FOREWORD

Aluva is located 10 km south of the Cochin International Airport at Nedumbassery. Aluva town has various development potentials due to its locational advantage, importance of being a part of Kochi urban agglomeration and also being part of a thriving urban corridor in the state, also presence of metro rail, trade & commerce and recreational activities. The National Commission on Urbanisation (1987) identified Kochi- Thrissur corridor as a Spatial Priority Urban Region in the country. Aluva is one among the towns in this corridor.

The fast pace in growth of the Town and resulting issues made it necessary to adopt planned intervention for the sustainable development of the town and to face the challenges associated with it. The thought in this direction has been materialized now as the "Master Plan for Aluva Town - 2031". The Plan is drafted with the general purpose of guiding and accomplishing a coordinated, adjusted, and harmonious development of the town and its environs. I am happy to place it before the people of Aluva, as it is developed through them and it is anticipated that the Town shall take a profile as envisaged in the Plan.

All the members of the present and previous council have actively participated in the discussions for finalising the Plan. The dymanic participation and advices rendered by Sri. Anwar Sadath, MLA and Sri. K. P. Dhanaplan, former M P of Chalakkudy constituency were of immense help in the task. Special acknowledgement is extended to all councillors and municipal staff for their guidance and involvement in the work. Members of the Special Committee and working group have put in considerable efforts in preparing this Plan.

I also appreciate the LSGD (Planning), Government of Kerala for their stupendous efforts in materialization of the Master Plan for Aluva Town.

I am certain that the developments in the municipal area will be benefitted through this Plan. The "Master Plan for Aluva Town - 2031" prepared jointly by Aluva Municipality and LSGD (Planning) can definitely help to transform Aluva into a more habitable space for the generations to come.

Aluva

Sri. M.O. John

Chairman, Aluva Municipality

PREFACE

Aluva, one among the 11 municipal towns in Ernakulam district, a suburb of Kochi, is located on the banks of river Periyar. Aluva is a major transportation hub, with easy access through all major forms of transportation. Aluva is well connected to other urban centers through rail, road, and water way. Cochin international airport at Nedumbasseri, 12 km from Aluva is connected to most of the cities in India and several middle eastern countries. The NH 544 (Old NH 47) passes through this town connecting Ernakulam towards south and Thrissur towards north. An important state highway viz. Aluva –Munnar road starts from Aluva and leads to Munnar. Aluva forms part of the Kochi urban agglomeration. As per the delineated urban profile of the state for 2031 in the State Urbanisation Report, Aluva town forms part of the delineated urban corridor of 'Alappuzha - Ernakulam - Thrissur-Palakkad'. It is thus evident that the town is part of the thriving urban development corridor of the state.

As per GO(Rt) No. 2766/2009/LSGD dated 24/10/2009 the government ordered to prepare a revised Master Plan for Aluva town as part of the preparation of Master Plans for 32 towns in Kerala. The Master Plan is prepared jointly by the Municipality and the LSGD (Planning), Government of Kerala. Aluva Municipality and the Department took single-minded efforts in this regard which made it possible to develop a Master Plan for Aluva town.

The Master Plan was prepared through a systematic process, comprising of all-encompassing data collection and analysis, identification of development concerns, setting up of goals and objectives, formulation of development concept and carving out policies & strategies followed by detailed sectoral proposals.

The regional development frame work provided by State Urbanisation Report, the District Urbanisation Report of Ernakulam and the Draft Master Plan for Kochi City Region became major fundamentals in formulating the development concept of the Plan. Based on development needs and prospects of the town identified from outcomes of studies and analysis, spatially located integrated development proposals were arrived at and included in this Plan.

I would like to appreciate the leadership provided by the Aluva Municipality for this endeavour, the involvement of former chairperson and the present chairperson Sri. M.O. John is reckoned with utmost gratitude. The Master Plan for Aluva is prepared after conducting

exhaustive discussions and workshops with the council members as well as the working group members ensuring a good level of people's participation. The sustained and collective effort of the Special Committee, working groups and the Planning team has helped in the documentation of this Master Plan. The hard work, spirit and the earnestness of the Planning team in the LSGD (Planning) District Office, Ernakulam in bringing the Master Plan within the scheduled time is highly appreciated. I also appreciate the officials of the head office of the Department who exerted unswerving efforts in vetting and finalisation of the Plan.

Certainly, the Master Plan for Aluva Town will provide a frame work for systematic development of the town to guide it's growth to be productive, sustainable and habitable for the people of the town.

Thiruvananthapuram

Sri.Prashanth. H
Senior Town Planner
Chief Town Planner (Planning) In Charge.

ACKNOWLEDGEMENTS

Considering the prime role and importance of balanced and systematic growth of urban centres, the Government of Kerala intends to streamline the development process in urban settlements, to ensure that these settlements continue to achieve their objectives of improved competence and productivity.

As per GO(Rt) No. 2766/2009/LSGD dated 24/10/2009 the government ordered to prepare a revised Master Plan for Aluva town as part of the preparation of Master Plans for 32 towns in Kerala.

The Master Plan for Aluva Town is prepared through the combined efforts of Municipality and the LSGD (Planning). The preparation of Master Plan was started on 4/11/2009 as per the order C1/7931/2009 of Chief Town Planner under the provision of Town planning act 1108 (which was in force at that period). While on preparation of Master Plan for Aluva town, Kerala Town and Country Planning ordinance came in to force on 23/09/2013 and the preparation continued as per the said ordinance. Various activities were coordinated by Special Committee constituted specifically for the purpose, under the guidance and supervision of the Aluva Municipal Council.

Given the stupendous nature of the development, planning and the intricacy of details involved, right leadership and direction was very substantial for the effective and successful preparation process of the plan. Several discussions were conducted with the Municipal Council, political representatives during the preparation stage of the master plan. After publication of the Master Plan, Special committee has scrutinised the received objections and suggestions from public. The special committee has conducted various meetings, hearings and site inspections on the objections received. Finally the Master Plan was modified based on the decisions of the Municipal council.

In this respect, I acknowledge with gratitude the guidance and involvement of Sri. M.O. John, present Chairman, Sri. M.T. Jacob former chairman and Smt. Lissy Abraham, former Chairperson of Aluva Municipality during the entire course of plan preparation.

The support and guidance rendered by each and every member of the Aluva Municipal Council are also thankfully acknowledged. They actively participated in all the workshops and meetings conducted as part of the preparation of this Plan and contributed highly by giving their concept of development. I am grateful to the Municipal Council for their tremendous support in subduing the objections raised by the public against the Master plan.

The members of Special Committee, especially Chairpersons of the working groups, played very remarkable role in shaping this Plan. As the planning exercise encompassed various sectors, it required the support and positive interaction with many public and private agencies and the line departments. I thankfully acknowledge their contributions.

The Plan prepared under the guidance and supervision from office of the Chief Town Planner (planning) Thiruvananthapuram. I acknowledge with gratitude the guidance and support of Sri. Prashanth. H, Chief Town Planner (Planning) in charge. I thankfully acknowledge the unlimited support rendered by Smt. Sindhu K.M, Town Planner and other officials of the Office of Chief Town Planner (Planning).

I appreciate the concerted efforts exerted by Smt. Usha Kumari P.R, former Senior Town Planner in the time bound preparation of this comprehensive Master Plan taking the ground realities into consideration. The concerted effort of the officials of the LSGD (Planning), Ernakulam District Office was significant in the preparation of the report. In particular, Smt. M.M. Sheeba, Town Planner has to be acknowledged for the leadership and guidance that she provided for materializing this Plan in its present form.

Special mention is also made to Famidha Yousaf DyTP, Ejas P.J ATP and the entire planning team for the sincere and dedicated efforts in the preparation of master plan. Separate mention must be made to the statistical section and the planning section of this office for the support rendered in the process of gathering data and conducting systematic analysis for the preparation of this Master Plan. I also appreciate all other staff of this Office for extending their sincere and dedicated assistance in the task.

Ernakulam

Sri. K.M Gopakumar
Senior Town Planner
Office ofthe District Town Planner, Ernakulam

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1. INTRODUCTION

1.1 INTRODUCTION

Aluva, a suburb of Kochi in the Ernakulam district of Kerala, is located on the banks of river Periyar. Aluva is a major transportation hub, with easy access through all major forms of transportation. The Aluva- Munnar road acts as corridor which links the highland districts to the rest of the state. Aluva, home to the summer residency of the Travancore royal family- the Aluva Palace is famous for the 'Sivarathri Festival', celebrated annually at the sandbanks (Manappuram) of Periyar.

Today, while part of the Kochi urban agglomeration, Aluva is one of the eleven municipalities in Ernakulam district, its administration conducted by Aluva municipal council. The town also serves as the administrative centre of the Aluva taluk. Aluva is a constituency in the Kerala Legislative Assembly and Aluva assembly constituency is a part of the Chalakudy Lok Sabha Constituency. In 1911, it was a town in Thiruvithamkoor (Travancore) and was ruled by the Town Sanitary Council and later by Town Improvement Committee and had attained its municipal status in 1921.



Fig: 1.1 Aluva Municipal Office

The town is located at the north-west part of the Ernakulam district and on the side of river Periyar. Its latitudinal extension is between 10° 05' 39" & 10° 07' 30" North and the

longitudinal extension is between 76° 19' 56" & 76° 21' 55" East. Aluva town lies in the midland region and its altitude varies from 4m to 40m above MSL. Major economic base of the town is trade & commerce. Due to the high commercialization of areas, land value inside the town area is increasing. So, one of the major issues in the town is housing. People are migrating to the nearby areas for residential purpose due to high land value.



Fig: 1.2 Aluva Town – Byepass junction

The proposed Metro Rail starting from Aluva Bye-pass junction gives scope for immense development for Aluva town. As a terminal station for metro rail, Aluva will attract lot of people from the influence area and needs of the floating population also has to be taken into consideration.

Aluva town is a part of Kochi urban agglomeration as per census 2001 and 2011. It is a second order settlement in Ernakulam district and therefore it has to cater to the requirements of a wider service area. Also as per the delineated urban profile for 2031 in the Sate urbanisation report Aluva forms part of the delineated urban corridor of 'Alappuzha-Ernakulam-Thrissur-Palakkad'. It is evident that the town is part of thriving urban development corridor of the state. Planned development of the town shall therefore be within this regional frame work.

In order to address the above problems and to ensure a planned development of the growing town, a master plan is needed.

1.2 NEED FOR THE PLAN

Master planning aims at improving the urban environment as the efficiency of urban settlements largely depends 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 in the short, medium and long term. It identifies development pattern, infrastructure gap and deficiencies, project and reform priorities and an 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. Master Plan is a basis for reservation of land for various uses. Success of Master Plan will depend on peoples 'will and willingness' to adhere to certain disciplines in the use of land, roads and public places and on the level of civic awareness in general with a long term perspective.

The most important event in the history of decentralized planning process in India was the promulgation of 73rd and 74th Constitutional Amendment Acts on December 22nd 1992 conferring constitutional status to Local Self Government Institutions (LSGIs). These Acts were notified by the Central Gazette on April 20, 1993 aiming to devolve functional and fiscal powers to the local bodies. This became a land mark in democratic decentralization in the country, giving Local Self Government Institutions the required constitutional legitimacy.

National Commission on Urbanization (NCU), 1988 rightly identifies the need of spatial planning. Each investment, whatever is the sector, has a definite physical manifestation and geographical location. Also, it generates a chain of developmental impulses affecting, in several cases, the activities of other sectors and results in a related spatial pattern

The functions of the Master Plan / Development plan are as follows

- To guide development of a city is an orderly manner so as to improve the quality of life of the People
- Organize and coordinate the complex relationships between urban land uses

- Chart a course for growth and change, be responsive to change and maintain its validity over time and space, and be subject to continual review
- Direct the physical development of the city in relation to its social and economic characteristics based on comprehensive surveys and studies on the present status and the future growth prospects; and
- Provide a resource mobilization plan for the proposed development works.

Considering all the above factors, Government of Kerala has decided to prepare Development Plans for all major towns in order to have a planned development in future. Aluva is one among the towns which should have a Development Plan to move forward.

The Development Plan lays down the space requirement for the coming years. The plan suggests future width of roads that already exist. They also suggest new roads. For additional population that is expected to arrive in coming years, the plans provide for new residential areas along with amenities and services. The plan also reserves sites for future educational institutions, health institutions, transport terminals, commercial centres etc.

The proposals in the Development Plan do not mean that all structures existing in its way will be overnight bulldozed. It only means that all future construction must be controlled according to the plan proposals.

The land use prescription of a Development Plan is based on future quantity of land needed for various activities. These are located depending on the suitability of different locations, topography, compatible and incompatible uses, accessibility and other objectives of achieving compact settlements where services can be extended economically.

1.3 METHODOLOGY

The methodology adopted for preparation of the master plan is as per the guidelines issued vide G.O.(Rt.) No.2766/2009/LSGD dated 24.10.1999. As envisaged in the guidelines,

the master plan has been prepared jointly by the municipality and the Department of Town and Country Planning.

The plan preparation process consists of data collection, analysis (local analysis and spatial analysis), envisioning process and detailing. The plan preparation process is detailed in **figure 1.3.**

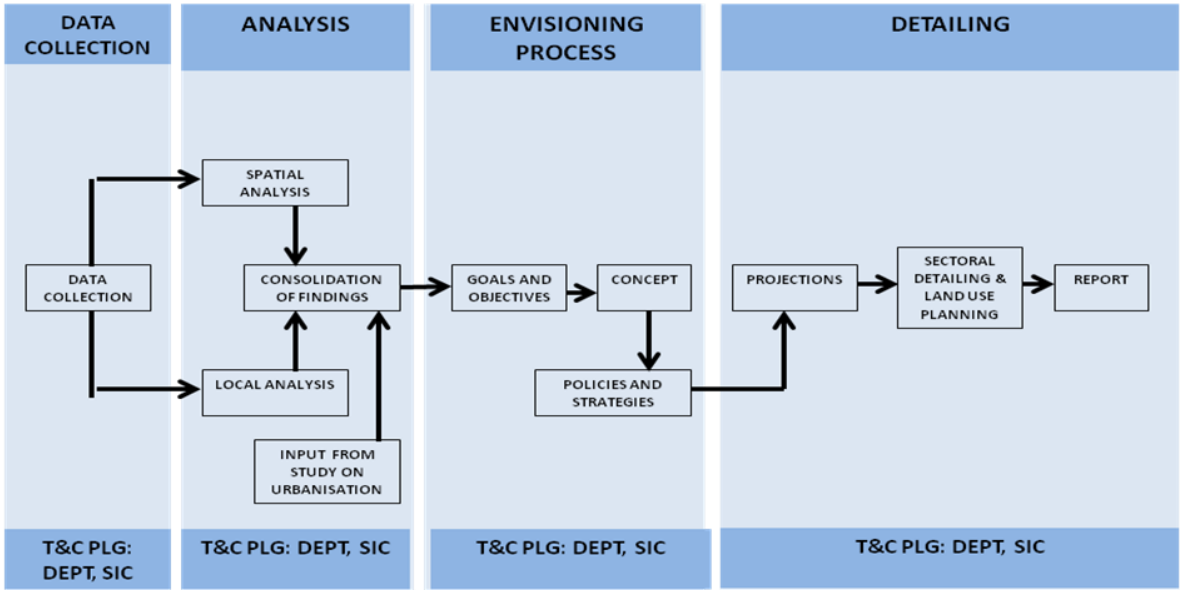

Fig: 1.3 Plan preparation process and agencies involves

1.4 MASTER PLAN

The master plan consists of a written document and a set of maps. The master plan that sets out how places should change and what they could be like in the future. It specifies the areas that need to be developed & the type of development that should take place and the areas that need not be developed.

The report of the master plan is divided into four parts; the first part, 'the study and analysis part' details various studies carried out as part of the plan preparation exercise and provides detailed information about the existing condition of the town and different planning issues. This part is followed by a second part, an integrated development vision of the town for the future. In this part development goals and objectives are framed based on the development issues identified, development is envisioned based on the goals and objectives set and policies and strategies are formulated to achieve the envisioned future.

The third part of the master plan contains the proposals and suitable recommendations on land use and various sectors. The last part includes detailed standards for the control of development and specific objectives for different areas. The proposed land use map which is part of the Plan illustrates the land use zoning provisions of the plan, the road proposals and other special zones such as heritage and tourism sites, sites for parks and other projects.

The purpose of the master plan is to guide and direct decisions concerning land in Aluva town. The plan provides a basis for the preparation of more detailed plans and projects; it creates a benchmark for measuring progress and change over time and it encourages co-ordination and consultation in planning matters among the various development partners.

2. PHYSICAL CHARACTERISTICS

2.1. LOCATION

Aluva is one of the municipalities in Ernakulam district and it is situated on the North West part of the district on the banks of river Periyar. Aluva is well connected to other urban centers through rail, road, and water way. Cochin international airport at Nedumbasseri, 12 km from Aluva provides connectivity to most of the cities in India and several middle eastern countries. The NH 544 (Old NH 47) passes through this town connecting Ernakulam towards south and Thrissur towards north. An important state highway viz. Aluva –Munnar road starts from Aluva and leads to Munnar through Perumbavur, Kothamangalam and Neriamangalam in the eastern direction. Towards west, the town is connected to North Paravur town by the Aluva – Paravur road which is a major district road. Other two major district roads passing through Aluva viz Perumbavoor – Aluva road and Aluva – Varappuzha road provide the road connection to other part of the district. Thiruvananthapuram – Shornur railway line provides connection to other parts of our country. The town is about 20 km inside sea coast and Cochin port is located at a distance of 25 km from Aluva town. Also the terminal station of the Kochi Metro, which is being developed, is located in Aluva town. The Latitudinal extension is between 10° 05’ 39” & 10° 07’ 30” North and longitudinal extension is between 76° 19’ 56” & 76° 21’ 55” East. The geographical location of the town is shown in **figure 2.1.**

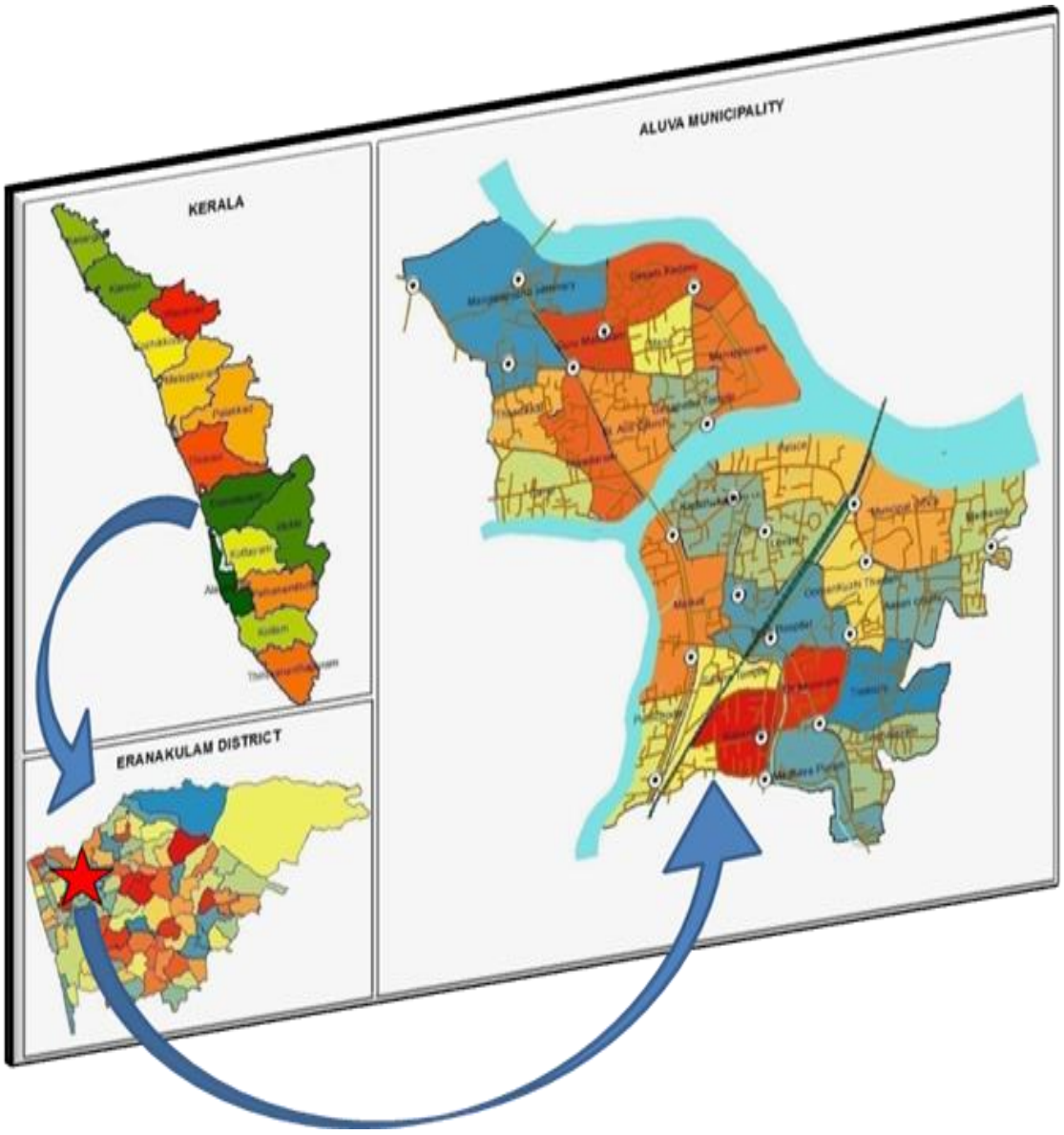

Fig: 2.1 Location of Aluva town

It is bounded on the north by Karumaloor and Chengamand grama panchayats, on the south by Choornikkara grama panchayat, on the east side by Keezhmadu grama panchayat and on the west by Kadungalloor grama panchayat. The regional linkage of Aluva is shown in **figure 2.2.**

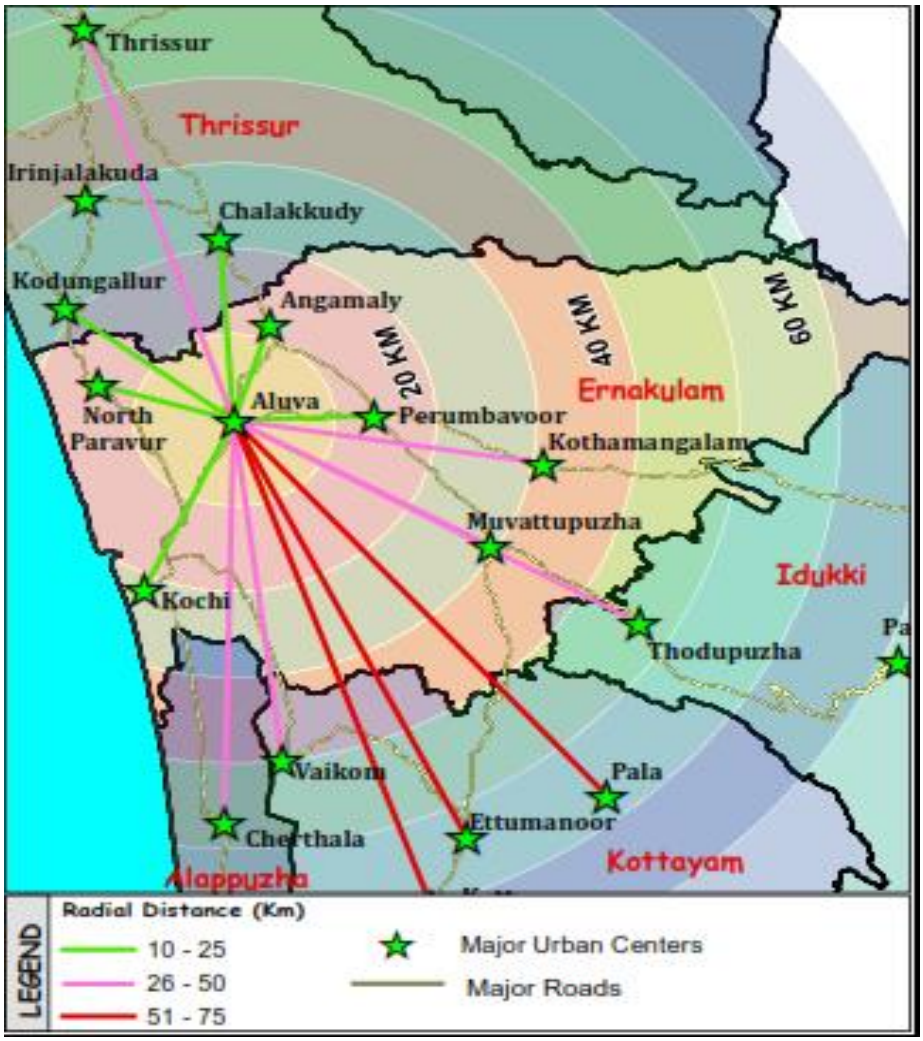

Fig: 2.2 Regional linkages of Aluva

2.2. HISTORY

Originating from Shringagiri (Shivagiri) peak in Aanamudi and by forming the tributaries Muthirappuzha, Nallathanni etc. and flowing into Kodungalloor backwaters in Trissur district, the Periyar and its river valley civilization has given to our geographical history, a very valuable contribution, which is Aluva. Archaeologists have found evidence of settlements in Aluva as far back as 250 BC. The place used to be a continuous area of land spread across Kakkanad and Alangad and historians have recorded that it was so up to AD 1341. Although the earlier geographical features of Aluva were unknown to us, the history records the changes that happened to the Periyar and its banks in AD 1341. The Periyar river was then known as

Churniyar and had its course as a single stream, flowing through Thottummukham, caressing Mangalapuzha and flowing into the Arabian sea. Deluge forced the river to flow into two tributaries at Thottummukham, one continued to flow through Desam and Mangalappuzha to fall into the Kodungalloor backwaters. The other made a new track to flow downward dividing the Aluva mainland into two, the north and south. And this deluge was known as the cause of formation of Aluva manappuram. The town used to be holiday resort and a centre of commerce right from ancient times. From the beginning of 20th century, Aluva was known as the industrial epicenter of the state. Though it has a very small area, because of the abundance of the physical characteristics /conditions, Aluva was renowned as a tourist resort and also it was known as the industrial capital at that time. Mangalappuzha, branch of Periyar which bifurcates at Aluva was known to be the nerve centre of trade and commerce in this part of South India. Before Indian independence, Aluva was part of the Kingdom of Travancore and was the summer residence of royal family.



Fig: 2.3 Periyar River

Spices, ivory, rosewood etc. from this part of the land were the major items that attracted merchants from all parts of the world to Kerala. The presence of water transport and

railway, and Aluva's importance as the gateway to Idukki famous for its spice production, tea plantation and rubber cultivation - have contributed to this.

The etymology of the name of the town 'Aluva' has been the subject of speculation for centuries. One of the accepted versions relates to the mythological story of Hindu God Shiva drinking the Kalakootam poison to save the world at the time of 'Palazhi Madhanam'. It is said that Shiva with the poison –'Alam' – in his mouth –'Vaa' – was made into a deity, which was then rested in a temple in Aluva. The Sivarathri festival for which the town is famous for is celebrated in the honor of Shiva. The Shiva temple located on river banks is the main attraction of the town, due to traditions and legends associated with it. In earlier times, the temple used to get submerged under river during monsoon seasons.



Fig: 2.4 Shivarathri festival



Fig: 2.5 Aluva Shiva Temple

Sri Narayana Guru, who was instrumental in setting the spiritual foundations for social reforms in Kerala and who was one of the most successful social reformers who tackled caste issues in India, had founded the Adwaitha Ashramam at Aluva in the year 1913, to teach, propagate as well as live the Adwaitha Philosophy. By considering the spiritual significance and industrial importance of Aluva, Gurudevan had decided this place as his place of work. This ashram was dedicated to a great principle - Om Sahodaryam Sarvatra (all men are equal in the eyes of God). In 1921, Narayana Guru presided over the annual meeting of the 'All Kerala Association of Brotherhood' held at Adwaitha Ashramam. Proximity to the calm & quiet Aluvappuzha, had caused the transformation of Aluva into a peaceful town.

The formation of Modern Aluva started when H.H.Maharaja Chitra Thirunal, then Maharaja of Travancore started his industrialization program in 1930's, making Travancore Aluva, one of the major centers for various industries. The existing Marthandavarma Bridge which is considered as a landmark of Aluva was constructed during the pre-independence period of 1940-42 by his Excellency Marthandavarma Ilayaraja of Travancore, who was regarded as the founder of Modern Travancore. The bridge was constructed to promote the trade and business between nearby kingdoms. It is known as the lifeline of the inhabitants of Aluva since then. The bridge is strategically built above the river Periyar offering the travellers a panoramic view of the city. And in 2001, the ministry of road transport and high ways approved the construction of parallel bridge due to the narrow width of the carriage way. The feature of the new bridge follows that of the existing old bridge.



Fig: 2.6 Marthandavarma Bridge

2.3. AREA AND POPULATION

Aluva municipality attained municipal status in 1921. As per the 2011 census Aluva town has a population of 22428. The total area of Aluva is 6.46 sq.km. and among the municipalities and corporation in the Ernakulam district, Aluva municipality ranks 12th, ie.last in population and area. However, the town has high density of population viz, 3472 persons /sq.km next only to Kochi corporation.

2.4. GEOGRAPHICAL FEATURES

It is located at the north-west part of the district. Aluva town lies in the midland region and mainly consist of plain topography. Periyar, a beautiful river and second largest in the state is the life line of Aluva. Aluvappuzha divides the Aluva main land into two - the north and the south parts. The altitudes of Aluva vary from 4m to 40m above MSL. Digital elevation of Aluva town is shown in **figure 2.3.**

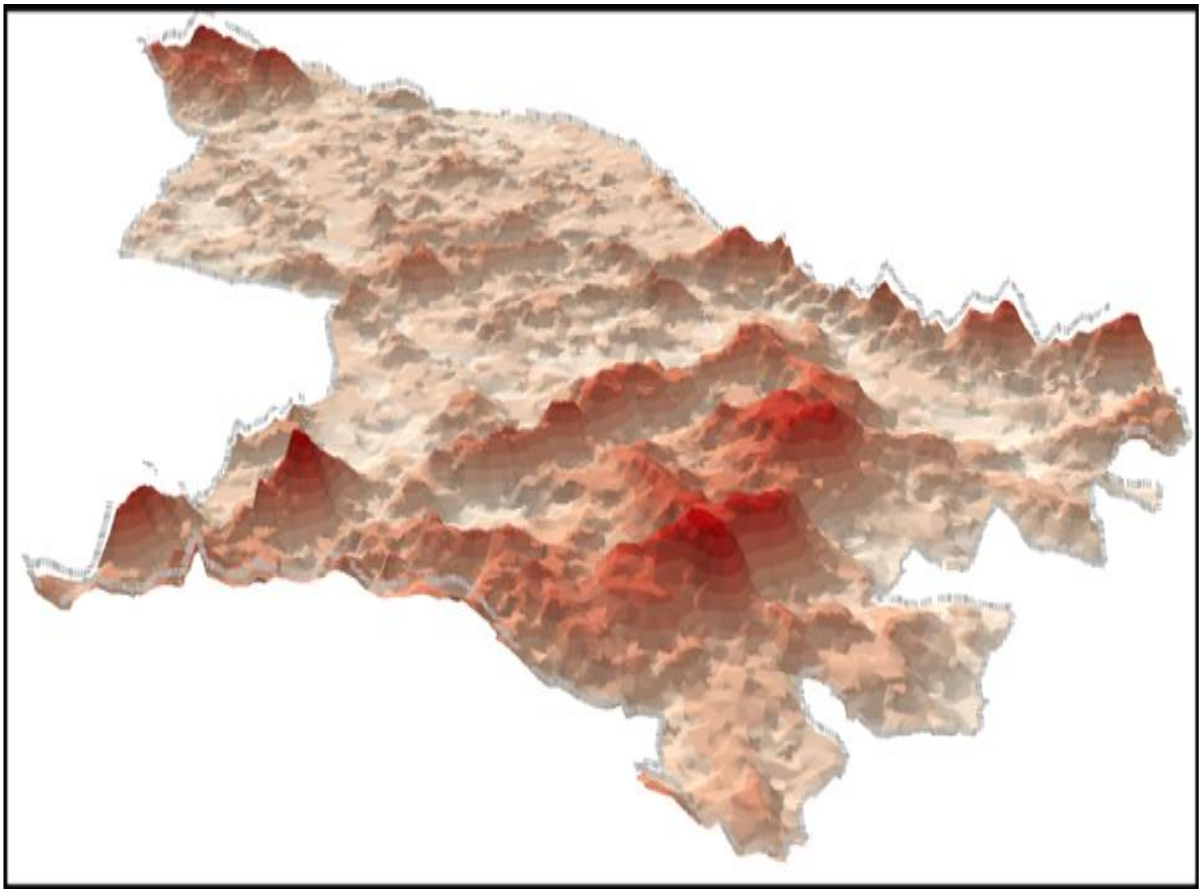

Fig: 2.7 Digital elevation model of Aluva town.

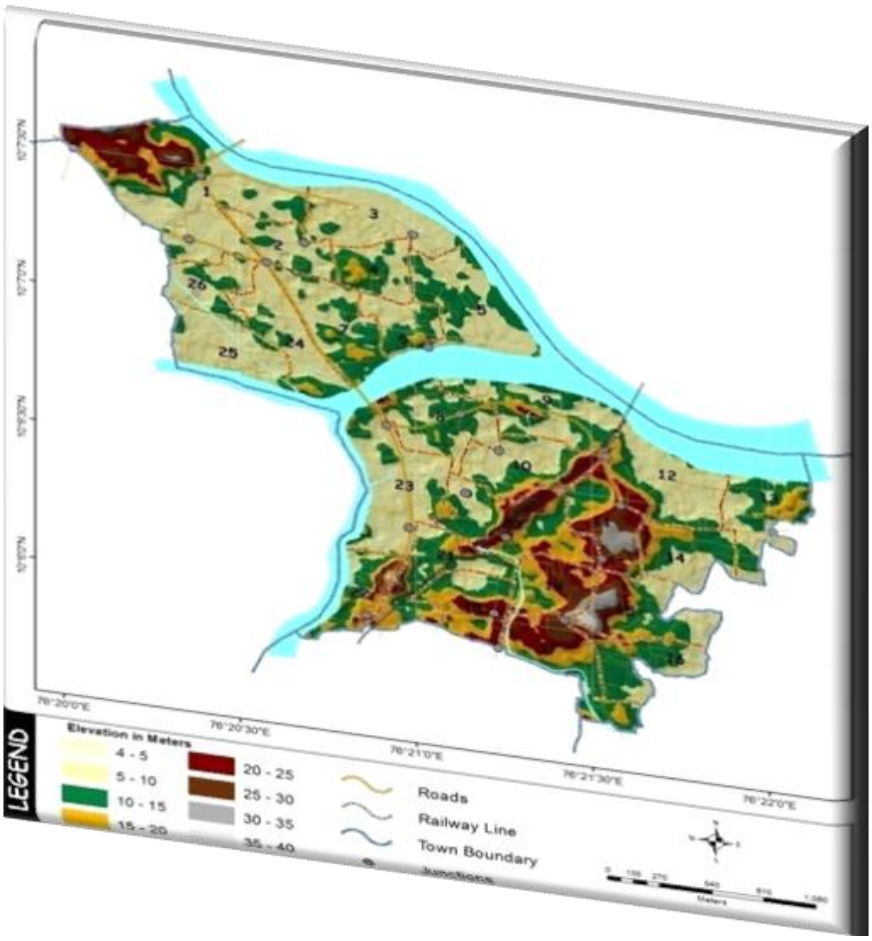

Fig: 2.8 Topography of Aluva town.

Average slope of Aluva municipality is 4.38^0. Topography of Aluva town is shown in **figure 2.4.** North-west and southern part of the municipality is showing 10^0 to 26^0 slopes. Thrikkunnath seminary and Power house area are the two elevated places in Aluva town which is in south-east part of municipality. In Aluva town, the area showing the maximum altitude in north-west part is between UC College and Mangalappuzha seminary. Top view of Aluva municipality is shown in **figure 2.5.**



Fig: 2.9 Top view of Aluva Town

2.5. CLIMATE, RAIN FALL AND SOIL CONDITION

The town has three seasons namely the dewy, the hot and the rainy. The dewy season lasts from December to February, the days are hot, the nights are chilly and there is heavy dew fall at night. The hot season begins in February and lasts till June, both the days and nights are hot but occasional showers and sea breeze provides relief. The rainy season extends from June to November. The south-west monsoon starts in June and lasts till August. June and July are the rainiest months when 45% of the annual rainfall is received. The north-east monsoon strikes in October and continues till November. On an average there are about 132 rainy days in a year.

The air is highly humid throughout the year. The relative humidity is generally above 70%. The wind flows in the town, with moderate force and it prevails throughout the year. During south-west monsoon season, the wind flows mainly on western or north-eastern directions. The rest of the year wind is flowing towards north-east and eastern directions in the morning and south-west and western directions in the afternoon.

The land slopes from east to west. The soil of the town can be classified as sandy clays and laterites. The clay found here is inferior type of clay and used for manufacturing of tiles and bricks. Laterite is popularly used for building construction. All garden crops including arecanut and coconut are grown in this soil.

2.6. BIO DIVERSITY

In Aluva municipality only 0.57 sq.km of area is under agricultural land use, that comes to 8.80% of total area of Aluva and the categories under agricultural land use are coconut, mixed crop etc. The details given by the agricultural department contains a cultivation of 2 ha of rice, also which comes under the dry cultivation and not under paddy.

2.7. CONCLUSION

Aluva is located at the north- west part of the district and on the side of the river Periyar and is well connected by all means of transportation. The future status as terminal station of Kochi Metro will boost up the development potential of the town. Aluva was part of the kingdom of Travancore and was the official summer residence of the royal family. Aluva attained municipal status in 1921. Aluva town lies in the midland region and mainly consists of plain topography. The altitude of Aluva varies from 4m to 40m above MSL. All garden crops including coconut, arecanut are grown in the soil of Aluva. Areas having high altitude are used as rubber plantation areas. Aluva manappuram and Aluva Shiva Temple are heritage sites in Ernakulam district. Physical barriers impose restrictions on land availability for future developments.

3. REGIONAL SETTING

3.1 REGIONAL SETTING

Aluva is one of the 11 municipalities in Ernakulam district, which is the part of the Kochi urban agglomeration. As the regional setting of a town describes hierarchy of settlement in the regional scenario, the activity which the town has to perform and its connectivity with different settlements. Extensive regional settings study has been carried out in connection with the preparation of master plan for municipalities in Ernakulam district, which is documented as the District Urbanisation Report (DUR). As per this report Aluva Municipality has been classified as second order settlement along with Kalamassery, North Paravur, Thrippunithura, Muvattupuzha, Perumbavoor and Kothamangalam municipalities in the district, Kochi Corporation being only one first order settlement.

3.2 ALUVA IN REGIONAL CONTEXT

National commission on urbanisation (NCU) identified Kochi region as one of the national priority cities (NPC). As per their report Kochi – Thrissur corridor is spatial priority urban region. Aluva is one of the townships in this corridor. The regional linkage of Aluva is shown in **figure 3.1.**

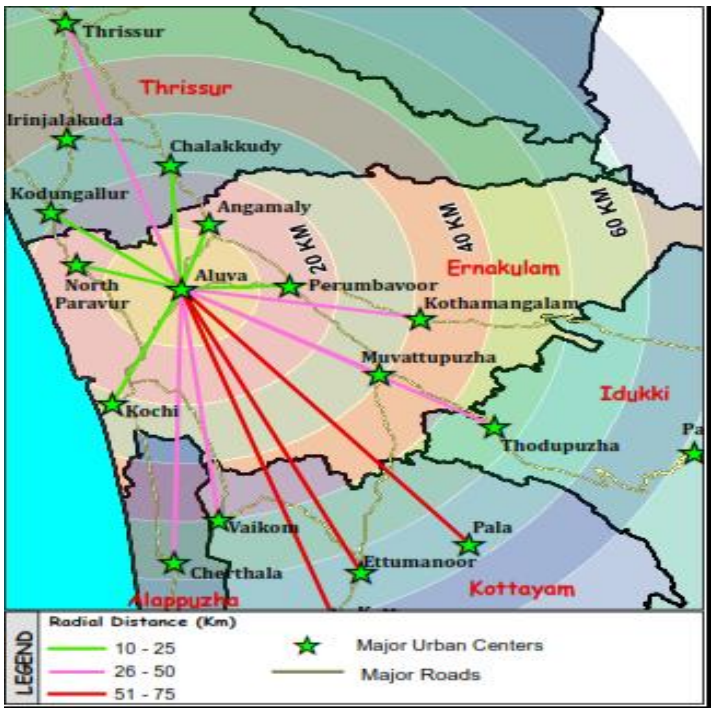

Fig: 3.1 Regional Linkages of Aluva

Aluva municipality is part of the Kochi urban agglomeration which is the first order urban centre of the state as per the state urbanization report (SUR) of Kerala. As per the future urban profile of the state delineated in the state urbanization report for 2021, Aluva forms part of the delineated urban cluster of Kochi as shown in **figure 3.2.**

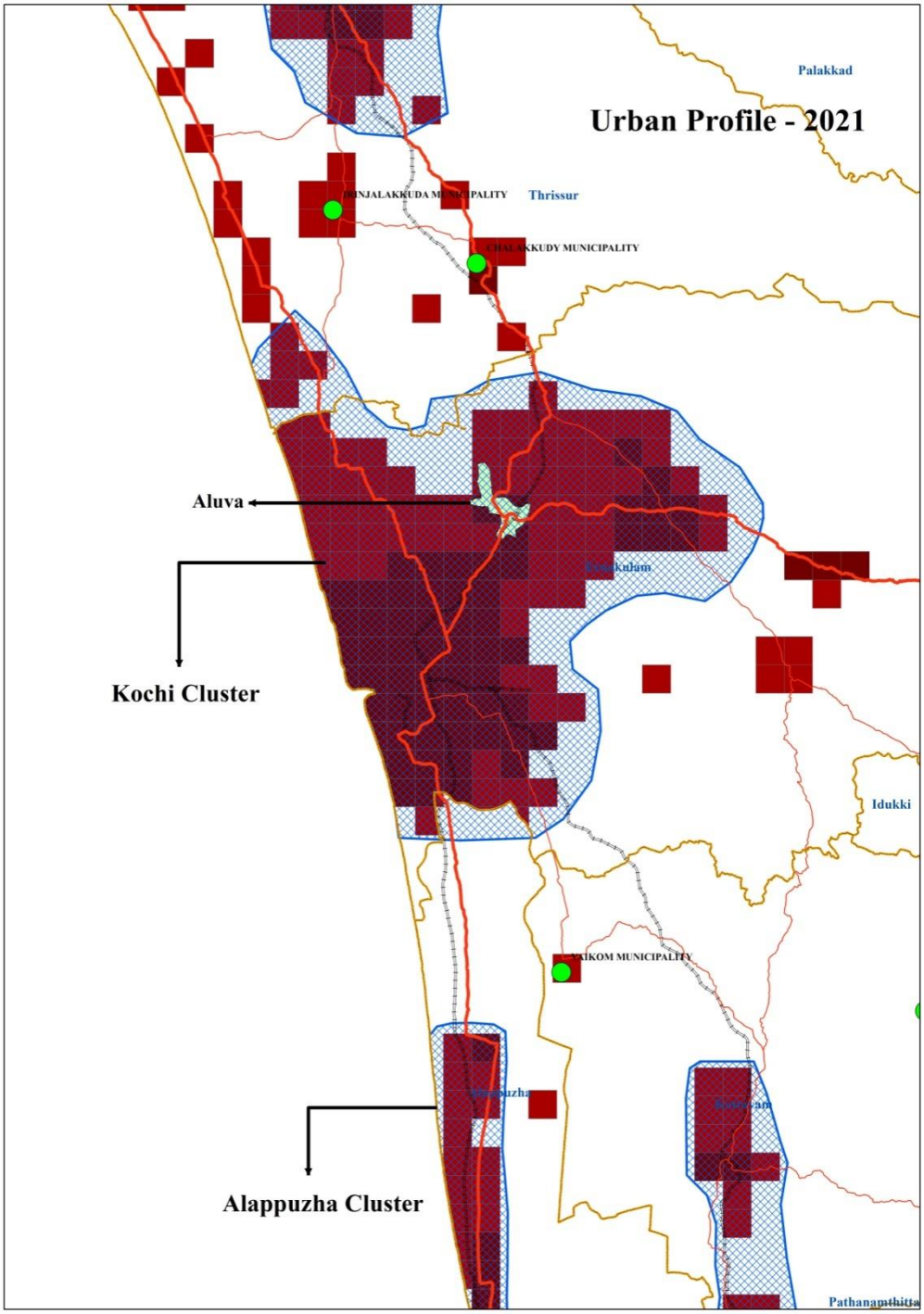

Fig: 3.2 Future Urban Profile 2021 – The Kochi Urban Cluster in SUR

As per the delineated urban profile for 2031, Aluva forms part of the delineated urban corridor of 'Alappuzha-Ernakulam - Thrissur-Palakkad' as shown in **figure 3.3.**

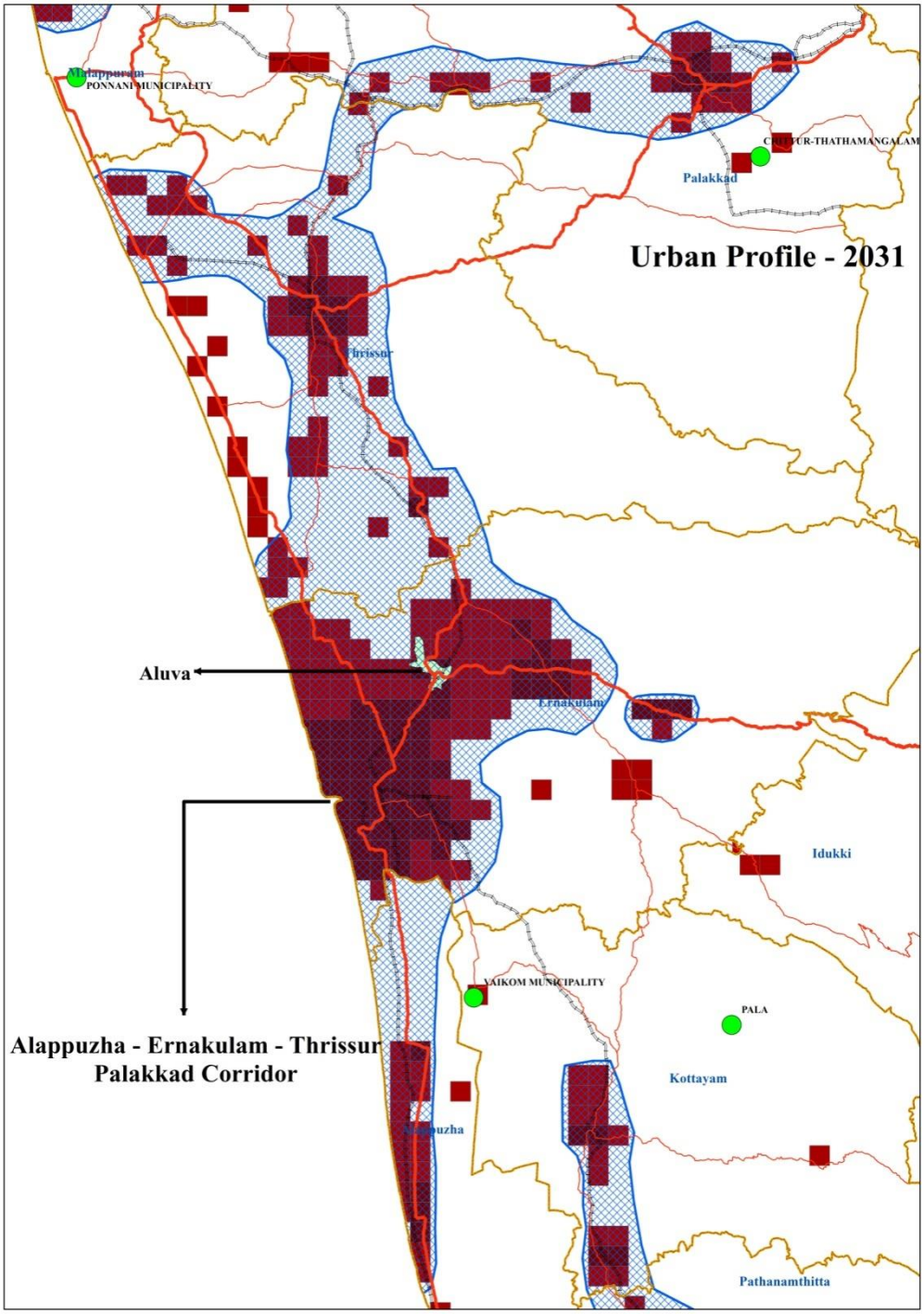

Fig: 3.3 Future Urban Profile 2031 – The Kochi Urban Cluster in SUR

It is thus evident that the town is part of thriving urban development corridor of the state. The SUR recommends preparation of regional plans for the delineated urban cluster/corridor and its influence area and settlement level plans for each LSG within this regional frame work.

The hierarchy of settlements of Ernakulam as revealed from regional setting study is shown in **figure 3.4.** As per the study, the existing hierarchy of Aluva town is 2nd order.

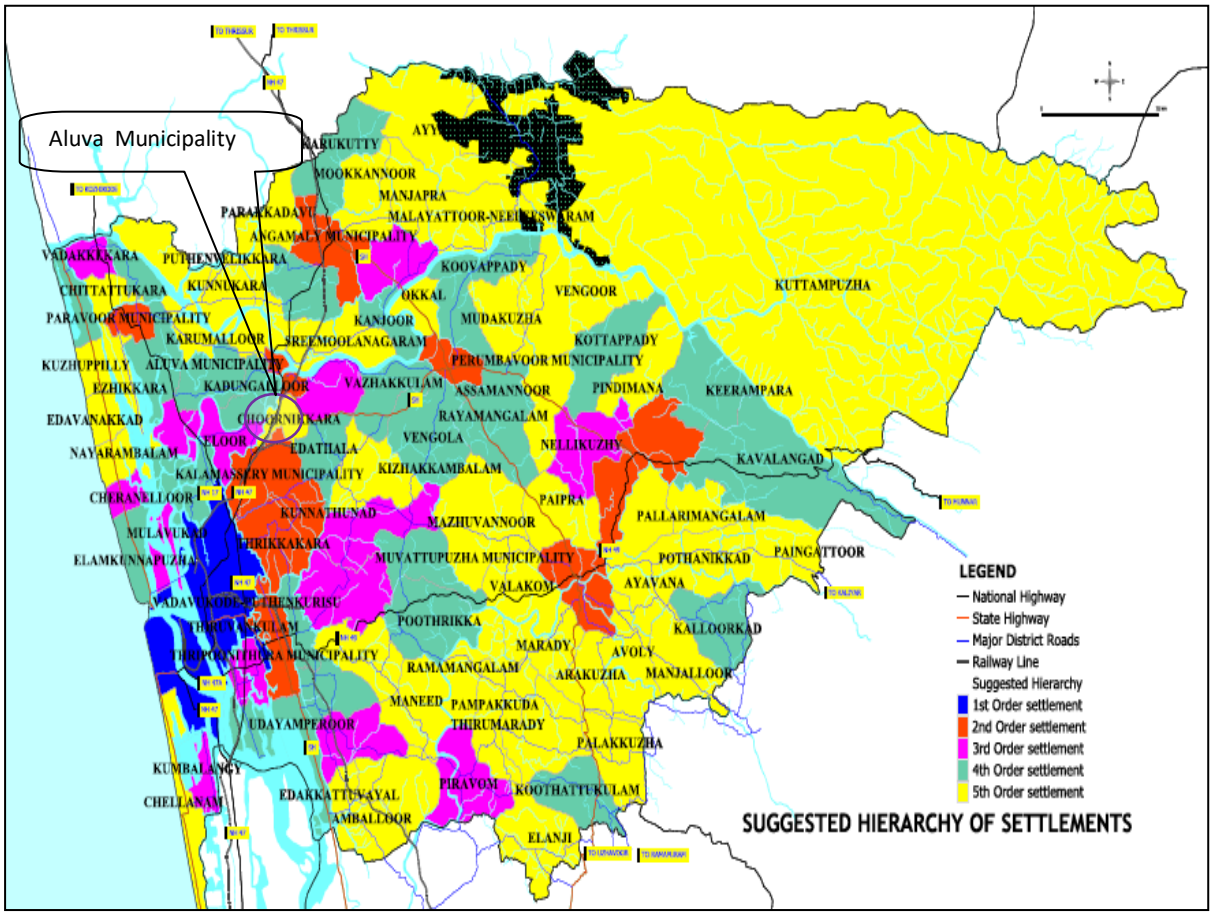

Fig: 3.4 Settlement hierarchy of Aluva in the district

The settlements in the service area of the Aluva town are grama panchayaths of Karumalloor, Chengamanad, Kadungalloor, Keezhmadu, Choornikkara and Alangad. The service population of the town as per 2001 works out to 240263. Being a second order town, Aluva has to cater the demands for various higher order facilities of these settlements.

When the functional character of settlements are studied based on land use and average plot size, the functional character of the town is found to be urban, and also based on the occupation pattern of the workers, the activities of the town comes under secondary and tertiary activities indicating that the people in the town are engaged mainly in the non agricultural activities, i.e. urban activities. Local body wise functional character of the district is as shown in the **figure 3.5**

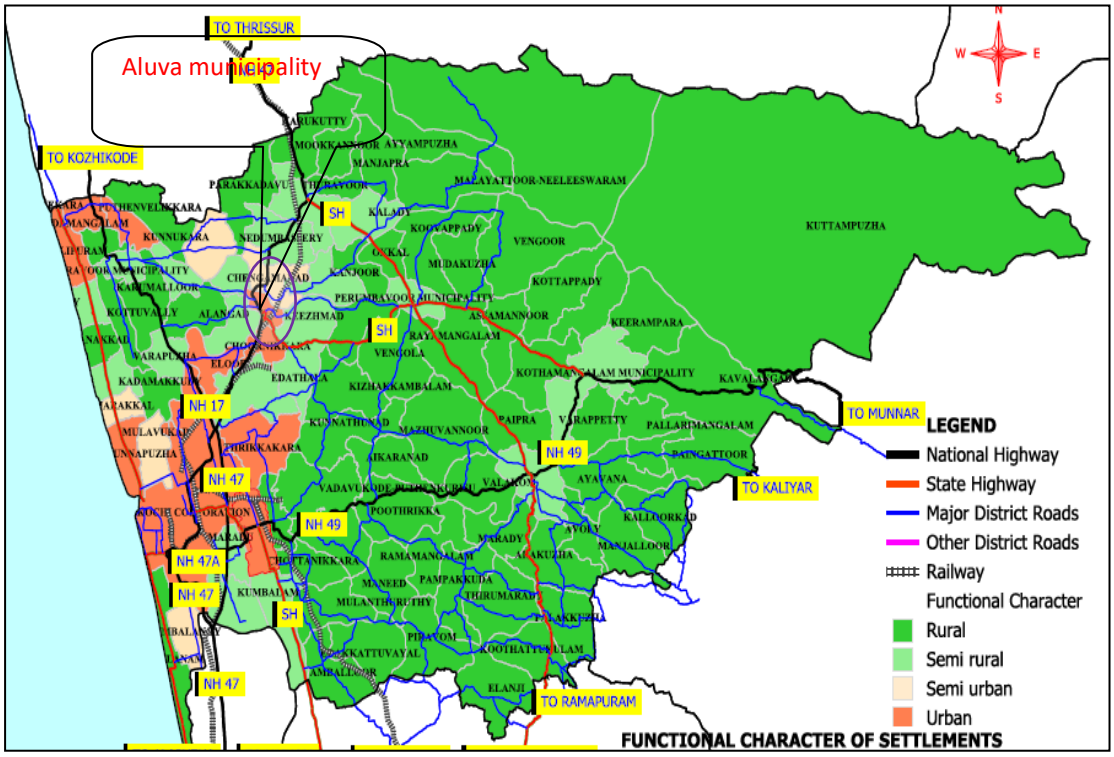

Fig: 3.5 Functional Character of Aluva in the district

The activity pattern of Ernakulam district is shown in **figure 3.6.** The activity of Aluva town is urban activity.

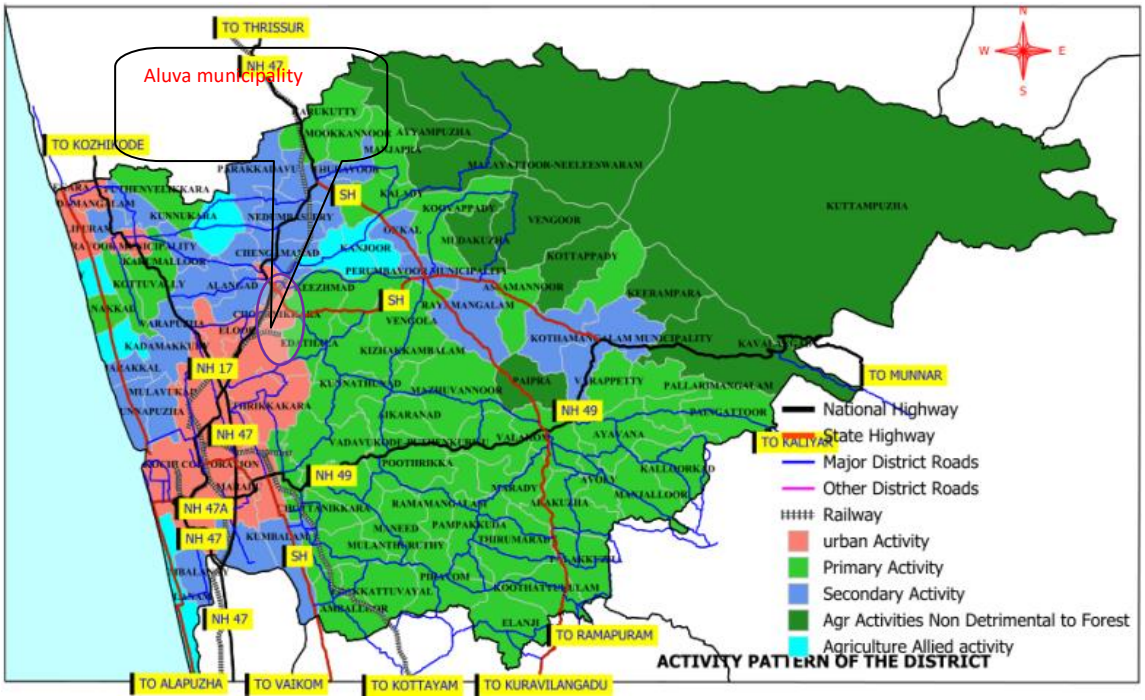

Fig: 3.6 Activity Pattern of Aluva in the district

The connectivity of Ernakulum district, as revealed from regional studies based on study on urbanisation is shown in the **figure 3.7.** Cochin International Airport in Nedumbassery is 12km from Aluva which is connected to most of the cities in India and several middle eastern countries. The NH 544(old NH 47) passing through Aluva provides the road connection to other parts of the state.

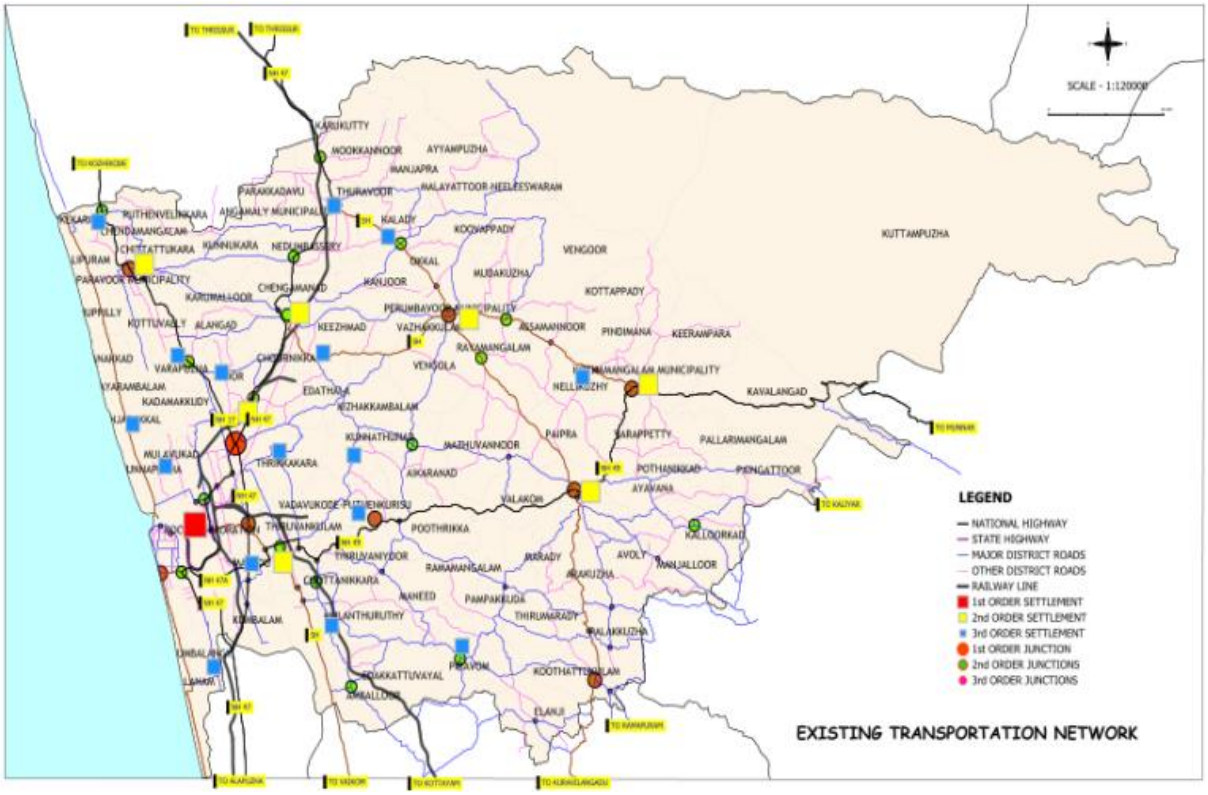

Fig: 3.7 Existing transportation network of the district

Major district roads (MDR) such as Aluva-Munnar road, Aluva-Perumbavoor road, Aluva - Paravur road and Aluva - Kadungalloor road provide the road connection to other part of the district. Aluva railway station is in the town and the Thiruvananthapuram – Shornur railway line provides connection to other parts of our country. Major roads and railway line in Aluva is shown in the **figure 3.8.**

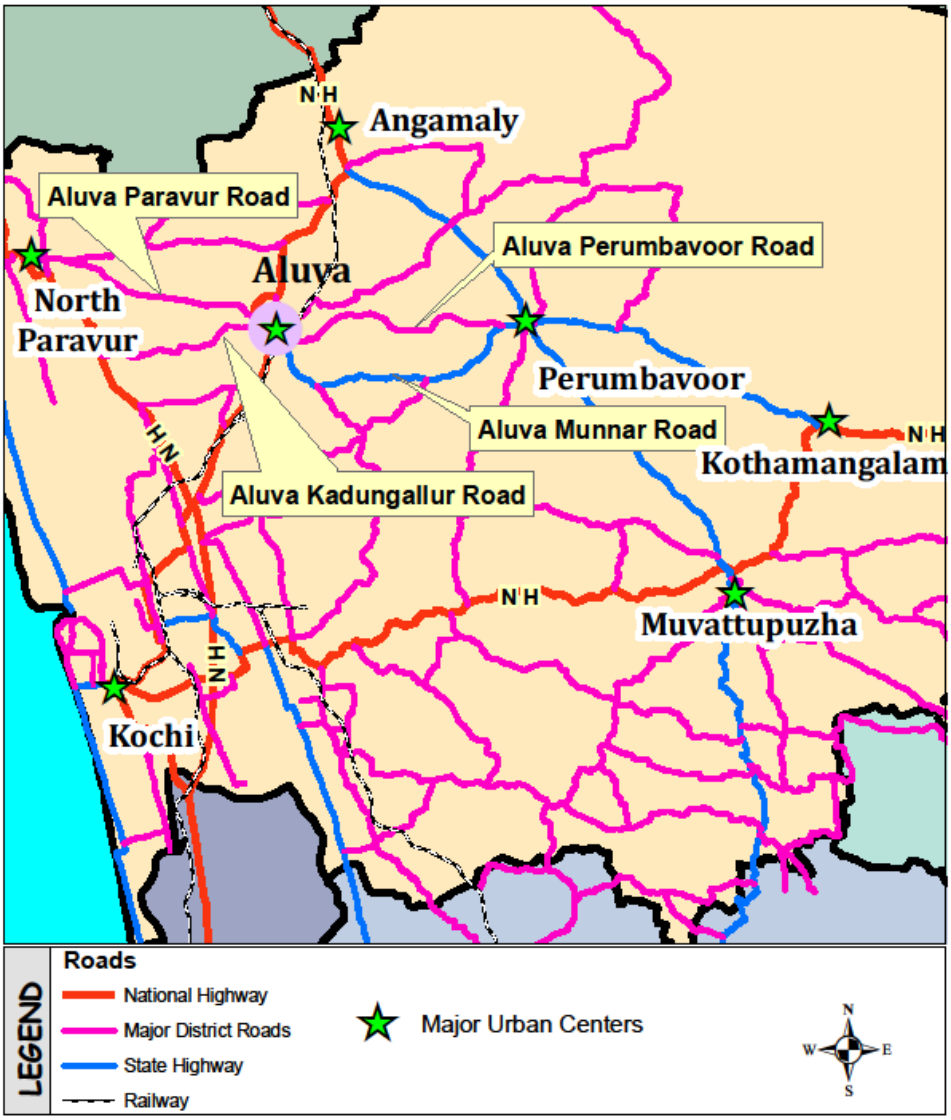

Fig: 3.8 Major roads & railway line of Aluva

3.3 DELINEATION OF PLANNING AREA

The regional level analysis based on district urbanisation report of the district has been considered for the delineation of planning area for the preparation of master plan. The role of the town under consideration in the overall development of the region and its influence area are the major deciding factors. The planning area has been delineated by analysing the characters like urban profile, functional character and land use concentrations of the town and grama panchayats lying adjacent to Aluva town, viz. Karumallooor, Chengamanad, Kadungalloor, Keezhmad, and Choornikkara. Aluva and its adjoining local bodies are shown in **figure 3.9** and the character of service area is shown in table **3.1.**

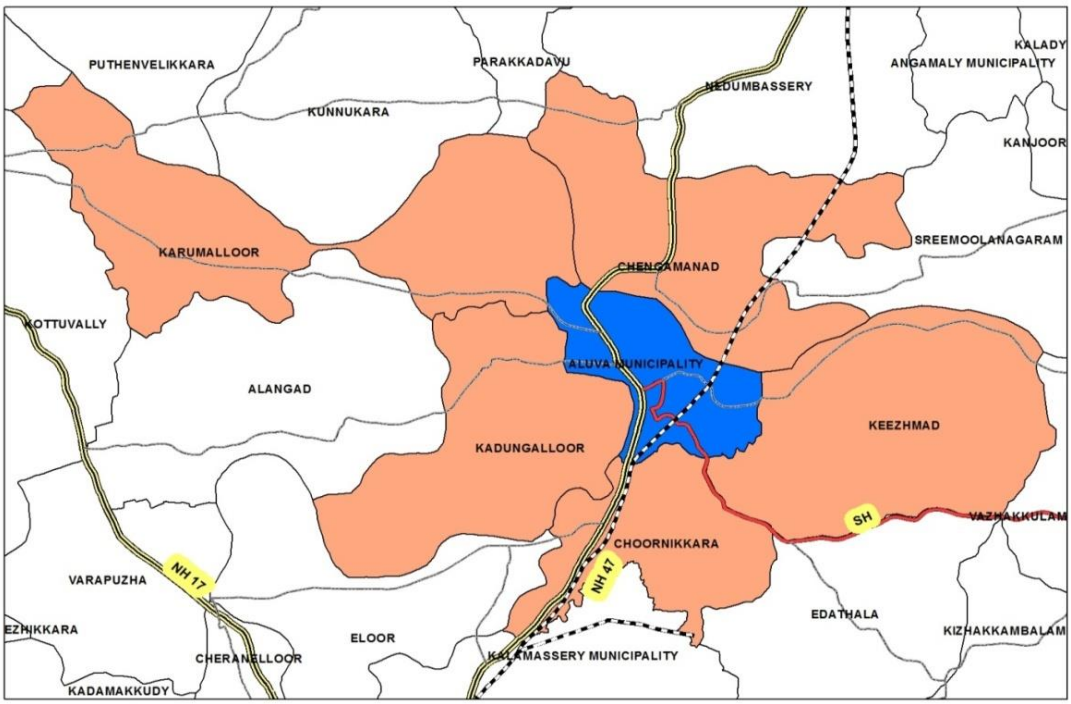

Fig: 3.9. Aluva & its adjoining local bodies

Table: 3. 1 Characteristics of adjacent Grama Panchayats of Aluva

settlement	**Urban profile**	**Functional character**	**Land use concentration**
Karumalloor	Non-urban	Semi-rural	Agriculture
Chengamanad	Urban	Semi-urban	Urban
Kadungalloor	Urban	Semi-rural	Agriculture
Keezhmad	Urban	Semi-rural	Agriculture
Choornikkara	Urban	Urban	Urban
Alangad	Urban	Rural	Agriculture

Source: District Urbanization Report

Most of the adjacent grama panchayats are showing functional character as semi-rural or rural, except for Choornikara grama panchayat showing urban character and Chengamanad grama panchayat showing semi urban character. However, considering that physical aspect and contiguity of development, the planning area is taken as Aluva municipal area itself.

3.4 INFLUENCE AREA OF THE TOWN

Aluva town influences the surrounding grama panchayats in many ways. A large number of State and Central Government offices are functioning in Aluva. For the administrative needs, people from the nearby local bodies are depending on Aluva town.

The famous Shivarathri Manappuram situated on the bank of Periyar is in Aluva municipal area. People from all parts of Kerala visit Aluva manappuram for "balitharppanam"on Shivarathri day.

Aluva is well connected to other urban centres through rail, road and waterway. This is one of the major stations on the Thiruvananthapuram - Shornur railway line. Aluva is a major collection and distribution centre, catering to the needs of the neighbouring towns and villages.

One of the terminal stations of the proposed metro rail is inside the Municipal area. In future, people from surrounding areas will have to depend on Aluva for metro rail. The town serves as a feeder town to the surrounding panchayats and other municipalities' viz. Chengamanad(P), Karumallur(P), Kadungallur(P), Choornikkara(P), Keezhmad(P), Perumbavoor(M), Kothamangalam(M). Aluva is developing fast as a satellite town of Kochi city. In the study on urbanization of Ernakulam district, Aluva is one of the second order settlements of Ernakulam district. In this study Aluva municipality and Choornikkara, Karumallor, Kadungalloor, Kunnukara, Alangad, Keezhmad Chengamanad panchayats have been included in the service area of Aluva.

Aluva market is one of the major whole sale markets of the region. People from surrounding local bodies also depend on Aluva market. Other commercial establishments of the town also attract people from surrounding panchayats.

NH 544 (old NH47) provides the road connection to other parts of the state. Also because of the Aluva railway station, KSRTC bus stand, private bus stand which help to provide connection to many other places, nearness to Nedumbassery Airport, and because of the Aluva-Munnar road, Aluva-Perumbavoor road etc, Aluva acts as a major transportation hub. Large number of KSRTC buses and private buses pass through or begins or ends their trip in Aluva town. A large number of educational institutions including higher education centers are functioning in and around Aluva town. The District Hospital (old Taluk

Hospital) is functioning at Aluva which is a major government hospital. For medical and educational purposes, the people from surrounding local bodies and even beyond depend on Aluva town.

Considering the above facts, Aluva municipality, the panchayats of Choornikkara, Karumalloor, Kunnukara, Alangad, Keezhmad and Chengamand have been considered as the influence area of Aluva town. The influence area of the town is shown in **figure 3.10**.

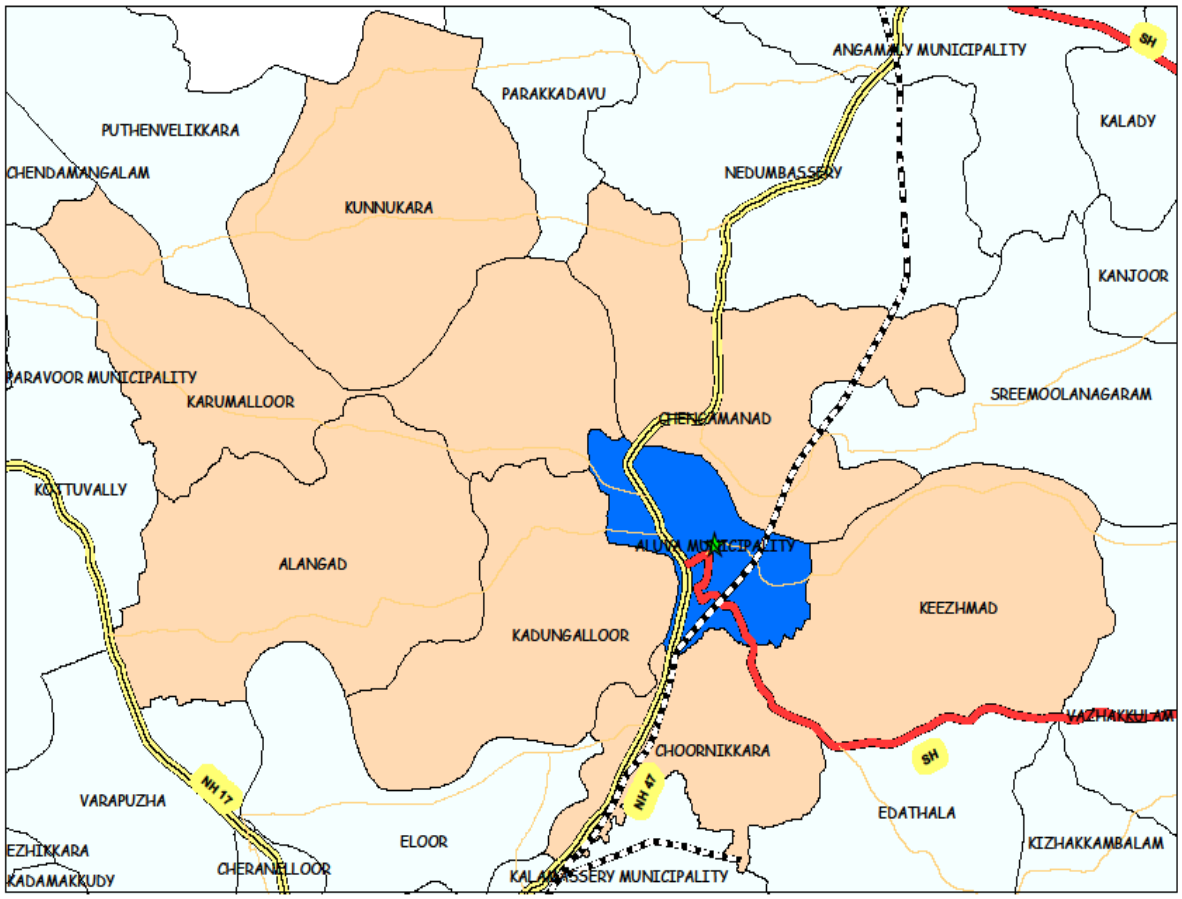

Fig: 3.10. Influence area of Aluva town

3.5 CHARACTERISTICS OF THE INFLUENCE REGION

There are eight grama Panchayaths including Aluva municipality that have been included in the influence area of Aluva town. The area and population details of the influence area of Aluva municipal town is shown in **table 3.2.** The total area of the region is 130.25 sq.km in 2001.

Table: 3.2 Area and Population details of Influence region of Aluva Municipal Town

SL. No.	Name of the LGs	Area in sq.km. - 2001	Population 2001	Density of Population 2001 (Persons per Sq:km)	Population growth rate 1991-2001 in %
1	**Aluva (M)**	**6.46**	**24110**	**3732**	**-2.68**
2	Choornikkara (P)	11.01	28875	2623	9.14
3	Karumalloor (P)	21.05	33451	1589	13.69
4	Kadungalloor (P)	18.06	35595	1971	16.56
5	Kunnukara (P)	21.25	22126	1041	12.08
6	Alangad (P)	19.05	36420	1912	14.28
7	Chengamanad (P)	15.58	28030	1799	11.01
8	Keezhmad (P)	17.79	31656	1779	13.78
Total		**130.25**	**240263**	**2056** (average)	**10.98%**

Source: Census of India

The total population of the influence region as per 2001 census was 240263. Among the constituent local governments in influence region of Aluva, Alangad grama panchayat has the highest population of 36420 and Kunnukara grama panchayat has the least population of 22126 as per 2001 census.

Aluva municipality has a population density of 3732 persons per sq.km whereas the average population density of the region is 2056 persons per Sq.km. both are high compared to the population density of 1012 persons per sq.km of the district.

The average decadal (1991-2001) population growth rate of the region is 10.98 %. It is just more than the population growth rate of the district of 10.24%. In fact this region is recording high population growth in the district except for Aluva municipality and Choornikkara grama panchayat areas. In this region the growth rate is high in grama panchayats of Kadungalloor (16.56%), Alangad (14.28%), Karumalloor (13.69%), Kunnukara (12.08%) and Keezhmad (13.78%). The population growth rate is low in Choornikkara grama panchayat (9.14%). Aluva municipality has a negative growth rate of population of 2.68%. This trend continued in 2011 census also with the total population of the municipality coming down to 22428 with growth rate as – 6.97%.

Table: 3.3 Literacy rate and sex ratio

Sl.no	Name of the LGs	Population	Literacy rate	Sex ratio
1	**Aluva (M)**	**24110**	**96.07**	**1053**
2	Choornikkara (P)	28875	92.53	1031
3	Karumalloor (P)	33451	90.90	1021
4	Kadungalloor (P)	35595	92.03	1008
5	Kunnukara (P)	22126	87.76	1034
6	Alangad (P)	36420	91.82	1013
7	Chengamanad (P)	28030	88.86	1027
8	Keezhmad (P)	31656	90.81	1046

Source: Census of India 2001

The average literacy rate of the influence region as per 2001 census is 91.35%, which is lower than the district rate of 93.20%. The literacy rate is in the range from 87.76% to 96.07% and the highest literacy rate is in Aluva municipality and the lowest literacy rate is in Kunnukara grama panchayat.The literacy rate of other local governments are Choornikkara (P)-92.53%, Karumalloor(P)-90.90%, Kadungalloor(P)-92.03%, Alangad(P)-91.82%, Chengamanad(P)-88.86% and Keezhmad(P)- 90.81%

The sex-ratio of the region is 1029 and it is higher than the district figure of 1019. The maximum value of sex-ratio (1053) in the region is for Aluva municipality and the minimum value of sex-ratio (1008) is for Kadungalloor grana panchayat. All the panchayats and Aluva (M) in the influence region of Aluva town except Kadungalloor (P) and Alangad (P) have sex ratio more than the district value. Population, literacy rate and sex ratio of Aluva municipality and nearby panchayat is shown in **table 3.3.**

3.6 FACILITIES IN THE INFLUENCE AREA

Almost all facilities are distributed in all constituent local bodies with some concentration in Aluva municipality. Facilities like primary health centre, ayurvedic and homeo medical centres and educational facilities like L.P.school, U.P.school, High school etc are available in all constituent local governments of the region. Markets and banking facilities are also available in all LGs.

Higher order facilities are more or less concentrated in Aluva municipality and Aluva being in the central part of the region, the constituent grama panchayats of the region has more dependency on Aluva.

3.7 TRANSPORT LINKAGES

Aluva is connected to almost all the grama panchayats of the influence region by State Highways / Major District roads, NH 544(Old NH 47) also pass through some of the LSG's in the influence area. In addition to this all panchayats are connected to Aluva town by PWD roads/ municipal roads. A good public transport system is available connecting Aluva with these settlements.

3.8 CONCLUSION

In the regional context of the district, Aluva is a second order settlement. In the district level analysis Aluva can be termed as an urban activity area in which service sector activities are the main activities. Aluva has very good transportation linkage with the settlements in the influence region. For higher order functions people are depending more on Aluva Municipality. Major roads viz. NH 544(old NH 47), A.M Road and Aluva – Perumbavoor road play influential role in the regional setting of the town. As the location of major railway station the town serves a wider region when the Kochi Metro becomes operational the importance of Aluva town will increase and people from the adjacent settlements will increasingly depend on Aluva than at present.

4. LAND USE

4.1 INTRODUCTION

Land use planning is the systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adopt the best land use options. Its purpose is to select and put into practice those land uses that will best meet the needs of the people while safe-guarding resources for the future.

As part of the preparation of Master plan for Aluva town, the Department of Town and Country Planning conducted land use survey in the town in the year 2010. From this land use survey we can find out whether the major activity of an area is Residential, Commercial, Industrial, Public and Semi-public, Transport & communication, Park & open spaces, Agricultural , Burial Grounds and water bodies etc. This chapter discusses the Peculiarities of land use pattern of the town.

4.2 EXISTING LAND USE 2010

As per the land use survey conducted in 2010, the major land uses in Aluva town were Residential, Commercial, Public & semi-public, Industrial, Agricultural Park & Open spaces, Traffic and Transportation, Water bodies & Burial grounds etc.

At present, the Aluva municipal area is divided into 26 wards, which include an area of 6.46 sq.km. As per the land use survey conducted, the total developed area (excluding water body and paddy land uses) of the town is 568.64 hectares. Existing land use break up -2010 shown in **table 4.1** and **figure 4.1**.

Table: 4.1 Existing Land use break up of Aluva Town 2010

Land Use	Area (Ha)	% Total area	% Developable area
Residential	229.56	35.54	40.37
Commercial	39.86	6.17	7.01
Industrial	2.54	0.39	0.45
Public & Semipublic	114.15	17.67	20.07
Traffic & Transportation	79.12	12.25	13.91
Park & Open Space	24.49	3.79	4.31
Mixed crop (Active)	47.89	7.41	8.42
Mixed crop (Non Active)	0.38	0.05	0.07
Coconut	2.4	0.37	0.42
Wet Land	4.32	0.67	0.76
Vacant Land	23.93	3.71	4.21
Developable area	**568.64**		
Paddy (uncultivated)	1.85	0.29	
Water Body	75.51	11.69	
Total	646	100	100

Source: Land use survey -2010

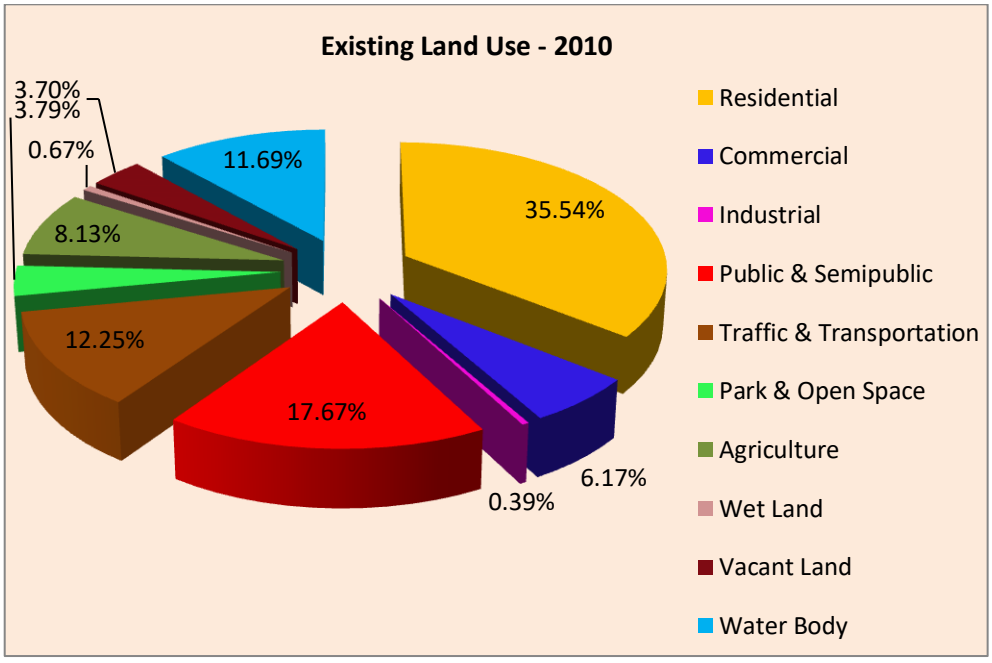

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Fig: 4.1 Land use break up of Aluva Town 2010

The details of various land uses of Aluva town as per the land use survey are shown **figure 4.2.**

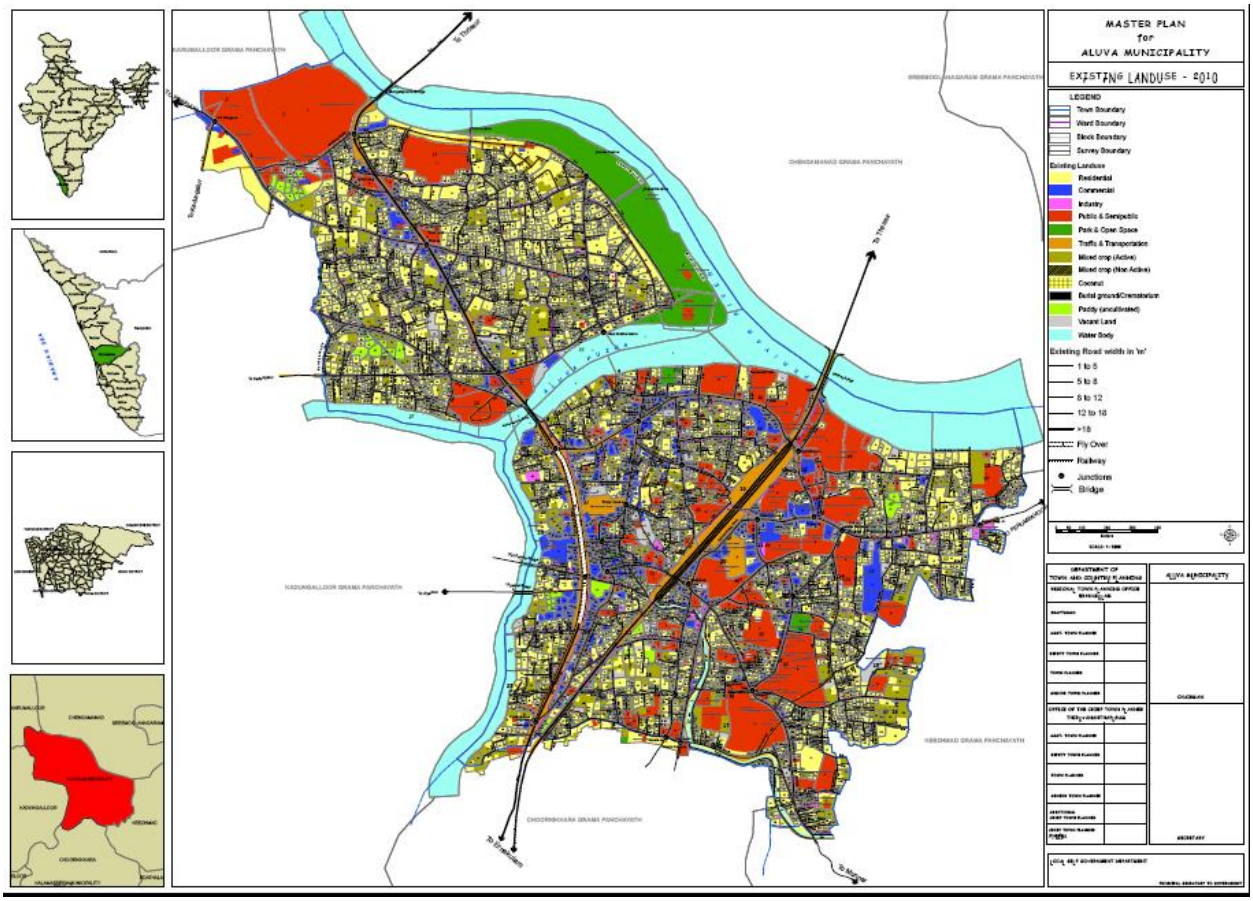

Fig: 4.2 Existing land use of Aluva town as per land use survey-2010

4.2.1 RESIDENTIAL LAND USE

The residential use occupies about 35.54% of the gross area and 40.37% of the total developed area of the town, which is the highest percentage of land use available as per the existing land use categorization. As per the land use survey conducted in 2010, it is found that though residential areas are distributed all over the municipality, southern half of the town constitutes more percentage of residential land use than the northern portion when compared with the total land use of Aluva town. More percentage of land use available in this northern portion is residential land use when compared with the total area of the northern portion. Refer **figure 4.3** for the distribution of residential land uses.

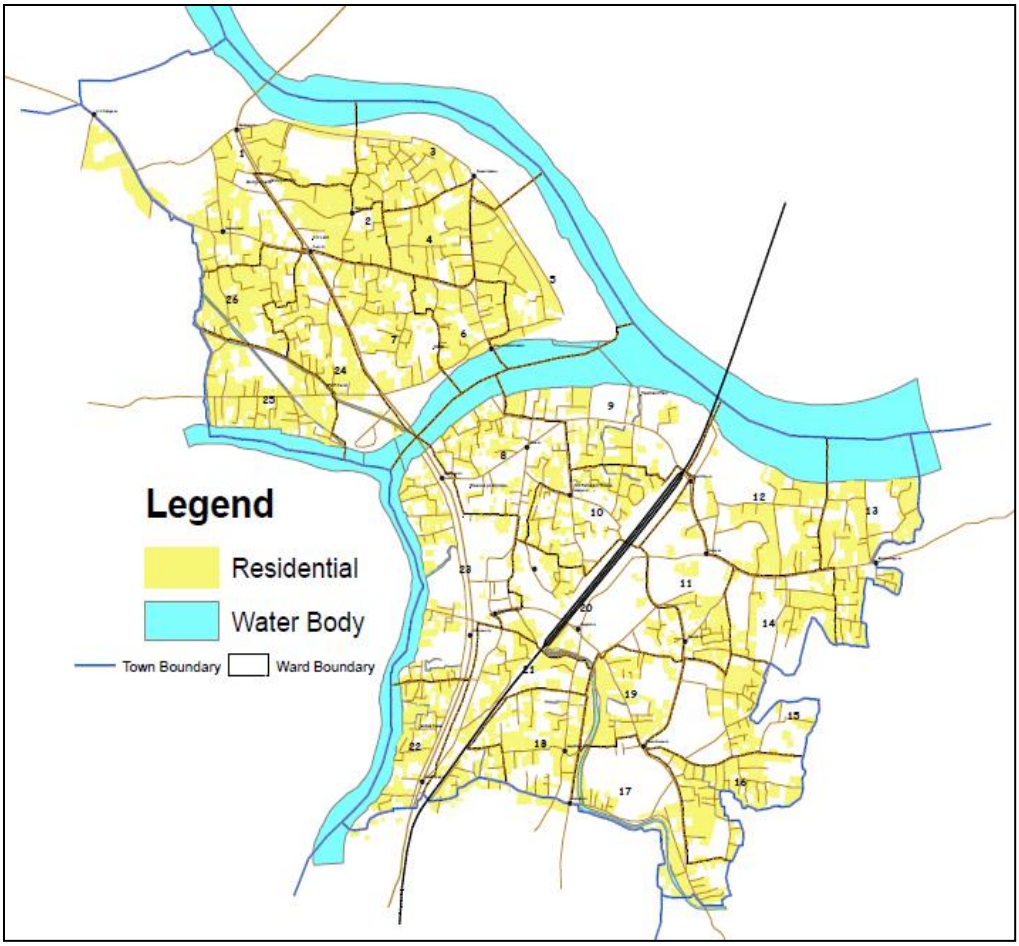

Fig: 4.3 Existing Residential land uses in Aluva town as per land use survey-2010

4.2.2 COMMERCIAL LAND USE

The major economic base of the town is trade and commerce. About 6.17% of the gross area of the town is under commercial land use which is 7.01% of the developed area. Major concentrations of commercial activities are on the southern part of the town. In the northern side, the sides of NH 47 (the new NH 544) near Paravur junction are identified as the centre of booming commercial activity. As per land use breakup of the town – 1991 (refer table 4.6), the commercial area was 22.03 hectares, which was 4.16% of the developed area. It indicates the increase in commercial land use during two decades. **Figure 4.4** shows the distribution of commercial land use in Aluva town.

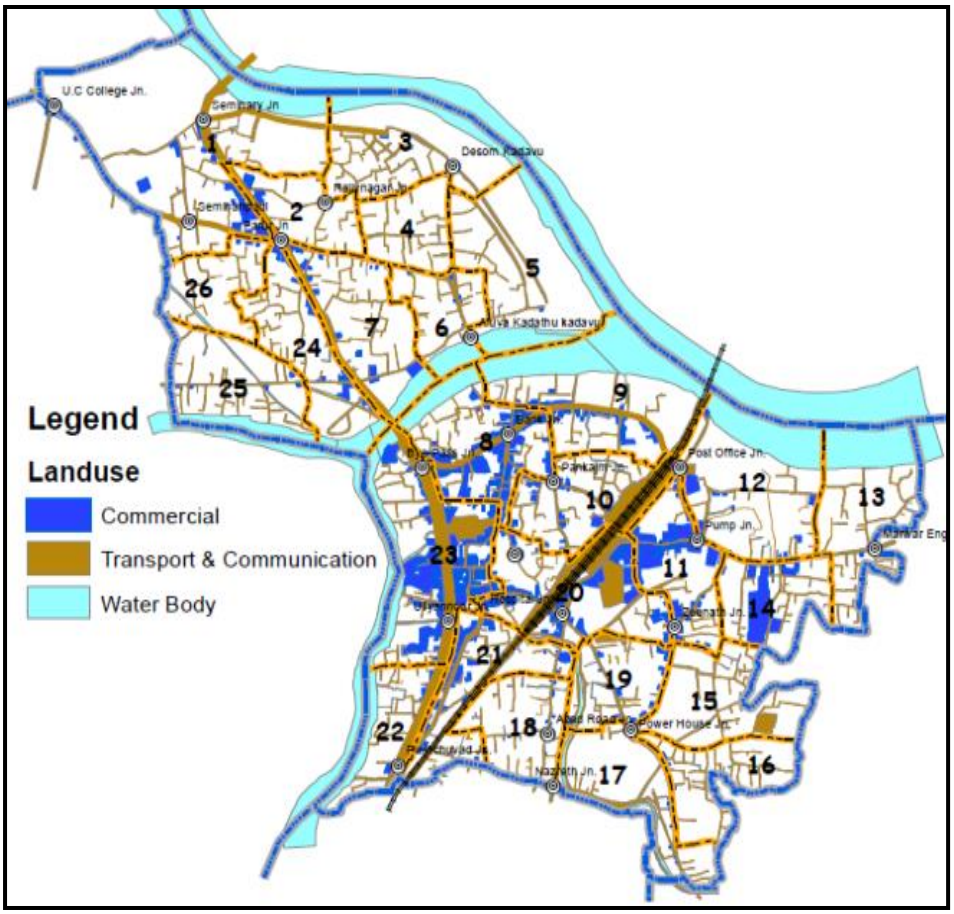

Fig: 4.4 Distribution of Commercial land use in Aluva Town

Commercial activities on the southern part of the town are concentrated on the sides of palace road, market road, market area, railway station road, near railway station and private & KSRTC bus stand areas. There are various commercial establishments in the whole of Aluva town. These include establishments for wholesale trades, retail trades, personnel services, professional services, business, banking etc. There are 4 cinema theatres in town namely– Matha & Madhurya, Zeenath and Casino.

4.2.3 INDUSTRIAL LAND USE

From the beginning of 20th century, Aluva was known as the industrial epicenter of state. As per the land use survey 2010 the industrial land use comes to only 2.54 hectares, which is 0.39% of the gross area of the town (0.45% of the developed area). In 1991 the industrial area was 9.14 hectares, which was 1.73% of developed area. Closing down of Kathai

Cotton Mills might have caused this decline in extent of industrial use between 1991 and 2010. Industrial units of all types are spread out throughout the southern part of the town and a very minute percentage of industrial land use is seen in the northern part of the town. Refer **figure 4.5** for the locations of Industrial land uses in Aluva town.

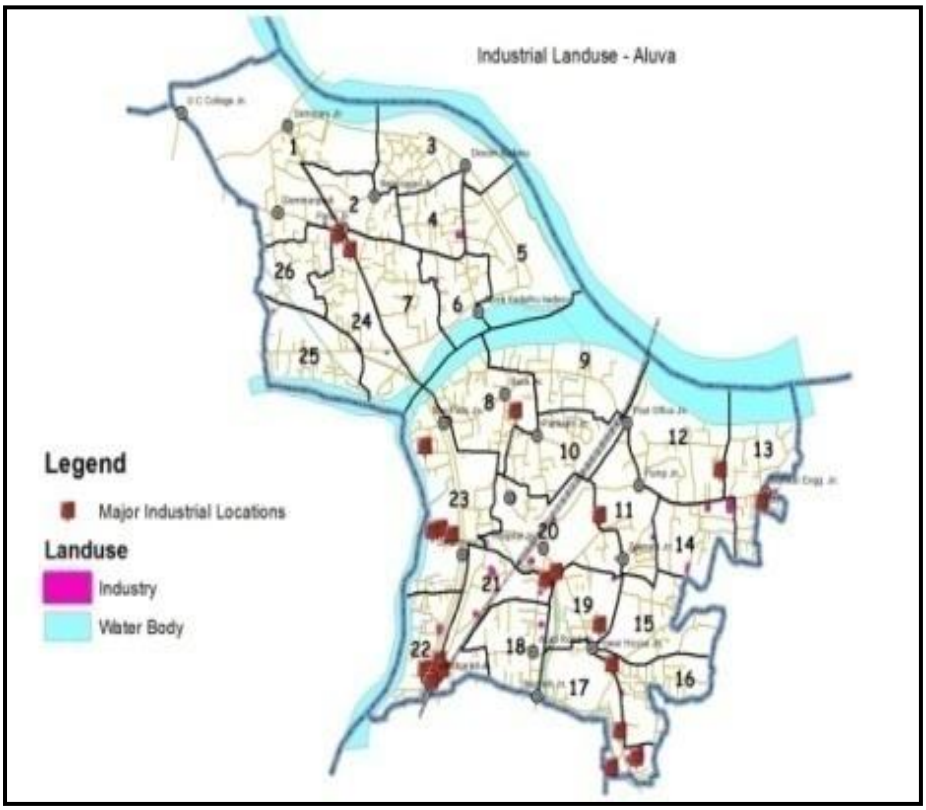

Fig: 4.5 Industrial land uses in Aluva Town

4.2.4 PUBLIC & SEMI-PUBLIC LAND USE

As per the land use survey conducted in 2010, the area under Public & semi-public land use is 114.15 hectares, this is about 17.67% of the gross area of the town, and 20.07% of developable area. Major concentrations of Public & Semi-public land uses are on the southern part. This Public & Semi-public area includes educational institutions, KWA treatment plant, government offices, hospitals and religious institutions etc. High percentage of area under this use is mainly due to large number of religious institutions. **Figure 4.6** shows the locations of Public & semi-public land uses in Aluva town. This land use has the second highest share of land uses in the town, next only to Residential land use.

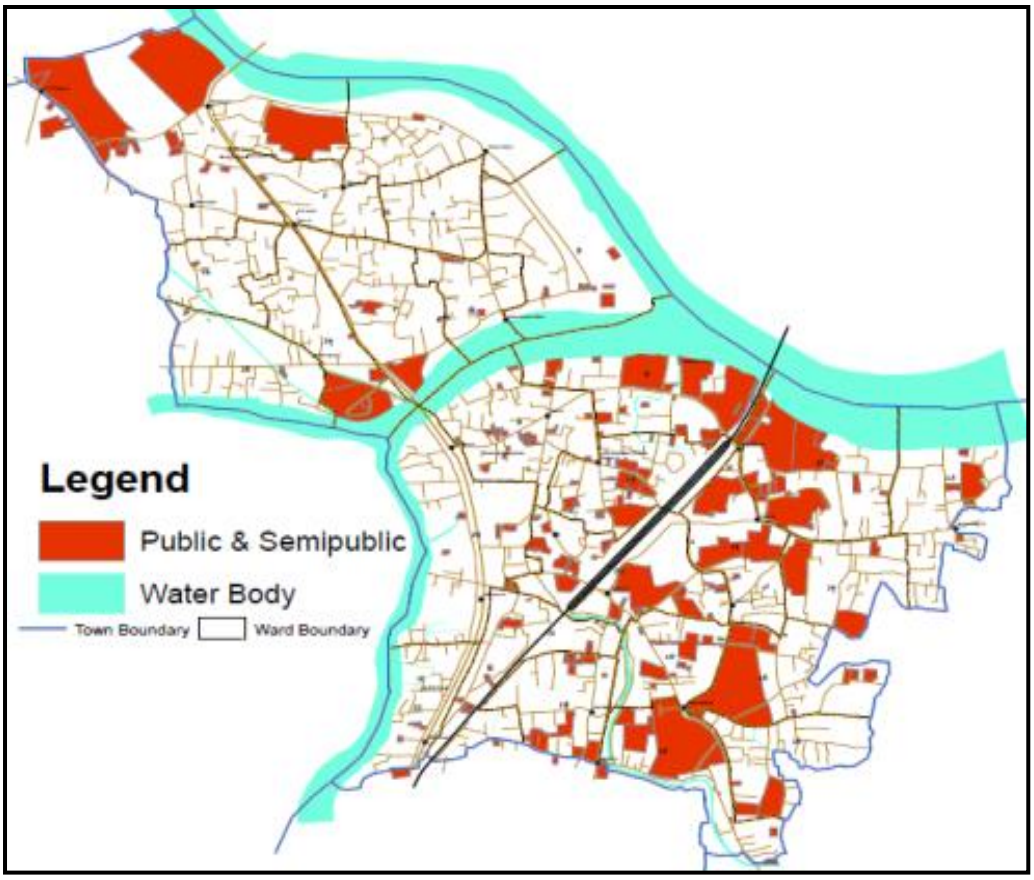

Fig 4.6 Public & Semi-public land use in Aluva Town

4.2.5 AGRICULTURAL LAND USE

Agricultural land use of Aluva town comprise mainly of coconut gardens, mixed crop (Active/Non – active) and uncultivated paddy lands. **Table 4.2** gives the details of agricultural land use in Aluva town.

Table: 4.2 Agricultural land use

Description	Coconut	Mixed Crop (Active)	Mixed Crop (non-Active)	Paddy (All type)	Others	Total
Area in ha	2.40	47.89	0.38	1.85	4.32	56.84
% (of Total area)	0.34%	7.41%	0.05%	0.29%	0.67%	8.79%

Source: Land use survey 2010

It is clear from **table 4.2** that total Agricultural land usage is 8.80% of the gross area of the town. Paddy lands (uncultivated) are found in ward 12 & ward 25. Agricultural land use of Aluva municipality, as per the land use survey 2010 is shown in **figure 4.7.**

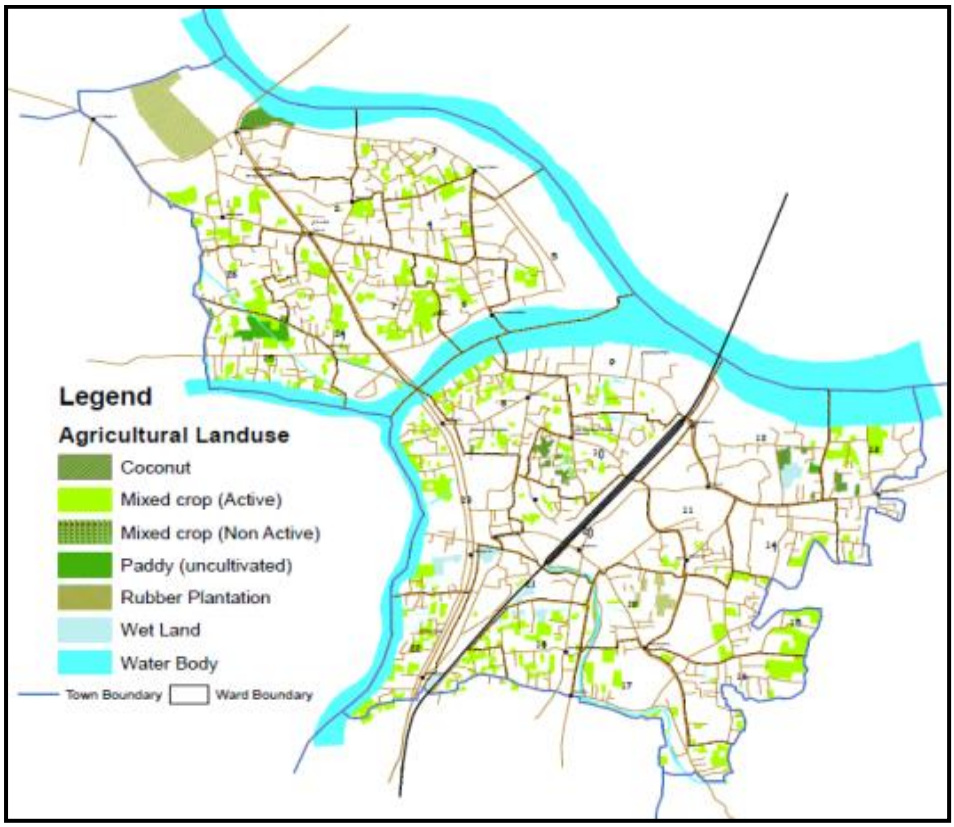

Fig: 4.7 Distribution of Agriculture land uses in Aluva Town

4.2.6 TRAFFIC & TRANSPORTATION LAND USE

The different categories under this use are railway station and yard, bus stand, road etc. As per the land use survey conducted in 2010, the area under traffic and transportation use is 79.12 ha. This is about 12.25% of the gross area of the town (13.91% of the developable area) **Table 4.3.** gives the details of land under traffic and transportation use in Aluva town.

Table: 4.3 Traffic and Transportation use

Description	Railway Station, Yard etc.	Bus Stand, Road, Transport Terminals etc.	Total
Area in ha	11.9	67.22	79.12
% (of Total area)	1.85%	10.41%	12.25%

Source: Land use survey2010

As per the 1991 land use survey land under Roads & railways was 54.03 hectares. We cannot compare these land uses in different years because as per the 1991 land use classifications, transport terminals (railway station, K.S.R.T.C bus terminal, old municipal bus terminal, new municipal bus stand) and establishments for freight transport, establishments engaged in storage and warehouse etc. were included under traffic & transportation land use. But as per the latest classification, establishments for freight transport, establishments engaged in storage and warehouse etc. are not covered under Traffic and Transportation land use. **Figure 4.8** depicts the traffic and transportation land use in Aluva Town.

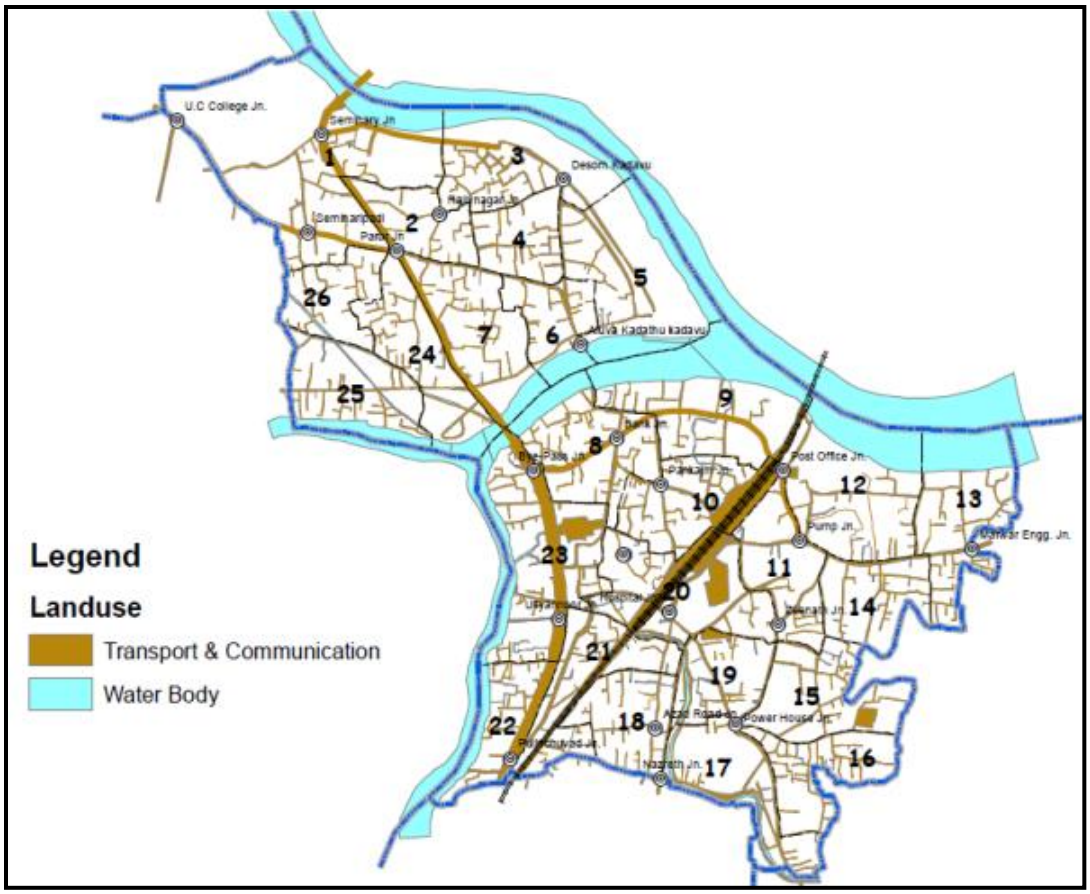

Fig: 4.8 Traffic and Transportation land use in Aluva Town

4.2.7 PARK & OPEN SPACES

The different categories under Park & open space land uses are Stadium/playground, Park, Open Maiden etc. For details of Park & open space land use refer **table 4.4.**

Table: 4.4 Park and open space land use

Description	Stadium / Playground	Park	Open Maiden	Total
Area in ha	0.77	0.74	22.98	24.49
% (of Park & Open space Land use)	0.12%	0.11%	3.56%	3.79%

Source: Land use survey

It is clear from **table 4.4** that total Park & open space land usage is 3.79% of the gross area of Aluva town. As per the land use survey the Park & open space area used by open maidan is 22.98 hectares, which comes to 3.56% of the gross area of Aluva municipality. Major portion of this open maidan category consists of Aluva manappuram area.

As per the land use survey conducted in 2010, the municipal ground is shown as sub-jail ground and included under the playground category and a municipal park is available for public use, which is included under the Park & open space land use. Refer **figure 4.9** for the locations of Park & open spaces in Aluva town.

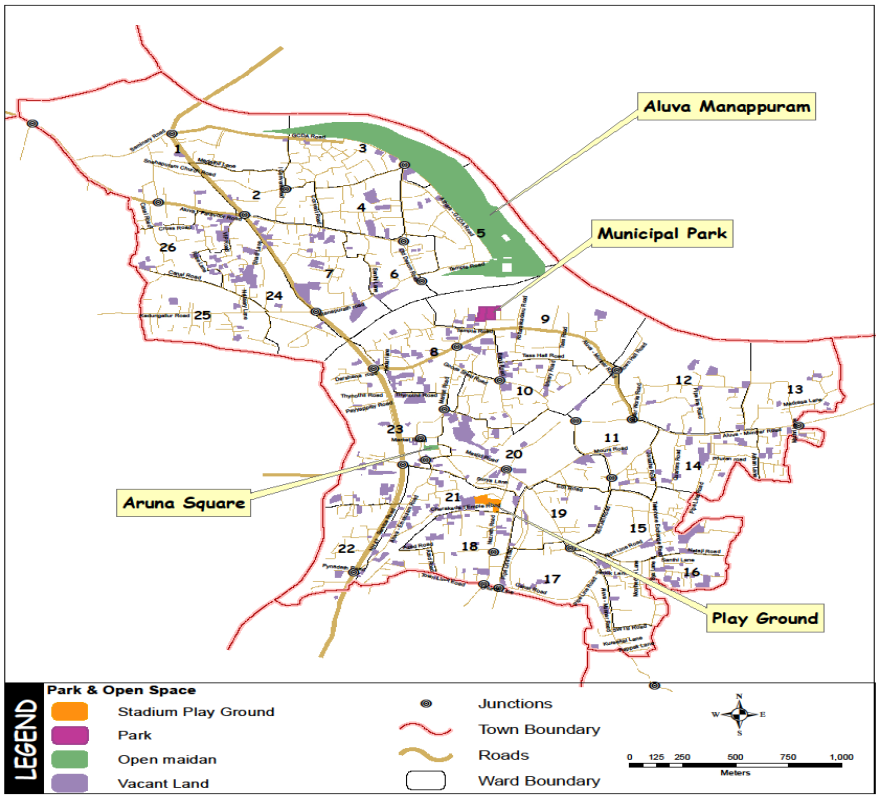

Fig: 4.9 Locations of Park & open spaces in Aluva Town

4.2.8 WATER BODIES

As per the land use survey conducted in 2010, the area coming under water bodies is 75.51 hectares; this is about 11.69% of the gross area of the town. River and drains are included

under the water bodies' category and aqueducts and canals are also included under this category. Major portion of this category consists of Aluvappuzha.

4.3 COMPARISON WITH PLANNING STANDARDS

A comparison of existing developable area of Aluva town with the UDPFI norms for small towns is shown in the **table 4.5.** The shares of land use categories of Commercial, Public & semi-public and traffic & transportation are more compared to the UDPFI standards. The land uses under Residential, Industrial and Recreational, parks & playground are below the UDPFI norms. Though the share of recreational / parks & playground land use of Aluva town is less compared to than UDPFI standards, when compared to other nearby towns, this percentage is high.

Table: 4.5 Comparison of land use of Aluva town with UDPFI norms

Land Use	% of total (existing) developable area-2010	UDPFI norms - For small Towns
Residential	40.37%	45-50%
Commercial	7.01%	2-3%
Industrial	0.45%	8-10%
Public & Semi Public	20.07%	6-8%
Traffic and transportation	13.91%	10-12%
Recreational, Parks & Play ground	8.52%	12-14%
Agriculture except paddy	9.67%	Balance
Total	100%	100%

Source: Land use survey

4.4 TEMPORAL VARIATION OF LAND USE

A comparison of land use break up of Aluva municipality of 1991 and 2010 has been made. It was found that 59.76% of the developable area was under Residential land use, which was the highest percentage of usage. The temporal variation of land use of Aluva municipality is shown in **table 4.6**. On comparison, it can be noted that the land uses under commercial, public & semipublic and traffic and transportation uses are on the increase. The change in area of land under residential use is due to the change in categorization of land uses between the two periods.

Table: 4.6 Land use break up of 1991and 2010 of Aluva Town

Sl No	Type of Land use	Existing Land use area in Ha		Existing Land use area in percentage	
		1991	2010	1991	2010
1	Residential	316.70	229.56	59.76	40.37
2	Commercial	22.03	39.86	4.16	7.01
3	Industrial	9.14	2.54	1.73	0.45
4	Public & Semi Public	103.57	114.15	19.54	20.07
5	Traffic and Transportation	5.32	79.12	1.00	13.91
6	Road and railway	54.03	-	10.2	-
7	Green and open space	2.35	48.42	0.44	8.52
8	Dry cultivation	12.47	54.99	2.35	9.67
9	Marshy	4.33	-	0.82	-

	Developed land	529.94	568.64	100	100

Source: Land use survey- 1991 & 2010

4.5 COMPARISON WITH SIMILAR TOWNS

Land Use of Aluva town is compared with other towns like Angamaly, Kothamangalam, Muvattupuzha, North Paravur and Perumbavoor on **table 4.7 and figure 4.10.**

Table: 4.7 Comparison of land use of Aluva town with adjacent towns

Land Use Category	Aluva	Angamaly	Kothamangalam	Muvattupuzha	North Paravur	Perumbavoor
	Percentage share of Land Use Category					
Residential	35.54	35.68	25.53	60.43	**66.00**	59.56
Commercial	**6.17**	2.21	0.87	2.21	2.22	1.67
Industrial	0.39	**4.75**	0.22	0.37	0.18	3.09
Public & Semi-public	**17.67**	4.35	2.12	5.09	5.13	3.44
Open space+Vacant land	**7.50**	0.65	1.32	0.91	2.3	1.56
Agriculture	8.80	43.17	**62.17**	18.73	12	19.8
Transport & Communication	**12.25**	6.81	4.87	5.05	9.2	6.13
Water Body	**11.69**	2.38	2.9	7.21	2.97	4.14
Forest	0	0	0	0	0	**0.61**

Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Land use survey

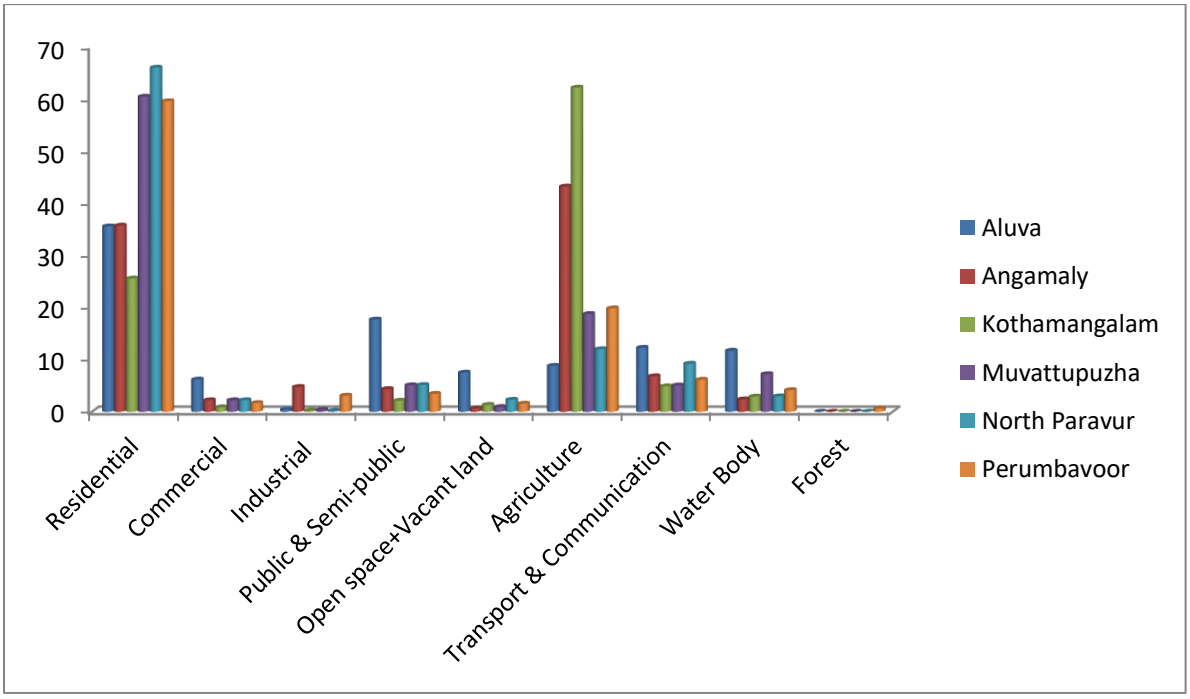

Fig: 4.10 Comparison of land use of Aluva town with adjacent towns

Land use categories of Commercial, Public & Semi-public, Open space, Traffic and Transportation and water body have comparatively more dominance in Aluva Town depicting the urban nature of the town.

4.6 CONCENTRATION PATTERN OF LAND USES

4.6.1 INTRODUCTION

Concentration pattern of a land use is analysed to get an idea about in which ward the different categories of land uses are concentrated.

Concentration index of a land use in a ward = [(Area of that land use in a ward / Total area of the ward)] / (Area of that land use in the town / Total area of the town)

Concentration Index may have a value greater than one, equal to one or less than one. Wards with concentration index greater than one indicates that the land use under consideration is concentrated more in that ward than other wards in the town.

Concentration pattern of residential, commercial and public and semipublic land uses of Aluva town are studied here under.

4.6.2 CONCENTRATION PATTERN OF RESIDENTIAL LAND USE

Comparing the concentration index values obtained for 26 wards in Aluva town, it is observed that concentration index of residential land use is varying from a value of 0.47 to 2.07. Though residential areas are spread out throughout the town, the higher concentration indices are found in ward 4 (Mana), ward 26 (Thandikkal) and ward 2 (Guru Mandiram) and value of CI is more than two for ward 4 and ward 26. These wards are located on the northern portion of the town, near Paravur junction and on the sides of Aluva- Paravur-Deshom Kadavu road. Generally, wards in the northern portion have higher values of CI indicating concentration of residential activities there. Ward 20 (Taluk hospital) and ward 9 (Palace) are the two wards having least CI value of Residential land use. The concentration pattern of Residential land use is shown in **figure 4.11.**

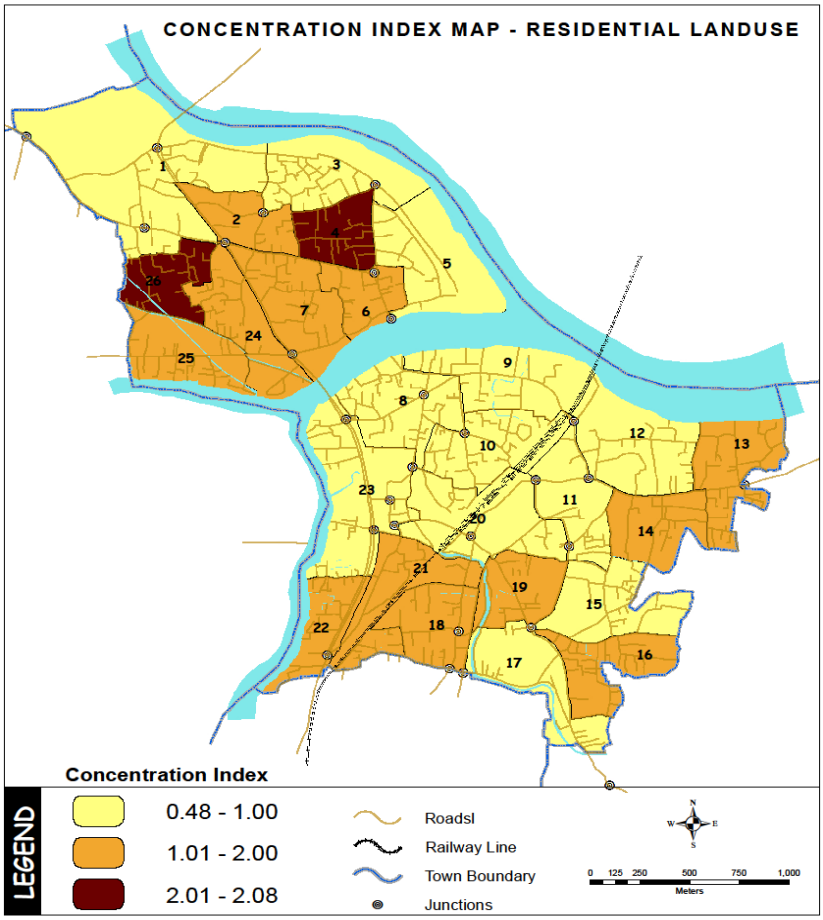

Fig: 4.11 Concentration Pattern of Residential land use

4.6.3 CONCENTRATION PATTERN OF COMMERCIAL LAND USE

Comparing the concentration index values obtained for 26 wards in Aluva town, it is observed that concentration index of commercial land use shows varying values with a maximum value of 3.66. The higher concentration indices are found in ward 23 (Market), ward 11 (Ooman kuzhi thadam), ward 8 (Kadathukadavu), and ward14 (Aasan Colony). Wards having less value of commercial CI are Ward 15 (Treasury), ward 5 (Manappuram) and ward 17 (Madhavapuram). The major economic base of the town is trade and commerce. Main concentration of commercial activities is on the southern part of the town. And these wards are located along the sides of NH 544 and Palace road and along the sides of Railway station road and Aluva- Perumbavoor road. The concentration pattern of Commercial land use is shown in **figure 4.12**

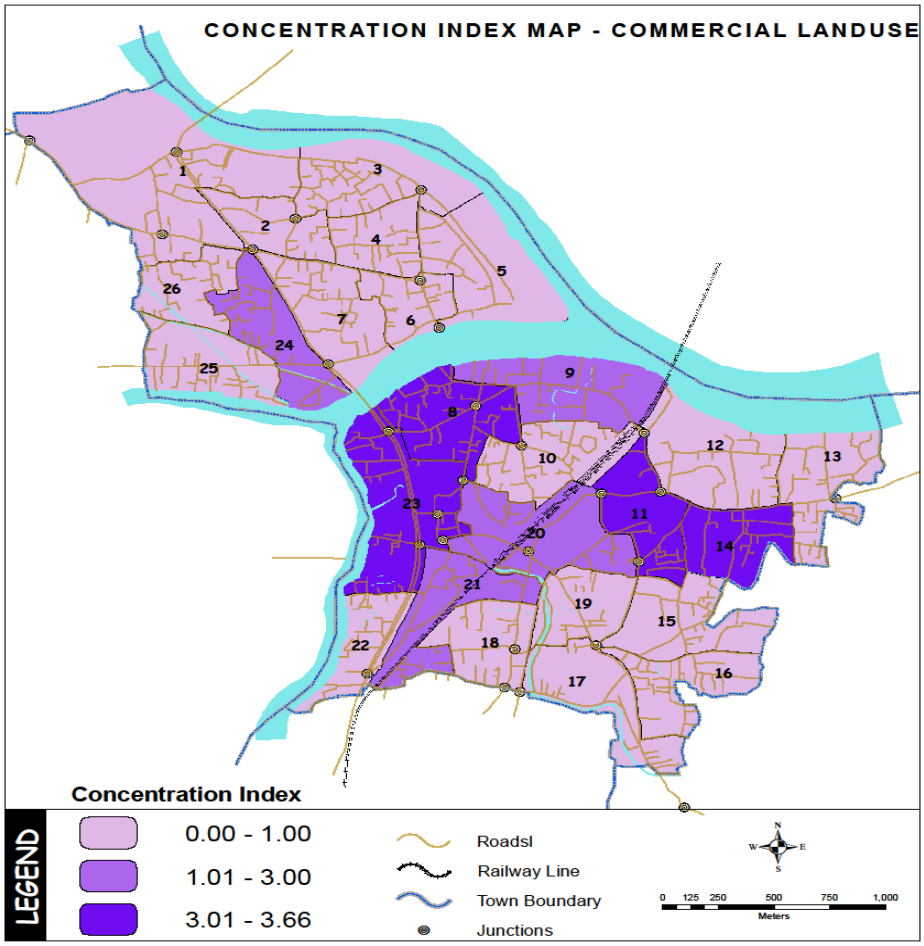

Fig: 4.12 Concentration Pattern of Commercial land use

4.6.4 CONCENTRATION PATTERN OF PUBLIC AND SEMI-PUBLIC LAND USE

The concentration index values for Public & semi-public land uses are varying from a value of 0.01 to 2.50. The higher concentration indices are found in ward 15 (Treasury), ward 17 (Madhavapuram), ward 1 (Mangalapuzha seminary) and ward 12 (Municipal office). Major concentrations of Public & Semi-public land uses are in the southern part. But ward 1 (Mangalapuzha seminary), which is having a high CI value for Public & semi-public land use is in the northern portion of the town, because of the presence of U.C. College and the seminary there.

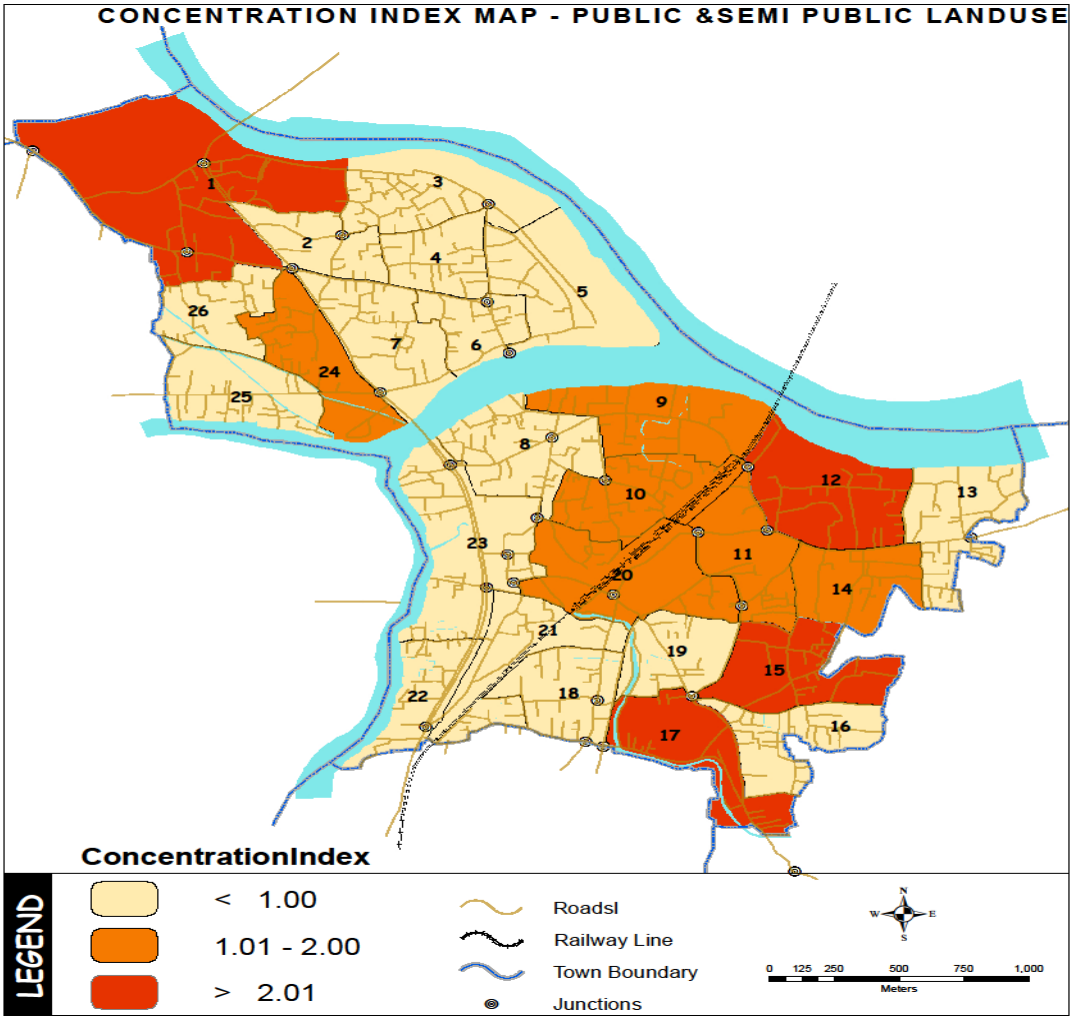

Fig: 4.13 Concentration Pattern of Public & semi-public land use

Ward 4 (Mana) and ward 26 (Thandikkal) are the two wards having least CI value of Public & semi-public land use. The concentration pattern of Public & semi-public land use is shown in **figure 4.13.**

4.7 LAND USE ACTIVITY PATTERN

As per the regional setting study, Aluva town can be termed as an urban activity area with service sector activities as main activities at present. The activity pattern of wards of Aluva municipality based on land use is found as Residential, Public cum Commercial, Residential cum Commercial or Residential cum Public. Land use with higher concentration index and existing

land use percentage are considered for each ward for finalising the activity of that particular ward. According to this, the activity pattern is arrived at and is shown in **table 4.8 & figure 4.14.**

Residential activities are mainly concentrated in wards 2, 4, 6, 7, 13, 16, 18, 22, 25 & 26. Main concentration is near to NH 544 in northern zone. In wards 3 & 5 where major portion of Aluva Manappuram is situated have to be considered separately. Residential cum Commercial activities are concentrated in wards 8, 21 & 23, along the sides of NH 544 on southern portion of the town. Residential cum Public activities are concentrated in wards 1, 9, 10, 12, 14, 15, 17, 19 & 24. Except for wards 1 and 24 and all other wards with concentration of Residential cum Public activities are located on the southern portion of the town. Public cum Commercial activities are concentrated in two wards i.e. ward 11& ward 20. These wards are located at the central portion of the southern part of the town and are near to the railway station & railway station road.

Table: 4.8 Activity pattern of wards

Sl. No.	Name of Wards	Ward No	Activity Pattern
1	Mangalapuzha seminary	Ward I	Residential cum Public
2	Guru Mandiram	Ward II	Residential
3	Desam Kadavu	Ward III	Residential
4	Mana	Ward IV	Residential
5	Manappuram	Ward V	Residential
6	Ganapathy Temple	Ward VI	Residential
7	St. Ans Church	Ward VII	Residential
8	Kadathukadavu	Ward VIII	Residential cum Commercial
9	Palace	Ward IX	Residential cum Public
10	Library	Ward X	Residential cum Public
11	OomanKuzhi Thadam	Ward XI	Public cum Commercial

12	Municipal Office	Ward XII	Residential cum Public
13	Madrassa	ward XIII	Residential
14	Aasan colony	Ward XIV	Residential cum Public
15	Treasury	Ward XV	Residential cum Public
16	Snehalayam	Ward XVI	Residential
17	Madhava Puram	Ward XVII	Residential cum Public
18	Nazareth	Ward XVIII	Residential
19	Thrikkunnath	Ward XIX	Residential cum Public
20	Taluk Hospital	Ward XX	Public cum Commercial
21	Sastha Temple	Ward XXI	Residential cum Commercial
22	Pulinchode	Ward XXII	Residential
23	Market	Ward XXIII	Residential cum Commercial
24	Priyadarsini	Ward XXIV	Residential cum Public
25	Canal	Ward XXV	Residential
26	Thandikkal	Ward XXVI	Residential

Source: Land use survey

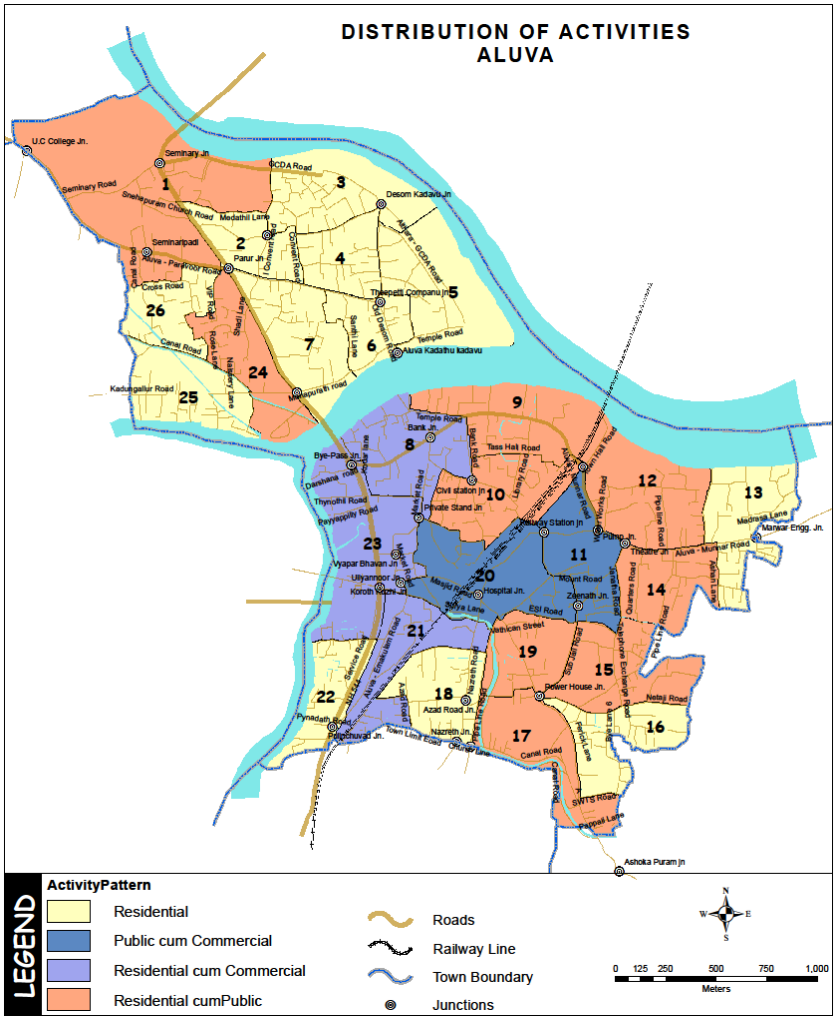

Fig: 4.14 Activity pattern of Aluva town based on Land Use

4.8 FUNCTIONAL CHARACTER OF THE TOWN

The function of a settlement is the major activity within the settlement, be it primary sector activities (rural), secondary sector / tertiary sector activities (urban activities) or the combination of above. Analysis based on land use and average plots size revealed that there exist settlements having semi urban and semi rural character other than urban and rural character normally expected. As per the regional setting study, Aluva town shows urban character. The functional character of different wards of Aluva town has been analyzed and it is shown in **table 4.9.**

Table: 4.9 Functional character of wards

Sl. No.	Name of Wards	Ward No	Functional Character
1	Mangalapuzha seminary	Ward I	Urban
2	Guru Mandiram	Ward II	Urban
3	Desam Kadavu	Ward III	Semirural
4	Mana	Ward IV	Urban
5	Manappuram	Ward V	Semirural
6	Ganapathy Temple	Ward VI	Urban
7	St. Ans Church	Ward VII	Urban
8	Kadathukadavu	Ward VIII	Urban
9	Palace	Ward IX	Urban
10	Library	Ward X	Urban
11	OomanKuzhi Thadam	Ward XI	Urban
12	Muncipal Office	Ward XII	Urban
13	Madrassa	Ward XIII	Urban
14	Aasan colony	Ward XIV	Urban
15	Treasury	Ward XV	Urban
16	Snehalayam	Ward XVI	Urban
17	Madhava Puram	Ward XVII	Urban
18	Nazareth	Ward XVIII	Urban
19	Thrikkunnath	Ward XIX	Urban
20	Taluk Hospital	Ward XX	Urban

21	Sastha Temple	Ward XXI	Urban
22	Pulinchode	Ward XXII	Urban
23	Market	Ward XXIII	Urban
24	Priyadarsini	Ward XXIV	Urban
25	Canal	Ward XXV	Urban
26	Thandikkal	Ward XXVI	Urban

Source: Land use survey

The functional character of ward 3 (Desam Kadavu) & ward 5 (Manappuram) are semi rural character and all other wards shows urban character. Refer **figure 4.15.**

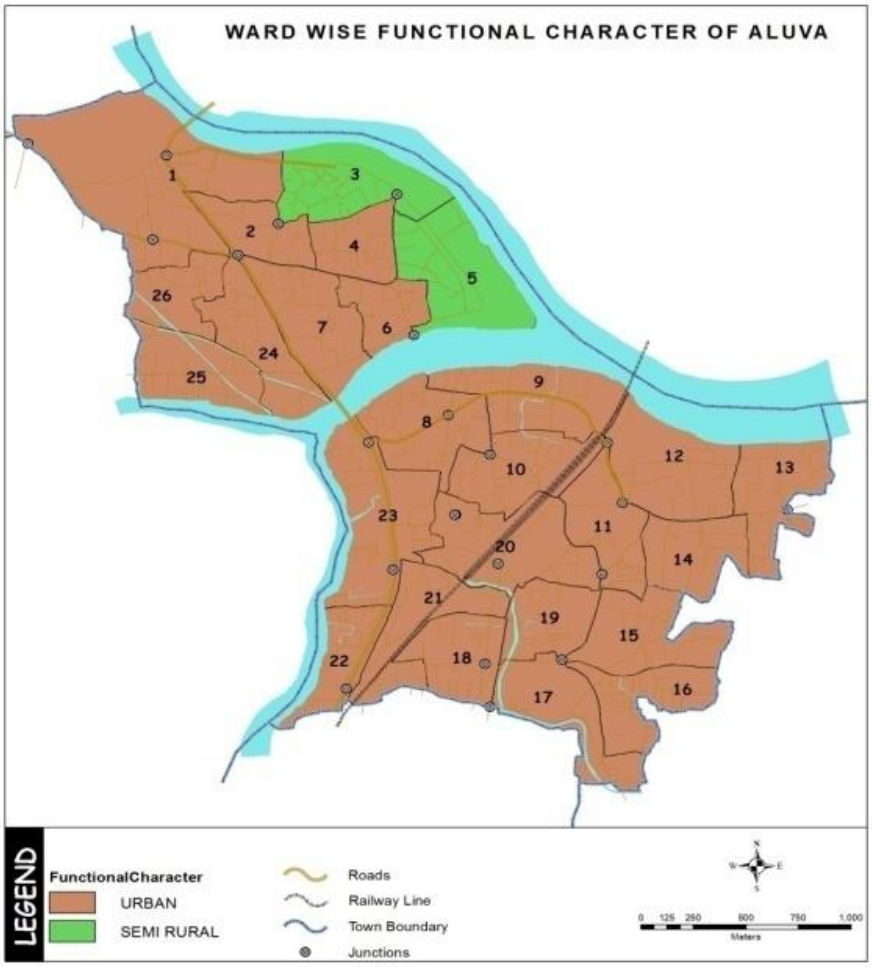

Fig: 4.15 Functional characters of wards in Aluva town

4.9 CONCLUSION

Residential use occupies major portion of the Aluva town. The major economic base of the town is trade and commerce and this land use has increased over the years. From the beginning of 20th century, Aluva was known as the industrial epicenter of the state. But the deterioration of the industries that had occurred after the 50's had its impact in Aluva town. Public & semi-public is the second highest land use in the Aluva town, with large parcels of land under educational, institutional and religious activities. The Traffic & Transportation land use has also grown over the years and the proposed metro rail starting from Aluva gives scope for immense development of the town. As per the land use survey there is no active paddy in the town. Aluvappuzha, is the lifeline of Aluva town. As per the regional setting study, Aluva town is an urban activity area. Functional character of the town is urban. The functional character of different wards of Aluva town has also been analyzed. It is seen that and except for ward 3 & ward 5, which are semi rural all other wards show urban character.

5. DEMOGRAPHY

5.1 INTRODUCTION

Demography is the statistical study of human populations. It can also be applied to any kind of dynamic living population, i.e., one that changes over time or space. (Demography refers to the dynamics of human population and their study.) It helps to project and estimate trends in the growth of the population. The base of all the development efforts is the population parameter. To provide maximum benefit for the maximum number of people is one of the objectives of planning. So it is necessary to analyze the population by studying its size, growth rate, density, concentration pattern etc. This chapter looks into the demographic profile of Aluva municipality. Final provisional figures of 2011 census included in this chapter.

5.2 POPULATION SIZE

The population growth had shown a convex pattern from the year 1961 to 2011 as per the census details. From 1961 onwards a steady increase in population has been observed, reaching the highest figure of 25278 in 1981. The 1991 census showed a declining population growth which was the start of a reverse in trend. This trend continued in the succeeding censuses of 2001 and 2011.

As per census 2011, the population of Aluva town is 22428 which is 0.68% of the total population of the Ernakulam district. **Table 5.1** and **figure 5.1** show the population of Aluva municipality from 1961 to 2011.

Table: 5.1 Population of Aluva Municipality from 1961 to 2011

Year	1961	1971	1981	1991	2001	2011
Population	20863	24067	25278	24774	24110	22428

Source: Census 1961 to 2011

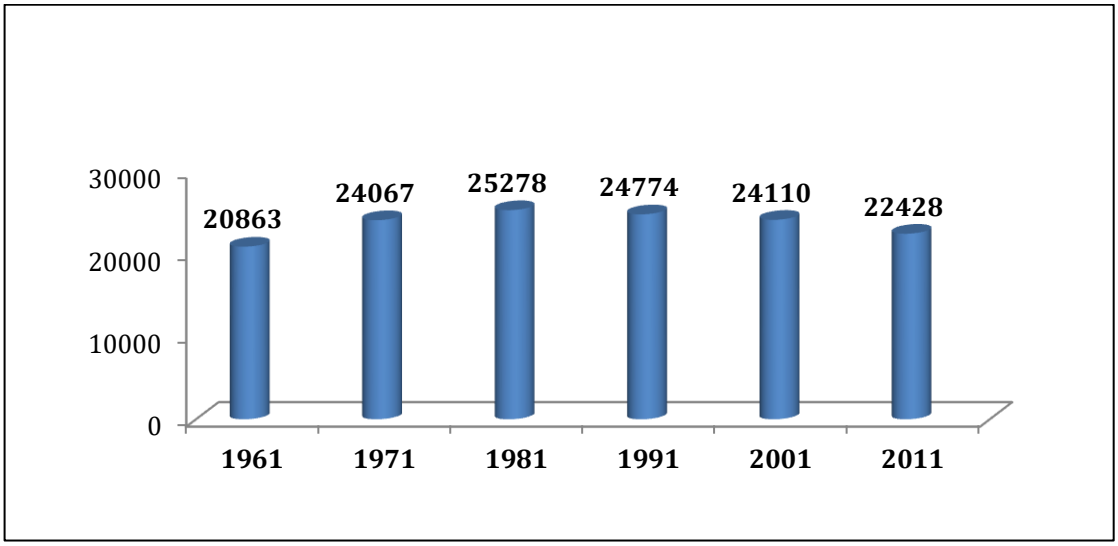

Fig: 5.1 Population of Aluva municipality from 1961- 2011

Comparison of Aluva with other urban local bodies in the district is shown in **figure 5.2.** Aluva is reported to have the lowest population among the urban local bodies in the district.

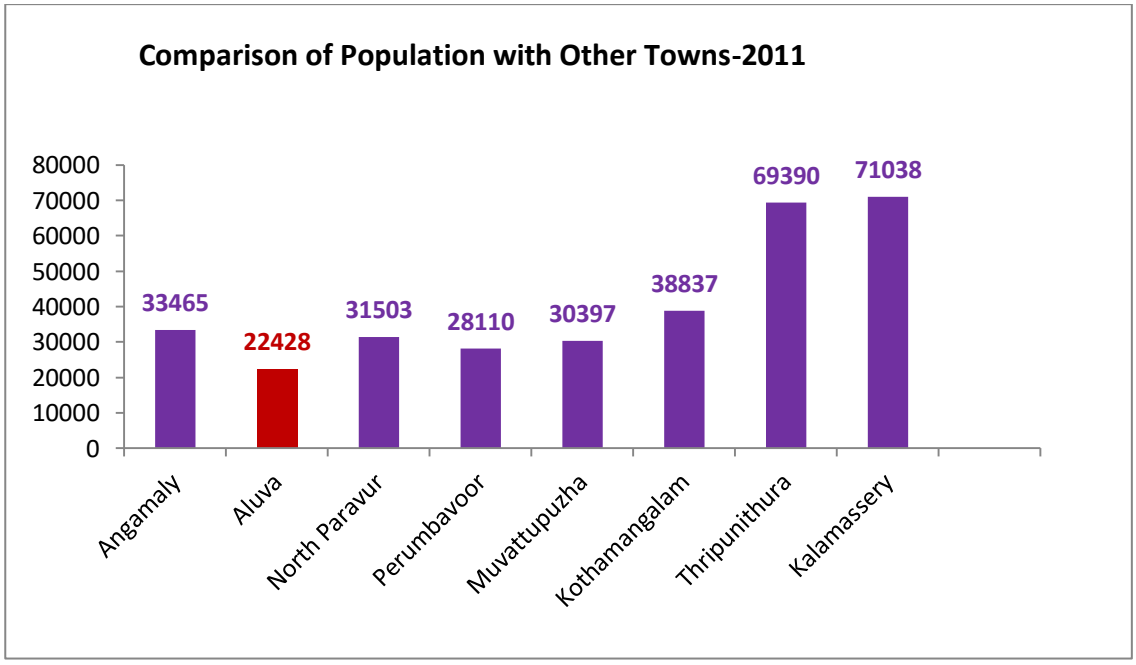

Fig : 5.2 Comparison of population of Aluva with other urban local bodies in the district.

Comparison of population of Aluva town with population of nearby grama panchayats in the influence area of the town is shown in **figure 5.3**. Among these seven grama panchayats, most of them have the higher population size compared to Aluva town.

Alangad panchayat is having the highest population and Kunnukara panchayat is having the lowest population among the grama panchayats included in the influence area of Aluva.

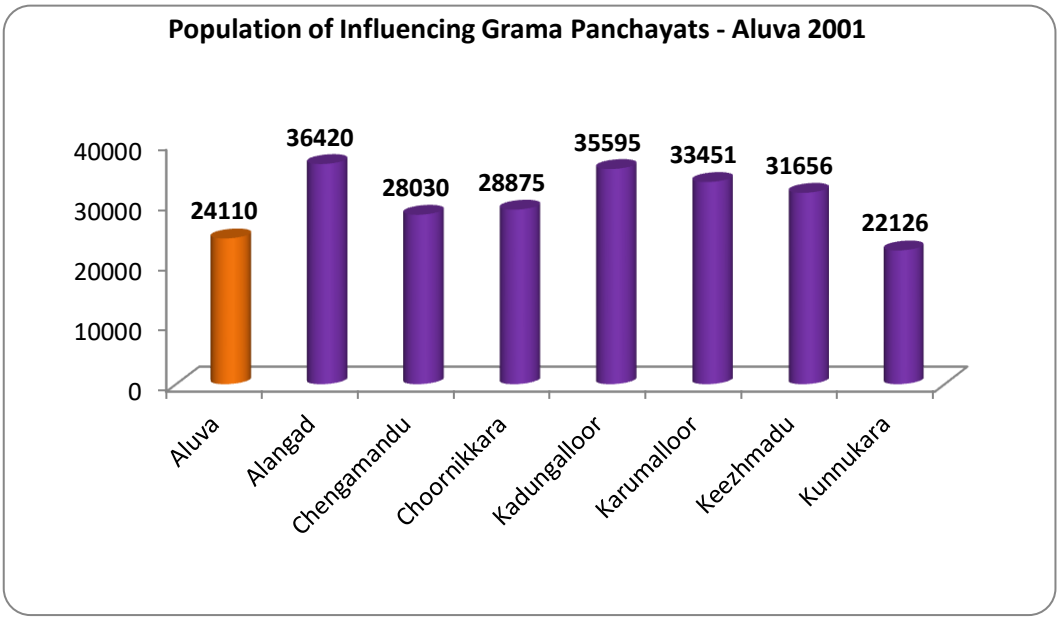

Fig: 5.3 Comparison of population of Aluva with panchayats included in the influence area of Aluva

5.3 POPULATION GROWTH RATE

The population growth rate of Aluva town shows a decreasing trend. The decennial population growth rate of Aluva town from 1961-71 to 2001-2011 is shown in **table 5.2 and figure 5.4.** The growth rate of Aluva during 1961-71 was 15.36% and it reduced to 5.03% during the decade of 1971-81. Thereafter, it had shown a negative trend. The growth rate during the decades 1981-91, 1991-2001 and 2001-11 were -1.99% , -2.68% and -6.98% respectively.

Table: 5.2 Population growth rate of Aluva Municipality from 1961-71 to 2001-2011

Decade	1961-1971	1971-1981	1981-1991	1991-2001	2001-2011
Growth Rate (%)	15.36	5.03	-1.99	-2.68	-6.98

Source: Census 1961 to 2011

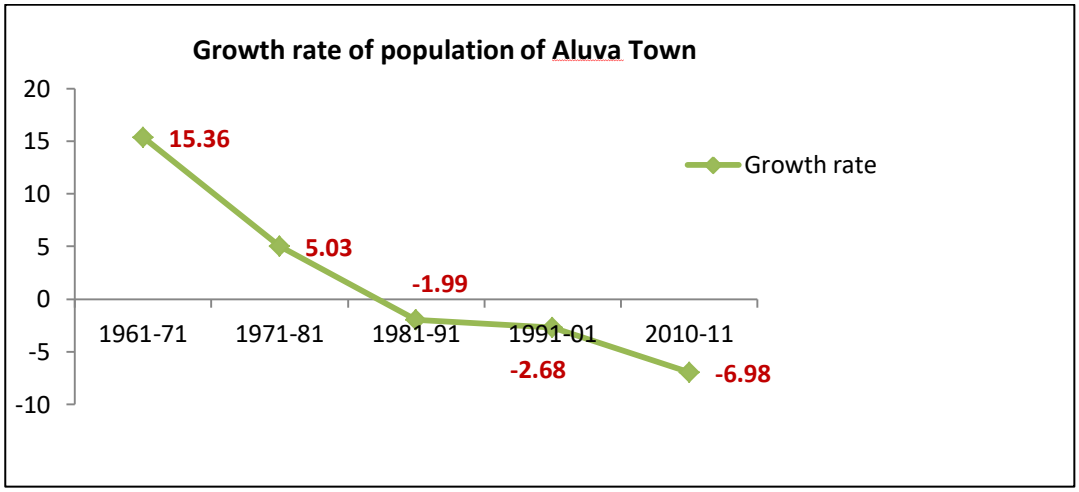

Fig: 5.4 Population growth rate of Aluva during the period 1961-2011

Table: 5 .3 Comparison of Growth rate of Population of Aluva (M) with State, district and Taluk figures

Description	1971-81	1981-91	1991-01	2001-11
Kerala	19.24	14.32	9.43	4.86
Ernakulam	6.38	11.12	10.24	5.69
Aluva taluk	20.98	11.42	9.15	5.35
Aluva (M)	5.03	-1.99	-2.68	-6.98

Source: Census 1971 to 2011

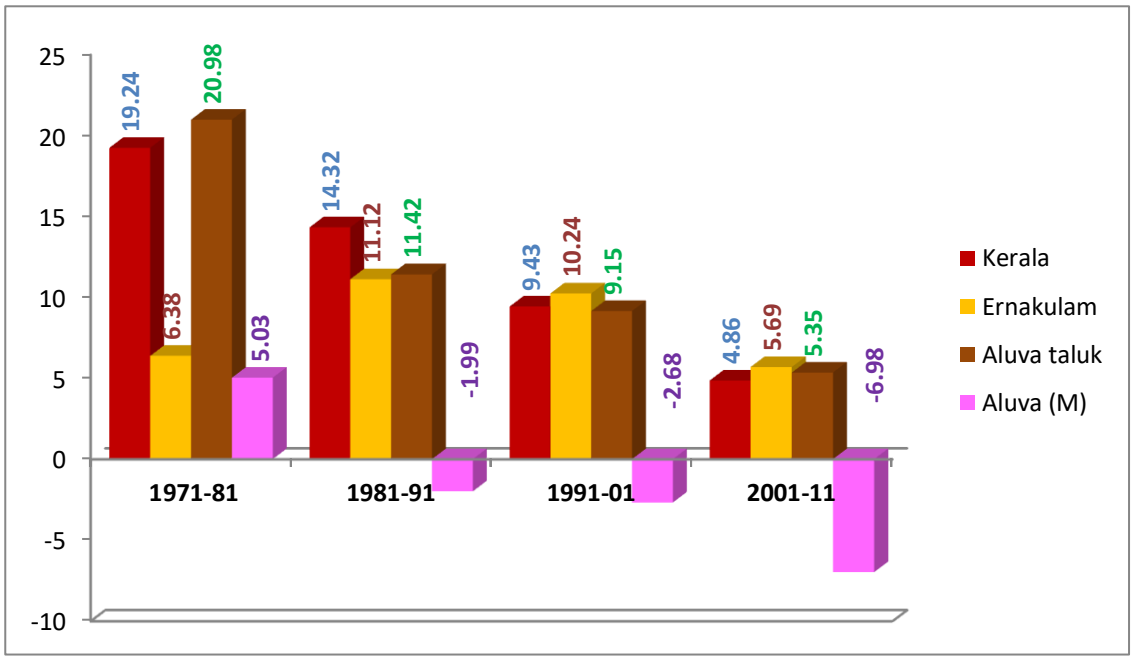

Fig: 5.5 Comparison of Growth rate of population of Aluva town with that of state, district and taluk

Comparison of population growth rate of Aluva town with that of taluk, district and state figures is shown in the **table 5.3 and figure 5.5**. It can be seen that Aluva town exhibits lesser growth compared to state, district and taluk. In Aluva taluk, only Aluva town shows negative growth rate.

Table 5.4 gives the comparison of population growth rate of Aluva town with other municipalities in the district.

Table: 5.4 Comparison of Population growth rate of Aluva Town with other towns in the district

Growth Rate (%)				
Towns	**1971-81**	**1981-91**	**1991-01**	**2001-11**
Aluva	5.03	-1.99	-2.68	-6.98
Angamaly	15.29	7.36	9.93	0.17
North Paravur	7.77	6.15	7.72	4.8
Perumbavoor	10.42	6.95	7.62	5.89
Muvattupuzha	14.35	9.02	5.98	3.94
Kothamangalam		7.29	4.61	4.48
Thripunithura	19.27	17.03	17.24	15.87
Kalamassery	48.13	24.16	16.15	12.55

Source: Census 1971, 1981, 1991, 2001, 2011

Aluva town is experiencing a different type of growth pattern comparing to Ernakulam district (Refer figure **5.6** and **table 5.5**).

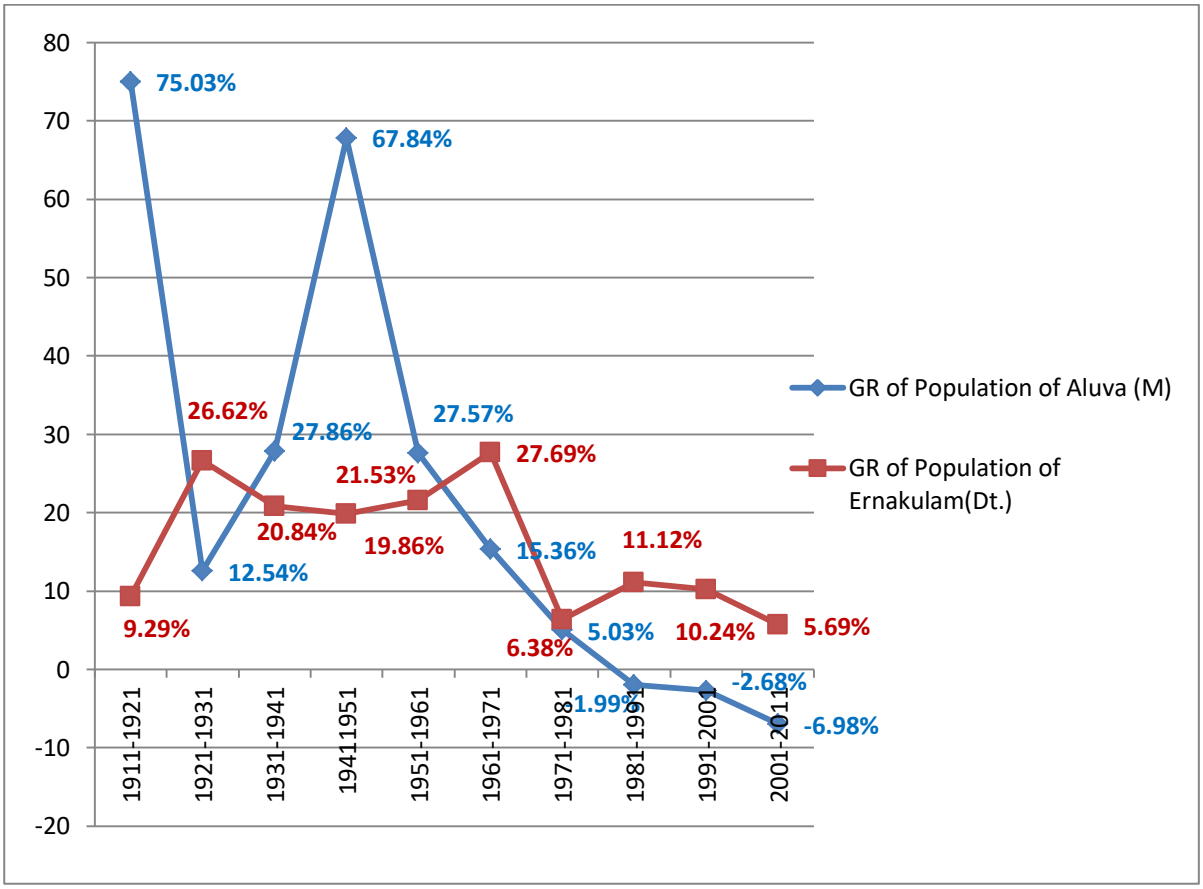

Fig: 5.6 Growth rate of Population in Aluva Town & Ernakulam Distinct

Due to the industrial development that happened in Aluva during 1931 – 1951 period, the growth rate of population in the town had increased during that time. The existing Marthanda Varma Bridge, which is considered as a land mark of Aluva, was constructed during the pre-independence period of 1940-42, which helped to promote the trade & business between nearby kingdoms. This commercial and industrial boom and the resultant in migration was the reason for the growth rate of population of Aluva to be high during the period 1941-51. Deterioration of the industries that had occurred after the 50's and because of this reason, migration to other places in search of better jobs had caused the population growth rate to decrease after that time. Due to high land value, prevailing in the central areas of the town, there is a recent trend of out-migration to nearby grama panchayat areas which also might have contributed to decrease in population in the town.

Table: 5.5 Comparison of Population growth rate of Aluva Town with Ernakulam district

Year	Aluva Municipality		Ernakulam District	
	Population	% increase / decrease	Population	% increase / decrease
1911	3869	*****	766340	*****
1921	6772	+75.03	837506	+9.29
1931	7621	+12.54	1060422	+26.62
1941	9744	+27.86	1281362	+20.84
1951	16354	+67.84	1535843	+19.86
1961	20863	+27.57	1866436	+21.53
1971	24067	+15.36	2383178	+27.69
1981	25278	+5.03	2535294	+6.38
1991	24774	-1.99	2817236	+11.12
2001	24110	-2.68	3105798	+10.24
2011	22428	-6.98	3282388	+5.69

Source: Census of India

5.4 POPULATION DENSITY

Density indicates the pressure of population on land. And it is a measurement of population per unit area. The overall density of population per sq/km in Ernakulam district is 1070 persons in the year 2011.The population density of Aluva town as per 2011 census is 3472 persons/sq.km. The population density of Aluva during the period 1971-2011 is shown in **table 5.6** and **figure 5.7.**

Table: 5.6 Population density of Aluva from 1971 to 2011

Year	1971	1981	1991	2001	2011
Population	24067	25278	24774	24110	22428
Area(sq.km)	7.18	7.18	7.18	6.46	6.46
Population Density (persons/sq.km)	3352	3521	3450	3732	3472

Source: Census 1971, 1981,1991,2001,2011

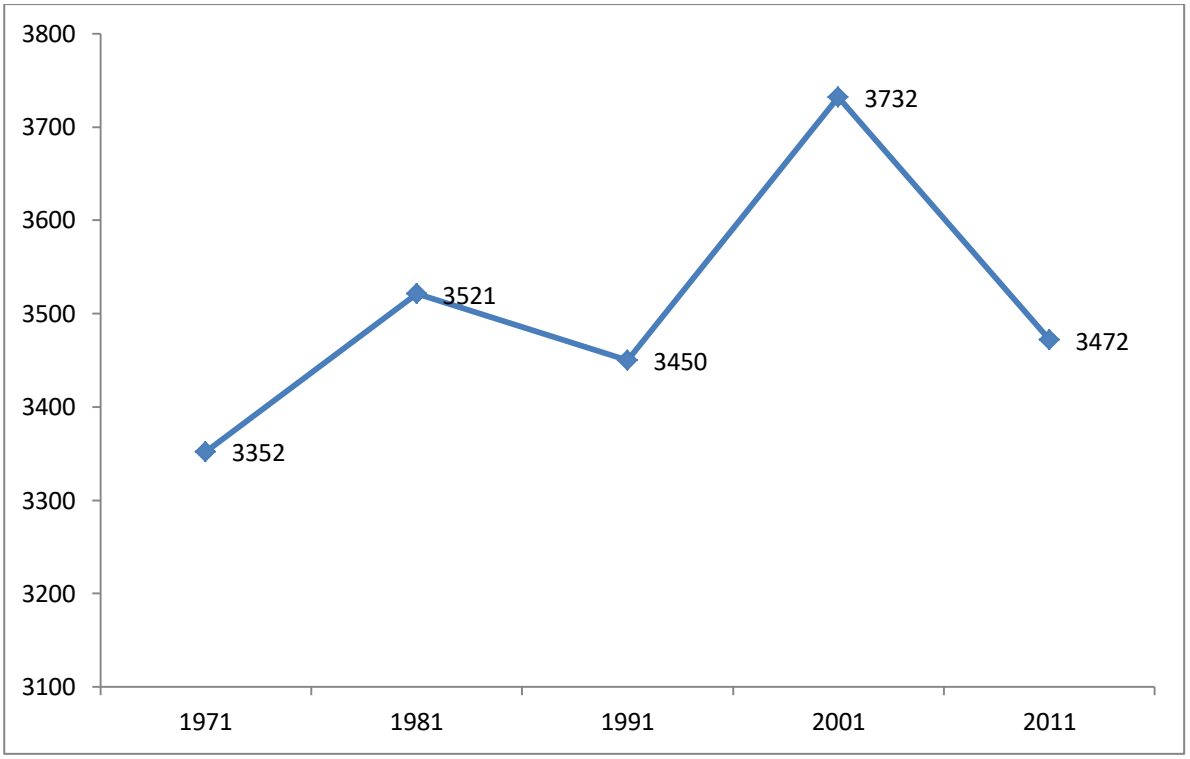

Fig: 5.7 Population density of Aluva from 1971 to 2011

The population density of Aluva is above the state, district and taluk figures. Comparison of the population density of Aluva with state, district and taluk figures is given in **table 5.7** and **figure 5.8.**

Table: 5.7 Comparison of population density of Aluva (M) with state, district and Taluk from 1981 to 2011

Year	Kerala	Ernakulam	Aluva Taluk	Aluva (M)
1981	655	1053	1120	3521
1991	749	1170	1186	3450
2001	819	1012	1301	3732
2011	859	1070	1370	3472

Source: Census 1981,1991,2001,2011

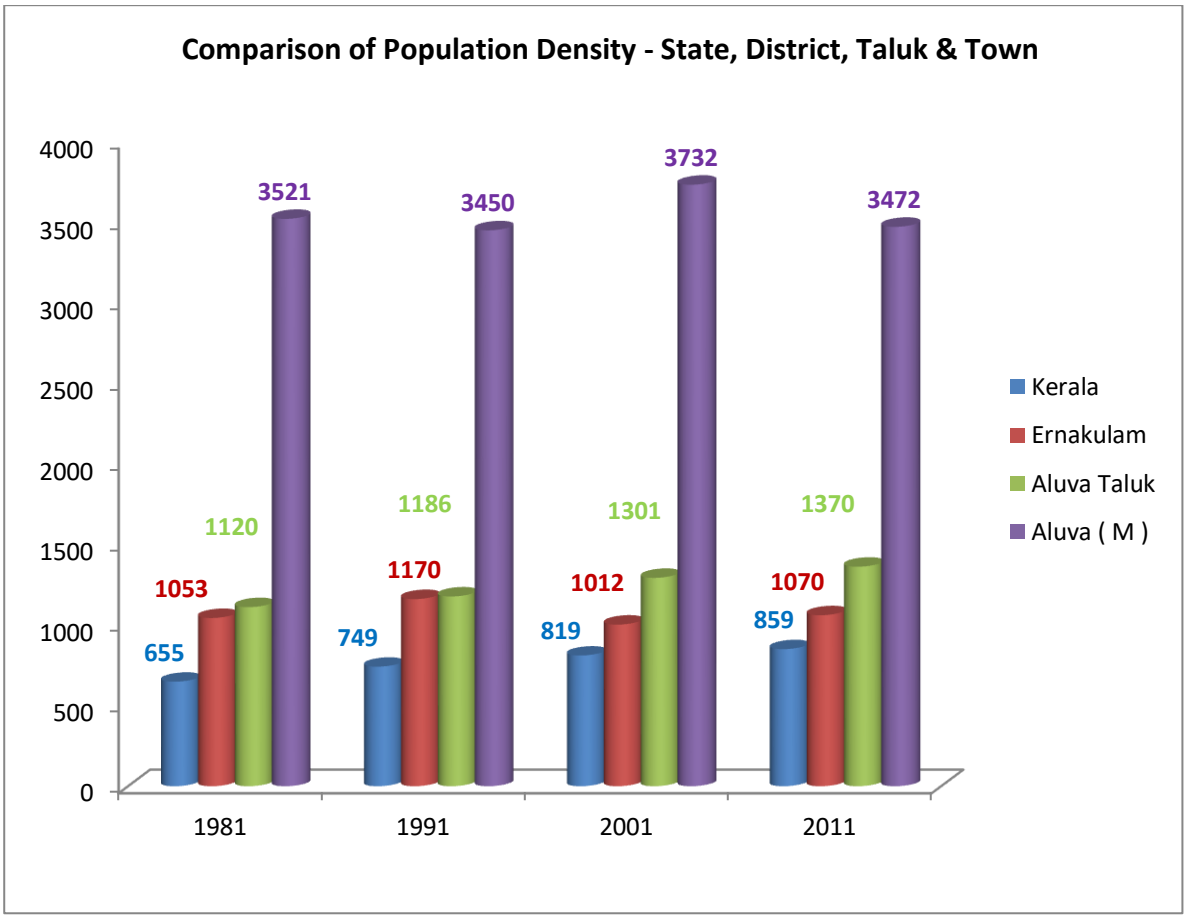

Fig: 5.8 Comparison of population density - state, district, Taluk and Aluva Town

Comparison of the population density of Aluva with that of other towns in the district for the year 2011 is shown in **table 5.8** and **figure 5.9.** Aluva town is 2nd in position with population density of 3472. North Paravur town holds the first position and Kothamangalam

municipality is having the least population density when comparing with other towns in Ernakulam district.

Table: 5.8 Comparison of population density of Aluva (M) with that of other municipalities in the district- 2011

Municipality	Aluva	Anga -maly	Perum- bavoor	North Paravur	Kalama - ssery	Thrippu -nithura	Muvattu -puzha	Kotham- angalam
Population Density (persons/sq.km)	3472	1640	2065	3493	2631	2378	2306	970

Source: Census 1981,1991,2001,2011

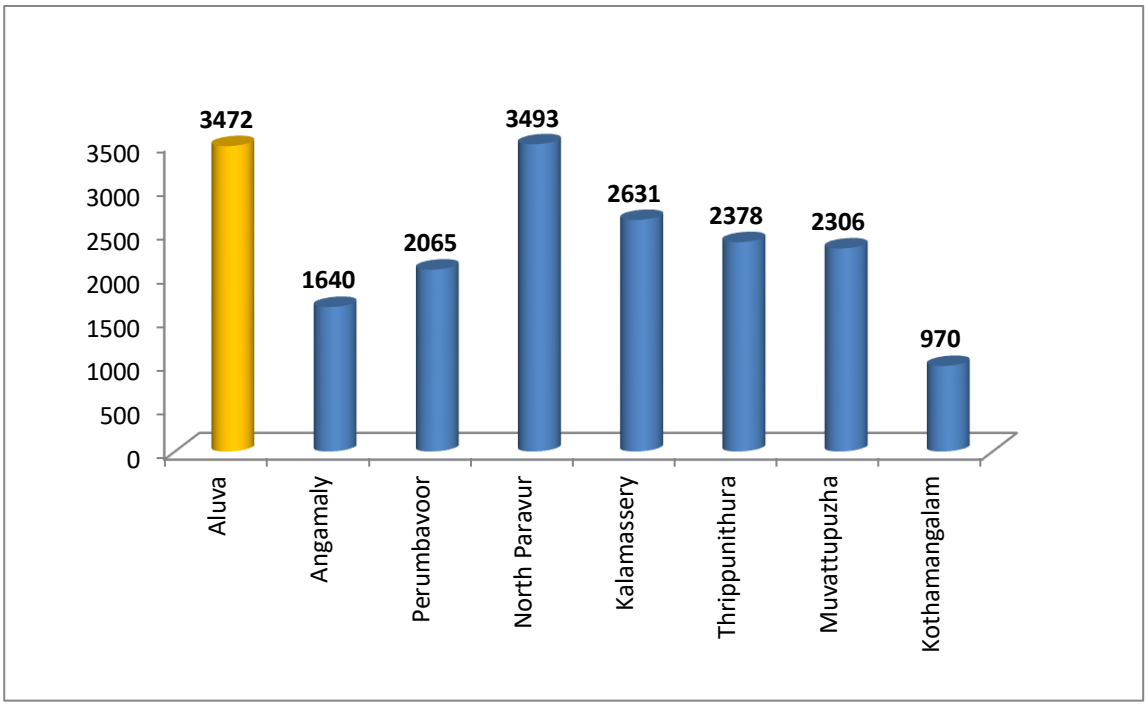

Fig: 5.9 Comparison of population density of Aluva with other towns in the District - 2011.

5.5 WARD WISE POPULATION DENSITY

There is large variation in density of population among different parts of the town. To study the variation, an analysis of ward wise population density has been done and the result is shown in **table 5.9** and **figure 5.10**

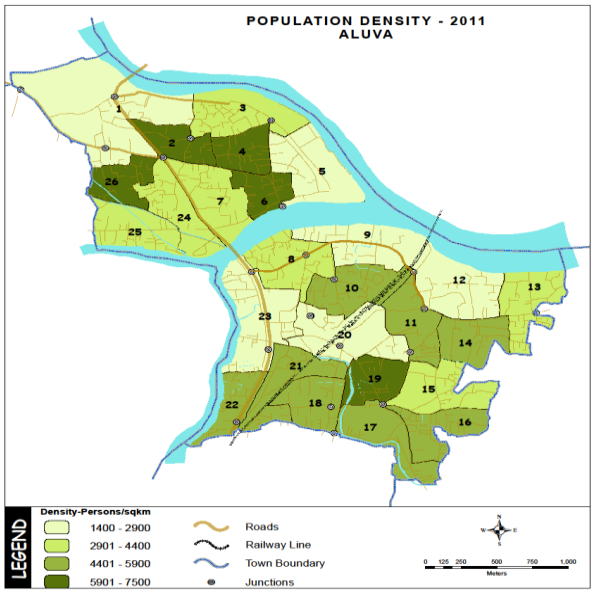

Fig: 5.10 Ward wise gross population density map-2011

Table: 5.9 Ward wise Gross Population density

Sl. No.	Ward No.	Aluva Ward names	Population - No.	Area in ha	Population density in persons per sq. km.
1	WARD I	Mangalapuzha seminary	979	69.66	1405.00
2	WARD II	Guru Mandiram	858	13.56	6327.00
3	WARD III	Desam Kadavu	961	29.69	3237.00
4	WARD IV	Mana	983	13.24	7424.00
5	WARD V	Manappuram	839	36.66	2289.00
6	WARD VI	Ganapathy Temple	924	14.11	6549.00
7	WARD VII	St. Ans Church	872	25.48	3422.00
8	WARD VIII	Kadathukadavu	942	26.32	3579.00
9	WARD IX	Palace	898	38.99	2303.00
10	WARD X	Library	994	21.54	4615.00
11	WARD XI	OomanKuzhi Thadam	902	18.68	4829.00
12	WARD XII	Muncipal Office	972	35.26	2757.00

13	WARD XIII	Madrassa	983	27.55	3568.00
14	WARD XIV	Aasan colony	946	16.99	5568.00
15	WARD XV	Treasury	905	22.54	4015.00
16	WARD XVI	Snehalayam	957	17.69	5410.00
17	WARD XVII	Madhava Puram	976	22.07	4422.00
18	WARD XVIII	Nazareth	975	17.00	5735.00
19	WARD XIX	Thrikkunnath	977	15.28	6394.00
20	WARD XX	Taluk Hospital	861	30.37	2835.00
21	WARD XXI	Sastha Temple	964	20.05	4808.00
22	WARD XXII	Pulinchode	843	16.08	5243.00
23	WARD XXIII	Market	872	37.58	2320.00
24	WARD XXIV	Priyadarsini	839	22.60	3712.00
25	WARD XXV	Canal	994	22.95	4331.00
26	WARD XXVI	Thandikkal	894	14.06	6358.00

Source: Municipality

As per the data given by the municipality, ward 4 (Mana) has population of 983 persons. As per the land use survey conducted in 2010, the area covered by this ward is 13.24 hectares. The gross population density, of this ward is 7424 persons per sq. km. which is the highest among wards of the municipality. Most of the wards having high gross population density are situated on the northern portion of the town, near Paravur junction and on the sides of Aluva-Paravur-Deshom kadavu road. Other wards having high gross population density in northern portion are ward 6 (Ganapathy temple), ward 26 (Thandikkal) and ward 2 (Gurumandiram). The only ward in southern portion of Aluva town having high gross population density is ward 19 (Thrikkunnath).

As per the data given by the municipality, ward 1 (Mangalapuzha seminary) has 266 households and a population of 979 persons. As per the land use survey conducted in 2010, the area covered by this ward is 69.66 hectares, which is the largest area covered by any ward in Aluva town and it is having the least gross population density, a value equal to 1405

persons per sq. km. Another ward having least gross population density is ward 5 (Manappuram), which is also situated in northern portion of the Aluva town. Other wards having least gross population density are ward 9 (Palace), ward 23 (Market), ward 12 (Municipal office) and ward 20 (Taluk hospital) and these wards are located on the southern portion of Aluva town.

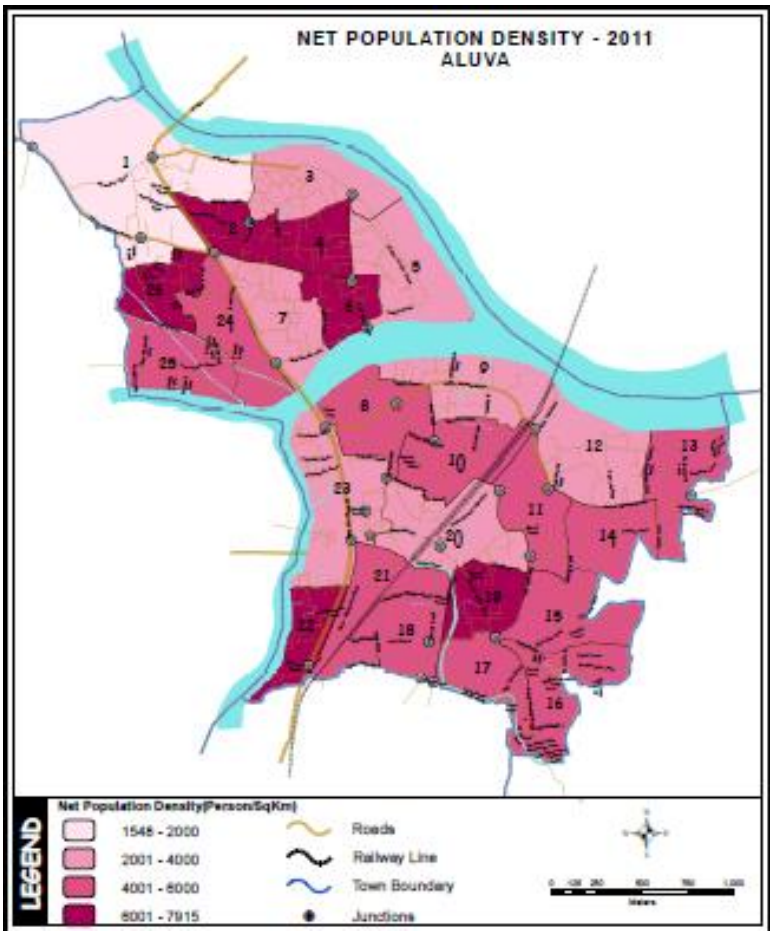

Fig: 5.11 Ward wise Net Population density map-2011 of Aluva town

Net population density is calculated taking into account the developed area and population in the ward. The net population density of wards of the town is shown in **table 5.10 and figure 5.11.** The highest net population density, is in ward 6 (Ganapathy Temple) with a value equal to 7915 persons per sq. km. Other wards having high net population density are ward 4 (Mana), ward 19 (Thrikkunnath), ward 26 (Thandakkal) and ward 22 (Pulinchode).

Table: 5.10 Ward wise Net Population density

Ward No.	Ward Name	Population Nos.	Developed Area in sq.km.	Net Population Density in Persons/sq.km.
1	Mangalapuzha seminary	979	0.632269	1548
2	Guru Mandiram	858	0.135643	6325
3	Desam Kadavu	961	0.245245	3919
4	Mana	983	0.132366	7426
5	Manappuram	839	0.283121	2963
6	Ganapathy Temple	924	0.116741	7915
7	St. Ans Church	872	0.233843	3729
8	Kadathukadavu	942	0.228518	4122
9	Palace	898	0.245535	3657
10	Library	994	0.214652	4631
11	OomanKuzhi Thadam	902	0.186775	4829
12	Muncipal Office	972	0.268685	3618
13	Madrassa	983	0.205226	4790
14	Aasan colony	946	0.169461	5582
15	Treasury	905	0.225366	4016
16	Snehalayam	957	0.175683	5447
17	Madhava Puram	976	0.2073	4708
18	Nazareth	975	0.169486	5753
19	Thrikkunnath	977	0.147462	6625
20	Taluk Hospital	861	0.295097	2918
21	Sastha Temple	964	0.205758	4685

22	Pulinchode	843	0.131098	6430
23	Market	872	0.324041	2691
24	Priyadarsini	839	0.200023	4195
25	Canal	994	0.170786	5820
26	Thandikkal	894	0.13613	6567

Source: Municipality

Least net population density of 1548 persons per sq.km. is observed in ward 1(Mangalappuzha Seminary). Ward 23 (Market), ward 20 (Taluk Hospitl) and ward 5 (Manappuram) are the other wards having the least net population density.

5.6 POPULATION CONCENTRATION PATTERN

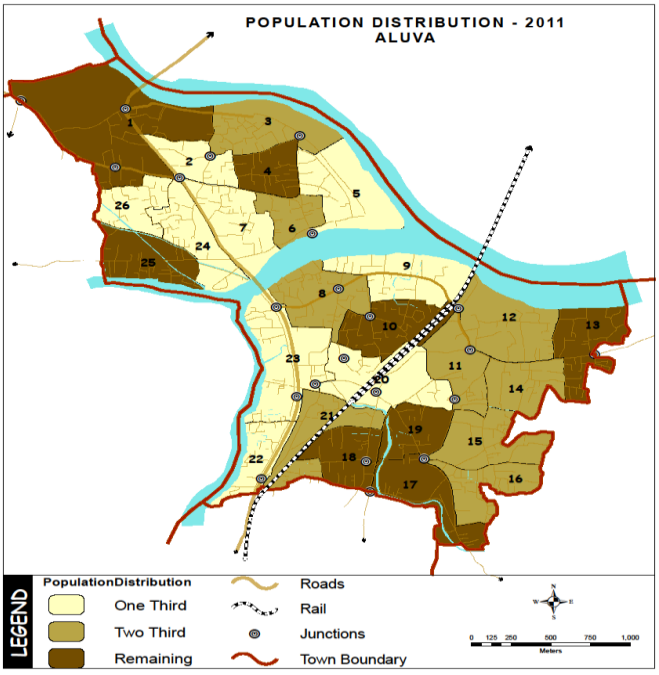

Fig: 5.12 Population concentration pattern

The population concentration pattern is derived by calculating the cumulative population after arranging the wards in the ascending order of population. The population concentration pattern of Aluva town (2010) is shown in **figure 5.12.** It shows that 1/3 population of the town is in 9 wards, with an area of 235.28 ha which comprises of 36.44 % of gross town area. Ward 2 (Gurumandiram), ward 5 (Manappuram), ward 7 (St.Ans

Church), ward 9 (Palace), ward 20 (Taluk Hospital), ward 22 (Pulinchodu), ward 23 (Market), ward 24 (Priyadarshini) and ward 26 (Thandikkal) are the wards accommodating 1/3rd population.

The 2/3 of population of the town is in 9 more wards with total area of 201.33 ha (31.16% of gross town area). Ward 3 (Desam Kadavu), ward 6 (Ganapathy Temple), ward 8 (Kadathukadavu), ward 11 (Oomankuzhithadam), ward 12 (Municipal Office), ward 14 (Aasan colony), ward 15 (Treasury), ward 16 (Snehalayam) and ward 21 (Sastha Temple) are the wards accommodating the next 1/3rd population and remaining population of the town is accommodated in 8 wards namely; ward 1 (Mangalappuzha seminary), ward 4 (Mana), ward 10 (Library), ward 13 (Madrassa), ward 17 (Madhavapuram), ward 18 (Nazareth), ward 19 (Thrikkunnath), and ward 25 (Canal).

The pattern of concentration of population thus arrived at is depicted in **figure 5.12.** It can be inferred that there is no significant concentration of population in any particular areas of the town.

5.7 AGE – SEX PYRAMID

The distribution of male and female in the society has direct bearing on the social and economic condition of a State. An age-sex pyramid also known as a population pyramid graphically represents this distribution. It can be used to compare the characteristics of different populations. An age-sex pyramid consists of two horizontal histograms joined together. It displays the percentage or actual amount of a population broken down by gender and age. The five-year age increments on the y-axis allow the pyramid to reflect the long-term trends in the birth and death rates.

Table: 5.11 Age –Sex Pyramid of Aluva town

	% of Male Population	% of Female Population
0-5	5.73	5.91
5 to 10	6.18	6.81
10 to 15	6.18	4.8

15 to 20	5.96	6.36
20 to 25	7.08	8.48
25 to 30	9.55	8.59
30 to 35	6.97	5.92
35 to 40	7.3	9.04
40 to 45	6.4	6.58
45 to 50	7.42	9.38
50 to 55	7.53	7.48
55 to 60	8.88	7.48
60 to 65	5.62	5.36
65 to 70	4.49	3.79
70 to 75	2.13	2.12
75 to 80	1.46	1.12
greater than 80	1.12	0.78

Source: Socio Economic Survey 2010

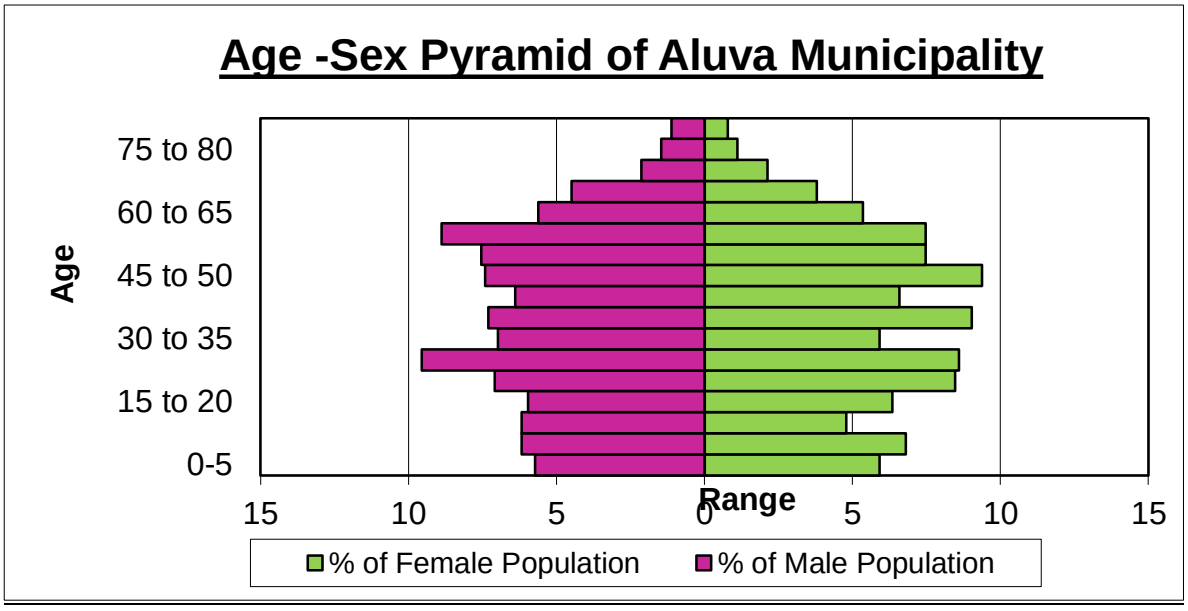

Fig: 5.13 Age Sex pyramid of Aluva town in 2010

The Age – sex pyramid of Aluva Municipality was derived from the Socio-Economic survey (2010) and percentage of male and female population in different age group is shown in **Table 5.11** and in **figure 5.13.**

Majority of the population is coming under 20 - 60 age group (working age group) which shows a healthy sign for the economy. It is observed from the pyramid that the percentage of children is higher than the percentage of old people. It indicates that the population is likely to increase in future as the percentage of child population has a positive relationship with the decadal growth-rate.

5.8 SEX RATIO

Sex Ratio is a sensitive indicator that displays the status of women. Changes in sex composition largely reflect the underlying socio-economic and cultural pattern of a society. Sex ratio measures the extent of equity prevailing between males and females at a given point of time. Kerala is the only State in India where sex-ratio is above the equality ratio. The trend in State is reflected in Aluva Municipality from 1981 onwards**.** As per the 2011 census data the sex ratio of the town is 1033. The variation in sex ratio of the town from the year 1971 onwards is shown in **figure 5.14.**

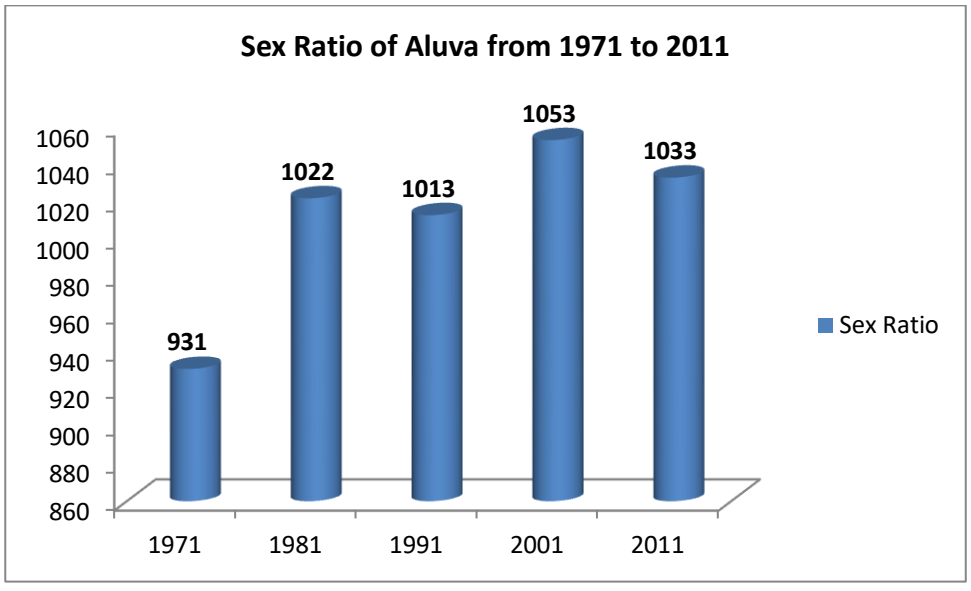

Fig: 5.14 Sex ratio of Aluva Town from 1971 to 2011

The sex ratio of the town is fluctuating. Sex ratio of Aluva town is 1033 in 2011 . The sex ratio of the taluk, district and state in 2011 are 1027, 1027 and 1084 respectively. The sex ratio of Aluva is lower than the state figure and slightly higher than the district and taluk figures. (**figure 5.15.**)

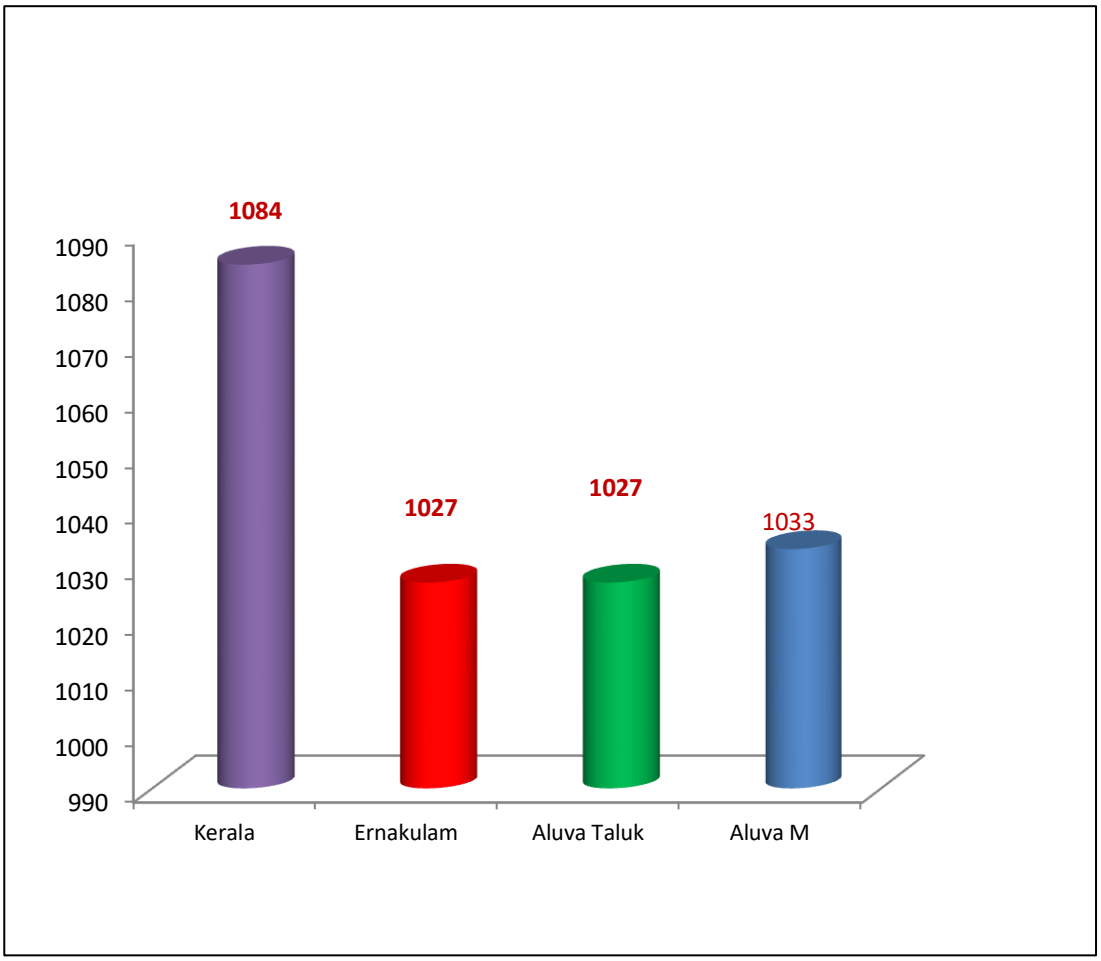

Fig: 5.15 Sex ratio of Kerala, Ernakulam, AluvaTaluk and Aluva Town -2011

Referring to the **table 5.12** and **figure 5.16**, Aluva muncipality had experienced a decrease in sex-ratio over the decade 1981 – 1991. The sex ratio of the town had increased during the decade 1991 - 2001 and again decreased in the decade 2001 to 2011.

While comparing with the sex ratio of the state, sex ratios of Aluva municipality, Aluva taluk as well as Ernakulam district are on the lower side.

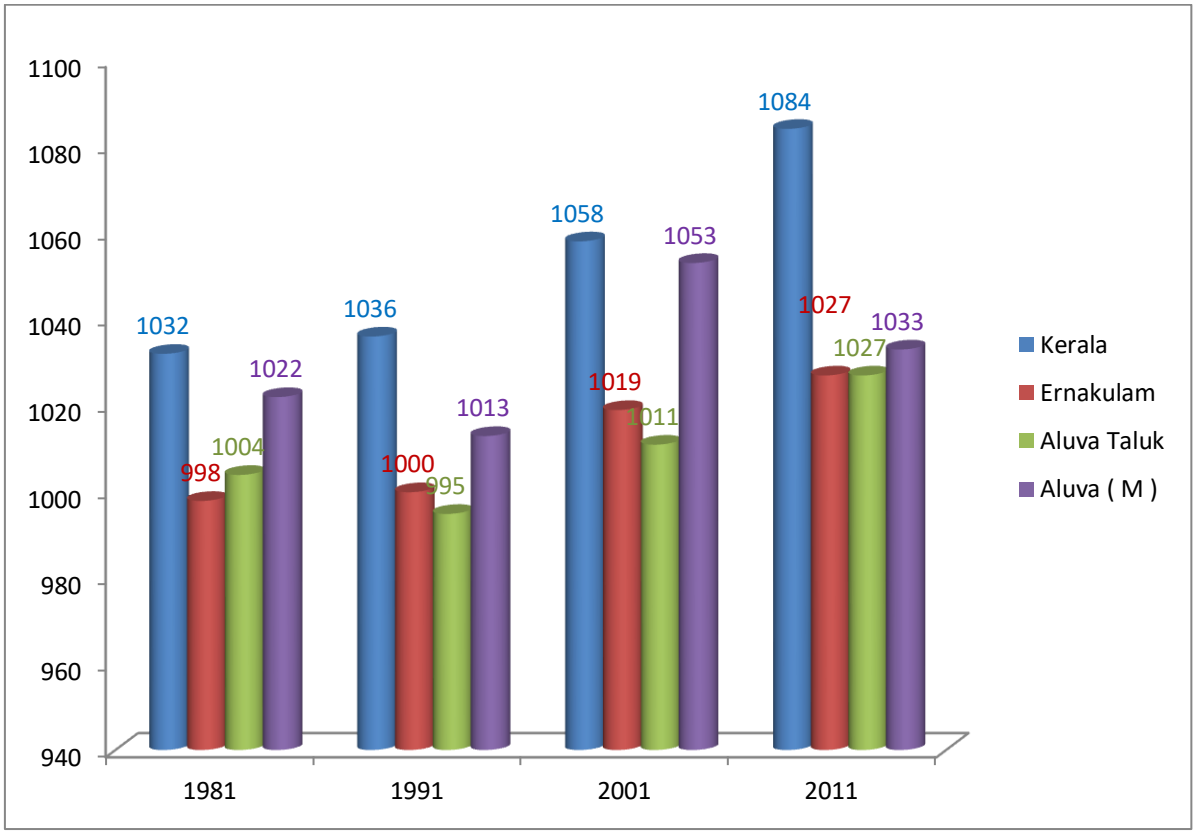

Fig: 5.16 Sex ratio of Kerala, Ernakulam, Taluk and Aluva-1981 -2011

Table: 5.12 Comparison sex-ratio between state, district, taluk and town

Year	**Kerala**	**Ernakulam**	**Aluva Taluk**	**Aluva (M)**
1981	1032	998	1004	1022
1991	1036	1000	995	1013
2001	1058	1019	1011	1053
2011	1084	1027	1027	1033

Source: Census of India

Child Sex ratio

Child sex ratio shows the future trends of sex-ratio of the population. The child sex ratio of Aluva municipality has varied from 951 in 1991 to 980 in 2011. Sex ratio in age group (0-6) of Aluva town is comparatively higher than that of state, district and taluk in 2011.

Figure 5.17 shows the comparison of child sex ratio of Aluva with state , district and taluk figures.

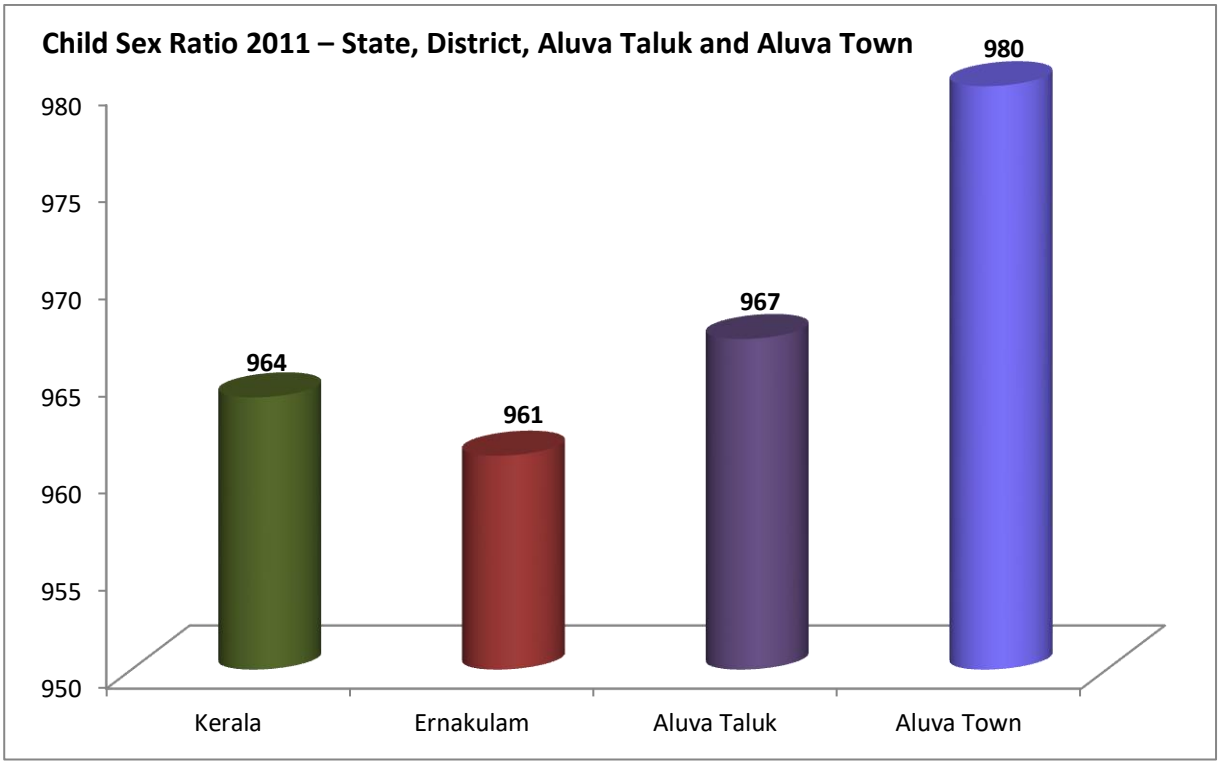

Fig: 5.17 Child Sex ratio Kerala, Ernakulam ,Aluva taluk and Aluva(M) in 2011

5.9 LITERACY RATE

A person aged 7 years and above who can read and write with understanding in any language is treated as literate. So for the Literacy rate to be more meaningful the children in the age group of 0-6 are excluded from the total population.

According to 2011 census, literacy rate of Aluva municipality is 97.9% which is higher than the state figure of 94.05% , district figure of 95.89% and taluk figure of 94.83%. The literacy rate comparison with Aluva Taluk, Ernakulam District and Kerala State is shown in **figure 5.18 .** Out of the total population of 22428 persons in the town 20208 are literates. Out of the total literates, 9975 are males and 10233 are females. The literacy rate of Aluva municipality has increased from 74.42% in 1971 to 97.90% in 2011 and is shown in **figure 5.19**. This increasing trend of literacy rate is a welcome sign for future development. Kerala has been the most literate state in the country. An analysis of literacy data brings to light the

fact that the literacy rate of Aluva is higher than the literacy rates of Aluva taluk, Ernakulam district and Kerala state.

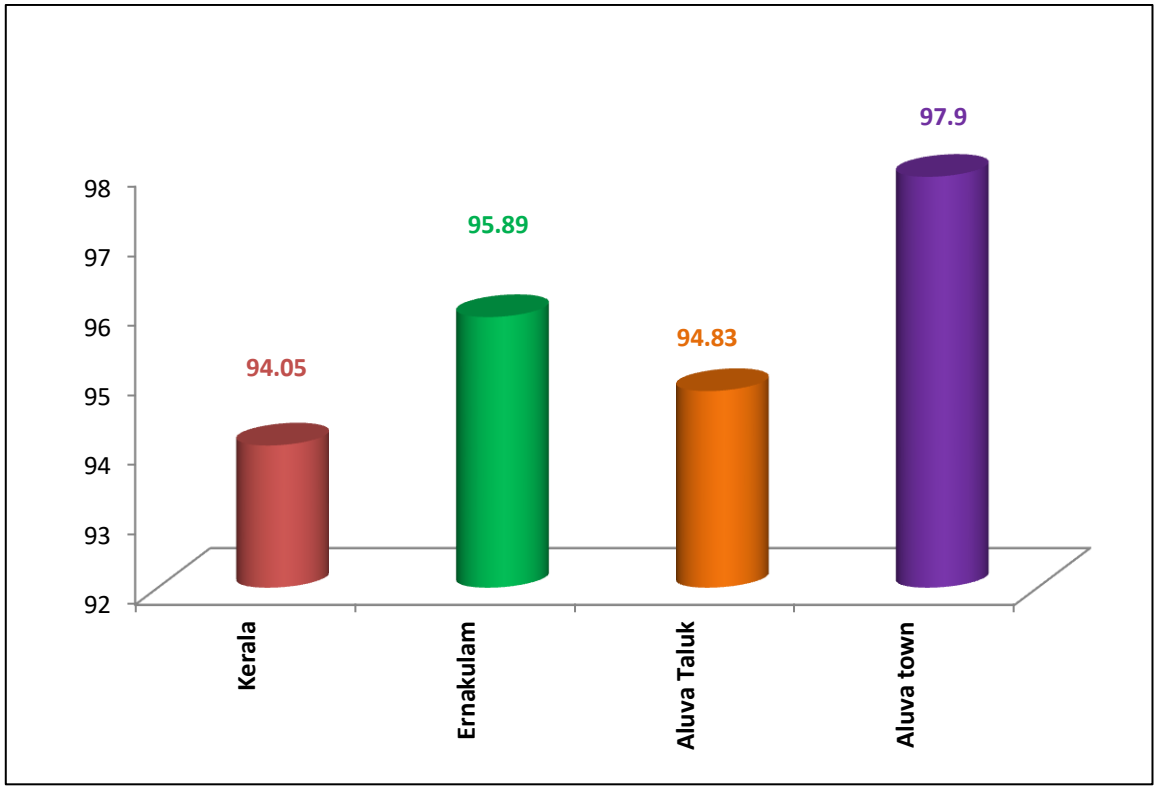

Fig: 5.18 Comparison of literacy rate of Aluva (M) with Taluk, District and State figures

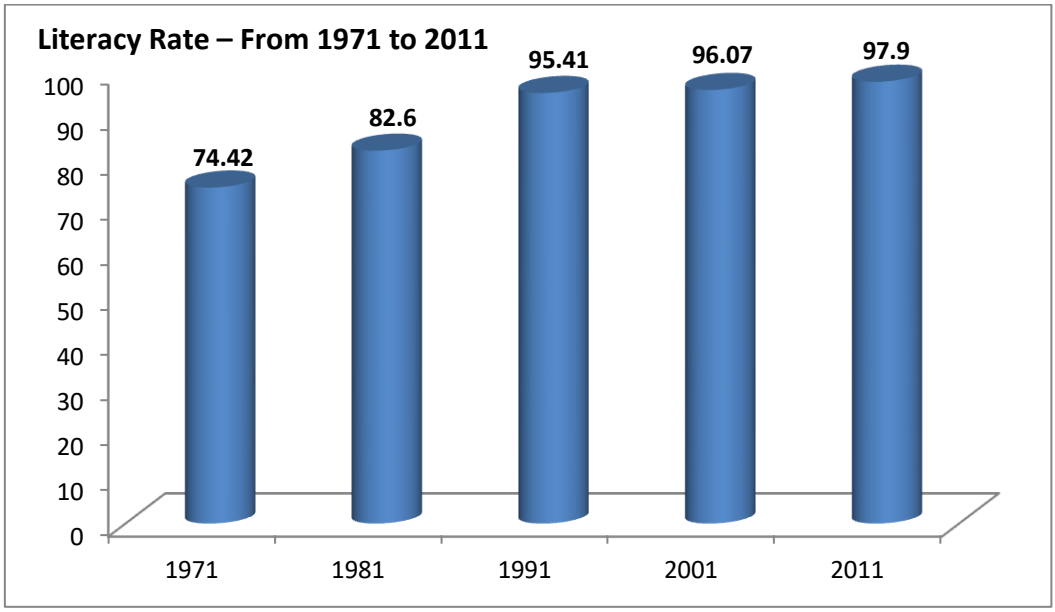

Fig: 5.19 Decadal Variation of literacy rate of Aluva Town

5.10 HOUSEHOLD SIZE

The household size of Aluva has decreased from 5.99 in 1971 to 3.98 in 2011. It is diagrammatically represented in **figure 5.20**. Household size of Aluva is less when compared to the state, district and taluk figures. The pictorial representation of Household size of Aluva, Aluva taluk, Ernakulam district and Kerala is shown in **figure 5.21**. Since the absolute size of population is also decreasing in the town, this reduction in household size will not have much reflection in the housing demand.

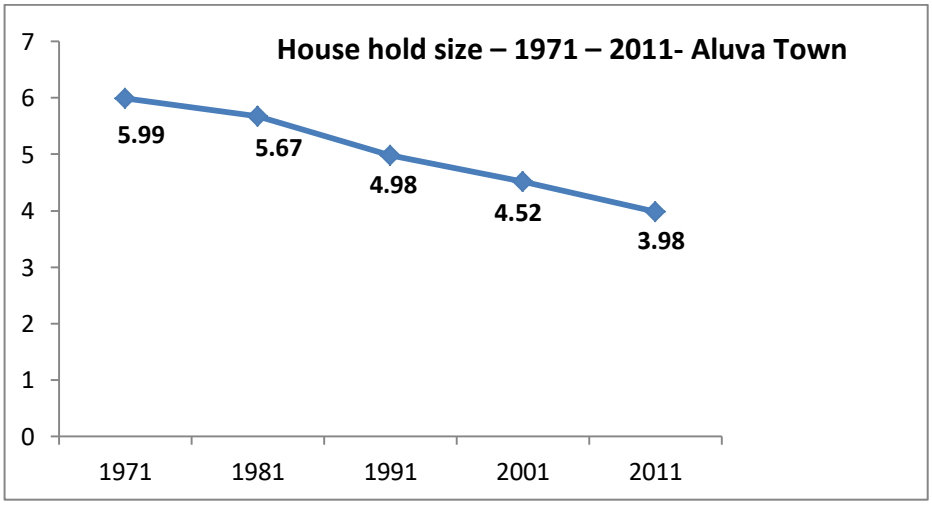

Fig: 5.20 House hold size of Aluva Town from 1971 to 2011

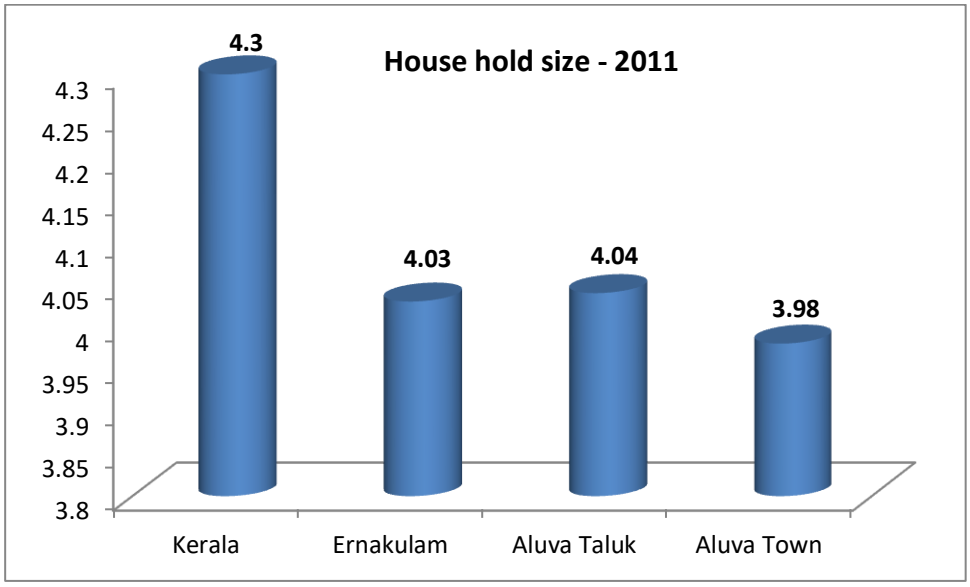

Fig: 5.21 House hold size of Kerala, Ernakulam, Aluva taluk and Aluva municipality in 2011

5.11 CONCLUSION

The population growth rate of Aluva has shown a decreasing trend from the year 1951 onwards, and it is experiencing a different type of growth pattern comparing to Ernakulam district, which shows a fluctuating growth rate of population. The growth rate of Aluva is less than that of state, district and taluk figures. The 2011 population of the town is 22428. The population density of Aluva was above the state, district and taluk figures for the three consecutive decades. When comparing with the other municipalities in the district for the year 2011, Aluva town is second in position with respect to population density and North Paravur holds the first position. There is large variation in density of population among different parts of the town. Most of the wards having high gross population density are situated on the northern portion of Aluva town. Net population density, which is calculated taking into account the area under residential land use and population, shows higher values in the wards located in the southern portion of Aluva town. Study of population concentration revealed that there is no significant concentration of population in any particular area of the town. It is observed from the age-sex pyramid that the percentage of children is higher than the percentage of old people. It indicates that the population is likely to increase in future. Most of the people comes under 20 - 60 age group (working age group), which shows a healthy sign for the economy. The sex-ratio of Aluva town is lower than that of State and higher than that of the district and taluk in the year 2011. Sex ratio in age group (0-6) is higher than that of state and district in 2011. The literacy rate of Aluva town as per 2011 census is 97.90% which is high compared to the literacy rates of Aluva taluk, Ernakulam district and Kerala.

6. OCCUPATIONAL STRUCTURE

6.1 INTRODUCTION

The distribution of the population according to different types of occupation is referred to as occupational structure. Occupational structure plays an important role in a diversity of studies, including those related to the level of economic development and social inequalities. Occupational structure depends on a number of economic, technological and geographical factors. In this chapter the existing economic base of the town based on the occupational structure is studied.

6.2 WORKERS

Total number of workers in Aluva town is 7798 in 2011. The total number of main workers of the town is 7082, which constitute 31.58 % of total population and total number of marginal workers of the town is 716, which constitute 3.19% of total population and the remaining 14630 persons are non-workers which is 65.23% of total population. It is shown in **table 6.1** and in **figure 6.1** and **figure 6.2.**

Table: 6.1 Classification of workers of Aluva town and Ernakulam district – 2011.

Classification of Workers	Aluva Town		Ernakulam District	
	Total workers	% to population	No. of workers	% to population
1. Total Main Workers	7082	31.58	1061388	32.34
2. Marginal workers	716	3.19	187955	5.73
3.Non workers	14630	65.23	2033045	61.94

Source: Census of India 2011

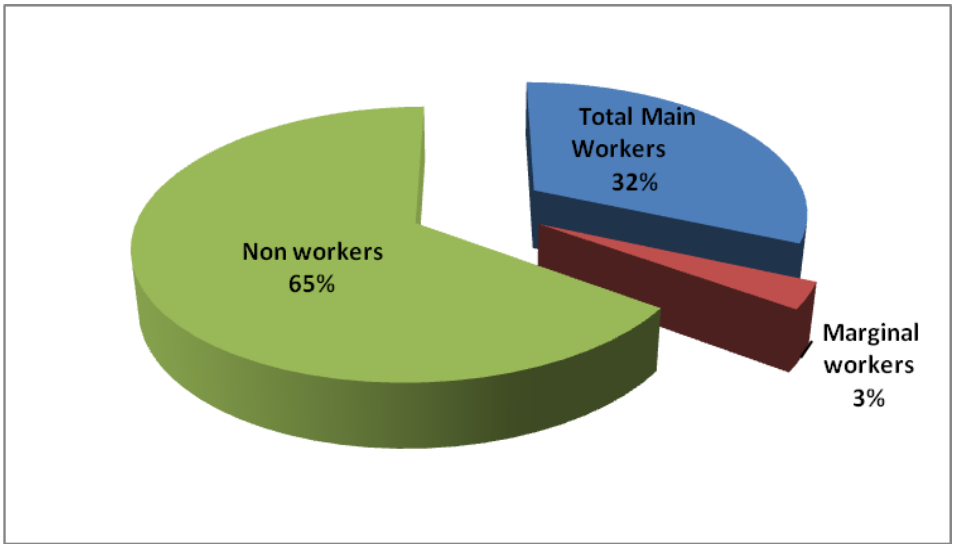

Fig: .6.1 Classification of workers of Aluva town

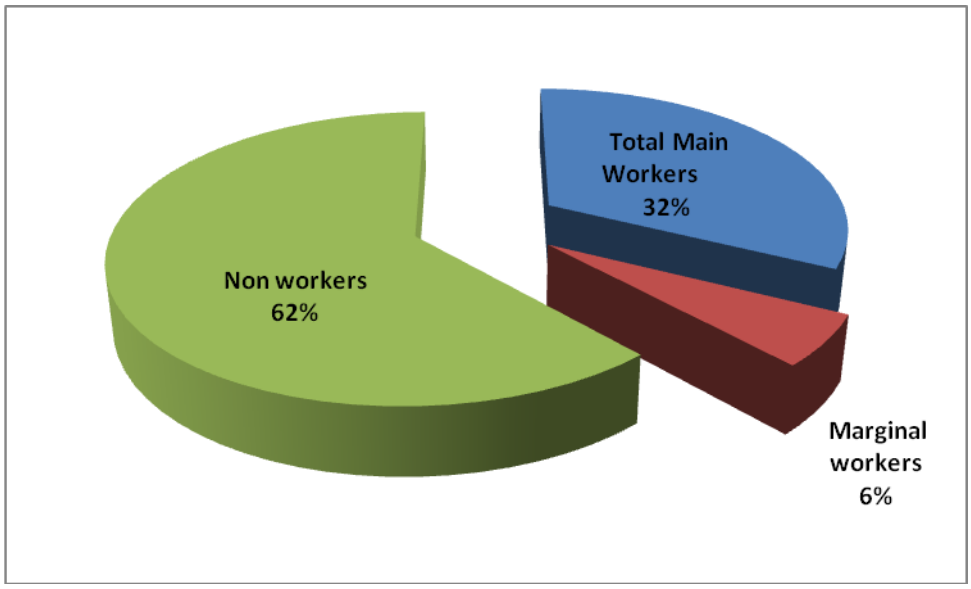

Fig: 6.2 Classification of workers of Ernakulam district

Source: Census of India 2011

6.2.1 WORK FORCE PARTICIPATION RATE

The participation rate is the percentage of the working age population in the labour force. As per 2011 census the work force participation rate of Aluva municipality is 34.77%. It means, out of total population of 22428 persons, 7798 people are workers. Out of 7798 workers, 5541 are male workers and the remaining 2257 are female workers. The total workers are further divided into main workers and marginal workers. As per Census 2011 main

workers are 7082 which is 90.82% of total workers and marginal workersare 716 which is 9.18% of total workers.

Work force participation rate is increasing from 29.16% to 34.77% during the period 1971-2011. The work force participation rate for the years 1981, 1991 and 2001 are 29.33, 31.14 and 32.31 respectively. Temporal variation of work force participation rate is shown in **figure 6.3 and table 6.2.**

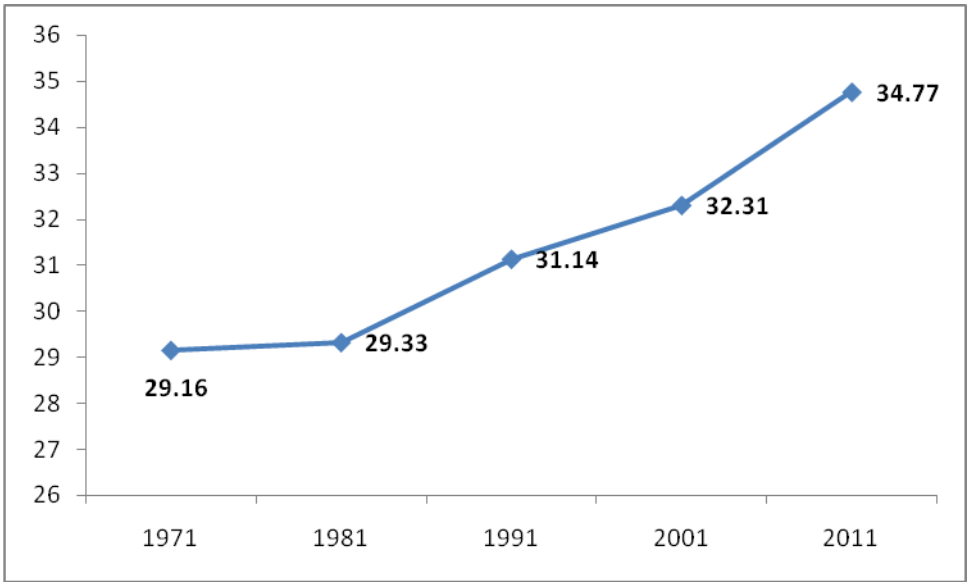

Fig: 6.3 Temporal variation of work force participation rate- Aluva Town

The work force participation rate of Aluva shows a general increasing trend from 1971 to 2011.

Table: 6.2 Temporal variation in Work Force Participation Rate – Aluva Town

Year	1971	1981	1991	2001	2011
Population	**24067**	**25278**	**24774**	**24110**	**22428**
Total workers	**7018**	**7415**	**7715**	**7790**	**7798**
Work participation rate	**29.16**	**29.33**	**31.14**	**32.31**	**34.77**

Source: Census, 1971, 1981, 1991, 2001 and 2011

The growth rate of population and the growth rate of workers are shown in **table 6.3** and **figure 6.4.** Even though the number of workers is increasing over the years, the growth

rate of workers is fluctuating. During the decades 1971-81, 1981-91, 1991-2001 and 2001-2011 the growth rates of workers were higher than the respective population growth rates indicating a healthy sign for the economy.

Table: 6.3 Comparison of Growth Rate of Population and Workers of Aluva

	1971-81	1981-91	1991-01	2001-11
Growth rate of population	5.03	-1.99	-2.68	-6.98
Growth rate of workers	5.66	4.05	0.97	0.10

Source: Census 1961, 1971, 1981, 1991, 2001 & 2011

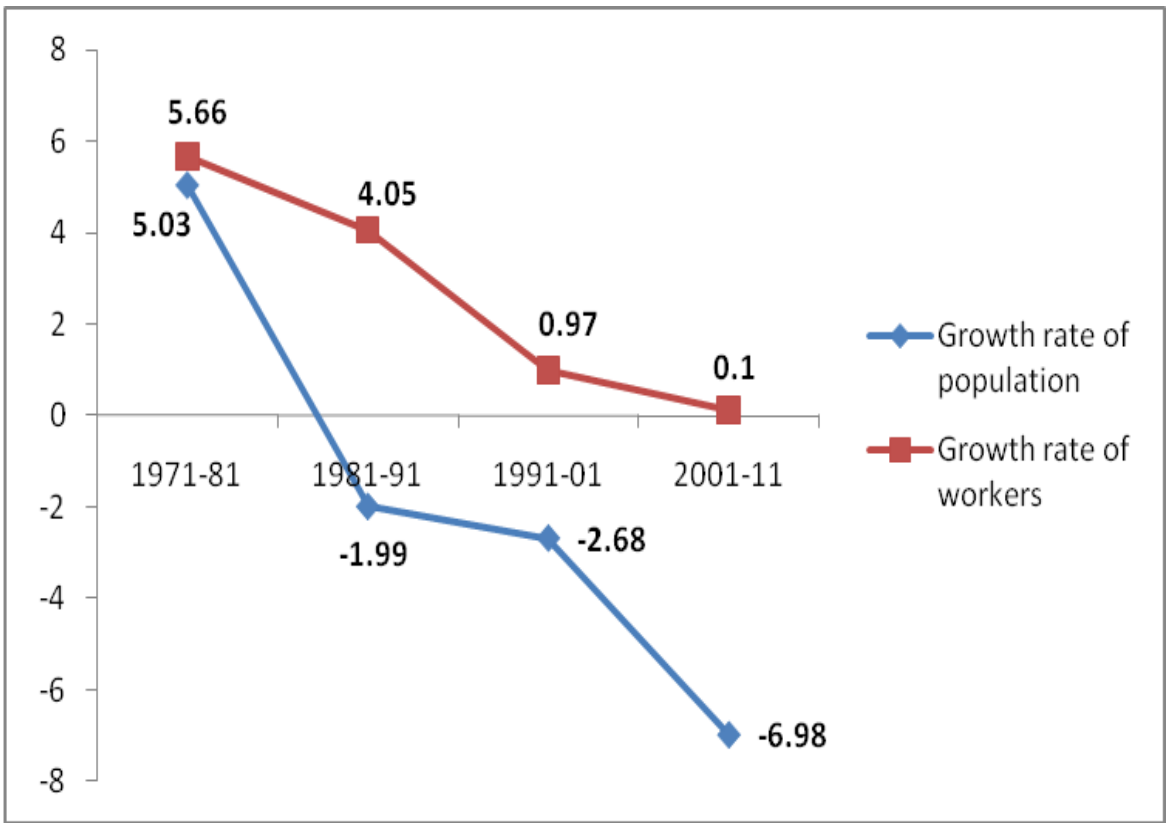

Fig: 6.4 Comparison of Growth rate of Population and Workers

The comparison of work force participation rate of Aluva is done with corresponding figures of Ernakulam district, other urban centers of the district and surrounding grama panchayats. The work force participation rate of the district is 38.06% which is more than the work force participation rate of Aluva which is 34.77%. The work force participation rates of all

urban centres in the district are shown in the **table 6.4** and in **figure 6.5.** Comparison of work participation rate of Aluva with influencing Grama Panchayats is shown in **table 6.5** and in **figure 6.6.**

Table 6.4 Comparison of Work participation rate of Aluva with other urban centres in Ernakulam district

Sl.No	Name of urban centres	Population	No.of workers	Work participation rate
1	Aluva	22428	7798	34.77
2	Angamaly	33465	12606	37.67
3	Paravur	31503	10560	33.52
4	Thripunithura	69390	27700	39.92
5	Kalamassery	71038	26454	37.24
6	Muvattupuzha	30397	10756	35.39
7	Perumbavoor	28110	9816	34.92
8	Kothamangalam	38837	14675	37.79
9	Kochi Corporation	610398	232336	38.06

Source: Census of India 2011

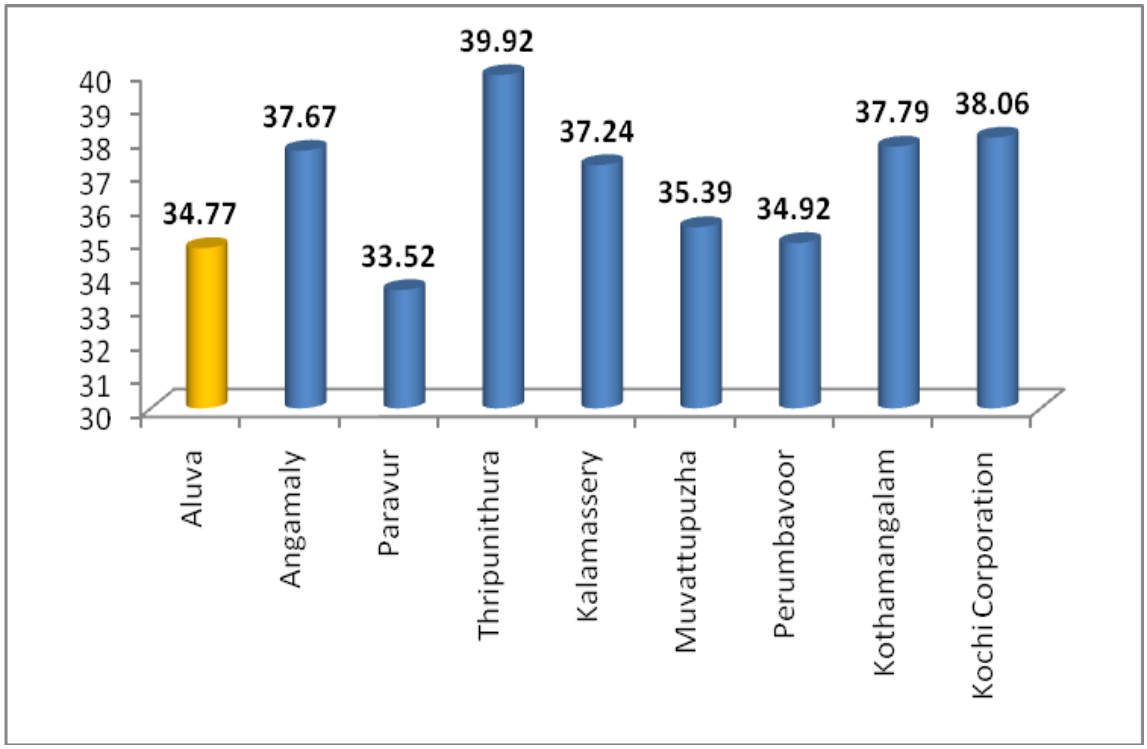

Fig: 6.5 Work force participation Rate in 2011 – Comparison with other urban centres in the district.

Table: 6.5 Comparison of Work participation rate of Aluva with neighbouring grama panchayaths

Sl.No	Name of LSGs	Population	No.of workers	Work participation rate
1	Aluva	24110	7790	32.31
2	Alangad	36420	13158	36.13
3	Chengamanad	28030	9123	32.55
4	Choornikkara	28875	9198	31.85
5	Kadungallor	35595	11659	32.75
6	Karumalloor	33451	12111	36.21
7	Keezhmad	31656	10214	32.27
8	Kunnukara	22126	8845	39.98

Source: Census of India 2001

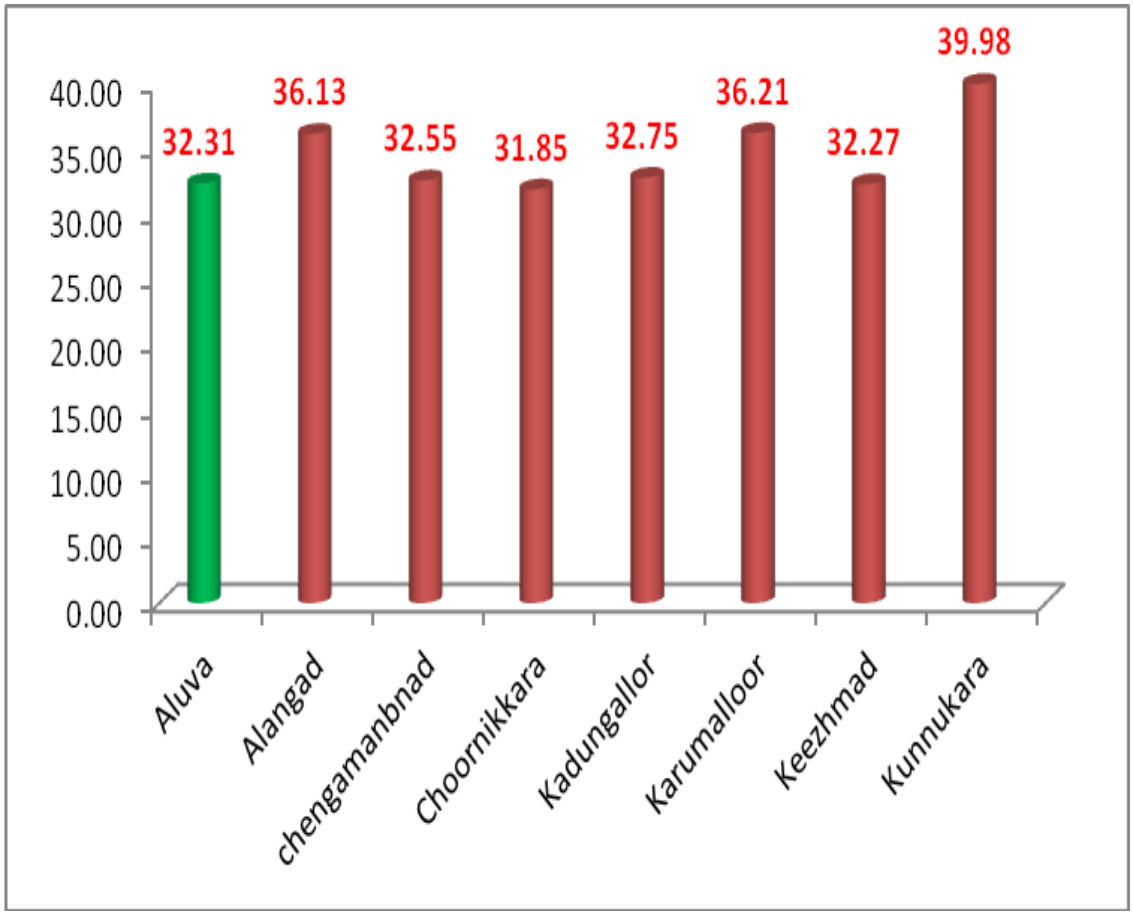

Fig: 6.6 Work participation Rate in 2001 –Comparison with neighbouring Grama Panchayaths

6.3 OCCUPATIONAL STRUCTURE

As per Census of India 2011, the main workers are classified into four categories viz. cultivators, agricultural labourers, household industrial workers and other workers. The other workers category includes primary sector workers (relating to livestock, fishing, plantation, mining and quarrying), secondary sector workers (relating to processing, servicing and repairs in other than household industry, constructions) and tertiary workers (relating to trade and commerce, transport, storage and communication and employees working in Govt and private institutions). The occupational structure of Aluva town (2011) and Ernakulam district are shown in **figures 6.7** and **6.8** respectively. In the town, 96.56% of workers belong to other workers category, 0.75% of workers are agricultural laborers, 0.64% of workers are cultivators and the remaining 2.05% is household industrial workers. The four fold classification of workers for Aluva town and the district is shown in **table6.6.**

Table: 6.6 Four fold classification of workers of Aluva town in 2011

Classification of Workers	Aluva		Ernakulam	
	Total workers	% to total workers	No. of workers	% to total workers
a) Cultivators	50	0.64	50423	4.04
b) Agricultural laborers	58	0.75	71391	5.71
c) Household industry workers	160	2.05	23976	1.92
d) Other workers	7530	96.56	1103553	88.33
Total Workers	7798	100	1249343	100

Source: Census of India 2011

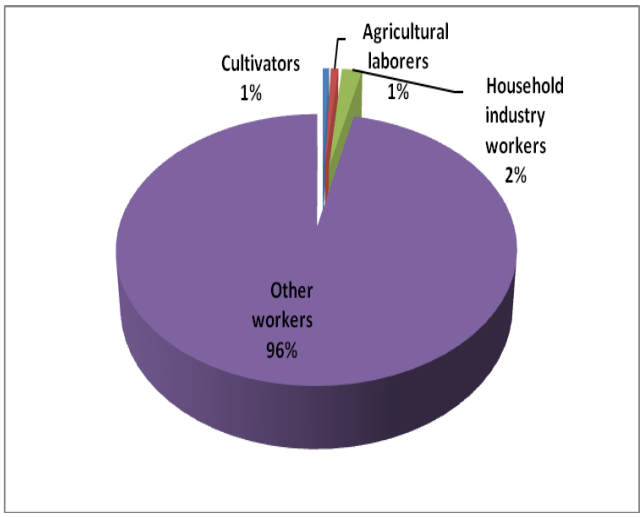

Fig : 6.7 Occupational structure Aluva Town 2011

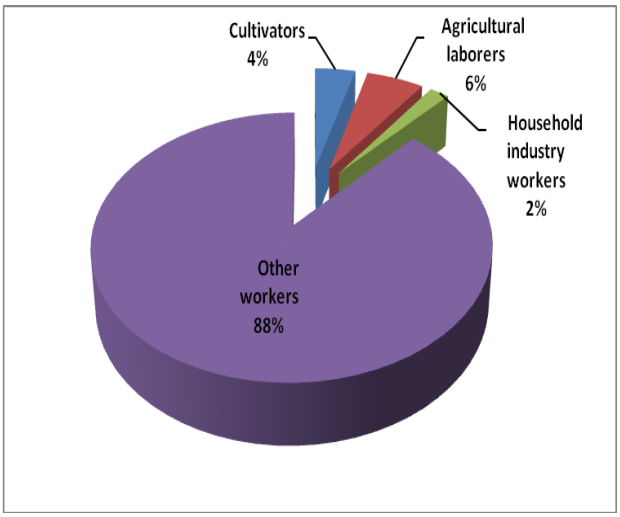

Fig: 6.8 Occupational structure Ernakulam District 2011

The temporal variation of occupational structure of Aluva town is shown in **table 6.7** and its diagrammatic representation is given in **figure 6.9.** It shows that the other workers category only is predominant in the town. The reduction in number of other workers during the 1991 – 2011 period corresponds to the reduction in population size of the town.

Table: 6.7 Occupational structure of Aluva (Main workers) - Temporal variation

Year	Cultivators	Agriculture labourers	House hold industrial workers	Other workers
1981	79	119	76	6889
1991	44	14	70	7455
2001	18	16	99	7105
2011	45	47	141	6849

Source: Census 1981, 1991 , 2001 and 2011

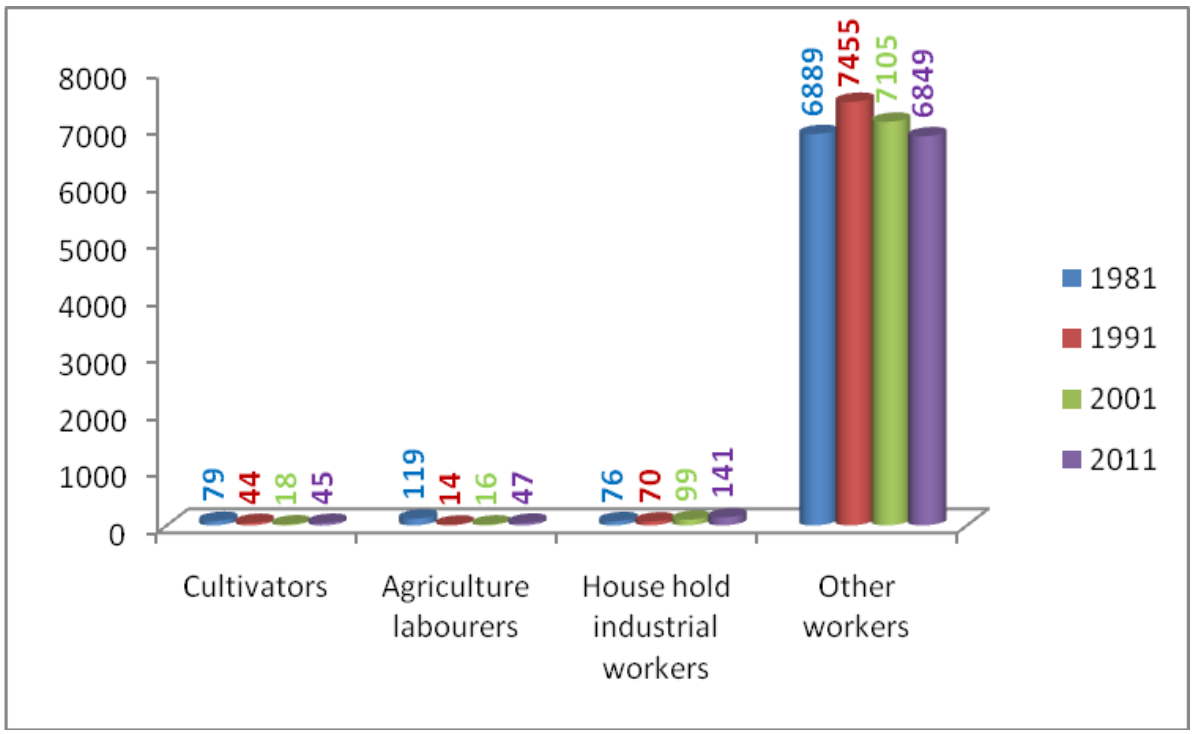

Fig: 6.9 Temporal variations of workers 1981, 1991, 2001 & 2011

Female workers are only one fourth of the total working population. Much variation is not found in percentage of women workers during the period 1981-2011. Temporal variation of percentage of male and female workers of Aluva town during 1981-2011 is shown in **table 6.8** and **figure 6.10.**

Table: 6.8 Temporal variation of male and female workers(%)

	1981				1991				2001				2011			
	workers	%	workers	%	workers	%	workers	%	workers	%	workers	%	workers	%	workers	%
Main workers	5479	76.5	1684	23.5	5884	77.6	1699	22.4	5393	74.5	1845	25.5	5100	72.01	1982	27.99
Marginal workers	192	76.2	60	23.8	94	71.2	38	28.8	402	72.8	150	27.2	441	61.59	275	38.41
Total workers	5671	76.5	1744	23.5	5978	77.5	1737	22.5	5795	74.4	1995	25.6	5541	71.06	2257	28.94

Source: Census 1981, 1991, 2001 & 2011

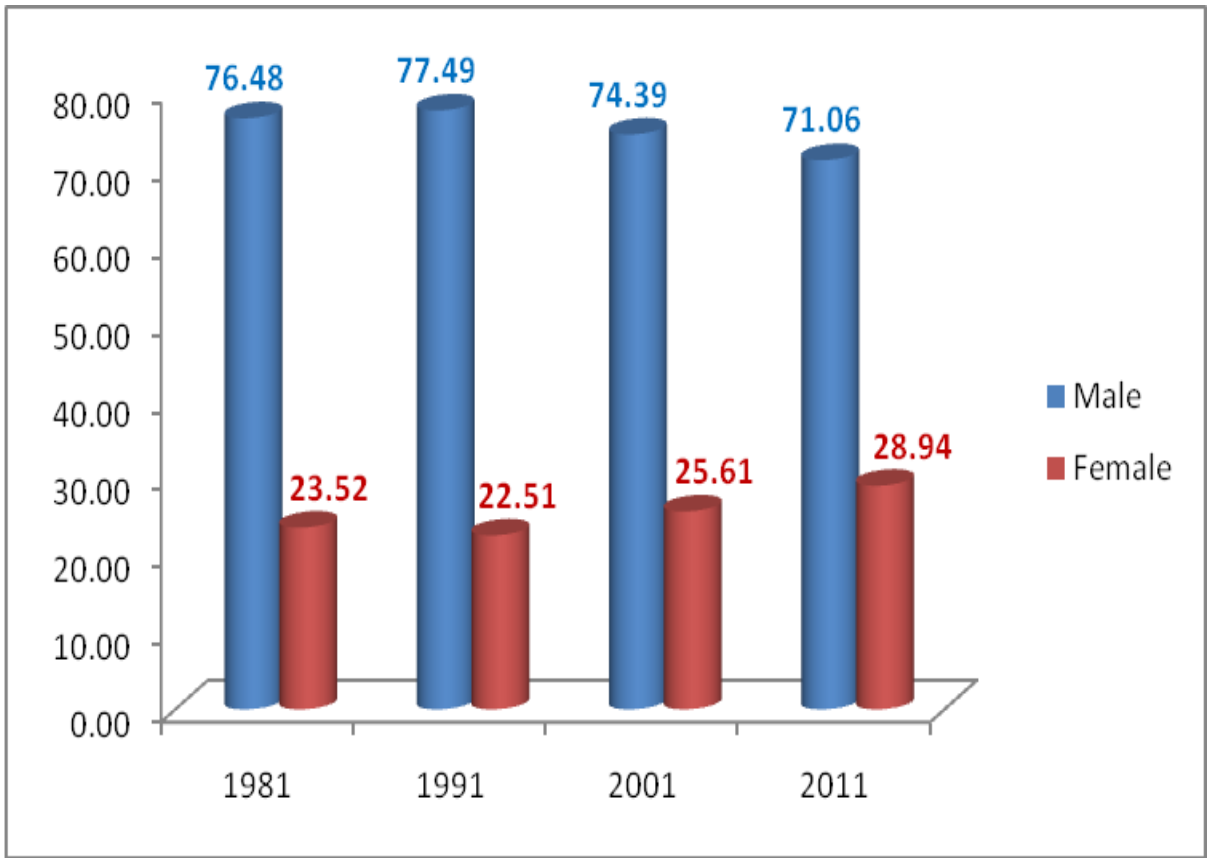

Fig: 6.10 Temporal variation of percentage of male and female workers 1981, 1991, 2001 & 2011

6.4 SPATIAL DISTRIBUTION OF WORKERS

The concentration index of workers gives an idea about where a particular class of workers is concentrated in the town. The ward wise concentration index [(Number of workers of a particular class of workers in a ward / Total number of workers of the ward) / (Number of workers of the same class of the workers in the town / total number of workers in the town)] of four classes of workers viz cultivators, agriculture labourers, household industrial workers and other workers for each ward has been calculated and its spatial distribution studied. Concentration index maps thus generated are shown in **figure 6.11** to **figure 6.14.**

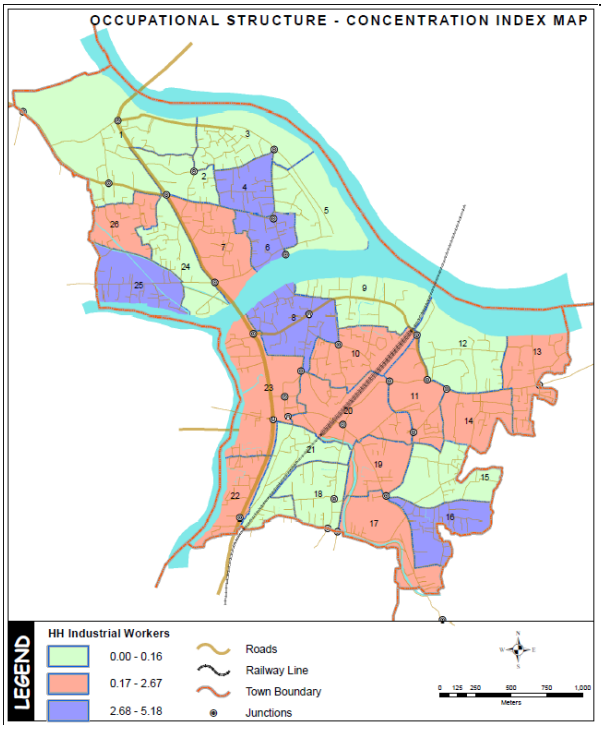

Fig: 6.11 Concentration index map for HH industrial workers

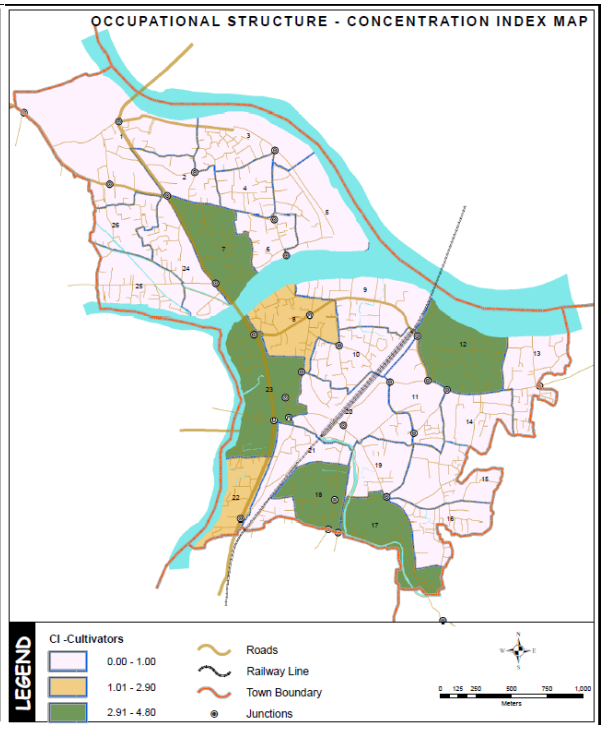

Fig: 6.12 Concentration index map for Cultivators

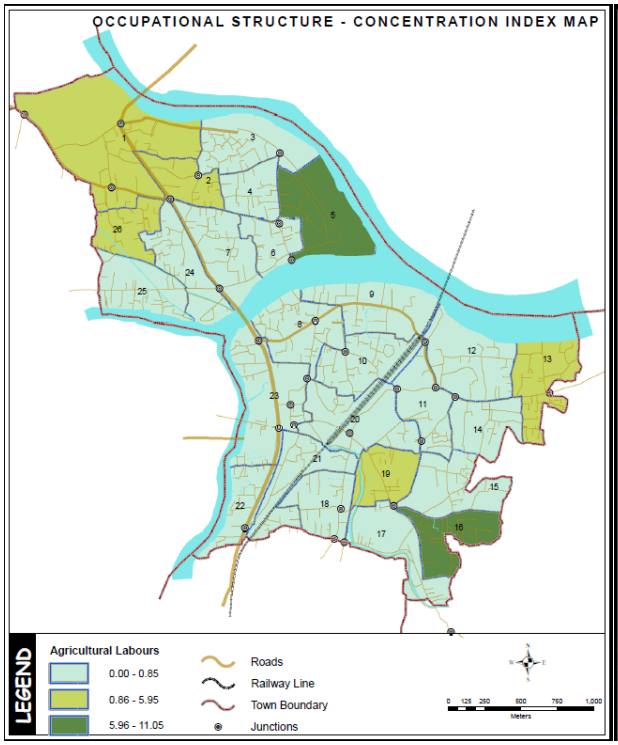

Fig: 6.13 Concentration index map for Agricultural labourers

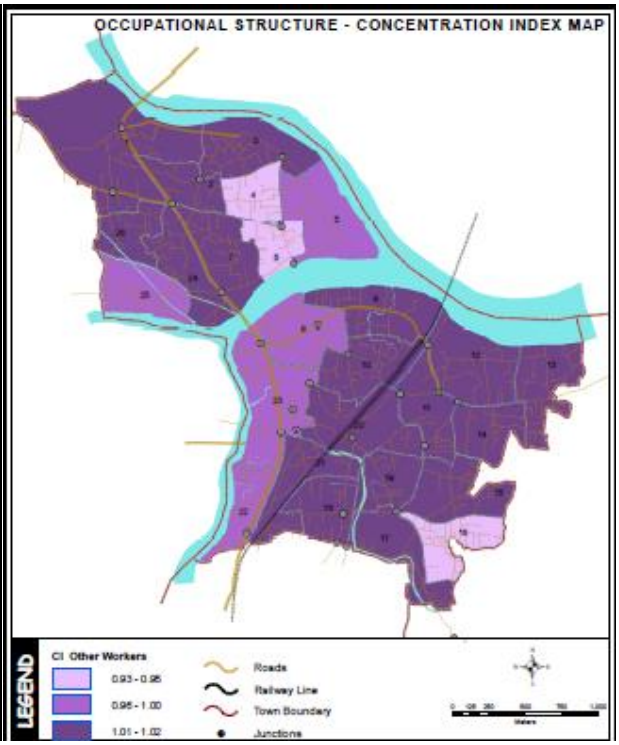

Fig: 6.14 Concentration index map for Other workers

It can be deduced from the map that the 'Household industry workers' are concentrated in southern part of the town, 'cultivators' are less in northern part of the town. Other workers which accounts to 96.56% of workers of the town are more or less distributed all over the town.

6.5 CONCLUSION

WPR of Aluva is increasing over the decades. The growth rate of workers is greater than population growth rate. Although the Population of Aluva muncipality had shown a decreasing trend from 1981 to 2011, the work force participation rate had increased due to the increase in total workers because of more job opportunities in and outside the muncipality. The occupational structure shows that more workers belong to the other workers category. From 1991 there is gradual reduction in the number of workers engaged in agriculture and related activity and there is corresponding increase in number of workers in other workers category. This indicates that workers moved from agricultural and allied activities to other sectors.

7. ECONOMIC ASPECTS

7.1 TRADE AND COMMERCE

7.1.1 INTRODUCTION

The major economic base of the town is trade and commerce. Main concentration of commercial activities is on the southern part of the town. Commercial activities are concentrated on the sides of palace road, market road, market area, railway station road, near railway station and private & KSRTC bus stand areas. The development of the town was concentrated in the eastern side of railway line, because of the existing railway station and KSRTC bus stand. The commercial importance of western side is also multiplied due to the formation of National Highway Bye pass and shifting of the municipal bus stand to that area. Though the northern part of the municipal area, does not show high concentration in commercial activity, the sides of NH 544 near Paravoor junction are identified as centre of 'Booming Commercial Activity'.

7.1.2 LAND UNDER COMMERCIAL USE

The total area under commercial land use in the town is 39.86 hectares. This forms 6.17% of total land area of the town. The Periyar river divides the Aluva municipal area into two parts. Total commercial area in the southern part of municipal area is 33.1 hectares, which constitutes about 85.97% of the total commercial land use in Aluva and the balance 14.03% is at the northern part of the Aluva town.

In 1991, the area under commercial land use was only 22.03 hectares. But in 2010, the area under commercial land use is 39.86 hectares reflecting the growth of trade and commerce activities in the town.

There are various commercial establishments in the whole of Aluva town. These include establishments for wholesale trades, retail trades, personnel services, professional services, banking etc.

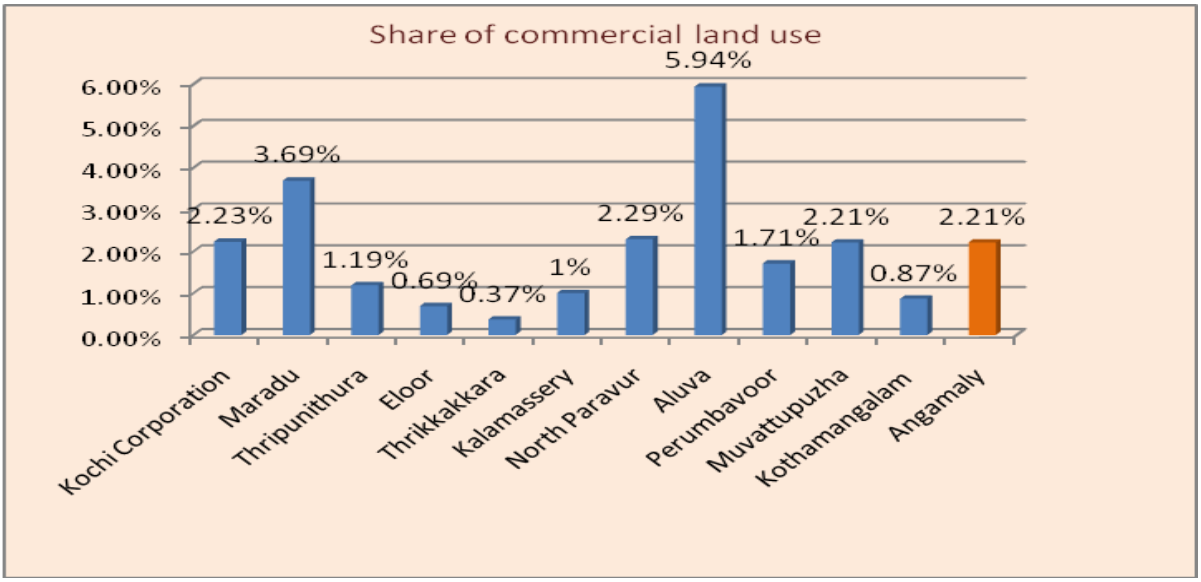

Fig: 7.1 Comparison of % share of commercial land use with similar towns

7.1.3 COMMERCIAL NODES

The junctions with major commercial activities are identified as commercial nodes. A detailed survey was conducted by the department to detail out the various commercial activities carried out within 100m radius of these junctions. By this survey 106 different types of shops were identified and their numbers were taken in each junction. A total of 18 junctions were surveyed and they are 1.Thottakkattukara Junction, 2.Paravur Junction, 3.Seminary Junction, 4.Pump Junction, 5.Zeenat Junction, 6.Railway Station Junction, 7.Taluk Hospital Junction, 8.Power House Junction, 9. Marwar Junction, 10.Bank Junction, 11.Private Stand Junction, 12.Old Market Junction, 13. Karothukuzhi Junction, 14.Main Market Junction, 15.Bye pass Junction, 16. Pulinchode Junction, 17.Civil Station Junction, 18.Post Office Junction.

The existing hierarchy of nodes has been arrived at based on the number & type of shops and extent of commercial land use and is given in the **table 7.1** and **figure 7.1**.

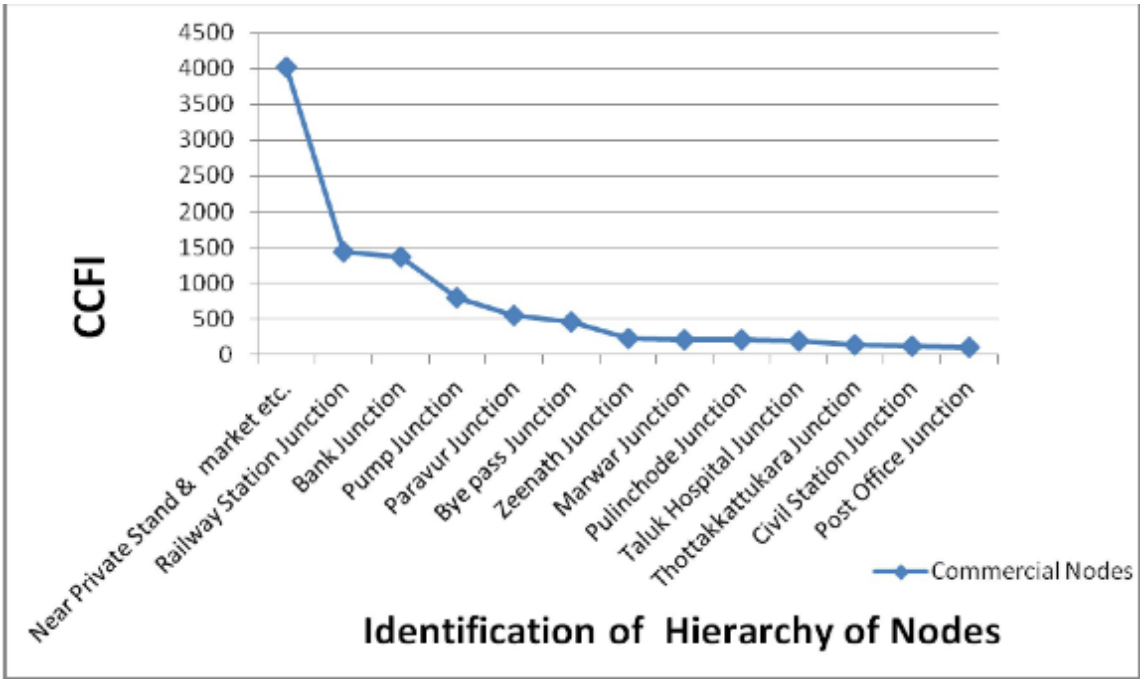

Fig: 7.2 Identification of hierarchy of nodes based on Cumulative Commercial Facility Index (CCFI)

Table: 7. 1 Commercial Node

Sl. No	Nodes	Score	Final Score (CCFI)	Nodes Order
1	old market Junction	1481.04	4013.07	1st order node
2	Private stand Junction	1020.37		
3	Main market Junction	896.51		
4	Karothukuzhi Junction	615.15		
5	Railway station Junction	1442.80	1442.80	2nd order node
6	Bank Junction	1372.19	1372.19	2nd order node
7	Pump Junction	788.84	788.84	3rd order node
8	Paravur Junction	538.96	538.96	3rd order node
9	Bye-pass Junction	450.70	450.70	3rd order node
10	Zeenath Junction	220.19	220.19	4th order node
11	Marvar Junction	204.00	204.00	4th order node
12	Pulinjodu Junction	197.53	197.53	5th order node

13	Taluk hospital Junction	179.82	179.82	5th order node
14	Thottakkattukara Junction	136.08	136.08	5th order node
15	Civil station Junction	121.87	121.87	5th order node
16	Post office Junction	99.06	99.06	5th order node
17	Seminary Junction	84.29	84.29	not considered
18	Power house Junction	0.53	0.53	not considered

Source: Primary survey, 2012

Private Stand Junction, Old Market Junction, Main Market Junction and Karothukuzhi Junction are very nearby junctions and are considered as a single node for finding out the hierarchy of nodes. Considering the commercial importance of the above mentioned nodes and the nearness to the proposed metro station, the order of this combined node is taken as first order. The existing hierarchy of nodes derived is given here under:

- FIRST ORDER – Near Private Stand & Market
- SECOND ORDER - Railway Station Junction, Bank Junction
- THIRD ORDER - Pump Junction, Paravur Junction, Bye-Pass Junction
- FOURTH ORDER - Zeenath Junction, Marwar Junction
- FIFTH ORDER - Pulinchode Junction, Taluk Hospital Junction, Thottakkattukara Junction, Civil Station Junction, Post Office Junction.

Since the commercial activities in the Seminary Junction and Power House Junction are very minimal, these nodes are not considered for analyzing the hierarchy of nodes.

Due to the nearness of the Bye-Pass & Bank Junctions and the proximity of these junctions to the proposed Metro Station in Aluva, these junctions are considered jointly and suggested as a second order node. Also due to the closeness of the Railway Station Junction and the Pump Junction, these nodes are also taken combined and suggested as a second order node.

Existing hierarchy of nodes is depicted in **figure 7.2.**

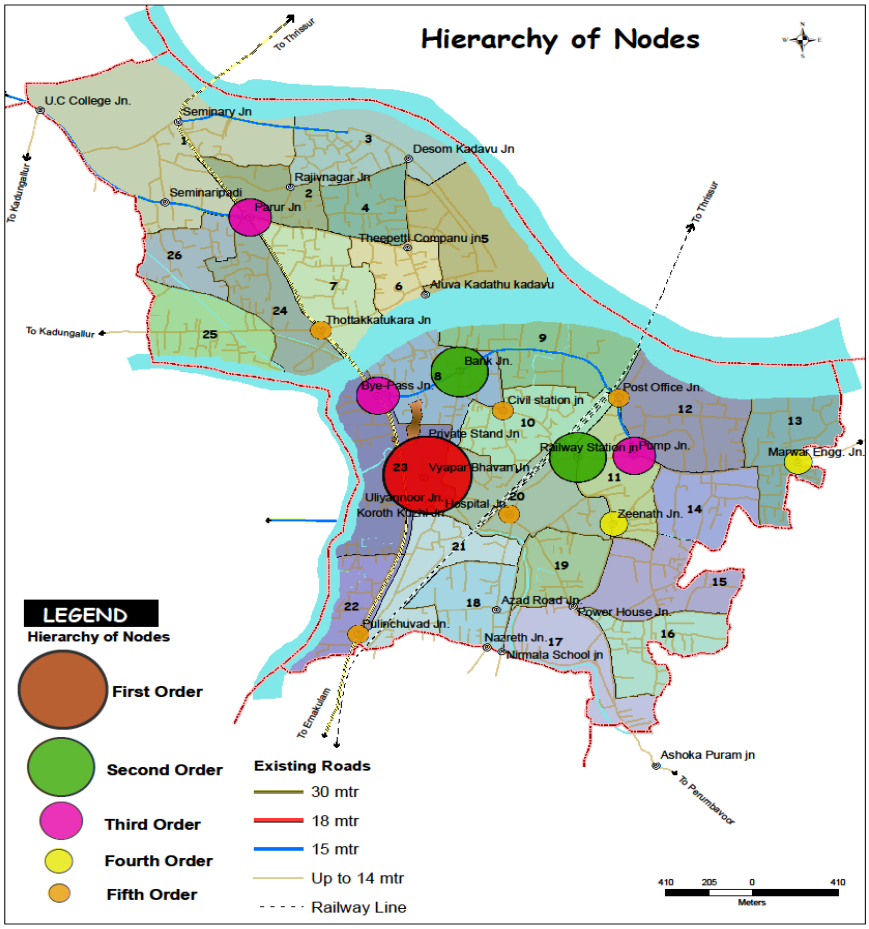

Fig: 7.3 Hierarchy of nodes

7.1.4 MARKETS

The existing municipal market complex at Aluva is situated adjacent to the National Highway, just outside the central business area of the town. This is one of the oldest and biggest markets in central Kerala. Having an extent of 2.5 acres, this market is accommodating fish stalls, meat shops, vegetable stalls, wholesale vegetable shops, fruit stalls and grocery shops. Dry fish whole sale agency is also operating inside this market. Aluva town is developing as a satellite town of the fast growing Cochin City. This adds to the importance of this market.

Mini market is at Thottakkattukara area, behind the Priyadarshini Municipal town hall. Earlier the cattle market was operating in municipal land near private bus stand. Because of the construction of shopping complex in that area, the cattle market was shifted to Aluva General Market.

Aluva is an important wholesale marketing centre in the region. The major commodities are lemon, grass oil, coconut oil, rice, textiles, vegetables, roofing tiles etc. There is a daily market and a weekly market. The weekly market days are Wednesday and Saturday, when commodities such as coconuts, areca nuts, coir, coir products, betal leaf, banana, vegetables, eggs, fish etc. are sold in large quantities.

Income from Markets

The approximate income from the Aluva market from the year 2006-07 onwards to 2010-11 is detailed in the **table 7.2.**

Table: 7. 2 Income from Markets

EXPECTED INCOME FROM MARKETS IN ALUVA MUNCIPALITY						
Numbers	Type	Demand in Rupees				
No. of shop rooms/stalls	1. General Market	2006-07	2007-08	2008-09	2009-10	20010-11
	Vegetable Market	993000	1053000	1080450	1130450	1136000
	Fish Market	918000	952225	1065501	1025000	931200
163 nos.	Rent from shops/stalls	754924	792671	832305	873920	917616
	Others	55385	300266	337516	487287	404338
	Total	2721309	3098162	3315772	3516657	3389154
	2. Mini Market					
38nos.	Rent from shops/stalls	176288	185102	194357	204075	229068
	3. Cattle Market	12333	18450	30000	38010	38510
	Total (1+2+3) Rs.	2909930	3301714	3540129	3758742	3656732

Source: Aluva Municipality

Present Condition of Aluva General Market*:* - All the structures in the market are in a dilapidated condition. Narrow internal roads, lack of proper drainage, congestions at many areas, very poor sanitary facilities etc. give a true picture of the present market. Unscientific parking spaces, lack of identified public entry and truck entry, road side selling at the main

entry area are some of the facts making the market atmosphere worse. The dilapidated condition of the structure may result in the loss of materials and human life at any time.

7.1.5 OTHER SHOPPING FACILITIES

There are 19 major shopping complexes in Aluva. In these complexes, facilities like separate parking area, public comfort station etc. available. But proper drainage facilities and authorized auto, taxi, lorry terminals are to be provided.

The details of Municipality owned shopping complexes/commercial facilities in the town are given in **tables 7.3** and **7.4.**

Table: 7.3 Commercial centers owned by Aluva Municipality

No	**Ward No.**	**Name of shopping complex**	**No.of floors**	**No. of rooms**
1	6	Rest house	3	25
2	7	Tass building	2	2
3	9	Scavenching colony	1	4
4	10	Marwar shopping complex	2	6
5	12	Town bazaar	1	22
6	12	Old stand building	3	20
7	12	Town bazaar rehabilitation building	1	10
8	17	Cattle market	1	9
9	17	SC/ST shopping complex	2	5
10	19	Commercial shopping complex	1	8
11	19	New stand rooms	1	33
12	19	Cart stand building	1	17
13	19	Cart stand godown	2	13
14	19	Mini shopping complex	1	8
15	19	Cart Stand bye- pass building	2	14
16	19	Clock tower building	3	6
17	19	Rajiv Gandhi Bus Terminal	2	15

Source: Aluva Municipality

Table: 7.4 Commercial Facilities in Aluva Town

No	Category of commercial node/centre*Name	Separate Parking area (Y/N)	Authorized stand			Public comfort Station (Y/N)	Proper Drainage	Remarks
			Auto (Y/N)	Taxi (Y/N)	Lorry (Y/N)			
1	NSS Shopping complex	Yes	No	No	No	Yes	No	
2	Kalathil Complex	Yes	No	No	No	Yes	No	
3	CSI complex	Yes	No	No	No	Yes	No	
4	KAP complex	Yes	No	No	No	Yes	No	
5	Santo Complex	Yes	No	No	No	Yes	No	
6	Manjooran Complex	Yes	No	No	No	Yes	No	
7	Jalaliya Complex	Yes	No	No	No	Yes	No	
8	Maziad complex	Yes	No	No	No	Yes	No	
9	Payaappilly Bazar	Yes	No	No	No	Yes	No	
10	CSI shopping complex	Yes	No	No	No	Yes	No	
11	Kadavath Shopping complex	Yes	No	No	No	Yes	No	
12	Kayyanattu Shopping complex	Yes	No	No	No	Yes	No	
13	St George Shopping complex	Yes	No	No	No	Yes	No	
14	Royal Plaza	Yes	No	No	No	Yes	No	
15	City Tower	Yes	No	No	No	Yes	No	
16	Agricultural Bank Complex	Yes	No	No	No	Yes	No	
17	Palm Land complex	Yes	No	No	No	Yes	No	
18	Prasad Buildings	Yes	No	No	No	Yes	No	
19	Calcutta Tower	Yes	No	No	No	Yes	No	

Source: Aluva Municipality

7.1.6 INFORMAL SECTOR

Hawkers and street vendors have long been a common feature of sidewalks and markets of urban centers. A hawker is a vendor of merchandise that can be easily transported and in large cities; hawkers are commonly known as street vendors. Street vendors are an integral component of urban economies around the world. As distributors of affordable goods and services, they provide consumers with convenient and accessible retail options and form a vital part of the social and economic life of a city. Street vending, as an occupation, has existed for hundreds of years and is considered a corner stone of historical and cultural heritage of many cities.

The details of informal sector activity in Aluva, which mainly included the street vendors, are obtained from the municipality and also from the primary survey conducted by the Town and Country Planning Department in connection with preparation of master plan for the town. These street vendors are concentrated in areas near Aluva Market, Railway Station, K.S.R.T.C, Bank Junction, Paravur Junction, Bye pass Junction etc. Details of informal sector activities i.e., area of concentration, type of activity, number of units and number of labour force etc. of Aluva municipality are given in **table 7.5.**

Table: 7.5 Informal sector (street vendors)

Sl. No	Area of concentration of informal sector activities	Type of activity	Extent of informal sector activity in each area (no of shops/cart)	Labour force	Remarks
1	Near Aluva Market	Fruits and vegetables	5	5	Day street vendors
2	Near Aluva Market	Home appliance	7	11	Day street vendors
3	Near Railway Station , KSRTC & Govt. Hospital	Fruits and vegetables, garments, tea & snacks, home appliances	24	36	Day street vendors

4	Near Bank Jn.	Fruits and vegetables	18	30	Day street vendors
5	Paravur Jn.	Fish, garden plants, Fruits and vegetables, tea and snacks	9	14	Day street vendors
6	Bye-pass & Bank Jn.	Fast food	12	23	Evening & night street vendors
7	Paravur Jn.	Fast food	1	1	Evening & night street vendors
8	Near Railway Station , KSRTC	Fast food	2	8	Night vendors
9	Near Railway Station , KSRTC	Tea, coffee& flowers	4	4	Early morning street vendors
10	Near Railway Station , KSRTC	Chappal, CD, Garments	15	19	Sunday street vendors

Source: Local Body, primary survey

7.1.7 BANKING

Major Nationalized Banks have branches in Aluva Town. Various other financial institutions are also functioning in the town. Please refer **table 7.6**. Sufficient numbers of banks are operating in the Aluva municipality.

Table: 7.6 Details of banks in Aluva Municipality

DETAILS OF BANKS IN ALUVA MUNCIPALITY (2010-2011)		
Sl No.	Name Of Bank	Location (Ward)
1	Catholic Syrian Bank	XII
2	Indian Overseas Bank	"
3	Ernakulam District Co - Operative Bank	"
4	South Indian Bank	"
5	M/s Gokulam Chitties	"
6	Union Bank of India	"
7	Desabhivardhini Bank	"
8	Punjab National Bank	XIX
9	Vijaya Bank	"
10	Allahabad Bank	"
11	Federal Bank	"
12	HDFC Bank	"
13	Central Bank of India	"
14	Malabar Gramin Bank	"
15	United Bank of India	"
16	Ernakulam Co - Operative Agricultural Rural Development Bank	VI
17	Ernakulam District Co - Operative Bank Ltd.	"
18	Bank of Baroda	XI
19	ICICI Bank	"
20	HDFC Standard Life Insurance	"
21	SBI	"

22	SBT	XI
23	Canara Bank	VIII
24	Aluva Urban Bank	"
25	Dhanalakshmi Bank	"
26	SBI	"
27	SBI	IV
28	Federal Bank	"
29	Nithya Chaithanya Kuries	"
30	Bank Employees Co-op Society	VII
31	Kerala Permanent Benefit Fund	"
32	Muthoot Finance Pvt. Ltd.	"
33	Indian Bank	"
34	Axis Bank	"
35	Syndicate Bank	"
36	HDFC House Loans	"
37	IndusInd Bank	"
38	Kochi Minimuthoot Nidhi Ltd.	"
39	Mini Muthoot	XVIII
40	Federal House Constructions Co-op Bank Ltd.	"
41	Desabhivardhini Service Co-op Bank Ltd.	"

Source: Aluva Municipality

Comparisons of number of banks in Aluva town with similar neighboring towns are shown in the **table 7.7** and **figure 7.4.**

Table: 7.7 comparison of banking facilities

Municipality	Total economic infrastructures
Angamaly	14
Aluva	19
Paravur	15
Perumbavoor	6
Kalamassery	23
Tripunithura	15
Muvattupuzha	13
Kothamangalam	10

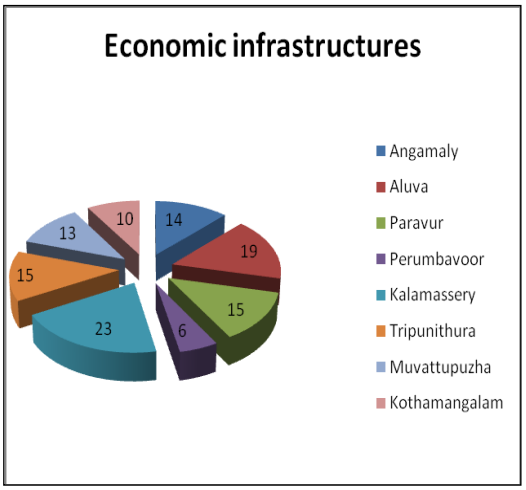

Fig:7.4.comparison of banking facilities

7.1.8 CONCLUSION

Aluva Market which is situated adjacent to the National Highway is one of the oldest and biggest markets in central Kerala, which is also an important wholesale marketing centre in the region. The commercial node including the four junctions, namely Private Stand Junction, Old Market Junction, Main Market Junction and Karothukuzhi Junction is the first order node in the town. Trade and commerce is a major economic base of the town. The construction of Modern Fish Market building is in an almost completed stage except the construction of sewage treatment plant. When this starts functioning, it will be the major wholesale and retail fish market in the region. The new market complex construction will also be started soon. It will also boost the trade and commerce activities in the town. Although the informal sector activity is small in Aluva area, it is clear that as distributors of affordable goods and services, they provide consumers with convenient and accessible retail options and form a vital part of the social and economic life of the town. Sufficient number of banks is functioning in Aluva town.

7.2 INDUSTRY

7.2.1 INTRODUCTION

The industrial sector of the town is analysed in this chapter. Medium scale, small scale, micro level and traditional industries are functioning in the town. As per the land use analysis 2.54 hectares of land which is just 0.39% of total town area is coming under industrial land use and it was 0.45% of developable area. Only small Industrial units of all types are spread out mainly throughout the southern portion of the town. As per 1991 land use it was 9.14 hectares ie 1.73% of developable area. That means industries are getting reduced over the years. As per the census 1981, 1991 and 2001 the number of workers in house hold industrial sector are 76, 70 and 122 respectively.

The industrial developments had taken place in and around Aluva during the period of 1931 to 1951, so the population growth had increased. After the 50's, the deterioration of the industries had caused and thus the population growth is decreased.

7.2.2 MAJOR INDUSTRY

No Major industries are functioning in Aluva town. The Kathai Cotton Mills, a major industry which existed in Aluva is no longer functioning due to labour problems.

7.2.3 MEDIUM SCALE INDUSTRIES

5 medium scale industries are functioning in the Aluva municipality. Among them 2 industries are functioning under engineering category. One of them is repairing and servicing centre for 2 wheelers. The details regarding the medium scale industries are given in the **table 7.8.**

Table: 7.8 Details of Medium Scale Industries

Name of Ward/ Place	Name of Industry	Type of produce	No of employees
Market Rd.	Alampilly pressure testing Co.Pvt.ltd	Component for LPG cylinder	50
Aluva west	Aryabhangi motors	Repairing & Servicing of 2 wheelers	10
Aluva	Water Purification Plant	Water purification	56
Near KWA	Water Treatment Plant	Water purification	145
Marvar Jn.	Marvar Engg. works	Fabrication of iron a& steel	20

Source: Local body, DIC

Total number of employees in these medium scale industries is only 281.

7.2.4 SMALL SCALE INDUSTRIES

9 small scale industries are functioning in the town. They are under engineering, chemical, mineral, rubber based, electronics and agro based categories. The total number of employees working in small scale industries is 154. The details of small scale industries are given in the **table 7.9.**

Table: 7.9 Details of Small Scale Industries

Name of Industry	Type of produce	Qty. of produce (specify unit)	No. of produces	No of employees
Alwaye Engg. Works	Repairing of motor vehicles	250 nos.	3	15
Dynamic Techno Medicals Pvt.Ltd	Surgical dressings, Bandages	2000 nos.	4	40
Bharath Clays	Clay Products	300 MTS	1	17
Alwaye Techno Rubbers Pvt. Ltd	Rubber products	10 Ton	1	41
Prima Beverage Pvt. Ltd	Soft drinks	2 Ton	1	12
Micro Medi Tex Pvt. Ltd	Medicines	600 Kg	10	7
Mazcom IT solutions	Repairing of Computers	60 nos.	1	2
Premier Printers	Printing books	18000 nos.	1	15
Jeevan Food & Spices	Spices	600 MTS	4	5

Source: Local body, DIC

7.2.5 MICRO LEVEL INDUSTRIES

24 micro level industries are functioning in Aluva. Following categories of micro level industries are functioning in the town viz. Engineering, electronics, rubber based, plastic based, agro based, building materials, chemicals, and others. The details of micro level industries are given in the **table 7.10.**

Table: 7.10 Details of Micro Level Industries

Sl no.	Ward No.	Name of Industry	Type of produce	Qty. of produce (specify unit)	No. of produces	No of employees
1	17	Nylon Net manufacturing	Nylon net	1000 kg	1	3
2	6	RK Printers	Printing	250 lmp	2	6
3	6	Anu Engg.	Gate & Grill	180 Nos.	2	5
4		MSQUE Technologies	Software development	50Nos	1	3
5	15	Jolly Plast	Rubber Products	50 Ton	3	2
6	6	Vignesh offset printers	Offset printing	14 lmp	3	2
7	7	Tip Top Bag house	Bags	4000 Nos.	1	4
8		Ecovedic products pvt ltd	Ayurvedic & Unani products	250	3	7
9		Narayanan Engg.	Doors and Windows made of iron or steel	12 Nos.	1	3
10		Sky net	Medical transcription	10 Nos.	1	18
11		Systems & software	Software development	6 Nos.	1	3

12		E&M Engg.	Doors and Windows made of iron or steel	2 Ton	2	4
13	14	Alwaye Plastic Industries	Packing products of plastics	40 Ton	1	2
14		Kiran Plastics	Polymer/Synthetic/PVC Water storage tanks	2 Ton	3	8
15	14	Net way Technologies	Software development	2000 Nos.	1	2
16	19	Abrar Soda	Soda product	70000 Ltrs.	1	2
17	1	Gayathri Enterprises	DTP	2000 Nos.	2	1
18	5	Colors	Flex printing	300000 Nos.	1	5
19	3	Mariya Power tools	Hiring of power tools	900 Nos.	1	2
20	17	Amson computers	Software development	300 Nos.	1	5
21	12	Sharaf Plastics	Polymer/Synthetic/PVC Water storage tanks	100 MTS	1	5
22		Arrow wood & metal	Iron and Steel furnitures	60 MTS	2	4
23		Palakkal flour mills	Manufacturing of breakfast foods obtained by roasting or swelling of cereals grains	500 Kgs	3	
24	20	Eagle Engg. Works	Doors and Windows made of iron or steel	2 Ton	2	5

Source: Local body, DIC

7.2.6 TRADITIONAL INDUSTRIES

Only 5 traditional industries are functioning in Aluva municipality. The details are given in the **table 7.11.**

Table: 7.11 Details of Traditional Industries

Name of Industry	Type of Traditional Industry	Qty of Produce/Year (specify unit)	No. of workers
Premier Timber Industries	Cane and Reed	250 MTS	10
Puzhayoram furniture Industries	Cane and Reed	1000 Nos.	6
Teak Industries and Saw mills	Furniture made of wood, cane & reed	100000 Cu.ft.	4
Matha wood industries	Furniture made of wood, cane & reed	500 Nos.	5
Sajeed Furnitures	Furnitures made of wood, cane & reed	6000 Cu.ft.	3

Source: Local body, DIC

7.2.7 DETAILS OF CONSTRUCTION INDUSTRIES

As per the data obtained from the municipality, currently no construction industries are functioning in Aluva town.

7.2.8 COMMODITIES MANUFACTURED

Most important commodities manufactured are Rubber product, Nylon net and coconut oil. The commodities exported are spices, dry fish and coconut oil.

7.2.9 CONCLUSION

Only small industrial units of all types are spread out mainly though out the southern portion of the town. Currently no construction industries are functioning in the town. The major commodities manufactured are timber products. Industries are getting reduced over the years. Total number of industrial employment available in the town is only around 560. The town has unutilized potentials for industrial development viz good connectivity through

both road and rail , potentials for developing connectivity through water ways , availability of water and a wider resource region , thanks to its locational aspects. The major problem faced by industrial sector is lack of availability of land.

7.3. AGRICULTURE

7.3.1 INTRODUCTION

Nearly 10.41% of the total land area of the town is coming under agricultural use. The functional character of the town shows that out of 26 wards, 24 wards are showing urban character and the remaining two wards are Semi urban in nature. This indicates that agriculture and allied activities has not much role in the economy of the town. This chapter discusses the role of agricultural sector in the town.

7.3.2 AGRICULTURAL LAND USE IN ALUVA TOWN

The total extent of land under agriculture use is 67.5 hectares **(figure 7.5).** The agricultural activities are concentrated at the southern and western end of the town. The land use survey was conducted grouping the agriculture land use into four categories viz. rubber, paddy, mixed crops and coconut. The split up of agriculture land use is shown in **table 7.12** and **figure 7.6.**

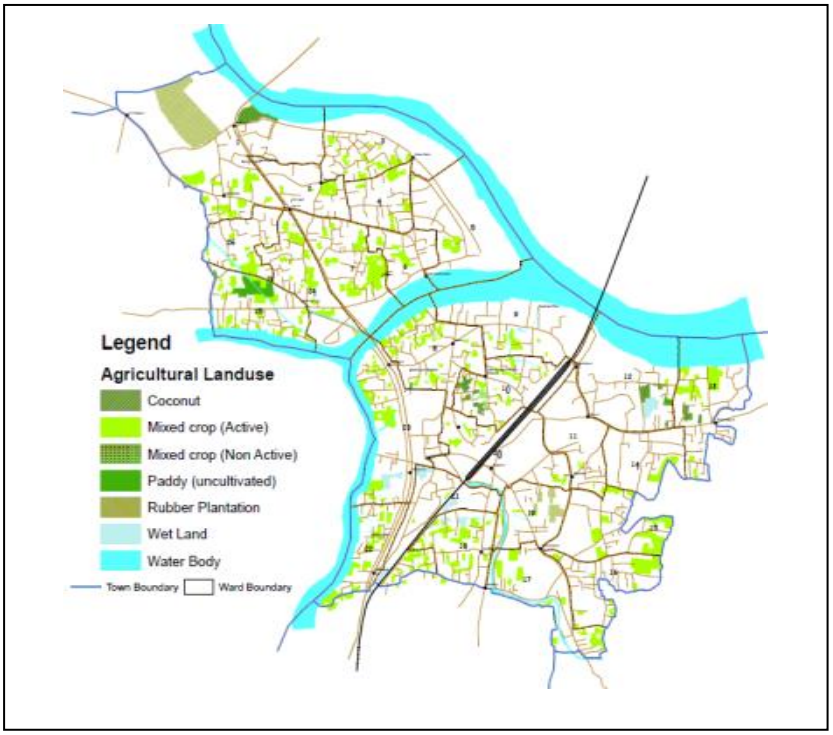

Fig: 7.5 Agricultural Land use in Aluva Town

Table: 7.12. Split up of land under different crops.

Sl.No.	Crops	Area (in Ha)	% of town area	% of Agriculture land
1	Paddy/low lying land	5	0.78%	7.41
2	Coconut	3.7	0.57%	5.48
3	Mixed crops	48.5	7.47%	71.85
4	Rubber	10.3	1.59%	15.26
TOTAL		67.5	10.41	100.00

Source: Land use survey 2010.

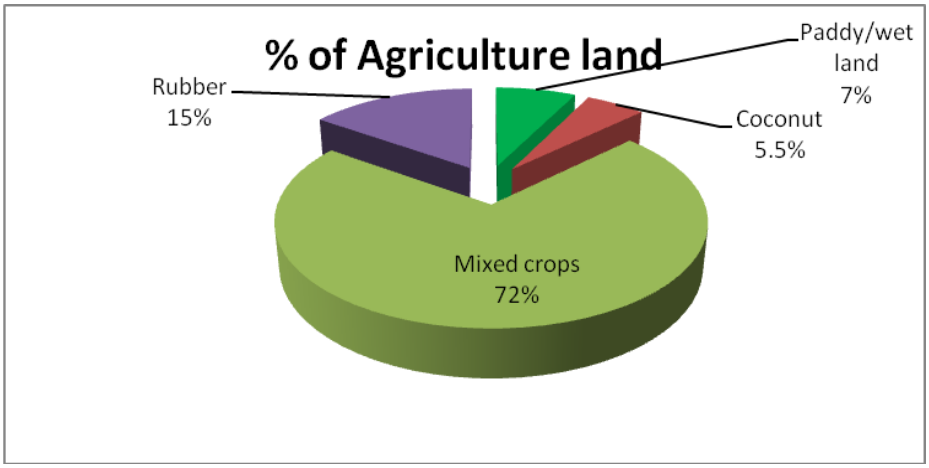

Fig: 7.6 Split up of land under different crops.

7.3.3 CONCENTRATION OF AGRICULTURE LAND USE

The agriculture area is distributed in all parts of the town. In fact it is mixed with other urban land uses especially the residential area. The concentration pattern of Agriculture land use has been discussed in detail. More concentration of Agriculture land is at the western side and southern side of the town away from the town centre and on both sides of river. The concentration pattern of agriculture land use is shown in **figure 7.7.**

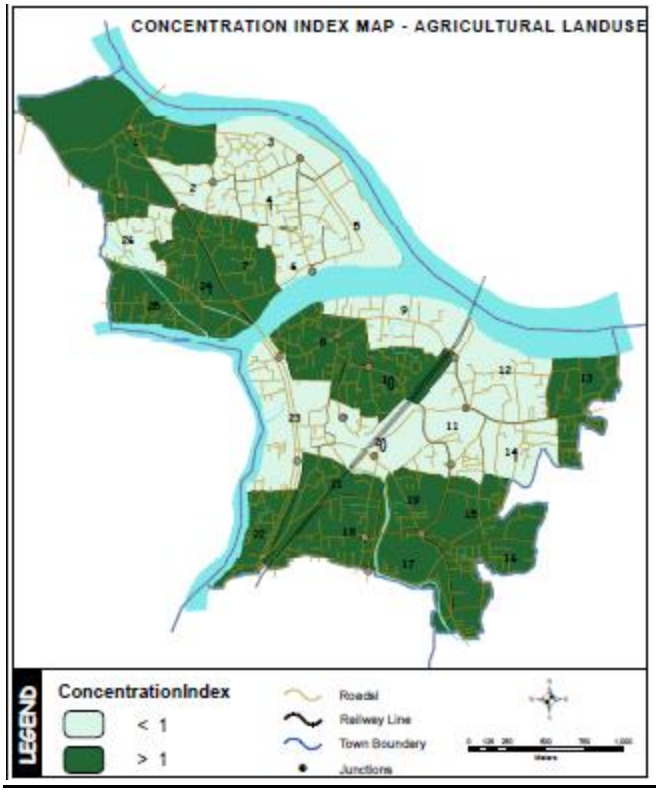

Fig: 7.7 Concentration pattern of agricultural land use

7.3.4 LABOUR STRENGTH

As per 1991 census out of total workers of 7715, only 44 are cultivators, and 14 are agricultural labors. In the 2011 cultivators are 45 in number and agriculture labourers are 47. **Table 7.13** gives the temporal variation of cultivators and agricultural labourers during 1981-2011 period.

Table: 7.13 Labour strength of Aluva -Temporal variation

Year	Cultivators	Agriculture labourers	Total workers
1981	79	119	7415
1991	44	14	7715
2001	18	16	7790
2011	45	47	7798

Source: Census 1981, 1991 , 2001 and 2011

As per the Socio – Economic survey 2010, the percentage of Agriculture Labourers is 1.02%, percentage of Cultivators is 0.87% and the percentage of live stock workers is 0.73%. The total percentage of workers engaged in Agriculture and allied sector is thus 2.62%. Both census figures and findings of socio-economic survey indicate the subtle role of agricultural sector in the town.

7.3.5 FARMING METHODS

Conventional farming methods are adopted in the area. Labour shortage is the major problem and methods like group farming are not adopted. The mechanization of farming is limited to the usage of tractors and tillers.

7.3.6 MAJOR CROPS OF THE TOWN

Table: 7.14 Area of cultivation of Major crops

Crops	Area (Ha)
Coconut	110
Banana	5
vegetables	8
tapioca	2
rice	2
floriculture	1
others	2

Source: municipality, Agricultural department 2010

As per the data available with the agricultural department major crops and their area of cultivation in Aluva town are as given in **table 7.14**. Accordingly, coconut is the major crop as far as the area of cultivation is concerned, followed by vegetables and banana. There is no active paddy cultivation in Aluva municipality and the area of uncultivated paddy field is around 1.80ha only. It is to be noted that paddy fields are used for the cultivation of tapioca, banana and vegetables.

7.3.7 AGRICULTURE INFRASTRUCTURE

7.3.7.1 Irrigation Facilities

The municipality is not vast and agricultural area is only about 10% of land use. PVIP canal passing through Aluva town.

7.3.7.2 Marketing Facilities

There are two agriculture markets in Aluva town. The main market is at the opposite side of municipal bus stand and the mini market is behind the Priyadarshini town hall at Thottakkattukara. Agriculture products like banana, yam, ginger, betal, vegetables, fruits etc. from the town and surrounding area are transacted through this market.

7.3.8 CONCLUSION

Nearly 10% of the town area is under agriculture use. Coconut is the major crop of the town as far as the area of cultivation is concerned. Agricultural area is concentrated at the western side and southern side of the town away from the town centre and on both sides of the river. Major portion of paddy fields are remaining uncultivated or used for cultivation of crops other than paddy. Limited land availability of the town impose restrictions in the development of the sector. However, the existing potentials of the town can be put to optimum use through promoting suitable agricultural practices.

7.4 ANIMAL HUSBANDRY

7.4.1 INTRODUCTION

Animal Husbandry and Dairy development sector is of vital importance in generating additional employment opportunities and supplementing income of families. Mostly peasants and agricultural labourers are engaged in cattle rearing and allied activities. Aluva Town depicts purely urban character. Hence naturally, the animal husbandry sector also will have limited role in the economy of the town. This chapter discusses the present status of the sector in the town.

7.4.2 LIVE STOCK DETAILS OF ALUVA TOWN

In Aluva town live stock population is distributed in all wards of the town. The main species found in the town are hen, cow and goat. The details of livestock population in Aluva municipality and nearby municipalities are given in **table 7.15** shown below.

Table: 7.15 Live stock population – Aluva town and other urban centres in the district

Sl No.	Name of Municipality	Live stock population					
		Cow/ Buffalo	Goat	Hen	Duck	Pig	Others (Specify)
1	Aluva	366/35	183	1596	117	38	Dog-514
2	Angamaly	1553/93	2497	11736	495	137	-
3	North Paravoor	653	652	3990	287	14	Rabbit -79 Cat -387
4	Muvattupuzha	601/23	1091	3104	41	10	Dog-490
5	Kothamangalam	1666/24	1565	7983	700	180	Dog-1108, Cat-295

Source: secondary data

The table clearly depicts that strength of live stock population in Aluva municipality is very much less compared to other municipalities in the district. The urban character of the town and the relatively small plot sizes impose restriction on the future prospects of animal husbandry sector in Aluva town.

There are no poultry farms or slaughter houses or dairy farms in Aluva municipality. There is a milk Co-operative society with capacity of 16500 litres. There is a veterinary hospital and veterinary research institute in Aluva town. The cattle market was functioning behind the municipal bus stand, which is now shifted to the new market opposite to the bus stand. As already stated, there is only one dairy outlet in the municipality.

7.4.3 CONCLUSION

Considering the land use pattern there is only limited scope for developing Animal Husbandry sector in the town. However, back yard poultry rearing can be promoted along with the agricultural activities.

8. TRANSPORTATION

8.1. INTRODUCTION

The transport sector is an important component of the economy, development and the welfare of the people. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment and additional investment. When transport systems are deficient in terms of capacity or reliability, they can have an adverse effect on the economic base of the town. Transport also carries an important social and environmental load, which cannot be neglected.

Transport contributes directly to economic activity and employment through bus, rail, road, air and maritime services. It also has a large indirect impact via all the other sectors and activities in the economy that depend on and use these various modes of transport to move people and goods around, nationally and internationally, in an efficient and safe manner.

As part of preparation of Master plan for Aluva various studies related to Traffic and Transportation has been conducted. The study on Traffic and Transportation was entrusted with the National Transportation Planning and Research Centre (NATPAC) and the study was conducted in the year 2010. Study about vehicle population, road network, speed and delay, traffic volume, parking, pedestrian, Origin and destination of traffic etc were carried out in this respect. This chapter discusses the salient aspects of traffic and transportation in Aluva town.

8.2. TRANSPORTATION SYSTEM

Located at the centre of Ernakulam District, Aluva is connected to all major cities in the country by air (Cochin International Airport at Nedumbassery, 10 km away), rail, road and sea (nearest port Cochin, 22 km away). Most trains including express trains have stop at Alwaye railway station. The National Waterway III passes towards the western part of Aluva Town. The point nearest to Aluva town is Paravur. Town is linked to the National Waterway III through the Periyar River. In the past the Periyar was a major navigation route which served Aluva Region.

Aluva has a network of roads, which connects it to the nearby towns and cities. The road network of the study area does not conform to any regular pattern. The Ernakulam-Thrissur stretch of National Highway 544 passes through the town. Other major roads are

Paravur road, Alangad road, Perumbavoor road, Aluva Munnar Road (SH 16) and Thaikattukara road.

8.3. EXISTING ROAD NETWORK

The road network system of the town consists of roads maintained by PWD and Municipality. The Existing Road network of the town is shown in **figure 8.1.**

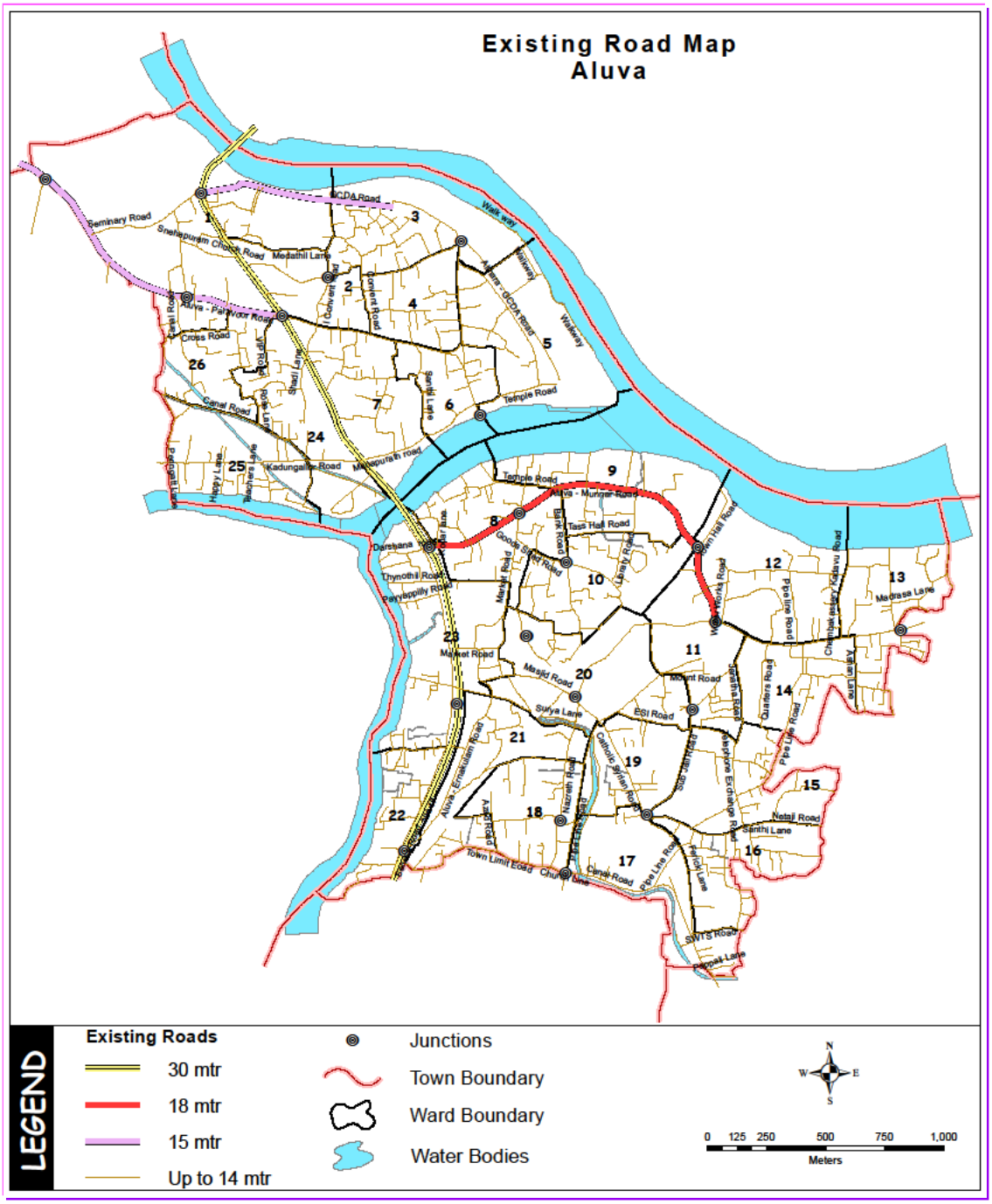

Fig: 8.1. Existing road map, Aluva Town

8.3.1. MAJOR ROADS

The major roads identified in the Aluva municipality are:

1. Ernakulam – Thrissur road (NH 544): Pulinchuvadu jn to Mangalam Puzha Bridge

2. Aluva –Paravur road: Paravur jn to UC college jn

3. Aluva- Kadungallur Road: Thottakkattukara jn to municipal limit

4. Siva Temple Road (manapurath road): Thottakkattukara jn to Aluva sand bank

5. Palace road (part of Aluva – Perumbavoor road): Bypass jn- pump jn

6. Market Road: karothukuzhi jn to bank junction

7. Aluva –Thaikkatukara road: Taluk Hospital jn to Thaikkatukara municipal limit

8. Aluva –Munnar road(SH 16): Railway station jn to municipal limit

9. Police station road(Sub- jail road)(Part of Aluva- Munnar road): sub jail road jn to power house jn

10. Aluva - Perumbavoor road: Pump Jn. to municipal limit on Perumbavoor road.

8.4. RAIL

Out of the total area of 54.03 hectares under roads and railways 10.46 hectares is under railways. Thiruvananthapuram – Shornur railway line provides connection to other parts of our country.

8.5. AIR TRANSPORT

Cochin international airport at Nedumbasseri, 10 km from Aluva Town, provides linkages to most of the cities in India and several Middle Eastern countries**.**

8.6. WATER TRANSPORT

Aluva and the surrounding region are endowed with an integrated system of canals, rivers and backwaters. The Periyar River and its tributaries were the main highway of trade and commerce of the region in the past. Besides passenger travel in the past depended predominantly on water transport. The Periyar River has played a crucial role in moulding the socio - economic life of the region. At present the transportation through this river is confined to only ferry lines. With bridges coming up across the river, the ferry services are

becoming extinct. The inland waterway network, which was the lifeline of the region, due to interaction of several factors, has been rendered dysfunctional. A reversal of this trend at the present juncture is highly desirable. This will reduce the overburdened road system. Aluva is linked to National Waterway No: III at Kottapuram (near Kodungallur) through the Mangalampuzha arm of Periyar River and at Cherai through a section of the Periyar River and the Paravur Canal.

Possibilities are also open for linking the Willington Island in Kochi and the International Airport at Nedumbassery through waterways by making use of a section of the NW 3, Edamala arm of Periyar River and the Chengal Creek. This project, if implemented, will reduce vehicular traffic on the roads leading to Aluva town.

In recent times emphasis has been laid on revival of waterways for movement of cargo and passengers. Besides deviating from its conventional role, the waterways have been called upon to serve as a source of recreation for domestic and foreign tourists. The full potentiality of waterways for solving the transportation problems of Aluva needs to be explored.

8.7 ROAD NETWORK CHARACTERISTICS

The Taluk head-quarter town of Aluva is a medium sized commercial centre. The vegetable and provision wholesale and retail market here was a major trading centre from very ancient times. The market and the railway station are the principal trip generating points of the town.

The characteristics of the roads of the study region are given below:

National Highway 544 (old NH 47):

The section of the National Highway 544 between Kms 329/6 and Kms 332/9 passes through the town. The NH 544 enters the study area at Mangalampuzha and exits through the Pulinchauvd Junction. The NH 544 is the only link between the two parts of the town. The NH 544 passing through the town provides favorable surface characteristics. The capacity of the road is however undermined by the traffic junctions namely the Thottakkattukara and Paravur Junctions. There is a grade-separator on the NH 544 by pass in the town that segregate vertically the traffic on the NH 544 and the traffic to/ from the

market. However even after the completion of grade- separator, the vehicular movement at the Pulinchauvd and by pass junction still remain at- grade.

Aluva- Munnar Road (S H 16) via Choondy:

The Aluva- Munnar State Highway takes off from Kms 0/300 of the Eastern Approach Road in the vicinity of the Aluva Railway Station and leads to Munnar. The total length of the road running through Aluva municipality is 1.7 Kms. The name given to this road is a misnomer, since the Kothamanglam - Munnar section of road now coincides with the alignment of the Kochi - Madurai National Highway 85.

Aluva- Perumbavoor Road -MDR via Marampally:

The Aluva-Perumbavoor Road takes-off from the Bank Junction and leads to Perumbavoor. The total length of the road is 16 Kms. The length of the road which passes through Aluva town is 1.6 Kms. The section of this road within the municipal limits carries a significantly high volume of traffic. Between the Bank Junction and the pump Junction vehicles of all categories are allowed to ply. In the counter direction heavy vehicles are prohibited**.**

Aluva - Paravur Road - MDR:

The Aluva- Paravur road originates from Desam Kadavu located on the banks of the Periyar River. It intersects the NH 544 at Kms 1/800 and leads to the Municipal town of Paravur. The Paravur Junction is formed at the intersection of the Paravur Road and the NH544. The length of the road within the study area is 2.8 Kms. The section of the road between the sand bank and Paravur Junction carries low volume of traffic, predominantly consisting of personal modes of travel-cars and two- wheelers.

Aluva-Kadungallor Road

The Aluva – Kadungallor road originates from the Vicinity of the sand bank of the Siva Temple. At Kms 0/920 it intersects the NH 544 forming a four arm junction at this point. The Thottakkattukara Junction formed at the intersection of the NH 544and the Kadungallor Road carries a high volume of traffic.

Aluva - Ernakulam Road (Old NH Road section)

The total length of the Old NH road is 1.980 Kms. The road commencing from the By-pass Junction, passing through Bank Junction and Karothkuzhi Junction, and finally

terminating at Pulinchuvad Junction, has been stated as the Old NH Road in the records of the PWD (Roads). In local parlance the section of the Old NH Road between by- pass Junction and Bank Junction is known as Palace Road. There are four major Junctions on this road. The section of the road passing through the market is very narrow. Commercial vehicle parking aggravates the problem across this section.

Thaikattukara Road:

The road has a narrow carriageway ranging from 2.6 m to 3.0 m. The Thaikattukara Road is the southern arm of the Taluk Hospital Junction. It runs through a residential colony and joins the NH 544 near Choorinikara. It provides a short and convenient link from Aluva Town to Choorinikara area located on the NH 544. Public transport buses run on this road despite its narrow width. It does not offer any scope for widening due to the built- up nature.

8.7.1 ROAD INVENTORY

An understanding of the extent and quality of road network is very important to formulate plans for the future. A detailed inventory of existing road network was carried out to obtain information like road length, cross-sections, hierarchical ranking of roads, surface condition, intersections, street furniture, parking area, bus bays etc. The roads/sections taken for detailed study are given in **table 8.1**.

Table: 8.1 Roads/sections

Road No.	Name of Roads/sections	
	From	To
1	**Ernakulam-Thrissur road (NH 544) ie old NH47**	
HS1	Pulinchodu junction	Bypass junction on NH 544
HS2	Bypass junction	Thottakatukara Junction on NH 544
HS 3	Thottakattukara junction	Paravur junction on NH 544
HS 4	Paravur junction	Mangalapuzha Bridge
2	**Aluva-Paravur road**	
HS 5	Paravur junction	UC College junction

3	**Aluva-Kadungallur road**	
HS 6	Thottakattukara junction	Muncipal Limit
4	**Siva temple road**	
HS 7	Thottakattukara junction	Aluva Manalpuram
5	**Palace road**	
HS 8	Bypass junction	Market road junction
HS 9	Market road junction	Bank junction
HS 10	Bank junction	Pump junction
6	**Market road**	
HS 11	Market road junction	Karothukuzhi Junction
7	**Aluva-Thaikattukara road**	
HS 13	Taluk Hospital junction	Thaikattukara Municipal limit
8	**Aluva-Munnar Road (SH 16)**	
HS 16	Karothukuzhi Junction	Taluk Hospital junction
HS 17	Taluk Hospital junction	Power House Junction
HS 18	Power House Junction	Pallikkal Municipal limit
9	**Police Station road (Sub- Jail Road)**	
HS 19	Sub jail road junction	Power house junction
10	**Aluva-Perumbavur road-Major District Road**	
HS 20	Railway station junction	Bazar junction
HS 21	Bazar junction	Pump Junction
HS 22	Pump Junction	Municipal limit on Perumbavur road

Source: Traffic & Transportation Survey, March 2011.

The details of the cross-sectional elements of each of the main corridors of the study area were collected. This includes right-of-way width, carriageway width, shoulder width and details of footpath, side drains etc. The various elements of cross structures located on the major roads have also been studied. The results of the inventory survey are presented in

table 8.2. It is to be noted that the while carrying out the traffic and transportation studies the work of fly over on N.H. By pass was only progressing.

Table: 8.2 Inventory details of major roads in Aluva Town

Sl. No	Chainage		Length (km)	Width (m)		Median (m)	Footpath (m)		Shoulder (m)		Bus stops	Adjoining land use	
				CW	ROW		L	R	L	R		L	R
1	**Pulinchodu Jn to Mangalam-puzha section of NH 47**		**3.3**										
	1	0/00 to 0/700	0.7	6	44.7	1.5			4	2.5	2	Commercial	Commercial
	2	0/700 to 1/800	1.8	6	44.7	1.5			4	2.5	2	Commercial	Commercial
	3	1/800 to 2/500	2.5	6	45	1			3.5	2.5	1	Commercial	Commercial
	4	2/500 to 3/300	3.3	6	45	2			8	10	1	Commercial	Commercial
2	**Aluva-Paravur road**		**1.3**										
	5	0/0 to 1/30	1.3	8	12				1.5	1.5		Residential	Residential
3	**Market Road**		**1.75**										
	6	0/000 to 0/600	0.6	10	15		2	3				Commercial	Commercial
	7	0/600 to 1/000	1	7.5	11		1.5	2	1	1		Commercial	Commercial
	8	1/000 to 1/750	1.75	10	17		3.5	3.5				Commercial	Commercial
4	**Aluva - Perumbavur SH 16**		**1.8**										
	9	0/000-0/700	0.7	13	17				2	2		Commercial, Residence	Commercial, Residence
	10	0/700-1/000	1	7	9				1	1		Commercial, Residence	Commercial, Residence

	11	1/000-1/100	1.1	11	17				1	5		Commercial, Residence	Commercial, Residence
	12	1/100-1/700	1.7	8	15				2.5	4.5		Commercial, Residence	Commercial, Residence
	13	1/700-1/800	1.8	8	15				2.5	4.5		Commercial, Residence	Commercial, Residence
5	**Kodungalloor road**		**0.8**										
	14	0/000-0/800	0.8	5.5	7.5				1.5	0.5		Residential	Residential
6	**Palace road**		**1.6**										
	15	0/000-0/500	0.5	11	14				1	1	1	Commercial, Residence	Commercial, Residence
	16	0/500-0/800	0.8	14.5	17.5		1.5	1.5				Residential	Residential
	17	0/800-1/200	1.2	14.5	17.5		1.5	1.5			1	Commercial	Commercial
	18	1/200-1/600	1.6	14	21								
7	**Aluva - perumbavur road**		1.6										
	19	0/000-0/300	0.3	10	11					0.5	0.5	Commercial	Commercial
	20	0/300-0/800	0.8	9	12					1.5	1.5	Commercial	Commercial
	21	0/800-1/600	1.6	8	13.5					3	2.5	Commercial	Commercial
8	**Sub-Jail Road**		**1**										
	22	0/00-0/200	0.2	8	15				4	3		Residential/ Commercial	Residential/ Commercial
	23	0/200-1/000	1	8	13				2	3		Residential/ Commercial	Residential/ Commercial
9	**Aluva - Thaikkattukavu**		**0.31**										
10	Siva temple road		**1**										
	24	0/000-0/500	0.5	5.5	5.5							Residence	Residence
	25	0/500-1/000	1	3.5	3.5							Residence	Residence

Source: Traffic & Transportation Survey, March 2011.

8.7.2 TRAFFIC ANALYSIS

On the basis of reconnaissance and field studies, roads which were deemed important for facilitating mobility within the study region were identified. Traffic studies and surveys were conducted on the identified roads of Aluva Town. The data collected were tabulated, compiled and analyzed in order draw inferences on the traffic characteristics of the town. The findings of the traffic studies are explained below:

8.7.2.1 Vehicle Population

The trend in vehicular growth has been phenomenal all over the country and the State and Aluva Municipality is no exception to this. The growth of motor vehicles in Ernakulam district during the period from 2000 to 2009 is given in **table 8.3.** It can be seen that the vehicle population in Ernakulam district has grown by more than 1.38 times during the last nine years.

The number of motor vehicles having valid registration in Ernakulam district as on 31st March 2009 is given in **table 8.4.**

Table: 8.3 Growth of motor vehicles in Ernakulam district.

Sl. No	Year	Total Number of Vehicles	Index
1	2000-01	592536	100.00
2	2001-02	734717	124.00
3	2002-03	787086	132.84
4	2003-04	838100	141.45
5	2004-05	896933	151.38
6	2005-06	953249	160.88
7	2006-07	1041205	175.72
8	2007-08	748605	126.34
9	2008-09	815863	137.69

Note: Base year (2000-01) index = 100.00

Table: 8.4. Number of motor vehicles having valid registration in Ernakulam districts on 31st March 2009

Sl. No.	Type of Vehicle	Number
1	**Goods Vehicles**	
	i. Four wheelers and above	50,698
	ii. Three wheelers and tempos	13,669
2	**Buses**	
	i. Stage carriages	5,208
	ii. Contract carriages/Omni-buses	18,794
3	**Four wheelers**	
	i. Cars	1,38,107
	ii. Taxis	18,285
	iii. Jeeps	2,124
4	**Three wheelers**	
	i. Auto rickshaws	48,238
	ii. Motorised cycle rickshaws	-
5	Two wheelers	
	i. Scooters and Motor cycles	5,11,857
6	**Tractors**	
	i. Tractors	1,282
	ii. Tillers	1,299
	iii. Trailers	151
	Others	6,151
	TOTAL	**815863**

8.7.2.2 Speed And Delay

The efficiency of the road network is usually evaluated in terms of speed. In order to derive information on the traffic flow characteristics, speed and delay studies were carried

out on identified roads of the study area. Information on the traffic flow characteristics, such as average speed, factors responsible for delays and delay locations have been identified. The speed and delay characteristics with respect to vehicle operation within the town are indicated in the **table 8.5.** The factors that interrupts traffic flow on the NH By pass are the traffic junctions at Pulinchauvd, Aluva By-pass, Thottakkattukara and Paravur Road Junction. The traffic from to the Aluva Vegetable Market merging/ diverging with the through traffic also leads to delays. (The flyover work site on the NH Bypass also contributed to delays at the time of the study. Hence, the delays due to the market traffic and the same due to the flyover construction work are therefore counted to be temporary, as the traffic flow on this section will become smooth once the construction of the flyover is complete).

On the Karothkuzhi-Taluk Hospital-Power House Junction- Municipal Boundary stretch of the road the speed ranges from 18 to 41 Kmph. The overall modal speed within the town is 30Kmph, the mean speed is 24.3 Kmph and the median speed is 25.5 Kmph.

Table: 8.5. Speed and Delay Studies -Aluva Town

Sl No:	Road / Road Section		Length m	Running Time Seconds With delay	Delay Time secs	Actual Running time- secs Without delay	Speed km/hr		Delay causes
							With delay	Without delay	
1	NH Section between Pulin-chauvd and Mangalampuzha Bridge		3300						
	i	Town Boundary - Pulinchauvd Jn:	200	69	45	24	10.5	30	Traffic congestion
	ii	Pulinchauvd Jn: - Aluva Market area	500	102	35	67	17.6	27	Signal
	iii	Aluva Market area- Bypass Jn:	600	205	85	120	10.5	18	Vehicles crossing Grade separator

									work site
	iv	By pass Jn: - Thottakkattukara Jn:	400	128	70	58	11.25	25	Traffic merging
	v	Thottakkattukara Jn: - Paravur Jn:	800	286	155	131	10.0	22	Signal / traffic congestion
	vi	Paravur Jn.-Mangalam-puzha Bridge	800	193	90	103	15.0	28	Signal / traffic congestion
2	Aluva-Perumbavoor Road								
	i	Karotkuzhi Jn: – Taluk Hospital Junction	400	81	35	46	18	31	Cross stream traffic
	ii	Taluk Hospital Jn to Power house Jn.	600	72	10	62	30	35	Cross stream traffic
	iii	Power House Jn: to Municipal Border (SH16) (Cashew Company Gate)	800	72		72	4I	41	
3	Taluk Hospital Jn: to Pump Junction Road								
	i	Taluk Hospital Jn: to Hospital Gate	100	10	-	10	35	35	-
	ii	Hospital Gate to KSRTC stand entry	200	24	-	24	30	30	-
	iii	KSRTC stand entry to Railway Station jn:	150	40	15	25	14	14	Buses entering stand
	iv	Railway Station jn to Pump Jn:	350	45	25	70	28	18	Cross stream traffic
4		NH Bypass Jn: to Thottumugham (Municipal boundary)							
	i	By- pass Jn: to Bank Jn	400	47	10	37	30	38	Signal, Bus stop

	ii	Bank Jn: to ROB	800	96	-	96	30	30	Bus stop
	iii	ROB to Pump Jn:	400	81	30	51	18	28	Cross stream traffic
	iv	Pump Jn; to Thottumugham (Municipal Boundary)	1200	123	-	123	35	35	-
5		Thottakkattukara – Kadangallur Road							
	i	Thottakkattukara Jn: to Aqueduct	500	77	30	47	23	38	Junction
	ii	Aqueduct to Perikkathodu (Municipal boundary)	400	36	-	36	40	40	
6		Paravur Road							
		Paravur Jn: to U.C College	1400	126	20	106	40	47	Junction delay

Source: Traffic & Transportation Survey, March 2011.

8.7.2.3 Traffic volume

Traffic volume data is an important factor for drawing conclusions related to efficiency of the road network. It reflects the efficiency at which the system works and the general quality of service offered to road users. Classified traffic volume counts were carried out at i) outer cordon points, ii) mid blocks on important corridors, and iii) at major intersections. Details of the survey are given in the report of Traffic & Transportation study.

8.7.2.4 Capacity utilization

The volume of traffic as a ratio of the capacity of roads of Aluva town has been worked out. This analysis covers the major roads of the town, section wise. The peak hour traffic volume has been taken into consideration in this analysis.

The volume-capacity ratio (V-C Ratio) reflects quantitatively the level of congestion. The Volume- Capacity ratio associated with the major roads of the study area is indicated in **table 8.6.**

Table: 8.6. Volume capacity ratio on major road links in Aluva town

Sl No	Roads Stretch/ section	Capacity - PCU/day	Volume Per day in PCU's	Volume-Capacity Ratio
I	**Ernakulam-Thrissur road (NH544)**			
1	Pulinchauvd Jn -Bypass Jn	36000	74969	2.08
2	Bypass Jn- Thottakkattukara Jn	36000	78230	2.17
3	Thottakkattukara Jn- Paravur Jn	36000	19459	
4	Paravur Jn -Mangalampuzha Bridge	36000	10679	
II	**Aluva-Paravur road**			
1	Paravur Jn-UC College Jn	12000	22008	1.83
III	**Aluva-kadungallor road**			
1	Thottakkattukara Jn-Municipal Limit	9000	12902	1.43
IV	**Siva temple road**			
1	Thottakkattukara Jn- Aluva Sand Bank	9000	5541	0.62
V	**Palace road**			
1	Bypass Jn-Market road Jn	24000	41529	1.73
2	Market road Jn-Bank Jn	24000	54919	4.5
3	Bank Jn- Pump Jn	24000	69862	2.3
VI	**Market road**			
1	Market road Jn - Karothkuzhi Jn	12000	19201	1.6
2	Karothkuzhi jn - Pulinchauvd Jn	12000	17551	1.46
VII	**Aluva-Thaikattukara road**			
1	Taluk Hospital Jn -ThaikattukaraMunicipal limit	400	1986	5.0
VIII	**Aluva-Munnar Road(SH 16)**			

1	Karothkuzhi Jn- Taluk Hospital Jn	12000	28586	2.38
2	Taluk Hospital Jn - Power House Jn	9000	15278	1.70
3	Power House Jn- Municipal limit	12000	28243	2.35
IX	**Sub-jail Road**			
1	Sub- jail Road Jn – Power house junction	9000	14860	1.65
X	**Aluva-Perumbavoor Road**			
1	Railway station junction - Sub- jail Road Jn	9000	29034	3.2
2	Sub- jail junction- Pump Junction	9000	30397	3.38
3	Pump Junction to Municipal limit on Perumbavoor road	9000	38573	4.2

Source: Traffic & Transportation Survey, March 2011.

It could be seen from the table that the ratios have exceeded unity i.e. a value greater than 1, almost on all the roads of Aluva Town. This implies that the streets are required to cater to a traffic volume which is higher than its capacity or will be required to cater to much higher volume of traffic in the near future. The section of the NH 544 between bypass junction and Thottakkattukara Junction has a V -C Ratio of 2.17, meaning that the traffic load at present on this road is higher than its capacity by more than two times.

The section of the Railway Station Road linking the railway station and the Pump Junction is buckling under the impact of heavy traffic load. The V -C Ratio associated with this road is greater than 3.

8.7.2.5 Traffic volume at major intersections

Aluva Town has seven major junctions. The traffic handling capacity of the junctions, by and large, influences the efficiency of traffic flow on the entire road network of the town. The traffic junctions which were taken up for detailed study are as follows.

1. Pulinchauvd Junction
2. Aluva By pass Junction
3. Thottakkattukara Junction
4. Paravur Road Junction

5. Bank Junction
6. Pump Junction
7. Power House Junction

Peak hour traffic volume at these major junctions is given in **table 8.7**

Table: 8.7 Peak hour traffic volume at major intersections

Sl No	Name of junction	No of arms	Peak hour	Peak hour volume (in PCU's)
1	Pulinchauvd Jn:	3	14.30hrs-15.30hrs	5431
2	By pass Junction	3	17.00hrs - 18.00hrs	7858
3	Thottakkattukara Jn:	4	09.00hrs-10.00hrs	6852
4	Paravur Road Jn:	4	17.00hrs-18.00hrs	7966
5	Bank Junction	3	17.00hrs-18.00hrs	4625
6	Pump Junction	3	09.30hrs-10.30hrs	5019
7	Power House Jn:	3	10.00hrs-11.00hrs	2135

Source: Traffic & Transportation Survey, March 2011.

8.7.2.6 Parking demand

Parking facilities are an integral part of any transportation system. Inadequate parking facilities will lead to congestion of the streets and affects the free flow of traffic. Thereby it severely undermines the capacity of the street system.

To assess the parking demand, parking accumulation and parking duration surveys were carried out at selected locations of the town. Registration Number Plate method was

adopted to collect the data on parking duration and accumulation of vehicles. From this, peak hour parking requirements was derived.

Like other small and medium size towns, In Aluva also, the Kerb of the roads is utilized for parking. No headway has so far been made in providing off-street parking facilities. Provision of the same is a vital component of traffic planning and can immensely improve the capacity of the roads. The locations of parking studies are indicated in **figure 8.2**.

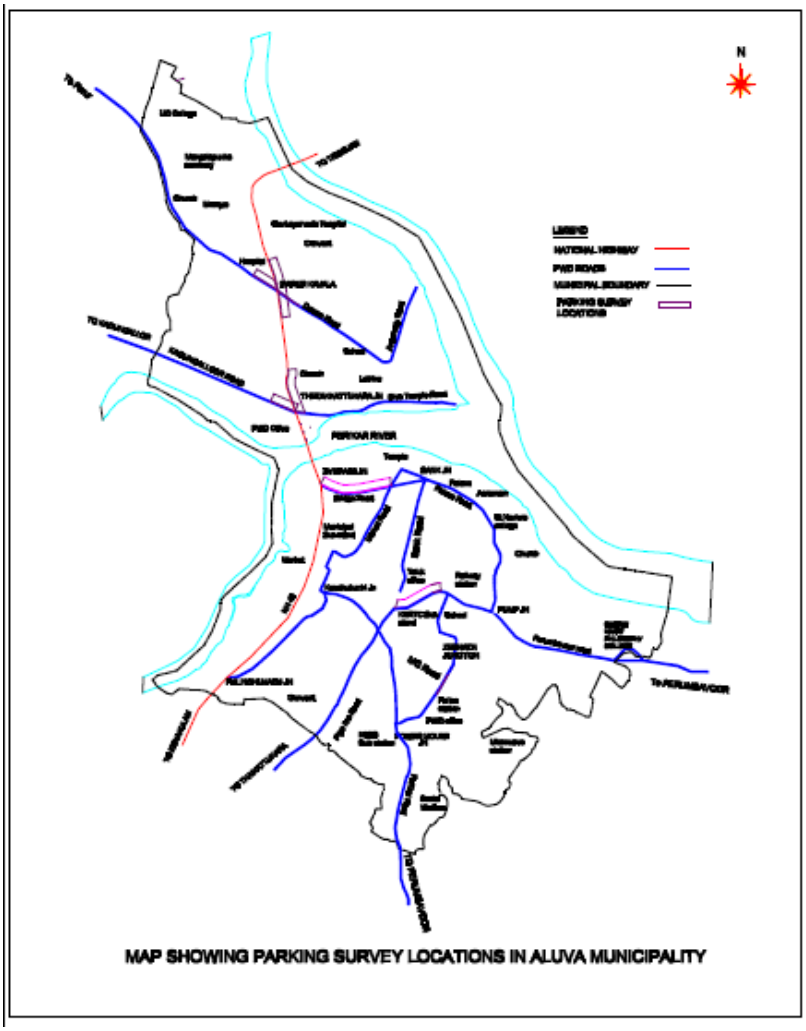

Fig: 8.2. Locations of parking studies

Parking demand arises from the following categories of vehicles:

1. Personal modes, such as cars and two wheelers.
2. Intermediate Public Transport (IPT), such as taxis, auto rickshaws and jeeps.
3. Commercial vehicles: light and heavy.

8.7.2.7. Pedestrian traffic

Pedestrians are an important component of the traffic system. Pedestrian traffic survey was carried out at important areas where the lateral as well as crossing movement of pedestrians takes place frequently. Pedestrian volume counts have been conducted on NH544, section-wise, and also on other major corridors where pedestrian problems are observed to be acute. The locations where pedestrian studies were conducted are presented in **figure 8.3**. The cross-stream pedestrian volume across major corridors is indicated in **table 8.8.**

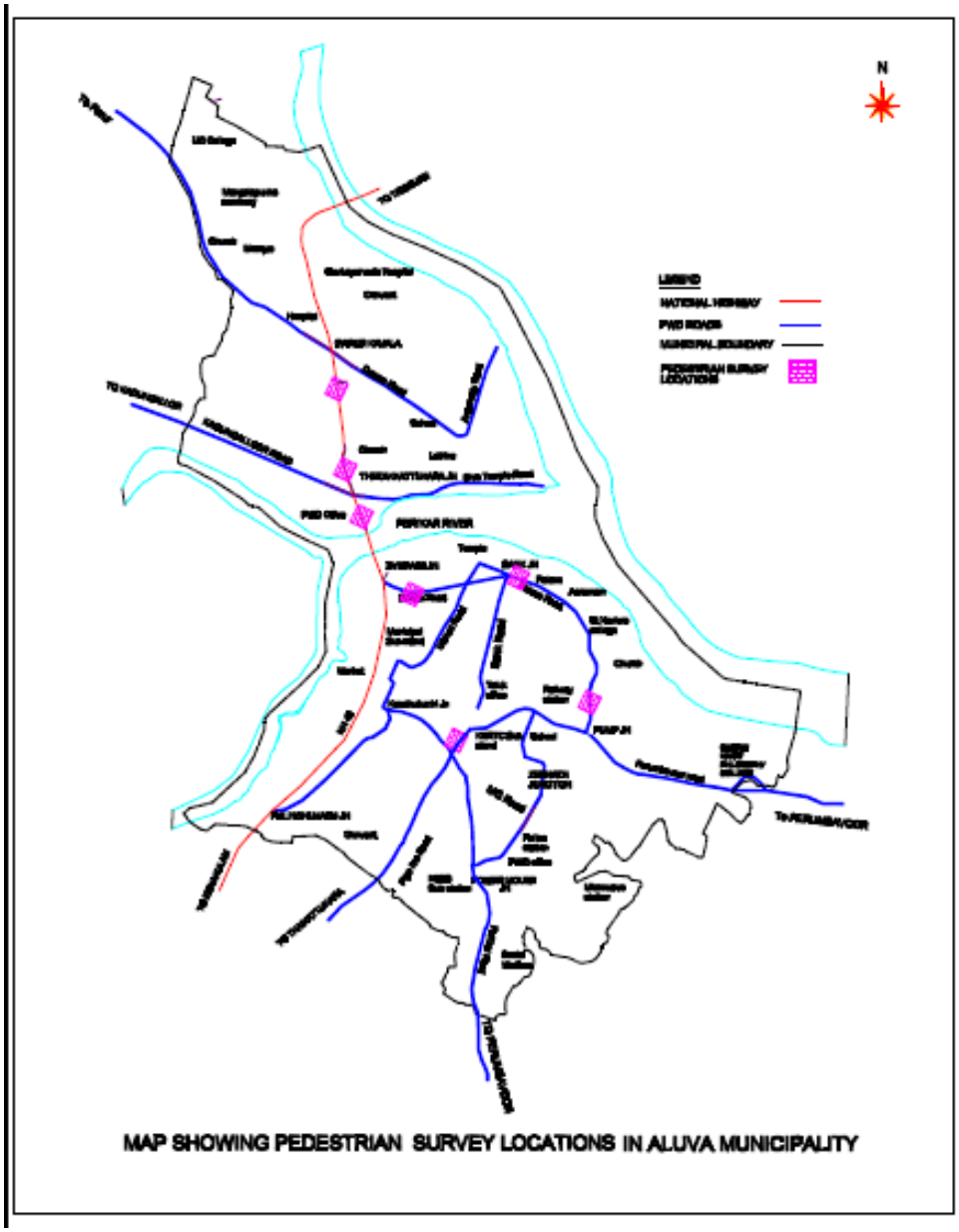

Fig:8.3 Map showing location of pedestrian studies conducted in Aluva Town

Table: 8.8. Peak hour cross- stream pedestrians at major road sections

Sl No	Road /section	Direction	Peak hour	Pedestrian Volume		Total
				Up	Down	
1	**National Highway 544 section**					
	Southern arm of Paravur Jn:-	Paravur side to Desam side	17.30 hrs to 18.30 hrs	226	101	327
	Between North Bank of Periyar and Thottakkattukara Jn:	Kadangallur side to Siva temple side	09-15 hrs to 11.15 hrs	162	85	247
	Northern arm of Pulinchauvd Jn:	Pedestrian movement between eastern and western sides across NH 47	09.00 to 10.00 hrs	212	167	379
	Aluva – Ernakulam road (Old NH 47) arm of Pulinchauvd Junction	Pedestrian movement between eastern and western sides across Town limit Road	09.30 to 10.30	156	173	329
2	**Palace Road** (Between By-pass junction and Pump Jn:)					
	Eastern arm of By Pass Jn:	Arogayalayam Hospital to Bus stand on opposite side	09.30 hrs to 10.30 hrs	327	244	571
	Bank Jn: Bus stop to Bank Road on opposite side	-	17.45 hrs to 18.45 hrs	250	308	558
	Between Bank Junction and		09. 30hrs to 10.30	178	102	280

	Pump Jn		hrs			
3	**Taluk Hospital Jn**:	Karothkuzhi side towards Power house Jn:	10.00 hrs to 11.00 hrs	188	97	285
		From Railway Station Road towards Power house jn:	10.00 hrs to 11.00 hrs	208	105	
4	**Railway Station**		09.00 hrs to 10.00 hrs	520	385	

Source: Traffic & Transportation Survey, March 2011.

8.7.2.8 Intercity travel characteristics

Origin - Destination surveys were conducted at outer cordon points of Aluva town in order to determine the inter-city passenger and goods movement pattern. Accordingly the place of origin and destination of passenger and goods trip, trip length, information on commodities carried, such as description of the commodity, and quantity of the consignment was collected. In the case of passenger trips, in addition to the place of origin, and destination, purpose, frequency and trip length, information on the socio-economic status of the trip maker, such as occupation and income was also derived. The data on the total volume of traffic entering/exiting the city through each of the survey station was also collected.

The O.D. survey covered all the five-entry/exit points to the town as shown in **figure 8.4**. The survey stations were located at the following points.

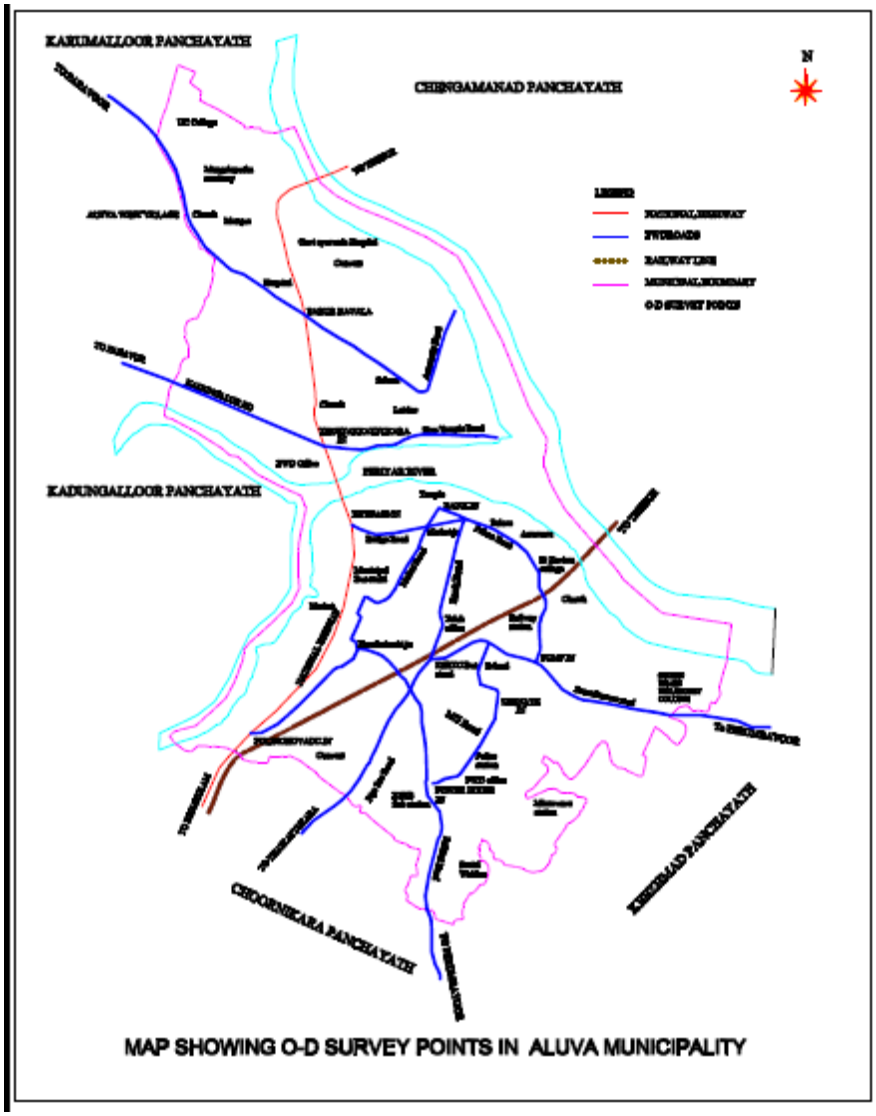

Fig: 8.4. Map showing O.D survey points in Aluva Town.

1. Pulinchauvd (NH 544)

2. Desom (NH 544)

3. Choondy (Aluva – Munnar(SH 16))

4. Thottumugham (Aluva- Perumbavoor – MDR)

5. Aluva Settlement (Aluva – Paravur – MDR)

For the purpose of the origin-destination study 20 zones were delineated, the same is indicated in **table 8.9**.

Table: 8.9.Traffic Zones of Aluva Delineated

Zone Code	Zone Name
01	Aluva Market area west of by pass
02	Area around KSRTC, Private Bus stand and railway station
03	North of Periyar River
04	Eastern part of Aluva Town
05	Southern part of Aluva Town
06	Ernakulum City, Kalamaserry, Tripunithura
07	N.Paravur, Vypeen and other regions on West Coast
08	Thrissur and regions located on NH-47
09	Perumbavoor, Kothamanglam, Munnar
10	Sreemolamnagar, Chowra, Kuttamserry
11	Muvattupuzha, Thodupuzha, Other regions of Idukki District
12	Kottayam District located on M.C. Road
13	Southern Districts –Allapuzha, Kollam, Thiruvanthapuram
14	Northern Districts
15	Mangalore, Goa
16	Other regions of Karnataka
17	Tamilnadu State- Western Region adjoining Idukki District
18	Other regions of Tamilnadu
19	Other parts of India
20	Nedumbassery

The details of traffic volume entering and exiting the town through each of 5 entry/exit points were collected from primary surveys. The volume of traffic (in PCUs) entering/exiting through Desam O- D survey point was 76700. The traffic load at this point is the highest compared to the other 4 points. This was followed by Pulinchauvd with 67800 PCUs. The volume of heavy commercial vehicles, including multi - axle truck - tankers and containers, entering through this point is very large. The consignments, includes L.P.G from Mangalore refinery, sea foods from Calicut and Mangalore; industrial raw - materials and consumer goods from Mumbai etc. The volume of traffic, category wise entering/exiting the town through the five points are indicated in **table 8.10.**

Table: 8.10. Vehicular volume at outer- cordon points

Sl. No	Entry / Exit Point	KSRTC Bus	Pri-vate bus	Other buses	Mini-bus/Tempo	Car/Van/jeep	Pass. -Auto-rikshaw	Two wheeler	MAT	Truck	Vehicular volume at outer- cordon points						Total PCU/day
											Mini-truck/tempo	Goods autorikshaw	Bi-cycle	Hand cart	Others (Specify)	Total	
1	**Aluva settlement**																
	Paravoor - Aluva	304	6	106	357	2411	707	2173	45	444	489	307	13		**0**	7463	8622
	Aluva - Paravoor	210	12	115	402	3131	914	2084	16	195	297	276	28		14	6694	8879
2	**Choondi**															0	0
	Perumbavoor - Aluva	27	423	71	361	4147	2834	5388	57	418	83	349	3		**0**	14180	13773
	Aluva - Perumbavoor	24	402	360	424	5169	3442	6255	27	201	398	618	19		**0**	17439	16730
3	**Thottumugham**															0	0
	Perumbavoor - Aluva	164	40	461	484	6872	4690	6893	241	226	429	660	44		**0**	21304	20868
	Aluva - Perumbavoor	257	48	742	714	5933	4741	6478	475	434	480	764	138		3	21207	23137
4	**Pulinchuvadu**															0	0
	Ernakulam -Aluva	374	705	255	2732	9777	3000	9903	572	1214	1351	1287	12		0	31183	35366
	Aluva - Ernakulam	561	816	575	2400	9012	2904	9330	266	1043	957	661	15		0	28541	32468

5	**Desom**															0	0
	Thrissur-Aluva	120	348	392	1183	8298	2160	9365	660	3496	3283	2014	116	0	0	31435	39950
	Aluva-Thrissur	788	454	548	885	8370	3590	9629	237	2628	1927	1423	94	0	0	30571	36782

Source: Traffic & Transportation Survey, March 2011.

8.7.2.8.1 Intercity passenger transportation

The inter-city travel is mainly dependent on public bus transport. Aluva Town is directly linked to several towns falling within and also outside the district; namely Paravur, Kodungallur, Vypeen, Angamaly , Chalakudy, Thrissur Palakad, etc.

In terms of vehicle numbers that passes through the various survey points, two wheelers, occupied the first position with 32% to the overall fast traffic entering and exiting the study area. Passenger cars fall next in order with 29%. Out of the total fast moving vehicles recorded at each of the O.D survey stations, buses constitute 4% and passenger and auto - rickshaws constitute 14%.

Volume of passenger vehicles observed at outer - cordon points

The modal-mix constituting the traffic stream at the various outer - cordon points varies widely. The volume of passenger traffic inbound and outbound at each of the survey stations are indicated in Analysis of inter - city passenger traffic data has revealed among other things, the modal choice of the passengers. At each of the outer cordon points, classified traffic volume was recorded.

Personal modes of travel such as cars and two-wheelers accounted for 22.75%. Auto rickshaws accounted for 12% of the total traffic and buses accounted for 51.6%. Mini-buses accounted for 7.25% of the total vehicles crossing the various O-D stations.

The volume of passengers entering Aluva Town is 1.68 lakhs per day and the total volume of passengers exiting the town is 1.88 lakhs. The modal choice of the passengers is presented in **table 8.11.** The table indicates that bus is the most popular mode of travel for inter city travel followed by cars and two-wheelers.

Table: 8.11. Pattern of intercity daily passenger trips.

Sl. No	Origininating region	Terminating zones				Total	percent
		Aluva study area	Ernakulam District	Other districts	Other States		
	Bus						
1	Aluva study area		**86776**	9480	0	**96256**	**41**
2	Ernakulam district	**84242**	29525	8353	325	**122444**	**53**
3	Other districts	3871	2806	3747	1093	**11517**	**5**
4	Other States	415	1330	0	0	**1745**	**1**
	Total	**88528**	**120437**	**21579**	**1418**	**231963**	**100**
	per cent	**38**	**52**	**9**	**1**	**100**	
	Mini-bus					**0**	
1	Aluva study area		6208	368	0	**6576**	**20**
2	Ernakulam district	**9302**	6385	3338	273	**19298**	**59**
3	Other districts	1297	1289	2043	619	**5248**	**16**
4	Other States	376	667	457	0	**1500**	**5**
	Total	**10975**	**14549**	**6206**	**891**	**32621**	**100**
	per cent	**34**	**45**	**19**	**3**	**100**	
	Car					**0**	
1	Aluva study area		23026	7150	0	**30176**	**43**
2	Aluva district	**19878**	10685	4707	0	**35270**	**51**
3	Other districts	1020	1175	1020	156	**3371**	**5**
4	Other States	0	432	157	0	**589**	**1**
	Total	**20898**	**35318**	**13034**	**156**	**69406**	**100**
	per cent	**30**	**51**	**19**	**0**	**100**	
	Auto					**0**	

1	Aluva study area		**28692**	188	0	**28880**	**54**
2	Ernakulam district	**20957**	**2686**	70	0	**23713**	**44**
3	Other districts	506	81	23	58	**667**	**1**
4	Other States	0	209	0	0	**209**	**0**
	Total	**21463**	**31667**	**281**	**58**	**53468**	**100**
	per cent	**40**	**59**	**1**	**0**	**100**	
	Two wheeler					**0**	
1	Aluva study area		**24787**	1548	0	**26335**	**43**
2	Ernakulam district	**26251**	6871	713	0	**33834**	**55**
3	Other districts	464	108	206	84	**862**	**1**
4	Other States	0	200	55	0	**255**	**0**
	Total	**26715**	**31966**	**2521**	**84**	**61286**	**100**
	per cent	**44**	**52**	**4**	**0**	**100**	
	Total						
1	Aluva study area	0	169489	18734	0	188223	42
2	Ernakulam district	160630	56151	17180	598	234558	52
3	Other districts	7158	5458	7038	2009	21664	5
4	Other States	791	2838	669	0	4297	1
	Total	**168579**	**233936**	**43621**	**2607**	**448743**	100
	per cent	**38**	**52**	**10**	**1**	**100**	

Source: Traffic & Transportation Survey, March 2011.

Origin-destination pattern of inter-city passenger vehicles

The origin- destination pattern of passenger trips irrespective of the vehicle mode is presented in O-D matrix form in **table 8.12.**

Table: 8.12 Origin-destination matrixes of intercity daily passenger trips in Aluva Town

ZONE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	0	0	0	0	0	10392	407	11817	0	6581	0	0	1347	0	0	0	0	0	0	0	30542
2	0	0	0	0	0	9717	1726	10412	18834	19595	0	0	3763	0	0	0	0	0	0	0	64047
3	0	0	0	0	0	10980	2240	10571	4238	0	0	7193	0	0	0	0	0	0	0	0	35221
4	0	0	0	0	0	10162	690	5816	2329	7486	0	0	0	0	0	0	0	0	0	0	26484
5	0	0	0	0	0	8080	324	3877	10001	3216	0	2725	1452	2255	0	0	0	0	0	0	31929
6	15597	12911	20557	15226	9160	0	2853	12753	4658	0	419	1095	1050	0	990	0	0	0	598	0	97867
7	1941	5784	3563	1799	2952	5286	0	3498	315	0	215	2484	1453	1634	0	0	0	0	0	0	30925
8	7000	8616	6735	5153	4594	11025	1176	0	1031	434	0	735	723	2490	0	0	0	0	0	0	49711
9	6347	3788	3040	3114	1144	4971	677	891	0	0	0	1003	505	926	77	0	0	0	0	0	26485
10	7192	5464	3181	2163	0	1829	1158	87	0	0	0	0	0	1591	0	0	0	0	0	0	22665
11	0	124	3485	0	0	970	685	1219	0	0	0	261	161	0	0	0	0	0	0	0	6905
12	3549	771	371	0	0	28	650	961	0	0	0	521	0	0	0	0	0	0	0	0	6852
13	0	0	0	328	0	0	0	1393	0	0	469	0	0	0	1372	0	0	786	0	0	4348
14	0	0	0	0	0	1606	0	0	350	0	0	0	0	2259	1748	1223	0	0	0	0	7186
15	0	0	0	0	2139	0	0	0	0	0	0	0	0	1138	0	0	0	0	0	0	3277
16	0	0	0	0	0	0	0	0	0	0	0	0	0	801	0	0	0	0	0	0	801
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	1208	0	0	0	0	0	103	0	0	0	0	0	0	1312
19	0	0	0	0	0	724	0	0	0	0	0	0	0	0	0	0	0	0	0	0	724
20	0	0	0	0	791	905	0	0	0	0	0	0	0	255	0	0	0	0	0	0	1951
Total	41626	37458	40932	27782	20781	76685	12585	64504	41756	37311	1103	16017	10454	13452	4187	1223	0	7862	598	0	449232

Source: Traffic & Transportation Survey, March 2011.

Distribution of inter-city passengers according to purpose of trip

Inter - city trips were broadly classified into eleven categories based on purpose. Bulk of the trips were performed for purpose of work (40 percent), back home trips accounted for 6% and 6.6% of the trips were made for purposes related to social visits. The trips made for medical purpose was 3.8% of the total trips. **table 8.13 and figure 8.5 i**ndicate trips purpose details within the study region.

Table: 8.13 Purpose of trip within the region

Sl.No.	**Purpose**	**Type of vehicle**						
		Bus	Mini-bus	Car	Auto	Two wheeler	**Total**	Per cent
1	Work	94565	12996	37397	21880	29317	**196155**	40.1
2	Part of work	29547	3261	11132	8497	8852	**61289**	12.5
3	Personal business	16297	2506	6788	2784	5430	**33805**	6.9
4	Shopping	13988	1969	5704	3218	4136	**17298**	3.5
5	Recreation	25417	9820	7579	4581	5325	**52722**	10.8
6	Social	21015	5577	8675	3648	4676	**27342**	5.6
7	Education	15520	9772	2431	1962	2508	**32193**	6.6
8	Back home	13179	2457	5114	2879	3708	**27337**	5.6
9	Serve passenger	9103	1176	3627	2147	2829	**18882**	3.9
10	Medical	9158	735	4020	2620	2463	**18996**	3.9
11	Others	1395	122	730	357	290	**2894**	0.6
	Total	249183	50391	93197	54573	69534	**488913**	100

Source: Traffic & Transportation Survey, March 2011

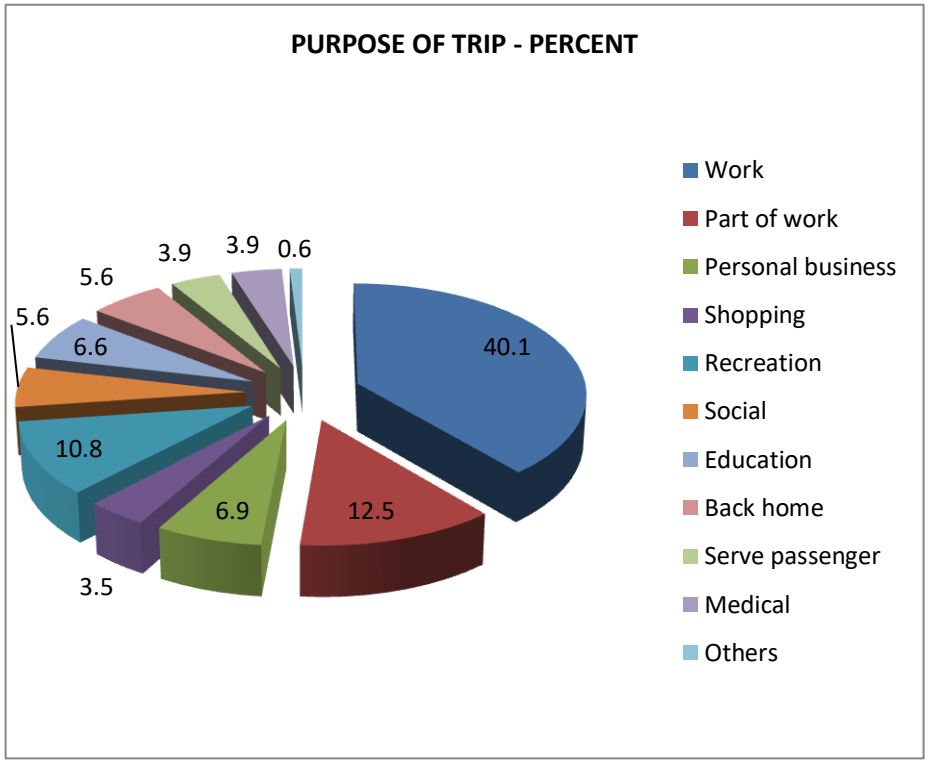

Fig: 8.5 Percentage of purpose of trip within the region

Distribution of inter-city passengers according to occupational status

The Origin-Destination survey helped in understanding the occupational status of the inter - city trip makers. Accordingly 30% the total trip makers were employed in private concerns. The number of trip makers engaged in government service was of the order of 14.95%. The percentage of trip makers engaged in business was 15%. Professionals accounted for 3.7% of the trip makers. The distribution of trip makers according to occupation and mode of travel is presented in **table 8.14** and **figure 8.6.**

Table: 8.14 Distribution of intercity daily passenger trips according to occupation and mode of travel

Sl.No.	Occupation of trip makers	Type of vehicle						
		Bus	Mini-bus	Car	Auto	Two wheeler	Total	Per cent
1	Government service	37856	6414	14046	7375	9488	75179	15
2	Private service	86741	9910	21792	19849	19827	158119	32
3	Industry service	19559	4136	6288	5636	6282	41902	8
4	Business	37976	4177	17070	7190	9000	75413	15
5	Professional	8616	1600	4027	2285	2490	19019	4
6	Cultivator	2019	368	1038	382	416	4224	1
7	Casual laborer	22549	501	3100	4631	6485	60881	12
8	Retired	2984	748	1400	417	692	6242	1
9	Unemployed	0	0	0	0	0	0	0
10	Housewife	1138	0	808	288	146	2380	0
11	Student	19410	8305	4611	2435	3828	38589	8
12	Others	10330	1125	4239	2580	2632	20907	4
12	Gulf	0	0	0	0	0		
	Total	249183	37284	78419	53068	61286	502854	100

Source: Traffic & Transportation Survey, March 2011

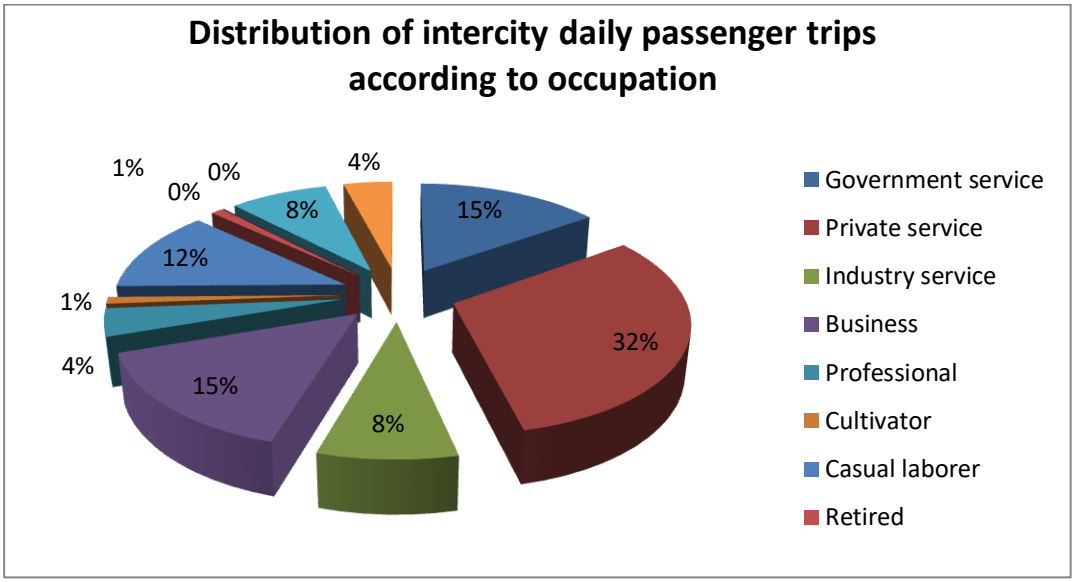

Fig: 8.6. Distribution of intercity daily passenger trips according to occupation

8.7.2.8.2 Inter–city goods transport

Volume of goods traffic observed at different outer cordon points

The inter city goods traffic volume at various entry points were studied. A total number of 17846 goods vehicles passes through Aluva town daily. Truck traffic constitutes nearly 29% of the total goods traffic. Multi axle trucks accounts for 8.5 %. Light carriage vehicles and Goods auto accounts for 35.5 % and 27% of the total goods traffic respectively.

Distribution of inter-city goods traffic according to commodity and quantity carried

The goods transported across the study region or destined to the same, were classified into 56 commodity categories They consist of single–use consumer goods, durable use consumer goods, industrial raw material, machinery, construction material, timber etc. The total quantity of various commodities carried and the types of vehicles involved in transporting each commodity type per day is given in **table 8.15**. The total haulage of commodities through Aluva town is 68469 tonne. The quantity of sand and clay transported per day across the study area or destined to it is about 7000 tonnes, and in terms of quantity this goods category stands first.

Table: 8.15 Distribution of intercity goods traffic in tones according to commodity carried

Sl No.	Name of commodity		Vehicle type				Total
			MAT	Truck	Mini-truck	Auto Goods	
1	**Empty**		0	0	674	270	**944**
2	**Foods grains**	Wheat	0	3211	0	0	**3211**
3		Rice & paddy	553	793	327	75	**1748**
4		Grains & pulses	0	108	163	6	**277**
5		Other food grains	309	1581	186	51	**2128**
6	**Agricultural products**	Fruits & vegetables	103	42	238	292	**675**
7		Milk & milk products	381	1087	308	23	**1799**
8		Coconut & copra	0	839	0	42	**881**
9		Meat	0	0	0	0	**0**
10		Fish	0	0	22	55	**77**
11		Eggs	0	0	0	0	**0**
12		Spices including rubber	214	195	0	1	**410**
13		Tea & coffee	1980	0	0	0	**1980**
14		Sugar	0	2342	0	0	**2342**
15		Bakery items	0	213	281	406	**900**
16		Bewerages & toddy	0	43	366	247	**656**
17		Soda & drinks	0	56	227	60	**343**
18		Provisions	0	2204	150	78	**2432**
19		Hay	0	0	0	0	**0**
20		Cattle feed	15	253	68	2	**339**

21	**Construction materials**	Cement	574	1315	2354	579	**4822**
22		Quick lime (Kakka)	0	0	0	0	**0**
23		Earth & gravel	1539	892	938	92	**3461**
24		Sand & clay	231	3398	1736	1794	**7160**
25		Brick & tiles	0	358	107	626	**1091**
26		Granite & rubbles	1008	1386	2565	1082	**6041**
27		Sanitary wares	336	410	27	501	**1274**
28		Asbestos sheets	0	167	22	42	**231**
29		Paints & varnish	0	150	150	148	**448**
30		Timber	95	95	23	107	**320**
31		Firewood	0	1491	0	77	**1568**
32		Bamboo & wood	400	0	35	0	**434**
33		Furniture	24	0	0	0	**24**
34	**Industrial goods**	Steel machinery	0	10	312	11	**333**
35		Iron & steel	3309	610	182	28	**4128**
36		Aluminum	0	0	0	0	**0**
37		Electrical goods	585	103	305	173	**1165**
38		Tyres & tubes	0	42	46	0	**88**
39		Spare parts	0	299	0	0	**299**
40		Chemicals & Drugs	0	1666	1894	220	**3781**
41		Medicines	0	43	201	6	**250**
42		Fertilisers	0	0	24	22	**46**
43		Soap	0	0	49	16	**66**
44		Rubber & plastic goods	0	2199	498	710	**3407**
45		Glass	0	0	24	20	**44**

46		Leather goods	15	254	253	99	**621**
47		Ready-made garments	48	0	0	0	**48**
48		Stationery & paper	113	879	434	11	**1437**
49		Coir & coir products	0	87	95	0	**182**
50	**Petroleum products**	Motor spirit (Petrol)	1562	1646	337	49	**3594**
51		Kerosene	1947	0	0	35	**1983**
52		LPG	656	1087	360	482	**2586**
53		Other POL products	498	2814	193	189	**3695**
54	**Miscellaneous**	Empty bags, tins & battles	0	816	63	41	**919**
55		Parcel	1064	826	147	25	**2061**
56		Ice	0	0	0	10	**10**
		Miscellaneous	2611	1402	964	242	**5219**
		Total	**20167**	**37412**	**17348**	**9046**	**83973**

Source: Traffic & Transportation Survey, March 2011

8.7.2.9 Parking facilities

The town is devoid of dedicated parking areas. This leads to on- Street parking. Parking activities are concentrated at the following locations of the town.

i) Sub-Jail Road – The first 100m of this road is more or less free from parking activities. From this point to Zeenath junction the parking demand is high.

ii) Palace Road- Scattered parking

iii) Market Road-From Bank junction to market moderate parking. In the Market area parking of commercial effects smooth flow of traffic

iv) Railway station Road- Railway station junction to Karothkuzhi Junction Parking of autos, taxis and personal modes are very high.

8.7.2.10 Truck terminals

There is only one truck terminal in the municipality. It is the S.K.Roadlines at Maju building near Mahavishnu Temple.

8.7.3.1 CONCLUSION

Located at the centre of Ernakulam District, Aluva is connected to all major cities in the country by air (Cochin International Airport at Nedumbassery, 10 km away), rail, road and sea (nearest port Cochin, 22 km away). Most trains including express trains have stops at Alwaye railway station. The National Waterway III passes towards the western part of Aluva Town. The point nearest to Aluva town is Paravur. Town is linked to the National Waterway III through the Periyar River. In the past the Periyar was a major navigation route which served Aluva Region.

Aluva has a network of roads, which connects it to the nearby towns and cities. The road network of the study area does not conform to any regular pattern. The Ernakulam-Thrissur stretch of National Highway 544 passes through the town. Other major roads are Paravur road, Alangad road, Perumbavoor road, Aluva -Munnar Road and Thaikattukara road.

The study serves as a data base of critical traffic parameters necessary for planning. Based on analysis of data, broad outline of the infrastructure that needs to be provided in the short, medium and long term can been outlined. Several junctions in the study area are performing at sub-optimal levels. These junctions require redesign. Lack of adequate parking facilities creates serious problems within the town. Measures for improving the road network, which includes providing new link roads, widening of existing roads, parking and pedestrian facilities, non - traffic solutions for solving the traffic problems etc. are found to be essential in the traffic and transportation system of Aluva Town.

9. HOUSING

9.1. INTRODUCTION

Housing generally refers to the social problem of insuring that members of society have a home to live in, whether this is a house, or some other kind of dwelling, lodging, or shelter. One of the urgent problems that should engage the serious attention of planners is the provision of sufficient dwellings enabling each household to have its own house. In planning for self sufficiency in housing, a correct assessment of existing scenario and estimate of the housing requirements should form the very first step.

9.2. HOUSEHOLD SIZE

The average household size of the town was 4.52 with no of households 5333 as per census of India data 2001. As per the census of India 2011 number of households in Aluva municipality is 5372 and the population is 22428. The household size of 2011 is calculated as 4.17. Household size of Aluva has decreased from 5.67 in the year1981 to 4.98 in 1991, 4.52 in 2001 and to 4.17 in 2011. **(table 9.1.)** This decreasing trend is also obvious in the case of state, district and taluk. It indicates a shift towards smaller family sizes in state, district, taluk and municipality level.

Table: 9.1 House hold size of State, District, Taluk & Town

Description	Average House Hold Size			
	1981	1991	2001	2011
Kerala	5.75	5.28	4.73	4.25
Ernakulam	5.75	5.07	4.48	4.03
Aluva Taluk	5.78	5.09	4.50	4.04
Aluva Municipality	5.67	4.98	4.52	3.98

Source: Census 1981 to 2011

9.3. OVERVIEW OF HOUSING SECTOR

The key demand drivers for the housing industry are Population growth, acute shortage of housing stock, increasing urbanisation, increasing nuclearization, affordability and increasing penetration of housing stock. The present status of Aluva with respect to these is discussed below:

The population growth in Aluva Town had shown a convex pattern from the year 1961 to 2011 as per the census details with a peak value in the year 1981. Though the population was decreasing from the year 1981 onwards, the proposed metro rail starting from Aluva bye-pass junction gives scope for reversing the population trend of Aluva town.

The number of workers in Aluva municipality has shown an increasing trend over the decades, this in turn will generate greater demand for housing.

Nuclearisation refers to the formation of nuclear families from extended or joint families. It is often driven by employment-related migration, largely to urban areas, and thereby increasing the demand for housing units. As explained earlier, for Aluva town the household size has decreased over the decades, indicating the formation of nuclear families, in effect increasing the housing demand.

The Age – sex pyramid of Aluva Municipality was derived from the Socio-Economic survey-2010. In that, the majority of the population was coming under 20 - 60 age group (working age group), which shows a healthy sign for the economy. A large proportion of Aluva's working population is young, with higher aspiration levels leading to rising standards of living, matched with sufficient purchasing power.

Increase in availability of housing finance along with low interest rates in the past; have given significant fillip to house purchases, especially in urban areas. As per the socio-economic survey conducted in 2010 for Aluva town, 97.38% of workers are other workers and in that 20.35% are government employees. This group is considered as more acceptable by most lenders.

9.3.1. Residential plots

As per the District Urbanisation Report, Aluva Municipality and Kochi Corporation are characterised with highest concentration index for residential land use with concentration

indexes of 7.52 and 7.76 respectively. Details regarding the size of plots and ownership of plots have been collected in the Socio Economic survey 2010. The percentage of plot in different ranges of plot size as per socio-economic survey 2010 is shown in **table 9.2** and **figure 9.1.**

Table: 9.2 percentage variation for each category of plot area

Range of Plot Area	<=3 cents	4 to 5	6 to 10	11 to 25	26 to 50	51 to 70	>70
% share for the LSG	12.9	27.7	41.65	15.86	1.69	0.20	0

Source: Socio economic survey, 2010

In the Socio Economic Survey it is revealed that 41.65% of households in the town have land with plot size 6 to 10 cents. 15.86% have plot area in the range of 11 to 25 cents. No households have plot area greater than 70 cents. 0.20% has plot area in the range of 51 to 71 cents. 98.11 % of households have plot sizes below 25 cents. This is an indication of the urban nature of the town.

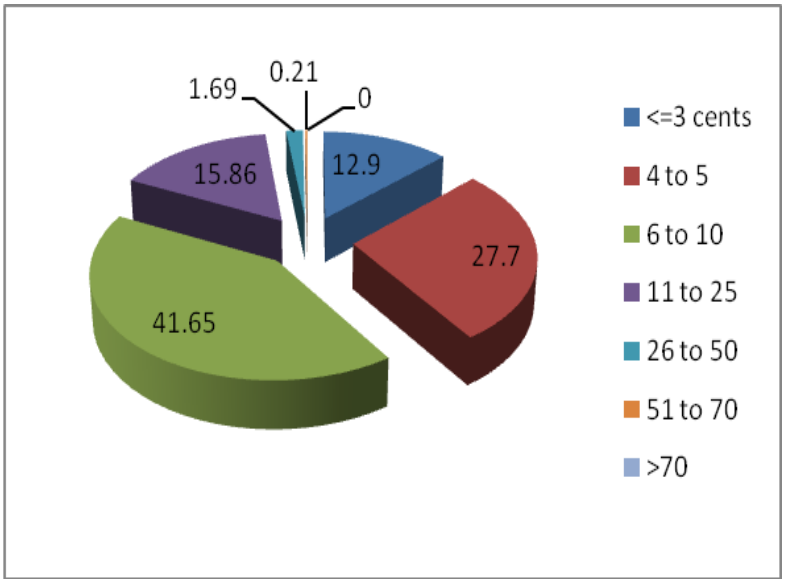

Fig: 9.1 % variation for each category of plot area.

In the Socio Economic Survey it is revealed that 87.53% have their own land and the remaining 12.47% has other type of land ownership. It is shown in **table 9.3** and **figure 9.2.**

Table: 9.3 Land ownership details

Land Owner ship	Own land	Land on lease	Others
% share for the LSG	87.53	0.21	12.26

Source: Socio economic survey, 2010

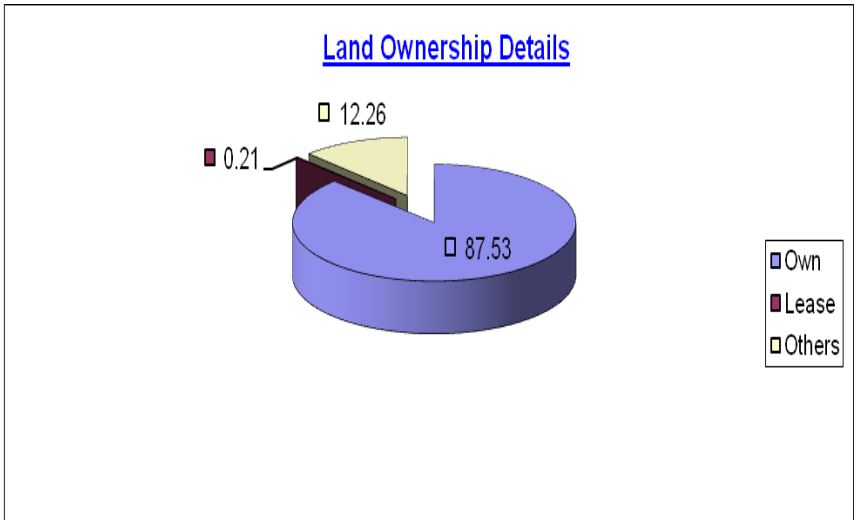

Fig: 9.2 Land ownership details

9.3.2. Size and structural condition of houses

As per the Socio-Economic Survey conducted by Town and Country Planning Department in 2010, the percentage of houses in different range of plinth area is shown in **table 9.4 & figure 9.3.** 42.28% of houses have plinth area in the range of 75-150sq.m., followed by 28.96% in the range of 50-75 sq.m. plinth area and 0.64% have plinth area greater than 250sq.m. It indicates that the houses in Aluva municipality have moderate size.

Table: 9.4 Percentage variations of houses in each range of plinth area

Range of plinth area(Sq.m)	< 20	20-50	50-75	75-150	150-250	>250
Average % for the LSGI	4.23	15.01	28.96	42.28	8.88	0.64

Source: Socio economic survey, 2010

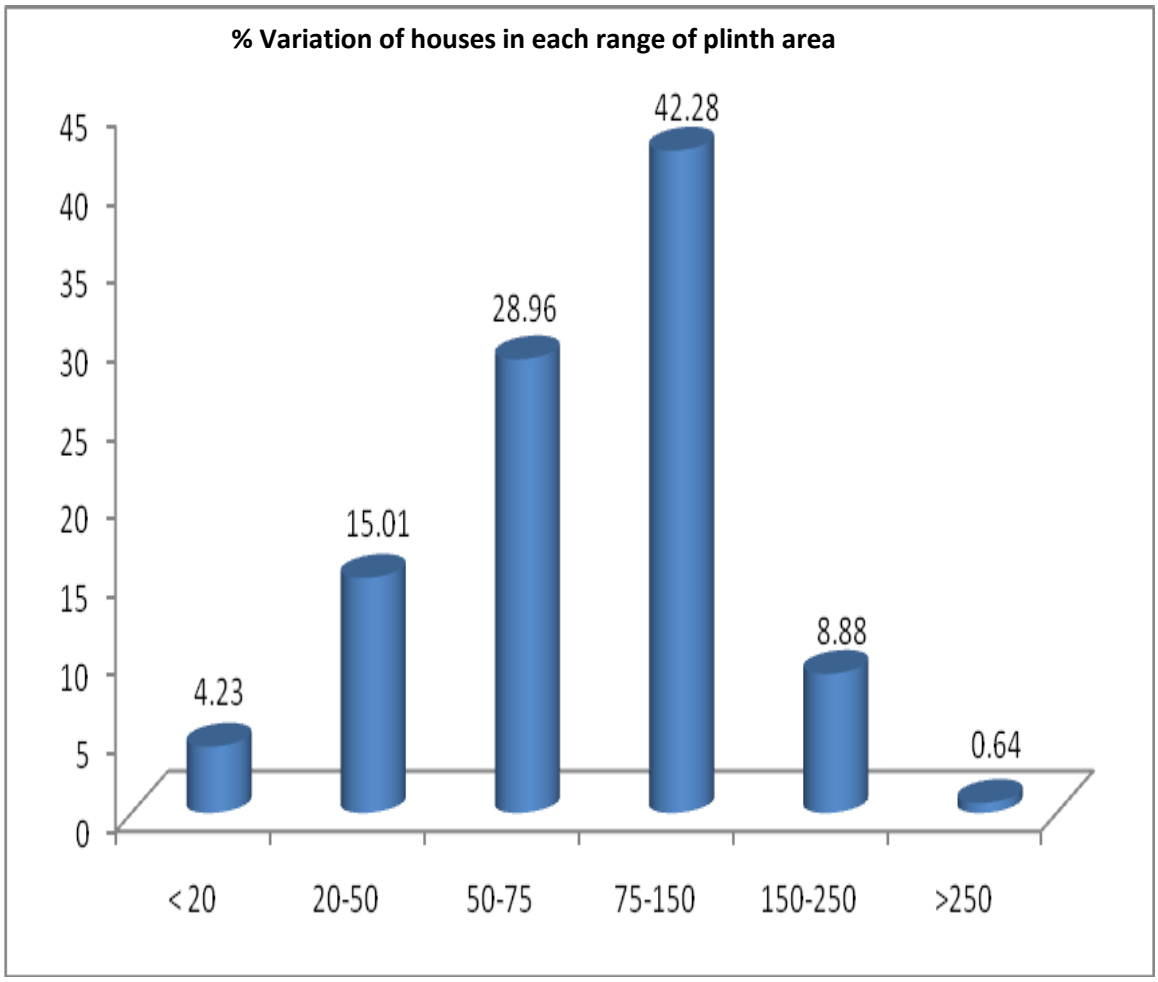

Fig: 9.3 Percentage variation of houses in each range of plinth area

As per the result of Socio-Economic Survey 63% of houses have pucca building, 36.15 % of houses have moderate buildings, and 0.85% of buildings are huts. It is represented in **table 9.5** and **figure 9.4.** It indicates the better structural condition of houses in Aluva town.

Table: 9.5 Percentage variation of houses with different structural conditions

Type of Building	Pucca	Moderate	Kutcha	Hut
Average % for the LSGI	63	36.15	0	0.85

Source: Socio economic survey, 2010

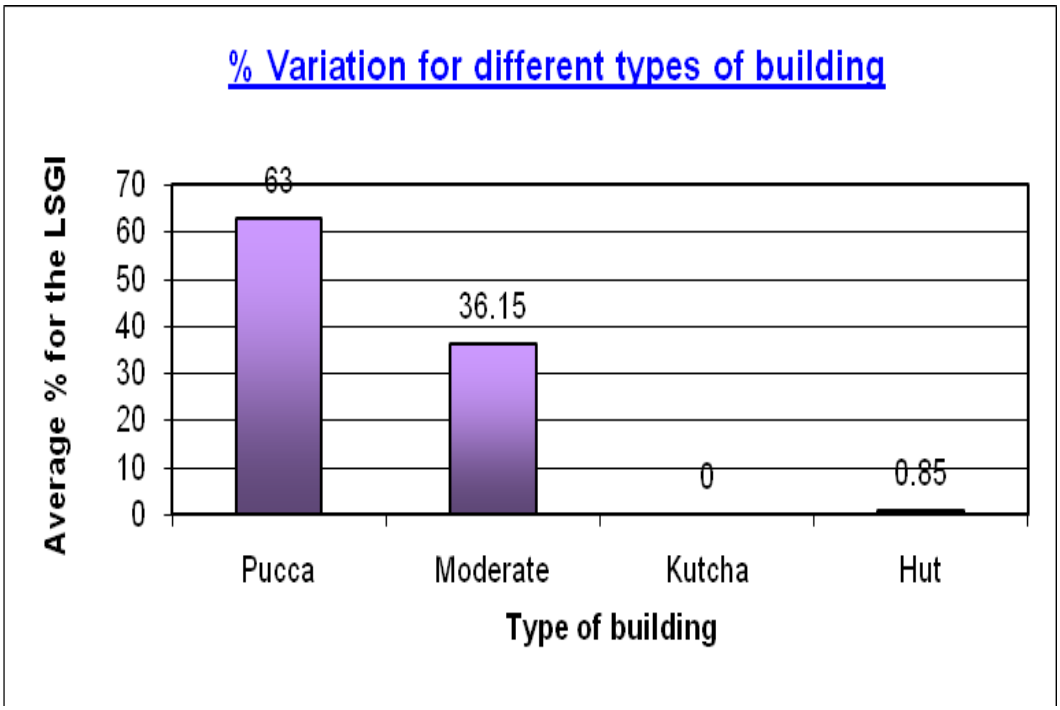

Fig: 9.4 Percentage variations for different types of buildings

9.4 HOUSING STATUS IN ALUVA TOWN BASED ON CENSUS 2011 DATA

As per census of India 2011, total number of census houses in Aluva town is 10183. As per the census definition, a census house is a building or part of a building used or recognized as a separate unit because it has a separate main entrance from the road or common courtyard or staircase etc. These may be occupied or vacant and may be used for residential or non-residential purpose or both. Hence the census data will only give an over all status of buildings in the locality.

Census houses are categorized in different ways in Census of India 2011 – tables on houses, household amenities and assets. Based on predominant material of roof, census houses are categorised into nine groups, as given in table 9.6. The predominant material used for roof construction is concrete and second commonly used material is machine made tiles. Least used material for roof construction is grass/thatch/bamboo/wood/mud etc.

Table: 9.6 Census house classifications based on material of roof – Aluva Town

Total number of census houses	Material of Roof								
	Grass/ Thatch/ Bamboo/ Wood/ Mud, etc.	Plastic/ Polythene	Hand made Tiles	Machine made Tiles	Burnt Brick	Stone /Slate	G.I./ Metal/ Asbestos sheets	Concrete	Any other material
10,183	4	14	374	1,315	33	31	294	8,098	20

Source: Census of India 2011 – Housing tables

Based on predominant material of wall, census houses are categorised into ten groups, as given in **table 9.7.** The predominant material used for wall construction is burnt brick and second commonly used material is stone packed with mortar. Least used material for wall construction is grass/thatch/bamboo etc. and plastic/polythene.

Table: 9.7 Census house classifications based on material of wall – Aluva Town

Total number of census houses	Material of Wall									
	Grass / Thatch/ Bamboo etc.	Plastic / Polythene	Mud / Unburnt brick	Wood	Stone not packed with mortar	Stone packed with mortar	G.I./Metal/ Asbestos sheets	Burnt brick	Concrete	Any other material
10,183	4	4	310	19	177	3,808	25	5,483	333	20

Source: Census of India 2011 – Housing tables

Based on predominant material of floor, census houses are categorised into seven groups, as given in **table 9.8.** The predominant material used for floor construction is cement

and second commonly used material is mosaic/floor tiles. Least used material for floor construction is wood/bamboo.

Table: 9.8 Census house classifications based on material of floor – Aluva Town

Total number of census houses	Material of Floor						
	Mud	Wood/ Bamboo	Burnt Brick	Stone	Cement	Mosaic/ Floor tiles	Any other material
10,183	44	22	31	556	4,827	4,434	269

Source: Census of India 2011 – Housing tables

These census tables also depict a picture of fairly good structural condition of buildings in the town.

9.5 HOUSING INFRASTRUCTURE FACILITIES

Adequate housing is necessary for social welfare as it provides protection from weather, place to bring up families and a place to work. While policy debates have more or less accepted that urbanization is an irreversible phenomenon with more positive than negative externalities, the biggest challenge associated with urbanization is that it has not kept pace with the housing needs of those living in cities and those migrating to the cities.

Some of the facilities provided are explained in detail here.

9.5.1 Main source of drinking water

Main sources of drinking water according to the census 2011- housing tables regarding Aluva town are as shown in **table 9.9.** The source, which was availed during the greater part of the year, was taken as the main source. Where drinking water was made available by tankers or bottled water was used by the household, then it was categorized under 'Other sources.'

Table: 9.9 Main source and location of source of drinking water used-Aluva Town

Location of source of drinking water	Total Number of Households	Main Source of Drinking Water									
		Tap water from treated source	Tap water from un-treated source	Covered well	Un-covered well	Hand pump	Tubewell/Borehole	Spring	River / Canal	Tank / Pond / Lake	Other sources
Total	5,372	4,758	16	230	224	18	119	1	1	2	3
Within the premises	5,301	4,715	14	225	212	16	119	-	-	-	-
Near the premises (<100mts)	66	40	2	5	12	2	-	1	1	2	1
Away (>100mts)	5	3	-	-	-	-	-	-	-	-	2

Source: Census of India 2011 – Housing tables

Tap water from treated source is used by 4758 households as main source of drinking water and the next position in this respect is for covered well with 230 households.

Location of source of drinking water

In Aluva Town location of source of drinking water is within the premises for 5301 households, near the premises for 66 households and away from the premises for 5 households.

Nearness to drinking water sources depending upon the distance at which it is available can be obtained from **table 9.9.**

9.5.2 Availability and type of latrine within the premises

Out of the total number of households of 5372 in Auva town, the numbers of households having latrine facility within the premises is 5356. Number of households not having latrine facility within the premises is 16. Details as per Housing Tables, census of India 2011 are given in **table 9.10.**

Table: 9.10 Type of latrine facility used Aluva Town

Total number of households	Number of households having latrine facility within the premises	Type of latrine facility within the premises								Number of households not having latrine facility within the premises	No latrine within premises	
		Flush/pour flush latrine connected to			Pit latrine		Night soil disposed into open drain	Service Latrine			Alternative source	
		Piped sewer system	Septic tank	Other system	With slab/ ventilated improved pit	Without slab/ open pit		Night soil removed by human	Night soil serviced by animal		Public latrine	Open
5,641	5,356	2,019	3,108	9	217	2	1	-	-	16	4	12

Source: Census of India 2011 – Housing tables

9.5.3 Bathing facility within the premises

Out of the total number of households in the town 5312 households have proper bathroom within the premises and 9 households do not have any type of bathing facility within the premises. Refer the **table 9.11** for the details.

Table: 9.11 Bathing facility within the premises and Connectivity of waste water outlet Aluva Town

Total number of households	Number of households having bathing facility within the premises			Waste water outlet connected to		
	Yes		No	Closed drainage	Open drainage	No drainage
	Bathroom	Enclosure without roof				
5,372	5,312	51	9	4,477	601	294

Source: Census of India 2011 – Housing tables

9.5.4 Connectivity of waste water outlet

Information related to drainage system is also provided in **table 9.11.** As per the details 4477 households have their waste water out let connected to closed drainage.

9.5.5 Availability of kitchen

Under this classification the details collected were whether the cooking was done within the house or outside the house. In either case, the additional details collected were, whether there was a separate kitchen (room) for cooking or not. The maximum number of households had separate kitchen with cooking inside the house. More details can be obtained from the **table 9.12.**

9.5.6 Fuel used for cooking

The number households using different type of fuels for cooking in the town can be obtained from the **table 9.12.**

Table: 9.12 Availability of kitchen and fuel used for cooking Aluva Town

Availability of separate kitchen	Total number of households	Type of Fuel used for Cooking									
		Fire-wood	Crop residue	Cow dung cake	Coal,Lignite, Charcoal	Kerosene	LPG/ PNG	Electricity	Biogas	Any other	No cooking
Total	5,372	314	11	1	-	31	4,994	3	1	-	17
Cooking inside house	5,341	310	9	1	-	31	4,986	3	1	-	-
Has Kitchen	5,327	308	9	1	-	29	4,976	3	1	-	-
Does not have kitchen	14	2	-	-	-	2	10	-	-	-	-
Cooking outside house:	14	4	2	-	-	-	8	-	-	-	-
Has Kitchen	8	2	2	-	-	-	4	-	-	-	-
Does not have kitchen	6	2	-	-	-	-	4	-	-	-	-
No Cooking	17	-	-	-	-	-	-	-	-	-	17

Source: Census of India 2011 – Housing tables

9.5.7 Main Source of Lighting

The source of lighting used for major part of the preceding year was treated as the main source of lighting. **Table 9.13.** shows that main source of lighting used by the households in the town is electricity. Only 4 households use solar energy as their source and for the rest source of lighting is kerosene.

Table: 9.13 Main source of lighting of house holds – Aluva Town

Total number of households	Main Source of lighting					
	Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
5,372	5,353	15	4	-	-	-

Source: Census of India 2011 – Housing tables

9.5.8 Availability of services

The average distance in kilometer (As per the Socio-Economic survey 2010) from houses to facilities like motorable roads, bus stops, schools, Post offices, health facilities, hospitals, ration shops, play grounds etc is shown in **table 9.14** and **figure 9.5.**

Table: 9.14 Average distance to various facilities

Average distance to various facilities	To motorable road	To bus stop	To primary school	To LP School	To UP School	To HS School	To PO	To Health Centre	To Hospital	To Ration shop	To play ground
Average distance in km for the LSGI	0.53	0.54	0.65	0.65	0.66	0.67	0.66	1.44	0.91	0.63	1.03

Source: Socio economic survey, 2010

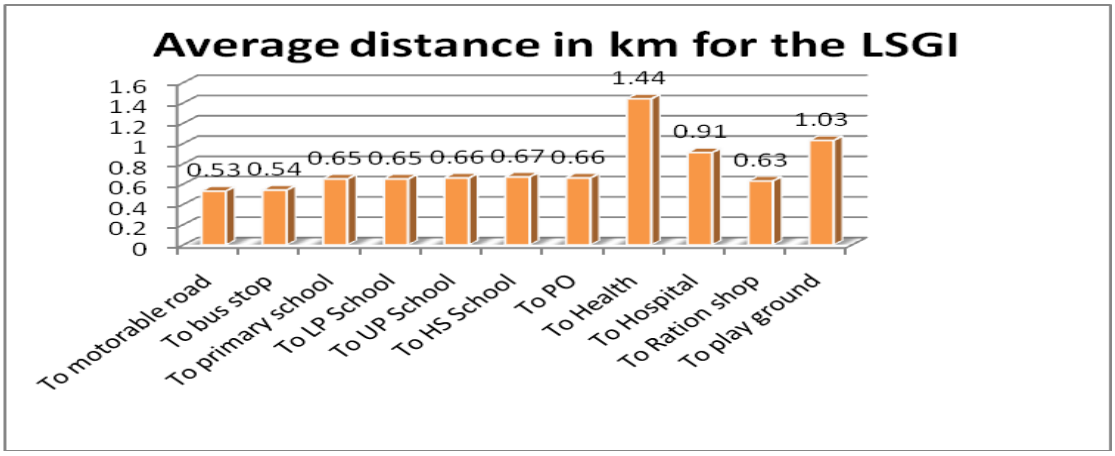

Fig: 9.5 Average distance to various facilities

The Socio-Economic survey data is also made use of for comparing the distance to various facilities in comparison with standards. The percentage of households having opinion that their distance to the facilities is exceeding the adopted standard is given in the **table 9.15.**

Table: 9.15 Distance to facilities and comparison with standards

Sl.No	Facilities and standard	% of people with the opinion that distance to facilities are more than standards
1	Distance to Motorable Road Greater Than 0.5 Km	12.68
2	Distance to Bus Stop Greater Than 0.5 Km	17.97
3	Distance to Primary School Greater Than 0.5 Km	29.81
4	Distance to LP School Greater Than 0.5 Km	31.71
5	Distance to UP School Greater Than 1 Km	9.51
6	Distance to HS School Greater Than 3 Km	0.21
7	Distance to PO Greater Than 3 Km	0.85
8	Distance to Health Centre Greater Than 5 Km	6.13
9	Distance to Hospital Greater Than 5 Km	0
10	Distance to Ration Shop Greater Than 5 Km	0
11	Distance to Play Ground Greater Than 5 Km	0

Source: Socio economic survey, 2010

The analysis shows that facilities like hospitals, high school, Post office, ration shops, play ground are available at a close distance to the residential areas.

9.5.9 Households Availing banking services / Availability of assets in the Households

A household is considered to be availing banking services if the head and/or any other member in the household were availing services provided by a bank or post office as a holder of any type of account. This covered nationalised banks, private banks, foreign banks and co-operative banks. However, credit and thrift societies were not considered part of the banking system. In Aluva town, out of the total of 5372 households, 4890 households are availing banking facilities.

The availability of certain assets in the household is also ascertained by Census of India, 2011 (availability and not their number). Refer the **table 9.16** for the details pertaining to Aluva town.

Table: 9.16 Availability of assets and banking services – Aluva Town

Total number of households	Total number of households availing banking services	Availability of assets											
		Radio/ Transistor	Television	Computer/Laptop		Telephone/Mobile Phone			Bi cycle	Scooter/ Motorcycle/Moped	Car/ Jeep/ Van	Households with TV, Computer/Laptop, Telephone/mobile phone and Scooter/ Car	None of the assets specified in col. 10 to 19
				With Internet	Without Internet	Land line only	Mobile only	Both					
5,372	4,890	2,303	5,093	1,799	1,187	495	1,760	3,031	1,338	2,371	2,140	2,225	31

Source: Census of India 2011 – Housing tables

9.6 HOUSING SHORTAGE

The housing shortage in the country is calculated on the basis of the number of households, available housing stock, acceptable housing stock, overcrowding/congestion in the existing dwelling units, and obsolescence. The successive population censuses have provided the background information on households, housing stock and quality of the units. The overcrowding/congestion can be assessed on the basis of the number of room in the dwelling unit and number of married couples in the households. Obsolescence factor can be determined based on the year of construction of the units in the housing stock. Importantly, Housing shortage is estimated in terms of excess households over houses including houseless households, congestion, replacement/up gradation of kutcha/unserviceable kutcha houses and obsolescence/replacement of old houses. **Table 9.17** shows the estimation of demand for housing.

Table: 9.17 Estimation of demand for housing

Estimation of demand for housing	
Households	**5372**
Housing Stock	**5274**
Pucca	3449
Semi Pucca	1779
Kutcha	46
Excess Households over housing stock	**98**
Congestion factor (%)	0.5
Congestion in households	**27**
Obselence in Housing Stock (2.5%)	**132**
Upgradation of Kutcha	**224**
Total Shortage	**481**

Source: Census of India , Housing Tables 2011

Estimates in **table 9.17** show that there is a numerical shortage of 481 housing units in Aluva.

9.7 SLUMS

A slum, as defined by the United Nations agency UN-HABITAT, is a run-down area of a city characterized by substandard housing, squalor, and lacking in tenure security. As per the report of local body there are 8 slums in Aluva town and detailed study has been conducted about these slums. Colonies with at least ten houses are only included in the study. The general details of the slums are given in **table 9.18.**

Total number of houses in the slum area is 199. The largest slum in terms of number of houses is Kuzhinikattil colony (18 Nos) and smallest is Goodshed colony (15 Nos). The largest slum in terms of extent of slum is Mooppan colony (15679.24sqm) and smallest is Oomankuzhithadam colony (1981.08sqm). BPL families are accommodated in almost all wards, especially in canal purambokku, pipe line road side, canal side and in the slum area. Occupation of most of the people in slums is daily labour, house hold industries, driving etc.

Table: 9.18 Physical Condition of slums in Aluva town

Sl: No	Name of the Slum	Ward (s)	listed/ non listed slum	Total area(m2)	No. of houses	Housing category			No. of HHs
						Pucca	Moderate	Kutcha	
1	Karottakadu	2	Listed	5182	16			16	16
2	Mooppan Colony	2	Listed	15679.24	16			16	16
3	Kuzhinikattil	22	Listed	5520.7	18			18	18
4	Goodshed	8	Listed	4930	15			15	15
5	Pipeline	15	Listed	6264.07	17			17	17
6	Oomankuzhithadam	12	Listed	1981.08	17			17	17
7	Canal colony	15	non listed	...	75			75	75
8	Friendship Colony	16.19	non listed	...	25			25	25

Source: Socio economic survey, 2010

As revealed from the table, structural conditions of buildings in these slums are poor with all households living in kutcha buildings.

Public tap is the only source of drinking water. Method of sanitary waste disposal is individual septic tank and leach pit. Street lights are provided in the roads and access through motorable road of atleast 3m width is available to all these areas. Integrated Housing and Slum Development Programme (IHSDP) and *RAY (Rajiv Awas Yojana)* are the main on-going projects for the improvement of the slums. There are no other special housing schemes in Aluva municipality exclusively for slum area. But the housing schemes such as WAMBAY, EMS etc. aimed for the improvement of housing of BPL sector cover the slum population also.

9.8. CONCLUSION

The houses in Aluva municipality have comparatively moderate sizes and better structural and sanitary conditions. 87.53% of people of the town are living in their own plot (socio-economic survey). At present there is a shortage of only 481 houses.

The main source of drinking water is the 'Tap water from treated source' and maximum number of households have their source of drinking water 'Within the Premises'. Results of Socio-Economic Survey reveal that Aluva town do not face shortage of drinking water. The location of the town on the banks of Periyar River and the presence of Aluva Water Works contribute to this. In the survey conducted 8 slums were identified within the town limit. Urgent measures are needed for the improvement of slums with poor housing quality. A present the town has diminishing trend of population. Since the proposed metro rail starting from Aluva bye-pass junction gives scope for immense development for Aluva town and as a terminal station for metro rail, Aluva will attract lots of people from the influence region, which in turn may reverse this trend and result in increase in population in the coming decades. The number of workers in Aluva municipality shows an increasing trend over the decades, which may also generate greater demand for housing. With rising income levels, there are chances of greater demand for owned houses as well as larger houses, thereby providing a fillip to the housing industry. So it can be expected that in future the housing demand will increase. However because of the high land value in the town, own land and house is not affordable for common man. So necessary planning interventions have to be made.

10. PHYSICAL INFRASTRUCTURE

10.1 DRINKING WATER

10.1.1 INTRODUCTION

Water has always played central role in human societies. Access to safe water is one of the basic human rights. Improving access to safe drinking water can result in tangible improvements to health. This chapter discusses the salient aspects of water supply system in Aluva town.

10.1.2 WATER SUPPLY SCHEME

Majority of the people in Aluva town depend on the water supplied by Kerala Water Authority (KWA). Aluva water works of KWA is one of the efficient water treatment plants in Asia. The plant is situated in ward 12 in the heart of Aluva town on the banks of Aluvappuzha. The source of water for the Aluva treatment plant is Periyar river. Now Aluva treatment plant has a capacity of 225 MLD and the type of treatment is conventional.

Before the expansion of Aluva water treatment plant, a pipeline was laid parallel to the railway line from Chowara in the old Kochi kingdom for distributing water in Aluva area and Kochi. To increase the supply of water to Ernakulam area, there was a booster pumping station near Kalamassery poly technique. In 1965, 48 MLD capacity treatment plant was installed and water was supplied to Ernakulam by 36 inch pipeline. In 1975, 72 MLD capacity treatment plant was installed and water was supplied to Ernakulam by 45 inch pipeline. In 1993, 70 MLD capacity treatment plant was installed with the help of World Bank. As the years passed, due to the large water consumption, water treatment and distribution requirements were increased in Aluva itself. Coverage of Aluva water works includes full area of Aluva town. Two over head water tanks having capacity of 10 MLD and 6 MLD are situated near St. Mary's high school.

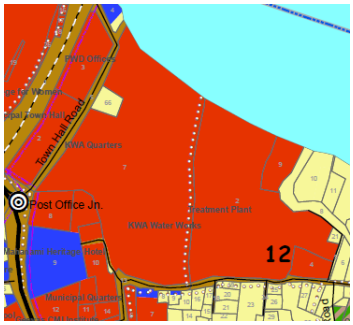

Fig: 10.1 *Aluva water works*

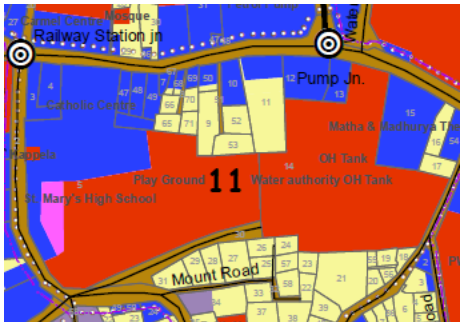

Fig: 10.2 *Location of overhead water tank*

Following are the new projects which are implemented by KSUDP (Kerala Sustainable Urban Development Programme) for Water Authority, financed by Asian Development Bank. In these pojects in Aluva water works, there are four treatment plants functioning and raw water is collected in these treatment plants from three intake wells. A new chemical house is constructed for plant 1 after demolishing the old one. Some internal MS pipelines between the plants are replaced by glass reinforced (GR) pipes and new control valves, flow meters etc. were installed. Some civil maintenance works and construction of RR compound wall were also done as part of this rehabilitation work. A clear water sump of 10 lakhs litre capacity was also constructed in this work.

10.1.3 SOURCE OF WATER

As per socio-economic survey conducted by the T&CP department in 2010, about 94.5% of people are using KWA water as their source of water and 4.24% of people are using own wells as their source of water. About 16.07% of people are using both KWA water and own well as their source of water. Community wells, public bore well, own pond, etc. are also used, even through to a limited extent. **Table 10.1** and **figure 10.1** give the details.

Table: 10.1 Dependency on different sources of drinking water.

Sources of water	KWA	Own well	Community Well	Public bore well	River	Own Pond	Community Pond	Others
% of people using each category	94.5	4.24	0.21	0.21	0	0.21	0	0.63

Source: socio-economic survey-2010

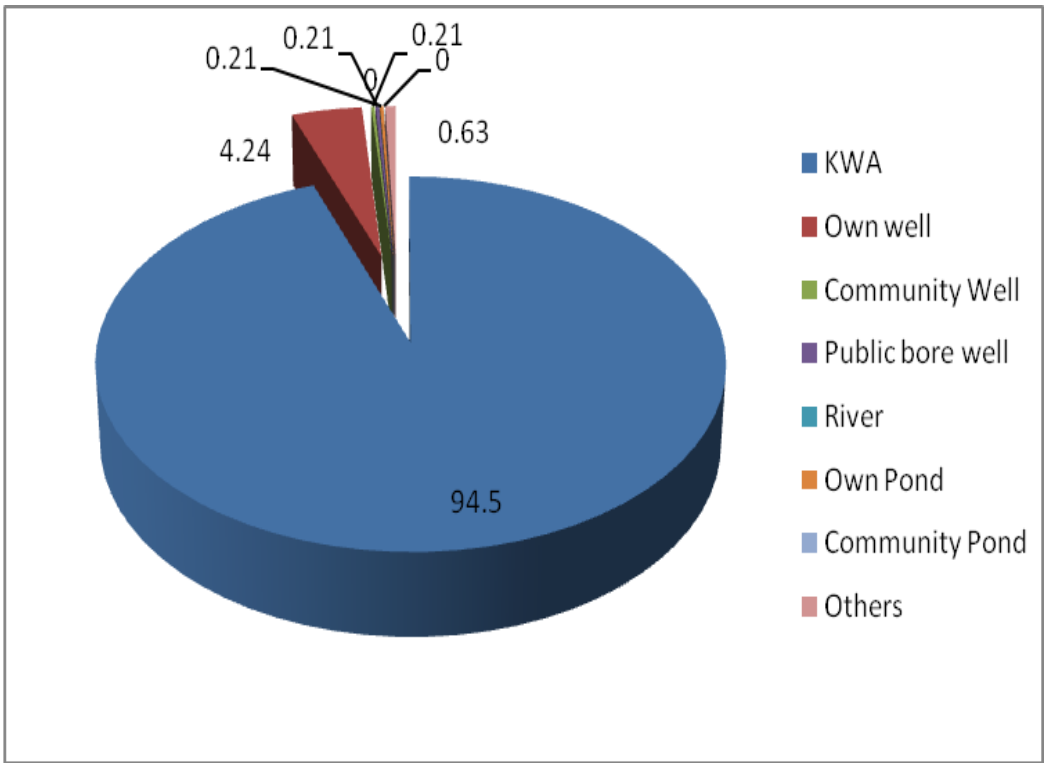

Fig: 10.3 Dependency on different sources of drinking water

Discrepancies in the water distribution such as absence of proper and timely maintenance work of pipelines, misuse of public water taps, non availability of enough water due to the insufficient capacity of pipelines, uninformed maintenance of pipelines, inadequate supply of water in higher places etc. are the major issues in the water distribution system of Aluva Town. At the north west part of the town, complaints occur due to breakage and leakage of pipes. Old pipes used in this area consists of concrete pipes, primo pipes, AC pipes and are mostly in a disintegrated state. So frequent repairs are required in these areas.

10.1.4 DISTRIBUTION NETWORK OF ALUVA TOWN

The distribution network of Aluva town has 500mm to 50mm lines which covers 26 wards with 6769 connections and the capacity of overhead tank is 17.50 million litres. The number of connections includes domestic, non-domestic and public taps etc. Total quantity of water supplied is 16 MLD. The water is properly treated before distribution. The detail of water supply in Aluva town is shown in **table 10.2.**

Table: 10.2 Details of Water supply of Aluva

Net work	Source	Area of coverage (wards)	Number of houses covered/no of connections	Capacity (ML) of OH tank	Total Quantity supplied /day	Quality of water
500 mm to 50 mm lines	Periyar River	26 divisions	6769	17.50 million litre	16 MLD	Properly treated

Source: KWA

Alternate sources of water used by people of Aluva town are, own well, community well, public bore well, own pond etc. In the case of Aluva Water Works, the source is Periyar river and the details of this source are given in **table 10.3.**

Table: 10. 3 Details of source of water supply in Aluva water works

Sl. No	Source of water	Location/ Ward	Quality of water source	Yield from the sources (MLD)	Challenges to the sources (Stake holder discussion)
1	Periyar River	Ward 12 - Municipal Office ward where water treatment plant existing	Potable water that can be used after Chlorination	20	Domestic waste

Source: KWA

10.1.5 SCARCITY OF WATER

As per socio-economic survey 2010, there is no scarcity of water in Aluva town (refer **table 10. 4.** & **figure 10.2**) According to the KWA officials, there is no scarcity in Aluva town except in the dry season.

Table: 10. 4 Details of water scarcity in Aluva town

Category of scarcity	No scarcity	1-2 Months	2-3 Months	3-6 Months	more than 6 months
Average % for the LSGI	100	0	0	0	0

Source: socio-economic survey -2010

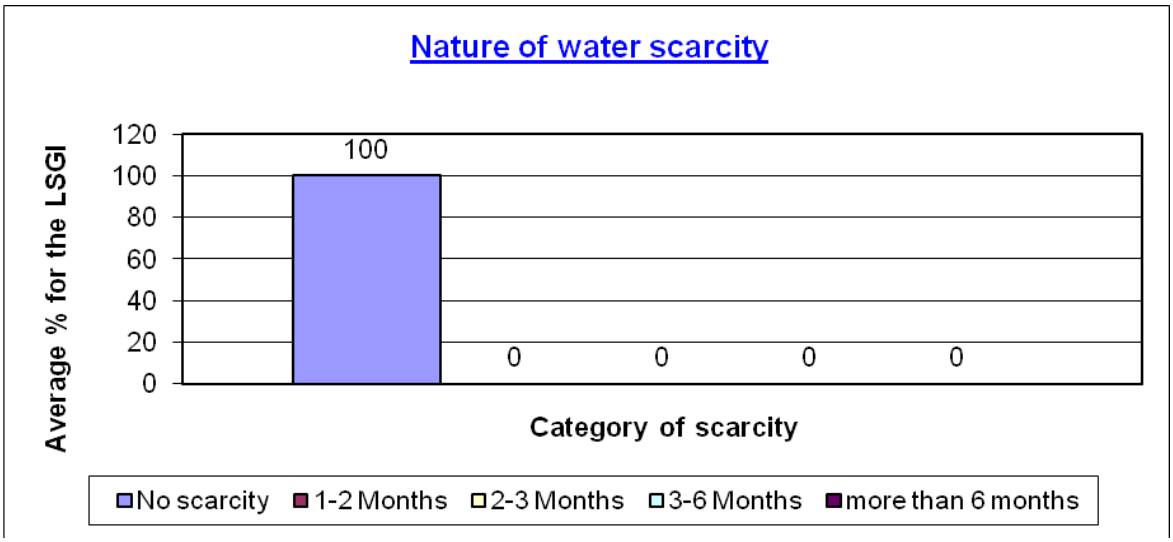

Fig: 10.4 Details regarding water scarcity

Another detail obtained from socio-economic survey conducted in 2010 is duration of water supply. 99.79% of houses have 24 hrs water supplies and 0.21% of houses have water supply in once in 2 days or more. Details are shown in **table 10.5.**

Table: 10.5 Duration of water supply in Aluva town

Duration of water supply	24 hrs	12-24 hrs	6-12 hrs	1-6 hrs	<1 hr	Once in 2 days or more
Average % for the LSGI	99.79	**0**	**0**	**0**	**0**	0.21

Source: socio-economic survey-2010

From the socio-economic survey conducted, it is revealed that the distance to water sources is less than 0.50 km in all parts of the town and is shown in **table 10.6.**

Table: 10.6 Distance to water sources in Aluva town.

Distance to water sources	>0.5 km	> 1 km
Average % for the LSGI	0	0

Source: socio-economic survey-2010

Two over head water tanks having capacity of 10 MLD and 6 MLD are existed near St. Mary's high school. From these tanks, major portion of water, ie. about 12MLD is distributed to Aluva town and remaining is distributed to Choornikkara grama panchayat and Kadungallur grama panchayat . Duration of water supply is 24 hrs. The domestic water requirement for medium town as per UDPFI guidelines and Central Public Health and Environmental Engineering Organization (CPHEEO) norms, the domestic water requirement is 135 lpcd. Current level of water supplied to Aluva town is approx. 868 lpcd and thus there is no scarcity of water at present.

10.1.6 CONCLUSION

In the Aluva town, there is no shortage of water except in the dry season. In most of the places in town duration of supply is full day. About 94.5% of the people depend on KWA for drinking water.Four treatment plants, of total capacity of 225MLD of water of the Aluva water works are situated in ward 12 of Aluva municipality and the source of water is Periyar river. Regarding water distribution system in Aluva municipality following are found to be the requirements viz. timely maintenance of pipelines, maintaining uninterrupted 24x7 water supply, proper working of water treatment plant, augmenting the capacity of distribution system through measures like laying large diameter pipes wherever necessary and ensuring availability of water in the comparatively higher grounds in the town.

10.2 ENERGY

10.2.1 ELECTRICITY

Electric power to Aluva town is distributed through Aluva 110 KV Sub-Station located at Power house junction in Aluva-Munnar road.

In the local level analysis it is identified that, voltage problems or power interruptions are only of minimal nature in the locality.

10.2.2 CATEGORY WISE CONNECTION AND CONSUMPTION

Categories wise connection and consumption details are shown in **table 10.7** and **table 10.8.**

Table: 10.7 Category wise electricity connection details

Sl. No	Total Number of connections	Category wise break-No of connections			
		Domestic	Industrial	Commercial	Agricultural
1	21040	15100	361	5315	264

Source: KSEB

Table: 10.8 Category wise electricity Consumption (in MKWH) details

Sl. No	Total consumption (MKWH)	Category wise break up of –Power consumption(MKWH)			
		Domestic	Industrial	Commercial	Agricultural
1	3.59	2.025	0.138	1.42	0.007

Source: KSEB

Category wise consumption of electricity in MKWH is shown in **figure 10.3**. More percentage of electric power (in terms of connection and consumption) is used for domestic purposes. Consumption for industrial and agricultural purpose is very less.

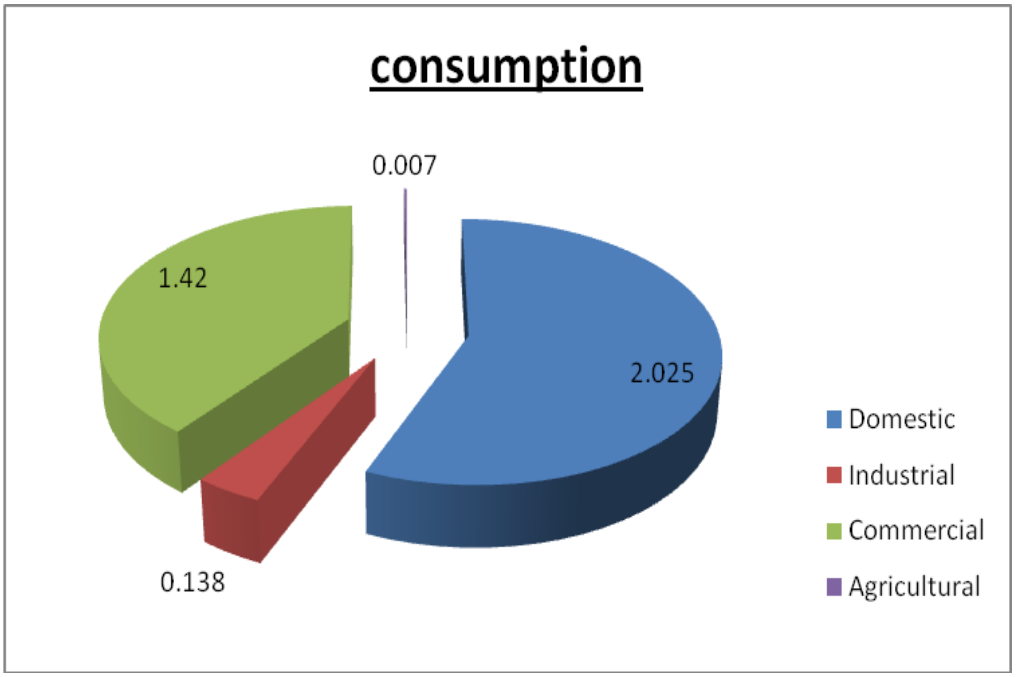

Fig: 10.5 Category wise consumption of electricity (MKWH)

As per the Socio-economic survey conducted in 2010, 99.79% of houses of the town are electrified and only 0.21% of houses are unelectrified. The survey also revealed that non-conventional source of energy is not utilized considerably in Aluva town.

10.2.3 Distribution network details

Distribution network includes Transmission line, Distribution Line and Supply Line including substation, high tension lines etc. The substation in Aluva is a 110 KV substation. As per the details obtained from KSEB, the transmission line is 12 kms in length. The distribution lines and supply lines are 214.5 kms in length. There is no generating station. High tension lines (66 KV and above) are also nil.

10.2.4 Source of Lighting

As per the details of census of India 2011 – housing tables, main source of lighting used by the households in the town is electricity with a number of 5353 and the least number of households use solar energy as their source and for the rest source of lighting is kerosene. **(Table 10.9)**

Table: 10.9 Main source of lighting

Area Name	Total/ Rural/ Urban	Total number of households	Main Source of lighting					
			Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
Aluva (M)	Urban	5,372	5,353	15	4	-	-	-

Source: Census of India 2011 – Housing tables

10.2.5 Domestic fuels

In the household sector, fuels are consumed for cooking, lighting, heating water for bathing and washing clothes and heating/cooling rooms. The major fuels consumed are commercial fuels like kerosene, LPG, electricity and the non-commercial fuels such as fuel wood (firewood, twigs, sawdust and wood shavings) etc. The percentage of households using

different category of domestic fuels is shown in **figure 10.4.** The socio- economic survey reveals that 97.67% of households use LPG as a fuel, but only 58.56% of households use LPG as the sole fuel used. 29.60% of households use firewood as domestic fuel, but only 1.48% of households use firewood as the sole fuel used. 18.39% of households are using both fire wood and LPG as fuels.

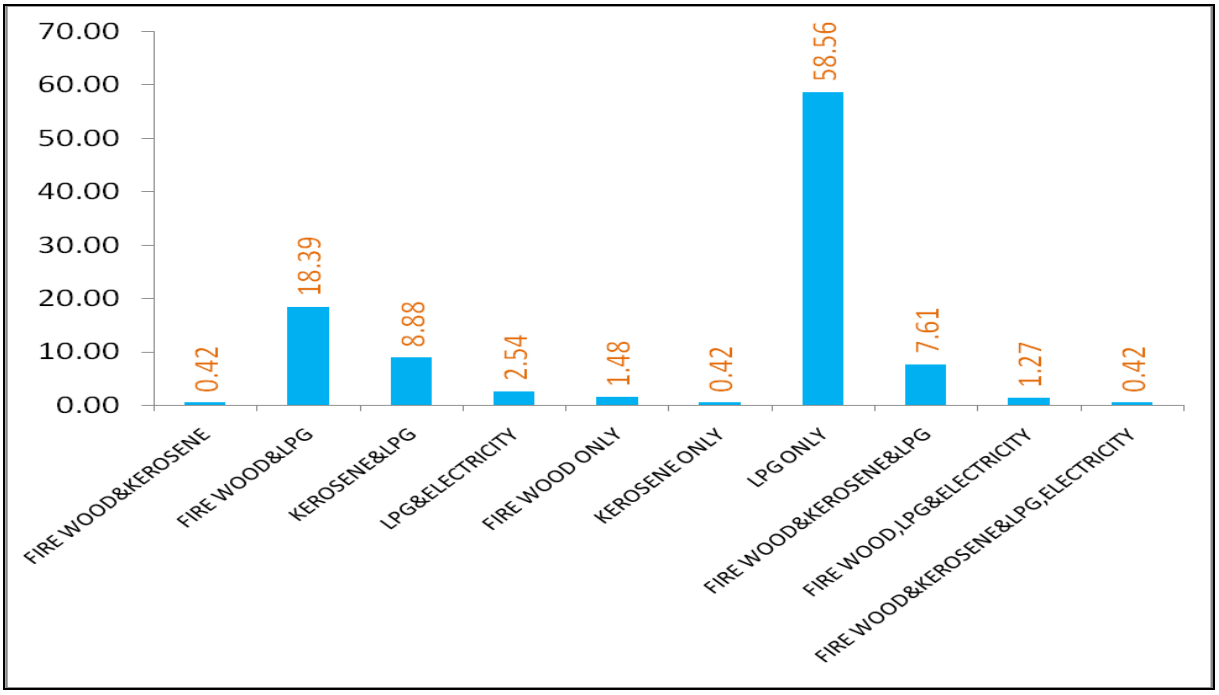

Fig: 10.6 Percentage of households using different category of fuels

Source:socio economic survey 2011.

10.2.6 CONCLUSION

Low voltage is not a problem in the town, the power supply failure occurs only due to natural calamities. Absence of separate street light line is creating problems in the functioning of street lights. Most of the houses are electrified. Now importance shall be given for improving the quality of supply. LPG is the major domestic fuel in the town.

In non domestic sector LPG in large scale and firewood in small scale are used as non conventional energy sources .Other than this no other non conventional energy sources are available in Aluva town for domestic and non domestic purposes.

10.3 WASTE DISPOSAL

10.3.1 INTRODUCTION

Solid waste management is considered as one of the most important obligatory functions of urban local bodies. The basic reason of increasing the urban waste is mainly due to fast urbanizing trend and the changing life style of the people. As per secondary data, 15 tonnes of solid wastes and 3 tonnes of market wastes are generated per day.

10.3.2 SOLID WASTE COLLECTION SYSTEM

There is an almost efficient solid waste collection and disposal system for bio-degradable wastes & not sufficient for non bio-degradable wastes in the town. The generated bio-degradable solid waste is fully collected. Frequency of collection is daily and 29 vehicles are used. The details of solid waste collection system are shown in **table 10.10**. There is no waste disposal yard inside Aluva town. There is a waste dumping yard at 4th mile in Keezhmad grama panchayath adjacent to Aluva town under the ownership of municipality. This dumping yard is not functioning now.

Table: 10.10 Details of solid waste collection system

Type of the System	Source of solid waste (Area/ Ward)	Total quantity of solid waste genera-ted (T)	Total quantity of solid waste collected (T)	Coverage Area(sq.km.)/ wards	Collection details			
					Location of Collection points	Workers employed	Frequency of collection	Vehi-cles used
Centralized	All Wards	22	22	6.46 (all wards)	All Wards	106	daily	29

Source: Local Body, 2010

10.3.3 WASTE DISPOSAL SYSTEM

The separation of wastes into bio-degradable and non bio-degradable is being done at the waste generation point itself. The waste disposal site of Aluva municipal council is located

near at 4th mile is not functioning now. A centralized solid waste treatment plant (bio-degradable wastes) has the capacity to treat the waste generated from all the adjacent local bodies of Kochi Corporation including Aluva is functioning at Brahmapuram. Bio-degradable wastes are treated at this plant. This system is sufficient for bio-degradable wastes. There is no method for the treatment for non bio-degradable wastes. The existing waste dumping yard of Aluva municipal council at 4th mile in Keezhmadu grama panchayat is to be maintained as an additional facility if any shutting down of Brahmapuram waste treatment plant occures. The hospitals in Aluva town are depending on private agency, IMAGE, palakkad for collection and disposal of bio-medical wastes.

10.3.4 SANITARY WASTES

There is no public sewerage system in Aluva town. As per the socio-economic survey conducted by the Town and Country Planning Department (2010), 95.98 % of houses have septic tank, 3.59% of houses have pit latrine and only 0.21% of houses adopting other system for the disposal of sanitary wastes shown in **figure 10.6** and **table 10.11.** Sweeping of all the roads and by-lanes of Aluva town are being done regularly.

Table: 10.11 Method of sanitary waste disposal

Category of sanitary waste disposal	Septic tank	Pit latrine	Public Sewerage System	Others
Average % for the LSGI in each category	95.98	3.59	0	0.21

Source: Local Body, 2010

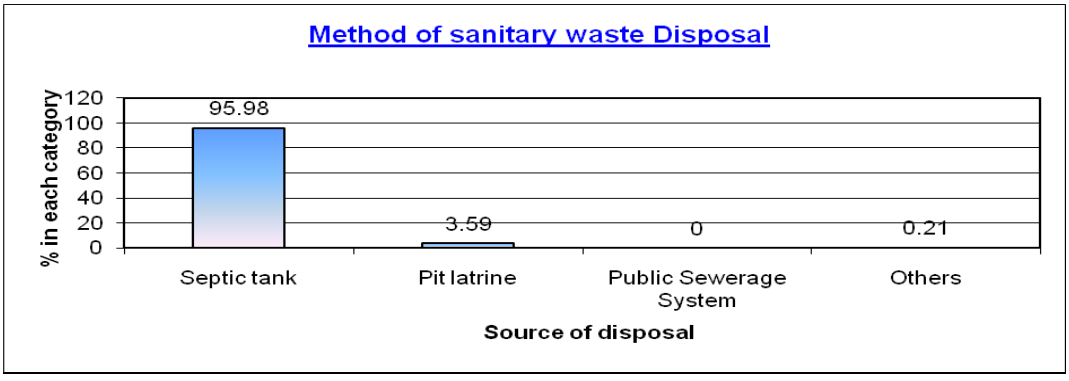

Fig 10.7 Method of sanitary waste disposal

10.3.5 SEWAGE

There is a sewage treatment plant in Aluva town near Asramam kadavu started in 2003. This plant is not functioning properly. Sewage from other parts of the town is discharged to river Periyar without treatment through Market kadavu, near KWA pump house and Perikkathodu makes river Periyar polluted.

10.3.6 DRAINS

There is no proper drainage facility in the town. The insufficient cross sectional area and slope and also improper maintenance of the existing drains often lead to stagnation of water resulting in unpleasant environmental conditions. This water finally drains into the river Periyar.

10.3.7 PUBLIC COMFORT STATIONS

The availability of public toilet / comfort stations is very less in the town. At present there are three public comfort stations, located at market, private bus stand and near Mangalapuzha bridge. Attributable to the role of the town as a transit point of vehicular traffic and as the regional service centre, the number of commuters is high. Hence more public comfort stations are to be provided at different parts of the town.

10.3.8 CONCLUSION

The biodegradable wastes are being disposed off at centralized solid waste treatment plant functioning at Brahmapuram, to treat the waste generated from all the adjacent local bodies of Kochi Corporation including Aluva. There is no method for the treatment for non bio-degradable wastes. The existing waste dumping yard of Aluva municipal council at 4th mile in Keezhmadu grama panchayat is to be maintained as an additional facility if any shutting down of Brahmapuram waste treatment plant occurs. The hospitals in Aluva municipality area are depending on private agency, for collection and disposal of bio-medical wastes. The existing sewage treatment plant is not functioning properly and thus river Periyar gets polluted. There is no proper drainage facility in the town. A Drainage plan for the entire town is recommended for improving the drainage system. More public comfort stations are to be provided at different parts of the town.

11. SOCIAL INFRASTRUCTURE

Social infrastructure such as educational facilities and health facilities are essential for healthy urban environment.

11.1. EDUCATION

11.1.1 INTRODUCTION

In a civilized society education is of paramount importance. With the advancement in science and technology and intellectual thinking, educated and trained personnel are required in every field to achieve the wellbeing of the society. Education facilities were available in Aluva, even when it was part of Travancore kingdom.

According to 2001 census, literacy of Aluva town was 96.07% which was higher than the district rate of 93.20%. In 2011 census, literacy rate of Aluva town is 97.90%. In this chapter educational status and the infrastructural facilities in education in Aluva are detailed.

The main educational institution to be mentioned in Aluva is Union Christian college, founded way back in 1921 and it is one of the prestigious institute of higher education in Kerala.it is affiliated to M.G university and is one of the top A grade colleges in Kerala. It was started in an old court building gifted by the maharaja of Travancore. In 1925, Mahatma Gandhi visited the college and planted a mango tree. The mango sapling is now flourishing in front of the administrative block.

Another educational institution to be mentioned in Aluva is st.xavier's college for women, which is also a prestigious institution in Kerala.



Fig: 11.1 U.C College , Aluva



Fig: 11.2 St.Xavier's College for Women

11.1.2 GENERAL EDUCATION STATUS

The status of the general education is assessed based on literacy rate, number of educational institutions per one lakh population and educational status. The literacy rate of Aluva town as per 2001 census is 96.07%. The literacy rate of Ernakulam district and Kerala state are 93.20% and 90.92%. The literacy rate of the town is higher than district and the state literacy rate. Another comparison is made with district urban literacy rates. The literacy rate of Ernakulam district (urban) is 94.31% and in comparison, the literacy rate of Aluva town is higher than the district urban literacy rate. The educational status of the town is assessed by comparing the percentage qualification of the people. It is shown in **table 11. 1** and **figure 11. 1**

Table: 11. 1 Educational status of Aluva town

Type	Illiterate	Primary	HS	Pre degree	Degree	PG	Technical	Professional Graduates	Others
Average % for the LSGI in each category	3.5	18.38	33.2	14.65	14.3	3.91	6.61	4.6	0.86

Source- Socio-economic survey2010

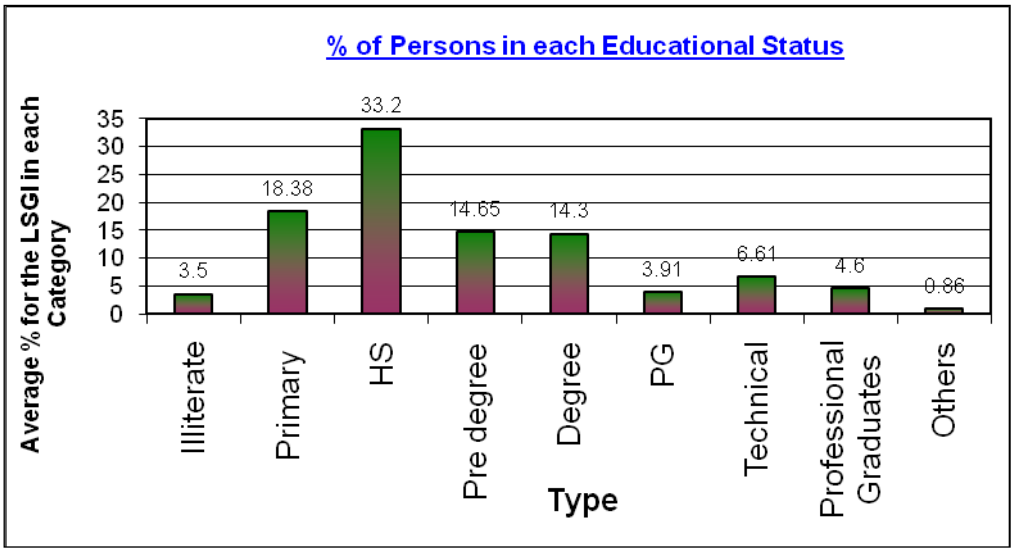

Fig: 11.3 Educational status of Aluva town

From the above table and figure, it can be observed that 18.38% of people have only Primary Education, 33.2% of people have high school education and 14.65%.People have Pre-degree qualification. The remaining possesses degree or higher qualification. The above analysis shows that Aluva has comparatively high literacy rate and the educational qualification of the people is also high. It indicates the high educational status of the town.

11.1.3 SCHOOL EDUCATION

There are 19 schools(including L.P.Schools) functioning in Aluva town limit.. The number of schools in various categories is shown in **table 11.2.** The details of schools in the town, i.e. number of students and number of teachers, syllabus (up to HS), Category like Government, aided, unaided, unrecognized etc are given in **table 11. 3** and **table 11. 4.**

Table: 11. 2 Number of schools in various categories

Category	Pre-primary school	primary School	High School	Higher Secondary Schools	V.H.S.S
No.of schools	1	7	3	8	0

Source: Primary Survey 2010

Table 11.3 -Details of schools in Aluva –No. of students

Sl. No	Name of school	Location/Ward	Category*	Number of students				
				Pre Primary	Primary	High school	HSS	VHSS
1	Holy Ghost Convent H S S	1	2	189	1272	628	298	0
2	St Francis Xavier's LP School	7	2	0	655	0	0	0
3	SNDP HSS Aluva	7	2	0	0	0	336	0
4	SNDP HS Aluva	7	2	0	354	522	0	0
5	St. Francis Xavier HSS for girls	7	2	0	990	864	295	0
6	Govt. HSS for boys Aluva	7	1	0	0	0	717	0
7	HAC LPS Aluva	9	1	0	57	0	0	0
8	Govt. HSS for Girls	9	1	0	68	174	240	0
9	St John's Baptist CSI HS	9	3	83	593	286	0	0
10	St Mary's L P School Aluva	11	2	48	117	0	0	0
11	St Mary's HS Aluva	11	2	0	269	608	0	0
12	Vidhyadhi Raja Vidhyabhavan EMHS Aluva	16	3	0	1564	0	0	0
13	Vidhyadhi Raja Vidhyabhavan EMHSS Aluva	16	3	135	825	442	256	0
14	Islamic HSS Aluva	19	3	102	561	319	334	0
15	Jeevas CMI Kindergarten Aluva	7	3	248	0	0	0	0
16	Jeevas CMI Central School Aluva	7	3	0	410	0	0	0
17	Nazarath LPS	16	3	72	159	0	0	0
18	Islamic HS Aluva	17	3	0	838	0	0	0
19	Technical HSS Aluva	8	1	0	0	0	190	0

** Govt.-1 Aided-2 Unaided-3 Unrecognized-4* *Source: Primary Survey 2010*

Table: 11.4 Details of schools in Aluva - No. of teachers, syllabus & category

Sl. No	Number of Teachers					Syllabus (up to HS)	Govt. /Aided/ Un aided/ Un recognized
	Pre Primary	Primary	High school	HSS	VHSS		
1	5	30	20	18	0	State	Aided
2	0	12	0	0	0	State	Aided
3	0	0	0	18	0	State	Aided
4	0	12	15	0	0	State	Aided
5	0	21	27	17	0	State	Aided
6	0	0	0	21	0	State	Govt.
7	0	4	0	0	0	State	Govt.
8	0	3	18	13	0	State	Govt.
9	3	17	14	0	0	State	Un Aided
10	2	7	0	0	0	State	Aided
11	0	8	23	0	0	State	Aided
12	0	50	0	0	0	State	Un Aided
13	5	22	22	13	0	State	Un Aided
14	4	22	13	13	0	State	Un Aided
15	14	0	0	0	0	Central	Un Aided
16	0	29	0	0	0	Central	Un Aided
17	4	9	0	0	0	State	Un Aided
18	0	25	0	0	0	State	Un Aided
19	0	0	0	5	0	State	Govt.

Source: Primary Survey 2010

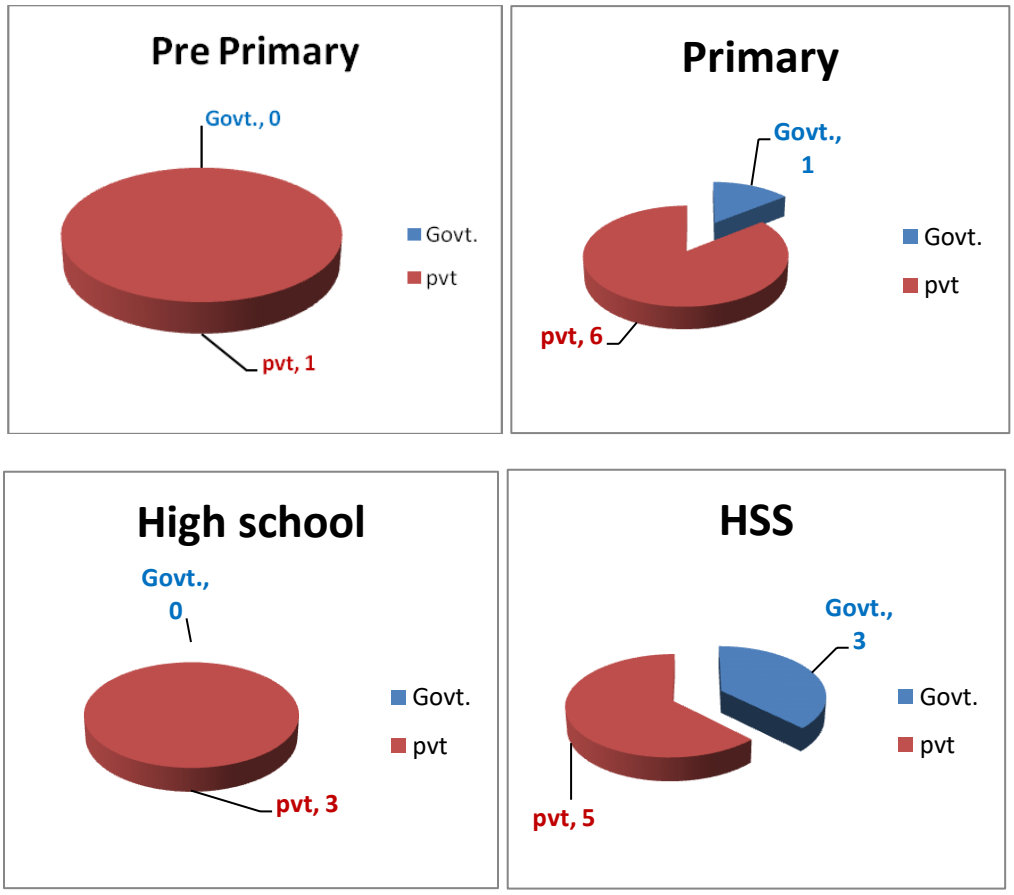

Fig:11.4 Owner ship of schools

The ownership of schools i.e. in Government sector or private sector of various categories is shown in **figure 11. 2**. All schools in High School level in municipal limit are functioning in private sector. But in case of higher secondary schools 3 schools are functioning in Govt. sector and 5 schools are in private sector. But in the case of primary schools, 6 schools are functioning in private sector, one school is in Government sector. In the case of preprimary School, all schools are functioning in private sector. This shows the predominance of private sector in the school education of Aluva town. In High school there are no government institutions and hence students have to depend either aided or unaided institutions. But in primary section (both L.P. School and U.P. School) and higher secondary education the situation is comparatively better. Number of students in four categories of school in preprimary, primary, High school and Higher Secondary categories is shown in **figure11.3**

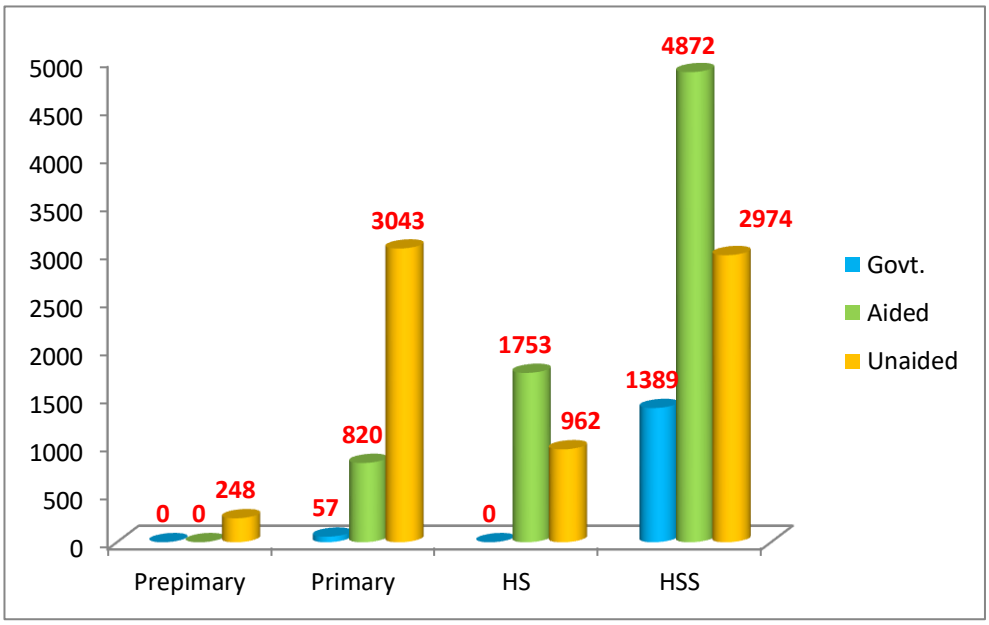

Fig: 11.5 No. of students in schools

The student –teacher ratio of Government Schools, Aided schools and unaided schools of the town in Higher Secondary school, High school and primary school and pre-primary school is shown in **figure 11.4**

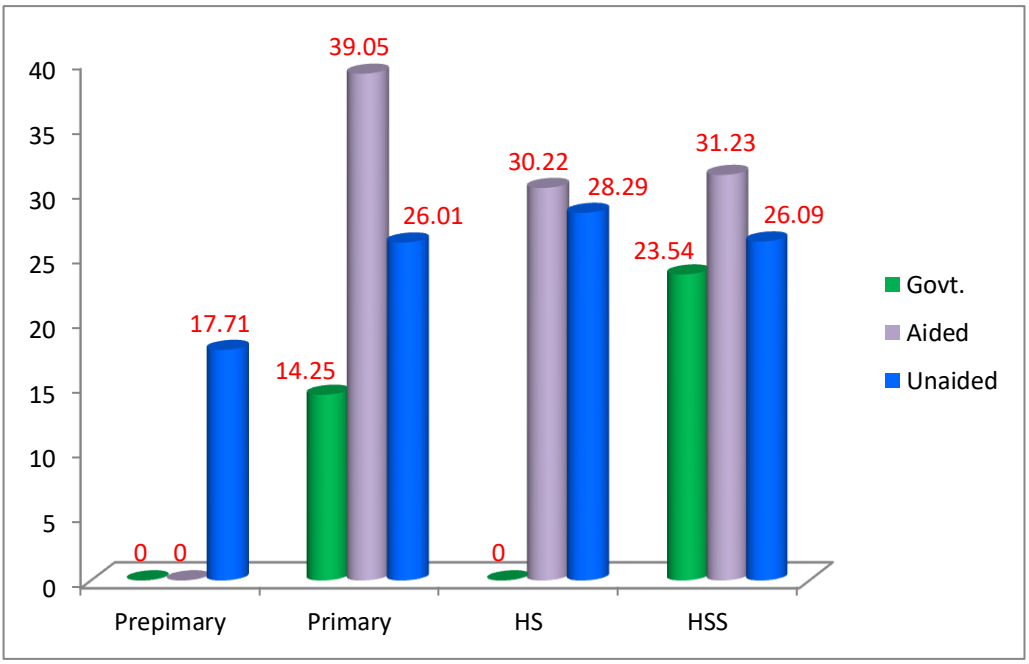

Fig: 11.6 Student teacher ratio of schools

Out of 19schools functioning in the town, in 17schools Kerala state syllabus is followed while in two schools C.B. S.E. syllabus is followed. There are no vocational higher secondery schools in Aluva.

Regarding facilities available at school, the parameters like play ground, separate toilets for girls, computer labs, internet facilities, drinking water, road connectivity etc. were considered. . Basic facilities are available in most of the school. But facilities like play ground and Internet facilities are absent in a number of schools. Availability of facilities at school wise is shown in **table 11.5.**

Table: 11.5. Facilities available in schools

Sl. No	Name of the school	Play ground	Separate toilets for girl students	Computer lab	Internet	Water Avail ability	Source of Water	Connectivity with motorable road (connected by road having a width of 3m or more, no connectivity)
1	Holy Ghost Convent HSS Aluva	Yes	Yes	Yes	Yes	Yes	Well, KWA	Yes
2	St Francis Xavier's LP School	Yes	Yes	Yes	Yes	Yes	Well	Yes
3	SNDP HSS Aluva	No	Yes	Yes	Yes	Yes	KWA	Yes
4	SNDP HS Aluva	No	Yes	Yes	Yes	Yes	Well, KWA	Yes
5	St. Francis Xavier HSS for Girls	Yes	Yes	Yes	Yes	Yes	Well	Yes
6	Govt. HSS for boys Aluva	Yes	Yes	Yes	Yes	Yes	KWA	Yes
7	HAC LPS Aluva	No	Yes	No	No	Yes	KWA	Yes
8	Govt. HSS for Girls	No	No	Yes	Yes	Yes	KWA	Yes

9	St John's Baptist CSI HS	Yes	Yes	Yes	Yes	Yes	Well, KWA	Yes
10	St Mary's L P School Aluva	Yes	Yes	Yes	No	Yes	KWA	Yes
11	St Mary's HS Aluva	Yes	Yes	Yes	Yes	Yes	Well , KWA	Yes
12	Vidhyadhi Raja Vidhya Bhavan EMHS Aluva	Yes	Yes	Yes	Yes	Yes	Well	Yes
13	Vidhyadhi Raja Vidhya bhavan EMHSS Aluva	Yes	Yes	Yes	Yes	Yes	Well	Yes
14	Islamic HSS Aluva	Yes	Yes	Yes	Yes	Yes	Well, KWA	Yes
15	Jeevas CMI Kindergarten Aluva	Yes	Yes	Yes	Yes	Yes	Well, KWA	Yes
16	Jeevas CMI Central School Aluva	Yes	Yes	Yes	Yes	Yes	Well , KWA	Yes
17	Nazareth LPS	Yes	Yes	Yes	No	Yes	KWA	Yes
18	Islamic HS Aluva	yes	yes	yes	yes	yes	Well , KWA	yes
19	Technical HSS Aluva	no	yes	yes	yes	yes	KWA	yes

Source: Primary Survey 2010

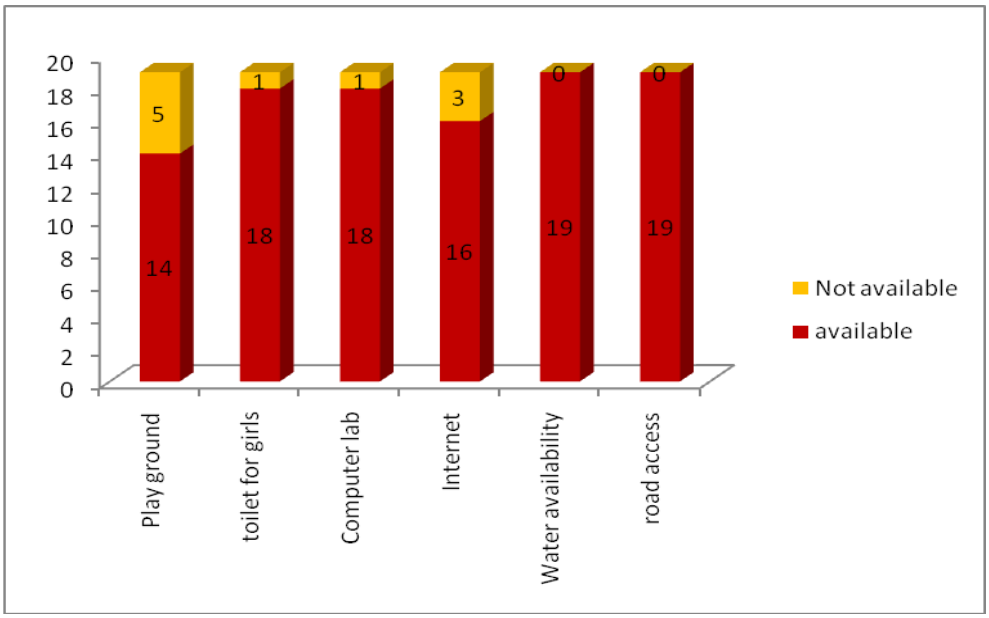

Fig: 11.7 Facilities in schools.

It is seen that most of the facilities are available in all schools. The details are shown in **figure 11.5.**

As per the socio-Economic survey of 2010, the average distances to Pre-primary school,lower primary school,upper primary and, high school are 0.65 km, 0.65km, 0.66km, and 0.67km respectively. It is represented in **figure 11.6**

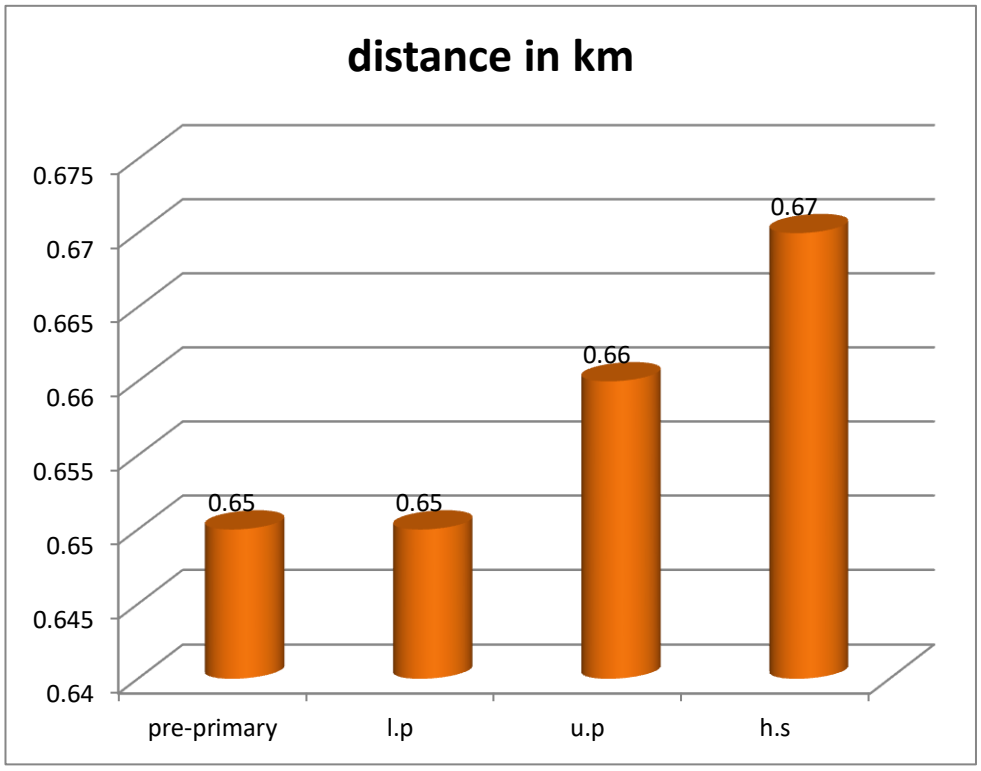

Fig:11.8 Average distance to schools in km.

11.1.4 HIGHER EDUCATION

The prestigious institutions-U.C.College and St. Xavier's college for women, both Arts and Science Colleges are situated in the town limit. Around 2700 students are studying in these colleges. For college education, students from neighbouring local bodies also come to Aluva. There are two more private arts and science colleges in Aluva, St.Antony's parallel college and Queen mother's college. Two colleges for philosophy and theology are there in Aluva under Christian management.The details of other educational institutions in Aluva town is given in **table 11.6.**

Table: 11.6 Other educational institutes

Sl. No	Name of College	Details of ownership	Location/ Ward	Specify the course	Number of students course wise				
					SSLC	Plus 2	Degree	PG	
1	St. Joseph's Pontifical Seminary	Christian management	Near Mangalapuzha bridge	Philosophy &Theo-logy			180 & 210		
2	Sacred Heart Philosophical college	Christian management	Marvar Jn.	Philosophy			120		
3	Audio Visual & Reprographic centre	Govt.	Near Paravur Jn.	No regular course					
4	Govt. pre-examination training centre	Govt.	Marvar Jn.	No regular course					
5	Social Welfare Technical School	Christian management	Near SP Office	ITC					198
6	St Antony's Parallel college	Private	Near Pump Jn.	Science & Arts	65	120	60	10	
7	Queen Mother's College	Private	Near new Pvt. Bus-stand	Science & Arts		447	218	80	
8	Ideal ITC	Private	Near Paravur jn.	ITC					84

9	Faraday ITC	Private	Oppo. PWD Quarters	ITC					18
10	LF Social Centre	Private	Near Power House Jn.	DTP ,Data Entry Training					30
11	Mamy's Hindi Padan Kendra	Private	Oppo. GPO Aluva	Hindi Visarad Praveen Pandit					23

Source: Primary Survey 2010

11.1.5 TECHNICAL EDUCATION

There are no professional colleges in the town. However professional colleges available in adjacent local bodies scater to the requirements for professional education of the residents of Aluva town also.

Two Technical institutions in private sector (ITC), are functioning at Aluva.

But supporting facilities like library facilities, sports and recreational facilities, hostel facilities etc are inadequate in the town.

11.1.6 CONCLUSION

The town has high literacy rate and Educational standard. More number of students are studying in Government or Aided schools when compared with unaided schools. Majority of students are following state syllabus. Infrastructural facilities in most of the schools are satisfactory. Even though there are no professional colleges in Aluva, nearby local bodies meet the demand of Aluva town in this respect.

11.2 HEALTH

11.2.1 Introduction

A healthy population forms the back bone of a developing economy. For the well being of the community, easy accesses as well as efficient functioning of medical facilities are highly essential.

In this chapter, the existing systems of medicines and the institutions in three systems of medicine ie. Allopathic, Ayurvedic and Homeopathic, functioning in the town are discussed. The existing status of medical facilities and spatial distribution of medical facilities, also discussed.

11.2.2 Allopathic System of Medicine

More than 80000 people within Aluva municipal area, from surrounding LSGs and people from the outskirts of Thrissur district also depend hospitals (both govt. hospital and private hospital) in Aluva town for medical purposes. List of hospitals in allopathic system of medicine functioning in the town is given in **table 11.7.**

The institutions in allopathic system are functioning both in government and private sector. The Aluva Taluk hospital, now upgraded as the District hospital and the ESI dispensary is the major medical institution in Government sector functioning in the town. All other medical institutions are in private sector. List of hospitals in allopathic system of medicine functioning in the town and a comparison of hospitals in government and private sector is given in **table 11.7.** Accordingly 74% of beds are in private sector and only 26 % of beds are in government sector.

The District hospital serves nearly 24000 people belonging to Aluva municipality and adjacent local bodies viz. Choornikkara , Karumallor , Kodungallor , Kunnukara , Alangad ,Chengamanad , Keezhmad .

Orthopedics, Dermatology, Respiratory Infection, Causality Unit, Dental Unit, General Medicine, Surgery, Gynecology, Anesthesia, Pediatrics, Ophthalmology, and ENT are the major departments presently functioning in the District hospital. Total bed strength of the

District hospital is 210 and 12 doctors are serving here. There are 8 private hospitals with total bed strength of 585 and 85 doctors working in these hospitals. The total bed strength in allopathic and Ayurvedic hospitals is 915 which is more than the UDPFI standards (2.5 lakhs population capacity: 500 beds).

In addition to the ESI dispensary there are 21 clinics with O.P facility only. Number of hospitals with more than one operation theatre is 7. There are no referral hospitals or super specialty hospitals in Aluva town area.

The list of hospitals and clinics and available facilities like number of beds, number of doctors, departments etc are given in **table 11.8.**

Table: 11.7 Details of Allopathic Hospitals

Sl:No	Hospitals	No. of beds	No.of Doctors	Govt./private
1	Taluk Hospital	210	12	Govt.
2	ArogyalayamHospital	110	5	private
3	KMK Hospital	40	7	private
4	Najath Hospital	60	7	private
5	Anwar memorial Hospital	110	18	private
6	Lakshmi hospital	50	16	private
7	Karothukuzhi Hospital	95	21	private
8	CKP's Hospital	20	6	private
9	Lakshmi Nursing Home	100	5	private

Source: Local Body, DMO-2010

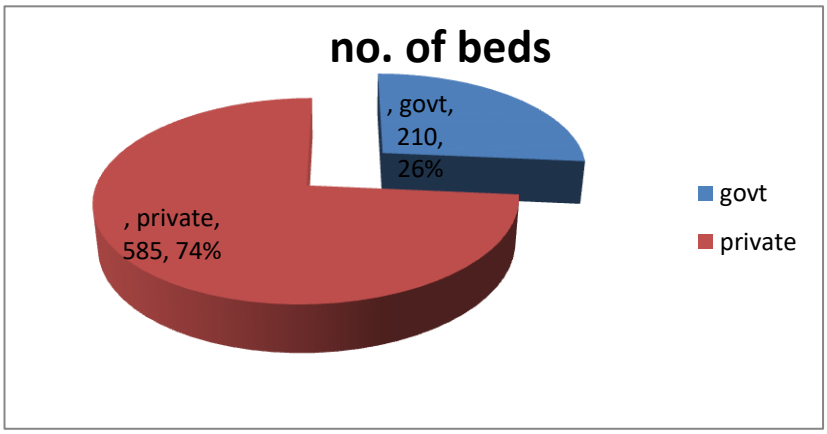

Fig:11.9 Bed strength of govt. and private hospitals

Table: 11.8 Allopathic system of medicine – Availability of facilities

Sl. No	Name of Hospital	Location / ward	Category*	Number of beds	Number of Doctors	Govt./ Private/ Cooperative society
1	Arogyalayam	7	4	110	5	Private
2	KMK Hospital	7	4	40	7	Private
3	Najath Hospital	6	4	60	7	Private
4	Anwar Memorial Hospital	6	4	110	18	Private
5	Laksmi Nursing Home	7	3	100	5	Private
6	Lakshmi Hospital	12	4	50	16	Private
7	Karothukuzhy Hospital	17	4	95	21	Private
8	Taluk Hospital	19	3	210	12	Govt.
9	Janatha Clinic	17	1	0	1	Private
10	Surya Clinic	21	1	0	1	Private

11	ESI Dispensary No.1	12	1	0	1	Govt.
12	CKP's Hospital	20	4	20	6	Private
13	Dr.Jogi Cherian Dental clinic	19	1	0	1	Private
14	Dr.Umman's Dental clinic	7	1	0	1	Private
15	Mamman's Dental clinic	17	1	0	1	Private
16	Moidheen Eye clinic	13	1	0	1	Private
17	NK Hospital	11	1	0	1	Private
18	PJ Dental clinic	11	1	0	1	Private
19	Skin Clinic	12	1	0	1	Private
20	St.John Dental clinic	12	1	0	1	Private
21	Suresh Hospital	14	2	0	1	Private
22	Surya Clinic	20	1	0	1	Private
23	Vithayathil Dental clinic	12	1	0	1	Private
24	Dental clinic	10	1	0	1	Private
25	Anil Dental clinic	12	1	0	1	Private
26	Fathima Dental clinic	12	1	0	1	Private
27	Dental clinic	17	1	0	1	Private
28	Dental clinic	19	1	0	1	Private
29	Mazhuvancheril Dental clinic	19	1	0	1	Private
30	Dental clinic	19	1	0	1	Private

31	Dental clinic	21	1	0	1	Private

Source: Local Body, DMO-2010

*Category (Allopathic)

Category 1 – Clinics only OP
Category 2– Hospitals with 24 hrs service
Category 3 – Hospitals with single Operation theatre [Specify no. of operation theaters and category i.e. major/minor]
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)

11.2.3 Indian System of Medicine

In Ayurvedic system of medicine there are three hospitals of which one is functioning in Govt. sector with bed strength of 20 and services of three doctors are available there. The two private ayurvedic hospitals functioning in Aluva town has total bed strength of 100 with the service of seven doctors. Population / Bed ratio is 187:1. There are 15 Ayurvedic dispensaries and two clinics functioning in different parts of Aluva town. All dispensaries and clinics are in private sector. Details of institutions in Ayurvedic system of medicine is given in **table 11.9.**

These facilities are sufficient to meet the requirements of present population. To meet the future demand more facilities are to be made available and at the same time facilities should be affordable to common man. Even though surrounding local bodies have Ayurvedic dispensaries, more people depend on the district Ayurveda hospital for Ayurveda treatment .

Table: 11.9 Ayurvedic system of medicine – Details of institutions.

Sl.No	Name of Hospital	Location/ Ward	Category	Number of beds	Number of Doctors	Govt./Private/ Cooperative society
1	Kerala Ayurveda Pharmacy Ltd	8	Hospital	40	4	Private
2	Ayurvaid	6	Hospital	60	3	Private
3	Govt. Ayurvedic Hospital	12	Hospital	20	3	Govt.
4	Ajantha pharmacy	Bank Jn.	Dispensary	0	1	Private
5	Aryavaidya Pharmacy	Market	Dispensary	0	1	Private
6	Kottakkal Aryavaidyasala	Bank Jn.	Dispensary	0	1	Private
7	ETM Vaidyasala	Market	Dispensary	0	1	Private
8	Metro Chikilsalayam	Market	Dispensary	0	1	Private
9	Nagarjuna Pvt. Ltd.	Railway station Rd.	Dispensary	0	1	Private
10	SD Pharmacy	Bank Jn	Dispensary	0	1	Private
11	Sajeeva Pharmacy	Bank Jn	Dispensary	0	1	Private
12	Thoppil Vaidyasala	Railway station Rd.	Dispensary	0	1	Private
13	Vaidyaratnam Oushadhasala	Bank Jn.	Dispensary	0	1	Private
14	Sarathy Ayurveda clinic	7	Dispensary	0	1	Private
15	Arya Pharmacy	8	Dispensary	0	1	Private

16	Health Spa	PO Jn.	Dispensary	0	1	Private
17	Karippayi	KSRTC Stand	Dispensary	0	1	Private
18	Birla kerala vaidyasala	18	Dispensary	0	1	Private
19	Ayurveda Clinic	18	Clinic	0	1	Private
20	Ayurveda Clinic	21	Clinic	0	1	Private

Source: Local Body, DMO-2010

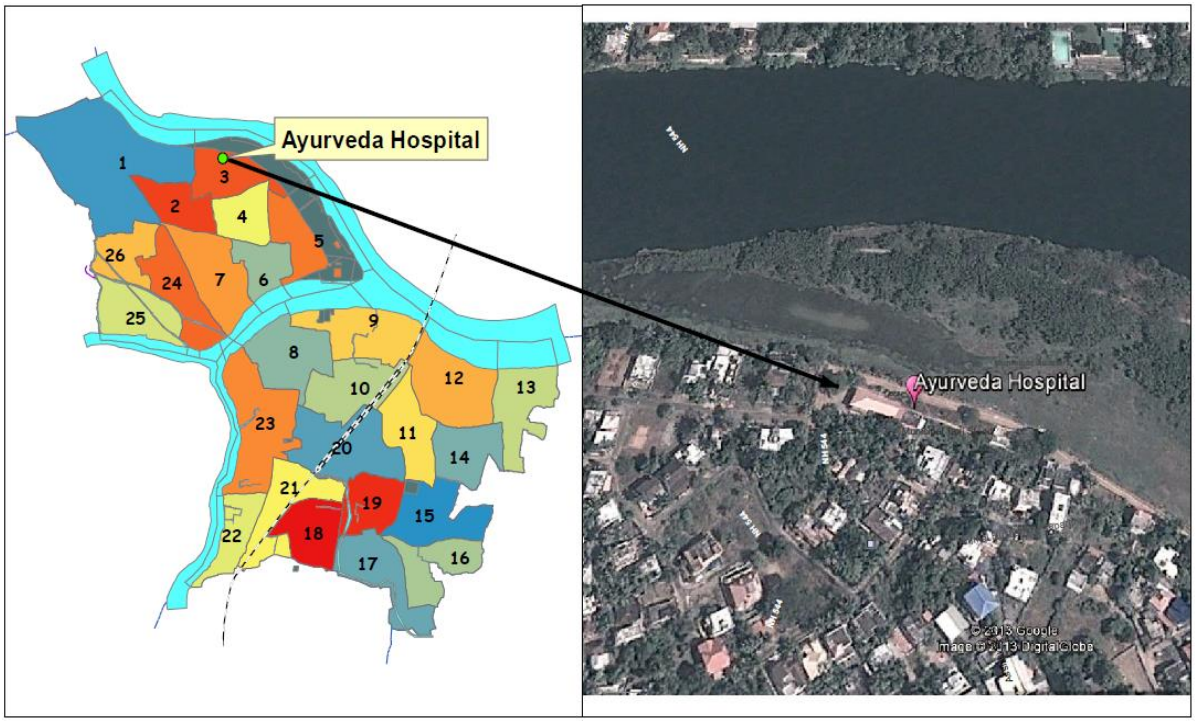

Fig:11.10 Ayurveda hospital at Aluva

11.2.4 Homoeopathic System of Medicine

In Homoeopathic system of medicine 9 dispensaries are functioning at different parts of the town. Details given in **table 11.10**.

Table: 11.10 Homeopathic system of medicine – Details of institutions.

Sl. No	Name of Hospital	Location /Ward	Category	Number of beds	Number of Doctors	Facilities for trauma care	Govt./ Private/ Cooperative society
1	Homeo Medical Hall	7	Dispensary	0	1	nil	Private
2	Jaya Homeo Clinic	6	Dispensary	0	1	nil	Private
3	St. George Homeo Clinic	12	Dispensary	0	1	nil	Private
4	Santhakumari Homeo Clinic	10	Dispensary	0	1	nil	Private
5	Elanjikal Homeo Clinic	9	Dispensary	0	1	nil	Private
6	Samagra Homeo Dispensary	6	Dispensary	0	1	nil	Private
7	Curewell Homeo Clinic	11	Dispensary	0	1	nil	Private
8	Homeo Clinic	8	Dispensary	0	1	Nil	Private
9	Homeo Clinic	8	Dispensary	0	1	nil	Private

Source: Local Body, DMO-2010

11.2.5 Spatial Distribution of Medical Facilities

Distances to a medical facility or hospital have been assessed in the Socio- Economic Survey conducted in 2010. It is found that the average distance to a medical facility is 1.44 Km .

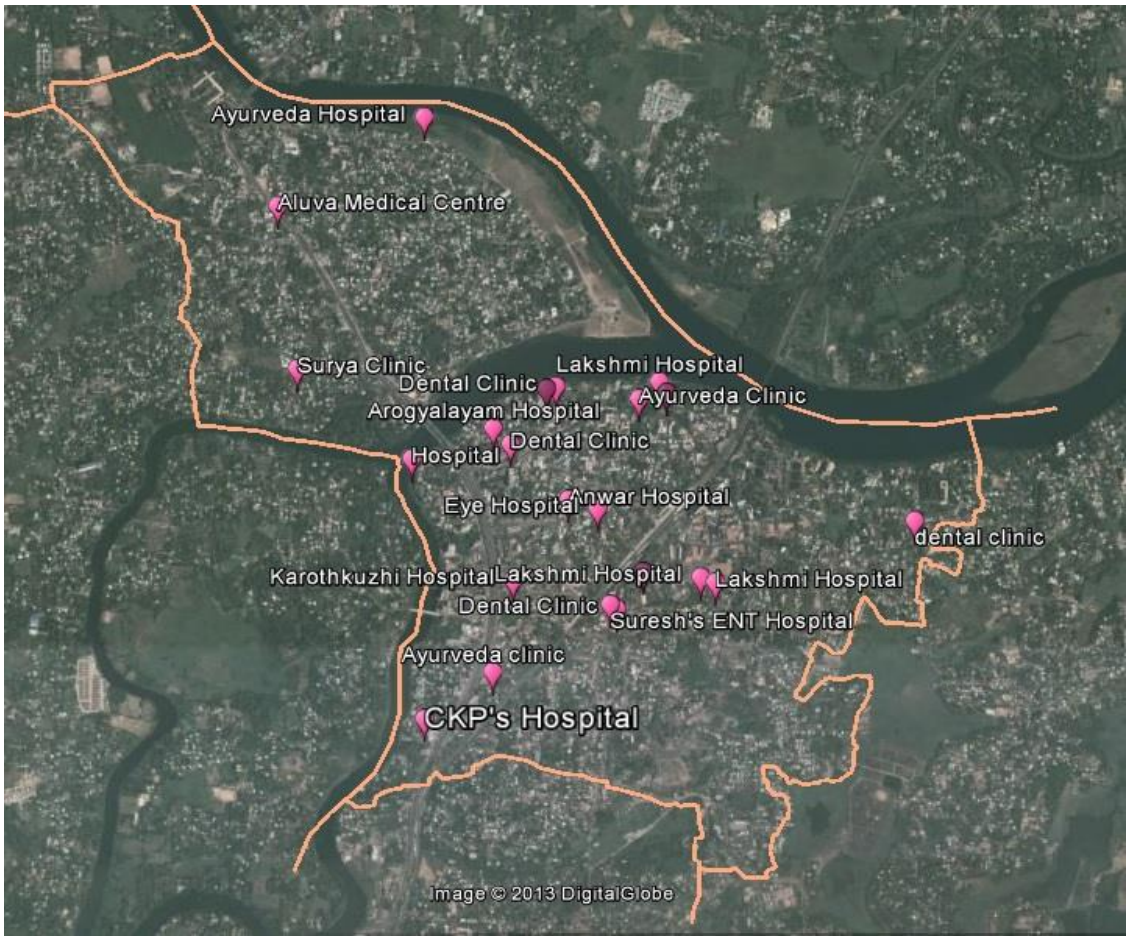

Fig:11.11 Spatial Distribution of Medical Facilities at Aluva

11.2.6 Major Diseases

Major diseases reported in the town area as per the records of the local body is given in **table 11.11**. Diarrhea, Dysentery, Pneumonia, Tuberculosis, Chickenpox etc. are the major diseases reported.

Table: 11.11 Incidences of Epidemics

Name of the disease	Number of person affected	% of Curing	Prominent location
Filaria	11	100	Aluva Municipal area
Tuberculosis	153	100	Aluva Municipal area
Water Diarrhea	401	100	Aluva Municipal area

Chickenpox	173	100	Aluva Municipal area
Viral Hepatitis E	21	100	Aluva Municipal area
Dysentery	65	100	Aluva Municipal area
Typhoid	75	100	Aluva Municipal area
Pneumonia	146	100	Aluva Municipal area
Measles	78	100	Aluva Municipal area.
Viral Hepatitis A	22	100	Aluva Municipal area
Leptospirosis	21	100	Aluva Municipal area
Viral Hepatitis B	23	100	Aluva Municipal area
Swine Flu	6	100	Aluva Municipal area

Source: Local enquiry, DMO-2010

However the data is related to the town as well as the service region.

11.2.7 CONCLUSION

Aluva District hospital is the major medical institution in the town in terms of number of patients and number of beds and is in the government sector. In addition to this, hospitals in private sector also provide necessary medical facilities. Cumulative bed strength available in the hospitals of the town is sufficient as per standards. In Homeopathic system of medicine, hospitals with IP facilities have to be established. In Aluva there is no super specialty hospital or hospital with advanced facilities like C.T. scan, EEG etc. and health facilities have to be improved.

12. RECREATIONAL FACILITIES AND CIVIC AMENITIES

12.1 INTRODUCTION

The "need to do something for recreation" is an essential element of human biology and psychology. Recreational activities are often done for enjoyment, amusement, or pleasure and are considered to be fun and it is an essential part of human life. Recreational activities can be communal or solitary, active or passive, outdoors or indoors, healthy or harmful, and useful for society or otherwise. Public space such as parks and open spaces are essential venues for many recreational activities. In this chapter, the availability and present condition of recreational facilities of the town, facilities for sports, religious and cultural activities of the town etc. are discussed.

12.2 RECREATIONAL FACILITIES

The total land coming under park and open space in the town include park, playground, Aluva manappuram etc. and it is 48.42 hectares which is 7.50% of total town area. Approximately 23 ha of park and open space belong to Aluva manappuram. All the parks in Aluva are in the southern part of the town. The municipal park is in ward 9 of the town facing Periyar. There is a small municipal play ground near the market road.



Fig: 12.1 Aluva Siva Temple

12.2.1 ALUVA MANAPPURAM

Aluva Sivarathri is one of the most popular and spectacular festival of Kerala, which attracts thousands of people from all over the country. In addition to the observance of Sivarathri rites and sacrifice to the ancestors, people belonging to all classes, castes and creeds assemble for this festival. Daily fairs are organized for a month commencing from the sivarathry day in every year. Sivarathry manappuram plays an important role as a place of recreation in Aluva. Location map of Aluva manappuram shown in **figure 12.4**



Fig: 12.2 Aluva Sivarathri



Fig: 12.3 Aluva Manappuram

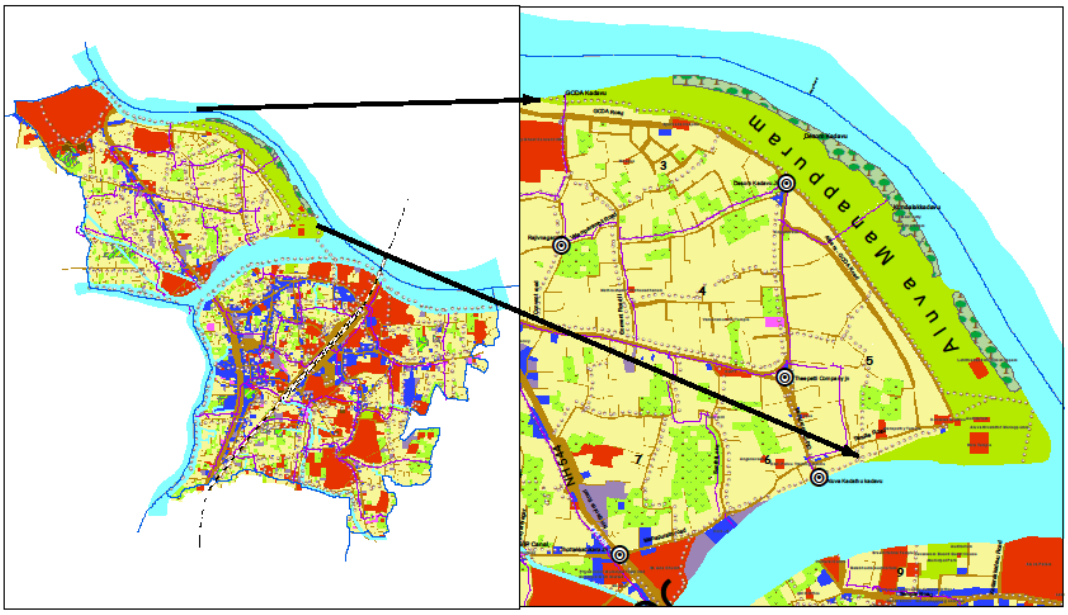

Fig: 12.4 Location map – Aluva manappuram

12.2.2 ALUVA SIVARATRI FESTIVAL FAIR

On Sivaratri day, people assemble at a Siva temple on a sandy expanse. This sandy expanse (which is not a proper beach) is on the banks of river Periyar across the town of Aluva in mid-Kerala. Every year many devotees come to Aluva manappuram to perform the holy rituals in the name of lord Shiva and keep awake the whole night to keep company with Lord Siva who had consumed the poison of a huge snake that could have destroyed the whole earth. The poison could have killed the Lord if he had slept. So he had to be kept awake and devotee keep him company in this task. Devotees perform some rituals for the welfare of their dead ancestors and bathe in the river. For most visitors, however the attraction is the fair that comes up on the sands during this festival.





A fair is organised by the tourist department which is called “Aluva Sivarathri Fair”. The Aluva sivarathri festival celebrated at manappuram (land with sand) on the banks of Periyar river, attracts lakhs of tourists/pilgrims to the town. Approximately 4.5 to 5 lakhs tourists / pilgrims are visited Aluva sivarathri manappuram per year.

The sheds or stalls are made up of bamboos and coconut leaves on which traditional and rare household items are on display, kitchen utensils and cutting tools. The modern Kerala get to know the ancient usage items and its uniqueness. Sleeping mats are sold which are made of rare plants and bushes,mats for various purposes. The special and





ancient door mats are made of fibers of rare plants and shrubs. Hand fan are available which is actually scented,people used to use in early times. In this fair the different dance and folk songs are organised by the locals. The tourists can come here to relish the importance of festival in the mind of all incredible Indians.

The "Harithavanam project" has been proposed by District Tourism Promotion Council (DTPC) to enhance the basic infrastructure of Aluva Manappuram. The project proposal consists of construction of amphi theatre, office counter, toilet block, development of park, walkway, seating area, boat jetty etc.

12.3 INDOOR RECREATION FACILITIES:

The major indoor recreation facility available for the town population is the cinema theatres. There are four cinema theatres in the town with a total seating capacity of 2812. All of them are located on the southern half of the town. There are no open air theatres in the town. **Table 12.1** lists the recreational open spaces/ Recreational facilities in Aluva town.

Table: 12.1 Recreational open spaces/ Recreational facilities

Sl. No	Facilities	Name	Location/ ward	Extent*(Sq.km for recreational areas)*/ Seating Capacity *(Nos. for halls/theatres)*
1	Park	Chacha Nehru Park	6	0.0030
2	Open (Play) grounds	Municipal Recreation Ground	13	0.0071
3	Community Hall / Town Hall	1. Mahatma Town Hall	9	1500
		2. Priyadarshini Town Hall	5	750
		3. Community Hall	13	100
		4. Cultural Centre	6	100

		5. Namboorimadam Auditorium	1	750
		6. U C College Auditorium	1	700
		7. Snehapuram Church Auditorium	1	600
		8. Little Flower Auditorium	13	1000
		9. IMA hall	12	275
		10. Sree Balabhadra Auditorium	6	450
		11. Adwaitasramam Auditorium	6	200
		12. FBOA Hall	19	200
		13. Tass Hall	7	700
		14. FBEU Hall	7	100
		15. GSBY Samajam Hall	17	300
		16. YMCA hall	13	300
4	Art Galleries	1. Comu & Sons Art Gallery	5	-
5	Public libraries	1. Kuttippuzha Krishnapillai Memorial Municipal Library	8	0.0022
6	Cinema Halls	1. Matha & Madurya Theatres	11	1035 & 453
		2. Zeenath Theatre	11	764
		3. Casino Theatre	11	560

Source: Local Body

12.4 TOWN HALLS AND AUDITORIUMS

There are two Municipal Town Halls in in the town, viz. the Mahatma Town Hall in ward 9 (near post office) and the Priyadarshini Town Hall in ward 5 along the side of N.H.544. There is one community hall in ward 13 and one cultural centre in ward 6. In addition to this, there are 12 large, medium and small auditoriums or community halls, in the town.



Fig: 12.5 Mahatma Gandhi municipal town Hall

12.5 LIBRARIES AND READING ROOMS

There is one municipal library functioning in the town.

12.6 STADIUM/ GROUNDS

Two parcels of land of area 0.82 ha were proposed for parks and open space in DTP scheme for Kottarakadavu vicinity area Aluva, one at the west side of Sree Krishna temple and other near the devaswam board guest house. Among these the park near the devasom board guest house has been developed by the Municipality.

There are no stadiums in the town. The Municipal play ground is the only facility in the town for sports activities. On account of Sivarathri, a month long fair is being conducted in manappuram, well participated by people from all over the state. Facilities like open air theatres or swimming pools are also not available in the town. Play grounds are available with most of the schools in the town.

12.7 OTHER CIVIC AMENITIES

At present Aluva town does not have a public burial or cremation ground. Religious institutions like churches, mosques etc, and SNDP are having burial grounds. Since most of the

people own large residential plots till date demand for public burial/cremation ground has not emerged as an immediate necessity. **Table 12.2** shows the details of other civic amenities in Aluva.

Table: 12.2 details of civic amenities

Sl No	Facilities	Name / numbers	Location/ ward	Extent/ capacity/ service area
1	Petrol pumps	Hindustan Petroleum	9	39000 ltr
		Hindustan Petroleum	5	28000 ltr
		Hindustan Petroleum	7	60000 ltr
		Bharath Petroleum	17	20000 ltr
2	LPG godown	Bindu Gas Agencies	3	8000 kg
3	Crematorium / Burial Ground	SNDP Cremation ground	10	0.0008
		SNDP Cremation ground	1	0.0008
		Kerala Pulaya Maha Sabha	1	0.0004
		Muslim Cremation ground	1	0.0032
		Muslim Cremation ground	3	0.004
		Syrian Christian Cremation ground	1	0.0032
		Latin Christian Cremation ground	1	0.002
		Jacobite Christian Cremation ground	1	0.0024
		CSI Church Cremation ground	1	0.0028
4	Fire Station	Fire and Rescue Station	19	0.0024
5	Police Station	SP Office(Rural)	14	0.00208
		Traffic Police Station, Circle office, Women's Police Station	13	0.004046
		Police Station	13	0.001640
		DYSP Office	13	0.0092

Source: Local Body

12.8 RELIGION, CULTURE

Many shrines dot the town landscape for believers from every religion. These include famous Hindu temples such as Narasimha Swamy Temple (Kadungalloor), Siva Temple, Sri Krishna temple; famous Christian churches and seminaries like St. Antony's Monastery, St. Dominic's Church, Catholic Mangalapuzha Seminary; Mosques like Aluva Central Juma Masjid, Settu Masjid, and Mujahid Masjid. Aluva Sivarathri is one of the most famous festivals of Kerala and in connection with that fares are also conducted.

12.9 CONCLUSION

The Town has picturesque river banks, for those interested in outdoor activities. Being a regional centre the recreational facility in the town has to be improved considering the people of the town and its influence area. A stadium and swimming pool for sports are also needed. Small grounds at neighborhood level are also needed.

13. SOCIAL WELFARE AND SECURITY

13.1 INTRODUCTION

The analysis of the present status of weaker sections of the society namely women, children, old aged people and scheduled cast people are done in this chapter. The safety aspects of the town are also discussed in the chapter.

13.2 WOMEN

As per 2011 census, out of total population of 22428, the number of females in the town is 11397, which is 50.82% of total population. It is shown in **figure. 13.1**. No institution for the welfare of women is functioning in the town. But there are two working women's hostels functioning in the town.

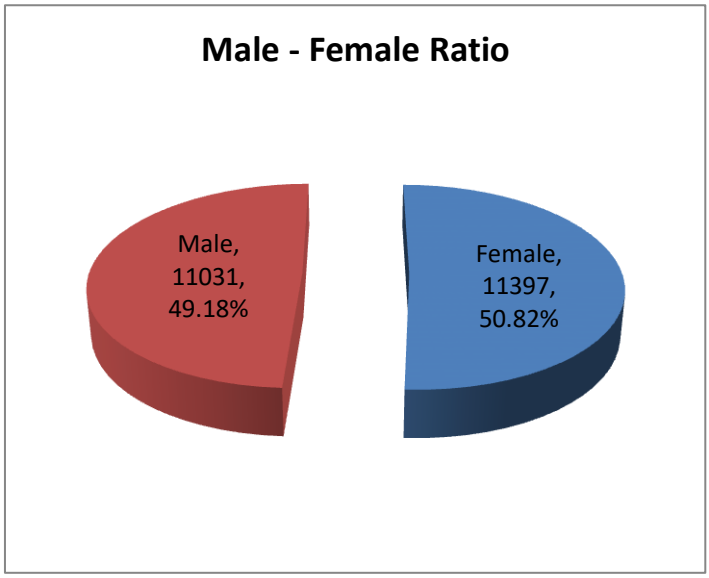

Fig: 13.1 male –female ratio of population

In the local level analysis the major proposals suggested in this sector includes, programme for self employment of women like SSI units under Kudumbasreee, ensure the safety of women, starting of old age homes etc. Women work force participation rate in Aluva town as per census is 16.14%.

13.3 CHILD DEVELOPMENT

Population in the age group of 0 to 15 is considered child group. As per 2011 census, 8.18% male population and 8.01% of female population are in the child group. Anganawadies are the grass root level delivery point of social welfare activities. 20 anganawadies are functioning in the municipality and out of these, 9 are functioning in their own buildings, 10 are functioning in rented buildings and one anganwadi is functioning in municipal building. New buildings are to be constructed for those anganawadies functioning in rental buildings. Water connection is available for all anganwadies except two and electricity is available for 19 anganwadies. In one anganawadi there is no electricity. Also the standard of facilities of anganawadies has to be improved.

13.4 AGED PEOPLE

The people above 60 years are considered as the old age people. As per the socio-economic survey 2010, 14.82% of male population and 13.17% of female population is coming under this group. At present no old age homes or other facilities required for aged people are available in the town. In the local level analysis major suggestions related to this sector received are for establishing old age homes and providing necessary medical facilities for aged people.

13.5 S.C/ S.T DEVELOPMENT

The scheduled caste population of Aluva town as per 2011 census is 835(male-395, female-440 and it is 3.72% of total population. The total number of scheduled tribe population in the town is only 90(38 males and 52 female) and it is 0.40% of total population. This is shown in **figure 13.2**. There are no institutions for scheduled caste in the town. In the local analysis, the major suggestions related to this sector were for improvement of housing condition, improvement of infrastructural facilities of S.C Colonies and programmes.

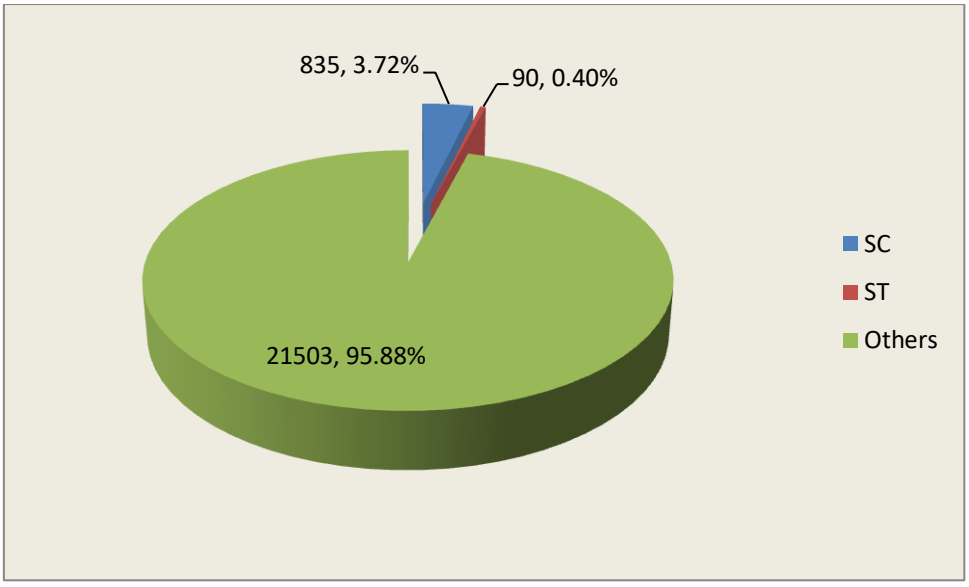

Fig: 13.2 Population of scheduled caste, scheduled tribe and others

Population, number of workers and WFPR of scheduled castes and scheduled tribes in Aluva is shown in **table 13.1**. (2011 census data of number of workers and WFPR are not available). WFPR of Aluva town is 32.31%. WFPR of SC/ST in Aluva is greater than that of the WFPR of Aluva town. WFPR of scheduled castes shares 4.61% and scheduled tribes shares 0.22% w.r.to the WFPR of the total population.

Table: 13.1. Population, Workers and WFPR of SC/ST

Caste	Population	Workers	WFPR
SC	967	359	37.13%
ST	37	17	45.95%

Source: Census 2001

Comparison of percentage of SC/ST population with other municipalities is shown in **table 13.2** and **figure 13.3** & **13.4.** WFPR of scheduled castes and tribes with that of similar towns is compared in **table 13.3** and **figures 13.5** & **13.6** resp. With respect to WFPR of scheduled castes Aluva stands forth position. Aluva is in second position in the case of WFPR of scheduled tribes.

Table: 13.2 Comparison of percentage of population with similar towns

Towns	Scheduled Caste(%)	Scheduled Tribe(%)
Aluva	3.72	0.4
Angamaly	4.24	0.2
North Paravur	5.01	0.37
Perumbavoor	8.41	0.09
Muvattupuzha	5.22	0.46
Kothamangalam	6.03	0.32
Thrippunithura	9.44	0.24
Kalamassery	7.93	0.54

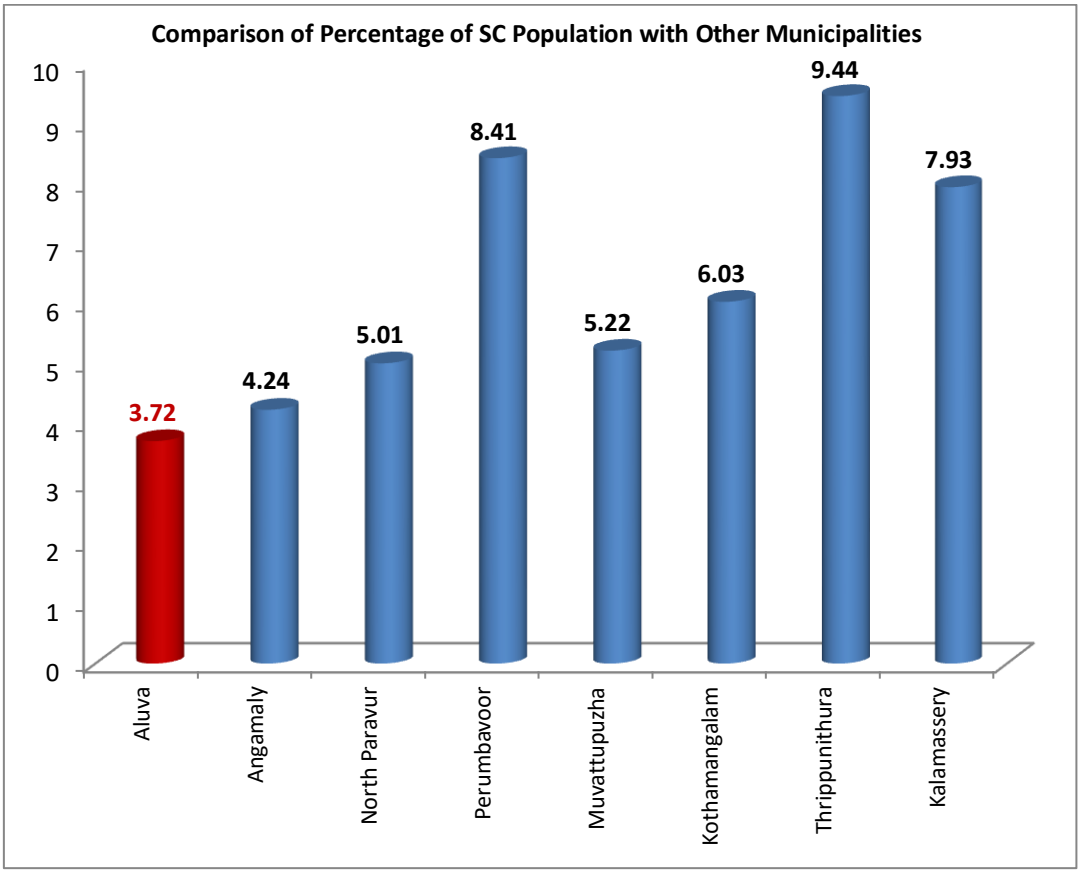

Fig: 13.3 Comparison of percentage of population of Scheduled Castes with similar towns

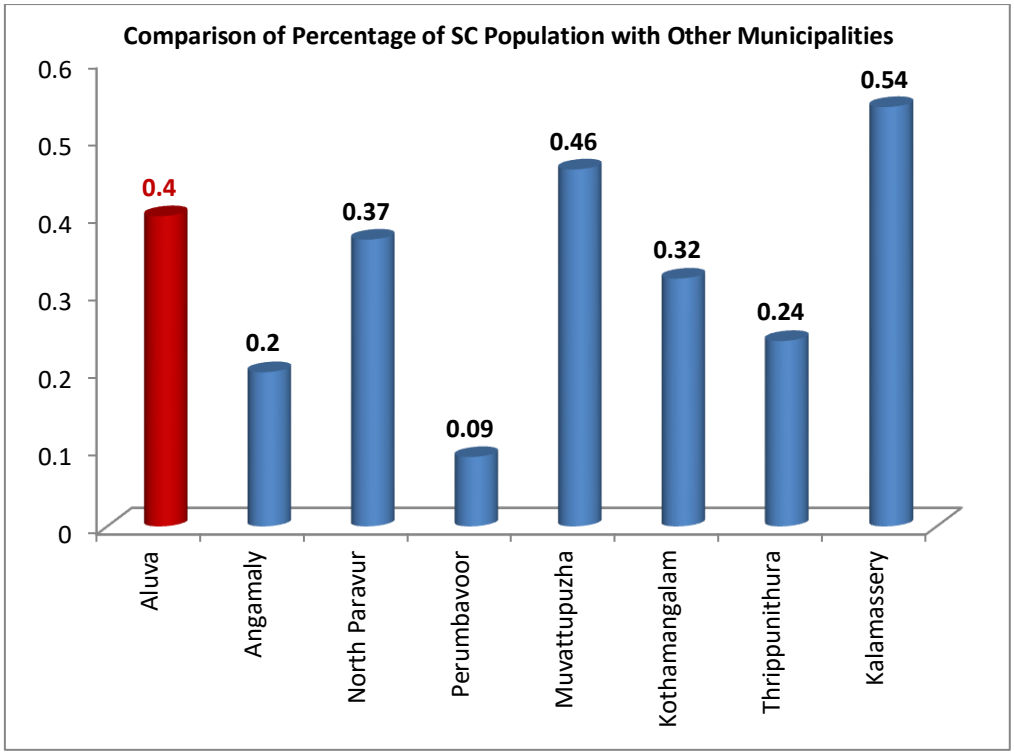

Fig: 13.4 Comparison of percentage of population of Scheduled Tribes with similar towns

Table: 13.3 Comparison of WFPR with similar towns

Towns	Scheduled Caste	Scheduled Tribe
Angamaly	42.16	52.63
Aluva	37.13	45.95
N. Paravur	33.36	31.13
Muvattupuzha	36.54	42.31
Kothamangalam	43.66	28.00
Perumbavoor	41.68	11.11

Source: Census 2001

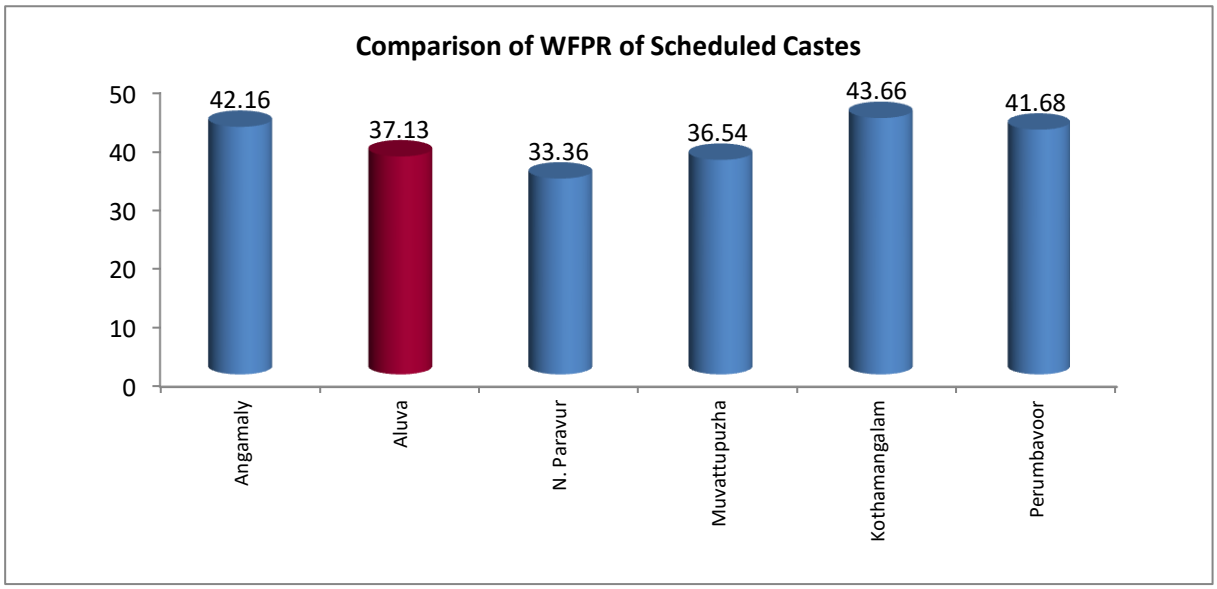

Fig: 13.5 Comparison of WFPR of Scheduled Castes of Aluva town with similar towns

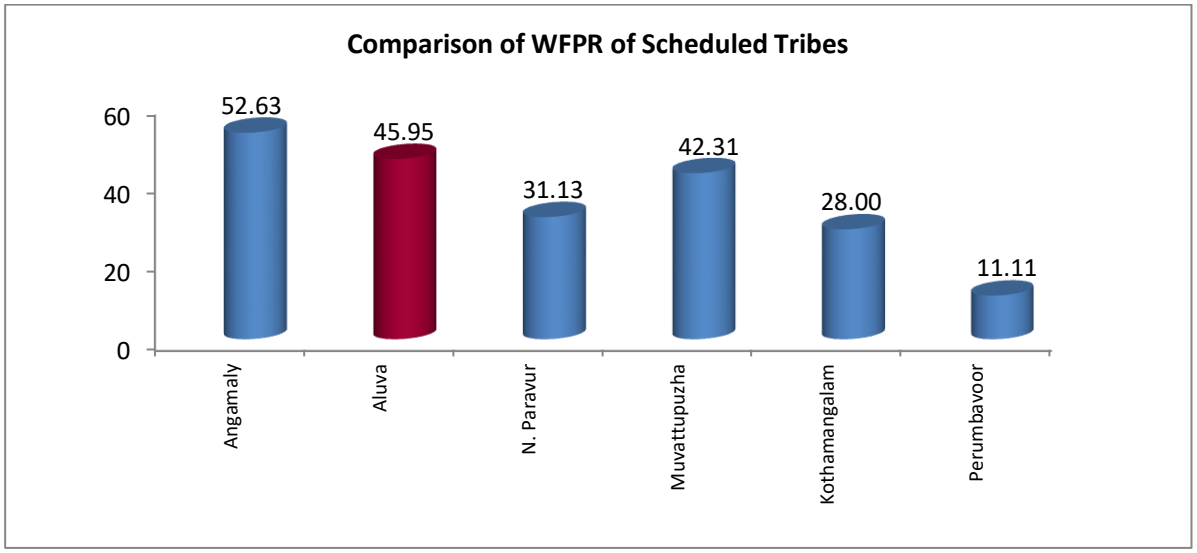

Fig: 13.6 Comparison of WFPR of scheduled tribes of Aluva town with similar towns

The housing schemes for general and SC /ST are EMS (2009 onwards), IHSDP – (2008 onwards) and VAMBAY (2002-03 onwards).

13.6 BELOW POVERTY LINE FAMILIES (BPL)

There are 743 BPL families in Aluva municipality. 13.17% of the total families of Aluva is below poverty line includes SC/ST also. Ward wise details of BPL families in Aluva municipality in the year 2009 is shown in **table 13.4.**

Table: 13.4 Ward wise details of BPL families

Ward No.	Name of ward	No. of BPL families
1	Mangalappuzha Seminary	28
2	Ayurveda Hospital	69
3	Mana	18
4	Manappuram	27
5	St. Johns Church	14
6	Taluk Office	8
7	Palace	18
8	Aashramam	14
9	Municipal Office	30
10	Madrassa	40
11	Aasan Colony	14
12	Oommenkuzhythadam	56
13	Treasury	21
14	Snehaalayam	51
15	Power house	98
16	Thrikkunnathu	43
17	Nazrath	42
18	Sastha Temple	20

19	Municipal Bus stand	20
20	Market	11
21	Priyadarshini	44
22	Thandikkal	25
23	Snehapuram	32
	Total	**743**

Source : Aluva municipality 2009

13.7 SECURITY

Office of the Superintendent of Police,(rural), Office of Circle Inspector of Police and DYSP Office are functioning in Aluva. Traffic Police Station and Women Police Station are also functioning in the town. Aluva Police Station, Circle Office, DYSP Office, Women's Police Station, Traffic Police Station are functioning in the same ward. There is a sub-jail functioning in the town.

13.8 FIRE AND SAFETY

The main objective of the fire and rescue service is to protect the people and their properties from fire and other calamities, which include both natural and incidental. Office of the fire and rescue service is functioning in Aluva in ward 19.

13.9 CONCLUSION

As per 2011 census 4.12% of total population of Aluva belongs to SC/ST. For the welfare of weaker section of the town more facilities are to be provided. 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 cast and scheduled tribe people. EMS, IHSDP and VAMBAY are the major programmes for the improvement of housing condition of SC/ST BPL families.

14.TOURISM AND HERITAGE

14.1 HERITAGE

Aluva town has rich historical value as it was the place where Travancore Kingdom was based. Aluva is famous for temples, festivals and its large river banks. Aluva Shivarathri is the main festival of the Aluva Shiva Temple. People belonging to all classes, castes and creeds assemble for this festival. Daily fairs are organized for a month from the Shivarathri day in every year.

As per the Heritage Survey of Ernakulam District conducted by Department of Town & Country Planning, the heritage buildings in Aluva municipality are (1) Aluva Siva Temple & Manappuram, (2) Marthandavarma bridge (3) The St. Joseph Ponthificial Seminary, (4) the Advaidasramam – Aluva and (5) the Aluva Palace.

a) Aluva Siva Temple & Manappuram

The reputation of Aluva is spread outside due to the celebration of 'Sivarathri Maholsava' in Kumbhom every year. It is similar to that of 'Kumbhamela' in Prayag. This festival is celebrated as a remembrance for the Lord Siva. Lakhs of people from various parts of the country visit the town for the celebration of 'Sivarathri Maholsava'. Thus Aluva became a pilgrim centre of North Indians and Aluva is regarded as 'South Kasi'.



Fig: 14.1 Sivarathri Mahotsav

During Sivarathri, thousands of devotees offer sacrifice to their ancestors in the morning succeeding the holy night and tourists gather to perform and witness the Hindu rituals and prayers. Fairs are conducted in accordance with the festival where lots of stalls are set up for shopping, exhibitions,


Fig: 14.2 Siva

adventure rides for children and adults and lot more. This will remain for two weeks after the offerings of Bali. Since ages, people have been gathering here to enjoy the fairs irrespective of their religion which has helped to instill communal harmony.

b) Marthanda Varma Bridge

Marthanda Varma Bridge as the name indicates is built by the great Travancore king Marthanda Varma Ilayaraja who is regarded as the founder of modern Travancore. To promote trade and business between nearby Kingdoms, the bridge was constructed during the period of 1940-42. The Marthanda Varma Bridge is known as the lifeline of the inhabitants of Aluva since then. The bridge is strategically built above the river Periyar offering the tourists a panoramic view of the city.



Fig: 14.3 Marthanda Varma Bridge

The bridge which has 5.5 carriage way was regarded as one of the most important landmarks of Aluva. Since the bridge can't meet the modern day heavy traffic needs, a similar bridge was built parallel to the original one. The new bridge was opened to the public in June 2002, and it reflects the industrial growth of Aluva.

c) St. Joseph Ponthificial Seminary



Fig: 14.4 St.Joseph Ponthificial Seminary



Fig: 14.5 St.Joseph Ponthificial Seminary

Located in Sy. No.2 of Aluva West village, the seminary is at a distance of at 1km from seminarypady junction on Aluva – Paravoor road. It is the Ist Christian Seminary where largest number of brothers studying in South India. It was shifted from Varapuzha to Puthenpally in 1886. But due to increasing number of students and the limitation of available space, it was shifted to Aluva in 1932. A church was constructed in connection with this Seminary in 'Gothic' style by the Karmalita Spanish priests in 1951. It is a beautiful church. Due to the increase in the number of students, the Seminary was shifted in 1954 to Karumallur gramapanchayat. It was provided to Latin Reeth in 1997-98. Western style can be seen in the buildings here.

d) Aluva Advaidasramam

It is located in Sy. No.1 of Aluva West village on the bank of river Periyar and on the side of Palace road . Aluva Advaita Ashram founded in 1913 by Sree Narayana Guru in order to preach, propagate as well as live the Advaita philosophy. Here he also established a Sanskrit school to restore the sanctity of the language through which universal spiritual teachings can be grasped and imparted to dedicated disciples.



Fig: 14.6 Aluva Advaidasramam

In 1921, Narayana Guru presided over the annual meeting of the All Kerala Association of Brotherhood, held at Ashram. It was here that he proclaimed the message that, whatever the differences in man's creed, dress, language etc., ie, all of the mankind is of the same creator and there is no harm in dining together or having marital relations with one another. Gurudev departed to Aluva along with his disciples after Saradha Prathishta. He selected this location in 1912, and constructed the Asram in 1914. Personal belongings of the Guru like walking stick, easy chair and dishes, are preserved here now. The 'Shashti poorthi' of Guru (attaining the age of 60 years) was celebrated in the Asram. Asia's first all religious conference was held here in 1924.

e) Aluva Palace (Alwaye Palace)



Fig: 14.7 Aluva Palace

The Aluva Palace is located on the banks of river Periyar, at Sy. No. 20 of Aluva West village. Before Indian independence, Aluva was part of the Kingdom of Travancore and was the official summer palace of the royal family. This building with typical style of Kerala Architecture is now used as guesthouse under tourism department. The Alwaye Palace, is a glorious monument which is a reminiscent of the splendor and heritage of the ancient past of Kerala. The Palace has seen a long past, which was full of events that changed the face of Kerala.

14.2 TOURIST ATTRACTIONS IN AND AROUND ALUVA

The main tourist places in and around Aluva municipality are Aluva Sivarathri manappuram, Aluva Palace, Periyar River, Aluva Municipal Park, Sivagiri Advaidasramam, Thiruvairanikkulam Sree Mahadeva Temple in Sreemoolanagaram grama panchayat and Uliyannoor mahadeva Temple in Kadungalloor Grama Panchayat.

Details related to Aluva Sivarathri and manappuram, Aluva Palace and Sivagiri Advaidasramam are already discussed in the previous paragraphs. Regarding other tourist attractions like Periyar River, Aluva Municipal Park, Thiruvairanikkulam Sree Mahadeva Temple and Uliyannoor Mahadeva Temple, details are given hereunder:

1) Periyar River

Periyar, the second largest river in the state, is the life line of Aluva town. A trip down the river and its silken-smooth sand banks will be one of the most memorable experiences in anyone's life. The history of Aluva brings to the picture the history of Periyar. The presence of the river has given Aluva one of the most exquisite culture as could be compared to that of any part in Kerala. As it is known, the rivers of Kerala have brought with them the behavioral

and traditional aspects of the population living on their banks. The case is no different here either.

The riverbank has its ornamental look with huge tall coconut palms lending its own charm. The green canopy along the shores fills the mind with happiness. The temples, churches and mosques along the banks of the Periyar give a touch of Aluva's diverse culture and beliefs. The town is also known for its communal harmony and the goodness that comes with it.







Fig: 14.8 River Periyar

2) Union Christian College (U.C. College)

The U.C. College, located in Sy. No. 2 of Aluva West village is on the side of Aluva Paravur road. Almost half portion of U.C. college is located in Aluva municipality and other portion is in Karumalloor grama panchayat. The old Kacheri Malika, which is a beautiful

building in which the Alangad Taluk Kacheri functioned earlier under the Travancore Kingdom and built in a blended style of Indo-European architecture, was handed over by the then Travancore king in 1921 to house the college. Considering its structural and historical importance, this old building was declared as protected monument by the department of archaeology in 1993.

The Union Christian College, Alwaye was founded in 1921 as a Centre of Christian Higher Education and as a venture in inter-denominational cooperation among the four major non-Roman Catholic denominations of South India viz. The Malankara Orthodox Syrian Church, Malankara Jacobite Syrian Church, the Church of South India and the Mar Thoma Syrian Church. The Union Christian College, Aluva (UC College) is one of the prominent educational institutions in in the field of education. So many eminent Indians had their collegiate education in this prestigious Institution.

In 1925 Mahatma Gandhi visited the college and planted a mango tree. The mango sapling is now flourishing in front of the administrative block.

3) Thiruvairanikkulam Sree Mahadeva Temple

Located in Sy. No. 75 / 8 of South Chowara village - about 3kms away from Sreemoolanagaram hospital junction on Aluva - Kalady road - the Thiruvairanikulam Mahadeva Temple is a famous Shiva Parvati temple. The presiding deity is Lord Shiva, who is worshipped as Mahadeva. The Lord faces east



Fig: 14.9 Thiruvairanikkulam Sree Mahadeva Temple

and the separate shrine for Goddess Parvati facing west is also in the same sanctum. The unique feature of Thiruvairanikulam Temple is that the shrine of Lord Shiva is open all round the year; whereas temple of Parvathi is open only for 12 days in a year commencing from the Thiruvathira nakshatram in the Malayalam month of Dhanu (mid December – mid January) - the birthday of Lord Shiva. A grand festival known as Nadathurappu Mahothsavam is

celebrated at the Temple during this period. During this period lakhs of pilgrims visit this temple. Facilities such as toilets, drinking water, parking facilities are provided for pilgrims by temple authorities. Still during Nadathurappu Mahothsavam these facilities are not sufficient.

4) Uliyannoor Sree Mahadeva Temple

Uliyannoor has secured its place in the tourist map of Kerala with the Uliyannoor Sree Mahadeva Temple which is considered to be one of the 108 Sivalayas. It is believed that this Shiva temple was built by Perumthachan, when previous temple of Maadathilappan was destroyed by fire. The ruins of the old structure still remains there and the Sivalinga, in a rare 'Kumkumasila', is still worshipped. Perumthachan was the son of the renowned scholar Vararuchi, who was patronized by King Vikramaditya. The Shiva temple features a uniquely constructed 'Vatta Sreekovil' with the 68 wooden beams of the Sreekovil depicting 64 Arts and 4 Vedas. It is believed that while building the Sreekovil, Perumthachan's son was accidentally killed by the father's chisel. From that day onwards the village came to be known as 'Uliyattooru" which later evolved as "Uliyannoor". Major tourism and heritage locations in and around Aluva town are shown in **figure 14.11.**



Fig: 14.10 Uliyannoor Sree Mahadeva Temple

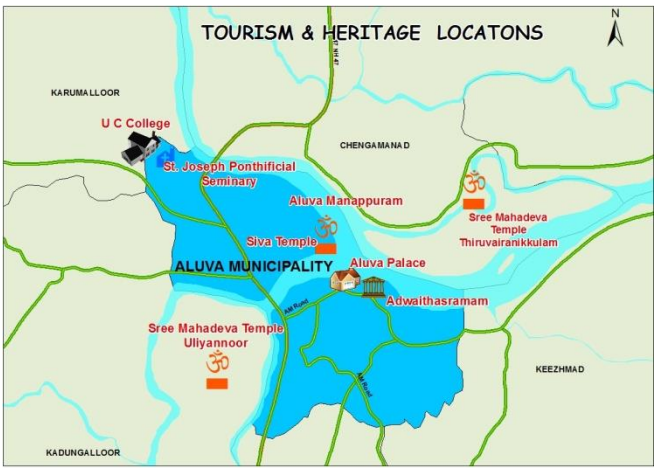

Fig:14.11. Tourism and heritage locations

14.3 CONCLUSION

Eventhough Aluva has a high potential for tourism, it is not utilized much. Thousands of pilgrims and hundreds of tourists visit Aluva. There is inadequacy of tourism related infrastructure in the town. Traffic congestion also affects tourism development in the town. There are no tourist information centers or facility for house boats. There is large scope for water tourism in Aluva and measures are to be taken for the improvement of the same.

15. ENVIRONMENT

15.1 INTRODUCTION

The physical expansion and demographic growth of urban areas have exerted an adverse impact on the urban environment. The conversion of minimum available agricultural land for urban uses like commercial, housing and infrastructure has resulted not only in loss of greenery but in creation of urban heat islands. A large number of trees and water bodies have given way to concrete structures. The major environment issues in the municipality are water logging, water pollution in Periyar and solid waste. Except these issues the town environment is quite satisfactory for comfortable residential settlement with the old shadow trees, greenery, water front and fresh air. Air and noise pollution are also serious issues. Proper planning and awareness to public is needed to keep clean urban environment.

15.2 WATER POLLUTION

The pollution comes from Eloor industrial estate and the domestic wastes are devastating aquatic habitats as well as pose serious health risks. It wrecks ecosystems and livelihoods and is not something to be ignored. Periyar river flows in Aluva for which the town is famous for. The water of the river earlier had medicinal properties and was considered as cure for many skin diseases. But the quality has degraded so much that a dip in the river may invite all sorts of infections. As per the estimate of the Kerala Pollution Control Board, about 67,400 liters of effluents are daily being discharged into the river. These effluents contain highly toxic rare-earth chloride, rare-earth oxide, formic acid, copper sulphate, aluminum ingots, ammonium sulphate and sulphuric acid and are largely generated by 50 large and medium and 2,500 small scale industries in and around the Aluva municipality especially from Eloor industrial estate. Excessive sand mining (43,700 tons/day) has so much deepened the river bed so that saline intrusion is happening.





Fig: 15.1 Pollution in Periyar River

The Periyar basin is highly contaminated with domestic wastes from 41 panchayats, 3 municipalities and Kochi city and it also makes the river a mobile garbage dump yard. Pesticides also find their way into the river through agricultural runoff.

The indiscriminate discharge of hazardous effluents by 250 factories in the Udyogamandal industrial estate in Eloor toxically contaminated the river. The contaminated water from the Periyar flowed upstream triggering a scare that it might get into the drinking water supply through the local pumping station in Eloor as well as in Aluva.

15.3 PADDY FIELDS

The paddy fields, in addition to its agriculture importance, are also acting as a collection basin of rain water and in turn, recharging the ground water resources. The paddy fields are being converted for various urban activities like construction of buildings, roads etc. So the conversion of paddy fields is also an environmental issue.



Fig: 15.2 Paddy Fields

15.4 AIR& NOISE POLLUTION.

The increase in motor vehicular traffic in town has contributed to air pollution which in turn has an adverse effect on the health of the people. The important source of noise pollution

is motor vehicles. Such pollution is experienced during day and night in major roads and junctions like NH 544, Bank jn, A M road, Aluva Paravoor road, Thottakkattukara jn. at Kadungalloor road etc.

15.5 WATER LOGGING

Certain parts of the town such as under flyover, in front KSRTC bus stand and Rail way station experience water logging even though for a limited period due to lack of availability of drains and blocking of natural drains. Measures are required for protection of the remaining paddy fields, natural drains and periodic maintenance of road side drains etc.

Even though, for a limited period, water logging is experiencing in certain part of the town such as under flyover, in front KSRTC bus stand and Rail way station due to lack of availability of drains and blocking of natural drains. Measures are required for protection of the remaining paddy fields, natural drains and periodic maintenance of road side drains etc.

15.6 CONCLUSION

The town is experiencing various environmental issues, in different magnitudes. The major environment issues in the municipality are water logging, water pollution in Periyar and solid waste. Measures should be taken for proper solid waste management. Since Aluva is a growing town, the environmental issues need to be addressed at this stage itself and planned growth of the town also has to be ensured.

16. SUMMARY OF FINDINGS

16.1 INTRODUCTION

The development trend of each sector, its potential and development problems etc. were analyzed based on the studies done on each sector and the peoples development aspirations from the earlier development reports. Regional settings of the settlement, the distribution pattern of activities, population, land use and infrastructure network etc. were also studied in detail in the first part of the report. It also brought out the potentials, deficiencies and barriers which existed in the municipal area. And it also disclosed that the town still has lot of opportunities for development. Summary of findings and the derived conclusions based on the studies and analysis are summarized in this chapter.

16.2 PROFILE OF THE TOWN

Aluva is located at the North-west part of the district and on the side of river Periyar. Aluva town lies in the midland region. Periyar a beautiful river and second largest in the state, is the life line of Aluva. The Latitudinal extension is between 10^0 05' 39" & 10^0 07' 30" North and longitudinal extension is between 76^0 19' 56" & 76^0 21' 55" East. The altitude of the town varies from 4m to 40m above M.S.L. Aluva is well connected to major centers of the state, country and world by road, rail, and water and air ways. Aluva municipality attained municipal status in 1921. As per the 2010 ward re-distribution Aluva consists of 26 wards. This is one of the major collection and distribution centre, catering to the needs of the neighbouring towns and villages.

16.3 ALUVA IN REGIONAL CONTEXT

- Aluva is one of the 11 Municipal towns in Ernakulam district in the state of Kerala. It is located at the North-West part of the district, and on the side of river Periyar. Aluva puzha divides the Aluva main land into two, the north and the south.
- NH 544 (Old NH 47) provides the road connection to other parts of the state. The State Highway, Aluva – Munnar road starts from Aluva and leads to Munnar through Perumbavoor, Kothamangalam and Neriamangalam in the eastern direction
- The Major District Roads, Perumbavoor – Aluva road, Aluva – Parur road, Aluva – Varappuzha road provide the road connection to other part of the district.

- Thiruvananthapuram – Shornur railway line provides connection to other parts of our country.
- Cochin international airport in Nedumbasseri is only 12 km from Aluva which is connected to most of the cities in India and several Middle Eastern countries.
- Cochin port is located 25 km from Aluva.
- As per the delineated urban profile of the state for 2031 in the State Urbanisation Report, Aluva town forms part of the delineated urban corridor of 'Alappuzha-Ernakulam -Thrissur-Palakkad'. The SUR recommends preparation of regional plans for the delineated urban cluster/corridor and its influence area; and settlement level plans for each LSG within this regional frame work.
- As per the delineated urban profile for 2021, Aluva forms part of the delineated urban cluster of Kochi.
- Aluva town is a part of Kochi Urban Agglomeration as per Census 2001 and 2011. It is a second order settlement in Ernakulam District and therefore it has to cater to the requirements of a wider service area.
- There are eight LSG's including Aluva municipality that have been included in the influence area of Aluva town. The total area of the region is 130.27 sq.km in 1991 and 130.25 sq.km in 2001. The total population of the influence region as per 1991 census was 215874 and it has increased to 240263 in 2001.
- In the district level analysis, Aluva municipality is identified as one of urban activity area and the concentration of 'Other Workers' is more.
- The trade & commerce sector is the major economic base of the town and the surrounding panchayats depend on Aluva for various services.
- Aluva has very good transportation linkage with the settlements in the influence region. For higher order functions people are depending mainly on Aluva town.
- As per the Development Concept of the draft Development Plan for Kochi City Region, other major urban centers in the district, including Aluva shall be given impetus for development to arrest the influx of floating population to Kochi city and also to provide opportunities for the other towns in the region to develop. Hence there is need for stimulating the growth of Aluva, to provide the much needed facilities and better job opportunities.

16.4 PLANNING AREA AND INFLUENCE AREA

Three characters - urban profile, functional character and land use concentration of the town and immediate surrounding grama panchayats has been studied. Accordingly the planning area delineated is limited to Aluva municiplal area.

Considering the factors like administrative needs, commercial needs, travel need, educational needs, medical need, settlement hierarchy of the town in the district, in addition to Aluva town, seven grama panchayats - Choornikkara, Karumallor, Kadungalloor, Kunnukara, Alangad, Chengamanad and Keezhmad - fall in the influence region of Aluva town. The total area of the region is 130.25 Sq.km. and total population is 240263 as per 2001 census.

16.5 DEMOGRAPHY

- ✓ As of 2011 India census, Aluva had a population of 22428.
- ✓ The population of Aluva municipality is showing a decreasing trend since 1951. The population growth rate of Aluva has shown a fluctuating trend.
- ✓ Growth rate of Aluva town is less than that of state, district and taluk figures.
- ✓ When comparing with the other municipalities in the district for the year 2011, Aluva town is second in position with respect to population density and North Paravur holds the first position. The overall density of population per sq/km in Ernakulam district is 1070 persons in the year 2011.The population density of Aluva town as per 2011 census is 3472 persons/sq.km.
- ✓ Literacy rate of Aluva municipality is 97.9% which is higher than the state figure 94.05% , district figure of 95.89% and taluk figure 94.83%.
- ✓ The age-sex pyramid highlights the importance of persons coming under 20-55 age group (working age group) which shows a healthy sign for the economy. Increase in the number of children and decrease in the share of old people are also observed in the pyramid. It indicates that population is likely to increase in future.

16.6 WORKERS

- ✓ Although the Population of Aluva municipality had shown a decreasing trend from 1981 to 2011, the work force participation rate had increased due to the increase in total workers because of more job opportunities in and outside the municipality.

- ✓ The work force participation rate of Aluva shows a general increasing trend from 1971 to 2011.
- ✓ The growth rate of workers is greater than population growth rate.
- ✓ In the town, 96.56% of workers belong to other workers, 0.75% of workers are agricultural laborers, 0.64% of workers are cultivators and the remaining 2.05% is household industrial workers.
- ✓ Workers moved from agricultural and allied activities to other workers sectors (mainly employees in private and Govt institutions, company workers, drivers, workers in construction field etc) for better employment.

16.7 LAND USE & FUNCTIONAL CHARACTER

Aluvappuzha is the lifeline of Aluva town. Residential use occupies major portion of the Aluva town. The major economic base of the town is trade and commerce. From the beginning of 20th century, Aluva was known as the industrial epicentre of state. But the deterioration of the industries that had occurred after the 50's had its impact in Aluva town. Public & semi-public is the second highest land use in the Aluva town. The Traffic & Transportation land use is also grown over the years and the proposed metro rail starting from Aluva gives scope for immense development of the town. There is no active paddy in the town and has minimum potential for agriculture in Aluva town. As per the regional setting study, Aluva town is an urban activity area. Functional character of the town is urban. Almost all the wards in Aluva town show urban character.

16.8 TRADE & COMMERCE

The major economic base of the town is trade and commerce. Main concentration of commercial activities is on the southern part of the town. Commercial activities are concentrated on the sides of palace road, market road, market area, railway station road, near railway station and private & KSRTC bus stand areas. The existing hierarchy of nodes derived is given here under:

- ➢ FIRST ORDER – Near Private Stand & Market
- ➢ SECOND ORDER - Railway Station Junction, Bank Junction
- ➢ THIRD ORDER - Pump Junction, Paravur Junction, Bye-Pass Junction

- FOURTH ORDER - Zeenath Junction, Marwar Junction
- FIFTH ORDER - Pulinchode Junction, Taluk Hospital Junction, Thottakkattukara Junction, Civil Station Junction, Post Office Junction.

Aluva Market which is situated adjacent to the National Highway is one of the oldest and biggest markets in central Kerala, which is also an important wholesale marketing centre in the region. The major commodities are lemon, grass oil, coconut oil, rice, textiles, vegetables, roofing tiles etc. There is a daily market and a weekly market. The weekly market days are Wednesday and Saturday, when commodities such as coconuts, areca nuts, coir, coir products, betal leaf, banana, vegetables, eggs, fish etc. are sold in large quantities. There is a mini market at Thottakkattukara area, behind Priyadarshini municipal town hall.

16.9 INDUSTRY

Medium scale, small scale, micro level and traditional industries are functioning in the town. No Major industries are functioning in Aluva town. The Kathai Cotton Mills, a major industry existed in Aluva is no longer functioning due to labour problems. The major commodities manufactured are timber product. Industries are getting reduced over the years. Total number of industrial employment available in the town is only around 560. The town has unutilized potentials for industrial development viz good connectivity through both road and rail , potentials for developing connectivity through water ways , availability of water resource. The major problem facing the industrial sector is lack of availability of land. Transportation, water resources and electricity are easily available. Pollution causing industries are not functioning in the town.

16.10 HERITAGE AND TOURISM

Aluva town has rich historical value as it was the place where Travancore Kingdom was based. Aluva is famous for temples, festivals and its large river banks. Aluva Shivarathri is the main festival of the Aluva Shiva Temple. The main tourist places in and around Aluva municipality are Aluva Sivarathri manappuram, Aluva Palace, Periyar River, Aluva Municipal Park, Sivagiri Advaidasramam, Thiruvairanikkulam Sree Mahadeva Temple in Sreemoolanagaram grama panchayat and Uliyannoor mahadeva Temple in Kadungalloor Grama Panchayat. Eventhough Aluva has a high potential for tourism, it is not utilized much. Infrastructural facilities for tourism sector is not available in Aluva town.

16.11 AGRICULTURE & ANIMAL HUSBANDRY

Agricultural area is concentrated at the western side and southern side of the town away from the town centre and on both sides of the river. Major portion of paddy fields are remaining uncultivated or used for cultivation of crops other than paddy. Limited land availability of the town imposes restrictions in the development of the sector. However, the existing potentials of the town can be put to optimum use through promoting suitable agricultural practices. There are no poultry farms or slaughter houses or dairy farms in Aluva municipality. There is a veterinary hospital and veterinary research institute in Aluva town. The cattle market is functioning in the new market opposite to the bus stand. Considering the land use pattern there is only limited scope for developing Animal Husbandry sector in the town.

16.12 HOUSING

About 87.53% of people of the town are living in their own plot. The houses in Aluva municipality have comparatively moderate size and better structural and sanitary condition. Most of the households using septic tank. maximum number of households has their source of drinking water 'Within the Premises'. The location of the town on the banks of Periyar River and the presence of Aluva Water Works contribute to this. 8 slums were identified within the town limit. Urgent measures are needed for the improvement of slums with poor housing quality. Because of the high land value in the town, own land and house is not affordable for common man. So migration to nearby areas for housing is happening here. Since the proposed metro rail starting from Aluva bye-pass junction gives scope for immense development for Aluva town and Aluva will attract lot of people from the influence region, which in turn may result in increase in population in the coming decades. The number of workers in Aluva municipality shows an increasing trend over the decades, which may also generate greater demand for housing.

16.13 DRINKING WATER

In the Aluva town, there is no shortage of water except in the dry season. In most of the places in town duration of supply is full day. About 94.5% of the people depend on KWA

for drinking water. 4.24% of people are using own wells as their source of water. About 16.07% of people are using both KWA water and own well as their source of water. Aluva water works of KWA is one of the efficient water treatment plants in Asia. Four treatment plants, of total capacity of 225MLD of water of the Aluva water works are situated in Aluva municipality and the source of water is Periyar river. Thottakkattukara area is the one region where frequent complaints occur due to breakage and leakage of pipes.

16.14 POWER

Electric power to Aluva town is distributed through Aluva 110 KV Sub-Station located at Power house junction in Aluva-Munnar road. Voltage problems or power interruptions are only of minimal nature in the locality. More percentage of electric power (in terms of connection and consumption) is used for domestic purposes. Consumption for industrial and agricultural purpose is very less. The major fuels consumed are commercial fuels like kerosene, LPG, electricity and the non-commercial fuels such as fuel wood.

16.15 WASTE DISPOSAL

The present methods of collection and disposal of bio-degradable wastes are sufficient and that of non bio-degradable wastes are not sufficient. The generated bio-degradable solid waste is fully collected. There is no waste disposal yard inside Aluva town. There is a waste dumping yard at 4th mile in Keezhmad grama panchayath adjacent to Aluva town under the ownership of municipality. This dumping yard is not functioning now. A centralized solid waste treatment plant (bio-degradable wastes) has the capacity to treat the waste generated from all the adjacent local bodies of Kochi Corporation including Aluva is functioning at Brahmapuram. Bio-degradable wastes are treated at this plant. This system is sufficient for bio-degradable wastes. There is no method for the treatment for non-bio-degradable wastes. Solid waste from other institutions like schools, religious centres should be collected. If any problem arises at Brahmapuram plant an alternate method of solid waste treatment is not available. The hospitals in Aluva municipality area are depending on private agency, for collection and disposal of bio-medical wastes. The existing sewage treatment plant is not functioning properly and thus river Periyar gets polluted. There is no proper drainage facility in the town. A Drainage plan for the entire town is recommended

for improving the drainage system. More public comfort stations are to be provided at different parts of the town.

16.16 TRANSPORTATION

Located at the centre of Ernakulam District, Aluva is connected to all major cities in the country by air (Cochin International Airport at Nedumbassery, 10 km away), rail, road and sea (nearest port Cochin, 22 km away). Most trains including express trains have stops at Alwaye railway station. Aluva has a network of roads, which connects it to the nearby towns and cities. The road network of the study area does not conform to any regular pattern. The Ernakulam-Thrissur stretch of National Highway 544 passes through the town. Other major roads are Paravur road, Alangad road, Perumbavoor road, Aluva Munnar Road and Thaikattukara road.

The study serves as a data base of critical traffic parameters necessary for planning. Based on analysis of data, broad outline of the infrastructure that needs to be provided in the short, medium and long term can been outlined. Several junctions in the study area are performing at sub-optimal levels. These junctions require redesign. Lack of adequate parking facilities creates serious problems within the town. Measures for improving the road network, which includes providing new link roads, widening of existing roads, parking and pedestrian facilities, non - traffic solutions for solving the traffic problems etc. are found to be essential in the traffic and transportation system of Aluva Town.

16.17 EDUCATION

The town has high literacy rate and Educational standard. The facilities of many government schools are not fully utilized. More number of students are studying in Government or Aided school when compared with unaided schools. Majority of students are following state syllabus. Infrastructural facilities and educational standard in all institutions are up to the mark. Even though there are no professional colleges in Aluva, nearby local bodies meet the demand of Aluva.

16.18 HEALTH

Aluva District hospital is the major medical institution in the town in terms of number of patients and number of beds and is in the government sector. In addition to this, hospitals in private sector provide necessary medical facilities. Sufficient bed strength as per standards is available at the hospitals in the town. In Homeopathic system of medicine, hospitals with IP facilities have to be established. In Aluva there is no super specialty hospital or hospital with advanced facilities like C.T. scan, EEG etc. and health facilities have to be improved.

16.19 RECREATION

The total land coming under park and open space in the town include park, play ground, Aluva manappuram etc. and it is 48.42 hectares which is 7.50% of total town area. There is a small municipal play ground near the market road. On account of Sivarathri, a month long fair is being conducted in manappuram well participated by the mass all over the state. Facilities like open air theatres or swimming pools are also not available in the town. Play grounds are available with most of the schools in the town. There are four cinema theatres in the town. There are two Municipal Town Halls in Aluva, viz. the Mahatma Town Hall and the Priyadarshini Town Hall. There is one municipal library functioning in the town. Due to the natural beauty of the place and the perennial flow with clean water, Aluva Municipality has the potential to promote river tourism.

16.20 SOCIAL WELFARE & SECURITY

For the welfare of weaker section of the town more facilities are to be provided. 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, old age people, child development and scheduled cast. Women work force participation rate in Aluva town is 16.14%. 18.09% male population and 17.53% of female population are in the child group. 14.82% of male population and 13.17% of female population is coming under old age group. WFPR of SC/ST in Aluva is greater than that of the WFPR of Aluva town.

16.21 ENVIRONMENT

Major environmental sensitive areas are water bodies & Paddy fields. The town is experiencing various environmental issues, but in different magnitude. The major environment issues in the municipality are water logging, water pollution in Periyar and solid waste. Measures should be taken for proper solid waste management. Since Aluva is a growing town the environmentally issues need to be addressed at this stage itself and planned growth of the town also has to be ensured.

16.22 CONCLUSION

The Aluva town has various development potentials because of its locational advantage, importance of being a part of Kochi urban agglomeration and also being part of a thriving urban corridor in the state, presence of metro rail, trade & commerce and recreational activities. The infrastructure facilities are almost satisfactory, however some augmentation/expansion to meet present gap and the additional requirements are needed for future. The main environmentally sensitive area of the town is Periyar river.

17. DEVELOPMENT GOALS AND OBJECTIVES

17.1 DEVELOPMENT GOALS

The development goals of the Aluva municipality are formulated based on the findings and conclusions derived from various sectoral analysis, local level analysis and spatial analysis. The analysis shows that, Aluva was developed as a market centre and still it is one of the major market centres of the region. Trade and commerce is the major economic activity of the town and hence to develop Aluva as a service centre is the first goal. The following are the other major goals formulated.

1) To develop Aluva as an easily accessible regional level service centre in the district with adequate infrastructure.
2) To develop the town as a regional centre of trade and commerce by facilitating new commercial developments.
3) To sustain and develop the role of Aluva as a transit point of vehicular traffic.
4) To conserve the environmental important areas.
5) To ensure the social welfare and security of the society.

17.2 DEVELOPMENT OBJECTIVES

Development objectives are also framed so as to achieve above development goals. In this respect, a set of development objectives are framed against each development goal.

1. In connection with the first goal - ' To develop Aluva as an easily accessible regional level service centre in the district with adequate infrastructure', the objectives set are:
   - ❖ To strengthen the Aluva Town as a major second order urban centre as envisaged in draft development plan for Kochi city region 2031.
   - ❖ To ensure that infrastructure improvements are comprehensively planned to address the development within the town.
   - ❖ To strengthen the regional connectivity network of the town.

- To promote the high intensity development around the proposed metro terminal that will provide fiscal benefit for the town.

2. In connection with the goal 'To develop the town as a regional centre of trade and commerce by facilitating new commercial developments,' the objectives set are:

- To strengthen the commercial base of the town by promoting appropriate new commercial development or redevelopment of existing commercial centres.
- Resolve the existing traffic and parking problems that discourage shopping in the existing commercial centres.
- Encourage business and trade activities around the proposed metro terminal in the town.

3. In connection with the goal ' To sustain and develop the role of Aluva as a transit point of vehicular traffic', the objectives set are:

- To strengthen the regional transport corridor and to promote better mass transport facilities.
- To integrate various modes of transport and to develop intermodal exchange facilities.
- To have an intra – town transportation system that provides safe and efficient movement of people and goods while stressing a balance between vehicular and pedestrian modes of travel.
- To develop a more efficient circulation pattern in the town through better traffic planning and providing alternative routes within the town centre and to the surrounding service region.
- To provide improved pedestrian facilities throughout town, especially to connect the residential neighbourhood.
- To improve parking facilities.

4. In connection with the goal ' To conserve the environmental important areas' ,the objectives set are,

- To ensure protection for environmentally sensitive areas of the town such as uncultivated paddy lands, water bodies, Aluva manappuram etc.
- To achieve a high quality environment, particularly in residential areas.

5. In connection with the goal 'To ensure the social welfare and security of the society', the objectives set are:

- To ensure equitable distribution of basic facilities in the town.
- To promote rehabilitation or replacement of substandard housing units and to ensure increased availability of affordable housing.
- Provide public open space and recreational facilities in a hierarchical manner.
- Provide tourism related recreational activities in Manappuram area
- To protect and maintain the best features of the Aluva's peaceful and attractive residential areas especially at Thottakkattukara.

18. DEVELOPMENT CONCEPT

18.1 INTRODUCTION

Spatial and local level analysis discussed in the previous chapters revealed various potentials and issues of the town. The inter sectoral linkages need also to be explored for carving out an integrated development vision. Also the spatial aspects of the town which is the physical manifestation of all such linkages is to be analyzed for most desirable spatial structure of the town to ensure the maximum utilization of the existing potentials for a sustainable development. The development concept is formulated based on the spatial structure, findings of sectoral studies and development objectives set. Development objectives when spatially located provides the development concept of plan. The development concept will clearly indicate how the plan area will develop in future and also it will give an overall idea of the location of determinant development proposals.

18.2 INTER SECTORAL LINKAGES

From the analysis of different sectors of the planning area following are the key compounds:

- ✓ Population
- ✓ Land use
- ✓ Transportation
- ✓ Trade and commerce
- ✓ Topography
- ✓ Tourism and Heritage

18.2.1 LINKAGES BETWEEN LAND USE AND POPULATION

From the last decades of 20th century the Aluva town is characterized by continuous decrease of population rate. Due to high land cost and insufficient availability of residential areas for housing, a tendency of migration from Aluva town to nearby grama panchayats is observed. The population growth rate of adjacent grama panchayats started increasing during

these periods. Due to high land value, most of the earlier inhabitants sold out their properties in the town centre and settled in the nearby grama panchayat areas which is another reason for decrease in population in the town.

18.2.2 EFFECT OF TOPOGRAPHY ON DEVELOPMENT OF TOWN.

The topography of the town is very peculiar. The Periyar river divides the town into two halves. The northern portion of the town is residential predominant and is considered as the planned residential area especially because of the sanctioned Town planning Scheme of "Housing Scheme for Thottakkattukara".

Major concentration of commercial activities is on the southern part of the town, along the sides of NH 544, Palace road, Railway station road and Aluva- Perumbavur road. The development of the town is concentrated in the eastern side of railway line, because of the existing railway station and KSRTC bus stand. The commercial importance of western side is also multiplied lately due to the formation of National Highway Bye pass and shifting of the municipal bus stand to that area. In the northern part of the municipal area, not show high concentration on the sides of NH 47(the new NH 544) near Paravur Kavala is identified as centre of 'Booming Commercial Activity'.

18.2.3 LAND USE AND TRANSPORTATION.

Land use and transportation are inextricably linked. In Aluva town, better connectivity makes land more accessible. It can be observed that concentration of major commercial and public establishments is around the railway station and K.S.R.T.C bus stand and new developments are started on the side of NH by-pass after its implementation. In other words, transportation pattern of town has total influence on the land use pattern of the town.

18.2.4 LINKAGES BETWEEN TRANSPORTATION AND COMMERCIAL SECTOR OF THE TOWN.

Transportation infrastructure is one of the basic requirements of a town, along with water, electricity, health, sanitation etc. The availability of the same in adequate measure will significantly help in improving the quality of urban living.

Aluva Town is located centrally on the map of the state. Given this strategic location, the town serves as a major nodal point for movement, of both passenger and goods, between the northern and the southern regions of the state. The market and the railway station are the principal trip generating points of the town. The AM road links the town to the eastern high lands also.

Aluva is developing as a service centre and trade & commerce is identified as one of the main economic base of the town. Rapid urbanization and intense commercial developments in the recent past have resulted a steep rise in travel demand putting town's infrastructure to stress. Even though there are physical constraints in the town, the transportation planning strategy for meeting the requirements of future mobility demand requires to be framed taking into consideration these physical constraints.

Decentralisation of commercial activities by developing other potential areas and providing better transportation network to connect these centres can build a mutually beneficial linkage between commercial and transportation sector. Utilisation of full potentials of the areas surrounding metro terminals will be another opportunity for the town.

18.2.5 LINKAGES BETWEEN INFRASTRUCTURE FACILITIES AND TOURISM SECTOR

Aluva town has rich historical value as it was the place where Travancore Kingdom was based. Aluva town has an area of only 6.46 Sq.km. This town can be characterised as small and compact town. Now the tourism sector is not much developed in the town. Within the limited area, the town has many potential resources like the river periyar, Aluva manappuram etc which are greatly influencing the tourism sector. Along with these resources, the town is blessed with fairly good availability of physical infrastructure facilities like transportation (road, rail , proposed metro rail, proximity to air transport and water transport option), uninterrupted water supply, power etc.

Thousands of pilgrims and hundreds of tourists visit Aluva. Aluva is well connected to other urban centres and the tourist places like Fort Kochi, Munnar, Mattanchery,Chinnar, Thekkady, Edamalayar, Bhoothathankettu, etc. Utilizing the location advantage and tourism

potential of the town, a tourism circuit shall be promoted connecting Aluva with these adjacent tourist spots.

Measures like providing more accommodation facilities (home stay) conservation of water bodies, maintaining hygienic environment etc. and promoting river tourism etc. can be thought of in this regard.

18.3 PROPOSED SPATIAL STRUCTURE

The proposed spatial structure of the town is decided by considering the geographical aspects of the area, spatial distribution of existing development, environmentally sensitive areas, spatial distribution of population, proposed nodes and proposed road network.

The development activity of an area is decided by considering the geography of the area. The activity that may come in an area is based on the slope of the particular area. A slope between 0^0 and 15^0 is suitable for human settlements, between 15^0 to 30^0 is suitable for agricultural activities and between 30^0 and 50^0 is suitable for horticultural activities and land with slope more than 50^0 is suitable for forest land only. **Figure 18.1** shows the slope of different part of Aluva municipal area. The slope of the town varies from 10^0 to 26^0. Average slope of the municipal area is 4.38.

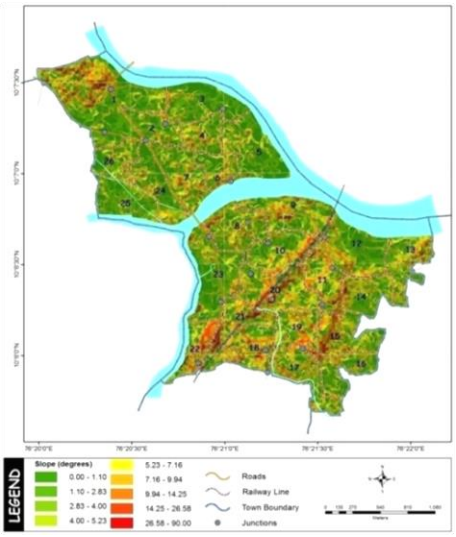

Fig: 18.1 Slope of the town

The commercial dominant activities are concentrated along the major travel corridors of the town and around railway station and bus stand areas. Even though settlements are there in all parts of the town, more residential concentration is in the northern portion of the town. Public and semipublic dominant areas are concentrated in the southern part of the town and

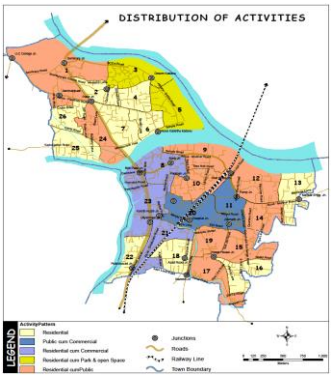

Fig:18.2 Activity Pattern based on land use

near UC college areas. The spatial orientation of different activities of the town based on land use analysis is shown in **figure 18.2.**

Aluva manappuram, water bodies, paddy fields, and few natural drains are the environmental sensitive areas in Aluva municipal area which are to be conserved and the future activities in these areas are to be regulated judiciously so that the permissible activities do not impact adversely on the overall environmental balance. **Figure 18.3** shows the environmental sensitive areas in Aluva municipal area.



Fig: 18.3 Environmental sensitive areas

The population concentration pattern of Aluva town is shown in **figure 18.4.** It can be seen that there in no significant concentration of population in any particular areas of the town.

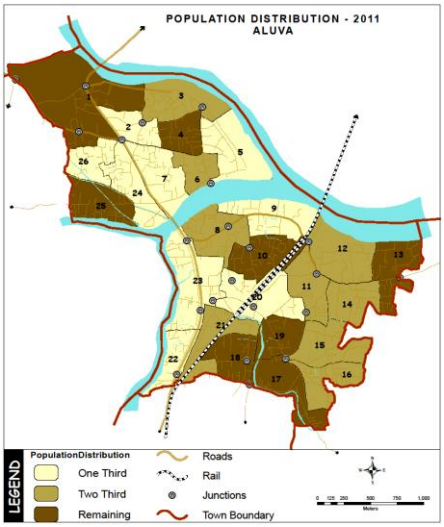

Fig: 18.4 Population Distribution

As per the hierarchy of Nodes, the 1st order node of the town is the area comprising of Private stand junction, Old market junction, Main market junction and Karothukuzhi junction. Bank junction and Railway station junction are the second order junctions. According to the score obtained different ranks are given to the remaining nodes. Due to the nearness of the Bye-pass & Bank junctions and the proximity of these junctions to the proposed Metro rail

station in Aluva these junctions are considered jointly and suggested as second order node. The proposed nodes of the town are shown in the **figure 18.5.**

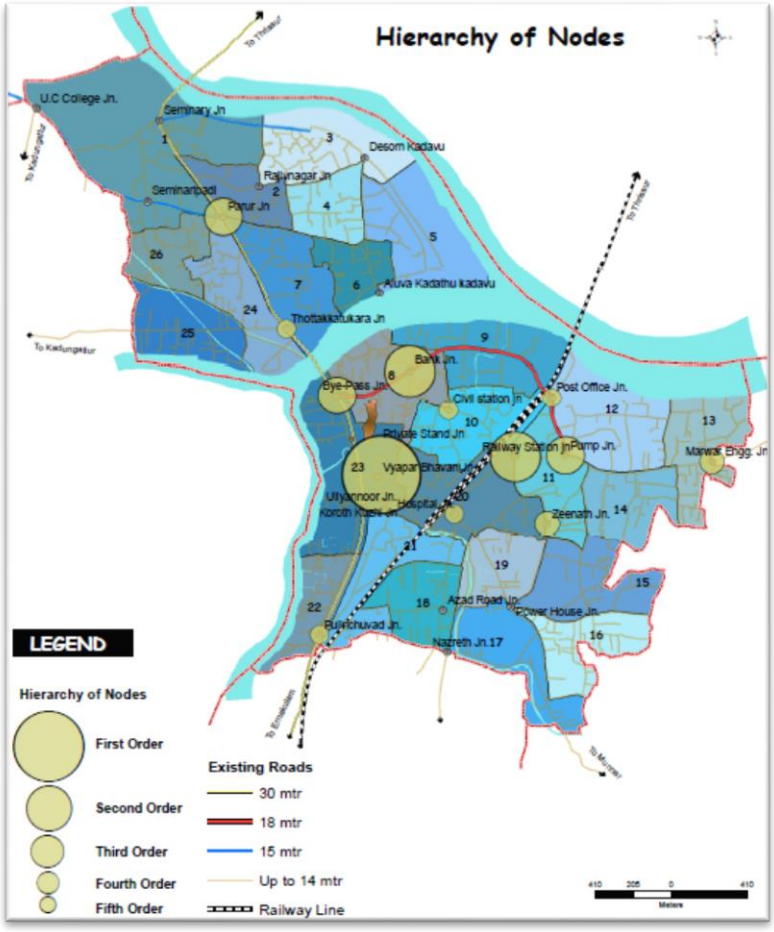

Fig:18.5 Hierarchies of nodes

The proposed developments and distribution of population are decisive criteria for the proposed transportation network of an area. The projected traffic volume based on study on Traffic and Transportation and the road network proposed in the District Urbanization report, will govern the road network. The railways & the metro rail will also play a significant role. The concept of transportation network of the town is shown in **figure 18.6.**

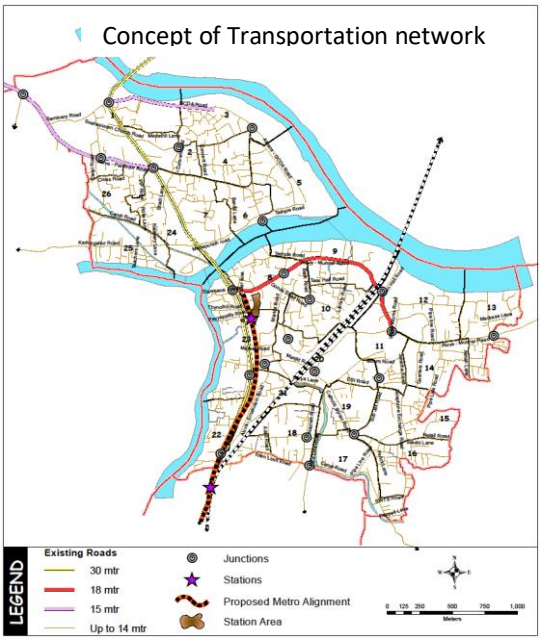

Fig: 18.6 Concept of transportation network

The spatial structure for the town is evolved by integrating all the above factors. The evolution of spatial structure and suggested spatial structure for Aluva municipal area is shown in **figure 18.7** and **18.8** respectively.

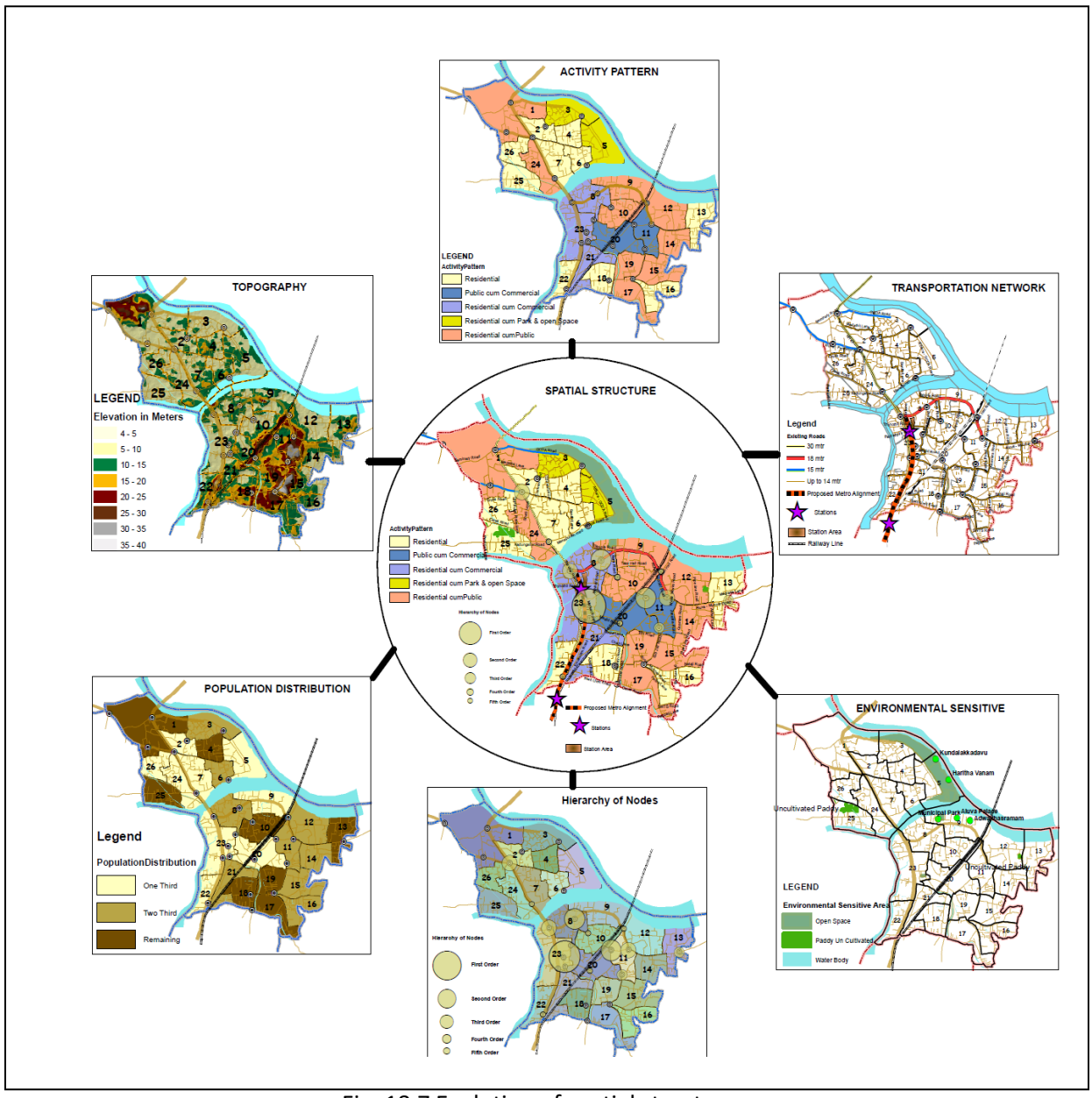

Fig: 18.7 Evolution of spatial structure

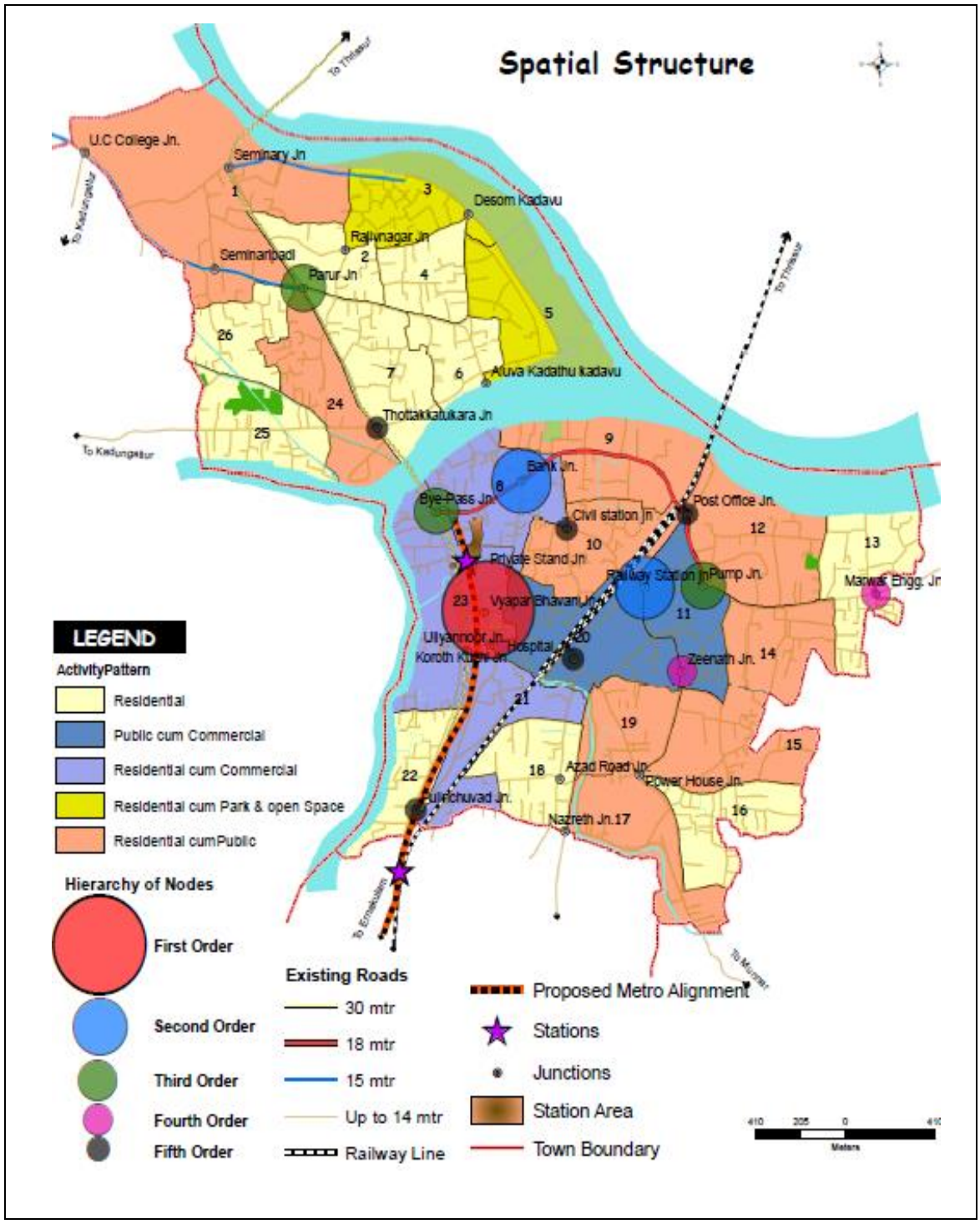

Fig: 18.8 Suggested spatial structure

18.4 THE DEVELOPMENT CONCEPT

Spatial structure of the town and influencing factors for the development of the town are considered for the formulation of development concept. As far as Aluva town is considered, the following sectors have significant influence in the formulation of development concept.

- Residential
- Trade and commerce
- Transportation & communication
- Public and semi public

Based on the above factors the development concept for Aluva has been evolved. Following are the major features

- Intensive residential area development in the northern portion of the town
- Transit oriented development in the proposed metro rail terminal station area
- Tourism facilities at Manappuram area by utilizing the existing potential of the Periyar river
- Conservation of environmentally sensitive areas/heritage precincts
- Considering the potential of high literacy rate & high percentage of working age population, IT/ITES industries are suggested in the town.
- New mini parks, multi-functional stadium, active sporting/recreational open space and facilities, natural areas and ancillary open spaces etc. are suggested in order to meet the needs of residents and visitors.
- Special projects for the beautification of the rivers.

The development concept formulated is shown in **figure 18.9.**

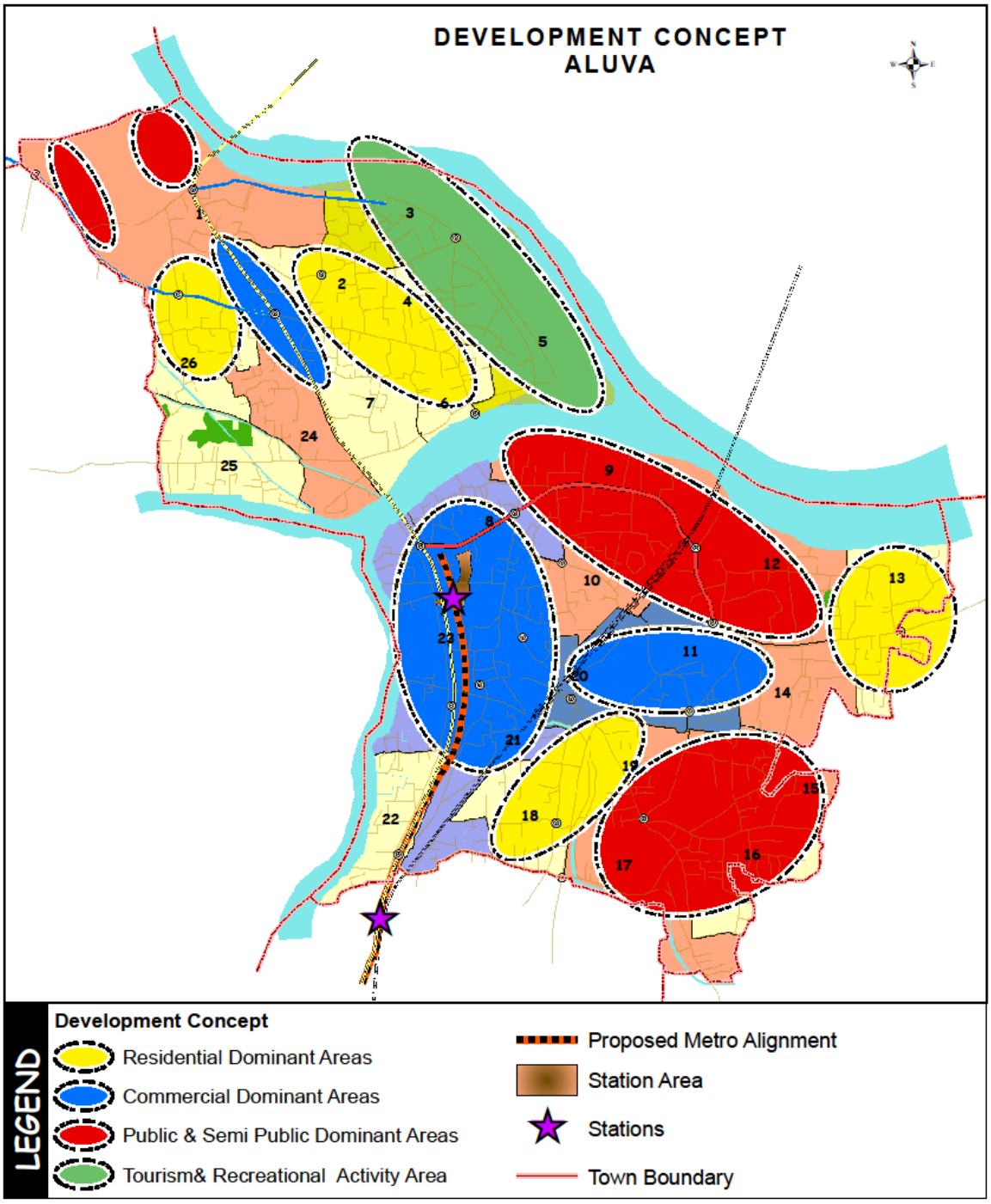

Fig: 18.9 Development concept

19. DEVELOPMENT POLICIES AND STRATEGIES

19.1 INTRODUCTION

Aluva being the premier town of the district must contribute strongly to the development of the region in addition to ensuring its own sustainable development. The development vision for Aluva must therefore be consistent with these requirements. The vision statement for the town is thus " Aluva- a sustainable urban centre of higher order"

The development policies and strategies for the next 20 years shall be focused on the vision for Aluva town to be "*sustainable urban centre of higher order".*

This implies that there is need to enhance the town's natural, cultural, social and economic environment by ensuring environmental sustainability, cultural vibrancy, economic prosperity and social well being. While engaged in the regional context, it's also imperative to focus on the challenges and opportunities unique to Aluva town. The development policies and strategies of the Plan shall be derived inn this background. The physical shape of town, the distribution of land uses, the new growth areas and infrastructure development especially roads and rail systems are also all directly attributable to the policies and strategies to be set out in the Master Plan for Aluva town. The development strategies thus set out, shall form the basis for the planned development of Aluva town.

The development policies and strategies that will guide development of the town for the next 20 years are summarised below:

19.2 SECTORAL DEVELOPMENT POLICIES AND STRATEGIES

The sector wise policies and strategies for the major sectors identified for Aluva town are furnished below.

19.2.1 ECONOMIC DEVELOPMENT

Policy: Promote development that creates a vibrant, thriving and complete economy by diversifying economic activities, trade & commerce and tourism sectors.

Strategies:

- Enhance the working, living and business environment of the town

- Provide priority and incentives to development in areas around transit terminals
- Strengthening key sectors such as the trade & commerce and tourism.;
- Encourage light, non-hazardous and knowledge based industries.
- Ensure complete and integrated town linkages
- Resolve traffic and parking problems that discourage shopping in the existing commercial centers.

19.2.2 TRANSIT ORIENTED DEVELOPMENT

Policy: Support intense development around Kochi metro station in the town by encouraging both public and private sector development and integration of a full range of compatible land uses (residential, commercial and public etc.).

Strategies:

- Supportive densities, pedestrian-friendly streets, and a mix of land uses to allow more people to live and work close to the terminal.
- Incentives to development in areas around transit terminals.
- Improve pedestrian and traffic linkages, both within and from outside these zones, to provide more convenient access to the transit terminals.
- Park-and-ride facilities shall be provided at interchanges on the perimeter of the transit station, encouraging more people to use public transportation to access the town.

19.2.3 INFRASTRUCTURE

Policy: To provide adequate physical, social and economic infrastructure so as to develop the area as higher order urban centre

Strategies:

- To maintain and improve the existing drinking water supply
- To provide sanitation facilities for all and also to develop a proper system for disposal of sewage and solid waste.
- To promote non conventional energy sources like energy from Bio waste.

- To establish better traffic and transportation network by widening existing roads/establishing new links, providing adequate parking and pedestrian facilities, introducing efficient public transportation system and by integrating all modes of transport.
- To provide higher order recreation facilities in the town and to maintain the existing parks and open spaces in the town with proper access.
- To provide other urban amenities such as public crematorium, convention centres, community hall, old age homes, public utility services etc.

19.2.4 TRANSPORTATION

Policy: Provide an efficient traffic and transportation network ensuring, safe, affordable, quick, comfortable and reliable access for the town's residents as well as the commuting population.

Strategies:

- Promote alternative modes of transportation.
- Ensure rapid connectivity between urban centers.
- Develop a hierarchical system of road network.
- Ensure that new developments provide streets and sidewalks that meet the town's standards.
- Integrate various modes of traffic.

19.2.5 HOUSING

Policy: To have a sufficient supply of good quality housing to meet the needs of all ages and income levels.

Strategies:

- Encourage high density and high quality residential development in southern half of the town around the proposed metro station
- Medium density high quality residential development shall be promoted in the predominantly residential areas in the northern half of the town.
- Promote the rehabilitation or replacement of substandard housing units.

- Promote public-private partnership in housing projects.

19.2.6 TOURISM

Policy: To capture the potential of water bodies and heritage sites in the area for the promotion of river based tourism and heritage tourism.

Strategies:

- To develop tourism circuits connecting tourist attractions in and around the town.
- Developing eco tourism based on Periyar River.
- To provide infrastructure facilities required for tourism development.
- To protect the environment and reduce river pollution.
- To utilise the full potential of Aluva Manappuram

19.2.7 Environmental Sustainability

Policy: Sustain and enhance important features of the natural environment in and around the town and promote the preservation of best ambient air quality compatible with sustainable development.

Strategies:

- To ensure sustainability of the environmentally sensitive areas and heritage centres through proper development controls.
- Establishing an integrated and self-contained operating system for Municipal Solid Waste Management
- To create strong awareness among the local people about the importance of environmental conservation with the help of NGO's and other organisations.
- To monitor the level of pollution through a continuous monitoring mechanism and suitable remedial measures are to be implemented so as to contain the pollution within the permissible limit.

20. PROJECTED REQUIREMENTS

20.1 POPULATION PROJECTION

Aluva municipality was experiencing negative growth during the previous three decades ie, 1981-1991, 1991-2001 and 2001-2011 periods. The population of Aluva municipality is 22428 as per census 2011. The growth rate of population is -6.98% in 2001-2011 period. In the above context the scope for trend based population projection is restricted. Aluva town is the terminal of the proposed metro rail project, which is under construction. Thus the concept of Transit Oriented Development has to be considered here in envisioning the future. Mixed-use of relatively high-density residential and commercial uses has to be promoted around the metro station. TODs generally are located within a radius of 400 to 800 m from a transit point, as this is considered to be an appropriate scale for pedestrians. However, in the case of Aluva town, this distance limit may be taken into account only in the case of commercial development. The intensified residential development may be expected in all residential areas of the town which may even transcend the town limits. This may lead to reversing the trend of negative growth of population in Aluva town in future.

The possibilities of intensifying residential development in the town area include:

- Re-densification of existing residential areas through low rise high intensity development
- More and more high rise residential apartments coming up in the town
- Additional lands being brought into residential use through conversion of land under dry cultivation

A combination of the above has to be expected, resulting in densification of the existing residential areas of the town and bringing in additional land under residential use. It is therefore attempted to estimate the future population of Aluva town considering the above aspects.

Here, it is assumed that approximately 50% of the agricultural land in the town currently under coconut and mixed crop will be brought under residential use in future. In other words, there will be an increase of 26.09 hectares of residential area during the plan period. Hence it is expected that 241.60 and 254.60 hectares of land will be under

residential use in the town in 2021 and 2031 respectively. Assuming net residential density in the range of 110-120 pph (average 115pph) for 2021 and in the range of 120-130 pph (average 125pph) for 2031 (considering UDPFI guideline and also proposed net density for Kochi etc.) the densification of residential areas in Aluva town is anticipated. The estimated population in 2021 and 2031 is thus calculated as 27784 and 31825 respectively as detailed in **table 20.1.**

Table: 20.1 Projected Population of Aluva Town

Year	Residential Area (Hectares)	Net Density Assumed (pph)	Projected population	Growth rate of population (%)	Gross population density(pp/sq.km)
2021	241.60	Range: 110 – 120 Average: 115	27784	15.24	4301
2031	254.60	Range: 120 – 130 Average: 125	31825	14.54	4926

In addition to the above, floating population in the town also has to be considered. The towns like Angamaly, Perumbavoor, Kothamangalam and the adjoining panchayats of Aluva town will surely depend on the metro rail facility. Besides the expected high intensity mixed development around the metro terminals of Aluva and Pulinchuvadu will also attract considerable floating population. The floating population in Aluva for 2021 and 2031 is assumed to be 30% to 40%.

20.2 PROJECTED WORK FORCE

Anticipating a fast growing development in connection with the metro rail situated in Aluva, we can expect a boom in future population of Aluva. Hence the number of workers is also likely to increase in future. The work force participation rate of Aluva municipality is 34.77 in 2011. The projected WFPR for 2021 is 37.24. The rate of workers participation for 2031 is calculated as 40.39 limited to 38 which is a fair rate of workers participation for a town. **Table 20.2** & **figure 20.1** shows the projected work participation rate of Aluva town.

Table: 20.2 Projected WPR & Work Force for Aluva Town

Year	Total population	WPR	No. of workers
1971	24067	29.16	7018
1981	25278	29.33	7415
1991	24774	31.14	7715
2001	24110	32.31	7790
2011	22428	34.77	7798
2021	27784	37.24	10347
2031	31825	38.00	12094

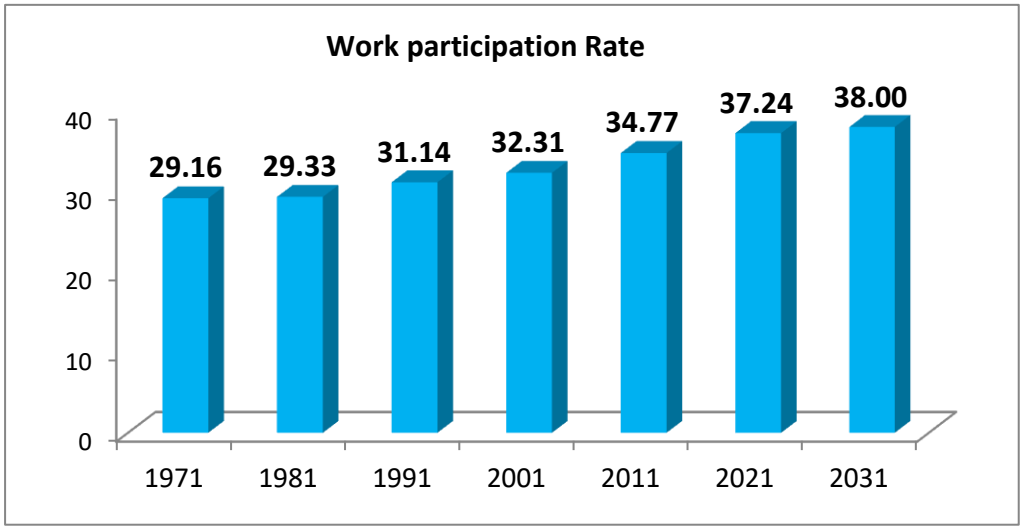

Fig: 20.1 Projected Work participation rate of Aluva Town

According to 2011 census, 0.64% of total workers belongs to cultivators, 0.74% constitute agricultural labourers, 2.05% Household industry workers and 96.56% other workers. Based on this the occupational structure of Aluva town for 2021 and 2031 are projected. **Figure 20.2** shows the percentage of workers in four fold classification in 2011. **Table 20.3** represents the estimation of occupational structure of Aluva town in 2021 and 2031.

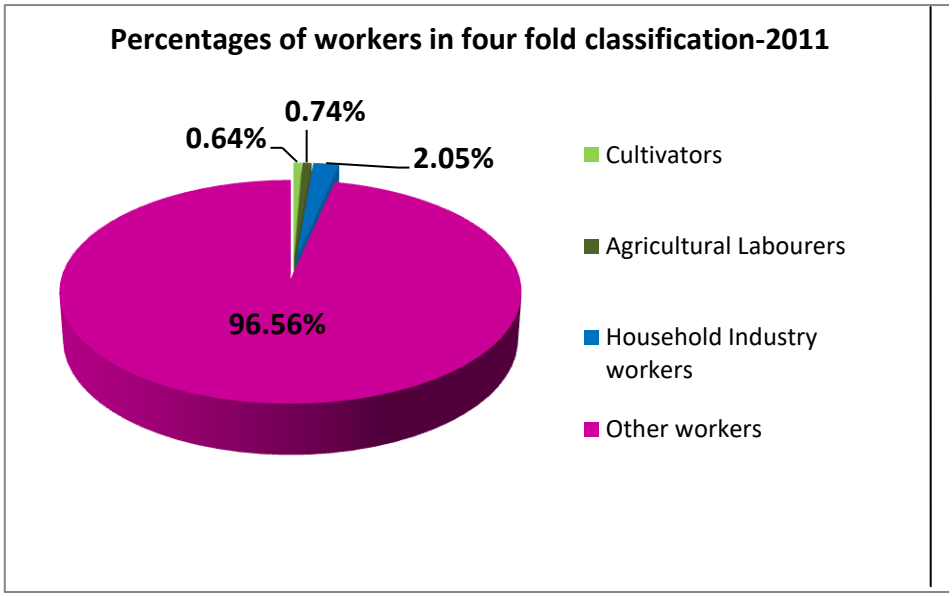

Fig: 20.2 Percentage of workers of Aluva town in four fold classification -2011

Table: 20.3 Estimation of Occupational structure

No.	Category	2011	2021	2031
1	Cultivators	50	67	78
2	Agricultural Labourers	58	77	90
3	Household Industry workers	160	212	248
4	Other workers	7530	9991	11678
	Total	**7798**	**10347**	**12094**

20.3 HOUSING REQUIREMENTS

20.3.1. DEMAND FOR HOUSING

Adequate housing is necessary for social welfare as it provides protection from weather, place to bring up families and a place to work. The ideal goal would be to provide for every household a house of right size, type, and cost with all appropriate internal and external facilities in a suitable location. The housing shortage in the country is calculated on the basis of the number of households, available housing stock, acceptable housing stock, overcrowding/congestion in the existing dwelling units, and obsolescence. The successive population censuses have provided the background information on households, housing

stock and quality of the units. A correct estimate of the housing requirements should be formed as the first step in planning for self-sufficiency in housing.

Table: 20.4. Estimation of demand for housing

Estimation of demand for housing	
Households	5333
Housing Stock	5274
Pucca	3449
Semi Pucca	1779
Kutcha	46
Excess Households over housing stock	59
Congestion factor (%)	0.5
Congestion in Hhs	26
Obselence in Housing Stock (2.5%)	132
Upgradation of Kutcha(10% of semi pucca+kutcha)	224
Total Shortage	441

Source: Census of India, 2001,secondary data.

From the table given above we can see that there is a numerical shortage of 59 housing units in Aluva. Considering the factors like congestion and obsolesce and the dilapidated condition of houses which require reconstruction, there is a shortage of 441 dwelling units.

20.3.2. REQUIREMENT OF HOUSING UNITS IN ALUVA TOWN.

Average family size has been assumed as 4.5 persons, which is also the existing household size of the town. The housing requirements for 2011, 2021 & 2031 of the town have been calculated with the base year as 2001. The housing requirement for 2011, 2021 and 2031 as per the projected population is calculated and given in **table 20.5.**

Table: 20.5. Requirement of housing units

year	Projected population	No. of houses required
2011	24110	5358
2021	29940	6653
2031	34944	7765

The Sky rocketing land price, feeling of security in flats and scarcity of land suitable for house construction to encourage people to choose flats thus bringing in a new trend in housing.

20.4. PHYSICAL INFRASTRUCTURE REQUIREMENTS

20.4.1. WATER SUPPLY

20.4.1.1 Quantity of Urban Water Supply

The water demand for a town or city is broadly classified as domestic and non-domestic. The domestic water demand includes per capita consumption and system losses, while non-domestic water demand includes industrial and commercial consumption, institutional consumption and fire fighting demand. The domestic water requirement up to the year 2031 for Aluva town have been calculated by taking the desirable norm of 135 LPCD for medium town as given in UDPFI guidelines. As per Central Public Health and Environmental Engineering Organization (CPHEEO) norms, the domestic water requirement is 135 LPCD. Future domestic water demand and requirements have been calculated as 135 LPCD, based on existing scenario along with standards assigned as per UDPFI & CPHEEO norms.

Considering the non-domestic demand, the quantity of water is taken as 20% of the domestic demand. An additional 1% is taken for fire demand and 15% uncounted water losses shall be made as per CPHEEO norms.

Design Period: For water supply project, a thirty years design period is assumed. The population forecast for this period is derived by taking into consideration of the potential of various sectors of urban economy and regional, physical and economic linkages.

Per Capita Rate of water supply: As a general rule, the following per capita rates are recommended as the minimum for design of public water supply in India.

(a) For design population up to 10000: 70-100 liters per day
(b) For the design population 10000 to 50000; 100-125 liters per day
(c) For design population above 50000; 125-200 liters per day

20.4.1.2 Demand of Water:

A general standard of 200 lpcd (including drinking and non-drinking purpose) is found acceptable for urban areas and 150 lpcd for rural areas. Considering all the factors, in

Aluva town the requirement of water per persons per day is taken as 200 lpcd. Accordingly, the demand comes out to be 5.9 MLD for 2021 and 6.9 MLD for 2031. At present the total quantity of water supplied per day is 16MLD and this quantity is supplied not only in Aluva, but also to other areas like Fort Kochi and nearby local bodies. At present there is no scarcity for water in Aluva. As Periyar is the source of water in Aluva, sufficient supply of water for both domestic and industrial purpose will be available for the future population of the town.

Table: 20.6. The requirements of water supply in Aluva town

Total quantity supplied/day through Aluva water works	year	Projected population of the town	Requirement in MLD for town's population
16MLD	2021	29940	5.9
	2031	34944	6.9

Water Treatment: There is one water treatment plant in Aluva town having a capacity of 225 MLD.

Distribution Network: The distribution network covers almost all wards.

a. **Elevated Storage Capacity:** There are two overhead water tanks with a capacity of 17.5million liters.

20.4.2 SEWERAGE

At present there is no sewerage system and Sewage Treatment Plant (STP) in the town. By 2031, 5.52 MLD of sewerage water has to be treated and this is calculated as 80% of the water supply as per CPHEEO norms.

20.4.3 SOLID WASTE TREATMENT

Waste generation: At present approximately 22 metric tonnes waste is generated and collected in the town per day. By 2031 it is expected to increase 10 metric tons for the population of approx. 40000, taking a standard of 250 gms./capita/day of solid waste generation for a town like Aluva.

a) Collection Performance: The existing collection covers all wards and is carried out daily. Collection efficiency is of 100%.

b) Waste Transportation and disposal: The numbers of vehicles for transportation at present is 29 and shall be sufficient for 2031.

20.4.4 TRAFFIC AND TRANSPORTATION

Included in Traffic and Transportation plan.

20.4.5 ENERGY

As per UDPFI norms, the consumption of power is worked out to 18000 KW.

Table 20.7 shows the projected consumption of power.

Table: 20.7. Projected requirement of power

category	Existing Nos	Standards Recommended	Additional Demand for 2031
11 KV	One substation with 110KV, 10nos. 11 KV feeders	1 for 15000 population	Nil
LPG Godown	1 No. with 8000 kg	1 for 40000 to 50000 population	Nil
Petrol pumps	4 Nos.	1/150 Ha of gross residential and 1/40 Ha of industrial area	Nil

20.5 SOCIAL INFRASTRUCTURE REQUIREMENTS

20.5.1 EDUCATIONAL

The details of existing and projected requirements of educational facilities are shown in **table 20.8**. The total requirements for municipal area shall be well distributed in the town and shall be placed at strategic locations in the municipal limit.

Table: 20.8. Projected Requirement of Educational Facility

Details	Existing Numbers	UDPFI Standards recommends per population	Demand for 2031	Gap
LP school	3	1/5000 poulation	7	4 Nos.
UP school	1	1/7500 poulation	5	4Nos.
High school	4	1/13000 poulation	3	nil
HSS	9	1/13000 poulation	3	nil
Arts & science college	6	1/80000 poulation	1	Nil
Polytechnic	0	1/36000 poulation	1	1No.
I T I/I T C , Computer Institutes, NIFE	3	1/36000 poulation	1	Nil
T T I	0	1/120000 poulation	1	1 No.
Professional college	0	1/125000 poulation	1	Also available at nearby LBs

The existing High schools and higher secondary schools have the facility for primary education also. So there is no gap in primary schools in Aluva town.

20.5.2 HEALTH CARE FACILITIES

In Aluva town there are nine allopathic hospitals and twenty one clinics with only outpatient wing. There are three ayurvedic hospitals and seventeen ayurvedic clinics/dispensaries. There are no homeopathic hospitals, but nine homeopathic dispensaries. Primary health centres (PHC) does not exist in the town. As per standards one PHC is required for 5000 population.

21. PROPOSED LAND USE PLAN

Most of the growing towns and cities eventually confront the issues of the ultimate limits of their growth. In the case of Aluva town, it has only a finite supply of land in which future growth of the town has to take place. The town is divided into two halves northern and southern zone by Aluvappuzha. The major developments of the town are concentrated in southern side because of the railway station, bus stand and national highway (544). Aluva town is bounded on the north by Chengammanadu grama panchayat and south by Choornikkara grama panchayat. The land use plan which is part of the master plan covers the entire geographic area of the town, and translates in the sectoral requirements to a spatial platform. Despite, limits to town expansion, there is ample developable land within the planning area-enough to meet the needs of Aluva's growing population for the next twenty years.

This land use plan provides the geographic arrangement of various land uses within the town, such as residential, commercial, public & semi public, industrial, transportation, parks & open spaces etc.

This land use plan provides a great deal of flexibility in arrangements of future land uses and thrives to achieve pedestrian and transit friendly community. The plan provides strong support for transit oriented development. The proposed metro rail station at Aluva town will change the face of Aluva and intense developments in the town shall be anticipated. So it will be important to establish a development pattern at this early stage that offers the potential for an economic and efficient transit system at a later stage. The gross area of the town is only 6.46 sq. km and the net area in only 5.69 sq. km. Future land requirement has been worked out for different uses as per Urban Development Plan Formulation and Implementation (UDPFI) Norms, existing and proposed group pattern envisioned for the town.

21.1 LAND USE PROPOSALS

Following categories of land use zones are proposed in the land use plan which is part of the Master Plan for Aluva town:

1. Residential use zone
2. Commercial use zone
3. Central business district (CBD)
4. Sub centres
5. Industrial use zone
6. Public and semi public use zone
7. Traffic and Transportation use zone
8. Park and open space use zone
9. Dry cultivation use zone
10. Paddy
11. Green strip
12. Burial ground / Crematorium
13. Water bodies to be retained
14. Special use zones

In addition to the above, special use zones are proposed where land is reserved for various essential projects like special market , mini market, park and open space, Nursing college, Capacity augmentation of STP, New STPs and truck terminal.

21.1.1 RESIDENTIAL USE ZONE

From the analysis of existing land use pattern of the town, it is revealed that the residential areas are fragmented in nature due to large parcels of other land uses between

them especially on the southern half of the town. The general strategy adopted in the development of residential area is to redensify the less populated areas providing proper accessibility and facilities.

The projected population of Aluva town for the year 2021 & 2031 is 27784 & 31825 respectively. The total land under residential use is 229.56 Ha which is 35.54% of the total town area and 40.37% of the total developed area. The overall density and net density of population is 34.72 PPH and 39.44 PPH respectively. The residential density in terms of total population accommodated in the existing residential areas of the town is 97.70 PPH. Again the net residential density in the northern zone alone is 69.85 PPH with total population in this zone 9143. Net residential area here is 130.89 ha.

As per the concept, Aluva town is envisaged as a higher order urban centre, a small town, shall have an average density of 75 - 125 PPH according to UDPFI standards. The town almost attained this density. The future population expected to be accommodated in the town is around 35000. Then the net density shall be 61.55 PPH. Different range of density pattern has to be adopted considering the physical nature of town, uneven distribution of population and dispersed pattern of residential settlements.

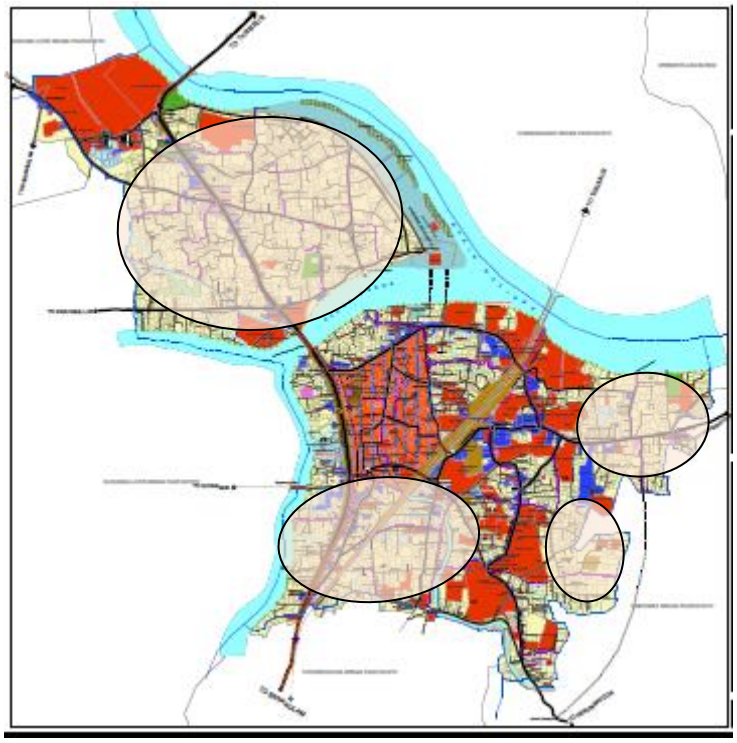

Fig: 21.1 The proposed residential areas in Aluva town

The northern half of the town is proposed to accommodate 12250 people by 2031, which is around 35% of the total future population. The remaining 65% of the population has to be accommodated in the southern zone. The high density of 150PPH and above shall be provided in the CBD of southern zone. A medium density of 100 - 150 PPH is envisaged for northern zone and the remaining area of CBD in the southern zone. An area of 277.49 Ha is proposed for residential use alone which is almost 42.95% of total area and 48.80% of the developed area of the town. The proposed residential areas are shown in **figure 21.1.**

21.1.2 COMMERCIAL USE ZONE

In Aluva town, a lot of businesses, commercial and banking activities are taking place. Most of the commercial activities of the town are spread over the southern half of the town. As per the UDPFI guideline, the commercial area required for small towns is 2-3% of developed area of the town. The existing land under commercial use in the town is about 39.86Ha (7.01%

of developed area) which is more than required even for a medium town. Hence no new commercial zones are proposed in the town. But certain re-arrangement of land use has been proposed with the concept of transit oriented development with the metro station at Aluva.

21.1.3 CENTRAL BUSINESS DISTRICT (CBD) AND SUB CENTRES

Anticipating intense development with the metro rail situated at Aluva, a strong CBD with mixed use high density compact development is envisaged nearby to the transit station of metro rail at Aluva. The CBD around the metro station and its contiguous area within the walkable distance of 500m shall be delineated and a detailed town planning scheme can be prepared in future with the concept of TOD and this area can be designated as priority development area. An area of 26.63 Ha (4.12% of total town area) is proposed as CBD including the metro station. The CBD area is as shown in **figure 21.2.**

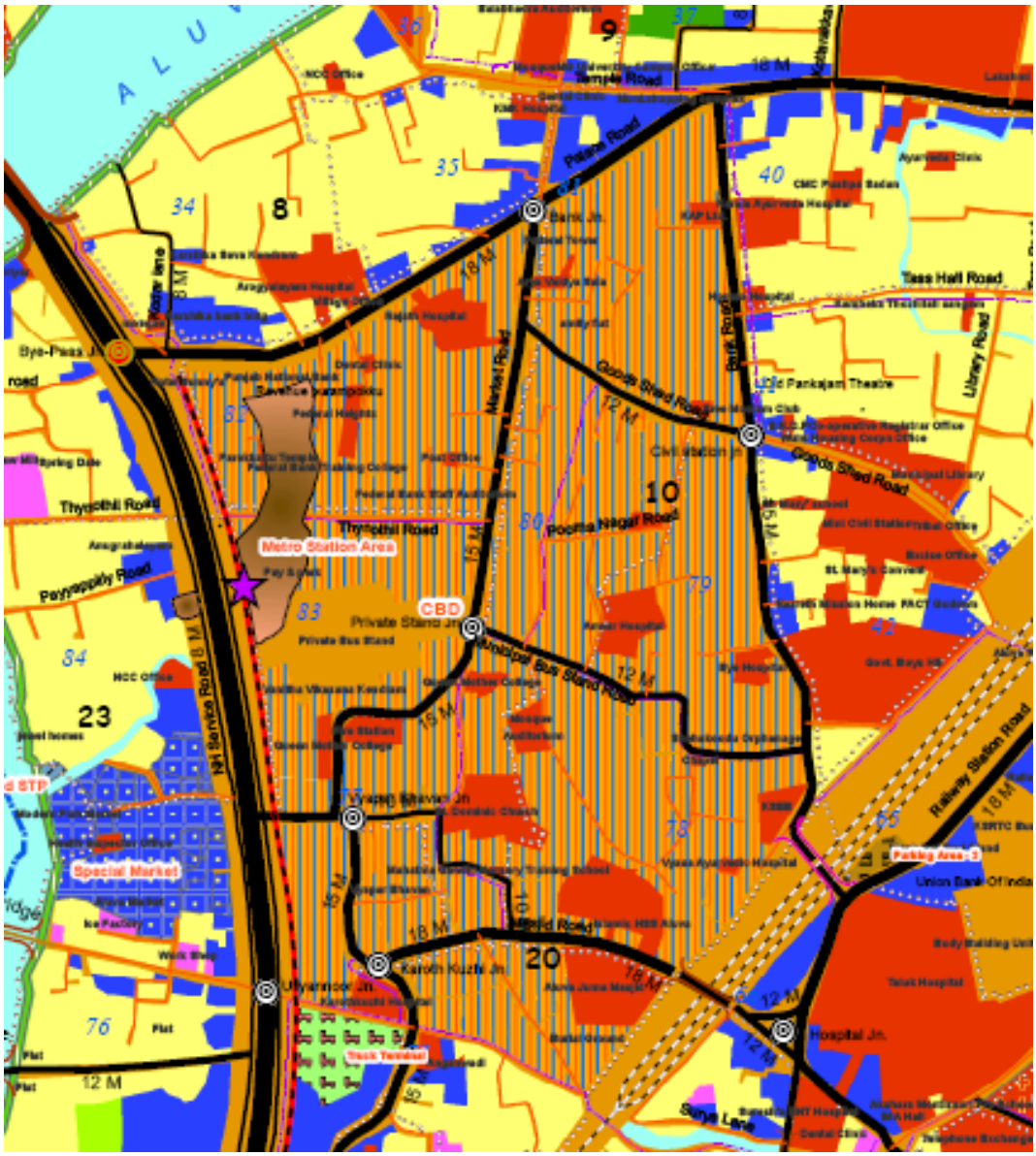

Fig: 21.2 The proposed Central Business District (CBD) in Aluva town

Two sub centres are proposed one at Paravur kavala and other at Theepetticompany kavala considering the locational advantage and as part of facilitating the residential activities in the northern zone of the town. The area proposed for two subcentre is 3.64 Ha(0.56% ot total town area) which is adequate as per UDPFI guideline to serve the function of a commercial centre in the northern zone. The proposed sub centres are shown in **figure 21.3.**



Fig: 21.3 The proposed sub centres at Paravur kavala & Theepetticompany kavala in Aluva town

21.1.4 INDUSTRIAL USE ZONE

The existing area for industrial use is 2.54 Ha. Land under Industrial use is getting reduced from 9.14 to 2.54 Ha from 1991 to 2010. Moreover there is no scope for heavy industrial development in view of the development scenario of the town. Hence no separate area is proposed for future industrial development. Future industrial promotion in the town is suggested to be achieved by permitting non-nuisance type industries including IT/ITES in various zones along with other uses.

21.1.5 PUBLIC AND SEMI PUBLIC USE ZONE

At present 114.15 Ha of land, which is about 20.07% of total developed area of the town is under Public and semi public uses. The high percentage of the area under this use is mainly due to a large number of religious institutions, the KWA water treatment plant, the KSEB substation, educational institutions etc. An area of 0.04 Ha is proposed as a special zone project for augmentation of waste water treatment plant. Except this no additional land is proposed for public and semi public land use zone. The existing public and semi public uses are proposed to be retained.

21.1.6 TRAFFIC AND TRANSPORTATION USE ZONE

The proposed road network is designed so as to get maximum accessibility to the existing and functional areas at minimum disturbances to the existing establishments. As a part to form better transportation network, major road, ring road and link roads are to be upgraded. The existing width of the road is proposed to be increased according to the hierarchy. The widening of NH 544, other road widening proposals, proposed truck terminal, proposed fly over, parking facilities etc. form part of the transportation proposals. The area under the proposed land use, shown in **figure 21.4** under this category is 79.36Ha, which is about 13.96% of the developed area of the town.

The Kochi Metro is going to play a vital role in the future transportation network of the town. The transportation network of the town shall therefore be oriented towards promoting Transit Oriented Development that is anticipated.

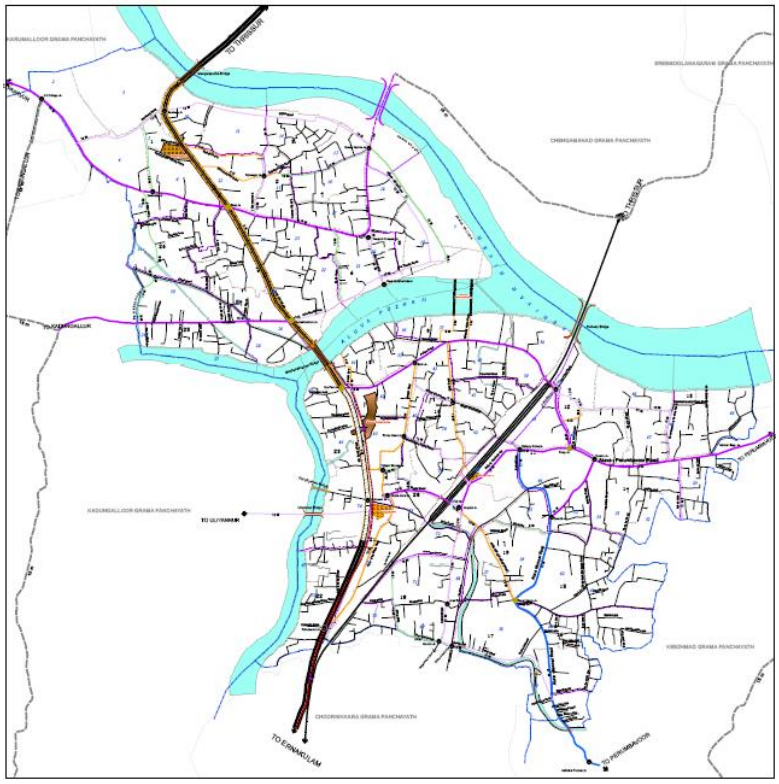

Fig: 21.4 The proposed transportation network in Aluva town

21.1.7 PARKS AND OPENSPACE USE ZONE

Well organized parks, large play grounds and big maidans for the congregation of the town's folk are the attractive elements of a town. At present the area under this category is 24.49 Ha which is almost 4.31% of the developed area and this area includes the Aluva Manappuram also. The area under park and open spaces in the town is more when compared to the other towns in the district. The total area specifically indicated for parks and open spaces is around 25.43Ha. An additional area of 0.94 Ha is proposed for parks and open space in the town.

21.1.8 DRY CULTIVATION USE ZONE

The dry agriculture area in the town comprises of coconut and mixed crop (active & non-active). Considering the nature of usage of plots and intense development of Aluva town,

the small parcels of dry cultivation areas could not be retained as such. Only contiguous parcels of active dry cultivation area are proposed to be retained. An area of 2.59 Ha is proposed to be retained as dry cultivation use zone. The urban agriculture methods like terrace farming, horticulture etc. can be promoted. In order to promote productivity and value addition to the agro-products, agro based knowledge centres and marketing centres may also be set up along with Krishi bhavan or Agricultural co-operative societies.

21.1.9 PADDY LANDS

The paddy in the town includes the uncultivated paddy of only about 1.85 Ha in ward 12 & 25 and also distributed in the town as small parcels. The uncultivated paddy area is to be retained in the proposed land use plan.

21.1.10 GREEN STRIP

A green strip of 5m width is proposed along the sides of River Periyar in order to curb the encroachment of water bodies and to encourage a healthy environment.

21.1.11 BURIAL GROUND / CREMATORIUM

There is number of burial grounds available (common as well as attached to churches) in Aluva town. The area of 1.15 Ha under this use is proposed to be retained.

21.1.12 WATER BODIES TO BE RETAINED

The Periyar river and its tributaries are the main water bodies flowing through the town. All the water bodies in the town of area 75.51Ha are proposed to be retained in the proposed land use plan.

21.1.13 SPECIAL USE ZONES

The following specific project areas are included in the special use zone.

1. Special market.
2. Mini market.
3. Nursing College.
4. Capacity augmentation of STP.
5. Proposed STPs (4 Nos.)
6. Truck terminal.
7. Parking area

The special use zones are shown in **figure 21.5.**

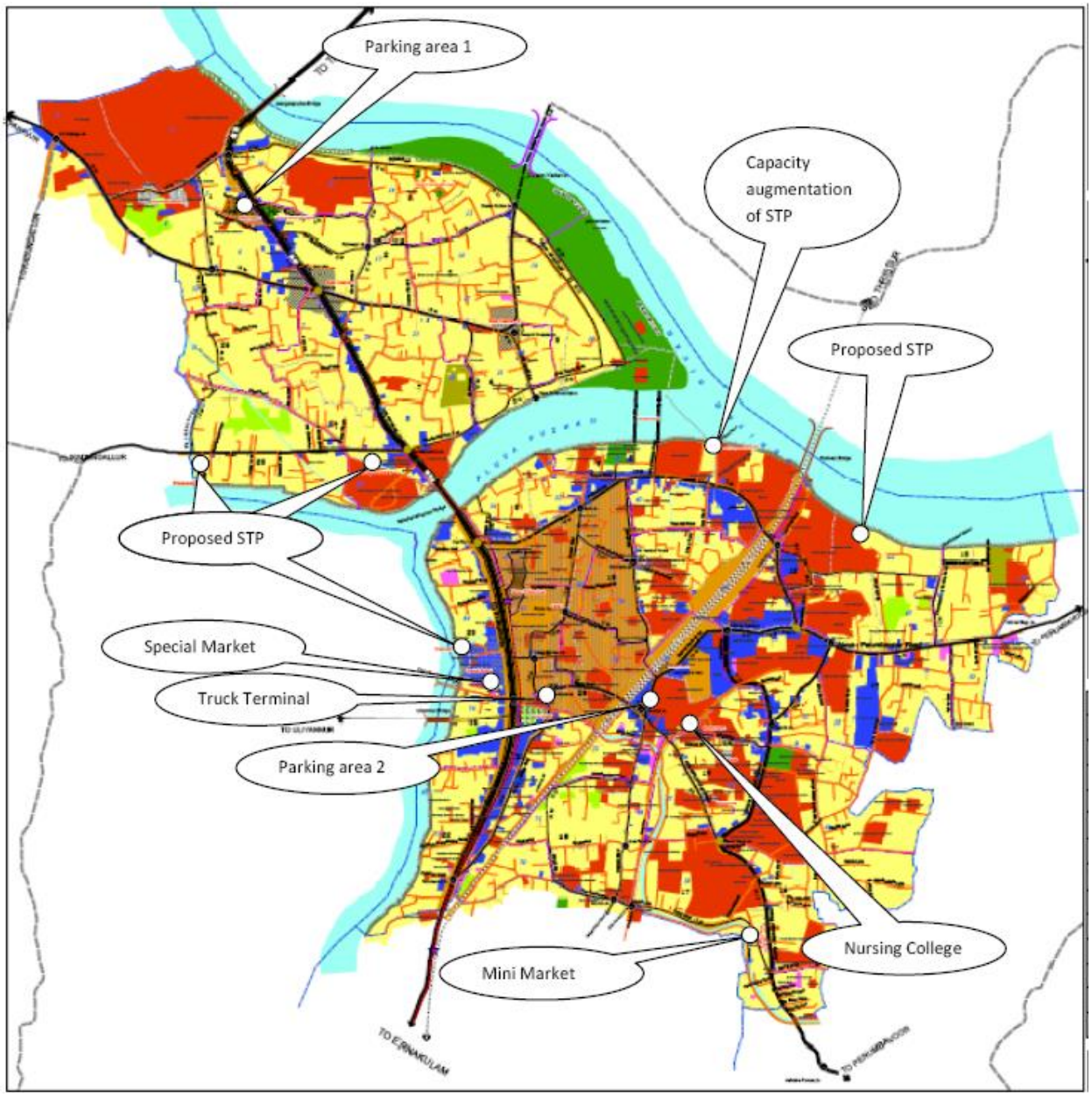

Fig: 21.5 The proposed projects under special use zone in Aluva town

21.2 PROPOSED LAND USE MAP

The proposed land use map and the area break up of each of the above proposed land use are given in **figure 21.6** and in **table 21.1** & **figure 21.7** respectively.

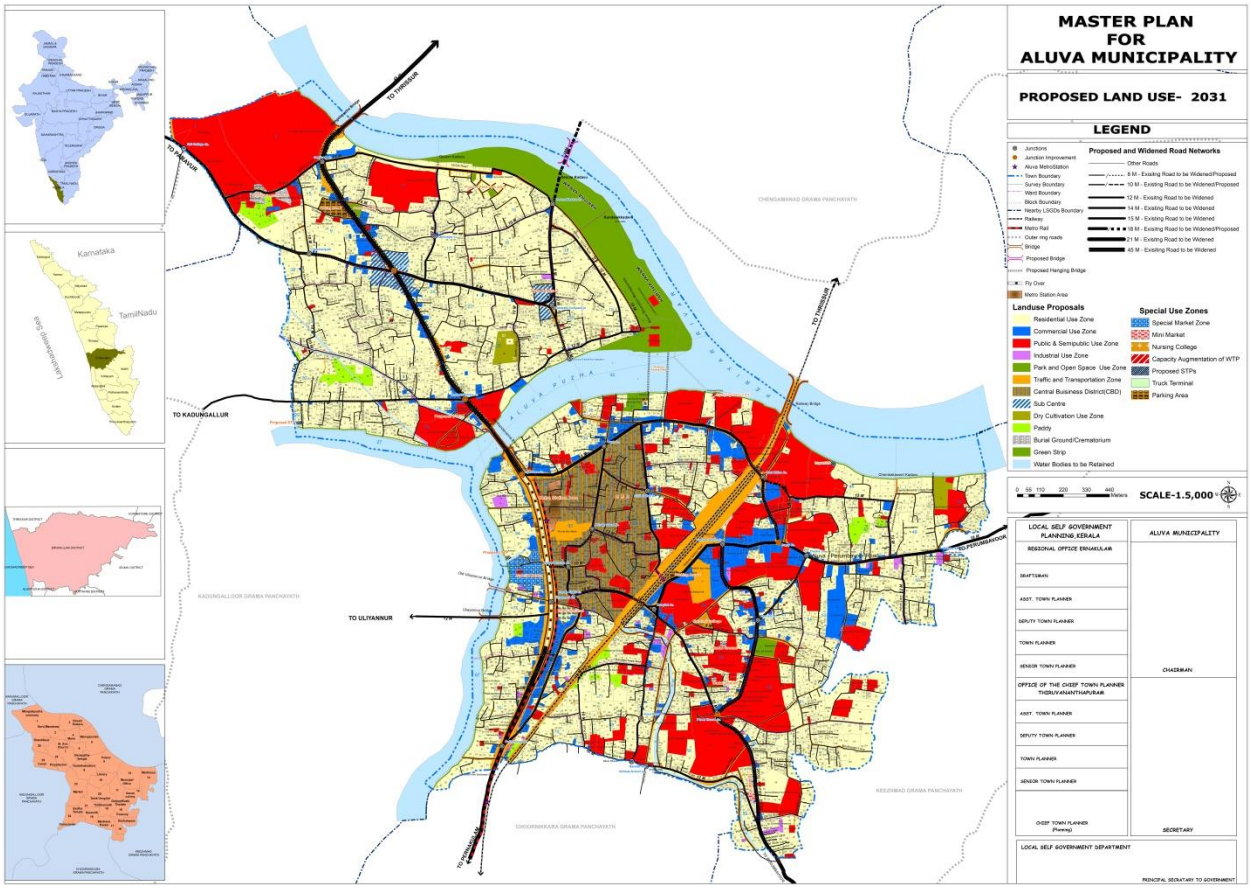

Fig: 21.6 Proposed land use map - 2031

Table: 21.1 Proposed land use break up of Aluva

Proposed Land use - 2031		
Land Use	**Area (Ha)**	**Percentage**
Residential Use Zone	277.64	42.97
Commercial Use Zone	28.55	4.41
Central Business District (CBD)	26.63	4.12
Sub centres	3.64	0.56
Industrial Use Zone	2.54	0.39

Public & Semipublic Use Zone	113.97	17.64
Traffic &Transportation Use Zone	81.26	12.58
Park & open space Use Zone	25.43	3.94
Dry Cultivation Use Zone	2.59	0.40
Paddy	1.85	0.29
Green strip	0.70	0.11
Burial ground/Crematorium	1.15	0.18
Water Bodies to be Retained	75.51	11.69
Special Use Zones		
Special market	2.28	0.35
Mini Market	0.16	0.03
Nursing College	0.34	0.05
Capacity Augmentation of WTP	0.04	0.01
Proposed STP	0.19	0.03
Truck Terminal	0.63	0.10
Parking Areas	0.97	0.15
Total	**646**	**100**

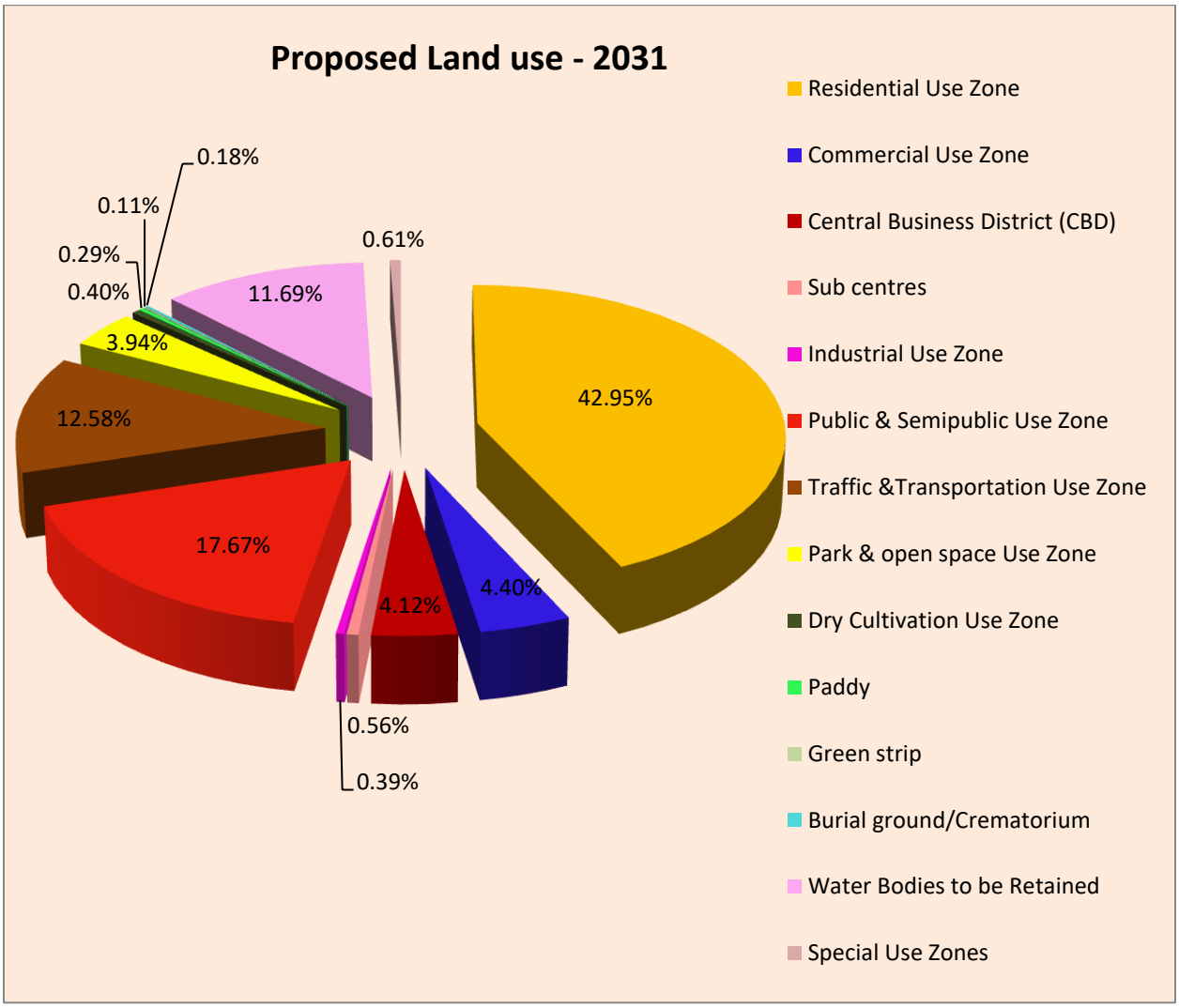

Fig: 21.7 Proposed Land use break up of Aluva town

22. DETAILED SECTORAL PROPOSALS

22.1 INTRODUCTION

This chapter deals with sector wise proposals of Aluva master plan. The sector wise proposals are derived based on development concept and development issues pertaining to the sector. The economic feasibility, environmental feasibility etc are also considered for finalizing the proposals. The sector wise proposals are furnished below.

22.2 ECONOMIC ASPECTS

22.2.1 TRADE AND COMMERCE

Aluva is developing as a service centre and trade & commerce is identified as one of the main economic base of the town. One of the development goals of the plan is to develop Aluva as an easily accessible regional level service centre in the district with adequate infrastructures.

CBD: - The northern terminal station of the proposed Kochi Metro is near By pass junction, Aluva. According to the transit oriented development concept, provisions are to be given for station area development. Hence it is proposed to allocate more land in this area for the mixed use activities where higher order commercial activities are also permitted. So this area is earmarked as Central Business District (CBD).

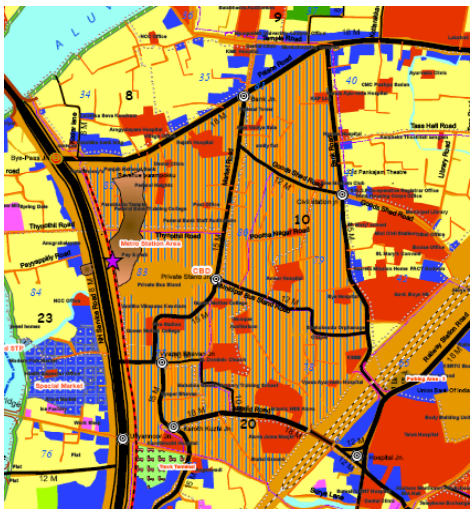

Fig: 22.1 The proposed Central Business District (CBD) in Aluva town

Sub Centre: - To bring the urban character to the northern portion of the town, distributions of organized commercial activities are to be provided in this area too. For this, two sub centres are proposed in Paravoor Kavala and Theepetty company kavala. This sub centre can also cater the commercial needs of the people residing in this locality.

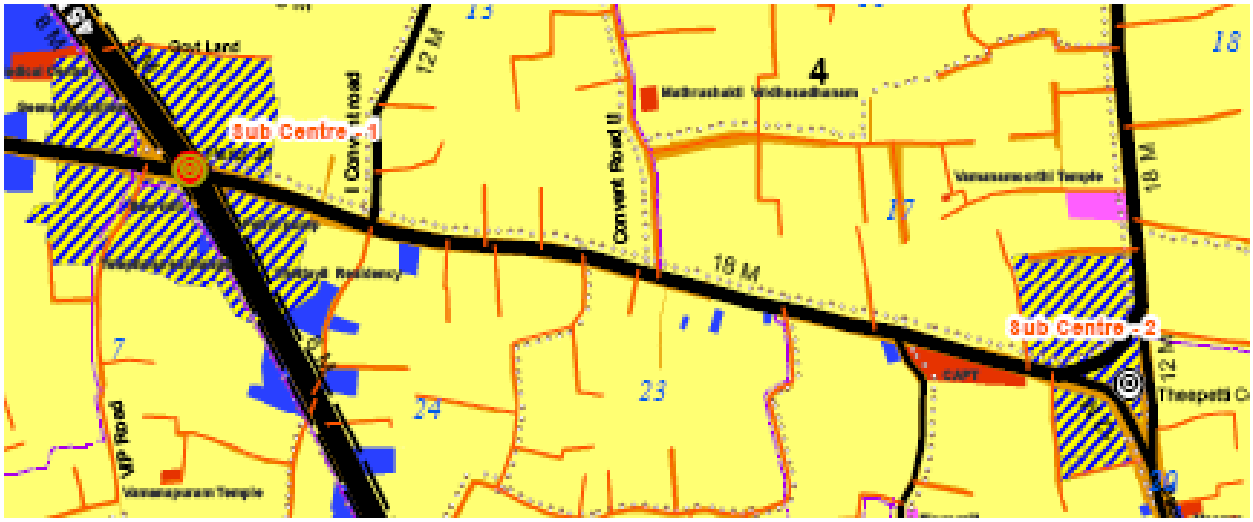

Fig: 22.2 The proposed sub centres in Aluva town

Aluva Municipal Market Reconstruction: - At present the municipal market is in a dilapidated condition. Hence it is proposed to reconstruct the municipal market with new building, drainage facility, waste disposal system etc.

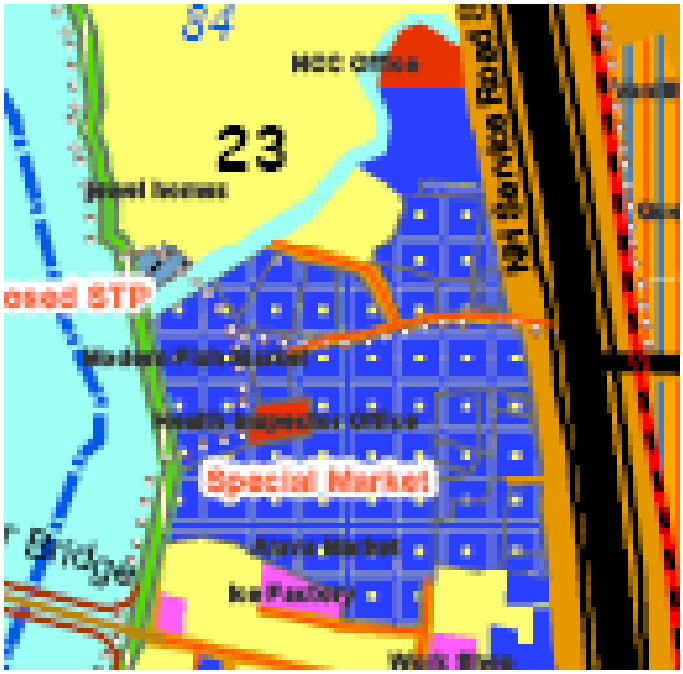

Fig: 22.3 The proposed municipal market in Aluva town

Minimarket: - In order to cater the commercial needs of the people of south east area a mini market is proposed in ward No. 17 in between Assissi road and Aluva Munnar road.

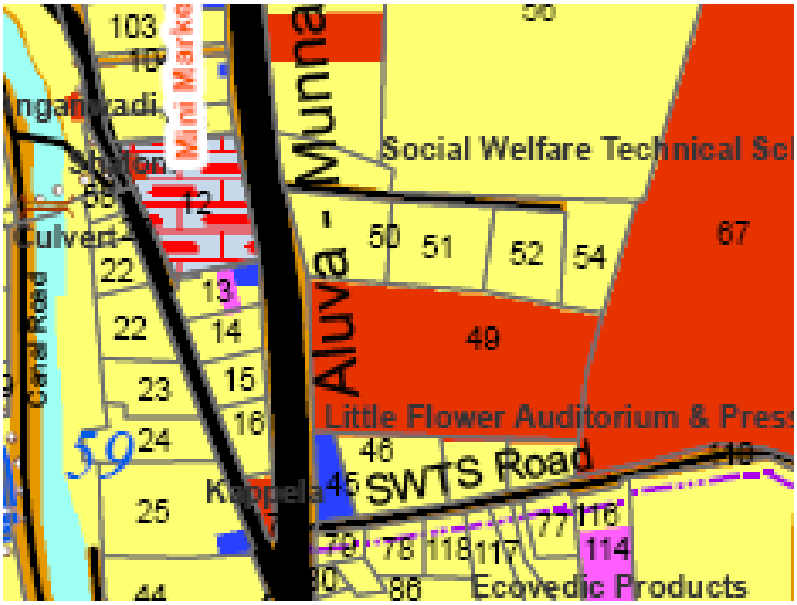

Fig: 22.4 The proposed mini market in Aluva town

Slaughter house: - Existing slaughter house in the municipal market is not functioning now. Hence it is proposed to open up this slaughter house with all modern facilities.

22.2.2 INDUSTRY

No major industrial units are functioning in Aluva at present and the industrial scenario of the town is limited to few small and micro level industrial units. Agricultural & rubber produces and raw materials for building materials are available in the region. Availability of all modes of transport and nearness to international airport at Nedumbassery is an advantage to establish IT based industries and can be promoted in other zones also. The main proposal evolved for the sector is small and micro level industrial units.

Small and micro level industrial units: - Rubber and agro based small and micro level industries can be promoted by giving financial and technological incentives in this sector.

22.2.3 AGRICULTURE

Only 8.12% of the land use is under agricultural use. Out of which 96% is mixed crop use (coconut, banana, vegetables etc.). Only 4% is paddy land. But all paddy fields are lying vacant or used for cultivation of crops like vegetables, banana, etc. Conservation of these paddy lands is essential considering the environmental equilibrium of the town. In the proposed land use, these factors are considered and the agricultural areas are zoned as paddy lands and dry agriculture area. The proposals of this sector are for promoting paddy cultivation, homestead cultivation and for maintaining the agriculture activities for environmental conservation leading to economic boost up. Paddy cultivation needs to be promoted for maintaining the environmental balance and for agriculture promotion.

22.2.4 ANIMAL HUSBANDRY

The activities in the animal husbandry sector shall be coordinated with other sectors especially agriculture sector. Coordinated efforts in a centralized manner is required in the production of egg, meat etc. in a profitable manner. The area which identified as suitable for agriculture activity is suitable for the animal husbandry also.

Poultry farm / Broiler farm

Small poultry farms with 100 to 150 hens per unit can be started in those areas identified as suitable for agriculture, for meeting the demand of eggs and meat of the town to an extent.

Marketing of products

Facilities for selling of the products like broiler chicken, egg etc are to be developed / attached to the markets of the Aluva town.

22.2.5 TOURISM AND HERITAGE

Proper connectivity is the major requirement for tourism development. Aluva is well connected through road, rail and air. National Highway, Aluva-Perumbavoor road, Aluva-Munnar road and other major roads serve the purpose. Proximity to International airport at Nedumbassery is another favourable factor. Kochi, the major tourism destination for domestic and international tourists is only 30km from Aluva. Aluva is a transit station to the tourist places like Munnar, Chinnar, Thekkady, Edamalayar, Bhoothathankettu, etc.

a. Periyar River Tourism Project

Due to the natural beauty of the place and the perennial flow with clean water, Aluva municipality has the potential to promote river tourism. In order to achieve this, Aluva municipality has to develop infrastructure facilities which will enable tourist to visit, stay and enjoy river related recreational activities. Basic infrastructure needs of tourists shall be satisfied. Major requirements are proper transportation facility, accommodation facility, (home stay) conservation of water bodies, hygienic environment etc. Walkway throughout the river bank is proposed as a measure of river protection/river tourism.

The Bathing ghat at Manappuram, walkway along river bank, river beautification schemes, water sports/water recreation, training centre for river swimming, river front cultural centre, river side accommodation etc. form part of the River Tourism Project. Two hanging bridges across the river “Periyar” are also proposed.

River bank is protected by top gardening, side with turfing 1:1 slope and toe with 2m high dry rubble masonry. Improvement of roads leading to Manappuram shall also form part of tourism project.

The proposed River Tourism Project enable the municipality to increase the economic activity in the town through direct revenues from the project as well as indirect economic activity which will result from the tourist inflow to the town. The strategy behind this project is to keep up the economic activity in the town and achieve sustainable development which broadens the economic base of the municipality and substantial positive economic and cultural benefits to the local community as well.

b. Excursion Centre

Aluva Palace located at the banks of river periyar has to be conserved considering its heritage value. An excursion centre for touring parties in the Palace area with picnic facilities, restaurant, parking place and facilities for entertainment of children etc are the proposals.

c. Tourism Circuit

Utilizing the location advantage and tourism potential of the town, a tourism circuit connecting Aluva with adjacent tourist spots like Fort Kochi, Mattanchery, Munnar, Thekkady, etc. is proposed.

22.3 HOUSING

Housing provision shall be linked with other programmes such as sanitation, potable drinking water and waste disposal etc. with cost-effective use of natural resources, land being one of them. Inadequate and inequitable supply of serviced land has been the most significant bottleneck for the promotion of housing activities.

As far as housing sector is concerned creation of complete data base is suggested to evolve various projects/programmes on housing. Long term programmes and short term strategies have to be introduced to tackle problems in housing.

In this respect, the reform measures suggested in the National Housing Programme are:-

- Measures to control the continuing spiral of land prices, speculation, shortage of developed land, and increasing pace of unregulated and environmentally damaging land development;
- Restructuring of Housing Finance Institutions (HFIs) to meet the housing finance needs of the formal sector as well as the poor and the informal sector.
- Increased involvement of NGOs/CBOs/Cooperatives to promote self-help, mutual-help, thrift and credit, self-management, community empowerment, etc.
- Forging strong partnerships between private, public and cooperative sectors to enhance the capacity of the construction industry to participate in every sphere of housing
- Plan housing complexes and industrial estates which include a provision for hostel accommodation for working women etc
- Implement central and state sector schemes and programmes pertaining to housing and infrastructure sector.
- Negotiated purchase of land between the owner(s) of land and the project proponents would be an ideal way to acquire land to give right value to the land owners.
- Land being a limited and costly resource, needs to be planned to provide for rationalized and optimum density use.
- Substantial pockets of land remaining underutilized belonging to central/state/public/ private sector units and such unutilized/ underutilized land should be considered for redensifcation and utilization, excluding the land needed for the purpose for which the land was originally given to the unit concerned.
- The land policy concerned and land-use regulations should provide statutory support for land assembly, land pooling and sharing arrangements.
- The land or shelter provided to the poor / slum dweller would as far as possible be made non-transferable for a period of ten years.

In Aluva town, prepare the local level plan for housing. It is necessary to earmark a portion of land at affordable rates for housing for EWS & LIG. Design of public housing programmes has to be done taking in to account the land uses concerned. Development

agencies, private sector etc. could be directed to ensure 20 to 25% land in new housing colonies / projects for facilitating the housing needs of EWS/LIG household.

22.4 INFRASTRUCTURE

22.4.1 Physical infrastructure

a. Water supply: -There are no issues in the town regarding the supply of drinking water. But the problem is in distribution system. There is urgent need to replace the old pipes.

b. Drainage: -A complete drainage system is not available in the municipality. A detailed drainage plan is to be prepared for the municipality before taking up works on the drainage network.

c. Sewerage: -The town has no efficient sewerage network. The existing sewage treatment plant is not working satisfactorily because of the improper maintenance. Hence an augmentation scheme is proposed for the existing sewage treatment plant. And four number of sewage treatment plants are proposed. The locations are Aluva water works, near market, near Priyadarsini municipal town hall and at the end of Perkkathodu. By constructing these plants, entering of waste water from the town into Periyar river can be avoided.

d. Solid waste disposal: - A centralized solid waste treatment plant is functioning at Brahmapuram under the ownership of Kochi Corporation. This plant has the capacity to treat the waste generated from all the adjacent local bodies of Kochi Corporation. So waste generated from Aluva municipality can also be treated at the Brahmapuram treatment plant. But proper mechanism for collection and transportation of waste shall be ensured by the municipality. Along with this, it is essential to develop decentralised solid waste management system for the town. Every house shall be provided with biogas plant by subsidy from municipality. Installation of biogas plant shall be made mandatory. In markets, where solid waste generation is considerable, the municipality shall construct and maintain biogas plant and utilize the energy for other purposes. In hotels and restaurants it should be insisted to provide biogas plant. With the help of Kudumbasree, solid waste can be utilized for vermi composting, recycling etc.

e. Energy

The proposal in the power sector is furnished below.

- *Improvement of Power distribution:* Installation of new Transformers, 11 KV lines etc.
- *Street Lighting:* Provision of High mast lights and Sodium vapour lights in CBD Area and at road intersections. Provision of separate street mains for street lights.
- *Electrification of houses:* Electrification of all houses especially the houses of economically weaker section.
- *Non-Conventional Energy:* Incorporating energy conservation and efficiency by adoption of Non-conventional sources of energy like bio gas, solar energy and green buildings etc.

22.4.2 SOCIAL INFRASTRUCTURE

a. Education

Educational sector of the town satisfies the requirements suggested by UDPFI Guidelines except for professional colleges. But professional colleges are available in adjacent local bodies. So this facility is also available within the distance suggested by UDPFI Guide lines. Even if the available educational institutions are sufficient for the plan period, improvements of infrastructure facilities in educational institutions are recommended. In this respect, new buildings, play grounds, toilets, computer lab, language lab, internet facilities, drinking water, vehicles etc. shall be provided based on requirement in the premises of existing schools. Additional facilities required as per local level analysis are:

(i) *VHS School:* - A VHS school in the northern part of the town.

(ii) *Nursing College:* - A nursing college in ward no.19.



Fig: 22.5 The proposed *Nursing College* in Aluva town

b. Health

Health facilities are adequate as per UDPFI Guide lines. But super speciality hospitals or hospitals with advanced facilities like CT scan, EEG, etc. are not available in Aluva municipality. In District urbanization report Aluva is classified as a second order settlement. Hence Aluva has to function as a service area providing higher order facilities to the surrounding grama panchayats. Hence it is suggested to upgrade the general hospital to a super specialty hospital by providing all necessary departments, equipments and infrastructural facilities including trauma care units. The other projects which are to be implemented in health sector are detailed below.

(i) Centre for aged and disabled people: - Centers for the care of aged people, disabled children, mentally retarded person etc

(ii) Health Tourism: - Promoting health tourism considering the high connectivity of the town.

22.5 ENVIRONMENT

Paddy fields, water bodies and ponds are included in the category of environmentally sensitive areas of the town. Strict regulation has been included in the zoning regulation for the protection of the environmentally sensitive areas.

22.5.1 CONSERVATION OF PADDY FIELDS

Promotion of active paddy cultivation is the most effective way for conserving the paddy lands in the town. In order to conserve paddy lands of the town, the strict enforcement of the "Kerala conservation of paddy land and wet land Act 2008" is to be done by the conservative efforts of municipality and public.

22.5.2 GREEN STRIP FOR RIVER PERIYAR

A green strip of 5m width is proposed along the sides of River Periyar in order to curb the encroachment of water bodies and to encourage a healthy environment.

22.6 CIVIC / RECREATION FACILITIES

An intensive residential area is envisaged in the northern portion of the municipal area. In order to cater the recreational needs of the people of that area, two parks are proposed.

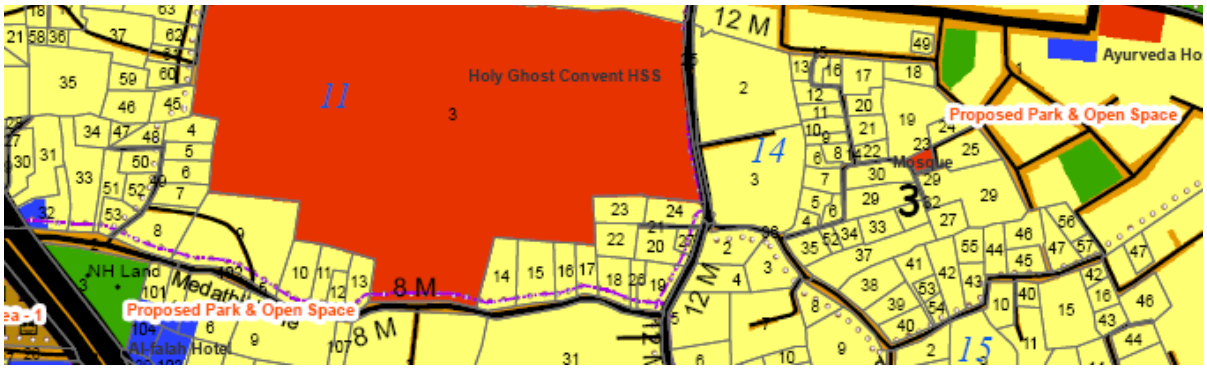

Fig: 22.6 The proposed *Park and open spaces* in Aluva town

23. TRAFFIC AND TRANSPORTATION PLAN

23.1 INTRODUCTION

Traffic and Transportation is the most critical component of any town because it defines and determines both existing and future patterns, typology of growth and development of the town. Since, the traffic and transportation is the main function of land use, the road network would be required to be integrated with the land use in order to provide high degree of connectivity and travel options between various land uses. Accordingly, traffic and transportation plan of Aluva town up to the year 2031 has been proposed based on the proposed land use plan for the town.

23.2 PROPOSED ROAD NETWORK PLAN

The proposed road system is designed so as to get maximum accessibility to the existing and proposed functional areas at a minimum disturbance to the existing establishments. Aluva is connected to all major cities in the country by air (Cochin International Airport at Nedumbassery, 10 km away), rail, road and sea (nearest port Cochin, 22 km away). Aluva has a network of roads, which connects it to the nearby towns and cities. The Ernakulam-Thrissur road (National Highway 544 - Aluva bypass) passes through the town. Other major roads are Paravur road, Kadungalloor road, Perumbavoor road, Aluva Munnar Road and Thaikattukara road.

Aluva is as much a quaint and interesting town as it is a strategic one. Communal amity and economic well being are the characteristic hallmarks of this town. Aluva serves as a transit point to the towns of Angamaly to the North, Kalamaserry to the south, North Paravur to the west and Perumbavoor to the east.

Aluva town is located centrally on the map of the state, given this strategic location, the town serves as a major nodal point for movement, of both passenger and goods traffic between the northern and the southern regions of the state. Aluva town therefore bears the burden of sustaining not only the destined traffic, but also carries the burden of a large volume of by passable traffic.

The Periyar River system segregates the town into two parts. The NH 544 is the only link between the two parts of the town. The NH 544 passing through the town provides favourable surface characteristics. Aluva Town occupies a strategic position on the map of Kerala State. Situated centrally, the town serves as a major conduit for travel between the southern and northern parts of the State. Aluva is linked to the high ranges by the Aluva- Munnar Road. Besides, the town is linked to the municipal town of North Paravur and the coastal regions, such as Vypeen, Munnambam etc.

The configuration of the existing road network within Aluva town does not reflect any regular pattern, although the northern half resembles a combination of radial and grid pattern. From the NH 544 emanates roads of various denominations namely the Sivatemple (manapuram road) road which leads to Aluva sand bank. The Kadungallur road and the Aluva - Paravur road leading to various destinations on western region of the town also takes off from the NH 544.

The NH 544 passing through Aluva town bears semblance to the vertebral column of the road network. From the NH544 emanates roads of various denominations namely the Aluva-Ernakulam road linking the Pulinchauvd junction and Karothkuzhi junction, Aluva- Perumbavoor road, Paravur road and Kadungalloor road leading to important destinations within the state. The roads within the town cater to destined traffic as well as through traffic. The mix of the two components of traffic has led to severe congestion on the city roads.

The roads of Aluva town are required to carry a traffic load much higher than its capacity. The roads here are reeling under the impact of heavy traffic load. The vehicular volume entering Aluva town through Pulinchauvd junction is an estimated 77000 PCUs per day. The volume- capacity analysis reveals that many roads within the town are required to support a vehicular load higher than their capacity by more than two times.

In addition to the Periyar river the broad gauge railway line passing through the CBD of the town, also segregates it into two halves- eastern half and western half. Within the town there are two rail over bridges (ROBs), one on Masjid road and the other on Palace road. Vehicles converging from different directions are routed either through the palace road or the

Pulinchauvd- Karothkuzhi junction - Masjid road. Other than this there are no points within the town where the railway track can be crossed. This has led to increase in trip length for travel within the town. The taluk head-quarter town of Aluva is a medium sized commercial centre. The vegetable and provision wholesale and retail market here was a major trading centre from very ancient times. The market and the railway station are the principal trip generating points of the town.

In Aluva town Paravur junction,Thottakkattukara jn.,Pump jn. Railway station jn. are the main parts of the town, because of its concentration of activities like commercial, public and semi-public activities, location of bus stop etc. The location of trip generators such as the railway station, KSRTC and private bus stands within the CBD of the town has also been responsible for the vehicular congestion.

All the existing problems as well as the future traffic and transportation problems likely to arise in the town were taken into account while formulating the long term road master plan for the horizon year. The development proposals should give importance to increase the capacity of major intersections by proper planning and design of these junctions. The capacity of the road is however undermined by the traffic junctions namely the Thottakkattukara and Paravur junctions. The capacity of the NH could be augmented by scientifically redesigning the junctions. Special emphasis should also be given to improve the pedestrian facilities and in developing off-street parking lots.

On the basis of proposed development activities and the projected volume of traffic, an alternative road master plan has been formulated for the town.

23.2.1 MAJOR ROADS

a) National Highway 544- Aluva bypass

The National Highway 544 passes through the town facilitating north - south connectivity. The NH 544 enters at Mangalappuzha and exits through the Pulinchuvad junction. This is proposed to be widened to 45m.

b) Aluva – Munnar road(SH 16)

The Aluva- Munnar road State Highway takes- off from Kms 0/300 of the eastern approach road in the vicinity of the Aluva railway station and leads to Munnar .The road is classified under the state highway category. The total length of the road running through Aluva municipality is 1.7 Kms. It starts from pump /railway station jn to municipal limit. This is proposed to be widened to 21m.

c) Aluva –Paravur Road

It intersects the NH 544 at Kms 1/800 and leads to the municipal town of North Paravur. It starts from Paravur Jn. to UC College junction. This is proposed to be widened to 18m.

d) Aluva – Perumbavoor road

This is one of the major roads leading out of the town. It starts from Pump jn. to municipal limit on Perumbavoor road. This is proposed to be widened to 18m.

e) Aluva - Kadungalloor road

The Aluva – Kadungallor road originates from the vicinity of the sand bank of the Siva temple. This road links Thottakkattukara jn to the municipal limit. The widening road proposal is 18m.

f) Palace road

The road commencing from the By-pass junction, passing through Bank junction and finally terminating at Pump junction. The widening road proposal is 18m

g) Aluva- Ernakulam Road (old NH Road section) SH:

The total length of the old NH road is 1.98 kms. The road commencing from the By-pass junction, passing through Bank junction and Karothkuzhi junction and finally terminating at Pulinchauvd junction. The widening road proposal is 15m.

h) Thaikkattukara Road (Nazareth road)

The road has a narrow carriageway ranging from 2.6m to 3.0 m. The Thaikkattukara road is the southern arm of the Taluk Hospital junction. It runs through a residential colony and

joins the NH544 near Choornikkara. It provides a short and convenient link from Aluva town to Choornikkara area located on the NH.544. The widening road proposal is 12m.

23.2.2 OTHER MAJOR ROADS & OTHER ROAD IMPROVEMENT SCHEMES

As per the proposed road network the width of main roads other than NH 544 ,Aluva – Paravur Road, Aluva – Perumbavoor road, Aluva – Munnar road, Aluva - Kadungalloor road , Aluva- Ernakulam Road (Old NH Road section) ,Thaikattukara Road (Nazreth road), Palace road etc. varies from 8 m, 10 m, 12 m and 15 m. The **table 23.1** shows the proposed width of the major roads on priority basis.

Table: 23.1 Proposed widths of the major roads on priority basis.

From	To	Existing Width (m)	Proposed Width(m)
	Priority 1		
	NH 544		
North municipal boundary	South municipal boundary	30	45
	Aluva- Munnar road (SH 16)		
Railway station jn	Power house jn	14	21
Power house jn	Municipal limit.	12	21
	Aluva – Paravur road		
Paravur jn	UC College junction	15	18
	Aluva – Perumbavoor road		
Pump Jn.	Municipal limit on perumbavoor road	12	18
	Aluva-Kadungalloor road		
Thottakkattukara jn.	the municipal limit	6.5	12

	Palace road		
By-pass Junction,	Bank Junction	15	18
Bank Junction	Pump Junction	15	18
	Market road		
Bank jn	Karothukuzhi jn	10	15
	Aluva-Ernakulam Road (a portion)		
Karothukuzhi jn	Pulinchauvd jn	12	15
	Priority 2		
	Desamkadavu- paravur road		
Desamkadavu jn	Theeppetticompany jn	10	18
Theeppetticompany jn	Paravur jn	10	18
	Bank road		
Railway line (proposed over bridge)	Palace road	12	15
	Catholic syrian church road		
Hospital jn	Power house jn	7	15
	Railway station road		
Hospital jn	Pump jn	12	18
	Masjid road		
Karothukuzhi jn	Hospital jn	7	18
	Link road		
Desom Kadave	Across Manappuram	-	18

Zeenath jn	Aluva- Perumbavoor road	10	14
	Siva Temple Road (manapurath road)		
Thottakkattukara jn	Aluva manappuram	7	12
	GCDA road		
Seminary jn	Desamkadavu jn.	7.5	12
	Convent road I		
Desamkadavu – paravur road	Rajivnagar jn	5.5	10
Rajivnagar jn	GCDA road	5.5	12
	Seminary road		
Seminary jn	Paravur road	7	12
	Althara – GCDA road		
Desamkadavu – paravur road	Siva Temple road	7	12
	Old desam road		
Theepetticompany jn	Aluva kadathukadavu		12
	Link road		
Near Uliyannur jn	Periyar river (Aluva puzha Tributary)	3	12
	Cherakada temple road		
Aluva – Ernakulam road	Railway line near underpass	3	12
Railway line near underpass	Nazreth road	7	12
	Goods shed road		

Market road	Civil station jn	11	12
	Municipal bus stand road		
Private stand jn	Bank road	7	12
	Canal road		
Nazreth jn	PVP Canal road	4	12
	Chembakassery kadavu road		
Aluva – Perumbavoor road	Near chempakassery cross road	8	12
	Water works road		
Chempakassery kadavu road	Post office jn at palace road	7	12
	Asan lane		
Aluva – Perumbavoor road	Municipal boundary	5	12
	Priority 3		
	Shanthi lane		
Siva Temple Road (manapurath road)	Desamkadavu – paravur road	3	10
	Desam kadavu – velamparambil road		
Desam kadavu jn	velamparambil road	4	10
	New Link road		
Convent roadII	Velamparambil road	-	10
	New manappuram road		

Desamkadavu jn-	Siva temple road	6	10
	Canal road		
Kadungalloor road	Near seminarypady at aluva – paravur road	5.6	10
	Link road		
Seminarypady	Seminary road	8	10
	Link road		
Vyapar bhavan jn	Masjid road	4	10
	Azad road		
Railway line(near proposed under pass)	Town limit road	4.5	10
	Town limit road		
Azad road	Nazerath jn.	5	10
	Madathil lane		
NH544	Convent road I	5	8
	Velamparambil road		
Aluva – Paravur road	Near Convent road II	4	8
	Kodar Lane		
Palace road	Periyar river	4.5	8
	ESI Road		
Aluva – munnar road	Pipeline road	6	8
	Link road (between GGHSS and municipal office)		
Palace road	Water works road	4	8

	NH service road(both side)		
Marthandavarma bridge	Pulinchuvad jn	6	8
Marthandavarma bridge	Mangalampuzha bridge	-	8

23.2.3 JUNCTION IMPROVEMENT PROPOSALS

Traffic junctions are very complex areas of multiple traffic movement. The following junctions should be improved for the efficient movement of traffic.

1. Aluva By pass Junction
2. Thottakkattukara Junction
3. Paravur Road Junction
4. Power House Junction
5. Pump Junction.

23.2.4 TERMINALS

Truck terminals*:* At present, there is no truck terminal in Aluva town. A Truck terminal is proposed near Uliyannur junction.

23.2.5 PEDESTRIAN FACILITIES

(i) 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 Aluva town, considering the scarcity of land, sidewalks with a width of 1.5m to 2.5 m is proposed for all types of roads including arterial, sub-arterial, collector and local roads.

(ii) Marked crosswalks and enhancements: Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help to designate right-of-way for motorists to

yield to pedestrians. For Aluva town, cross walk markings are desirable at all arms of the major intersections and at major high pedestrian volume locations.

23.2.6 PARKING FACILITIES

Considering the parking demand observed at many of the road stretches, a combination of commercial cum automated parking system is proposed for Aluva town. The tentative locations for provision of these facilities are given below:

i) Sub-Jail Road – The first 100m of this road is more or less free from parking activities. From this point to Zeenath junction the parking demand is high.

ii) Palace Road- Scattered parking

iii) Market Road-From Bank junction to market moderate parking. In the market area parking of commercial effects smooth flow of traffic

iv) Railway station road- Railway station junction to Karothkuzhi junction Parking of autos, taxis and personal modes are very high.

The proposed traffic and transportation map is shown in **figure 23.1**

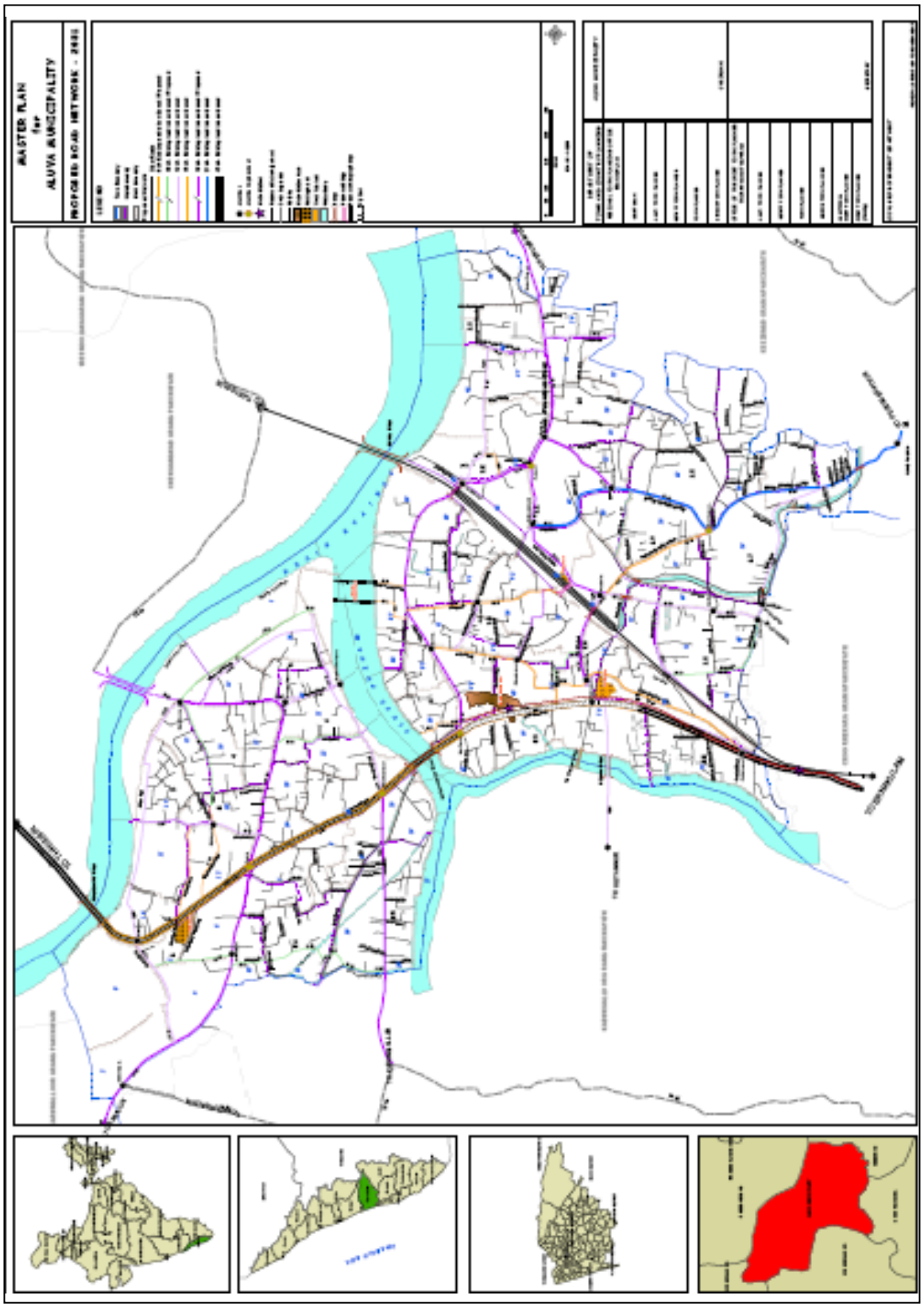

Fig: 23.1 The proposed traffic and transportation map

Cross section of the roads of 45m, 30m, 27m, 21m and 18m,15 m widths are shown in **figure 23.2.**

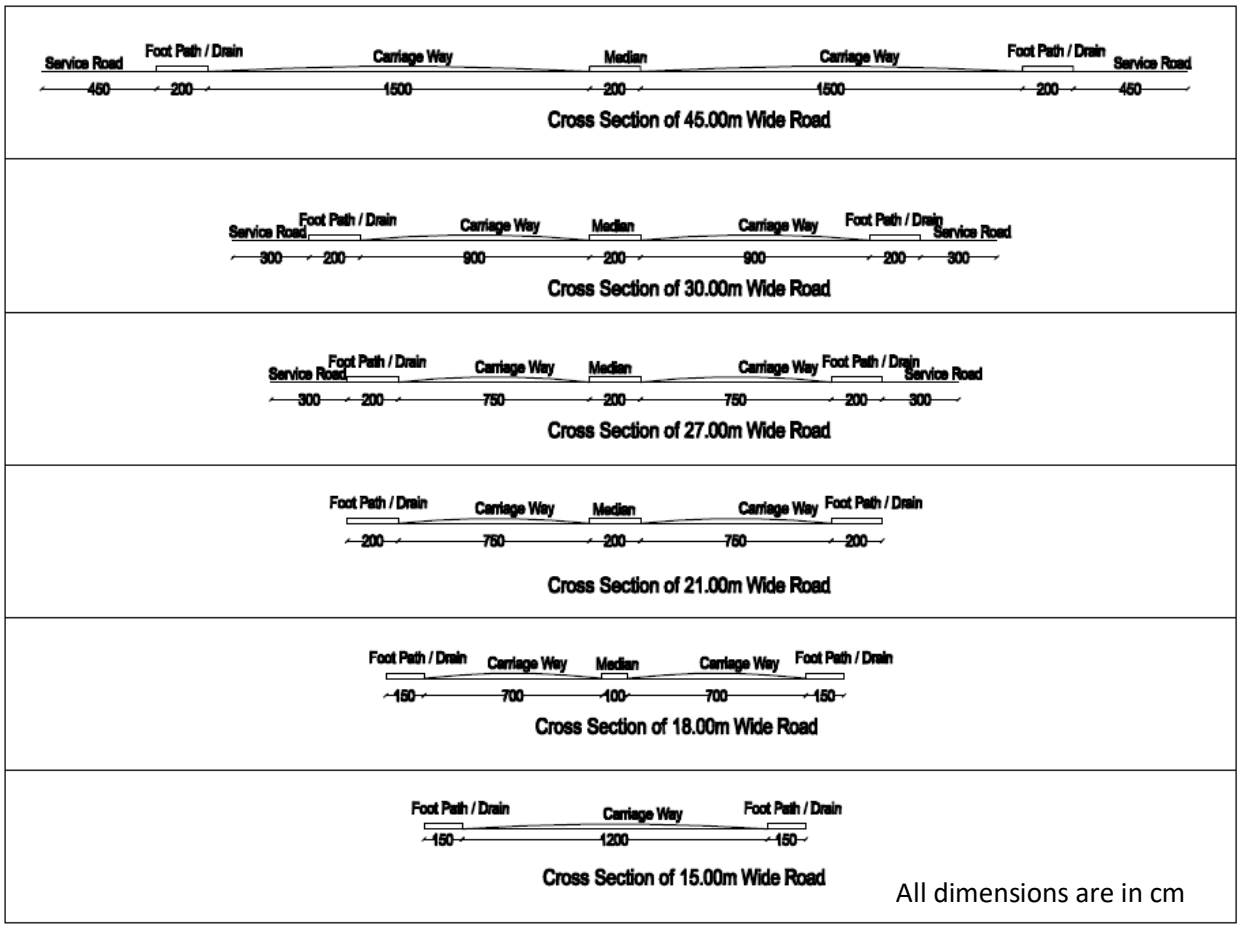

Fig: 23.2 Cross sections of different road width

23.3 BRIDGE

Vehicles bound northwards from Aluva have necessarily to make use of both the Marthandavarma bridge and the Mangalampuzha bridge. No other option is available at present.

Hanging bridge is proposed from Kottarakadavu road to Aluva Manappuram by crossing Periyar river. An over bridge is proposed near taxi stand for crossing the railway line to reach near the KSEB. A bridge is also proposed at Desom Kadave.

23.4 TRANSPORTATION – RAILWAY

23.4.1 KOCHI METRO

Kochi Metro is a rapid transit system for the city of Kochi in Kerala, India under the control of DMRC. Kochi metro is an efficient public transportation system with reduced level of air and noise pollution. As the population of the city grows, the share of public transportation system should also increase. But the roads do not have adequate width and the city caters mixed traffic system. The alteration of these conditions does not meet the traffic demands. With inadequate public transport system people, passengers will shift to private vehicles which will not only aggregate the congestion on the roads but will also increase the pollution level. So there is the need for a good public transportation system and planned Kochi metro construction.

The starting station of Kochi metro is at Aluva. Once the Metro becomes functional, it will lead to the overall development of the town so that the transportation system should be improved to cater the anticipated development.

23.5 WATER TRANSPORT AS AN OPTION

Water transport is not new to Aluva town. In the by gone days water transport was the mainstay for passenger and goods movement. The Periyar river is linked to the National Waterway III. By virtue of this Aluva town is linked to Kochi which, is the principal trip generation point as far as Aluva town is concerned. The trip generated here includes both passenger and goods trips.

Congestion caused by vehicular traffic within Aluva town cannot be solved by constructing new roads alone. The only cost effective and environmentally desirable option is to encourage diversion of road based traffic to other modes like waterways and railways.

23.6 AIRPORT - SEAPORT WATERWAY CONNECTIVITY

Cochin Port / and the Inland waterway terminal at Vallarapadam is linked to the Cochin International Airport by a chain of waterways, made up by the following water bodies:

i) Vembanad lake section of the NW- III between Kochi city and Vypeen Island

ii) The section of the Udyogamandal Canal (N. W III)

iii) The Edamala arm of the Periyar river passing through Aluva

iv) The Chengalthodu linking the Periyar and Nedumbassery.

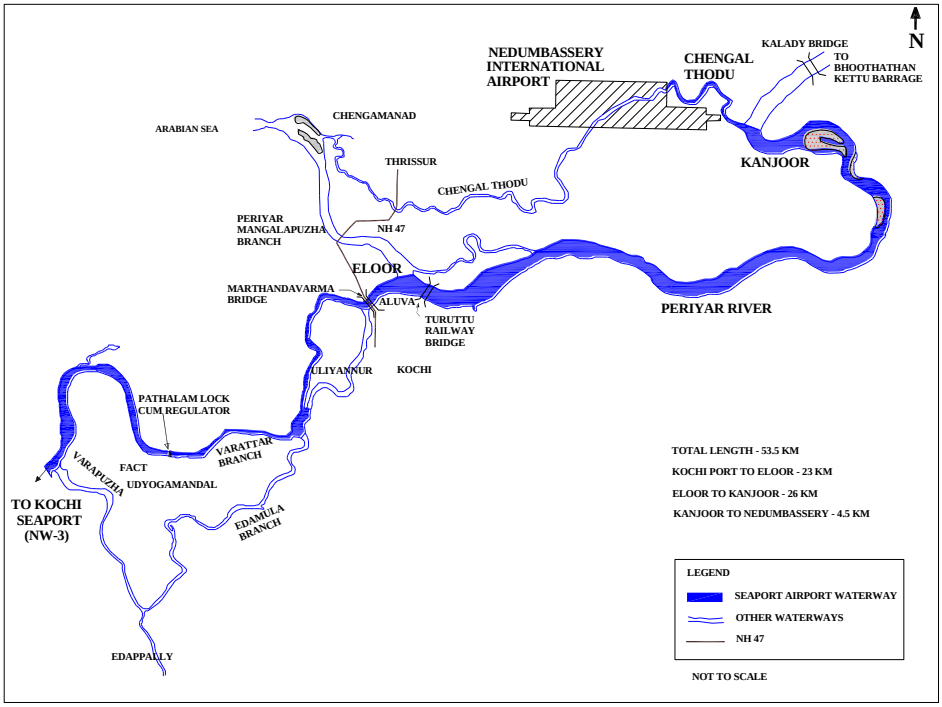

Fig: 23.3 The Alignment Of The Proposed Waterway Route Between Kochi And The International Airport

The alignment of the proposed waterway route between Kochi and the international airport is presented in **figure 23.3.** The total length of the waterway route between Kochi and the International airport is 53 Kms. The first two sections of the waterway mentioned above constitute a part of the National Waterway No.III. Favourable condition exists for navigation application across both these sections.

The third section is made up by the Edamala arm of the Periyar River. The minimum depth necessary for navigation application is not available across several points in this section. This stretch has rocky beds at several points, which are hazards for navigation.

The fourth section is the Chengalthodu and it links Periyar river (Kanjoor) to the International Airport site at Nedumbassery. It has a length of 4.5 Kms and a width of 60m. However it is highly silted, and there is large scale encroachments on the banks.

The improvement works to be taken up are:

1. Dredging of waterway
2. Side protection works
3. Construction of Jetties
4. Walkways on the banks
5. Informatory and warning signs

If this project is implemented, it will significantly reduce the traffic load within Aluva town. This project will benefit both passenger and goods movement. Cargo meant for export and aviation fuel consignment destined to the airport, originating from Kochi can be transported at comparatively lower cost than road. A Detail Project Report is to be taken-up for this waterway project.

24. ZONING REGULATIONS

1. The implementation and enforcement of the Master Plan shall be in conformity with the development control regulations prescribed hereunder. These regulations shall guide decisions on granting or rejecting of applications for land development and buildings.
2. All future developments shall be in conformity with the provisions of the Master Plan for Aluva Town and future constructions shall conform to Kerala Municipal Building Rules in force, if not otherwise specified in these regulations, regulations and control if any enforced by the Cochin International Airport Authority, Kerala conservation of Paddy and Wet land Act 2008 or any other legislation applicable to the planning area or in any detailed scheme prepared within the frame work of this Plan.
3. For the implementation and enforcement of the proposals envisaged in this Master Plan, areas have been zoned under various categories such as :-
   - I. Residential Use Zone
   - II. Commercial Use Zone
   - III. Central Business District (CBD)
   - IV. Sub centres
   - V. Industrial use Zone
   - VI. Public & Semi-public Use Zone
   - VII. Traffic and Transportation Use Zone
   - VIII. Park & Open Spaces Use Zone
   - IX. Dry Cultivation Use Zone
   - X. Paddy
   - XI. Green Strip
   - XII. Burial Ground/ Crematorium
   - XIII. Water bodies to be retained
   - XIV. Special use Zones

   Details regarding the nature of uses ‘permitted’, uses ‘restricted’ and uses ‘prohibited’ in each zone are given in the accompanying sheets. These

regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the Plan and in accordance with the other statutes applicable.

4. 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, Aluva Municipality, hereinafter referred to as the Secretary.
5. 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 special locational factors. Such cases which come under this category are classified as “Uses Restricted”. Uses Restricted-1 category deals with the uses that shall be restricted by the Secretary, with the concurrence of the District Town Planner. Uses Restricted-2 category deals with the uses that shall be restricted by the Secretary with the concurrence of the Chief Town Planner of the Department of Town and Country Planning, Kerala.
6. “Uses Prohibited” enlists the various objectionable uses in each zone which shall not be permitted under normal circumstances.
7. If any portion of a zone is put to a “Use Prohibited” as stated in Para 6, before the sanctioning of the Master Plan, such use shall be termed as non-conforming use. A non-conforming use may be allowed to continue in its existing location, if lawfully established prior to the enforcement of these regulations, and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use creates no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary with the concurrence of the Chief Town Planner concerned.
8. Any use not specified in the ‘uses permitted’ or ‘uses restricted’ category of a particular use zone, but which is of a similar nature to any use permitted or restricted in that

particular use zone can be considered by the Secretary, with the concurrence of the Chief Town Planner concerned.

9. Existing areas and structures of archaeological importance, agricultural uses and religious uses shall be permitted to continue in all the zones and shall not constitute non-conforming uses.
10. Constructions and/or land developments, if any, in paddy lands and in wet lands, shall be in conformity with the Paddy land and Wetland Act in force in the state.
11. Regulation of constructions and/or 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 centre line of the road, unless otherwise specified in the Master Plan or any detailed road alignments approved by Chief Town Planner concerned.
12. All existing ponds shall be preserved considering its infiltration capacity for ground water recharging, other environmental and aesthetic values.
13. Coverage, floor space index (FSI) and area limitation of all constructions wherever it is not specified in a particular use zone shall be as per the values prescribed in the Kerala Municipality Building Rules, 2019 and its time to time amendments.

Para No.	**Uses permitted**	**Uses restricted-1**	**Uses restricted-2**	**Uses prohibited**
8	**Residential Use Zone**			
8.1	Residential buildings consisting of single or multifamily dwellings, residential flats / apartments, residential quarters, night shelters, orphanages, old age homes, dharmasala	Ashram /mutt, places of worship	Fuel filling stations	Any other use not specified

	Shops, commercial offices, restaurants, professional offices, Banks & other financial institutions, restaurants, hotels – floor area up to 200 Sq.m.		Public utility areas and buildings other than those included in the permitted use	
	Cottage industries, service Industries of non-nuisance nature (See Annexe-I), with number of workers limited to 6 without power or 3 workers with power limited to 5 HP			
	Educational institutions essentially serving the needs of residential community such as day care and crèche, nursery schools, kindergartens and primary schools.		Transmission/ Telecommunicatio n towers	
	Health institutions essentially serving the needs of the residential community such as dispensaries, clinics, Diagnostic Centers, nursing homes etc. having floor area upto 100 Sq.m.			
	Community facilities such as community halls, recreational			

	clubs, gymnasium/yoga centers, libraries etc. – floor area upto 100 Sq.m.			
	Utility installations and civic amenities essentially serving the needs of residential community such as post office, police station, telephone exchange, electric substation, fire station, tot lots, parks, play grounds, water treatment plants below 5 MLD.			
	Pump house, wells & irrigation ponds			
	Plant nurseries incidental to community needs			
3.2	**Provided that the access road has a width of 5m minimum**			
	Automobile workshops for two/ three wheelers – floor area upto 100 Sq.m.			

3.3	**Provided that the access road has a width of 8m minimum**			
	Hospitals with 5 beds	LPG distribution centres (excluding bottling plants and bulk storage) limiting the built up area to 50 Sq.m		
	Convention centres/ auditorium/ wedding halls/ community halls/ exhibition centers and art gallery-floor area upto 500 Sq.m.			
	Shops/ Professional Offices/ Commercial Offices/ Banking and Financial institutions - floor area up to 500 Sq.m			
	Educational Institutions upto Higher Secondary Schools			
3.4	**Provided that the access road has a width of 12m minimum**			
	Educational institutions of higher order such as colleges/universities/general education institutions / specialised /professional education institutions/ research and development			

	institutions			
9	**Commercial Use Zone**			
	All shops including shopping complexes, Shopping malls, multiplex, hypermarkets, restaurants, hotels, markets.	Places of worship	Hospitals & health centers above 50 beds, Higher educational institutions	Any other use not specified
	Professional offices, commercial offices & establishments, banking and financial institutions, IT software units, Movie halls, Auditorium/wedding halls/ community halls	Outdoor games stadium	Fuel filling stations	
	Residential buildings floor area upto 300m^2, residential flats/apartments with lower floors for commercial use, night shelters, orphanages, old age homes, Dharmasala, hostels and boarding houses, lodges and guest houses, ashram/mutts.	Other public utility areas & buildings	Dairy farm, poultry farm	
	Godowns/warehouse/ storage of non hazardous materials, stacking yards.			

	Cottage industries, automobile workshops, automobile service stations, cold storage, service industries of non-nuisance nature (see Annexe I) engaging not more than 19 worker without power or 9 workers with power limited to 30HP, saw mill, weigh bridges, IT hardware / electronic industries.			
	Marble and granite storage / cutting centres.			
	Transmission towers, telecommunication towers and wireless stations			
	Gymnasium/Yoga centers, Day care and Creche, Nursery/ Kindergarten, schools up to higher secondary level, expansion of existing educational institutions			
	Local/State/Central Govt. or Public sector offices, IT Software units			
	Tot lots, Parks & playgrounds, fair ground, open air theatre			

	Social welfare centres, convention centres, museum, Exhibition Centers and Art Gallery, Library and Reading rooms.			
	Indoor Games stadium			
	Public Utility Areas & Buildings, comfort stations			
	Clinics (out patient), diagnostic centres, Hospitals up to 50 beds.			
	Parking plaza, transport terminals			
	Plant nursery, storage of agricultural produces and seeds.			
10	**Central Business District (CBD)**			
10.1	All uses that are permitted in Residential Use Zone and Commercial Use Zone.	Museum, Exhibition Centers and Art Gallery, Places of Worship.	Fuel Filling Stations	Any other uses not specified
10.2	**Provided that the access road has a width of 5m minimum**			
	Diagnostic Centres - floor area up to 500 Sq.m	Parking plazas, other parking areas.		

10.3	**Provided that the access road has a width of 8m minimum**			
	Secondary/ Higher Secondary Schools, Junior Technical Institutions			
	Public Offices			
	Service Industries of Non nuisance nature(see annexe II) engaging not more than 19 workers without power or 9 workers with power limited to 30 HP.			
	Industrial Estates & Industrial Parks			
	Automobile workshops / Automobile Service Stations - Light Vehicles			
10.4	**Provided that the access road has a width of 12m minimum**			
	Automobile workshops/ Automobile Service stations for Heavy vehicles		Bus Terminal / Stand, Lorry Stand	
10.5	**Provided that the access road has a width of 18m minimum**			
	Movie Halls/ Auditorium/ Wedding Halls/ Community Halls - floor area above 1000 Sq.m provided that parking is provided 1.1 times that of			

	KMBR			
11	**Sub centres**			
	All Shops including Shopping Complexes, Professional offices, Commercial Offices & Establishments, Banking and financial institutions Restaurants, Hotels, Markets	Residential Flats / Apartments with or without lower floor commercial above 300 Sq m.		Any other uses not specified
	All Residential buildings/ residential apartments with or without lower floors for commercial use upto 300 sq m.			
	Hostels, Boarding Houses, Guest Houses, Lodges, Night Shelters.			
	Godowns/ Warehouses/ Storage of non hazardous materials, stacking yards	Stadium, Other recreation facilities		
	IT Software units			
	Movie Halls, Auditorium / Wedding Halls / Community halls/ Convention Centers			
	Gymnasium / Yoga Centers,			
	Fuel Filling Stations			

	Cottage Industries, Automobile workshops, Automobile Service Stations, Cold storage, Service Industries of non-nuisance Nature (See Annexe I) engaging not more than19 workers without power or 9 workers with power limited to 30 HP, Saw Mills, weigh bridges, IT Hardware / Electronic Industries			
	Marble and Granite Storage / Cutting centers			
	Local / State/ Central Govt. or Public Sector offices			
	Transmission towers, Telecommunication towers and Wireless Station			
	Day Care and Crèche, Nursery / Kinder Garten / Schools upto Higher Secondary level, Library and Reading Rooms, Tot Lots/Parks/Play Grounds			
	Library and Reading Rooms, Social Welfare centers			
	Museum, Exhibition Centers			

	and Art Gallery			
	Indoor Games Stadium			
	Public Utility Areas & Buildings			
	Places of Worship			
	Clinics (Outpatient), Diagnostic Centers, Hospitals up to 50 beds			
	Parking Plazas, Transport terminals			
	Plant Nursery			
	Storage of Agricultural Produces and Seeds			
12	**Industrial use Zone**			
	All industries other than obnoxious and nuisance type	Public Utility Areas & Buildings of area up to 200 Sq.m without affecting the character of the area	Fuel Filling Stations, Obnoxious and nuisance type industries. (see Annex III)	Any other use not specified
	Industrial estates & industrial parks, IT software units		Cremation Ground/ Crematorium, Burial Ground / Common Vault,	
	Residential uses incidental to		Junk yards, Storage	

	the industrial use		of Explosive and fire works, Gas Go Downs	
	Any other activity incidental to industrial use		Saw mills with Timber Yard, Slaughter Houses/Fish / Meat processing Centers	
			Dumping yards and Sewage Treatment Plants	
13	**Public & Semipublic Use Zone**			
	Additions and alterations to the existing buildings, buildings for essential incidental uses to the main use	Transmission Towers and Wireless Stations, Auditorium/ Wedding Halls/ Community Halls upto 500 Sq.m incidental to the Public and Semipublic Use, Convention Centers, Parking Plazas/parking areas	Cremation Grounds/Crematorium, Burial Grounds	Any other use not specified
	Local/State/Central Govt. or			

	Public sector offices, Educational Institutions, Library and Reading Rooms, Social Welfare centres, Museum, Exhibition Centers and Art Gallery, Public Utility Buildings, Places of Worship.			
	Residential Uses incidental to the public and Semi public use, Ashram/Mutts.			
14	**Traffic and Transportation Use Zone**			
	Transport terminals including constructions that form an integral part of the terminal. ATM's, comfort stations, fuel filling stations			Any other use not specified
15	**Park & Open Spaces Use Zone**			
	Any construction/land development essential for the development/ improvement of open air recreational facilities. ATM's, comfort stations.			Any other use not specified

16	**Dry Cultivation Use Zone**			
	Agriculture, horticulture and fodder cultivation, pastures, grazing ground and other types of cultivation including social forestry	Places of worship	Cremation ground / crematorium, burial ground, common volt	Any other use not specified
	Dairy farms, fish farms, seed farms, poultry farms, piggery farms, smoke house	Public utility areas and buildings like water supply and electrical installations, sewage treatment plant etc.	Gas Godowns	
	Plant nursery, pump house, wells and irrigation ponds.	Transmission/Tele communication towers and wireless station.	Fuel filling Stations	
	Residential building floor area upto300 Sq. m.	Saw mills	fish /meat processing centers	
	Orphanages, old age homes, dharmasala, Ashrams/ mutt	Dairy farm, poultry farm, piggery farm, smoke house	Higher education/ health care facilities - floor area above 500 sq.m.	
	Clinics(Outpatient) and diagnostic centres- floor area upto 200 Sq.m.	Markets plot area upto 500 sq. m.	Service industries of non-nuisance Nature (See	

			Annexe-II) engaging not more than 19 workers without power or 9 workers with power limited to 15HP	
	Shops, professional offices, commercial offices/ establishments, banking and financial institutions, restaurants / canteens - floor area upto200 sq.m,			
	Social Welfare centers,Gymnasioum / Yoga Centres, – floor area upto 200 sq.m			
	Police Post/Police Station, Post and Telegraph office, Fire Post / Fire station, Telephone Exchange			
	Day care and creche, Nursery / Kinder garten / Primary & Upper primary schools			
	Library and Reading Rooms.			
	Storage of agricultural products.			
	Cottage industries, Service			

	industries of non-nuisance Nature (See Annexe-I) engaging not more than 6 workers without power or 3 workers with power limited to 5HP			
	Tot lots/ Parks/ Play grounds			
	Provided that the access road has a width of 5m minimum			
	Godowns/warehouses/ Storage – non-hazardous – floor area upto 500 Sq.m.			
	Automobile workshops for 2/3 wheelers			
	Provided that the access road has a width of 8 m minimum			
	Residential building floor area upto 3000 Sq. m.			
	Hospitals & Health Centres – floor area upto 500 Sq.m.			
	Auditorium/Wedding Halls/Community halls floor area upto 500 Sq.m.			
	Provided that the access road has a width of 10 m minimum			
	Residential Flats / Apartments		Higher education / Health care facilities	

17	**Paddy**			
	Paddy Cultivation Agriculture/ Horticulture/Fodder cultivation, Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction.	Minor Public Utility areas & buildings which will not affect the character of the area		Any other use not specified
	OR 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.			
18	**Green Strip**			
	Along the river bank, a green strip of 5m width shall be conserved as no development zone. Only river side protection or river side beautification scheme as part of river protection measure only shall be permitted in the Green Strip. The activities for Tourism Promotion are permissible in the green strip.			Any other use not specified
19	**Burial Ground/ Crematorium**			
	Cremation/burial activities	Building/ structures		Any other use not

		incidental to the permitted use of the zone.		specified
20	**Water bodies to be retained**			
	All existing water bodies shall be conserved. Bridges, side protection walls, bathing ghats, floating jetty and facilities related to river tourism may be permitted.			Any other use not specified

Regulations as per clause 10 above, is also applicable to land to a depth of 100m on either sides of following stretches of roads in Residential, Commercial and Dry Agricultural Zones:

1. NH 544
2. Aluva-Munnar road (S H 16)
3. Aluva- Perumbavoor road

21	**Special use Zones**

Special use zones include the areas specifically demarcated for certain projects. No other activity unless otherwise specified should be permitted in such areas. If the project is not materialized within a period of 7 years from the date of the scheme, the area shall be deemed as part of immediate surrounding zone and constructions shall thereafter be allowed with the

concurrence of the Chief Town Planner.		
1	Special market	Market construction and other incidental uses.
2	Mini market	Market construction and other incidental uses.
3	Nursing college	Construction of nursing college and other incidental uses.
4	Proposed STP and capacity augmentation of STP	A modern Sewage Treatment Plant with necessary facilities/buildings/structures is proposed.
5	Truck terminal	Truck terminal with essential incidental facilities are proposed in this zone.
6	Parking areas	Commercial cum parking plazas subject to the conditions of KMBR 1999 prevailing rules.

GENERAL NOTES

1. Subject to the Zoning Regulations of the respective use zones, more than one use may be combined in a building provided that total floor area of such a building shall not exceed the maximum floor area permitted for any of such use premises in that use zone.

2. For the purpose of these regulations, floor area means the total floor area of the building on all floors.

3. The Government shall have the power to issue any clarification in respect of Technical interpretation, in any, required in consultation with the Chief Town Planner concerned.

4. Any use not specified in the 'uses permitted' or 'uses restricted' category of a particular use zone, but which is of a similar nature to any use permitted or restricted in that particular use zone can be considered by the Secretary, with the concurrence of the Chief Town Planner concerned.

5. Silence Zone, as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986and its subsequent amendments, shall be applicable to the area under this scheme.

6. Irrespective of zoning regulations, 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 can be implemented anywhere in the planning area except at special zones.

7. Future expansion of existing public and semi-public institutions to adjacent plots shall be considered as uses permitted in all zones subject to restrictions imposed under other acts and rules.

GENERAL GUIDELINES FOR LARGE SCALE PROJECTS

Large scale development proposals in an area not less than 2 hectares, exceeding and investment of Rs.50 crores, which provide direct employment (after commissioning of the project) to the tune of not less than 500 nos. may be permitted in all zones other than Heritage and Park & Open space, subject to the recommendation of a committee to be constituted by the Government for this purpose, under the Chairmanship of the Secretary, Local Self Government Department, consisting of Chief Town Planner concerned of Kerala State Department of Town and Country Planning, the Head of office of the District Office of the Department of Town and Country Planning being the convener and the Secretary of the municipality and satisfying following conditions:-

a) The developer shall produce project cum feasibility report and environmental impact assessment report, if required, of the project to the convener of the committee, 15 days in advance of the committee meeting.

b) The developer shall produce before the committee, all required clearances from the State and Central Government agencies concerned.

c) Adequate provision shall be made for supporting infrastructure such as water supply, Sewerage, Solid Waste Management etc. Separate sewage treatment plant and solid waste management measures shall be provided and maintained by the developer at his /her cost.

d) Adequate Memorandum of understanding between the developer and Secretary of Local body concerned shall be undertaken to bring this into effect.

e) Maximum floor area ratio shall be 2 and minimum access width 12 metres.

f) The project shall be completed within a period of 3 years if not specified otherwise.

ANNEXURE- I

Type of non-obnoxious and non-nuisance type of service or light industries permissible in Residential zones & Dry agriculture zones

1. Flour Mills
2. Embroidery and Lace manufacturing
3. Gold and silver smithy
4. Watch, pen and Spectacle repairing
5. Laundry, dry cleaning and dying
6. Photo and picture framing
7. Manufacture and repair of musical instruments
8. Automobile servicing (excluding repair)
9. Radio servicing and repairing
10. Cotton and silk printing
11. Bakeries
12. Confectioneries
13. Cold storage
14. Aerated waters and fruit beverages
15. Manufacture of tobacco products
16. Garment making/tailoring
17. Electroplating
18. Bamboo and cane products
19. Sports goods
20. Card-board box and paper products
21. Domestic electrical appliances

22. Toy making
23. Furniture without machinery
24. Wooden electrical accessories
25. Copper, brass and metal utensils
26. Small foundries
27. Padlock
28. Sanitary fittings and other similar industries

ANNEXURE- II

List of non-obnoxious and non-nuisance type of service or light industries

1. Aerated water and fruit beverages
2. Apparel making
3. Assembly of air coolers and conditioners
4. Assembly of bicycles, baby carriage and other small non motorized vehicles
5. Atta – chakkies
6. Ayurvedic medicinal formulations, Ayurvedic health club
7. Bakery products , biscuits, confectionaries
8. Bamboo and cane products(only dry operations)
9. Block making for printing
10. Card board or corrugated box and paper products (paper or pulp manufacturing excluded)
11. Carpet weaving
12. Cement and concrete products(where crusher is not used)
13. Chilling plants and cold storage
14. Coir(without bleaching / dyeing)
15. Concrete batching plants
16. Cotton and woollen hosiery/ Cotton and silk printing
17. Electro plating
18. Electronics and electrical goods
19. Electronics equipment(Assembly)
20. Engineering workshop and general fabrication works (without any chemical treatment)
21. Embroidery and lace manufacturing

22. Flour mills(job work only)
23. Foam bed, latex thread
24. Foot wear(Rubber and PVC)
25. Furniture making
26. Fountain pens
27. Garment stitching , tailoring
28. Gold and silver smithy
29. Gold and silver thread saree work
30. Ice cream or ice making
31. Insulation and other coated papers(paper or pulp manufacturing excluded
32. Jobbing and machining
33. Light engineering
34. Laundry, dry cleaning and dyeing
35. Manufacturing of formulated synthetic detergent products
36. Manufacture of soaps involving process without generation of trade effluents (saponification of fat and fatty acids only)
37. Mineralized water
38. Musical instruments manufacturing
39. Oil ginning /expelling
40. Optical frames
41. Paint(by mixing process only)
42. Paper pins and U-clips
43. Power looms/ handlooms(without dyeing and bleeching)
44. Photo and picture framing
45. Pressure testing units
46. Printing Press
47. Rice mullors
48. Rope(Cotton and plastic)
49. Rubber gloss other than that for surgical and medical purpose
50. Rubberized coir mattresses
51. Scientific and mathematical instruments

52. Sports goods
53. Steeping processing of grains
54. Small foundries
55. Tissue culturing
56. Toys
57. Water softening and demineralization plants
58. Watch, Pen and spectacles repairing

ANNEXURE III

List of obnoxious or nuisance industries subject to objectionable sounds, dust, odours, fumes, effluents or processes grouped under Indian Standard Industrial Classification to be located in Industrial zones vide regulation (11) of Part IV.

Manufacture of Food Stuff

1. Slaughtering, preservation of meat and fish and canning of fish

Manufacture of Beverages

2. Production of distilled spirits, wines, liquor etc from alcoholic fruits and Malts in distillery and brewery
3. Production of country liquor and indigenous liquor such as toddy, liquor from Mahua, palm juice

Manufacture of textiles

4. Dyeing and bleaching of cotton

Manufacturing of wood & wooden products

5. Sawing and planning of wood and creosoting
6. Wood seasoning
7. Manufacture of veneer & plywood
8. Paper, pulp and straw board

Manufacture of leather & leather products

9. Currying, tanning and finishing of hides and skins and preparation of finished leather.

Manufacture of Rubber petroleum & local products

10. Manufacture of tyres and tubes and tyre re-trading

11. Manufacture of industrial and synthetic rubber
12. Reclamation of rubber
13. Production of petroleum, kerosene and other petrol products in refineries

Manufacture of chemical and chemical products

14. Manufacture of basic industrial chemicals such as acids, alkalies and their salts, not elsewhere specified (specially sulphurious, sulphuric, nitric, hydrochloric etc aids, ammonia chlorine and beaching powder manufacture.)
15. Manufacture of dyes, paints, colours, ink powder, varnishes, printing ink etc
16. Manufacture of fertilizers (specially from organic materials)
17. Manufacture of disinfectants and insecticides
18. Manufacture of Ammunition, explosives and fire works
19. Manufacture of matches

Manufacture of Non-metallic mineral products other than Petroleum and coal

20. Manufacture of cement and cement products
21. Manufacture of lime
22. Manufacture of plaster of Paris

Manufacture of Basic Metals and their products

23. Manufacture of iron and steel including sheeting, refining, rolling and conversion into basic forms
24. Manufacture including smelting, refining etc of non-ferrous metals and alloys in basic forms
25. Manufacture of ornaments

Manufacture of machinery (other than transport) and electrical equipment

26. Manufacture of all kinds of battery

Miscellaneous items not covered above

27. Incineration, dumping and reduction of offal, dead animals, garbage or refuse
28. Manufacture of gelatin and glue
29. Fat, tallow, grease or lard refining or manufacture
30. Bone meal, bone grist and bone powder

31. Manufacture of cashew nut shell oil and

32. Other similar types of nuisance industries

(Note: In addition to the above *i*ndustries categorized as 'Red' by Kerala State Pollution Control Board are also to be treated as obnoxious and nuisance industries)