilities. The town has potential for faster commercial development that can catalyze the economic development.

10. B INDUSTRY

10. B.1 Existing industrial base

Industrial land use constitutes only 0.95% of the total municipal area. There is no large scale industry in Cherthala town.

There are only 3 medium scale industrial units and 24 small scale industrial units in the town. The medium scale industries are The Travancore Coir mat & Mattings Company in Saktheeswaram ward, Ram Coir Mills in Nedumbrakkad ward and Swamy Heath fitness industry in X-Ray ward. The details of medium scale industries are given in Table 10.B.1.

Table10.B.1 Medium scale Industries

Ward No.	Name of Ward/ Place	Name of Industry	Type of produce	No of employees
1	Saktheeswaram	The Travancore Mats & Mattings Company	Mats	380
12	X - Ray	Swamy Health Fitness	Health fitness	4
5	Nedumbrakkad	Ram coir Mills	Mats and coir products	45

The small scale industries are further classified into Agro based, Cement based, Electronics based and others. The number of units in each class is given in *Fig. 10.B.1*. Details of small scale industries are provided in Table 10.B.2.

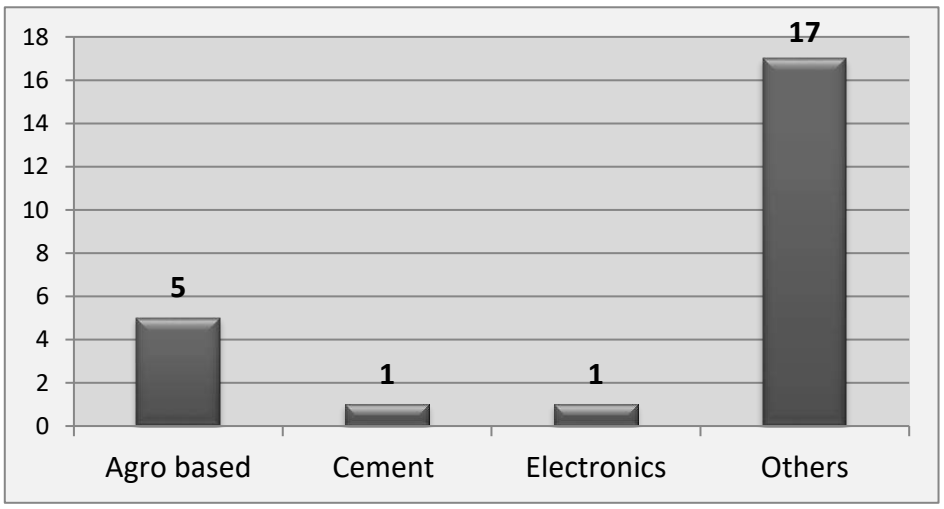


Fig 10.B.1 Industries in various categories

Agro based industries include coir industries and manufacturing of food products etc.

The house hold industrial workers constitute to about 7.07 % of the total workers. A study on the concentration and the type of industries show that the major household industry in the town is the coir/coir related industry. As this is unique to Cherthala, promoting coir related industries need serious consideration as this will contribute greatly to the economy of the region.

10. B.2 Industrial production

The industrial production is limited to food products and coir products. Value addition or diversified productions are limited.

Table10.B.2 Small scale Industries

Ward No.	Name of Ward/ Place	Name of Industry	Type of produce	No of employees
4	Mannukuzhi	Nakshattra		5
27	Edathil	Travancore Exports		24
28	`Municipal Bus Stand	Scalar IT Solutions		12
12	X-Ray	Madhav Offset Printers	Books	8
21	Karuvayil	Rony wood Industries	furniture	7
4	Mannukuzhi	Orange secretarian services		6
26	Vallayil	St:joseph Coir industries	Mats and coir products	4
26	Vallayil	St:maritin Coir Industries	Mats and coir products	6
22	Kattangat	Allppey engineering Works		3
22	Kattangat	K S coir Works	Mats and coir products	18
28	Municipal Bus Stand	Thakadiyil Coir Industries	Mats and coir products	12
24	St:Martin	Alleppey Diesel service		46
4	Mannukuzhi	Orchid services		4
30	Muttam Bassr	Cake palace	Food items	6
8	Kulathrakadu	Kannan visual tech		1
5	Madumbarakadu	Universal coir Industries	Mats and coir products	13
4	Mannukuzhi	Poothotta coir Vyavasaya co-op society-825	Mats and coir products	9
16	Poly Technic	Vadakkemattathil hollow Blocks	Hollow Bricks	9
1	Saktheeswarim	Zubin Associates		19
31	Velor Vattam	Sreeshailam Net World	Computers	3
11	Municipal Office	M/S visnu Design Media		3
4	Mannukuzhi	M/S R K Electronics		2
28	Municipal Bus Stand	Drona Engineering		5
28	Municipal Bus Stand	M/SPearl Designs		2

10. B.3 Spatial distribution

The spatial distribution of industrial land use in Cherthala town shows that the concentration of industrial land use is high in Saktheeswaram ward. The high concentration in this ward is explained by the presence of coir factory in this ward. The WPR of women is found to be higher in the House Hold Industrial sector as per 2011 census. On the analysis of employment details, this could be attributed to the House Hold coir industries, unique to Cherthala. This industry can definitely contribute to a sustainable economic base of the Town. The concentration index is relatively low in the remaining wards except Nedumbrakkad, Power House, Railway Station, Palluveallyvely and Arattuvazhy wards.



Fig 10 B.2 Spatial Distribution of Industrial Landuse

10. B.4 Problems and potentials

The town has a large number of people working outside the country. The major problem experienced by the town in this sector is the lack of entrepreneurship due to a wide spread culture of migration to Kochi in search of employment. The town has not attracted any large scale industrial investment for a long time in spite of accessibility and availability of land.

The draft Industrial and Commercial Policy, 2011 of the Government of Kerala envisages in bringing the state in top three positions in per capita income in the country (the state is in the seventh position at present). NRI remittances create demand for trade, commerce and service in the state. However, recent developments in West Asian region and North Africa, demanding employment for local population, is expected to bring in drastic changes in employment structure in those countries which in turn will severely affect the out migration of people for employment from the state to these regions. So, there is an urgent need to create a strong economic base (and thus employment) in the region for which Cherthala Town has to play major role.

Efforts to regain the status of the town as an industrial center for agro based products will open out chances of value addition units.

10. B.5 Inference

The existing industrial base of the town is not very strong, mainly due to lack of entrepreneurship and cultural orientation towards out migration to Kochi for employment. However, the town has potential for growth in large and medium scale as well as house hold industrial units which is a need of the hour in view of the anticipated changes in the employment pattern. Efforts to regain the status of the town as an industrial center for agro based products will open out chances of value addition units, especially coir. The House Hold industrial sector can improve the economic base in a sustainable manner, in the back drop of the concentration of coir sector in Cherthala Town and the region.

10. C TOURISM

At present tourism does not figure prominently as a noble sector in Cherthala. However, The Town has a clean and beautiful environment. Also the surrounding region, blessed with a network of back waters and canals, is a well known destination for water way tourism.

10. C.1 Tourist attractions near Cherthala Town

St. Andrew's Basilica/ Arthunkal Basilica: Arthunkal is an important pilgrim centre of Latin Catholic Christians and is for well known for St. Andrew's Basilica, popularly known as 'Arthunkal Basilica', situated 8 km south-west of Cherthala town facing the sea coast. The annual feast of St. Sebastian is celebrated at St Andrew's Basilica from 10 to 27 January. The main festival is on 20 Jan attracts a huge crowd for the evening 4 pm procession. Hindu pilgrims from Sabarimala used to visit Arthunkal Basilica and take bath in a tank in the Church premises to formally conclude their penance. The tank is not in existence now.



Arthunkal Basilica



Thanneermukkam Bund

Thanneermukkom Bund: The Thanneermukkom Bund, considered the largest mud regulator in the country, was built as part of the Kuttanad Development Scheme. The huge construction is built across Lake Vembanad, the largest lake of the State, and divides the lake into two parts. It also connects

the two districts of Kottayam and Alappuzha through the Thanneermukkam and Vechoor villages on either side of the bund. Thanneermukkom bund can be reached by road. Bus services are available from Kottayam, Alappuzha and Cherthala. This is only 8 kms from Cherthala town.

Kumarakom: Kumarakom is a popular tourism destination located near the city of Kottayam. Tourism in Kumarakom largely revolves - around the backwaters of the Vembanad Lake. Several luxury and budget resorts lined up on the shores of the lake provide tourists with facilities for boating, yachting and fishing, with panoramic views of the lake. The other major attraction is the Bird Sanctuary which can be visited by canoes arranged by local fishermen at the entrance to the sanctuary. This is only 18 kms from Cherthala town.



Kumarakom

Pathiramanal: Pathiramanal is a small island in Muhamma panchayat of Alappuzha district. The name 'Pathiramanal' means 'sands of night'. The scenic beauty of both sides of the lake as well as that of the island is mind blowing. It is home to many rare varieties of migratory birds from different parts of the world. The island is a birdwatcher's paradise. It is home to around 91 local species of birds and 50 migratory birds. This is only 12 kms from Cherthala town.



Pathiramanal

Cherthala town has good transport linkages to these regions.

10. C.2 Places of interest within the town

a. Sree Karthyayini Temple

Cherthala Sree Karthyayini Temple was constructed around 500 years ago by Sri Vilwamangalam Swamiyar. Now it is being protected by Travancore Devaswom Board.



Sree Karthyayini Temple

It is said that Vilwamangalam Sawmiyar was returning to Guruvayur after consecrating the Ananthapadmanabha temple in

Thiruvananthapuram. He reached the present Cherthala and was taking rest below a Thambaka tree. He noticed several swans swimming in several ponds there. Suddenly he saw a divine lady swinging in a swing, tied to the Thambaka tree. He recognized her as goddess Karthyayani and approached her whereupon she jumped into a nearby pond. Swamigal also jumped into, but couldn't get any trace of her. This happened continuously for 7 days. Every day, the goddess jumped into 7 different ponds. Swamigal got extremely frustrated. On the 8th day, somehow, the pond into which the goddess jumped was full of slush and mud called '*Cher*' in Malayalam. This time, Swamigal was able to catch hold of her hair. He could only pull up her head (*thala* in Malayalam) exposing her neck. Because of this incident the place was called Cherthala.

The idol of the Goddess in the sanctum sanctorum of the temple is consecrated below the floor level and only the head part is visible. Outside the temple, there are separate temples for Lord Vishnu and Lord Shiva. The devotees hand over cocks as an offering to the goddess Karthyayini. So you can find several cocks at this temple. Near the sanctum sanctorum of the goddess, there are separate temples for Ganapathy and Lord Dharma Sastha. Just outside the temple is the place where Vilwamangalam Swamiyar is said to have found her in a swing.



Cocks in the temple

The '*arattu*' festival of the temple is celebrated for eight days in the month of Edavam (May-June). Each day, the '*arattu*' is held in a different pond for the first seven days and on the eighth day the Goddess is brought back to the temple along with Lord Vishnu and Lord Shiva.

There are two very special and peculiar '*prasadam*' offerings at this temple. They are called '*Iratti*' and '*Thadi*'.

b. St. Mary's Forane Church

St. Mary's Forane Church, Muttam was constructed in 1023 AD by Arch bishop of Ernakulam. Now the complex in protected by Vicar of the Church. It includes buildings, artifacts and cemetery.



Muttom Church

It is one of the most popular pilgrim centres, in Kerala. Built in 1023, this church is portrayed as the symbol of strong Christian faith and

spiritual renaissance of Muttom, Cherthala. St. Mary's Forane Church, Muttom, Cherthala, is one of the most beautiful and largest Churches made under Portuguese artistry. The carvings in the altars with beautiful paintings which adorn the sanctum of the church, made from a combination of fruit pulp, rare plant leaves and gold dust, are marvelous. A very large relief work of ascension of Virgin Mary is rarest and cannot be seen anywhere except in this Church. The statue of Mother Mary Immaculate was established in a shrine facing the road adjacent to the church. The statue is there since 1904. The presence of the Church, makes Muttom a famous and important pilgrim centre.

People of all faiths and religion come to this Church to pray to Amma (the Virgin Mary). Everything seen here, wordlessly says the history and heritage.

c. Anthraper Gardens





Anthraper Gardens

The history of Anthraper family goes back to the early 16th century. It begins with the arrival in Cochin of Andrew Pereira of Portugal and his wife Catherina and son Diego Pereira along with Vasco de Gama, the explorer, in 1502. Andrew Pereira settled down in Cochin, rising to the rank of Military Commander of the King of Cochin at the time. His son inherited his father's mantle and served the King well. Diego Pereira was made a 'Madambi' (Local chieftain or Earl) in 1545, and was the only Christian Madambi among 71 other Madambis of Cherthala Area. The Anthrapers always married ladies of Portuguese origin until 1786 when Kochandy Anthraper accepted a bride Anna, from the local parish. And with this, their integration with the land was complete. All the living Anthrapers of many branches are the descendants of this couple. The very name 'Anthraper' is derived from Andrew Pereira, a Portuguese name, and also 'Anthara Periyavar', a term used to denote a person of high nobility.

The present house of the Anthraper's viz. the *'Anthraper Gardens'* with waterfront on three sides is a very quiet and picturesque place with a spacious and well manicured garden. Away from the hustle & bustle of the town, it is an ideal place to unwind and rediscover oneself. It was established almost a hundred years ago by Chevalier ACM Anthraper, the grandfather of the present generation. A man of great vision with political and business acumen, he loomed large in the social and industrial scene of Kerala. He was knighted by the Pope for his charitable deeds and contribution to the society. His son, late AMJ Anthraper and his wife

Thankamma Anthraper continued as the torch bearers of the family tradition and are well known in Kerala.

The Anthraper Gardens Home stay is a dream come true of the late Alexander Anthraper, the last heir to the family estate. The home stay is presently managed by his sister, Omana Thomas, ably assisted by her sisters Mary, Shantha, Leela and Rani.

Anthraper Gardens offers the experience of elegant traditional living in an atmosphere of age old charm. The home is surrounded by water on three sides with a private boat jetty and a sprawling garden. The home stay building is 75 years old, well maintained in a 2 acre plot surrounded by backwaters on three sides. A verandah runs around the building with a view of the backwaters. The property is well landscaped with 6000sq ft of lawn, varieties of fruit trees and coconut palms.

10. C.3 Availability of tourism infrastructure

The town does not possess basic amenities for tourists like street lights, litter bins, toilet facilities, lockers etc. There are also no amenity centres in the town.

10. C.4 Problems and potentials

The Town has a clean and beautiful environment. Also the surrounding region, blessed with a network of back waters and canals, is a well known destination for water way tourism. Cherthala town has good transport linkages to this region. The town is enroute the National Highway and also is connected by rail to various parts of the country. Besides, there is scope for directly linking the town to the NW-III through navigable canals. Hence the town has every potential to develop into a tourist transit station in the region. However, the town lacks tourist infrastructure and there are no basic amenities to support tourism. The marketing efforts are also minimal. The existing potentials due to places of interest like Sree Karthyayini Temple, Muttam Church, 'Anthraper Gardens' etc. are not fully utilized.

10. C.5 Inference

The regional setting of the town indicates that the town has potential to develop in to a tourist transit station, as many tourist destinations are located within and around Cherthala town, having transit routes through the town centre. It is also a welcome centre for waterway tourism, for which the region as such is known for, utilising the possibility of linking directly to National Waterway-III passing through Vembanad Lake through the AS canal by the development of Nedumbrakkad ferry. The tourism sector in the town is currently under developed. Also, buildings/precincts of heritage importance are very limited the in the town except for Sree Karthyayini Temple, the St. Mary's Forane Church, Muttam, *the 'Anthraper*

Gardens' etc. as mentioned above. There is limited potential for tourism within the town. But by utilizing the locational advantage of the town, and by providing supporting facilities for the regional tourist circuits, maximum utilization of the existing potentials can be achieved.

10. D AGRICULTURE

10.D.1 Area under cultivation



Coconut Cultivation

Agricultural land use covers 18.51% of municipal area. In Cherthala town the major agricultural crop is coconut, which covers about 7.2% of the total land area. Other than Coconut, crops like Plantain, Tapioca, Tuber crops, Arecanut, Pepper, Paddy, Vegetables, Fruits, Pulses, Cashew etc are also cultivated. The area under cultivation for the past three years in Cherthala Town shows a decreasing trend. The area under cultivation for 2009, 2010 and 2011 are shown in *Fig.10.D.1*.

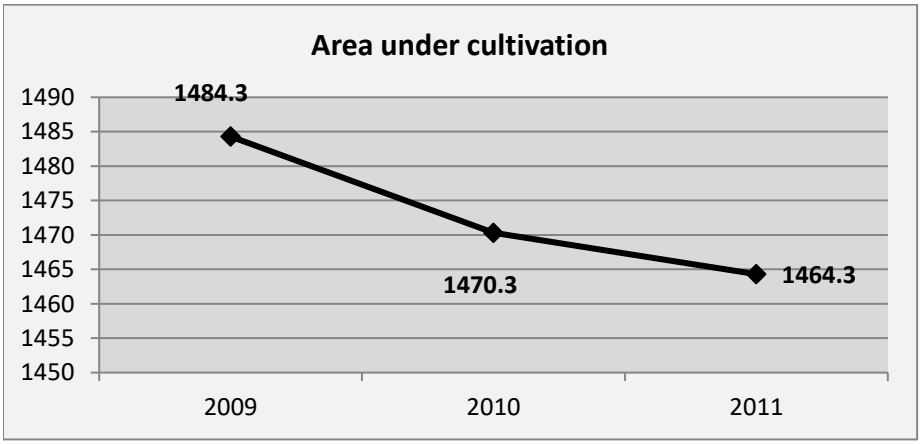


Fig 10.D.1 Variation in area under cultivation *Source: Agriculture Department*

10. D.2 Important crops and production

Important crops in Cherthala town and their production and productivity are shown in *Table 10.D.1*

Table 10. D.1. Important crops and production

Type of crop	Area under cultivation (Ha)			Production (T)			Productivity (T0ns/Nuts per Ha)		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Coconut	1288.6	1288.6	1288.6	6829580	7087300	7087300	5300	5500	5500
Tapioca	12	12	12	96	108	108	8.5	9	9
Vegetables	40	40	40	200	220	240	5	5.5	6
Banana	40	43	43	740	817	817	18.5	19	19
Pepper	8	9	8	2.2	2.7	2.2	0.275	0.3	0.275
Pulses	13	10	10	58.5	50	50	4.5	5	5
Areca nut	10	10	10	2	1.5	1.5	0.2	0.15	0.15
Spices	0.2	0.2	0.2	0.7	1	1	3.5	5	5
Fruits	7	7	7	35	35	35	5	5	5
Other crop	3.5	3.5	3.5	2	2	2	0.57	0.57	0.57
Cashew nut	2	2	2	4	4	4	2	2	2
Paddy	55	40	35	110	80	105	2	2	3
Fodder	5	5	5	175	150	200	35	30	40

Source: Department of Agriculture

Figures 10.D.2 and *10.D.3* show the variation in agriculture produces with respect to time. Paddy area under cultivation is showing a deceasing trend but the production has increased during 2011. For coconut, the area under cultivation remains the same but the production has increased during 2010.

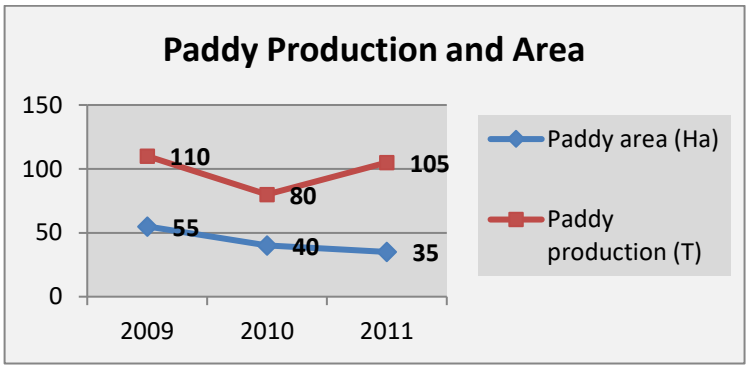


Fig 10.D.2 Paddy production and area

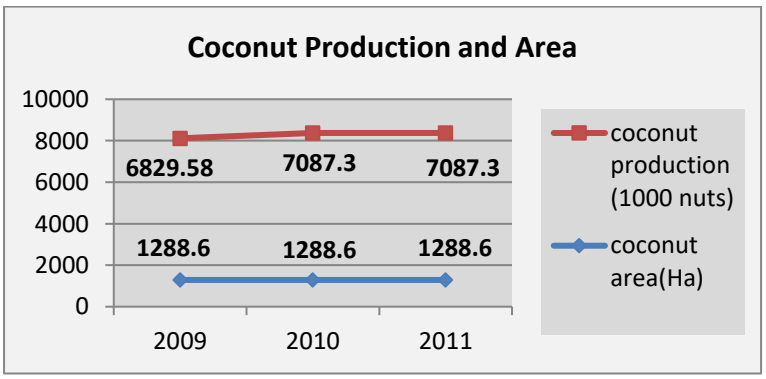


Fig 10.D.3 Coconut production and area

10. D.3 Spatial distribution

The spatial distribution of agricultural area is shown in *Fig.10.D.4*. The agricultural activities are concentrated more in Karuvayi ward and least in the TD Ambalam Ward.

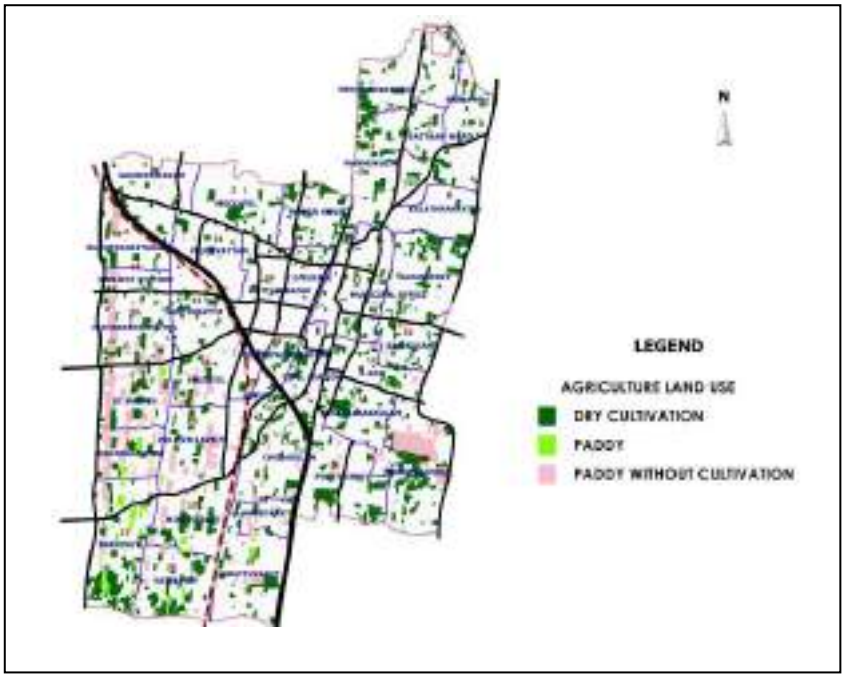


Fig 10.D.4 Spatial distribution of Agricultural land

10. D.4 Irrigation facilities

The Irrigated area constitutes only 200 hectares of land in the town. Agricultural activity in Cherthala Town is mainly depending on rain. Wells and ponds are used for the irrigation purposes. Besides, there are 600 Nos. of 1.5HP pumps, 700 Nos. of 1HP pumps and 500 Nos. of 0.5HP pumps in the town. It is observed that the drainage canals near the paddy fields are not maintained properly.

10. D.5 Agricultural inputs

Agriculture infrastructure available in the town is limited. Only an Agriculture office is present in the town. Agricultural research stations, seed farms and Units supplying machineries are not available in the town. 2 nos of fertilizers shops,1 tractor, 1 triller and 1800 pump sets are available in the town for the agricultural purposes.

10. D.6 Problems and potentials

The analysis of various inputs to agricultural growth in the town shows that the irrigation facilities in the town are minimal. Agriculture has not become organised and is not being done on a professional basis. The infrastructure facilities are also not commensurate with the area

under cultivation. High cost of inputs & fertilizers and lack of availability of skilled labourers are the main problems in the Town.

10. D.7 Inference

Land use analysis reveal that about 18.50 % of the total town area is still under agricultural use. In other words, 329.08 hectares of land within the town are currently put to/can be put to agricultural activities. It can be seen that eight peripheral wards of the town show rural or semi-rural nature indicating the prospects for promoting agricultural sector. Coconut is the major crop cultivated in the town. Crops like Plantain, Tapioca, Tuber crops, Areca nut, Pepper, Paddy, Vegetables, Fruits, Pulses, Cashew etc are also cultivated. *As of now, Agricultural produces are mostly imported to the town from other areas in the district as well as from the surrounding districts and states. Through planned interventions, the town can be equipped to meet part of its requirements for agricultural produces through in-house production. Majority of the workers are migrating to tertiary sector making agriculture production uneconomical due to unavailability of labourers. There is also no organised markets for selling agriculture produces within the town. Such issues have to be properly addressed.*

10. E ANIMAL HUSBANDRY

10. E.1 Population

The main livestock are cattle, buffaloes, goat, hen, duck, pig and rabbit. Livestock population is shown in *Fig.10.E.1*

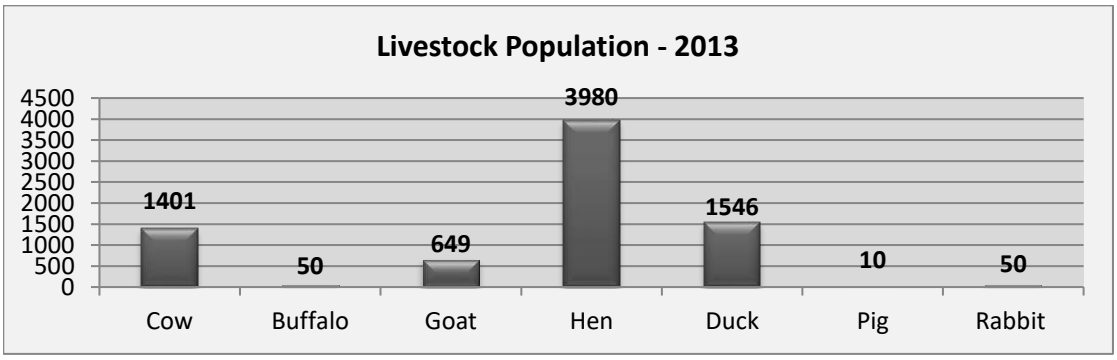


Fig 10.E.1 Livestock population

10. E.2 Production

a) Meat

Even though the livestock population is showing a decline, produces from livestock does not follow such a trend. Eating habits of people have changed and there is an increase in demand for meat products. There is no authorized slaughter house in Cherthala town, but the existing facility is very unhygienic, there is no adequate facility for water supply and for collection and disposal of waste.

b) Milk

There are 7 Dairy Farms with a total of 40 cattles in Cherthala Town. There is a milk co-operative society at Karuvayil and 2 sub centres each at X- Ray and Municipal bus stand wards. The demand for milk is 13060 litres per day and as per the data obtained the availability of milk per day is 3999 litres only. Milk production in the town is less than 36% of the consumption.

10. E.3 Physical Infrastructure

There is a veterinary Dispensary, one veterinary Polyclinic and a Regional Artificial Insemination Centre (RAIC) in Cherthala town. There are 7 dairy farms in the town. But there is no hatchery available in the town.



Veterinary Polyclinic

Table 10.E.2 Details of Dairy farms

Ward No.	Name of Ward/Place	Ownership Details	No. of Cattle	Quantity of Milk produced per day
14	Chakkarakkulam	Anilkumar, Puthukkattuvely	32	3200
12	X-Ray	Anilkumar, Thekkevely	11	160
9	Savasserry	Narayanan, Pathu kandom	9	120
9	Savasserry	Narayanan, Sreebhavanam	11	140
9	Savasserry	Sivaraman, Chirayil	9	120
4	Mannukuzhy	Rejikumar, Puthuval nikarthil	8	109
19	Arattuvazhy	Changarangattu	13	150
			Total	3999

Table 10.E.3 Details of Dairy Outlets and collection centres

Ward No.	Name of Ward/Place	Type of outlets and collection centers	No.	Average Qty collected per Month (Litres)
3	Power House	Town Milk Co-operative society	1	6000 Ltrs
9	Savasserry	Sub Center	1	3000 Ltrs
22	Mini Market	Sub Center	1	15000 Ltrs

10. E.4 Problems and potentials

The municipal area with its large extent of dry cultivation area, availability of water, rising demand for live stock produces etc has good potential for development of this sector. However, the infrastructure facilities available in the sector are minimal and needs enhancement.

10. E.5 Inference

Animal Husbandry sector is weak in Cherthala Town. *However, there is a possibility for developing the sector with creation of adequate infrastructure in the sector.*

10. F Fisheries

The town has no coast line and hence fisheries are not an important sector of economy in the town. Cherthala already acts as a major regional wholesale fish market, attracting many truck loads of fish from Neendakara, Kochi, etc to the wholesale market. However adequate facilities for the wholesale trade are not available. 380 families depend on fisheries in Cherthala Town.



Fish market

10. F.1 Physical infrastructure

There is lack of infrastructural facilities in the fishing sector, i.e. there is no modern fish markets, hygienic fish drying yards, fish processing units, cold storage facilities etc. within the Municipal area. 20 boats are available in the municipal area for the fishing sector.

10. F.2 Problems and potentials

The town has no coast line and hence fisheries are not an important sector of economy of the town. Cherthala already acts as a major regional wholesale fish market, attracting many truck loads of fish from Neendakara, Kochi, etc to the wholesale market. However adequate facilities for the wholesale trade are not available. Provision for such facilities may strengthen the wholesale fish trade in the town.

10. F.3 Inference

The town has no coast line and hence fisheries are not an important sector of economy of the town. There are no modern fish markets, cold storage facilities etc. within the Municipal area. By providing supporting facilities, fisheries sector can be developed in the town.

Chapter-11

Traffic and Transportation

11.1. Introduction

Traffic and transportation is of prime importance in the economic activity of an urban settlement and improvements in the interactions that the settlement has with the neighbouring towns and the settlements within the region may contribute to the development of the urban settlement.

Cherthala town is served by three modes of transport namely road, rail and water.

11.2. Characteristics of transport network

11.2.1. Roads

- **Existing road network**

Cherthala town has a good network of roads. The road network of Cherthala town is of grid pattern and the roads are formed almost parallel to each other. National highway No. 66 from Panatela to Kanyakumari passes through the central area of the town (now the bypass) and connects Thiruvananthapuram, the State headquarters.

It has also many roads which connect the neighboring districts of Alappuzha, Kottayam and Ernakulam and also other parts of the State. In addition, about 100 municipal roads serve the people of the town.

Major roads emanating from Cherthala town are;

(i) National Highway No. 66 from Panvel to Kanyakumari
(ii) Thanneermukkam Road
(iii) Arookutty - Chenganda Road
(iv) Vayalar Road
(v) Cherthala – Arthungal road
(vi) Meenarperuvazhy Road
(vii) Cherthala - Kanichikulangara Road
(viii) Saktheeswaram – Meenarperuvazhy Road
(ix) Cherthala Kuruppankulangara road
(x) Cherthala – Muttathupparambu Road

(xi) Kalikulam - Chenganda Road

(xii) Nedumprakkadu road

(xiii) Muttam Bazaar Road

(xiv) Convent road

The road network of Cherthala town is given in *Figure 11.1*

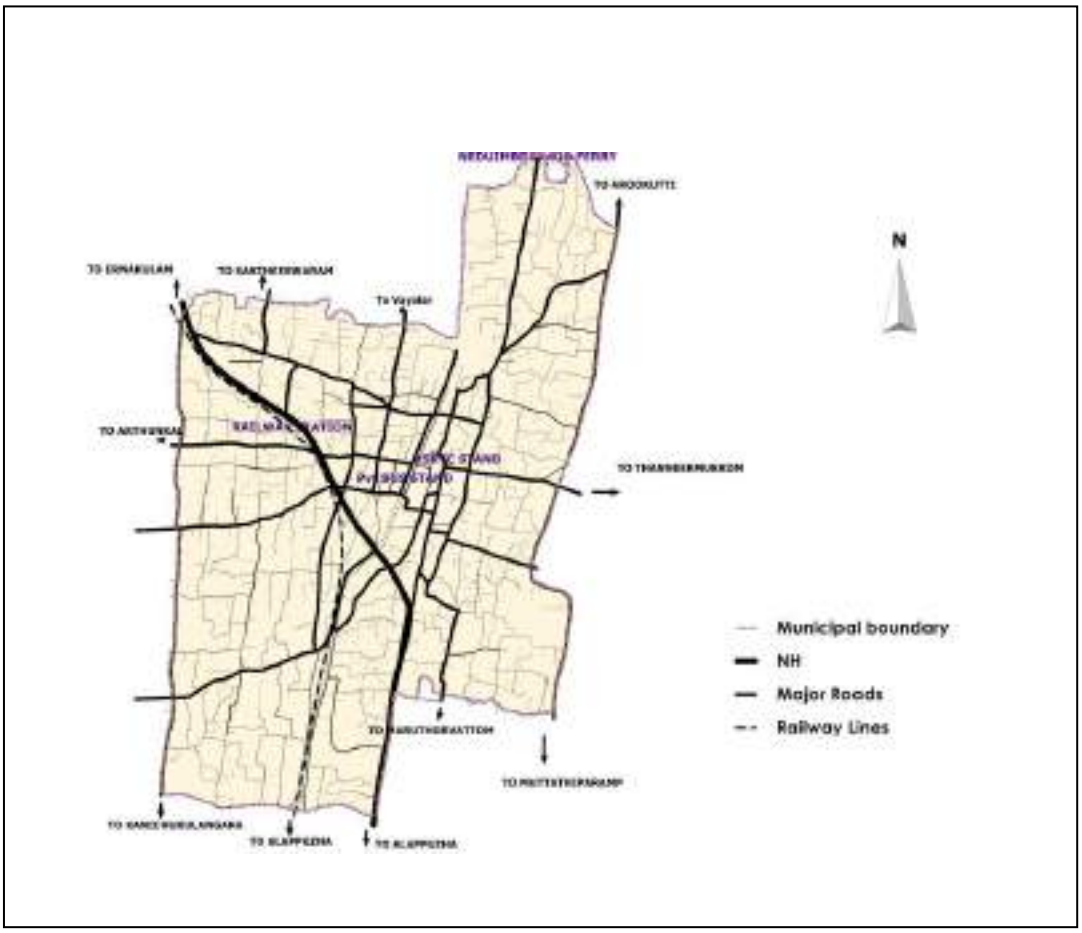


Figure 11.1 Road network of Cherthala town

It has been observed that National Highway 66 Cherthala bypass is passing through the outskirt of the CBD area and has a length of about 5.5 km. The carriageway width of this road is 7 meters with adequate side shoulders. The old NH – 66 (Ottappunna Jn – X ray junction) through the central area of the town, has a length of 5.6 km with varying widths of carriageway. Manorama junction, Iron bridge Junction and Court junction are the major traffic bottleneck areas along this road.

Cherthala – Thanneermukkam road bound for Kottayam is passing through Thanneermukkam bund, which is one of the important PWD roads passing through the study region. The road runs about 1.0 km length in the town and 5.5 meter wide carriageway with in the town limit.

Cherthala- Arookutty road which forks out from Cherthala town at Court Jn and ends at Chenganda bridge has a total length of 2.7 km. The road has intermediate lane width (5.0 – 5.5 metre carriageway. Cherthala -Vayalar road is another important road, which meets the travel requirement of people between Ernakulam district and Cherthala. The road starts from Manorama Junction and ends at Vayalar bridge with in the town limits. Cherthala – Arthungal road and Cherthala – Kanichikulangara road are the main roads, which connect the CBD area with the western parts of the town. Apart from these roads, there is Muttam Bazar road, Chenganda – Muttathipparambu road and other roads, which are passing through the town.

❖ Transport Terminals

The town has two bus terminals. One is owned by KSRTC and is exclusively used by them and is located on the Thanneermikkam road. This terminal mainly caters to the inter district operations as well as intra district operations.



KSRTC Bus stand

Cherthala town has a private bus station by the side of Iron bridge – St. Mary's Jn Road near Muttam bazaar. The station handles both long distance and local services operated by private buses.



Private Bus stand

As the Private bus station is located close to commercial areas of the town, the entry and exit of buses cause traffic congestion on the road, the autorickshaw and other vehicles parking on the road side restricting the road capacity.

❖ Bottlenecks and Missing links

Manorama Junction, Iron Bridge Junction and Court Junction are the major traffic bottle neck areas along NH 66. The major traffic problems facing Cherthala town are the acute traffic congestion experienced at the main road between X ray junction and Ottappunna Jn on old NH 66. This stretch is the main commercial area of Cherthala town which is dotted on both sides by commercial centres, creating parking and pedestrian activities in a large scale. The vehicles visiting the area, in the absence of adequate off-street parking spaces, are parked on both sides of the road utilizing all the available road side areas and during parking and deparking, they cause traffic blocks on main roads. The huge pedestrian movements

across the road slow down the vehicular traffic on the main road, increasing the traffic congestion.

Large volume of vehicles catering to the transport needs of the populace of the town is plying on the road. Added to this, Cherthala private bus station is located in Muttam Bazaar road stretch, and movements of buses to and from the bus station hinder the traffic movements on the road causing traffic congestion and bottlenecks during most parts of the day. Pedestrian criss-cross movements in front of the bus station add to the traffic problems.

Also, Devi temple junction where roads from Alappuzha, Ernakulam and Kottayam intersect, witness lot of turning movements from all arms causing traffic conflicts and traffic jam on the main road.

As a combination of the above factors, traffic congestion is witnessed on main road during most parts of the day.

Other places where traffic problems are witnessed are the Manorama junction where offices and commercial areas are located. Traffic congestion is caused due to parking of large number of vehicles on all available road spaces, pedestrian movements. Inadequate road width between iron bridge junction and Manorama junction is also contributing to the traffic problems.

- **Other aspects**

The road coverage is reasonably good within the municipality but the lesser width is a major problem. The draft transport policy for the state realizes this bottle neck in the case of urban roads and prescribes advance action to widen the existing arterial and sub-arterial roads to 4/6 lane standards with provision for pedestrian walking and crossing facilities, cycle tracks and off street parking. The road system in Cherthala which has been developed based on a need based approach has to be ordered based on hierarchy of roads considering their importance and their role to carry traffic. Based on such an approach it is necessary to prepare a Road Network Plan, which would not only show the regional and local level importance of roads, but would also point out the need for new linkages, which have to be developed and the probable traffic volume which can be diverted to each of these roads.

11.2.2. Railways



Railway station

The Broad gauge railway line, which forms a part of Ernakulam - Alappuzha section of Southern railway, passes through Cherthala town. The railway line running parallel to the NH bypass divides the town in to two distinct parts namely eastern and western parts. Cherthala railway station, which is one of the important stations in the Ernakulam – Alappuzha section is locate on the western side on NH – 66 Bypass.

❖ **Details of railway station**

Cherthala railway station is one of the important stations in the Ernakulam – Alappuzha section of Indian Railway and is located on the western side on NH – 66 Bypass. 34 express/ passengers trains are passing through the station providing connectivity to places within and outside Kerala State. Doubling and electrification of railway line and running of sub-urban services are the major development schemes under the active consideration of railways.

❖ **Passenger and goods movement**

Since the exact volume of passengers alighting or boarding a train in a day could not be established from manual counts due to multiple entry/ exist points, number of passengers boarding/alighting a railway station was worked out by taking the average number of passengers who booked their tickets in advance as well as on the day of travel in addition to the number of season ticket holders in a month. The same number of passengers was also taken as the alighting passengers.

A sample of 3.8 % passengers was interviewed. The analysis of data revealed that nearly 3105 passengers alight/board at the railway station on a typical working day. The main goods coming through rail to the town are fish and vegetables.

11.2.3. Water Transport

Cherthala town is connected to Alappuzha and surrounding areas through AS canal and backwaters. The waterways were predominantly used by people who live nearby backwater or canal front and also for freight transportation, mainly for coir and coir products.

11.3. Existing Traffic Characteristics

The Town & Country Planning Department has entrusted the study on existing traffic characteristics of Cherthala town with the technical assistance of NATPAC. The following are the excerpts from the traffic study report of NATPAC.

❖ Traffic V-C studies

Capacity utilization of the road stretches was 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.

The following road sections were found to be overloaded more than their carrying capacity:

Table 11.1 Road sections with V/C ratio >1

Sl. No.	Name of Road Section	Volume-Capacity Ratio
	National Highway	
1	11 th Mile Jn - X ray Jn	1.93
2	X ray Jn – Ottappunna Jn	1.3
	Old National Highway	
3	X ray Jn - Devi Temple Jn	1.28
4	Devi Temple Jn - Court Jn	1.54
5	Court Jn - Iron Bridge Jn	1.6
6	Iron Bridge Jn – Manorama Jn	1.6
7	Manorama Jn - Ottappunna Jn	1.14
	Cherthala - Thanneermukkam Road	
8	Devi Temple Jn - Girls HS Jn	1.86
9	Girls HS Jn–Kalikulam	1.1
	Cherthala - Arthungal Road	
10	Kambikkal Jn - Arthungal Road Jn	1.45

❖ Speed and delay studies

On National Highway - 66 (bypass), the average journey speed varied between 24.4 and 27.4 km/hr. The maximum speed of 45.3 km/hr was observed between X' ray junction and Ottappunna Junction. The low speed was observed due to signal near the Jn.

On the Old National Highway, the average speed was as low as 15.65 Km/hr between Court Jn and Iron bridge Jn of the town. Main delay was due to congestion on the narrow road and bridge. The speed was however on the higher between the Manorama Jn and Ottappunna Jn.

The test vehicle had to slow down quite often with frequent stopping. The test vehicle was able to run at only 26 km/hr speed in the stretch due to traffic Congestion, inadequate road width and poor surface.

It could be seen that the major delay of 34 seconds was observed between 11th Mile Jn and X-Ray Jn due to encroachments and signal. This was followed by 25 seconds of delay observed between X-Ray jn and Ottappunna Jn due to signal.

❖ Turning movement at intersections

Based on the reconnaissance survey, turning movement surveys at 6 major intersections in the study area were conducted to ascertain the peak hour demands. The observations are given in *Table 11.2*.

Table 11.2 Peak hour traffic flow at major intersections in Cherthala town

Sl. No.	Name of Intersection	No. of Arms	Peak Hour	Peak Hour Volume (PCU)
1	Devi Temple Jn	3	9.30 – 10 .30 AM	2725
2	Girls High school junction	4	3.30 - 4.30 PM	3822
3	Court Junction	4	10.15 – 11.15 AM	1850
4	Nadakkavu junction	4	5.00- 6.00 PM	1760
5	Arthungal road junction	4	9.00 – 10 .00 AM	2172
6	Ottappunna junction	3	10.30 – 11.30 AM	2091

❖ Pedestrian survey

Pedestrian surveys were conducted at major locations where the pedestrian cross movements were found to be high. Locations selected for pedestrian survey and peak hour pedestrian demand is shown in *Table.11.3.*

It could be seen that there were lot of pedestrian criss cross movements in front of Devi temple junction (Kottayam road) to the tune of 809 movements during peak hour between 09.30 and 10.30 am in the morning. It was followed by 612 movements at the Alappuzha road arm on Devi temple junction area during morning peak period. There were 189 pedestrian movements on Kuppikavala road arm in the Girls High school junction.

Table 11.3 Peak hour pedestrian volume

Sl. No.	Name of Location	Peak Time	No. of Pedestrians		
			Up	Down	Total
1	GHS Jn (Devi Temple Road)	04.30 PM- 05.30PM	44	84	128
2	GHS Jn (Kalikulam Road)	04.00 PM-05.00 PM	35	35	70
3	GHS Jn (Kuppikavala Road)	04.30 PM-05.30 PM	55	134	189
4	GHS Jn (Charankattu Road)	04.30 PM-05.30 PM	29	48	77
5	Devi Temple Jn (Alappuzha Road)	10.30 AM-11.30 AM	373	239	612
6	Devi Temple Jn (KSRTC Bus stand Road)	09.30 AM-10.30 AM	520	289	809
7	Devi Temple Jn (Ernakulam Road)	09.30 AM-10.30 AM	33	78	111

Safe passage of pedestrians is an urgently felt necessity in Cherthala town.

❖ Junctions

The main junctions in Cherthala Municipality are

1. Devi Temple junction
2. Court junction
3. Manorama junction
4. Nadakkavu junction
5. Ottappunna junction
6. X-ray junction
7. Hospital junction

Junctions like KSRTC, Court junction, Manorama junctionand GHSS junctions experience heavy congestion due to lack of space for parking and the nearness to Bus terminals. During the peak periods, especially in the evening, the situation becomes even worse causing traffic block at these junctions.

❖ O.D Survey

The objective of this survey is to determine the origin and destination of external-external, external-internal and internal-external passenger and goods movements across the external cordons. An analysis of these traffic movements will give the proportion of bye-passable traffic along with the major external interaction areas.

For a meaningful analysis of O-D survey data, the study region was divided into six traffic zones for in the study region, the boundaries of the zone forming the combined boundary of one or more wards of Municipality. In a similar way, outside study region was divided into 14 traffic zones, which included the immediate surrounding areas, adjoining Districts and neighboring States.

Base year inter-city travel characteristics of passenger and goods movements were obtained by conducting Origin-Destination survey of a sample number of motor vehicles passing through major outer cordon locations on roads and of passengers alighting and boarding at the railway station located within Cherthala town.

❖ O-D of passenger trips

A total of 203,681 passenger trips were performed as inter-city trips in the study region on a day. The major traffic generating zones within the study region was the CBD area and surrounding area with 19,171 trips constituting 9.41 % of the total trips. As many as 17,867 inter-city trips (8.77%) originated from Cherthala south area. Arattuvazhi area generated 13,934 inter-city trips which were 6.84 % of the total trips. Cherthala North and Railway station area were the other major traffic generating points with more than 11,000 inter-city trips each. In the case of external zones within Alappuzha district, the major traffic generating zones were Northern parts of Alappuzha district (33,227 trips), and other southern parts of the district (18,753 trips). Western part of the district generated 12,467 trips. Trips originated from other districts were 19,653 trips, the major component being Ernakulam District. A total of 22 inter-State trips were performed in the study region.

An analysis of inter-city trip attractions revealed that Cherthala South area attracted 20,536 inter-city passenger trips from various zones, CBD area attracted 15,742 trips, Nedumprakkadu area, Arrattuvazhi and Cherthala North area were the zones which attracted trips more than 14,000 trips each. Among the external zones, the highest number of trips was from southern part of the District with 26,310 trips, followed by Northern part of the district (23,030 trips). Other southern districts including Thiruvananthapuram district attracted 4,108 trips. Other States including Tamil Nadu attracted only 26 trips.

The O-D pattern of inter-city passenger traffic revealed that there were 92,364 internal - external trips (Study region to outside study region), out of 203,681 inter-city passenger trips. They constituted 45.35 % of total trips. A total of 86,244 trips were external - internal trips (outside study region to study region) constituting 42.34 % of the total trips.

Distribution of inter-city daily passenger trips according to mode of travel and mode of travel & occupation of trip makers is given in *table 11.4* and *table 11.5*. Origin-destination matrix of inter-city daily passenger trips by all modes in Cherthala town is given in *table 11.6*.

Table 11.4 Distribution of inter-city daily passenger trips according to mode of travel & occupation of trip makers

Sl.No.	Occupation of trip	Type of vehicle							
		Bus	Mini-bus	Car	Auto	Two wheeler	Train	Total	Per cent
1	Government service	7642	450	1205	196	1584	176	11,253	5.52
2	Private service	57540	3575	8021	3305	6652	1170	80,264	39.41
3	Industry service	1150	66	235	272	188	34	1,945	0.96
4	Business	38095	2329	5453	1354	2257	796	50,284	24.69
5	Professional	4405	349	957	0	97	140	5,948	2.92
6	Cultivator	0	0	0	42	81	0	123	0.06
7	Casual laborer	20147	1142	3203	3163	3299	467	31,422	15.43
8	Retired	4565	284	653	661	319	95	6,577	3.23
9	Unemployed	998	93	295	90	127	43	1,645	0.81
10	Housewife	1697	116	298	1396	104	43	3,655	1.79
11	Student	6452	376	899	468	1781	131	10,107	4.96
12	Others	228	19	63	41	97	9	458	0.22
	Total	**142,920**	**8,800**	**21,282**	**10,988**	**16,586**	**3,105**	**203,681**	**100**

Inter-city movement of goods to the tune of 2,000 MT was carried out over the study region. The major traffic generator of goods traffic within the study region was Cherthala North area with 210 tonnes (10.5%) most of them bound for other districts within the State. Among the zones outside the study region but within Alappuzha district, traffic generation was high from Ernakulam district.

Similarly in the case of goods traffic attraction, Cherthala railway station area had the dominant share with 331 tonnes, followed by Cherthala south area with 253 tonnes. Among the external zones, Alappuzha district excluding the study region had attracted 419 tonnes while Ernakulam district attracted 377 tonnes, all other districts together attracted 173 tonnes.

A further study of the goods traffic pattern observed within the study region vis-a-vis the outside study region revealed that 601 tonnes of traffic originated from the study region and 1,032 tonnes of traffic terminated in the study region.

The origin-destination matrix of inter-city goods traffic is shown in *Table 11.7*.

Table 11.5 Distribution of inter-city daily passenger trips according to mode of travel & purpose of trip

Sl. No	Originating region	Terminating zones				Total	Percent
		Cherthala study area	Alappuzha district	Other districts	Other States		
	Bus						
1	Cherthala study area	-	56,870	6,612	-	**63,482**	**44.42**
2	Alappuzha district	53,846	7,235	4,351	-	**65,432**	**45.78**
3	Other districts	7,913	3,703	2,390	-	**14,006**	**9.8**
4	Other States	-	-	-	-	-	-
	Total	**61,759**	**67,808**	**13,353**	-	**142,920**	**100**
	per cent	**43.21**	**47.44**	**9.34**	-	**100**	
	Mini-bus						
1	Cherthala study area	-	3,550	369	-	**3,919**	**44.53**
2	Alappuzha district	3,359	462	266	-	**4,087**	**46.44**
3	Other districts	448	224	122	-	**794**	**9.02**
4	Other States	-	-	-	-	-	-
	Total	**3,807**	**4,236**	**757**	-	**8,800**	**100**
	per cent	**43.26**	**48.14**	**8.6**	-	**100**	
	Car						
1	Cherthala study area	-	7,958	1,896	-	9,854	**46.3**
2	Alappuzha district	5,286	1,285	1,019	-	7,590	**35.66**
3	Other districts	1,908	993	937	-	3,838	**18.03**
4	Other States	-	-	-	-	-	-
	Total	**7,194**	**10,236**	**3,852**	-	**21,282**	**100**
	per cent	**33.8**	**48.1**	**18.1**	-	**100**	
	Auto						
1	Cherthala study area	-	5726	147	-	**5873**	**53.45**
2	Alappuzha district	4898	144	73	-	**5115**	**46.55**
3	Other districts	-	-	-	-	-	-
4	Other States	-	-	-	-	-	-
	Total	**4,898**	**5,870**	**220**	-	**10,988**	**100**
	per cent	**44.58**	**53.42**	**2**	-	**100**	
	Two wheeler						
1	Cherthala study area	-	6,990	839	-	**7829**	**47.2**
2	Alappuzha district	6,319	912	276	-	**7507**	**45.26**
3	Other districts	948	267	35		**1250**	**7.54**
4	Other States		-	-	-	**0**	-
	Total	**7,267**	**8,169**	**1,150**	-	**16,586**	**100**
	per cent	**43.81**	**49.25**	**6.93**	-	**100**	
	Train						
1	Cherthala study area	-	1231	154	22	**1407**	**45.31**
2	Alappuzha district	1118	154	92	-	**1364**	**43.93**
3	Other districts	175	80	**53**	-	**308**	**9.92**
4	Other States	26	-	-	-	**26**	**0.84**
	Total	**1,319**	**1,465**	**299**	**22**	**3,105**	**100**
	per cent	**42.48**	**47.18**	**9.63**	**0.71**	**100**	
1	Cherthala study area	-	**82,325**	**10,017**	**22**	**92,364**	**45.35**
2	Alappuzha district	**74,826**	**10,192**	**6,077**	-	**91,095**	**44.72**
3	Other districts	**11,392**	**5,267**	**3,537**	-	**20,196**	**9.92**
4	Other States	**26**	-	-	-	**26**	**0.01**
	Total	**86,244**	**97,784**	**19,631**	**22**	**203,681**	**100**
	per cent	**42.34**	**48.01**	**9.64**	**0.01**	**100**	

Table 11.6 Origin-destination matrix of inter-city daily passenger trips by all modes

Origin	Destination																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	-	-	-	-	-	-	1,091	5,859	-	3,426	415	2,712	311	1,718	87	-	70	53	-	-	**15,742**
2	-	-	-	-	-	-	5,087	5,329	104	4,841	297	1,385	2,450	373	303	-	367	-	-	-	**20,536**
3	-	-	-	-	-	-	2,439	3,101	-	1,580	434	1,894	1,048	1,314	-	-	-	-	12	10	**11,832**
4	-	-	-	-	-	-	1,741	4,343	344	1,992	453	2,376	1,039	1,849	87	-	-	-	-	-	**14,224**
5	-	-	-	-	-	-	2,103	5,037	141	1,895	651	2,678	52	1,257	263	-	53	176	-	-	**14,306**
6	-	-	-	-	-	-	2,686	5,887	232	2,440	742	811	879	1,938	-	-	-	109	-	-	**15,724**
7	5,435	3,885	2,368	2,114	2,717	5,978	-	272	-	1,621	446	-	-	1,446	-	-	28	-	-	-	**26,310**
8	4,820	2,110	3,465	2,290	3,963	2,550	778	-	73	832	-	-	200	851	-	35	1,063	-	-	-	**23,030**
9	1,473	461	362	972	76	199	25	950	-	378	161	-	388	84	-	-	107	28	-	-	**5,664**
10	1,294	1,196	1,669	2,241	1,195	948	806	628	159	-	107	200	25	418	70	-	720	-	-	-	**11,676**
11	213	692	733	228	81	-	52	131	224	104	-	28	-	-	-	-	142	-	-	-	**2,628**
12	1,933	2,269	323	1,681	481	1,086	284	113	39	215	-	-	-	78	-	-	333	-	-	-	**8,835**
13	2,173	3,778	1,005	1,102	823	2,444	-	396	-	479	78	-	-	240	-	-	434	-	-	-	**12,952**
14	1,778	2,541	1,452	1,617	825	530	1,221	291	472	143	-	-	-	-	217	-	1,480	-	-	-	**12,567**
15	52	324	-	935	-	-	-	172	-	284	-	-	-	551	-	-	-	-	-	-	**2,318**
16	-	572	284	-	-	161	-	-	-	576	-	197	-	-	-	-	-	-	-	-	**1,790**
17	-	39	168	76	-	38	440	718	-	216	351	186	-	936	28	129	-	87	-	-	**3,412**
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	109	-	-	-	**109**
19	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**18**
20	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8**
Total	**19,171**	**17,867**	**11,855**	**13,256**	**10,161**	**13,934**	**18,753**	**33,227**	**1,788**	**21,022**	**4,135**	**12,467**	**6,392**	**13,053**	**1,055**	**164**	**4,906**	**453**	**12**	**10**	**203,681**

Table 11.7 Origin-destination matrix of inter-city daily goods traffic in Cherthala town

Origin	Destination																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
1	-	-	-	-	-	-	11.14	3.21	-	32.72	3.37	-	-	81.71	-	-	-	2.51	-	-	**134.67**
2	-	-	-	-	-	-	5.61	96.87	-	7.65	-	6.64	-	132.72	3.92	-	-	-	-	-	**253.41**
3	-	-	-	-	-	-	22.18	64.34	-	39.79	-	76.45	-	53.49	-	-	-	74.29	-	-	**330.53**
4	-	-	-	-	-	-	5.83	98.77	44.57	8.38	-	0.59	-	28.31	-	-	-	-	-	-	**186.46**
5	-	-	-	-	-	-	11.45	20.15	15.53	-	-	5.47	4.33	34.87	-	-	-	-	-	-	**91.80**
6	-	-	-	-	-	-	-	1.27	-	0.13	-	-	-	33.43	-	-	-	-	-	-	**34.83**
7	-	-	3.25	2.08	-	17.16	-	4.78	-	8.92	-	-	-	-	-	-	-	-	-	-	**36.19**
8	3.37	37.87	37.28	117.72	-	2.47	42.58	-	0.35	-	-	-	-	-	0.26	-	2.50	-	-	-	**244.38**
9	-	-	-	-	-	-	-	27.01	-	-	-	-	-	-	-	-	-	-	-	-	**27.01**
10	-	-	7.76	29.88	7.76	-	2.76	-	-	-	-	-	-	7.43	-	-	24.23	-	-	-	**79.83**
11	-	-	-	6.25	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7.03**
12	-	5.42	6.92	-	-	-	-	5.80	-	-	-	-	-	-	-	-	-	-	-	-	**18.14**
13	-	-	3.54	-	-	-	-	-	-	3.33	-	-	-	-	-	-	-	-	-	-	**6.87**
14	57.51	-	13.19	42.60	94.80	54.68	20.52	0.54	7.20	2.50	-	-	-	-	-	-	83.06	-	-	-	**376.61**
15	-	-	-	-	-	-	-	5.61	-	-	-	-	-	-	-	-	21.90	-	-	-	**27.51**
16	-	4.16	-	-	1.01	-	-	-	-	3.50	-	-	-	-	-	-	-	-	-	-	**8.66**
17	-	6.92	24.89	-	-	-	7.20	6.28	-	26.53	-	-	-	31.84	0.11	-	-	-	-	-	**103.76**
18	-	-	-	11.23	-	-	21.05	-	-	-	-	-	-	-	-	-	-	-	-	-	**32.28**
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

❖ Modal split

• Modal split of passenger traffic

The inter-city passenger transport in Cherthala is predominantly met by road based KSRTC buses, private buses, mini-buses, train and a host of personalized vehicles like 4-wheelers, two-wheelers etc. An analysis of the O-D survey data collected from outer cordon survey locations revealed that an estimated 2,03,681 inter-city passenger trips were performed in the study region on a reference day consisting of 1,42,920 bus passenger trips (70.17%), 30,082 mini bus/ car, van, jeep trips (14.77%), 10988 autorickshaw trips (5.39%), 16,586 two wheeler trips (8.14%) and 1.52 percent of train passenger trips. It could be inferred that public transport had a significant role in meeting the inter-city passenger demand. *Table 11.8* gives the modal split of inter-city passenger traffic in Cherthala town. *Figure 11.2* presents the same in a pie diagram.

Table 11.8 Modal split of inter-city daily passenger traffic in Cherthala town

Modal Split of Inter-town Daily Passenger Trips in Cherthala			
Sl. No.	**Mode of Travel**	**No.of Passengers**	**% of Passengers**
1	Train	3,105	1.52
2	Bus	142,920	70.17
3	Mini-bus	8,800	4.32
4	Car	21,282	10.45
5	Autorikshaw	10,988	5.39
6	Two wheeler	16,586	8.14
	Total	**203,681**	**100.00**

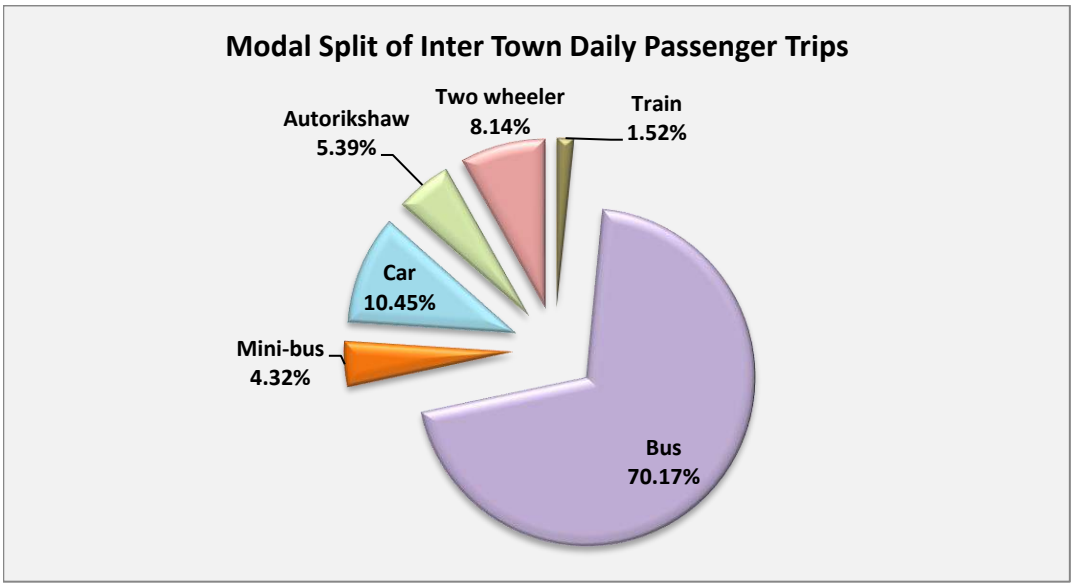


Figure 11.2 Modal split of inter-city daily passenger traffic in Cherthala town

The number of passengers travelling by bus is more. It could be inferred that public transport had a significant role in meeting the inter-city passenger demand.

❖ Modal split of goods traffic

A total of 9153 goods vehicles were found to be involved in carrying goods traffic to and from the study region, consisting of 4654 trucks, 3457 mini-trucks and 1042 goods autos. Trucks carried the maximum volume of goods traffic (77.67%), followed by mini-trucks (19.84%). The remaining 2.49 per cent of goods traffic was handled by goods autos. *Table 11.9* gives the modal split of inter-city daily goods traffic in Cherthala town.

Table 11.9 Modal split of inter-city daily goods traffic in Cherthala town

Modal spilt of inter-city daily goods traffic (in tonnes) in Cherthala Town					
Sl.No.	Mode	No.of Vehicles		Quantity Carried	
		No.	Percent	Tons	Percent
1	Truck	4654	50.85	12,087	77.67
2	Mini Truck	3457	37.77	3,087	19.84
3	Goods Autorikshaw	1042	11.38	387	2.49
	Total	**9153**	**100**	**15,562**	**100**

❖ Freight transport

Out of the 2,000 tonnes of inter-city goods traffic observed through outer cordon survey stations, maximum volume of 662 tonnes were observed in the case of Agricultural product goods including milk and milk products ,coconut and copra, beverages and cattle feed, followed by Industrial goods 600 tonnes were including Stationery items, coir and coir products and Electrical goods (33.00%), followed by Construction materials with 570 tonnes (28.5 %), 76 tonnes of petroleum products (3.8%) and 31 tonnes of miscellaneous items (1.6%).

❖ Parking survey

Parking surveys were carried out on major road sections of Cherthala study area to obtain the peak parking demand and parking duration of various categories of vehicles on these road sections. *Table.11.10* shows peak parking accumulation observed on major corridors.



Road side parking in Cherthala town

Table 11.10 Parking accumulation of different road sections in Cherthala town

Parking Accumulation at Different Road Sections in Cherthala Town											
Sl. No.	Road Section/Location	Peak Parking Time	Type of Vehicle								Total (No)
			Bus	Mini Bus	Car	Passenger auto	Two-Wheeler	Truck	Mini Truck	Goods auto	
	Iron Bridge Road										
1	Pvt Bus Stand - St.Marys	04.00 PM	0	0	14	15	18	1	2	0	**50**
2	St.Mary's - Pvt Bus stand	06.00 PM	12	0	0	39	0	0	0	0	**51**
	Old NH										
3	X-ray Jn - Devi Temple	10.00 AM	0	2	51	14	15	0	4	0	**86**
4	Devi Temple - Court Jn	10.30 AM	0	0	24	15	14	0	0	0	**53**
5	Court Jn - Iron Bridge	10.30 AM	0	0	36	14	11	0	2	0	**63**
6	Iron Bridge – Manorama Jn	10.30 AM	0	0	14	7	16	0	0	0	**37**
	Kottayam Road										
7	Temple - GHS Jn	04.30 PM	0	0	17	5	11	0	0	0	**33**
	Market Road										
8	Nadakkavu – Manorama Jn	05.30 PM	0	0	34	35	26	0	0	0	**95**
9	Nadakkavu - Pvt. Bus stand	04.30 PM	0	0	2	8	44	0	0	0	**54**
10	Nadakkavu – Kambikkal Jn	04.30 PM	0	0	18	21	18	1	4	0	**62**

It could be seen that the road section between Nadakkavu Jn and Manorama Jn (on Old NH road) had the highest parking accumulation of 95 vehicles, followed by 86 vehicles on Alappuzha road, 63 vehicles on the road section between Court Jn and Iron bridge Jn. In all the eastern part of Cherthala town was found to be the major parking corridor due to the concentration of major commercial activities of the town.Majority of the vehicles parked at most of parking corridors were found to be for short duration of less than 30 minutes. 67 to77 % of the vehicles parked on selected parking corridors were found to be parked for duration less than 30 minutes. 12 to 29 % of these vehicles were parked for a period ranging between 30 minutes and one hour. Long duration vehicles constituted only around 5 % of the total vehicles.

❖ Major corridors

Cherthala town has a good network of roads. National Highway 66 Cherthala bypass is passing through the outskirt of the CBD area and has a length of about 5.5 km. The old NH – 66 (Ottappunna Jn – x ray junction) through the central area of the town, has a length of 5.6 km with varying widths of carriageway. Cherthala – Thanneermukkam road bound for Kottayam is passing through Thanneermukkam bund, which is one of the important PWD roads

passing through the town. Cherthala- Arookutty road forks out from Cherthala town at Court Jn and ends at Chenganda bridge. Cherthala -Vayalar road is another important road, which meets the travel requirement of people between Ernakulam district and Cherthala. Cherthala – Arthungal road and Cherthala – Kanichikulangara road are the main roads, which connect the CBD area with the western parts of the town. Apart from these roads, there is Muttam Bazar road, Chenganda – Muttathipparambu road and other roads, which are passing through the town.

11.4. Parking facilities

Facilities for parking of private vehicles as well as public carriers are vital for the smooth functioning of the traffic system of any town. In most of our towns commercial buildings have come up without adequate parking facilities due to various reasons. The vehicles coming to these commercial centers are forced to park in the public roads seriously reducing the carrying capacity of these roads. The draft transport policy for the state states that "For existing buildings /commercial complexes built without providing adequate parking space, such parking facilities will be built off-street by the local bodies at suitable locations and costs from the building owners." Further the policy outlines the initiatives required by the government by saying "Open and multi-storied parking facilities will be constructed by the government at important terminals, market centres multi-modal logistic centres to promote inter-modal. In Cherthala town there are no designated parking spaces for private vehicles. So the vehicle owners park on the road on a first come first basis creating chaos. The narrowness of the town roads do not allow on street parking without affecting traffic flow. However there are some designated areas for public carriers.





Authorised Taxi and Auto Stand

Taxi stands available at Temple junction only. There are a number of authorized auto stands in the municipality located at Temple Jn, Court Jn, Muttom Bazar, Manorama Jn and Iron Bridge. Mini Lorries is popular in Chertha town catering to the goods movement in small quantities. They have parking facilities at Muttom bazaar and Iron bridge.



Lorries parked near private bus stand

11.5. Truck terminals

There are no organized truck terminals in the municipality. The trucks and other goods vehicles are

operating from the road sides. The need for truck terminal (without allowing kerb parking) is strongly felt.

11.6. Prime Issues and Problems

The major traffic and transportation problems facing Cherthala town are,

- Heavy movement of vehicular traffic through the CBD area of Cherthala town
- Inadequate carriageway width of Cherthala -Kottayam road between Kalikulam Jn and GHS Jn
- Heavy concentration of commercial activities on the main road and the resultant parking and pedestrian activities
- Heavy unorganized on-street parking on the main road and High movement of pedestrians in front of bus station
- Movement of inter-city bus traffic due to the location of intercity-bus station within the central area of the town;
- Lot of turning movements at Devi temple Jn, Manorama Jn and the resultant traffic conflicts and congestion;
- Encroachment of right-of-way by hawkers, parking of vehicles on the main Devi temple Jn and Manorama Jn in all the arms;
- Absence of adequate design for major junctions along NH and bye pass road like Devi temple Jn, Court Jn, and Iron bridge Jn .Manorama Jn on Alappuzha – Ernakulam road and Arthungal road Jn on NH 66.

11.7. *Inference*

The coverage of road network is good except for some missing links. But, the width of most of the roads is not adequate even for the present traffic volume. The section of the National Highway passing through the town is overcrowded. There are number of junctions in the municipality with volume exceeding their capacity, which require immediate improvements in geometry. Safe passage of pedestrians in the town centres is another issue to be tackled. The number of passengers travelling by bus is more. It could be inferred that public transport had a significant role in meeting the inter-city passenger demand. There is a dearth of parking spaces for private vehicles in the municipality causing kerb parking affecting the carrying capacity of the roads. A proper truck terminal is needed for the development of trade and commerce in the town.

Chapter-12

Water Supply

12.1. Existing water supply system

Majority of the Municipal population depend on domestic wells and water supply scheme for domestic purposes. According to socio economic survey, the various sources of water were identified as in *Figure 12.1*.

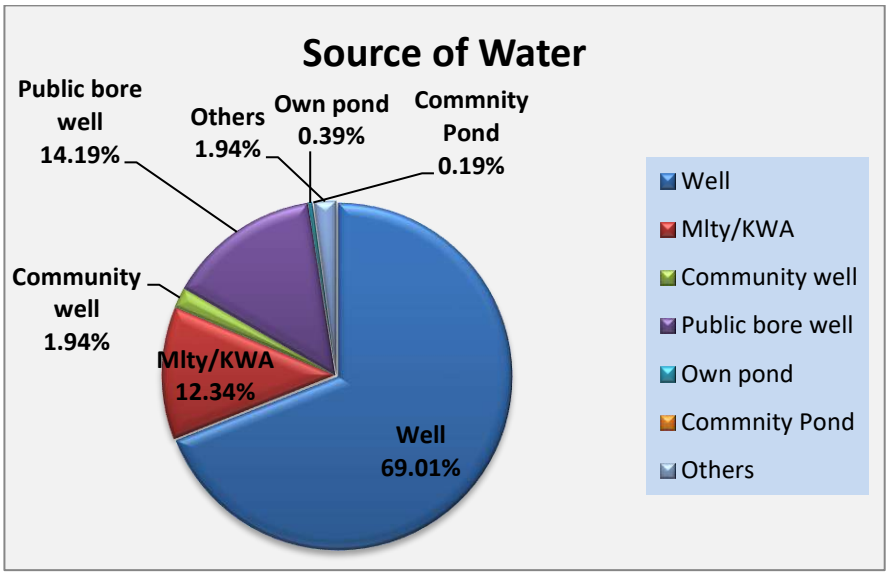


Figure 12.1 Source of water



OHSR KWA

The Japan Water Supply Scheme executed by Kerala Water Authority for providing an uninterrupted supply of drinking water for the people of entire Cherthala taluk is one of the five Mega water supply project implemented in the state under the cited scheme. The scheme covers Cherthala Municipal town and all the Grama panchayats included in 13 villages of Cherthala taluk. The funding agency is the Japan International Cooperation Agency (JICA). The agreement for the project was executed on 23 February 1997 between the OECF and the Government of India. According to the agreement, the Government of India is the borrower and the (KWA) Kerala Water Authority is the executing agency. The project aims at augmenting and rehabilitating the water supply systems of two urban regions, namely Kozhikode and Thiruvananthapuram, and to construct water supply for three rural regions, namely Pattuvam of Kannur district, Cherthala of Alappuzha district and

Meenad of Kollam district. The water source for the Cherthala project area is Muvattupuzha River at with intake at Kulampoorkadavu near Aryankavu. The Water from Moovattupuzha River is brought to Makkekadavu treatment plant, treated and stored there and then supplied to Water tanks located in various villages of Cherthala Taluk. The scheme was commissioned in January 2012.

Water is pumped from Kulmburkadavu intake well to the treatment plant at Thaikattusserry which is having a capacity of 107 MLD. The Water from Moovattupuzha River is brought to Makkekadavu treatment plant, treated and stored there and then supplied to 2 Water tanks located in Pazhamkulam and X-ray junction and having capacity of 47.7 lakh ltrs and 10.70 lakh ltrs respectively. 5 MLD of water supply is possible in Cherthala Town from this scheme. At present 2.9 MLD of water is supplied to the town. The length of distribution pipes is 162Kms. Major portion of the water supplied by KWA is through Public taps followed by domestic connection.

Table 12.1 Consumption details of water 2015

Category	Av. Monthly consumption in kilo litres
Domestic	80000
Non-domestic	3500
Industrial	125
Public taps	3750
Total	87375

The consumption details of water from the water authority is given in table 12.1.

12.2. Scarcity

Shortages in water supply do exist in 3 wards of Cherthala town. According to the data collected in the socio-economic survey about 88% of the houses have no scarcity of water. The nature of scarcity as per socio economic survey is shown in *Figure. 12.2*.

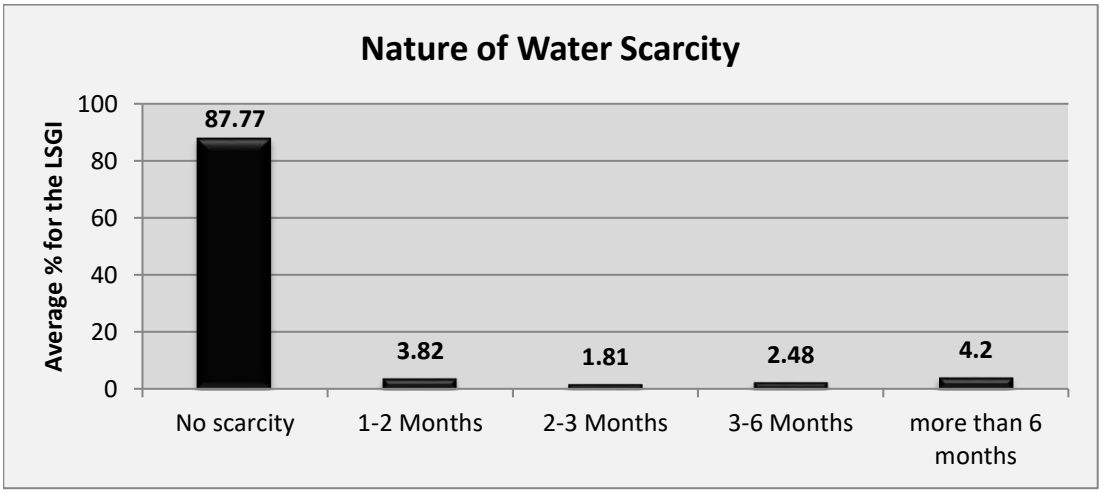


Figure 12.2 Nature of water scarcity

3.82% of the households are facing water scarcity for 1-2 months, 1.81% are reported with scarcity for 2-3 months, 2.48% are reported with scarcity for 3-6 months and 4.2% of the households are with scarcity for more than 6 months. The socio economic survey was conducted in early 2013. Even though JICA project was commissioned in 2012, after the initial dilemma of the citizens to the paid water supply system, the house connections were in full fledge only by late 2013. The scarcity mentioned in the socio economic survey is now fully addressed by this project.

Results of socio-economic survey reveal that most of the houses have water sources within their yard. Most of the houses have wells or ponds in their compound. The water quality is good. Major chemical constituents lie within the permissible limits. The average ground water table depth in this area is 0.5m. The distance to the source is given in Figure 12.3.

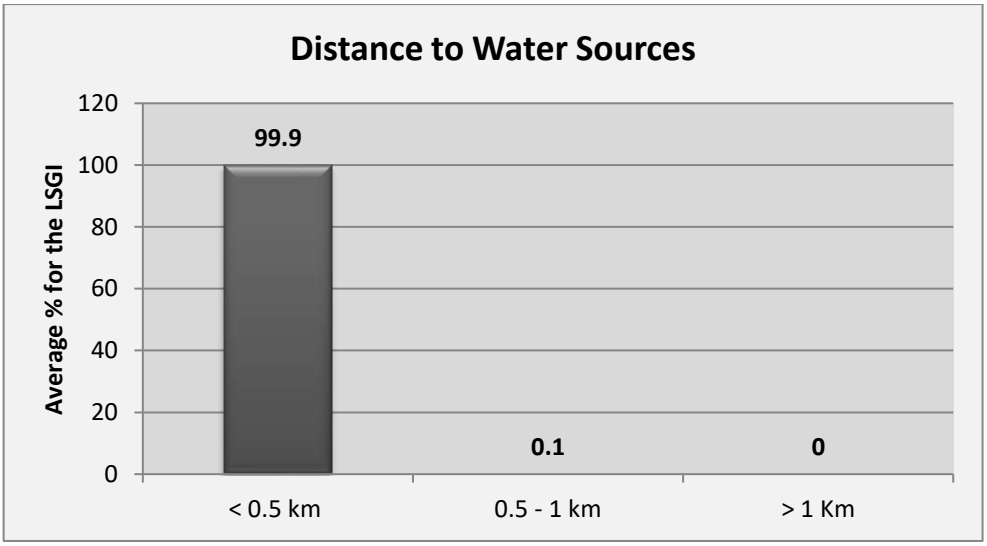


Figure 12.3 Distance to water sources

The population of Cherthala town was 45,827 in 2011. Taking into consideration the future growth prospects, it can be assumed that the population of town may grow to 50,000 by 2031. As per URDPFI guidelines, for a town with piped water supply but without sewerage system, recommended maximum water supply level is 70 lpcd. Assuming a per capita consumption of 70 lpcd, the total quantity of water to be supplied for a population of 50,000 is approximately 3.5 MLD. At present 2.9 MLD of water is supplied to Cherthala town. But the present water supply project is able to supply 5 MLD of water to the town. This shows that as per standards the supply is sufficient. But according to URDPFI guidelines, for a town with piped water supply where sewerage system is existing /contemplated, recommended maximum water supply level is 135 lpcd. Assuming a per capita consumption of 135 lpcd, the total quantity of water to be supplied for a population of 50,000 is approximately 6.75 MLD. At

present only 5MLD of water is supplied to Cherthala town. This shows that as per standards there will be a shortage of 1.75 MLD of water in 2031 if a public sewerage system is proposed.

12.3. Problems and potentials

As per socio-economic survey conducted, the residents of the town attached only 8.12% priority for the development to water supply, which indicates that people are satisfied by the present availability of water. Even though standards are met in majority of the areas, the people's expectation regarding quantity and quality of water is high as experienced throughout the state. Major source of the water supply scheme for Cherthala town is Muvattupuzha River. The project was completed from the source upto the storage tank including water treatment plants. the distribution network are nearly 35 years old. Most of the pipe lines are very old and the water pressure causes frequent failures and require frequent maintenance. It is noted that there is about 25% loss of water during distribution due to the faults in the distribution system. The poor level of sanitation in the town causes percolation of polluted waters into the sub soil polluting the underground resources. Therefore, open shallow wells cannot be continued in a big way as a source of water for too long.

12.4. Inference

People in this town mostly depend on well water since the water quality in this area is good. The water quality is good. Major chemical constituents lie within the permissible limits. The average ground water table depth in this area is 0.5m. As per planning standards the quantity of water supplied is sufficient. The distribution lines laid in 1980's are too aged to carry water under pressure. Major portion of the existing distribution system has been laid almost 35 years ago. Cast iron Pipe, AC pipe and PVC pipes are used for the distribution purpose and these are broken at many points which may account for the wastage of almost 25% of water. Therefore replacement of distribution pipes is a major need for the proper functioning of the system. In addition uninterrupted supply of potable water has to be ensured as a part of the efforts for improving the quality of life of the people. Proposals under water supply sector have to be evolved in this consideration.

Chapter-13

Sanitation

The factors affecting sanitation of the town, i.e, drainage, solid waste management and sewerage are discussed in this chapter

13.1. Drainage

Surface water drainage has emerged as an important component of the urban development sphere in Kerala. Many urban area changes have contributed to this situation. The per capita land availability in urban areas is decreasing at a fast rate. Majority of the residential plots have less than 400 sq.m of area. Such plots of land are almost fully occupied by buildings or are paved. There is hardly enough open ground within the building plot to allow percolation of rainwater and waste water into the soil. Therefore such surface water from the individual plots is let off into the street drains.

The towns and cities in Kerala have witnessed fast densification due to population increase. All available vacant parcels of land, open spaces and erstwhile low lying lands and paddy fields are facing landuse conversions. At the present pace of landuse conversions, open land to allow collection of storm water during rains to permit percolation into the soil or to allow its slow discharge into the natural streams/manmade drains are fast getting depleted. This is especially true in the case of low lying lands and paddy fields that act as drainage basins. In view of this, water during storms and high intensity rains cause flash floods in many areas of our towns and cities. The available road side drains are not designed to carry such large quantities of water.

The physical terrain of towns in the midland areas of Kerala gives rise to formation of natural areas which are bowl shaped or low lying, which stagnate water during rains. Similarly there were many ponds, which acted as rainwater collection basins. It is sad to notice that Ponds which still exist in many of the urban areas are not incorporated in the drainage network and conserved. On the other hand, these are getting fast depleted because of land conversions due to filling up of these low lying land parcels for construction activities.

The faster pace of development and the resultant land use changes/conversion of low-lying lands and water courses have adversely affected the natural system of drainage in our settlements and have increased the need for urban surface drainage to be dealt with as an important urban infrastructure component in the urban areas of Kerala.

❖ Existing drainage network

Only 20 % of the roads in Cherthala town have side drains. The existing drains are also in a deteriorating stage- some of them are broken and blocked, obstructing the flow of water in the drains. These drains are constructed along the slope of the road not taking into consideration the alignment of any major canals. Most of these drains do not even end in any canals or water bodies.

Earlier the town had a low density development. Therefore many of the patches of paddy fields and low lying land parcels could absorb storm water during the monsoons. During the recent period, these privately owned properties are getting filled up and are being converted into building plots. In the process the natural drainage basins disappear and water stagnates on the roads.

Most of the commercial establishments have outlets to let off waste water into these drains. Disposal of rubbish and garbage through these outlets clog these drains. This becomes a problem during the rainy season when the drains overflow and the waste water is let out into the roads and other public spaces. Such flooding of roads and low lying pockets within the town causes mosquitoes to breed in these water pools. Chances of occurrence of water borne diseases are high in the town.

The most important surface water discharge outlet in Cherthala town is AS canal. All the secondary canals are linked to AS canal. The road side drains wherever they exist are connected to these canals through secondary canals. This canal discharges into Vembanadu backwaters situated on the northern side of the town. This canal is fed by a large number of small and big drains which run along the roads in many parts of the town.

The AS canal passes through the town centre. This canal is linked Vembanadu backwaters.

❖ Identification of gaps in the network

AS canal, which runs through the town, has been converted into a dump yard for solid waste and a sewer during the last few years. Urban Drainage Master Plan for the town has not been attempted. The town does not have an organized and a planned system of road side drains. Many of the road side drains are not designed for taking storm water flowing into these drains. A cluster of drains without inter connectivity or a hierarchical pattern does not form a network. This should be made to a network by correcting the geometry of existing drains and adding the missing links.

❖ ***Inference***

The drainage network of the town needs total revamping. Dredging, cleaning and side protection to AS canal in the form of a buffer is needed. There should be a planned provision of roadside drains for all the roads.

13.2. Sewerage system

❖ **Existing system**

Cherthala Town has no public sewerage system at present. The general practice in Cherthala town for disposal of sewage is to resort to septic tanks. However, many households still adopt soak pits, E.S.P type/ two pit latrines etc. It is noticed that there are a few houses even without sanitary latrines particularly in the slums. The wastes from the markets, hotels, commercial establishments and other public buildings are washed off directly into the road side drains. During rainy seasons, these drains overflow, spilling such sullage and sewage onto the roads and the open yards of nearby houses. A major share of this untreated waste water ends up in the canals causing foul smell and water pollution. Such polluted and stagnating water bodies form breeding beds for mosquitoes.

An issue, which is of major concern regarding the disposal of waste water in Cherthala, is that the waste water from hospitals is presently let out into the drains.

❖ **Treatment facilities**

Socio economic survey conducted in Cherthala town in connection with preparation of Master Plan shows that about 77.55% of people are using septic tank and 18.24% of the people depend on Pit latrine. About 69% of the town population depend on open well for drinking water. Sewage and septage disposal through soak pit or pit latrines pollute subsoil water. The households do not have latrines resort to open defecation into the water bodies only 4.9% resort to of this. Sewerage system does not exist in the town. The waste water is disposed without any treatment. The untreated waste water either end in the canals or in the underground water source causing epidemics.

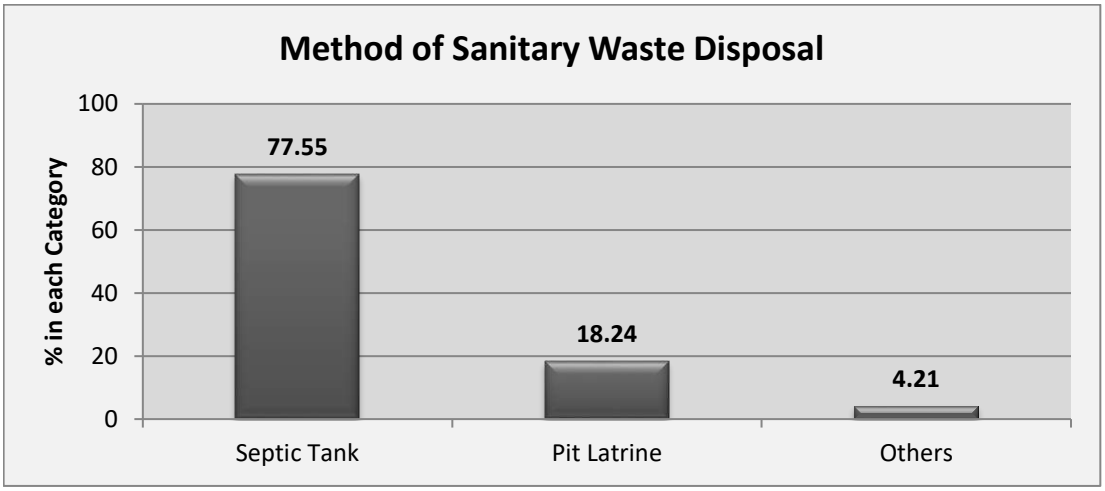


Figure 13.1 Method of sanitary waste disposal

Source: Socio economic survey 2013

❖ ***Inference***

The town does not have any facility for the treatment of waste water at present which poses a serious threat to the public health and environmental quality. The town is characterized by medium density of population with gross population density of 2977 persons per sq.km and ward wise population density varying between 1670 to 4151persons per sq.km. Further densification is anticipated for the area owing to inherent development potentials and locational aspects. So, the area has to be covered under a properly designed and developed public sewerage system. The flat terrain of the town demands a decentralized sewerage system as the flow of sewerage cannot be maintained in a centralized system.

13.3. Solid Waste Disposal

An urban area is characterized by concentration of people and concentration of non agricultural activities. In the process of its day to day activities the town generates large quantity of solid wastes. One of the important mandatory responsibilities of the local self government is management of solid waste collection and disposal. Most of the towns and cities in Kerala suffer from the absence of adequately designed sanitary and solid waste management arrangements suited to the particular town or city

❖ **Generation and collection**

Presently, Cherthala municipal area does not have a proper solid waste management system. Collection system covers only the central part of the town especially the commercial area. Majority of the garbage produced in residential areas are dumped in the backyard or into open spaces or road side drains. Street sweepings are also limited to the commercial

centre of the town. Solid waste collection fleet with the municipality is inadequate and not properly maintained.

The town has only two vehicles for the collection and transportation of waste. According to the municipal data, about 10.33 tons of waste is generated daily in the town centre, of which about 7.40 tons is collected and disposed at different dumping sites. This shows that only 71% of waste generated is collected. At present the municipal area does not have a solid waste treatment plant. The waste is dumped unscientifically in private yards for land filling and gravel is spread over the waste disposed, causing environmental pollution. Now the Municipality is spreading gravel over the waste disposed area which will pose a serious threat as the waste is not segregated and not properly treated.

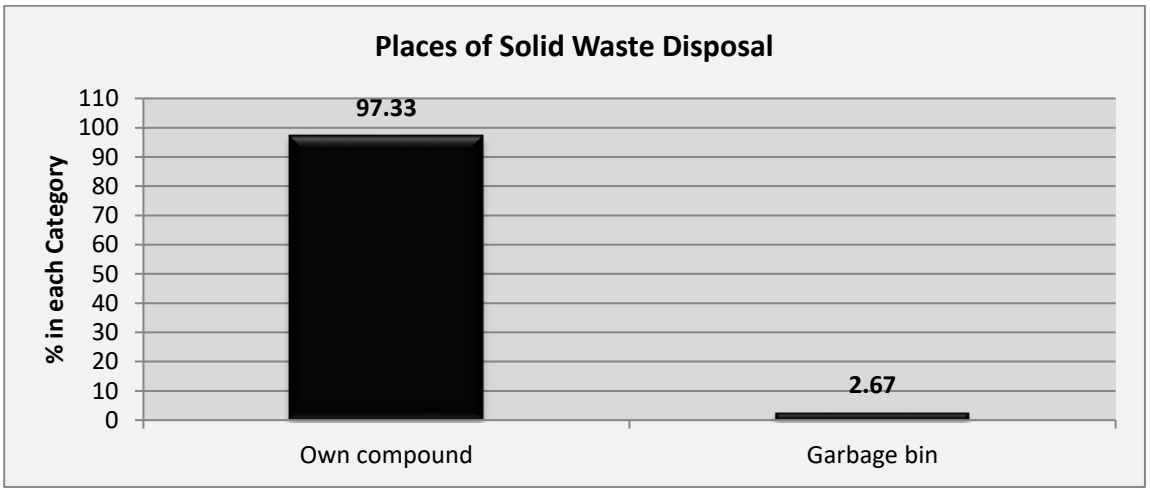


Figure 13.2 Place of solid waste disposal

Source: Socio economic survey 2013

The socio-economic survey reveals that 97.33% of people are disposing waste in their own compound and 2.67% in the garbage bins. The average plot size as per socio economic data is 16.75 cents, at present this type of disposal is feasible. But in future, as the plot gets subdivided the waste disposal may pose threat to the environment. The place of disposal of solid waste (own compound/garbage bins provided by the Municipality) as identified by the socio-economic survey is given in *Figure 13.2*. Collection of waste generated is as important as its treatment, but not well attended by the authorities.

❖ Existing treatment facilities

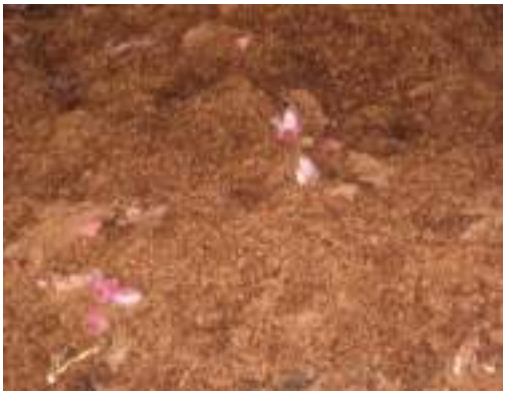
At present, the municipal solid waste from Markets, hotels, auditorium and other major institutions are collected by a private agency and treated after segregation. This project is undertaken by a private entrepreneur. The revenue for running the project is collected as fee levied for the waste collection Nearly 8 to 10 tons of waste is processed per day. Solid check aerobic fermentation technology is used for the treatment of solid waste. Composting is done by mixing the waste with bioclean in 1:1 ratio. The waste is converted to compost within 20 days. Bio clean is prepared from processed coconut pith by adding special bacteria. All the bio degradable solid waste can be converted to good compost within 15-20 days through bio clean technology. The required bio clean composting media is collected from Coimbatore.



Sorting of Waste

The following steps are adopted for waste treatment:

Waste is collected daily from each door before decay so that sorting becomes comfortable for the workers. Collected waste is sorted as plastics, vegetables, chicken/ fish waste, food waste etc. and separated. Vegetable waste is used as cattle feed, chicken waste is used as fish feed, food waste is used as pig feed and the remaining wastes including fish waste etc. are converted as manure through bio clean composting. Plastic is recycled. Approximately 4 tons of plastic waste are separated per month and sold at the rate of Rs. 2 to 12 per kg. This scheme is successfully is continuing since 5 years. But due to social and political issues, the treatment site has been shifted from the immediate vicinity of the town to a distant place in Chennampallippuram grama panchayath.



Waste with bio – clean layer

The bio medical waste from the hospitals in the town are collected by IMAGE (Indian Medical Association Goes Eco-friendly), the biomedical waste treatment and disposal project

of the Indian Medical Association. So threats from the improper disposal of biomedical waste is not a question here.

- ***Inference***

Solid waste is a problem in the municipal area. About 71% of solid waste generated in the town centre is collected by municipality but the town does not have a solid waste treatment plant. The waste collecting scheme is successfully continuing since 5 years. But due to social and political issues, the treatment site has been shifted from the immediate vicinity of the town to a distant place in Chennampallippuram grama panchayath. In the method adopted for more than 5 years, the segregation of waste can be done at the House Hold level or at the source itself, rather than the workers doing it through proper awareness among the citizens. For the Municipal proposal of gravelling the waste disposal area, proper precautionary measures must be taken for segregating the biodegradable & non biodegradable waste. The Solid state aerobic fermentation technology is a reliable model and may be followed for all the local bodies in the state.

Coming to the peripheral areas about 97% of the waste is disposed in own plots of individuals. As about 50% of the residences are in large plots (plot size ranging from 11 to 50 cents or more, the solid waste disposal in own compound, as of now, if disposed after proper segregation, does not pose a serious threat to the G.W. quality. But as the population increases, this need to be taken care of as the G.W. Table is high. The disposal of plastic & other chemical wastes also need serious attention due to the high G.W. Table. The ground water table depth in the town is 0.5m.

AS canal, which is linked to Vembanad lake, is the most important surface water discharge outlet in the town. The canal is highly polluted due to the dumping of solid waste and sewage, and also due to the discharge of storm water which gets polluted due to the waste accumulated on the road sides along with other impurities. This polluted water finally reaches the Lake creating various environmental as well as health issues.

Direct disposal of waste water from hospitals, hotels, commercial establishments and other public buildings into the drains are also creating health issues. Due to this practice the ground water sources are getting polluted. Pit latrines at Household level may pollute the subsoil as well as the ground water source.

Due to the plain terrain of the town, a decentralized sewerage & septage treatment method and a centralized solid waste treatment method may be adopted after proper studies on G.W. Table and water quality.

Chapter-14

Energy

Energy is the resource input by which the human civilization grows, and is considered to be a major input for urbanisation. Energy can be in various forms, of which electrical energy is the most adopted form of energy. Electricity has become a fundamental necessity for the development of any society and level of consumption of electricity is often considered an indicator of urbanisation. The intensity in conventional energy use has to be made less to protect our natural resources. The existing scenario in Cherthala Town, with respect to generation, distribution and consumption of power is studied in this chapter. The Kerala State Electricity Board is the single licensee responsible for power distribution in the town.



Electricity Distribution network in the town

14.1. Energy consumption: source wise break up

The major energy consumption is the electrical energy generated from hydro electric project. No other non-conventional energy is fed into the main grid. Petroleum products like diesel and petrol, biomass etc are also used.

14.2. Electrical Energy

In Cherthala Municipality the power distribution is carried out by the K.S.E.B. In the municipal area, major 3 substations such as Cherthala, Thaikattussery and SLPuram distribute electricity. There are two electricity offices in the town, one is near iron bridge and the other is towards south of Devi Temple. Under Deendayal Upadhyaya Gram Jyothi Yojana (DDUGJY) strengthening and augmentation of sub transmission and distribution infrastructure is being done by KSEB. Replacement of meters, transformers and transmission lines are being done under this project.

14.3. Consumption: sector wise break up

The consumption of electricity by various categories is considered. The details of number of power consumers in Cherthala town are shown in *Table.14.1.*

Table 14.1 Details of power consumers in the town

Category	2011	2012	2013
Domestic	18576	18871	19101
Commercial	4230	4408	4477
Agricultural	409	440	472
Industrial	304	316	327
Others	34	39	39

Source: KSEB

The number of power consumers is highest in domestic category, which is showing a constant increase from 2011 to 2013. The numbers of commercial, agricultural and industrial consumers have also increased. The trend in number of consumer is shown in *Figure.14.1.*

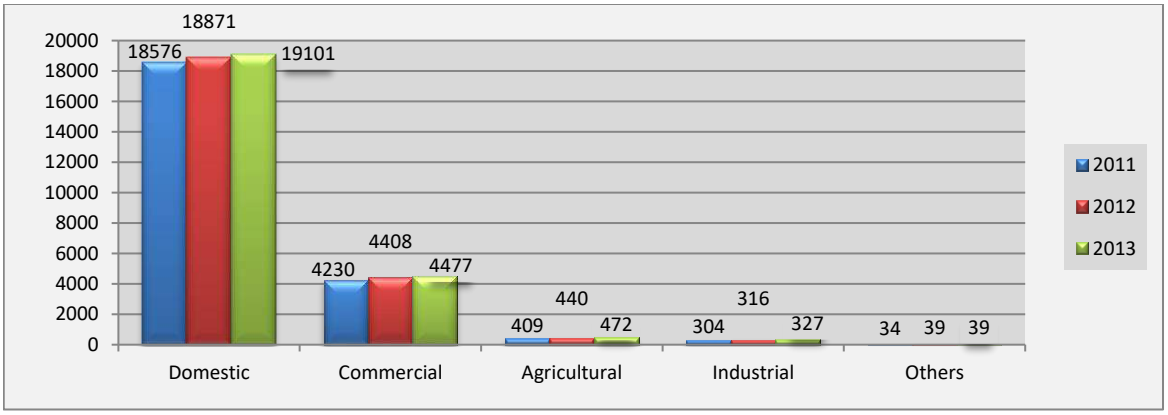


Figure 14.1 Variation in number of consumers

Source: KSEB

The figure shows that there is an increase in number of various categories of consumers. The power consumption details for various categories are shown in *Table.14.2.*

Table 14.2 Consumption of power by various categories of users

Category	2011(Kwh)	2012 (Kwh)	2013 (Kwh)
Domestic	15685733	17372041	18618391
Commercial	6100695	6531823	6662459
Agricultural	87627	117337	125551
Industrial	1459656	1504777	1733467
Others	132256	271500	284602

The consumption in all categories in Cherthala town has increased in 2013 compared to the previous years.

The total number of Transformers in Cherthala town is 164. There are no areas with frequent power cuts or low voltage. The distribution of power is only by over head lines.

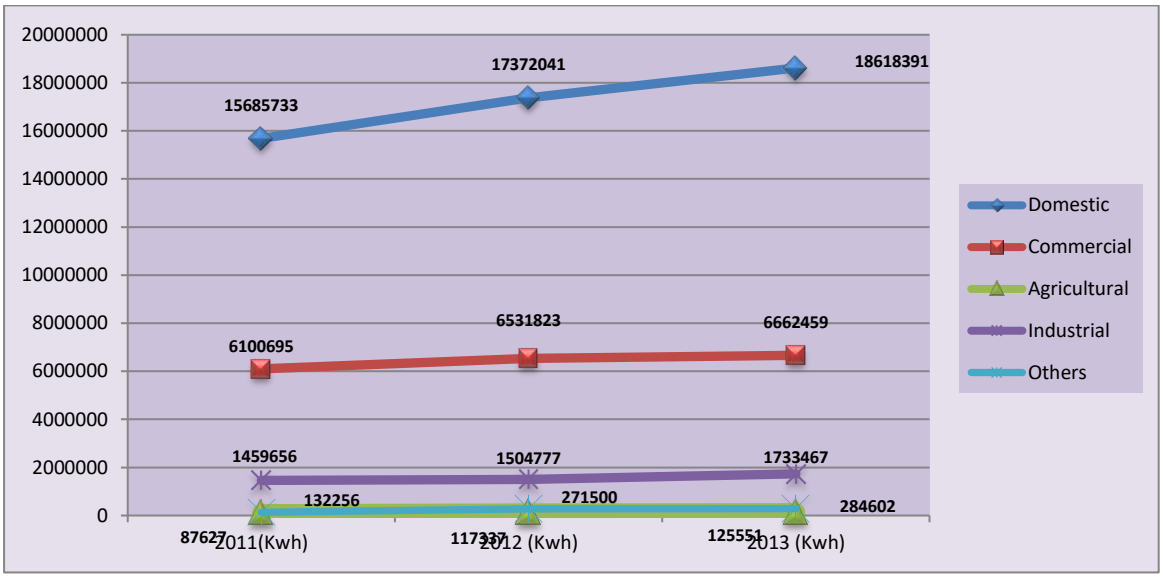


Figure 14.2 Variation in consumption of power by various categories of users

Source: KSEB

14.4. Fossil Fuels

There are 6 Petrol Pumps in Cherthala Town. The total capacity of storage of petrol is 110 kl and diesel is 189 kl. The storage capacity of diesel is higher than the petrol; which shows a higher use of diesel vehicles. The number of fuel filling stations is satisfactory at present and they are distributed along the major road networks.



Petrol Pump

14.5. Domestic Fuels

Almost 95% of the houses use LPG as the cooking fuel. There are 2 LPG godowns functioning in the municipal area which serves the municipal area and surrounding areas.

14.6. Non-conventional sources

Biomass fuel being sourced from their homestead garden lands, the consumption details are not available. The non-conventional sources of energy are not being used except for a few household level solar lamps and water heaters. 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%. Cherthala town has not yet exerted serious efforts towards this direction.

14.7. Problems and potentials

Cherthala town does not have major energy problems except that it has to depend on other areas for the energy requirement especially in the case of electrical energy. For that matter, Alappuzha district itself does not contribute much to the generation of electrical energy but for the power generation within the district by NTPC thermal plant that produces 2158 MU annually and supplies to the state grid for distribution. No other form of non-conventional energy other than solar energy is being utilized. Even in the case of solar energy, the use is limited to a few household level solar lamps/water heaters. Tapping of solar energy/on-site power generation using various renewable energy technologies has tremendous potential in Cherthala Town and surroundings characterized by plain terrain. The distribution of petroleum products are at a satisfactory level.

14.8. Inference

The distribution of electrical energy is sufficient. Domestic sector is the highest power consumers in the town and the rate of consumption is increasing every year. Consumption in all sectors is also increasing every year. The use of non-conventional sources of energy is very less. Hence there is an immediate need for tapping solar energy and promoting other non-conventional energy forms including bio-gas in order to reduce spiraling consumption of fossil fuels.

Chapter-15

Education

15.1. General

The Alappuzha district as a whole is considered to be educationally forward. Nowadays providing quality education to their children has become the primary criteria of each and every parent in Kerala. Among the students in self-financing colleges both within the state and outside the share of the district is considerable. The case is not different with Cherthala town also.

15.2. Existing facilities, students, teachers

The literacy rate of Cherthala town is 97.02% as per census 2011 which is higher than the literacy rate of Alappuzha district, which is 95.72%. The literacy rates of Chengannur town and Cherthala town are more or less same with Chengannur slightly on the higher side. In Cherthala town the male literacy rate is 98.58% and female literacy rate is 95.59%. Details of literacy rate is given in *Table.15.1*.

Table 15.1 Literacy rate of towns in Alappuzha district

Name of Municipality	**Literacy Rate (2011)**
Cherthala	97.02
Kayamkulam	94.81
Chengannur	97.82
Mavelikkara	96.90
Alappuzha	96.20

There are 20 schools in Cherthala town, in which 11 are Primary, 5 are High Schools and 4 are Higher secondary schools. The number and type of schools is given in *Table 15.2*

Table 15.2 Number of schools in Cherthala town

Sl. No	Type	Number	Govt.	Aided	Un aided	No. of Students		
						Govt.	Aided	Un aided
1	Pre primary	7	4	2	1	288	446	110
2	Primary	11	6	5	0	1544	4207	0
3	High School	5	2	3	0	1259	2044	0
4	Higher Secondary	4	2	2	0	690	416	0

The total number of students studying in 20 schools is 10160 and the number of teachers is 319. The total population to be served within the age group of 0-15 is 6897. Total number of students in schools up to 10th standard is 9054. This means that the schools in the town cater to the students in the nearby LSGs also.

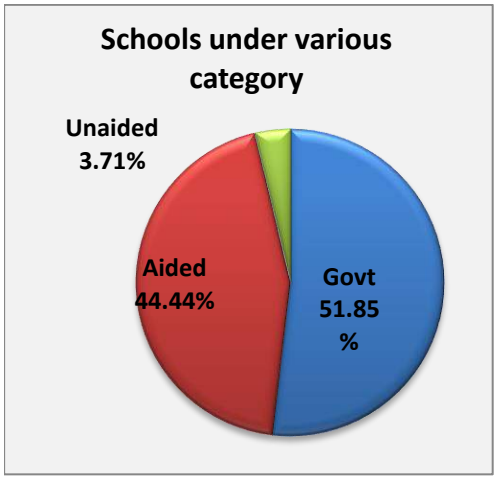


Figure 15.1 schools under various categories

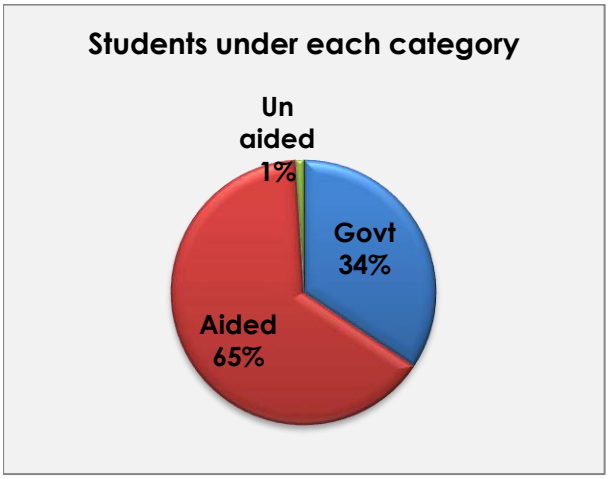


Figure 15.2 Percentage of students studying in each category

Source:Secandary Data

There are in total 14 schools under government ownership ,12 aided schools and 1 unaided school. Table 15.3. shows the total number of students and teachers in each school.

Table 15.3 Number of Students and teachers in each school

Sl. No	Name of school	Govt/Aided/Private	Number of students	No of Teachers	Teacher student Ratio
1	L F LPGS	Aided	360	9	1 in 40
2	Govt.LPS Karuvayilbhagam	Govt	198	9	1 in 22
3	LF UPS Cherthala	Aided	1341	33	1 in 40
4	Govt. UPS Nedumbrakad	Govt	511	21	1 in 24
5	Govt. Town LPS	Govt	491	19	1 in 26
6	Govt. East LPS Cherthala	Govt	101	6	1 in 17
7	Holly Family HSS.,Cherthala	Aided	2346	71	1 in 33
8	Govt.Girls HSS,Cherthala	Govt	1625	61	1 in 27
9	SNM Govt.Boys HSS,Cherthala	Govt	855	33	1 in 26
10	St.Ann's Public School	Aided	1407	41	1 in 34
11	Mary Matha English Medium Nursery School	Unaided	110	4	1 in 28
12	St.Mary'sGirls HS	Aided	1659	47	1 in 35

At primary level and high school level most of the students are studying in aided schools. But at higher secondary level most of the students are in government schools. This may be an indication of the academic quality of government schools at HSS level.

Analyzing the teacher - student ratio, all 12 schools have a ratio below 1:40, which is the standard value.

Infrastructure details of schools

At higher institution level the facilities available in schools are satisfactory. There are 5 High School and 4 Higher Secondary Schools in Cherthala town. All of them have separate toilets for girls, computer lab, internet facility, water availability and connectivity.

In Primary school level, all schools except GLPS Karuvayilbhagom, Govt. UPS Nedumbrakkad, Govt. Town LPS and Govt. East LPS have internet facility. All schools in Cherthala town have water availability, connectivity, playground, separate toilet for girls and computer lab.

15.3. Higher and professional education

- **Colleges**

There is no Arts & Science Colleges in the Municipality. There is one Govt. Polytechnic college at ward 16 and one Co-operative training centre at Deepika junction in Cherthala Town. The Polytechnic has nearly 540 seats for Electronics & Instrumentation, Electronics Production Technology and Computer Hardware maintenance.

Sree Narayana College, N.S.S College, St. Michaels
College and K.V.M College of Engineering & information Technology are arts and Science College and Professional Colleges associated with the town. These are in the immedeate vicinity of the town boundary.

Sree Narayana College offers Bachelor of Arts (Malayalam, Politics, Philosophy, History and Economics), Bachelor of Science (Computer Science, Physics, Chemistry, Botany, and Zoology), Master of Arts (Economics), Bachelor of commerce and Master of Science (Botany, Zoology, and Physics). The college is affiliated to Kerala University. The college at present has on its rolls more than 2,500 students and faculty of more than 90 members. St. Michaels College has student strength of 1,700 with 62 members on the teaching staff and 47 on the non-teaching staff. It offers Bachelor of Arts (Economics), Bachelor of Science (Physics, Chemistry and Zoology), Master of Arts (Economics) and Bachelor of commerce. The College is also

affiliated to Kerala University. Both these colleges are located in Cherthala South Grama panchayath towards south of Cherthala town.

The N.S.S College is affiliated to Kerala University. Currently it offers Bachelor of Arts (English, Malayalam, History and Economics), Bachelor of Science (Mathematics, Physics, Chemistry, Botany and Environment & Water Management), Master of Arts (Economics), Bachelor of commerce and Master of Science in Mathematics. College of engineering Cherthala is also affiliated to Cochin University of Science and Technology (CUSAT). These colleges are in Chennam Pallippuram gram panchayath towards north east of Chethala town.

K.V.M College of Engineering & information Technology is approved by the All India Council of Technical Education (AICTE) and is recognized by Cochin University of Science & Technology (CUSAT). The college is in Thanneermukkom Grama panchayath to the South of Cherthala town.

Table 15.4 Details of Colleges in Cherthala Town

Name	University	Ownership	Location	Course offered	No. of Students
	Affiliated to	Public/ Private			
St.Joseph College of Pharmacy	Kerala University of Health Science (KUHS)	Private	Muttam Convent road,Cherthala	1.Diploma in Pharmacy 2.M.Pharm 3.B.Pharm 4.D. Pharm	204
Naipunya College of Management	Kerala University	Private	Near Manorama Jn, Cherthala	1.B.Com with computer 2.B.Com-Travel & tourism 3.B.Sc-Hotel management 4.B.Sc-Computer Science 5.B.B.A 6.B.A-Communicative English 7.B.Com with tax 8.B.C.A 9.M.Com 10.M.A English 11.M.Sc-Computer Science	360

Students who are unable to get admission in the colleges mentioned above depend on various private institutions like SB College of Engineering, Excel ITI, St.Joseph's school of Pharmacy and Naipunya School of management etc. In SB college of Engineering, technical

courses offered are for Mechanical, Civil, Fitter, Electrical, Mechanic, and AC mechanic. In St.Joseph's School of Pharmacy courses offered are for B Pharm and D Pharm. In Naipunya School of Management Graduate and post graduate courses offered for Finance, Computer Applications, Computer Science, Commerce and English Literature.

Apart from the above mentioned colleges there are educational institutions which are offering specialized courses. They include institutes which offer computer courses, technical training, driving schools, spoken English centers and parallel Colleges. Spatial distributions of Educational institutions are shown in Figure 15.3.

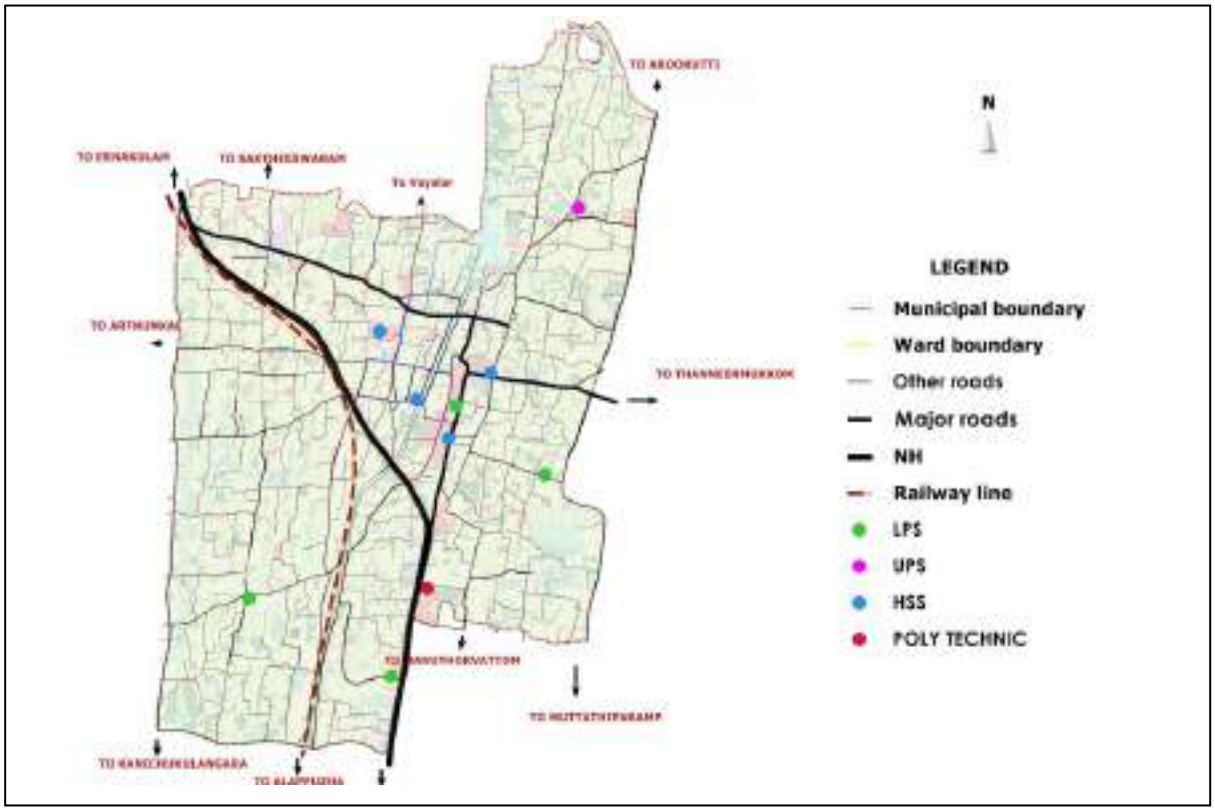


Figure 15.3 Spatial distribution of Educational institutions

Comparison with Planning Standards

Threshold Population of a High School with student strength of 700-750 is 14000. The number of high school needed = 45827/14000 = 3.3 schools with 700 strength. i.e schools with a capacity of 2310 (3.3 x 700) students is needed. Existing facility constitutes schools with a capacity of 3303 students as per secondary data. The existing high school facility is sufficient.

One Higher Secondary School with 8 divisions is needed for 14,000 populations as per standard. The number of high school needed = 45827/14000 = 3.3 schools with 336 strength. ie schools with a capacity of 1109 (3.3 x 336) students is needed. As per secondary data there are schools with a capacity of 1106 students in the town. For 86,000 population 1 college with

500 students capacity and Polytechnic with student strength 300 are needed. There is a polytechnic with a total strength of 540 students available in the town.

For 86,000 population 1 ITI/ITC with 300 student's capacity is needed. So for a town like Cherthala, ITI/ITC with student strength 600 is needed. For 1,20,000 population TTC with a strength of 120 is needed.

Table 15.5 Comparison with planning standards

Type of Institution	Standard	Available	Required	Gap
High School	700-750 for 14000 population	3303	2300-2400 for 45827 population	Sufficient
Higher Secondary School	336 for 14000 population	1106	1092 for 45827 population	14
College	500 for 86000 population	564	267 for 45827 population	Sufficient
Polytechnic	300 for 86000 population	540	160 for 45827 population	Sufficient
ITI/ITC	600 for 86000 population	0	320 for 45827 population	320
TTC	120 for 120000 population	0	46	46

15.4. Problems and potentials

The conventional educational facilities in the town, especially at the school level are commensurate with the population of the town. However, professional education facilities are meager in the town. Most of the colleges are offering only the conventional course which is one of the reasons for the increasing demand for colleges outside the district. Basic educational facilities available in the town are sufficient in quantitative terms. Two engineering colleges, three Arts colleges, a Nursing College and a D.Pharm college are available in the nearby local bodies.

15.5. Inference

The literacy rate of Cherthala town is high compared to that of the district. The teacher-student ratio is satisfactory. Most of the colleges are offering only conventional courses, and there are no professional colleges or higher centers of learning within the municipal boundary. But two engineering colleges, three Arts colleges, a Nursing College and a D.Pharm college are available in the nearby local bodies.

Chapter-16

Health

16.1. General

Health is a sector in which the state of Kerala has achieved remarkable progress, comparable to that of developed countries. However, at micro level certain problems like inadequate reach and affordability do exist. Cherthala town also follows the general pattern of development of health care institutions elsewhere in the state.

Cherthala town is a Second Order settlement in the district and the service area of Cherthala town when considered as a second order settlement, extents to the entire northern portion of the district. The service area of Cherthala town, when considered as a third order settlement, includes the neighbouring LSGs viz. Pattanakkad, Thanneermukkam, Vayalar, Kadakkarapally, Thuravoor etc. Service population of the town when considered as a 3rd order settlement is to the tune of two lakhs. Hence, the town has to cater to the higher order health care requirements of this region.

In this chapter, the status of availability of health care facilities in Cherthala town is studied in comparison with the planning standards.

16.2. Existing facilities

- **Health Institutions**

There are 3 government hospitals and 2 private hospitals in Cherthala town. Government hospitals include Taluk head quarters hospital near Taluk Office, Itty Achuthan Memorial Government Ayurvedic Hospital near St. Mary's bridge and Government Homoeo Hospital near Kuttikatt. In addition, there are few clinics, most of them managed by the private sector.



Taluk Hospital

There are 3 allopathic health institutions, 1 ayurvedic institution and 1 homeopathic institution in the municipality. Among the allopathic medical institutions, there is only one hospital under government ownership. Considering the facilities available in hospitals, there is one referral hospital in Govt sector and one hospital having advanced diagnostic facility like CT scan and ECG. And there are no super specialty hospitals in Cherthala town.



Ayurvedic Hospital

There is only one institution practicing Ayurvedic system of medicine. Itty Achuthan Memorial Govt Hospital near St. Mary's bridge is the Ayurvedic hospital in the town. It is a twenty bedded hospital. This hospital can be developed as a destination for health tourism considering the fact that many tourists are now-a-days attracted by traditional Ayurvedic treatment in Kerala. The accessibility to this Ayurvedic Hospital and the infrastructural facilities in the hospital needs improvement.

Itty Achuthan was a 17th century Vaidyar (ayurvedic doctor) who had precious understanding on practice of Ayurveda as also the specialized knowledge on rare endemic medicinal shrubs. Itty Achuthan led the compilation and documentation work of Hortus Malabaricus –meaning Garden of Malabar- which is a comprehensive treatise that deals with the medicinal properties of the flora in the Malabar region. Originally written in Latin, it was compiled over a period of nearly fifteen years and published from Amsterdam during 1678-1693. It was conceived, managed and financed by the Dutch Malabar governor Hendrik Van Rheede.



Kuriala of Itti Achuthan vaidyan

After the long demands made by the admirers of Ayurveda and the Hortus Malabaricus Trust, the State Archeology Department has declared the remains of the work place of this famous Ayurveda physician, who is co-author of Hortus Malabaricus, a protected monument. The department issued government order to protect the monument. The *'kuriala'*- a small wooden room used by the scholar and the '*narayam*'- wooden pen used by him to write; palm leaf writings; a basket made of cane; the silk and bangle *('pattum valayum')* gifted by the erstwhile King of Kochi kept in the *'kuriala'* and the botanical garden surrounding are part of the protected monument. In the meanwhile, the West has honoured and cherished him by naming Achudemia – an entire plant family, in his name.

In homeopathic system of medicine there is only one institution. That is Govt Homeo hospital near Kuttikkatt.

The details of hospitals, its location and category, number of beds and doctors, ownership details etc. are given in *Table 16.1*



SNMM Hospital

Table 16.1 Healthcare institutions in the town

Allopathic system of medicine

Sl. No	Name of Hospital	Location	Category*	Number of beds	Number of Doctors	Govt./Private /Cooperative society
1	Govt. Taluk Head Quarters Hospital	Near Taluk Office,Cherthala	1,2,3,4,7	251	23	Govt.
2	KVM Hospital	South of X-Ray Junction	5	308	25	Private
3	SNMM Hospital	Near X-Ray Junction	4	86	1 1	Private

Ayurvedic system of medicine

Sl No	Name of Hospital	Location	Category	Number of beds	Number of Doctors	Govt/Private/Cooperative society
1	Itty Achuthan memmorial Govt. Hospital	Near St.Mary's Bridge	2	20	3	Govt.

Homoeopathic system of medicine

Sl. No	Name of Hospital	Location	Category	Number of beds	Number of Doctors	Govt./Private /Cooperative society
1	Govt. Homoeo Hospital	Near Kuttikkatt	2	25	2	Govt.

Category 1 – Clinics only OP

Category 2– Hospitals with 24 hrs service

Category 3 – Hospitals with single Operation theatre

Category 4 – Hospitals with more than one OT

Category 5 – Hospitals with advanced diagnostic facilities like CT scan, EEG

Category 6 – Super specialty hospitals

Category 7 – Referral Hospital (Govt. Sector)

A comparison of government and private sector is shown in Figure 16.1 and it shows that 61.09% of beds are in private sector and only 38.91 % of beds are in government sector in Allopathic hospitals. Availability of doctors in government and private sector is given in Figure 16.2.

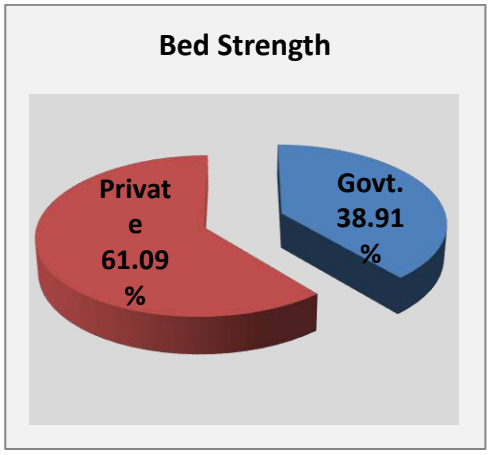


Figure 16.1 Comparison of bed strength in government and private hospital

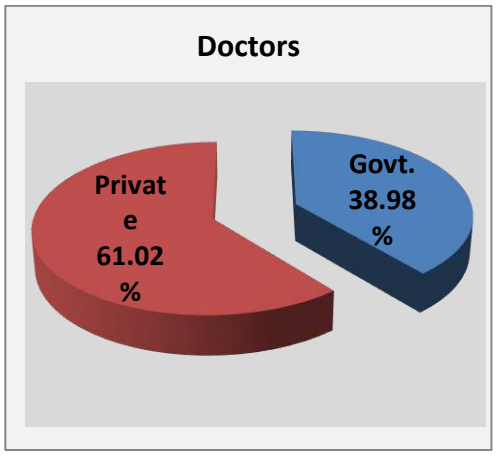


Figure 16.2 Comparison of number of doctors in government and private

As per standards one PHC is required for a population of 20000 with 24 beds. The Taluk Hospital caters to this need also. As per standards one Nursing home, child welfare and maternity centre is required for a population of 45000 to 1 lakh. Cherthala town has a population of 45827 as per 2011 census. Therefore 1 such hospital is required.

There are 2 private allopathic hospitals in Cherthala town. These hospitals together have bed strength equal to 394. As per standards number of beds in private hospital for 1 lakh population is 40. Hence these hospitals are sufficient to serve the people in Cherthala town.

The spatial distribution of health facilities are shown in the figure 16.3.

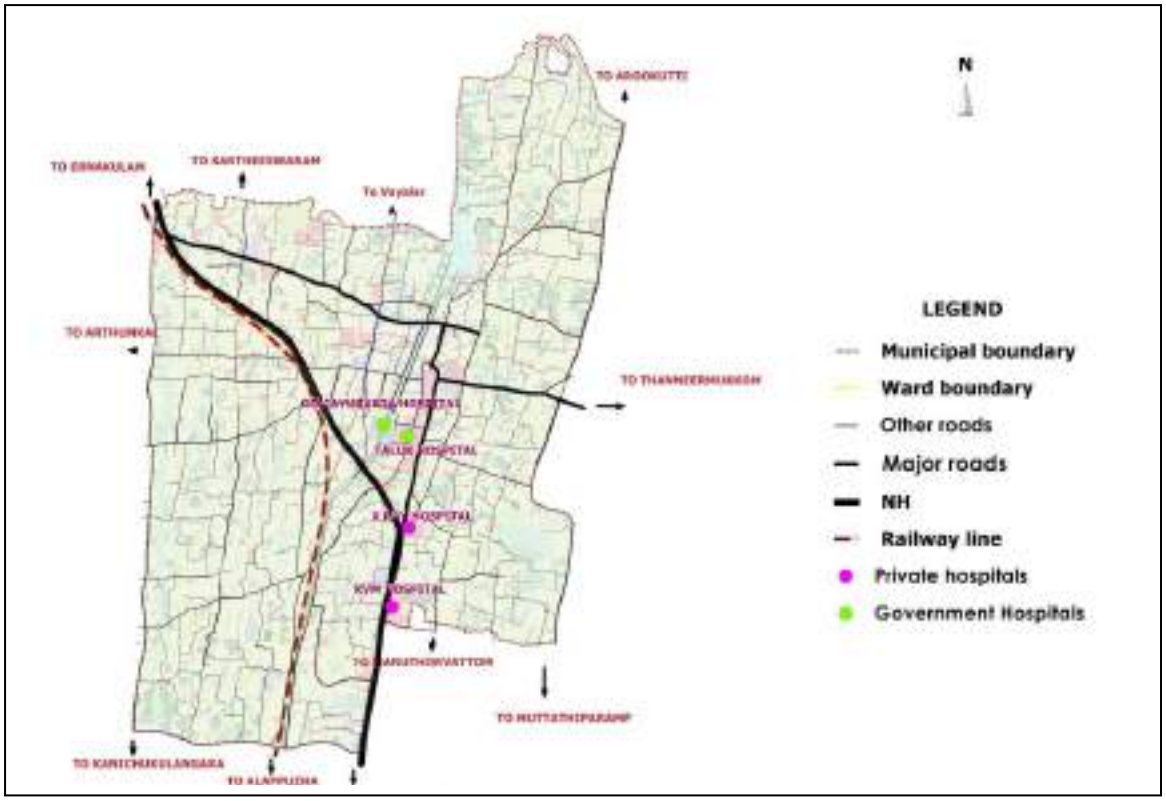


Figure 16.3 Spatial distribution of health care facilities

Distances to a Medical facility and hospital have been assessed in the Socio- Economic Survey conducted in 2013. In the survey, it is found that the average distance to a medical facility is 1.46km and a hospital is 1.43km. The distance to the hospital is further analyzed by assessing the percentage of households with travel distance more than 5.00km and less than 5.00m. It is found that for 96.77% of households has hospital facility within 5.00km distance and only 3.23% have to travel more than 5.00km for hospital facility.

In the Socio Economic Survey conducted in the year 2013 as part of preparation of Development Plan, details regarding major diseases occurred in the town during the past five years have been collected. Major diseases occurred and percentage of Houses diagnosed with diseases is shown in Figure 16.5. Chickun Guinea was reported as the major disease of the town during the last five years.

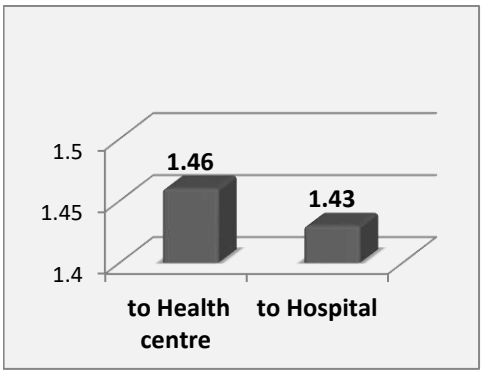


Figure 16.4 Average distance to health facilities

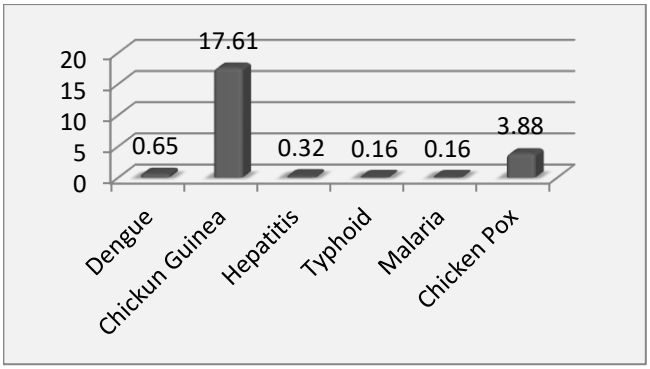


Figure 16.5 Percentage of houses diagnosed with diseases within last 5 years

16.3. Problems and potentials

Major problem in the health sector is the insufficiency of facilities in the hospital. There are no super specialty hospitals in town. Taluk hospital is the only government allopathic hospital with IP facility in the town.

Cherthala town is situated on the National Highway-66. The Department of Health and Family welfare suggests incorporation of Trauma Centres in the highways cutting across urban local authority jurisdiction. The trauma care centres should be suitably positioned along the highways with doctors trained in emergency medicine and trauma care, with adequate emergency management technicians, supported by efficient and efficient ambulance system. Such a facility is not available in Cherthala Town.

16.4. Inference

There is no super specialty hospital in Cherthala town. Hence the people have to depend on hospitals outside the town. Health care facilities are to be provided in the town considering the requirements of the wider service area of the town.

Major problem in the health sector is the inadequacy of facilities in the hospitals. Bed strength etc. available in the town, in hospitals under government sector and private sector, are comparable to planning standards. The infrastructure facilities are to be upgraded in the hospitals for Ayurvedic and Homeopathic systems. Due to the proximity of the town to Alappuzha and Ernakulam, and the more flourished health sector with major medical colleges there, people of the region depend on in these two cities for higher order healthcare facilities. Cherthala town can be developed as a destination for health tourism utilizing the potentials in ayurvedic sector.

Chapter-17

Recreational Facilities and Other Civic Amenities

17. A. Recreational Facilities

Recreational facilities such as parks, open spaces, sports facilities etc are essential part of any town as it is a great way to socialize and meet others. Parks and open spaces serve as gathering places for families and social groups, and individuals. The existing status of Cherthala town with respect to such aspects is discussed in this chapter.

17. A.1. Parks and open spaces

There is no park and open space developed as such in Cherthala town at present. But there is an area of 0.02 hectares of land owned by municipality available near Govt. Polytechnic which was used as a recreational space but at present it is left abandoned.

17. A.2. Play grounds/stadia

There are no public play grounds or stadia available in the town. Only available play grounds are the play grounds associated with the educational institutions.

17. A.3. Theatres and Auditoria

There are no open air theatres and Art Galleries in the town. But there are 3 cinema halls in the town. Two of them are under Kerala State Film Development Corporation. The total number of seats in these theatres is 785.



Cinema hall in Cherthala Town

There are 6 Auditoriums in Cherthala town, out of which 2 are having an average capacity of 500. They are S.S Kalamandir and Municipal Town Hall.

17. A.4. Problems and potentials

The recreation facilities are meager in Cherthala town. There are no parks, play ground or stadium in the town. With the fragmentation of residential properties, people have lesser open land attached to their houses and hence need for public open space for recreation is on the rise. As per UDPFI guidelines 12-14% area is needed for recreational purpose. But 0.001% is the available space in the town which is hardly 0.02 hectare.

17. B. Other Civic Amenities

Civic amenities are necessity of any town and are very important in promoting community cohesion within communities. Civic amenities assist economic development of the town and also offer employment opportunities. Improving civic amenities can boost tourism by increasing visitors to the town.

17. B.1. Town Hall

The Municipal Town hall of Cherthala Town is located near the municipal office. It has a seating capacity of 500.

Besides, there are 5 auditoriums/community halls in Cherthala town. These are used for various public gatherings. The details of halls, their locations and capacity are given in *Table 17.1*.

Table 17.1 Community halls in Cherthala Town

Sl No	Name	Location/ward	Extent/ capacity
1	SS Kalamandir	Near TD Temple, ward -29	500
2	Madakkan	Near Manorama Junction	150
3	NSS Building	Kizhakke nalpathu	150
4	NSS Auditorium	Near Devi Temple, ward -13	300
5	Ananthanarayana SNDP Hall	Vallayil bhagom	250
6	Municipal town hall	Near municipal office	500

17.B.2. Reading Rooms and Library

There are two libraries,one at the Municipal office and other is Jayakerala Grandhasala. The municipal office library houses more than 20,000 books and it is accessible for the public and students.



Library in Cherthala Town

17. B.3. Community Centres

There are no community centres available in the town.

17.B.4. Crematoria and Burial Grounds

There are 6 Crematoria/burial grounds in Cherthala town. But these are associated with the churches and mosques. other communities are now using their own land for cremation. One public crematorium was functioned by the Muncipality, but now it is not functioning. The land is under the ownership of municipality and is outside the municipal limits. The details of the burial grounds are given in the *Table 17.2*

Table 17.2 Crematoria/burial grounds in Cherthala Town

Sl No	Location/ward
1	Chakkarakulam
2	St. Martin Church
3	Madekkad
4	Nedumbrakadu
5	Muttom Church
6	Panatt

17. B.5. Religious Facilities

There are 14 temples, 2 mosques and 2 Churches. Cherthala Town Central Juma Masjid is the main mosque in Cherthala town. Sree Karthyayani Temple and Velorvattom Mahadevar Temple are the main temples in the town. St. Mary's Forane Church, Muttom is the famous church in Cherthala. Famous St. Andrew's Basilica Church (Arthunkal palli)is 8 km southwest from town, outside the town limits.

The main festival of St. Mary's Forane Church, Muttom is in January 21, the Vivaha thirunal of St. Mary & Joseph a rare feast in Kerala Catholic Churches. The festival at the Shrine is celebrated on the Sunday after DEC 8th every year. The 'arattu' festival of Sree Karthyayani Temple is celebrated for eight days in the month of Edavam (May-June). There are two very special and peculiar 'prasadam' offerings at this temple. They are called 'Iratti' and 'Thadi'.

17. B.6. Other Amenities

There is a police station available in ward no. 4. There is also the office of Deputy Supernatant of Police (DySP) near the Taluk office. The only fire station in Cherthala taluk functions round the clock next to Civil station. A large BSNL microwave tower functions near the BSNL telephone exchange used for high-speed data transfer and telephone communication. There is a court complex that houses the Magistrate court and Munsif courts.

There are 6 Petrol Pumps in Cherthala Town. The total capacity of storage of petrol is 110 kl and diesel is 189 kl. There are 2 LPG godowns functioning in the municipal area which serves the municipal area and surrounding areas. There is a milk co-operative society at Karuvayil and 2 sub centres each at X- Ray and Municipal bus stand wards.

32 Anganawadies are functioning in the Municipality and out of these, 21 are functioning in own buildings, 11 are functioning in rented building. All these Anganawadies have toilet facilities and gas connection. There is an institution in the town near Poothotta for the care of mentally challenged children. At present no old age homes or other facilities required for old age people are functioning in the town. There are no night shelters or orphanages in the town.

17. C. Inference

There is no park and open space developed as such in Cherthala town at present. But there is an area of 0.02 hectares of land owned by municipality available near Govt. Polytechnic which was used as a recreational space but at present it is left abandoned. *A hierarchy of organised green such as parks, play fields and other open spaces are essential for our urban areas considering the requirements of the town's population and also the regional level requirements. In this aspect, status of Cherthala Town is very poor. The recreational facilities in the town are not adequate to cater to the present population left alone the target population. Besides, spatial distribution of recreational facilities is not* uniform. *Residents from most of the wards do not have recreational facilities at a walking distance. The AS canal, which runs through the centre of the town and the Nedumbrakkad ferry can be revived and developed as a major recreational node in the town with adequate recreational facilities along the canal.*

The civic amenities in the town do not meet the requirements of the present population. Also the future additional demands due to increase in population have to be met with.

Chapter-18

Housing

The details regarding the present condition of housing in Cherthala Town is dealt in this section.

18.1. Population and household size

As per 2011 census the total population of Cherthala Town is 45827 and the total number of households in Cherthala town is 11416. The average house hold size is 4.01. (From the socio economic survey conducted in 2013, it is observed that the average house hold size is 4). This is lower than the state average (4.25), but higher than average household size for the district which is 3.97. Compared to other municipal towns in the district, the house hold size of Cherthala is lower than that of Kayamkulam and Alappuzha, where as Chengannur and Mavelikkara towns has even lower household sizes. The gross density of population in Cherthala town is 2552 persons per sq.km which is the third position among the urban centres of the district.

The gross density of population in Cherthala town is 2552 persons per sq.km. In this regard, Cherthala is in the third position among the urban centres of the district as shown in figure below:

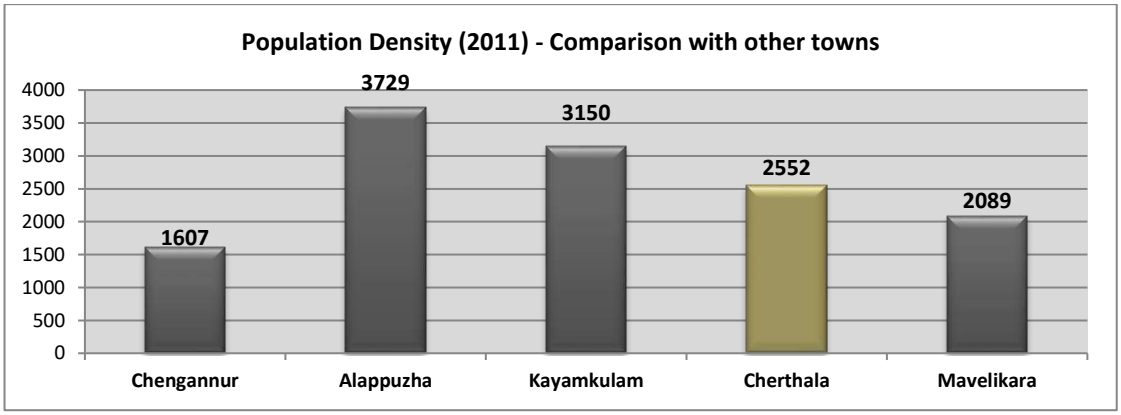


Figure 18.1 Population density

There are 35 wards in Cherthala Town. Population in the wards ranges from 504 to 1942. Cherakulam (ward no:17), Nedumbrakkad (ward no:5), Muttom Bazar (ward no:30) and Kuttikkat (ward no:32) are the most populous wards.

The density of population is an indicator of pressure of population on land which in turn is influenced by factors like accessibility, proximity to facilities etc. Higher population density puts more pressure on infrastructure and environment but reduces the per capita costs of supply of public goods and services. In Cherthala Town, Kulatharakkad ward has a population density of 4151 persons per sq. km where as the Municipal Office ward has the least population density of 1670 persons per sq.km. The highest density of above 3500 is seen in ward numbers 8, 14, 27, 28, 29 and 31 (Kulatharakkad, Chakkarakkulam, Edathil, Municipal Bus stand, T.D Ambalam and Velorvattam wards). The wards with high density are located adjacent to the major transportation corridors. Ward wise distribution of population density and population concentration are shown in figure 18.2 and 18.3 respectively.

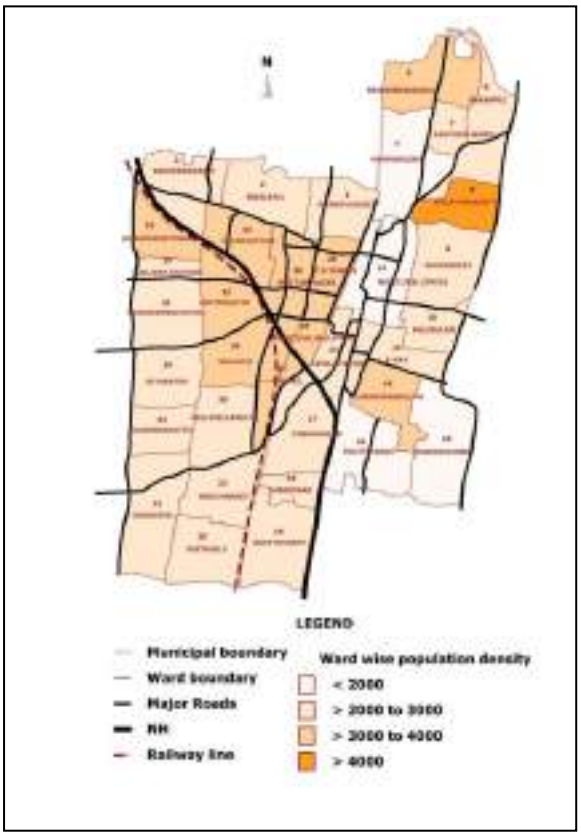


Fig. 18.2 Ward wise distribution of population density in Cherthala Town

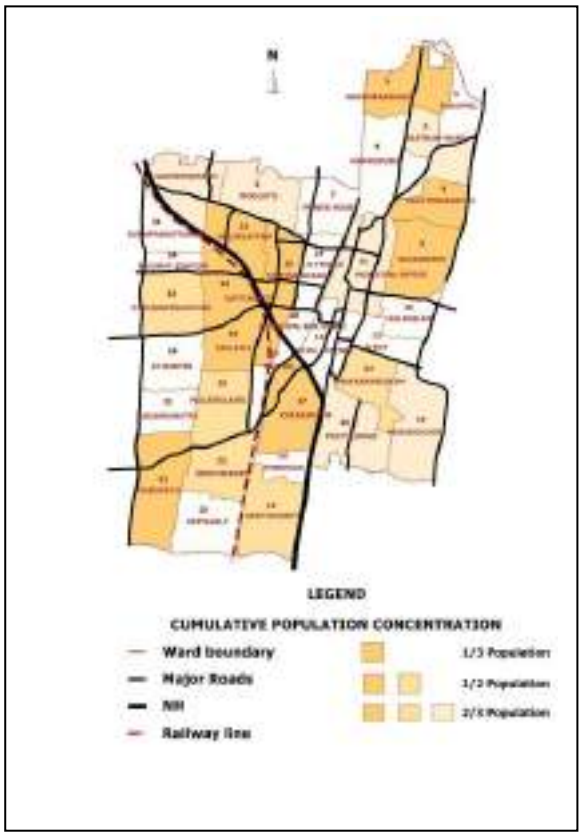


Fig. 18.3 Population concentration in Cherthala Town

Almost 60.25% (10.71 sq.km) of the total land in the town is under residential use. Considering area under residential use, the overall net residential density of the town is 4277 persons per sq.km.

18.2. Housing stock and housing shortage

As per census 2011 there are 11416 households in Cherthala Town. From socio economic survey, there are 10500 houses in the town. Thus, there is an absolute shortage of 1333 houses in the municipal area at present.

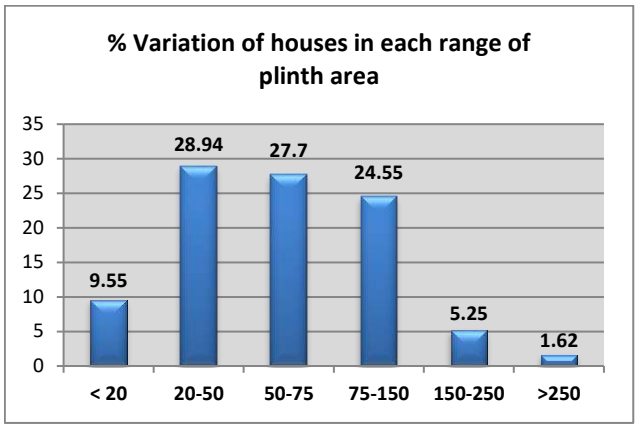


Figure 18.4 Houses in various ranges of plinth area

The plinth area detail of houses is given in *Figure 18.4*. According to socio economic survey majority of houses are in the plinth area range of 20 -50 sq.m followed by the 50- 75 sq.m range.

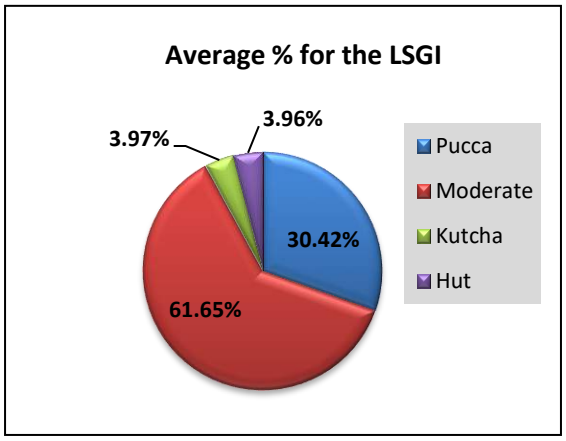


Figure 18.5 Percentage of various types of buildings

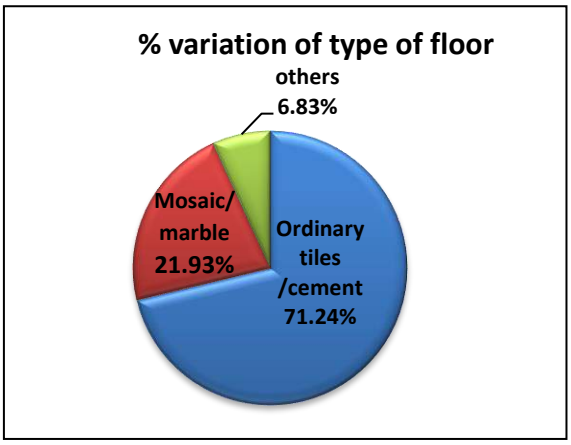


Figure 18.6 Percentage of various types of floor

The housing shortage is calculated by adding the number of kutcha houses to the difference between number of households and number of houses. According to the socio economic survey total number of kutcha houses comes to 3.97 % of the total number of houses. The number of kutcha houses which require replacement comes to approximately 417. From socio economic survey, majority of houses are either pucca or moderate type. Kutcha houses and huts are negligible in number. The percentage share of different type of buildings is given in *Figure 18.5*.

The houses are classified as pucca and moderate depending on the type of walls and roofing provided. Therefore this does not reflect the actual structural stability of the building. The Kutcha buildings are those having walls and roofs made of kutcha materials. So they are houses that require replacement. The Socio Economic survey indicates that people, at all levels, does not consider housing as a major problem in their town.

The percentage variation of different types of materials used for construction of floors, walls and roof are shown in figure 18.6, 18.7 and 18.8 respectively. As per socio economic survey more than 70% of the houses are with ordinary tiles or cement floor. About 20% of the houses are with mosaic or marble flooring. About 95% of the houses are with brick or brick plastered walls and about 60% of the houses are with concrete roof and 40% with tin or asbestos or tile roofing.

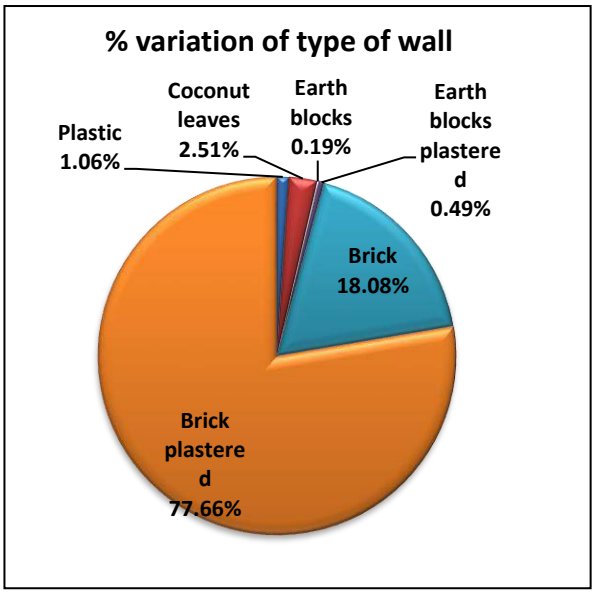


Figure 18.7 Percentage of various types of wall

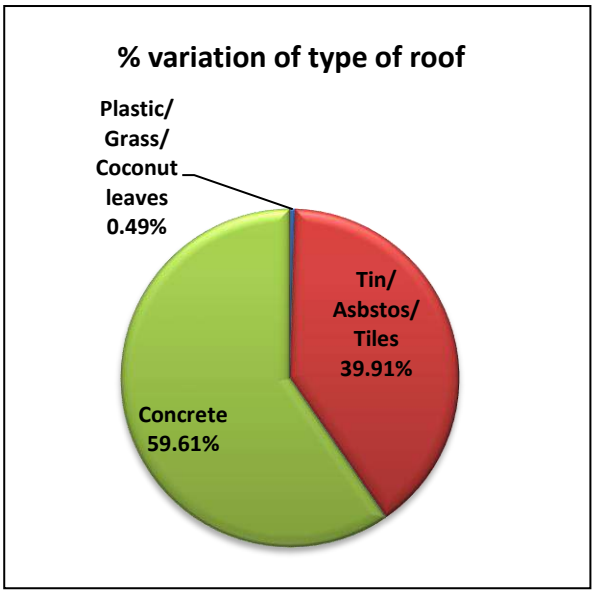


Figure 18.8 Percentage of various types of roof

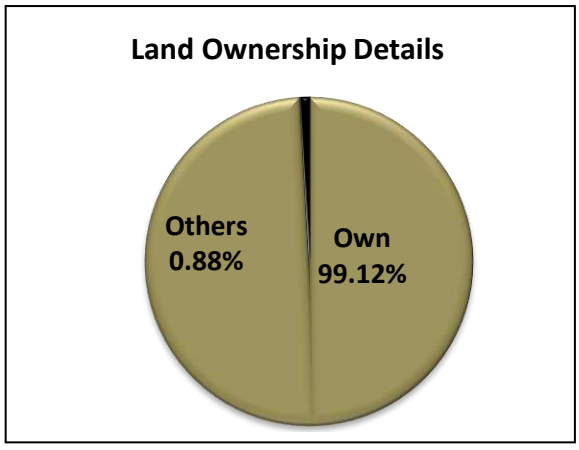


Figure 18.9 Nature of land ownership

Further, the survey reveals that most of the people have their own land for housing. This is shown in *Figure.18.9. The variation of plot area is shown in Figure 18.10. From the socio economic survey it is understood that more than 75% of the people are living in plot size more than 5 cents. Majority of the people are living in plot sizes varying from 11 to 25 cents (31%).*

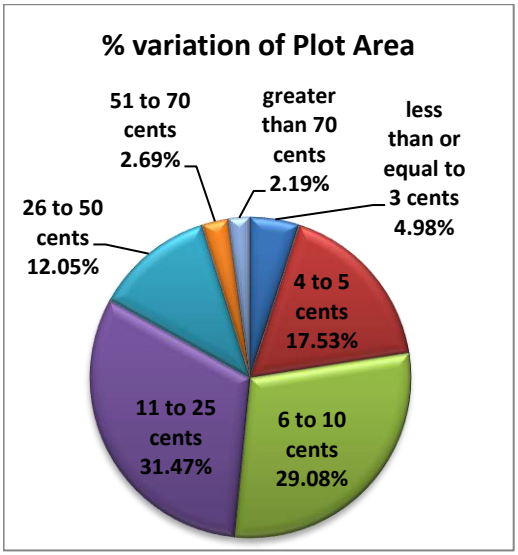


Figure 18.10 Variation of plot area

Under EMS housing project 863 beneficiaries are identified in the town. Construction of 503 houses has been started under this scheme of which 327 has been completed. Under the housing project of VAMBAY, 745 beneficiaries were identified. Construction of 736 houses have been started and 722 houses among them were completed. 255 beneficiaries are identified under IHSDP project in the Municipality. Construction of 179 houses has been started under this scheme of which 113 has been completed.

18.3. Slums in the municipal area

As per the secondary data there are 11 slums in the municipal area. The details of slums are given in the *Table 18.1*.

There are about 672 households in the town are living in slums. The number of houses are also 672. Among them, 134 are pucca houses and 369 are moderate houses. 169 houses are in kutcha condition.

18.3.1. Categorization of Slums

Data on the availability of infrastructure in each of the above colonies are also collected during the survey. The methodology adopted for identifying urban slums includes assigning weightage on basic amenities, density of population, number of scheduled caste/ scheduled tribe population and the structural condition of dwelling units in the area. The indication of backwardness, their minimum standard and weightage assigned are listed in *Table 18.2*.

The survey data collected for each of the settlements is analysed and presented in *Table 18.3*.

Table 18.1 Details of slums in the town

Sl. No.	Name of the Slum	Ward	listed/ non listed slum	Total area (Ha)	No of Houses	Housing category			Number of HHs
						Pucca	moderate	Kutcha	
1	Kandanattu Pradesham	20	listed	37.38	131	31	88	12	131
2	Velorvattom	31	listed	6.48	70	20	42	8	70
3	Kalariveli	19	listed	2.95	35	10	17	8	35
4	Gouri gardens	3	listed	43	56	13	28	15	56
5	Kariyil Predesham	2	listed	2.94	50	7	39	4	50
6	Kanichukadu Predesham	7	listed	17.64	48	0	31	17	48
7	Pazhamkulam	9	listed	5.57	38	6	20	12	38
8	Housing colony	11	listed	3.61	26	7	18	1	26
9	Puthezhathubhagam	22	listed	9.89	62	12	29	21	62
10	Kattanganattu	23	listed	20.64	60	9	17	34	60
11	Kuttikattu	33	listed	17.83	96	19	40	37	96

Source: Integrated housing and slum Development Plan

Table 18.2 Indicators of Backwardness, their minimum standard/ benchmark and the weightage assigned

Sl No	Indicators of Backwardness	Minimum Standard /Bench mark	Maximum weightage when amenities are completely absent
A	Adequacy of basic amenities		
1	Inadequacy of latrine facilities	1 seated latrine for every 20 persons	10
2	Inadequacy of drainage system and exit for sullage and rain water		10
3	Inadequacy of access road		8
4	Inadequacy of water supply	1 tap point for every 100 persons	5
5	Inadequacy of street light	1 street light for every 30 metres	5
B	Density of population	100 persons/acre (250 persons / Hectare) gets 5 points and 1 point each for every additional 20 persons	20 maximum weightage when density reaches 300 persons per acre
C	SC/ST population	30 % or above	10 maximum weightage
D	Structural conditions of dwelling units	50 % or more huts or dilapidated structures	5 maximum weightage

Table 18.3 Combined weightage of listed slums in the planning area

Sl No	Name of Slum	Weightage according to facilities									Grade
		Latrine	Drainage	Access Road	Water Supply	Street Light	Population	SC/ ST	Structural Condition	Total	
1	Kandanattu Pradesam	0	10	8	0	2	0	0	1	21	B
2	Velorvattom	0	10	8	1.5	1.2	0	0	1	21.7	B
3	Kalariveli	0	10	8	0	1	0	0.5	2	21.5	B
4	Gouri Garden	0	10	8	0	4.5	0	0	2.5	25	B
5	Kariyil Predesam	0	10	8	0	1.5	0	0	0	19.5	A
6	Kanichukadu Predesam	0	10	8	0	4	0	0.5	3.5	26	B
7	Pazhamkulam	0	10	8	5	5	0	0	3	31	C
8	Housing colony	0	10	8	1	5	0	3	0	27	B
9	Puthezhathubhagam	0	10	8	0	3	0	0	3.5	24.5	B
10	Kattanganattu	0	10	8	0	2	0	0.5	5	25.5	B
11	Kuttikattu	0	10	8	1.5	5	0	0.25	4	28.75	B

Grade D: Colonies with combined weightage of 40 or above is categorized as Grade D which can be considered as pucca slums. No colonies in the planning area are identified as grade D.

Grade C: Combined weightage ranging between 30 and 39 is categorized as grade C colonies. These colonies are slightly improved colonies compared to pucca slums. However severe problems on basic infrastructure, relatively high density and social backwardness exist in these colonies. Grade C colony in the planning area is Pazhamkulam Colony.

Grade B: Colonies with combined weightage varying from 20-29 are categorized as grade B colonies. In these colonies the major problem is the poor basic infrastructure facilities. The colonies identified in the grade B are Kandanattu Pradesham, Velorvattam, Kalariveli, Gouri Garden, Kanichukadu Pradesham, Housing Colony, Puthezhathubhagam, Kattanganattu and Kuttikattu colonies.

Grade A: Grade A colonies are comparatively well developed among other colonies. Most of the basic infrastructure is available in this area. With less financial support, these colonies will become as normal housing areas. Kariyil Pradesham colony in the planning area is identified as grade A.

In Pazhamkulam colony (C Grade) lack of drainage facilities, access roads, water supply, street lights and poor structural condition of houses are the major problems. In Kandanattu Pradesham, Velorvattam and Kalariveli (B Grade) major problems include lack of drainage and access roads. In Gouri Garden, Puthezhathubhagom, Kattanganattu and Kanichukadu Pradesham (B Grade) drainage facilities and access roads are absent. Poor condition of the houses and lack of street lights are also there. In Housing colony lack of drainage, access roads and street lights are the major problems. In Kuttikattu colony (B Grade)

the major problems are lack of drainage, access roads and street lights. In some houses availability of drinking water is also a problem. The structural conditions of the houses are also poor in this colony.In Kariyil Pradesham lack of drainage facilities and access roads are the problems. In some areas street lights are absent.

18.4. Location of slums

Slums in the planning area are found in the following wards viz. Moolayil, Power House, Sastham, Savassery, Municipal Office, Arattuvazhy, Vattavely, Mini Market, Kattanganattu, Velorvattam and Kizhakke Nalpathu. *Figure 18.11* shows the location of slums in the town.



Figure 18.11 Location of slums in the town

18.5. Problems and potentials

Almost 60.25 % of the total land in the town is of residential use. The gross density of population in Cherthala town is 2552 persons per sq.km and the net residential density of the town is 4277 persons per sq.km. The town is characterized by medium density making further densification possible. The demand for housing is increasing with time, which is clearly reflected in the change in habitation pattern. Urban amenities like water, electricity and sanitation are found to be adequate.

18.6. Inference

In Cherthala Municipal area the housing sector as such do not face any serious problems. 92.07 % of houses are in pucca or moderate condition. 99.12 % of people reside in their own land. Only 0.88 % of people live in rented or lease buildings. However, 7.93 % of the houses in the town *are kutcha/huts. Besides, there is shortage of 1333 houses. These shortages can be covered mostly by the housing projects by government for the economically weaker sections. There are 11 listed slums in Cherthala where infrastructural facilities are limited. Lack of drinking water facilities, lack of sanitation facilities and absence of internal roads are major problems. Adequate provision of infrastructure shall be given priority in such areas.*

Chapter-19

Special Concern Areas

The weaker section of the society i.e. children, women, old aged people, BPL families and SC/ST need special attention and has been emerged as a major sector in the planning process.

19.1. Poverty

❖ BPL index

Poverty Line is an economic benchmark and poverty threshold used by Government of India to indicate economic disadvantage and to identify individuals and households in need of Government assistance and aid. Kerala is one of the few states which have formulated its own criteria.

In Kerala, among the 9 parameters shown in Table 19.1, families which satisfy to 4 or more parameters are classified as BPL.

Table. 19.1 Parameters for BPL Classification of families

1	No land or < 5 cents of land
2	No house or dilapidated house
3	No Sanitation Latrine
4	Family without Colour television
5	No regular employed person in the family
6	No access to safe drinking water
7	Women-headed HH or presence of widows or divorcee
8	SC and ST
9	Mentally retarded or disabled member in the family

According to BPL survey conducted in the year 2009 about 53.7 % of the total population is below poverty line in Cherthala town. *Figure 19.1* shows the concentration pattern of BPL families in the town based on the said data. BPL index of about 21 wards (wards of 1, 2, 3, 4, 5, 6, 7, 8, 9, 19, 20, 21, 22, 23, 24, 25, 26, 27, 33, 34 and 35) is greater than one in Cherthala town. In Cherthala town, 6132 households have been categorized as BPL as per BPL survey.

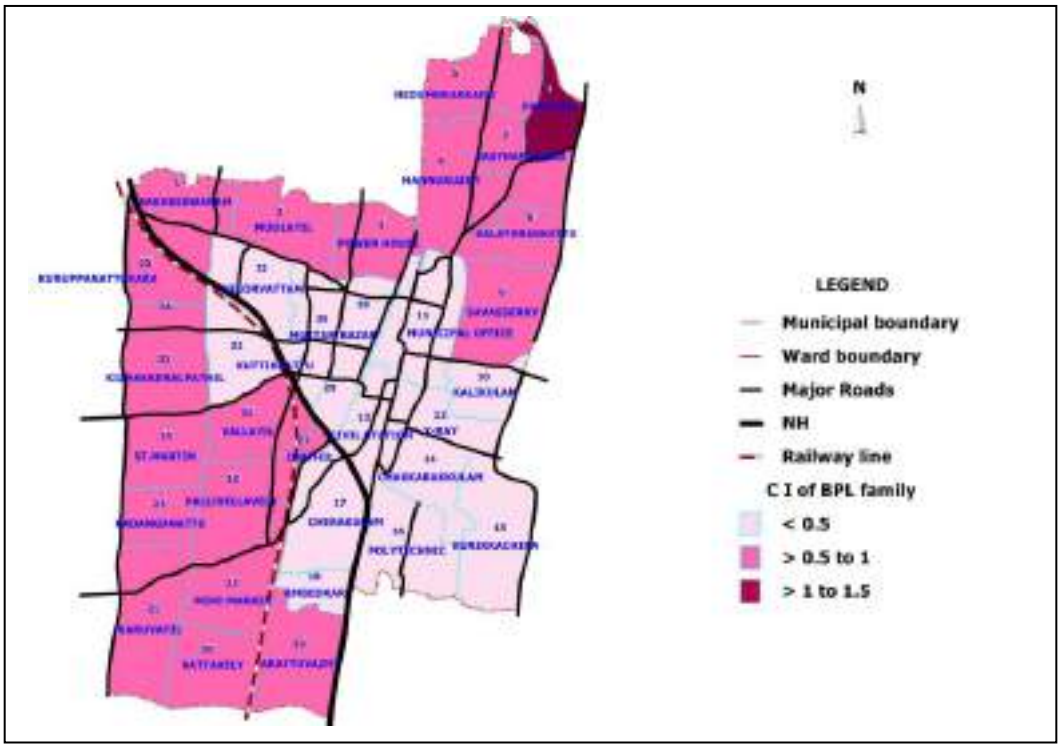


Figure 19.1 Concentration pattern of BPL families

❖ General condition of BPL population

In Cherthala town 6132 households are categorized as BPL families, spreading over many wards of the town. The concentration of BPL families is more in wards of Mini Market (22), Kuruppanattukara (35), Kulatharakkad (8), Savasserry (9), Karuvayil (21), Edathil (27) and Parappel (6)

Empowerment of the poor through networking and community development, livelihood initiatives/income generation opportunities, and education and information campaign on health and sanitation will create greater awareness on improving living conditions and environment.

19.2. SC/ST Population

SC population constitutes nearly 3.34 % of the total population in Cherthala town whereas ST population is very low (nearly 0.24 %). Percentage of SC population of the district is 9.46. SC/ST Concentration Index is higher in Civil Station (13), Kurikkachira (15), Idathil (27), Kuruppanattukara (35), Savassery (9), Arattuvazhy(19). The concentration pattern of SC/ST population is shown in *Fig.19.2*.

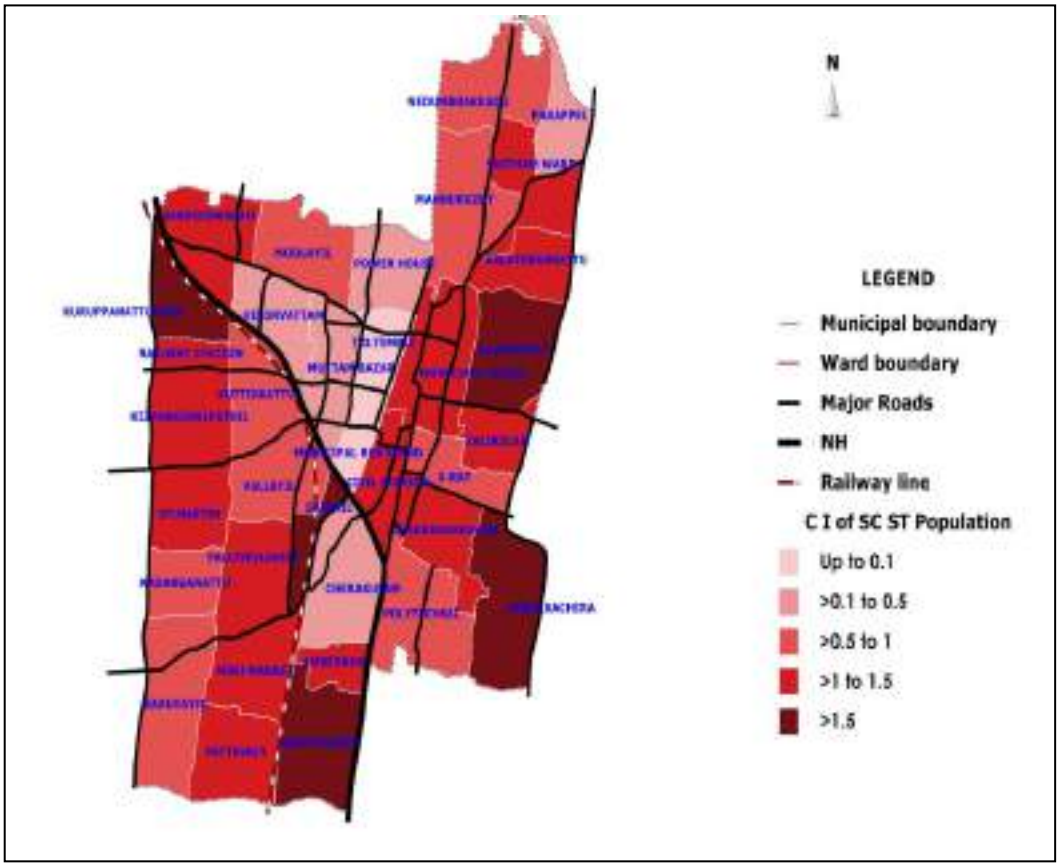


Figure 19.2 Concentration pattern of BPL SC ST Population

ST population is very less compared to SC population. Sex ratio is 1131 for SC and 965 for ST as per census 2011.

19.3. General condition of SC/ST population

In Cherthala town, SC/ST population is less than 4 % of the total population. There is 1642 SC/ST population spreading over many wards of the town. For SC/ST development Integrated Tribal Development Project (ITDP) department successfully implemented different projects like housing scheme, grant for various purposes etc. However special labour oriented training programme as well as economical support for labour enterprises are to be provided in this respect.

The main problem of reaching the various schemes under this sector to the beneficiaries is the lack of awareness. Major problem regarding the housing schemes is the non availability of housing plot. So Government has to reserve housing plots for SC/ST and economically weaker section.

19.4. Literacy

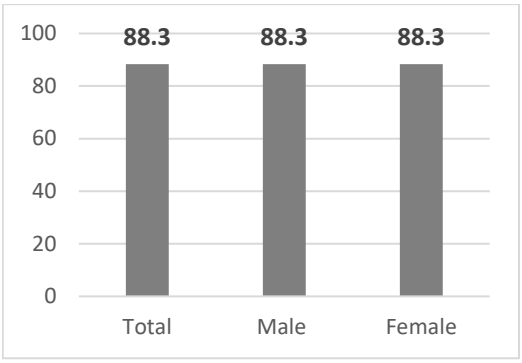


Figure 19.3 Literacy rate 2011 of SC

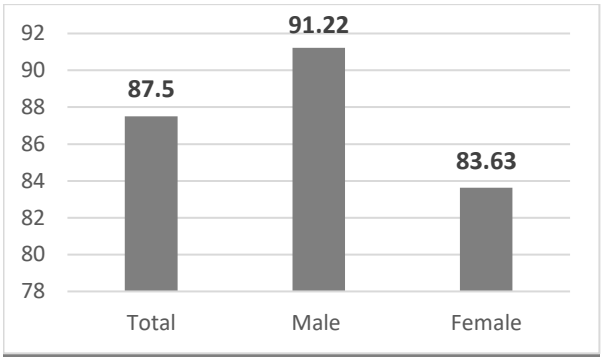


Figure 19.4 Literacy rate 2011 of ST

Literacy rate of SC population in Cherthala town is 88.3 % and that of ST population is 87.5 %. Male literacy rate of ST population is more than the female literacy rate. *Fig 19.3* and *Fig 19.4* shows the 2011 literacy rate of SC and ST population.

19.5. Other social aspects

In Kerala population of women is more than half of the total population. Literacy rate of women is also on the higher side in Kerala state. Regarding the women participation in development activities in Cherthala town, the situation is not however in par. Government had taken many proposals for bringing women into the main stream.

Sex ratio is the most credible pointer towards the status of women in a society. Kerala has a unique position with regard to sex ratio. According to 2011 census sex ratio of Cherthala town is 1065; whereas the sex ratio of the district is 1100. Variation of sex ratio for Cherthala town in the previous decades is given in *Table 19.2*.

Table. 19.2 Decadal variation of sex ratio

Year	1971	1981	1991	2001	2011
Sex ratio in Cherthala Town	1023	1011	1048	1057	1065

The literacy rate of town in comparison with the State and District is shown in *Fig.19.5*. as per the data the female literacy rate of Cherthala town is 95.59 % and that of the District is 94.24 % and the State is 92.07 %.

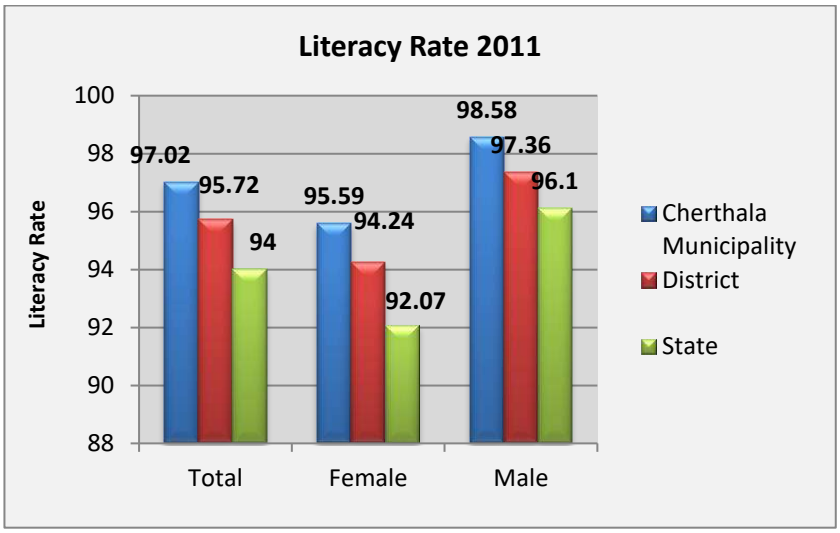


Fig. 19.5 Literacy rate – Comparison with district & state

Source: Derived from Census data

For the welfare and advancement of women, labour enterprises and special labour training programmes have to be encouraged. 'Kudumbasree' plays a major role for establishing labour enterprises. In unorganised sector the minimum wages of women should be ensured.

Female work participation rate of Cherthala town is 31.73 which is far high compared to the district average of 24.02 and state average of 18.23. Gender based comparison of WPR with respect to District and State is shown in figure 19.6.

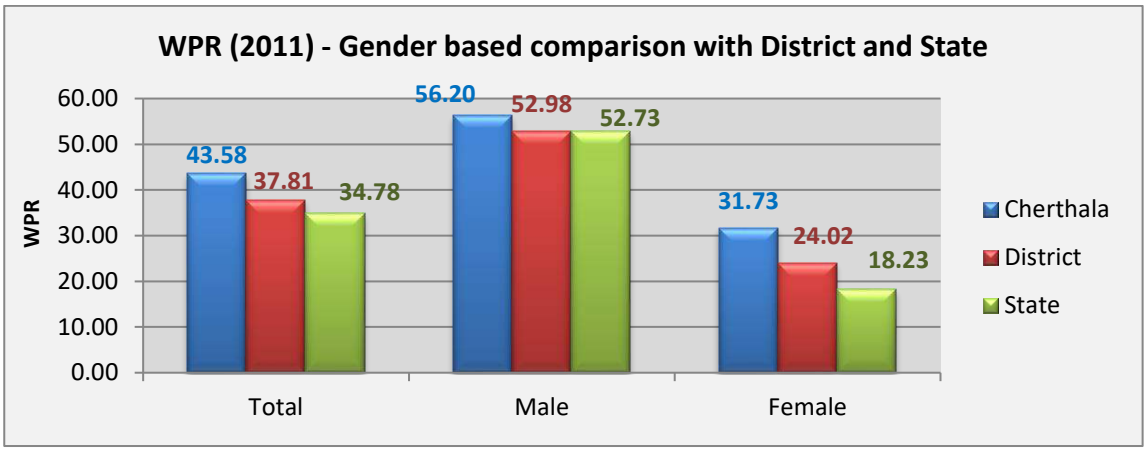


Fig 19.6 Gender based Comparison of WPR with district and state

Source: Derived from Census data

In Cherthala town women are involved in various kind of works such as building construction, tailoring, printing, agriculture, fish vending, teaching, cleaning town etc. and some of them are in Government service too. There is no wage difference in Government service on gender basis. But in other sectors wages of women is lesser than that of men.

No institution for the welfare of women is functioning in the town. But there are a few working women's hostels functioning in the town.

Absence of proper accommodation facilities is the major problem being faced by the working women. Immediate steps have to be taken to provide accommodation facilities and measures to ensure their safety has to be taken care of. Another problem is the lack of basic facilities like toilets at public places.

Population in the age group of 0 to 15 is considered Child group. As per the socio economic survey 2013, 16.53 % male population and 13.57 % of female population are in the child group. Anganawadies are the grass root level delivery point of social welfare activities. 32 Anganawadies are functioning in the Municipality and out of these, 21 are functioning in own buildings, 11 are functioning in rented building. New buildings are to be constructed for those Anganawadies functioning in rental buildings. All these Anganawadies have toilet facilities and gas connection. There is an institution in the town near Poothitta for the care of mentally challenged children.

The people above 60 years are considered as the old age people. As per the socio-economic survey 2010, 33.58 % of male population and 21.57 % of female population is coming under this group. At present no old age homes or other facilities required for old age people are functioning in the town. In the local level analysis major suggestion in this sector are construction of old age homes and providing necessary medical facilities for old age people.

19.6. Inference

The distribution of SC/ST population or concentration of BPL families does not show any relation to the distribution of Agriculture laboures and cultivators. For the welfare of weaker sections of the town more facilities are to be provided. The concentration of BPL families is more in Mini Market (22), Kuruppanattukara (35), Kulatharakkad (8), Savasserry (9), Karuvayil (21), Edathil (27) and Parappel (6) wards. SC/ST Concentration Index is higher in Civil Station (13), Kurikkachira (15), Edathil (27), Kuruppanattukara (35), Savassery (9), Arattuvazhy(19) wards. Ward of Kuruppanattukara (35) and Savassery (9) figure out both lists and call for priority attention. In the changed social structure more attention is needed for the welfare of Old age people. Projects have to be evolved for the economic development of women, Scheduled Caste and Scheduled Tribe.

Chapter-20

Environment

20.1. Environment

For a livable and healthy town, it is imperative that its planners address environmental concerns, which have deep and long standing influence on its people and land. Environment fatigue is a natural corollary to bad environment management caused by environmental degradation and biodiversity loss by developmental activities across the world. It is not different in the case of Cherthala town. Protection, conservation and sustainable environmental practices are the essential functions of a desirable integrated urban approach.

20.2. Present scenario

The environment of Cherthala town is not much polluted compared to similar towns in the state. The general flat terrain of the town interspersed with a network of canal system linked to the backwaters, helps in avoiding water logging and flooding. The regional setting of the town, midway between the sea and the Vembanad lake, as shown in Figure 20.1, has its influence on the local climate.

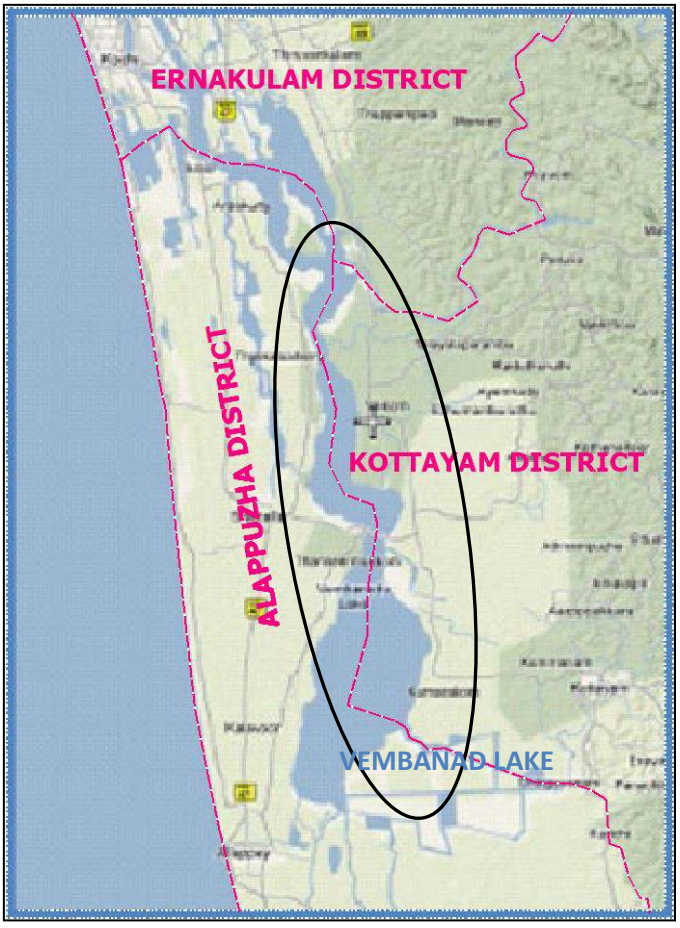


Figure 20.1 Environmental – Regional aspects

20.3. Areas of Ecological Importance

The stretch of land in Cherthala is classified as flat coastal belt – low land based on the natural classification. The town has a very fertile soil, rich in all plant nutrients. The soil can be classified as Kari and Alluvial.

The sensitive areas in the town include wet lands (paddy), canal sides and the Kayal lands. The area of paddy, marshy land and water body is shown in Table 20.1.

Table 20.1 Areas of ecological importance

Landuse	Area (Ha)	% of Total area
Paddy	102.24	5.75
Marshy Land	58.23	3.27
Waterbody	66.96	3.77

❖ Paddy Lands

The town has a total extent of 102.24 Ha of paddy. Only a fraction of this area is cultivated. The major land use change affecting environment, identified in Cherthala town is the depletion of paddy land. There has been a considerable decline in both the area of paddy field and the extent under cultivation. (Area reduced from 182.46 hectares in 1990 to 102.24 hectares in 2013. Area under paddy cultivation is steadily reducing as per sectoral data.) As, the paddy lands essentially acts as green open space and also functions as reservoir of water, during rains preventing floods and enabling fast run off, such areas are to be conserved.

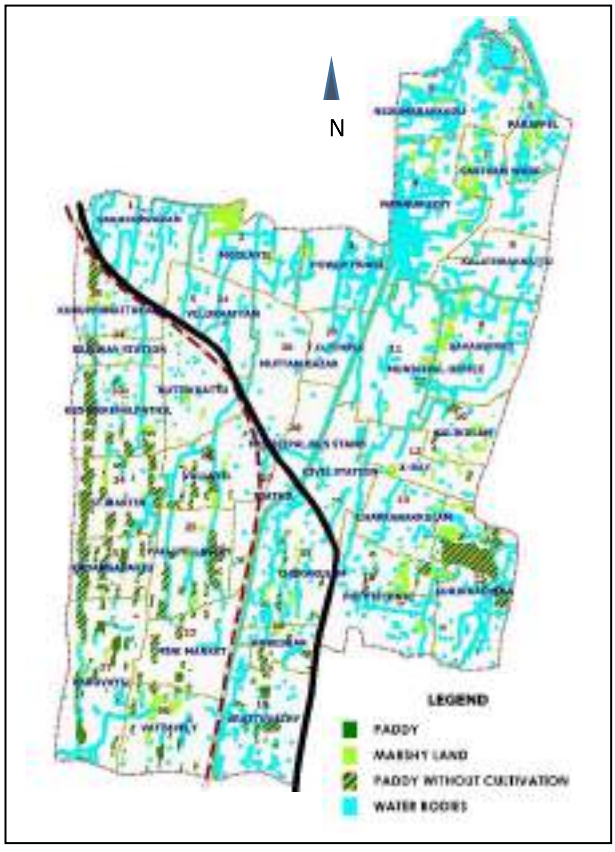


Figure 20.2 Location of areas of ecological importance

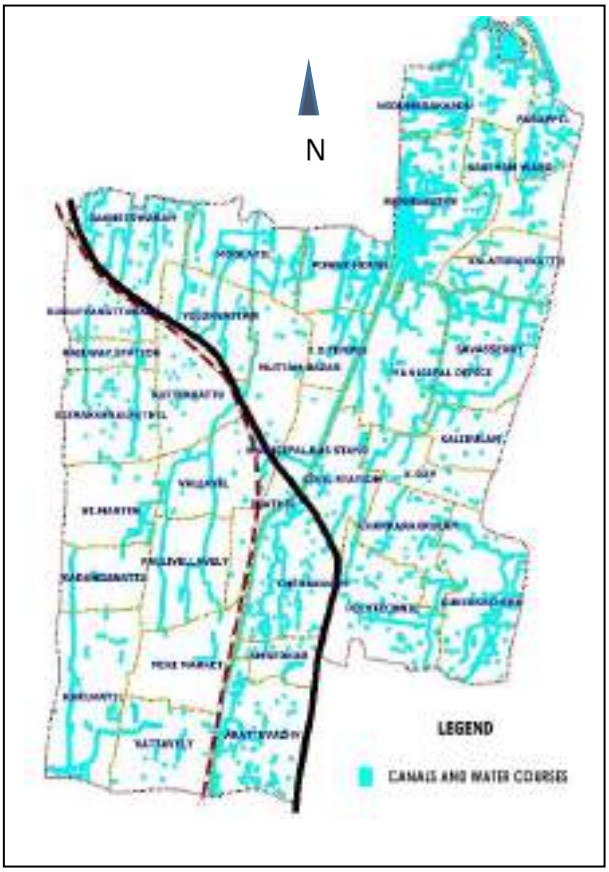


Figure 20.3 Canals and watercourses in town

❖ Lake side/Canal Side areas

Besides paddy land there is another area identified in Cherthala town. i.e. the lake side and canal side areas. The main canal, Alappuzha - Cherthala canal isn't presently navigable. The secondary canals are used to serve as natural drainage channels in the town, but today they are in an advanced state of deterioration through silting and waste dumping. The changes in land use in these areas need serious consideration. Highly polluting activities in the lakeside shall threaten the cleanliness and quality of the lake.

❖ Ponds

Village ponds had been the sole source of drinking water along the coastal region a few decades ago. Continuous maintenance of these ponds through traditional methods ensured the water quality. As population increased and urbanization set in, many of these ponds were reclaimed for alternate use. The rest of the ponds were neglected as and when public water supply became accessible. Considering that ponds are important fresh water ecosystems and abode of rich biodiversity, the need of their conservation is recognized.

❖ Sacred groves

Most of the sacred groves (kavus) have been preserved by family or by temple trusts and are based on the old belief in snake worship. Local people also believe that ponds associated with sacred groves are perennial. The temple and family trusts are not always aware of the modern scientific importance of their sacred groves.

Many sacred groves in the district face threat due to the dense human population and change in landuse pattern. Breakup of ancestral joint family system to nuclear families is the major reason for deterioration of these valuable resources. The family member who receives the portion of the land harbouring sacred groves would clear the vegetation by transferring the deities of the grove to selected temples in the state after offering expensive special rituals.

People strongly prefer to follow idol worship and for them, most of the tree species or vegetation in the groves are of no economic use. Weakening of beliefs, failths and taboos associated with these groves has added to the destruction. In many groves, idols called 'Chithrakoodam' were constructed within the grove and over a period of time, when they developed cracks due to the pressure exerted by group of trees, the owner of the grove cut the trees to save the idols from getting damaged.

- **Dry Cultivation Areas**

The dry cultivation areas provide the necessary green cover in the town. Changes in this land use will reduce the green cover and hence shall adversely affect the environmental quality.

20.4. Other Aspects

- **Built form**

A less compact built form (with more than necessary intrusion of residential, commercial and such other land uses requiring built space to agricultural / open land uses) shall mean wider building foot prints. This calls for putting more land under manmade structures which is detrimental to environmental quality. Reducing the building foot print is the answer to this problem. Lesser foot prints shall reduce the possibility of creating heat islands within a town. Reducing the building foot print also shall mean compact development for which it is easier and less costly to provide basic amenities like water, sewerage system, energy, roads etc. Similar to other towns in the state, Cherthala is also characterized with the typical homestead type of development resulting in a less compact built form. The residential density is also not high compared to similar towns in the state.

- **Waste Management**

One important problem in the environmental sector is the letting out of waste water to the storm water drains without any treatment from some of the residences and commercial establishments. Providing proper waste treatment facilities is essential for ensuring better quality of environment.

At present, the municipal solid waste from Markets, hotels, auditorium and other major institutions are collected by a private agency and treated after segregation. The process is done outside the municipal limits. The municipality does not have a proper treatment/disposal facility for the solid waste. As the land holding is larger, the household wastes are disposed in their own compounds, which gets mixed up with storm water and finally reaches canals and

then to the Vembanad lake, increasing the pollution level of these water bodies and their surroundings.

❖ **Water and Air Quality**

The water quality is good such that most of the households are drawing water for domestic purpose from the wells directly without any treatment. Air pollution due to vehicular traffic is limited to a very small area in the town centre.

20.5. Conservation efforts

The Kerala Conservation of Paddy Land and Wetland Act, 2008 in force prevents unregulated conversion of paddy and wet land for other purposes.



Paddy fields

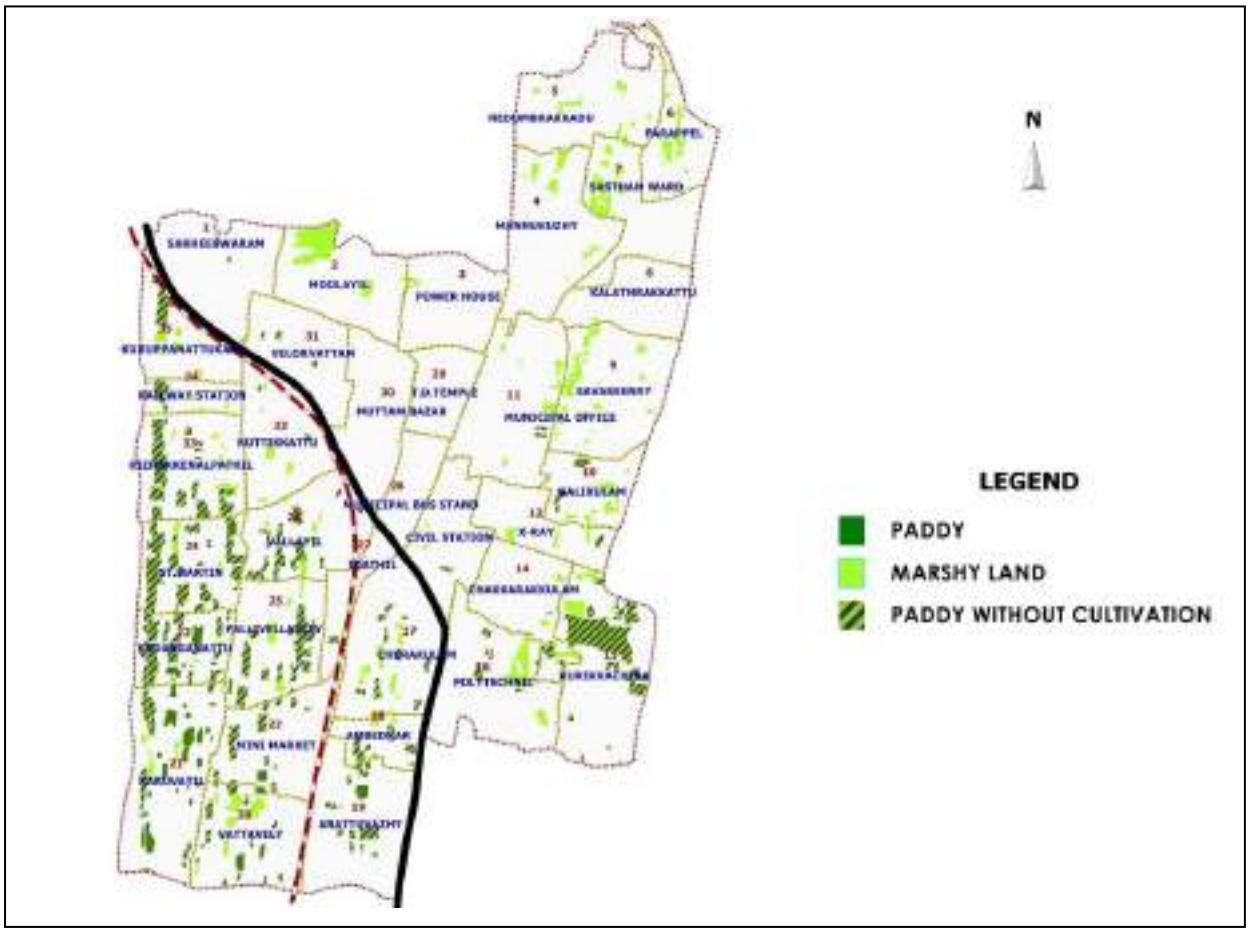


Figure 20.4 Distribution of Wetlands and Paddy fields

20.6. Problems and potentials

The problems faced by the town in the environmental sector are the fast depletion of paddy/wet land and water pollution due to waste water entering the storm water drains. The low density and a vast area of land under dry cultivation are the strengths of the town in the environmental sector. The town does not have a proper waste management system. Waste generated from the central areas of the town only is collected by the municipality and there is no proper treatment/disposal facility for the waste so collected. Improper waste management is creating health issues and environmental degradation. 97.33 % of the waste which is disposed by the people in their own compound gets mixed up with storm water and finally reaches canals and then to the Vembanad lake, increasing the pollution level of these water bodies and their surroundings. Direct disposal of waste water from hospitals, hotels, commercial establishments and other public buildings into the drains are also creating health issues. Due to such practices, the ground water is getting polluted. Environmental pollution due to the usage of pit latrines at Household level need attention since it is polluting the subsoil as well as the ground water source. The problems identified have not reached unmanageable proportions and hence can be brought under control.

20.7. Inference

Even though the town *has a serene environmental quality, some problems do exist and hence the authorities need to be vigilant to mitigate the present problems as well as to conserve the environmental quality. Environmental Pollution due to direct disposal of solid waste as well as liquid waste without proper treatment from various sources has to be checked. Depletion of paddy lands in the town also needs special attention and measures has to be taken to prevent land conversion, which is taking at a faster rate due to high demand of land.*

Chapter 21

Disaster Management& Risk Informed Planning

21.1 Introduction

The primary goal of the Disaster Management is to reduce the likelihood that the town will experience disaster and to mitigate the impact of any disasters that might occur in the area. Potential for disaster can be reduced by identifying and correcting hazardous conditions by encouraging alertness in detecting and reporting. This calls for a preliminary identification of the major disasters affecting the Municipality and those areas which are prone to disaster.

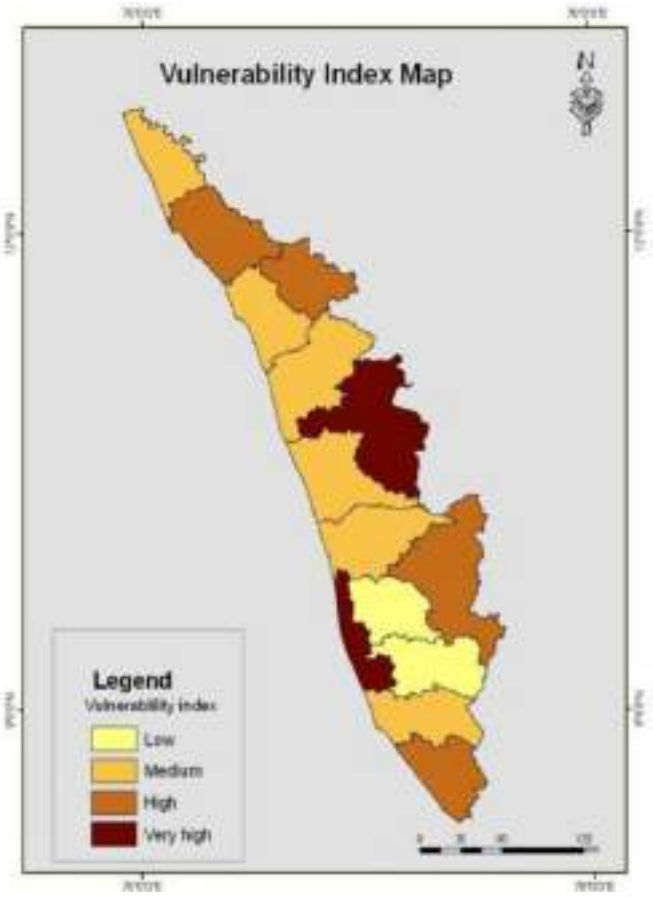


Fig.21.1Vulnerable districts in Kerala

Source: Kerala State Action Plan on Climate Change, DoECC, 2014

Nowadays climate change acts as a major catalyst for disaster all over the world with Kerala being one of the most vulnerable states in India suffering from subsequent social and economic loss. The Kerala State Action Plan on Climate Change was drafted by the Directorate of Environment and Climate Change (DoECC) with relevant departments, agencies and institutes providing inputs. This was endorsed by the Government of India in 2014. As per the report, Alappuzha is identified as one of the four vulnerable hotspot districts of the state. With respect to Climate change, the hotspot analysis of districts in Kerala is determined based on hazard exposures (flood and drought) impact on biodiversity, and impact on life, livelihood and wellbeing of inhabitants of the areas. The degree of vulnerability of climate sensitive sectors, tribal population and low performer of Human Development Index were also considered in identifying hotspots.

As per the study, Alappuzha and Palakkad districts are the most vulnerable to climate change exposure, as these districts having higher values of Composite Vulnerability Index. Alappuzha showed very higher values of CVI showing exposure in terms various environmental variables like coastal wetlands, lagoons and sand beach. The district which is under very high vulnerability category lack adaptive capacity and show higher sensitivity and exposure to climate change in terms of social and environmental variables. The vulnerability index map of Kerala is given in Figure 21.1 and Types of disasters are shown in Figure 21.2.

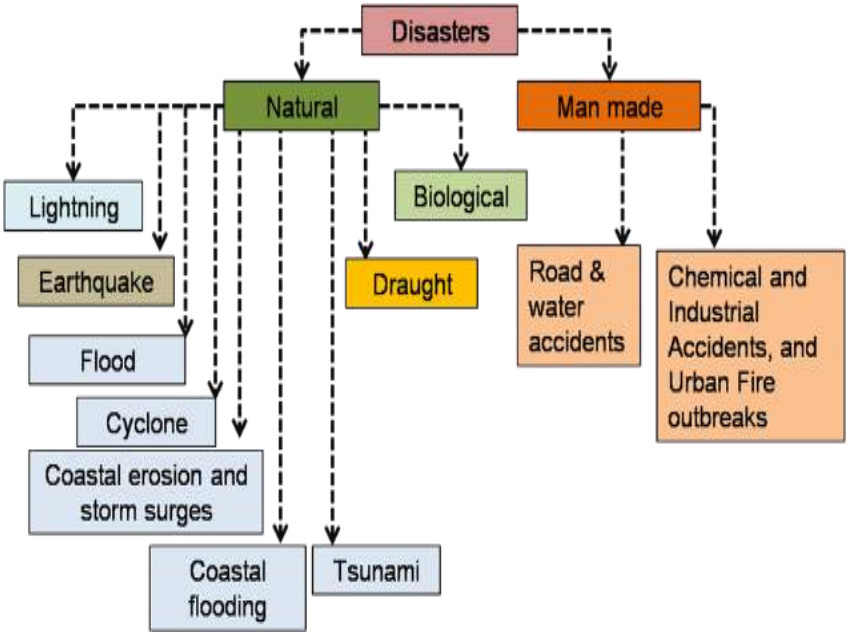


Fig.21.2 Types of Disaster

Table 21.1Hazard Seasonality mapping of the district

Disaster	J	F	M	A	M	J	J	A	S	O	N	D
Drought												
Lightning												
Flood												
Storm surge												

Alappuzha district has been traditionally vulnerable to natural disasters on account of its unique geoclimatic conditions & vast coastline. Floods and droughts have been recurrent phenomena. The Alappuzha District has a District Disaster Management Plan prepared in the year 2015 by Kerala Disaster Management Authority. The District Disaster Management Plan is envisaged to provide critical inputs that would enhance the efficiency and effectiveness of disaster management in real time. It also helps to foresee disaster risk reduction activities at various levels and develop preparedness for recovery/mitigation. However, events like the flood of 2018 and unpredictable climatic events have occurred over the recent years. The hazard seasonality mapping of the district is given in Table 21.1 and Hazard profile of the district is given in Table 21.2.

Table 21.2 Hazard profile of the district

Sl.No.	Classification	Types of Disaster
1.	Naturally Triggered/ Weather Related	Flood
		Coastal Tsunami, Coastal erosion Kallakadal, Storm surge
		Thunder and lightning
		Cyclone
		DroughtSalt water intrusion
2.	Geological	Earthquakes
		Landslides
3.	Biological	Epidemics
		Cattle epidemics
		Food poisoning
		Pest attack, Bird Flew
4.	Anthropogenically/ Technologically triggered	Industrial explosions Petro-chemical transportation accidents
		Fireworks accidents
		Road accidents
		Human triggered forest fire
		Stampede
		Short circuit and related fire
		Building collapse
		Boat capsizing Tourism related drowning
		Rail accidents
		Hooch accidents

Source: District Disaster Management Plan, 2015

21.2 Past Disasters in Town

History of disasters occurred in Cherthala Taluk is given in Table 21.3. Cherthala Taluk was affected slightly by flood, coastal erosion, windfall, drought and lightning in the previous years.

Table 21.3 Past Disasters in Cherthala Taluk

Disaster	Flood	Coastal Erosion	Windfall	Drought	Lightning
No. of affected villages	120	36	120	68	120
Population affected	2328503	327350	953828	1807233	124833
Number of Houses damaged	2429	114	1384		58120
Estimated cost of houses damaged	9932000	471000	5313000		401000
No of casuality	12		2		
Drinking water supply expenditure				1802969	

21.3 Types of hazards



Fig.21.3Multiple hazard Zonation map of Alappuzha

Source: NCESS

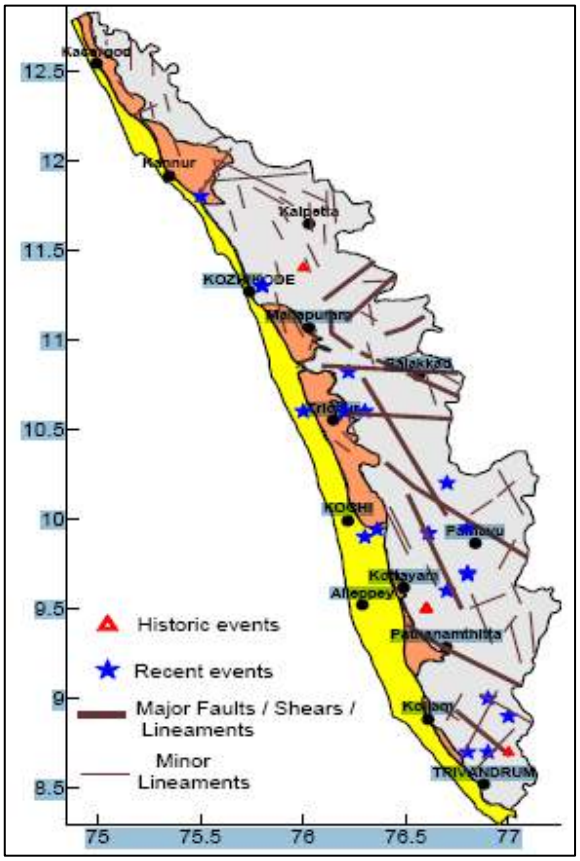


Fig.21.4 Location of historic and recent earthquakes in Kerala

Source: Kerala State Disaster Management Plan

As per the Multiple Hazard Zonation Map of NCESS (National Centre for Earth Science Studies) for the District, Alappuzha is prone various hazards like coastal erosion, storm surges, flood, lightning as shown in Figure 21.3. Cherthala has history of slight flood, windfall, drought, lightning and biological hazard.

21.3.1 Earthquake

Kerala has been placed in zone III, where the maximum expected intensity is 5.6m. Kerala has experienced occasional mild tremors since historical times. However, pockets of higher ground acceleration have been identified in central Kerala. Several deep-seated faults exist in Kerala together with many minor faults and fractures that can generate minor tremors as a result of crustal readjustment. Cherthala has not experienced any earthquake disasters in the history as per Fig 21.4.

21.3.2 Lightning

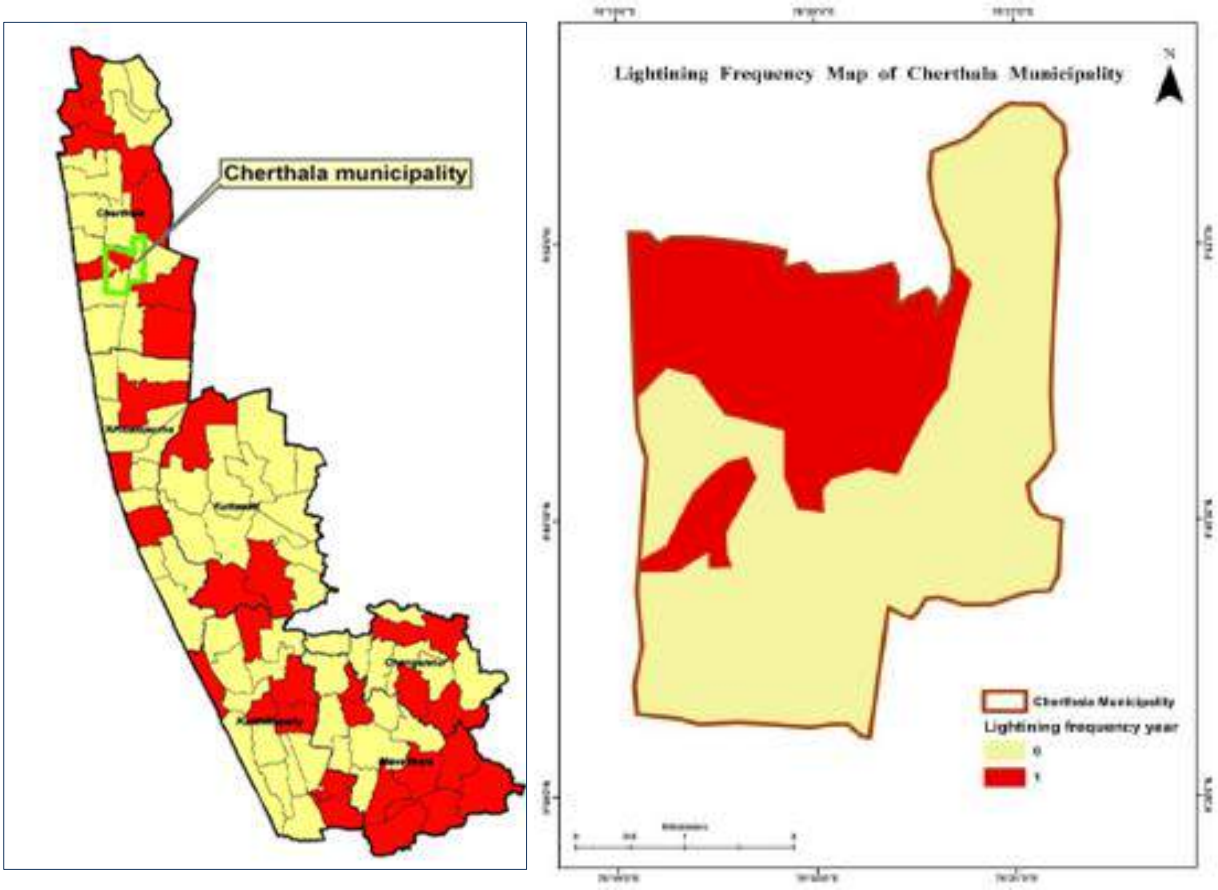


Fig.21.5 Lightning Frequency map of Cherthala Town

Source: District Disaster Management Plan, 2015

Occurrence of casualities during monsoon season is common within the district and therefore can be considered as thunder and lightning prone district. The lightning phenomena majorly occur during the summer showers and the N-E monsoons. The Cherthala town has no past lightning events and has a score 1 in certain areas in the lightning frequency map for the District as shown in Fig 21.5. Cherthala in Lightning susceptibility map of Kerala is shown in Fig 21.6.

21.3.3 Landslides

On analysing the topography, the town has a general flat coastal belt – low land terrain. So, there is less danger of landslides. The disaster management plan 2015 has not yet recorded Landslide as a major threat here.

21.3.4 Drought

The State of Kerala experiences seasonal drought like conditions every year during the summer months. Even in the years of normal rainfall, summer water scarcity problems exist in the midland and highland regions. Drought is mainly reflected in the non-perennial rivers and lowering of ground water table. This adversely affects the rural and urban drinking water supply. In Kerala draught is principally manifested as drinking water shortage. The district disaster management report 2015 classifies certain regions of Cherthala into Moderate drought classification as shown in Fig 21.7. This might be due to the rainfall pattern that has become more unpredictable and the unprecedented use of ground water which has increased over time along with reduction in vegetative ground cover and rapid urbanisation.

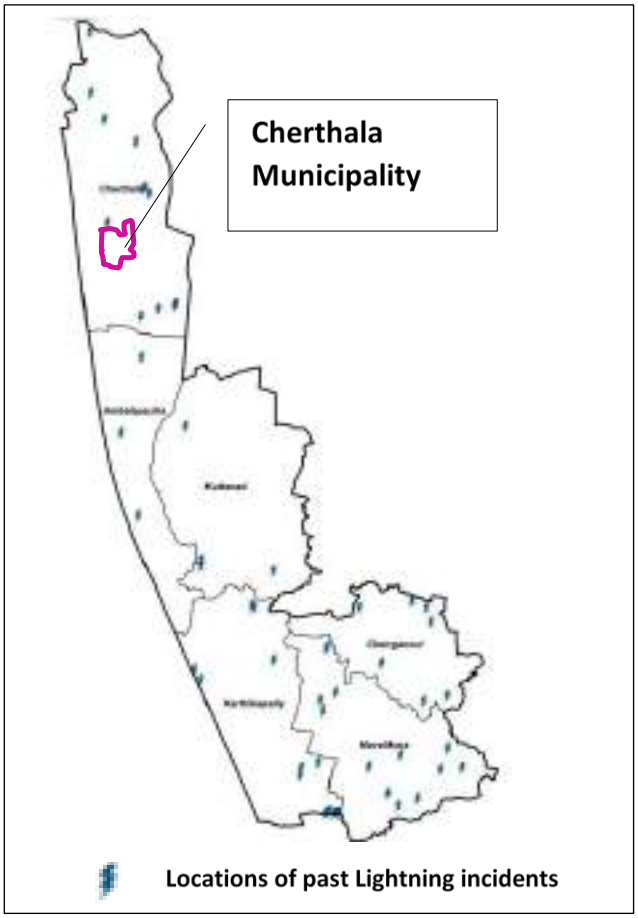


Fig.21.6 Cherthala in Lightning Susceptibility map of Alappuzha District
Source: District Disaster Management Plan, 2015

21.3.5 Chemical, Industrial and Fire outbreaks

A major industry in the Town, is pointed out as a cause for industrial/chemical/fire disaster in the town as per The district disaster management plan 2015.The maximum and minimum probable extent of threat zone due to this industry is shown in Figure 21.8. The Cherthala town has no major festivals, tourist place and major crowd events that might lead to stampedes or other related disasters as per disaster management report for Alappuzha 2015.

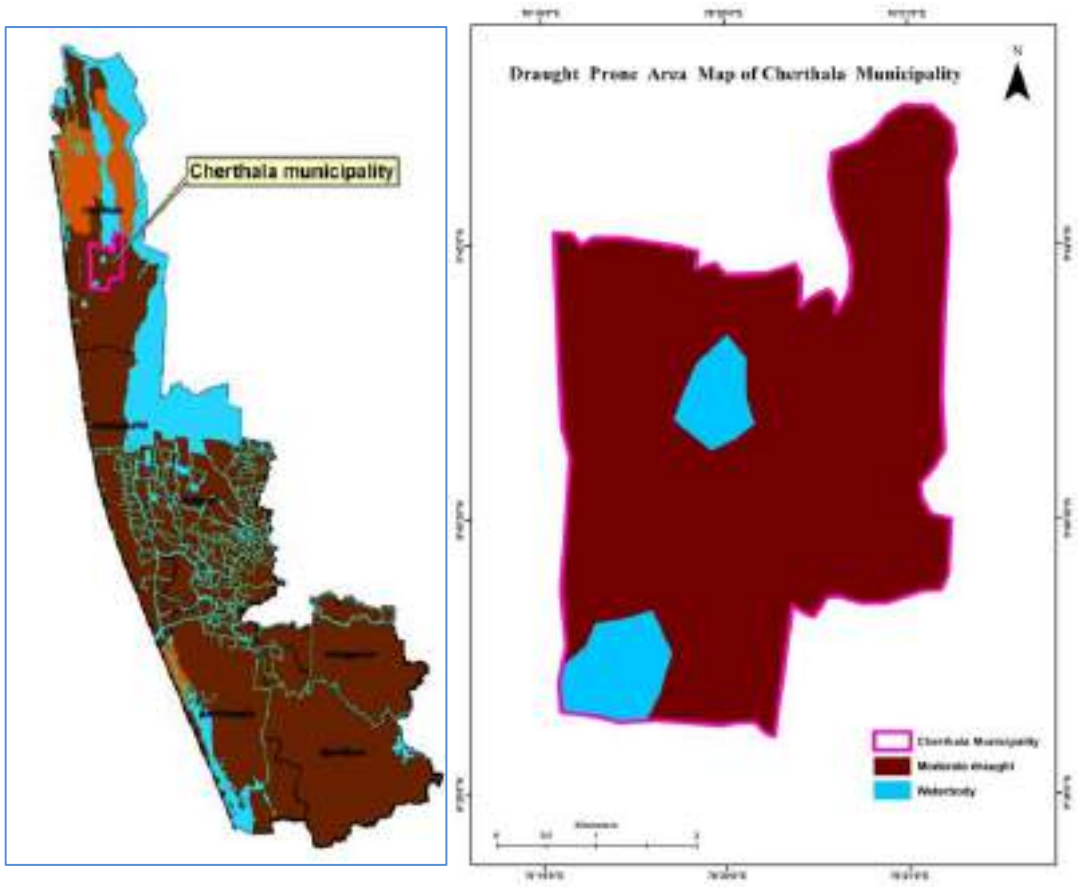


Fig. 21.7 Draught prone areas in Cherthala Town

Source: District Disaster Management Plan, 2015

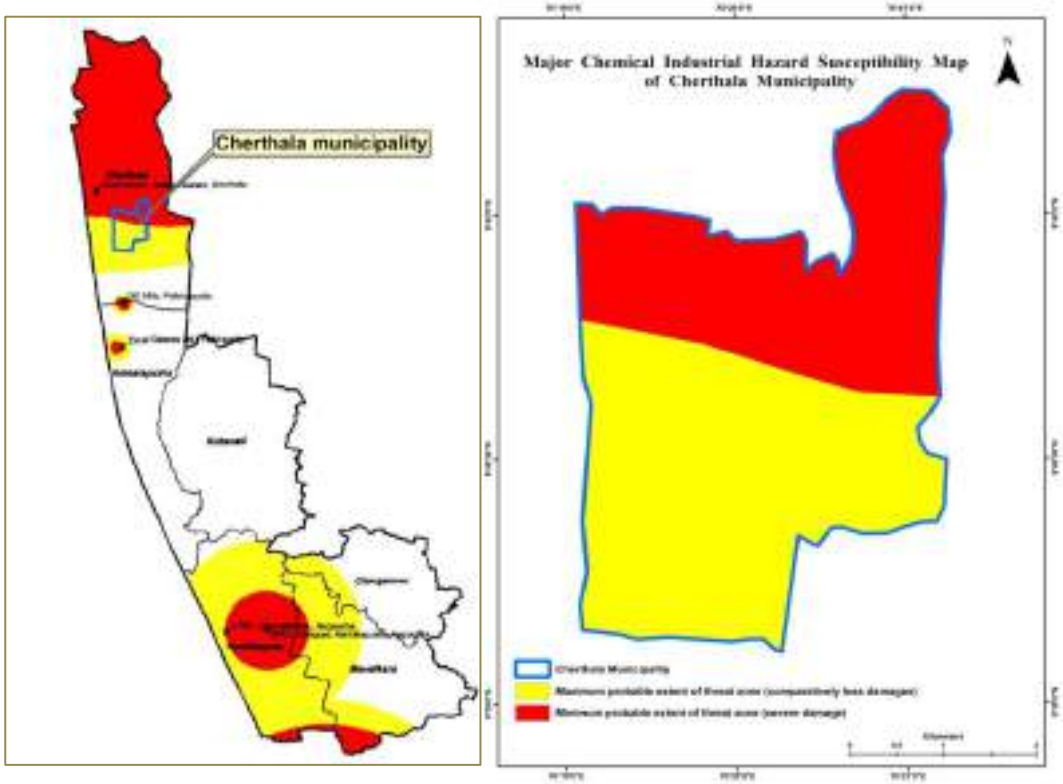


Fig.21.8 Chemical/Industrial/Fire Hazard prone areas in Cherthala Town

Source: District Disaster Management Plan, 2015

21.3.6 Flood

Flood is the major natural disaster occurring in Alappuzha District. Flood prone areas of the district as per District Disaster Management Plan, 2015 is shown in Fig 21.9. As per NCESS, about 53.77% of the total area of Alappuzha district is prone to flood. Kuttanad region in the district is identified as the major flood prone area of the district with flood vulnerability of 92.11% of area. Fig 21.10 shows the Flood Inundation level map in 25 year return probability in Cherthala Taluk as per the study of Kerala State Disaster Management Authority in 2022 and Fig 21.11 shows the Flood Inundation level map in 25 year return probability in Cherthala Municipality generated from the map of KSDMA. In Cherthala town, there are certain flood prone areas where flood is a periodical phenomenon in every year. Apart from this, there is no history of severe flood in any areas in the town. Even the Mega floods in Kerala in the years 2018 and 2019 had not severely affected Cherthala Town. There were no severe damages reported in the town. The regular water logging areas in the town especially in the Northern and South-Eastern wards are shown in Fig 21.12. This water logging can be addressed through the restoration of streams and channels and ensuring proper flow through the channels.

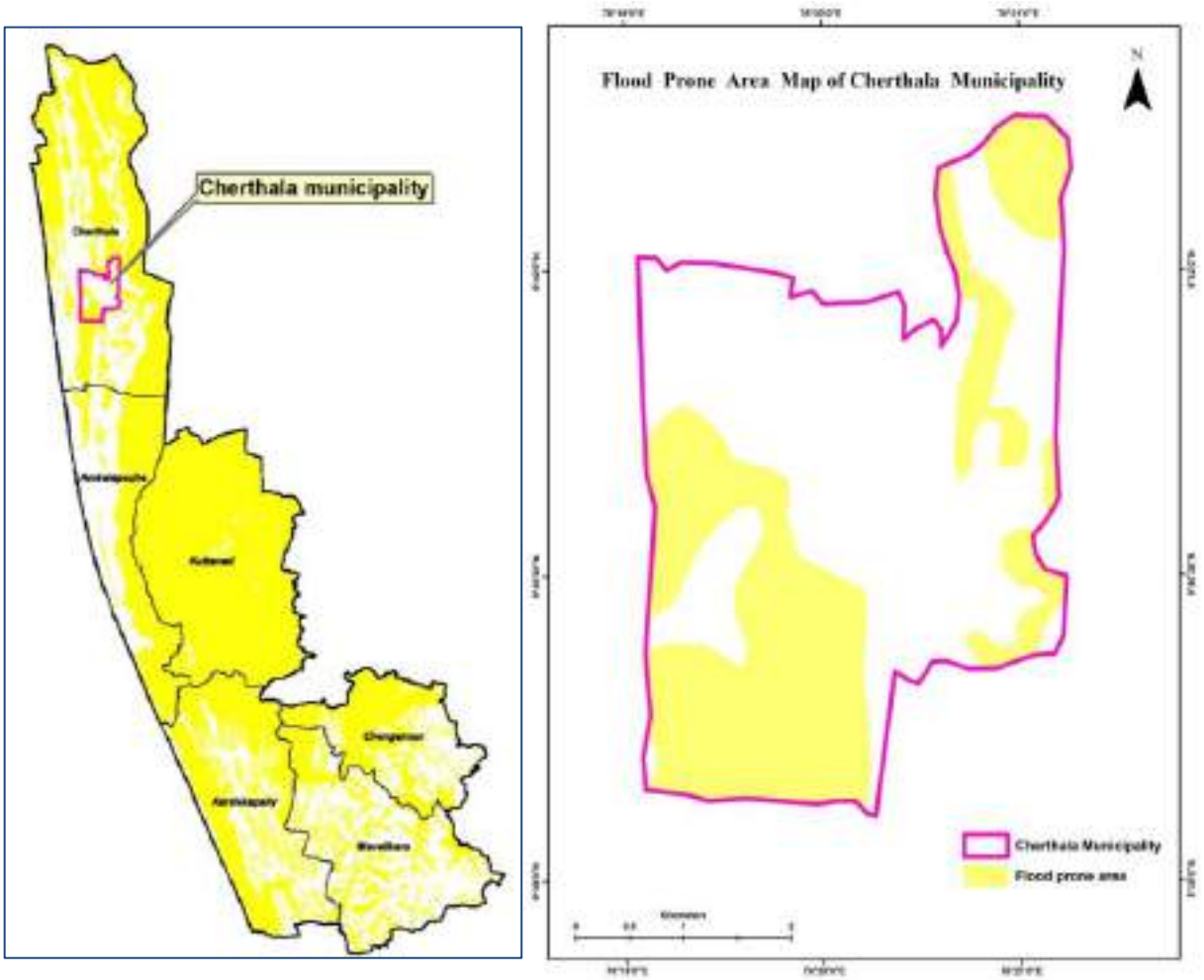


Fig. 21.9 Flood prone areas in Cherthala Town
Source: District Disaster Management Plan, 2015

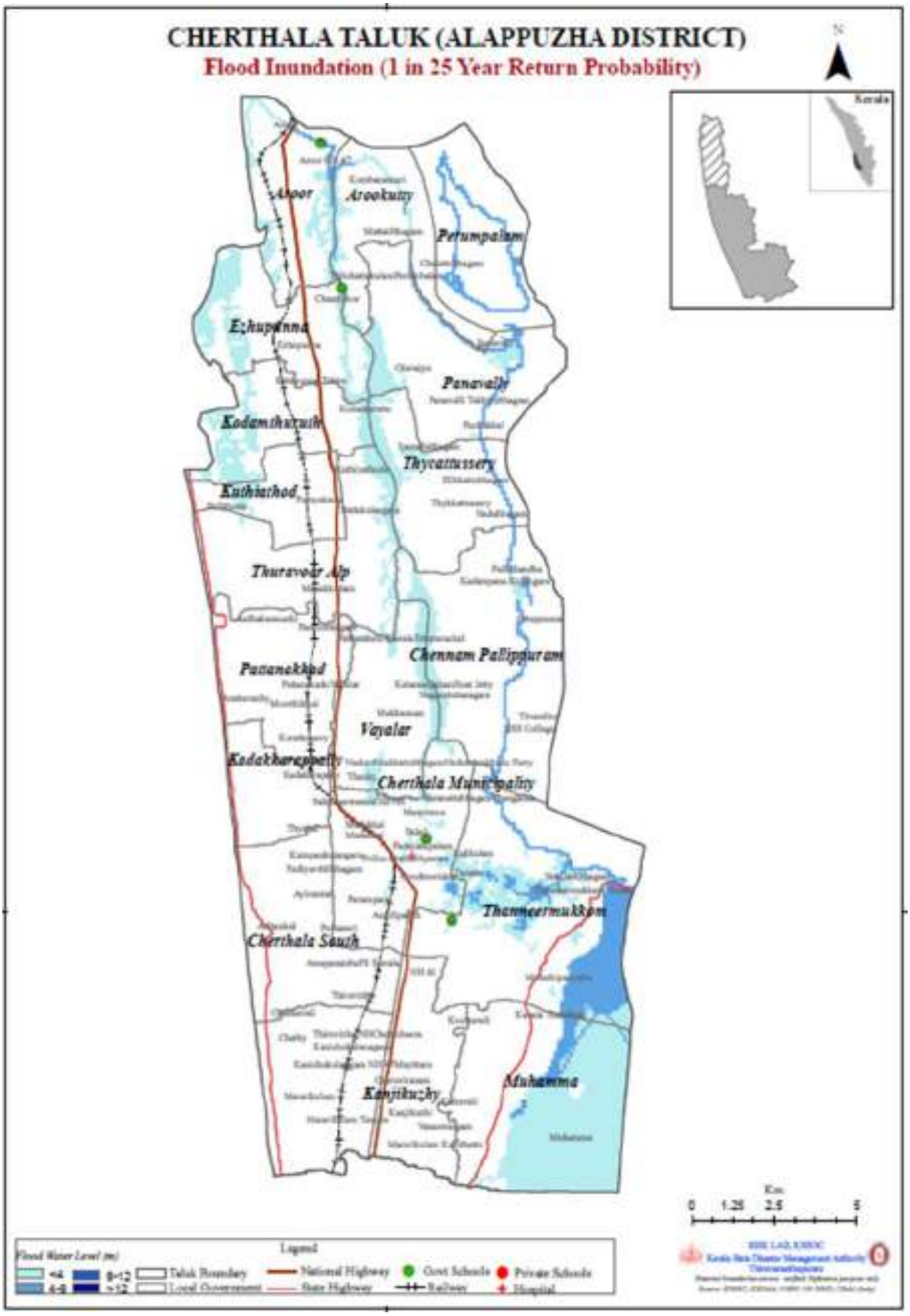


Fig. 21.10 Flood inundation in 25 year return probability in Cherthala Taluk
Source: Kerala State Disaster Management Authority

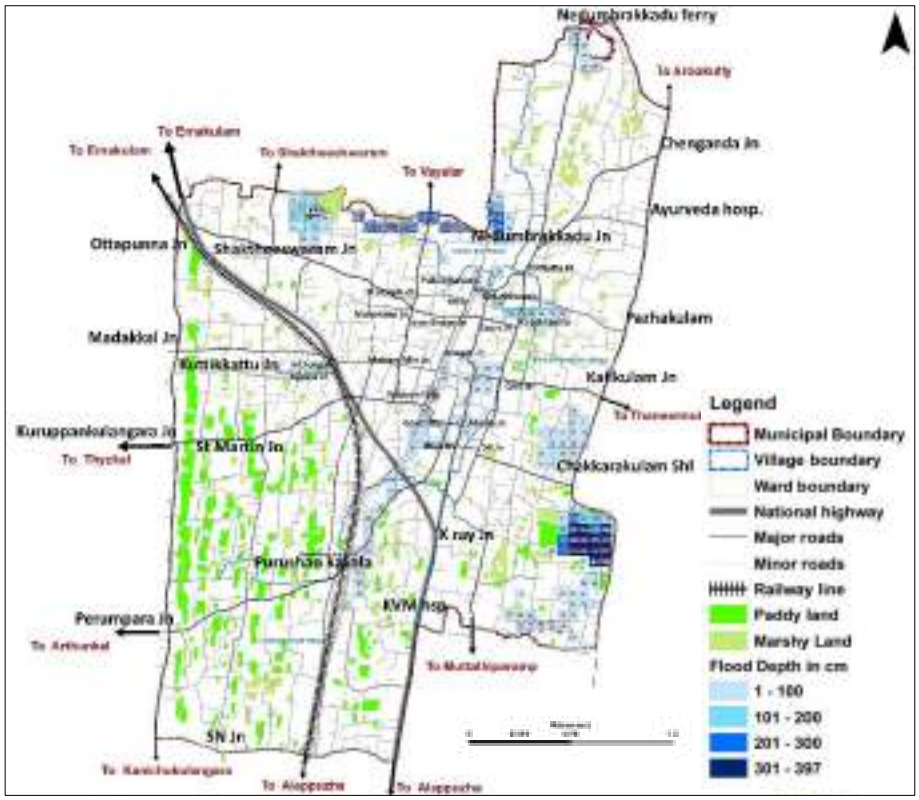


Fig. 21.11 Flood inundation in 25 year return probability in Cherthala Municipality
Source: Generated from Kerala State Disaster Management Authority map

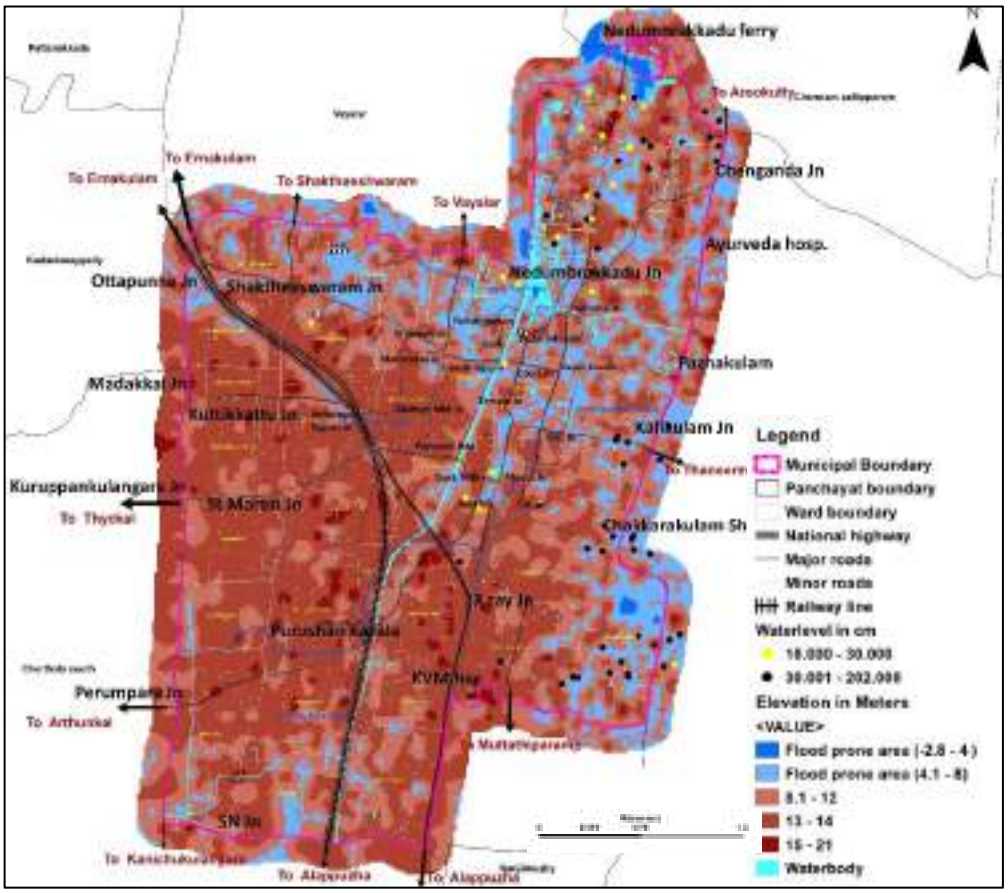


Fig. 21.12 Regular water logging areas in Cherthala Town

21.3.7 Biological Hazard

Disaster caused by the exposure of living organisms to germs and toxic substances are included in this category of disasters. The district disaster management plan 2015 for Alappuzha has listed epidemics, cattle epidemics, food poisoning, pest attack and Bird flew to the profile of biological disasters in the district.

Cherthala was once well known for Brugian Filariasis in India. High level of pollution in canals, Lack of safe and wholesome drinking water and huge multiplication of mosquitoes and infective organisms due to stagnation of contaminated water in the premises of each house caused spread of Brugian Filariasis and later Chikun gunya in town.

But the situation has changed lot with the introduction of vaccination as well as improvement in the environmental condition. Now the level of water pollution has reduced and availability of safe drinking water is ensured for the population.

The global pandemic COVID-19has led to death, devastation, migration and economic slowdown throughout the world. The first case in Kerala was reported in January 30th 2020 and ever since the wave has been going up and down while being declared a state specific disaster demanding isolation and containment.

The future possibilities of such outbreaks are high and therefore adopting early planning measures to arrest the outbreak and defining of containment zones needs to be considered.

21.3.8 Sea Level Rise

Sea level rise is one of the best known of climate change's many dangers. As humanity pollutes the atmosphere with greenhouse gases, the planet warms. And as it does so, ice sheets and glaciers melt and warming sea water expands, increasing the volume of the world's oceans. Sea level rise poses numerous risks to residences, buildings and infrastructure located in vulnerable areas. The risk of sea level rise to coastal water utility infrastructure varies based upon the rate of sea level rise relative to land elevation in a particular location. For coastal regions, no change is likely to have a greater impact than that of sea-level rise.

Where relative sea level rise occurs, it amplifies near-term vulnerability to storm surge and increases long-term flood and inundation risk. Rising sea levels amplify the threat and magnitude of storm surges in coastal areas. Higher water levels during tides can reverse or reduce efficiency of storm water drainage and wastewater outfall operations. Sea level-rise can also threaten the long-term operation of drinking water, wastewater and storm water utilities. It also increases saltwater intrusion into freshwater resources. (Environmental Resilience Institute, n.d.)

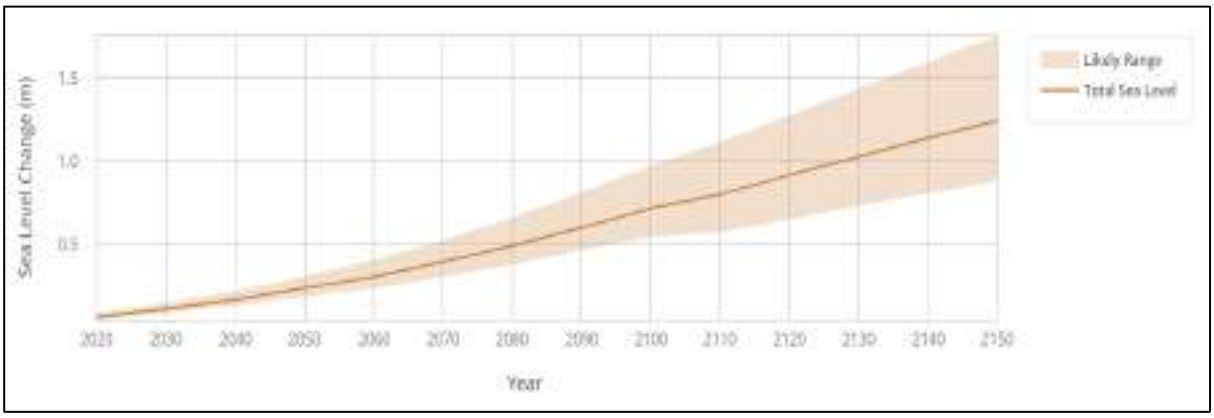


Figure21.13 Projected Sea Level Rise

The US space agency NASA which has come out with a new online visualization tool on future sea level rise in coastal cities shows that Kochi will have a sea level rise of 0.16±0.50m by 2040 from current (1995-2014 baseline) level. The tool projects a 1m rise by 2130. In the event of a 1m rise in sea level projected for 2130, around 374 sqkm of coastline of central Kerala will be affected or submerged, which includes Alappuzha, Ernakulam, Kottayam and Thrissur districts. Projected sea level rise in coming years is shown in Figure 21.13.(The times of India, n.d.)

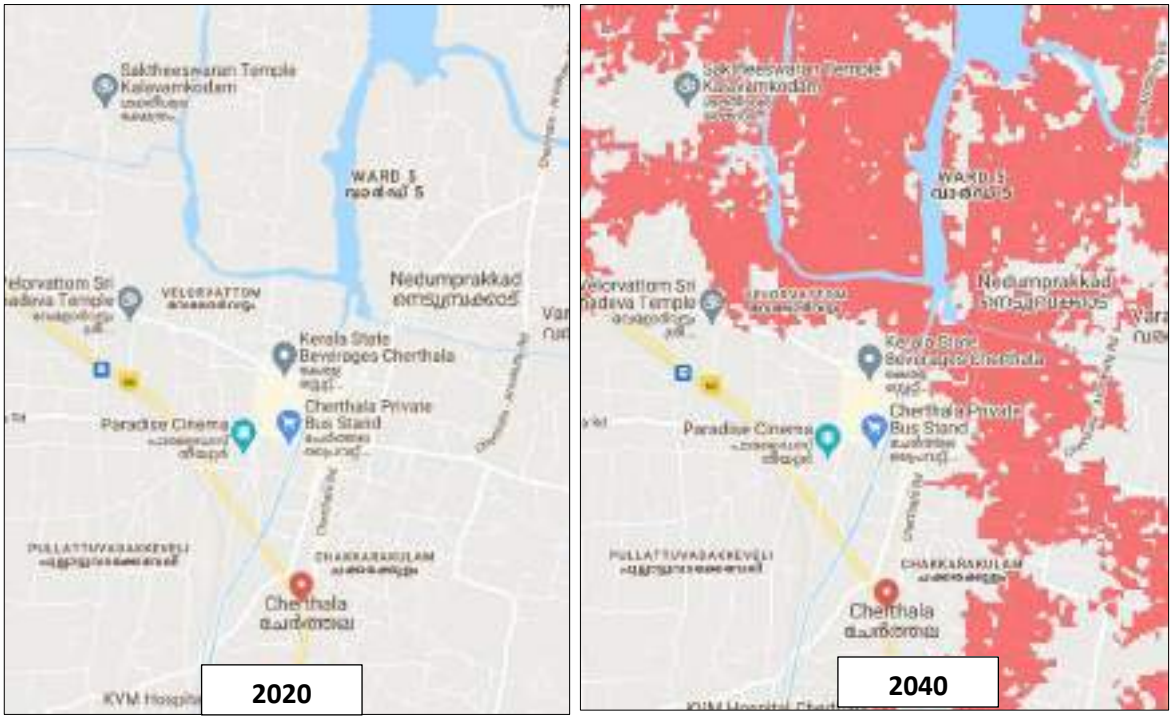


Figure21.14 Projected Sea Level Rise in 2040

Figure 21.14 shows the land projected to be below annual flooded level in 2040. It indicates that the low lying areas of the Cherthala Municipality is under the risk of flooding due to sea level rise (Climate Central, n.d.).

Figure 21.15 shows the sea level rise inundation maps for different scenarios for Vembanad lakes as per a research work to investigate the impact of sea level change on the land use pattern, the flow dynamics of the lake and its influence on the lake ecosystem titled, "A GIS based approach to study the impacts of sea level rise on lakes". It is deduced that for 1m meter rise in sea level only 10.4sq.km would be inundated. Similarly, 171 sq.km for 3m and for 5m rise 3971 sq.km area under inundate. It is observed from DEM map that the increase in area under inundation would be exponential for linear rise in SLR. From the map, it can be observed that the low-lying region of Alappuzha Town will get affected. It can be thus concluded that the sea-level rise not only affects the region abutting the coastal line but its impact can be felt in other regions too (A GIS based approach to study the impacts of sea level rise on lakes).

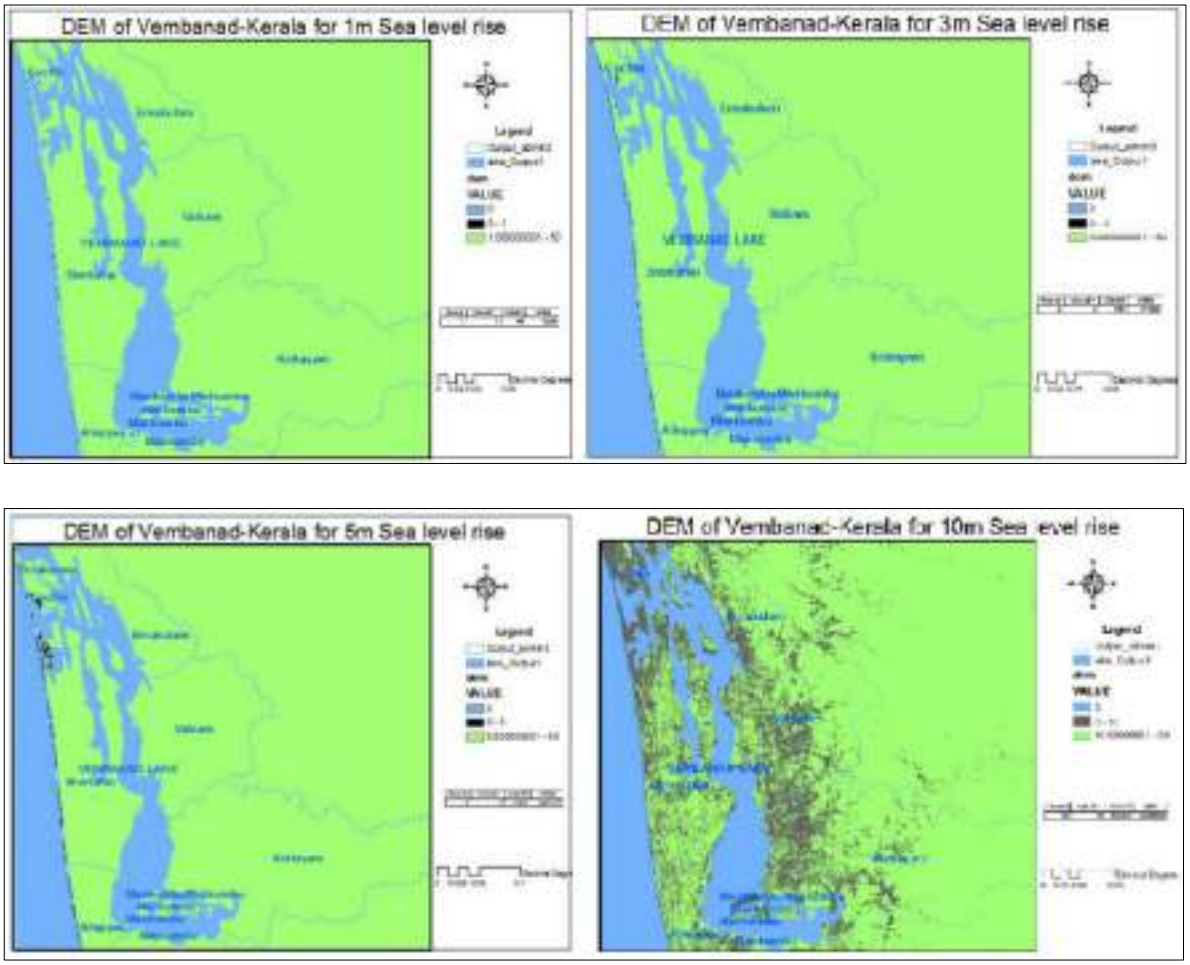


Figure 21.15 Sea level rise map around Vembanad Lake

21.4 Inference

Cherthala has not experienced any severe disasters in the history. The history of epidemics such as Brugian Filariasis and Chikun gunya are also deminishing in town. Eventhough Alappuzha is identified as one of the most vulnerable districts of the state with respect to Climate change, Cherthala town shows different character in the district. Being compared to the other Municipalities in the district, Cherthala is the least disaster vulnerable town. In Cherthala town, there are certain flood prone areas where flood is a periodical phenomenon in every year. Apart from this, there is no history of severe flood in any areas in the town. Even the Mega floods in Kerala in the years 2018 and 2019 had not severely affected Cherthala Town. There were no severe damages reported in the town. The regular water logging areas are in the Northern and South-Eastern wards of the town. This water logging can be addressed through the restoration of streams and channels and ensuring proper flow through the channels. All other towns being in the Pampa river basin are severe flood prone areas. Since Kerala being affected by series of flood and Landslide disasters consecutively in the previous years, the demand for a town without any history of disasters like Cherthala will definitely increase in future and huge developments can be ensured in such towns.

Chapter-22

Inter- Sectoral Linkages and Existing Spatial Structure

22.1. Inter-Sectoral Linkages

22.1.1 Effect of population growth on various development sectors

The growth in population has an all evasive effect on all the development sectors since development is for the people and by the people. The effect of population growth is direct on sectors like water supply, electricity, housing, traffic & transportation, education, health care etc where there is direct consumption. The rest of the sectors have secondary impact on them.

No perceptible impact is anticipated in Industrial sector due to increase in population since the problems faced by the industrial sector in Cherthala town are mostly related to the lack of entrepreneurial impetus rather than anything else.

Population growth shall have impact on trade and commerce only beyond a threshold population. If we analyse the trade and commerce that take place in a town, distribution of basic necessities of life contribute only to a part of it. The rest of the trade depends on surplus income. So, even though there is an increase in trade due to population growth, the trade volume is more elastic towards the surplus income and thus the significant changes are often related to the change in surplus income rather than population growth. The increase in trade due to increase in demand for basic necessities shall not be apparent if the surplus income is reducing. When both the population and the surplus income grows, the trade & commerce take off at an accelerated pace.

In the case of tourism sector, the growth of population has no bearing on the performance of the sector within the town. Similarly, in the case of animal husbandry, agriculture and fisheries also, the town's population has not much influence in these sectors since the produces from these sectors are not locally grown but imported to a large extent.

With growth in population, the human activities increases and it reflects on the transportation needs of the people. The transportation needs grow exponentially with the increase in population. The physical improvements to the transport network shall be attempted with this in view.

The demand for water supply, sewerage system, solid waste management system, energy, education, health care, recreational and other civic amenities has direct relation to the increase in population. But physical infrastructure for these services cannot be built

incrementally. Hence these facilities are to be developed in a phased manner dove tailing with the respective threshold population.

The housing sector also has direct relation to the growth in population. However, development in this sector can be taken up in an incremental manner to an extent.

22.1.2 Land use changes and environment

The changes in land use affect the environment to a great extent. The major land use change thus affecting environment, identified in Cherthala town is the depletion of paddy land. There has been a considerable decline in both the area of paddy field and the extent under cultivation. The agricultural production is not a very significant factor to be considered while formulating land use policy in an urban context. But, the paddy land essentially acts as green open space and also functions as reservoir of water, during rains preventing floods and enabling fast run off.

Likewise the dry cultivation area also provides the necessary green cover in the town. Changes in this land use will reduce the green cover and hence shall adversely affect the environmental quality. The land use policy decides the compactness of built form in the town. A less compact built form (with more than necessary intrusion of residential, commercial and such other land uses requiring built space to agricultural / open land uses) shall mean wider building foot prints. This calls for putting more land under manmade structures which is detrimental to environmental quality. Reducing the building foot print is the answer to this problem. Reducing the building foot print also shall mean compact development for which it is easier and less costly to provide basic amenities like water, sewerage system, energy, roads etc. Providing waste treatment facilities are also a lot easier for a compact development. All these have positive impact on the quality of environment. The land use also has profound impact on the micro climate. Lesser foot prints shall reduce the possibility of creating heat islands within a town.

Another issue is that of other environmentally fragile areas. Besides paddy land there is another area identified in Cherthala town. i.e. the lake side and canal side areas. The changes in land use in these areas need serious consideration. Highly polluting activities in the lakeside shall threaten the cleanliness and quality of the lake.

The distribution of various land uses in the town decides the traffic pattern of the town and hence has environmental ramifications. So, the changes in land use shall be managed in such a way that traffic and transportation needs are optimised causing less pollution from vehicular traffic and less consumption of precious fossil fuels.

22.1.3 Industrial sector – effect on environment, land use and employment

Micro, Small and Medium Enterprises (MSME) sector is an important generator of employment. In Cherthala town the small enterprises are not concentrated in any particular location. The industrial (small) units have come up in various locations in the town in a scattered manner due to the entrepreneurs' preference for utilising the land which is already in their possession rather than acquiring the required land in an earmarked industrial area. Considering the tremendous potential for employment creation, MSMEs have to be promoted. The establishments of small scale units in the residential and commercial areas are to be viewed in this backdrop. However, allowing such industries in residential and commercial areas should not affect the environmental quality of the area. Hence the nature of industries that can come up in such areas should essentially be non-polluting and non nuisance type.

There are no large scale industries in the municipal area. Thus earmarking of parcels of land exclusively for industrial purpose can be avoided. Instead, a policy of allowing non-polluting and non nuisance industries of small scale in residential and commercial areas along with the development of necessary infrastructure required for industrial development such as good road connectivity, availability of water and electricity etc may be apt to promote industrial development in the town.

In the case of large scale industries of non nuisance / non-polluting nature, the locations cannot be earmarked in advance due to the problems associated with the acquisition of land and uncertainty regarding the establishment of such units. In such instances considering the location decisions on a case to case basis only is feasible.

There is an issue regarding polluting industries (with pollution abatement measures) / nuisance type industry which has to be located in the town if it is essential due to other aspects (economical / locational / strategic) which require consideration. The solution is to allow such industries in the less inhabited areas in the town with strict guidelines for site selection prior to establishment of such industry and control of other land uses around such industries after their establishment.

22.1.4 Effect of various sectors on employment

The small industrial sector is considered to be the prime provider of employment in small and medium towns. But in the case of many towns in Kerala, including Cherthala, the employment in industrial sector is not the prominent one. The tertiary sector, mostly various services employ more people than industries. Trade and commerce is an important employment sector, both direct and indirect. However, the employees in this sector are mostly

unorganised and hence their share is not much reflected in the statistics. The fluctuation in employment level is also high in this sector.

Tourism, even though not developed in the town as an employment sector, has much potential in creating more jobs. The investment required to create unit employment is low in tourism sector. Another area of interest which can bring in employment to the town is IT related activities. The town has a number of well educated technicians in IT field. With a good number of people working overseas, getting Business Process Outsource (BPO) assignments to IT units located in the town need to be explored.

Even though studies based on physical features suggest agriculture, animal husbandry and Small Scale Industries (SSI) as thrust areas of employment in the town, the number of cultivators and agricultural labourers are on the decline in Cherthala. This trend is not likely to be reversed. So, increase in productivity with increased technology inputs is imminent in this sector. Organised farming does exist in a few holdings in the town. Their potential for creation of further employment is marginal. The case of animal husbandry is also the same.

The employment in government and private office sector is almost at a saturation level and is not expected to grow at a fast pace. Education and healthcare are the major providers of organised employment in the state. In addition to the direct employment created by these sectors, development in these sectors create number of secondary employment besides making the population more employable. Likewise improvements to the physical infrastructure of the town shall attract employment generating activities to the town. So, providing better infrastructure also is a key to the creation of jobs in the municipal area. So industry, tourism, IT, services, education, health care and physical infrastructure are the thrust areas for employment generation in the town. In the Master Plan it is proposed to address this issue in two ways. One is by providing for improvements to physical infrastructure and creating new infrastructure facilities in the thrust areas. The second approach is by putting in appropriate policy measures for the development of the identified thrust areas.

22.1.5 Changes in traffic & transportation needs due to growth in various sectors

The relation between demand for traffic & transportation infrastructure and different sectors of economy is a very dynamic one. The growth in any sector of economy calls for instantaneous changes in the demand pattern for transportation infrastructure. However, the transportation infrastructure cannot be provided in an incremental manner. Phase wise expansion is the only solution. Hence careful consideration is required in any development plan while dealing with development in major sectors of economy and social infrastructure.

The trade and commerce sector calls for increased freight traffic both in-bound and out-bound. Here, in-bound traffic is likely to be more than the out-bound traffic. Since the increase in demand shall be for freight transport, development of a truck terminal is essential. So, a truck terminal, easily accessible from the network is a pre-requisite for development of industries and trade & commerce sectors. The increase in trade and commerce increases the intra city traffic also. So development of trade & commerce meant for local consumption should be decentralised to the maximum extent possible in order to reduce intra city traffic. These efforts shall focus on decongesting the town centre.

Development of education and health care sectors means establishment of institutions of higher order also. This shall increase the passenger traffic. The locational decisions of such institutions shall be taken so that the existing network is suitably used by the additional demand and development of the network is possible in a phased manner. Otherwise the cost of development of new links in the network shall hamper the pace of development in these sectors.

The improvements of existing as well as development of new recreational facilities shall also result in changes in demand pattern. The trips generated by these developments shall be intra city in nature. Hence the location of new such facilities should be decided keeping the need to segregate through traffic and intra city traffic. On the other hand development in tourism sector means an increase in inter city traffic which in turn call for improved arterial and sub arterial roads.

22.1.6 Changes in traffic & transportation needs due to changes in land use

The land use pattern and the traffic pattern are interwoven inexplicably. The traffic pattern is the dependant variable in the relation and various models try to define this relation. The changes in traffic pattern due to changes in land use can be studied using these models to a reasonable level of accuracy. The land use pattern can change mainly in two ways. One is due to the growth in population and subsequent increase in economic activities. The other is due to changes or increase in the pace of economic activities due to other impetus rather than population growth. The population growth is mainly reflected upon the residential land use, its geographic spread and densification. The trips generated increases in proportion to the growth in population and the origin of these trips are decided by the spatial distribution and density of residential land use. The change is generally in increase in volume and not in pattern since the various destinations are normally in place in the case of Cherthala town since no major shifts in social infrastructure is anticipated.

The land use changes attributable to changes in the pattern of economic activity recast the existing traffic pattern and needs special consideration. The distribution of

commercial land use has a great impact on both the intra city and intercity traffic demand. This indicates need to locate commercial land use easily accessible from arterial and sub arterial roads. But the experience in the state in this regard is the occurrence of ribbon development which is detrimental to the proper development of roads and result in inefficient use of land. So care shall be taken to prevent ribbon development while considering development of commercial land use along the arterial and sub arterial roads. The attempt to re-route intra traffic away from NH also shall prompt dispersion of commercial use, discouraging ribbon development.

Another issue is the changes in land use due to large scale industries and higher level educational and healthcare institutions. These institutions are big enough to change the land use pattern in their vicinity. However, the location of such institutions cannot be fixed in advance in a Master Plan, in the present legal regime, unless land is available. The town, being a second order settlement in the district, anticipates establishment of a number of such institutions in the coming years. The possible locations of these institutions (in terms of sheer availability of suitable land and not with the intention of acquisition by public agencies) will also be a determinant of the proposed road network.

22.1.7 Spatial distribution of trade & commerce: effect on real property values and equitable housing policies

The Housing policy, 2011 of the Government of Kerala states that "*the International Covenant of United Nations on economic, social and cultural rights, to which India is a signatory, upholds the right to adequate housing as a human right. Article 21 of the Constitution of India which defines the protection of life and personal property encompasses the right to shelter and right to livelihood also which are integral to the dignified living of the individual.*" The trend in urban development in the state had been such that more and more people are forced to out migrate from the towns. The Housing policy upholds the need for adequate and affordable housing for all. The spatial distribution of trade and commerce activities has a significant impact on the land value in any town. The increase in land value in commercial areas has a ripple effect on the price of residential plots also. This issue can be addressed in a Master Plan by ensuring adequate spread of commercial land use and making adequate area available for commercial development so that pressure on commercially developable area is released. This will affect the land value in residential area also since there will not be any unsaturated demand for commercial use and the resultant attempts by the trade and commerce activities to intrude into the residential areas. The extent zoned for residential use also should be adequate so that the demand for more houses could be met. Another provision that shall reduce the pressure on land for housing is allowing low density EWS and LIG houses in a restricted manner in areas zoned for dry cultivation etc. These policy

interventions through zoning (in extent and zoning regulations) are expected to increase the availability of land suitable for residential purpose and hence reduce demand driven increase in land value.

22.1.8 Tourism and environment

Tourism and environment have a dual relationship. Certain level of environmental quality is a must for healthy development of tourism sector. But, unbridled development in tourism sector can adversely affect the environment. At present tourism does not figure prominently as a major sector in Cherthala. However, the Town has a clean and beautiful environment. Also the surrounding region, blessed with a network of back waters and canals, is a well known destination for water way tourism. Also, Cherthala town has good transport linkages to this region. Hence, Cherthala plays the role of a tourist transit point in the region. The places of tourist attractions in the town are mostly in the environmentally fragile areas. So, maintaining the environmental quality should be given top priority while formulating new tourism projects. Provision of basic amenities for the anticipated number of visitors is a must. New concepts like e-toilets etc merit consideration in this regard. Waste management practices (for both solid and liquid waste generated by the tourism activities) should be state of art and should not interfere with the biotic systems in any case. .

22.1.9 Inclusive growth in various sectors

The approach paper to the twelfth five-year plan, released by the Planning Commission of India, aims at faster, sustainable and more inclusive growth. Inclusiveness, being a multidimensional concept, is difficult to assess. The concept can be explained in terms of livability, poverty alleviation, access to health, education, basic amenities etc in general. Housing is the most prominent component of inclusive growth in the context of a Master Plan. Adequate and affordable housing should be ensured to all by direct intervention and / or policy measures to promote affordable and decent housing for the poor. The road connectivity, availability of water supply, electricity, educational facilities, healthcare facilities, recreational options and other amenities are addressed by the Master Plan. An equitable distribution of such amenities is targeted by this Master Plan which shall improve the inclusiveness in urban development. In the trade and commerce sector, recognising the street vendors as legitimate entrepreneurs addressing the shopping needs of the common man is a big step towards inclusive growth. By this initiative the street vendor is no more a person to be taken off the road for illicit occupation, but someone whose trade is to be facilitated by the public authority in the interest of the common man. The attempt is to share a part of the demand for trade and commerce and the profit there from with the poor who makes out a

livelihood by peddling goods for day to day use. Besides, the common man receives his supplies at reduced prices since the overhead expenses are minimal for the street vendor.

In the industrial sector, allowing micro enterprises in residential and commercial zones is a policy measure for ensuring inclusive growth in the sector. The zoning regulations in general have to be lenient towards the housing needs of the poor, being inclusive. The spatial distribution of educational and healthcare facilities is also important from the inclusiveness point of view. Access to school and primary healthcare facilities at walkable distance is essential for bringing in inclusiveness in the growth of these sectors. Ensuring proper sanitation (by giving sanitary toilets, efficient collection of wastes, abatement of waste water logging etc) should be given top priority in alleviating slum like conditions within the town.

In the traffic & transportation front, widening of interior collector roads so that mass transport systems like buses can reach the remote habitations, measures for the safe passage of pedestrian traffic etc can be considered as attempts at inclusive growth.

In the energy sector no additional effort is required since the town is almost fully electrified. Various policy and other measures for creating employment in the town shall also contribute towards inclusive growth.

22.1.10 Energy efficiency and land use

Energy efficiency is a very important consideration in the design of any system that uses energy. The urban system as a whole is a guzzler of energy. The energy requirement of an urban area is much more compared to a rural area of the same size. Conservation of energy is a need of the day due to various reasons such as depletion of fossil fuels, carbon emission and related climate change, depletion of ozone layer etc. The energy saved is considered to be energy produced. The benefits of energy saved by land use planning measures are of long term and hence need careful consideration. The compact nature of development reduces intra city traffic and thus saves fossil fuel. Efficient layout of various land uses based on their compatibility and trip generation characteristics shall result in reduction in use of energy for transportation needs. The compactness and proper layout shall prompt pedestrian traffic also contributing to energy conservation. This also shall help to conserve energy in sectors like water supply, electricity etc. The formation of urban heat islands within the town can be avoided by appropriate land use measures. This shall cause savings in energy by reduced demand for air conditioning and artificial ventilation.

22.2. Spatial Structure

Cherthala town is located in the Cherthala taluk of Alappuzha district and occupies a prominent position as the important town between Alappuzha and Kochi on the National Highway 66. The activity pattern of the wards in the town, their connectivity and the hierarchy of nodes/centers within the town are studied in detail to derive the spatial structure of the town.

22.2.1 Functional character

At the regional level the functional character of Cherthala town is determined as urban. The wards in the town are studied in detail with respect to aspects like total area under each land use category, Concentration pattern of population percentage of workers engaged in non-agricultural pursuit. Average plot size in the residential/agricultural mix use category etc. The functional character is determined based on the land use, population distribution and average plot size within the settlement and wards are classified as rural, semi rural, semi urban and urban. The functional character of each ward thus derived is given in Chapter 9, which is repeated in *Table 22.1* and *Fig.22.1*.

Table 22.1 Functional character of the wards in the town

Ward No.	Name of Ward	Functional Character	Ward No.	Name of Ward	Functional Character
1	Mannukuzhy	RURAL	19	Arattuvazhy	URBAN
2	Saktheeswaram	URBAN	20	Vattavely	RURAL
3	Moolayil	SEMIURBAN	21	Karuvayil	RURAL
4	Power House	SEMIURBAN	22	Mini Market	SEMIURBAN
5	Nedumbrakkad	SEMIRURAL	23	Kattanganattu	RURAL
6	Parappel	SEMIURBAN	24	St.Martin	RURAL
7	Sastham	SEMIURBAN	25	Palluvallyvely	SEMIURBAN
8	Kulatharakkad	SEMIURBAN	26	Vallayil	SEMIURBAN
9	Savassery	SEMIURBAN	27	Edathil	SEMIURBAN
10	Kalikulam	SEMIURBAN	28	Municipal Bus stand	URBAN
11	Municipal Office	URBAN	29	T.D.Ambalam	URBAN
12	X-Ray	SEMIURBAN	30	Muttam Bazar	URBAN
13	Civil Station	URBAN	31	Velorvattam	URBAN
14	Chakkarakkulam	URBAN	32	Kuttikkat	URBAN
15	Kurikkachira	RURAL	33	Kizhakke Nalpathu	RURAL
16	Polytechnic	URBAN	34	Railway Station	SEMIURBAN
17	Cherakulam	URBAN	35	Kuruppanattukara	URBAN
18	Ambedkar	URBAN			

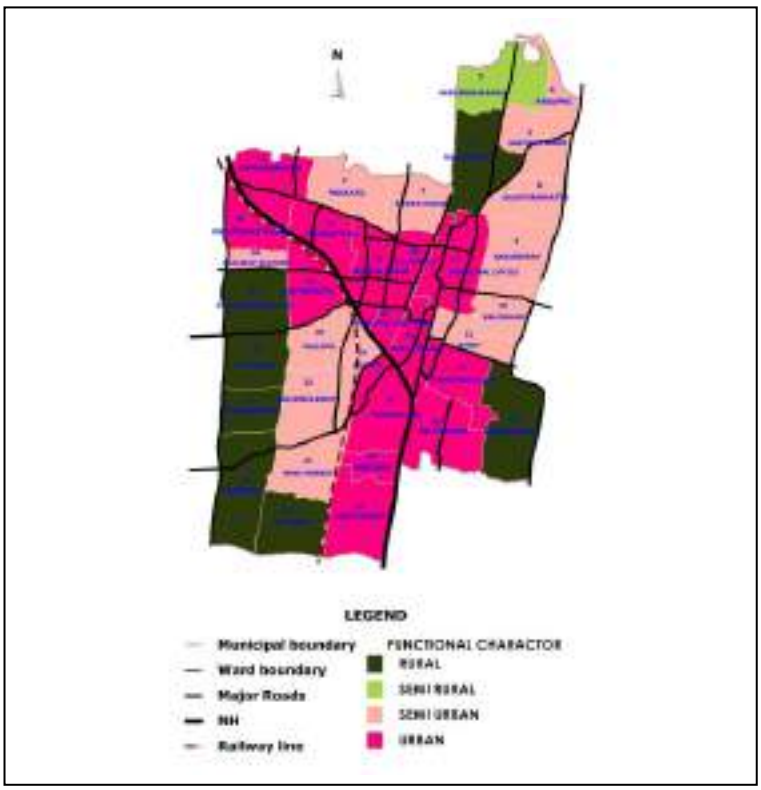


Figure 22.1 Functional character of the wards in the town

22.2.2 Activity pattern

The term activity pattern is used to indicate the major economic activity of a place or that can be brought there in future. It may be agriculture/plantation (Primary activity), industries (Secondary activity), Service activities (Tertiary activity) or a combination of these like agriculture and animal husbandry and small scale industries. The activity pattern can be derived through the integration of the land use concentration pattern, functional character and the urban profile. From the regional setting study the activity pattern of Cherthala town is obtained as tertiary activity.

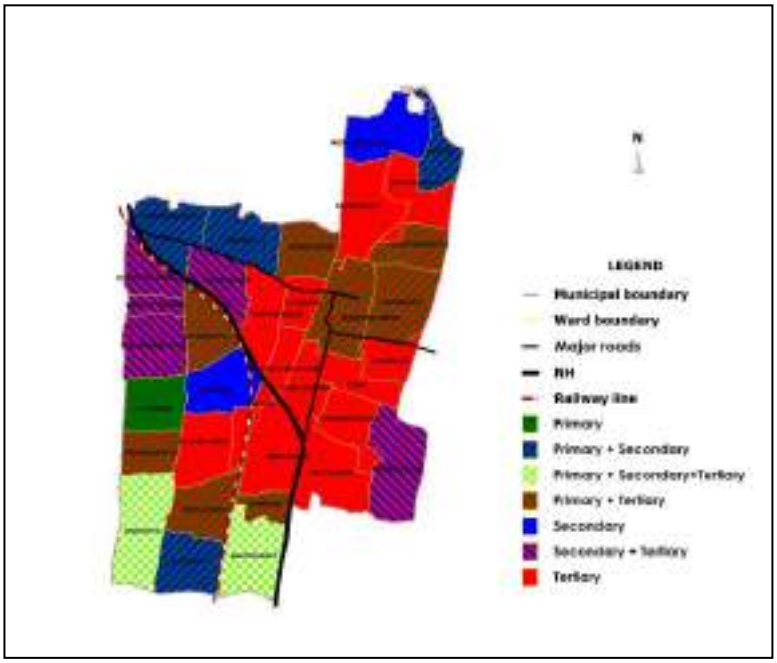


Figure 22.2 Activity pattern of the wards in the town

The determination of activity pattern at ward level is attempted here. It is obtained as shown in *Table* 22.2. Accordingly, for 13 out of the 35 wards the most suitable activity is Tertiary. For 8 wards it is primary + tertiary activity. For 4 wards primary + secondary, for 2 wards secondary, for 1 ward primary, for 2 wards primary +Secondary +Tertiary and for 5 wards secondary + tertiary activity is most suitable. *Fig. 22.2* shows the activity pattern of the wards in the town.

Table 22.2 Activity pattern of the wards in the town

Ward number	Name of Ward	Activity Pattern
1	Mannukuzhy	Primary + Secondary
2	Saktheeswaram	Primary + Secondary
3	Moolayil	Primary + Tertiary
4	Power House	Tertiary
5	Nedumbrakkad	Secondary
6	Parappel	Primary + Secondary
7	Sastham	Tertiary
8	Kulatharakkad	Primary + Tertiary
9	Savassery	Primary + Tertiary
10	Kalikulam	Tertiary
11	Municipal Office	Primary + Tertiary
12	X-Ray	Tertiary
13	Civil Station	Tertiary
14	Chakkarakkulam	Tertiary
15	Kurikkachira	Secondary + Tertiary
16	Polytechnic	Tertiary
17	Cherakulam	Tertiary
18	Ambedkar	Primary + Tertiary
19	Arattuvazhy	Primary + Secondary+Tertiary
20	Vattavely	Primary + Secondary
21	Karuvayil	Primary + secondary+Tertiary
22	Mini Market	Primary + Tertiary
23	Kattanganattu	Primary + Tertiary
24	St.Martin	Primary
25	Palluvallyvely	Tertiary
26	Vallayil	Secondary
27	Edathil	Tertiary
28	Municipal Bus stand	Tertiary
29	T.D.Ambalam	Tertiary
30	Muttam Bazar	Tertiary
31	Velorvattam	Secondary + Tertiary
32	Kuttikkat	Primary + Tertiary
33	Kizhakke Nalpathu	Secondary + Tertiary
34	Railway Station	Secondary + Tertiary
35	Kuruppanattukara	Secondary + Tertiary

22.2.3 Connectivity pattern

Cherthala town has good road connectivity. The road network of Cherthala town is of grid pattern and the roads are formed almost parallel to each other. National highway No. 66 from Panavel to Kanyakumari passes through the central area of the town (now the bypass) and connects Thiruvananthapuram, the State headquarters. It has also many roads which connect the town to the neighboring districts of Alappuzha, Kottayam and Ernakulam and also other parts of the State. In addition, about 100 municipal roads serve the people of the town.

Cherthala – Thanneermukkam road bound for Kottayam is one of the important PWD roads passing through the town. Cherthala- Arookutty road which forks out from Cherthala town at Court Jn and ends at Chenganda bridge has a total length of 2.7 km. Cherthala - Vayalar road is another important road, which meets the travel requirement of people between Ernakulam district and Cherthala. The road starts from Manorama Junction and ends at Vayalar bridge with in the town limits. Cherthala – Arthungal road and Cherthala – Kanichikulangara road are the main roads, which connect the CBD area with the western parts of the town. Apart from these roads, there are roads like Muttam Bazar road, Chenganda – Muttathipparambu road and other roads, which are passing through the town.

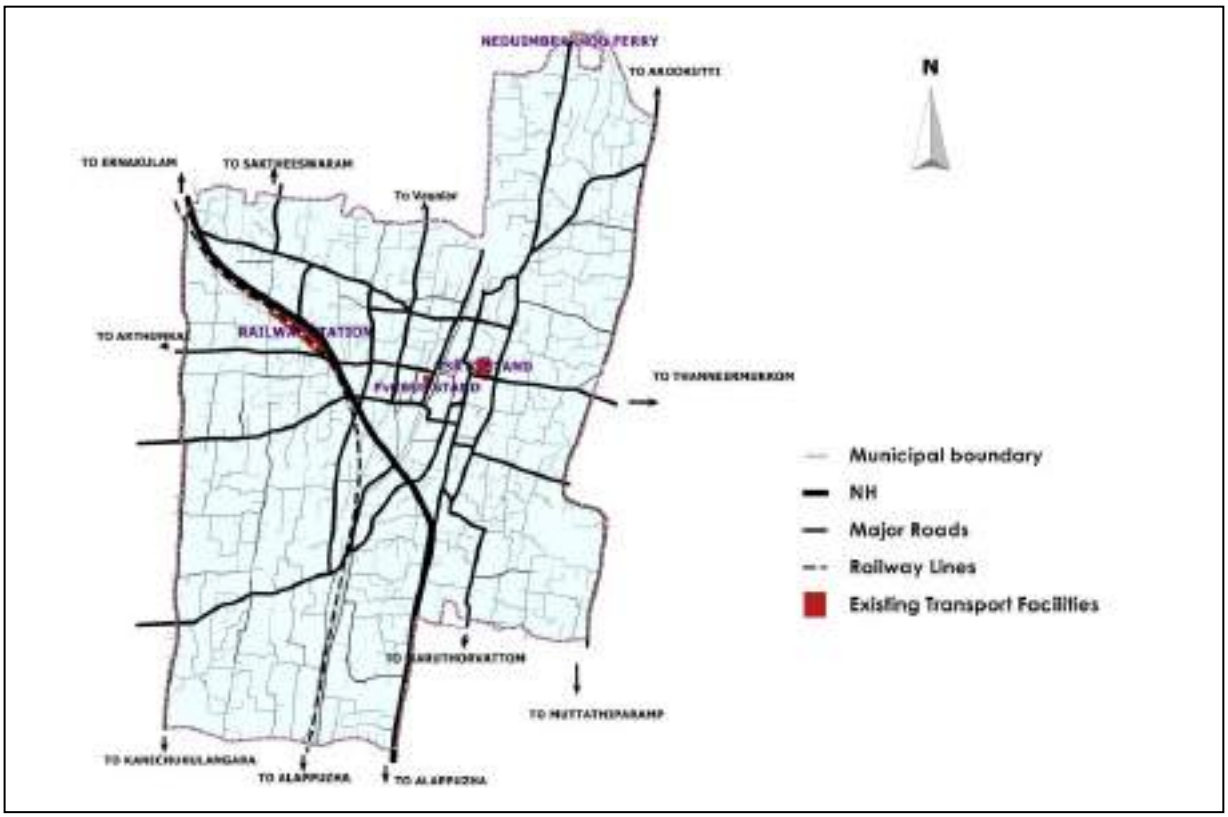


Figure 22.3 Connectivity pattern of the town

Majority of the facilities are located along the important roads. The connectivity pattern is shown in *Fig. 22.3*.

22.2.4 Hierarchy of Nodes

The most important commercial nodes identified are Manorama junction, Iron bridge, Court junction, Nadakkavu, Ottappunna Junction, Devi Temple and X-Ray Junction (mark on map). Many of the educational, health, civic and other facilities are also located at these places. The hierarchy of nodes in the town is shown in *Fig. 22.4*.

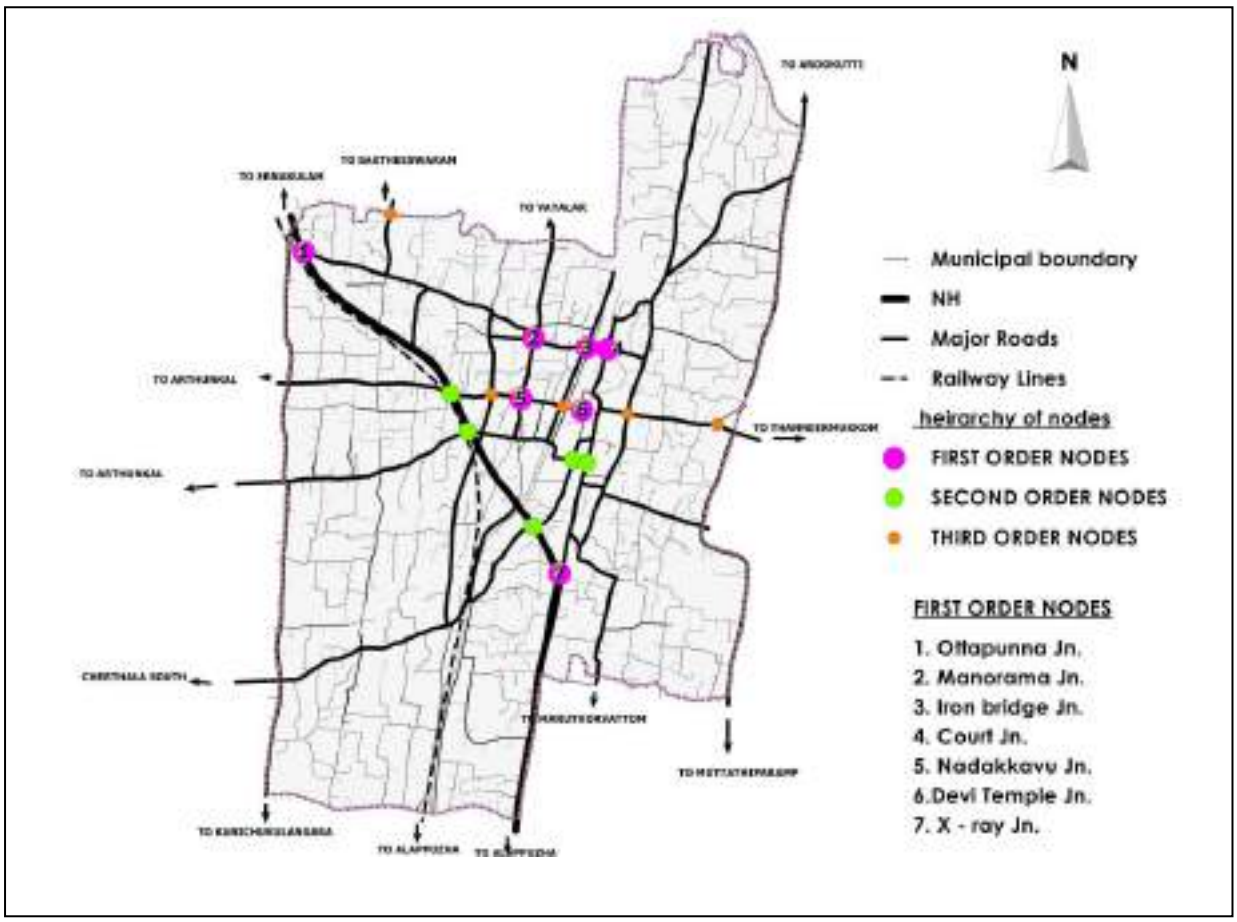


Figure 22.4 Hierarchy of nodes

22.2.5 Spatial Structure

The activity pattern, connectivity and hierarchy of spaces are considered together to formulate the spatial structure of the town and the spatial structure so evolved is shown in Fig.22.5.

The spatial structure of the town shows that the whole area is urban or semi urban except for 8 wards in the periphery mainly on the western side. The core area is actively public and semipublic and commercially developed. The service activity is the main function

throughout the major corridor and in the core city.13 wards are showing fully tertiary activity, 15 wards are showing tertiary activity along with primary or secondary activities. That means 28 out of 35 wards are inclined to tertiary activity.

The first order nodes of the town are Manorama junction, Iron bridge, Court junction, Nadakkavu, Ottappunna Junction, Devi Temple and X-Ray Junction. The lower order nodes are spread throughout the town and the connectivity of the nodes are there but needs strengthening.

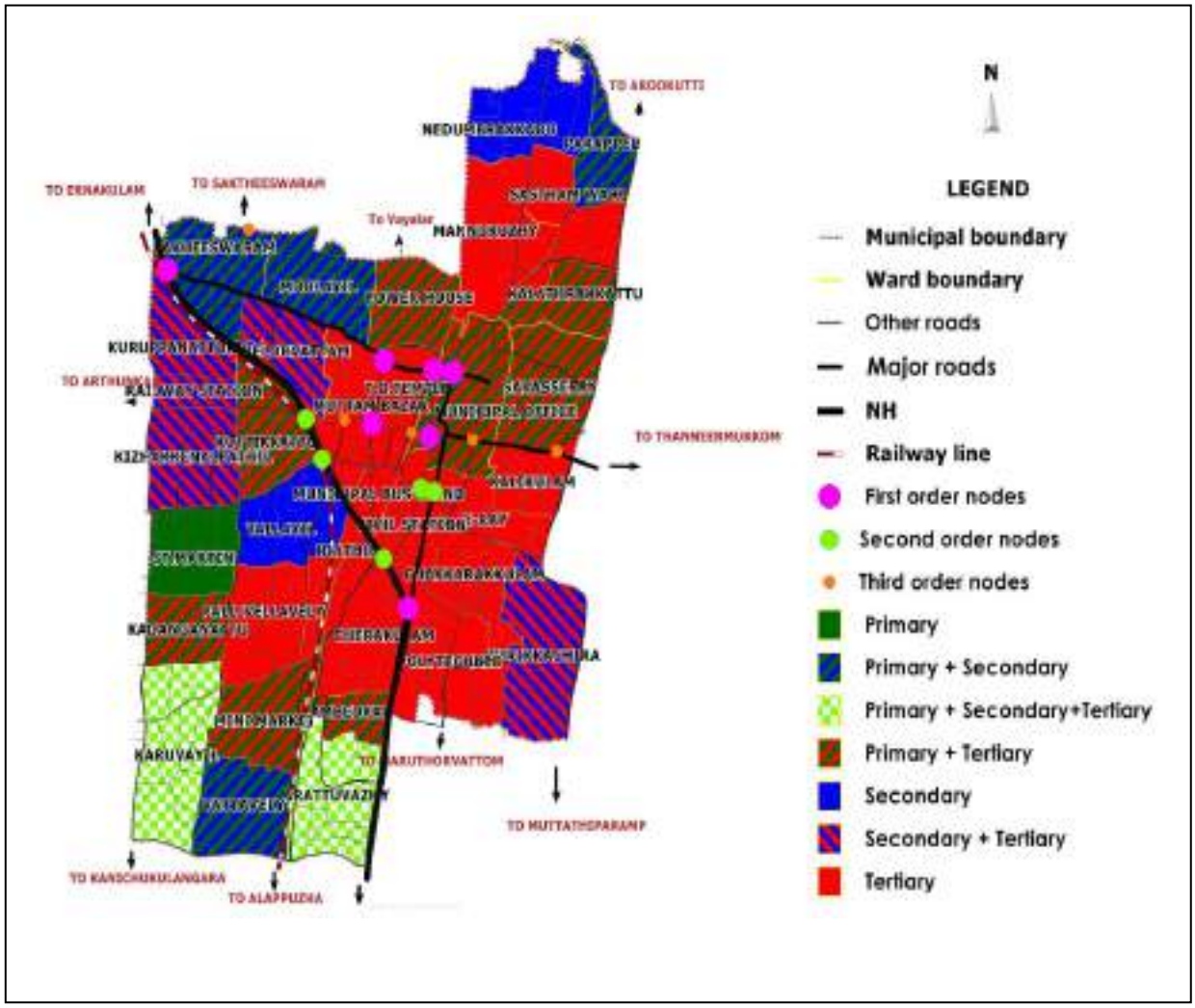


Figure 22.5 Spatial structure

PART II
INTEGRATED DEVELOPMENT VISION

Chapter-23

Summary and Findings

As part of the studies conducted the Profile of the town, Earlier planning efforts, Regional Setting of the town, Landuse, Demography, Employment, Economic Aspects, Physical as well as Social infrastructure and Environment of Cherthala town has been analysed in detail in the previous chapters. Inter-sectoral linkages has also been analysed to understand various possibilities for future development and the existing spatial structure of the town has been derived, which will be the framework for framing suitable proposals for the town. Summary of findings of each sector is discussed below.

23.1. Regional setting

Cherthala is a 4th order urban centre in the state as per the State Urbanization Report. As per the Regional Setting study, documented as District Urbanisation report, Cherthala town is a Second Order settlement in the district and also acts as a second order node. As a second order settlement, it's service area extends to the entire northern portion of Alappuzha district. The service area of Cherthala town, when considered as a third order settlement, includes the neighbouring LSGs of Pattanakkad, Thanneermukkam, Vayalar, Kadakkarapally and Thuravoor with a total area of 111.80 sq.km and a service population of 199434 .

There is also a high potential for development for this town as it forms the part of the thriving urban corridor in the state i.e. the Alappuzha – Ernakulam- Thrissur - Palakkad Urban Corridor as per the delineated future urban profile for the State for 2031 in the SUR. The spatial structure of the district depicts that the activity pattern of Cherthala is tertiary while the activity pattern of all surrounding settlements are primary. Cherthala exhibits urban character whereas all the surrounding Grama Panchayats of the town exhibit rural or semi-rural character. Hence the planning area for Cherthala town is delineated as the Cherthala Municipal Area.

23.2. Profile of the Town

Cherthala town is located in Cherthala Taluk of Alappuzha district and occupies a prominent position as the important town between Kochi and Alappuzha. It is 42 km from Kochi and 22 km from Alappuzha on the Kochi – Alappuzha section of NH 66 Road Route and Railway Route.

Cherthala town lies on 9°41'13'' North latitude and 76°20'10'' East longitude. The terrain of the town is relatively flat. The stretch of land in Cherthala is classified as flat coastal belt – low land based on the natural classification. The soil type in the town is sandy and in most of the area the soil is white silica sand, which is the best white silica sand in Asia, similar to that found in Hawaii.

Cherthala town consists of the revenue villages of Cherthala North (part), Cherthala South (part), Kokkothamangalam (part) and Vayalar East (part). On the town's northern boundary is Vayalar Grama panchayat and on the southern boundary is Cherthala south and Thanneermukkom Grama panchayats. On the eastern side of the town is Thanneermukkom Grama panchayat and on the western side is Kadakkarappally and Cherthala south Grama panchayats.

23.3. Area and Population

- Cherthala town has an area of 17.96 sq.km and a population of 45,827 as per Census of India 2011. There are 35 electoral wards in the Cherthala Municipality.

- The decadal growth rate of population is 1.60% during 2001-2011 which is high when compared to the district average of 0.88%. Comparing with other urban centres of the district, the town has the highest growth rate. However, the growth rate is gradually decreasing over the previous decades. The LSGs surrounding the Cherthala town have shown a higher rate of growth of population than the municipality.

- The town has a population density of 2552 persons per sq.km. The population density varies among the different wards from 1670 to 4151 persons per sq.km. Cherthala Town is third in population density among the municipal towns in the district.
- The sex ratio of the town (1065) is low compared to that of the district (1100). The literacy rate of the town as per census 2011 is 97.02 % which is significantly more than state average and the district average.
- The household size in the town is 4.01 according to the 2011 census which is lower than the state average.
- The percentage of working population is around 59%. However, the population in the age group 15-20 years is also significant and hence a drastic reduction in work force participation due to change in age structure is not anticipated.

23.4. Land use

- Major land use is residential which covers 60.25% of the municipal area. The second major land use is dry cultivation covering about 12.76%.

- Commercial land use in the town constitutes only 1.88% of the area. Industrial land use is 0.95% of the town. Public and semi public use occupies 3.87% of the municipal area. The transportation needs are met by 7.51% of the total land. Water bodies cover 3.77% of the area.

- Cherthala town lacks parks and open space, which is an essential part of any town or city for its social development. As the population is showing an increasing trend it is necessary to provide sufficient parks and open spaces within the town for the recreational activities of the existing as well as future population.

- Paddy field area has shown a significant decline from 10.16% to 5.75% which shows the tendency of land reclamation. Also most of the paddy lands in the town are left without cultivation.

- Functional character of the town is urban.

23.5. Employment

The work participation rate of Cherthala town is 43.58% which is high compared to District and State. The percentage of main workers is 36.9 %, 6.68 % are marginal workers. Besides, the share of female workers (37.55 % of the total workers) is high in the town when compared to the other urban local bodies of the district. While comparing with the neighbouring local bodies, the percentage of females in the working population is low. The WFPR of Cherthala town is highest when compared to other towns in the district.

Regional setting of the town, as revealed from the District Urbanisation Report , shows that the Cherthala town and surrounding region are characterized by high value for work participation rate. Concentration of House hold industrial workers and other workers are conspicuously high in this region. The reason may be attributed to the presence of coir industry in the region as well as the fisheries related activities in the region blessed with back waters. More participation of females in the workforce is also a reason. Another aspect, to be taken into account is the nearness to Kochi, the commercial capital of the state. In contrast, the concentration of Cultivators and Agricultural labourers are low in this region.

The tertiary sector workers have predominance in the occupational structure of the town with gradual decline in number of people engaged in agricultural activities and a stagnation of employment in secondary sector. In other words, while the production sectors including agriculture and industrial sectors show a declining trend of growth, the service sector which is to supplement the production sector shows growth.

23.6. Economic Aspects

23.6.1 Trade & Commerce

Cherthala is one of the second order settlements in the district. The commercial area in the town amounts to 33.35 Ha of land, which is about 1.88% of the total developed area, which should be 3-4% for medium towns as per UDPFI guidelines. Wholesale commerce and trade are mainly concentrated in the Muttom Bazar area. Most important commercial nodes in Cherthala town are Temple Jn, Court Jn, Muttam Bazar, Private Bus stand, Manorama Jn and Iron Bridge.

Insufficient space for parking and for loading & unloading problems faced by the commercial areas of the town. Town market which is the main centre for vegetables, fruits and fish commodities is very congested. The town needs a faster commercial development to catalyze the economic development while accommodating inclusive growth policies like relocation of street vendors etc.

23.6.2 Tourism

At present tourism does not figure prominently as a noble sector in Cherthala. The present attractions in the town are Sree Karthyayini Temple, St. Mary's Forane Church and Anthraper Gardens which are not adequately publicized and marketed under tourism. The Town has a clean and beautiful environment. Also the surrounding region, blessed with a network of back waters and canals, is a well known destination for water way tourism. Cherthala town has good transport linkages to this region. The town enroute the National Highway and also is connected by rail to various parts of the country. Besides, there is scope for directly linking the town to the NW-III through navigable canals. Hence the town has every potential to develop into a tourist transit station in the region.

However, the town lacks tourist infrastructure and there are no basic amenities to support tourism. The marketing efforts are also minimal. The existing potentials due to places of interest like Sree Karthyayini Temple, Muttam Church, 'Anthraper Gardens' etc. are not fully utilized.

23.6.3 Agriculture

Land use analysis reveal that about 18.50 % of the total town area is still under agricultural use. In other words, 329.08 hectares of land within the town are currently put to/can be put to agricultural activities. It can be seen that eight peripheral wards of the town show rural or semi-rural nature indicating the prospects for promoting agricultural sector. 12.76 % of municipal land is under dry cultivation. Since there is scope for Homestead cultivation in Cherthala, Agriculture along with Animal Husbandry activities is suitable for low residential density areas.

As per the socio economic survey conducted the average land holding is 16.75 cents. Coconut is the major crop cultivated in the town. Crops like Plantain, Tapioca, Tuber crops, Areca nut, Pepper, Paddy, Vegetables, Fruits, Pulses, Cashew etc are also cultivated. As of now, Agricultural produces are mostly imported to the town from other areas in the district as well as from the surrounding districts and states. Through planned interventions, the town can be equipped to meet part of its requirements for agricultural produces through in-house production. Majority of the workers are migrating to tertiary sector making agriculture production uneconomical due to unavailability of labourers. There is also no organised market for selling agriculture produces within the town. Such issues have to be properly addressed.

23.6.4 Industry

The landuse survey reveals that only 16.90 ha, which is only 0.95% of the total area of the town is under industrial use now, which is very low compared to the UDPFI standards of 8-10% for small and medium. There are no large scale industries in the town. There are only 3 medium scale industries and 24 small scale industrial units in the town. However, there are large coir exporting industries located in the immediate vicinity of the town, few of them along the NH 66. Cherthala town has the potential for developing as the Satellite town of ever expanding Kochi metropolitan city.

Cherthala also has potential to develop as an agro-based industrial town. Agriculture activities like cultivation of coconut and paddy and agro-based industries using these products are the predominant activities in the suburbs of the town. The traditional industrial sector of coir and coconut oil have potentials for flourishing as the importance of coir related products are gaining importance as an alternative to plastic products. Hence with modernization and diversification there is a potential for the development of coir related industries.

Thus, the town has potential for growth in large and medium scale as well as house hold industrial units which is a need of the hour in view of the anticipated changes in the

employment pattern. Efforts to regain the status of the town as an industrial center for agro based products will open out chances of value addition units, especially those based on coir. The Household industrial sector can improve the economic base in a sustainable manner, in the back drop of the concentration of coir sector in Cherthala Town and the region.

23.6.5 Animal husbandry

The increasing cost of cattle feeds, land scarcity for fodder cultivation, low yielding varieties of cattle and poultry have made this sector non profitable. The municipal area with its large extent of dry cultivation area, availability of water, rising demand for live stock produces etc has fairly good potential for development of this sector. However, the infrastructure facilities available in the sector are minimal and needs enhancement.

23.7. Traffic & transportation

- Cherthala town has good regional connectivity, both by road and rail.
- The area ccovering Traffic and Transportation use comes around 133.56 ha, which is about 7.51 % of the town area, which should be 12-14 % for medium towns as per UDPFI guidelines.
- Cherthala town is connected to Alappuzha and surrounding areas through AS canal and backwaters. Hence there exists a possibility for water transport and other canal front development with the revival of AS canal. This will also enhance the tourism sector.
- The coverage of road network is good except for some missing links. But, the width of most of the roads is not adequate even for the present traffic volume. The section of the National Highway passing through the town is overcrowded.
- There are number of junctions in the town with volume exceeding their capacity, which require immediate improvements in geometry.
- Safe passage of pedestrians in the town centre is another issue to be tackled.
- There is a dearth of parking spaces for private vehicles in the town causing kerb parking affecting the carrying capacity of the roads.
- Encroachment of right-of-way by hawkers and heavy concentration of commercial activities on the main roads are creating traffic issues.
- A proper truck terminal is needed for the development of trade and commerce in the town.

23.8. Water supply

As per socio-economic survey conducted the residents of the town attached only 8.12% priority for the development to water supply, which indicates that people are satisfied by the present availability of water. The socio economic survey was conducted in early 2013. Even though JICA project was commissioned in 2012, after the initial dilemma of the citizens to the paid water supply system, the house connections were in full fledge only by late 2013. The scarcity mentioned in the socio economic survey is now fully addressed by this project.

Even though standards are met in majority of the area, the people's expectation regarding quantity and quality of water is high as experienced throughout the state. Major source of municipal water supply for Cherthala Town is Muvattupuzha River. Major problem is the efficiency of distribution network i.e., pipe lines. Most of the pipe lines are very old and require frequent maintenance. It is noted that there is about 25% loss of water on distribution due to the faults in the distribution system. *People in this town mostly depend on well water since the water quality in this area is good. The water quality is good. Major chemical constituents lie within the permissible limits. The average ground water table depth in this area is 0.5m.* The poor level of sanitation in the town causes percolation of polluted waters into the sub soil polluting the underground resources. Therefore, open shallow wells cannot be continued in a big way as a source of water for long.

23.9. Drainage

Only 20% of the roads in Cherthala have side drains. The existing drains are also in a deteriorating stage - some of them are broken and blocked obstructing flow of water in the drains. These drains are constructed along the sides of roads not taking into consideration the alignment of any major canals. Disposal of rubbish and garbage clog these drains.

The most important surface water discharge outlet in Cherthala town is AS canal. This canal discharges into Vembanadu backwaters. All the secondary canals are linked to AS canal. The road side drains wherever they exist are connected to these canals through secondary canals.

The drainage network of the town needs total revamping. Dredging, cleaning and side protection of Alappuzha-Cherthala canal and the feeder canals is needed. There should be a planned provision of roadside drains for all the inner area roads.

23.10. Waste water

The town does not have any facility for the treatment of waste water at present which poses a serious threat to the public health and environmental quality. The town is characterized by medium density of population with gross population density of 2977 persons per sq.km and ward wise population density varying between 1670 to 4151persons per sq.km. Further densification is anticipated for the area owing to inherent development potentials and locational aspects. So, the area has to be covered under a properly designed and developed public sewerage system. The flat terrain of the town demands a decentralized sewerage system as the flow of sewerage cannot be maintained in a centralized system.

23.11 Solid waste disposal

About 10.3 tons of waste is generated daily in the town of which about 7.38 tons is collected and disposed of at the various dumping sites. This shows that only 71% of waste generated is collected. At present the municipal area does not have a waste treatment plant. The waste is dumped unscientifically in private yards for land filling and gravel is spread over the waste disposed, causing environmental pollution. Now the Municipality is spreading gravel over the waste disposed area which will pose a serious threat as the waste is not segregated and not properly treated. For the Municipal proposal of gravelling the waste disposal area, proper precautionary measures must be taken for segregating the biodegradable & non biodegradable waste. The Solid state aerobic fermentation technology is a reliable model and may be followed for all the local bodies in the state.

The bio medical waste from the hospitals in the town are collected by IMAGE (Indian Medical Association Goes Eco-friendly), the biomedical waste treatment and disposal project of the Indian Medical Association. So threats from the improper disposal of biomedical waste is not a question here.

97.33% of people are disposing the waste in their own compound and 2.67% in the garbage bins. As about 50% of the residences are in large plots (plot size ranging from 11 to 50 cents or more, the solid waste disposal in own compound, as of now, if disposed after proper segregation, does not pose a serious threat to the G.W. quality. But as the population increases, this need to be taken care of as the G.W. Table is high.

23.12 Energy

Cherthala town does not have major energy problems at present. However, qualitative improvements and strengthening of the distribution network in view of the future requirements is essential. Effective utilization of non-conventional energy is another area to be given priority in Cherthala. There is a tremendous potential for the development of harnessing solar energy. The distribution of petroleum products are at a satisfactory level.

23.13 Education

The literacy rate of Cherthala town is 97.02% as per Census 2011 which is higher than the literacy rate of Alappuzha district. From the studies it is understood that the schools in the town cater to the nearby LSGs also. Basic educational facilities available in the town are sufficient in quantitative terms. But in qualitative terms the facilities need improvements.

Professional education facilities are meager in the town. Two engineering colleges, three Arts colleges, a Nursing College and a D.Pharm college are available in the nearby local bodies.

23.14 Health

As per standards one PHC with 24 beds is required for a population of 20000. The Taluk Hospital caters to this need also. As per standards one Nursing home, child welfare and maternity centre is required for Cherthala town.

Taluk hospital and Ayurvedic hospital are the government hospitals with IP facility in the town. Most of the hospitals are in private sector. There are no super specialty hospitals in town.

23.15 Housing

Almost 60.25 % of the total land in the town is under residential use. The demand for housing is increasing with time, which is clearly reflected in the change in habitation pattern. Urban amenities like water, electricity and sanitation are found to be adequate.

There is a possible shortage of approximately 1333 houses in the town. The structural condition of most of the houses are satisfactory and only a few existing houses need replacement. But in slums and other backward settlements, lack of infrastructural facilities is very acute.

23.16 Recreation

The recreation facilities are limited in Cherthala Town. There is no park, open air theatre, play ground or stadium in the town. With the fragmentation of residential properties, people have lesser open land attached to their houses and hence need for public open space for recreation is on the rise.

23.17 Other civic amenities

The Municipal Town hall of seating capacity of 500, which is located near the municipal office may be used for public gathering. Besides, there are 5 auditoriums/community halls in Cherthala town. There are two libraries at the Municipal office and Jayakerala Grandhasala. The civic amenities in the town are not in proportion with the present population. Also the future additional demands due to increase in population have to be met.

23.18 Social backwardness

The BPL index of 21 wards out of 35 wards is above 1 indicating an almost uniform spread of people below poverty line. The SC population constitutes only 3.34 % of the municipal population and ST population is even less at below 0.24 %. The literacy rate among SC population is slightly less than that of the general population. The SC/ST population is concentrated in Civil Station (13), Kurikkachira (15), Edathil (27), Kuruppanattukara (35), Savassery (9) and Arattuvazhy(19).

For the welfare and advancement of women, labour enterprises and special labour training programme have to be encouraged. No institution for the welfare of women is functioning in the town. But there are a few working women's hostels functioning in the town. Immediate steps have to be taken to provide accommodation facilities for working women and measures to ensure women's safety has to be taken care of. Another problem is the lack of basic facilities like toilets at public places.

Anganawadies are the grass root level delivery point of social welfare activities. 32 Anganawadies are functioning in the Municipality. There is an institution in the town near Poothitta for the care of mentally challenged children. At present no old age homes or other facilities required for old age people are functioning in the town. In the local level analysis major suggestion in this sector are construction of old age homes and providing necessary medical facilities for old age people.

23.19 Environment

The problems faced by the town in the environmental sector are the fast depletion of paddy/wet land and water pollution due to waste water entering the storm water drains. The low density and a vast area of land under dry cultivation are the strengths of the town in the environmental sector. The problems identified have not reached unmanageable proportions and hence can be brought under control.

Environmental Pollution due to direct disposal of solid waste as well as liquid waste without proper treatment from various sources in the city has to be considered. Depletion of paddy lands in the town also needs special attention and has to be prevented from land conversion, which is taking at a faster rate due to high demand of land.

Village ponds had been the sole source of drinking water along the coastal region a few decades ago. Continuous maintenance of these ponds through traditional methods ensured the water quality. As population increased and urbanization set in, many of these ponds were reclaimed for alternate use. The rest of the ponds were neglected as and when public water supply became accessible. Considering that ponds are important fresh water ecosystems and abode of rich biodiversity, the need of their conservation is recognized.

Many sacred groves in the district face threat due to the dense human population and change in landuse pattern. Breakup of ancestral joint family system to nuclear families is the major reason for deterioration of these valuable resources. The family member who receives the portion of the land harbouring sacred groves would clear the vegetation by transferring the deities of the grove to selected temples in the state after offering expensive special rituals.

Even though the town has a serene environmental quality, some problems do exist and hence the authorities need to be vigilant to mitigate the present problems as well as to conserve the environmental quality.

23.20 Disaster Management and Risk Informed Planning

Cherthala has not experienced any severe disasters in the history. The history of epidemics such as Brugian Filariasis and Chikun gunya are also deminishing in town. Eventhough Alappuzha is identified as one of the most vulnerable districts of the state with respect to Climate change, Cherthala town shows different character in the district. Being compared to the other Municipalities in the district, Cherthala is the least disaster vulnerable town. All other towns being in the Pampa river basin are severe flood prone areas. Since Kerala being affected by series of flood and Landslide disasters consecutively in the previous years, the demand for a town without any history of disasters like Cherthala will definitely increase in

future and huge developments can be ensured in such towns. But improper maintenance and lack of rejuvanation of the water channels cause water logging in certain areas of the town especially during heavy rain and high tide periods. This logged water can be easily drained out through proper cleaning, desilting and rejuvenating the water channels.

23.21 Spatial Structure

The spatial structure of the town shows that the whole area is urban or semi urban except for 8 wards in the periphery mainly on the western side. The core area is developed actively with a mix of public and semipublic and commercial uses. The development of the town is of a monocentric nature.

The first order nodes of the town are Manorama junction, Iron bridge, Court junction, Nadakkavu,Ottappunna Junction, Devi Temple and X-Ray Junction. The lower order nodes are spread throughout the town and the connectivity of the nodes are there but needs strengthening.

Cherthala town has good road connectivity. The internal road network of Cherthala town is of grid pattern and the roads are formed almost parallel to each other. National highway No. 66 that passes through the central area of the town connects Cherthala to the State capital and other major development centers. It has also many roads which connect the town to the neighboring districts of Kottayam and Ernakulam and also other parts of the State.

Chapter-24

Goals and Objectives

The first stage of envisioning process is to formulate the goals and objectives based on the findings of various analyses carried out. The goals and objectives of the plan states what the plan intends to achieve. Without such statements of purpose, it is difficult to prepare a plan that meets the particular needs of the community.

24.1. Goals

1) To develop Cherthala as an easily accessible regional level service centre in the district with adequate infrastructure facilities.

2) To strengthen the economic base of the town through strengthening the industrial base of the town city by promoting coir based industries agro industries and by utilizing the potential's due to the nearness to Kochi.

3) To strengthen the regional linkages of the town. To integrate all modes of transport and to provide access to the ten developed areas.

4) To promote compact urban development through the process of intensive land utilization within the developable places of the urban area.

5) To ensure healthy living condition with the provision of excellent infrastructure.

6) To maintain ecological balance and environmental quality through sustainable measures.

24.2. Objectives

In connection with the goal 'To develop Cherthala as an easily accessible regional level service centre in the district with adequate infrastructure facilities' the objectives set are:

- Develop new hub of activities utilizing the available resources.
- Develop hierarchy of commercial centres and provide areas as per UDPFI standards.
- Improve the connectivity through development of regional road network
- To provide adequate civic amenities.

In connection with the goal 'To strengthen the economic base of the town through strengthening the industrial base of the town city by promoting coir based industries agro industries and by utilizing the potential's due to the nearness to Kochi' the objectives set are :

- Facilitate trade and commerce in line with the projected status of the town.
- Promote coir products and local agricultural products.
- Promote higher order facilities to cater the service demands of the region.
- Provide supporting facilities for household industries and other small-scale industries based on the resources available in the region.
- Conserve heritage precincts & structure of the town and to develop the town as a tourist center with necessary amenities.
- Develop model farms to increase agricultural production capacity.
- Increase the economic growth by enhancing job opportunities
- Promote fish farms by utilizing the resources available

In connection with the goal 'To strengthen the regional linkages of the town. To integrate all modes of transport and to provide access to the ten developed areas' the objectives set are;

- Improve the transportation facilities of the central area of the town aiming decongestion for free flow of traffic.
- Explore the possibility of integrating all the 3 available modes of transport i.e, road, rail and water for better regional connectivity.
- Implement better traffic management system and introduce road widening proposals to improve traffic system.

In connection with the goal 'To promote compact urban development through the process of intensive land utilization within the developable places of the urban area.' the objectives set are;

- Provide all necessary infrastructure facilities to attract people.
- Ensure availability of affordable and quality healthcare and education for all
- To open out new/less developed areas for intensive development through planned interventions

In connection with the goal 'To ensure healthy living condition with the provision of excellent infrastructure' the objectives set are:

- Ensure availability of competitive physical infrastructure viz 24 x 7 potable water and power supply
- Affordable housing for all and Shelter and Basic services for weaker section
- Strengthen the health care facilities and to develop higher education facilities
- Build a planned drainage system and environment friendly waste disposal method.
- Provide amenities like community spaces, library, green spaces and playground in a hierarchical manner

In connection with the goal 'To maintain ecological balance and environmental quality through sustainable measures' the objectives set are:

- Conserve the existing paddy lands in the town area and to protect the water courses in the area.
- Take measures for minimizing environmental pollution.
- Conserve existing network of water bodies by preventing from pollution and encroachment.
- Conservation and networking of green and open spaces in the town.
- Impart value-based education with practices in ecological conservation and environmental awareness being integral to general studies.

Chapter-25

Development Concept

The development concept is formulated based on the proposed spatial structure, conclusions arrived from sectoral studies and development objectives arrived. Development objectives spatially located provides the development concept of the plan. The development concept will clearly indicate how the plan area will develop in future and also will give an overall idea of the location of determinant development proposals.

The key development aspects of the planning area identified through detailed analysis are transportation, commercial activities, industrial development, tourism, recreational facilities and environment. The development concepts of each of the above sectors are first formulated, which are then integrated to evolve the development concept of the planning area.

25.1. Traffic & Transportation

Proper connectivity shall be ensured for the integration between different activity zones. A well developed transportation network with adequate road capacity and grade separated intersections, over bridges at railway crossings where ever possible permitting continuous movement of vehicles is the concept of traffic & transportation of planning area. NH 66 which passes through the town and Thanneermukkam Road and Cherthala – Arthungal road act as the main arterial roads.



Figure 25.1 Concept of Transportation Network

Developments are mainly towards the north eastern side of the National Highway. Hence roads linking NH and arterial roads are envisaged as part of bettering the traffic and transportation network. For ensuring the development in the

south eastern side of the town better connectivity towards that side is provided by the widening of the existing roads. The western portion of railway line is also showing a low development trend due to the railway crossing in major roads connecting the western area. So for better connectivity to the western area railway over bridges are envisaged. Cherthala town has enough link roads. So no new roads are conceptualized. Only the strengthening of network through widening of roads are proposed. The concept of transportation network is depicted in figure 25.1.

25.2. Commercial Development

Future concept on commercial development is formulated mainly based on spatial distribution of commercial activities. The central market area, mainly the Muttom Bazar area has a network of well-connected roads and the water transport network with godown facilities on the canal banks. Potential area for commercial activities shall be boosted up and expanded as per future need. The concept on future commercial development is depicted in figure 25.2.

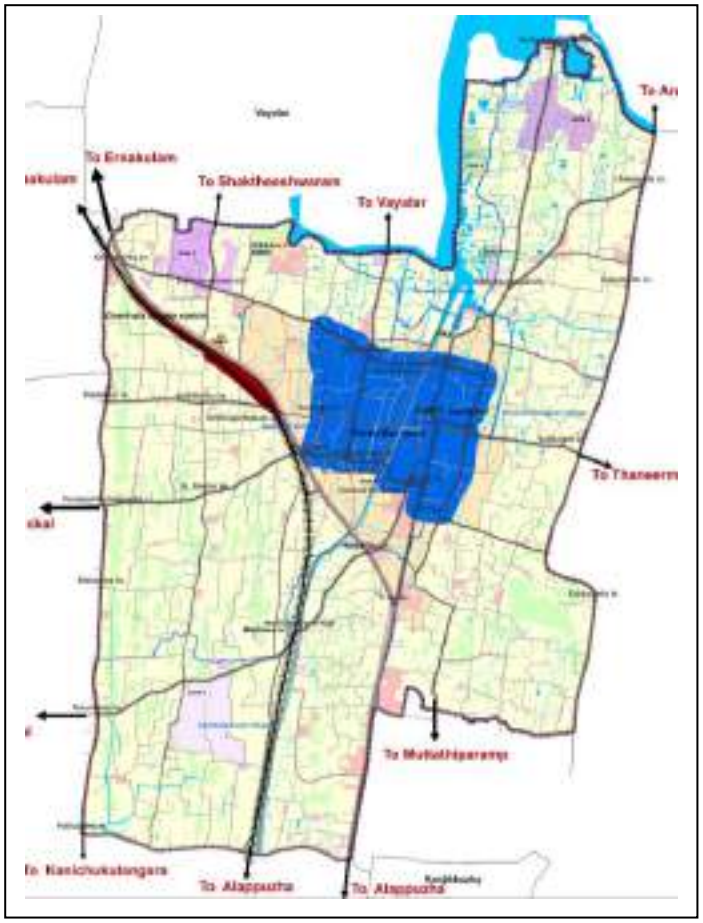


Figure 25.2 Commercial activity areas

25.3. Industrial Development

The major objective of developing Cherthala as an economically vibrant town shall be achieved through coir and agro based industrial development. Proper connectivity and availability of raw materials will catalyse the industrial development in Cherthala.

The concept of future industrial development is to promote non nuisance type service/engineering industries throughout the developable areas other small industries and coir and agro based industries in pre-assigned areas. These pre-assigned areas are decided

based on the existing spatial structure and future development potential. The concept on industrial development is shown in figure 25.3.

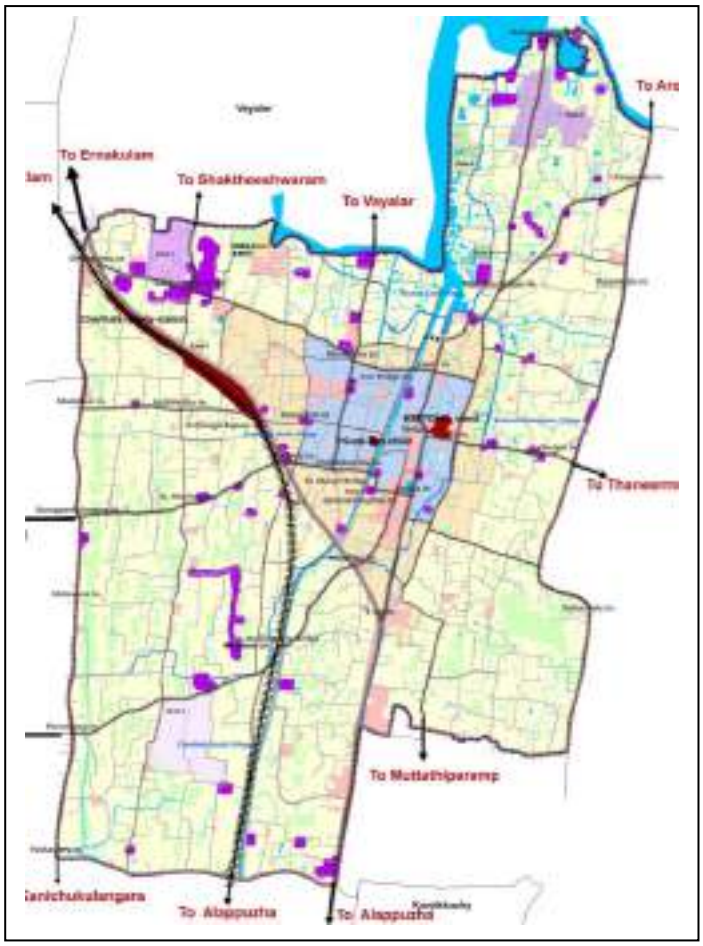


Figure 25.3 Concept on Industrial development

25.4. Tourism Development and Recreational Centres

Development of tourism sector is identified as yet another objective. This can be mainly achieved through the utilization of potential water bodies available in Cherthala. A well developed transportation network with adequate road capacity and proper connectivity to different activity centres is an added advantage for tourism promotion. Analysis on tourism sector reveals that Vembanad Kayal is highly potential for promoting tourism activities. Adequate land with scenic beauty is available adjacent to the Vembanad lake for acquisition and development. In addition, canal tourism should also be promoted.

The concept on recreational facilities is that the planning area can serve the the adjacent local bodies also. Besides the tourism centres, stadiums and parks & open spaces are envisaged to provide recreational facilities. Vembanad Kayal and neighbouring areas are considered as sensitive open space with restricted development activities. Stadium towards the north of the town and recreational space on the banks on AS canal will cater the recreation facilities needed. Development of tourism infrastructure will be a priority area. The concept on tourism and recreational facilities is depicted in figure 25.4.

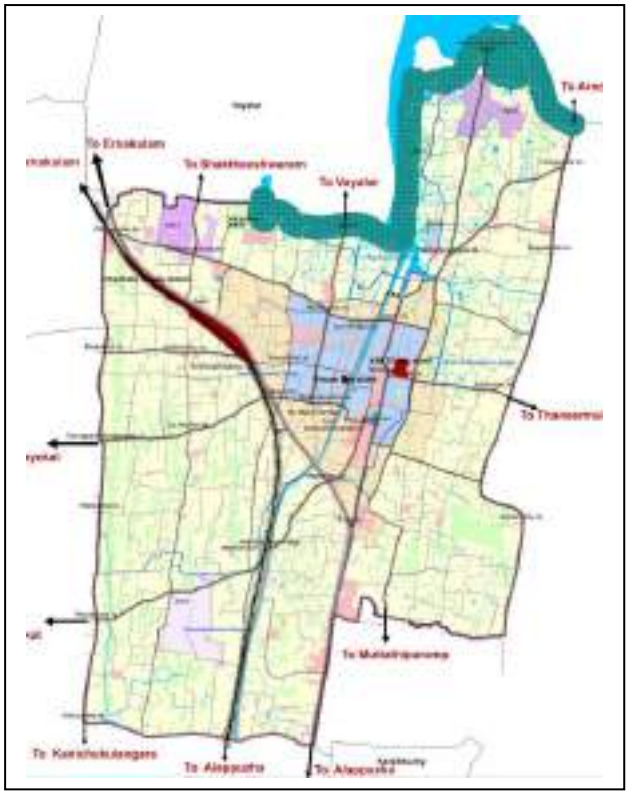


Figure 25.4 Concept of Tourism and Recreational facilities



Figure 25.5 Areas of ecological importance

25.5. Environmental Conservation and Disaster Management

The concept on conservation of the areas of ecological importance is to allocate the future activities in those areas judiciously so that the permissible activities do not impact adversely on the overall environmental balance and also to encourage the participation of local people and NGOs in the conservation efforts. Kayal and canal tourism are envisaged in the plan. Hence conservation of these ecological important areas are ensured through judicious planning .The areas of ecological importance are shown in the figure 25.5.

Cherthala has not experienced any severe disasters in the history. Eventhough Alappuzha is identified as one of the most vulnerable districts of the state with respect to Climate change, Cherthala town shows different character in the district. Being compared to the other Municipalities in the district, Cherthala is the least disaster vulnerable town. All other towns being in the Pampa river basin are severe flood prone areas. Since Kerala being affected by series of flood and Landslide disasters consecutively in the previous years, the demand for a

town without any history of disasters like Cherthala will definitely increase in future and huge developments can be ensured in such towns.

25.6. Development Concept

The development concept for the planning area is formulated by physically overlaying all the above concepts on the existing spatial structure as shown in the figure 25.6. As per the development concept (figure 25.7), the developable areas are classified as following major activity areas. They are

1. Multifunctional area(Mixed Development Trend)
2. Commercial activity area(Town centre)
3. Industrial area
4. Residential activity area
5. Tourism promotion area
6. Recreational area

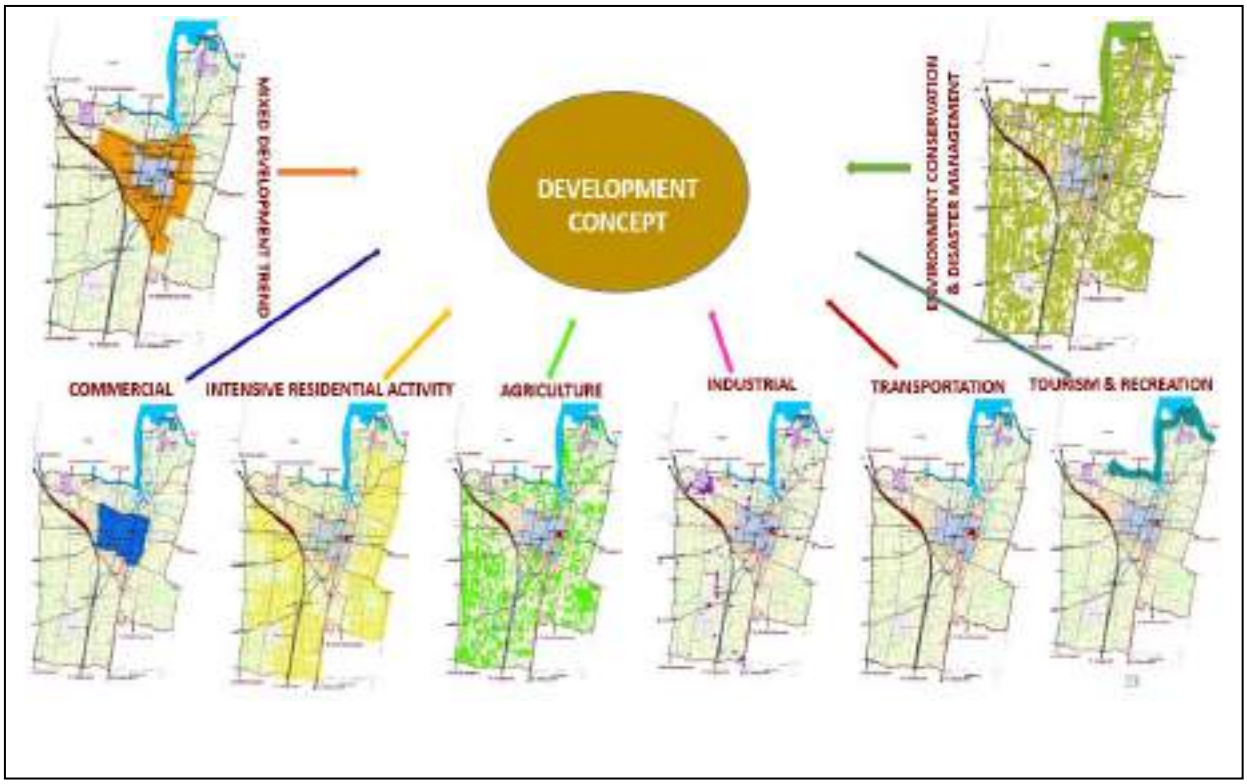


Figure 25.6 Evolving Development Concept

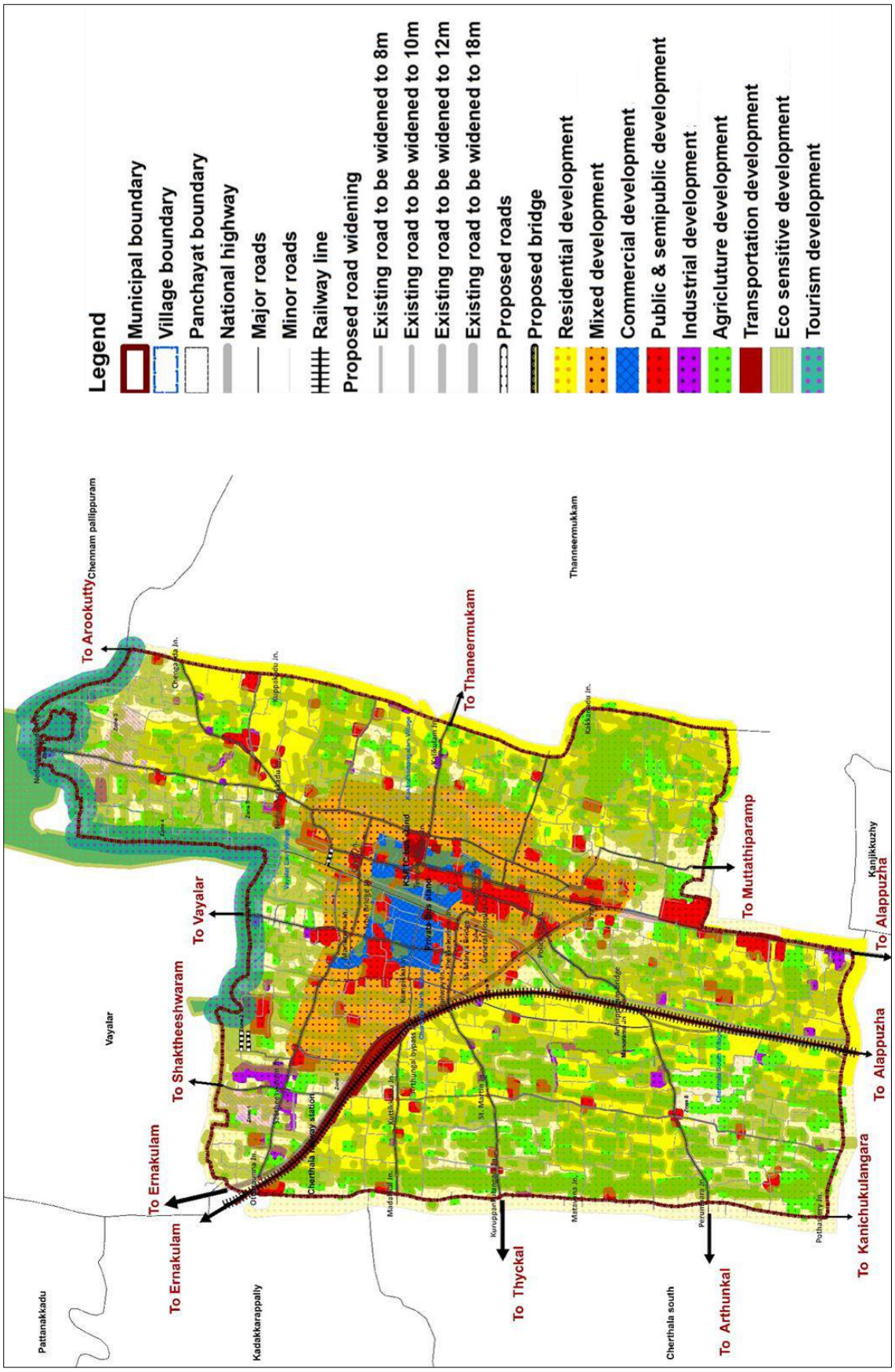


Figure 25.7 Development Concept

Chapter-26

General Policies and Strategies

The general policies and strategies are worked out to achieve the goals set through the objectives without conflicts among the development proposals, considering the development potential, demand for physical development and need to conserve certain features and bring in synergy to the development process as a whole.

26.1. The General Policy Statement

The general policy for the overall development of the town, considering its regional importance as part of a vibrant urban corridor of the State, its location advantage due to nearness to Kochi and very good connectivity by National Highway, Railways and proximity to National Water Way is furnished hereunder,

> ***"Comprehensive development that will facilitate the growth of Cherthala Town with a strong economic base of industrial and trade & commerce sectors, meanwhile giving due importance to agriculture as a supporting sector of economy and as a means for maintaining the environmental balance and to act as a healthy, vibrant residential hub supported with good quality service and infrastructure facilities, equipped to perform as a second order settlement in the district"***

The sectoral policies and strategies drawn up are given hereunder.

26.2. Sectoral Development Policies and Strategies.

26.2.1 Economic Development

Policy:

Promote developments that provide economic stability for the town by developing the potentials of the town in trade and commerce, industrial, tourism and agricultural sectors.

Strategies:

- Developing Cherthala as a potential development hub in the sub-region with in-par higher order facilities

- Promote area wide infrastructure improvements that will farther the town's competitive position in the region, with respect to residential, commercial and industrial development
- Promote multi modal transport facilities between cities – by road, rail and water.
- Solve traffic and parking problems that discourage shopping in the existing commercial centers.
- To develop housing facilities especially for the migrant population
- Promote non-nuisance type medium & small scale industrial development in the town for income generation, employment promotion and economic development, with environment friendly ventures and investor friendly guidelines.
- Promote agriculture as a support sector for local economic development.
- To strengthen and modernize traditional industries by diversification of product and implementing new technologies
- To strengthen marketing network by providing adequate marketing facilities and by imparting skills in marketing
- To organize awareness programmes and educate people on the probable development of economic base of Cherthala from coir indutry
- Promotion of IT Sector by:

    - Providing adequate social as well as physical infrastructure
    - Providing better connectivity to nearest IT campuses and residential areas
    - Utilize the benefits due to nearness to Kochi

- Optimum utilization of tourism potentials by:

    - Developing an internal tourist circuit in the town with its serene environmental quality, places of heritage value and scope for recreational facilities
    - Reviving AS canal for developing waterway tourism connecting Alappuzha town and Vembanad lake
    - Developing Cherthala as a tourist trasit centre for the wider tourism potential region
    - Providing better linkage to nearest tourism spots

26.2.2 Agriculture and Animal Husbandry

Policy:

Conserve the agricultural sector and promote animal husbandry along with agricultural practices so as to achieve self sufficiency to the possible extent.

Strategies:

- Retain active paddy cultivation in the existing paddy fields by adopting suitable practices to maximize productivity.
- Promote coconut cultivation and its produces
- Promotion of homestead cultivation and urban agricultural activities
- Protection of existing ponds and water network for irrigation.
- Promotion of units for the value addition of agriculture products.
- Promotion of dairy and poultry farming and increase productivity through scientific methods.
- Provision of basic infrastructure facilities like veterinary clinic, slaughter house etc.
- To provide basic facilities for the development of agro industries and the marketing of finished products

26.2.3 Transportation

Policy:

Provide an efficient transportation network with intermodal integration for ensuring safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of town's residents and commuters to centers of job, education and recreation.

Strategies:

- At regional level ensure rapid connectivity to various centers in the district/region.
- Develop a hierarchical system of road network within the town.
- Revive the water transportation and linking the National Water Way III
- Ensure inter modal integration of road, rail and water ways
- Provision of terminal facilities and parking facilities at appropriate locations.
- Ensure safe passage of the pedestrian traffic in the core area by traffic management means and by providing pedestrian facilities.
- Divert through traffic from town centre area and divert local traffic from the NH and arterial roads by improving internal connectivity
- Improve the geometry of roads (gradient, width, function etc) to ensure safety.
- To improve overall efficiency by a functional road network considering the present bottlenecks and future needs

26.2.4 Civic Amenities & Recreation Facilities

Policy:

To have abundant recreational opportunities for town residents provided at reasonable cost and in a manner that adds to town's sense of community.

Strategies:

- Provide and maintain adequate community facilities and services to meet the needs of the town
- Provide a variety of parks and recreational facilities that serve a wide range of ages and interests in a hierarchical manner.
- Encourage cooperative partnerships with the schools, nonprofit organizations and others to provide new recreational opportunities.

26.2.5 Environmental Sustainability

Policy:

To sustain and enhance important features of the natural environment and to preserve the semi-rural character of the town by protecting scenic vistas and open spaces

Strategies:

- Conservation of paddy lands and water network.
- Promote water conservation measures such as rain water harvesting.
- Conservation of the banks of canal and lake with a view to prevent water pollution
- Promote community driven preservation of green spaces
- Planting of trees in public places, Institutions, etc
- Framework to promote Green buildings, usage of non-conventional energy etc.
- Ensure a proper drainage network
- Ensuring proper disposal of solid waste and sewage:

    - proper waste collection and segregation
    - installation of biogas plants/pipe compost at household level
    - provide decentralized solid waste disposal methods
    - ensure proper disposal of e-waste and bio-medical waste

26.2.6 Physical and Social Infrastructure

Strategies:

- Providing adequate drinking water supply by improving the existing schemes

- To provide sanitation facilities for all and also to dispose sewage safely from environmentally fragile areas
- Promoting non conventional energy sources especially usage of solar energy and energy from bio waste
- Strengthening public health care institutions and to provide affordable Healthcare and Education for all
- Ensure 24*7 Electricity supply and IT connectivity
- Affordable Housing for all
- To provide better transportation facilities to improve the intra city as well as regional linkages

26.2.7 Safety and Security

Strategies:

- Safety to be inculcated in all infrastructure planning aspects – For workers, and citizens. Safe road, public spaces, working environment, homes etc.

Chapter-27

Projected Requirements

27.1. Population projection

The population projection for 2021,2031 and 2041 of the town are made by assuming that same trend in the population growth continues. The population is projected by three methods and the average of the three is taken to arrive at the population figures in 2021,2031 and 2041.

The following methods were used.

a. Arithmetical increase method
b. Geometrical increase method
c. Incremental increase method

a) Arithmetical Increase method

In this method the average increase in population per decade is calculated from the past census reports. This value is added to the present population to find out the population of the next decade. By this method, the population growth rate of 2021,2031 and 2041.

are calculated by assuming that the population is increasing at constant rate for the succeeding decades. The projected population of the Town based on arithmetic increase method is shown in *Table 27.1*.

Table 27.1 Projected municipal population – Arithmetical increase method

Arithmetical increase method			
Year	Total population	Population Increment	
1971	36752		Averaging the increment
1981	40492	3740	
1991	43326	2834	
2001	45105	1779	
2011	45827	722	
2021	**48096**	**2269**	
2031	**50365**	**2269**	
2041	**52634**	**2269**	

Source: Census 1971,1981,1991,2001

b) Geometrical Increase method

In this method the percentage increase in population from decade to decade is found out. This percentage increase is used to find out the future increase in population. By this method, the population growth rate of 2021,2031 and 2041 are calculated by assuming that the same percentage increase in population prevails as that of 2011 for the succeeding decades.

Table 27.2 Projected municipal population – Geometrical increase method

Geometrical increase method				
Year	Total population	Population Increment	Growth rate	
1971	36752			Assuming same growth rate prevails for next decades
1981	40492	3740	10.18	
1991	43326	2834	7.00	
2001	45105	1779	4.11	
2011	45827	722	1.60	
2021	**46560**	**733**	1.60	
2031	**47305**	**745**	1.60	
2041	**48062**	**757**	1.60	

c) Incremental Increase method

This method is a modification of arithmetical increase method. In this method, the increase in increment is considered for calculating the future population. The incremental increase is determined for each decade from past population and average value is added to the present population along with the average rate of increase. The population of 2021,2031 and 2041 are found out assuming the average incremental increase prevails for the future decades also. The projected population of the Town based on the incremental increase method is shown in *Table 27.3*.

Table 27.3 Projected municipal population – Incremental increase method

Incremental increase method				
Year	Total population	Population Increment	Incremental increase	
1971	36752			Averaging the incremental increase
1981	40492	3740		
1991	43326	2834	-906	
2001	45105	1779	-1055	
2011	45827	722	-1057	
2021	**45543**	**-284**	-1006	
2031	**44253**	**-1290**	-1006	
2041	**41957**	**-2296**	-1006	

Source: Census 1971,1981,1991,2001

The projected total population by the above mentioned methods differs slightly. The average of these three projected values is taken as the population figures of the Cherthala town.

Table 27.4 Final projected population

Final Population				
Year	Total population as per arithmetical increase method	Total population as per geometrical increase method	Total population as per incremental increase method	Average population figures
2021	**48,096**	**46,560**	**45,543**	**46,733**
2031	**50,365**	**47,305**	**44,253**	**47,308**
2041	**52,634**	**48,062**	**41,957**	**47,551**

So it can be concluded that the total population of Cherthala town will be 46,733, 47,308 and 47551on 2021,2031 and 2041 respectively based on the projection. However, the town shall attract migration of certain population to it due to the development projects envisaged in some of the sectors. Hence, the population in the horizon year is considered to be 50,000 for calculation purposes.

27.2. Sectoral projections

The projected population in 2041 is 47,551. For the Purpose of assessment of sectoral requirements this is rounded off to 50,000.

a) Estimation of labour force for 2041

Cherthala town is expected to accommodate 50,000 population by the year 2041. In 2013, 59% of the total population of the town was in the age group of 20-59. As no up-to-date data of the age structure of the town is readily available, almost the same age structure is assumed to prevail in the town in the next decades. Thus 59% of the population is considered to be in the working age group during 2041 which works out to be 29,500.

Sex ratio for age group 0-6 in 2011 is 911. So the working age group population can be divided into 14063 females and 15437 males.

% of female workers to the female working age group population is (7499/23635) x100 = 31.7

Assuming that all men in the working age group will be workers and that the participation rate of women will improve to 45% due to the increased literacy rate, female workers as on 2041 will be 14063 x 45/100 = 6328

Total number of workers = 6328 + 15437= **21765**

Proposed distribution of workers

Primary workers:

In 2011 the number of primary workers is 391. It is 1.95% of the total workers. Expecting the same trend for next decades we can assume that 2% of total workers will come under primary sector.

21765 x 2/100 = **435**

Secondary workers:

In 2011 the number of secondary workers is 1412. It is 7.1% of the total workers. Expecting the same trend for next decades we can assume that 7% of total workers will come under secondary sector workers.

21765 x 7/100 = **1524**

Tertiary workers:

In 2011 the number of tertiary workers is 18169. It is 91% of the total workers. Expecting the same trend for next decades we can assume that 91% of total workers will come under tertiary sector workers.

21765 x 91/100 = **19806**

Table 27.5 Sector wise distribution of workers

sector wise distribution of workers (2011)			
	Sector	No.	%
1	Cultivators	56	0.33
2	Agricultural labours	229	1.35
5	Household industrial workers	1022	6.04
9	Other workers	15602	92.28
	Total	16909	100

Source: Census 2011

b) Trade and Commerce

As per existing landuse survey commercial area in the town comes to 33.35 hectares.

As per the URDPFI standards, for medium towns, 4 to 6 percentage of the developed area should be earmarked for commercial use. In the case of Cherthala the calculated area needed for commercial use is 78Ha.

The hierarchy of commercial centers for a medium town like Cherthala, as per URDPFI Guidelines is as indicated below:

Table 27.6 Commercial Centres and Population Served

Sl No	Hierarchy of commercial centre	Population served	Requirement (by 2041)
1	Cluster centre	5000	10 Nos with 1500 sq.m each
2	Local shopping incuding service centre centre	15000	4 Nos with 4600sq.m each
3	Community centre	1 lakh	1 No with 5Ha area

c) Traffic & transportation

- Presently the capacity utilization of all sections on NH 66 and Cherthala-Thanneermukkom Road are found to be exceeding carrying capacity.
- Presently on Old NH all the sections are crossing the carrying capacity.
- The capacity utilization of all sections on Cherthala-Arookutty road will exceed carrying capacity by 2020 onwards.
- On Cherthal-Arthungal road, Kambikkal Jn to Arthungal Road Jn section is presently exceeding its carrying capacity. By 2020 onwards Nadakkavu Jn – Kambikkal Jn section will cross its carrying capacity. All the road sections except Devi Temple Jn – Private Bus Station section will exceed carrying capacity by 2030.
- On Muttam Bazar road, Nadakkavu Jn to Deepika Jn section will cross its carrying capacity by 2030.
- Poothotta Jn – Girls HS Jn road will cross its carrying capacity by 2030.

Table 27.7 V/C ratio of road sections

Sl.No	Road Link	Carriage way width(m)	Capacity (PCU)	V/C ratio 2013	V/C ratio 2020	V/C ratio 2030
I	**National Highway**					
1	11 th Mile Jn - X ray Jn	14	30,000	1.93	2.53	3.75
2	X ray Jn - Ottappunna Jn	14	30,000	1.3	1.71	2.53
II	**Old National Highway**					
3	X ray Jn - Devi Temple Jn	7.4	15,000	1.28	1.69	2.5
4	Devi Temple Jn - Court Jn	7.4	15,000	1.54	2.03	3
5	Court Jn - Iron Bridge Jn	7.4	15,000	1.6	2.11	3.12
6	Iron Bridge Jn - Manorama Jn	6.9	15,000	1.6	2.11	3.12
7	Manorama Jn - Ottappunna Jn	6	15,000	1.14	1.51	2.23
III	**Cherthala - Thanneermukkam Road**					
8	Devi Temple Jn - Girls HS Jn	7.5	15,000	1.86	2.44	3.62
9	Girls HS Jn - Kalikulam	5.56	12,000	1.1	1.45	2.15
IV	**Cherthala - Arookutty Road**					
10	Court Jn - Kuppikavala	5.5	12,000	0.78	1.02	1.51
11	Kuppikavala - Poothotta Jn	5.5	12,000	0.78	1.03	1.53
12	Poothotta Jn - Chenganda	5	9,000	0.93	1.23	1.82
V	**Cherthala - Vayalar Road**					
13	Manorama Jn - Vayalar Bridge	5	9,000	0.31	0.41	0.6
VI	**Cherthala - Arthungal Road**					
14	Devi Temple Jn - Pvt Bus Station	4	9,000	0.26	0.34	0.51
15	Pvt Bus Station - Nadakkavu Jn	4.5	9,000	0.59	0.78	1.15
16	Nadakkavu Jn - Kambikkal Jn	5.5	12,000	0.94	1.23	1.82
17	Kambikkal Jn - Arthungal Road Jn	5.5	12,000	1.45	1.91	2.82
18	Arthungal road Jn - Madakkal Jn	5.5	12,000	0.75	0.99	1.47
VII	**Muttom Bazaar Road**					
19	Manorama Jn - Nadakkavu Jn	5.5	12,000	0.45	0.6	0.88
20	Nadakkavu Jn - Deepika Jn	4.5	9,000	0.63	0.83	1.23
VIII	**Chenganda - Kalikulam Muttathiparamba Road**					
21	Chenganda - Kalikulam	5	9,000	0.23	0.31	0.45
22	Kalikulam - Muttathiparamba	5	9,000	0.11	0.14	0.21
IX	**Poothotta Jn - Girls HS Jn**					
23	Kuppikavala - Girls HS Jn	5.5	12,000	0.54	0.72	1.06
X	**Other Roads**					
24	Girls HS Jn - Charankattu Road	4.5	9,000	0.29	0.38	0.56

d) Water supply

Domestic purpose: requirement of water for domestic purpose for a population of 50,000 for the year 2041 = 50,000 x 150 = **7.5 MLD**

Medical: requirement of water for 690 beds in the various hospitals at the rate of 455 per bed = 690 x 455 = 0.312 **MLD**

Educational:

Colleges: requirement of water for 700 students in colleges = 700 x 45 = 0**.031MLD**
Schools: requirement of water for 10160 students at the rate of 45 lpcd = 10160 x 45 = **0.457 MLD**

Industries: water requirement for 21765 workers in various factories at the rate of 30 lpcd = 21765 x 30 = **0.653 MLD**

Total = 7.5 + 0.312 + 0.031+ 0.457 + 0.653 = **8.953 MLD**

Adding 25 % (ie 2.238 MLD) for commercial, public institutions, park and open spaces, street taps etc. the total requirement of water for 2041 = 8.953 + 2.238 = **11.19 MLD**

- Current water supply = **5MLD**
- Additional requirement = **6.19 MLD**

e) Solid waste management

- Waste generated = 220gm/Head/day
- Waste generation in 2041 = 11 tons/day
- Waste collected/day = 7.4 tons

Hence additional **3.6 tons/day** to be collected and treated

f) Energy

The electric power requirement in the town is computed at the rate of 1 KWH percapita per day for residential use and 4 KWH per worker per day for industrial purposes.

Residential use = 50000 KWH

Industrial use:

Workers in industries = 1524

Power required = 1524 x 4 = 6096 KWH

Total power requirement = 50000 + 6096 = **56096 KWH**

Table 27 .8 Energy availability and projected requirements

Category	Existing Nos	Standards recommended	Demand 2041
110KV substation	1	1 for 1,50,000 persons	1 Nos
Fire station	1	1 for 2 lakh persons	1 No
LPG Godowns	2	1 for 40-50,000persons	1 Nos
Petrol pumps	6	1/150Ha of gross residential and 1/40 Ha of industrial area	7 Nos

g) Education

1. High School (8th Std to 10th Std)

As per the TCPO guidelines manageable Student strength of a High School is 700-750 students. The total number of population with 700 students of age group 13-15, can be obtained from the age structure. The age structure of Alappuzha Dist is shown in the table below.

Table 27.9 Population Distribution in 0-19 Category of Cherthala

% of People in various age groups Alappuzha District	
Age	%
0-4	7.87
5-9	7.01
10-14	8.15

Total % of students in the age group (13-15) = (8.15x3)/5 = 4.89 %

Total No. of people = 700x100/4.89 = 14315 (say 14000)

Threshold Population of a High School with student strength of 700-750 is 14000

In 2041 number of high school needed = 50000/14000 = 3.6 schools with 700 strength. ie schools with a capacity of 2500 (3.6 x 700) students is needed. Existing facility constitutes schools with a capacity of 3303 students as per secondary data.

The existing high school facility is sufficient.

2. Higher Secondary School.

It is derived that for a population of 14,000, a High School with strength 700 is sufficient.

In 2041 number of high school needed = 50000/14000 = 3.6 schools with 336 strength. ie schools with a capacity of 1210 (5.35 x 336) students is needed. As per secondary data there are schools with a capacity of 1106 students in the town.

3. Arts & Science Colleges

It is derived that for a population of 14,000, a Higher Secondary School with strength 336 is needed. Assuming 80% pass from the HSS, and majority of this (Say 60%) opt for college Education the number of students opting for College Education (including Professional Colleges) from within a population of 14,000 =336x.6= 202

Assuming that 65% of the 125 students are opting for Arts & Science Colleges, the number of students opting for higher education from Arts and science college = 202x.65=132

The total students strength of an Arts & Science College = 500 (BSc-120, BA-120, BCom-120, Others-120)

So the total number of population having 500 students for Arts & Science College = 14,000x500/132 =53030 (Approximately 53000)

For 53,000 population 1 college with 500 students capacity is needed.

Sree Narayana College, N.S.S College and St. Michaels College are arts and Science Colleges associated with the town. These are outside the town area but in the nearby local bodies. These colleges together accommodate more than 5000 students. So a new arts & science college for the town is not necessary.

4. Professional College

One professional college for 2,50,000 populations with student strength of 250 at the entry level is needed as per standards.

Since there are professional colleges in the nearby panchayaths a new professional college in the town area is not a need.

5. Other Professional Institutes (Polytechnic, ITI & ITC)

Assuming 20 % of the students from HSS pass are opting Politechnic colleges

Total number of students opting for Polytechnic=336X0.2 = 68

Total strength at the entry level of a polytechnic = 150

Threshold population of a Polytechnic = 14000 x150/68= 30882 (say 30000)

Polytechnic needed = 50000/30000 = 1.6 (say 2)

Polytechnic with student strength **300** is needed. There is a polytechnic with a total strength of 540 students is available in the town as per the secondary data.

Assume that 10% of the students failing HSS and 1% of the students failing HS and 15% of students passing HS and 2% of the students passing Higher Secondary Schools are opting for ITI or ITC. No. of students opting for ITI or ITC = 20+ 3+63+3 (20% of 202+1% of 280+ 150% of 420+ 2% of 125)= 89

Students strength at the entry level on an ITI or ITC = 300

Threshold population of an ITI or ITC = 14000x300/89 = 47191 ≈47000 (say)

Threshold population of an ITI or ITC = 47000

ITI/ITC needed = 50000/47000 = 1.06(say 2)

ITI/ITC with student strength **600** is needed.

h) Health

At present there are 645 beds in various Allopathic hospitals. Out of 645 beds, 394 are in the private hospitals. Ayurvedic and homeopathic hospitals contribute 45 beds (20 and 25 beds respectively). This is fully in the government sector. There is a total of 165 beds in the government sector.

Assuming a standard of 4 beds per 1000 population, the number of beds needed by 2041 = (50000/1000) x 4 = **200**

i) Housing

As per the secondary data collected, the existing number of houses in Cherthala town is 14750. The number of households in the town is 11416. There is a shortage of 634 houses in the town at present. Average household size for the town is 4.01.

Number of houses needed by 2041 = 50000/4.01= 12469

Housing shortage = 12469 – 10500 = 1969

Number of houses to be reconstructed = 417 (kucha houses in the town)

1% removed due to developmental activities = 10500/100 = 105

Total houses to be built = 1969 + 417 + 105 = **2491**

j) Industrial area

As per URDPFI guidelines, industrial workers are to be taken to be about 20% of the total working population. Thus it is estimated that there will be around 1314 household industrial workers in Cherthala by 2041. As per URDPFI standards, the industrial landuse use should be 7-9 % of the developed area and for Cherthala it is coming around 144Ha.

k) Recreational facilities

As per URDPFI guidelines recreational area for medium towns should be 12-14% of the developed area. Based on this 201.5 ha should be reserved for recreational facilities in Cherthala town. As per URDPFI standards, demand for various recreational activities in town is given in below table.

Table. 27.10 Recreational facilities available and future requirements

Category	Standards recommended	Demand 2041
Park & open spaces (overall town)	10-12 sq.m /persons	50-60 Ha
Neighborhood Park	1for 15,000 persons	4Nos
Open spaces (variations by size of settlement)	1.4-1.6Ha/1000 persons	75 Ha
Community room	1/5000 persons	10Nos (660m^{2}each)
Community hall & library	1/15000 persons	4Nos (2000m^{2}each)
Recreational Club	1for 1 lakh persons	1No (1Ha each)
	1for 50,000persons	1Nos (0.5Ha each)
	1for 15,000 persons	4Nos (0.2Ha each)

PART III

LANDUSE AND SECTORAL PROPOSALS

Chapter-28

PROPOSED LAND USE PLAN

The land use plan for Cherthala town is prepared considering the spatial structure of the town, transportation network, land use characteristics, development concept, goals and objectives and projected demand for various sectors during the plan period. Land requirements for various uses are calculated and spatial representation is done based on development concept.

The categories of land use proposed are:

1. Residential Zone
2. Mixed Zone
3. Commercial Zone
4. Industrial Zone
5. Public & Semi Public Zone
6. Traffic & Transportation Zone
7. Industrial Promotion Zone
8. Agro Based Industrial Promotion Zone
9. Artisans Village/ Coir Village
10. Tourism Promotion Zone
11. IT Promotion Zone
12. Park & Open Spaces
13. Paddy/ Low Lying Area
14. Environmental Conservation Zone
15. Waterbodies
16. Special Zones
    a) SZ-01: Proposed Stadium
    b) SZ-02: Park and Open space
    c) SZ-03: Slaughter House
    d) SZ-04: Truck Terminal
    e) SZ-05: Bus Terminal
    f) SZ-06: Area reserved for Nedumbrakad Ferry
    g) SZ-07: Farm Tourism Promotion Zone

28.1. Residential Zone

According to the development concept of 2041, the areas suitable for residential purpose in the planning area are identified. As per the concept intensive residential activity is envisaged in Cherthala town due increased demand for residential activities expected due to the proximity to Kochi. To facilitate the development of housing sector for the migrant population, identified parcels of the existing dry agriculture land and other developable land parcels are also designated as residential use zone along with existing residential use areas.

The proposed residential zone comprises an area of 1066Ha which is about 60 % of the total extent of the town. Hence, the land required for housing needs shall be adequate and the net residential density shall remain below the values stipulated for a medium town throughout the plan period. The residential use is provided in a continuous manner except for natural barriers like water ways, roads, etc. in order to ensure compactness and this will ease provision for basic amenities and infrastructure. But to maintain a livable environment, hazardous/ nuisance causing activities are not be permitted in this area.

28.2. Mixed Zone

In this zone, a mixed land use of uses permitted in residential, commercial and public & semipublic zones are proposed. However, to maintain a livable environment, hazardous/ nuisance causing activities cannot be permitted in this area, but non-nuisance types of industries may be permitted considering the future scope for industrial development in the town. Other higher order activities are permitted in this zone with adequate conditions to ensure minimum disturbance to the residents. In this master plan, mixed zone is provided surrounding the central core area and along the side of selected roads that are mentioned in zoning regulations. The area zoned for mixed zone comprises of 125Ha.

28.3. Commercial Zone

According to the development concept, the central area of the town with vibrant commercial activities is identified as commercial zone. This area includes the existing market. The area zoned exclusively for commercial activities comprises of 75Ha. In this zone commercial uses are permissible. In addition to this area, commercial uses are permissible in residential mix zone. The existing and proposed commercial areas together with mixed residential use areas provide the required land for commercial activities. Distribution of commercial nodes in a hierarchical manner is also envisaged.

28.4. Industrial Zone

Industrial land use is only nominal in Cherthala town. Industrial sector is found as one of the key sectors for economic boosting up of the town. As per the concept of master plan for Cherthala, industrial sector shall be promoted by encouraging coir industries and agro

based industries. Non nuisance type small industries are visualized in all urban/built-up land use zones based on general development control regulations. All existing industrial land is included in this zone.

28.5. Public & Semi Public Zone

The area under public and semipublic land use comes to 66.19Ha. In the proposed land use plan no additional land for public and semipublic use is ear marked. Specific requirements of land for any public/ semipublic use will be met at the time of project implementation by locating it within other permissible zones. Priority is to be given for accommodating additional facilities like new buildings for hospitals, schools, community halls etc in the existing public and semipublic zones by utilizing the land optimally.

28.6. Traffic & Transportation Zone

An extent of 129Ha is coming under the traffic and transportation zone. A major share of this area is the area covered by roads. The municipal road network has good connectivity and a fair coverage. Hence no new roads are proposed. Widening of existing roads and providing a few missing links only are attempted. The land under this zone also covers bus stands, truck terminals, bus bays, taxi stands etc. Detailed traffic and transportation plan is given in next chapter.

28.7. Industrial Promotion Zone

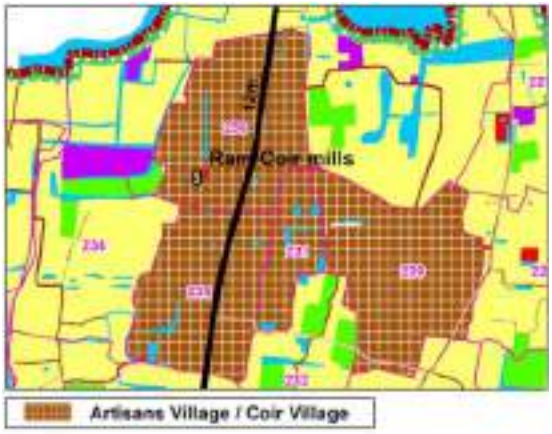
The existing land use shows that only 0.95% of the total town area i.e., 16.90Ha of land is under industrial use. Recognizing Cherthala Town's potential to become a satellite town for the expanding Kochi metropolitan city, a 12.8Ha of land is demarcated as Industrial Promotion Zone towards the northwestern part of the town to foster small and medium-scale industries and non-nuisance type of industries, aiming to enhance employment opportunities and promote economic development.



28.8. Agro based Industrial Promotion Zone

It is seen that despite the town's potential in agriculture, animal husbandry, and Small-Scale Industries (SSI) for employment, there has been a declining trend in cultivation over the recent years. In response, it is proposed to enhance the Town's potential for development in the coir & agro based industrial sector. And an area of 24.6Ha land is proposed as Agro-based Industrial Promotion Zone, with a view to enhance the value of agricultural produces in the region.





28.9. Artisans Village/ Coir Village

To promote and showcase the activities of traditional coir making and coir industry, an Artisans Village/ Coir Village is proposed in the town. An area of 19.8Ha land in Ward 5 and 6 of the Town near Nedumbrakkad Ferry is envisaged for this. It is proposed to revive the coir and related industrial activities in the region and to use it in the development of tourism and industrial sector.

28.10. Tourism Promotion Zone

The vicinity near Vembanad lake has tourism potential but lacks sufficient facilities. For improving and promoting tourism activities in the Town, an area of 5.36Ha of land on the northwestern side of the town area is proposed as Tourism Promotion Zone. This proposed zone along the side of Vembanad Kayal near Nedumbrakkad, capturing the scenic beauty and calmness of the nature may help to improve the recreational facilities in the Town and will be beneficial to the residential population as well.



28.11. IT Promotion Zone

To utilize the benefits of nearness to Kochi city, the Town is also exploring the possibility of new age development opportunities, and an area of 0.63Ha of land is proposed as IT Promotion Zone. It is proposed in the southeast side of the Municipal area, with the aim of capturing the potential for IT sector development. The zone is proposed for IT industry development, contributing to economic growth and technological advancement in the region.



28.12. Park & Open Spaces

Park and recreational open space occupy 0.02Ha of land. In addition to the existing park on the banks of Alappuzha- Cherthala Canal, a new Park on the banks Vembanad lake and an open-air theatre is also proposed.

28.13. Paddy/ Low Lying Area

Nearly 140Ha of paddy fields are available in the town. Conservation and proper utilization of paddy fields are necessary from the point of view of their environmental importance and for supporting the economic base for the community. Paddy cultivation shall be promoted through strong interference of local body. Hence conversion of paddy/ low lying lands to urban uses shall not be permitted. Hence conservation of paddy fields shall be enforced to maintain a healthy environment. The uses permitted in this zone are in accordance with the provisions of the Kerala Conservation of Paddy land and Wet land Act and other wet land conservation laws in force, relevant for the area.

28.14. Environmental Conservation Zone

A 20m strip of land along the sides of the Vembanad Lake and the water bodies as shown in the Proposed Landuse map is envisaged as Environmental Conservation Zone. This zone is demarcated with a view of protecting the natural environment along the banks of the Lake, and to conserve it for the future generations. An area of 11.7Ha land is under this zone, and it may act as a green belt area to protect and maintain the balance of the environment.



28.15 Waterbodies

Cherthala Town is blessed with canals and backwaters which constitute an area of 53.9Ha. All the existing water bodies including ponds are proposed to be conserved under this zone. A construction free buffer has to be provided for protecting water bodies.

28.16 Special Zones

Special Zones are the areas identified either as project sites or as of environmental importance and of heritage significance. Seven special zones are proposed in this plan. These zones are intended for specific projects such as Bus terminal, Truck terminal, Stadium, Farm tourism promotion zone, Slaughter house, etc. The special zones proposed for the Town are as follows.

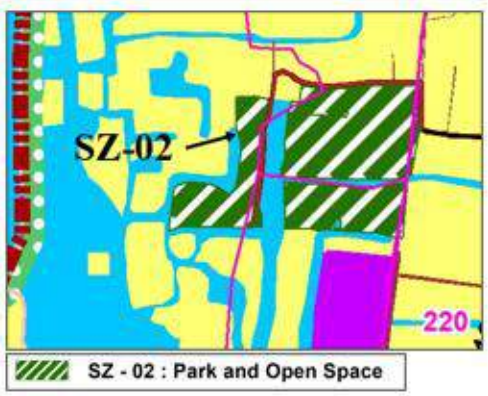
28.16.1 SZ-01: Proposed Stadium

A new stadium with entry and exit roads of 10m width each is proposed for the Town as shown in the Proposed Landuse map. It is proposed in Ward 2, to the north of Velorvattom Temple, in the area locally known as Olangattukari pradesham, covering an area of 2.07Ha of land in Survey number 206 of Cherthala North Village. This proposed stadium area is seen as marshy land according to existing land use map. Hence, if the project Including Entry and Exit Road is not materialized within a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as part of proposed Paddy/ Low Lying Area.



28.16.2 SZ-02: Park and Open space

A new Park and Open Space is proposed on the banks of the Vembanad Lake in Ward 4, covering an area of 1.83Ha of land in Vayalar East Village. This proposed Park and Open space area is seen as dry cultivation and residential areas according to existing land use map. Hence, if the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as part of surrounding proposed Residential Zone.



28.16.3 SZ-03: Slaughter House

A new modern slaughter house is proposed in the municipal land available near Muttom fish market in ward 30, in an area of 0.375Ha of land in Survey number 234, 237 of Cherthala North Village. This proposed Slaughter House area is seen as dry cultivation, residential and commercial areas according to existing land use map. Hence, if the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as part of surrounding proposed Commercial Zone.

28.16.4 SZ-04: Truck Terminal

A new truck terminal is proposed on the side of National Highway near railway station, in an area of



0.165Ha of land in survey number 121 of Cherthala North Village. This proposed Truck Terminal area is seen as dry cultivation area according to existing land use map. Hence, if the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as a part of surrounding proposed Residential Zone.

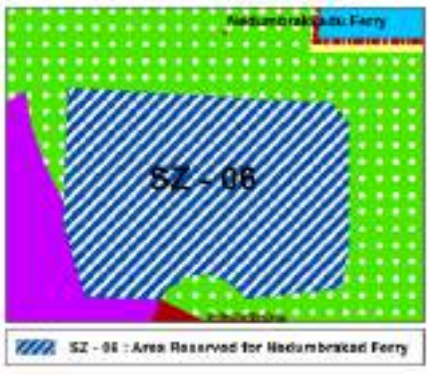
28.16.5 SZ-05: Bus Terminal

The existing private bus stand is proposed to be shifted to the municipal vacant land available on the side of National Highway near railway station, in an area of 0.599Ha of land in Survey number 179 of Cherthala North Village. This proposed Bus Terminal area is seen as public & semipublic area according to existing land use map. Hence, if the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as a part of proposed Public & Semi-Public Zone.



28.16.6 SZ-06: Area reserved for Nedumbrakad Ferry

It is proposed to develop the existing Nedumbrakad Ferry area in Ward 5 of Kokkothamangalam Village, for achieving better connectivity and improving tourism potential of the area. So an approximate area of 0.026Ha of land near Vembanad lake at Nedumbrakkad Ferry area is proposed in this special zone. If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as a part of the surrounding proposed Environmental Conservation Zone.





28.16.7 SZ-07: Farm Tourism Promotion Zone

To improve the tourism sector activities in the Town, a Farm Tourism Promotion Zone is proposed in the southeastern side of the municipal area in ward 15, in an area of 9.78Ha of land in Kokkothamangalam Village. This proposed special zone area is seen as paddy land according to existing land use map. Hence, if the project is not materialized with in a period

of 7 years from the date of sanctioning of the Master Plan, it is envisaged to be deemed as a part of proposed Paddy/ Low-Lying Area.

The activities which are permissible in different use zones are explained in the Zoning Regulations which is given in chapter 32. *Figure 28.1* shows the proposed land use of different areas.

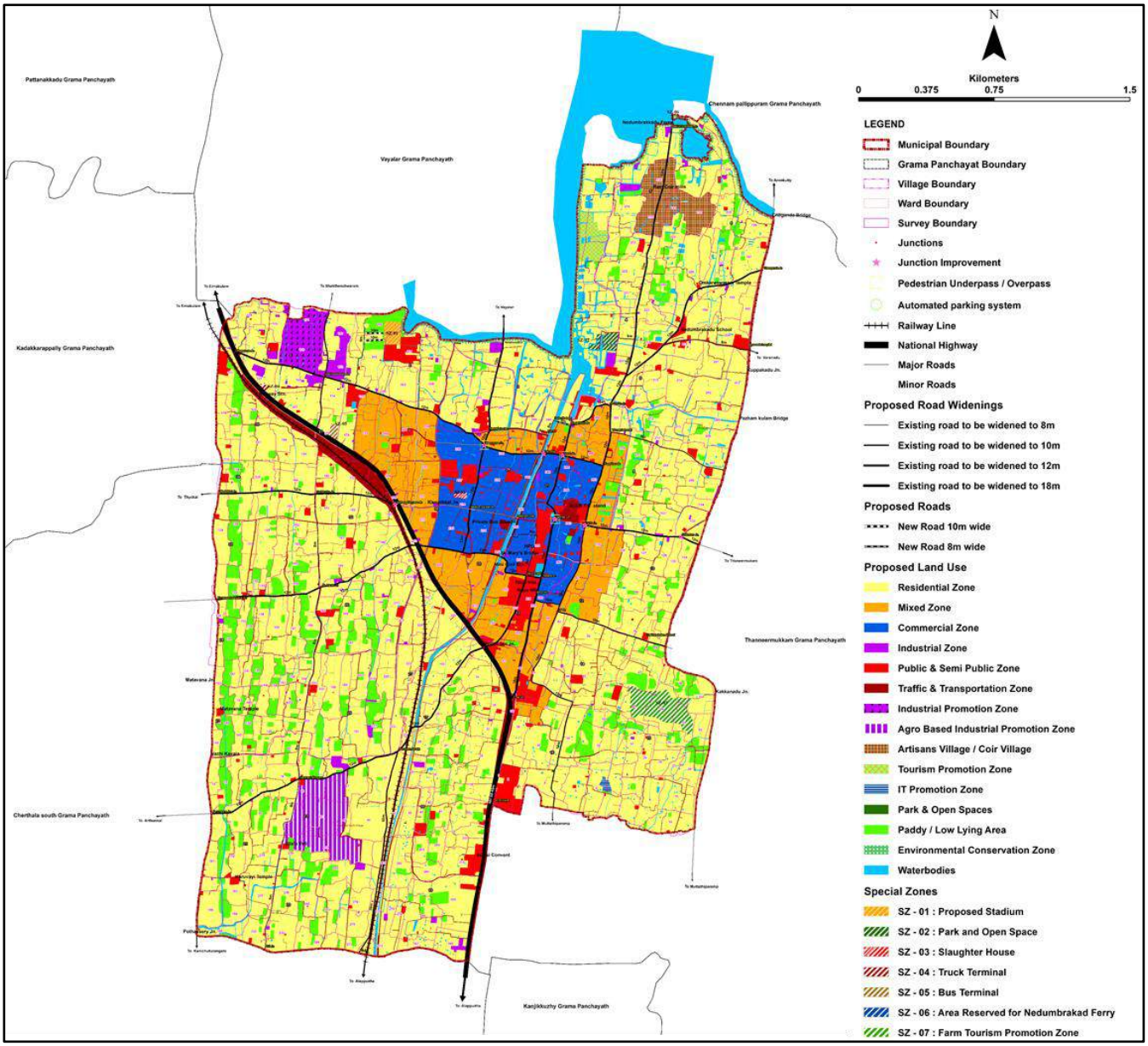


Fig 28.1 Proposed Land use map

Chapter-29

Traffic and Transportation plan

The road network of the town has fairly good coverage. But the road width is inadequate in most of the stretches. The projected traffic volume for 2041 far exceeds the capacity of the road network. Hence widening of the existing roads to cater to this increase in volume is attempted. The future Traffic and Transport Network of the town, evolved based on findings of studies and analysis related to the sector as well as the prospects of other sectors is depicted in *Fig 29.1*.

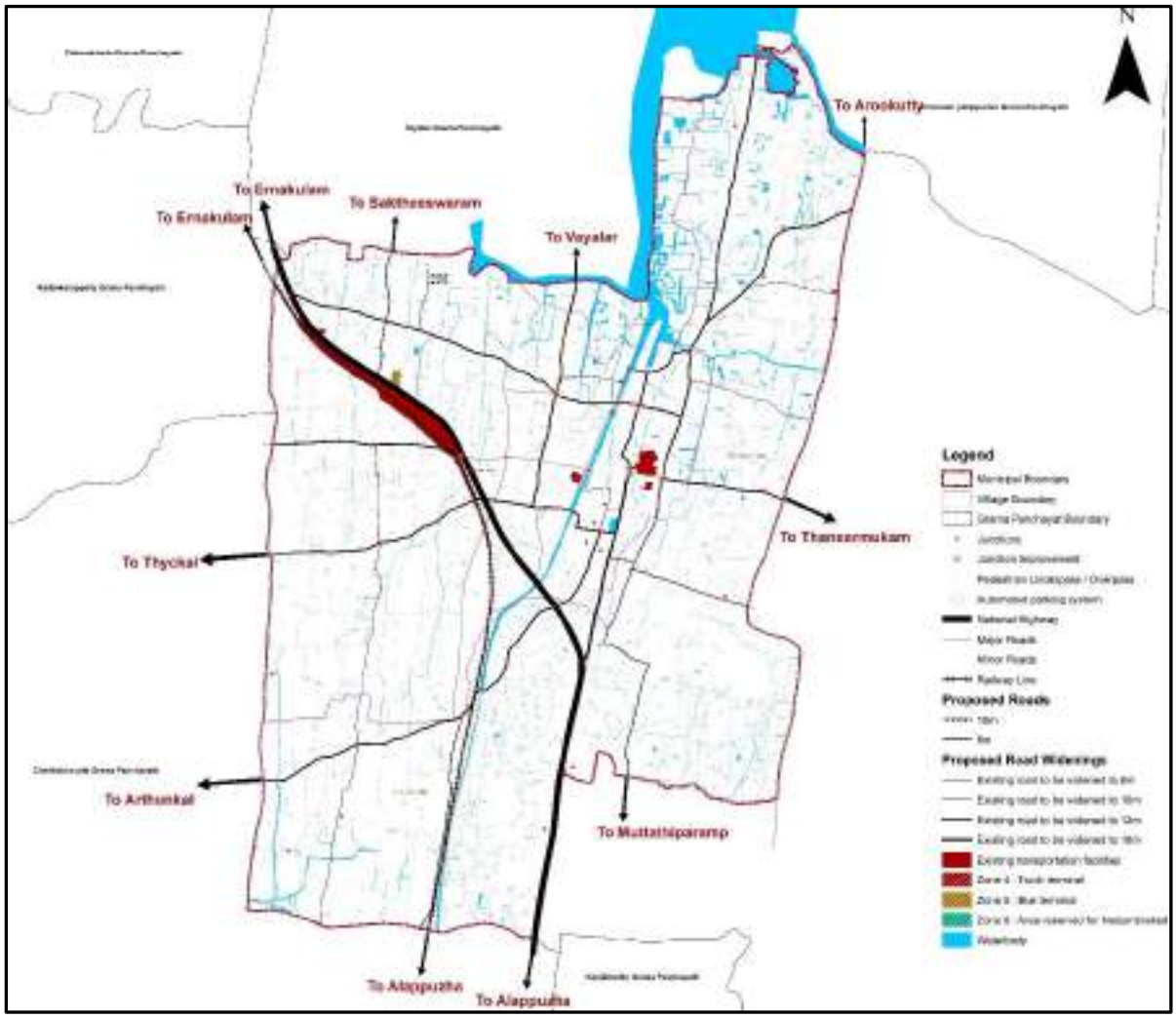


Figure 29.1 Proposed Road Network

29.1 Proposed Road Network

The National Highway passing through the town, which will continue to be the major arterial road of the town, has a varying width at present. The National Highway Authority of India had fixed the width of National Highways as 45m. Considering the projected traffic volume and NHAI stipulation, the proposed width of the National Highway passing through the town is fixed as 45m. In Thanneermukkam – Arthunkal road, GH school to Kaalikulam and Madakkal to Arthunkal Byepass road is proposed to be widened to 12m. This road connects Cherthala town with Thanneermukkam, a major tourist centre and Arthunkal, a major pilgrim centre. In Old NH the stretch from X-ray Junction to KSRTC passing through Apsara Junction, Devi Temple Junction etc. is proposed to be widened to 18m and KSRTC to Ottappunna Junction, passing through Court Junction, Manorama Junction, and Saktheeswaram Junction is proposed to be widened to 12m. The road from Girls High School Junction to Court Junction through Kuppikavala Junction is also proposed to be widened to 12m. Another major road, Cherthala – Arookutty road which starts from KSRTC to Chenganda Junction through Court Junction and Poothotta Junction is proposed to be widened to 12m.

Apsara Junction – Kurupankulangara road is proposed to be widened to 12m. This road connects Apasara Junction to Kurupankulangara through St. Martin Junction. Apsara Junction – Perumpara Junction road which passes through Government hospital Junction, Cherthala Police Station is also proposed to be widened as 12m. This road caters to the Agro based industrial area proposed in the master plan.

Girls High School Junction – Muttathiparambu road through DP Junction and Boys High School Junction- is also proposed to be widened to 10m. Chakarakulam road is proposed to be widened to 10m. Vayalar road from Thekkekurisady jn to Northern boundary via Manorama jn is also proposed to be widened to 12m.

A number of sub-arterial roads are identified in the town. They are proposed to have a width of 8m depending on the importance and projected traffic through the link. It is proposed to provide railway over bridge near railway station on Arthunkal road (Arthungal bypass junction to Madakkal junction) and near Anjilipalam on Kuruppamkulangara road.

The basic priorities of the road network plan are to strengthen the existing network by improvement in geometry, increasing width, providing missing links etc. and to divert intra town traffic from the National Highway and other arterial roads. Improvements of major junctions are also to be taken up while widening the existing road network. Detailed road alignment plans for all new road stretches and junction improvement plans shall be prepared based on the Master Plan proposals.

Table 29.1 Proposed widening of roads

	Name of Road	**Existing Width (m)**	**Proposed Width (m)**
1	GH school to Kalikulam	10	12
2	Madakkal to Arthunkal Byepass Road	8	12
3	Old NH (X Ray Junction to KSRTC)	17	18
4	Old NH (KSRTC to Ottapunna)	8	12
5	Cherthala - Arookutty Road	9	12
6	Court Junction - Girls School Junction	10	12
7	Apsara Junction - Kurupankulangara Junction	8	12
8	Apsara Junction - Perumpara Junction	8	12
9	Girls School Junction - Muttathiparambu Road	8	10
10	Chakkarakulam Road	8	10
11	Vayalar Road (from Thekkekurisady jn to Northern boundary via Manorama jn)	8	12
12	Boys HS - DP Junction Road	6	10
13	Vaaranadu- Shasthaamkavala Road	6	8
14	Nedumbrakadu Road	8	12
15	Pazhamkulam - Women's Hostel	6	8
16	Purushan Kavala – PS Kavala Road	8	10
17	Saktheeswaram - NH Byepass Road	8	10
18	Kuttikattu - S N Kavala	6	8
19	Kuppikavala - Poothotta Road	8	12
20	Vadakkekurishu- Proposed bridge at Pullurithikkary (Via KSEB)		8
21	Old NH to proposed stadium		8
22	Gen Hospital to Padayani bridge		8
23	Access road to proposed park(SZ-02) from Nedumbrakad road		8
24	Road connecting Power house - Pullurithikkary road to TB Road with a proposed bridge across AS Canal (proposed road)		8
25	Stadium entry Road (Proposed road)		10
26	Stadium exit Road (Proposed road)		10
27	Devi Temple west to Private Bus stand Road/Gossai Road (Proposed Road)		4
28	Rajiv Gandhi Town hall westside – Gandhi bazar shopping complex Road with a proposed bridge across AS Canal (Proposed road)		4
29	Railway station- Manorama Kavala Road through Mutharamman kovil		4

Note: All the roads sharing boundary with neighbouring Panchayats are excluded from widening proposals. The road widening mentioned in Table 29.1 are applicable within the Municipal Limit only.

29.2 Intersection Improvements

Intersections are the vehicle conflict points and are prone to accident risks. Therefore, there is a need to properly design the intersections for streamlining traffic flow and minimizing conflict points. The following Intersection points in Cherthala town need to be taken up for detailed design considering the existing traffic flow and the need for future road widening.

On NH 66

i. Devi Temple Junction
ii. Court Junction
iii. Iron Bridge Junction
iv. Manorama Junction
v. Arthungal Junction

On Thanneermukkam Road

vi. Girls High School Junction
vii. Kalikulam Junction

29.3 Terminal Facilities

The existing private bus stand located in the town is heavily congested due to the platoon type movement of buses from all directions. It is proposed to construct a new bus stand opposite to the railway station. A truck terminal is also proposed on the side of NH near railway station for the parking of trucks. Land acquired for the private bus stand near Railway station is shown in Figure 29.2 and the proposed location of Truck terminal and Private bus stand is shown in Figure 29.3.



Figure 29.2 Land acquired for private bus stand near Railway Station

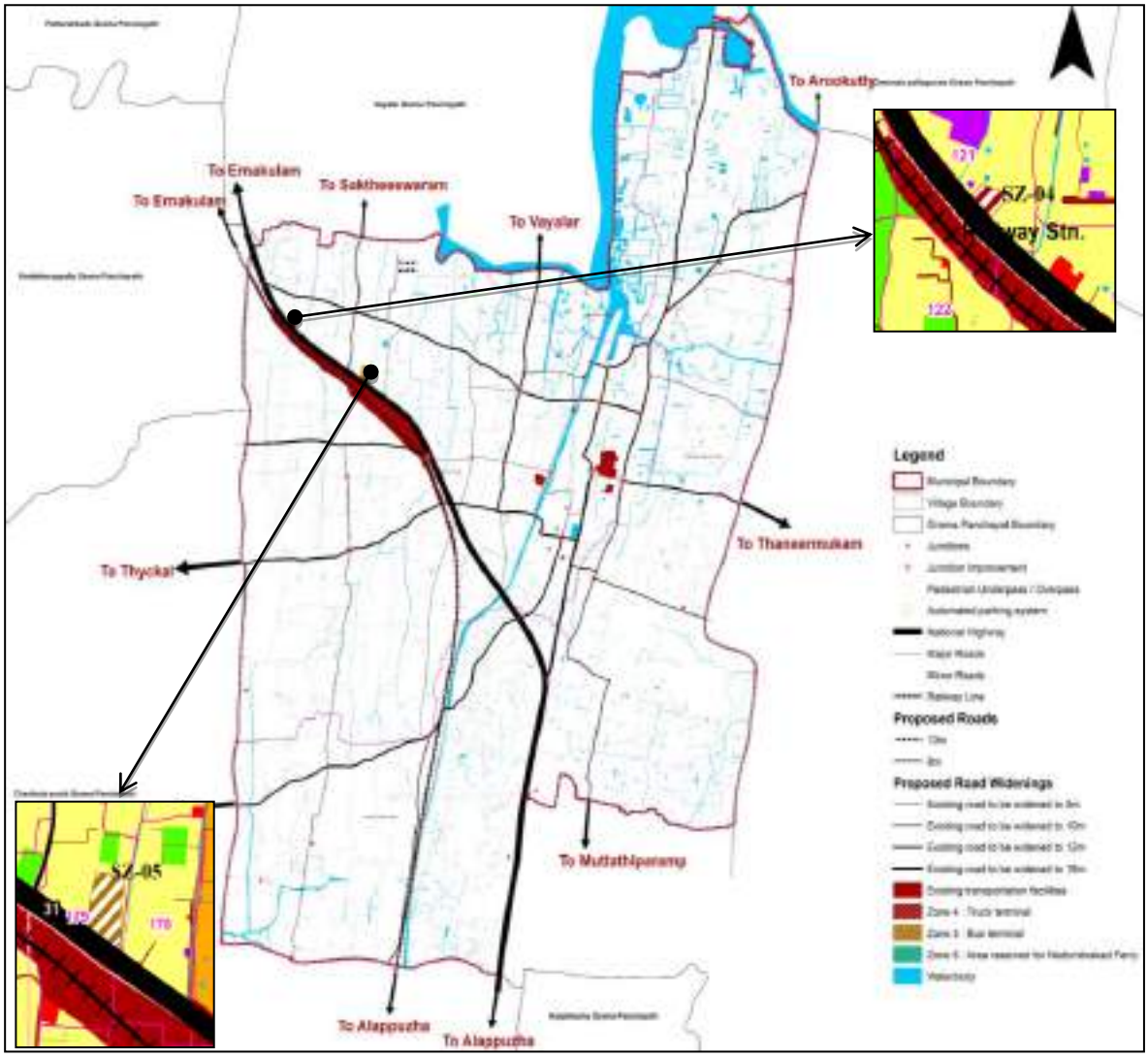


Figure 29.3 Location of Proposed Truck Terminal and private bus stand

29.4 Pedestrian Facilities

The pedestrian facilities that need to be considered are:

Sidewalks or walkways: Sidewalks and walkways are "pedestrian lanes" that provide people with space to travel within the public right-of-way, that is separated from roadway vehicles. Sidewalks are associated with significant reductions in pedestrian collisions with motor vehicles. For Cherthala town, considering the existing pedestrian demand, sidewalks with a width of 1.5m to 2.5m is proposed for all types of roads including arterial, sub-arterial, collector and local roads.

Marked crosswalks and enhancements: Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Crosswalks are often installed at signalized intersections and other

selected locations. Marked crosswalks are desirable at some high pedestrian volume locations (often in conjunction with other measures) to guide pedestrians along a preferred walking path. For Cherthala town, cross walk markings are desirable at all arms of the major intersections. Apart from these intersections, cross walk markings need to be proposed at major high pedestrian volume locations like educational institutions, religious places, hospitals, bus stops and commercial centres.

Pedestrian Overpasses/Underpasses: Pedestrian overpasses and underpasses allow for the uninterrupted flow of pedestrian movement, separated from the vehicle traffic. However, they should be a measure of last resort, and it is usually more appropriate to use traffic-calming measures or install a pedestrian-activated signal that is accessible to all pedestrians. This is also an extremely high-cost and visually intrusive measure. Such a facility must accommodate all persons. These measures include ramps or escalators. Extensive ramping will accommodate wheelchairs, but results in long crossing distances and steep slopes that discourage use. 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, high-volume arterials.

Pedestrian underpass/overpasses are proposed at selected locations in Cherthala town which have high concentration of commercial establishments and pedestrian volume. The locations are;

i. Devi temple Junction
ii. Girls High School Junction
iii. Court Junction
iv. Manorama Junction

Detailed engineering surveys need to be carried out before finalizing the exact location and design of the pedestrian facilities at the proposed sites.

29.5 Flyover

A flyover, or elevated roadway, is a bridge built above existing roads or intersections, enabling continuous traffic flow without stopping. This infrastructure helps alleviate congestion and enhance efficiency by allowing vehicles to pass over obstacles like waterways or railways. In locations with heavy train and road traffic, like Cherthala Municipality, a flyover is crucial to prevent traffic jams and accidents at railway crossings.

Proposed construction of flyovers at the railway crossing on Arthunkal road (Arthungal bypass junction to Madakkal junction) and near Anjilipalam on Kuruppamkulangara road aims to alleviate passenger difficulties caused by the intersection of the railway and road in this area.

29.6 Parking Facilities

As most of the commercial activities are centered along the main road, as a short-term measure, a parking management plan need to be prepared for the main road with earmarking of parking spaces for various categories of vehicles utilizing the available road spaces. A progressive parking fee need to be considered to restrict long haul parking with low fee for short duration parking and relatively high fee for long duration parking.

As a long-term measure, a combination of commercial cum automated parking system can be considered for Cherthala town. The tentative locations for provision of these facilities are given below:

i. Devi temple Junction area
ii. Court Junction area
iii. Manorama Junction

29.7 Water Transport

Cherthala town is connected to Alappuzha and surrounding areas through AS canal and backwaters. The waterways were predominantly used by people who live nearby backwater or canal front and also for freight transportation, mainly for coir and coir products.

During the construction of highway, the Alappuzha – Sherthalai canal was obstructed at various points and the continuity of canal is only through bunds and pipes. This has blocked the water transport through this canal. For the rejuvenation of water transport through this canal these blocked areas are to be cleared and better connectivity has to be ensured. The connectivity of AS canal has to be reestablished for bringing in water transport facilities. Through AS Canal, Cherthala town can be connected to the National Water Way III that is passing through the Vembanadu Lake. As part of multi model integration, this proposal may be taken up and a special zone is reserved for the development of Nedumbrakad Ferry in future as

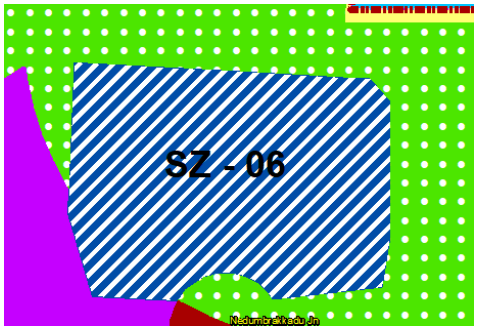


Figure 29.4 Area reserved for Nedumbrakad Ferry Development

shown in Figure 29.4. Also, the road to Nedumbrakad Ferry is proposed to be widened to 12m.

29.8 Railways

Cherthala railway station is one of the important stations in the Ernakulam- Alappuzha section of Indian Railway and is located on the western side on NH 66 bypass. 34 express/ passenger trains are passing through the station providing connectivity to places within and outside Kerala State. Doubling of railway line and running of sub urban services are the major development schemes under the active consideration of railways. Additional platforms are to be provided with the development of the existing station. Existing open platforms are to be covered. Additional foot over bridges have to be provided for the easy movement of passengers.

Godown facilities have to be provided to accommodate the goods. The railway station also needs improvements such as a proper railway canteen, facilities such as drinking water, sanitation, rest rooms etc.

Chapter-30

Sectoral Proposals

30.1 Trade & Commerce

The development of this sector is ensured by the land use policies and projects to be taken up by the municipality. The major proposals for developing commercial facilities include development of higher order commercial centres as per development concept. Nearly 75 Ha of land area is earmarked for commercial use at town centre. Outside the commercial core, 125 Ha of land is earmarked as Mixed zone. Here also higher order commercial facilities are permitted on the sides of roads as specified in the zoning regulations with higher width. These zones are intended for the boosting up of commercial activity. The proposed commercial area and mixed zone are shown in Figure 30.1.



Figure 30.1 Proposed Commercial area and mixed zone

Cherthala municipality has certain projects under consideration in the town. Major projects include a shopping complex in front of Kambikkal Jn and a shopping mall near railway station.

30.2 Tourism

Considering the historic background and potential for tourism development a number of projects are formulated in tourism sector with a view to anchor the town in the tourism map of Kerala. The present attractions are the heritage tourism sites (Sree Karthyayini Temple, St. Mary's Forane Church and Anthraper Gardens) which are not adequately publicised and marketed under tourism. The town has Vembanad lake frontage at the northern end. This offers scope for house boat cruise.



Figure 30.2 Proposed Tourism Promotion Zone

Adequate land with scenic beauty is available adjacent to the Vembanad lake for acquisition and development to provide facilities for the tourists cruising along Kayal.

The proposal includes development of about 5.36 hectares of land on the north western side of the town abutting the back waters as Tourism promotion zone as shown in Figure 30.2. The area is to be developed with adequate tourism infrastructure including access roads, water supply and power.

It is possible for the municipal council to implement land pooling schemes or facilitate provision of required tourism infrastructure through tools like Accommodation Reservation or other suitable PPP modes so that private individuals who own land/buildings within the area can be accommodated within the proposed development so that they can derive benefits from tourism development in the area.

Presence of coir industry and coir related activities near Nedumbrakad ferry the coir village proposed, displaying the activities related to coir industries, may add impetus to tourism promotion zone.

This area shall accommodate the following tourist facilities:

- Boat terminal for motor boats
- Tourist lounge with café, lockers, toilets, information desk, tour operator's desk etc.
- Mini open-air theatre
- Park
- Water sports
- Parking lot for vehicles
- Restaurants
- Small channels for row boat movements between various facilities

This land has to be developed as a tourist spot provided with good quality infrastructure like access roads, water transport, water supply, lighting and power, waste management facilities, tourist cottages, retail trading outlets etc. The proposed Agro based industrial promotion zone may also be integrated with the proposed tourism promotion zone.

In order to make canals and canal banks beautiful and attractive the following proposals are made:

i. The canals have to be cleaned and continuous circulation of water has to be ensured so as to avoid water stagnation and resulting pollution.
ii. The canal banks are to be properly protected by providing retaining walls, chain link fencing and proper drainage. Canal sides shall be beautified by proper landscaping so as to attract tourists as well as the local people.

iii. Necessary dust bins are to be provided and the systematic removal of the solid waste is to be ensured.

iv. Provide bio swales as far as possible along the canal edges to act as a buffer and also to filter grey water from the roads and surroundings.



Figure 30.3 Farm Tourism Promotion Zone

There is also a proposal for tourists centre near TB for facilitating the tourism activities in the municipality and giving information about the tourist destinations to tourists.

Along with promoting tourism, a 'Farm Tourism' zone is also proposed in the south eastern side of the town as shown in Figure 30.3. Farm tourism helps to maintain the balance of the nature by giving importance to the natural resources and environment friendly. Usually farm tourism involves: Accommodation, Farm visit, Farm shops, Guided walks in farms and Farm activities.

Farm tourism helps the tourists to be part of day-to-day agricultural activity. People can also buy products from there along with enjoying the local cuisines. The additional income from this can be utilized for the improvement of agriculture and farming.

Some benefits from farm tourism are:

- A get together in a farm will be some precious moments in your life
- It involves group work
- An opportunity to meet new people
- Get closer to nature

30.3 Agriculture

Since there is scope for Homestead cultivation in Cherthala, Agriculture along with Animal Husbandry activities is suitable for low residential density areas. Thrust should be given in using bio fertilizers in agriculture. The source of bio fertilizers can be from the solid waste collected and procured at Municipal level. At the same time household composting of solid waste also should be encouraged.



Figure 30.4 Proposed Agro based Industrial Promotion Zone

Paddy cultivation needs to be promoted for maintaining the ecological balance. The existing paddy fields are to be conserved as they also act as water sinks. Supplying high yield variety seeds, adopting new farming techniques etc shall increase the productivity of existing paddy fields. One of the main reasons for not cultivating paddy is the increasing labour cost and shortage

of labourers. Hence it is proposed to provide adequate labour supply through labour bank system.

As dry cultivation crops such as coconut, arecanut, plantain, tapioca, vegetables, tubercrops, pepper etc are having more scope these should also be given importance in Cherthala. For the value addition of agricultural products especially coconut, an Agro based industrial promotion zone is proposed in the master plan as shown in Figure 30.4.

30.4 Industry

Areas of major existing industries are zoned under industrial zone. A separate area is earmarked as Industrial promotion zone as shown in Figure 30.5 to promote small scale industries on the north western side of town.

For the promotion of coir industry a coir village is proposed on the north eastern side of the town as shown in Figure 30.6. The finished products from the village can be exhibited in the Coir Kerala event organized by the government during the first week of February every year at Alappuzha. Certain stalls can be reserved for the products from coir village for the promotion of marketing.

An IT Promotion zone is proposed on the south eastern side of the town as shown in Figure 30.7 to promote IT Industry. This will add job opportunities in the IT sector.



Figure 30.5 Industrial Promotion Zone



Figure 30.6 Artisans/Coir village

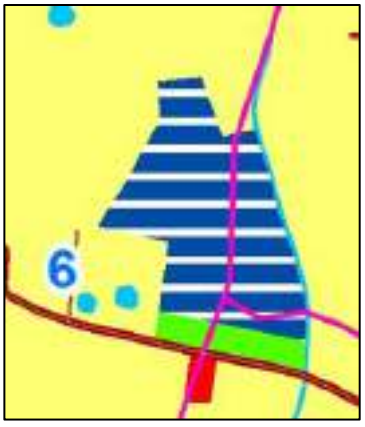


Figure 30.7 IT Promotion Zone

30.5 Animal husbandry

Peripheral wards of the town exhibit semi-rural character indicating scope for promoting animal husbandry.

From the studies it is evident that the milk production is less than 36% of the consumption. Hence it is proposed to promote cattle farming through awareness programs. As most the paddy lands are left uncultivated, they can be used for fodder cultivation for supporting dairy farms.

The nearness to waterbodies provides a scope for duck farming, which will add to the economic base of the town. Ducklings may be given to the beneficiaries and they may be trained to promote duck farming.

Even though the consumption of meat is considerable as revealed from the socio-economic studies, the town has no proper slaughter house. Hence it is proposed to build a slaughter house near the Muttom Fish market. Also, a shelter home for the stray dogs is to be established within the town.

30.6 Water supply

Improvement of the existing distribution network, reducing unaccounted flow of water, proper monitoring of pipe losses and replacement of non-working metres has to be done on priority basis.

Various practices such as minimum consumption of water, rain water harvesting and recycling of water should be encouraged. Measures should also be undertaken to recharge the ground water reservoirs through the maintenance of the existing open ponds. Conservation of existing paddy fields should be ensured as they act as water sinks. Promoting urban compaction also leaves large open lands, which will ensure proper ground water recharge. Projects should be taken up to get full coverage of water supply in the town with 24 X 7 hours supply.

As majority of the population are depending on well water for their daily needs and as the ground water table is fairly high, the quality of ground water needs to be ensured.

30.7 Drainage and Sanitation

The drainage network of the town needs total revamping. It is proposed to improve the canals by widening, side protections works and deepening. A detailed drainage network plan is proposed to be prepared for the town.

- The constructions of drains are to be taken up in such a way that each stretch of the drain, drains out the storm water to a natural stream or canal.
- Road repair or development projects must have mandatory drains or side pitching for storm water discharge.

Public Comfort stations should be insisted in all public gathering places especially in bus stands. Waste disposals to the thodu/canal should be strictly prohibited. Proper sanitation facilities are to be provided as water table is high and more than 80% of the people are depending on well water for their daily needs in this region.

30.8 Solid waste disposal

Efficient solid waste management can be made possible through decentralized solid waste management system. Solid waste can be managed through Vermi composting, recycling etc which can be efficiently done with a multi-pronged approach. Use of bio gas plants/composting techniques at house hold level, provision of community level facilities at places like markets etc may be promoted.

Non-biodegradable wastes need separate treatment facility. Plastics can be processed and used along with tar. Hence a plastic processing unit may be made part of solid waste treatment units. Public awareness and strong interference from municipality is needed for the efficient solid waste management system.

30.9 Slaughter House

Lack of modern infrastructure for production and marketing of hygienic meat and value-added products is a major concern in the planning area. Another concern for small and medium sized slaughter houses is the waste generated during slaughter operations. In the absence of proper infrastructure, the slaughter house wastes are increasingly dumped in a haphazard manner, enormously polluting our drinking water sources, the rivers and wetlands. It is high time that modern slaughter houses are established in the planning area, for clean and hygienic meat production. Scientific organization of these activities will generate more employment, both in animal husbandry as well as allied industries for processing of slaughter house by-products, and will ensure environment friendly disposal of the slaughter waste. Hence, a hi-tech abattoirs/ modern slaughter houses are proposed at northern side of existing Fish market as shown in Figure 30.8. Full-fledged infrastructure for Meat Processing, Cold Storage and Marketing Facilities shall be provided here. Besides, a plant for processing the slaughter waste is also proposed along with this slaughter house. The plant may utilize a combination of bio-methanation, rendering and composting technologies for the treatment of the slaughter waste, and incineration for disposal of the residue. The by-products from the plant like tallow, grease and MBM (meat



Figure 30.8 Proposed Slaughter House

and bone meals) can be marketed profitably. The bio-gas produced from the plant can be used as fuel for production of by-products and value-added products, while the compost can be marketed.

30.10 Energy

The supply of energy in the town is satisfactory. It is presumed that the KSEB shall adequately cover the increased energy demand in the town. Conversion of overhead electric lines to underground cables is proposed in the town center in this Master Plan.

Promoting sustainable and resilient development involves incorporating solar power in new constructions and street lighting. This can be achieved through methods such as Rooftop Solar Energy Installations and solar-assisted water heating systems in buildings. Additionally, utilizing solar power for illuminating streets and public spaces contributes to energy efficiency, resilience and environmentally conscious development.

30.11 Education

According to the planning standards the education facilities are adequate for the town. Infrastructure facilities are to be improved in the existing institutions to develop Cherthala as a regional educational hub. Utilization of the underutilized facilities of the existing educational institutions like land, buildings etc for institutions with new courses may be proposed.

30.12 Health

Health institutions are adequate, but infrastructure facilities are to be upgraded and speciality units for treatment are to be provided. Upgrading the Taluk Hospital to the status of a General Hospital by providing all necessary departments, equipments and infrastructural facilities including trauma care units may be proposed. An emergency medical service with all necessary equipments with priority for aged people and upgradation of infrastructure facilities in Ayurvedic Hospital may also be proposed. Bio-medical waste disposal is a serious concern which needs immediate attention.

30.13 Housing

The housing sector is satisfactory in the town. Most of the people have their own land for housing. The housing shortage of 1333 houses needs to be addressed, which can be done by housing projects for the beneficiaries. In slums and other backward settlements infrastructural facilities fall short. There are eleven listed slums in Cherthala. The infrastructural facilities which are to be provided in Pazhamkulam and Kuttikattu Colony, Gouri Garden, Puthezhathubhagom, Kattanganattu and Kanichu Pradesham Colony, Housing colony and

Kariyil Pradesham Colony and Kandanattu Pradesham, Velorvattam and Kalariveli Colony are detailed here.

- The inadequacy of drainage facilities and drinking water facilities to be rectified.
- Internal roads to be constructed to facilitate travel by the residents of the colony.
- Street lights to be provided in the colony.
- Structural condition of the houses to be improved.

30.14 Recreation and other civic amenities

There is a dearth of recreational facilities and civic amenities in the town, which will adversely affect the tourism sector and the social well-being of the local community. The proposals in this sector include a Stadium towards the north of Velorvattom Temple, the area locally known as Olangattukari pradesham as shown in Figure 30.9. Renovation of the existing park and a new Park on the banks of the Vembanad Lake as shown in Figure 30.10, and boating facilities in the Vembanad Lake are proposed as part of the Tourism development of the town. Recreational space on the banks of AS canal by a canal beautification project is also proposed.

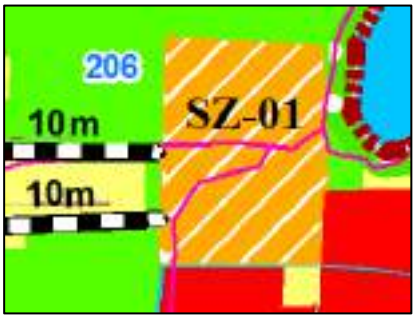


Figure 30.9 Proposed Stadium



Figure 30.10 Proposed park

30.15 Disaster Management and Risk Informed Planning

The regular water logging issues in the town especially in the Northern and South-Eastern wards can be addressed through the restoration of streams and channels and ensuring proper flow through the channels. The steps for restoration of channels are:

- Demarcation of river's boundaries to stop further encroachment
- Dredge sedimentation basin at suitable depth, Construct natural filter bed with dredged mud, & boulders
- De-weeding river & De-silting of the waterbody, by dredging the river & increasing the depth.
- Construct embankments along the water channels
- Construct fence along the waterbody & promote afforestation in periphery for natural filtration & percolation.
- Protecting paddy and wetland
- Promote constructions with higher plinth height in flood prone areas.

Chapter-31

Priority Projects, Action Plan and Phasing

31.1 Bus Terminal

31.1.1. Location Details

Presence of bus stands in the CBD area can cause undue traffic congestion problems due to plying of large vehicles. Hence the existing bus stand is proposed to be shifted to the municipal vacant land available near Railway station in an area of 148 cents in Survey number 179 of Cherthala North Village. Location details of the project area is shown in Figure 31.1.

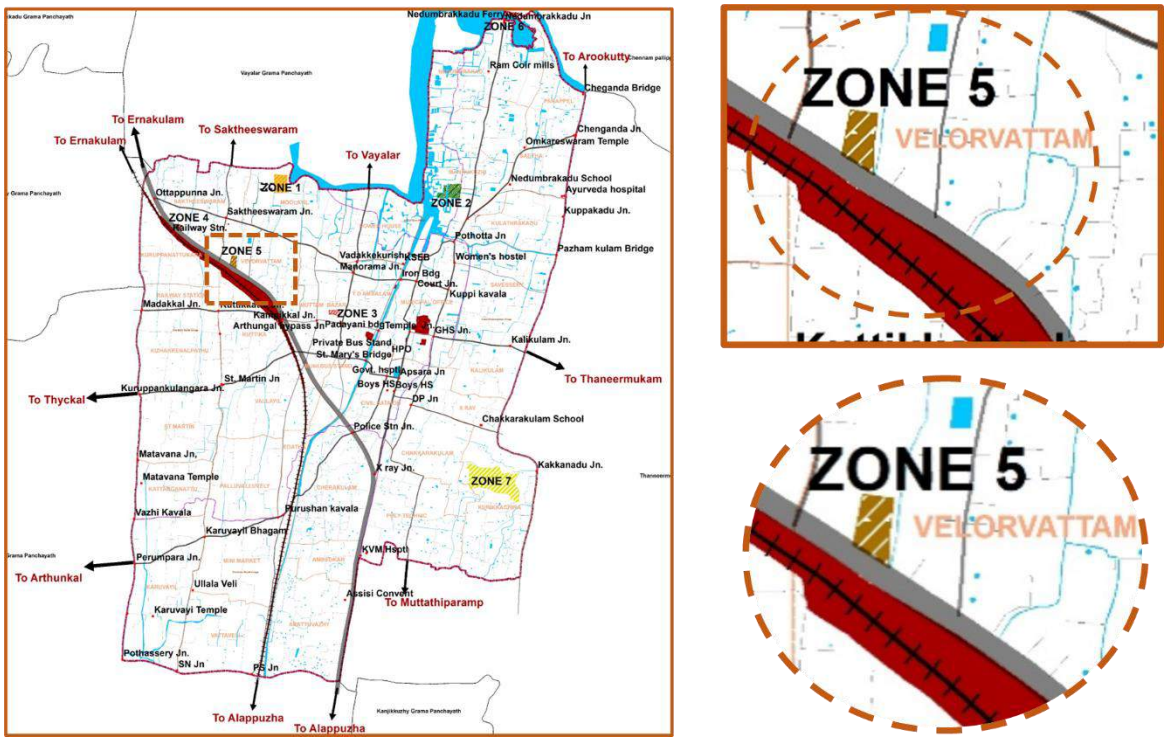


Fig 31.1 Location of Proposed Bus Terminal

31.1.2 Ownership Details

The land is owned by Cherthala Municipality.

31.1.3 Project brief

The project aims to construct a state of the art multi modal bus stand near Railway Station that is user friendly, catering to varied passengers comfort, pedestrian friendly,

ecologically sustainable, handicapped friendly, and aided with facilities as per best international practices. The proposed bus stand should have following facilities.

1. Bus, Car/taxi, two wheeler parking areas, auto taxi stands.
2. Circulation area with CCTV and Wi-Fi facilities, commercial shops, waiting areas, tea stalls.
3. Fuel filling stations, work shop.
4. Separate rest rooms for passengers and staffs.
5. Information centres and all other necessary amenities.

31.1.4 Responsible agency

Agencies responsible for the construction of Bus Stand is shown in Table 31.1.

Table 31.1 Agencies responsible for the construction of Bus Stand

Sl No	Responsible Agency	Role
1	Municipality	Demand assessment, Administrative approval, technical sanction, Contract management, Quality management
2	KIIFB	Funding
3	Consultant	Preliminary estimate, Functional design, Engineering design, detailed estimate, detailed project report
4	Developer	Construction of infrastructure

31.1.5 Need for the project

There are 2 bus stands within the heart of the town namely KSRTC, Private bus stand. Ideally there should be no bus terminal within the CBD of any urban areas as this would cause the unwanted clogging and congestion of the urban road network by the plight of large vehicles. Private bus stand has only limited space and facilities and can act only as bus bay. Hence existing bus stands should be shifted to the periphery of the town from where only those routes which service the internal destinations should enter the CBD area and the other should use the peripheral bypass to move to other destinations. Existing bus stand can be used for parking and as bus bays.

31.1.6 Suggested implementation mechanism

The project can be implemented by the Municipality. Funding can be done by KIIFB. Suitable developer can be chosen by KIIFB and Municipality through open tendering process. Table 31.1 shows the possible responsible agencies for the project. The constructed facilities

can be given to private parties on the basis of annual tendering. Table 31.2 shows the approximate project cost and it comes around 5 crores.

31.1.7 Approximate project cost and funding

Approximate project cost for the construction of bus Stand is given in Table 31.2

Table 31.2 Approximate project cost for the construction of bus Stand

Sl No	Item	Amount in Lakhs
1	Construction of CC road, Parking Lots	150
2	Bus bay and Shelter	100
3	Bus stand building accommodating passenger and staff amenities	200
4	Miscellaneous	50
Grant Total		**500**

31.1.8 Project period and priority

Project is prioritized in Phase 1 having highest priority and have to be implemented within a period of 5 years.

31.2 Tourism Promotion Zone

31.2.1. Location Details

Tourism Promotion Zone is proposed in Ward 5 near Nedumbrakkad on the banks of Vembanad lake in an area of 13.26 acres of land in Survey number 51/1 of Vayalar East Village. Location details of the project area is shown in Figure 31.2.

31.2.2 Ownership Details

The land is under Private ownership.

31.2.3 Project brief

The proposal includes development of about 13.26 acres of land on the North Western side of the town abutting the back waters as Tourism promotion zone. The area is to be developed with adequate tourism infrastructure including access roads, water supply and power.

Presence of coir industry and coir related activities near Nedumbrakkad ferry and the coir village proposed, displaying the activities related to coir manufacture, may add impetus to tourism promotion zone.

This area shall accommodate the following tourist facilities:

- Boat terminal for motor boats
- Tourist lounge with café, lockers, toilets, information desk, tour operator's desk etc.
- Mini open air theatre
- Park
- Water sports
- Parking lot for vehicles
- Restaurants
- Small channels for row boat movements between various facilities

This land has to be developed as a tourist spot provided with good quality infrastructure like access roads, water transport, water supply, lighting and power, waste management facilities, tourist cottages, retail trading outlets etc. The proposed Agro based industrial promotion zone, AS canal beautification and boating is also integrated with this project.

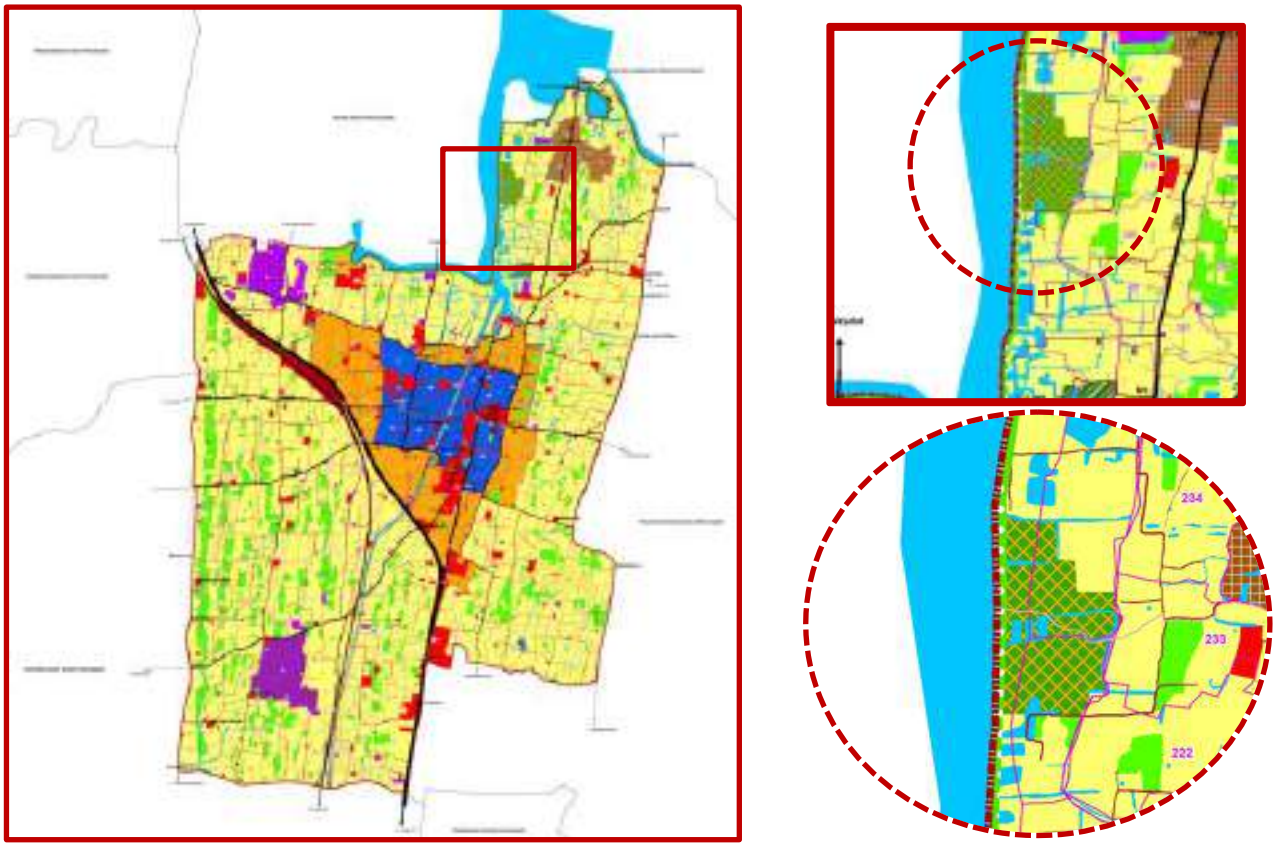


Fig 31.2 Location of Proposed Tourism Promotion Zone

31.2.4 Responsible agency

Agencies responsible for the project implementation is given in Table 31.3.

Table 31.3 Agencies responsible for the project implementation

Sl No	Responsible Agency	Role
1	Municipality	Preparation of land pooling scheme
2	Developer	Financing and developing the project area
		Construction of infrastructure
3	Land owners and Tenants	Active involvement in land pooling scheme
4	KTDC/DTPC	Technical Guidance

31.2.5 Need for the project

Cherthala lacks organized Tourism and recreational facilities within the town. But the potential components within the town such as presence of Vembanad lake, small scale coir manufacturing units and industries, availability of land etc. can be suitabily integrated and planned to develop necessary Tourism and recreational spaces within the town to attract more travelers.

31.2.6 Suggested implementation mechanism

It is possible for the municipal council to implement land pooling schemes or facilitate provision of required tourism infrastructure through tools like Accommodation Reservation or other suitable PPP modes so that private individuals who own land/buildings within the area can be accommodated within the proposed development so that they can derive benefits from tourism development in the area.

31.2.7 Approximate project cost and funding

The project cost is calculated according to the extent of the area involved in the land pooling scheme and type of infrastructure to be installed. The developer can finance the initial cost of the development later he can sell some area to recoup the cost of the development.

31.2.8 Project period and priority

Project is prioritized in Phase 1 having highest priority and have to be implemented within a period of 5 years.

31.3 Slaughter House

31.3.1. Location Details

A Modern Slaughter House is proposed in the municipal land available near Muttom Fish market in Ward 30 in an area of 92.82 cents in Survey number 234,237 of Cherthala North Village. Location details of the project area is shown in Figure 31.3.

31.3.2 Ownership Details

The land is owned by Cherthala Municipality.

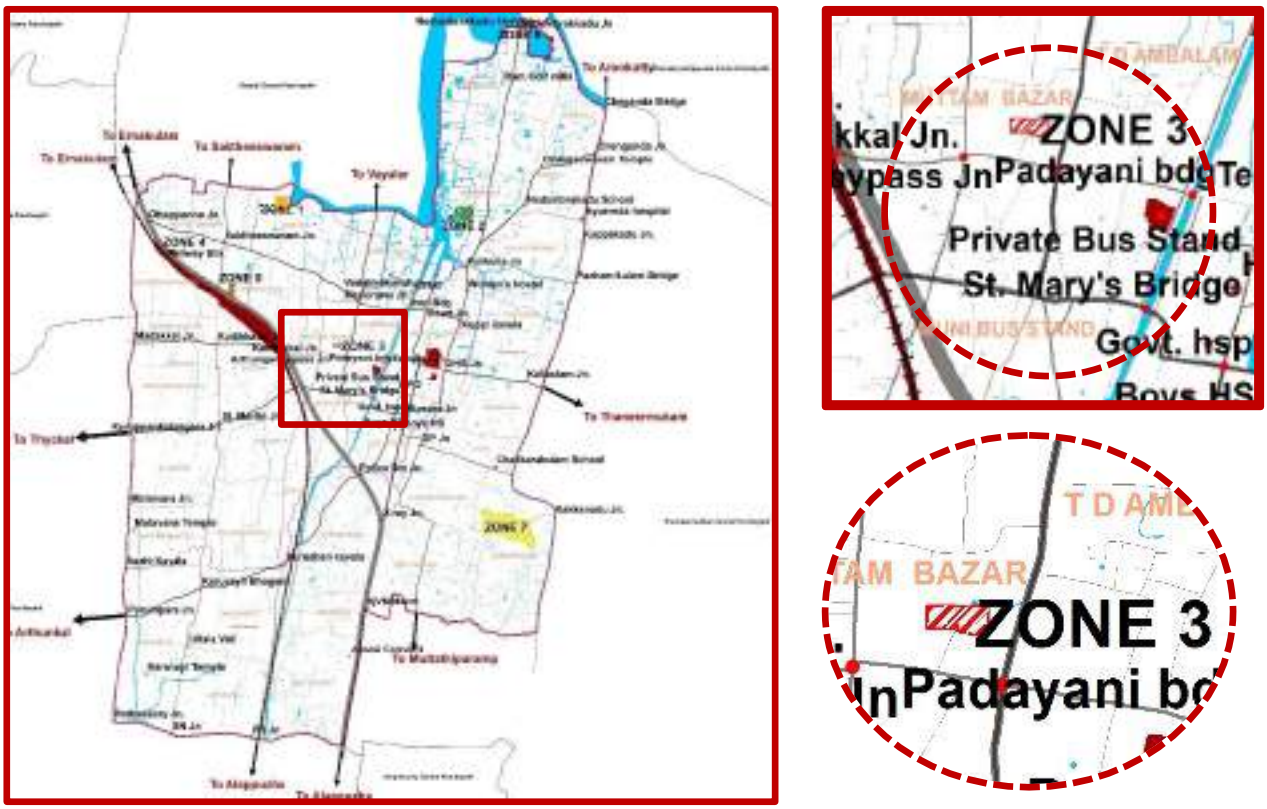


Fig 31.3 Location of Proposed Slaughter House

31.3.3 Project brief

A hi-tech abattoirs/ modern slaughter house is proposed at northern side of existing Fish market. Full-fledged infrastructure for Meat Processing, Cold Storage and Marketing Facilities shall be provided here. Besides, a plant for processing the slaughter waste is also proposed along with this slaughter house. The plant may utilise a combination of bio-methanation, rendering and composting technologies for the treatment of the slaughter waste, and incineration for disposal of the residue. The by-products from the plant like tallow, grease and MBM (meat and bone meals) can be marketed profitably. The bio-gas produced from the plant can be used as fuel for production of by-products and value added products, while the compost can be marketed.

31.3.4 Responsible agency

Agencies responsible for the construction of Slaughter house is given in Table 31.4.

Table 31.4 Agencies responsible for the project implementation

Sl No	Responsible Agency	Role
1	Municipality	Demand assessment, Administrative approval, technical sanction, Contract management, Quality management
		Preliminary estimate, Functional design, Engineering design, detailed estimate, detailed project report
2	Contractor	Construction and installation

31.3.5 Need for the project

Lack of modern infrastructure for production and marketing of hygienic meat and value added products is a major concern in the planning area. Another concern for small and medium sized slaughter houses is the waste generated during slaughter operations. In the absence of proper infrastructure, the slaughter house wastes are increasingly dumped in a haphazard manner, enormously polluting our drinking water sources, the rivers and wetlands. It is high time that modern slaughter houses are established in the planning area, for clean and hygienic meat production. Scientific organization of these activities will generate more employment, both in animal husbandry as well as allied industries for processing of slaughter house by-products, and will ensure environment friendly disposal of the slaughter waste.

31.3.6 Suggested implementation mechanism

The project can be implemented by the Municipality. Funding can be done and Suitable developer can be chosen by Municipality through open tendering process. Table 31.4 shows the possible responsible agencies for the project. The constructed facilities can be given to private parties on the basis of annual tendering.

31.3.7 Approximate project cost and funding

Table 31.5 shows the approximate project cost and it comes around 2 crores.

Table 31.5 Approximate project cost for Slaughter House

Sl No	Item	Amount in Lakhs
1	Modern Slaughter House	100
2	Rendering Plant	13
3	Vermi Compost	4
4	Effluent Treatment Plant	14
5	Overhead Water Tank	12

6	Anaerobic Digestion Tank	13
7	Dung pit	5
8	Labour Quarters	13
9	Septic Tank and Soak pit	1
10	Bio filter	12
11	Generator and Guard room	13
Total		**200**

31.3.8 Project period and priority

Project is prioritized in Phase 1 having highest priority and have to be implemented within a period of 5 years.

31.4 Artisans Village/Coir Village

31.4.1. Location Details

Artisans Village/ Coir Village is proposed in Ward 5 and 6 near Nedumbrakkad Ferry in an area of 48.93 acres of land in Survey number 230,231,235,236 of Kokkothamangalam Village. Location details of the project area is shown in Figure 31.3.

31.4.2 Ownership Details

The land is under Private ownership.

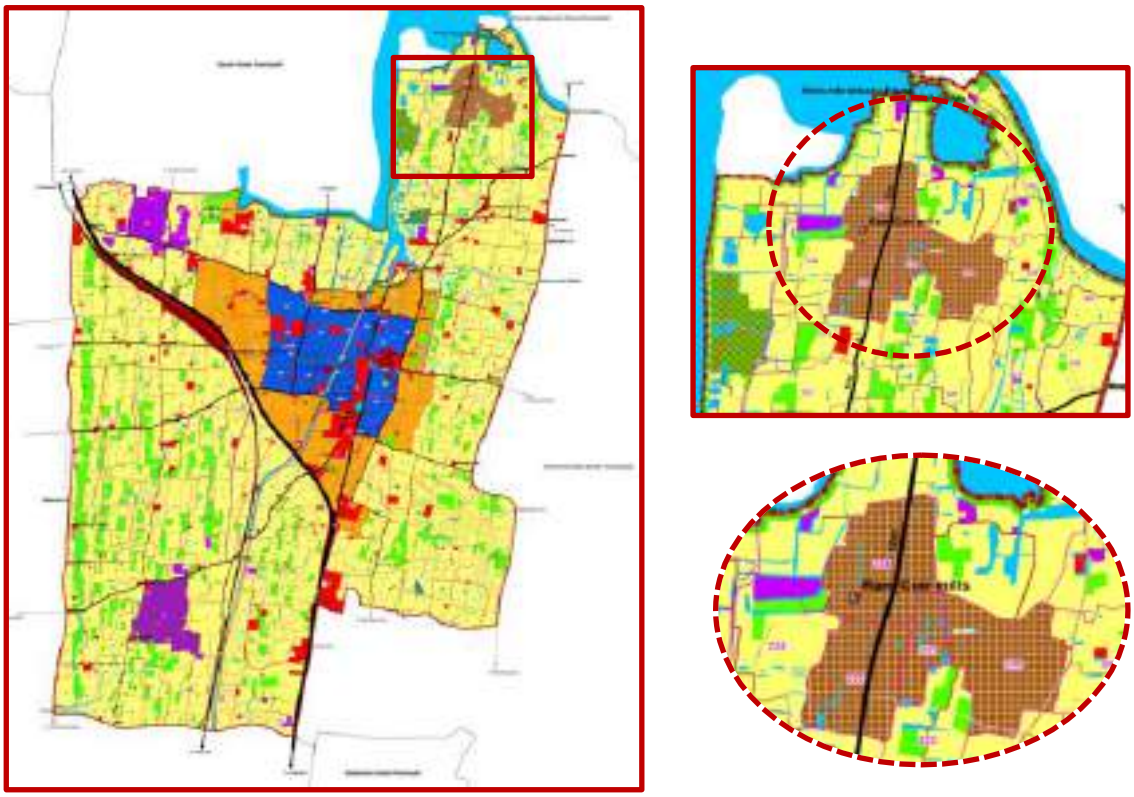


Fig 31.4 Location of Proposed Artisans Village/ Coir Village

31.4.3 Project brief

The proposal includes development of about 48.93 acres of land on the north side of the town as Artisans village/Coir village for the promotion of coir industry.

It is possible village for the municipal council to implement land pooling schemes or facilitate provision of required tourism infrastructure through tools like Accommodation Reservation or other suitable PPP modes so that private individuals who own land/buildings within the area can be accommodated within the proposed development so that they can derive benefits from tourism development in the area.

Presence of coir industries and coir related activities can be marketed by displaying the activities related to coir industries, may add impetus to tourism promotion zone also. Tourists can experience the life in these local coir manufacturing village, involve in coir manufacture related activities and can purchase local products also.

31.4.4 Responsible agency

Agencies responsible for the project implementation is given in Table 31.6

Table 31.6 Agencies responsible for the project implementation

Sl No	Responsible Agency	Role
1	Municipality	Project initiation, supervision, Establishing public private partnership
2	Developer	Financing and developing the project area
		Construction of infrastructure
3	Land owners and Tenants	Active involvement in PPP
5	Kerala State Coir Corporaton Ltd./ CoirFed	Technical Guidance, operation and maintenance
5	KTDC/DTPC	Technical support

31.4.5 Need for the project

In Cherthala town, there are several small scale household coir manufacturing and processing units. But these local manufacturers are not getting opportunities to market their products. Nowadays the importance of coir products as well as coir crafts are on a hike. Therefore exposing these local products to the outside markets through village tourism paves the way for economic as well as social development of the town.

31.4.6 Suggested implementation mechanism

It is possible for the municipal council to implement land pooling schemes or facilitate provision of required tourism infrastructure through tools like Accommodation Reservation or other suitable PPP modes so that private individuals who own land/buildings within the area can be accommodated within the proposed development so that they can derive benefits from tourism development in the area.

31.4.7 Approximate project cost and funding

The project cost is calculated according to the extent of the area involved in the land pooling scheme and type of infrastructure to be installed. The developer can finance the initial cost of the development later he can sell some area to recoup the cost of the development.

31.4.8 Project period and priority

Project is prioritized in Phase 1 having highest priority and have to be implemented within a period of 5 years.

31.5 Proposed Stadium

31.5.1. Location Details

A Stadium is proposed in Ward 2 towards the north of Velorvattom Temple, the area locally known as Olangattukari pradesham in an area of 5.12 acres of land in Survey number 206 of Cherthala North Village. Location details of the project area is shown in Figure 31.5.

31.5.2 Ownership Details

The land is under Private ownership.

31.5.3 Project brief

A Municipal stadium is proposed in ward 2 towards the north of Velorvattom Temple, the area locally known as Olangattukari pradesham in an area of 5.12 acres of land having 8m wide access road and 10m wide entry and exit roads. The components of stadium are,

- Gallery
- Jogging tracks
- Cycling Tracks
- Toilets/changing rooms
- Other amenities

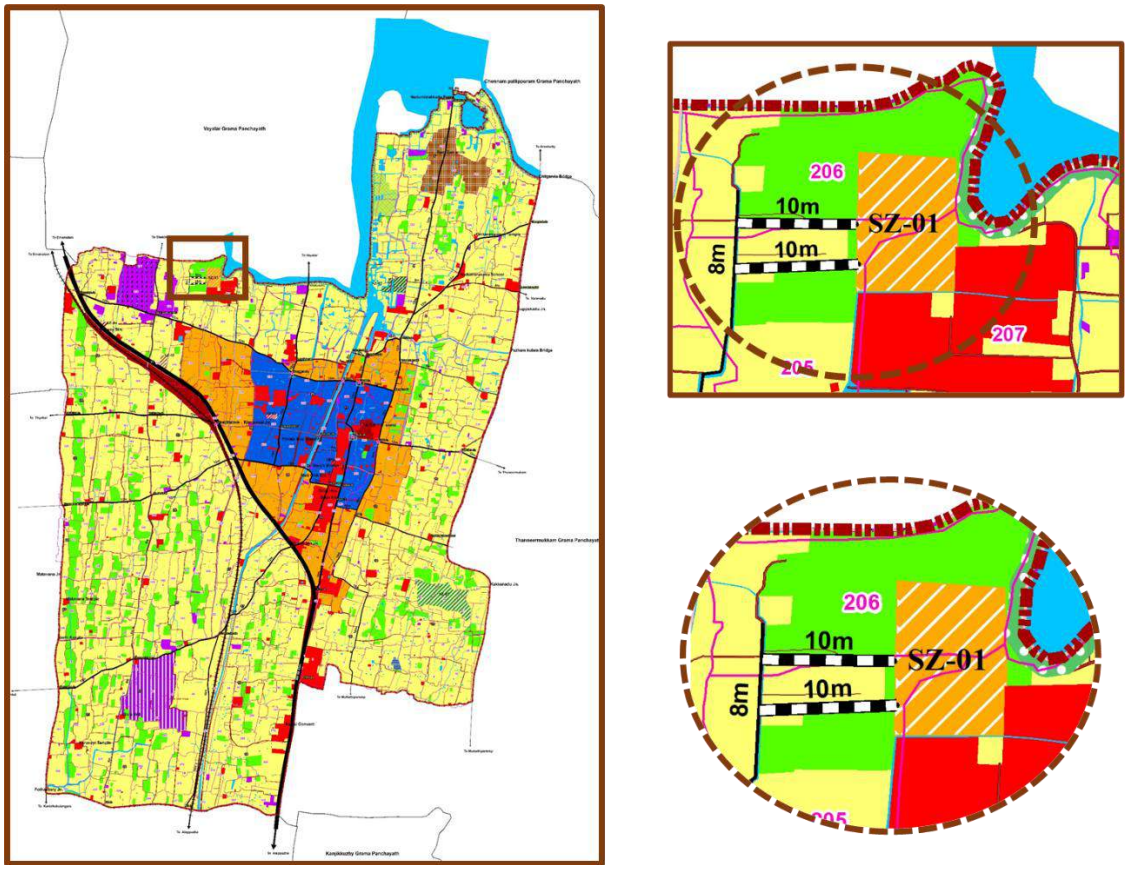


Fig 31.5 Location of Proposed Stadium

31.5.4 Responsible agency

Agencies responsible for the project implementation is given in Table 31.7

Table 31.7 Agencies responsible for the project implementation

Sl No	Responsible Agency	Role
1	Municipality	Project initiation, Land acquisition, Finding funds and suitable developer
2	Developer	Financing and developing the project area
		Construction of infrastructure
3	Sports Kerala Ltd/ District Sports Council	Technical Guidance, support, operation and maintenance

31.5.5 Need for the project

The dearth of recreational facilities and civic amenities in the town, adversely affect the tourism sector and the social well-being of the local community. There are no public recreation spaces, play grounds, jogging tracks or cycle tracks in the town.

31.5.6 Suggested implementation mechanism

The project can be implemented by the Municipality. Funding can be done and Suitable developer can be chosen by Municipality through open tendering process.

31.5.7 Approximate project cost and funding

Approximate project cost for the construction of Stadium is given in Table 31.8

Table 31.8 Approximate project cost for Stadium

Sl No	Item	Amount in Lakhs
1	Land acquisition	250
2	Earth filling and ground formation	200
3	Gallery	50
4	Amenities	50
5	Miscellaneous	50
Grant Total		**600**

31.5.8 Project period and priority

Project is prioritized in Phase 1 having highest priority and have to be implemented within a period of 5 years.

31.6 Project Action plan

The list of prioritised projects which are to be implemnted in the first phase with in a period of 5 years is given in Table 31.9

Table 31.9 Project action plan

Sl No	Project list	Phase 1 (5 YEARS)	Phase 2	Phase 3	Phase 4
1	Bus Terminal				
2	Tourism Promotion Zone				
3	Slaughter House				
4	Artisans/ Coir Village				
5	Stadium				

PART IV
DEVELOPMENT REGULATIONS

Chapter 32

Zoning Regulations

Zoning is a device of land use planning used in a Master Plan. The word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another. Zoning Regulations are the means to achieve development of a use zone as envisaged in the Master Plan. In other words, Zoning Regulations are laws that define and restrict how to use a particular property coming under a Master Plan. Thus, it is the public regulation of land and building use to control the character of a place.

The development regulation for Cherthala Municipal area is presented in two parts. Part A is the General guidelines which includes general provisions applicable to the entire Municipal area. Part B includes guidelines for each zone which includes specific regulation regarding confirmable uses applicable to the Municipal area.

32.1 Part A – General Guidelines

The general guidelines shall apply to all zones irrespective of the zoning regulations for individual zones.

1. All future developments shall be in conformity with the provisions of the '*Master Plan for Cherthala Town'* and future constructions shall conform to the Kerala Municipality Building Rules, 2019 and other applicable statutes in force and their time – to time amendments unless otherwise specified in this regulation or in any detailed scheme prepared and made in force within the frame work of this Master Plan.
2. For the implementation and enforcement of the proposals envisaged in the Master Plan, areas have been zoned under various categories such as *Residential Zone, Mixed Zone, Commercial Zone, Industrial Zone, Public & Semi Public Zone, Traffic & Transportation Zone, Industrial Promotion Zone, Agro Based Industrial Promotion Zone, Artisans Village/ Coir Village, Tourism Promotion Zone, IT Promotion Zone, Park & Open Spaces, Paddy/ Low Lying Area, Environmental Conservation Zone, Waterbodies and Special zones* for securing the most efficient and effective use of land in public interest. Details regarding the nature of *'Uses Permitted' and 'Uses Restricted'* in each zone are presented in Table 32.1. These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the Master Plan and in accordance with the other statutes applicable.
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, Cherthala Municipality, (hereinafter referred to as the Secretary) subject to satisfaction of applicable statutes. 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 studied based on their performance characteristics and spatial location 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 the Local Self Government Department (Planning).

4. All uses which does not come under *'Uses Permitted'* or *'Uses Restricted'* will be considered as *'Uses prohibited'*. *'Uses prohibited'* are various objectionable uses in each zone which shall not be permitted under normal circumstances.
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 in *'Uses Permitted'* or *'Uses Restricted-1'* in that particular use zone, can be considered by the secretary, with the concurrence of the Town Planner and that of similar nature to any in *'Uses Restricted- 2'* in that particular use zone, can be considered by the secretary, with the concurrence of the Chief Town Planner.
6. Zoning regulations are not intended to prohibit existing uses that have been lawfully established prior to the enforcement of these regulations, unless otherwise specifically mentioned in this Master Plan. All such existing uses in every zone shall be permitted to continue in all the zones and shall be treated as permitted uses. 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.
7. 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 structures may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Renovation, Alteration reconstruction, extension or addition of new blocks if found necessary as part of any mitigation measures or for the future expansion of the project may be permitted in the same plot without changing the principal occupancy of the plot by the secretary with the concurrence of the Town Planner.
8. Existing areas and structures of archaeological importance, agricultural uses and religious uses may be permitted to continue in all the zones and shall not constitute non-conforming uses.

9. Subject to the zoning regulation of the respective use zones, more than one use may be combined in a building/ plot, provided that the built up area of individual uses shall be limited to that prescribed for each such use in the zoning regulation for the respective zone.
10. 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 in the plot by the secretary. If application submitted includes any of the restricted uses and that 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 *Park and Open Spaces, Environmental Conservation Zone, Water bodies* and *Special Zone*, this provision shall not be applicable.
11. Provisions/ regulations under the '*Disaster Management Act 2005, The Ancient Monuments and Archaeological Sites and Remains Act 1958, Coastal Regulation Zone Notification 2011, Aircraft Act 1934, 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 under the Environment (Protection) Act, 1986* and its subsequent amendments, shall be applicable to the area under this plan.
13. Operational constructions as defined in the '*Kerala Town and Country Planning Act, 2016'* shall be treated as permitted use in the Master Plan area.
14. Regulation of constructions and land developments on the sides of new roads/roads proposed for widening as per the Master Plan shall be governed by the distance from the center line of the road, unless otherwise specified in the Master Plan or Detailed Town Planning Scheme in force or in any detailed road alignment approved by the Government. If widening on one side of any stretch of road is constrained due to the physical barriers of water bodies, railway land or protected archeological monuments/ sites, the road widening in that stretch shall be accounted from the other side.
15. In the event of change in alignment of new road proposal in the Master Plan, after the commencement of land acquisition of the new alignment, the land parcels in stretches excluded from the original alignment may be changed to adjacent suitable land use zone and developments shall be permitted by the secretary with the concurrence of the Town Planner. This provision is applicable only to new road development proposals and not to widening proposal.
16. Constructions and/ or land developments, if any, in paddy lands and in wet lands, shall be in conformity with '*The Kerala Conservation of Paddy land and Wetland Act, 2008'* in force in the state. Any piece of land which is marked as *Paddy/ Low Lying Area*, but not designated as paddy lands/ wet lands under the said act can be deemed as part of the immediate surrounding zone and constructions shall thereafter be allowed with the

concurrence of the Town Planner. 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 surrounding 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.

17. All existing ponds shall be preserved considering its infiltration characteristics and impact on ground water recharging, other environmental and aesthetic values.
18. No construction/ land development shall obstruct/ reduce drainage capacity in the area.
19. Future expansion of existing Public and Semi Public institutions and existing industrial units including their incidental uses in same plot or to adjacent plots shall be treated as permitted use in built up zones such as *Residential Zone, Mixed Zone, Commercial Zone, Industrial Zone, Public & Semi Public Zone, Industrial Promotion Zone, Agro Based Industrial Promotion Zone, Artisans Village/ Coir Village, Tourism Promotion Zone* and *IT Promotion Zone* subject to restrictions imposed under other acts and rules; if such uses are not included in the permitted uses or restricted uses as per the zoning regulations applicable. However, such projects shall confirm to provisions under Special Zones, widening of roads or new road alignments envisaged in the Master Plan.
20. Only the existing areas under Public and Semi Public uses and Industrial uses are intended to be included under *Public & Semi Public Zone* and *Industrial zone* 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 surrounding 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.
21. If public activity ceases or do not exists in a private land, *Uses Permitted/ Restricted* in the surrounding land use zone shall be allowed in the plot with the concurrence of the Town Planner, if no records are available with Cherthala Municipality regarding any proposal for acquiring that particular land for any public use at the time of application for building construction or land development.
22. 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.
23. The land specially demarcated for certain projects as *Special Zones* may be procured as per the provisions of *The Kerala Town & Country Planning Act 2016*, by Cherthala Municipality or other agencies concerned. If the proceedings to procure such land has 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 considering the existing land use zone or surrounding land use zone in the Proposed Land Use Map or to a Zone as specified in the regulation, and future development may be permitted by the secretary with the concurrence of the Town Planner based on any application received for the same.

24. Transmission/ Telecommunication Towers, Wireless Stations, ATMs, Water Tanks, Electric charging stations for vehicles, Waste management Units and public utility buildings/ Structures shall be treated as permitted uses in all zones except in *Waterbodies.*
25. Disaster Mitigation projects shall be permitted in all zones.
26. Projects of Central/ State Government, Local Self Government Institutions, Public Sector Undertakings and other Government Institutions may be permitted with the concurrence of the Town Planner in all built up zones such as *Residential Zone, Mixed Zone, Commercial Zone, Industrial Zone, Public & Semi Public Zone, Traffic & Transportation Zone, Industrial Promotion Zone, Agro Based Industrial Promotion Zone, Artisans Village/ Coir Village, Tourism Promotion Zone, IT Promotion Zone* and , *Environmental Conservation Zone* subject to restrictions imposed under other acts and rules; if such uses are not included in the permitted uses or restricted uses as per the zoning regulations applicable. However, such projects shall confirm to provisions under Special Zones, widening of roads or new road alignments envisaged in the Master Plan.
27. Any public utility areas and building under government approved schemes, irrigation/ water supply schemes and new road proposals or any detailed road alignments approved by line departments for implementation in the planning area may be permitted and shall have due regard to the flood proneness and shall incorporate necessary flood resilient measures.
28. For the purpose of these regulations, built up area means the total area covered by the building at all floor levels.
29. 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.

30. **Guidelines for Large Scale Projects**

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 waterbodies, 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 system for management of solid waste and sewage shall be provided and maintained by the developer at his/ her cost. The project shall be completed within a period of 5 years or as suggested by the committee.

30.1 **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 Forest, 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 of Government, Local Self Government Department	:	Chairperson
The Director, Local Self Government Department (Urban)	:	Member
The Chief Town Planner, Local Self Government Department Planning	:	Convener
The District Officer of the LSGD Planning having jurisdiction over the district concerned	:	Member
Secretary(s) of the Local Self Government(s) concerned	:	Member

c) The convener shall fix the venue, date and time of the meeting in consultation with chairperson and shall be responsible for the safe custody of the records and communications thereof.

d) The meeting shall be presided over by the Chairperson or in his absence by a member to be authorized 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 clearance from the State and Central Government agencies concerned.

32.2 Part B – Specific Guidelines

Table. 32.1 Zoning Regulation for the Various Land Use Zones in Cherthala Municipality

Para No.	Uses Permitted	Uses Restricted-1	Uses Restricted-2
1	2	3	4
1	**Residential Zone**		
1.1	Residential buildings consisting of single or multifamily dwellings, residential flats/ apartments, residential quarters, night shelters, orphanages, old age homes, Dharmasala. Shops & Commercial establishments, Professional Offices, Commercial Offices, Banks & other Financial Institutions, Restaurants, Canteen, Hotels –built up area limited to 300Sq.m. Cottage Industries including coir, Service Industries of non-nuisance Nature (See Annexe I), having built up area limited to 300sq.m. 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. having a floor area not more than 200Sq.m. Community facilities such as Community Halls, Recreational Clubs, Social Welfare Centres, Gymnasium/ Yoga Centers, Swimming Pool, Libraries etc. having a floor area not more than 200Sq.m. Utility Installations and Civic Amenities essentially serving the needs of residential community	Ashram, Mutt, Madrasa. Places of Worship. Public utility areas and Public buildings other than those included in the permitted category. Vehicle Fuel Filling Stations Cremation Ground / Crematorium, Burial Ground/ Common Vault.	

	such as post office, police station, telephone exchange, fire station, tot lots, parks, play grounds, water treatment plants below 5 MLD. Transmission Towers, Telecommunication Towers and Wireless Stations. Plant Nurseries, Pump House, Wells and Irrigation Ponds incidental to community needs. Any land development essential for residential related activities		
1.2	**Provided that the access road has a width of 5m minimum.**		
	Automobile workshops for two/ three wheelers – floor area up to 200Sq.m.		
1.3	**Provided that the access road has an existing or proposed width of 8m.**		
	Hospitals with 5 beds, Higher Secondary Schools. Convention Centres/ Auditorium/ Wedding Halls/ Community halls/ Exhibition Centers and Art Gallery- floor area limited to 500Sq.m. Shops & Commercial establishments, Professional Offices, Commercial Offices, Banks & other Financial Institutions, Restaurants, Canteen, Hotels having built up area more than 300sq.m	LPG distribution centres (excluding bottling plants and bulk storage) limiting the built-up area limited to 50Sq.m.	
2	**Mixed Zone**		
2.1	All *Uses Permitted* in Residential or Commercial Zone.	Container Terminal with access width of 18m All *Uses Restricted-1* in Residential or Commercial Zone.	All *Uses Restricted-2* in Residential or Commercial Zone.
	Land to a depth of 250 m on either sides of following roads except in Special zones, Paddy/Low Lying area and Water bodies shall be treated as Mixed Zone. 1. NH 66 2. Thanneermukkom Road from Girls High School jn to the eastern boundary of Municipality. 3. Old NH (X Ray to Ottappunna) **Land to a depth of 150 m on either sides of following roads except in Special zones, Paddy/Low Lying area and Water bodies shall be treated as Mixed Zone.**		

	1. Cherthala- Arookutty Road (from Kodathi kavala to Chenganda jn via TB) 2. Court jn - Girls School jn via Kuppikkavala 3. Apsara jn – Kurupankulangara jn Road 4. Apsara jn - Perumpara jn Road 5. Chakkarakalam Road (from Girls High School jn to Eastern boundary road via DP jn) 6. Vayalar Road (from Thekkekurisady jn to Northern boundary via Manorama jn) 7. Kalikulam - Chenganda Road (from Kalikulam jn to Northern boundary). i.e. Eastern boundary road from Kalikulam jn to Northern boundary up to Chenganda bridge. 8. Arthunkal road from NH66 to Madakkal jn 9. Kuppikkavala- Nedumbrakadu ferry road 10. Southern boundary road (from 11th mile to Pothassery jn)		
3	**Commercial Zone**		
3.1	All shops including shopping complexes, shopping malls, multiplex, hypermarkets, restaurants, hotels, markets. Professional offices, commercial offices & establishments, banking and financial institutions, IT software units, Movie halls, Auditorium, Wedding Halls, Community Halls, museum, exhibition centre and art gallery. Godowns/ warehouse/ storage of Non-hazardous materials, stacking yards. Gymnasium/ Yoga centres Cottage Industries including coir, automobile workshops, automobile service stations, spray painting work shop, cold storage, Saw mills, weigh bridges, printing press, IT hardware/ electronic industries, marble and granite storage/ cutting centres. Service industries of non-nuisance nature (See Annexe I) having built up area limited to 500Sq.m. Expansion of existing residential buildings, Single Family Residential buildings built up area upto 300Sq.m., Residential flats/ apartments with lower floor(s) for commercial use only, night shelters, orphanages, old age homes, dharmasala, hostels and boarding houses,	Places of worship Other public utility areas & Public utility buildings/ health care institutions. Fuel filling stations Saw Mills with Timber Yards Slaughter Houses. Educational Institutions of higher order not mentioned in column(2) Hospitals with number of beds above 50 provided that access has a width of 8m minimum Service Industries of non-nuisance nature (See Annexe I) having built up area more than 500Sq.m	

	lodges and guest houses, Ashram, Mutts, Madrasa. Government (Local/ State/ Central) or Public Sector Offices. Day care, Creche, Nursery/ Kindergarten, Expansion of existing educational institutions. Transmission & Telecommunication Towers, Wireless Stations. 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. Parking plaza, Transport terminals. Plant nursery, Storage of agricultural produces and seeds, Pump House, Wells and Irrigation Ponds. Any land development essential for commercial related activities		
4	**Industrial Zone**		
4.1	All industries listed in Annexe I and II, Automobile Workshops & Automobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish and Meat Processing Units, Printing Press, Water Treatment Plants, Marble and Granite Storage and Cutting Centres, Industrial Estates & Industrial Parks. Godowns/ Warehouses/ Storage of nonhazardous material, stacking yards, weigh bridge.	Other Public Utility Areas and Public Buildings. Storage of Explosives and Fire Works, Gas Godowns, Crusher Units. Sewage Treatment Plants, Dumping Yard. Slaughter House Fuel Filling Stations Container Terminals with access width of 18m minimum.	

	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. Transmission & Telecommunication Towers, Wireless Stations. 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. Additions and alterations to the existing buildings, without altering the use, including construction of new blocks. Any land development essential for industrial related activities		
5	**Public & Semi Public Zone**		
5.1	Local/ State/ Central Government/ Public Sector Offices and Other Related Public Buildings. Residential Quarters incidental to public and semi public use. Public Utility Areas and Buildings. Additions and alterations to the existing buildings, without altering the use, including construction of new blocks. Buildings for incidental uses with built up area limited to 100Sq.m. Cottage Industries including coir, Service Industries of non-nuisance Nature (See Annexe I), having built up area limited to 300Sq.m.	Cremation Ground/ Crematorium, Burial Ground, Common Vault.	

6	**Traffic & Transportation Zone**		
6.1	Transport terminals including constructions that form an integral or essential part of the terminal. Any incidental uses to the transport terminals such as Retail Shops, Restaurants, Canteen etc. Staff Quarters, Offices, Night Shelters, Guest Houses etc. incidental to the transport terminals. Parking Plazas, Transmission Towers and Wireless Stations, ATM. Automobile workshops, Automobile Service Stations.	Fuel Filling Stations	
7	**Industrial Promotion Zone**		
7.1	Small and Medium Scale Industries. Cottage Industries including coir, Service Industries of non-nuisance nature (See Annexe I). Incidental uses like electrical substation, canteen waiting rooms and other buildings for incidental uses with total built up area up to 300Sq.m. Additions and alterations to the existing buildings and addition of new blocks without altering the use. New residential buildings with built up area upto 300Sq.m. and new commercial establishments with built up area upto 1000Sq.m. Any constructions / land development essential for development of Industrial related activities		
7.2	**Provided that the access road has an existing or proposed width of 8m.**		
	New residential buildings with built up area above 300Sq.m, residential flats/ apartments		

	New Shops & Commercial establishments with built up area above 1000Sq.m		
8	**Agro based Industrial Promotion Zone**		
8.1	Agro based Industries shall be permitted. Godowns to store the agro industrial products, their raw materials and the value addition of raw materials. Service Industries of non-nuisance Nature (See Annexe I), having built up area limited to 300Sq.m. Additions and alterations to the existing buildings and addition of new blocks without altering the use. Buildings for incidental uses with built up area up to 300Sq.m. New residential buildings with built up area upto 300Sq.m. and new commercial establishments with built up area upto 1000Sq.m. Any constructions / land development essential for development of Agro Based Industrial related activities		
8.2	**Provided that the access road has an existing or proposed width of 8m.**		
	New residential buildings with built up area above 300Sq.m, residential flats/ apartments New Shops & Commercial establishments with built up area above 1000Sq.m		
9	**Artisans Village / Coir Village**		
9.1	Cottage Industries and Coir Industries shall be permitted. Godowns to store the industrial products, their raw materials and the value addition of raw materials.		

	Service Industries of non-nuisance Nature (See Annexe I), having built up area limited to 300Sq.m. Additions and alterations to the existing buildings and addition of new blocks without altering the use. Buildings for incidental use, with total built up area up to 300Sq.m. New residential buildings with built up area upto 300Sq.m. and new commercial establishments with built up area upto 1000sq.m. Any constructions / land development essential for development of Artisans / Coir related activities		
9.2	**Provided that the access road has an existing or proposed width of 8m.**		
	New residential buildings with built up area above 300Sq.m, residential flats/ apartments New Shops & Commercial establishments with built up area above 1000Sq.m		
10	**Tourism Promotion Zone**		
10.1	Parks/ Play Ground, Open Air theatre, Amusement Parks, Zoological and Botanical Gardens/ Bird Sanctuary, Temporary use for Camping Site, Fair ground, Swimming Pools, Auto/ Taxi/ Jeep Stand, Boat yard, Water landings. Tourism related activities and supporting facilities. Public Utility areas & buildings - Built up area upto 100Sq.m. Additions and alterations to the existing buildings and addition of new blocks without altering the use. Shops & Commercial establishments, Professional Offices/ Banking and financial institutions, Restaurants/		

	Canteen/ Resorts/ Cultural centres, Information centres with Built up area up to 300Sq.m. New residential buildings with built up area upto 300Sq.m.		
11	**IT Promotion Zone**		
11.1	Buildings/structures which are integral part of IT Park and buildings for incidental uses.		
12	**Park & Open Spaces**		
12.1	Any construction/ land development essential for the development/ improvement of open-air recreational facilities. Fish Landings, Boat Jetties, Guided Boat Rides, Watch Towers, Eco Walk Ways, Water Sports Facilities, Fair Grounds etc. Tot Lots, Park, Play Grounds, Swimming Pools, Open Air Stadium, Open Air Theatre, Zoological and Botanical Garden, Bird Sanctuary, etc.	Public Utility Areas and Buildings which will not affect the character of the area.	
13	**Paddy /Low Lying Area**		
13.1	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.	
14	**Environmental Conservation Zone – 20m wide Green belt along Vembanad lake side**		
14.1	Water landings, Pump houses/ Wells & Irrigation Ponds, Agriculture/ Horticulture/ Fodder Cultivation/ Pastures/ Grazing Grounds/ Seed farms/ fish farms and protective works. Walk ways, parks/ maidans/ grounds without any building constructions and without affecting the natural terrain and topography may be permitted. Additions and alterations to the existing buildings and addition of new blocks without altering the use.		

	Constructions/ land developments in conformity with the Coastal Zone Regulation Notification in force in lands demarcated in Coastal Zone Management Plan map under the said Notification.		
15	**Waterbodies**		
15.1	All existing water bodies shall be conserved. Bridges, Side protection walls, Bathing Ghats, floating jetty, etc may be permitted based on community level requirements and for tourism development.		
16	**Special Zones**		
Special Zones include the areas specifically demarcated for certain projects and/or environmentally sensitive areas and/or heritage areas. No other activities unless otherwise specified shall be permitted in such zones. Uses in these zones are permitted with the concurrence of the Town Planner.			
SZ-01	**Proposed Stadium**		
	If the project including entry and exit road is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Paddy/ Low Lying Area. Buildings/ structures which are integral part of the stadium. Uses incidental such as Retail shops/ Restaurants/ Canteen up to 100Sq.m may be permitted in the site along with or after the construction of the stadium. Public Utility Buildings such as Police Post/ Station, Fire Post/ Station- built up area up to 100Sq.m. and incidental uses like Autorickshaw/ Taxi/ Jeep stands, Parking Plazas and ATMs may be permitted.		
SZ-02	**Park and Open Space**		
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Residential Zone. Buildings/ structures which are integral part of the park. Uses incidental such as Retail shops/ Restaurants/ Canteen up to 100Sq.m may be permitted. Public Utility Buildings such as Police Post/ Station, Fire Post/ Station- built up area up to 100Sq.m. and incidental uses like Autorickshaw/ Taxi/ Jeep stands, Parking Plazas and ATMs may be permitted. Parking facilities, walk ways, street furniture, food courts, restaurants, children's park, fishing points, water front structures, aquarium, open stage, cultural centers, solid waste treatment units, comfort stations. Facilities for water sports and buildings incidental to it.		
SZ-03	**Slaughter house**		
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Commercial Zone. Buildings/ structures which are integral part of the Slaughter House.		

SZ-04	**Truck Terminal**
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Residential Zone. Truck terminal with essential incidental facilities.
SZ-05	**Bus Terminal**
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Public & Semi Public Zone. Buildings/ structures which are integral part of the bus terminal, Buildings for incidental uses like waiting sheds, toilets, canteens, shops, restaurants, etc.
SZ-06	**Area reserved for Nedumbrakkad Ferry**
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Environmental Conservation Zone. Buildings/ structures which are integral part of the Ferry.
SZ-07	**Farm Tourism Promotion Zone**
	If the project is not materialized with in a period of 7 years from the date of sanctioning of the Master Plan, the area shall be deemed as a part of Paddy /Low Lying Area. Residences with built up area limited to 300Sq.m, Guest Houses, camping Sites and Residential Cottages with floor area up to 200Sq.m. Coffee Shops, Tourism Information Centres and other similar amenities related to Farm Tourism with built up area limited to 200Sq.m. Shops related to sale of farm yields, professional offices/commercial offices with built up area limited to 100Sq.m.

Annexe I

Type of Non- Obnoxious and Non-Nuisance type of Service or Light Industries Permissible in Residential Zones

1. Production of copra
2. Processing of arecanut
3. Rice and Flour Mills.
4. Production of rice, flour etc., by hand pounding.
5. Processing of Cardamom, ginger, pepper etc.
6. Production of Khandsri for sugar-cane
7. Carrying and preservation of fruits and production of jam, jelly etc.
8. Processing of and preservation of cashew nuts.
9. Bakeries.
10. Production of Dairy Products.
11. Oil mills (vegetables)
12. Extraction of oil by ghani.
13. Manufacture of hydrogenated oil.
14. Manufacture of "aval" (Beaten rice) appalam.
15. Production of vinegar.
16. Manufacture of soda, water, lemonade etc.
17. Manufacture of Ice.
18. Manufacture of ice cream.
19. Processing, packing and distribution of tea.
20. Processing, grinding, packing and distribution of coffee.
21. Manufacture of syrup.
22. Manufacture of beedi.
23. Manufacture of Cigar.
24. Manufacture of tobacco snuff.
25. Manufacture of chewing tobacco.
26. Cotton ginning, clearing, pressing etc.
27. Cotton spinning other than in Mills
28. Cotton spinning and weaving in Mills.
29. Cotton weaving in handloom.
30. Cotton weaving in power looms.
31. Handloom weaving.

32. Khadi Weaving in Handloom.
33. Printing of cotton textiles.
34. Manufacture of Cotton thread, rope twine etc.
35. Jute spinning.
36. Manufacture of jute products including repairing of gunny bags.
37. Weaving of silk by Handloom.
38. Manufacture of hosiery goods.
39. Making of embroidery products
40. Tailoring
41. Manufacture of quilts and mattresses.
42. Manufacture of Coir and Coir Products.
43. Manufacture and assembling of umbrellas and production of spare parts of umbrellas.
44. Repairing of umbrellas.
45. Manufacture of wooden furniture and fixtures.
46. Manufacture of structural wooden goods such as doors, beams etc.
47. Manufacture of wooden industrial goods such as parts of handloom ambarcharka, bobbirs etc.
48. Manufacture of wooden utensils, choto frames, toys, etc., and photo framing.
49. Cane industry including baskets, weaving etc.
50. Manufacture of miscellaneous wooden articles such as sticks, sandals, rules etc.
51. Manufacture of paperboard and paper hand.
52. Making of paper boxes, bags, envelopes etc.
53. Printing and publishing of newspapers and periodicals.
54. Printing and publishing of books.
55. Miscellaneous printing works including type cutting, book binding.
56. Manufacture and repairing of leather shoes and chappals.
57. Manufacture of leather products such as suitcase, bag etc.
58. Vulcanizing and repairing of tyres and tubes.
59. Manufacture of rubber gloves.
60. Manufacture of Rubber products such as rubber sheets, nipples and rubber shoes including smoke-rubber.
61. Manufacture of pharmaceuticals, chemicals, Ayruvedic medicine etc.
62. Manufacture of agarbathi and other cosmetics.
63. Manufacture of plastic products such as nameplates etc.
64. Manufacture of lemongrass oil, candles etc.
65. Manufacture of cement products such as well-keros, tube, closets etc.

66. Manufacture of structural stone goods, stone crushing, stone carving, stone dressing, marble carving etc.
67. Manufacture of stone wares.
68. Manufacture of stone images.
69. Manufacture of chinaware's and crockery.
70. Manufacture of large containers and chinaware.
71. Manufacture of glass and glass products.
72. Manufacture of clay models
73. Manufacture of iron and steel furniture.
74. Manufacture and repairing of brass and bell metal products.
75. Manufacture of aluminum utensils and other products.
76. Manufacture of tin cars and copper vessels.
77. Electroplating, tinplating, welding etc.
78. Manufacture of agricultural implements, screws etc. (blacksmith and foundry)
79. Manufacturing assembling and repairing of machinery such as water pumps, oil mill chuck etc.
80. Manufacture of small machine tools and machine parts.
81. Manufacture of sewing machine parts and assembling and repairing of sewing machine.
82. Manufacture of electrical machinery and repairing of electric motors armature winding etc.
83. Manufacture and repairing of electric fans.
84. Charging and repairing of batteries.
85. Repairing of radios, microphones etc.
86. Manufacture of electric meters, production of electric and allied products, repairing and servicing of electrical appliances.
87. Bodybuilding of motor vehicles.
88. Manufacture and repairing of motor engine parts and accessories.
89. Serving and repairing of motor vehicle
90. Manufacture of cycles, parts and accessories.
91. Manufacture and repair of boats and barges.
92. Manufacture and repairing of animal drawn and hand drawn vehicles.
93. Repairing of photographic equipments, spectacles etc.
94. Manufacturing of medical instruments
95. Repairing of watches and clocks.
96. Manufacture of Jewellery.
97. Manufacture, repair and tuning of musical instruments.
98. Manufacture of sports goods, balloons etc.

99. Ivory, carving and ivory works
100. Miscellaneous industries.

Annexe II

List of Obnoxious or Nuisance Industries Subject to Objectionable Odours, Fumes Effluents or Processors to be Located in Hazardous Zones.

(Grouped under Indian Standard Industrial Classification)

I. Manufacture of Food Stuff :

1) Slaughtering, preservation of meat and fish and canning of fish.

II. Manufacture of Beverages:

2) Production of distilled spirits, wines, liquor etc., from alcoholic malt, fruits and malts in distillery and brewery.
3) Production of country liquor and indigenous liquor such as toddy, liquor form mahua, palm juice.

III. Manufacture of Textiles :

4) Dyeing and bleaching of cotton

IV. Manufacture of Wood and Wooden Products:

5) Sawing and planning of wood.
6) Wood seasoning and creosoting
7) Manufacture of veneer and plywood.
8) Paper, pulp and straw board.

V. Manufacture of Leather and Leather Products :

9) Currying, tanning and finishing of hides and skims and preparation of finished leather.

VI. Manufacture of rubber, petroleum and coal products:

10) Manufacture of tyres and tubes

11) Manufacture of Industrial and synthetic rubber.
12) Reclamation of rubber.
13) Production of petroleum, kerosene and other petroleum products in refineries.
14) Production of chemicals and chemical products.

VII. Manufacture of chemicals and chemical products:

15) Manufacture of basic industrial chemicals such as acids, alkali and their salts not elsewhere specified (especially sulphurous, sulphuric, nitiric, hydrochloric etc., acids) ammonia, chorine and bleaching powder manufactures.
16) Manufacture of dyes, paint, colours and varnishers, printing ink.
17) Manufacture of fertilizers (Specially from organic materials):
18) Manufacture of disinfectants and insecticides
19) Manufacture of ammunition, explosive and fireworks.
20) Manufacture of matches.

VIII. Manufacture of Non-metallic mineral products other than petroleum and coal:

21) Manufacture of cement and cement products
22) Manufacture of Lime
23) Manufacture of Plaster of Paris.

IX. Manufacture of basic metals and their products :

24) Manufacture of iron and steel including smelting, refining, rolling and conversion into basic forms.
25) Manufacture including smelting, refining etc., or nonferrous metals and alloys in basic forms.
26) Manufacture of Armaments.

X. Manufacture of machinery (other than transport) and electrical equipments:

27) Manufacture of all kinds of battery

XI. Miscellaneous items not covered above.

28) Incineration, reduction or dumping of offal, dead animals' garbage or refuse.
29) Manufacture of gelatin and glue.
30) Fat, tallow, grease or lard refining of manufacture.

31) Bone meal, bone grist and bone powder.
32) Manufacture of cashew nut shell oil.
33) Other similar types of nuisance industries.