MASTER PLAN FOR

PANDALAM



REPORT

AUGUST 2022

PANDALAM MUNICIPALITY

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING, KERALA STATE



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PANDALAM MUNICIPALITY

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING, GOVERNMENT OF KERALA

FORWARD

Pandalam is the land blessed with Lord Ayyappa where his childhood days are spend. This town is considered as a Holly Town due to its connection with Lord Ayyappa and Sabarimala. Pandalam is rather a new Municipality of Pathanamthitta District, got the municipal status on 1st November 2015, among the fastest growing towns in Kerala. It is renowned for Educational and Health care centre in Central Travancore region. Rightly recognized as the educational and cultural head quarters of Central Travancore, Pandalam hosts educational institutions ranging from reputed schools to Post Graduate, Training and Ayurveda Colleges. Kerala's widest suspension Bridge was constructed in the town over the Achankovil river which marked the early thought of planned development in this region. The Centuries' old "Kurunthottayam Market (Pandalam Market) is one among the largest agricultural market in Central Travancore. Traditionally it is an agricultural predominant area of Upper Kuttanad.

The Master Plan for Pandalam Municipality is now modified according to the valuable information from the public in terms of objections and suggestions enforced under the Town Planning Act-2016. The concrete decisions made by the Municipal council in this position also give the plan a clear direction for the future development of Pandalam Municipality.

I compliment the L.S.G.D Planning, Government of Kerala for their effort in materialization of the master plan for Pandalam Town. The challenges now is to implement the plan effectively and efficiently with people's participation, I am certain that the developments in the Municipal area will reap maximum benefit form the plan.

Suseela Santhosh

Chairperson

Pandalam Municipality

Pandalam

August 2022

OFFICE OF THE PANDALAM MUNICIPALITY
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PATHANAMTHITTA

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PREFACE

A Development Plan for an area details out the overall strategy for proper planning and sustainable development of the area. Development becomes comprehensive when the physical, social and economical variables of an area are planned in an integrated manner. Planning provides protection for the environment, promote and facilitate regeneration, help in creating sustainable communities. Developmental issues are more complex and diverse in urban areas. Hence planned development of urban area is a matter of priority.

74th Constitution amendment act envisages empowerment of the Urban local bodies with planning functions, which is enshrined in the 12th schedule to article 243 (W) of 74th amendment. The Kerala Town and Country Planning Act 2016 also mandates the municipal councils to prepare master plans for the area under their jurisdiction, through a participatory process and the master plan shall generally indicate the manner in which the development shall be carried out and also the manner in which the use of land shall be regulated. In view of this, Government of Kerala have undertaken the preparation of the master plans for all statutory towns in the State in a phased manner, under the 'Scheme of preparation of master plans and detailed town planning schemes' as per GO (Rt) No 1376/2012/LSGD dated 17/05/2012. The preparation of master plan for Pandalam is included under this scheme.

Pandalam is considered as a holy town and is an important point of visit for the pilgrims to Sabarimala. It is also a renowned educational and health care centre in central Travancore. There is the need for a long term plan in the development of Pandalam considering the growth trends, resource potential, locational aspects etc.

Therefore the preparation of Master Plan for Pandalam was taken up as a joint exercise of the Pandalam Municipality and the L.S.G.D Planning under the scheme of preparation of Master Plans and DTP Schemes as envisaged in the guideline of the scheme issued vide Government order G.O.(Rt) no: 2766/2009/ LSGD dated 24/10/1999. The Master Plan for Pandalam Municipality is now modified according to the valuable information from the

public in terms of objections and suggestions enforced under the Town Planning Act-2016. The concrete decisions made by the Municipal council in this position also give the plan a clear direction for the future development of Pandalam Municipality.

I express my gratitude for the initiative, co-operation and enthusiasm shown by Pandalam Municipality under the chairmanship of Smt. Suseela Santhosh towards this work. The hard work, spirit and the sincerity of the planning team in the Pathanamthitta Office headed by District Town Planner Sri. Arun. G , in bringing this plan within the scheduled time is highly appreciated.

Certainly, the Master Plan for Pandalam will provide a framework for development of the Town for years to come.

Thiruvananthapuram
August 2022

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Chief Town Planner (Planning)
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ACKNOWLEDGEMENT

Pandalam is one among the fastest growing towns in Pathanamthitta district and is considered as a holy town due to its connection with Lord Ayyappa and Sabarimala temple. It is also a renowned educational and health care centre in Central Travancore region. However, for all its advantages and importance it is still quite underdeveloped. More facilities are required to be provided to have a sustained development of the town. In this context, it is necessary to identify various development requirements and to plan for the future for ensuring a healthy, physical development and a progressive economic growth in the years to come.

The works for the preparation of Master Plan for Pandalam was taken up as a joint exercise of the Pandalam Municipality and L.S.G.D Planning, Govt. of Kerala under the Scheme of preparation of Master Plans and Detailed Plans. The Master Plan for Pandalam Municipality is now completed. The plan prepared is sure to stream line the growth of the town in a planned and organized manner.

With great pleasure I acknowledge the support and the motivation received from Honorable Minister for Local Self Governments Sri.M.V Govindan Master who have been very keen to see that the preparation of the Master Plans are completed at the earliest. Also with gratitude I acknowledge my sincere thanks to Smt. Sarada Muraleedharan IAS, Additional Chief Secretary, Local Self Government Department, for constant monitoring of the progress of the scheme.

The active involvement of the Council members and members of the Working group under the admirable leadership of Pandalam Municipal Chairperson Smt. Suseela Santhosh is worthy of applause. Vice Chairman Smt. Remya. U has provided continuous support to this effort. I thank them for their immense support and co-operation to this endeavor. I also acknowledge the constant support of Smt. Mumthaz , Secretary, Pandalam Municipality.

The concerned line departments also cooperated wholeheartedly in all activities and readily shared the data, which is gratefully acknowledged.

I am thankful to Sri. Pramod kumar C.P, Chief Town Planner for the advices and encouragement provided. I am indebted to Sri. Prasanth.H, Chief Town Planner (Planning) for the constant technical guidance motivation and encouragement. I also thank for the co-operation imparted by all planners and Technical staffs of the office of Chief Town Planner, Thiruvananthapuram.

I sincerely appreciate the hard work and unequivocal sincerity of the planning team in the district office comprising of Sri. Sunil Kumar.G, Assistant Town Planner; Sri. Vishnu.M, Planner Associate and Smt. Aalia, Planning Assistant (GIS) in completing the works in a time bound manner and bringing out the plan within the stipulated time. I am also indebted to all other members both in the technical and non technical section for all the co-operation and keen participation at various stages.

Pathanamthitta
August 2022

Arun.G
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PART.I

STUDY AND ANALYSIS

1. INTRODUCTION

1.1 INTRODUCTION

Pandalam is one of the newly formed Municipalities of the state. Before the formation of Pathanamthitta district, Pandalam was a part of Mavelikkara Taluk of Alappuzha district. Pandalam Panchayat was formed in 1953 and Pandalam became part of Adoor taluk with the formation of Pathanamthitta district in the year 1982. Pandalam Grama Panchayat was elevated to the status of a Municipality in 1989 and later in 1993 degraded as a Grama Panchayat. The Grama Panchayat was again elevated as a Municipality and the present Municipality was formed on 1.11.2015. The total area of the municipality is 28.42 Sq.Km and the population as per 2011 census is 41,594.


Pandalam Palace

Pandalam is considered as a holy town due the connection of Pandalam Royal family with Lord Ayyappa of Sabarimala temple. It is believed that the human sojourn of the presiding deity of Sabarimala, Sree Ayyappa had been the son of the Raja of Pandalam. The holy ornaments of Sree Ayyappa are kept at Pandalam palace and brought to Sabarimala during the Makaravilakku festival. It is a place of religious significance which attracts pilgrims from all parts of the country and experiencing heavy rush during Sabarimala season.

Pandalam is located at the western boundary of Pathanamthitta district and the State Highway No.1 (M.C.Road) and Mavelikkara –Pathanamthitta Road intersects at Pandalam. It is a higher

order settlement of the region and a major service center of the lower order settlements spread over a part of Pathanamthitta and Alappuzha districts. Various educational institutions of higher learning like Ayurvedic Colleges, Training Colleges, Arts and Science College attract students from Pandalam town as well as nearby areas. The Medical institutions of the town also attract people from surrounding areas.

Apart from main road, there is little connectivity to the interior part of the town. Major portion of the Pandalam municipality is undeveloped and still under agricultural use. Due consideration has to be given for agriculture and allied activities and balance growth of urban and non-urban activities are to be ensured. The potential of primary and secondary sectors is to be fully explored.

1.2 NEED OF MASTER PLAN

Pandalam is proposed as a second order settlement of the district in the District Urbanisation Report. It is a growing town in the region and is having positive growth rate of population while the Pathanamthitta district in general shows negative growth rate. The town is witnessing a change from rural to urban character. The economic base of the town is to be enhanced by identifying new avenues of development in the fields of tourism, industry, institutional activities, civic amenities etc. The status as an important pilgrim Centre particularly during Sabarimala Pilgrim season demands special care to the issues associated with the presence of floating population. It was in this background that the Government included Pandalam town in the second phase of the program of Preparation Master Plans (DP29). It is imperative that all sectors are to be studied and facilities of present and that required for future needs to be assessed. For this purpose, a Master plan is the best tool to analyse the situation in the town and propose the best solutions for the development of Pandalam.

1.3 METHODOLOGY

The methodology adopted for preparation of the Master plan is as per the guidelines issued vide GO (Rt) No.2766/2009/LSGD dated 24.10.1999. In order to gather the views of citizens,

stake holders, experts in various fields and people's representatives, four Workshops were conducted. 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 Figure1.1.

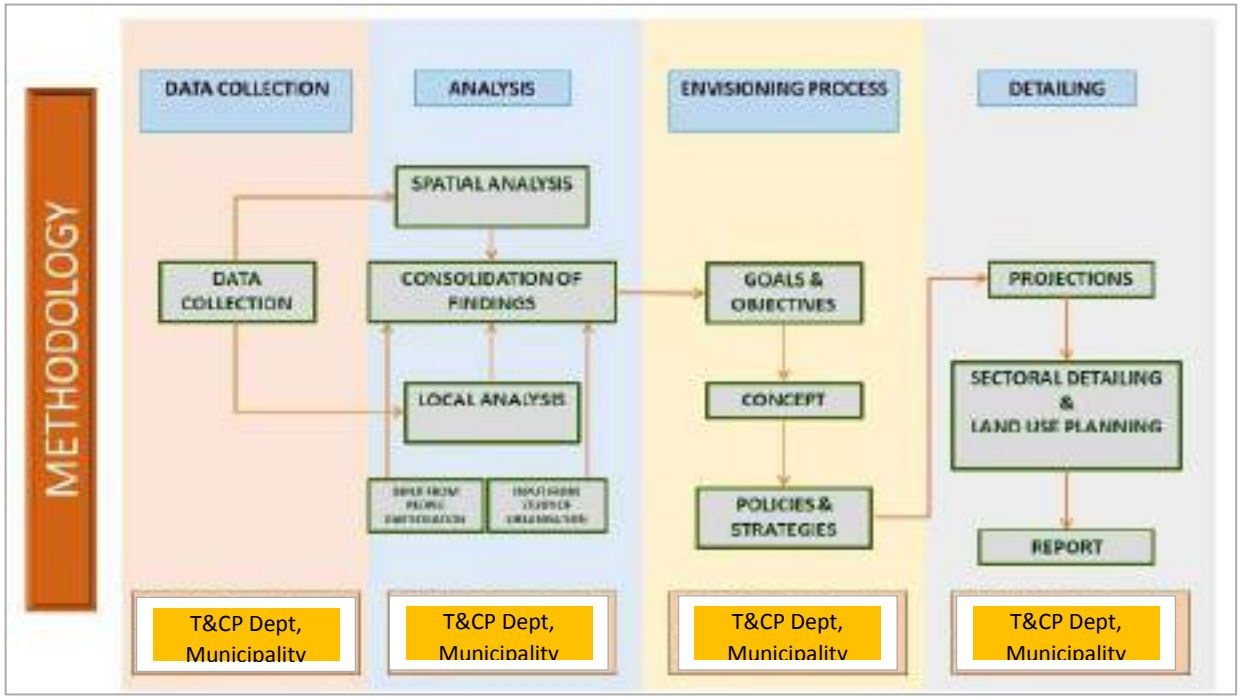


Figure 1.1 Plan preparation process and agencies involved

Detailed regional setting study was carried out in this connection which is documented as the District Urbanization Report (DUR) of Pathanamthitta.

1.4 REPORT

This report consists of 34 chapters which are grouped into four parts. Part I consists of 24 chapters, containing study and analysis of various sectors giving a detailed information about the existing condition of the town and different planning issues. Part II comprises five chapters about integrated development vision and projected requirements. Part III comprises four chapters about land use plan, transportation plan, sectoral proposals and model projects. The development regulations are included in part IV.

2. PHYSICAL CHARACTERISTICS

2.1 INTRODUCTION

Pandalam is one among the two urban local bodies of Adoor Taluk of Pathanamthitta district and is a service town in the western part of the district. River Achancovil flows through the northern boundary of the town. The urban development has taken place along the major travel corridors and major portion of the town still have rural character. It is the largest urban local body in the district in terms of geographical area with an area of 28.42sq.km. The town is divided into 33 municipal wards (in Municipal council election 2015) and the studies and analysis has been made taking wards as the smallest unit.

2.2 LOCATION

Pandalam town is located at a distance of about 16 km from Pathanamthitta town, the District Headquarters and in the western boundary of the district adjacent to Alappuzha district. The State Highway No.1, M.C.Road and Mavelikara - Pathanamthitta Road meet at Pandalam. The Pandalam is well connected with major centers like Kochi, Kottayam, Changanassery, Thiruvalla, Chengannur, Adoor, Kottarakkara, Mavelikkara, Kayamkulam, Pathanmthitta and Thiruvananthapuram and distance to these centers are 116km, 50km, 32km, 25km, 15km, 12km, 32km, 18km, 25km, 16km and 95km respectively. The location of the town is shown in Figure 2.1.

There is no railway linkage to Pandalam town and Chengannur is the nearest Railway Station and it is located at a distance of 15 km from Pandalam town. Thiruvananthapuram and Kochi

are the nearest International Airports located at a distance of 99km and 136km respectively from Pandalam town. The distance to nearest sea port at Kochi is 130km.

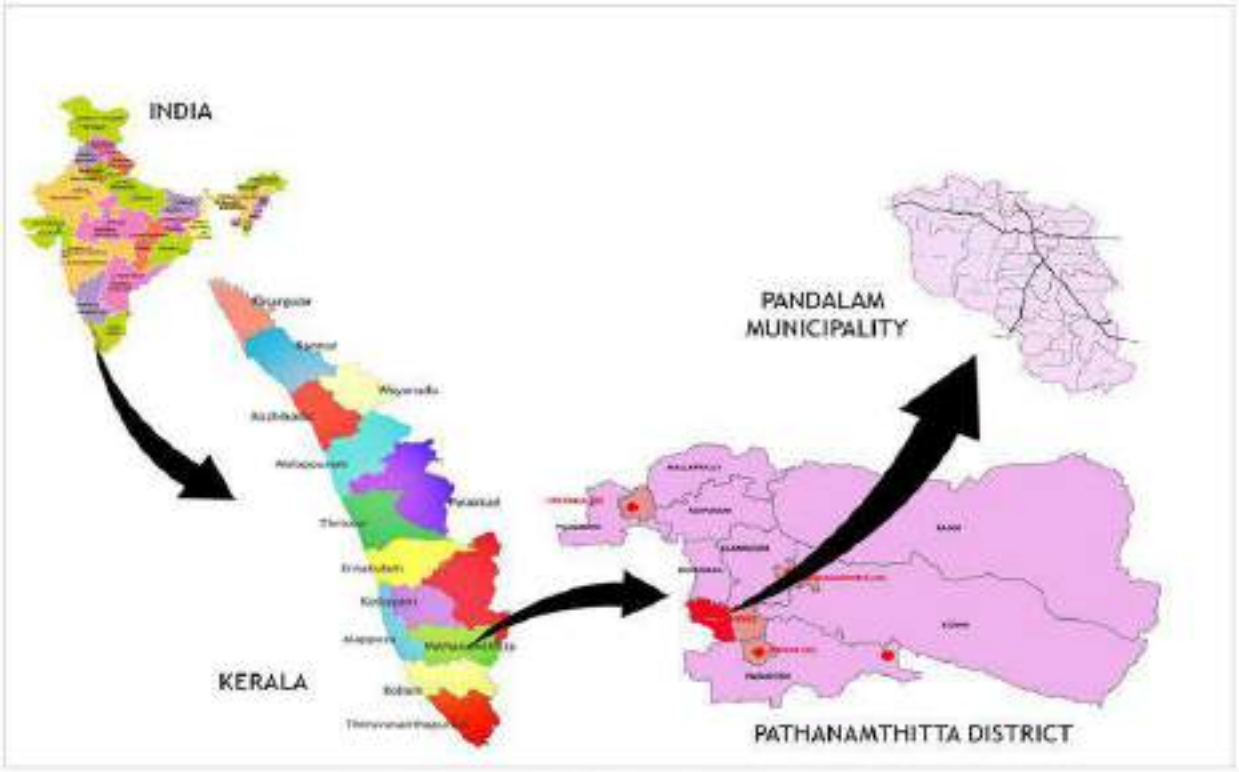


Figure 2.1 Location of Pandalam town

Pandalam town is bounded in the North by Kulanada Grama Panchayat and in the East by Thumpamon and Pandalam Thekkekkara Grama Panchayats, in the South by Pallickal Grama Panchayat and in the west by Venmony, Palamel and Noornad Grama Panchayats of Alappuzha district. The details of surrounding Grama Panchayats are shown in Figure 2.2



Figure 2.2 Surrounding settlements of Pandalam

The geographical location of the town is between 9 degree 10 minutes 30 seconds and 9 degree 14 minutes 30 seconds North latitudes and between 76 degree 38 minutes 30 seconds and 76 degree 42 minutes 30 seconds East longitudes.

2.3 HISTORY

The Pandya Kingdom of Tamilakam was once defeated by Malik Kafur, the commander-in-chief of Alauddin Khilji of Khilji dynasty. After the failure, the two branches of the Pandiya dynasty fled towards west to secure themselves from further attacks. One branch preceded via the Western Ghats mountainous regions and settled in Poonjar in Kottayam district and established the Poonjar kingdom. The other branch known as 'Chembazhannur' first settled in Valliyur near Tirunelveli and due to the threats of further invasion, the royal family shifted to Tenkasi. Later due to threat from Thirumalai Nayak of Madurai, the family moved to a place named *Elathoormaniyam* and procured the mountainous regions near Puliyankudi and then towards west (Kerala) via places such as Achankovil, Aryankavu, Kulathupuzha and settled in Konni. The family constructed a shrine for lord Shiva in Konni (Muringamangalam Sreemahadevar Temple) for their daily worships. This temple is one of the most noted contributions of Chembazhanuur family in Kerala. A number of Mutts, Manas and Koyikkals were also constructed by the family. The local people fed up with the activities of thieves accepted the family as the ruling class which was named as *Chembazhanji kovilakom*. Attacks on Travancore by Cholas forced the family to flee from Konni and then to settle down at Pandalam which became their permanent capital. A full-fledged kingdom was established by around 1194 AD by obtaining the land from Kaipuzha Thampan, a rich landlord. The Venad rulers also played a great role in the establishment of this kingdom. People enjoyed a peaceful atmosphere and ideal life under the Pandalam rulers. As per the Travancore state manual, Pandalam kingdom kept friendly relations with the rajas of Travancore.

The territories of Pandalam kingdom extended to an area of 2,600 km^2 which covered the parts of Elanthoor, Konni, Achankovil, Tenkasi and the forest regions of Sabarimala, the abode of

Ayyappa. Marthanda Varma, the famous Venad ruler and establisher of Travancore kingdom, during his conquests in Central Travancore, Pandalam was left independent and wasn't annexed to his domain. This was primarily due to cordial relations that Travancore had with Pandalam and in lieu of the assistance by the royal family to Marthandavarma in the conquer of Kayamkulam. By 995 CE, the raja of Travancore made an agreement with the Pandalam king assuring that they would support every members of the royal family if they are allowed to collect the revenues from Pandalam. Upon the acceptance, the kingdom of Pandalam was merged with Travancore Kingdom and a monthly pension was issued for each royal family member.

Before the formation of Pathanamthitta district, Pandalam was a part of the Mavelikkara taluk of Alappuzha district. Pandalam became part of Adoor taluk with the formation of Pathanamthitta in the year 1982. Pandalam Panchayat was formed in the year 1953 and Kurampala Thekkekkara Panchayat was added to Pandalam in 1965. The Pandalam was elevated to the status of municipality on 1989 and degraded as a Grama Panchayat in 1993. It is again upgraded to municipality on 1-11-2015.

2.4 AREA

Pandalam Municipal town spreads over two villages ie, Pandalam and Kurampala. The total area of the Municipality is 28.42sq.km and now there are 33 wards in the Municipality. Even though the geographical area was same, during the 2011 census there were only 23 wards in the Municipality. As majority of available data is based on 23 ward division the analysis in this report is done based on 23 ward division. The ward map of the town is shown in Annex. 2.1

2.5 GEOGRAPHICAL FEATURES

Topography of Pathanamthitta district consists of three natural divisions, the highland, the midland and the lowland. The highland stretches through the Western Ghats and descends to the midland in the Centre, down to the lowland in the West.

Pandalam falls in the midland region of the district. Pandalam presents a beautiful panorama with small hillocks and intermittent flat terrain in between. The town is located on the bank of Achankovil River. Pandalam has an average elevation of 18 meters (62 ft.) above sea level. The contour map of the town is shown in Figure 2.3.

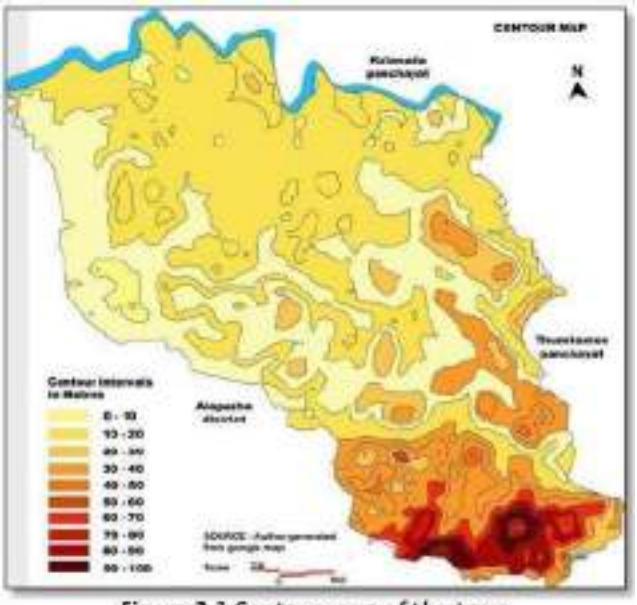


Figure 2.3 Contour map of the town



View from Aathiramala

2.6 CLIMATE AND RAIN FALL

The area enjoys humid tropical climate with two monsoons, viz, the south west and the north east monsoons. Maximum precipitation is received during the period from June to July. The meteorological data obtained from RRI, Chethakkal is furnished in figure 2.4 and 2.5. The average annual rainfall is 3314.4mm.

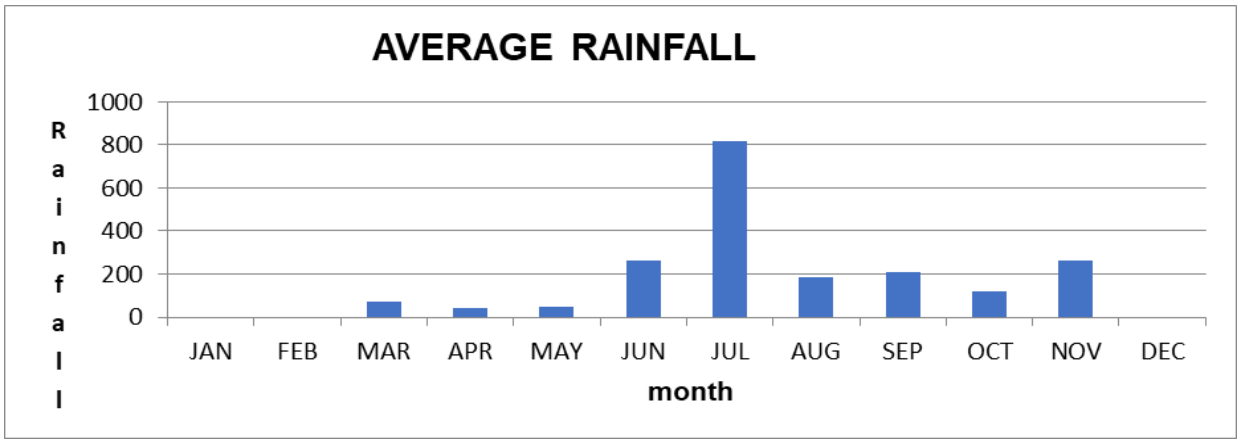


Figure 2.4 Average Rain fall in mm

The mean maximum and mean minimum temperatures are 32.26 degree Celsius and 26.92 degree Celsius respectively. Mean annual temperature is 26.92 degree Celsius.

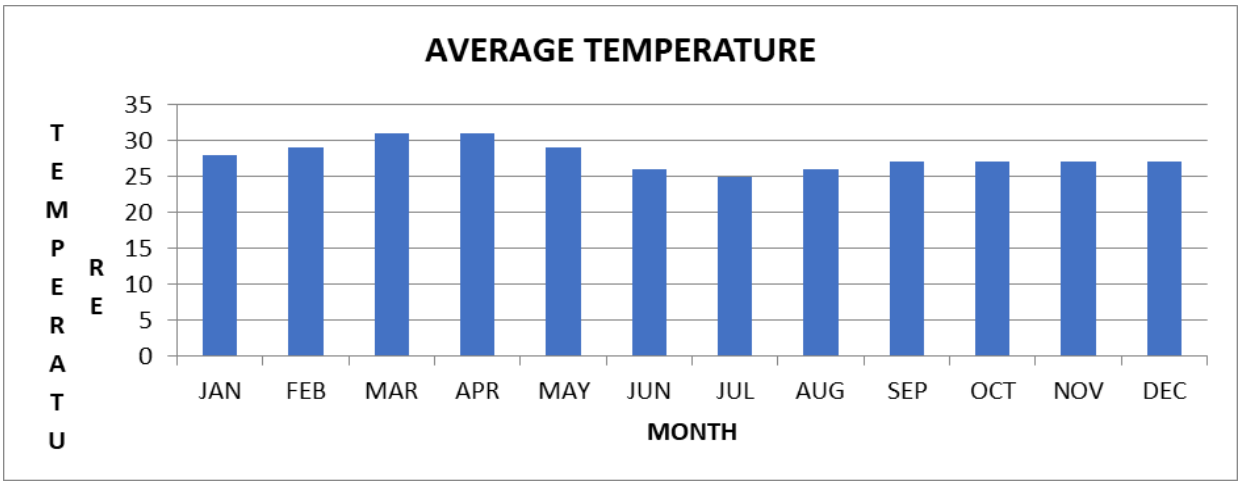


Figure 2.5 Average temperature in Degree Celsius

2.7 SOIL CONDITIONS

Six soil series and miscellaneous soils were found in the town. Garden land series found are Adoor, Bharanikkavu, Edavanassery and Ayroor. Wet land series occurring in the town is grouped under Erath and Sooranad series. The extent and occurrence of soil series are shown in Table 2.1.

Table 2.1 Soil series, Extent, Occurrence and soil type

Sl No	Name of soil series	Extent (Ha)	Occurrence	Soil Type
1	Adoor	931	Mid Land	Laterite soil
2	Bharanikkavu	647	Mid Land	Colluvium
3	Edavanassery	415	Mid Land	Gneissic
4	Ayroor	117	Mid Land	Riverine Alluvium
5	Sooranad	555	Mid Land	Alluvial soil
6	Erath	72	Mid Land	Colluvium
7	Miscellaneous	43	Mid Land	Transported

2.8 CONCLUSION

Pandalam municipality is located at a distance of about 16 km from Pathanamthitta, the District Headquarters and is well connected to major centers of the state by road way. As per the early history, the Royal family who was fled from Thamilakam made Pandalam as their permanent capital. Even though Pandalam was exempted from annexation in the earlier period by King Marthanda Varma, later it was added to Travancore in 1820. Pandalam has an undulating topography and the hills and valleys are scattered in all part of the town. Considering the topography, adequate land for urban development is available in the town. Moderate climate is experiencing in the town. Considering the diversity in the soil type, suitable area for different agricultural activities is available in the town.

3. REGIONAL SETTINGS

3.1 REGIONAL SETTINGS

The regional setting of a town spells out the hierarchy of settlement in the regional scenario, the activity which the town has to perform and its connectivity with different settlements. Extensive regional setting study has been carried out in connection with the preparation of development plan for municipalities in Pathanamthitta district. The study was documented as District Urbanization report of Pathanamthitta. The District Urbanisation report defines the spatial structure of the district which is arrived by integration of hierarchy of settlements, function of settlements and the connectivity between settlements.

The hierarchy of settlements of Pathanamthitta as revealed from regional setting study is shown in Figure 3.1. Thiruvalla and Pathanamthitta are suggested as first order settlements. Pandalam is proposed as a second order settlement along with Adoor, Mallappally, Ranni and Konni.

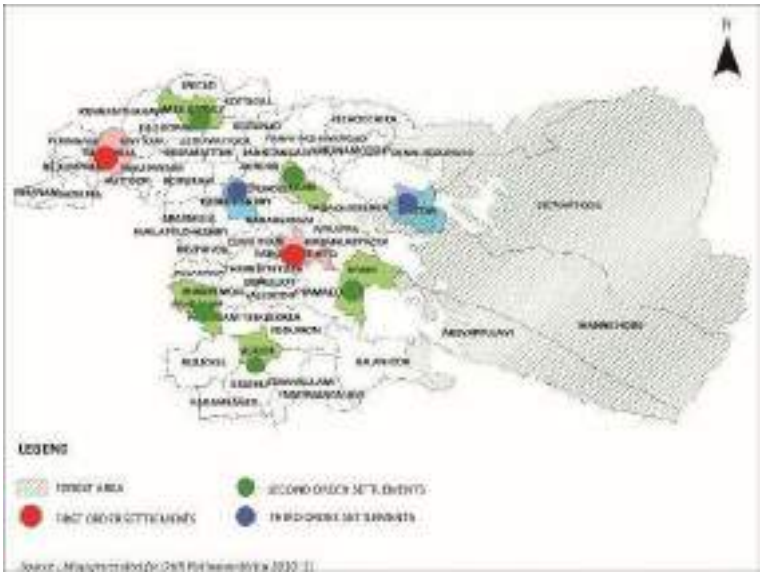


Figure 3.1 Hierarchy of settlements of Pathanamthitta

The Activity pattern of Pathanamthitta district is shown in Figure 3.2. In this study Tertiary activity, Primary activity (plantation), Primary activity (agriculture), combination of Agriculture SSI and Animal husbandry, Primary activity (agriculture and animal husbandry), Primary activity Agriculture-non detrimental to forest, combination of Plantation, SSI and Animal husbandry are the activities identified for various

settlements of the district. In this study combination of Agriculture, SSI and Animal husbandry has been identified as the activity of Pandalam town.

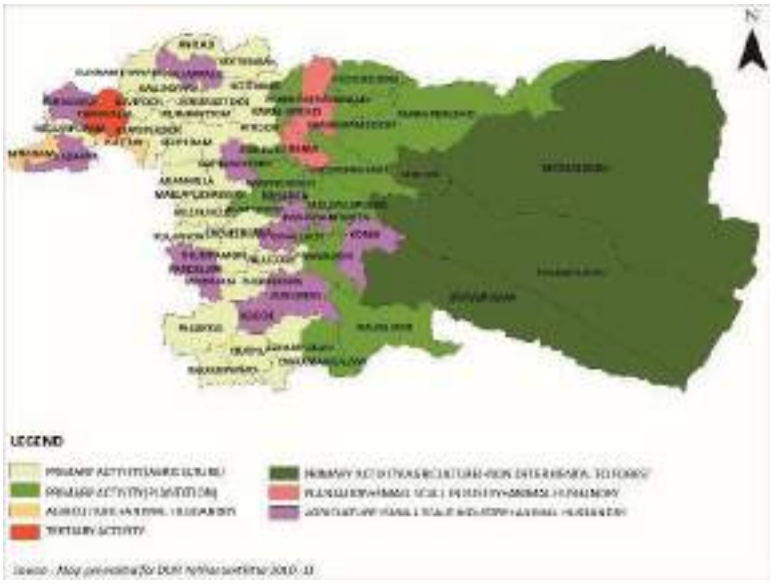


Figure 3.2 Activity Pattern of the district

The connectivity network of Pathanamthitta district, is revealed from regional studies of the study on urbanization of the district. The connectivity of the district is shown in Figure 3.3. State Highway No. 1 (Main Central road) and Pandalam - Kaipattoor- Pathanamthitta Road which are included in the proposed road network of the district are passing through Pandalam.

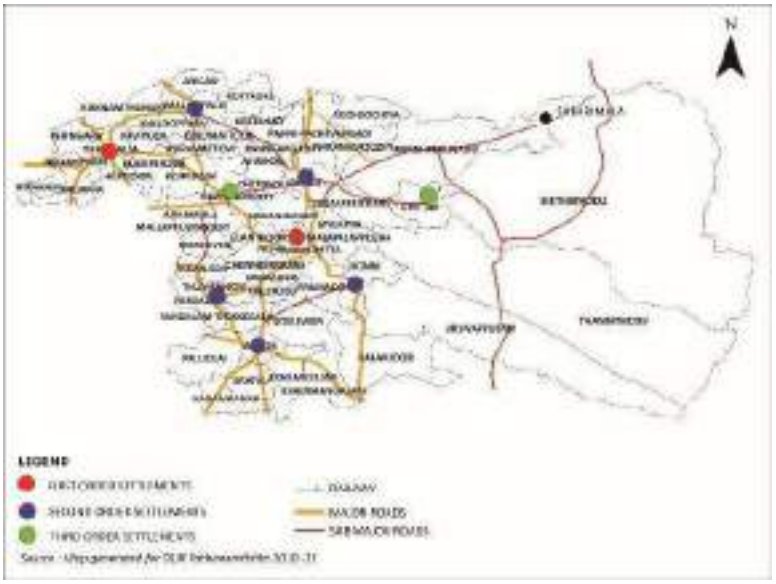


Figure 3.3 Proposed District Road Network

The regional road network and settlements within 10km, 20km, 30km and 40km radius is shown in Figure 3.4. Adoor falls within 10m radius, Chengannur, Mavelikara, Pathanamthitta falls within 20m radius, Thiruvalla, Kayamkulam,Pathanapuram, Ranni falls within 30m radius and Changanassery, Punalur falls within 40m radius of Pandalam.

3.2 PLANNING AREA

The Planning Area of a Development Plan shall be governed by the development scenario.

Planning Area has been delineated by studying the character of the Grama Panchayats lying adjacent to Pandalam town. Three characters viz, urban profile, functional character and land use concentration has been studied. The character of six adjacent Grama Panchayats – Kulanada, Thumpamon, Palamel, Nooranad, Pallickal and Pandalam Thekkekkara were studied and it is shown in table 3.1.

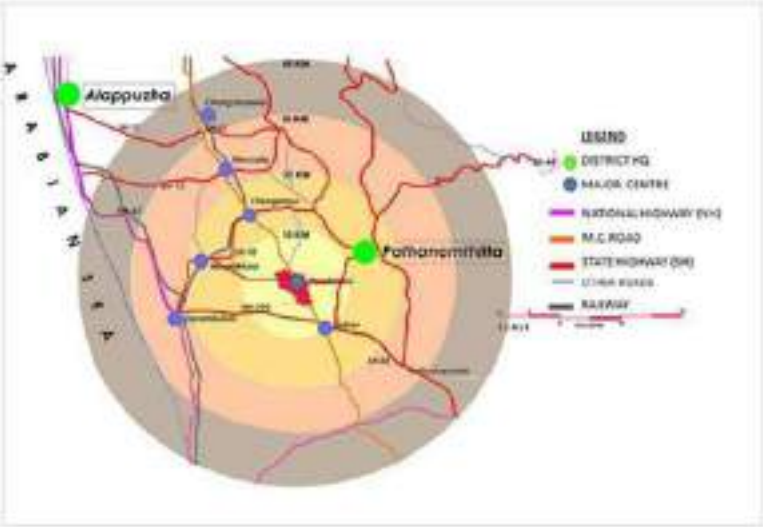


Figure 3.4 Regional setting of the town

Table 3.1. Character of Adjacent settlements

Settlements	Urban Profile	Functional Character	Land use concentration
Kulanada	Non-Urban	Rural	Agriculture
Thumpamon	Non-Urban	Rural	Agriculture
Palamel	Non-Urban	Rural	Agriculture
Nooranad	Non-Urban	Rural	Agriculture
Pallickal	Non-Urban	Rural	Agriculture
PandalamThekkekkara	Non-Urban	Rural	Agriculture

Source: District Urbanization report, Pathanamthitta and Alappuzha district.2011

From the above table, it is clear that none of the adjacent Grama Panchayat is showing an urban character and they are predominantly rural. But certain wards of the neighboring local governments outside the municipal limit exhibits a continuum of physical development with the character of Pandalam town. But these areas being small are ignored and the planning area is taken as Pandalam Municipal area limit only.

3.3 INFLUENCE AREA OF THE TOWN

Pandalam influences surrounding Grama Panchayats in many ways. A large number of Government offices are functioning at Pandalam. For the administrative needs people from the

surrounding settlements are depending Pandalam town. The locality of the town in the central part of a developed region, attracts people from a major part of Adoor taluk and Mavelikara taluk of Alappuzha district.

In the study on urbanization of Pathanamthitta district, Pandalam is one of the five proposed second order settlements of Pathanamthitta district. The people of surrounding Grama Panchayats depends Pandalam for various services.

The town acts as a transportation node due to the intersection of major roads and due to availability of KSRTC and Private Bus services to different destinations. Being located in M.C.Road buses are operated to all part of the state through Pandalam. This attracts people to Pandalam town for their travel needs.

Number of educational institutions including higher education centers is functioning in and around Pandalam town. Students from the surrounding areas and even from other districts depends Pandalam for higher education.

One Government Primary Health Centre and hospitals in private sector are available in Pandalam town. The people of surrounding area depend Pandalam town for their health need.

The historical and religious importance of the town also attracts a large number of pilgrims to this place especially during the Mandalakalam and Makara Vilakku festival of Sabarimala.

Considering the above aspects, the northern part of Adoor taluk and the eastern part of Mavelikara taluk of Alappuzha is considered as the influence region of Pandalam town. Kulanada, Thumpamon, Pandalam Thekkekara, Chennerkara, Mezhuveli, Palamel, Nooranad and Venmony Grama Panchayats are included in the influence area of Pandalam town. The influence

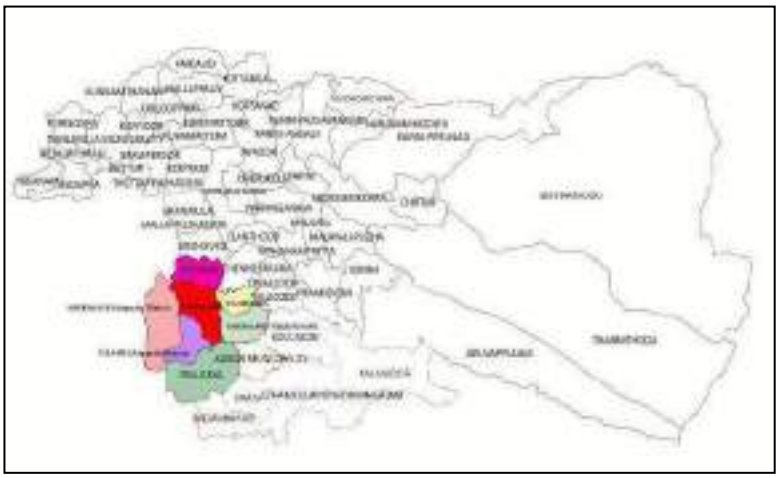


Figure 3.5 District map and influence area of Pandalam

area of the town is shown in Figure 3.5.

3.4 FLOATING POPULATION

The origin and destination survey conducted by NATPAC (2010) has been taken as the basis for calculation of floating population of the town. As per the study the total floating population of the town is estimated as 65,676, which is more than the resident population.

3.5 CHARACTERISTICS OF THE INFLUENCE REGION

In addition to Pandalam Town, eight Grama Panchayats falls in the influence region of Pandalam Municipality. The area and population details of the nine Local Governments (LGs) in the influence area of Pandalam Municipality are shown in Table 3.2. The total area of the region is 175.98 Sq.Kms. Thumpamon is the smallest Grama Panchayat with an area of 7.84 Sq.Kms and Palamel is the largest Grama Panchayat with an area of 25.59 Sq.Kms.

Table 3.2 Area and Population details of Influence region

Sl:No.	Name of the LGs	Area in Sq.km	Population 1991	Population 2001	Population 2011	Density of population 2001 (Persons per Sq.km)	Density of population 2011 (Persons per Sq.km)	Population growth rate 1991 -2001	Population growth rate 2001- 2011
1	Pandalam	28.42	37733	40810	41594	1436	1463	8.15	1.95
2	Kulanada	21.57	22978	24493	23545	1136	1092	6.59	-3.87
3	Venmony	18.01	20321	21202	19932	1177	1107	4.34	-5.99
4	Palamel	25.59	29471	31916	32512	1247	1270	8.3	1.87
5	Nooranad	21.29	24455	25604	25375	1203	1192	4.7	-0.89
6	Thumpamon	7.84	7644	8160	7566	1041	965	6.75	-7.28
7	PandalamThekkekkara	19.39	16526	18101	18366	934	947	9.53	1.46
8	Chennerkara	19.50	19351	19538	19124	1001	981	0.10	-0.21
9	Mezhuveli	14.36	14121	15223	14535	888	848	0.78	-0.45
TOTAL		**175.98**	**192600**	**205047**	**202549**	**1147**	**1133**	**6.46**	**-1.21**

Source: Census Reports

The total population of the region as per 1991 census was 192600 and it has increased to 205047 in 2001 but decreased to 202549 in 2011. It is a general trend of the Pathanamthitta district. Among the constituent local bodies, Pandalam municipality has the highest population of 41594 and Thumpamon Grama Panchayat has the least population of 7566 as per 2011 census.

While analyzing the population density (2011) of the region it can be seen that there are large variation among the constituent local bodies of the region with 848 persons per Sq.km in Mezhuveli Grama Panchayat to 1463 persons per Sq.Km in Pandalam Municipality. Average population density of the region is 1133 persons per Sq.Km. It is higher than the district population density of 454 persons per Sq.Km. The population density of Pandalam Municipality is 1463 persons per Sq.Km.

The average decadal population growth rate of the region during 1991-2001 is 6.46 %. But during the decade 2001-2011 it is decreased to – 1.21 %. In fact this region is recording negative population growth in the district. In the region the growth rate is negative in Grama Panchayat of Kulanada (-3.87 %), Venmony (-5.99 %) and Nooranad (-0.89 %), Thumpamon (-7.28 %), Chennerkara (-0.21%) and Mezuveli (-0.45). But Pandalam Municipality, Palamel and PandalamThekkekkara shows positive growth rate in the region.

3.6 RESOURCES

The resources mainly available in the region are the Agro based products.

3.7 FACILITIES OF THE REGION

Facilities are almost distributed in all constituent local bodies with some concentration in Pandalam Municipality. Facilities like Primary Health Centre, Ayurvedic and Homeo medical centers and educational facilities like L.P.School, U.P.School, and High School etc. are available in all constituent Local bodies of the region. Markets and banking facilities are also available in all constituent Local bodies.

Most of the middle order facilities are available Pandalam municipality. Pandalam town is being located in the central part of the region; the constituent Grama Panchayats of the region have more dependency on Pandalam.

3.8 TRANSPORT LINKAGE

State Highway No. 1 (Main Central Road) from Thiruvananthapuram to Angamaly is the major road passing through the region. In addition to that there is a network of Major District Road and Minor District Roads connecting the region with centers of Pathanamthitta, Kottayam, Alappuzha district and other parts of the State. Roads maintained by the Municipality and Grama Panchayats satisfy the local transportation needs of the people.

3.9 CONCLUSION

In the regional context of the district, Pandalam is proposed as a second order settlement. In the district level analysis agriculture Animal husbandry and small scale industry have been identified as activities of the town. The influence area of Pandalam consists of eight adjacent panchayats, all have significant dependency on Pandalam. Lower order facilities are available in the settlements of the influence area. But in case of middle order facilities they depend more on Pandalam town. The average floating population towards Pandalam is estimated as 65,676 Persons. The economy of the region is agriculture oriented and primary sector activity is the character of the region. The agro based products are the major resource of the region and the level of industrialisation is very low.

4. LAND USE

4.1 INTRODUCTION

The land use of an area is indicated by the predominant activity of that area, be it agriculture, residential, commercial, public and semi-public, transportation, park and open spaces, industrial etc. Hence the analysis of existing land use is inevitable to understand the predominant activity of the area and also to assess the availability of suitable land for the future urban development activities of the town. From this it is possible to draw the future requirement of land for various uses in the town. The Department of Town and Country Planning conducted detailed land use survey in the year 2013, as part of preparation of Master Plan for Pandalam.

4.2 GROWTH OF THE TOWN

Pandalam town was grown around two focal points; Pandalam Palace and Pandalam Market. The first one relates to the religious aspect and the second one relates to commercial aspect. The religious aspect related to some rituals in connection with lord Ayyappa of Sabarimala and Pandalam Palace, which acts as one of the focal point of development. The second one is Pandalam market which was known as Kurunthottiyam market is one of the oldest markets in Central Travancore. Establishment of bus stands, offices etc. in this area has intensified the activities in this area. Gradually, ribbon development came in between these two centers. Now the commercial and other urban developments are taking place along the major travel corridors- M.C. Road and Mavelikkara- Pathanamthitta road.

4.3 EXISTING LAND USE 2013

As per the land use survey 2013, residential, commercial, public and semi- public, transportation, industrial, agriculture (both dry and wet), sacred groves and water body/canal are the major land use classifications of Pandalam Town.

Table 4.1 Land use break up of Pandalam

Sl. No	Land use	Area in Ha	% of total area
1	Residential Use	961.19	33.82
2	Commercial Use	23.65	0.83
3	Public and Semi public Use	84.07	2.96
4	Transportation Use	30.19	1.06
5	Industrial Use	11.73	0.41
6	Dry Agriculture Use	995.12	35.02
7	Paddy Field & Wetland	630.74	22.19
8	Sacred Groves	1.4	0.05
9	Water body/canal	93.47	3.29
10	Vacant land	10.44	0.37
	TOTAL	2842.00	100

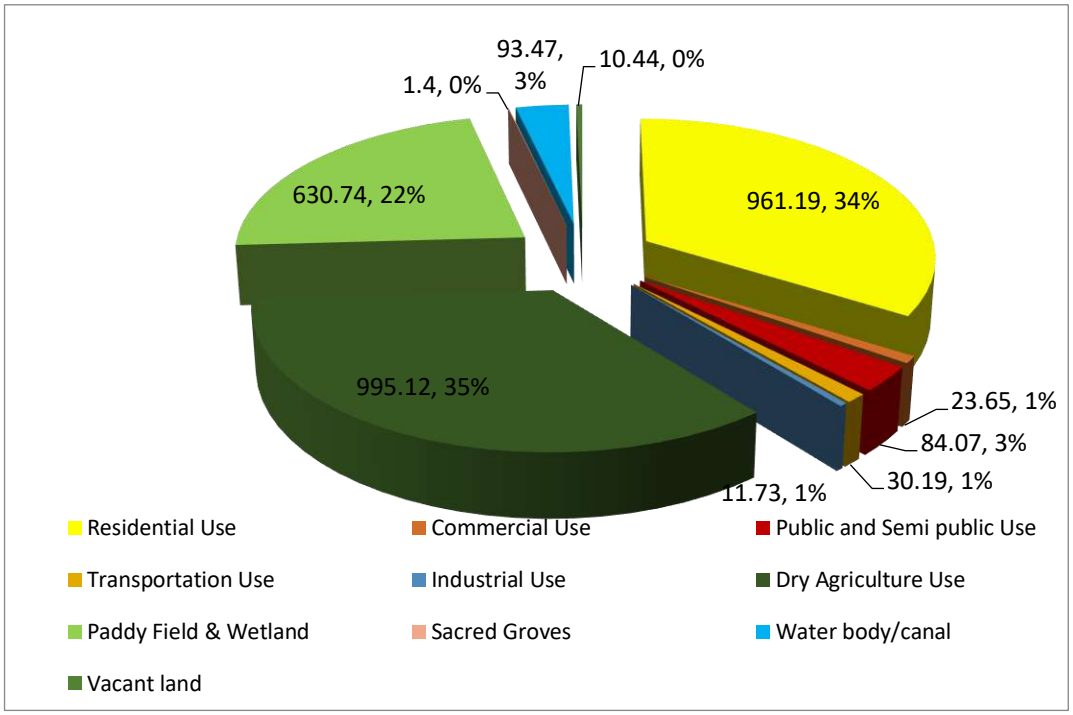


Figure 4.1 Land use Break up of Pandalam Town

The land use break up of Pandalam town is given in Table 4.1 and ward wise land use of Pandalam municipality is given in Annexure 4.1. The land use break up of Pandalam town is also represented in Figure. 4.1. The Figure 4.2 shows the Existing land use map of Pandalam 2013. It can be noted that only 39.5% of the town area is developed land.

4.3.1 Residential Use

Residential area occupies second position in land use with 961.19 hectares which is 33.82 % of the total town area. It is distributed in almost all parts of the town and is mixed up with the agriculture land.

4.3.2 Commercial Use

Commercial area is mainly concentrated in the town Centre along major travel corridors of the town. The central Junction and surrounding areas are acting as the C.B.D of the town. Few pockets of commercial land use are distributed in other parts of the town also. 23.65 hectares of land is coming under this use, which constitutes 0.83% of town area.

4.3.3 Public and Semi-public Use

Public and Semi-public areas include land where Government and semi- Government establishments, religious centers, educational institutions, health institutions etc. are functioning. It is distributed in almost all wards of the town and 84.07 hectares, of land which is 2.96% of town area is coming under this use.

4.3.4 Transportation Use

The Traffic and Transportation use of the town mainly consists of roads and two bus terminal areas. 30.19 hectares of land, which is 1.06 % of total land use comes under transportation use.

4.3.5 Industrial Use

The level of industrialization of the town is very low and only 11.73 Hectares of land which is 0.41% of the total area comes under industrial use. The industries are scattered in the town.

4.3.6 Dry Agriculture Use

Area wise, Agriculture is the major land use of Pandalam town and 1625.86 hectares of land comes under Agriculture land use, which constitute 57.21 % of total area of the town. The Dry Agriculture land of area 995.12 hectares which constitute 35.02% of total area includes areas under rubber plantations, mixed cultivation, coconut gardens and paddy fields. The rubber plantation constitutes 62 % of total agriculture land and the plantations are evenly distributed in almost all elevated part of the town. Coconut gardens are confined to few pockets and only 7 hectares of land is coming under coconut garden.

4.3.7 Paddy Field & Wetland

Paddy Field & wetland constitute 22.19% of the total georgraphical area of the town. In agriculture land, Paddy comes in second position with cultivation in 630.74 hectares of land and it is also scattered at almost all parts of the town with little concentration in the western part of the town. The paddy fields in the western part of the town have continuity with vast paddy fields in the adjacent Grama Panchayats in Alappuzha district. In certain areas paddy fields are used for cultivation of vegetables and other seasonal crops.

4.3.8 Sacred Groves

Sacred groves possess 1.4 hectares which constitute 0.05 % of the total land use. Sacred groves of ecological importance are located in different parts of the town. These sacred groves are either under private ownership or associated with temples.

4.3.9 Water body/Canal

93.47 hectares of land which is 3.29 % of total area comes under Water body/canal. Achankovil River passes through the municipality. The Canals of Kallada Irrigation Project (KIP), which pass through the town for a length of 20.32 km occupies major share of the water bodies. In addition to this there are a few small drains and ponds within the town.

4.3.10 Vacant Land

10.44 Hectares of land which is 0.37% of the town remains as vacant land.

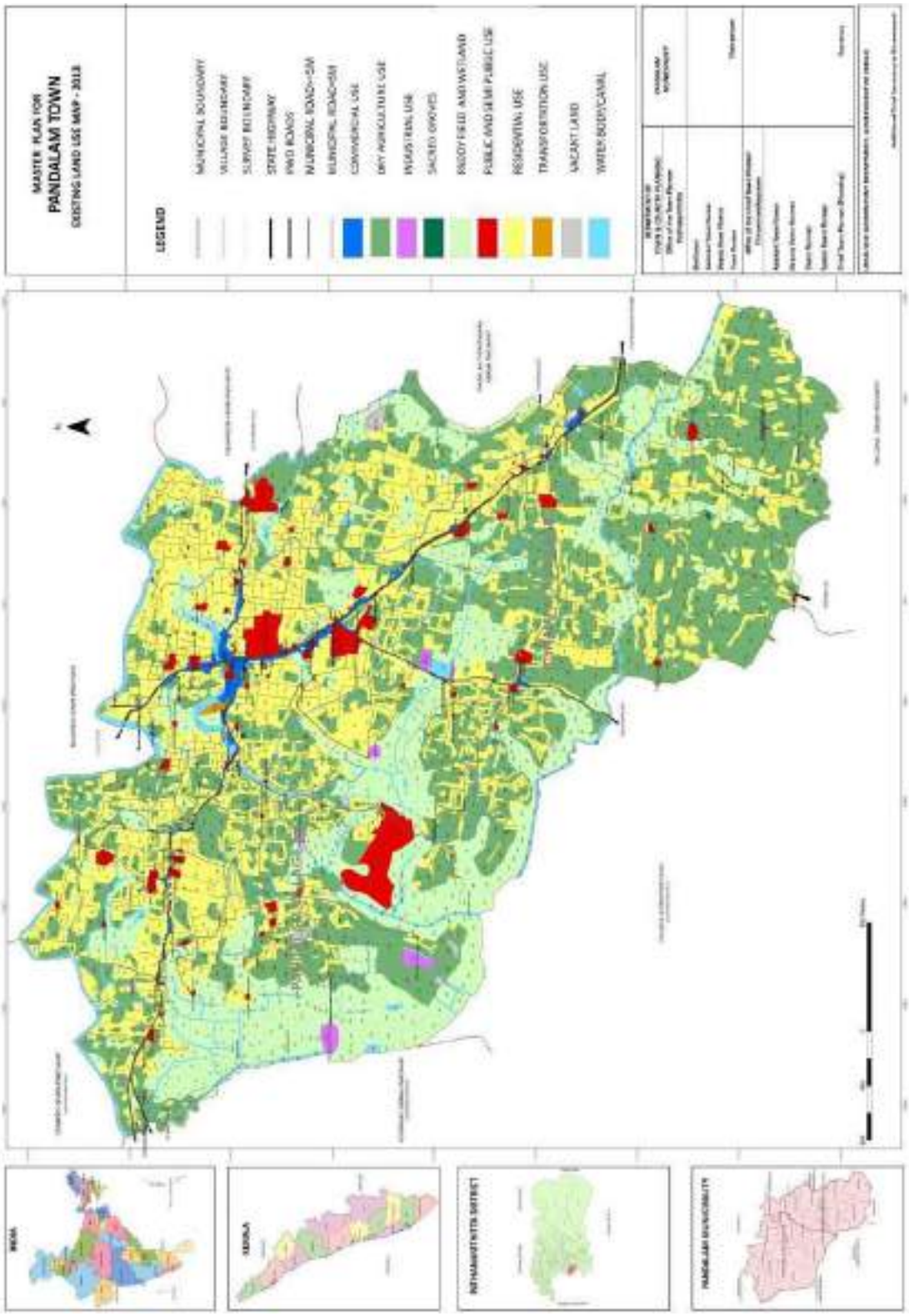


Figure 4.2 Existing land use Pandalam 2013

4.4 COMPARISON WITH PLANNING STANDARDS

Comparison of land use breakup of Pandalam with the proposed land use structure as per URDPFI Guide line has been made and it is shown in Table 4.2.

The percentage of residential use is far above the suggested standard as per URDPFI guide lines. The percentage of Public and Semi-public area and commercial use are also higher than the URDPFI standard. The percentage of transportation, industrial and recreational use is far below the suggested URDPFI standard.

Table 4.2 Comparison of Land use with URDPFI Guide line

Sl:No	Land use	Pandalam Town		Proposed land use structure as per UDPFI Guide line (for small towns)
		Area of existing land use (in Ha)	% of total (existing) developed area	% of Developed area
A	**Developed Area**			
1	Residential	961.19	85.61	45.00-50.00
2	Commercial	23.65	2.10	02.00-03.00
3	Public and Semi public	84.07	7.48	06.00-08.00
4	Industrial	11.73	1.04	08.00-10.00
5	Transportation	30.19	2.69	10.00-12.00
6	Recreational	11.84	1.05	12.00-14.00
	Total Developed Area	**1122.67**	100	
B	**Agriculture Land and Water bodies**	**1719.33**		Balance land

4.5 COMPARISON WITH SIMILAR TOWNS

Comparison of land use of Pandalam is made with similar towns in the region like Adoor, Pathanamthitta, Thiruvalla, Chengannur and Changanassery. The percentage of different land use of these towns is shown in Table 4.3. The comparison of percentage of land under different land use of the above town is shown in Figure 4.3.

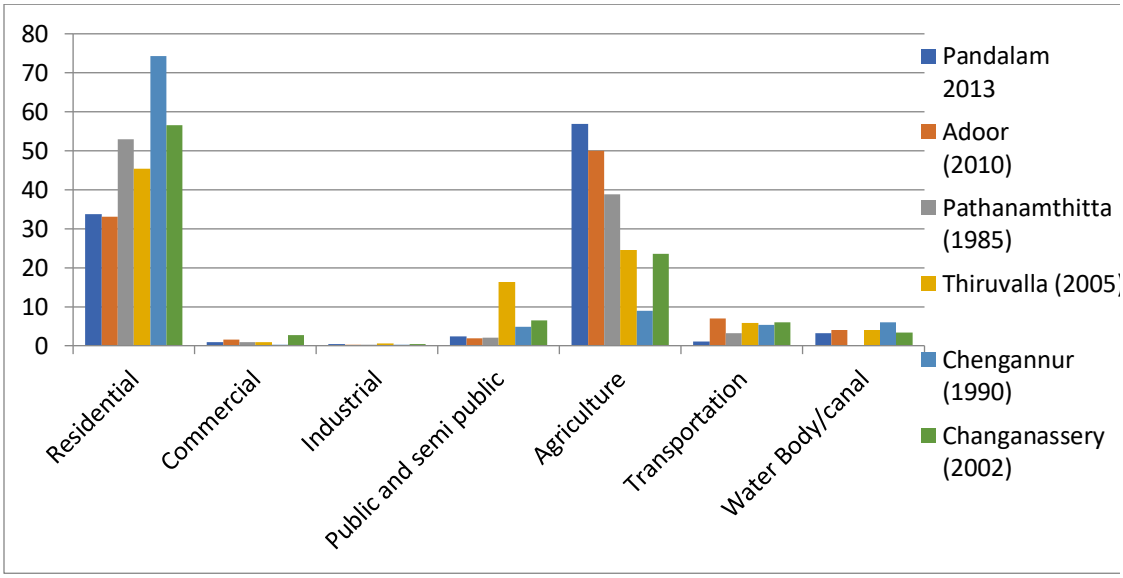


Figure 4.3 Comparison of land use with similar towns

The percentage of residential land use is high in Chengannur, Changanassery and Pathanamthitta municipalities and Pandalam town has lower percentage (33.82%) of residential land use. But In the case of Agriculture land use the percentage of agriculture land use is highest (57.21%) in Pandalam municipality.

Table 4.3 Comparison of percentage of land use of similar Towns

Towns / **Land use**	**Pandalam 2013**	**Adoor (2010)**	**Pathanamthitta (1985)**	**Thiruvalla (2005)**	**Chengannur (1990)**	**Changanassery (2002)**
Residential	33.82	33.13	52.89	45.45	74.37	56.52
Commercial	0.83	1.5	0.94	0.97	0.29	2.74
Industrial	0.41	0.18	0.26	0.54	0.27	0.43
Public & Semi public	2.96	1.92	2.13	16.39	4.91	6.56
Agriculture	57.21	50.05	38.81	24.55	9.01	23.63
Transportation	1.06	6.9	3.15	5.8	5.28	5.99
Water Body/canal	3.29	4.08	0	3.94	5.91	3.4

The percentage of Commercial land use is high in Changanassery and followed by Adoor. The percentage of Public land use and Industrial land use is highest in Thiruvalla Municipality and

least in Adoor. In the case of Transportation land use all towns except Pandalam and Pathanamthitta have almost same percentage.

4.6 CONCERNTATION PATTERN OF LAND USES

4.6.1 Introduction

The concentration pattern of a particular land use gives an idea about where that particular land use is concentrated within the town. The concentration pattern of a land use can be ascertained by the concentration index (CI) of that land use. The concentration index (CI) of a particular land use = ((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)). The concentration index values may be greater than one, equal to one or less than one. The CI greater than one for a particular land use indicates that the land use under consideration is concentrated more in that ward than other wards of the town. The concentration index of various land use is shown in the Annex.4.2.

4.6.2 Concentration pattern of Residential land use.

The concentration pattern of residential land use is shown in figure 4.4. The concentration index of residential land use varies from 0.31 to 1.84 and the residential area is spread in all wards of the town. The wards with higher values of concentration indices are Thonnallor North, Mulampuzha, Mangaram, Pandalam town, Kadakkadu West, Kurampala west, Muttar and Poozhikkadu. These wards are located along major travel corridor and around the commercial zone at Pandalam junction and Kurampala junction. The wards with low value of concentration index of residential

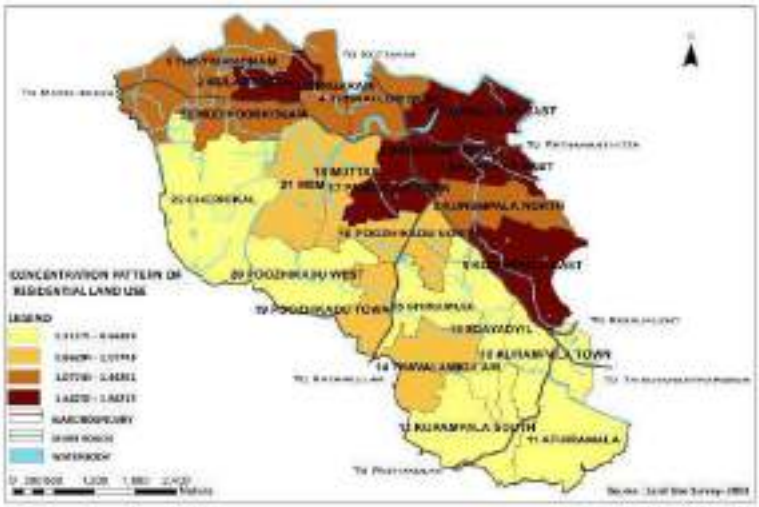


Figure 4.4 Concentration pattern of Residential Land use

land use are Thottakkonam, Thonnalloor East, Kurampala East, Kurampala south and Athiramala.

Generally the pattern shows that the residential area of the town is concentrated in the northern and eastern part of the town and there is gradual reduction in concentration of residential area towards the southern and western part of the town.

4.6.3. Concentration pattern of commercial land use.

The concentration pattern of commercial land use is shown in Figure 4.5. The concentration index of commercial land use is in the range of 0 to 7.65. High value of concentration index for commercial land use is obtained for Mulampuzha, Mangaram, Thonnallor North, Kadakkadu North, Kurampala West, Kurampala Town and Pandalam Town wards. The commercial land use is concentrated along M.C.Road and Mavelikara – Kaipattur Roads.

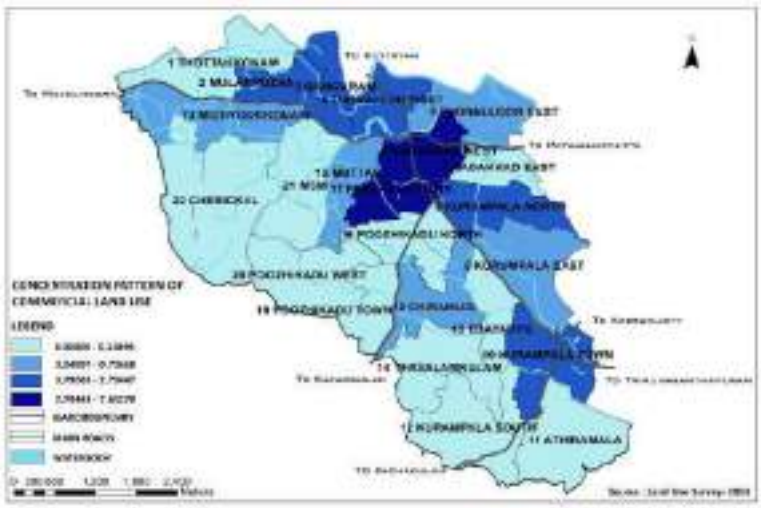


Figure 4.5 Concentration pattern of Commercial Land use

4.6.4 Concentration Pattern of Industrial land use.

The concentration pattern of industrial land use is shown in Figure 4.6. In fact only 11.73 hectares of land is coming under industrial land use and that also distributed in I0 (out of 23) wards of the municipality and there is no land under Industrial use in 13 wards.

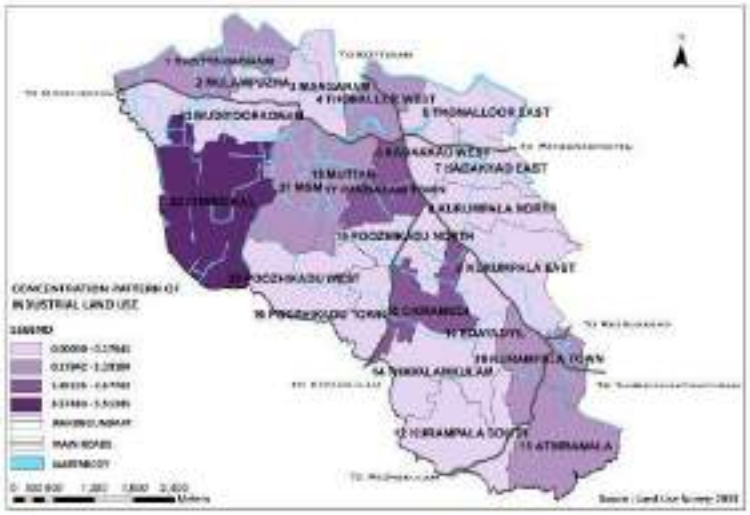


Figure 4.6 Concentration pattern of Industrial Land use

The concentration index of industrial land use is varying from 0 to 5.51. The maximum value of C.I is in Cherickal ward, followed by Pandalam town and Chiramudi wards.

No major industrial units are there in the town and the industrial activity is limited to a few MSME units. Mannam sugar mill was a major industry of the municipality which is not functioning due to the unavailability of sugar cane which is the major raw material.

4.6.5 Concentration Pattern of Public and Semi-Public land use.

The concentration pattern of public and semi-public land use, which includes Government establishments, educational facilities, health facilities, social institutions and religious is shown in Figure 4.7. The concentration index is varying from 0.04 to 5.68 and is high in KadakkaduWest, Kadakkadu East and Pandalam Town. The pattern shows that more concentration of public land use is in wards just outside the commercial zone. The concentration pattern of public land use, excluding religious use are concentrated more in Thottakkonam, Mulampuzha Wards.

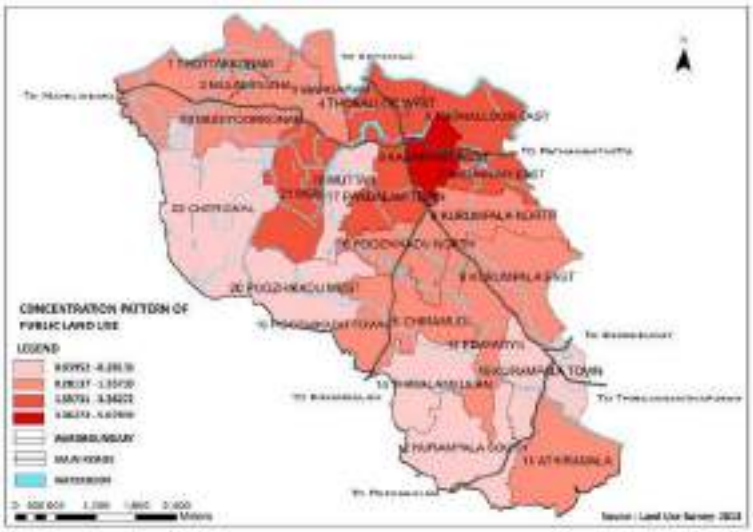


Figure 4.7 Concentration pattern of Public Land use

4.6.6 Concentration pattern of Agriculture land use.

Agriculture is the major land use of Pandalam municipality and 1625.86 hectares of land which is 57.21% of total town area in coming under Agriculture land use. Figure 4.8 shows the concentration pattern of Agriculture land use of the town. Agriculture land is distributed in all wards of the municipality. Concentration index is maximum in Kurampala Town, Athiramala, Kurampala South, Poozhikkadu West, MSM Ward and Cherickal wards. These wards are located in the peripheral area of the municipality in the south- west part of the town.

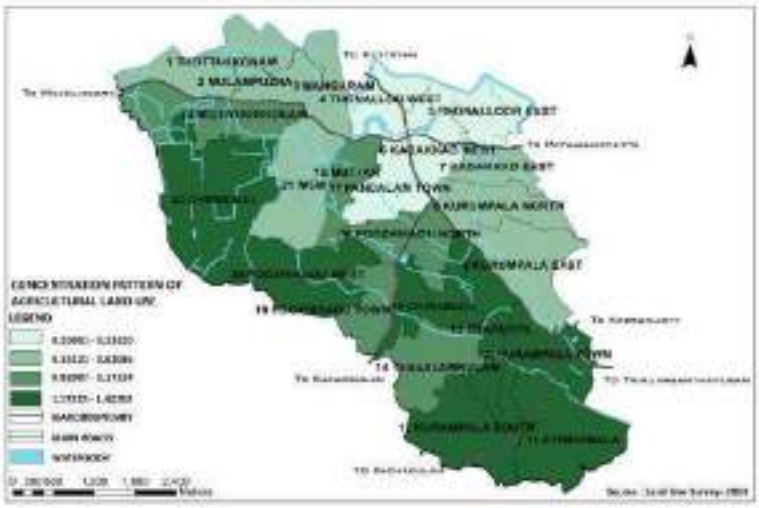


Figure 4.8 Concentration Pattern of Agriculture use



Figure 4.9 Concentration pattern of Rubber cultivation

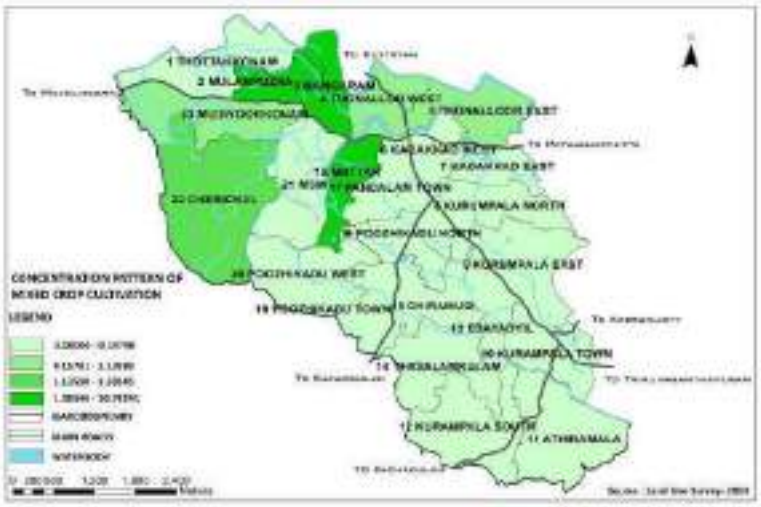


Figure 4.10 Concentration pattern of Mixed Crop cultivation

As already described in paragraph 4.1, the agriculture land is broadly classified into rubber plantation, mixed crops, paddy and coconut cultivation areas. Rubber and Paddy being the major components, the concentration index of land under these crops are studied and are shown in Figures 4.9 and 4.10 respectively.

4.6.7 Other land uses

In addition to the major land uses mentioned in sub-paragraphs 4.2.1 to 4.2.6, Transportation and Water bodies are the other remaining land uses of the town. The concentration pattern of these minor land use is discussed in the following paragraph.

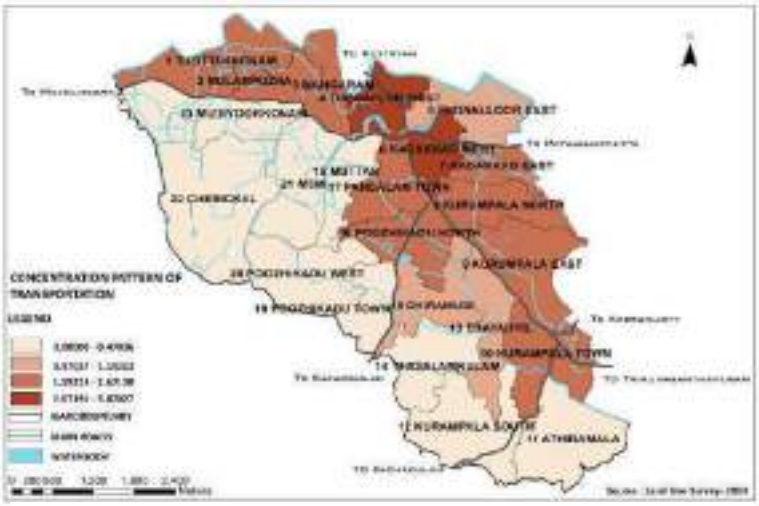


Figure 4.11 Concentration Pattern of Transportation

The land coming under Transportation is mainly roads and it is distributed in 23 wards and ward wise areas are varying from 0.0 hectors to 0.0611 hectors. In addition to the roads bus terminals are also coming under the transportation use and which is located in the Thonnalloor West ward. The concentration pattern of transportation land use is shown in Figures 4.11.

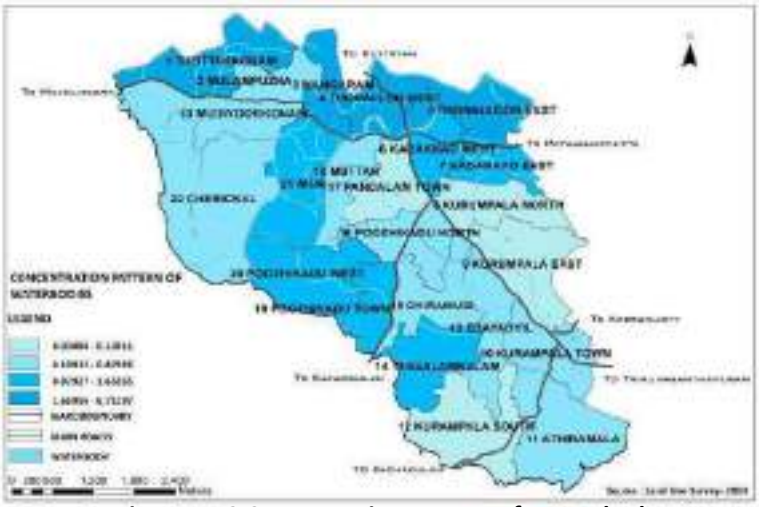


Figure 4.12 Concentration Pattern of Water body

Achankovil River passes along the northern boundary of Pandalam Municipality. Land coming under water bodies mainly consists of KIP canals, natural drains and ponds.

The concentration of this land use is more in wards along KIP canals. The concentration pattern of water bodies is shown in Figures 4.12.

4.7 LAND USE ACTIVITY PATTERN

As per the district level studies, one of the activities identified for Pandalam town is Agriculture. The activity pattern of Pandalam municipality based on land use is evolved here. Only four major category of land uses, viz residential, commercial, agriculture, public are considered for the analysis. The concentration index of the above four category of land use is shown in Annexe 4.2. Those activity (land use) with higher concentration index has been assigned as the activity of the particular ward. The activity pattern of the town based on the land use is shown in Figure.4.13.

From the above figure it can be inferred that, the commercial activity is concentrated at two parts of the town around Pandalam junction and Kurampala junction. There is no ward with high concentration of Public activity. The residential activity is concentrated in wards around the central nucleus consisting of commercial activity. The agricultural activity is concentrated in wards along the periphery of the town.

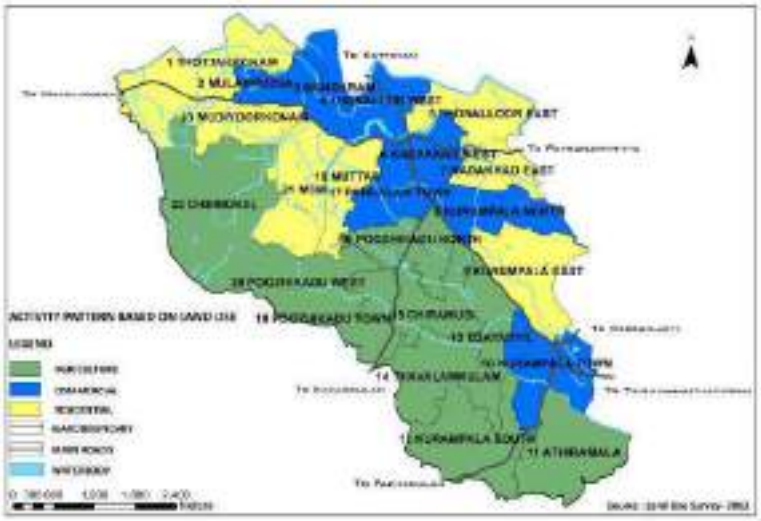


Figure 4.13 Activity pattern based on Land use

4.8 FUNCTIONAL CHARACTER OF THE TOWN

The functional character is determined based on population distribution, average plot size and land use. As per the regional studies in the District Urbanisation Report for Pathanamthitta district, Pandalam has rural character.

The functional character of different wards of Pandalam municipality has been determined and it is shown in Figure 4.14. The details and calculation is shown in Annex 4.3. Functional character of wards of Pandalam town is shown in Figure 4.15. Six wards along the roads passing through the central part of the town namely Pandalam Town, Kadakkad West, Thonalloor East, Thonallorwest and Mulampuzha have urban character. Seven wards, Thottakkonam, Mudiyoorkonam, MSM, Mangaram, Poozhikadu North Kurampala North and Kurampala East have semi urban character. Poozhikkadu West, Thavalamkulam, Kurampala south and Athiramala have semi-rural character and the remaining wards have rural character.

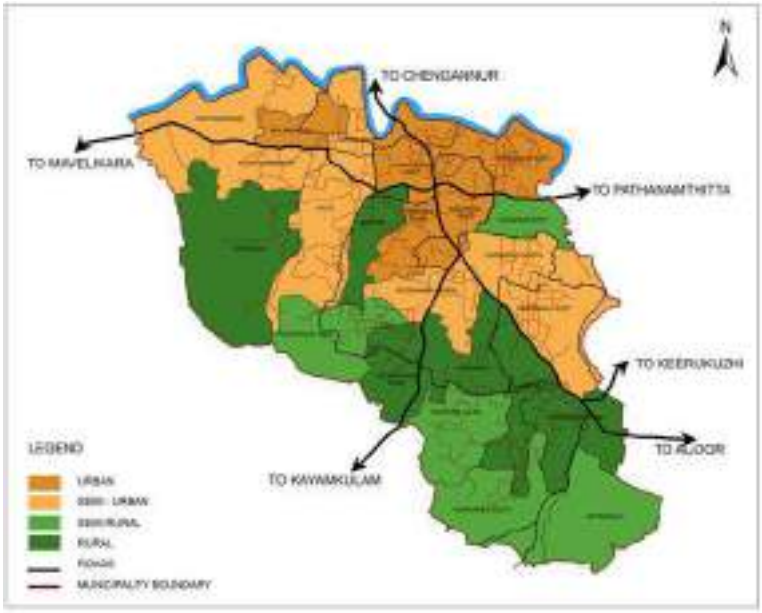


Figure 4.14 Functional Character of the town

The study shows that, wards with urban and semi urban characters are located along the major travel corridors of the town, M.C.Road and Mavelikkara- Kaipattoor road. The study also shows the predominant rural character of the town.

4.9 CENTRAL AREA OF THE TOWN

Central area of the town is the area where major activities of the town like commercial, civic transport, educational, administrative, recreational etc. are located with population in the surrounding residential area supporting the C.B.D. functions. Based on the above criteria the 7 Municipal wards of the town i.e. Kadakkad West (full), Thonnallur East (part only), Thonnallur West (Part only), Muttar (Part only), Pandalam Town (part only), Poozhikkad North (part only), Kadakkad East (part only) are included in the delineated central area. The extent of the

delineated central area is 218.4 hectares and the resident population in this area is 3596 which is 8.64 percentage of the total town population. The central area of the town is shown in Figure 4.15.

4.10 TOWN CENTRE (C.B.D)

A town centre is a meeting place for the population as a whole. It is the focus of a radial system of roads and either in or near to the central bus terminal. It is the main administrative business, entertainment and cultural centre of the town. For Pandalam town the area identified as the CBD includes - The stretch of M.C.Road from Post office Junction on Kottayam road to CMC Hospital Area on Adoor Road, where the religious building, educational institutions, shopping centres, business and banking institutions, hospitals etc .

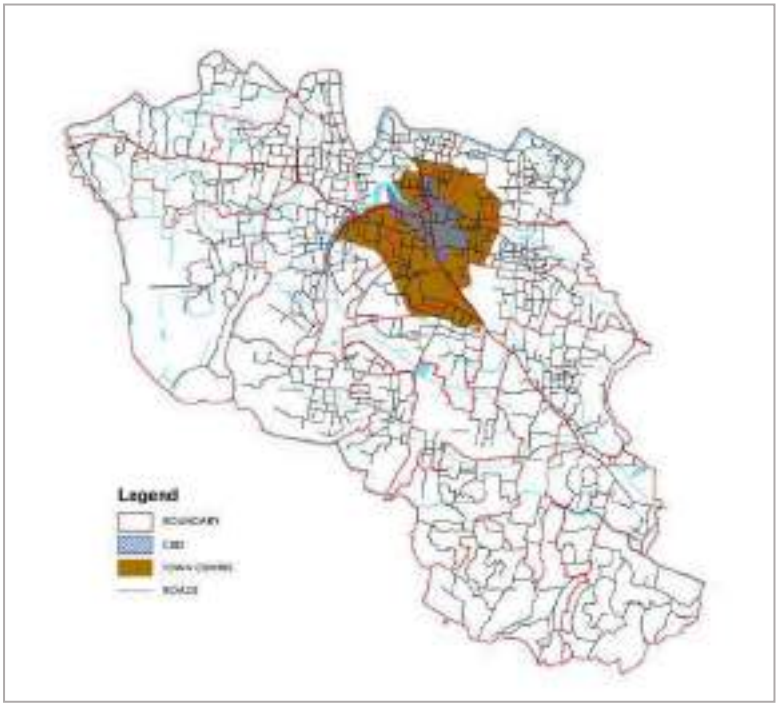


Figure 4.15 The Central Area and CBD of the Town

Mavelikkarea road from Central Junction to KSRTC Bus stand where the market, Government offices, bus terminals, commercial establishments etc are located. Kaipattur (Pathanamthitta) road from Central Jn to PHC Area where the market, institutions, commercial establishments etc are located.

The total area of the town centre is 41.09 hectare, which is 1.44 percentage of the total town area. The town centre is shown in the Figure 4.15.

4.11 CONCLUSION

The land use pattern of Pandalam shows that 57.21 % of the town area comes under Agriculture land. The commercial and other urban activities have taken place along the major travel corridors near Pandalam junction and Kurampala junction. Concentration of non-agriculture activities is almost concentrated near these two main nodes. The two KIP main canals pass through the town .The residential land uses is scattered all over the town area and mixed with agriculture land uses. This type of settlement pattern creates problems in provision of infrastructural facilities, especially in low density wards in the peripheral area of the town. As per the regional setting study in the District Urbanisation Report, one of the activities identified for Pandalam town is Agriculture. Non agriculture activities are concentrated around the central part of the town and the agriculture activities in the periphery of the town. The study on functional character of the town shows predominantly rural nature of the town with 8 wards of semi-rural character and 7 wards of rural character.

5. DEMOGRAPHY

5.1 INTRODUCTION

The demographic characteristics of Pandalam town are discussed in this chapter. The population parameters serves as the basis of all planning process and it is an essential tool in determining current and future needs of the public. In this chapter analysis of growth, temporal changes, structure, density, distribution of population etc. are included. Comparative study is also made with corresponding figures of Pathanamthitta district, Kerala state, similar towns and surrounding local self-Government institutions etc. The estimation of future population is needed for the assessment of various needs and distribution of activities in available land.

5.2 POPULATION SIZE

The population of Pandalam town as per 2011 census is 41594. It was 31872 in 1971 census and there after shows a steady increase in population. When comparing the population size of Municipalities of Pathanamthitta district, Pandalam occupies second place after Thiruvalla. The population size of other three Municipalities of the district ie, Thiruvalla, Pathanamthitta and Adoor are 56,837, 38,009 and 28,952 respectively.

Table 5.1 Population size of Pandalam town

Year	1971	1981	1991	2001	2011
Population	31872	35391	37733	40810	41594

Source: Census Reports

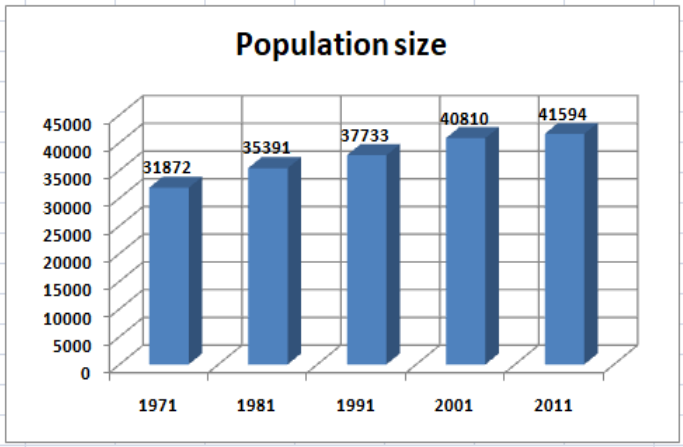


Figure 5.1 Population size of Pandalam town

5.3 POPULATION GROWTH RATE

The decennial population growth rate of Pandalam town from 1971-81 to 2001-11 is shown in Figure 5.2. The growth rate of population of Pandalam Municipality during 1971-81 was 11.04% and then it decreased to 6.62% during 1981-91. The growth rate is then slightly increased to 8.15% during the period 1991-2001 and then decreased to 1.92% in 2001- 2011. Comparison of population growth rate of Pandalam town with that of Pathanamthitta district and State figures is shown in the Table 5.2 and Figure 5.3. In the year 2001-2011 the Pathanamthitta district recorded negative growth in population and growth rate was (-) 2.77% (-4.7% for males and -1.38% for females), while it was 4.91% in the state level. The population growth rate of Pandalam is greater than the district growth rate and less than the state growth rate.

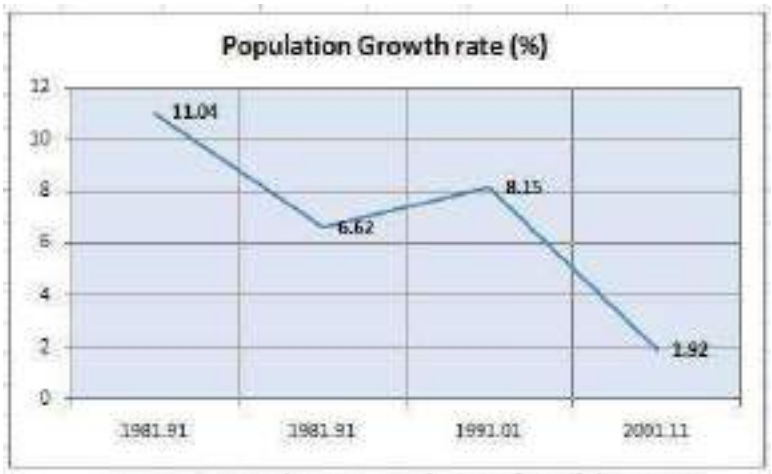


Figure 5.2 Population Growth rate of Pandalam town

Table 5.2 Comparison of Population Growth rate

	1971-81	1981-91	1991-01	2001-11
Pandalam	11.04	6.62	8.15	1.92
Pathanamthitta	9.45	5.45	3.85	-2.77
Kerala	19.24	14.32	9.42	4.91

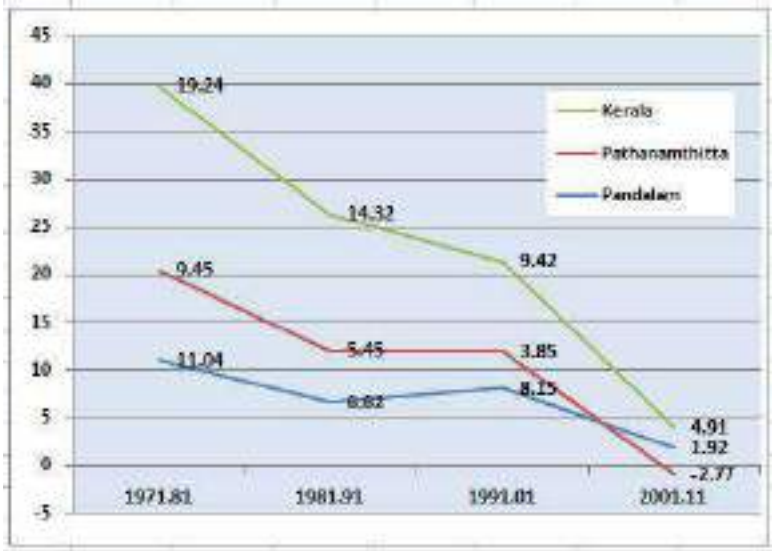


Table 5.3 Comparison of Population Growth rate

The growth rate of population of municipalities and Grama Panchayats of the district is shown in Figure 5.4. Pandalam is one among the 9 local bodies in the district which recorded positive growth in population and the remaining 48 local bodies of the district recorded negative growth in population during the decade 2001-11. It can be observed that the population growth rate is higher in the south-west quarter of the district where the Pandalam town is situated.

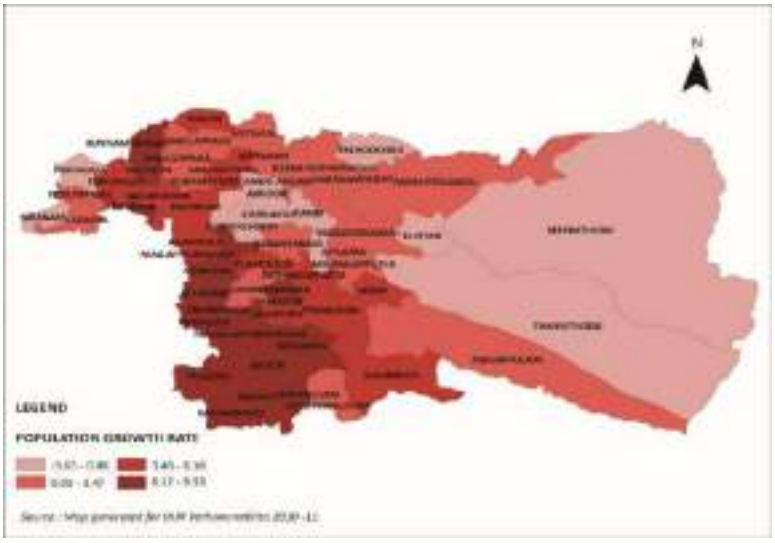


Figure 5.4 Population growth rate of Pathanamthitta district

The comparison of population growth rate of Pandalam with that of other three Municipalities of the district - Adoor, Thiruvalla and Pathanamthitta is shown in Table 5.3 and Figure 5.5.

Table 5.3 Comparison of growth rate rate of Municipaliies

Town	Growth Rate (in %)			
	1971-1981	1981-1991	1991-2001	2001-2011
Pandalam	11.04	6.62	8.15	1.92
Adoor	9.22	6.58	8.68	0.76
Thiruvalla	10.43	5.8	3.76	-6.96
Pathanamthitta	14.93	8.84	5.93	-2.77

During the decade 1971-81, the population growth rate of Pandalam is greater than the growth rate of Thiruvalla and Adoor and less than the growth rate of Pathanamthitta Municipality. During the period of



Figure 5.5 Comparison of Growth rate of Municipalities

1981-91 the growth rate of population of all the four municipalities reduced and the growth rate of Pandalam was greater than Adoor and Thiruvalla but lower than Pathanamthitta. During the period 1991-01 the population growth rate of Pathanamthitta and Thiruvalla has decreased, while the growth rate of Pandalam and Adoor have increased. During the period 2001-2011, Pandalam recorded high growth rate, while two municipalities of the district Thiruvalla and Pathanamthitta recorded negative growth rate.

The growth rate of population of **Pandalam** town has been compared with Grama Panchayats in the immediate surroundings. It is shown in figure 5.6. The population growth rate of **Pandalam** town and surrounding Grama Panchayats is in the range of 4.34% to 9.3% during the decade 1991-2001 and all the local bodies recorded positive growth rate of population. Two Grama Panchayats, Palamel and PandalamThekkekkara recorded more population growth rate than Pandalam and the growth rates of other four Grama Panchayats Kulanada, Venmony, Noornad and Thumpamon are less than that of Pandalam town. But the growth rate of all local bodies has decreased during 2001-2011 period and four local bodies recorded negative growth rate of population. Pandalam municipality recorded high growth rate among the local bodies.

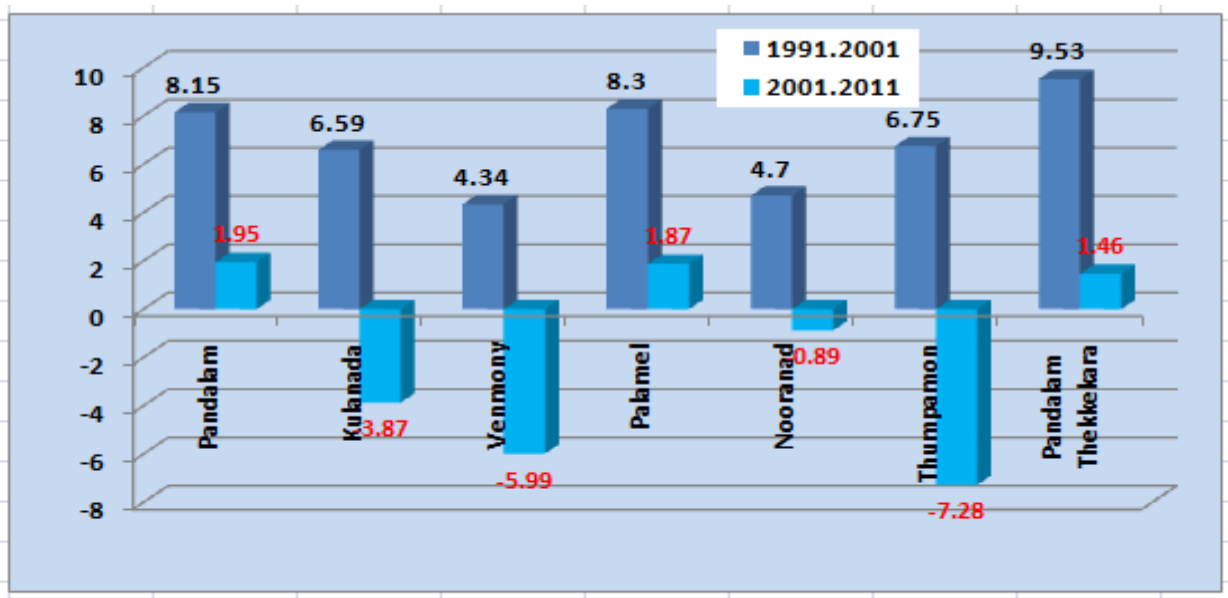


Figure 5.6 Comparison of population growth rate with surrounding LSGs

5.4 POPULATION DENSITY

The population density of Pandalam town as per 2011 census is 1436 persons/sq.km. It is lower than the population density of Thiruvalla and Pathanamthitta municipalities which have density of 2034 persons/sq.km,1617persons/sq.Km respectively. The fourth town Adoor has a density of 1418 persons/sq.Km and it is the lowest density among four urban centers of the district. The population density of Pandalam town is also compared with the density of surrounding Kulanada, Venmony, Palamel, Nooranad, Thumpamon and PandalamThekkekkekkara Grama Panchayats and it is shown in Table 5.9. The density of these Grama Panchayats is lower than the density of Pandalam town.

Table 5.4 Population density with surrounding Grama Panchayats

Sl. No	Name of Grama Panchayat	Population	Area in Sq.km	Density
1	Kulanada	24493	21.57	1136
2	Venmony	21202	18.01	1177
3	Palamel	31916	25.6	1247
4	Nooranad	25604	21.29	1203
5	Thumpamon	8160	7.84	1041
6	Pandalam Thekkekkara	18101	19.39	934

5.5 WARD WISE POPULATION DENSITY

The ward wise population (total, male, female), area of wards and population density is shown in Table 5.5 and the ward wise population density is shown in Figure 5.7.

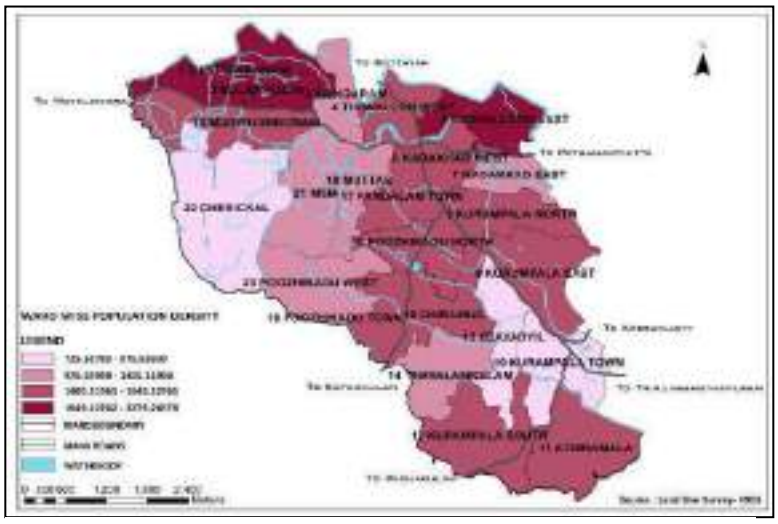


Figure 5.7 ward wise population density

The overall density of Pandalam Municipality is 1464 persons per sq:km and there is large variation in population density among different wards. The population density of the town varies from 726 persons/sq.km to 2279 persons/sq.km. The wards Thonnalloor East (2279 persons/sq.km.), Thottakkonam (2213 persons/sq.km.), Mulampuzha (1997 persons/sq.km.), Kurampala East (1849 persons/sq.km.), Poozhikkad North (1761 persons/sq.km.) have higher population density, while Cherickal (726 persons/sq.km.), Edayadil (878 persons/sq.km.), Kurampala Town (977 persons/sq.km.) have lower Population density.

Table 5.5 Ward wise population

ward No	Name of the ward	Total Population	Female	Male	Area of ward(Sq.km)	Population density (Persons per sq.Km)
1	THOTTAKKONAM	3250	1755	1495	1.47	2213
2	MULAMPUZHA	1327	727	600	0.66	1997
3	MANGARAM	895	473	422	0.74	1212
4	THONNALLOOR WEST	1545	850	695	0.90	1713
5	THONNALLOOR EAST	2743	1439	1304	1.20	2279
6	KADAKKADU WEST	1090	576	514	0.68	1594
7	KADAKKADU EAST	790	416	374	0.62	1277
8	KURAMPALA NORTH	1687	889	798	1.10	1540
9	KURAMPALA EAST	2762	1458	1304	1.49	1849
10	KURAMPALA TOWN	1308	701	607	1.34	977
11	ATHIRAMALA	2741	1472	1269	1.62	1697
12	KURAMPALA SOUTH	2670	1451	1219	1.65	1623
13	EDAYADIYIL	983	533	450	1.12	878
14	THAVALAMKULAM	1793	978	815	1.29	1386
15	CHIRAMUDI	1773	959	814	1.18	1497
16	POOOZHIKKADU NORTH	1925	1027	898	1.09	1761
17	PANDALAM TOWN	1459	781	678	0.94	1558
18	MUTTAR	1062	566	496	0.76	1405
19	POOOZHIKKADU TOWN	1404	755	649	0.92	1530
20	POOOZHIKKADU WEST	1592	869	723	1.42	1121
21	MSM WARD	2129	1142	987	1.68	1264
22	CHERICKAL	2218	1139	1079	3.06	726
23	MUDIYORKONAM	2448	1317	1131	1.48	1649

5.6 POPULATION CONCENTRATION PATTERN

The population concentration pattern based on concentration index is shown in Figure 5.8. Wards mainly along M.C.Road have high concentration of population. Another analysis is also made from the cumulative population after arranging the wards in the descending order of density. It shows that 1/3 population of the town is concentrated in 8 wards, with an area of 9.91 sq. Km, which constitute 34.87% of total town area. 1/3 population of the town is concentrated in Thottakkonam, Mulampuzha, Thonnalloor West, Thonnallor East, Kurampal East, Poozhikkad North, Mudiyoorkonam and Athiramala. The remaining 2/3 of population of the town is concentrated in 15 wards with total area of 18.58 sq. km which is 65.13% of total town area.

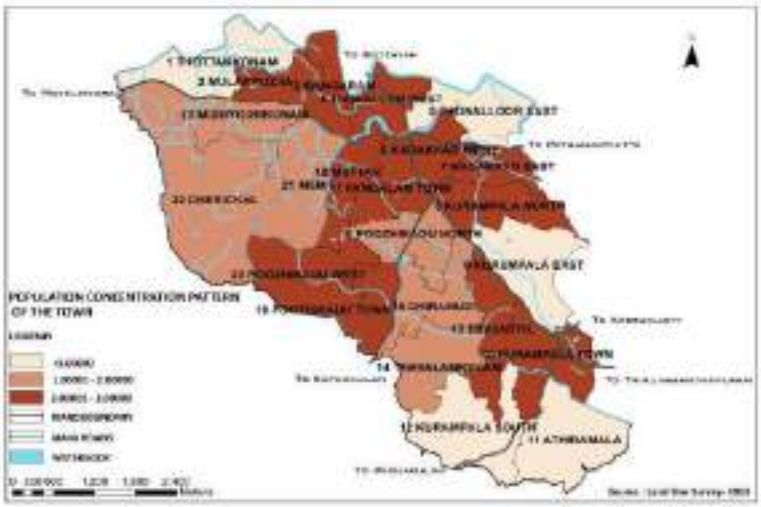


Figure 5.8 Population concentration pattern of the town

5.7 AGE-SEX PYRAMID

There are different ways to graphically present population data. The most important demographic characteristic of a population is its age-sex structure and the use of an age-sex pyramid, also known as a population pyramid, is considered the best way to graphically illustrate the age and sex distribution of a given population. An age-sex pyramid consists of two horizontal histograms joined together. It displays the percentage or actual amount of a population broken down by

Table 5.5 Age Sex Pyramid

Age Group	% of male population	% of Female Population
0-5	5.05	5.51
05 .10	7.03	5.12
10 .15	7.03	5.73
15-20	5.53	5.4
20-25	7.45	8.8
25-30	9.92	8.91
30-35	7.63	7.07
35-40	9.25	7.85
40-45	6.97	6.51
45-50	6.97	7.57
50-55	5.77	6.96
55-60	7.57	8.02
60-65	6.25	4.9
65-70	3.85	4.73
70-75	3.13	2.95
75-80	1.68	1.67
More than 80	1.68	2.28

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.

The Age–sex pyramid of Pandalam Municipality was derived from the Socio-Economic survey (2010) data and percentage of male and female population in different age group is shown in Table 5.5 and in Figure 5.9. The narrowing down of the base of the pyramid shows that there is decrease in the birth rate. The number of male and female varies in different age group. It is a regressive pyramid like that of a developed country, where there is fewer children and more old people and the population is likely to decrease in future. The bulges of the pyramid in the age group of 15 to 40 show the higher growth of population during 1970-1995.

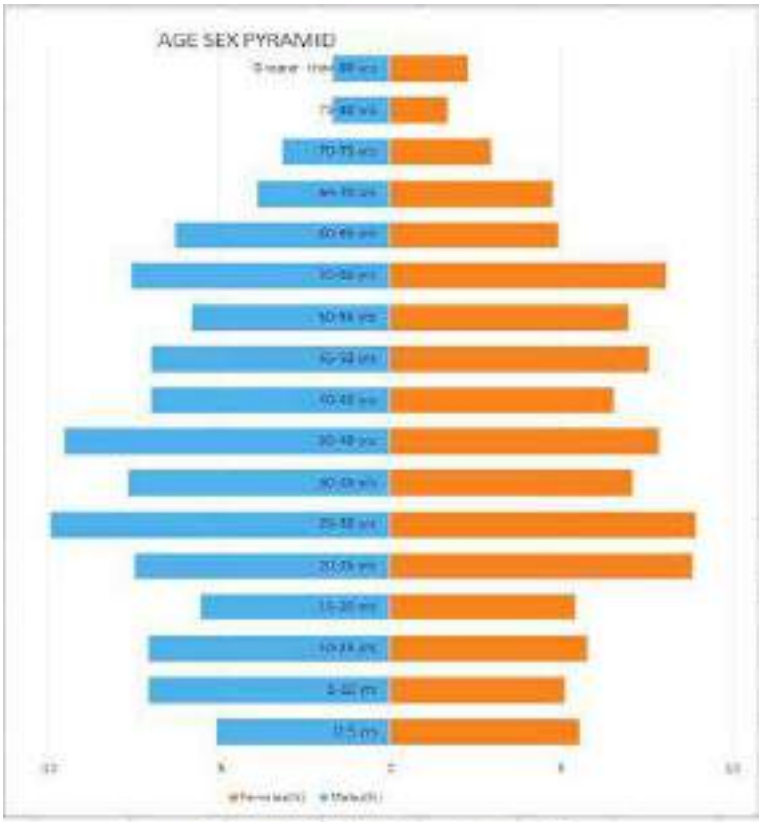


Figure 5.9 Age-Sex Pyramid

5.8 SEX RATIO

The male and female population of Pandalam town as per 2011 census is 19326 and 22278 respectively and the sex ratio of the town is 1153. The variation in sex ratio of the town from 1981 is shown in Figure 5.10.It shown that, the sex ratio of the town has gradually increased

from 1051 in 1981 to 1153 in 2011. The sex ratio of Pathanamthitta district and Kerala state as per 2011 census is 1132 and 1084 respectively and the sex ratio of Pandalam is lower than the district figure but higher than state figure. While comparing with other three municipalities of the district, ie, Thiruvalla (1098), Pathanamthitta (1053) and Adoor (1048), the sex ratio of Pandalam is high.

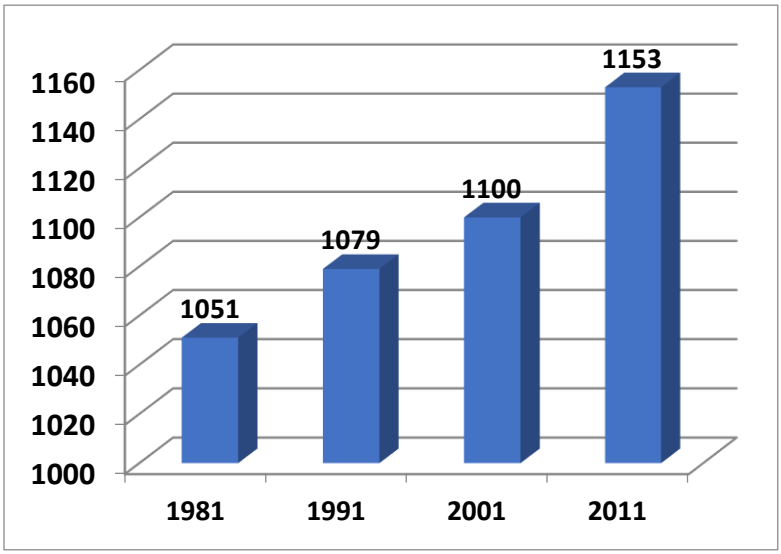


Figure 5.10 Comparison of sex ratio

5.9 CONCLUSION

Pandalam posses the second position in terms of population size in Pathanamthitta district. In the last two decades Pandalam recorded high population growth rate among the urban centers of the district. The growth rates of population of surrounding Grama Panchayats are varying and some of them recorded positive growth rate and some of them recorded negative growth rate. The trend of population growth reveals that the growth rate of Pandalam will reduce further in the near future. The density of population of Pandalam is high as compared to the surrounding Grama Panchayats. The population density of different wards in the municipality is varying from 726 to 2279. Thonnalloor East in the town has high population density. The age sex pyramid of the town is regression pyramid similar to that of a developed country, where there are fewer children and more old people and the population is likely to decrease in future.

6. OCCUPATIONAL STRUCTURE

6.1 INTRODUCTION

The economic growth is related to a quantitative sustained increase in the country's per capita output or income accompanied by expansion in its labour force, consumption and volume of trade. Economic development is related to qualitative changes in economic wants, goods, incentives and institutions. In this chapter the existing economic base of the town based on the occupational structure is studied. Work participation rate and its temporal variation, the occupational structure and the change that has happened over a period of time, spatial distribution of workers in the town etc. were analyzed.

6.2 WORK FORCE OF THE TOWN

The work force of a place is usually indicated by Work Participation Rate (WPR) which is the ratio of total workers (main and marginal) to the population of the place and it is generally expressed as percentage. As per 2011 census the work participation rate of Pandalam Municipality is 32.69 %. It means, out of total population of 41594 persons, 13589 people are workers. The total workers are further divided into main workers and marginal workers. The total number of main workers of the town is 10213 , which constitute 25 % of total population and total number of marginal workers of the town is 3386,

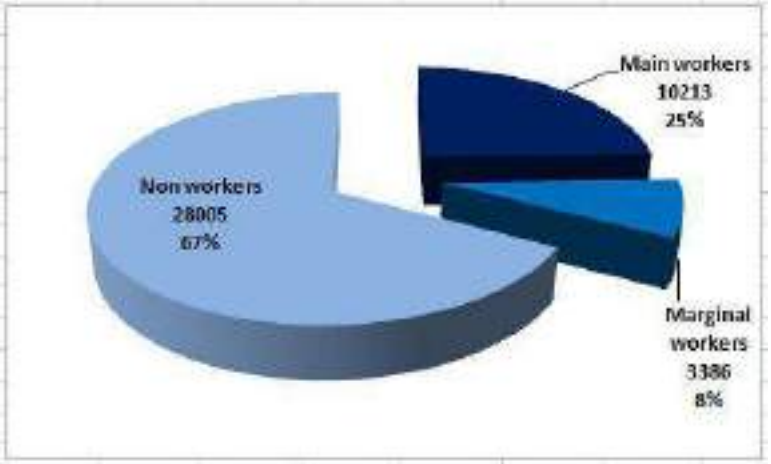


Figure 6.1 Main, Marginal and Non Workers of Pandalam town 2011

which 8 % of total population and the remaining 28005 persons are non-workers which is 67 % of total population. It is shown in Figure 6.1.

The temporal variation of work participation rate of Pandalam is shown in Table 6.1 and Figure 6.2. The work participation rate shows an increasing trend up to 1991 and thereafter shows a slight decreasing trend and it again shows an increasing trend during the period 2001 – 2011.

Table 6.1 Temporal variation in Work Participation Rate

Year	1971	1981	1991	2001	2011
Population	31872	35391	37733	40810	41594
Total workers	8445	9816	11085	11625	13599
Work participation rate (in %)	26.5	27.74	29.38	28.49	32.69

Source: Census, 1981, 1991, 2001 and 2011

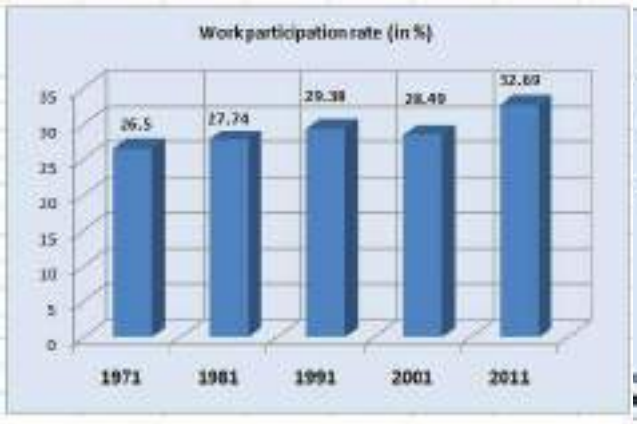


Figure 6.2 Temporal variation of Work Participation Rate

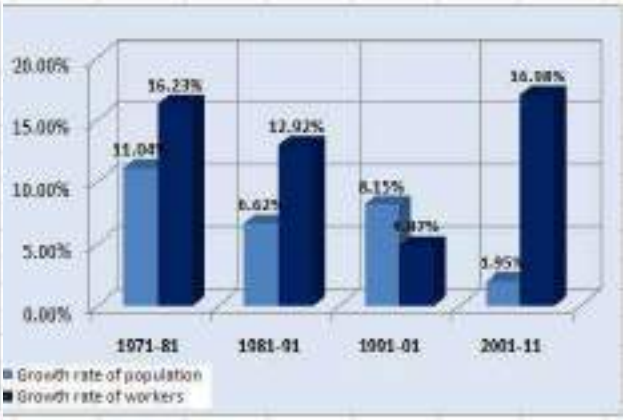


Figure 6.3 Comparison of Growth rate of Population and Workers

A comparison of the growth rate of population and the growth rate of workers of Pandalam municipality from 1971-81 is shown in Table 6.2 and Figure 6.3.The number of workers are increasing over the years and the growth rate of workers is more than the population growth except for the decade 1991-01. It is a good indication as far as economic growth of the town is concerned.

Table 6.2 Comparison of Growth Rate of Population and Workers

	1971-81	1981-91	1991-01	2001-11
Growth rate of population	11.04%	6.62%	8.15%	1.95%
Growth rate of workers	16.23%	12.92%	4.87%	16.98%

Source: Census 1981, 1991, 2001and 2011

Comparison of work participation rate of Pandalam is also made with corresponding figures of Pathanamthitta district, other urban centers of the district and surrounding Grama Panchayats.

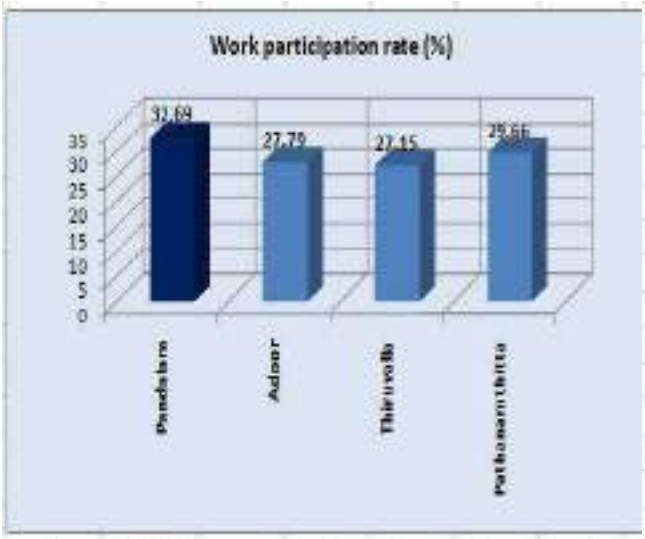


Figure 6.4 Work participation Rate – Comparison with other Municipalities of the district



Figure 6.5 Work participation Rate – Comparison with surrounding Grama Panchayats

The work participation rate of the district is 29.66%, which is lower than the work participation rate of Pandalam (32.69 %). The other three urban centers of the district –Adoor,Thiruvalla and Pathanamthitta have work participation rate of 27.79%, 27.15% and 29.66% respectively. So the work participation rate of Pandalam is higher than the other urban centers of the district. When compared with the work participation rate of surrounding Grama Panchayats, only Nooranand and PandalamThekkekara Grama Panchayat have more work Participation rate than Pandalam. Comparison of work participation rate with other urban centers and surrounding Grama Panchayats are shown in Figure 6.4. and Figure 6.5 respectively.

6.3 OCCUPATIONAL STRUCTURE

In the 2011 census, the main workers are classified into four categories viz. Cultivators, Agricultural labourers, Household industrial workers and other workers. The Other workers category includes the primary sector workers like fishermen and workers engaged in mining and plantation work. Occupational structure of Pandalam (2011) is shown in Figure 6.6. In the town, 76 % of workers belong to other workers category, 15% of workers are Agricultural laborers, 9% of workers are Cultivators and the remaining 3% is Household industrial workers.The temporal variation of occupational structure of Pandalam is shown in Table 6.3. The same is also represented in the Figure 6.7. It shows that number of laborers engaged in primary sector (cultivators and agriculture laborers) is showing a decreasing trend over the years and there is corresponding increase in other workers category. The number of household industrial workers shows a decreasing trend in the initial stage then shows an increase in 2011.

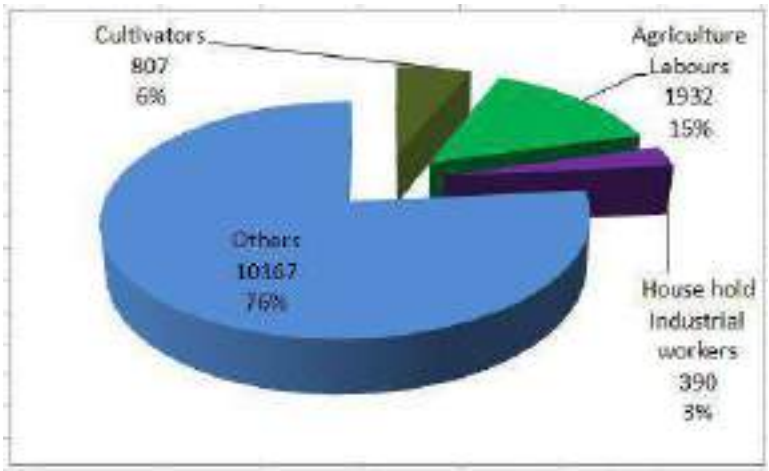


Figure 6.6 Occupational Structure of Pandalam 2011

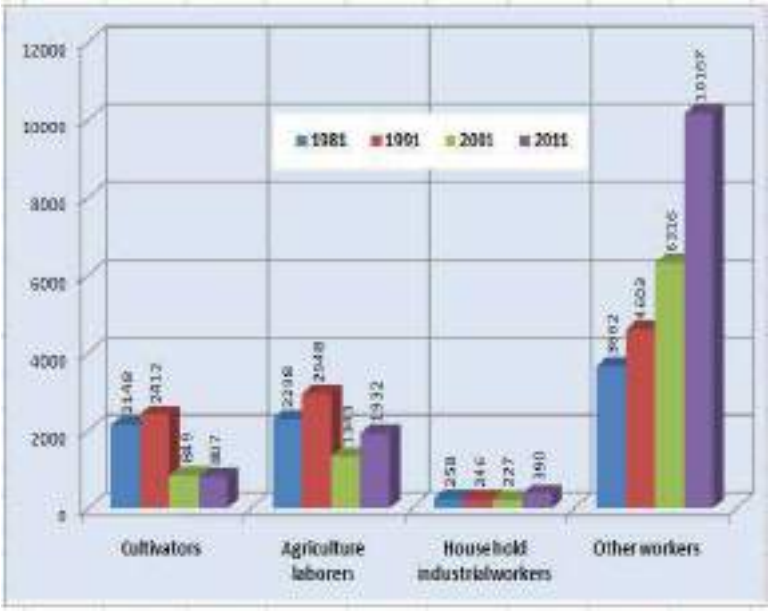


Figure 6.7 Temporal variations in Occupational Structure

More detailed composition of workers are available from the socio-economic survey 2013 and it is given in Table 6.4 The survey reveals that, 14.81% of workers are Government employee and 9.48 % of workers are working outside the country. Workers engaged in agriculture and allied sector constitute 22.03% (Agriculture laborers 9.64%, cultivators 9.33% and livestock workers 3.06%) It indicates that agriculture and allied sector still provide a major share of employment in the town.

Table 6.3 Occupational structure of Adoor- Temporal variation

Year	Cultivators	Agriculture laborers	House hold industrial workers	Other workers
1981	2148	2298	258	3662
1991	2412	2948	246	4603
2001	849	1343	227	6316
2011	807	1932	390	10167

Source: Census 1981, 1991 ,2001 and 2011

Table 6.4 Brake up of workers as per Socio-Economic survey

Type	Govt: Employee	Agriculture labourer	cultivators	Live stock worker	Outside country	Headload workers	Beedi workers	Carpenter
Percentage	14.81	9.64	9.33	3.06	9.48	1.18	0.16	1.33

Type	Coir worker	H.H.Industrial worker	Construction (Helper)	Vegitabletrader	Retail fish vendor	Whole sale fish vendor	Conventional fish man	Plantation worker
Percentage	0.31	2.9	8.54	0.63	1.02	0	0	0.16

Type	Hotel worker	Driver	Retail seller	Beverage worker	Construction worker	Other industrial worker	Other workers
Percentage	0.78	6.27	0.39	0.08	3.37	3.84	22.73

Source: Socio-Economic survey 2013

6.4 SPATIAL DISTRIBUTION OF WORKERS

The ward wise concentration index [(Number of workers of a particular class of workers in a ward / Total number of workers of

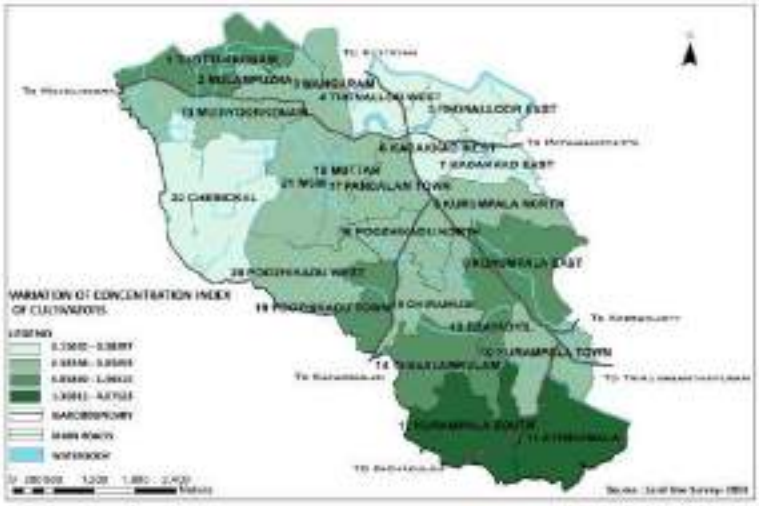


Figure 6.8 Variation of Concentration Index of cultivators

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 laborers, Household industrial workers and Other workers for each ward has been calculated and its spatial distribution has analyzed. The concentration index gives an idea about where a particular class of workers is concentrated in the town.

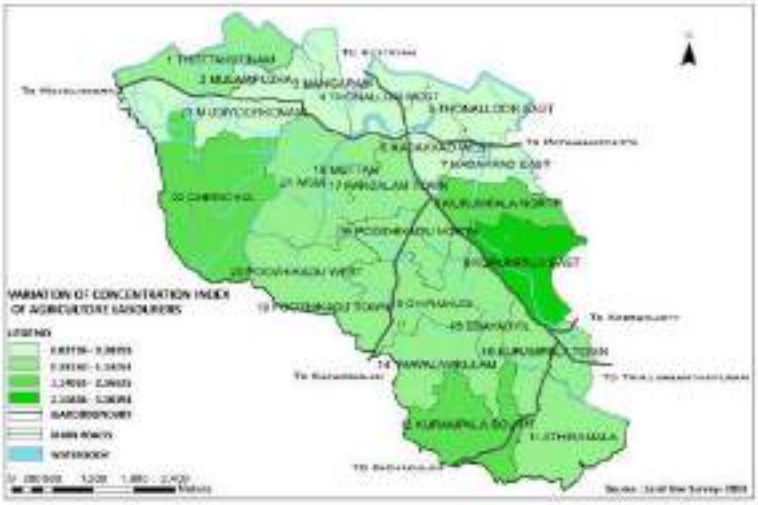


Figure 6.9 Variation of Concentration Index of Agriculture labourers

Figure 6.8 and 6.9 shows the variation of concentration index of Cultivators and Agricultural laborers respectively. From these figures it is clear that laborers related with agriculture sector are concentrated in the peripheral wards of the Municipality especially in the western part of the municipality. It has correlation with concentration pattern of Agriculture land use. The concentration pattern of household industrial workers is shown in the Figure 6.10. House hold industrial workers are mainly concentrated in the central part of the town and



Figure 6.10 Variation of Concentration Index of HHI workers



Figure 6.11 Variation of Concentration Index of other workers

four wards in the eastern part of the town.

Variation of concentration index of other workers is shown in Figure 6.11. The index varies between 0.26 to 4.27 and it is concentrated at the central part of the municipality. There is a gradual reduction in the concentration of other workers from the central core of the town to peripheral area. But the concentration of agriculture labourers and cultivators are lesser in the central core of the town and increases towards the peripheral area of the town.

6.5 CONCLUSION

The work participation rate of Pandalam town is lower than that of the district figure and higher than that of the other urban centers of the district. The work participation rate is also declining over the decade. The growth rate of work participation rate is greater than population growth rate in the past decades. The occupational structure shows that more percentage of workers belong to the other workers category. There is gradual reduction in the number of workers engaged in agriculture and related activity and there is corresponding increase in other workers category. The agricultural sector workers are concentrated in the peripheral area of the town and non-agriculture workers concentrated engaged in the central part of the town. The analysis shows that in production sector the agriculture sector shows a declining trend and the industrial sector not recording any growth. The only sector which shows growth is service sector.

7. TRADE AND COMMERCE

7.1 INTRODUCTION

Markets are the factors that influence the economy of the land. It will handle the transfer of money and commodity at the same time it enhance the economy of the place. The centuries old Kurunthottayam market (known as the Pandalam Market) was one among the largest agricultural markets in Central Travancore, situated in the heart of the town till late 1990s, this market was later shifted to a more convenient place in the Pandalam – Mavelikkara road. There are a large number of commercial establishments located along the entire MC road as well as the Pathanamthitta and Mavelikkara roads within the central area of the town. The trade and commerce activity of Pandalam is linked with Pandalam market, Kadakkadu market and Kunnikkuzhi Market.



Pandalam Market Area

7.2 LAND USE UNDER COMMERCIAL USE

The total land under commercial use of Pandalam Municipality is 0.224 sq. km, which is 0.79% of the total town area. The commercial area of the town is shown in Figure 7.1. The market area and commercial development has taken place along main roads and Trade and Commerce is one of the economic bases of the town. The commercial area of the town was developed with Pandalam junction and NSS Medical Mission junction as a nuclei. Later four more nodes were developed with centers at Muttar, Kadakkadu, Poozhikkadu and Kurampala. Now the area between these nodes are also developed with Commercial activities. A corridor development is

visible along M.C.Road and along the Mavelikkara - Pathanamthitta road stretch and it shown in Figure 7.1.

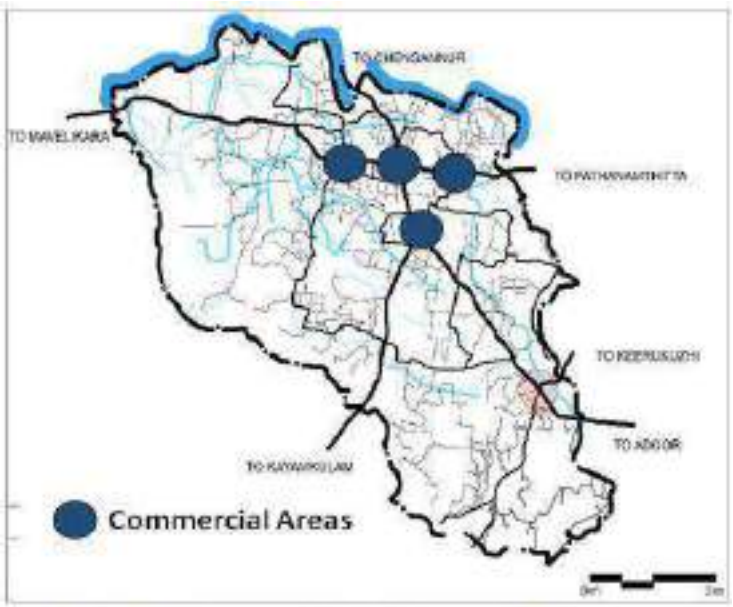


Figure 7.1 Commercial Development of the town

A comparative study with similar adjacent towns in the region has been made and the percentage share of commercial area to the total area of the towns Pathanamthitta, Thiruvalla, Chengannur and Changanassery are 0.94%, 0.97%, 0.29% and 2.74% respectively and it is shown in Figure 7.2. It shows that Pandalam is in third place after Changanassery as far as the percentage of commercial land use is concerned and it shows the commercial importance of the Town.

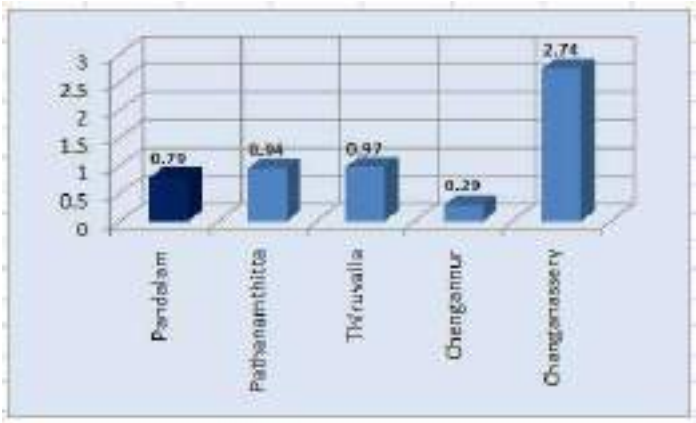


Figure 7.2 Comparison of % share of commercial land use with similar towns

7.3 COMMERCIAL NODES

A detailed survey regarding the commercial nodes in the town have been conducted by the department. Based on the preliminary survey, 7 commercial nodes in the town has been identified for the detailed study. The facilities at various nodes has been generally grouped into Retail shops, Whole sale shops, Commercial Offices, Small Scale Industries, Other facilities and Higher order facilities. The number of shops / units of different categories coming under these general groups were counted. For comparison total scores for each node were calculated after

assigning weightage to each facility. The details about shop under various categories available at each node, weightages assigned to each category of shops and score of each node are shown in Annex 7.1. The total score obtained for each node is given in Table 7.1 and Figure 7.3. Based on the variations in the graph, the existing hierarchy of nodes has been found out.

Table 7.1 Commercial Nodes

Sl. No.	Nodes	Score
1	Medical Mission Jn.	407.69
2	Kadakkadu	137.21
3	Kurampala	116.15
4	Poozhikkad	81.6
5	Muttar	74.66
6	Althara	70.04

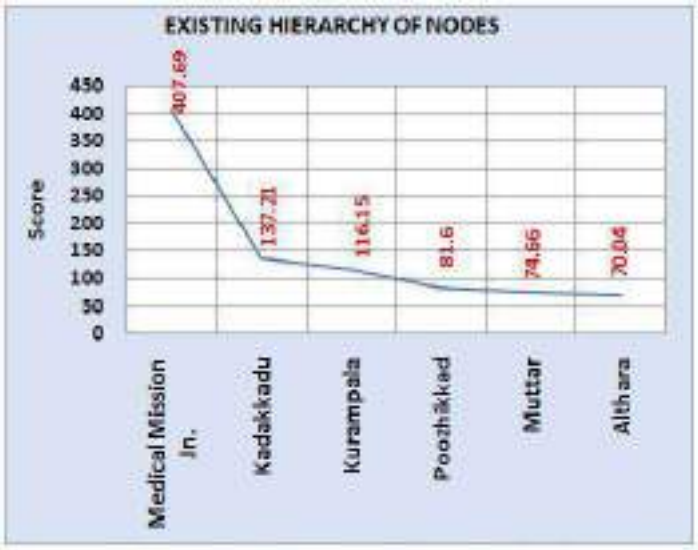


Figure 7.3 Identification of hierarchy of nodes

Based on the above analysis the existing hierarchy of nodes has been arrived at as given below.

- *FIRST ORDER - NSS Medical mission junction.*
- *SECOND ORDER - Kadakkadu, Kurampala, Poozhikkadu and Muttar*
- *THIRD ORDER - Althara, PuthanKavu and Chiramudi junction.*

Higher order nodes are formed along M.C. Road and the location of nodes reveals the pattern of commercial development is Corridor development

7.4 MARKETS

Three markets are Functioning in Pandalam Municipal area - Pandalam market, Kadakkadu market and Kunnikkuzhi Market. Pandalam market have more significance in terms of trading

and number of people coming to the market. A cattle market is functioning at Pandalam, which is major cattle market of the region after Omallur cattle market. Evening market is very active in the region for trading of locally produced agricultural materials. The location of the market is shown in Figure 7.4.


Pandalam Market

Pandalam Market is located at the centre of town. It is the largest market when compared to Kadakkadu Market and it is a daily market.The products like cattle, cattle feeds, fish are the major commodities transacted at Pandalam market. The vegetables and provisions are mainly arrived from the states of Tamil Nadu, Karnataka and Andhra Pradesh. This market also provides facilities for transaction of local products like betel, pepper, ginger and yam. Earlier this market was very famous for cattle trading. The commodities from this market are mainly distributed to an area of around 15 km radius. The commodities arrived from the local area is distributed to other districts and part of Tamil Nadu. The total extent of Pandalam market is 368 cents.

But Kunnikkuzhi market is weekly market and functions only on Tuesday and Friday. The scale of transaction of commodities in this market is high when compared with Kadakkadu market.

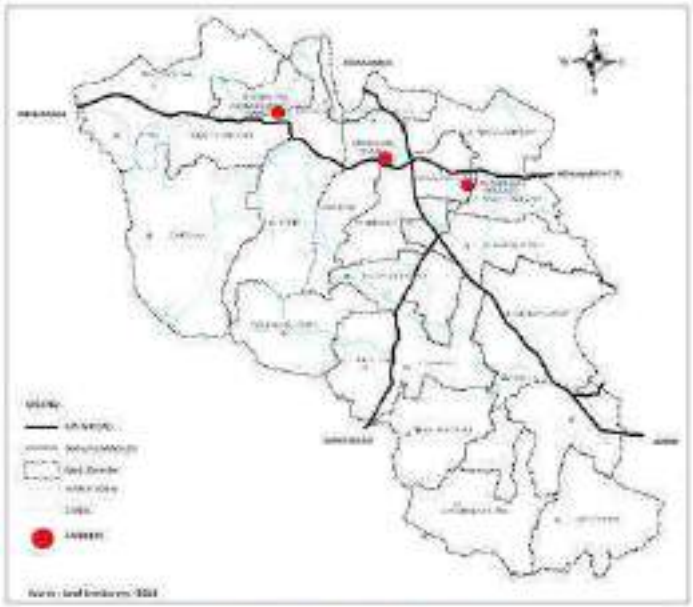


Figure 7.4 Market Location

The Kadakkadu Market is located along Pathanamthitta road and the extent of this market is only 35.5 cents. It is mainly fish and meat market. Some of the required basic infrastructural facilities are available in this market.

Table 7.2 Details of Commodity transaction-Pandalam Market

Sl. No.	Commodities	Average Quantity	Arrived From	Distributed To
1	Vegitables	30 Tonnes / week	Mettuppalayam, Chenkotta, Puliyamkudi	Centres within 15 Km radius
2	Banana	1.5 Tonnes / week	Local Areas	Centres within 10 Km radius
3	Rice	50 Tonnes / week	Kalady, Andhra Pradesh, Karnataka	Centres within 15 Km radius
4	Sugar	25 Tonnes / week	Changanassery	Centres within 15 Km radius
5	Pulses	10 Tonnes / week	Theni, Changanachery	Centres within 15 Km radius
6	Betel	1200 Kg / week	Kayamkulam	Centres within 15 Km radius
7	Pepper	100 Kg / week	Local Areas	Centres within 15 Km radius
8	Ginger	200 Kg / week	Local Areas	Centres within 15 Km radius
9	Yam	2000 Kg / week	Local Areas	Centres within 15 Km radius
10	Cattle feed	250 Tonnes / week	Iringalakkuda	Centres within 15 Km radius

The details of commodity movement through the Pandalam Market, Kadakkadu Market are shown in Tables 7.2 and 7.3 respectively. Commodities, average quantity, price, places of arrival of commodities, places of distribution of commodities etc are available in these tables.

Table 7.3 Details of Commodity transaction-Kadakkad Fish Market

Sl. No.	Commodities	Average Quantity	Arrived From	Distributed To
1	Cattle	7 No./Week	Local Areas	Centres within 15 Km radius
2	Goat	4No./week	Local Areas	Centres within 15 Km radius
3	Fish	6o Tonnes/ Day	Andhra Pradesh, Tamil Nadu, Thoothukkudy, Mangalapuram, Chavakkad etc.	Centres within 15 Km radius

7.5 INFRASTRUCTURE FACILITIES OF MARKETS

Even though the Pandalam market is the largest market of the town many infrastructure facilities are not provided. Stalls and platforms are inadequate; the condition of approach road is very poor. Parking space for vehicles, drainage and sanitation facilities etc. are not available. The Biogas plant and waste treatment plant working near the market is not functioning properly and cause difficulty to the people. Urgent renewal of market is needed and a modern market with all necessary infrastructure facilities has to be considered in this area.

In the case of Kadakkadu Market also the basic facilities like platforms, toilets, drainage, parking areas are insufficient. This market also needed immediate attention.

There is no modern slaughter house in the town.



Pandalam Market area

7.6 INCOME FROM MARKETS

The temporal variation of income from the market from 2008-09 is shown in Table 7.4. The income from the markets was Rs. 153000 during the year 2008-09. It has increased to Rs. 675100 in the year 2013-14.Pandalam Market is the major whole sale market of the town in terms of both number of commodities and the amount of transaction.

Table 7.4 Income from Markets – Temporal variations

Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Income (Rs)	153000	290100	400100	425000	656100	675100

7.7 OTHER SHOPPING FACILITIES

In addition to markets, there are other shops and commercial establishments including hyper market in the town. These shops and commercial establishments are providing medium type services to the inhabitants of the town and its influence area. For higher order commercial facilities people depend on Thiruvalla and Adoor town.



Green hyper market

7.8 INFORMAL SECTOR

Hawkers and vendors have long been a common feature of sidewalks and markets of urban centers. Hawkers contribute substantially in meeting the needs of the community. The common community depend on the informal sector for their requirements at an affordable price. They indirectly support the local artisans and poorer sections of the community, by making available the commodities at a comparatively cheaper rate. Even though their activities can be justified

socially, it is conflicting with the management of traffic and pedestrian movement on street and in many cases affect the environmental quality.

Even through in a small scale, the informal sector activity is there in Pandalam Municipality also. A study has been conducted by the Town and Country Planning Department to assess various aspects of hawking. There is no organized space for hawkers in the town and they are mainly utilizing road margins.



Informal sector activities

Details of informal sector activity ie, type of activity, number of units and number of persons engaged etc. of Pandalam town is given in Table 7.5.

Table 7.5 Details of Informal sector

1. CENTRAL JUNCTION				
Sl No	Area /Location	Type of activity	Number	Number of persons engaged
1	Private Bus Stand, Navaratri Mandapam	Fish Stall	1	2 men
		Ground nut Stall	1	2 men
		Lottery Stall	6	1man each
		Tea Stall	5	1 man each
		Fruits Stall	1	1 man
		Cloth Stall	1	1 man
		Mixed Stall	1	1 man
2	Central Junction to KSRTC	Fish Stall	1	1 man
		Vegetable Stall	1	1 man
		Ground nut Stall	2	1man each

		Pan Shop	6	1man each
		Chicken Stall	4	3 men
		Fruits Stall	1	1 man
		Lotery Stall	1 car	1 man
3	Central Junction to Pattupurackal (North)	Ground nut Stall	2	2 men each
4	Central Junction to Pathanamthitta Portion	Vegetable Stall	1	1 man
		Fish Stall	1	1 man
		Fruits Stall	1	1 man
5	KSRTC	Chips Stall	1	1 man
		Vegetable Stall	2	1 woman each
6	Manikandan Althara Junction	Mixed Stall	4	1man each
7	Private Bus Stand, waiting shed (Treasury portion)	Ground nut Stall	1	1man
		Lotery Stall	2	1man each
		Street Stationery Stall	1	1man
		Unbrella Repairing Stall	1	1man
		Cloth Stall	2	1man each
		Tea Stall	1	1man
2. MEDICAL MISSION HOSPITAL JUNCTION				
1	Medical Mission Junction	Fruits Stall	4	1 man each
		Fish Stall	3	1 man each
		Pan Stall	2	1 woman each

		Tea Stall	1	1 man
		Vegetable Stall	1	1 man
3.POOZHIKKADU JUNCTION				
1	Poozhikkadu Junction	Pan Stall	2	1 man each
		Vegetable Stall	1	1 man
		Fish Stall	2	1 man each
4.KURAMPALA JUNCTION				
1	Kurampala Junction	Pan Stall	1	1 man

In addition to the above hawkers listed above. Some hawkers occupy the road near the Pandalam market. Textiles, small house hold equipment, vegetable, fruits are the commodities traded by the hawkers in this area.

Town Street vending committee of Pandalam Municipality constituted under Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act 2014 has conducted a detailed survey and identified 60 numbers of street vending stalls. 42 stalls at Town centre and sides of major roads, 5 stalls near Poozhikkad junction,7 stalls near Medical Mission Hospital junction, 3 near Manikandan Althara, 2 near Kurampala junction and one at Cherikkal.

7.9 BANKING

Details of different category of banks functioning in Pandalam Municipal area is shown in table 7.6. A total of 15 branches of various category banks are functioning in the town. Sufficient number of branches are available for the need of the people.

Table 7.6 Details of banks functioning in Pandalam Municipal area

Banks	Public sector Bank	Nationalised Commercial Bank	Scheduled Commercial Bank	Land mortgage Bank	Co-operative Sector	Service Co-operative Bank and Societies	New Generation Bank
No of branch	2	6	3	Nil	2	2	2

7.10 CONCLUSION

Three daily markets and one weekly market are functioning in Pandalam town. Among the markets, the Pandalam market is the largest market in terms of Commodity transaction. Pandalam market provides opportunity for trading the agriculture products from Pandalam and its influence area. Pandalam and NSS medical mission junction are the first order nodes, Kadakkadu, Kurampala, Poozhikkadu and Muttar are the second order nodes and Althara, Puthenkavu and chiramudi are the third order nodes, as per the Existing Hierarchy of commercial nodes. Trade and commerce can be treated as one of the major economic bases of the town. Activity of informal sector in small scale is there in the town. Sufficient numbers of banks are functioning in Pandalam municipality limit.

8. INDUSTRY

8.1 INTRODUCTION

In this chapter the present scenario of industrial sector of the town is analysed. Major or medium type industrial units are not functioning in the town and the industrial sector is limited to few industries in the category of MSME. The mini industrial estate of Industrial department is the major industrial establishment of the town. The units were scattered in different parts of the town and as per the land use analysis 11.74 hectares of land which is just 0.41 % of total town area is coming under industrial land use. Traditional industries are also not functioning in the town. Once Mannam sugar mill was a major industry of the town and it is not functioning due non availability of sugar cane, the major raw material for the industry.

8.2 M.S.M.E (Micro Small & Medium Enterprises) UNITS

The number of MSME units functioning in the town during the year 2001 and 2013 is shown in Figure 8.1. There is only nominal increase in the number of registered industrial units in the town during the period 2001 - 2013. Out of 82 industrial units 51 units, which is 62% of total units are in service sector and the remaining 31 units (38%) are in manufacturing sector and it is shown in Figure 8.2. General Engineering, Wood Industries, Cement Blocks, Software Development, food products, candles and Paper products are the



Figure 8.1 Increase in the number of MSME units

units functioning in the manufacturing sector. Category wise industrial unit is shown in Figure 8.3.

Agro based units are very few in the town even though the town have abundant agricultural resources.

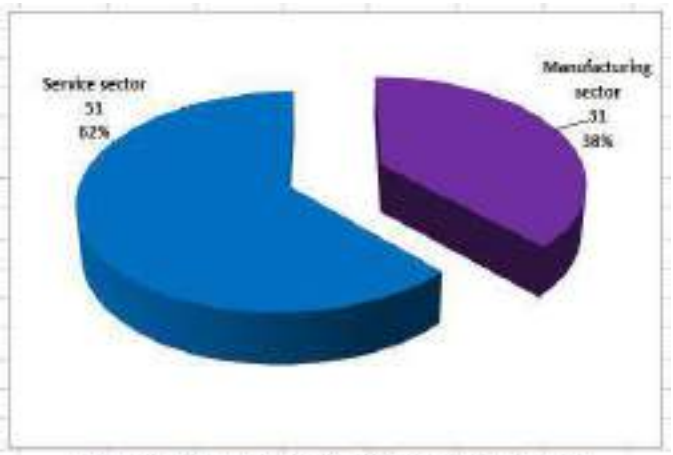


Figure 8.2 Sector wise classification of industries

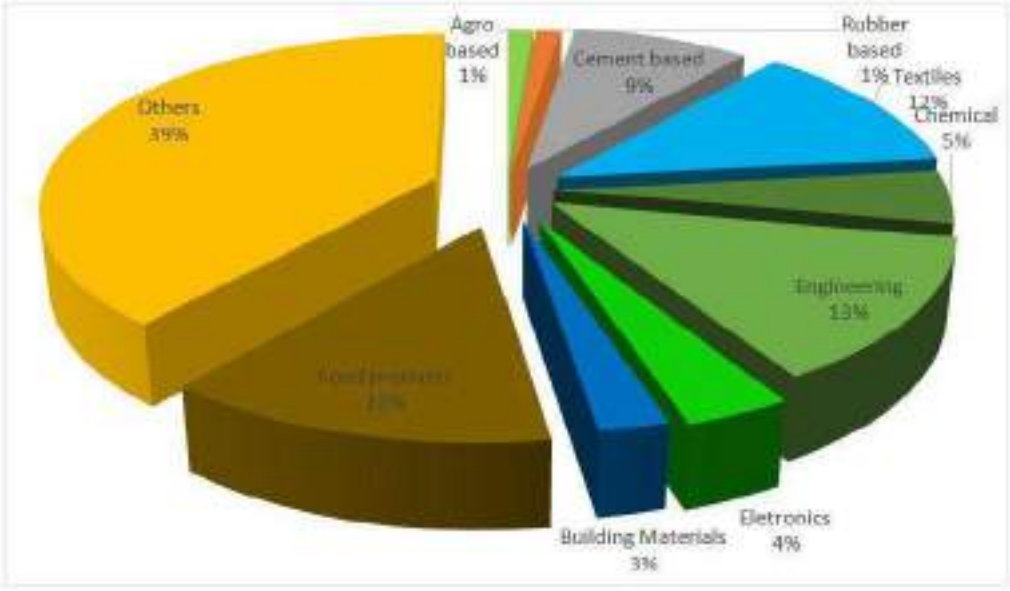


Figure 8.3 Classification of industries

8.3 MANNAM SUGAR MILL

Famous Pandalam Mannam Sugar mill was functioning in municipal limit. The functioning of this factory has been stopped due to non-availability of the sugar cane the main raw material, once which was available in plenty in the surrounding areas. Out of total area of 33.258 Hectares of the mill, an area of 12.50 Hectares has been now used for Ayurveda Medical

College and remaining 20.758 Hectares is remaining in the plot and can be utilised for other purpose, including suitable industrial activities.

8.4 RAW MATERIALS

Agro based raw materials are available of in the region, which can be utilized as industrial raw material. Latex which is a major industrial raw material is available in plenty in the town and its hinter land. Clay is the other raw mineral available in the influence region.

8.5 CONCLUSION

Only MSME units are functioning within town limit and there are no major industries. Pandalam has no specialization of particular category of industries in the present scenario. Availability of land and comparatively low population density is a potential for industrial development. Agro based raw materials and building materials are available in the region, which can be utilized as industrial raw material. Better connectivity with other parts of the state and neighboring states is another advantage of the town for industrial development.

9. HERITAGE, TOURISM AND AESTHETICS

9.1 INTRODUCTION

Heritage has inevitable significance in the development of an area. Urban growth causes the destruction of distinctive and meaningful built and natural elements, eradicating the physical expression of former indigenous ways of life that are very much part of the settlement culture. Since the architecture is a long-term and large scale physical witness to the past, future generations will continue to refer to it as a reflection of the spirit of the historic culture.

During the recent decades, the rehabilitation and regeneration of historic centers has been increasingly recognized as an efficient tool for urban development synthesizing cultural values with economic opportunities. Maintaining and enhancing historic buildings and historic areas can be economically rewarding, and in long term, increase the value of private and public property.



Valiyakoikkal Palace

9.2 HISTORICAL IMPORTANCE

Pandalam palace is the permanent home for the Royal family of Pandalam, is situated on the banks of river Achankovil. Although most of the original buildings have destroyed by flood and fires, a few buildings are still remaining.

At present there are two palace complexes –Valiyakoikkal palace complex and Kaipuzha Palace complex. The Valiyakoyikkal temple is situated on the left bank of Achenkoil river and the Kaipuzha Palace is situated on the right bankof river in adjacent Kulanada Grama panchayat.

Valiyakoikkal Temple is the family temple of the Pandalam Royal Family. The temple is located in Pandalam Municipal limit. It is situated within the Pandalam Palace premises and the main deity is Lord Ayyappa. The Palace has got religious significance as the ornaments worn by Lord Ayyappa of Sabarimala during Makaravilakku season are kept here. Procession of the Thiruvabharanam (Sacred Ornaments) towards Sabarimala shrine starts from the Valiyakoikkal temple every year before the Makaravilakku festival. Millions of devotees visit this temple every year during the Makaravilakku festivel season.



Thiruvabharanam Procession

9.3 HERITAGE

The Achankovil river and temples of heritage value, which are located on the bank of Achankovil River provide aesthetic appearance to the town and the detailed description is given in the subsequent paragraphs.

9.3.1 Achankovil River: -The river with lots of aesthetic attraction. Better place for riverfront tourism recreational activities. Number of temples are located on both sides of the river. The hanging bridge across the river connecting Pandalam Palace compound and Kaipuzha temple compound is an attraction of the area.

9.3.2 Sri Ayyappa Temple: - The temple is **a**lso known as Valiyakoikkal Temple, it was built in the similar lines of Ayyappa Temple at Sabarimala. The procession to Sabarimala with sacred ornaments of Sree Ayyappa starts from this temple three days prior to the Makaravilakku festival.



Pattupurathukavu Devi temple

9.3.3 Pattupurakkavu Devi Temple: - Located at Thonnallur at a distance of about 500 m from AyyappaTemple and it is dedicated to Goddess Bhadrakali. Annual festival is celebrated on Aswathy day in month of Meenam (March/April), Navratri is also of great significance to this temple. Special poojas, Carnatic concerts and cultural programmes are performed at the *Navratri Mandapam of the temple.*



Puthankavil Devi temple

9.3.4 Puthankavil Devi temple: -An ancient temple with its own variety ritualistic practices located at Kurampala. The temple is situated in the middle of a sacred grove (kavu) full of herbs, huge trees and, creepers. The famous Chooral Adavi, held in this temple as part of the annual Padayani festival attracts thousands of people.



Pandalam Palace

9.3.5 Pandalam Palace: -It is belived that Lord Ayyappa has grown up during his childhood in this palace. It is located adjacent to Ayyappa temple. There are

few other buildings in the compound and proper conservation methods need to be adopted to protect these buildings.

9.4 PILGRIM TOURISM

It is believed that Lord SreeAyyappa, the presiding deity of Sabarimala has his human sojourn here as the son of the Raja of Pandalam. The holy ornaments of Sabarimala temple are kept in Valiyakoikkal Palace, Pandalam. For the Makaravilakku festival these holy ornaments (Thiruvabharanam) are taken in a procession to Sabarimala. Before proceeding to Sabarimala, the pilgrims usually visit the deity of Valiyakoyikkal Temple in Pandalam Palace premises.

Other famous temples in Pandalam town are the Mahadevar temple, Kurampala Puthenkavil Bhagavathi temple, Thonnallor Pattupurakkavu Bhagavathi temple and Kaipuzha Sree Krishna Swami temple, Poozhikkad Sree Dharma Sastha temple. The centuries-old Kadaikkad Juma Masjid and Kurampala St. Thomas Church give this pilgrim town, the glare and glory of a secular town. Thumpamon Orthodox Cathedral in adjacent Thumpamon Grama Panchayat is also very famous. All these religious places attract lot of people to the town.

The pilgrim spots in and around Pandalam town have enough tourism potential. Tourism sector have significant role in developing the economy of the town.

9.5 CONCLUSION

Buildings/precincts of heritage importance are present in the town. There is enough potential for development of tourism within the town. But the potentials are not utilized fully. By utilizing the location advantage, heritage value, and tourism potential of the town, Pandalam can be developed as a tourist transit center. Thousands of people gathered at Pandalam during Sabarimala season and lack of infrastructural facility is the major issues in the area. The aesthetic appearance of the town is to be improved.

10. AGRICULTURE

10.1 INTRODUCTION

Pandalam town and its adjoining area has strong agriculture base. The study on functional character of the town shows predominantly rural nature of the town and out of 23 wards, based on which the analysis made, 7 wards have rural character and 8 wards have semi-rural character. Total geographical area of Pandalam municipality is 28.42 Sq.Km and out of this, 6.31 Sq.Km is paddy field, 9.95 Sq.Km of land is under dry cultivation and 0.93 Sq.Km are water bodies and these land uses together constitute 60% of total town area. This indicates that, Pandalam town have enough resources for agricultural development.

10.2 AGRICULTURAL LAND USE

In the land use survey conducted as part of preparation of the Master plan, the agriculture land uses has been broadly classified into two categories - wet agriculture land (paddy) and dry agriculture land (rubber, mixed crops and coconut). The total extent of land under agriculture use is 1625.86 hectares. The agriculture land is distributed in all part of the town with little concentration in the western part of the town. The distribution of agriculture land in the town is shown in Figure 10.1 and the split up of agriculture land use is shown in Table 10.1.

Table 10.1. Split up of land under different crops

Sl.No.	Crops	Area (in Ha)	% of town area	% of Agriculture land
1	Paddy	630.74	22.19	38.79
2	Coconut	59.59	2.10	3.66
3	Mixed crops	56.17	1.98	3.45
4	Rubber	879.36	30.94	54.1
TOTAL		**1625.86**	57.21	100

Source: Land use survey 2010.

Rubber is the major crop of the town and 879.36 hectares of land which is 54.1 % of agriculture land (30.94 % of the town area) is under rubber cultivation. Paddy fields are coming in second position and 630.74 hectares of land which is 38.79 % of agriculture land and 22.19 % of total town area is coming under this category. Area under mixed crops and coconut are 56.17 hectares (3.45 %of total agriculture land and 1.98% of total town area) and 59.59 hectares (3.66 %of total agriculture land and 2.10% of total town area) respectively. The breakup of Agriculture Land is shown in Figure 10.2. 61.21 % of total agriculture land is dry agriculture land and the remaining 38.79 % of the land is wet agriculture.



Figure 10.1 Agriculture area of the town

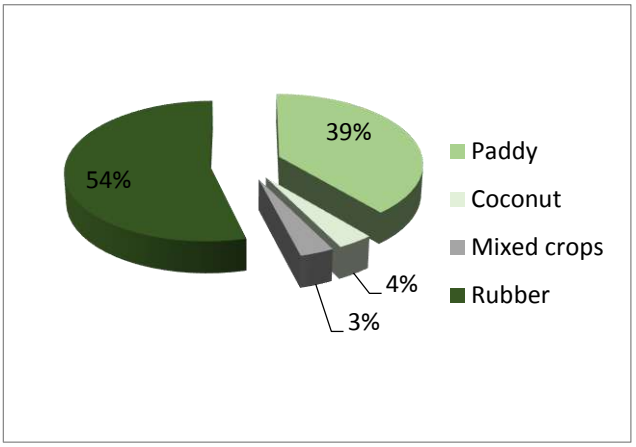


Figure 10.2 Breakup of agriculture land

10.3 CONCENTRATION OF AGRICULTURE LAND USE

The agriculture area is distributed in almost all parts of the town. In some area it is mixed with other urban land uses especially the residential use. The concentration pattern of Agriculture land use has

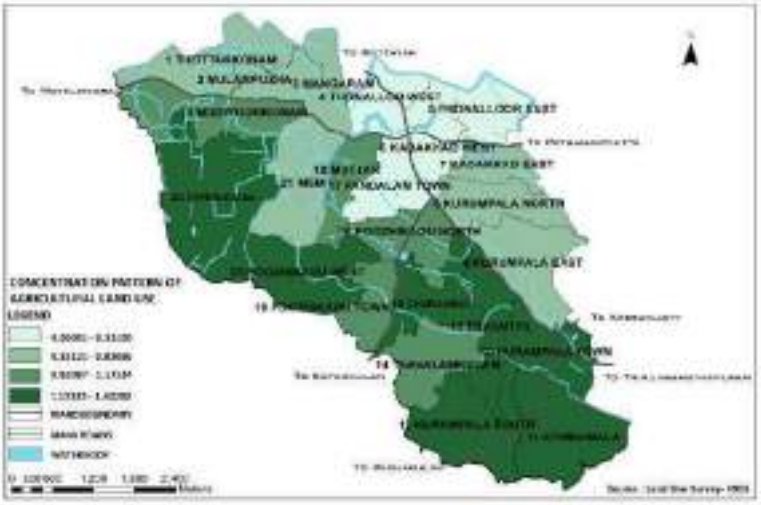


Figure 10.3 Concentration Pattern of Agricultural land use

been discussed in detail in paragraph 2.26. More concentration of Agriculture land is along the periphery of the town particularly in the south west part of the municipality. The concentration pattern of agriculture land use is shown in Figure 10.3.

10.4 LABOUR STRENGTH

As per 1991 census out of total workers of 10209, 2412 (23.63 %) workers are cultivators, and 2948 (28.87%) workers are agriculture labourers. It means 52.49 % of workers as per 1991 census is engaged in agriculture and allied activities. In 2001 census it is reduced to 9.71% in case of cultivators and 15.37 % in case of agriculture labours. But in 2011 census it again get reduced and out of total workers of 13589, 807 (5.942%) workers are cultivators and 1352 (9.95%) workers are agriculture labourers. It means only 15.89 % of workers as per 2011 census is engaged in agriculture and allied activities.

As per the Socio – Economic survey 2010 the percentage of Agriculture Labourers is 9.64 and the percentage of Cultivators is 9.33%. The total percentage of workers engaged in Agriculture and allied sector is 18.97. As per this survey laborers engaged in Agriculture and allied sector is the single largest workers group of the town. Even though there is reduction in number of workers engaged in agriculture and allied sector over the years still it is the major sector of the town.

10.5 FARMING METHODS

In Pandalam municipality conventional farming methods are adopted. Labour shortage is the major problem and methods like group farming are not practiced so far. The mechanization of farming is limited to the usage of tractors and tillers and lack of skilled labours for operating the agriculture related machines is the major hurdle in the field of mechanization.

10.6 MAJOR CROPS

10.6.1 Tapioca

Being an annual crop, the area under Tapioca cultivation varies from year to year. On an average this crop is grown in 235 ha in the town. Popular varieties are M-4 and Quintal kappa and the average yield is 10 t/ha.

10.6.2 Paddy

In the Municipality, the paddy fields are distributed in almost all part of the town. The main 'Punchas' are Karungalipuncha on the west and Mavarapuncha on the east. The other paddy fields are Paranthal, Vallathoor, Thottukara, Pangil, Mavanal Thondukanadam, Vallikavinal, Sasthampadi, Kurampalakulam and Thazhilvayal.

10.6.3 Rubber

Rubber is cultivated an area of 879.36 ha in the Municipality. The popular varieties are RRII-105 and RRIM-600



Rubber plantations

10.6.4 Banana

It is grown over an area of 90ha in this Municipality. The popular varieties are Padat, Poovan, Njalipoovan, Kannan,

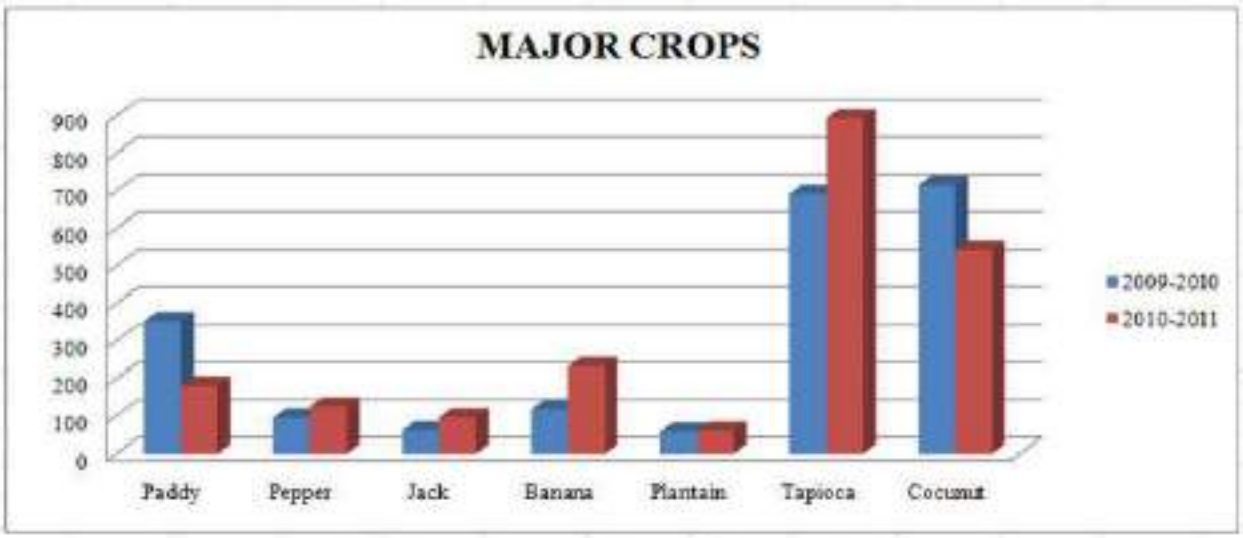


Figure 10.4 Major Crops and temporal variation in Production

Koompillakannan, Chenkadali, Malapoovan and Palayamkodan are the common local varieties seen in the panchayat and the average yield is 7500kg/ha.

Table 10.2 Productivity of different crops

Crops	Area of cultivation (in hectares)	Productivity
Coconut	100	25 Nuts/1 palm
Tapioca	250	30 Ton/1 Ha
Vegitables	15	12 MT/ 1 Ha
Banana	200	17 MT/ 1 Ha
Rubber	1436	90 MT/ 1 Ha
Pepper	20	250 MT/ 1 Ha
Arecanut	10	6 MT/ 1 Ha
Pulses	3	2.5 MT/ 1 Ha
Fruits	50	3 MT/ 1 Ha
Fodder	1	50 T/ 1 Ha
Paddy	15	3000 Kg/ 1 Ha

The productivity of different crops is shown in Table 10.2 and the temporal variation in the production of different crops is shown in Figure 10.4. It can be observed that production of conventional crops is showing a decreasing trend in successive years.

10.7 CONDITION OF PADDY FIELDS

Most of the paddy fields follow crop rotation techniques. In some fields there is only seasonal cultivation and Paddy fields are used as multi crop planting space. It includes cultivation of crops like vegetable, plantain, betel and tapioca. The soil in many parts of the town is suitable for sugar cane cultivation.

10.8 DRY AGRICULTURE AREA

The commercial crop rubber is the major cultivation in the dry agriculture area. The rubber cultivation is spreading to more and more areas of the town. High price of commercial crop is one of the reasons for this. Being located in hilly area, soil erosion is experiencing in dry cultivation area.

10.9 AGRICULTURE INFRASTRUCTURE

10.9.1 Institutions

The sugar cane seed farm functioning at Kadakkad is the major institution in the sector. Pandalam agriculture office, Crop research Centre is also working in the same compound.

10.9.2 Irrigation Facilities

Pandalam branch canal, Poozhikkadu distributary, Kadakkadu distributary, P.B.C minors are passing through Pandalam Municipal area. But the water from the KIP canals are not fully utilized for irrigation. There is no calendar for cultivation and distribution of water is at different season. Many of the agriculture land with irrigation facility have been converted for cash crops. Encroachment of canal land and disposal of wastes into canal are the threat to the canals in the town.


KIP canal

10.10 MARKETING FACILITIES

Pandalam market is a major agriculture market of the region. Agriculture products like banana, yam, ginger, betel and all other local agriculture products from the town and surrounding area are transacted through this market.

10.11 CONCLUSION

More than half of the town area is under agriculture use (56.14%). Rubber is the major crop of the town. Three fourth of agriculture land is currently under rubber cultivation and rubber cultivation is spreading to more and more areas. KIP canals, natural drains and ponds associated with paddy fields are available for irrigation. Major portion of paddy fields are remaining uncultivated or used for cultivation of crops other than paddy. Scope of Sugar cane cultivation in the municipality has to be explored. Still, agriculture and allied sector plays major role in the economy of the town.

11. ANIMAL HUSBANDRY

11.1 INTRODUCTION

Animal Husbandry and Dairy development sectors have of vital importance in generating additional employment opportunities and supplementing income of families. Mostly peasants and agricultural laborers are engaged in cattle rearing and allied activities. Hence any development in this sector will strengthen their economy and economy of the town. Generally the Animal Husbandry and Dairy development is a rural oriented activity. In case of Pandalam Animal Husbandry plays an important role in generating employment and income especially to the weaker sections of the population. In addition to the income from milk, egg and meat, the cow dung also constitutes the principal source of manure for agriculture. In the case of Pandalam 56.82 % percentage of total land is coming under Agriculture use. 15 out of 23 wards of the municipality have either rural or semi-rural character. The Socio-Economic survey (2013) reveals that in 24.45% of houses, at least there is one domestic animal (except dog). Dependence of the community on livestock such as goat, cow, poultry etc. for an additional income is comparatively high in the Municipality and these sectors have significance when considering the economic development of Pandalam Municipality.



Vast Agriculture land in the town

Table 11.1 Temporal variation in number of live stock

Year	Bovines (Cattles and Buffaloes)	Ovines (Sheep and Goats)
1991	4201	1349
2012	2468	1478

Source: Vikasana rekha and Veterinary hospital, Pandalam

11.2 LIVE STOCK PATTERN

The main species of live stocks found in Pandalam Municipality are Bovines and ovines. Number of live stock under different categories and temporal variation is shown in Table 11.1. The cattle population (2374 Nos) is distributed in all wards of the town, but Buffaloes (94 nos) are available in ward 16 (Poozhikkadu North) only. The total number of ovines (Goats) in the town is 1478. As in the case of cattle, the Goats population is distributed in all wards of the town. The temporal analysis shows that there is large scale reduction in number of Bovines, but in the case of Ovines the reduction in number is comparatively less.The common breeds of cattle found in Pandalam are Sindhi, Brown Swiss and Jersey.

11.3 POULTRY

The poultry population of Pandalam consists of Hens, Duck, Quail and Turkeys. The popular poultry breeds are White Leghorn, Giriraja and Guinea. The population of hen, duck, Quail and Turkey in the town (2012) are 12843, 732, 26 and 10 respectively. The temporal variation in the poultry population (1991 and 2012) is shown in Table 11.3. It shows that there is deduction in number of both hen and duck over the years. At present no Poultry Farms functioning in Pandalam Municipality. Availability of land and low residential density of certain wards provide scope for starting poultry farms in the Municipality.

Table11.3 Temporal variation in the number of Poultry

Year	Poultry			
	Hen	Duck	Quail	Turkey
1991	26718	687	-	-
2012	12843	732	26	10

Source: Vikasanarekha, Veterinary Hospital, Pandalam.

11.4 INSTITUTIONS

The Veterinary Hospital, Pandalam is the major institution in the Animal Husbandry sector functioning in the Municipal area. A Veterinary Ambulance is also attached with the Veterinary hospital. Two sub centers are also working along with the hospital in Pandalam Municipality.

Considering the scope of developing Animal Husbandry and Dairy sectors in the Municipality more facilities are to be provided in the hospital.



A government Agriculture Farm is functioning at Kadakkadu. The Milk co-operative Society Pandalam, which collecting and marketing milk from Pandalam town and surrounding area. Milma also collect milk from the farmers. It influences the economy of the town to an extent. Three slaughter houses are functioning in Pandalam Municipality and the total quantity of production of meat per month is 33,000Kg. But these



Table 11.3 Details of dairy Farms

Ward No.	Name of Ward/place	Name of Dairy Farm	Number of Cattle	Quantity of Milk produced per day (specify unit)
11	Paranthal	Sri.Prakash Plavilalyil	30	200 litre
15	Poozhikkad	Sri.Suchi, House of Bethlahem	15	100 litre
15	Poozhikkad	Sri.Rajan,	10	80 litre
6	Kadakkad	Govt.Agri Farm	40	200 litre
7	Kadakkad	Sri.Sivankutty, Koippurath Padmam	10	80 litre
3	Mudiyoorkonam	Sri.Vikraman Pillai, Thiruvathira	10	75 litre

Source: Local Body, Veterinary Dept., Diary dept.

slaughter houses are not modern slaughter houses. Details of the dairy farms are shown in Table 11.3. Details of Dairy Outlets and collection centers are shown in Table 11.4

11.5 ONGOING PROGRAMMES / SCHEMES

Various programmes are being implemented in animal husbandry sector. Treatment camps, School poultry clubs, Insurance schemes, scheme for feeder supply, Special live stock breeding Programme etc. are being implemented utilizing own fund and plan funds of the municipality.

Table 11.4. Details of Dairy Outlets and collection centers

Location	Name	Average Quantity collected per Month (Liters)
Mudiyoorkonam	Milk Co-operative Societies	9000 Liters
Arthimukke	Pandalam Vyavasaya Sheerolpadana Sangam	21000 Liters
Poothikkad	Poothikkad Vyavasaya Sheerolpadana Sangam	12000 Liters
Mavara	Mavara Vyavasaya Sheerolpadana Sangam	9000 Liters

11.6 CONCLUSION

Agricultural use is the predominant land use in Pandalam and utilising this potential there is ample scope for developing Animal Husbandry sector in the town. High demand for milk, egg and meat in the town and surrounding area and comparatively good price for this product is a potential for development of this sector. Availability of land and comparatively low density in certain wards provide scope for establishing dairy farms and poultry farms in the town and generating employment opportunities. Hence this sector can be developed as an income generating sector for the town.

12. HOUSING

12.1 INTRODUCTION

Housing is one of the basic needs of human being and it is important next to food and clothing. Normally the quality of housing reflects the quality of living. When compared to other towns in the neighboring areas and the district Pandalam municipality is experiencing comparatively high population growth rate. The assessment of housing need both quantitatively and qualitatively is important as far as Pandalam Municipality is concerned.

12.2 RESIDENTIAL AREAS

Pandalam town has scattered homestead type of residential developments and residential areas are scattered in all part of the town. The density of population and the concentration pattern of residential areas are already discussed in paragraph 5.5 and 4.6.2 respectively. The concentration pattern of residential area shows that the residential areas of the town are concentrated around major travel corridors of the town and the concentration decreases towards the periphery of the town.

12.3 HOUSING STOCK

The number of households and number of houses available from 1981 onwards is shown in Table 12.1. The analysis shows that the deficiency of houses is high in the town and measures are to be taken to provide houses to houseless people.

Table 12.1 Variation in number of houses and households

Sl:No	Year	Population	Number of houses	Number of households	No. of houses per 1000 HH
1	1981	35391	3898	3964	983
2	1991	37733	4569	4706	970
3	2001	40810	5733	9713	993
4	2011	41594	8017	10903	735

Source: Census reports, Panchayat level statistics

12.4 RESIDENTIAL PLOTS

Details regarding the size of plots and ownership of plots have been collected in the Socio Economic survey 2013. The Figure 12.1 shows the percentage plots coming under different range of plot size (in cents). Maximum number (33.09%) of plots coming in the range of 50-75 cents, followed by plots in the range of 75-150 (26.81%). It indicates that the plot size of Pandalam Municipality is comparatively high. In wards where the average plot size is less, the concentration index of residential land use is high. The ward wise average plot size of Pandalam Municipality is shown in Figure 12.2. The percentage of plot in different ranges of plot size as per socio-economic survey (2013) is shown in Annex 12.1.

In the Socio Economic Survey it is also revealed that majority of households in the town ie, 99 %

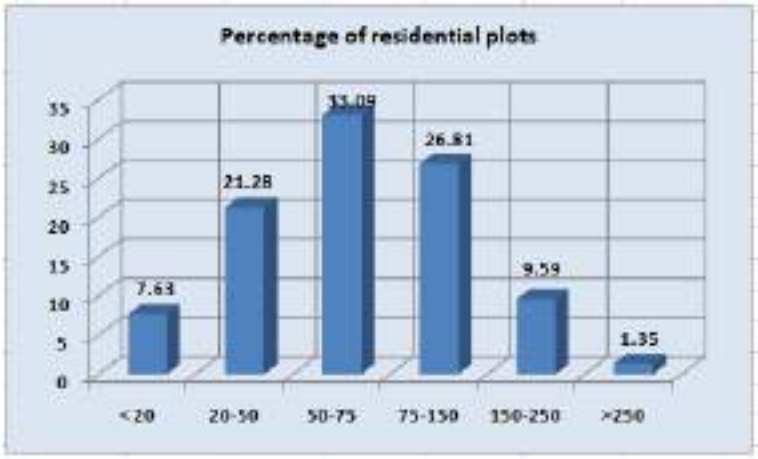


Figure 12.1 The plot size in different range average plot size

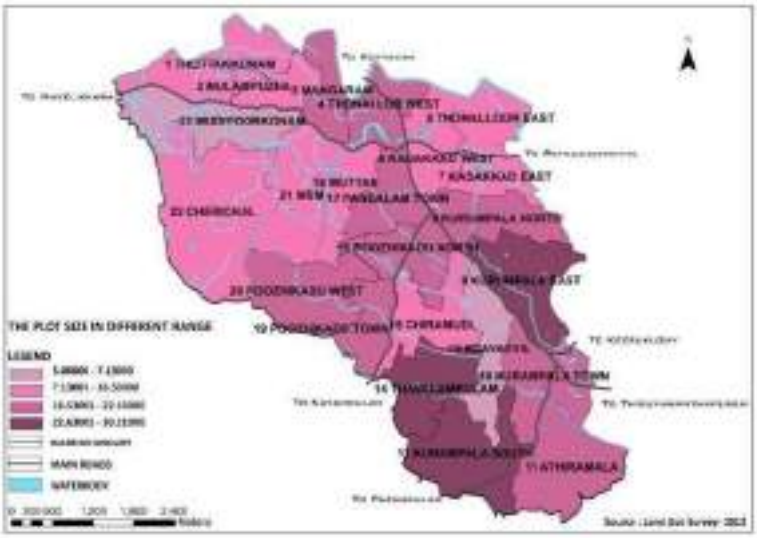


Figure 12.2 Average plot size of Pandalam Municipality

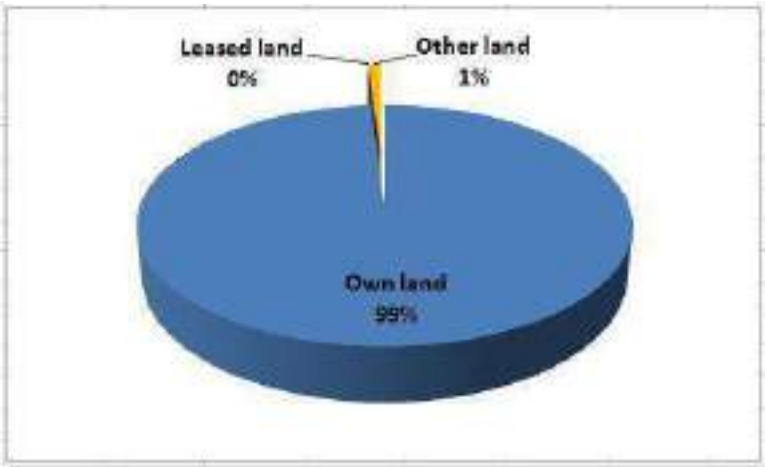


Figure 12.3 Ownership of Plot

have own land, there is no household having lease land and the remaining 1 % have other type of land ownership. The details are shown in Figure 12.3.

12.5 SIZE AND STRUCTURAL CONDITION OF HOUSES

As per the Socio-Economic Survey conducted by Town and country Planning Department in 2013, the average plinth area of the building is 81.70Sq.m and average floor area is 88.37Sq.m. The percentage of houses in different range of plinth area is shown in Figure 12.4. More houses (29.06%) have plinth area in the range of 75-150 Sq.m, followed by 27.35% of houses in the range of 50-75 Sq.m plinth area. It indicates that the houses of Pandalam municipality have comparatively large size.

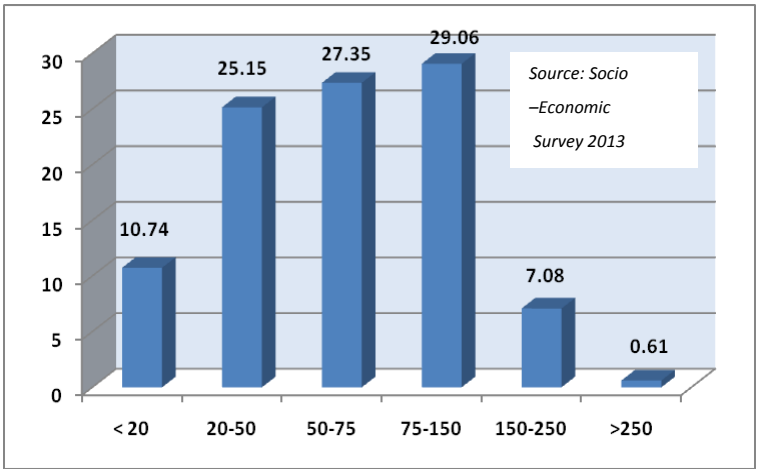


Figure 12.4 Percentage of houses in different range of plinth area

The structural condition of houses shows that 58 % of houses are pucca building, 34 % of buildings are moderate buildings, 7% of buildings are kutcha buildings and the remaining 1% of houses are huts. It is represented in figure 12.5. Distribution of houses with different types of floor material,

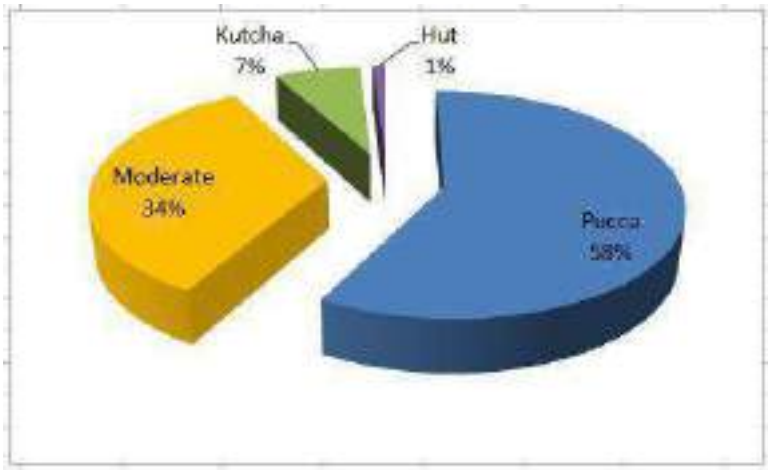


Figure 12.5 Structural conditions of houses

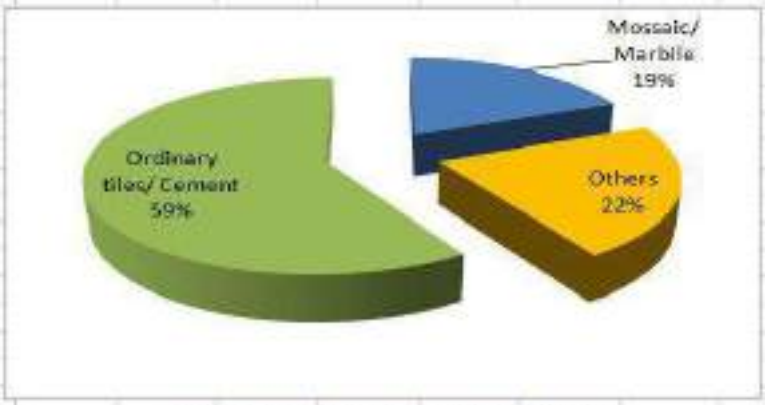


Figure 12.6 Materials used for flooring

different types of walls and different types of roof as shown in figures 12.6, 12.7 and 12.8 respectively.

From the figure 12.6 it can be observed that 59 % of houses are with ordinary tiles and 19 % of houses are with Mosaic and Marble tiles and only 22 % of houses are with other flooring materials.

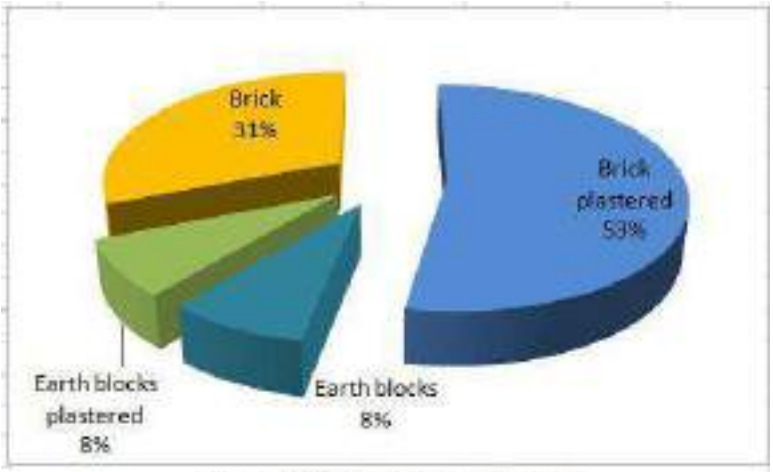


Figure 12.7 Materials used for wall

From the figure 12.7, it can be observed 53 % of houses are with good quality wall materials ie, Brick plastered and 31 % of houses with brick wall and only remaining 16% of the houses is with other inferior type wall materials like earth blocks.

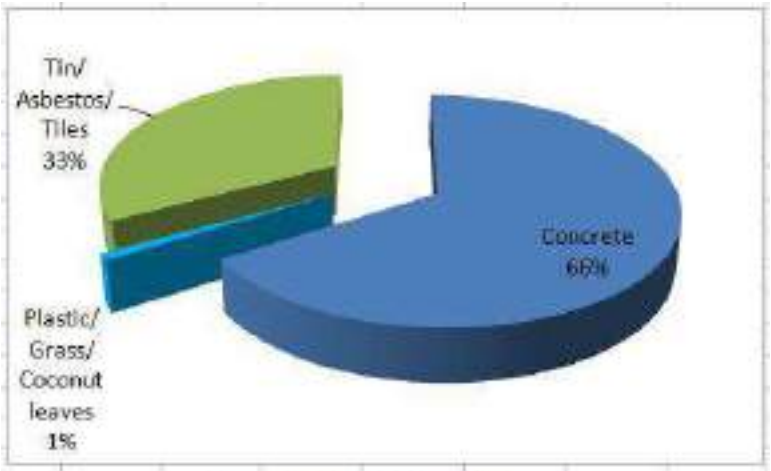


Figure 12.8 Materials used for roof

From the figure 12.7, it can be observed that 66 % of houses are with concrete roof, 33 % of houses are with moderate quality roofing materials like tin sheet, asbestos sheet and tiled roof. Only 1 % of houses are with plastic and perishable materials like grass, coconut leaves etc. The above analysis indicates the better structural condition of houses in Pandalam Municipality. But there is certain disparity among different wards in the municipality regarding the structural condition of houses. Wards Edayadiyil, Poozhikkadu North and Mudiyoorkonam have more percentage of kutcha houses and need immediate replacement. Also attention is needed to wards Thonnallor East, Thavalamkulam, Chiramudi, Pandalam Town and Muttar for the replacement of kutcha houses.

12.6 SANITARY SYSTEM AND SOLID WASTE DISPOSAL SYSTEM

As per the Socio-Economic Survey 2013, 95.08 % of houses in Pandalam Municipal area have some sort of sanitary system. No public sewerage system is there in the municipality. Septic tank is the major form of sanitary waste disposal system and it is followed by pit latrine. Percentage wise usage of different sanitary waste disposal systems of the town is shown in Figure 12.9. Majority of houses (54%) have septic tanks.

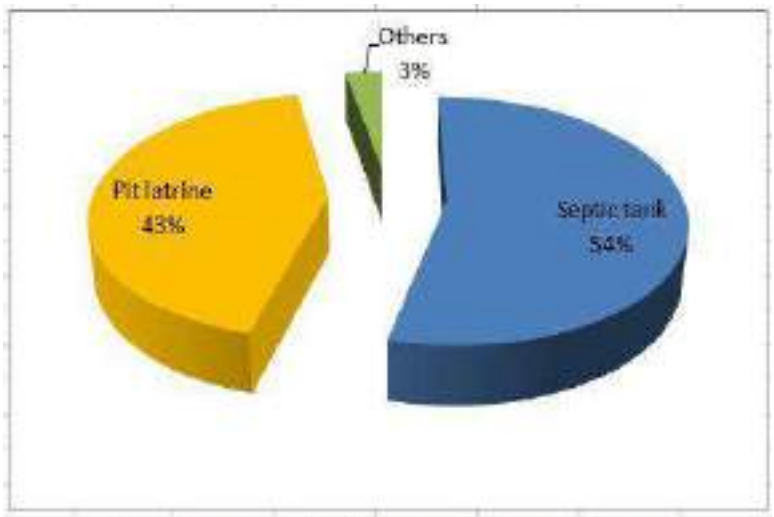


Figure 12.9 Method of sanitary waste disposal

The survey also reveals that 96.92 % of wastes from the houses are disposed in their own compound. Streets, garbage bin etc are the other means of disposal. The percentage of disposal at different places is shown in Figure 12.10. But the system for collection of wastes from the houses is very poor. A system for collection of waste from the houses have to be evolved especially in high density wards.

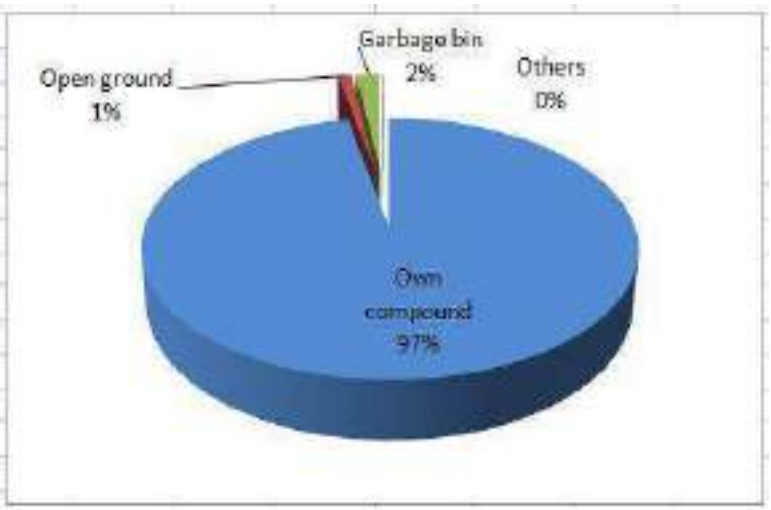


Figure 12.10 Method of Solid waste disposal

12.7 ELECTRIFICATION OF HOUSES

As per the Socio-economic survey (2013) conducted by Town and country Planning Department, 97 % of houses of the town are electrified.

12.8 AVAILABILITY OF SERVICES

The average distance in kilometer (As per the Socio-Economic survey 2013) from houses to facilities like motorable roads, bus stops, schools, Post offices, health facilities, hospitals, ration shops, play grounds etc. are shown in Figure 12.11. The Socio-Economic survey data is also analyzed by comparing the distance to various facilities with certain adopted standard(The standards derived for the preparation of IDDP/LDP of Kollam district). The average distance to various services is shown in Annex 12.2. The percentage of households having opinion that their distance to the facilities is exceeding the adopted standard is given in the Table 12.1.

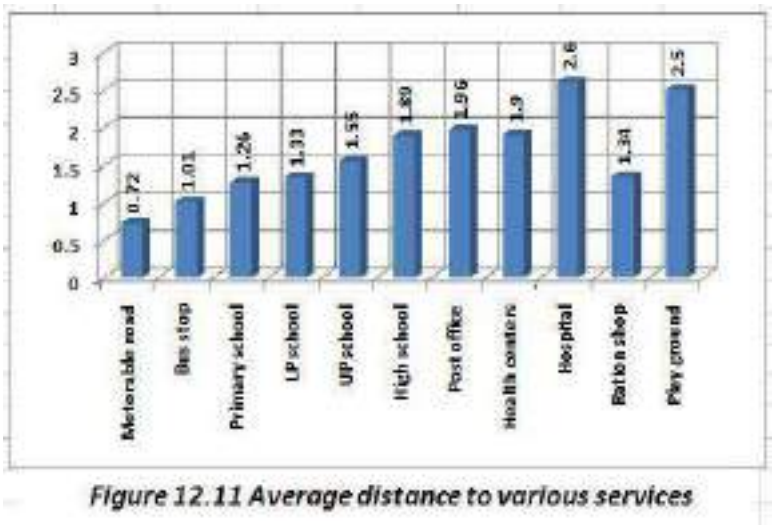


Figure 12.11 Average distance to various services

The analysis shows that when compared with the adopted standards, the facilities like motorable roads, high school, Post office, health facilities, ration shops, play ground are available at a close distance to the residential areas. But more distance has to be travelled for the facilities like bus stops and schools other than primary schools.

Table 12.2 Distance to facilities and comparison with standards

Sl.No	Facilities and standard	% of people with the opinion that distance to facilities are higher than standard
1	Distance to motorable road greater than 0.5 km	27.06
2	Distance to bus stop greater than 0.5 km	54.00
3	Distance to Primary school greater than 0.5 km	66.79
4	Distance to LP school greater than 0.5 km	68.63
5	Distance to UP school greater than 1 km	56.33
6	Distance to HS school greater than 3 km	17.84
7	Distance to Post Office is greater than 3 km	16.85
8	Distance to Health greater than 5 km	19.56
9	Distance to Hospital greater than 5 km	41.08
10	Distance to Ration shop greater than 5 km	00.86
11	Distance to Play Ground greater than 5 km	32.10

Source: Socio –Economic Survey 2013

12.9 CONCLUSION

The concentration pattern of residential areas shows that the residential area of the town are concentrated along major travel corridors and there is gradual reduction towards the peripheral area of the town. The deficiency of house is high in the town. 96% the people of the town are living in their own plot. The size of the house in Pandalam municipality is comparatively large and has better structural and sanitary condition. The collection of solid wastes from the residential area is very poor and majority of people disposing the garbage in their own premeses. When compared to adopted standards most of the services are available at reasonable distance from the residential areas.

13. WATER SUPPLY

13.1 INTRODUCTION

For the survival of human life one of the important components is pure water. The water supply scheme for Pandalam municipality was commissioned in 1994 and before that individual wells were the main source of drinking water. Undulating topography of the town is the major hurdle in providing piped drinking water. In this chapter, the details like water supply scheme, consumption of water, source of water, scarcity of water etc. are discussed.

13.2 WATER SUPPLY SCHEME

The supply of protected water in the town is made by Kerala Water Authority. The present water supply scheme to Pandalam Municipal area is called 'Water supply scheme to Pandalam'. The source of water is Achancovil river and the intake is located near Manikandan Althara. The distribution tank is located at NSS College ground and the capacity of the tank is 68,000 liters. The scheme is covering only 50% of the town area. Different category of consumers, number of connections and average monthly consumption in Kilo liters are furnished in Table 13.1.

Table 13.1 Details of water connections

Sl:No.	Category	No of connections	Average monthly consumption in Kilo liters)
1	Domestic	514	5140
2	Non domestic	57	855
3	Industrial	1	20
4	Special(Building construction purpose)	1	10
5	Public taps	130	650
	Total	**703**	**6675**

The pipe lines were laid more than 30 years back. The problem of leakage of water due to the old pipe is very common. There is shortage of water supply to the institutions of the town.

13.3 NEW SCHEME

A new water supply scheme is under implementation in Pandalam to augment the present water supply. The Source of water is River Achankovil and Capacity of treatment plant is 8MLD. As per the project report of the scheme, at present the population benefitted is 40810 including 4697 Scheduled Cast population. It is proposed to cover a total population of 55241 including 7216 Scheduled Cast population by 2039. The intake well cum pump house is located in Pulimoottil Kadavu at Mangaram. The treatment plant is located at Mangaram. Overheads tanks are proposed at Mangaram and Cherickal, sump tank is proposed at Kurmpala and ground level tank is proposed at Athiramala. The total estimated cost is Rs.739.00 lakhs.

The Components of the project already completed are, Intake well cum pump house, 8MLD Water treatment plant, Reservoirs, Raw water pumping main, PVC Distribution lines and Pump sets. The components which are to be completed are CI Distribution lines, clear water pumping main to Athiramala tank, back wash water recycling system, drain for disposal of sludge from plant and Power connection and allied works.

13.4 SOURCE OF WATER

In the Socio-Economic survey 2013, 90 % of people reported that well is the major source of water and a small group of people reported that water supplied by KWA is the main source of water. Community well (1.88%), Public bore well (0.25%), other sources (1.88 %) are the other sources of water as per the socio-economic survey. It is shown in Table 13.2 and also in Figure 13.1.

Table 13.2 Source of Drinking Water

Source of water	Well	KWA	Community well	Public bore well	Owned pond	Community pond	Others
Percentage	94.24	1.38	1.88	0.25	0.13	0.25	1.88

Source: Socio Economic Survey 2013

There is variation among different wards of town in the usage of water supplied by KWA and well water. Use of water supplied by Kerala water authority is more in Kadakkadu East (18.18 % of households), Poozhikkadu West (18.18 % of households), and Cherickal (27.27% of households).

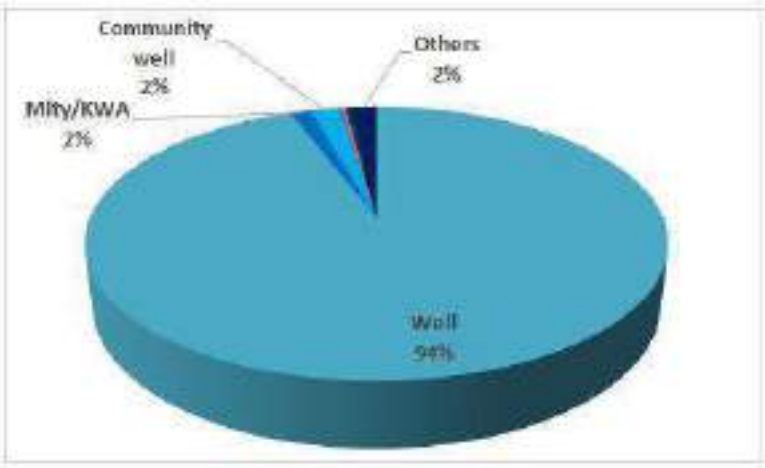


Figure 13.1 Source of drinking water

Table 13.3 Distance to the source of water

Distance to water sources	less than 0.25 km	0.25 – 1.00 km	> 1 km
Percentage	97.01	2.99	0

Distance to source water has also analyzed. For 97.01% of households some kind of water source is available within a distance of 0.25Km. For 2.99 % of households drinking water is available within a distance of 0.25-1.0km. No need to go beyond 1 km for obtaining water in the area.

Construction of Canals as part of KIP through different part of the town has helped in elevating the water tables of the wells in the adjacent areas especially in summer season.

The ponds are available in various part of the town and these ponds can be utilized as an alternate source of water. Ward wise source, scarcity of drinking water is shown in Annex 13.1.


KIP Canal

13.5 SCARCITY OF WATER

As per the socio-economic Survey (2013) conducted by Town and Country Planning Department, 98 % of the households reported that there is no scarcity of water and 2% of households reported that there is scarcity of water for a period of 2-3 months.

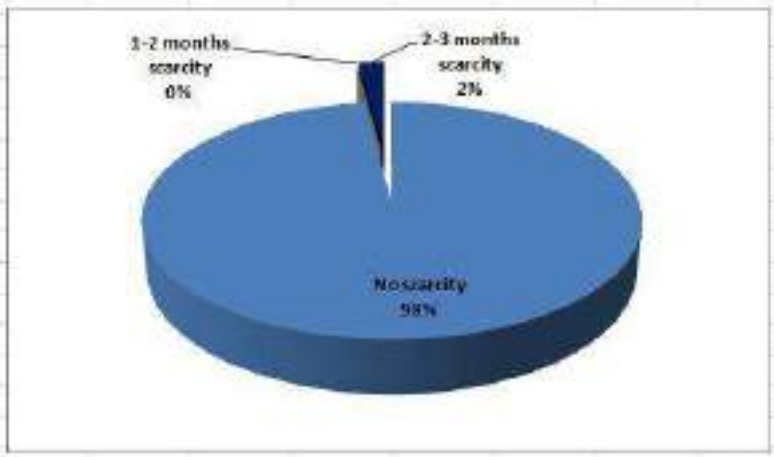


Figure 13.2 Scarcity of Water in percentage

13.6 CONCLUSION

System for distribution of water to all major habitable area of the town is available. In the same survey, majority of the people has of the opinion that scarcity of water is not a major issue. Undulating topography is a major hurdle in providing piped water supply. Only 25% of households getting protected water from KWA. For 90% of the households, well is the main source of water. Certain areas of the town need special attention as there is scarcity of water to an extent.

14. TRANSPORTATION

14.1 INTRODUCTION

For the balanced development of an urban centre planned growth of spatial activities, coupled with provision of adequate infrastructural facilities like, a well defined hierarchy of road network, drainage, water supply, power supply etc. are required. But in most of the cities and towns the available road system is not able to cater to the present traffic. The fast development of socio-economic and commercial activities coupled with inadequate supporting facilities and ever increasing demand due to centralization of employment centers in C.B.D area caused a perpetual vicious circle of traffic problems.

As part of preparation of Master Plan for Pandalam Town various studies related to Traffic and Transportation has been conducted. Department has entrusted NATPAC for conducting different studies. Also studies about vehicle population, road network, speed and delay, traffic volume, parking, pedestrian movement etc were carried out.

14.2 TRANSPORTATION SYSTEM

Among the various urban infrastructure facilities transportation is the one, which shapes the structure and growth of the city. A workable circulation plan ensuring efficient operation of the transportation system facilitates economic growth of the town. With progressive urbanization travel demand in towns has increased tremendously. This is evident from the long delays and traffic congestion observed on urban roads in most of the towns. In order to make the transport system efficient, there is a continuous need to maintain a balance between demand and supply of facilities within the town and its environs.

The transportation system of Pandalam town consists of only one mode ie, road ways. No railway or water way passes through the town. The road network plays most vital role in the all round development of any area. The existing road network of Pandalam consist of SH, MDR under Kerala Public Work Department and other roads under Municipality.

14.3 EXISTING ROAD NETWORK

Pandalam town has two diagonal roads intersecting at the central area of the town without any circular roads of standard geometries provide adequate connectivity to these roads. The State Highway-1 (M.C Road) (Thiruvananthapuram – Angamaly) and Mavelikkara-Pandalam-Kaippattoor road are the two diagonal roads passing through the central area of the town. There are other roads like Mannam Memorial Hospital Junction- Kudassanad road, Kurampala-Poozhikkad-Muttar road, Kurampala-Pazhakulam road and Kurampala – Keerukuzhi Road. The

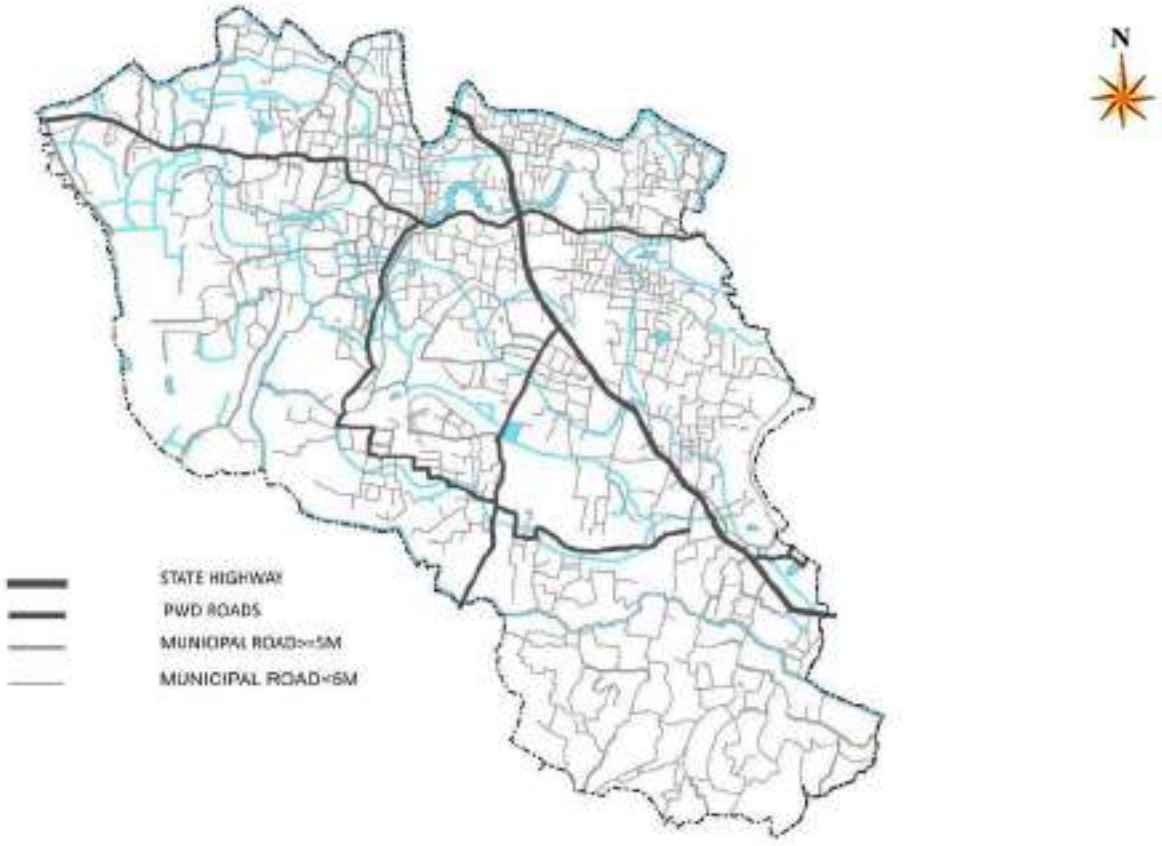


Figure 14.1 Existing Road Network of Pandalam Town

existing road network of the town is shown in the Figure 14.1 which provide connectivity to other areas of the town and centers in neighboring panchayats.

14.4 ROAD NETWORK CHARACTERISTICS

The road network configuration of Pandalam town does not resemble any particular pattern. M.C.Road (North – South direction) and Kaippattoor-Mavelikkara road (East – West direction) are meeting at Pandalam Junction. There are a number of roads linking these two major roads in both North-South and East-West directions. Kurampala-Muttar-ValiyaKoyikkal road lying on the western part of the town has the potential of being developed into a ring road for the town. Similarly on the eastern side, Kurampala – Thumpamon – Kulanada road can be developed into a ring road. However, most part of this road lies outside the boundary of Pandalam town. Pandalam town has about 100 kms of municipal roads, most of them having single line or intermediate lane width varying from 3 to 6m. Salient features of important roads in the town are discussed below;

- MC Road: The major road corridor passing through the town namely State Highway No. 1 (MC Road) has a length of about 6 km within Pandalam with a carriage way width of 7.50m to 8.00m.
- Mavelikkara– Kaipattur -Pathanamthitta –road has a length of 6.6 km within town limit and have two lane carriageway and the carriage way width is varying from 6.00m to 8.00m.
- Poozhikkadu – Muttar – ValiyaKoyikkal road has a length of 5.2 km within the study region and the width of carriageway is 3.5m.
- Kurampala – Pazhakulam road (with a length of 3Km within town limit) and Medical Mission Junction – Poozhikkadu road (with a length of 3.6 Km within town limit) are other important roads within town limit. The carriageway width of both of these roads are 5.00m.
- Other road network in the town include; Cherikkal road (3.1Km), Medical Mission Hospital Junction – Kadakkadu road (1.3Km), Kadakkadu Junction – Devi temple - Police

station Junction on MC road (3.2Km), MC Road– Sree Krishna Swamy temple - Kadakkadu Krishi Bhavan Road (0.8 Km) and Kurampala – Keerukuzhi road (0.5 Km).

The inventory details of major road links in the study area are given in Table 14.1

Table 14.1 Inventory details of major roads

Sl No	Chainage	Length (Mtr)	Width (m)		Drain		Shoulder (m)		Surface type	CD structure		Junctions		Adjoining land use	
			CW	ROW	L	R	L	R		Culvert	bridge	4-arm	3-arm	L	R
	I. MC Road														
1	River Bridge (Panchayat Boundary) - Valiya Koyikkal Jn	0.00 - 100	15.0	8.0			3.5	3.5	BT, Fair			1		Resi/Comm	Resi/Comm
2	Valiya Koyikkal Jn - Pandalam Jn	100 - 1300	15.0	8.0	1.0	1.0	3.5	3.5	BT, Fair	1	1	1	1	Resi/Comm	Resi/Comm
3	Pandalam Jn - Medical Mission Hospital Jn	1300 - 2500	12.0	7.5	1.0	1.0	2.5	2.0	BT, Fair	1				Resi/Comm	Resi/Comm
4	Medical Mission Hospital Jn - Kurampala Jn	2500 - 5300	12.5	7.5	1.0	1.0	2.5	2.5	BT, Fair	5			2	Resi/Comm	Resi/Comm
5	Kurampala Jn - Boundary	5300 - 6800	12.5	7.5	1.0	1.0	2.5	2.5	BT, Fair	1				Resi	Resi
	II. Mavelikkara - Kaippattoor Road														
6	Irammilkuzhi (Boundary) - Cherikkal Road Jn	0.00 - 1500	10.0	7.0	-	-	1.0	2.0	BT, Fair				4	Resi/Agri	Resi/Agri
7	Cherikkal Road Jn - Muttar Jn	1500 - 3900	10.0	7.0	1.0	1.0	1.5	1.5	BT, Fair				3	Resi/Comm	Resi/Comm
8	Muttar Jn - KSRTC Jn	3900 - 4300	10.0	7.0	1.0	1.0	0.5	0.5	BT, Fair		1		2	Resi/Comm	Resi/Comm
9	KSRTC Jn - Pandalam Jn	4300 - 4700	10.0	8.0	1.0	1.0	1.0	1.0	BT, Fair	1				Comm	Comm
10	Pandalam Jn - Kadakkadu Jn	4700 - 6100	10.0	6.0	0.5	-	2.0	2.0	BT, Fair	1				Comm	Comm
11	Kadakkadu Jn - Muttam Jn (Boundary)	6100 - 6400	10.0	6.0	0.5	0.5	2.0	2.0	BT, Fair				1	Resi	Resi
	III. Medical Mission Hospital Road (Mavelikkara Road)														
12	Medical Mission Hospital Jn - Poozhikkadu Jn	0.00 - 2900	7.5	5.0	1.0	1.0	1.0	1.0	BT, Fair	1			1	Resi/Comm	Resi/Comm
13	Poozhikkadu Jn - Boundary	2900 - 3600	7.5	5.0	1.0	1.0	1.0	1.0	BT, Poor	2				Resi/Comm	Resi/Comm
	IV. Puzhakulam Road														
14	Kurampala - Post office Jn	0.00 - 2000	7.5	5.0	-	-	1.0	1.0	BT, Fair	2	1		1	Resi/Agri	Resi/Agri
15	Post Office Jn - Panchayat Boundary (Kadamankadu)	2000 - 3000	7.5	5.0	-	-	1.5	1.0	BT, Fair	2			2	Resi/Agri	Resi/Agri
	V. Cherikkal Road														
16	Mavelikkara road jn - Cherikkal ITC	0.00 - 1300	8.0	6.0	1.0	1.0	1.0	1.0	BT, Fair	4				Resi/Comm	Resi/Comm
17	Cherikkal ITC - Cherikkal KSEB	1300 - 1800	8.0	3.5	-	-	2.5	2.0	BT, Fair	1				Resi/Agri	Resi/Agri
	VI. Kurampala - Keerukuzhi Road														
18	Kurampala - Thekkekkara Panchayat Boundary	0.00 - 500	5.0	4.5	-	-	0.2	0.3	BT, Fair					Resi	Resi
	VII. Valiya Koyikkal Jn - Muttar – Poozhikkadu - Kurumpala LP school Jn (On MC Road)														
19	Valiya Koyikkal Jn - Muttar Jn	0.00 - 1300	6.0	3.5	-	-	1.5	1.0	BT, Fair					Resi/Agri	Resi/Agri
20	Muttar Jn - NSS Ayurveda College Jn	1300 - 2900	6.0	3.5	-	-	1.5	1.0	BT, Poor					Resi/Agri	Resi/Agri
21	NSS Ayurveda College Jn - Poozhikkadu Jn	2900 - 5200	9.0	3.5	-	-	2.5	2.0	BT, Poor	1			1	Resi/Agri	Resi/Agri
22	Poozhikkadu Jn - Thavalam Kulam Jn	5200 - 7200	6.0	3.5	-	-	1.5	1.0	BT, Poor	2				Resi/Agri	Resi/Agri
23	Thavalam Kulam Jn - Kurumpala Lp school Jn (On MC Road)	7200 - 8700	6.0	3.5	-	-	1.5	1.0	BT, Poor	1				Resi/Agri	Resi/Agri

14.5 TRAFFIC VOLUME

Knowledge of the traffic volume in a particular road network is important to understand the efficiency at which the system works and the general quality of service offered to road users. Data pertaining to traffic volume and its composition was collected for all major roads through link volume survey.

It is seen that the traffic on the Mavelikkara – Kaippattur Road, especially within the Central area is very high. A maximum daily traffic of 21,212 PCU was observed in the section between

Pandalam Junction and KSRTC Bus Station. Also maximum daily traffic of 13,741 PCU was observed between Muttar Junction and KSRTC Bus Station, 12128 PCU was observed between

Pandalam Junction and Kadakkad Junction, 12082 PCU was observed between Kadakkad Junction and Municipal Junction and 10966 PCU was observed between Cherikkal Road Junction and Muttar Junction.

In M.C.Road a maximum daily traffic volume of 12,463 PCU was observed between Pandalam Junction and Medical Mission Hospital Junction. Also maximum daily traffic volume of 12,393 PCU was observed between Valiyakoikkal Junction and Pandalam Junction, 12312 PCU was observed between Kurampala Junction and Municipal boundary and 12025 PCU were observed between Medical Mission Hospital Junction and Kurampala Junction. The daily traffic volume recorded in other major roads of the town is shown in Table 14.2 and Figure 14.2.

Table 14.2 Traffic volume on major roads

Sl No	Name of the Stretch	Type of vehicle														
		KSRTC Bus	Private Bus	Other Bus	Mini bus/ Tempo	Car/ Van/ Jeep	Passenger auto	Two Wheeler	MAT	Truck	Mini truck	Goods auto	Bicycle	Hand cart	Others	Total vehicle/ day (Nos)	Total PCU/ day
	I. MC Road																
1	River Bridge (Panchayat Boundary) - Valiya Koyikkal Jn	299	100	149	53	3,392	633	3,608	52	638	503	385	34	2	-	9,877	10,909
2	Valiya Koyikkal Jn - Pandalam Jn	299	147	212	337	4,105	646	3,966	50	620	480	279	33	2	-	11,240	12,393
3	Pandalam Jn - Medical Mission Hospital Jn	315	155	305	410	3,830	667	2,886	69	692	524	370	62	1	-	10,296	12,463
4	Medical Mission Hospital Jn - Kurampala Jn	315	79	285	382	3,597	690	2,963	55	692	515	342	56	-	-	10,150	12,025
5	Kurampala Jn - Boundary	291	-	265	236	4,097	693	3,067	64	736	682	408	41	0	-	10,570	12,312
	II. Mavelikkara - Kaippattoor Road																
6	Ironmikuzhi (Boundary) - Cherikkal Road Jn	138	101	34	32	1,704	654	3,306	36	728	247	406	54	4	-	7,625	8,361
7	Cherikkal Road Jn - Muttar Jn	134	108	65	28	2,895	1,653	4,843	36	724	454	452	24	-	-	10,816	10,966
8	Muttar Jn - KSRTC Jn	134	257	127	289	3,611	2,002	5,313	36	651	559	512	36	-	-	13,527	13,741
9	KSRTC Jn - Pandalam Jn	755	560	195	324	5,382	3,818	6,533	36	432	914	847	59	6	-	19,862	21,212
10	Pandalam Jn - Kadakkadu Jn	50	216	297	110	3,551	1,447	4,063	37	716	337	400	46	-	-	11,271	12,128
11	Kadakkadu Jn - Muttam Jn (Boundary)	50	216	297	110	3,033	1,427	4,046	37	716	337	400	46	-	-	11,216	12,082
	III. Medical Mission Hospital Road (Mavelikkara Road)																
12	Medical Mission Hospital Jn - Poozhikkadu Jn	10	110	109	342	1,822	1,541	4,268	-	337	801	157	21	2	-	9,338	8,899
13	Poozhikkadu Jn - Boundary	19	119	109	432	1,822	1,541	4,268	-	422	871	167	37	2	-	9,549	9,202
	IV. Pazhakulam Road																
14	Kurampala - Post office Jn	12	41	71	76	595	1,184	1,241	-	155	184	81	46	-	-	3,617	3,861
15	Post Office Jn - Panchayat Boundary (Kadamankadu)	15	41	71	76	595	1,192	1,222	-	115	182	77	37	-	-	3,541	3,517
	V. Cherikkal Road																
16	Mavelikkara road jn - Cherikkal ITC	4	58	5	4	30	121	154	-	6	15	5	32	-	-	440	503
17	Cherikkal ITC - Cherikkal KSEB	-	-	1	2	12	23	51	-	2	2	1	20	-	-	114	87
	VI. Kurampala - Keerukuzhi Road																
18	Kurampala - Thekkekkara Panchayat Boundary	12	46	-	7	380	235	754	-	39	85	107	7	-	-	1,711	1,549
	VII. Valiya Koyikkal Jn - Muttar – Poozhikkadu - Kurumpala LP school Jn (On MC Road)																
19	Valiya Koyikkal Jn - Muttar Jn	-	-	-	-	304	476	1,360	-	19	72	262	58	-	-	2,602	1,957
20	Muttar Jn - NSS Ayurveda College Jn	-	8	71	275	695	1,207	1,358	-	75	112	259	54	-	-	4,125	3,900
21	NSS Ayurveda College Jn - Poozhikkadu Jn	-	3	29	210	254	976	1,120	-	62	74	251	120	-	-	3,107	2,813
22	Poozhikkadu Jn - Thovalan kalam Jn	-	-	15	110	134	585	615	-	45	31	85	98	1	-	1,927	1,650
23	Thovalamkulam Jn - Kurumpala LPS Jn (On MC Road)	-	-	10	51	85	216	585	-	15	18	42	-	-	-	1,022	814

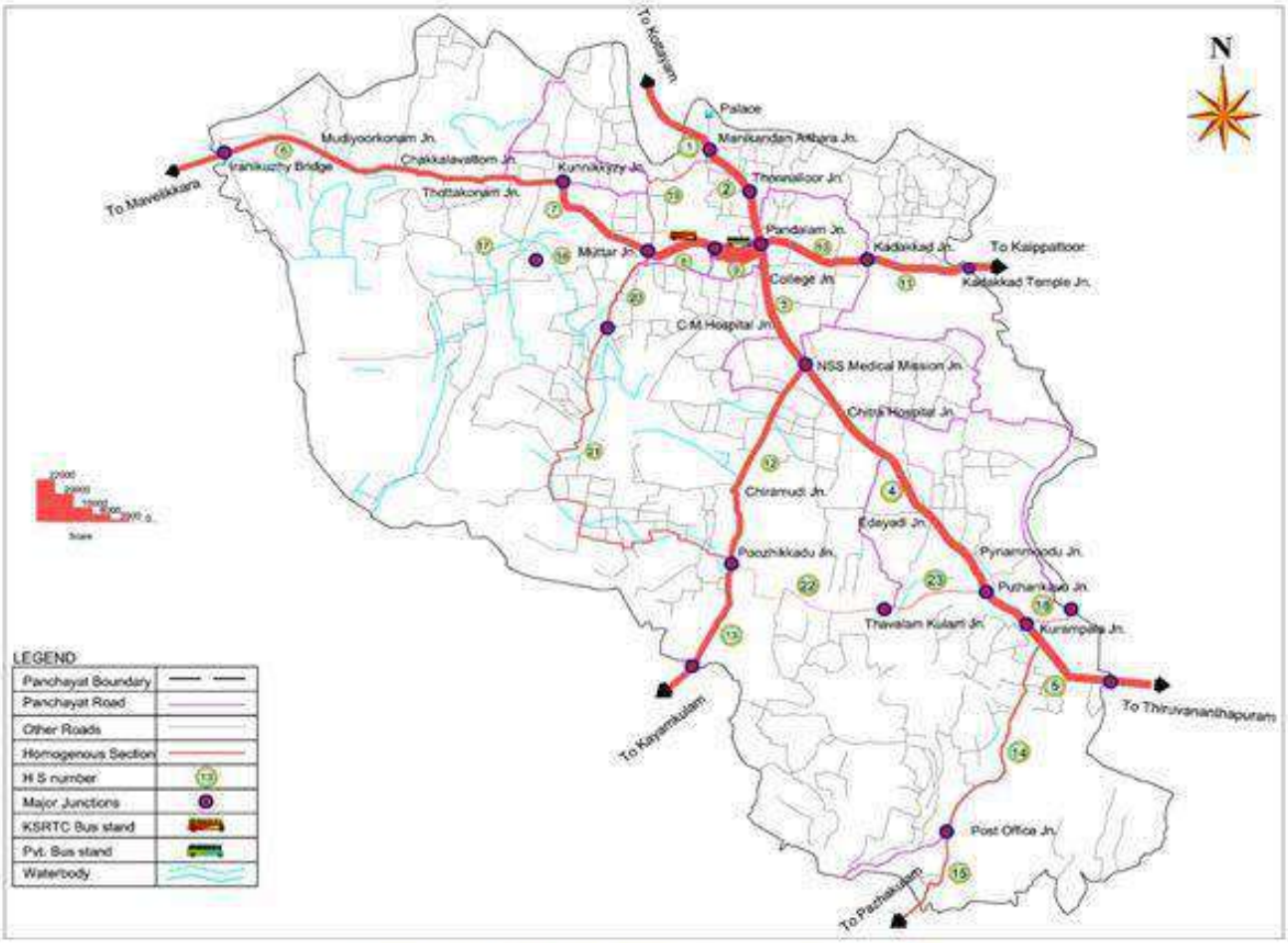


Figure 14.2 Traffic volume on major roads

14.6 CAPACITY UTILISATION

Capacity utilisation of the road stretches was measured by volume-capacity ratio (V/C Ratio). It is the ratio of volume of traffic playing on the road stretch to the capacity of the road stretch. For working out the capacity of different road sections, the information collected during the road inventory survey was compared with the specifications of IRC-106-1990 (Guidelines for capacity on urban roads).

While working out the capacities due consideration was given to carriage- way width, junctions, parking, lateral clearance, shoulder, surface condition etc. The traffic volume observed at different road stretches were compared with the capacity of road sections, to calculate the volume-capacity ratio (V/C ratio) of different road sections within the study area. The traffic volume and volume capacity ratio of major roads of the town is shown in Figure 14.3 and Table 14.3. From the above analysis, it shows that most part of M.C.Road and Mavelikkara-Pandalam - Kaipattur Road traffic volume exceeds its capacity**.**

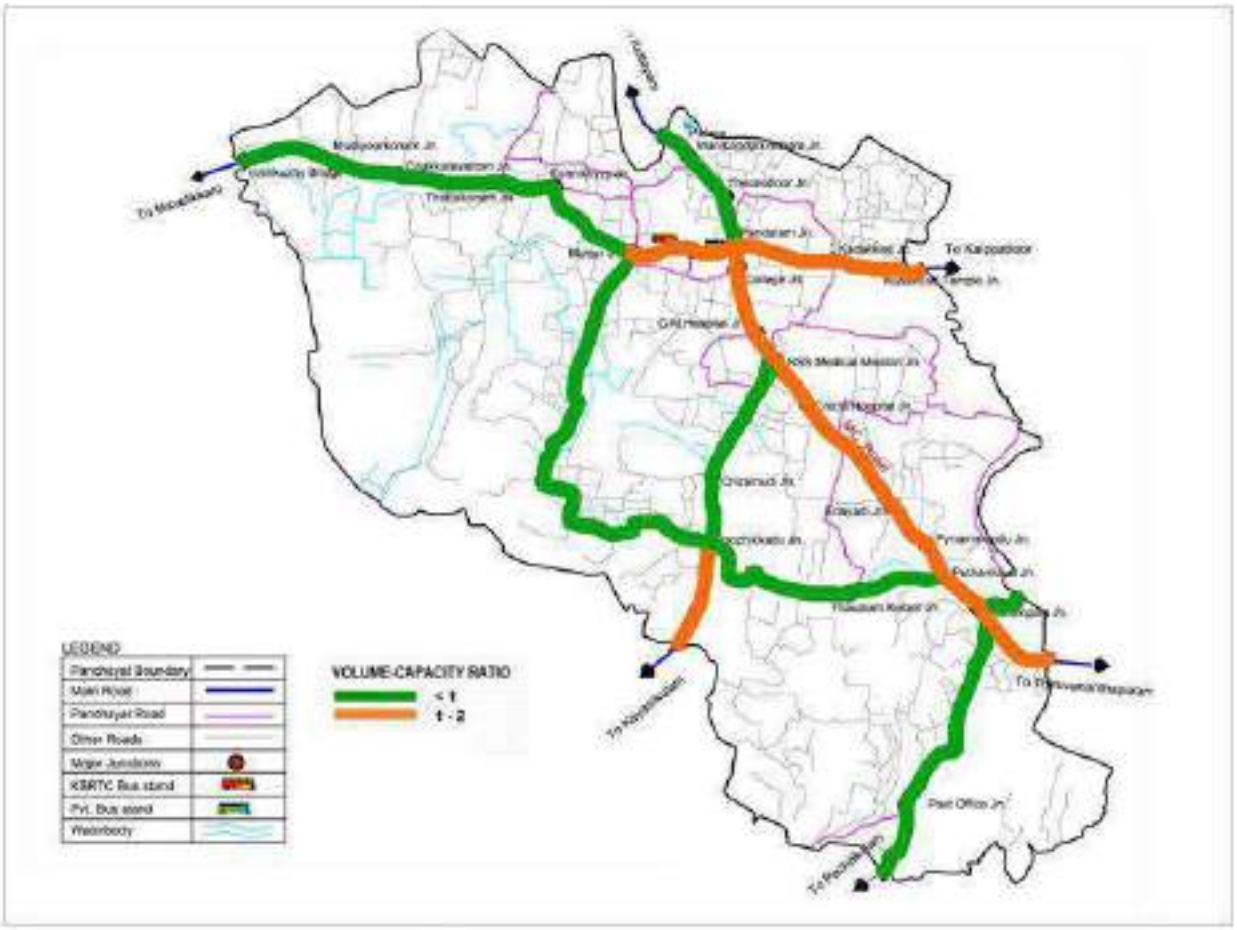


Figure 14.3 Volume – capacity ratio on major roads

Table 14.3 volume capacity ratio of major roads in Pandalam Town

Sl. No	Road Link	Carriage way width (m)	Capacity (PCU)	volume (PCU)	VC ratio
	I. MC Road				
1	River Bridge (Panchayat Boundary) - Valiya Koyikkal Jn	8.0	15,000	10,909	0.73
2	Valiya Koyikkal Jn - Pandalam Jn	8.0	15,000	12,393	0.83
3	Pandalam Jn - Medical Mission Hospital Jn	7.5	12,000	12,463	1.04
4	Medical Mission Hospital Jn - Kurampala Jn	7.5	12,000	12,025	1.00
5	Kurampala Jn - Boundary	7.5	12,000	12,312	1.03
	II. Mavelikkara - Kaippattoor Road				
6	Irannikkuzhi (Boundary) - Cherikkal Road Jn	7.0	12,000	8,361	0.70
7	Cherikkal Road Jn - Muttar Jn	7.0	12,000	10,966	0.91
8	Muttar Jn - KSRTC Jn	7.0	12,000	13,741	1.15
9	KSRTC Jn - Pandalam Jn	8.0	15,000	21,212	1.41
10	Pandalam Jn - Kadaikkadu Jn	6.0	12,000	12,128	1.01
11	Kadaikkadu Jn - Muttam Jn (Boundary)	6.0	12,000	12,082	1.01
	III. Medical Mission Hospital Road (Mavelikkara Road)				
12	Medical Mission Hospital Jn - Poozhikkadu Jn	5.0	9,000	8,839	0.98
13	Poozhikkadu Jn - Boundary	5.0	9,000	9,292	1.03
	IV. Pazhakulam Road				
14	Kurampala - Post office Jn	5.0	9,000	3,661	0.41
15	Post Office Jn - Panchayat Boundary (Kadamankadu)	5.0	9,000	3,517	0.39
	V. Cherikkal Road				
16	Mavelikkara road jn - Cherikkal ITC	6.0	12,000	503	0.04
17	Cherikkal ITC - Cherikkal KSEB	3.5	9,000	87	0.01
	VI. Kurampala - Keerukuzhi Road				
18	Kurampala - Thekkekkara Panchayat Boundary	4.5	9,000	1,549	0.17
	VII. Valiya Koyikkal Jn - Muttar – Poozhikkadu - Kurumpala LP school Jn (On MC Road)				
19	Valiya Koyikkal Jn - Muttar Jn	3.5	9,000	1,957	0.22
20	Muttar Jn - NSS Ayurveda College Jn	3.5	9,000	3,900	0.43
21	NSS Ayurveda College Jn - Poozhikkadu Jn	3.5	9,000	2,813	0.31
22	Poozhikkadu Jn - Thavalam kulam Jn	3.5	9,000	1,650	0.18
23	Thavalamkulam Jn - Kurumpala LPS Jn (On MC Road)	3.5	9,000	814	0.09

14.7 TRAFFIC VOLUME AT MAJOR INTERSECTIONS

Turning movement surveys were conducted at major intersections in the study area to ascertain the peak hour demands. Major intersections selected for volume count survey are; Pandalam Junction, Medical Mission Hospital Junction, Kurampala Junction (Keerukuzhi Road), Kurampala Junction (Pazhakulam Road) and Muttar Junction. The peak hour traffic volume at major intersections is shown in Table 14.4.

Table 14.4 Peak hour traffic flow at major intersections in Pandalam Town

Sl. No.	Name of road/ intersection	No. of arms	Peak hour	Peak hour volume (PCU)
1	Pandalam Jn	4	10.30-11.30AM	4,351
2	Medical Mission Hospital Jn	3	10.15-11.15AM	2,105
3	Kurampala Jn (Keerukuzhi Road)	3	05.45-06.45PM	1,810
4	Kurampala Jn (Pazhakulam Road)	3	05.45-06.45PM	1,905
5	Muttar Jn	4	05.30-06.30PM	987

14.8 SPEED AND DELAY STUDY

On State Highway 1 (MC Road), the journey speed varied between33 km/hr and 48 km/hr. Maximum speed of 47.6km/hr was observed between Kurampala Jn and the town Boundary and the minimum speed of 27.9 km/hr between ValiyaKoyikkal Jn and Pandalam Jn. The low journey speed was observed due to speed breaker and narrow bridge near the Junction.

On the Mavelikkara - Pathanamthitta road, the average speed was as low as 13.1 Km between KSRTC Jn and Pandalam Jn. The major delay was due to the congestion at Market area and due to entry and exit of buses from Private Bus stand area. The speed was however high on the road stretch between the Town boundary and Cherikkal Road Jn. The speed and delay characteristics on major roads in Pandalam study area is given in Table 14.5

Table 14.5 Speed and delay characteristics on major roads in Pandalam Town

Sl. No	Control Points	Distance (in mtr)	Average Journey Time (sec)	Delay time (Sec)	Actual running time (Sec)	Speed Km\hr		Cause of Delay
						With Delay	Without delay	
	I. MC Road							
1	River Bridge (Panchayat Boundary) - Valiya Koyikkal Jn	100	9	0	9	40.00	40.00	No delay
2	Valiya Koyikkal Jn - Pandalam Jn	1,200	155	23	132	27.87	32.73	Jn & Signal
3	Pandalam Jn - Medical Mission Hospital Jn	1,200	128	17	111	33.75	38.92	Slow Vehicle
4	Medical Mission Hospital Jn - Kurampala Jn	2,800	269	0	269	37.47	37.47	No delay
5	Kurampala Jn - Boundary	700	52	0	52	48.46	48.46	No delay
	II. Mavelikkara - Kaippattoor Road							
6	Irannikkuzhi (Boundary) - Cherikkal Road Jn	1,500	115	3	112	46.96	48.21	Vehicle crossing
7	Cherikkal Road Jn - Muttar Jn	2,400	210	8	202	41.14	42.77	Junction & Bus stop
8	Muttar Jn - KSRTC Jn	400	61	4	57	23.61	25.26	Junction & Bus stop
9	KSRTC Jn - Pandalam Jn	400	110	56	54	13.09	26.67	Junction & Bus stop
10	Pandalam Jn - Kadaikkadu Jn	1,400	149	23	126	33.83	40.00	Vehicle crossing/Jn
11	Kadaikkadu Jn - Muttam Jn (Boundary)	300	25	0	25	43.20	43.20	No delay
	III. Medical Mission Hospital Road (Mavelikkara Road)							
12	Medical Mission Hospital Jn - Poozhikkadu Jn	2,900	260	22	238	40.15	43.87	Jnunction signal
13	Poozhikkadu Jn - Boundary	700	87	0	87	28.97	28.97	No delay
	IV. Pazhakulam Road							
14	Kurampala - Post office Jn	2,000	176	2	174	40.91	41.38	Road Condition Poor
15	Post Office Jn - Panchayat Boundary (Kadamankadu)	1,000	86	0	86	41.86	41.86	No delay
	V. Cherikkal Road							
16	Mavelikkara road jn - Cherikkal ITC	1,300	125	0	125	37.44	37.44	No delay
17	Cherikkal ITC - Cherikkal KSEB	1,800	140	0	140	46.29	46.29	No delay
	VI. Kurampala - Keerukuzhi Road							
18	Kurampala - Thekkekkara Panchayat Boundary	500	53	0	53	33.96	33.96	No delay

14.9 PARKING CHARACTERISTICS

Parking surveys were carried out on major road sections of Pandalam town to obtain the peak parking demand and parking duration of various categories of vehicles. Major road stretches where there is more demand for parking is shown in Figure 14.4.

Table 14.6 gives the summary of peak parking accumulation observed on major parking corridors in Pandalam town. It could be seen that the road section between KSRTC Jn and Pandalam junction on Mavelikkara road had the highest parking accumulation of 122 vehicles, followed by 90 vehicles on Chengannur road, 89 vehicles on Kaippattoor road and 85 vehicles were parked on Adoor road. In short, the areas around Pandalam main junction at the

intersecting point of the major roads were found to be the major parking corridor of the town due to the concentration of major commercial activities on either sides of the road.

Majority of the vehicles parked at most of parking corridors were found to be for short duration of less than 30 minutes. About 86 per cent of the vehicles parked on selected parking corridors were found to be parked for duration less than 30 minutes. 12 per cent of these vehicles were parked for a period ranging between 30 minutes and one hour. Long duration vehicles constituted only around two per cent of the total vehicles. There is no off street parking space in the town and vehicles are parked in the road margin itself which leads to traffic congestion in

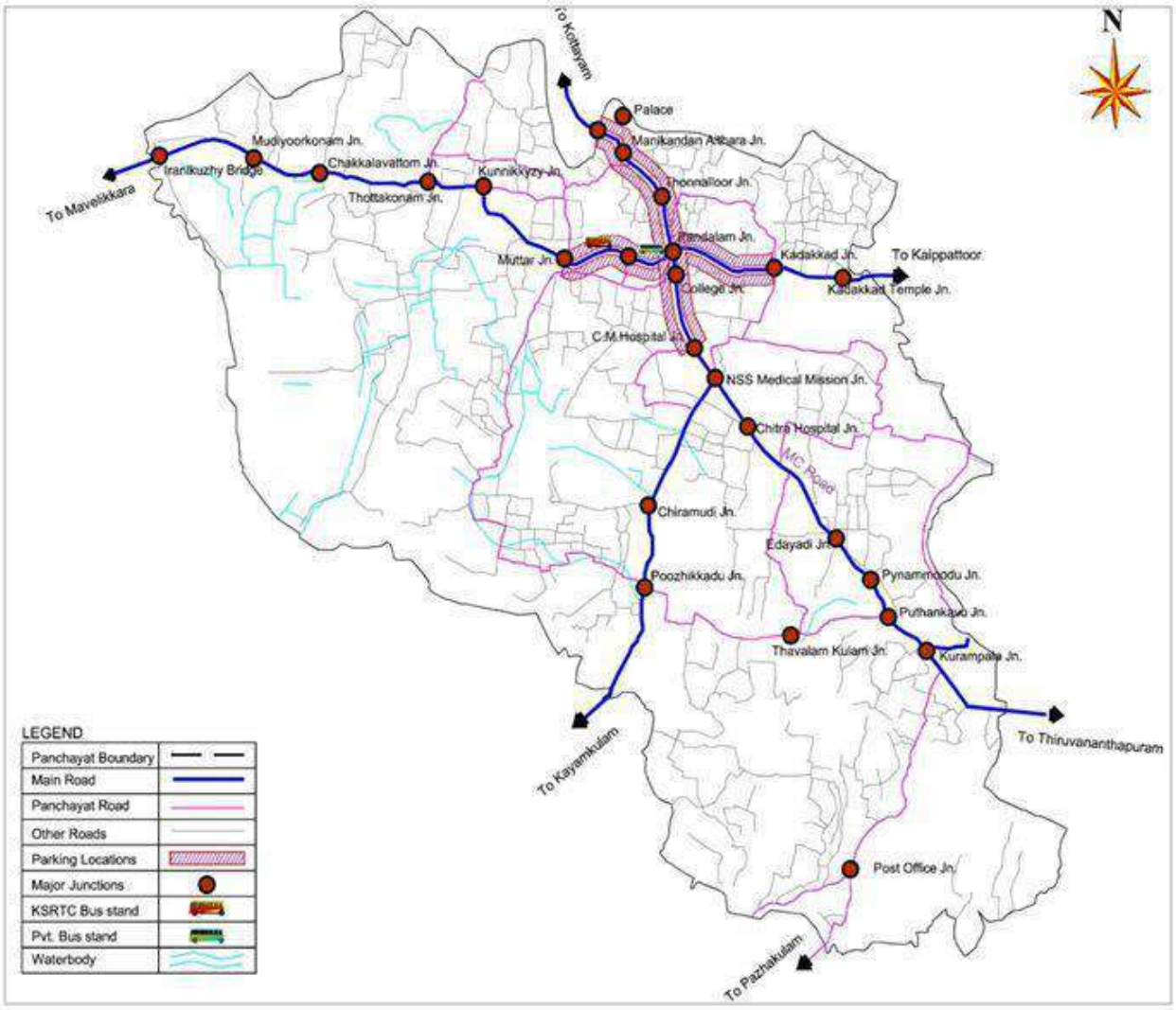


Figure 14.4 major parking locations of the town

roads. Adequate off street parking space are to be provided in locations where there is more demand. A terminal for goods vehicles is also needed in the town.

Table 14.6 Peak hour parking accumulation at major parking locations

			Bus	Mini Bus	Car	Pass auto	Two-Wheeler	Truck	Mini Truck	Goods auto	Total (No of Vehicles)
1	Pandalam Jn to Mavelikkara road (Right side)	05.30 PM	0	0	4	34	22	0	0	0	61
2	Pandalam Jn to Mavelikkara road (Left side)	05.30 PM	0	0	11	6	43	0	0	1	61
3	Pandalam Jn to Adoor side (Right side)	04.30 PM	0	0	1	7	23	0	0	2	47
4	Pandalam Jn to Adoor side (Left side)	12.30 PM	0	0	25	2	10	1	0	0	38
5	Pandalam Jn to Kaippattoor side (Left side)	03.00 PM	0	0	7	5	30	0	1	0	43
6	Pandalam Jn to Kaippattoor side (Right side)	06.30 PM	0	0	13	5	25	0	0	3	46
7	Pandalam Jn to Chengannur side (Left side)(Pandalam Dharma Sastra temple)	01.00 PM	0	0	0	0	46	0	0	0	46
8	Pandalam to Chengannur side (Rigth side)(Pandalam Dharma Sastra temple)	01.00 PM	0	0	5	2	37	0	0	0	44

14.10 PEDESTRIAN VOLUME

Pedestrian surveys were conducted at major locations where the pedestrian cross movements were found to be high. Pedestrian movement is high around the central Junction, where the Bus Stations, Markets, shopping centers etc. concentrated.

Table 14.7 gives the peak hour pedestrian volume at various locations in Pandalam town. It could be seen that there were lot of pedestrian criss cross movements in front of KSRTC bus stand on Mavelikkara road to the tune of 618 movements during peak hour between 09.30 and 10.30 am in the morning. It was followed by 407movements in front of the Private Bus stand on MC Road area during morning peak period. There were 264 pedestrian movements at Adoor road in the Pandalam junction area. In the Medical Mission Junction area, the pedestrian

movements were 219 during the morning peak period. There were only 55 pedestrian movements at Kurampala junction in the evening peak period.

Table 14.7 Peak hour pedestrian cross movements at major locations

Sl. No	Name of location Peak time	Peak Time	No. of pedestrians		
			Up	Down	Total
1	Pandalam Jn (Chengannur side)	10.30 AM - 11.30 AM	213	194	407
2	Pandalam Jn (Mavelikkara side)	09.30 AM - 10.30 AM	326	292	618
3	Pandalam Jn (Adoor side)	10.30 AM - 11.30 AM	127	137	264
4	Pandalam Jn (Kaippattoor side)	08.15 AM - 09.15 AM	119	50	169
5	Kurampala Junction area	04.45 PM - 05.45 PM	37	18	55
6	Medical Mission Hospital Jn area	08.00 AM - 09.00 AM	34	90	219

14.11 CHARACTERISTICS OF INTER-CITY PASSENGER TRAFFIC.

14.11.1 Passenger trips and model split

The inter-city passenger transport in Pandalam town is predominantly met by different road based transport modes like, KSRTC buses, private buses, mini-buses, and a host of personalized vehicles like 4-wheelers, two-wheelers etc. In the study conducted by NATPAC, it is observed that an estimated1,41,776 inter-city passenger trips were performed in the study region on a reference day consisting of 37,035 bus passenger trips (26.12%), 36,018 car, van, jeep trips (25.40 %),

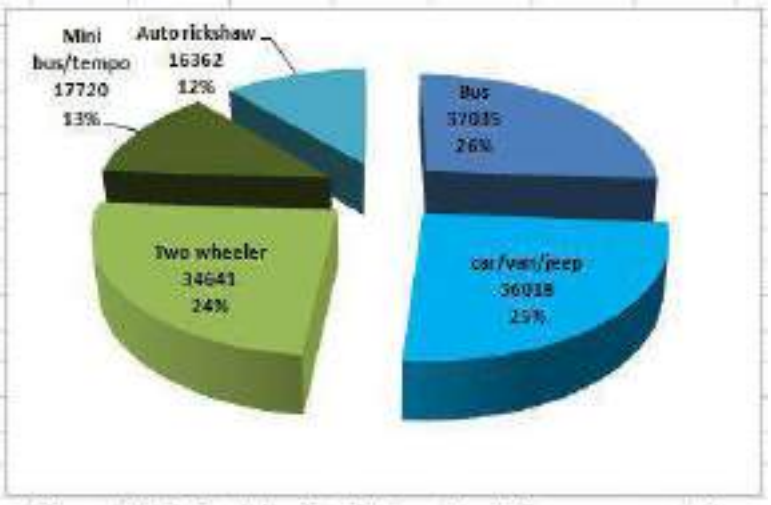


Figure 14.5 Model split of inter city daily passenger trips

34,641 Two wheeler trips (24.43%), 17,720Minibus/ tempo trips (12.50%) and 16,362 auto rickshaw trips (11.54%). It could be inferred that public transport had a significant role in meeting the inter-city passenger demand. The model split of passenger trip is shown in Figure 14.5.

14.11.2 Purpose of trips

The analysis of purpose of trips shows that, in Pandalam town, 46.81% of inter-city passenger trips were performed for work and work related purpose, which constituted almost half of the total inter-city passenger movements. This was followed by 17.7% personal business trips. 10.55% of the total trips were performed for back home purposes. Recreation purpose trips accounted for 8.63% of total passenger trips. Education trips constituted 5.6% of total passenger trips. Social trips were 5.53 per cent of the total passenger trips and 5.1 % of trips were for the shopping purpose. The purpose of passenger trips is shown in Figure 14.6.

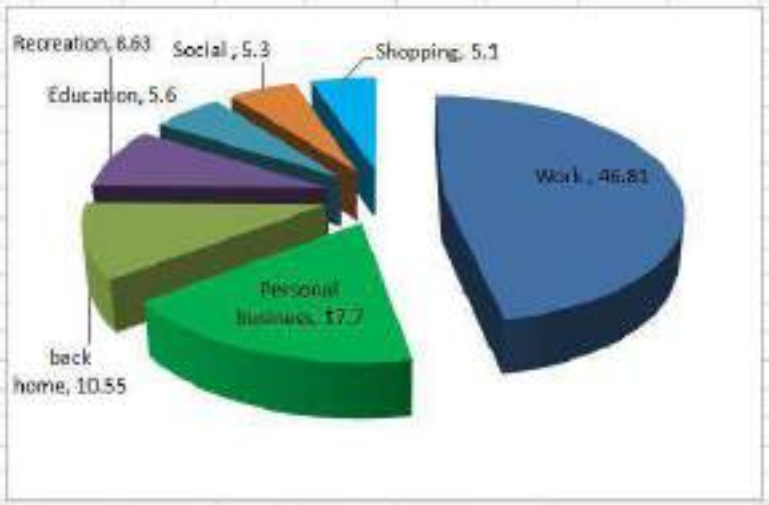


Figure 14.6 Purpose of visit

14.11.3 Occupation of passengers

The occupational characteristics of passengers were ascertained from the O-D survey. It could be seen that persons working in the service sector constituted the major segment (44 percent) of

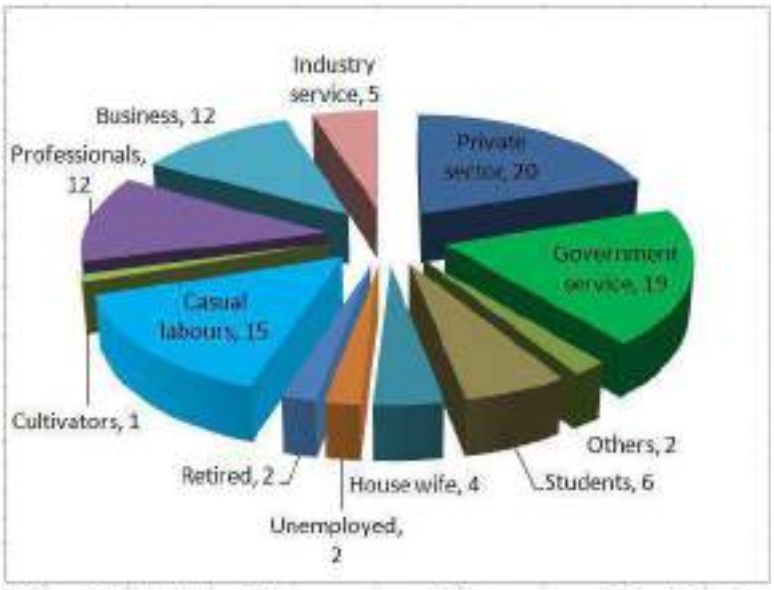


Figure 14. 7 Inter-city passenger trips - occupational status

the total inter-city travelers, of whom 20% in private sector, 19 per cent in the Government sector and 5 per cent in industrial sector. Self-employed people constituted 40 percent, of whom 12% each were Professional, and business peoples and 15% were casual laborers. Dependent population like unemployed, housewife, student and retired hands together constituted 13 per cent of the total inter-city passengers. The occupation of passengers is shown in Figure 14.7.

14.11.4 Pattern of intercity passenger trips

The O-D pattern of inter-city passenger traffic revealed that there were 44,240 internal - external trips (Study region to outside study region), out of 141,776 intercity passenger trips.

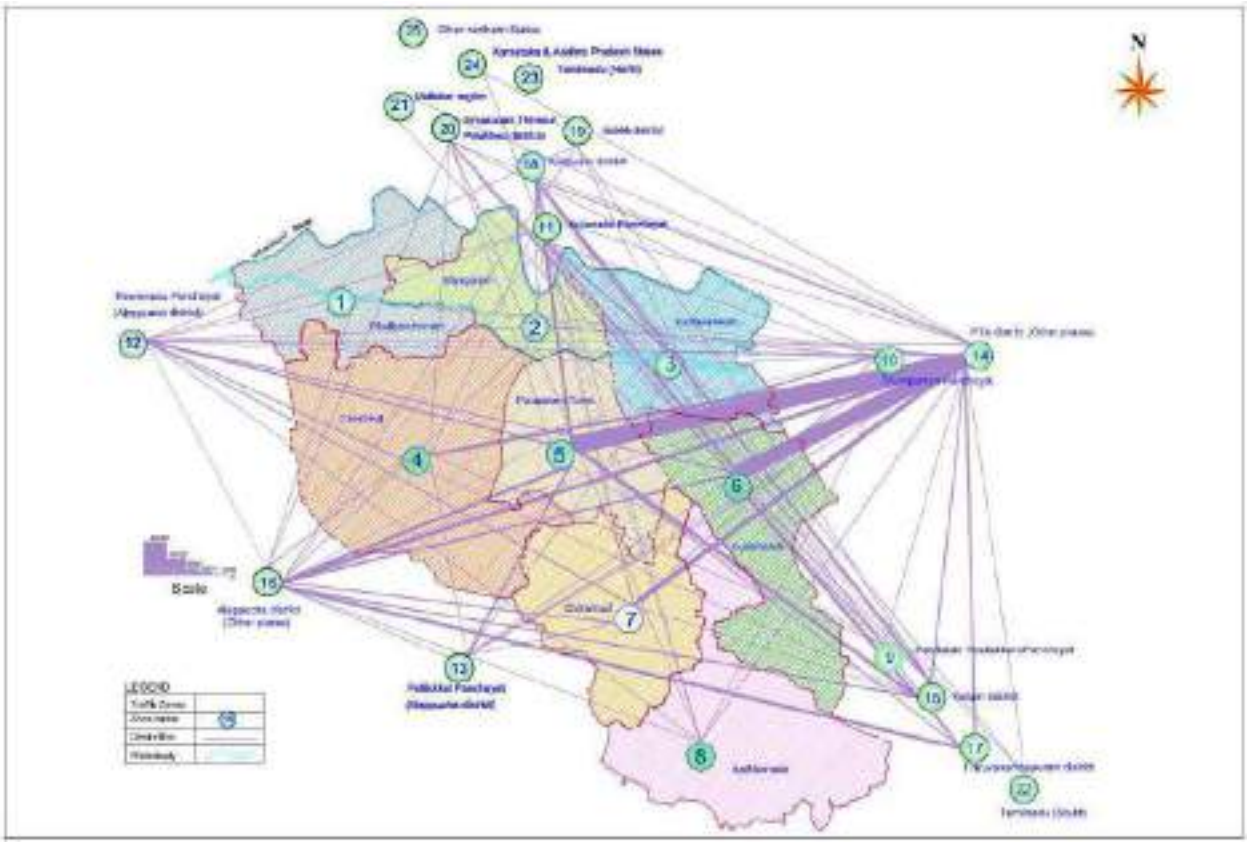


Figure 14.8 Inter-city passenger movement

They constituted 31 per cent of total trips. A total of 65,676 trips were external - internal trips (outside study region to study region) constituting 46.32 per cent of the total trips. External – external trips to the tune of 31,860 were performed through the study region and they were

22.47 per cent of the total trips. Intercity passenger movement is shown in Figure 14.8. Pattern of inter-city passenger trips details are given in Annex 14.1. The O-D Matrix of Passenger trips are shown in Annex 14.2.

14.12 INTER-CITY GOODS TRAFFIC

14.12.1 Modal split of goods traffic

A total of 8,006 goods vehicles were found to be involved in carrying goods traffic to and from the study region, consisting of 3,354 trucks 2,709 mini-trucks and 1,943 goods autos. The quantum of goods handled by these goods vehicles was to the tune of 17,170 tons. Trucks carried the maximum volume of goods traffic (53.08%), followed by mini-trucks (24.29%). The remaining 22.63 per cent of goods traffic was handled by goods autos. The model split of goods traffic is shown in Table 14.8 and Figure 14.9. OD survey details are provided in Annex 14.3.

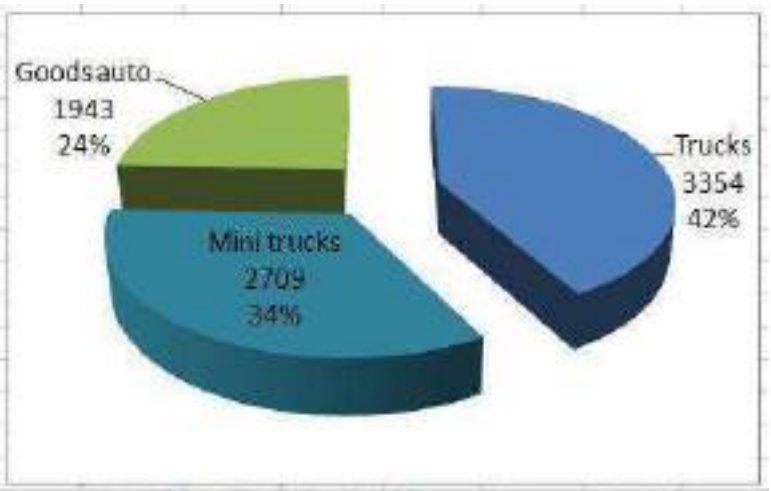


Figure 14. 9 Modal split of inter - city goods traffic

Table 14.8 Modal split of Inter-city daily goods traffic (in tones) of Pandalam town

Sl. No.	Mode of travel	No. of vehicles		Quantity carried	
		No.	Per cent	Tons	Per cent
1	Truck	3,354	**41.89**	9,114	53.08
2	Mini-Truck/ tempo	2,709	**33.85**	4,171	24.29
3	Goods Auto	1,943	**24.27**	3,885	22.63
	Total	**8,006**	**100.00**	17,170	100

14.12.2 Composition of goods traffic

Out of the 17,170 tons of inter-city goods traffic observed through outer cordon survey stations, maximum volume of 9,817 tons were observed in the case of construction materials including cement and timber (57.2%), followed by Agricultural products with 3,385 tons (19.7 %), 2,550 tons of Industrial goods (14.85 %), 1,112 tons of food grains (6.5 %), 205 tons of miscellaneous items (1.2%) and 97.6 tons of petroleum products (0.6%). Commodity wise distribution of goods traffic in tons is given in Annex 14.4

14.12.3 Pattern of Goods traffic movement

The pattern of goods traffic movement is shown in Figure 14.10. The maximum goods movement takes place between Pandalam town and other parts of Pathanamthitta district.

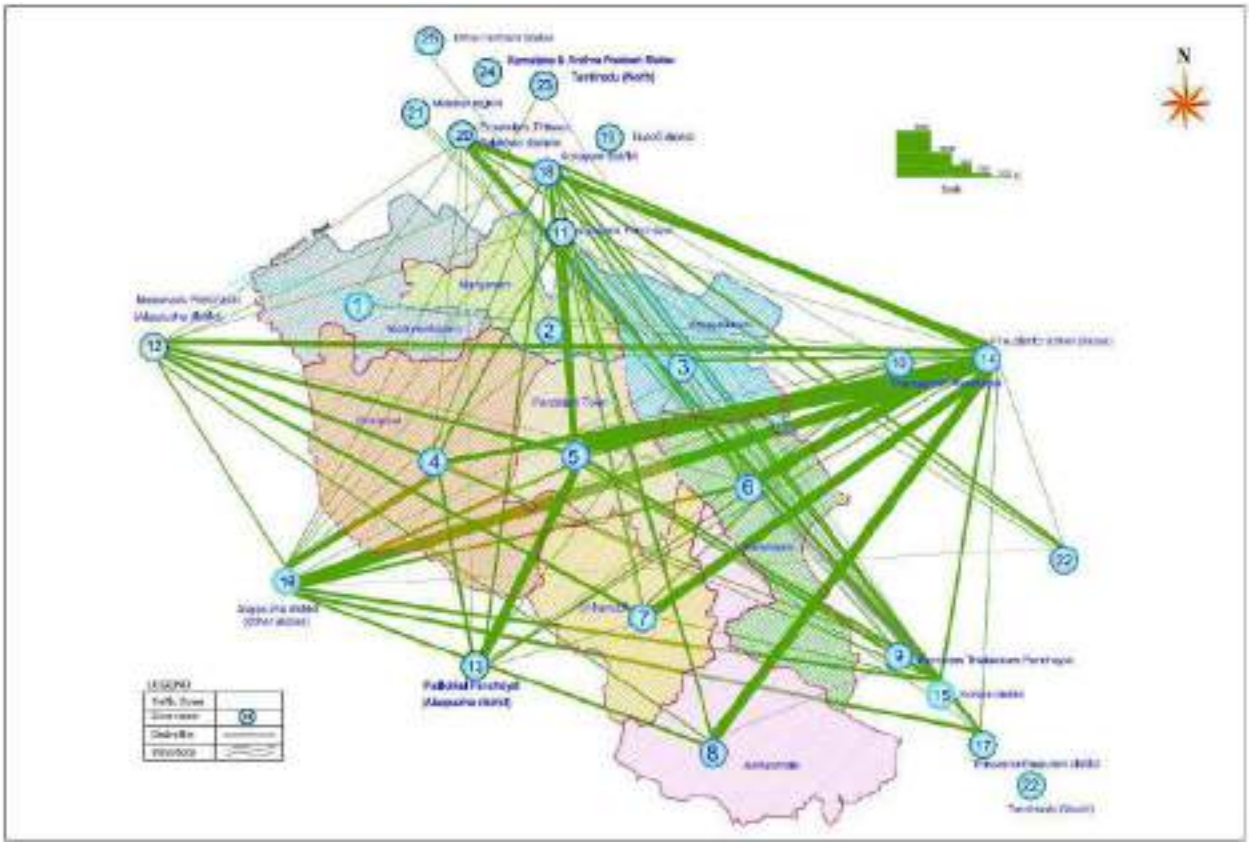


Figure 14.10 Inter-city goods traffic movement

14.13 PUBLIC TRANSPORT SYSTEM

KSRTC and Private bus operators provide public transport service in the town. Bus services are available through M.C.Road, Mavelikkara – Pathanamthitta Road and Pandalam – Kayamkulam Road. Average distance to the bus stops of various wards of the town is shown in Annex 14.5



KSRTC Bus station, Pandalam



Private Bus Stand ,Pandalam

14.13 BUS TERMINALS

The private bus terminal is located near the Pandalam junction. The entry and exit of buses to the terminal in the peak hour makes traffic congestion in the location. KSRTC bus stand is located near Pandalam market. Basic facilities for passengers are not available in these bus terminals.

14.14 PUBLIC TRANSPORTATION NET WORK

In the Socio – Economic Survey conducted in year 2013 details regarding the distace from houses to bus stop has been collected. Ward wise average distance to bus stop has been calculated. 0.50km has been adopted as a standared distance to the bus stop (Standard is derived from the IDDP/LDP experience, Kollam) and the percentage of households travelling more than that distance has been worked out. The details in this regard is shown in Annex 14.5.

Ward wise average distance to bus stop, ward wise percentage of people travelling more than 0.50km distance is shown in Annex 14.5.

14.15 TAXI STAND AND AUTO RICKSHAW STANDS



Taxi stand and Auto stand, Medical mission jn

Four auto rikshaw stand and two taxi stands are there within Pandalam town limit. More number of auto rikshaws and taxies are parked at stand adjacent to NSS Medical Mission junction.

14.16 CONCLUSION

The transportation system of pandalam town is limited to one mode ie,road ways. Major share of the traffic in the town is handled by M.C Road and Mavelikkara-Pandalam-Kaipattoor Road and the traffic volume of the roads exceed its capacity. Parking and pedestrian problem is experiencing in the central part of the town. Geometric deficiencies in four major junctions along MC road like Pandalam Junction, Medical Mission Junction, Kurampala Junction and Muttar Junction on Mavelikkara – Pathanamthitta road leads to traffic bottlenecks, Heavy pilgrim movements during Sabarimala season leads to traffic congestion, pedestrian and parking problems. Adequate infrastructural facilities are not available in the traffic terminals.

15. ENERGY

15.1 POWER DISTRIBUTION

Electric power to Pandalam town is distributed from Edappon 220 KV Sub station, the largest sub-station in central Travancore, which is located in Alappuzha district and about 7.00km away from the town. Initially this area was electrified in 1950s and the electricity was carried through the 11 Kv lines from Mavelikkara and Pathanamthitta substations. For improving the voltage, a new 33Kv sub station is proposed at Pandalam.


Edappon 11 KV Sub-Station

15.2 CATEGORY WISE CONNECTION

As mentioned in the previous paragraph, major portion of power supply to Pandalam Municipal town is coming from Edappon 220 KV Substation. The category wise connection and consumption details of Pandalam Municipality are discussed here. Distribution is done by dividing the Pandalam Electric section into two zones- Zone A and zone B. Categories wise

Table 15.1 Category wise electricity connection details

		Category wise break-No. of connections				
Number of consumers	Zones	Domestic	Industrial	Commercial	Agriculture	Others
	Zone –A	10550	199	1339	31	15
	Zone -B	9731	196	1960	22	19

Source: KSEB

Connection and consumption details are shown in Table 15.1 and Table 15.2. It includes connection in the area outside of Pandalam Municipality also.

Table 15.2 Category wise electricity Consumption (in MKWH) details

Total Consumption (MKWH)	Category wise break up of - Power consumption(MKWH)				
	Domestic	Industrial	Commercial	Agriculture	Others
Zone A	1755205	44038	332635	546	141695
Zone B	1912534	38912	475359	385	135300

Source: KSEB

More percentage of electric power (in terms of number of connections and consumption) is used for domestic purpose. Consumption for Industrial and Agriculture purpose is very less. It indicates low level of industrialization of the Town. The consumption details are shown in Figure 15.1.

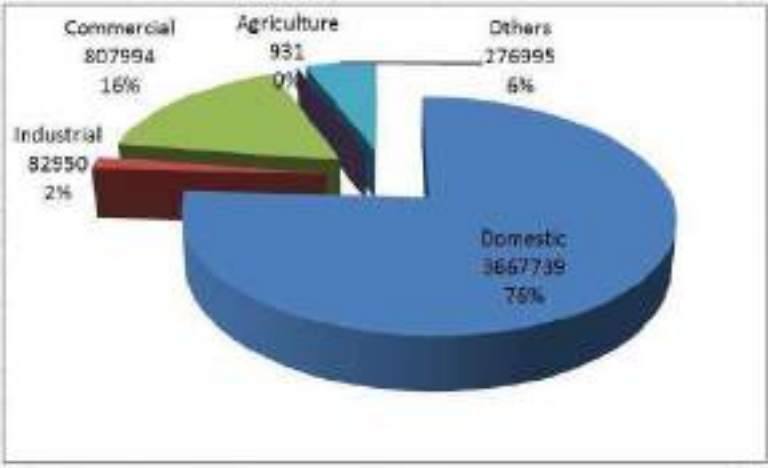


Figure 15.1 Category wise electricity consumption

15.3 LOCAL LEVEL ANALYSIS

As per the Socio-economic survey conducted in 2013, 97 % of houses of the town are electrified. The survey also revealed that 100 % of houses in the town are using conventional sources of energy and the use of non-conventional sources of energy is very rare in the municipality. Even though cattle farming is a predominant sector in the area but not explored the potential of gobar gas plants

In the local level analysis it is identified that, voltage problem and power interruption are the major problem in the town. Another problem identified is that absence of street lights in certain parts of the town and absence of separate line for street light.

15.4 DOMESTIC FUELS

The percentage of households using different category of domestic fuels is shown in figure 15.2. The survey reveals that 89.22% of households using fire wood as a fuel and 78.93% of households using LPG as domestic fuel. 67.66% of households are using both fire wood and LPG as fuels. Conventional source energy is mostly used and the usage of duel fuels is a common phenomenon of the town.

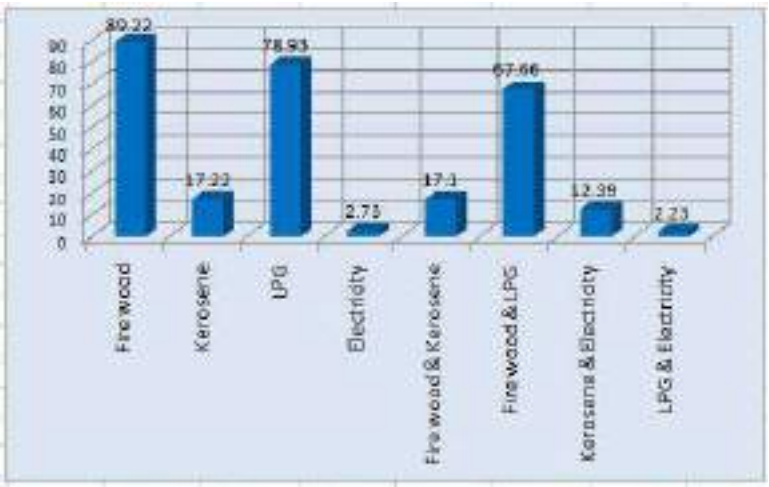


Figure 15.2. % of households using different category of fuels

15.5 CONCLUSION

Low voltage is a major problem in the town. Lack of street lights is another issue. Absence of separate street light line is creating problems in the functioning of the existing street lights. Importance shall be given for improving the quality of supply. Use of conventional source of energy like solar energy is not popular in the town and efforts shall be made to increase the use of non-conventional source of energy. Fire wood is still major domestic fuel in the town and it may be due to the rural character of major part of the town and its availability.

16. WASTE DISPOSAL

16.1 INTRODUCTION

Handling of solid waste is one of the major problems faced by the urban local bodies. Increase in the volume of urban waste is principally due to increasingly affluent life style, rather than urban growth. The main Solid Waste generation Sources are houses, commercial establishments, auditoriums, restaurants, hotels, lodges, markets, slaughter houses, schools & other institutions, hospitals, construction sites etc. The municipal solid waste productions continue to grow both in per capita and over all time. Assuming that 300 gm of solid waste is generated per day, the present quantum of solid waste generated will be about 12.50 tonnes.

16.2 SOLID WASTE COLLECTION SYSTEM

The collection of waste by the municipality is confined in public places and only part of the solid waste generated in the central part of the municipality is being collected and disposed by the Municipality. No agency other than Municipality is engaged in collection of solid waste. One mini truck and four workers were engaged in the collection of waste and another 14 workers are engaged with the segregation of solid wastes and a total of 18 workers are employed at the solid waste treatment plant as well as in the disposal yard.



Waste dumping space near Pandalam Market

The system for the transportation and disposal of waste is inadequate. The organic wastes received at the treatment plant are converted to manure and it is proposed to distribute through the agriculture department. Production of manure is on progress but the distribution through agriculture department is not yet started. The non-biodegradable wastes (collected from the streets within town area) are simply dumped at the yard without treatment, leading to environmental problems.

The regular sweeping areas are mainly the town centre area. During segregation, plastic wastes are segregated and crushed using machines. But the system is not functioning properly. In the interior area of the town only mass cleaning is being done on demand basis. There is no secondary storage space for solid waste.

16.3 WASTE DISPOSAL SYSTEM

16.3.1 Waste Treatment Plant

A solid waste collection and treatment plant is functioning in the Municipality. This unit was established on 26th August 2013 and is located nearer to the main market. The solid waste is collected from town, roads, markets etc. The waste coming to this plant is more than the capacity of the existing treatment plant. Improper working of the plant create bad odor in the surrounding area. Bio wastes are treated in the plant and convert it to fertilizers as well as biogas. Plastic recycling unit is also functioning here.



Solid waste treatment plant

16.3.2 Socio Economic Survey

In the Socio-Economic Survey conducted by the Town and Country Planning Department, 99 % households reported that they are disposing the solid waste in their own compound, and the remaining 1% in the open ground. No one is disposing the waste in street and Garbage bin. The share of places of disposal is shown in Figure 16.1.

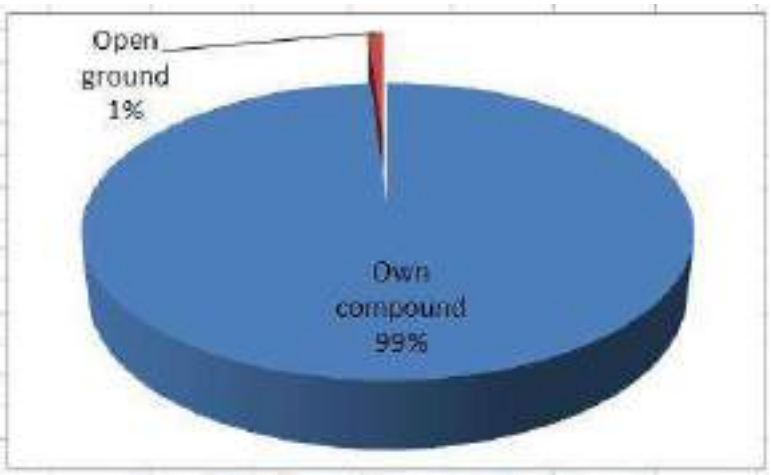


Figure 16.1 Place of disposal of solid waste

16.4 DISPOSAL OF BIO MEDICAL WASTES

No system managed by the Municipality is there for collection and disposal of bio-medical wastes from the Hospitals functioning in the town. They are depending on a private agency (IMAGE, Palakkad) for collection and disposal of bio-medical waste.

16.5 SANITARY WASTES

Sewerage network and sewage treatment plant is not available in the Municipality. Pandalam junction areas as well as pilgrim rest grounds are cleaned periodically by Municipality. Lack of sewer lines in the area causes flooding up of sewage and causes lots of difficulties as well as threats to the pedestrians. Sewerage network is essential in the central areas of the town.

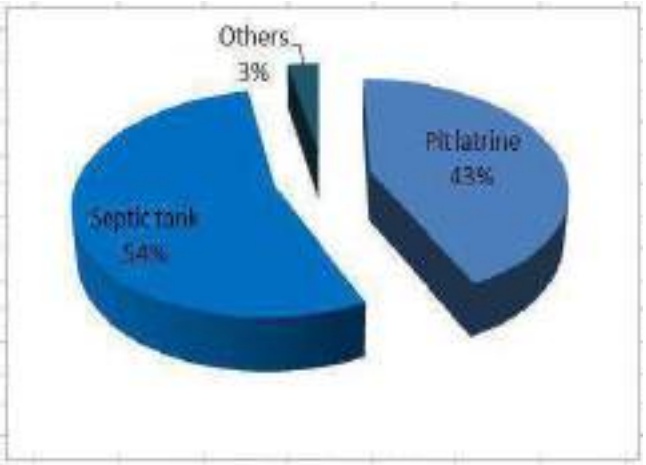


Figure 16.2 Method of disposal of Sanitary waste

As per the Socio-economic survey conducted by the Town and Country Planning Department, 95 % of houses have some sort of sanitation system and 5% of houses in the town do not have any sanitation system. In the survey it is also inferred that 54% of houses have septic tank, 43% of houses have pit latrine and 3% of houses adopting other system for the disposal of sanitary wastes. It is represented in figure16.2 and the analysis shows that better Sanitation system is available for the houses in the town

16.6 DRAINS

Drainage system is available only near major intersections. Covered as well as uncovered drainage systems are there. But there is no proper maintenance or cleaning. Accumulation of water in the drains causes accidents as well as pollution.

16.7 PUBLIC COMFORT STATIONS

The availability of Public toilet / comfort station is very less in the town and at present only three Public comfort stations – at Pandalam market, KSRTC Bus station and Private Bus Stand. But it is not functioning properly. More public Comfort Stations are to be provided at different parts of the town.

16.8 OTHER PROJECTS

16.8.1 Electronic Toilets/ E-Toilets

E-toilets are pay and use toilets. It was established near private bus station. Now it is not working properly due to the absence of uninterrupted power as well as water supply.



16.8.2 Mobile Sanitary Wagon

The mobile sanitary wagon is established by District Suchithwa Mission Pathanamthitta. This unit mainly intended for the cleaning operation during Sabarimala pilgrim season. But it is not functioning now.



Mobile Sanitary Wagon

16.9 CONCLUSION

Solid waste is mainly collected from public places in the central area and the available system for collection and disposal of wastes is very weak. A small solid waste management plant is working within Pandalam market. A small scale biogas plant is also working there. 95% of houses in the town have some form of sanitation system and 54 % of houses have septic tanks. Major portion of the municipal area has rural character and disposal of waste is not a major issue in peripheral area. But more attention is needed in the central part of the town.

17. EDUCATION

17.1 INTRODUCTION

In the earlier stage of history, education in Pandalam starts from Pandalam palace. The palace is not only the residence for the King but also it act as a place which promote study and research on art, Malayalam and Sanskrit literature. The first Government School in Pandalam was started near Thonnallor Devi temple and it was a UP school established in the year 1872. This school is functioning properly even now with around 200 students and 10 teachers. Pandalam Block Resource centre is also functioning in this school compound. A number of educational institutions were established in the earlier part of 19th century in Pandalam. The other schools in public sector are Government UPS Pozhikadu (Established in 1916), Government LPS Thottakkonam (Established in 1915), Government HSS Thottakkonam (Established in 1915), MTLPS Mudiyoorkkonam (Established in 1905), Government SVLPS Cherikal (Established in 1913), Government LPS Kurampala (Established in 1913) and Government LPS Kadakkadu (Established in 1927). Among this Government SVLPS Cherikal school was visited by our father of nation Mahatma Gandhi in 1932.

17.2 GENERAL EDUCATION STATUS

The general education status is assessed based on the literacy rate, number of educational institutions per one lakh population and educational status. The literacy rate of Pandalam Municipality as per 2011 census is 96.73 %. The literacy rate of Pathanamthitta District and Kerala State are 96.55% and 94% respectively. The literacy rate of Pandalam Municipality is higher than the district and state literacy rates. Another comparison is made with district urban literacy rates. The urban literacy rate in Pathanamthitta district is 96.9%, which is slightly greater than that of Pandalam Municipality. There is enough number of educational

institutions. The percentage of people with different qualification is shown in Table 17.1. It is also represented in Figure 17.1.

Table 17.1 Educational status of Pandalam Municipality

Type	Literate	Primary	High School	Pre-degree	Degree	Post Graduate	Technical	Professional	Others
Percentage	1.7	20.41	38.32	13.82	10.58	4.05	7.16	3.2	0.75

From the above table and figure, it can be observed that 20.41% of the total people have only primary education, 38.32% of people have high school education and 13.82% of people have with pre degree qualification. The remaining 25.74% possess degree or higher qualification. The above analysis shows that Pandalam has comparatively high literacy rate and the educational qualification of the people is also high. It indicates the high educational status of Pandalam Municipality.

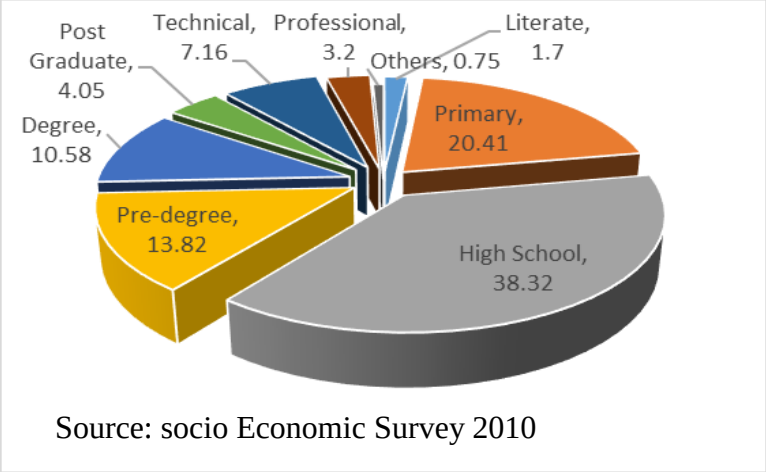


Figure 17.1 Educational status of Pandalam Municipality

17.3 SCHOOL EDUCATION

17.3.1 General details of school

The details of the schools in the Municipality, i.e. number of students, number of teachers syllabus (upto HS) sectors like government aided unaided, unrecognized, facilities available, established year etc. are shown in Annex 17.1. There are 23 schools functioning at

Pandalam municipality. N.S.S Boys high school, N.S.S Girls high school, N.S.S English Medium UP School and Govt. UP School, Pandalam are situated in the central area of town. The number of Schools in various levels is shown in Table 17.2.

Table 17.2: Number of schools in various levels

Category	Primary(upto 7th Std)	High School	Higher Secondary School
No. Of Schools	14 (1 UPS, Poozhikkad)	5	4

17.3.1 The ownership of schools

The ownership of schools in Government sector and private sector of various category is shown in Figure 17.2. In the case of Higher Secondary Schools, one school (Thottakonam HSS) out of 4 schools is functioning in Government sector. In the remaining 3 private schools, one is aided school and the other 2 are unaided.

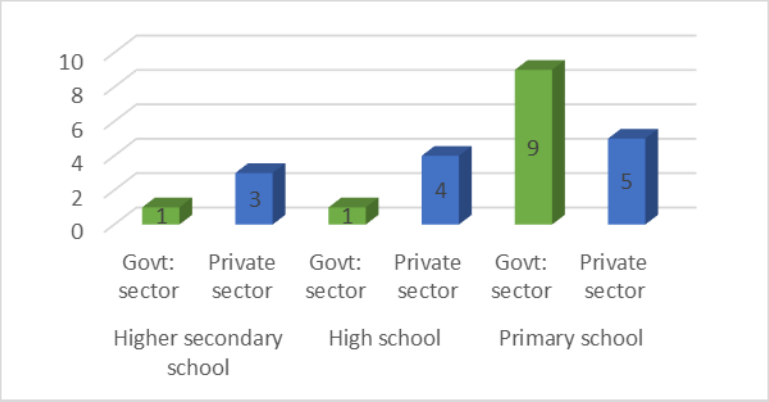


Figure 17.2 Percentage of schools in Government and Private sector

Similarly out of 5 high schools in Pandalam Municipality only one school (Govt.H.S.Thottakkonam) is functioning in the Government Sector. In the remaining 4 private

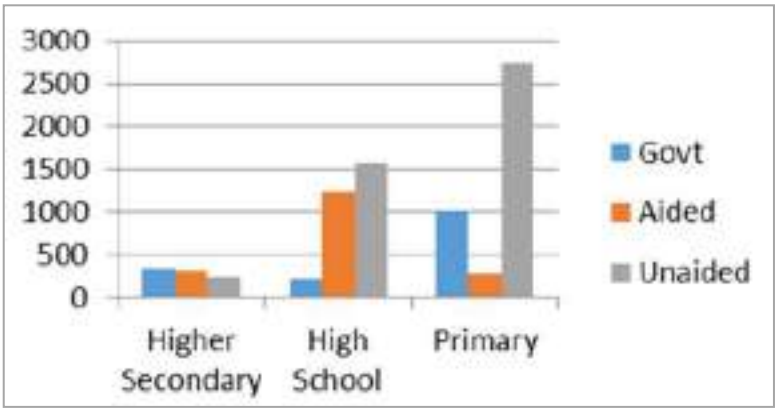


Figure 17.3 No. of Students in various categories of Schools

schools, 2 are aided and 2 schools are unaided. In the case of 14 Primary Schools, 9 Schools are functioning in Government sector and 5 schools are functioning in Private sector. Also in the above 5 private sector schools, only 2 are aided schools and the remaining 3 are unaided schools. This shows the predominance of private sector in the school education in Pandalam Municipality. In high school and higher secondary school section there are only one school each in Government sector most of the student depends either aided or unaided institutions.

But in Primary section most of the students are studing in Government schools. But in the case of private sector students in unaided schools is greater than that of aided schools. Number of students in three categories of schools in Primary, high school and higher secondary categories is shown in Figure 17.3.

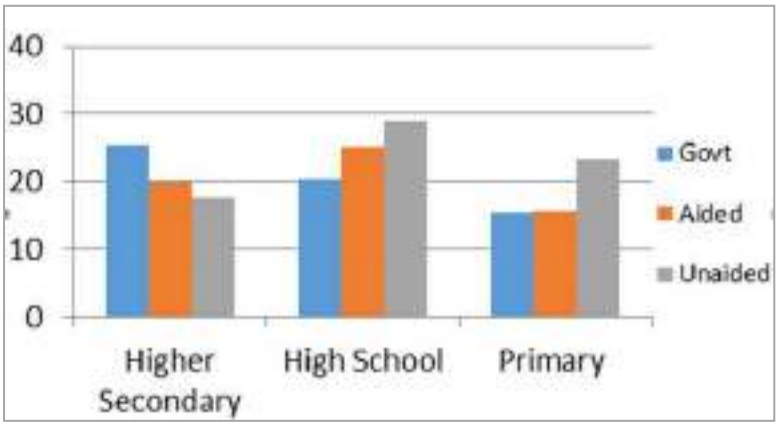


Figure 17.4 Student –Teacher ratio of school

The student teacher ratio of schools of the town in is shown in the Figure 17.4. It can be observed that in Higher Secondary School level the ratio in Government School is comparatively greater than that of aided and unaided schools. In high school level the ratio of unaided school is greater than that of the other two. Also in Primary level the ratio of Government and aided are same but the ratio of unaided school is greater.

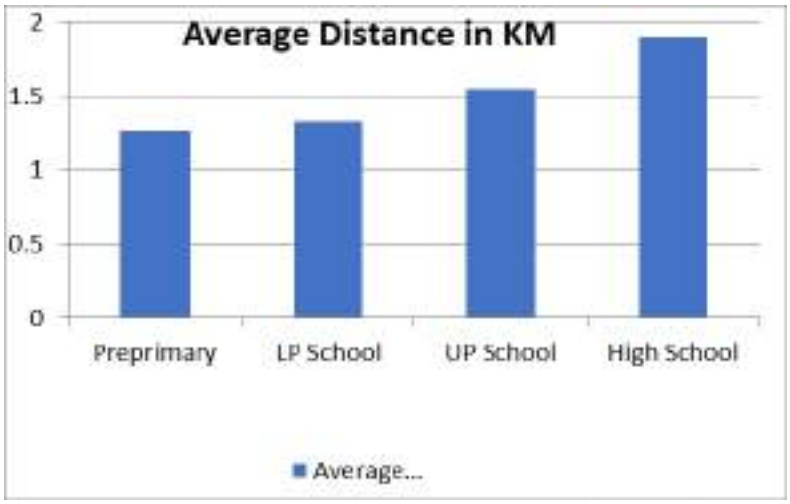


Figure 17.5 Average distance to schools

Out of 23 schools functioning the town 18 schools are following Kerala Syllabus, 4 schools following CBSE syllabus and 1 school following NCERT syllabus. Regarding facilities available at schools the infrastructure facilities like playground, separate toilet for girls, computer lab, internet facilities, drinking water facilities, good road etc were considered. It shows that except playground, computer lab, internet facilities and transportation facilities most of other facilities are available in all schools. Generally in Government schools, the facilities are less, when compared with aided and unaided schools. The teacher- student ratio of the school is shown in figure 17.4 .Basic facilities are available in most of the schools. But advance facilities like computer lab and internet facilities are absent in a number of schools, especially in Govt. Schools. Availability of facilities at school wise are shown in Annex.17.2

The availability of facilities (distance to educational institutions) of various categories of Schools has been analysed. As per socio-economic survey the average distance to pre-primary schools, LP Schools, UP School and high school are 1.26k.m. 1.33 km, 1.55 km and 1.89 km respectively. It is represented in Figure 17.5..

The distance to various categories of schools is compared with certain standards. The adopted standards bases on studies related to preparation of IDDP and LDP in Kollam district are the pre-primary schools, lower primary schools, upper primary schools and high schools shall be available within a distance of 1.5, 0.5, 1 and 3 km respectively. The percentage of people saying that distance to different category of schools is greater than the standard is shown in figure 17.6. The figure shows that in case of pre-primary schools, lower primary schools and upper primary schools the travel distance is more for a major percentage of students. Even though there are sufficient numbers of schools in the town, they are concentrated at certain

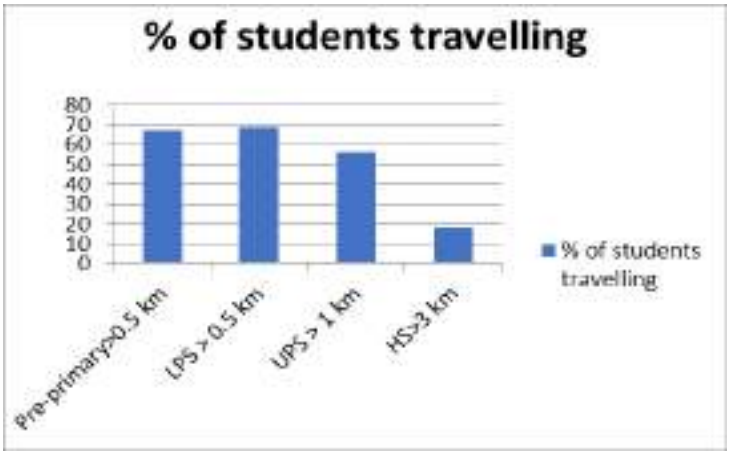


Figure 17.6 Distance to school

part of the town. The selection of school by the beneficiaries is based on the standard and the syllabus followed in the school. This may the reason for increase in travelling distance to school.

17.3.2 Spatial distribution of schools

The ward wise average distance to LP school, UP school and High school and its comparison with adopted standards are shown in Annex 17.3. The average distance to LP school is varies from 0.5 to 2.96 Km, the average distance to UP school varies from 0.9 to 3.21 km and for High school it is varies from 0.84 To 4.73 Km.

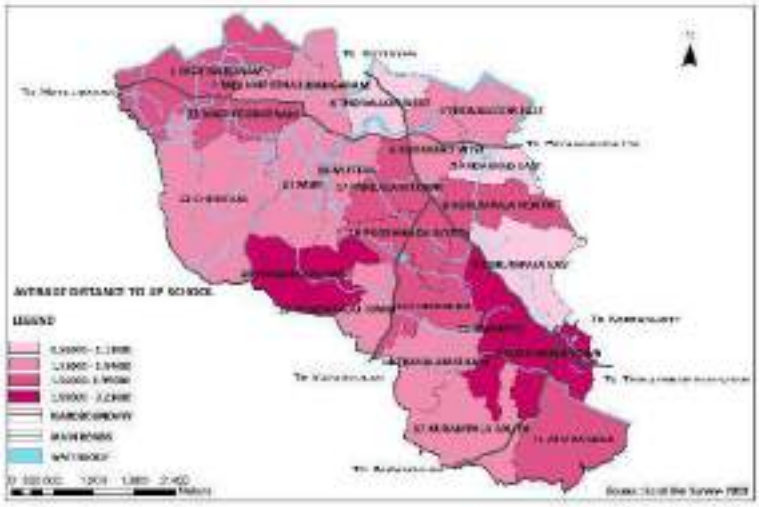


Figure17.7 Average Distance to LP school

The average distance to LP school is more in Poozhikkadu West, Edayadiyil and Kurampala town. Similarly the average distance to UP school is more in Cherickal, Poozhikkadu West, Edayadiyil and Kurampala town and in case of High school it is more in Cherickal, Poozhikkadu west, Edayadiyil , Poozhikkadu town and Kurampala town. The average distance to LP, UP and High school are shown in

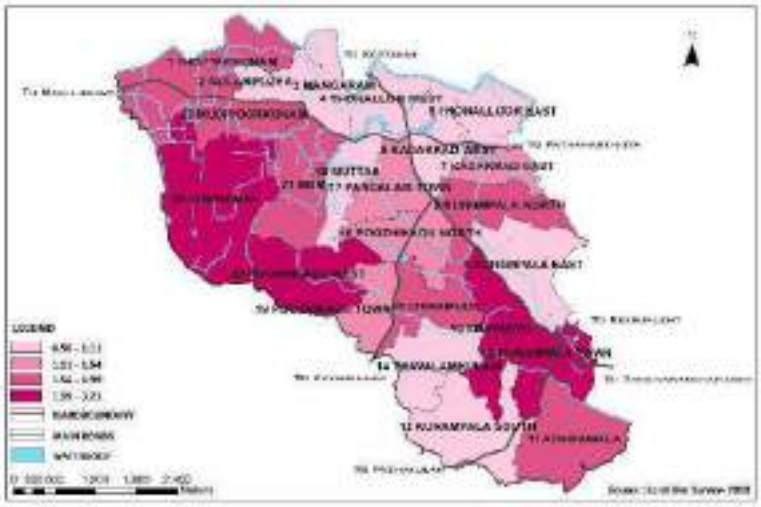


Figure 17.8 Average Distance to UP school

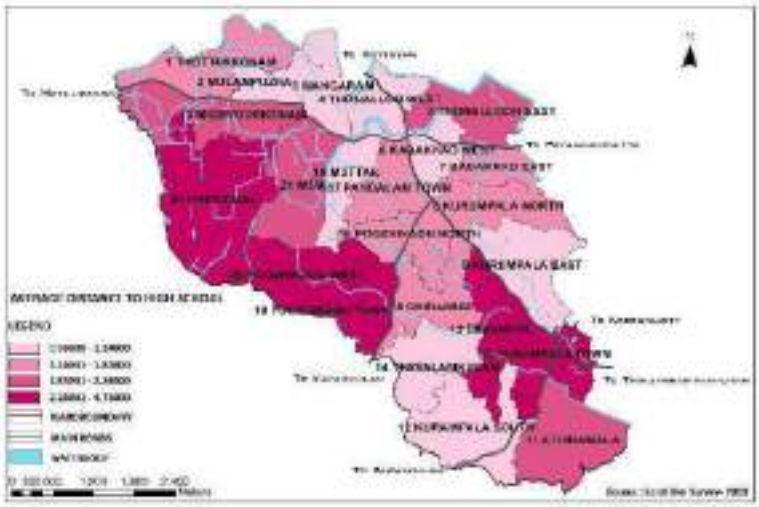


Figure 17.9 Average Distance to High school

the Figures. 17.7,17.8 and 17.9 respectively.

The standard adopted is that it desirable to have an LP school within a distance of 0.50 km a UP school within a distance of 1.00 Km and High school within a distance of 3.00 Km.

17.4 HIGHER EDUCATION

The only Arts and Science college in Pandalam town is N.S.S College, Pandalam which is located at town centre. N.S.S. College, Pandalam is one among the three earliest premier institutions of higher education establised in 1950. This college is affiliated to Kerala University. Majority of the students in Pandalam Municipality and nearby Panchayats depend the college. The course offered in this college is BA, B.Sc, B.Com and MA, M.Sc, M.Com.about 2000 students are studying in this college.

Table 17.3 Details of major Arts and Science college

Sl No	Name of College	Location	Number of students (course wise) UG			Number of students course wise (PG)			Govt/ Aided/ Unaided
	N.S.S College, Pandalam	Pandalam	BA	B.Sc	B.Com	M.A	M.Sc	M.Com	Aided

17.5 OTHER EDUCATIONAL INSTITUTIONS

Mannam Ayurveda Co-operative medical college offers BAMS course with 60 seats per year. It is located in the old Mannam sugar mill compound which is not functioning now. N.S.S Training College is the only technical education institution functioning in Pandalam Municipality. This training college is located at Pandalam Town. N.S.S training college is affiliated to Kerala University. The courses offered in this training college are B.Ed and M.Ed.

One Govt. ITI (SCDS) is functioning at Cherickal, Pandalam. The course offered in this ITI is NCVT Plumber Trade. The Private sector consists of Micro College of Engineering, Computer Tech, Private ITI which provide classes for Electrical and welding.

Chitra School of nursing at Kadakkadu and Chitra College at Kurampala are the two nursing institutions functioning at Pandalam municipality. General Nursing and midwifery are the courses provided at Chitra School of nursing, Kadakkadu. B.Sc. Nursing is the course offered at Chitra College of nursing, Kurampala.

Also there are several educational institutions in private sector they are NCPT at Pandalam, OK's College, Grand College, Engineering tuition institutes, Inspire Engineering Academy and Promise Career Guidance Centre. The courses offered in NCPT, Pandalam are BBA, BCA, B.Sc., AME and Fire and safety engineering. In OK's College and in Grand College there are classes for B.Com and M.Com in addition to tuition classes.

Computer centre of India is the Computer training centre at Pandalam Municipality. N.S.S Computer centre at Pandalam is at Co-operative sector. Besides there are many private computer training institutes functioning. Different types of job oriented courses are offered here. Some of the computer centres are soft tech computers, G.Tech computer education, IDEAL Computers, Mody computers, PAN institute of information technology, Micro College and Professional studies Academy. Also job oriented coaching centres and PSC coaching Centres like Brilliance college is at Pandalam Town. Also day care centre, dance schools, music schools, entrance coaching centres, yoga centres are functioning in different place in Pandalam Municipality.

In addition to that a farmers training centre is functioned at Agricultural Farm, Kadakkad. The services provided from here are Tractor operator training, training for coconut tree climbing, mechanization training for various agricultural instruments. Also training is given for organic farming vegetable cultivation, kitchen garden and terrace cultivation. Details regarding the other educational institutions are shown in Annex 17.4.

Table 17.4 Details of major technical education institutions

Sl No	Name of College/Institution	Details of ownership	Location	courses offered		Number of students
1	Mannam Ayurveda Co-operative Medical College	Nair Service Society	Pandalam	BAMS		60
2	N.S.S. Training College, Pandalam	Nair Service Society	Pandalam	B.Ed		150
				M.Ed		25
3	School of Nursing, Chitra Multi Speciality Hospital	Partnership	Kadakkad	General Nursing and midwifery	II GEN	8
					III GEN	16
					IV GEN	14
4	College of Nursing Chitra Multi speciality Hospital	Partnership	Kurampala	B.Sc Nursing	I	37
					II	28
					III	26
5	Govt. ITI (SCDS), Pandalam	Govt	Cherickal	NCVT, Plumber Trade		21

17.6 CONCLUSION

The town has high literacy rate and educational standard. The facilities of many Government schools are not fully utilized. The land and infrastructure facilities available can be utilized for starting education institutions for the future generation. In primary and high school level more, number of students are studying in unaided schools. But in higher secondary level more students are studying in Government school. Majority of schools are following state syllabus. Infrastructural facilities and educational standard in Government and aided schools are comparatively less and this attracts more people to the unaided schools. Travel distance to the schools in primary level and upper primary level is higher than standard.

18. HEALTH

18.1 INTRODUCTION

In this chapter the existing systems of medicines are analyzed. Institutions in three system of medicine, i.e. Allopathy, Ayurveda and Homeo are functioning in the town. The existing status of medical facilities, major diseases reported in the town etc. is discussed in the subsequent paragraphs.

18.2. ALLOPATHIC SYSTEM OF MEDICINE

List of hospitals in Allopathic system of medicine functioning in the town is shown in Table 18.1. The institutions in Allopathic system are functioning both in Government and Private sector. PHC Pandalam is the only allopathic medical institution in Government sector. This PHC has OP facility with 2 doctors including 1 NRHM doctor.

Table 18.1 Details of Allopathic Hospitals

Sl.No	Hospitals	No. of beds	No. of Doctors
1	NSS Medical Mission Hospital, Pandalam	180	17
2	Arpitha Hospital, Muttar	0	1
3	R.R Clinic, Mangaram	10	1
4	Jaya Clinic, Mudiyoorkkonam	0	1
5	Chitra Multi specialty Hospital, Pandalam	117	12
6	Parayil SM Hospital, Pandalam	6	1
7	Appollo Hospital, Pandalam	8	1
8	Christian Mission Hospital, Pandalam	100	28
9	PHC, Pandalam	0	2
10	Koshy's Clinic, Thonnallur	0	1

All other allopathic hospitals are functioning in private sector. The General Hospital, Adoor is the nearest major hospital in Government sector. Details are given in annex 18.1 and 18.2.

18.3 INDIAN SYSTEM OF MEDICINE (AYURVEDIC SYSTEM OF MEDICINE)

Mannam Ayurveda Co- Operative College Hospital is the only Ayurvedic Medical College in Pathanamthitta District, which is situated at M.S.M ward in Pandalam Municipality. This Medical College was started in 2005 is functioning in Co- Operative sector. It has about 100 beds and 45 doctors. The Government Ayurveda Dispensary at Kurampala, Pandalam is the only government institution in this system. Changethu Ayurveda Hospital near Medical Mission junction Pandalam, which is functioning in private sector with a bed strength of 20 and service of one doctor. Also there are 12 Ayurvedic dispensaries in private sector functioning in different parts of the town and services of about 16 doctors are available there. In addition to the above institution an Ayurvedic medical pharmacy unit (medicine manufacturing) in private sector is also functioning in the town, with the service of two doctors. Details of bed strength in different sectors are shown in Figure 18.1. Details of institutions in Ayurvedic system of medicine is given in Annex 18.3.

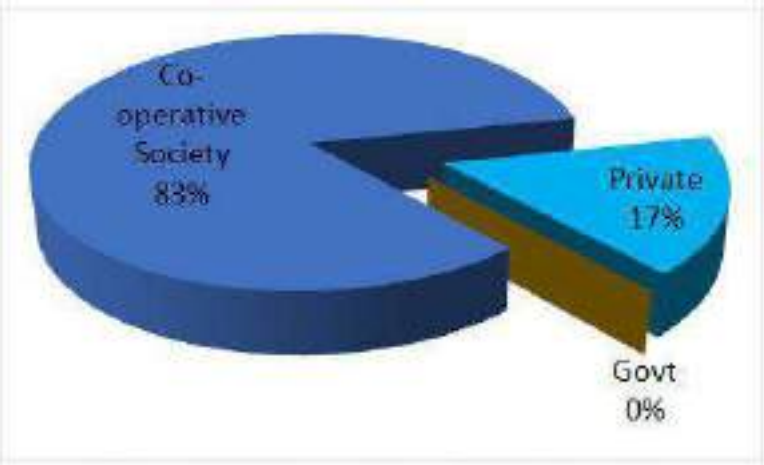


Figure 18.1 Comparison of bed strengths

18.4 HOMEOPATHIC SYSTEM OF MEDICINES

In Homeopathic system of medicine, dispensaries including one in government sector are functioning at different part of the town and services of 7 doctors are available in these dispensaries. No higher order facilities are available in this system of medicine. In Government

Homeo Dispensary Pandalam, a project named "Seethalayam" is implemented for ladies and teenage girls who are facing different mental and physical problems. This project helps to obtain proper counseling, treatment and legal advice to these ladies. Also Homeopathic department is selected some schools for the implementation of "Jyothirgamaya" project. This project suggests treatment and counseling of students who are suffering from mental and physical disorders. Details of institutions in Homoeopathic system of medicine is given in Annex 18.4.

Table18.2 Details of Institutions in Homeopathic System of Medicine

Sl. No	Name of hospital	Location	Category	No. of beds	No. of Doctors	Sector
1	Govt. Model Homeo Clinic	Muttar	OP Only	Nil	1	Govt.
2	Upasana Hospital	Kurampala	OP Only	Nil	1	Private
3	AyyappaHomeo Clinic	Kurampala	OP Only	Nil	1	Private
4	PreethyAleyamma John	Pandalam	OP Only	Nil	1	Private
5	Medinova Clinic	Pandalam	OP Only	Nil	1	Private
6	AthiraHomeo Clinic	Mangaram	OP Only	Nil	1	Private
7	Sumithra Kumar	Kadackadu	OP Only	Nil	1	Private

18.5 SPATIAL DISTRIBUTION OF MEDICAL FACILITIES

Distances to a Medical facility and hospital have been assessed in the Socio- Economic Survey conducted by the Town and Country planning Department. In

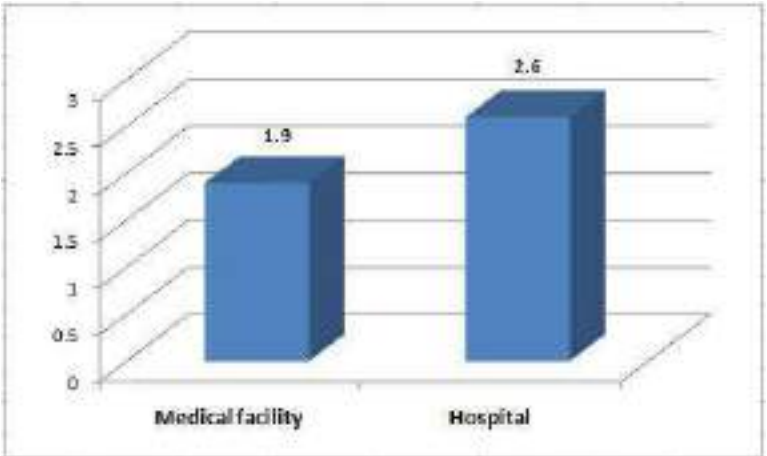


Figure 18.2 Spatial distribution of medical facilities

the survey, it is found that the average distance to a medical facility is 1.9 km and to a hospital is 2.6 km. The distance to the hospital is further analyzed by assessing the percentage of households with travel distance more than 5.00km. It is found that for 84 % of households has hospital facility within 5.00km distance and only 16 % have to travel more than 5.00km for hospital facility.

18.6 MAJOR DISEASES

In the Socio Economic Survey conducted as part of preparation of Master Plan, details regarding major diseases occurred in the town during the past years have been collected. Dengue fever was reported as the major disease of the town during the last years. The diseases and the prominent locations are given in Table 18.3.

Table 18.3 Diseases and prominent

Name of the Disease	Prominent location
Dengue fever	Poozhikkad, Kurampala, Pandalam, Mudiyoorkonam, MSM P.O.
Hepatitis A	Pandalam, Kurampala South
Hepatitis B	Kadakkad, Pandalam, Kurampala
Malaria	Muttar, Kurampala
Leptospirosis	Poozhikkad

18.7 CONCLUSION

The major Medical Institution in the town in terms of number of patients and availability of doctors and departments is NSS Medical Mission Hospital, Pandalam. Only one PHC, one Ayurveda clinic and one Homeo dispensary are functioning in the government sector and the people has to depend the government institutions in the neighbouring towns for higher order facilities. The facilities in the government sector needs to be improved. Sufficient bed strength as per standards is available at NSS Medical Mission Hospital and Christian Mission Hospital in the town. NSS Medical Mission Hospital is the major hospital in the town and almost all major departments functioning there. Dengue fever was reported as the major disease of the town during recent years. More concentration is needed on public health and preventive aspects of communicable diseases.

19. RECREATION FACILITIES&CIVIC AMENITIES

19.1 INTRODUCTION

Recreation is an essential part of human life and finds many different forms which are shaped naturally by individual interests but also by the surrounding social construction. Public space such as Parks and beaches are essential venues for many recreational activities. Tourism has recognized that many visitors are specifically attracted by recreational offerings. Recreation-related business is an important factor in the economy. 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.

19.2 RECREATION

Only limited facilities, that also in lower scale for recreational purposes of the people is available in the town. The total land use coming under Park and Open Space in the town is 0.78 square km, which is 2.74 % of total town area.



Pandalam Palace

Pandalam palace and its precincts are the main attraction of the town. Another attraction of this spot is the presence of Achankovil River and the hanging bridge across it.

There is potential for boating in the river and it is to be exploited. In 1932 Mahathma Gandhi our father of nation visited the Government SVLPS Cherikal School in Pandalam. No park is functioning in the town for active recreation. The Play grounds associated with schools are the available open space of the town. People depends adjacent towns Adoor and Chengannur for the recreational purposes.

19.3 TOWN HALL, AUDITORIUMS

There is no town hall in Pandalam municipality. But few private auditoriums are there in the town.

19.4 STADIUM/ GROUNDS

There is no stadium or open grounds in the town for sports activities or conducting fests etc. Land has been acquired near Kadakkadu junction for Municipal stadium. Facilities like open air theatre or swimming pools are also not available in the town. Play grounds are available with most of the schools in the town.

19.5 RELIGION, CULTURE

There are 29 temples, 15 churches and 6 mosques within the town limit. Among these Puthankavil Devi temple is famous for “Adavi” festival. Kadakkadu mosque is the oldest mosque in Pandalam. Thalayanadu church is the most famous among the churches in Pandalam. Pandalam have some ritualistic importance in religious as well as cultural aspects. Like Thiruvabharanam procession to Sabarimala etc. the presence of Pandalam palace gives a heritage importance to the place.

Pandalam is the land of many famous personalities. Pandalam Kerala Varma, artist V. S. Valiathan and S. Jithesh- World's Fastest Performing Cartoonist is the few among them. But no

cultural centre is functioning in the town.There are 7 libraries functioning in the town. Public library is the most important and large library among them.

19.6 CONCLUSION

No town hall is present in Pandalam Municipality. Only lower order recreational facilities are available in the town. 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 for sports, open ground and a town hall for conducting different cultural activities and fests are also needed. Small grounds at neighborhood level are also needed. A cultural centre is also needed for the town.

20. SOCIAL WELFARE, SECURITY

20.1 INTRODUCTION

The security of the weaker section of the society ie, children, women and aged people has been emerged as a major sector in the planning process. In the changed social structure of the society, these sections of the society need special attention. This chapter contain the analysis of the present status of weaker section of the society namely women, children, old aged people and scheduled cast people. The safety aspects of the town are also discussed in the chapter.

20.2 WOMEN

As per 2011 census, out of total population of 43,457, the number of female in the town is 23265, which is 53.53% of total population. It is shown in figure 20.1. A few working women's hostels are also functioning in the town.

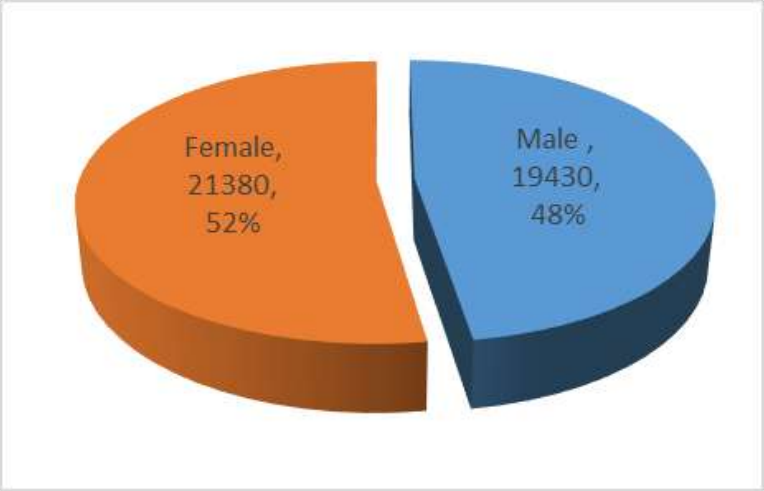


Figure 20.1 Percentage of male female population

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.

20.3 CHILD DEVELOPMENT

Population in the age group of 0 to 15 is considered Child group. As per the socio economic survey 2010, 19.11 % male population and 16.36 % of female population are in the child group. Anganawadies are the grass root level delivery point of social welfare activities. 48 Anganawadies are functioning in the Municipality and out of these, 15 are functioning in own buildings. Also the standard of facilities of Anganawadies has to be improved. List of Anganawadies in the town is given in Annex 20.1.

20.4 OLD AGED PEOPLE

The people above 60 years are considered as the old age people. As per the socio-economic survey 2010, 16.59 % of male population and 16.53 % of female population is coming under this group. At present no old age homes or other such facilities required for old age people are functioning in the town. In the local level analysis major suggestion in this sector are construction of old age homes and providing necessary medical facilities for old age people.

20.5 S.C, S.T DEVELOPMENT

The Scheduled cast population of Pandalam town as per 2011 census is 7678 and it is 18.46% of total population. There are 78 persons in Scheduled Tribe category. Which constitute about 0.19% of total population. In the local analysis, the major suggestion related to this sector was for improvement of housing condition, improvement of infrastructural facilities of S.C/S.T Colonies and programmes for improving the educational standards and job opportunities for them.

20.6 SECURITY

A Jana mythri police station is functioning near at Pandalam junction.

20.7 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 not functioning in Pandalam and the nearest fire station is at Adoor, which is 7km away from Pandalam town.


Fire station, Adoor

20.8 CONCLUSION

For the welfare of weaker section of the town more facilities are to be provided especially at the grass root level. In the changed social structure more attention is needed for the welfare of old age people. Projects have to be designed for the economic as well as social development of women, Scheduled Cast and Scheduled Tribe people. A Police out post shall be opened at Pandalam junction and a fire station shall be established in Pandalam Municipal area limit.

21. ENVIRONMENT

21.1 INTRODUCTION

Urbanization leads to many environmental problems of varying extent and it varies from town to town. Large scale industrialization, commercial activities, population explosion, vehicular growth, conversion of green and open areas, inadequate waste disposal etc. are leading to many environmental problems. Increased interaction between residing population and natural resources, due to economic developments lead to environmental issues. The urban environmental problems are threats to human well-being, resulting from human-induced damage to the physical environment, originating in or born in urban areas. It includes:

- *Localized environmental health problems such as inadequate house hold water and sanitation and indoor air pollution.*
- *Town level environmental problems such as air pollution, inadequate waste management and pollution of water bodies.*
- *Degradation of natural areas.*
- *Climate change and resultant problems.*
- *Infrastructure deficit.*

21.2 MUNICIPAL SOLID WASTE

Collection, conveyance and disposal of solid waste of the town is carried out in a limited way. Collection of solid waste is confined to selected area of the town and only limited system, is available for collection of



Waste dumping spot behind the treatment plant

wastes. The present system collects solid waste from the shops alone and it is only concentrated in the central town area. 96.92 % of households dispose the solid wastes in their own compound. The non-biodegradable wastes (collected from the streets within town area) are simply dumped at the yard without treatment, leading to environmental problems.

21.3 INDUSTRIAL POLLUTION

The industrial development of Pandalam is limited to few small and medium scale industrial units. No large scale industrial units are functioning in the town. Industries are categorized as Red, Orange and Green according to the nature of pollution. Red category has the highest pollution potential. There are 82 MSME units in the town and out of that only 4 unit is coming under red category, 18 units are coming under orange category and the remaining units are coming under green category and it is shown in Figure 21.1.There is not much pollution from industrial units.

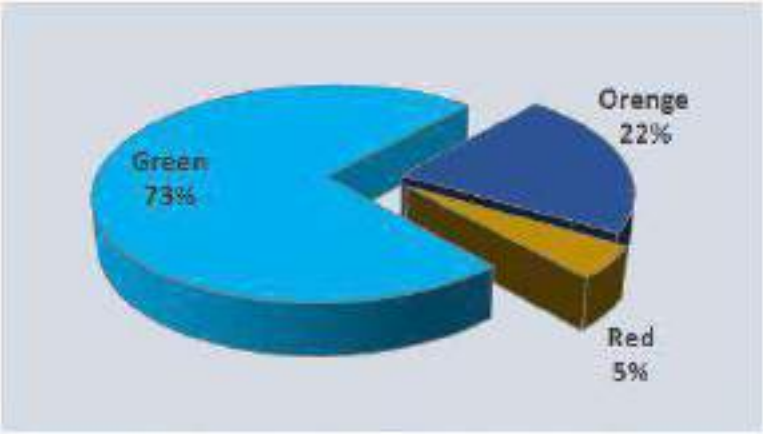


Figure 21. 1 Category of industries

21.3 NOISE POLLUTION

There is no major industry in the town producing noise pollution. The important source of noise pollution is by motor vehicles. Such pollution is experienced during day and night in two major travel corridors of the town -M.C.Road and Mavelikkara - Kaipattor road.

21.4 WATER POLLUTION

Achan kovil river is passing through Pandalam town. In addition to that about 15.5 km of Irrigation canals of Kallada Project is passing through the town. Proper maintenance is not

carried out for the canal. These water bodies are being polluted by disposal of wastes, especially solid wastes including wastes from Vegetable, Fish and Meat markets. In addition to that there are some ponds in different part of the town which were mainly used as source of water for paddy fields. But with reduction in paddy cultivation, many of these ponds are deteriorated due to lack of maintenance.

21.5 PADDY FIELDS AND SACRED GROVES

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. There is drastic reduction in the area of paddy fields in Pandalam town. The total area of paddy field was 625Ha in 2013. The paddy fields are being converted for various urban activities like construction of buildings, roads etc. So the conversion of paddy fields is another environmental problem. The condition of paddy fields of the town is already described in paragraph 7.6 of this report. The uncultivated paddy fields, which are remaining as marshy land also creates environmental problems. Details of sacred groves are shown in Annex 21.1. 11 sacred groves of ecological importance are located in different parts of the town. These sacred groves are under private ownership or associated with temples. All efforts are to be made for conservation of remaining sacred groves.

21.6 FLOODING



Mega Flood 2018

Pandalam Municipality is situated on the bank of Achankovil River and has an undulating terrain. River Achankovil is flowing through the northern side of the town. Even though, for a limited period, regular flooding is experiencing in certain part of the town due to lack of availability of

drains and blocking of natural drains. Measures are required for protection of remaining paddy fields, natural drains and periodic maintenance of road side drains.

In the Mega flood-2018, Pandalam is one of the badly affected areas in the state. The over flown water from Achankovil river submerged nearly half of the town including the Central Area on 16.8.2017. The traffic through M.C.Road, Mavelikkara – Kaipattur has been affected for few days. Many interior part of the town has been submerged and isolated. The flood affected areas, depth of inundation in different ranges etc are shown in Figure 21.2 and inundation details are shown in Table 21.1.

Table 21.1 Inundation details of Mega Flood 2018

Land use	Total Area	Depth and area (in Ha) of inundation			Total inundation area	
		0 to 3.00m	3.00m to 6.00m	Above 6.00m	Area (in Ha)	%
Builtup	63.89	16.98	11.84	14.90	43.71	68.42
Dry Agriculture	1110.81	147.11	102.45	82.04	331.60	29.85
Mixed use	846.30	127.86	77.98	63.97	269.81	31.88
Converted Paddy	757.51	62.60	131.06	470.91	664.57	87.73
Paddy&wetlands	14.98	3.29	1.54	3.95	8.78	58.59
Roads	11.84	2.26	1.41	1.97	5.65	47.69
Water Body	28.58	3.58	3.43	12.29	19.31	67.56
TOTAL	2833.90	363.68	329.72	650.01	1343.45	47.41

47.41% of total land area of the Municipality has been flooded. Considering the land use wise inundation, Converted Paddy with 664.57 hectares, which is 50% of total flooded area, is the mostly affected land use. It is followed by Dry Agriculture (331.60 hectares, 25 % of total flooded area), Mixed use (269.81 hectares, 20% of total flooded area), Built up area (43.71

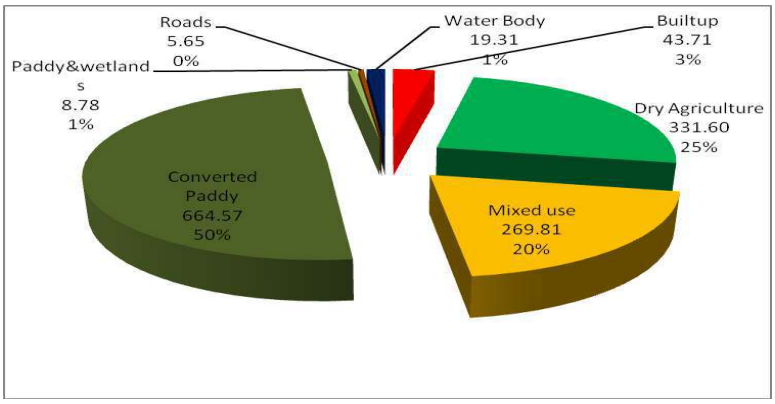


Figure: 21.3 Inundated areas – land use wise break up

hectare, 3% of total flooded area). The land use wise break up of inundated area is shown in Figure 21.3

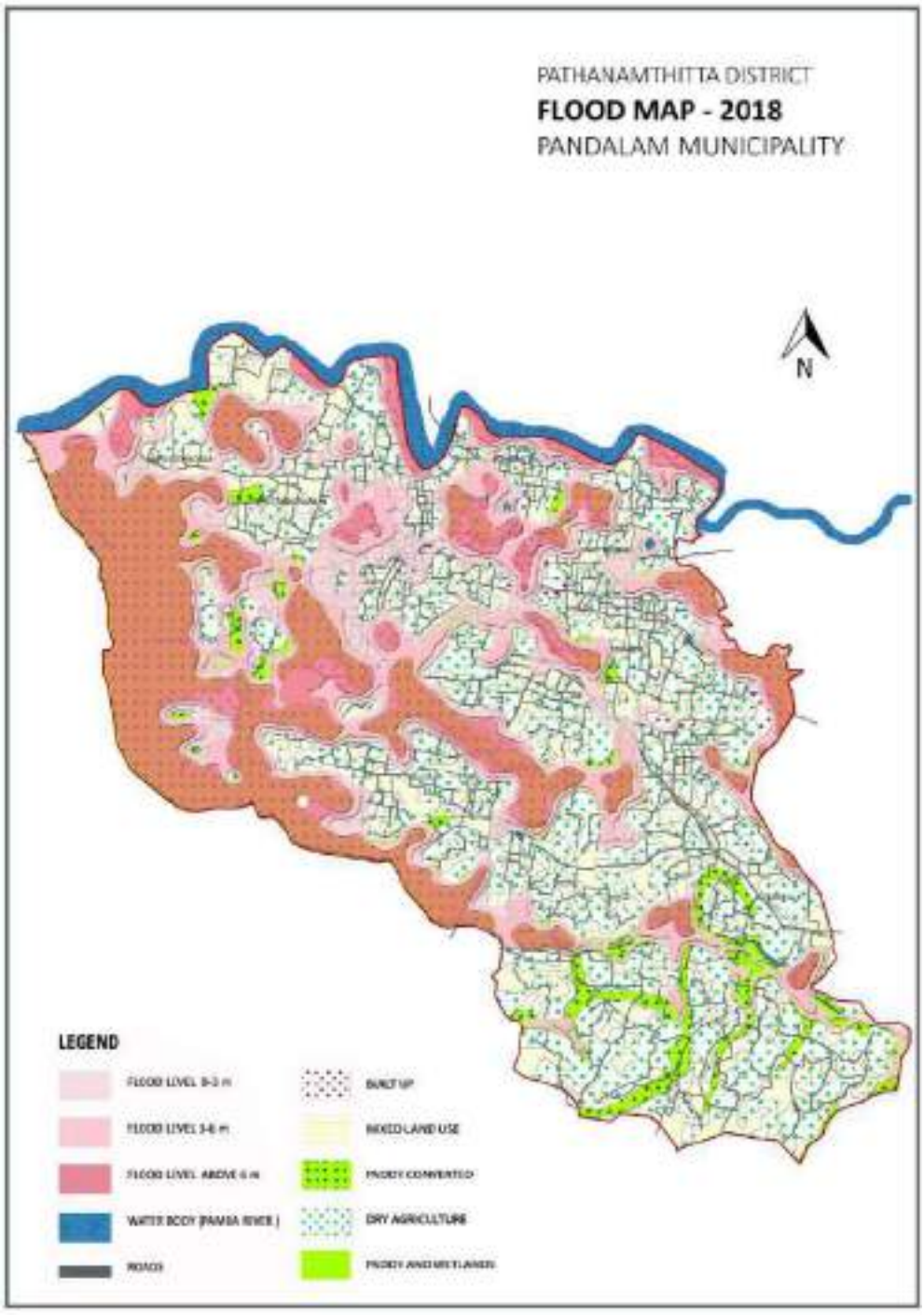


Figure: 21.2 Flood affected areas of Pandalam Municipality in Mega flood 2018

While analyzing the land use individually 29.85% of the total dry agriculture area, 31.88% of the total mixed use area, 87.73% of the total converted paddy area, 68.42% of total built up area and 47.49% of the total roads of the Municipality were inundated in the flood. Land use wise comparison of total area and inundated area is shown in Figure 21.4.

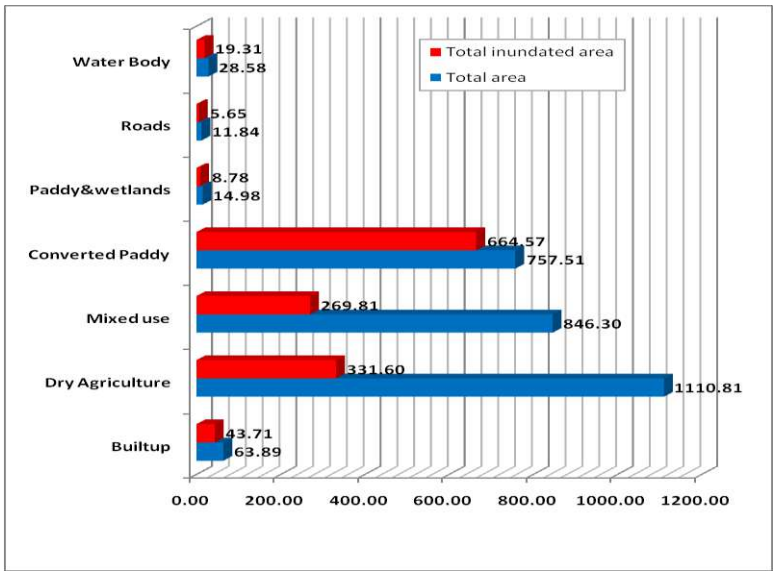


Figure: 21.4 Comparison of total area and area of inundation

While analyzing the depth of inundation, 48% flood affected area inundated above 6.00m, 25% inundated to a depth of 3.00m to 6.00m and the remaining 27% of the flooded area inundated to a depth less than 3.00m and it is represented in Figure 21.5.

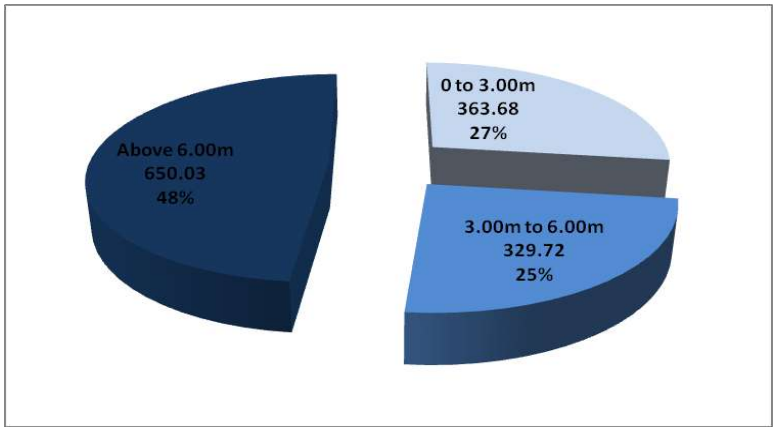


Figure: 21.5 Depth of inundation of Pandalam Municipality

On 12th September 2018 a mild tremor was noticed in 14th mile of Pallikkal panchayat, Pazhakulam, Nooranadu, Palamel panchayats, Adikulangara, Charumoodu, KurambalaThekku and Kudashanadu areas adjacent to Pandalam town. In these areas, people heard loud noise and felt the tremor. In many areas, cracks have appeared on walls of buildings. Meanwhile, there is no official confirmation on this. The authorities concerned said the quake

was not registered in the equipment currently available with the Meteorological department.

21.7 INFRASTRUCTURE

According to the Socio-Economic Survey (2013) only small percentage of the people of the town are getting protected water. Remaining people are depending well water for drinking purpose. Lack of Park and Open space for recreation is also experienced in the town.

21.8 CONCLUSION

The town is experiencing various environmental issues, but in different magnitude. Priority has to be given for protection of environmentally sensitive areas waste disposal, protection of wet land and water bodies. Since Pandalam 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.

22. RESOURCES

22.1 INTRODOUCTION

Money, man power and land are the main resources for planning and development of urban centers. Among these resources, land is limited and its availability differs from place to place. As a basic principle, allocation of these resources among various competing land use must be such that it helps in achieving a high level of economic efficiency.

22.2 FISCAL RESOURCES

The main source of income of Pandalam Municipality is municipal taxes, fees for various services, income from properties, government grant (plan fund), deposits and cess. The total revenue including the opening balance was Rs.14,99,47,750. But only a small share of the total income is available for capital improvement programme and it is inadequate to provide infrastructural facilities and services in par with demand. In addition to the above, various programmes including infrastructure development projects are being implemented through various State government Departments and also under various centrally sponsored schemes. Procuring funds for implementation of urban development plans and services delivery system from alternate sources shall be thought of.

22.3 HUMAN RESOURCES

The details of human resources have already been discussed in the chapter 5. Steps are to be taken for the effective utilization of the human resources for the development of the local economy and in the provision of infrastructure and services.

22.4 LAND

Urban land is emerging as a new area for local resources generation. There already exist innovative examples of generation of substantial funds using urban land as a resource in many parts of the country. No step in this direction has been adopted in Pandalam so far and there is enough potential for utilizing land as a major resource.

22.5 MINERAL RESOURCES

Mineral resources in large scale are not available in Pandalam municipal town limit. One granite quarry is there in Mamalappara near Kurampala. In earlier days there was mining of sand known as 'Vengli Sand' in Anikunnam area of Poozhikkad. There were country burned brick manufacturing units utilizing clay in Mudiyoorkonam, Poozhikkad and Thottakkonam areas. But these units are not functioning now.

22.6 AGRICULTURE RESOURCES

As far as the region is concerned, only Agro-based products are available. Rubber is the major crop in the eastern part of the region. Products like tapioca, vegetables, betel, ginger etc. are available in the town and its influence area. The agriculture sector has inevitable significance in the development of the area. It has already been discussed in chapter 10.

22.7 CONCLUSION

Different types of resources are available in the municipality. Optimized and planned use of these resources is required for the area. Still conventional method of resource mobilization is adopted in the municipality. Human resources which is available in plenty has to be utilized properly. The land resources can also be used more effectively for the development of the municipality. The major resource of the area is agro based. Agricultural sector have inevitable significance in the area. Innovative approaches have to be adopted for resource mobilization and to provide better services to the people.

23. DEVELOPMENT ADMINISTRATION AND MUNICIPAL FINANCE

23.1 INTRODUCTION

The role of different departments involved in the development activities of Pandalam Municipality is discussed in this chapter. The municipality has major role in the development activity of the town. In addition to the Municipality, Public Works Department, Kerala water Authority, Kerala State Electricity Board, Agriculture Department etc. are the major departments involved in the development activities.

According to the Kerala Municipal Act, 1994, the Municipal Corporation/local self-government is responsible for civic service delivery that consists of preparing and implementing a water supply and sewage disposal scheme, providing adequate sanitation through solid waste collection and disposal (including biomedical and hazardous waste), sanitation and surface drainage, providing street lighting facilities, constructing and maintaining roads and providing facilities for public conveniences. Administrative services that consist of issuing various certificates, maintaining public amenities, maintaining public utility services and providing ambulance services

Regulatory services that consist of issuing licenses and permits, registering births, deaths, marriages and private hospitals and tutorials, issuing notices and other certificates for taxation purposes, maintaining records and registers of all municipal transactions and abating nuisances.

Transferred services that consist of undertaking maintenance and operations of health and educational institutions, economic development in the LSGI jurisdiction, social welfare programs and social security schemes. State-level Departments, Programs and Missions and Institutions also govern urban management and basic service delivery in the State's urban local bodies.



Pandalam Municipal office

23.2 PANDALAM MUNICIPALITY

23.2.1 Introduction

The historical adoption of 74th Constitutional Amendment Act by the Central Government in 1992 has paved the ways and means for independent functioning of local bodies. This act makes election to the urban local governments mandatory, in addition to greater devolution of administrative and financial powers. In this chapter, the existing system of Governance in the Pandalam Municipality is discussed. Pandalam was a municipality during 1989-1993and degraded as a GramaPanchayat in 1993. Again on 1.11.2015 Pandalam is elevated to the status of municipality**.**

23.2.2 The elected council

The elected council consists of 33 members, which includes 18 women members. The Chairperson who is the head of the council has been elected from the elected members of the council. The Vice-chairperson to assist the chairperson and also to discharge the duties of Chairperson in absence is also elected by the members of the municipal council.

23.2.4 Functions of the Municipal Council

Pandalam Municipality is the major agency implementing development works within Pandalam municipal limit. The development works under the responsibility of Pandalam Municipal Council includes, the construction of Municipal roads and their maintenance, maintaining the public health institutions like Primary health centre, Solid waste disposal, Construction of public market and their maintenance, Construction and maintenance of cremation grounds, Construction and maintenance of Open spaces, parks, providing infrastructure in slums, Protection of common ponds, The maintenance of the institutions transferred to the Municipal Council such as Schools, Hospitals and other institutions

23.3 MUNICIPAL FINANCE

The 74th Constitution Amendment Act 1992 paved the way for devolution of financial and administrative powers to urban local bodies in a large way. By this amendment the financial position of the urban local bodies improved and a sizeable share of the total plan fund of the state Government has devolved to the local bodies for plan implementation.

23.4 GOOD GOVERNANCE

The Municipal office, Pandalam is functioning in the old Grama Panchayat office building itself. The inadequate office space and infrastructure facilities affect the day to day functioning of the office. Adequate space and facilities for people who are visiting the office for different purpose is also not available. A new building complex with modern facilities considering the next 50 years demand is required.

23.5 OTHER DEPARTMENTS

Kerala Water Authority is engaged in the distribution of portable drinking water in Municipal area. The Electricity distribution system is maintained by the Kerala State Electricity Board. The Public Works Department (Roads) is in charge of construction and maintenance of roads other

than those roads maintained by the Municipal Council. The Public Works Department (Buildings) is constructing major buildings.

23.6 PUBLIC OFFICES FUNCTIONING IN THE TOWN

There are 33 State government offices functioning in the town. A mini Civil Station or an office complex is needed for the town.

23.7 CONCLUSION

Pandalam municipality has major role in providing various infrastructure facilities and civic amenities to the people. It is a third-grade municipality and the present staff pattern is inadequate considering the responsibilities, powers and assets transferred to the Municipality. The present Municipal office building is not having adequate facilities for its smooth functioning and for providing better service to the people.

24. LINKAGES AND EXISTING SPATIAL STRUCTURE

24.1 LINKAGES

After the detailed studies on different sectors in previous chapters and spatial analysis, different planning issues are identified. Significant relations emerging out of cross sectional analysis of various sectors and linkages among them are included in the subsequent paragraphs.

The **topography and land use** of the town has certain relation. The northern parts of town have comparatively low slope with an average elevation of 20 – 30 m and central parts of the town with elevation ranges 0-10m. The southern part of the town is steeper with elevation varying from 70-100m elevation. For this reason, concentration of residential land use is found to be high in the northern and central part, and the least in the southern part of the town. Similarly agricultural prominence in dry cultivation is more in north eastern side and southern part, due to suitable conditions of soil, climate, geography etc. The south western low-lying area covers the major paddy (environmentally sensitive) areas of the town.

While considering **land use and transportation**, it can be observed that the concentration of traffic attracting land uses of the town, i.e. Major government offices, hospitals, markets, bus stands etc are in the central part of the town. Pandalam town has two diagonal roads intersecting at the central area of the town without any circular roads of standard geometry to provide adequate connectivity to these roads. It is leading to high traffic volume in roads at central part of the town. Developing the existing roads in a hierarchical order with inner and outer orbital roads could improve the traffic conditions of the town.

The population growth rate and the new activities of the town are related. The population growth rate of the town shows an increasing trend during the period 1991-2011. The population growth rate however has decreased to 1.95% during the decade 2001-2011, after an increase from 6.62% (1981-91) and 8.15% (1991-2001) in the previous decades. Presently the town has a population density of 1463 persons/sq.kms. The neighbouring municipalities also show a declining trend in population growth rate. Hence the coming year's one can expect a negative growth, which has already been observed in other municipalities and the district as a whole.

The **agriculture activities and the environment** of the town are mutually related. Conversion of paddy lands for other purposes leads to reduction in the capacity of the paddy fields as storm water collection basin. Similarly in the absence of paddy cultivation, a portion of low lying paddy lands are remaining as water logged area with contaminated water leading to health problems. Conversion of paddy land and flooding of certain area are related and in the Mega flood 2018 about 88% of converted paddy fields have been flooded. Hence the remaining paddy shall be conserved and used for agriculture activities.

The **settlement pattern and provision infrastructure facilities** are related to some extent. The intersection of the diagonal roads at the centre of the town and availability of transport facilities leads higher concentration of commercial activities, government offices, medical facilities, and educational institutions in the area adjacent to Pandalam junction. The wards in this area, Pandalam Town and Kadakkad West in the centre of the town, Thonalloor East, Thonallor West in the north east part of the town and Mulampuzha in the west part of the town show more urban character. As a result the adjacent wards may change its nature to urban character in the near future

The **agriculture and animal husbandry sector**s are inter connected. The extent of agriculture land is comparatively high in the town. It helps in the promotion of animal husbandry as a profitable activity of the town.

The **employment generation** of the town is linked with different sectors of economy. The availability of land and irrigation facilities, comparatively high price for agriculture products etc. provide scope for agriculture activities and employment generation in the sector. The elevation of town as a second order settlement in the district will lead to development of the service sector also lead to corresponding increase in employment opportunities.

The resources mainly available in the town and its influence areas are Agro based products. The markets at Pandalam town and Kadakkad act as a regional market and it provides facilities for trading of the agriculture and other products to the town and surrounding area. This linkage of the **agriculture sector and the trade activity** has to be utilized. Similarly the linkage between **agriculture and industry** can also be utilized using agro based raw materials for industry.

The **tourism**, **trade and commerce and transportation** have linkage. The location advantage as a town in a major state highway and connectivity with neighboring settlements can be utilized for development of tourism and trade & commerce activities.

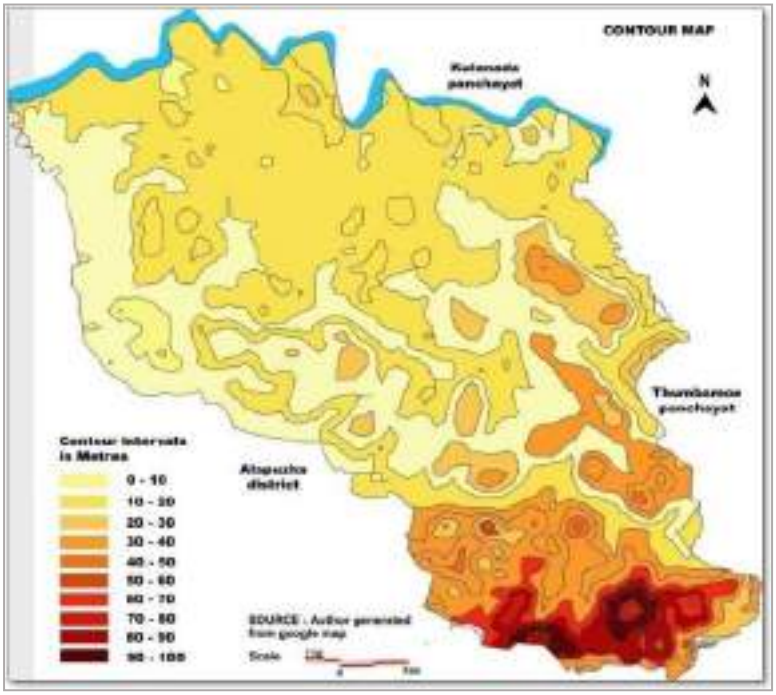
24.2 EXISTING SPATIAL STRUCTURE

The existing spatial structure of the town has been arrived by analyzing the geographical aspects of the area, activity based on land use, environmentally sensitive areas, functional character, spatial distribution of population, road network, commercial nodes and analysis from ISRO Bhuvan Indian Live Portal.

24.2.1. Geographical Aspects

The development activity of an area is decided by the geography of the area. The slope of an area is an indicator of the geography of the area. The likely activity that may come in an area is based on the slope of the particular area i.e., areas under elevation 10m are suitable for paddy lands, between 10-50m suitable for residential purposes and those above 50m are generally

suitable for forest cover. As major percentage of land of the town is within 50m elevation, sufficient land is available for development purpose. Athiramala, Kurampala South areas are under steep slope. The figure 24.1 shows the elevation of different part of the town in different range.



24.1 Contour map of the town

24.2.2 Activity Pattern based on land use

The activity pattern of different wards of Pandalam Municipality based on land use is shown in Figure 24.2. The agricultural activities are concentrated in wards on the western side of the town, i.e. Cherickal, Poozhikadu West, Poozhikadu North, Poozhikadu Town, Chiramudi, Edayadiyil, ThavalamKulam, Kurampala South and Athiramala. Commercial activities are concentrated in wards along M.C.Road and Mavelikara Kaipatoor road ie, in the wards

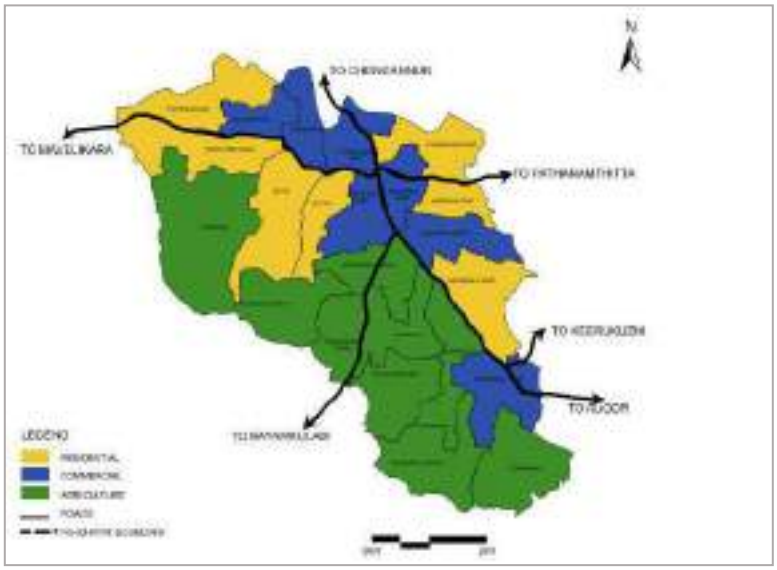


Figure 24.2 Activity pattern of the town

namely Mulampuzha, Mangaram, Thonalloor West, Pandalam Town, Kadakkad West, Kurampala North and Kurampala Town. Residential area is concentrated in the remaining 7 wards.

24.2.3 Environmentally Sensitive Areas

The environmentally sensitive areas of Pandalam Municipality mainly consist of paddy fields. In addition to that there are few natural drains and sacred groves. It is distributed in almost all parts of the municipality. The Environmentally sensitive area of Pandalam Municipality is shown in Figure24.3.

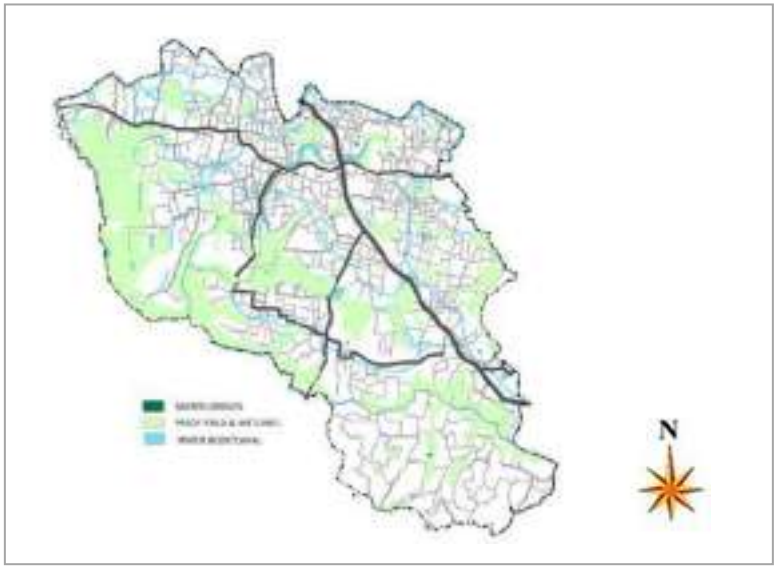


Figure 24.3 Environmentally sensitive areas of the town

24.2.4 Functional Character

The functional character of wards of Pandalam town is shown in Figure 24.4. Wards along the M.C Road and Mavelikkara-Kaipattor Road have urban character ie, in Pandalam Town, Kadakkad West, Thonalloor East, Thonallor west and Mulampuzha wards. Seven wards, Thottakkonam, Mudiyoorkonam, MSM, Mangaram, Poozhikadu

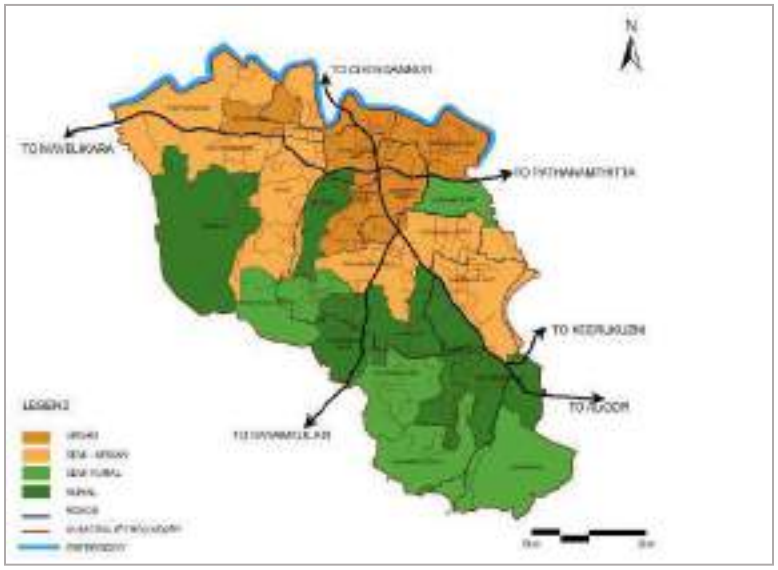


Figure 24.4 Functional characteristics of the town

North, Kurampala North and Kurampala East have semi urban character. Poozhikkadu West, Thavalamkulam, Kurampala south and Athiramala have semi-rural character and the remaining wards have rural character.

24.2.5 Population Distribution

The population of Pandalam as per 2011 census is 41,594. The population density of different wards of Pandalam is shown in Figure 24.5. The concentration of people is seen in wards around Pandalam Junction and NSS Medical Mission Junction. In addition to that, Thothakkonam and Thonalloor East ward also have high population density.

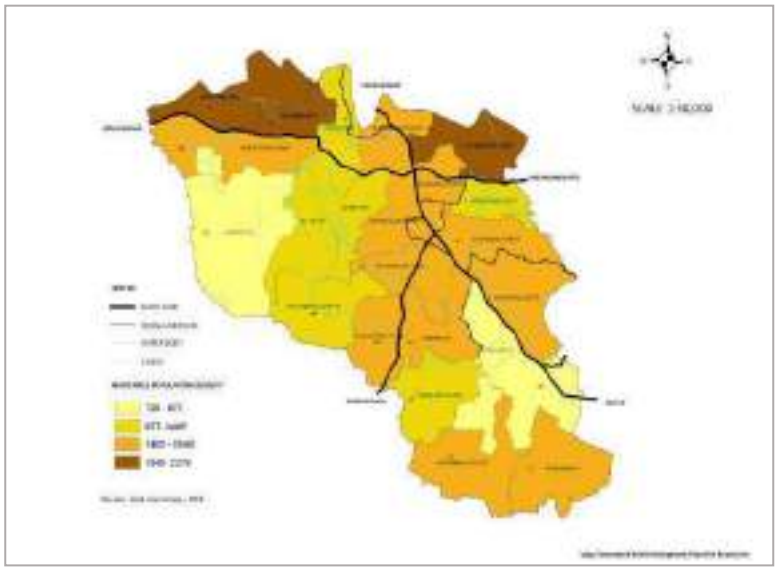


Figure 24.5 Ward wise Population density

24.2.6 Road Network

The existing road network of the town is shown in Figure 24.6. M.C.Road, Mavelikkara- Kaipattur Road, Pandalam-Kayamkulam road and Kurampala –Pazhakulam roads are the major roads passing through the town. In addition to that there are other minor roads



Figure 24. 6 Road Network

connecting the above roads. The major non – agriculture activities of the town are concentrated along these roads.

24.2.7 Commercial Nodes

Higher order Nodes were formed along M.C.Road and Mavelikkara - Kaipattor road. The CBD is formed around the intersection of diagonal roads at Pandalam junction. The commercial nodes of the town are shown in figure 24. 7

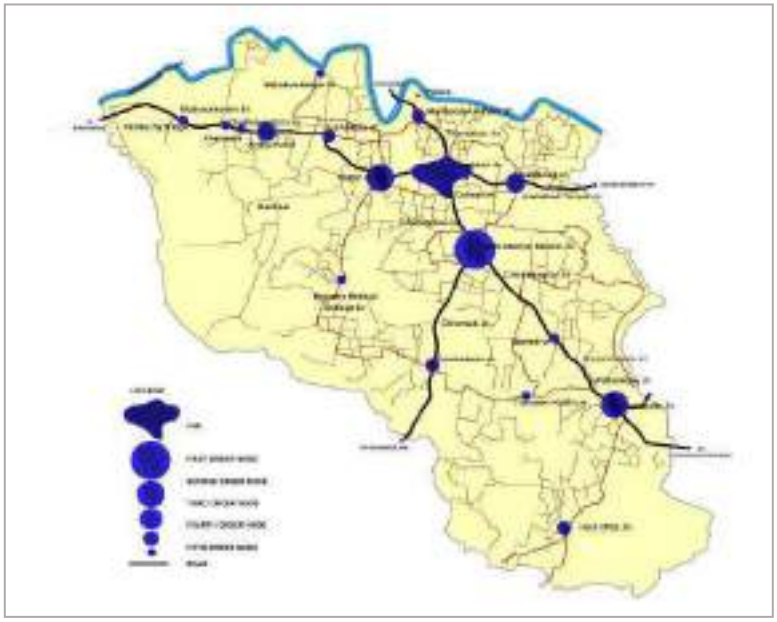


Figure 24. 7 Commercial Nodes of the town

24.2.8 Built form of town

The analysis of built form from ISRO's Bhuvan Indian Live Portal indicates the urban built form of the town, especially in the central portion where the diagonal roads meet. The growth pattern indicates the scale of urbanization of the town and it is shown in figure 24.8.

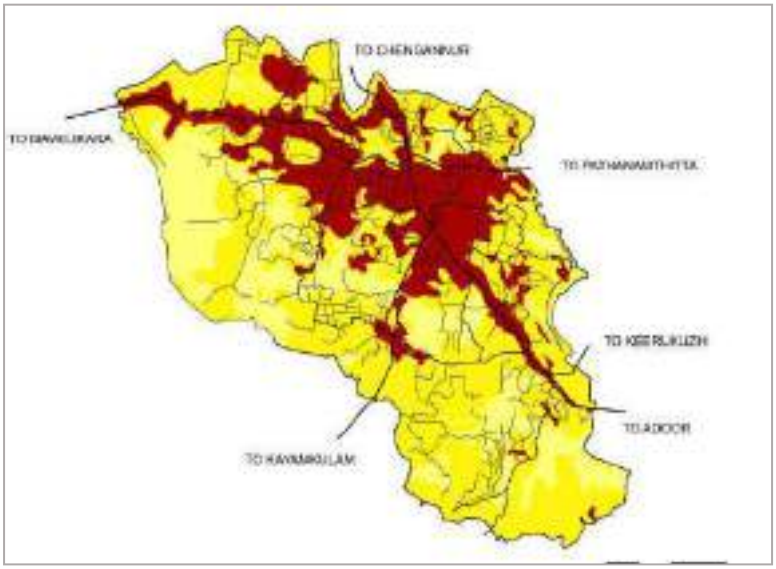


Figure 24.8 Scale of Urbanization of the town

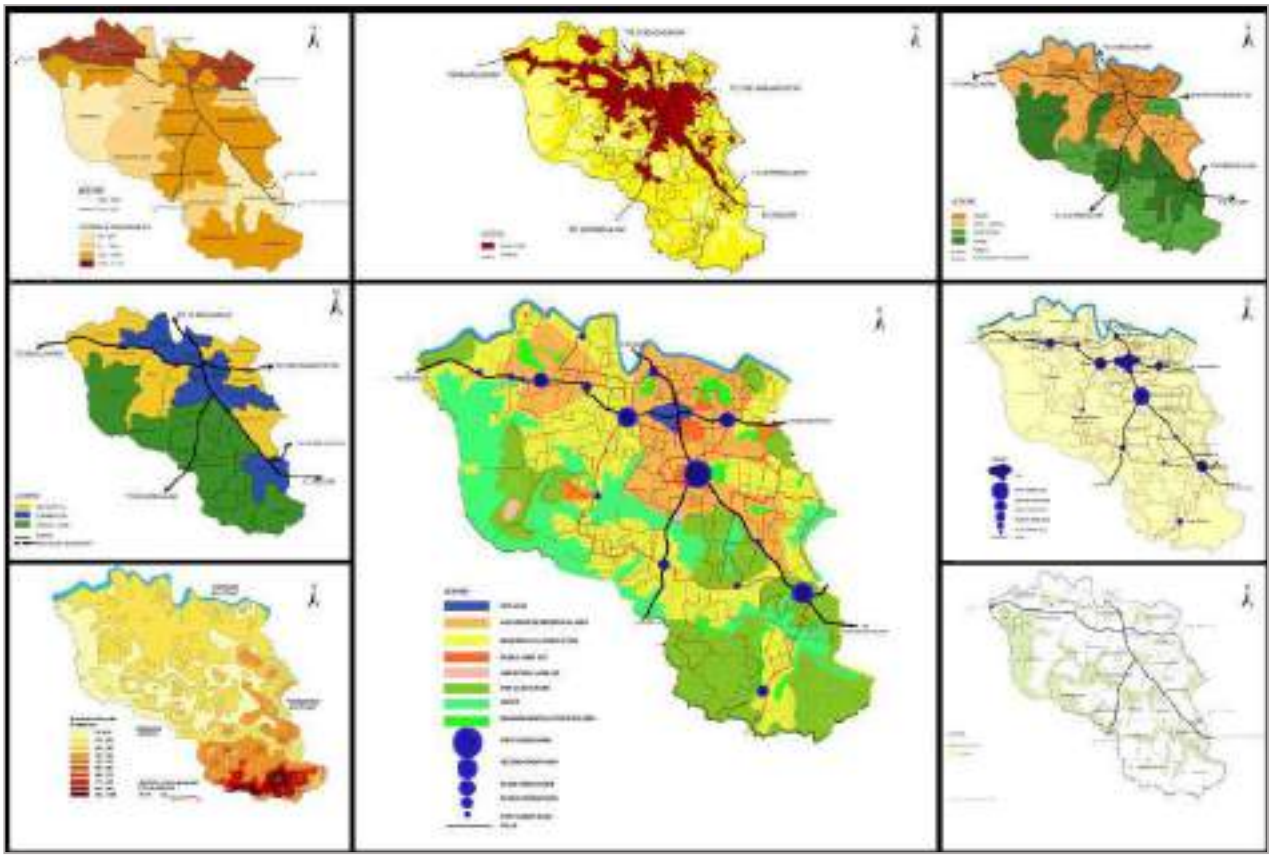


Figure 24.9 Factors considered for arriving Existing Spatial structure

24.2.9 Existing Spatial Structure

The spatial structure for the town is evolved by integrating the factors mentioned in paragraphs 24.2.1 to 24.8.8, i.e. Geographical aspects, land use activity pattern, environmentally sensitive areas, functional characteristics, population distribution, existing road network, commercial nodes, built form as depicted in Figure 24.9.

The land use concentration pattern of Pandalam indicates that the Agriculture area is concentrated in Cherickal, Poozhikadu West, Poozhikadu Town, Thavalamkulam, Kurampala South and Athiramala wards. While considering the functional character also all these wards

have rural and semi rural character. Most parts of these wards have low lying areas suitable for paddy cultivation and also portion of Athiramala and Kurampala South have terrain with steep slope and these wards are suitable for Agriculture activities. Portions of Edayadi, Chiramudi, Thonallor East, Thottakkonam and Kurampala Town wards are also included in agricultural regions.

The commercial activities are concentrated along the diagonal roads at the centre of the town. The wards have more concentration public use like schools, colleges, medical institutions are located along the major travel corridor. The population density of wards is another parameter deciding its characteristic of being urban, semi-urban, semi-rural and rural. Due to these character Thonalloor West, Thonalloor East, Pandalam Town, Kadakkad West and Mulampuzha have urban character.

The environmentally sensitive areas of the town are scattered in different parts of the town. The areas around the central core of commercial and public activities are predominantly under residential use with mixed crops cultivation. These areas have been designated as Residential Dry agriculture mixed zone.

The existing spatial structure of Pandalam is shown in Figure 24.10. The existing spatial structure consists of eight land uses they are CBD area, High density residential area, Residential & Agriculture area , Public land use, Industrial land use , Dry agriculture, Paddy, Environmentally sensitive area .

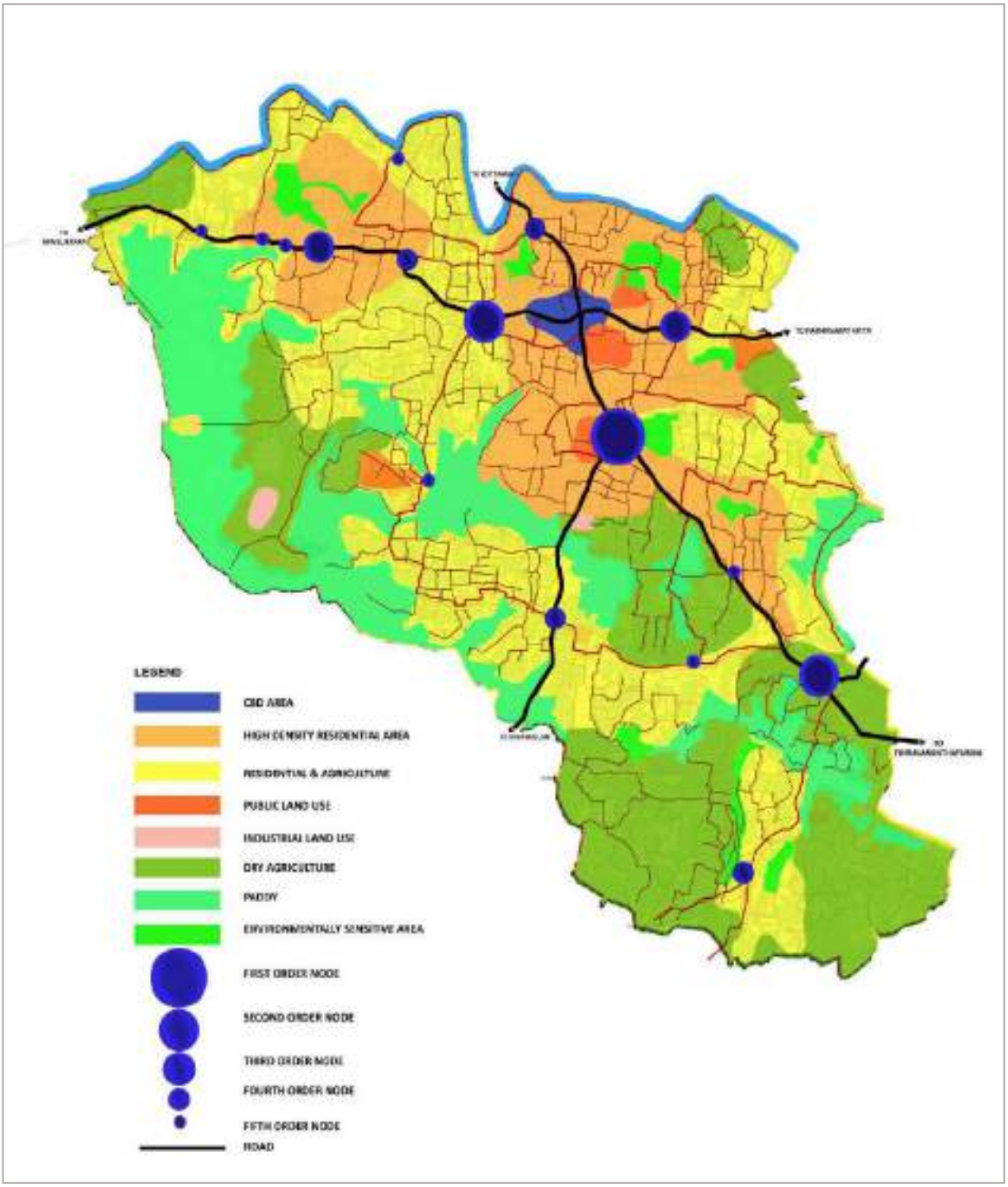


Figure 24.10 Existing Spatial structure of Pandalam town

24 .3 CONCLUSION

The linkages between topography and land use, land use and transportation, population growth rate and the new activities, agriculture activities and the environment of the town, settlement pattern and provision infrastructure facilities, agriculture and animal husbandry, employment generation and production sector and the trade activity, agriculture and trade, agriculture and industry, tourism and transportation, trade and commerce and transportation has been identified based on the analysis in the previous chapters. As per the existing spatial structure of the town urban activities are at the central core of the town and along the major travel corridors surrounded by residential activity. The agriculture activities are concentrated in the peripheral wards of the town. The environmentally sensitive areas of the town are scattered in all parts of the town.

25. FINDINGS

25.1 INTRODUCTION

Settlement studies and detailed analysis of various sector of the town has been made in the previous chapters of this report. The findings of the analysis are summarized in this chapter. Pandalam Grama panchayat was elevated to the status of a Municipality and later degraded as a Grama Panchayat. The Grama Panchayat was again elevated as a Municipality and the present Municipality was formed on 1.11.2015. The total area of the municipality is 28.42 sq:km and the population as per 2011 census is 41,604. Pandalam is considered as a holy town due to its connection with Lord Ayyappa and Sabarimala temple. There is no earlier planning attempts for Pandalam town and no town planning scheme prepared for the town.

25.2 PANDALAM IN THE DISTRICT CONTEXT

Pandalam is one of the four Municipalities of Pathanamthitta district. It is located in the south west part of the district. In the regional setting study, Pandalam has been identified as a second order settlement in the existing hierarchy of settlements. In the report documented as District urbanization report for Pathanamthitta district, Pandalam is proposed as a second order settlement of the district. In the District scenario, the Functional Character of the town is Rural Agriculture, Animal Husbandry and Small Scale Industries as the activities proposed for Pandalam town.

25.3 LOCATION

The location of the town is in the Central Travancore Region and mid-way between Thiruvananthapuram and Kottayam in M.C.Road (SH.1.) It is also located mid-way between Mavelikkara and Pathanamthitta town, the district head quarters. The geographical location of the town is between 9 degree 10 minutes 30 seconds & 9 degree 13 minutes 30 seconds North

latitudes and between 76 degree 38 minutes 30 seconds & 76 degree 42 minutes 30 seconds East longitudes. The town is well connected to major centers of the state by road way. Nearest railway station to the town is Chenganoor.

25.4 HISTORY OF DEVELOPMENT

The Pandya Kingdom of Tamilakam was once attacked by Malik Kafur, the commander-in-chief of Alauddin Khilji of Khilji dynasty. It is believed that the Pandya kings of Tamil Nadu fled to Pandalam in the face of an attack from Cholas and settled there in the land they bought from KaipuzhaThampan, a landlord. The King of Pandalam helped King Marthanda Varma to conquer the Kayamkulam province. In return for this help, Marthanda Varma did not attempt to attack and conquer Pandalam, during the expansion of his kingdom. But later Pandalam was added to Travancore in 1820. Due to its legendary connection with Lord Ayyappa and Sabarimala, Pandalam is considered to be a holy town. Pandalam Panchayat was formed in the year 1953. In 1965, Kurampala Thekkekkara Panchayat was added to Pandalam thus forming an area of 28.42 sq. km. Pandalam become a Municipality on 1.11.2015

25.5 TOPOGRAPHY

Topographically the town has an undulating terrain with hills and valleys. The elevation above MSL is varies from 8 m to 98m. Areas in the town with higher elevations are remaining as Agriculture land (dry cultivation). Major Urban developments in the town have taken place along the valleys. Achankovil River flows through northern border of the town.

25.6 REGIONAL SETTING

The regional setting of the town is arrived based on the hierarchy of settlement in the district scenario, the activity which the town has to perform and its connectivity with different settlements. In the district, Thiruvalla and Pathanamthitta are the suggested first order settlements. Pandalam is a second order settlement along with Adoor, Mallappally, Ranni and Konni. In the district scenario the Activity pattern identified for the town are Agriculture,

Animal husbandry and small scale industries. The State Highway-1 (MC Road) and Mavelikkara-Pandalam-Kaippattoor road are the two major roads passing through the town. There are other roads like M.M Hospital Jn - Kudassanad road, Kurampala-Poozhikkad-Muttar road, Kurampala-Pazhakulam road which provide connectivity to neighbouring areas.

25.7 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 for delineating planning area. Accordingly the planning Area is limited to Pandalam Municipal area.

The factors like administrative needs, commercial needs, travel needs, educational needs, medical need etc are considered for identifying the influence area of the town. The influence area of Pandalam includes eight adjacent Grama Panchayats – Kulanada, Venmony, Thumpamon, Chennerkara, Mezhuveli, Palamel, PandalamThekkekkara and Nooranad. Among these Grama Panchayats, Venmony, Palamel and Nooranad Grama panchayats belongs to Alappuzha District. All these panchayats shows rural character. The total extent of the influence area is 178.76 sq.km and total population as per 2011 census is 2,02,559. The floating population to the town is estimated as 65,676.

25.8 CHARACTERISTICS OF INFLUENCE REGION

The influence region of Pandalam town records negative population growth rate and the population density is also comparatively high. The economy of the region is agriculture oriented and primary sector activity is the character of the region. The agro based products are the major resource of the region and the level of industrialization is very low. Grama Panchayats in the region are more or less equally developed as far as the lower order facilities are concerned.

25.9 ADMINISTRATIVE STATUS

Several government offices are located within Pandalam Municipality. It does not have any status of a regional headquarters.

25.10 LAND USE

The existing land use of the town shows that Agriculture land use is 57.21 % of the total town area and total developed area of the town is only 39.5 %. Residential use comes in second place, with 33.82 % of the total town area.

The major urban activities of the town like commercial establishments, public buildings etc. are concentrated in the central part of the town along M.C.Road and Mavelikkara Kaippattoor road and the high density residential area is located in an area around this. There is specific pattern in land use activity and non-agriculture activities are concentrated around the central part of the town and the agriculture activities are in the periphery of the town.

25.11 FUNCTIONAL CHARACTER OF WARDS OF THE TOWN

The Functional character of the town shows that out of 23 wards (based on which the analysis is made) 8 wards have rural character and 7 wards have semi-rural character. Only 4 wards have urban character and 4 wards have Semi-urban character. This shows the predominance of rural character of the town. There is distinction between Agriculture and Non-Agriculture land use to an extent. There is scope for Agriculture sector to develop as one of the major economic bases of the town.

25.12 DEMOGRAPHY

Negative growth rate of population has been recorded by Pathanamthitta district during the period 2001-2011. Pandalam has a growth rate of 1.95% during 2001-2011 period and has

highest population growth rate among the four urban centres of the district. The population density of different wards in the municipality varies from 726 to 2213 persons per Sq.Km. The age sex pyramid of the town is regression pyramid and it indicates that the character of town is that of a developed country, where there are fewer children and more old people and the population is likely to decrease in future.

25.13 WORKERS

The work participation rate of Pandalam is 32.69 %. It is comparatively low and indicates the decline in the local economic activities of the town. The Occupational structure shows that 15.89% of workers of the town are engaged in Agriculture pursuits. The Workers engaged in Industrial sector are only 3 % and 76 % of workers are belonging to other workers category. In production sector, the agriculture sector shows a declining trend and the industrial sector is not recording any significant growth. The only sector which shows growth is the service sector.

25.14 COMMERCIAL ACTIVITY

The study on commercial activity of the town shows that there are four major commercial nodes in the town – Pandalam junction, Pandalam market area, NSS medical mission junction, and Kurampala area. Kadakkadu, Muttar and Althara junction are the other nodes with significant commercial activities.The Pandalam market, Kadakkadu market are the major markets of the town and these markets have regional importance also. There are 15 branches of Nationalised, Scheduled, Commercial and other banks in the town. Trade and commerce is one of the major activities of the town.

25.15 INDUSTRY

In Industrial sector, Pandalam is not specialized for any particular type of industries. The famous Mannam Sugar mill, Pandalam is not functioning now. Industries in the category of MSME are only there in the town and 62% of them are in service sector. A Mini Industrial Estate

of SIDCO is functioning in the town. Considering the raw materials available in the town and the influence region of the town, there is scope for developing Agro based industries and building materials units.

25.16 TOURISM AND HERITAGE

There is no major tourist spot within the town. Pilgrim tourism has great potential in Pandalam due to its connection with Sabarimala temple. It can be developed as a tourist transit point considering its location in between tourist centres and Pilgrim Centres. There are few buildings with heritage value within the town.

25.17 AGRICULTURE

57.21% of total land of Pandalam municipality is coming under Agriculture use and irrigation facility is available in the town. 54.10% of Agricultural land is utilised for rubber cultivation, followed by paddy (38.79 %), coconut (3.66) and mixed crops (3.45%). Major portion of paddy fields are remaining uncultivated or used for cultivation of crops other than paddy. The agricultural areas are mainly concentrated along the boundary of the town and there are certain areas in the town which are suitable for intense crop cultivation. The Paddy field have a continuation to the adjacent Grama Panchayats in the influence area of the town. Rubber, Tapioca, banana, coconut and vegetables are the major crops.

25.18 ANIMAL HUSBANDRY

As per the Socio-Economic Survey 2010, 24.45 % of houses in the town have at least one domestic animal other than dogs. Considering the rural character of major portion of the town and more percentage of agriculture land, Animal Husbandry sector has enough scope for development.

25.19 HOUSING

The average plinth area of residential buildings is found to be 81.71 sq.m and it indicates better housing size of the Municipality. The houses in Pandalam municipality have comparatively large size and better structural and sanitary condition. Now attention is needed to provide better housing facilities to this people who are living in this sub standard housing areas.

25.20 WATER SUPPLY

Undulating topography is the major hurdle in providing piped water supply. For 90% of the households, well is the main source of water. Certain areas of the town need special attention as there is more scarcity of water.

25.21 TRANSPORTATION

There is no specific pattern for roads and the widths of 97% of roads are in between 3.00m and 6.00m. Maximum traffic volume of 21,212 PCU is observed in between KSRTC junction and Pandalam Junction in Mavelikkara – Pathanamthitta road and the volume-capacity ratio at this stretch is 1.41. For most of the sections of M.C.Road and Mavelikkara –Kaippattoor road , the volume-capacity ratio is greater than 1. Parking demand is mainly met by on-street parking. The pedestrian facilities are inadequate. Major share of the passenger trips are made through public transport system. The availability of public transport facilities at the interior area of the town need to be improved. The facilities at the KSRTC Bus Station are inadequate the entry and exit of bus to the private bus stand cause traffic congestion at the road near to Pandalam junction. A Rail linkage and a ring road to the town is desirable for the overall development of the town as well as the region.

25.22 POWER

In power sector conventional source of energy is mainly used. Majority of houses are electrified. 84.29% of the electric power is consumed for domestic purpose and 13.71% for

commercial purpose. Consumption of power in Industrial sector is very nominal (1.64%). Low voltage and frequent power supply interruption are the problems in this sector. Absence of separate street light line creates problems in providing street lights.

25.23 SOLID WASTE DISPOSAL

In solid waste management, the collection of waste by the Municipality is limited to the Public places of the town. In majority of houses waste is disposed in own premises. The system for collection, conveyance and disposal of the waste is inadequate. The space at the disposal yard is inadequate and the composting plant is not working properly. But comparatively better sanitary conditions are there in the houses. Better waste management systems is needed to the town to improve the existing conditions.

25.24 EDUCATION

The level of education is high in Pandalam. While considering the Government, Aided and unaided schools, sufficient number of institutions is available for school education. The private sector educational institutions have major role in school education especially in the H.S and HSS level. Basic facilities are available in most of the schools. But advance facilities especially computer lab and Internet facilities are absent in a number of schools. Travel distance to the schools in primary level is higher than the adopted standards. In higher education sector adequate number of institutions are available in the town and surrounding areas.

25.25 HEALTH

Sufficient bed strength as per standards is available at the hospital in the town and the essential departments are available. For higher order facilities people depend the institutions in other towns. The NSS Medical Mission Hospital, C.M.M Hospital , Chitra Multi Specialty Hospital etc. are the major Medical Institution in the town in terms of number of patients and availability of departments. Pandalam is located in the major state highway and upgradation of Hospitals with

trauma care units is essential. In Indian system of medicine and Homoeopathic system of medicine, Hospitals with IP facilities has to be established in the town.

25.26 RECREATION

Only lower order recreational facilities are available in the town. Being a regional centre the recreational facilities in the town have to be improved considering the people of the town and its influence area. A stadium, open ground, fair ground, town hall etc. are also needed. Small grounds at neighborhood level are also needed. A cultural centre is also needed in the town. Neighbourhood level parks and other open parks improve the quality of life of the inhabitants.

25.27 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 need to be evolved for the economic development of women, Scheduled Cast and Scheduled Tribes. A fire station needs to be started in the town.

25.28 ENVIRONMENT

Even though in small extent the town is experiencing various environmental issues related to disposal of solid wastes, noise pollution, water pollution, filling up of paddy fields, inadequate infrastructure, squatter dwelling etc. Pandalam is one of the towns in the state which affected very badly during the recent flood. The Environmentally sensitive areas of the town are the paddy fields, ponds and sacred groves. The area of paddy field is reducing over the years due to conversion for other uses.The environmentally sensitive areas need to be conserved.

25.29 RESOURCES

Among the three major resources i.e. money, manpower and land, human resources are available in plenty. Hardly any mineral resources are available in Pandalam municipal town limit. As far as the region is concerned, only Agro-based products are available. Rubber is the major crop of the region.

25.30 URBAN GOVERNANCE

Pandalam is a class.III town and the present staff pattern is inadequate considering the powers, responsibilities and assets transferred to the Municipality. The present Municipal office building is not at all adequate for its smooth functioning and also for providing better service to the people.

25.31 CONCLUSION

Pandalam is a major service town in the western part of the district. Many part of the town is still having rural character and certain part of the town is on transition from rural to urban nature. The potential of the town as a pilgrim centre, its location advantage, availability of land etc need to be fully explored. The physical and social infrastructure facilities need to be improved.

PART.II

INTEGRATED DEVELOPMENT VISION AND PROJECTED REQUIREMENTS

26. DEVELOPMENT GOALS AND OBJECTIVES

26.1 INTRODUCTION

The future vision, that the Pandalam town shall follow, through the Master Plan, is explained in this chapter. These vision principles described as goals are the general target to be reached through completing a series of tasks. These tasks named as objectives are designed to meet the goal. The development goals are formulated from the observations and findings derived from the analysis of the sectors. The Master Plan Goals will drive development alternatives and serve as the ultimate criteria for the selection of the preferred development option and other major decisions throughout the plan process. The goals of a plan not only direct the focus of the actual plan preparation, they are also the basis for regulation changes, for capital improvements program funding and for future planning priorities. The goal of new Master Plan is to provide a comprehensive framework for physical development planning within the Town area.

26.2 DEVELOPMENT GOALS

The analysis shows that, Pandalam was developed as a small service town. The town does not have the status of an administrative headquarters. In the district level studies (District Urbanization Report, Pathanamthitta) Pandalam has been proposed as a second order settlement of the district. Hence to develop Pandalam as the major Service town of the region is the first goal.

The town is lacking many infrastructure facilities. In fact it is the major problem faced by the town and is one of the reasons for the decline in other development sectors of the town. The integrated development of the infrastructure is the second goal.

Pandalam is a major educational centre from early days and serves the need of the people of surrounding area. Few professional colleges were established in the surrounding areas. Develop Pandalam as a major educational center is the third goal.

Trade and commerce has been identified as the notable economic activities of the town. The hinter land of the town has agriculture resources especially and there is scope for developing agro based industries in the planning area. Tourism especially pilgrim tourism has developed as a major economic activity of the town especially during Sabarimala season. Optimum utilization of resources for diversification and strengthening the economy of the town is the fourth goal.

Environmental protection is another urgent need of the town. The town is located in the mid land region of the state. The wet lands, natural drains and river, hills etc are the environmentally sensitive areas of the planning area. So the conservation of environmentally sensitive area and transform the town as also carbon city is another goal.

The security of the weaker section of the society and senior citizen is the need of the time. To ensure the social welfare and security of the society is another goal.

Thus the development goals set are summarized as follows.

- To develop Pandalam as a major Service contributor of regional importance.
- The integrated development of the infrastructure.
- Develop Pandalam as a major educational centre.
- Optimum utilization of resources for diversification and strengthening the economy of the town.

- Conservation of environmentally sensitive areas and to transform the town as a low carbon green city
- To ensure the social welfare and security of the society.

26.3 DEVELOPMENT OBJECTIVES

The Optimum utilization of potentials and resources create new economic base for Pandalam. This will ultimately improve the quality of life of the people. Development based on available potentials and resources are the action towards achieving the development goal. The development objectives for Pandalam town are summarized below.

In connection with the first goal to ***develop Pandalam as a major Service contributor of regional importance,*** the objectives set are

- To develop various higher order facilities to cater the service demands of the region
- To develop trade and commercial activities of the town *by extending the CBD area*
- To develop the regional road network of the town so as to ensure better connectivity with influence areas.
- To improve the traffic and transportation facilities of central area of the town aiming at the decongestion of central area and to ensure the free flow of traffic.
- Provision of accommodation facilities, traffic and transportation, sanitation etc.
- Renovate the existing Trade and Commerce centers of Pandalam town. D*evelop existing markets in a planned manner and provision of additional markets*
- Promote the trading of selected produces specific to the region.

Second goal is the ***integrated development of infrastructure*** and the objectives set are

- To improve the traffic and transportation facilities in the central area of the town aiming at the decongestion of central area and to ensure the free flow of traffic.
- To decentralize the urban activities from central core to other areas of the town.

- Introduce sewage collection system for the central area of the town in the later stage of the plan period.
- To improve other infrastructure facilities like drinking water, waste disposal, housing etc
- To develop Pandalam to cater the higher order requirements regarding social infrastructure like health and education of the people of the town and the region.

Regarding the third goal, Develop ***Pandalam as a major educational centre*** *the objectives are*

- To diversify the courses in the existing educational institutions and improve the infrastructure facilities of existing educational centres

In connection with the fourth goal, ***Optimum utilization of resources for diversification and strengthening the economy*** *of the town,* the objectives set are.

- To promote homestead agriculture within residential areas
- To promote value addition products under agriculture and animal husbandry sector.
- *To promote the trading of selected produces specific to the region.*
- To promote small scale industry based on the resources of the region
- To develop tourism activities especially pilgrim tourism utilizing existing potentials and develop Pandalam as a tourist transit centre
- To develop the agriculture and animal husbandry sector.
- To increase the economic growth by enhancing job opportunities and better socio economic environment**.**

Conserve the ***environmentally important areas of the town*** is the *fifth* goal

- To rejuvenate and protect all sensitive natural drains, ponds and other water bodies etc
- To conserve the cultivable paddy land of the town.
- To conserve ecologically sensitive areas and minimize environmental pollution.

- Protection of Achankovil river
- Propose more carbon absorption green spaces and Provision of traffic and transportation management techniques

Finally the objectives set for the sixth goal regarding the ***welfare of weaker sections of the society*** are

- To ensure welfare of the economically weaker section of the society like aged people, women and socially backward people
- Up-lift the weaker section of the society by rendering job opportunities, better services and living conditions.
- To ensure the security of the citizen.

27. DEVELOPMENT CONCEPT

27.1 INTRODUCTION

The development concept of a particular area is derived based on the development objectives formulated. The problems and potentials existing in the area, the conclusions and recommendations of sectoral studies are also considered for the formulation of development concept. The development concept is derived by integration of the spatial particulars of the area and above factors. The proposed spatial structure for the area has to be evolved for formulation of the concept plan.

27.2 PROPOSED SPATIAL STRUCTURE

The proposed spatial structure of the town is decided by the ***geographical aspects of the area, spatial distribution of existing development***, ***Environmentally Sensitive Areas, Spatial distribution of population, proposed nodes and Proposed Road Network***.

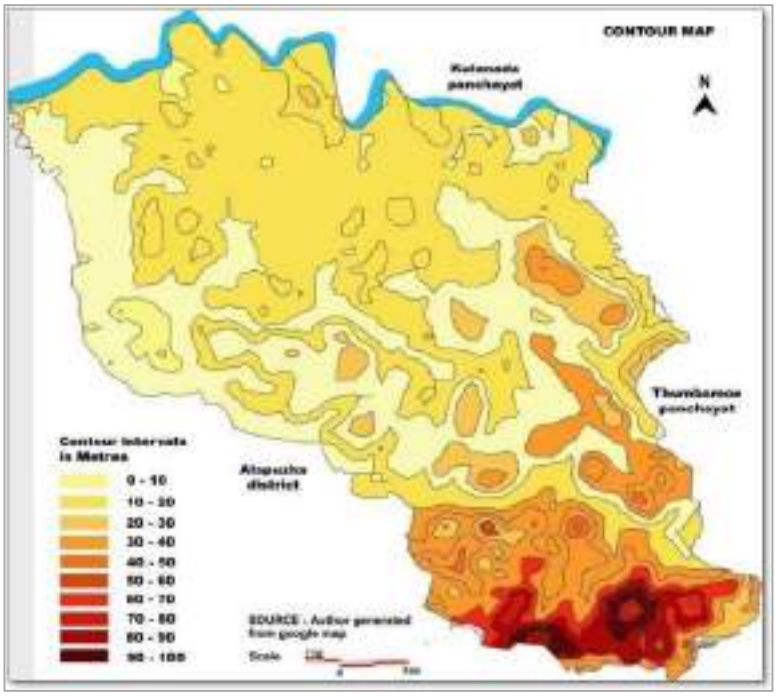


Figure 27.1 Contour map of the town

The development activity of an area is decided by the geography of the area. The likely activity that may come in an area is based on the slope of the particular area. Generally areas under elevation 10m are suitable for paddy lands, between 10-50m suitable for residential purposes and those above 50m are generally suitable for forest cover. Wards Athiramala, Kurampala South are with steep slope. As major percentage of land of the town is within 50m elevation, sufficient land is available for development purpose. Figure 27.1 shows the elevation of different part of Pandalam town. Major percentage of land of the town is within 50m height, hence sufficient land is available for development purpose.

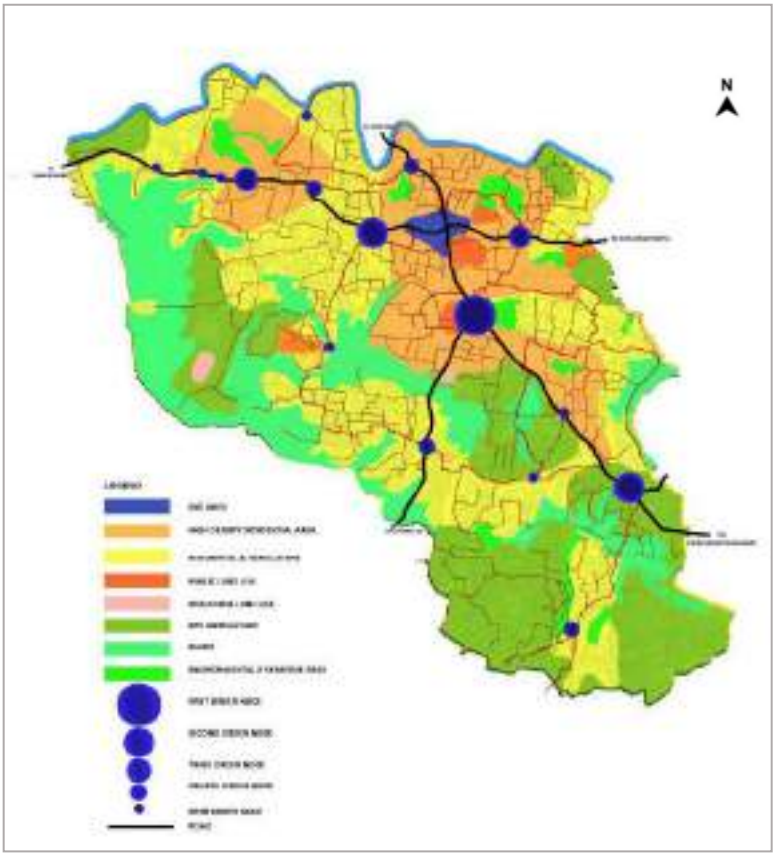


Figure 27.2 Existing Spatial structure of Pandalam

In Pandalam Municipality, the agriculture activities and urban activities are spatially separated. The agriculture dominant areas are located in the peripheral areas of the town and the commercial dominant activities are concentrated along the two major

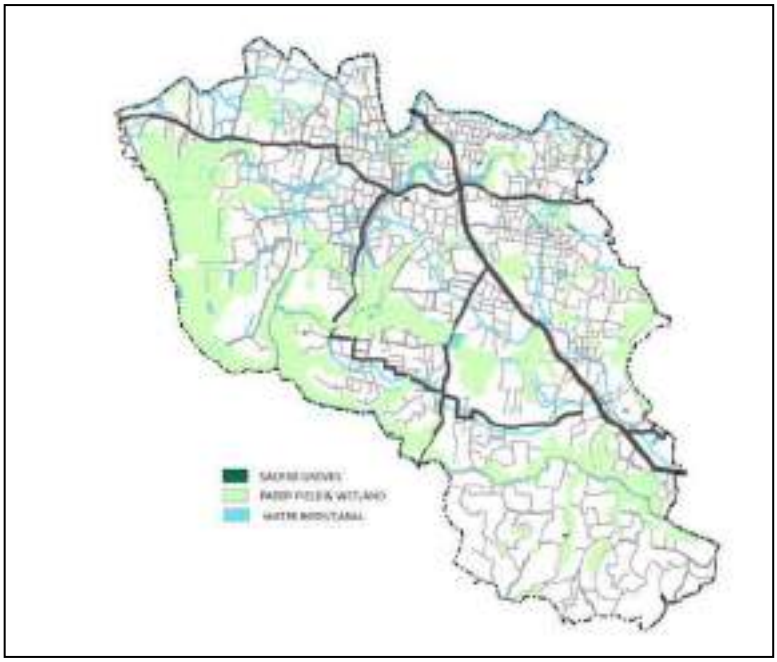


Figure 27.3 Environmentally sensitive area of the town

travel corridors of the town. The spatial orientation of different activities of the town is shown in Figure 27.2.

The environmentally sensitive areas of Pandalam Municipality mainly consist of paddy fields, sacred groves and natural drains. The Environmentally sensitive areas of Pandalam Municipality is shown in figure27.3

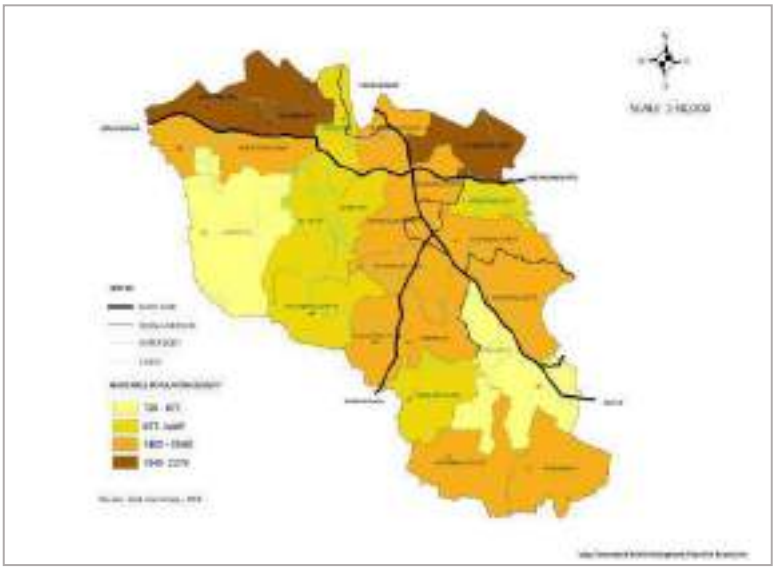


Figure 27.4 Ward wise Population density

The concentration pattern of population of the town is shown in Figure 27.4. The population is concentrated in northern part of the town comprising Thottakonam and Thonalloor East wards. In addition to that the population is concentrated in the central part of the town comprising Pandalam Town and Kadakkad East wards.

In the study on existing hierarchy of nodes, NSS Medical Mission Hospital Junction has been identified as first order node. Kurampala junction and Muttar junction are identified as second order nodes. Kadakkad junction and Arathilmukku are identified as third order nodes in the study.

The CBD of the town is located around Pandalam junction. Majority of commercial, educational, medical and socio cultural establishments are concentrated around this area. The spatial distribution of various services of the town is illustrated in Figure 27.5.

The famous Pandalam Sugar mill is not functioning now due to non availability of major raw material, sugar cane. An Ayurveda Medical College is started functioning in the compound and it is expected that this major institution will induces development in the surrounding areas.

Considering the above facts in the proposed hierarchy of settlements, NSS Medical Mission Hospital Junction, Kurampala junction and Arathilmukku have been proposed as first order nodes. Kadakkad junction and Puzhikkad junction as second order nodes and Kunnukuzhi junction and Post office junction as third order nodes. These nodes will provide services of different scale to all parts of the town. The proposed nodes are shown in Figure 27.6.

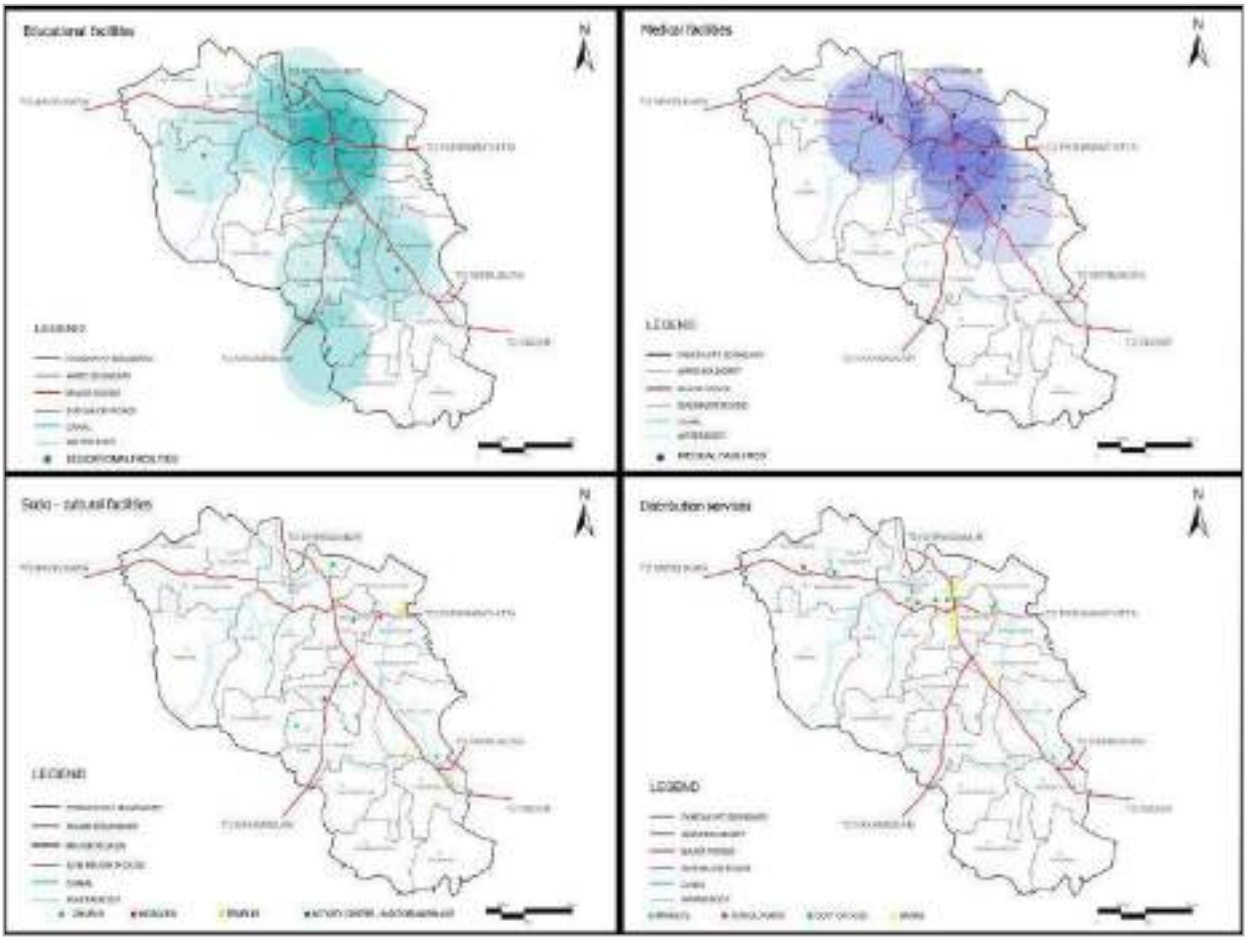


Figure 27.5: Spatial distribution of services

The projected traffic volume based on study on Traffic and Transportation and the road network proposed in the District Urbanization report are considered for arriving the proper road network. The proposed developments and distribution of population are also decisive criteria for the proposed road network of an area. The proposed road network is showed in figure 27.7.

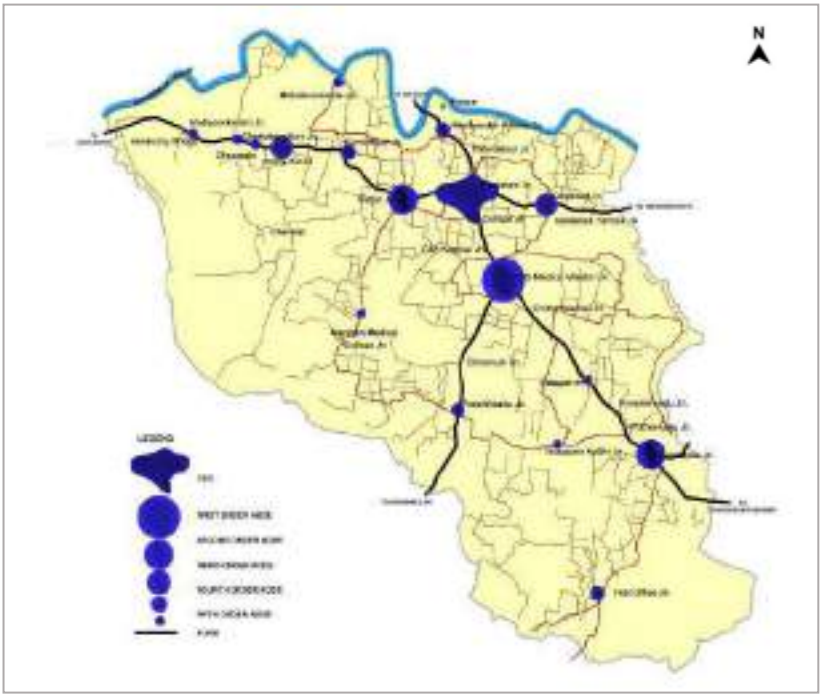


Figure 27.6 Commercial Nodes of the town

The spatial structure for the town is evolved by integrating all the factors mentioned above. Furthermore, the development of nodes will lead to an overall development of the town and will contribute in providing more urban facilities. It will also lead to the enhancement of agricultural productivity and develop the economies of the town.

Initially Pandalam town was grown around Pandalam Palace and Pandalam market (Kurunthottiyam market). In later stage urban activities spread to Central Jn, NSS Medical Mission junction and Manikandan Aalthara Jn. The proposed road network will increase the connectivity from the central area of town to the other areas, and induces development in the interior area. These developments will enhance the scale of economy and will help in expanding the market activities of the town. The above factors and development of infrastructure facilities will develop the town as a service provider for the influence area.

Also, the agricultural areas especially paddy fields along with the environmentally sensitive areas are to be retained. The area having more concentration of population is to be retained for residential purpose. Fig 27.8 shows the factors considered for preparing the proposed spatial structure.

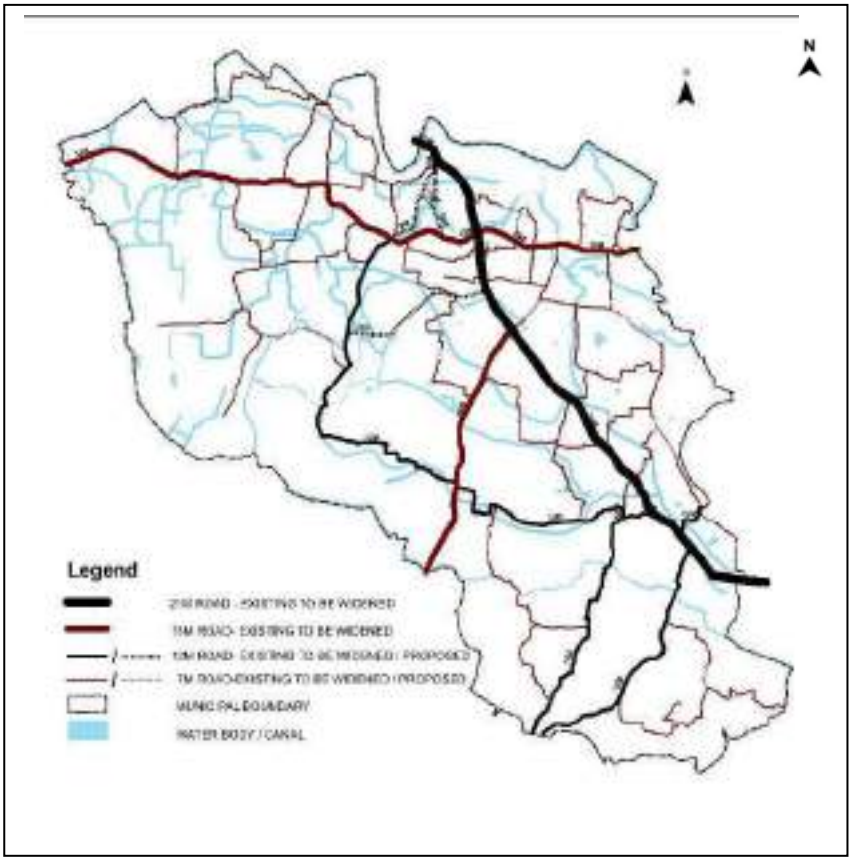


Figure 27.7: Proposed road network

Commercial and Public activities are concentrated in wards along M.C.Road and Mavelikara –Pandalam-Kaipattur Road. i.e. in Pandalam Town, Kadakkad West, Kadakkad East, Kurampala East, Kurampala Town, Thonalloor West and Poozhikadu Town. Higher order commercial nodes are located in these wards.

It is assumed that in future also commercial development will take place in these wards due to the presence of existing markets, commercial activities, public and private offices, transport terminals etc.

A hierarchy of roads of width varying from 7m to 21 m is included in proposed road network. In the town centre, in addition to M.C.Road and Mavelikara-Pathanamthitta Road, roads are proposed to develop new links which will decongest the town center and a radial network is adopted for the other parts of the town . These proposals will definitely influence the land use of that area. With the completion of the roads to Pandalam Junction, a large area of

comparatively vacant land will be opened for development and it will change the character of the area. The proposed spatial structure of Pandalam town is shown in Figure 27.9

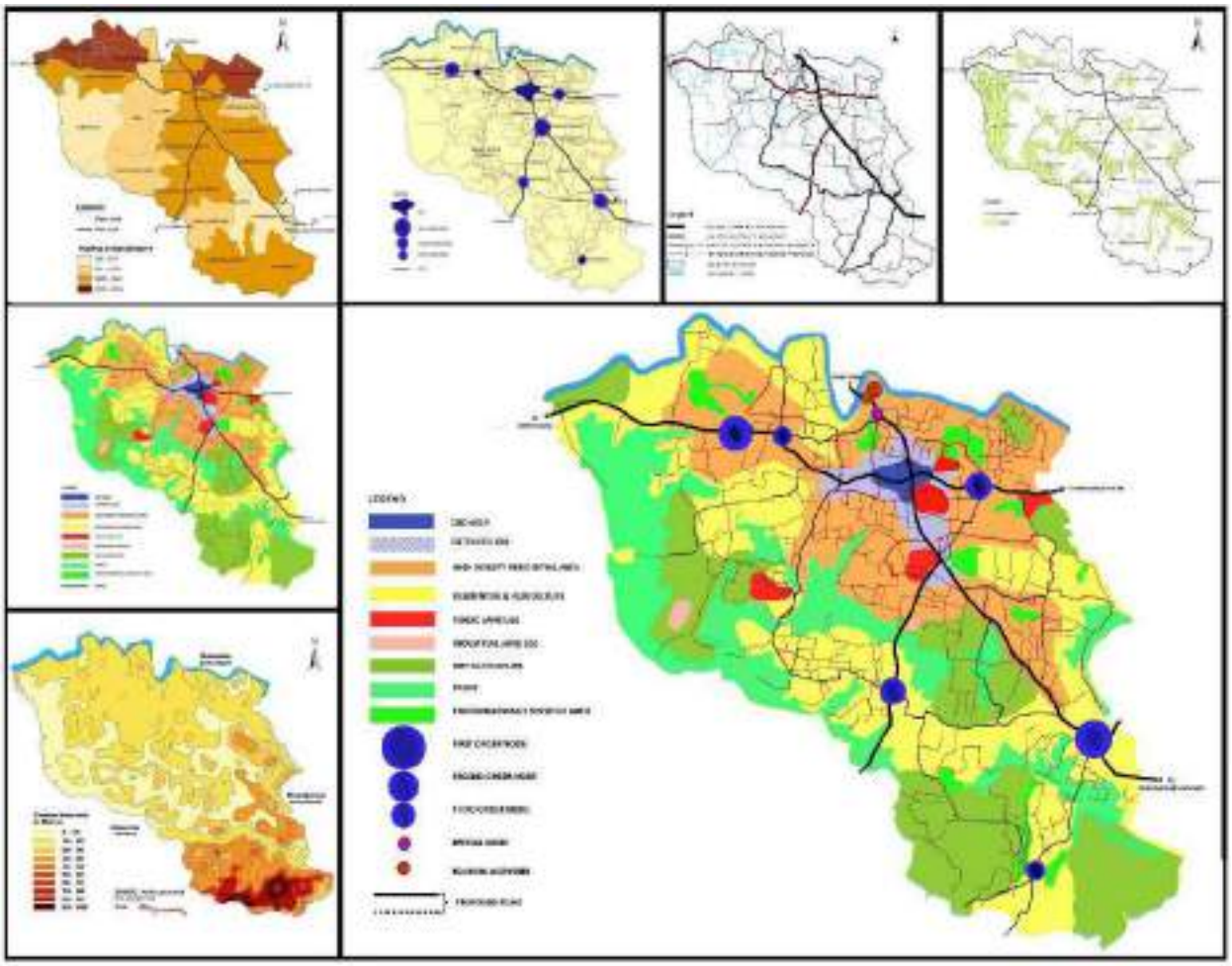


Figure 27.8: Proposed Spatial Structure -Methodology.

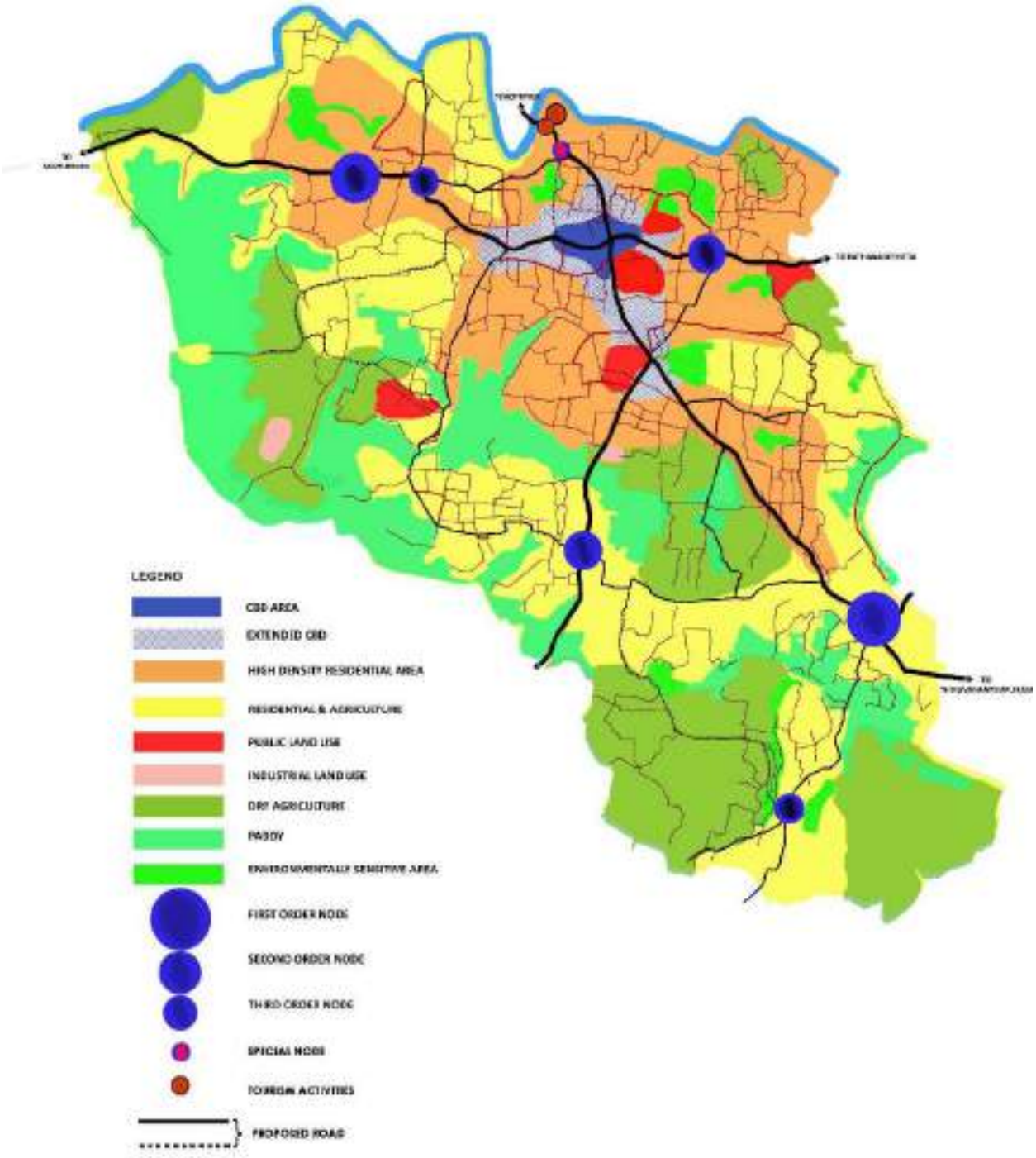


Figure 27.9: Proposed Spatial Structure of Pandalam Town.

27.3 DEVELOPMENT CONCEPT

Along with the proposed spatial structure of the town, those factors influencing the development of the town also need to be considered for the formulation of development concept. As far as Pandalam town is concerned the following sectors have significant influence in the formulation of development concept.

Trade and Commerce

Pilgrim Tourism

Agriculture and Animal Husbandry

Status of the town as a second order settlement in the district

Ancillary Activities

Based on the above factors the development concept for Pandalam has been evolved. Following are the major features of the concept.

- *A road network closely resembles radial pattern.*
- *Extention of C.B.D for provision of various urban activities especially commercial activities.*
- *Development of a hierarchy of nodes to meet the local needs.*
- *Promotion of high intensity residential activities in high density residential area around the central core of the town.*
- *Low density residential areas around the high density residential circle with homestead cultivation.*
- *Agriculture activities in the Southern and South western parts of the town and promotion of animal husbandry sector.*
- *Conservation of environmentally sensitive areas/heritage precincts.*
- *Special zones at different parts of the town with different projects.*

The Development Concept of Pandalam is shown in figure 27.10.

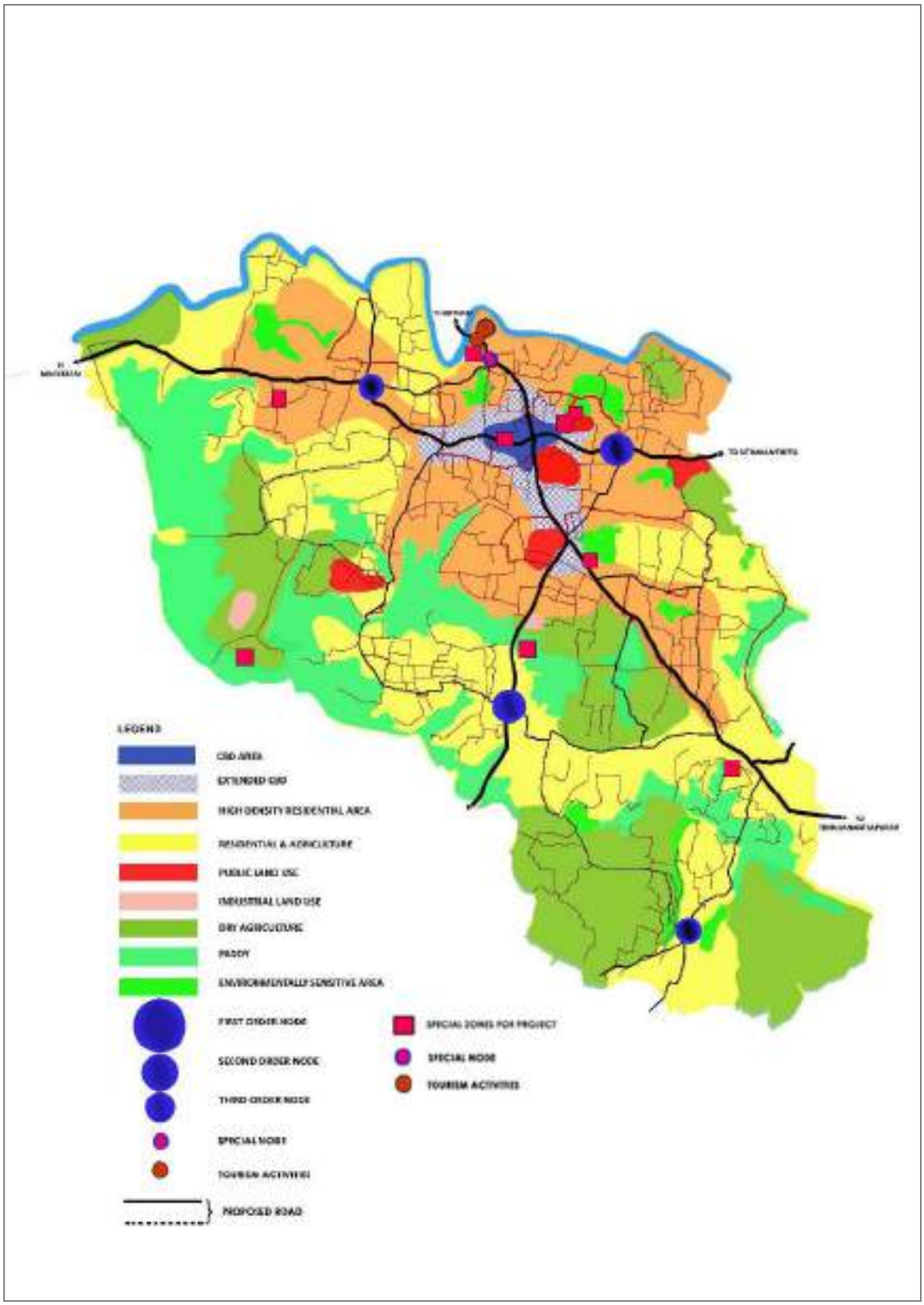


Figure 27.10 Development Concept of Pandalam

The development concept evolved above divide the town into CBD Area, extended CBD, High density residential area, Residential area, Public and semi-Public area, Industrial area and Agricultural area and Environmentally sensitive area. Special zones proposed at different part of the town.

28. POLICIES AND STRATEGIES

28.1 INTRODUCTION

Based on the studies and analysis in various chapters included in Part I of this report, a development concept have been evolved. The development policies and strategies evolved for the implementation of the development concept formulated for a period of 20 years has included in this chapter. The general development policy and sectoral development policy are included in this chapter.

28.2 GENERAL DEVELOPMENT POLICY

The general development policies adopted for implementation of development concept is furnished below.

Extension of the present CBD area for provision of better infrastructure, connectivity and services for the people to make Pandalam as a Second order settlement in the district as well as an administrative hub.

Tourism has been identified as one of the major economic activity of the town. Different types of tourisms like pilgrim tourism, health tourism, agricultural tourism can be adopted to increase the economic base of the town to the extent as possible. Also develop Pandalam as a tourist transit point considering its locational importance.

The Agriculture and Animal Husbandry has been identified as another major economic activity of the town. Intensive agriculture activities in the area identified for the same

and achieve maximum self-sufficiency in the production of rise, vegetables, milk, egg and meat to the extent possible.

Develop Pandalam as a major Market Centre of the region. Also develop Pandalam as a market Centre of the local agricultural produces.

Develop S.S.I units utilizing the locally available raw materials especially, the locally available Agro based products.

Providing better service facilities to the people by provision of better health services, quality education, water and various other infrastructure facilities.

Future development of the town with due consideration to the environment, with protection of all existing environmentally sensitive areas and increase carbon absorption areas.

28.3 SECTORAL DEVELOPMENT POLICIES AND STRATEGIES.

The sector wise policies and strategies for the major sectors identified for Pandalam Municipality are furnished below.

28.3.1 Trade and Commerce.

Policy:

Strengthen the economy of the town by developing the Trade and Commerce activities especially marketing facilities for local products.

Strategies:

- Remold the Pandalam Market as a market of higher standards
- Renewal and restructuring of Kadakkadu Market.

- Extension of Commercial area and providing connected facilities like parking place, drainage, waste disposal system etc.
- Provision of facilities for informal sector and avoid their encroachment to public places.
- Establishment of new commercial complexes by Municipality and other agencies.
- Provision of Parking areas in Market Places and Commercial areas
- Provide market facilities for locally produced value added products and agriculture products.

28.3.2 Industrial Sector

Policy:

Development Policy is to establish industrial units for value addition of locally available resources.

Strategies:

- Promote Agro based industrial units (sugar cane, Rubber, Jackfruits etc)
- Promote Building material units, utilizing the raw materials available in the hinter land
- Provision of infrastructure facilities like road, telecommunication facilities.
- Marketing facilities for the value added products.
- Industrial units for socially and economically weaker sections and industrial units under various self finance groups.

28.3.3 Heritage and Tourism

Policy:

Considering the location importance of the town, explore the potential of tourism, develop Pandalam as a Pilgrim Tourist Transit centre and Conservation of Heritage buildings and places of the town.

Strategies:

- Form a tourist circuit at Pandalam to connect the adjacent Tourist Places.

- Enhance the tourism potential by inter linking different types of tourism like pilgrim tourism, farm tourism and health tourism
- Provide support facilities for tourists.
- Maximum utilization of existing potentials.
- Provide facilities for Sabarimala pilgrims.
- Conservation of buildings/ precincts which have heritage value.

28.3.4 Agriculture sector.

Policy:

Strengthening the economic base of the town through strengthening the agricultural sector.

Strategies:

- Increase the productivity through the adoption of modern cultivation techniques.
- Promotion of homestead cultivation.
- Intense cultivation in the identified area utilizing the available irrigation facilities of KIP.
- Promote sugar cane cultivation by providing well yielding sugar cane plants to the cultivators through “Krishi Bhavan“
- Promoting organic farming and usage of bio fertilizer agriculture activity, the solid waste may be converted in to bio fertilizer.
- Priority for cultivation of vegetables
- Protection of existing ponds for irrigation.
- Retain the paddy fields through promotion of paddy cultivation by adopting suitable practices to maximize productivity.
- Utilize the potential of available markets for selling of Agriculture products.
- Promotion of units for the value addition of agriculture products.

28.3.5 Animal Husbandry Sector

Policy:

Make Animal Husbandry as a profitable profession and achieve self-sufficiency in the production of milk, meat and egg to the extent possible by proper integration of agriculture and animal husbandry sector.

Strategies:

- Establish more dairy, goat and poultry farms and increase productivity through scientific methods.
- Provision of basic infrastructure facilities and upgradation of offices like Veterinary clinics, etc.
- Promote cultivation of fodder grass.

28.3.6 Housing

Policy:

Improvement of structural condition of houses of economically weaker sections and improvement of housing quality of substandard housing area.

Strategies:

- Provide adequate residential areas in land use plan.
- Improvement of substandard housing area through different programmes.
- Provision of basic infrastructure like quality roads, street light, recreational facilities, drainage, drinking water etc. in residential areas.

28.3.7 Drinking water

Policy:

Increase the coverage of protected water supply system. Ensure drinking water of required standard throughout the day for all households of the town. Also provide sufficient water to the commercial and industrial establishments.

Strategies:

- Extension of water supply pipe lines to more areas.
- Provision of separate water distribution system for elevated area.

- Replacement of damaged pipe lines and fittings.
- Provision of rain water recharging zones.
- Conservation of paddy fields and ponds for recharging the ground water sources.
- Promote water Harvesting.
- Upgrade the 8 MLD existing treatment plant to 11 MLD plant.

28.3.8 Transportation.

Policy:

Provide an efficient road network, considering the traffic need of the town, connecting the various activities of the town and also considering the proposals of district road network.

Strategies:

- Developing a hierarchical system of road network.
- Providing new road links for decongesting the traffic in the central area.
- Provision of traffic Terminal facilities.
- Provision of parking facilities.
- Provision of Pedestrian facilities.

28.3.9 Power

Policy:

Provide quality power to the existing consumers and ensure quality power for the new establishments. Provide a good street light system for the town.

Strategies:

- Provide uninterrupted power supply with sufficient voltage.
- Provide a good street light system for the town.
- Electrification of the houses of socially and economically weaker section.
- Adoption of non-conventional source of energy to the extent as possible.

28.3.10 Waste disposal

Policy:

Improve the system of collection, conveyance and disposal of generated waste and provide a hygienic environment. Adopt technologies to generate energy from waste. Maintain the habitable area free from flooding.

Strategies:

- Strengthening the present collection system with additional labours, vehicles etc.
- Upgrade the solid waste treatment plant to energy generation Centre.
- Expansion of dumping yard area and more effective mechanism for waste disposal.
- Extension of waste collection system to more area with people's participation.
- Bio fertilizer manufacturing units.
- New public comfort stations.
- Maintenance of existing road side drains and natural drains to avoid flooding.

28.3.11 Flooding and Drainage

Improve the drainage system of the town and ensure easy drain out of storm water. Adopt measures to minimize the damages to life and properties due to floods.

Strategies:

- New drainage network for the town.
- Proper documentation of Flood 2018 and it includes marking of maximum flood level.
- Removing unauthorized buildings/ structures obstructing existing natural drainage lines. Restriction of unplanned growth so that the construction of structures obstructing natural drainage or resulting in increased flood hazard is not allowed.
- All new critical infrastructure projects like power, water, communication etc compulsorily comply with the safety standards of disaster reduction.
- Prevention of Indiscriminate encroachment of the flood plains of the rivers and waterways of natural and man-made drainage channels and reclamation of ponds, lakes etc
- Multipurpose buildings shall be constructed as flood shelters, which can be used for other purpose during non flood period.

28.3.12 Education

Policy:

Improve the general education status of the town and diversification of courses in higher education sector so as to improve Pandalam as an education center catering the need of surrounding areas.

Strategies:

- Provision of adequate infrastructural facilities for General education institutions in Government and Aided sector.
- Modernization of educational institutions with facilities like smart classes, language labs etc.
- Utilize the unutilized potentials, including land for starting new institutions/courses.
- Supporting facilities like hostels, libraries, sports complexes and career development programmes.

28.3.13 Health

Policy:

Provide modern health facilities to cater the needs of people of Pandalam Municipality as well as surrounding areas. Improve the general health condition of the people by preventive measures. Provide quality treatment through three systems of medicines.

Strategies:

- Providing sufficient working space and infra-structure facility to the primary health centers.
- Promote health tourism.
- Providing infrastructure facilities for Indian System of Medicine and Homeopathic Medicine System.
- Health awareness Programmes.
- Centre for care of Aged people, differently abled children etc.

28.3.14 Civic amenities and recreation facilities

Policy:

Provide civic amenities and recreational facilities as per standard considering the resident as well as floating population.

Strategies:

- Provide new Parks and Open spaces at town level and local level.
- Provide comfort stations associated with parks, parking spaces, and traffic terminals.
- Improvement of existing recreational facilities.
- Improvement to the existing libraries and provision of modern facilities.
- Construction of a crematorium

28.3.15 Environment

Policy:

To make Pandalam Municipality an eco-friendly, hygienic and aesthetically pleasing town by reducing pollution, improving and protecting environmentally sensitive areas.

Strategies:

- Conservation of wet lands and water bodies.
- Provision of rainwater recharging zones.
- Provision of carbon absorbing green spaces.
- Conservation of identified heritage precincts and sacred groves.
- Effective solid waste management.
- Improving aesthetics of the town through various efforts like planned street scape, organized open space etc.

29. PROJECTED REQUIREMENTS

29.1 INTRODUCTION

The developments envisaged for the town through the Development concept of the Master Plan will increase the job opportunities and production in various sectors. This will increase the population of Pandalam town. Trade and commerce, agriculture and animal husbandry, small scale industries and pilgrimage tourism are the activities envisaged in the development concept. In addition to that Pandalam is proposed as a second order settlement in the district and the facilities in this regard has to be provided and this will create job opportunities especially in-service sector.

29.2 CHANGES IN OCCUPATIONAL STRUCTURE

The change in occupational structure will mostly influence the economic activities of the area. 76 % of workers in the municipality belong to other workers category, 15% of workers are Agricultural laborers, 9% of workers are Cultivators and the remaining 3% is Household industrial workers. In the Development concept Trade and Commerce has taken as a major activity for the future and more job opportunity is expected from this sector. Another feature of the town is that nearly 57.21% of the land of the town is under Agriculture land use and there is scope for developing agriculture activity, particularly homestead cultivation and allied activities. In the Development concept, being an urban area more emphasis has been given for industrial development, particularly through small scale Industrial units especially agriculture and allied industries. The estimation of additional job opportunities to be created by 2031 is furnished in the subsequent paragraphs.

1. **Agriculture and allied sector.**

i. **Cultivators.**

Assume 30 percentage of the existing households support homestead cultivation

Approximate number of homesteads available for homestead cultivation.

(Derived from existing land use) -- 2405

Number of cultivators (2011) -- 807

Approximate number of persons attracted for homestead

Type of cultivation -- 300

Total cultivators 2031 -- 1107

ii. Agriculture Laborers

As per the Economic Review 2003, home stead cultivation in an area of 0.25 Ha will create one man day.

Area available for homestead Cultivation (approximately) -- 510 Ha

Number of jobs created in Agriculture and animal husbandry -- 2040

Number of Agriculture labourers (2011) -- 1932

Total Agriculture labourers by (2031) -- 3972

iii. At present the number of persons engaged in **secondary sector** is very low in Pandalam municipality. It is expected to increase the number of Industrial workers almost double by 2031.

People who are working in industrial sector (2011) -- 390

The proposed workers in House hold industry by 2031 -- 390x2 =780

iv. Development in industry, tourism and elevation of Pandalam as a second order settlement will increase the job opportunities in **other sectors**. It is expected to increase the opportunities by 40 % in this sector.

People who are engaged in other sector at present (2001) -- 10167

Total number of workers in other sector by 2031 -- 14234

The expected change in

Table 29.1 Change in occupational structure

Sl:No	Category	2011	2031
1	Cultivators	807	1107
2	Agriculture laborers	1932	3972
3	House Hold Industrial workers	390	780
4	Other workers	10167	14234
	Total	13296	20093

occupational structure by 2031 is shown in Table 29.1 and also in figure 29.1. The work participation rate of Pandalam as per 2011 census is 32.66 %. As per UDPFI Guide lines, for a Municipal Area, the minimum work participation rate shall be 33%. Based on this the work participation rate of Pandalam for the year 2031 is maintained as 33%.

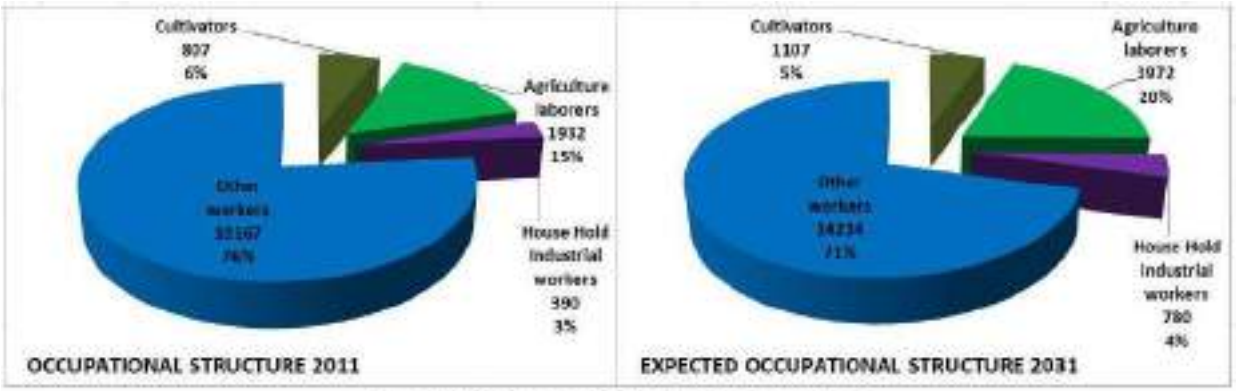


Figure 29.1 Change in Occupational structure

29.3 EXPECTED FUTURE POPULATION

The decadal growth rate of population of Pathanamthitta district was 8.15 % for the period 1991-2001. But district recorded negative population growth rate in 2011 census. In the case of Pandalam Municipality and adjacent Grama Panchayaths, the population growth rate of 1991-2001 was higher than the district growth rate but it shows certain fluctuation during 2001-2011. Also when comparing with the other three Municipalities in the district, the population growth rate of Pandalam Municipality during 2001-2011 is higher. The change in population of a town is directly related to the economic base of the town. Strengthening of the economic base of an area will increase the employment opportunities and this in turn will attract more people to the town and this will lead to increase in population, in addition to the natural growth rate.

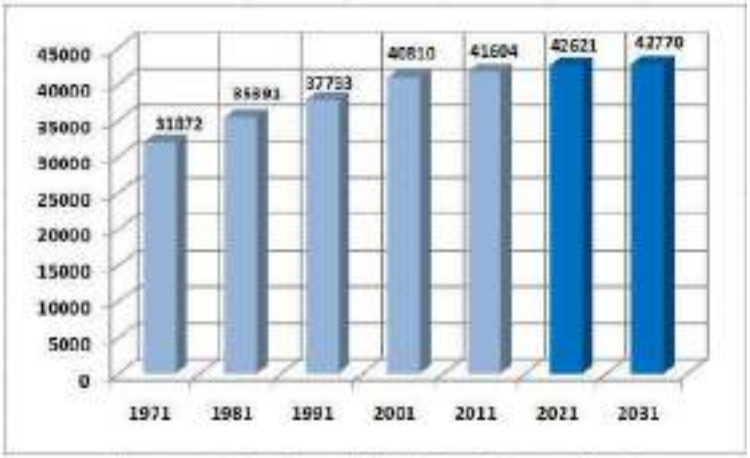


Figure 29.2 Projected population of Pandalam Municipality

The projection of population of the town is done based on anticipated increase in occupational structure. Work participation rate of Pandalam by 2031 fixed as 33% and the the labour force expected in Pandalam by 2031 is 20093. Based on this the population for the horizon year 2031 is estimated as 42770 persons and it is represented in Figure 29.3.

29.4 TRANSPORTATION

The fundamental principle of urban transportation planning is to formulate a long term transportation plan serving the community in the future. Thus it becomes necessary to forecast the future travel pattern for the horizon year. Traffic projection helps in evaluating the shortfall in the existing road network and accordingly plan the road network improvements, augment the facilities such as providing new roads, developing missing links, bypass road etc. In the case of Pandalam town, traffic projections were carried out according to the growth rates worked out by NATPAC on the following criteria.

- Growth rate based on realistic estimates using influencing parameters
- Studies conducted by NATPAC in different towns of similar size in Kerala in the past,
- Variation of AADT on major roads from biannual counts made by PWD periodically.

The criteria adopted for projection of traffic volume and annual growth rate is shown in Table 29.2. The impact of annual traffic growth on peak hour traffic were estimated based on the peak hour factors on daily traffic. On the basis of a critical evaluation of the above growth rates and also factors such as moderation in traffic growth over the years due to development of Information Technology in transportation

Table 29.2 The criteria adopted for projection of traffic volume

Methods	Annual growth rate(%)
Studies conducted by NATPAC in similar towns in Kerala in the past (Peak hour traffic growth)	3 to 6
Growth rate of Motor vehicles registeration in pathanamthitta district during 2008-2012	10.89
Bi annual trafffic count on major roads by PWD during 2007-08 (growth in AADT)	13.5

Table 29.3 Growth rate adopted for traffic volume projection

Hierarchy of road	Traffic growth rate (%)	
	Up to 2020	Beyond 2020
Primary distributer	5	4
Secondary distributer	4	3
Tertiary distributer	3	2

sector, the growth rates adopted for Pandalam study area for different categories of roads viz. primary distributer, secondary distributer and tertiary distributer is shown in Table 29.3 *(Source: NATPAC study)*

29.4.3 Projected link volume on Existing Network

The table below presents the estimated daily traffic for different horizon years on various road stretches in Pandalam Town. Volume-capacity ratio for the horizon years is also given in this table. It can be seen that almost all the major road corridors passing through the central area of Pandalam town would be severely congested in the horizon year with the anticipated traffic more than the capacity of the roads under "do-nothing option". The capacity utilization of

Table 29.4 Projected Daily Volume Capacity Ratio for Horizon Years

Sl. No	Road Link	Carriage way width(m)	Capacity (PCU)	Existing (2013)		2020		2030	
				Volume (PCU)	V/C ratio	Volume (PCU)	V/C ratio	Volume (PCU)	V/C ratio
	I. MC Road								
1	River Bridge (Panchayat Boundary) - Valiya Koyikkal Jn	8.0	15,000	10,909	0.73	14,355	0.96	21,249	1.42
2	Valiya Koyikkal Jn - Pandalam Jn	8.0	15,000	12,393	0.83	16,308	1.09	24,139	1.61
3	Pandalam Jn - Medical Mission Hospital Jn	7.5	12,000	12,463	1.04	16,400	1.37	24,276	2.02
4	Medical Mission Hospital Jn - Kurampala Jn	7.5	12,000	12,025	1.00	15,823	1.32	23,423	1.95
5	Kurampala Jn - Boundary	7.5	12,000	12,312	1.03	16,201	1.35	23,982	2.00
	II. Mavelikkara - Kaippattoor Road								
6	Irannikkuzhi (Boundary) - Cherikkal Road Jn	7.0	12,000	8,361	0.70	11,003	0.92	16,287	1.36
7	Cherikkal Road Jn - Muttar Jn	7.0	12,000	10,966	0.91	14,431	1.20	21,361	1.78
8	Muttar Jn - KSRTC Jn	7.0	12,000	13,741	1.15	18,083	1.51	26,767	2.23
9	KSRTC Jn - Pandalam Jn	8.0	15,000	21,212	1.41	27,913	1.86	41,319	2.75
10	Pandalam Jn - Kadaikkadu Jn	6.0	12,000	12,128	1.01	15,959	1.33	23,623	1.97
11	Kadaikkadu Jn - Muttam Jn (Boundary)	6.0	12,000	12,082	1.01	15,899	1.32	23,534	1.96
	III. Medical Mission Hospital Road (Mavelikkara Road)								
12	Medical Mission Hospital Jn - Poozhikkadu Jn	5.0	9,000	8,839	0.98	11,632	1.29	17,218	1.91
13	Poozhikkadu Jn - Boundary	5.0	9,000	9,292	1.03	12,228	1.36	18,101	2.01
	IV. Pazhakulam Road								
14	Kurampala - Post office Jn	5.0	9,000	3,661	0.41	4,818	0.54	7,132	0.79
15	Post Office Jn - Panchayat Boundary (Kadamankadu)	5.0	9,000	3,517	0.39	4,628	0.51	6,851	0.76
	V. Cherikkal Road								
16	Mavelikkara road jn - Cherikkal ITC	6.0	12,000	503	0.04	663	0.06	981	0.08
17	Cherikkal ITC - Cherikkal KSEB	3.5	9,000	87	0.01	114	0.01	168	0.02
	VI. Kurampala - Keerukuzhi Road								
18	Kurampala - Thekkekkara Panchayat Boundary	4.5	9,000	1,549	0.17	2,039	0.23	3,018	0.34
	VII. Valiya Koyikkal Jn - Muttar – Poozhikkadu - Kurumpala LP school Jn (On MC Road)								
19	Valiya Koyikkal Jn - Muttar Jn	3.5	9,000	1,957	0.22	2,576	0.29	3,813	0.42
20	Muttar Jn - NSS Ayurveda College Jn	3.5	9,000	3,900	0.43	5,132	0.57	7,597	0.84
21	NSS Ayurveda College Jn - Poozhikkadu Jn	3.5	9,000	2,813	0.31	3,702	0.41	5,479	0.61
22	Poozhikkadu Jn - Thavalam kulam Jn	3.5	9,000	1,650	0.18	2,171	0.24	3,214	0.36
23	Thavalamkulam Jn - Kurumpala LPS Jn (On MC Road)	3.5	9,000	814	0.09	1,071	0.12	1,586	0.18

major corridors like MC road, Mavelikkara – Pathanamthitta road and Poozhikkadu – Medical Mission road will be carrying heavy traffic in excess of their capacity by the year 2030.

29.5 HOUSING AND SHELTER

While dealing with housing, it is first necessary to distinguish between housing need and housing demand. Whereas the need refers to inadequacy of existing provisions when compared with socially acceptable norms, demand is an economic concept, wherein standard and amount of housing demand is related to household's income and ability to pay. Both housing need and demand are affected by factors such as housing shortage and rate of obsolescence, whereas demand would be additionally affected by affordability and future housing needs. Future need of housing is assessed based on the following criteria.

- Structural condition of buildings.
- Squatter settlements in Puramboke land.
- Housing for the additional households.

It is estimated that 8.36 % of the total residential buildings in the town are kutcha buildings and huts and require immediate upgradation. There are a total of 64 substandard housing areas are found within the municipality. It is necessary to provide sufficient infrastructure as well as service facilities to these areas.

The projected population of Pandalam municipality by 2031 is 42770. So an additional population of 1166 has to be accommodated in the town. Considering all the above factors approximately 800 new additional houses is to be constructed in the next twenty years.

29.6 DRINKING WATER

The standered adopted for the estimation of the requirement of

Table 29.5 Standard of drinking water requirement

Use	Requirement in lpcd
Domestic use	200 lpcd
Public use	5% of total
Fire demand	1 lpcd
Distribution loss	15% of total

drinking water for the year 2031 as per IS: 1172- 1993(2003 Revised), IS Code on "Basic Requirement of Water Supply, Drainage, and Sanitation and details are furnished in the Table 29.5.

The estimated demand of water for various purposes for the year 2021 and 2031 are furnished in the Table 29.6. The total demand for the horizon years 2021 and 2031 are 10.35 MLD and 10.38 MLD respectively. The present supply of water is 8.00 MLD and there is deficiency of 2.35 MLD and 2.38MLD respectively in the year 2021 and 2031.

Table 29.6 Estimation of water demand

Year	2021	2031
Population	**42641**	**42770**
Domestic water demand (in MLD)	8.53	8.55
Demand due to public use (in MLD)	0.43	0.43
Fire demand (in MLD)	0.04	0.04
Loss in transmission (in MLD)	1.35	1.35
Total water demand (in MLD)	**10.35**	**10.38**
Present supply (in MLD)	8.00	8.00
Difficiency in supply (in MLD)	2.35	2.38

29.7 SOLID WASTE

The estimation of quantity of solid wastes to be handled by the year 2031 is furnished below. At present in 99% of houses, waste is disposed in own compound. Since a major portion of the town is proposed as Agriculture area and considering low density, it is assumed that only half of the waste needs to be collected by an agency. The waste to be collected from the remaining portion of the town is estimated as follows.

Projected population		– 42770
Half of projected population		– 21385
Waste to be collected	– 21385X0.25 Kg/day	- 5.35 tons/day.
Present collection		– 3.00 tons/ day.

So a system has to be evolved for collection and disposals of an additional quantity of 2.35 tons/day by 2031.

PART.III

LAND USE PLAN, SECTORAL PROPOSALS AND MODEL PROJECTS

30. LAND USE PLAN

30.1 INTRODUCTION

Based on the development concept evolved proposed land use plan is prepared and suitable areas have been earmarked for different land uses considering the present trend of land development and projected requirements. Land use plays a major role in the process of evolving better environment for the town. The land use plan for 2031 is proposed in tune with the policies and strategies mentioned in previous chapters.

In the proposed land use plan, land has been set apart for **residential, residential mixed, commercial, public and semi public, industrial, dry agriculture, paddy field & wet land, sacred groves, water body/canal, roads etc**. Also special zones are proposed for Projects for Central area, Pandalam Palace and premises, NSS Medical Mission Junction improvement, Stadium and Town hall near Kadakkad, Park near Thikkuttathilpadi, Picnic village near Cherickal, Park at Kurampala, View point at Athiramala and Park at Poozhikkad. The proposed land use is shown in Figure 30.1.

30.2 RESIDENTIAL USE ZONE

The total land under residential use in Pandalam Municipality is 961.19Hectare, which is 33.82% of the total town area. The overall density of population is only 14.63 persons/ hectare and the residential density is 44.47 persons/ Hectare. For a small town like Pandalam, URDPFI Guide line proposes, an average density of 75-125 persons per Hectare. Assuming a population density of 75 persons/ Hectare, 570Hectare of land is required for residential use by 2031. According to the development concept, the area suitable for residential purpose has identified around the central core of the town. In the proposed land use 2031, 46.26% of land has proposed for residential (including residential mixed) land use. It is comparatively large area

and the residential density is far below the recommended standards. Homestead type cultivation can also be accommodated in this zone.

30.3 COMMERCIAL USE ZONE

Area required for commercial and trade activities have been work out on the assumption that as an average 0.50 Ha per person (URDPFI guide line specifies an area of 500 Ha per 1000 Persons) is required. Thus the commercial area requirement is worked out as 20.80 Ha. The present area of land under commercial use is 23.65Ha, which is 0.83 % of total town area. According to the development concept, the C.B.D and extended CBD mainly includes commercial area. Extended CBD is proposed to accommodate the future development. It also includes commercial development. The total area of proposed commercial zone is 55.55 hectares, which is 1.96 % of the town area.

30.4 RESIDENTIAL MIXED USE ZONE

Considering the high density, population concentration, trend of development and nearness to the town Centre an area 19.85% of land has been set apart as residential mixed zone.

30.5 PUBLIC AND SEMI PUBLIC USE ZONE

Additional land has been proposed as an extension to Kadakkad agricultural farm. Total land under Public and Semi Public land use zone (Including Existing and Proposed) is 94.11 hectares, which is 3.32% of total area. In addition to that public uses are included in special zones under various projects.

30.6 INDUSTRIAL USE

At present hardly 11.73 hectares of land, which is only 0.41 % of the total town area is coming under the industrial use. The number of industrial workers in the year 2031, is worked out as 780. So additional 390 new employment opportunities have to be provided in the secondary

sector. No major industries are proposed for the town and targeted employment generation under industrial sector is proposed to be met through promoting small scale industrial units. There is no proposal exclusive for industrial zone except the proposed rice mill. When the agriculture production increases through modern cultivation techniques, the mill may act as a ware house for rice as well as a processing unit. The area proposed for industrial use is 13.45 hectares.

30.7 DRY AGRICULTURE USE ZONE

As per the land use survey 995.12 hectares of land is coming under dry agriculture land use and is under cultivations like coconut, mixed crops and rubber, which is 35.02 % of the total town area. The land reserved under Dry Agriculture area in the proposed land use is 415.63 hectares which is 14.66 percentage of total town area.

30.8 PADDY FIELD & WETLAND ZONE

The paddy fields and wetland are identified as environmentally sensitive areas and 712.64 hectares of land, which is 25.13 percentage of the town area is proposed to retain as paddy field and wet land. Special provisions are included in the zoning regulation for the protection these environmentally sensitive areas.

30.9 SACRED GROVES ZONE

Sacred groves are considered as Environmentally Sensitive Areas and existing sacred groves are proposed as an independent zone. 1.58 Hectares of land, which is 0.06% of the total area is coming under this zone.

30.10 ROADS

104.24 hectares of land which is 3.67% of total town area is the area of proposed road network.

30.11 WATER BODY/CANAL

112.09 hectares of land is coming under the category of water body/canal.

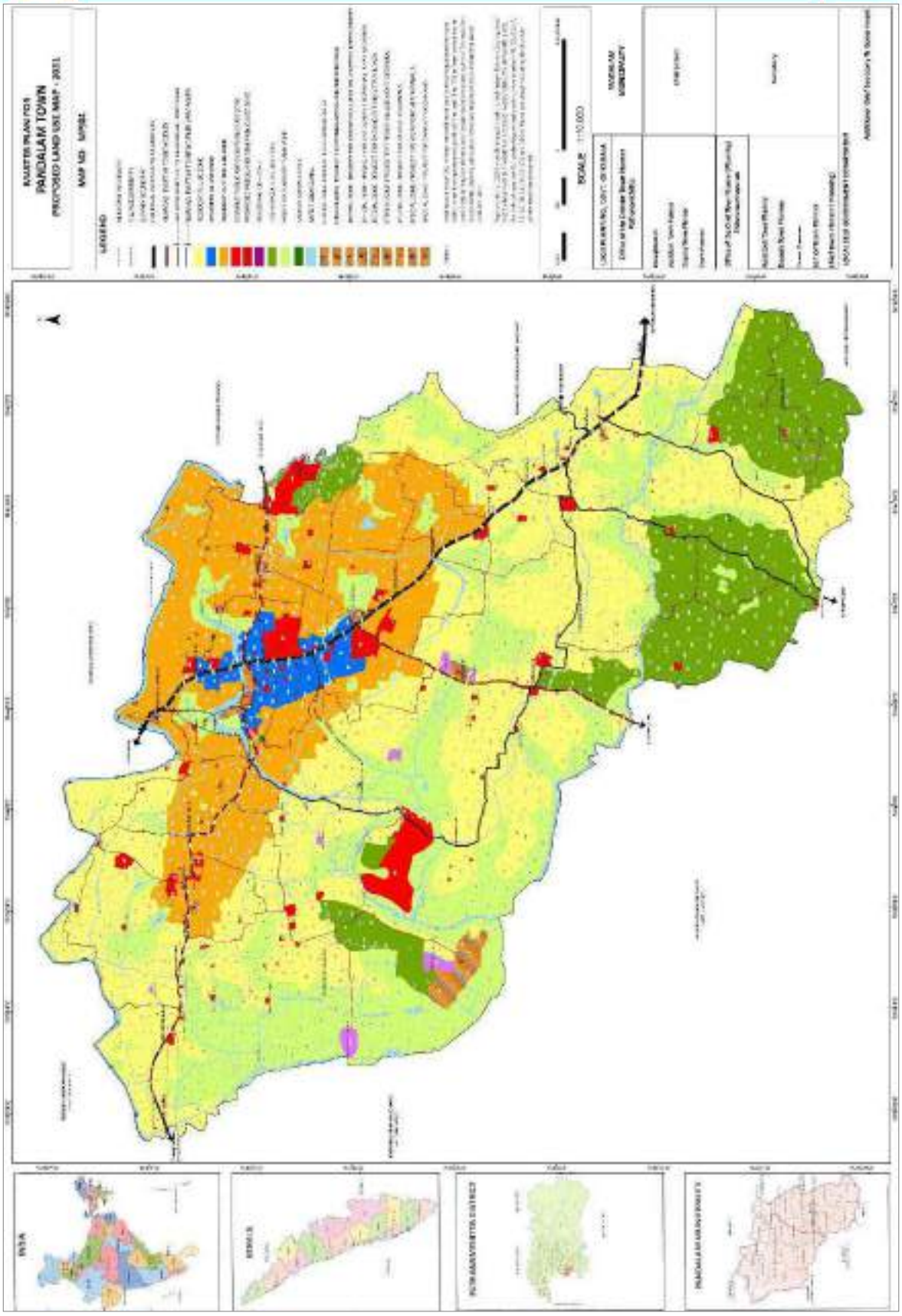


Figure 30.1 Proposed land use

30.11 SPECIAL ZONES

The following nine special zones are proposed in different parts of the town for identified projects.

Special Zone-1 : Project for Central Area

Special Zone-2 : Project for Pandalam Palace and Premises

Special Zone-3 : Project for NSS Medical Mission Junction Improvement

Special Zone-4 : Project for Stadium and Town hall near Kadakkad

Special Zone-5 : Project for Park near Thikuttathilpadi

Special Zone-6 : Project for Picnic Village near Cherickal

Special Zone-7 : Project for Park at Kurampala

Special Zone-8 : Project for View point at Athiramala

Special Zone-9 : Project for Park at Poozhikkad

Proposals for Transport Terminals, Commercial Complexes, Office Complex, Waterfront development along Kurunthottiyam thodu, Pilgrim amenities, Open spaces, under pass, Parks and tot lots, trade and fair area, Junction improvements, Evacuation space, Heritage walk way, Theme park, Bus bays etc. are included in the above projects. Details about these projects are included in Chapter 33 of this report. 32.70 hectares of land is set apart for special zones.

30.12 PROPOSED LAND USE

The proposed land use has been evolved based on the development concept and the projected requirement for the horizon year. The Pandalam municipal area has divided into following 9 land use zones and 9 special zones as per the proposed land use.

Table 30.1 Proposed Land use

Sl:No	Land use	Area (in hectares)	Percentage
1	Residential Use Zone	748.89	26.24
2	Commercial Use Zone	58.04	2.03
3	Residential Mixed Use Zone	566.84	19.86
4	Public and Semi Public Use Zone.	94.03	3.30
5	Industrial Use Zone.	13.52	0.47
6	Dry Agriculture Use Zone	415.46	14.56
7	Paddy Field & Wetland Zone	706.31	24.75
8	Sacred Groves Zone	1.61	0.06
9	Roads	104.24	3.65
9	Water body/Canal	111.84	3.92
	Special Zones		
1	Project for Central Area	5.03	1.15
2	Project for Pandalam Palace and Premises	1.02	
3	Project for NSS Medical Mission Junction Improvement	2.30	
4	Project for Stadium and Town hall near Kadakkad	1.20	
5	Project for Park near Thikuttathilpadi	0.61	
6	Project for Picnic Village near Cherickal	18.15	
7	Project for Park at Kurampala	0.79	
8	Project for View point at Athiramala	0.23	
9	Project for Park at Poozhikkad	3.37	

The abstract of the proposed land use 2031 is presented in the table 30.1. It is also shown in Figure 30.2. The activities which are permissible in different use zones are explained in the Chapter 34 - Zoning regulations

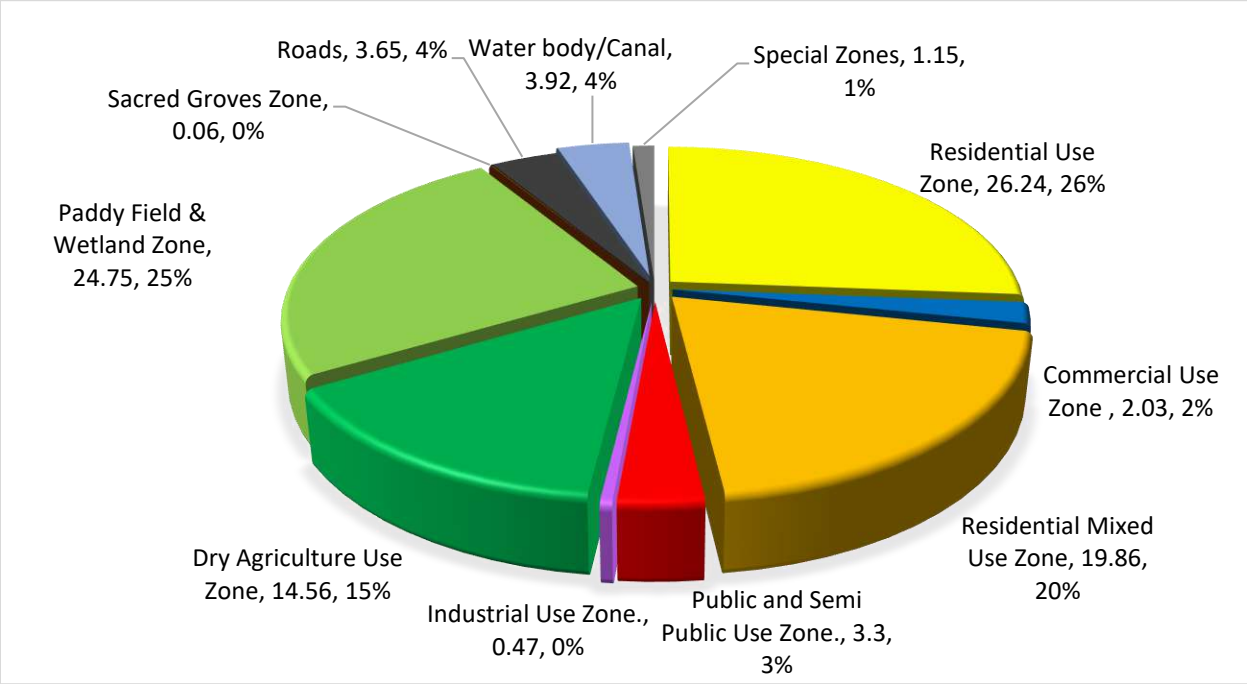


Figure 30.2 Proposed land use- zone wise break up

31. TRANSPORTATION PLAN

31.1 INTRODUCTION

Transportation is one of the inevitable sectors for the development of an urban area and this chapter details the development proposals to be implemented in the transportation sector within the plan period of 20 years in Pandalam Municipality. Due importance has been given for providing an efficient transportation system considering the future traffic also. Proposals for an efficient road network, terminal facilities, parking facilities and pedestrian facilities are included in this chapter.

31.2 ROADWAY

As already mentioned in the chapter 14 of this report, two roads, i.e M.C.Road and Mavelikkara Pathanamthitta Road, carries the major share of traffic through the town. NSS Medical Mission Junction- Kayamkulam Road also carries a considerable share of traffic through the town. Due to some missing links in the existing network majority of vehicles passing through Pandalam has to touch the town centre before leaving to other places. In addition to that, major traffic generating activities of the town are located along the side of the above roads. Emphasis has been given for the improvement of road network by developing some existing roads, providing new links etc.

31.2.1 Proposed road network 2031

The existing road network of the town is not following any particular pattern due to topographical reasons. But it closely resembles ring and radial pattern. A hierarchical system of road network is proposed for the town as shown in Figure 30.1. Four categories of roads ie, First order roads (21.00m width), Second order roads (18.00m width), Third order roads (12.00m width) and

Fourth order roads (7.00m width) are proposed. Most of these roads are formed by widening the existing roads and few new roads are also proposed. The proposed road network is for decongesting the town Centre and opening more land for various urban activities. The proposal of the new by-pass road along the western and eastern part of the town centre also included in the proposed transportation plan.

31.2.2 First Order Roads

Principal road network for through traffic is included in these categories. It is expected that this roads will carry major share of intra-urban traffic. For this road 21.00m width is proposed. The first order road proposed under the category is given below.

1. M.C Road from Municipal boundary (Achankovil River bridge) to Municipal boundary (Pallimukku) via Manikandan Althara junction and Chithra hospital junction

31.2.3 Second Order Roads

Principal road network for through traffic is included in these categories. It is expected that these roads will carry major share of intra-urban traffic. For these roads 18.00m width are proposed. Following are the second order roads proposed under different category.

1. Mavelikkara - Pathanamthitta Road in between the municipal boundaries.
2. Kayamkulam Road from Medical Mission Hospital junction to Municipal Boundary.

31.2.4 Third Order Roads

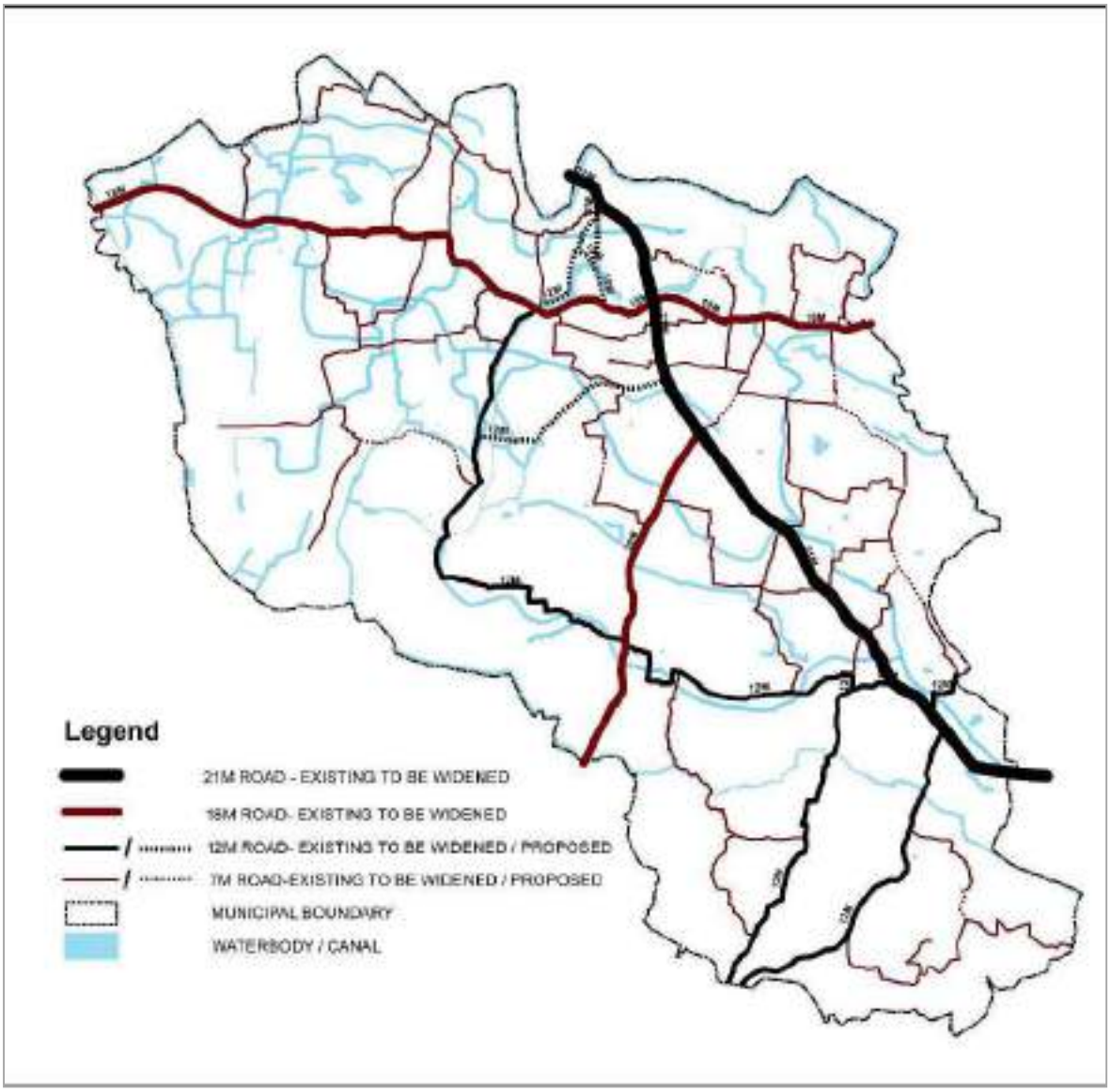


Figure 31.1 Proposed Road Network

These roads are of comparatively lower level of travel mobility than first and second order roads. At the same time these roads also have inevitable significance in the travel mobility. Following roads are proposed as third order roads and the proposed width of these roads are 12.00m.

1. Road from Mutter junction to Kurampala Puthenkavil temple junction via Poozhikkad junction

2. Road from Manikandan Aalthra to KSRTC Bus Station(Existing and proposed)
3. Road connecting Manikantan Althara and Muttar (proposed road)
4. Proposed road connecting road 2 and 3.
5. New road connecting MC Road (near CM Hospital junction) and Muttar Puzhikkad road
6. Pazhakulam road from Puthenkavu junction in MC Road to municipal boundary near Thandanuvila HSS via Puthenkavil temple
7. Pazhakulam road from Kurampala Petrol pump junction to Municipal boundary via Post office.
8. Keerukuzhy Road from Kurampala junction to municipal boundary

31.2.5 Fourth order roads

These roads are intended for collecting and distributing the traffic to and from higher order roads and also for providing access to interior areas and these are located in residential neighborhood, business areas. The width of the road is proposed as 7.00m.

1. Road from Mahadevar temple to junction near Mudiyoorkkonam in Mavelikkara road. (Existing and proposed)
2. Road from cherumukha jn to Cherikkal road.
3. Road between MET School jn and Cherikkal ITI jn.
4. Road between Mavelikkara road and road no.3 under 7m wide proposal
5. Road from Mavelikkara road to Mahadevar Temple
6. Road from Mangaram school jn to Mahadevar Temple
7. Road from Kadakkad to proposed Stadium
8. Road from Kadakkad temple jn to Kadakkad church road
9. Road from MC road, near NSSGHS to Pathanamthitta road near Kadakkad
10. Road from MC road, near NSSGHS to to Muttar jn..

11. Road from MC road, near NSS College entry to western side
12. Road from Kadakkad to Medical Mission Hospital junction (existing and proposed)
13. Road from MC road, near southern boundary of NSS College to road 12
14. Road between Kadakkad and Road no.13 under 7m wide proposal
15. Road from Kayamkulam road near Poozhikad chira to jn near Vayojana vinjapana kedram.
16. Road from Kurampala - Keerukuzhy road to Pathanamthitta road at Kadakkad temple jn.
17. Road connecting Road no.16 under 7m wide proposal and road no 12.
18. Road connecting Road no.17 under 7m wide proposal and Sankarathilpadi jn
19. Road connecting Road no.18 under 7m wide proposal and road no.16 under 7m wide proposal
20. Road connecting Road no.16 under 7m wide proposal and Edayadiyil jn
21. Road connecting Road no.16 under 7m wide proposal and pynamood jn
22. Road from Kayamkulam Road (between MM Hospital and Chiramudi Jn) to Edayadiyil jn
23. Road connecting Sankarathil Padi and Puthenkavil temple jn - Poozhikkad road
24. Road connecting Thandanuvila school-Puthenkavil temple road and Kurampala-Poozhikkad road
25. Road connecting road no.24 under 7m wide proposal and Pazhakulam Road
26. Road between Perumpaloor Temple Vanchi mukku and Post office jn.(Existing and proposed)
27. Road connecting road no.26 under 7m wide proposal and municipal boundary near Paranthal
28. Malankavu Malanada temple link road

29. Road connecting Manikantan Althara to Muttar jn via Govt UPS Mangaram.
30. Road connecting Police station junction in MC Road to stadium.
31. Road from Kunnikuzhy Junction in Mavelikkara Road to Municipal Boundary.
32. Road connecting Cherickal Road and Mannam Ayurveda Medical College Junction(Existing and proposed)
33. Road from Cherickal to municipal boundary (near cashew factory)
34. Road connecting Cherickal and proposed Picnic village
35. Road from vayojana vinjapana kendram to Pathanamthitta-Mavelikara road near Muttar jn.
36. Road from pynamoodu jn (MC road) to Puthenkavil temple jn

A connection can be proposed from the road through ambathayi Colony to Tumbaman grama panchayat on MC road at Painammood junction will help to reduce the movement of vehicles from Adoor side and to reroute the vehicles easily to Pathanamthitta road instead of going to Pandalam junction.

31.2.6 Intersection Improvements

Intersections are the conflict points and are prone to accidents. All-important junctions are proposed for scientific planning and geometric design for streamlining traffic flow and minimizing conflicts points. The following intersections in Pandalam town need to be taken up for detailed design considering the importance of nodes, land use, existing traffic flow and the future road widening, proposed roads etc.

MC Road

(i) Pandalam Junction (Central Junction)

(ii) Manikandan Aalthara Junction

(iii) Medical Mission Hospital Junction

(iv) Kurampala Junction (Keerukuzhi Road)

(v) Kurampala Junction (Pazhakulam Road)

Mavelikkara Road

(vi) Muttar Junction

Kaippattoor road

(vii) Kadakkad Junction

Kurampala-poozhikkadu-Muttar Road

(viii) Poozhikkadu Junction

Fly overs are proposed at Pandalam junction and Medical Mission Hospital junction for the smooth flow of through traffic.

31.3 BUS TERMINALS

The condition of the existing bus terminals of the town has already been mentioned in chapter.14. The location of private bus station close to Pandalam junction and narrow entry and exit to the bus station create traffic problems in Mavelikkara road and Pandalam junction. In order to avoid the problem and to provide better interchange facilities a new modern bus station is proposed adjacent to the KSRTC Bus station. A modern bus terminal is also proposed for KSRTC Buses in the existing bus station.

31.4 PARKING SPACES

Currently there is no off-street parking space within the C.B.D Area of the town. The on-street parking in major roads is reducing the effective capacity of roads and leading to congestion. Parking Area is proposed at the following locations

i. Near Manikandan Althara

ii. Near proposed Commercial complex at present private bus stand

31.5 PEDESTRIAN FACILITIES

Pedestrian facilities are inadequate in the town and the following facilities are proposed in this sector.

i. Pedestrian under pass Ways near Manikandan Aalthara from the proposed parking space.

ii. Providing standard foot path at

a. Pandalam town Centre

b. From Pandalam market to Pandalam junction

c. From NSS Medical Mission Hospital to NSS college

iii. Providing zebra line crossing at crossing points.

31.6 RAILWAYS

Absence of rail connectivity is the major drawback of the town and the people have to depend Chengannur railway station for their rail travel needs. Rail connectivity is needed for the town and the region. The feasibility of Chengannur – Thiruvananthapuram Railway line via Pandalam, Kottarakkara is to be explored.

32. SECTORAL PROPOSALS

32.1 INTRODUCTION

The sector wise proposals of Pandalam Master Plan are included in this chapter. The proposals are derived based on development concept and development issues pertaining to the sectors. The economic feasibility and the environmental feasibility etc are considered for finalizing the proposals. The proposals of transportation sector is included in Chapter 31. Certain model projects of different sectors have been proposed as special zones in the proposed land use map. The details of these projects are available in Chapter 33.The sector wise proposals are furnished below:

32.2 TRADE AND COMMERCE

Pandalam is proposed as a second order settlement of the district and It is important to develop the trade and commerce sector in Pandalam municipality area. The major projects includes,

32.2.1 Commercial Complex at central area

A commercial complex is proposed in the central area where sufficient of land is the available. Sufficient parking space, easy accessibility from road and walkway are the features of this project.

32.2.2 Hawking Areas

Hawking areas are proposed for the rehabilitation of Hawkers and vendors at suitable locations within the municipality. These proposals can be implemented as part of National Urban Livelihood Mission.

32.2.3 Expansion of CBD

The existing land use of the town reveals that in most part of the town, the commercial development has taken place along the road sides as ribbon development and the interior portions are remaining as under developed areas. It is proposed to expand the present CBD by provision of adequate infrastructure for increasing the commercial activities.

32.2.4 Pandalam Market renovation

Renovation of Pandalam Market by improving the yard condition, construction of new stalls and provision of infrastructure facilities like drainage, parking area, toilet facilities and garbage collection system.

32.2.5 Shopping Complexes near KSRTC & Private bus stands

New shopping complexes by Municipality and other agencies are proposed in commercial areas with sufficient parking and other basic facilities.

32.2.6 Trade and Fair Area

An area for conducting Trades and Fares on the side of proposed walkway near central area

32.3 INDUSTRY

Presently no major industrial units are functioning in Pandalam Municipal area and the industrial activities are limited to few MSME units. Local agricultural produces are available in the region. The major proposal in the industrial sector involves.

32.3.1 Small Industrial units

Small industrial units for value addition of agricultural products of the region proposed. Jack fruit and coconut are available in plenty in the region.

32.3.2 Exhibition cum Sale Centre

Permanent Exhibition cum sale Centre near Pandalam palace area for selling locally manufactured industrial products.

32.4 TOURISM and HERITAGE

There is potential for developing pilgrim tourism within the town. Sree Dharma Sastha temple and Pandalam palace associated with Lord Ayyappa is situated in the town. The town attracts lot of pilgrims especially during the Sabarimala Mandala- Makaravilakku season and in fact it is one of the major activities of the town. The town has locational advantage and proposals are mainly in the nature of supporting facilities to the tourists.

32.4.1 Central area development project

Renovation and protection of the Kurunthottiyam thodu, construction of water front walk way along the side of Kurunthottiyam thodu, Way side resting place, stalls etc. are the components of this project. The project can be implemented jointly by Minor irrigation, social forestry and Tourism departments.

32.4.2 Palace Area development Project

Provision of basic facilities for the pilgrims like parking area, shopping complexes, toilet, clock room etc. Conversion of present parking space to open space and evacuation area. Park near Manikandan Aalthara, Under pass for pedestrians to reduce the conflict between vehicles passing through MC road and pedestrian, construction of a heritage walk along the side of the Achankovil river etc. are the part of the project.

32.4.3 Tourism Circuit

Utilizing the location advantage of the town, a tourism circuit connecting Pandalam with adjacent tourist spots like Thenmala, Punalur, Gavi, Aranmula, Mannadi, Kollam, Kumarakom, Alappuzha etc. A pilgrimage circuit can also be created by connecting the temples around Pandalam municipality

32.4.4 Aesthetic Beauty of the town

Improvement of aesthetic beauty of the CBD area of the town by various programmes. Tot lots, green spaces, water front walk way along Kurunthottayamthodu, footpaths with hand rails, modern light system are the other components of this project.

32.5 AGRICULTURE

Major portion of land of the town is coming under different category of agriculture land use. Irrigation facilities are available in the town. As per the district urbanization report of Pathanamthitta, Agriculture, Animal Husbandry and Small-Scale Industries are the activities proposed for the town.

Most of the paddy fields are remaining uncultivated or under the cultivation of crops like vegetable, plantain, tapioca 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 paddy field & wet land zone has been proposed.

32.5.1 Irrigation projects

Branch canals and distributaries of the Kallada Irrigation project passes through Pandalam town. Many of these canals are not functioning properly due to lack of maintenance and water is not reaching the agriculture land properly. Proper maintenance of canals , canal inspection roads and providing facilities for getting water from irrigation canals are the proposals in this sector.

32.5.2 Protection of water bodies

The water bodies including ponds and canals were the main source of water for irrigation in the earlier days. With the decline of agriculture activities many of these ponds are in a dilapidated condition. Protection of these water bodies are essential considering the rejuvenation of agriculture activities and the environmental protection of the town. This

project can be implemented under watershed development programme. Retaining walls can be constructed along the river bank as a flood prevention measure.

32.5.3 Strengthening Agriculture labour bank

The agriculture sector of the town is facing lack of supply of agriculture laboures. Already two units are functioning in the town - Agro service centre and Karshika Karma Sena and strengthening of these units will solve the problem of deficiency of Agriculture labours. This programme can be implemented jointly by Krishibhavan, Pandalam and Pandalam Municipality.

32.5.4 Cultivators Group / Group Farming and Implements bank

For facing the problems in agriculture sector effectively measures like cultivator's group/ group farming may be adopted. An agricultural implements bank is also to be setup. Cultivation in the uncultivated land by leasing out the land to interested cultivators groups may be promoted.

32.5.5 Bio-fertilizer Plant

Promoting organic farming and the usage of bio fertilizer is one of the main agriculture promotion strategy for the town. This is to be achieved through the installation of Mini Bio fertilizer plant in all houses of the town for the disposal of the degradable wastes and for the production of bio gas and manure with the subsidy of Government. A Centralized plant for processing the wastes collected from the public places.

32.5.6 Medicinal agro farm

Construction of a Medicinal Agro Farm in Mannam Ayurveda Medical college campus. It can be developed as a tourism spot.

32.5.7 Vegetable Cultivation

Scheme for attaining self sufficiency to an extent in the production of commonly used vegetables by extension of vegetable cultivation to more areas. Possibility of exporting vegetables also to be explored.

32.5.8 Value addition of Agro based products

Units for value added products from the agricultural products of the town and its hinter land.

32.5.9 Soil Conservation measures

Considering the undulating topography of the town proper Soil conservation measures under watershed development programmes is proposing.

32.6 ANIMAL HUSBANDRY

The activities in the animal husbandry sector shall be coordinated with other sectors especially agriculture sector. Enough land is available in the town for this activity as more than half of the Municipal area is under agriculture use. Coordinated efforts in a centralized manner is required in the production of egg, meat, milk etc. in a profitable manner. The area which identified as suitable for agriculture activity is suitable for the animal husbandry also.

32.6.1 New dairy farms

Considering the vast agriculture land available and rural nature of part of the town establishing small scale dairy farms with 10 to 25 cows in a unit are proposed.

32.6.2 New office complex for Veterinary Hospital and upgradation to Veterinary Poly clinic

New building for veterinary hospital is required. It can be constructed on the municipal land which is near to existing veterinary hospital. Pandalam possess the highest number

of live stocks in Pathathanamthitta district. The veterinary hospital proposed to be upgraded to Veterinary Poly clinic.

32.6.3 Marketing of products

Facilities for selling of the products like broiler chicken, egg etc are to be attached to the markets of the Pandalam Municipality.

32.7 HOUSING

The structural conditions of houses are comparatively better in Pandalam municipality. That is 91.14% of houses comes under Pucca and moderate type of buildings. But there are a few substandard houses are also there in the area. In housing sector, the proposals include Improvement of internal roads of colonies, Improvement of drinking water facilities of colonies and Improvement of Electric Supply and Providing Street light to colonies.

32.8 DRINKING WATER

The projected population of pandalam town for the year 2031 is 42770 and it is estimated that an additional quantity of 2.38 MLD of water is required for the town in the horizon year.

32.8.1 Augmentation scheme

Augmentation scheme of present water supply scheme to ensure an additional supply of 2.38 MLD water for Pandalam municipality by the year 2031 is proposed. This project may be implemented by Kerala Water Authority.

32.8.2 Replacement of damaged pipe lines

Replacement of damaged pipe lines of the existing distribution network.

32.8.3 Public Wells

Maintenance of public wells

32.8.4 Extension of Pipe lines

Strengthening the distribution network by extension of pipe lines to uncovered area. This project may be implemented by Kerala Water Authority.

32.8.5 Protection of natural water sources

Protection of wells, ponds and natural drains. This project may be taken by the Municiplaity and Irrigation Department.

32.8.6 Water Harvesting

Adoption of water harvesting methods. This project may be taken up by the Municipality.

32.8.7 Kurunthottiyam Thodu Protection

Protection and rejuvenation of Kurunthottayam Thodu especially in the central area of the town from disposal of waste from Pandalam market.

32.9 ENERGY

The proposal in the power sector is furnished below.

32.9.1 Improvement of Power distribution

Installation of new Transformers, 11 KV lines, under ground cables etc.

32.9.2 Street Lighting

Providing High mast lights and LED lights in CBD Area and at road intersections. Provision of separate street mains for street lights.

32.9.3 Electrification of houses

Electrification of all houses especially the houses of economically weaker section.

32.9.4 Non-Conventional Energy

Incorporating energy conservation and efficiency by adoption of Non-conventional sources of energy like bio gas, solar energy and adopting green building concept etc.

32.9.5 Energy generation Centre

A project for generating electricity from waste can be implemented. Upgrade the present solid waste management plant into energy generation centre.

32.10 WASTE MANAGEMENT

It is estimated that the total waste to be collected from the town by the year 2031 is 5.35 tons / day, where as the present collection is only 3.00 tons per day. The analysis shows that 54 % houses have septic tanks and 95 % of houses have some sort of sanitation system. It is assumed that this system will continue in future also. Drains are available for few stretches of roads only. The proposals in this sector are given below. Waste coming out of hotels and houses should be treated through treatment plant.

32.10.1 Solid Waste Collection, manure production unit and energy generation centre

Strengthening and modernization of present waste collection unit – by adding more vehicles, equipments, labours and new odorless waste handling techniques. Improve facilities for biogas production using bio degradable wastes. Provide facilities to generate energy from waste. Improve the infrastructure facilities for the manure production unit and energy generation Centre.

32.10.2 Decentralized manure distribution units

Manure distribution centers are provided at suitable locations to cater the requirements.

32.10.3 Decentralized waste disposal systems

Biogas plants to houses, by providing biogas plants at different subsidized rate to households based on their income.

32.10.4 Septic tanks

54% of houses have septic tank. Continue this system of waste disposal. Provide septic tanks for remaining houses. Provide subsidy to economically weaker sections.

32.10.5 Road side drain

Provision of road side drains for all major roads in the CBD Area and renovation of dilapidated drains within the municipality area.

32.10.6 Natural drains

Cleaning and removal of blocks of Kurunthottiyam thodu and all other natural drains. Protection work to prevent further disposal of wastes.

32.10.7 Public Comfort Stations / E-Toilets

New public comfort stations / E-toilets at central area, proposed parking area near Pandalam Palace, NSS Medical Mission Junction etc. Rennovation of public comfort station at Pandalam market.

32.10.8 Awareness Programme

Conduct awareness programme on health, hygiene and environment. This programme can be carried out through the help of Health Department and Municipality.

32.11 EDUCATION

Educational Institutions in the category of High school, Higher Secondary Schools, Arts and Science College, Professional College, Polytechnic College, ITI/ITC etc. as per planning standard is available within Pandalam municipal area. Large number of students, other than inhabitants of Pandalam municipality also depend the educational institutions at Pandalam. The projects which are to be implemented in educational sector are detailed below.

32.11.1 Improvement of Infrastructural facilities and modernization of Government and aided schools

Improvement of infrastructure facilities of Government and Aided schools like new buildings, play grounds, toilets, computer lab, language lab, internet facilities, drinking water, vehicles etc. for all government and aided schools.

32.11.2 Utilization of surplus land and buildings

Utilize the unutilized facilities of existing educational institutions including land, buildings etc for new institutions with new courses.

32.11.3 Sports Complex and ground

A sports complex and ground for students and people near Kadakkad.

32.11.4 Students Centre

A student's centre with Auditorium, Museum, hostel, library, career development center for students in the town and surrounding areas.

32.12 HEALTH

Health facilities as per standard for the population of the town is available in the town. The projects which are to be implemented in health sector are detailed below.

32.12.1 Emergency Medical services

An emergency Medical service with all necessary equipment with priority for aged people.

32.12.2 Upgradation of primary health centre

Provision of better facilities and infrastructure to existing PHC.

32.12.3 Centre for Aged and disabled people

Centers for the care of Aged people, disabled children, mentally retarded person etc.

32.12.4 Health Tourism

Promoting health tourism considering the favorable climatic condition of the town.

32.13 CIVIC FACILITIES, CULTURE

Recreational and other civic facilities are inadequate in the town. As an urban centre and a second order settlement in the district, the following proposals are included in the plan.

32.13.1 Parks

A New park is proposed near Manikandan Aalthara, NSS Medical Mission Junction, Kurampala, Thikkuttathil Padi and Poozhikkad.

32.13.2 Stadium

A modern Stadium with all modern facilities near Kadakkad.

32.13.3 Town Hall

Construct a new town hall at Kadakkad near proposed stadium.

32.13.4 Crematorium

Construct a new crematorium at a suitable place by municipality in conformity with the zoning regulation of the Master Plan.

32.13.5 Cultural Centre

Considering the historical and cultural importance of Pandalam a new cultural Center need to be developed near the palace area.

32.13.5 Picnic Village

A picnic village is proposed at Cherickal.

32.14 SOCIAL WELFARE, SECURITY

For the welfare of children, women, senior citizen and other weaker section of the town and for the security of the people the following proposals are included in the plan.

32.14.1 Community halls

Community halls shall be provided in major zones of the town. Municipality need to find suitable locations for it.

32.14.2 Own building for Anganawadies

New buildings for 14 Anganwadies which are now functioning in rented building.

32.14.3 Equipment to all Anganawadies

Provision of modern playing equipments for all Anganwadies

32.14.4 Women Development

Small industrial units in all wards of the town with the help of Kudumbasree or similar social groups. Necessary training programme for starting the units and a centralized market facilities for selling the products.

32.14.5 Child Care Centre

Starting of a Child Care centre in all wards of the Municipality.

32.14.6 SC / ST Development

Training programme for personality development for attending test and interviews of competitive examinations and Subsidy for starting industrial units

32.14.7 Police Aid Post

A police Aid post near Pandalam junction

32.14.8 Fire Force Station

Establishing a new fire station at Pandalam.

32.15 ENVIRONMENT

Paddy fields, water bodies, sacred grooves 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.

32.15.1 Conservation of paddy fields

Details of the projects are furnished agricultural sector.

32.15.2Conservation of natural drains

Details of the projects are furnished in agriculture and waste management proposals.

32.15.3 Protection of sacred groves.

Protection of sacred groves by regulation. Sacred groves are proposed as a zone and any construction that comes in sacred groves are controlled by the zoning by regulation.

32.16 DISASTER MANAGEMENT

Considering the climatic change, a disaster management plan has to be prepared for the town after conducting detailed studies.An early warning system shall also be introduced for the town as an interim measure.

32.17 GOVERNANCE

Many Government offices are functioning in rented building, and those buildings functioning in own buildings does not have sufficient facilities. For better services to the people and better functioning infrastructure facilities of these offices need to be improved.

32.17.1 Municipal Office Complex

A new office complex for Municipality utilizing the available land and it is a component of project for central area.

32.17.2 Office Complex

New office complex is proposed in the project for Central area

33. MODEL PROJECTS

33.1 INTRODUCTION

The Master plan for Pandalam provides guide lines for the overall development of the town. Sectoral proposals of the Master Plan are included in the previous chapter. Among the sectoral proposals certain model projects are identified and the concept and brief description of these projects are included in this chapter. For few of these projects public land is available and for the remaining projects, private land is required. The town planning techniques like land pooling, land reconstitution techniques can be adopted for the implementation of these projects. Further detailed engineering studies are needed to prepare detailed project report and to implement the projects. The model projects include the project for the Central area, Pandalam Palace and its premises, NSS Medical Mission Junction improvement, Stadium and Town Hall near Kadakkad, Park near Thikkuttathilpadi, Picnic village at Cherickal, Park at Kurampala, View point at Athiramala and Park near Puzhikkad. The details of the projects are furnished in the subsequent paragraphs. The figures included in the chapter are conceptual illustrations only. But the scaled map of each project site with survey numbers, boundaries and area are given in Figures 33.5, 33.13, 33.21, 33.27, 33.30, 33.32, 33.35, 33.38 and 33.41. These scaled maps are to be referred for identifying zones. These are conceptual projects which can be implemented only after detailed engineering study and preparation of DPR.

33.2 PROJECT FOR CENTRAL AREA

Large extent of public land under the ownership of Municipality, Government and Kerala State Road Transport Corporation (KSRTC) is available in the central part of the town.

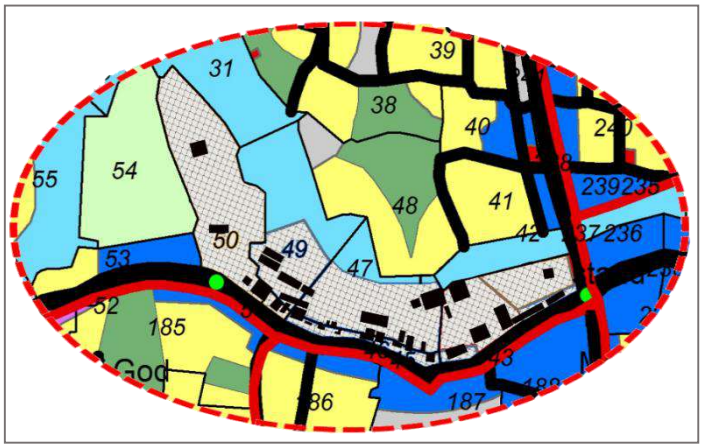


Figure 33.1 Delineated Central Area

These lands are used for public purpose including bus stations, government offices, markets, shopping complexes etc. Few pockets of land under private ownership and a temple trust are there adjacent to the above public land. The delineated area consists of an area around 10.2 acre of land from Central Jn to KSRTC Bus Station on the northern side of Mavelikkara- Pandalam road. It is interesting to note that out of 10.2 acre of land available, the built up area is around 1.7 acres and the available land in the core area of the town is not fully explored or utilized. Also haphazard growth has taken place in the area and many structures in the area are in dilapidated condition. The location of private bus stands very close to Pandalam junction cause traffic congestion on Mavelikkara- Pandalam road and also at Pandalam junction. The present KSRTC bus station is in developing stage only. The location of waste dumping yard in the area is another problem to be attended. The market is unplanned and with temporary structures. Due to the above traffic generating activities the pedestrian movement in the area is very high, but facilities are inadequate. Inadequate parking space is another issue of the area. The condition of

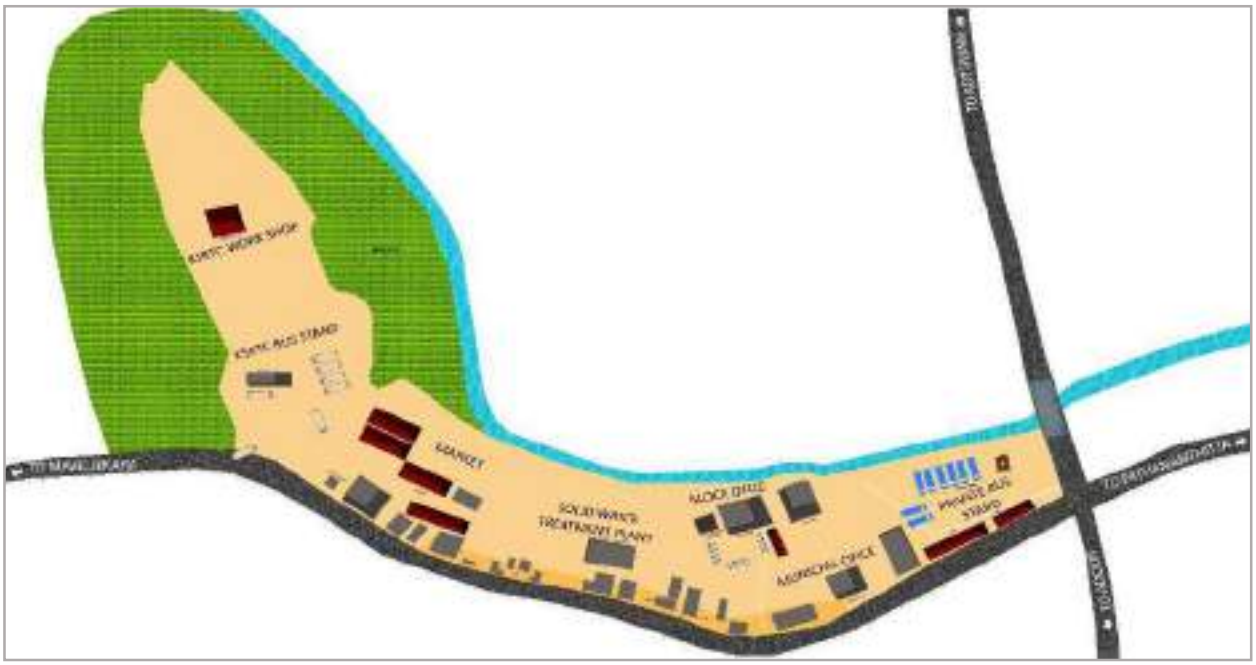


Figure 33.2 Existing condition of central area

Kurumthotiyamthodu flowing along the northern side of the area is very poor. All the above factors necessitate the planned development of prime land in the central part of the town. The delineated Central Area is shown in Figure 33.1.

The existing condition, development concept and proposals are shown in Figure 33.2, 33.3 and 33.4 respectively. The component of this project consists – A road along Kurumthottiyam thodu, Commercial complexes, Public spaces, Office complexes, Market area development, Traffic terminals, Water front development and rejuvenation of Kurumthottiyam thodu. The scaled map of each project with survey numbers, boundaries and area are given in Figure 33.5

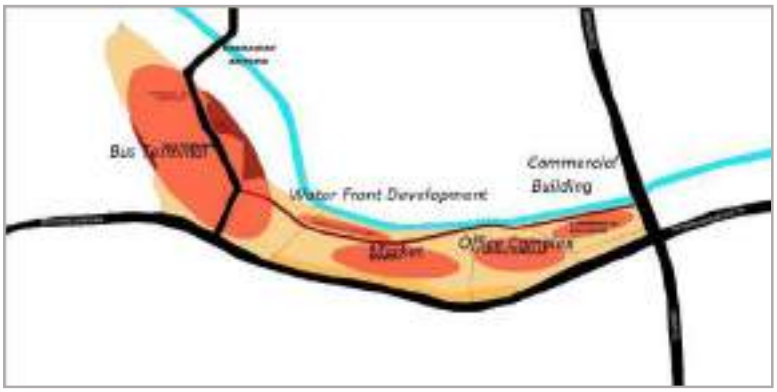


Figure 33.3 Central area – Concept plan



Figure 33.4 details of pproposed Central area project



Figure 33.5 Scaled map of the site of Project for Central area

33.2.1 Commercial Area

A restructuring and expansion of present commercial activity is proposed under this project. The area around the present private Bus stand adjacent to M.C.Road is proposed for this purpose. The commercial area consists of commercial complex with sufficient parking space, circulation area, green spaces and resting areas etc. Entry is proposed from both sides i.e., from the water front area and from the Mavelikkara- Pandalam road. Rehabilitation of few shop owners who are surrendering



Figure 33.6 Details of commercial area, temple and, public space

their land for the Central area development can also be considered in the complex. The details are shown in Figure 33.6. Pandalam Municipality is propsed as the implementing agency of the project

.33.2.2 Office Complex

Many public offices of the town are functioning in rented buildings. The main aim of the office complex is to bring all government offices functioning at different places to one place and provide more facilities to the public. The office of the Pandalam municipality is functioning in an old building without adequate space. A separate building for Pandalam municipality also proposed adjacent to the office complex. The details are shown in Figure 33.7. The Project can be implemented by Municipality/PWD Buildings.

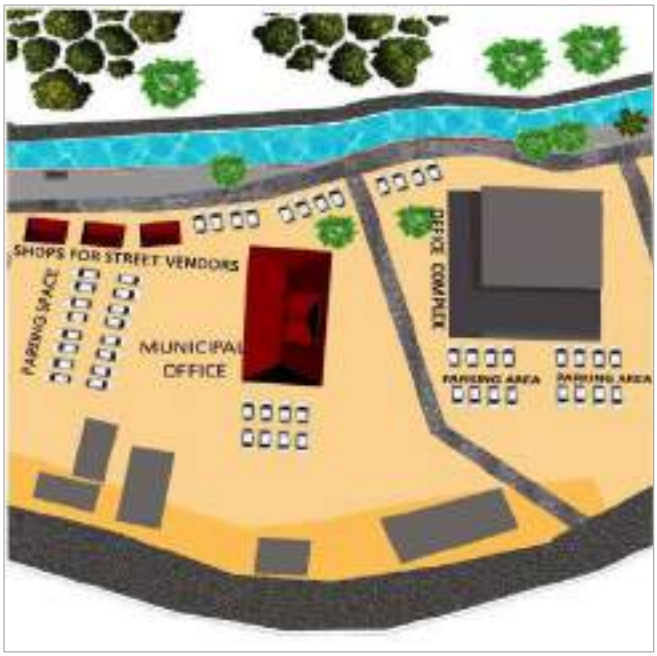


Figure 33.7 Details of Office complex

33.2.3 Public Spaces

An area for public gathering is not available in Pandalam town. A multipurpose open stage is proposed near the temple on the eastern side of the commercial complex. This can be used for conducting the programs of the temple during festival season as well as other public programs. This area has better visibility and access from both MC Road as well as from Mavelikkara- Pandalam Road. The Project can be implemented by Municipality / Tourism Department.

33.2.4 Water Front Development and Water Body Rejuvenation

The Kurumthttiyam thode is flowing along the northern boundary of the project area. The flow through this water body has been blocked due to deposit of waste and weed growth. It is proposed to clean, rejuvenate and protect the water body from further deposit of waste. A new road along the bank of the water body is the main feature of this project. Street furnitures, two wheeler parking



Figure 33.8 Details of Water front development

spaces, land scaping, water front walk ways, stall for local products, protective walls etc are the other components of the project.The walk way can be extended upto PHC. The details are shown in Figure 33.8. Project can be implemented by Municipality, Irrigation Department and Tourism Department.



Figure 33.9 Details of market area

33.2.5 Market Area Development

Re location and re-orientation of the market is proposed in the concept plan. The location of the Market adjacent to traffic terminals is convenient to the people. The details are shown in Figure 33.9. Project can be implemented by the Municipality.

33.2.6 Terminals

The existing private bus stand is proposed to shift to the area adjacent to existing KSRTC bus stand. The new road proposed from Manikantan Althara to Mavelikkara road provide an alternate access to the terminal and this will reduce the congestion in the, Central area of the town. A commercial

complex, Pay and park facilities are the other features of the project. The details are shown in Figure 33.10. The Project can be implemented by KSRTC and Municipality.

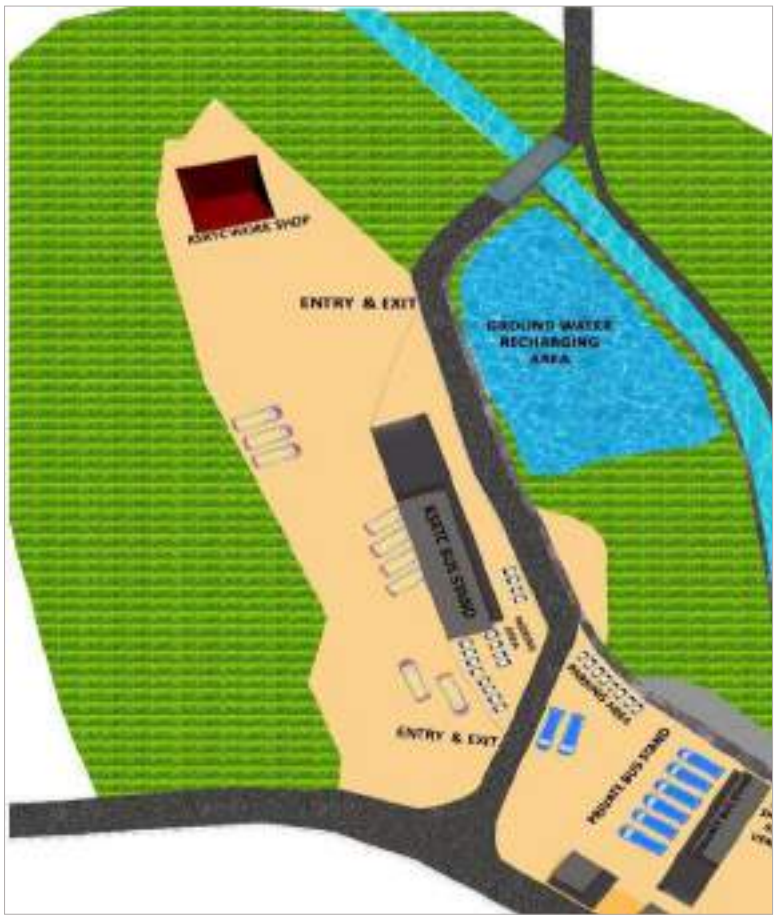


Figure 33.10 Details Traffic Terminal

33.3 PROJECT FOR PANDALAM PALACE AND PREMISES

Pandalam is considered to be sacred place due to the connection of Pandalam palace and Sabarimala temple. The famous Valiyakoikal Temple and Pandalam palace are located on the banks of the river Achenkovil. Pandalam palace and its premises have inevitable significance in the history of Pandalam in relation with lord Ayyappa and the holy ritual like Thiruvabharanam procession. Lakhs of devotees use to follow the Thiruvabharanam processions which are witnessed as very auspicious, holy, and divine ritual made to Ayyappa. Valiakoikkal Temple is the family temple of the Pandalam Royal Family. It is situated within the Pandalam Palace premises. The main deity is Lord

Ayyappa. Procession of the Thiruvabharanam (Sacred Ornaments) towards Sabarimala shrine starts from the Valiyakoikkal temple every year before the Makaravilakku festival.

Pandalam palace is the permanent home for the royal family of Pandalam. It is located on the banks of river Achankovil. There are two palace complexes at present. The first one is Valiyakoikkal Temple and the other the Kaipuzha Temple. The Valiyakoikkal temple is situated on the left bank of Achenkoil river and the Kaipuzha temple is situated on the right bank about one kilometer away from the Valiyakoikkal temple in adjacent Kulanada Grama Panchayat.



Figure 33.11 Existing condition of Palace area

The facilities available at the temple premises are inadequate to handle lakhs of pilgrims visiting every year. Total area of the two open spaces available in the premises is approximately 0.43 hectares. It's insufficient to cater the parking and resting needs of incoming devotees. Accommodation facilities are also not available in the area. The entry to parking space from main road is very narrow and difficult to negotiate large vehicles. Lack of evacuation space in the event of an emergency is also issue in the area.

A comprehensive plan for the development of Pandalam Palace and its premises is needed while considering the pilgrim tourism potential as well as the economic aspects of Pandalam town. Facilities are to be provided for attracting and staying of pilgrims at Pandalam and this will boost the local economy of Pandalam. A concept plan is proposed here for providing more facilities for attracting pilgrims and other local tourists to Pandalam.

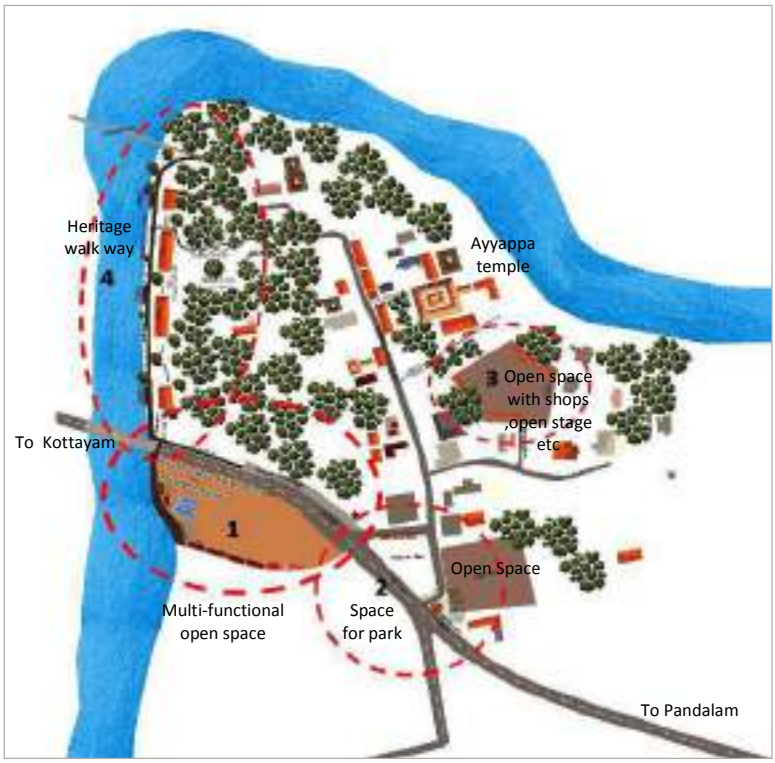


Figure 33.12 Proposed Palace area

The concept plan consists of parking

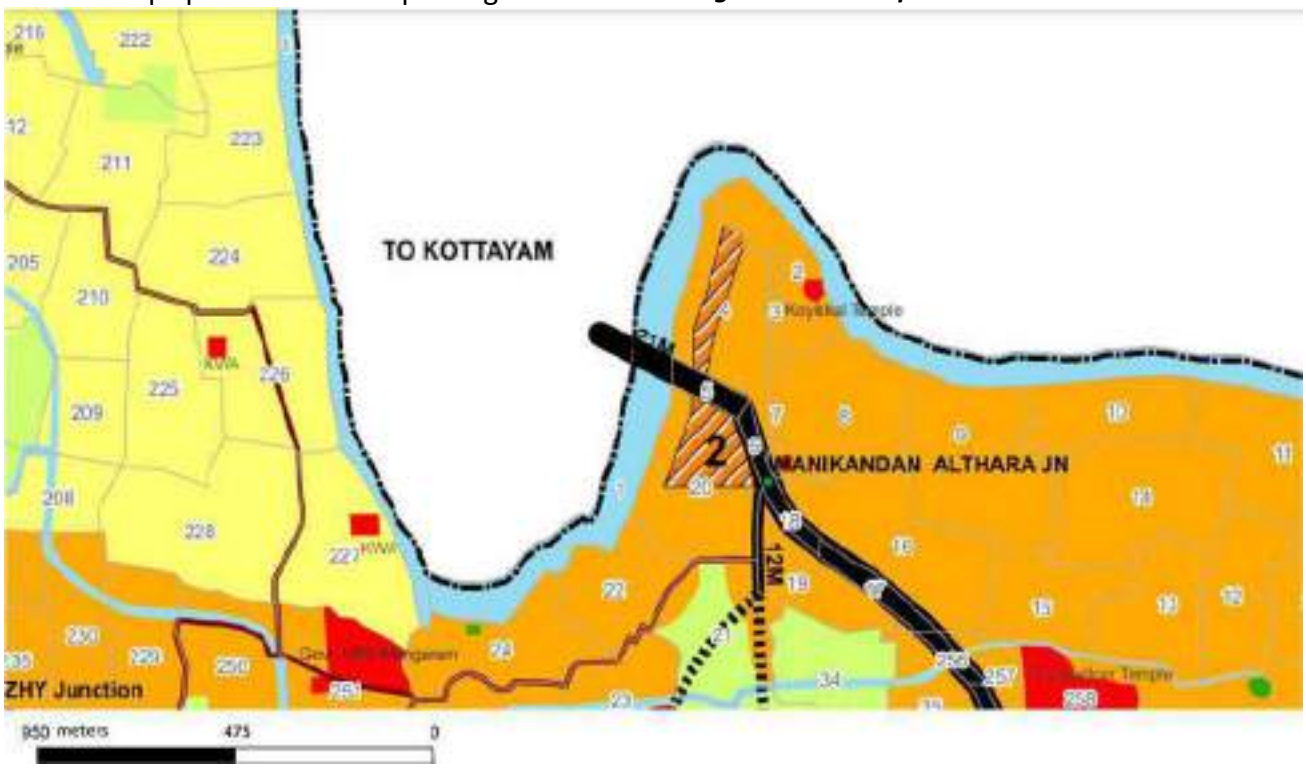


Figure 33.13 Scaled map of the site of Project for Pandalam Pace and its

facility both for light motor vehicles and heavy vehicles, open spaces, open stages, evacuation

spaces, heritage walk way, shopping facility, comfort stations, theme park etc. The Figure 33.11 shows existing condition of palace area and the Figure 33.12 shows the proposed concept plan. The scaled map of proposed palace area with survey numbers, boundaries and area are given in Figure 33.13. The land on the bank of Achancovil river on either side of M.C.Road is included in the concept plan for various proposals. The proposed concept plan has four components and the details are furnished in the subsequent paragraphs. Project can be implemented by Public Works Department/Travancore Dewaswam Board/ Municipality/ Tourism Department/ Pandalam Palace Authorities.

33.3.1 Multi-functional open space

A Multi-functional open space is proposed on the western side of M.C.Road. The major components are the parking facilities for both light motor vehicles and heavy vehicles. Comfort stations, shopping facilities, open stages, space for stabling fire force team etc. In off seasons the area can be used as exhibition ground, parking area, open stage for different social and cultural functions. An under pass connecting the multi functional open space and Palace premises across M.C.Road is included in the project to reduce the conflict between pedestrians and vehicles during the Sabarimala season. The details are shown in Figure 33.14.

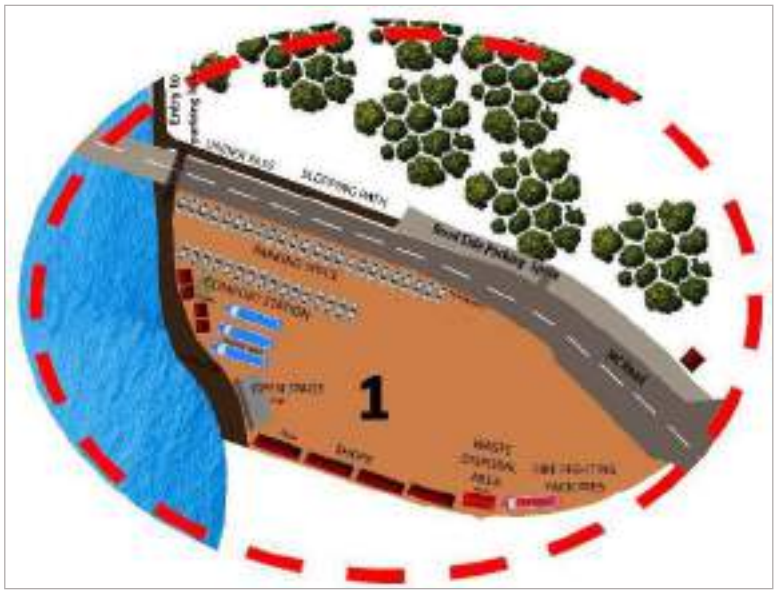


Figure 33.14 Multi functional open space

33.3.2 A Park and resting space near Manaikandan Aalthara

It is proposed to improve the aesthetic beauty of the area. A park with sculptures of lord Ayyappa, resting area, shops etc. are the major components of this project. The open space adjacent to Manikandan Althara can be utilized for "Annadanam" function. The junction improvement along with the above developments will reduce traffic congestion in MC road and ensure smooth entry to the Palace premises. The details are shown in Figure 33.15.

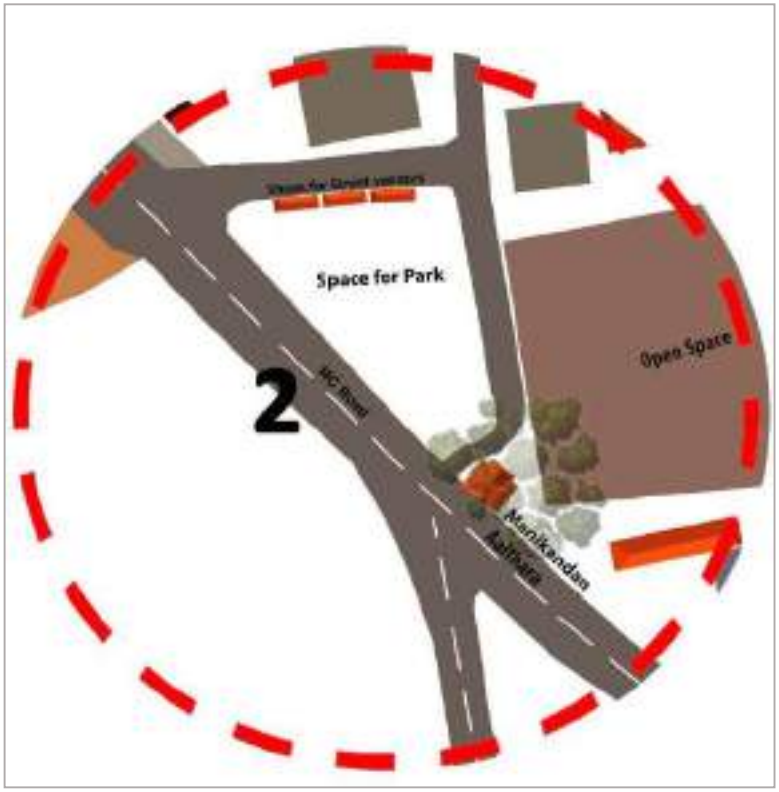


Figure 33.15 Park, resting space near Manikandan Aalthara

33.3.3 Open area cum evacuation space

It is proposed in the present parking area near the Palace. It is proposed as an open space near the temple with shopping facilities and open stages. This space is also designed as an evacuation space in the emergency situations. The area will be free of vehicles and only pedestrian movement will be allowed in the area. The present parking area will be

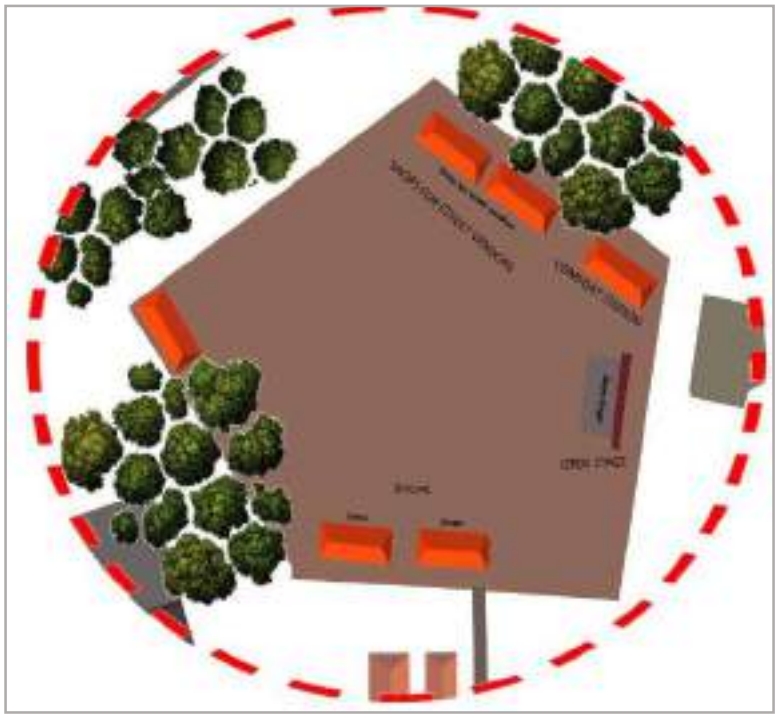


Figure 33.16 Details of Open cum evacuation space

shifted to the **Multi-functional open space** on the western side of M.C.Road. The details of the project are shown in Figure 33.16.

33.3.4 Heritage walkway This is the major component of the concept plan. It consists of a theme park with sculptures of Lord Ayyappa's life story, walk way along the riverside, shops, resting spaces, street furniture, steps to river (Kadavu), gathering space etc. The heritage walkway to the theme park starts from the Hanging Bridge and ends at the Multi-functional open space, it is represented in figure 33.17. The overall view of the proposals and movement circuit are shown in the Figure 33.18.

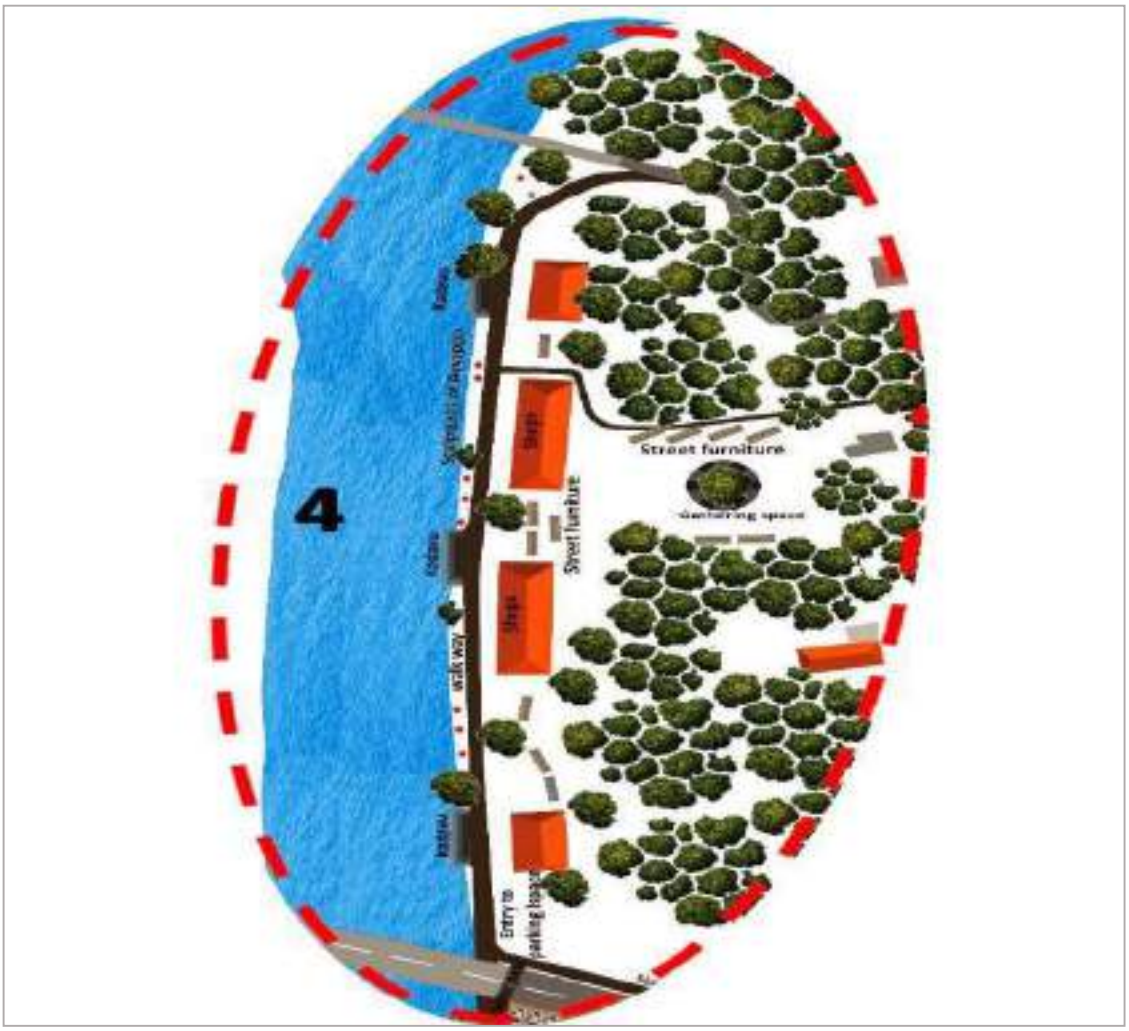


Figure 33.17 Details of Heritage walkway



Figure 33.18 Details of the Route of Heritage walk way

33.4. PROJECT FOR NSS MEDICAL MISSSION JUNCTION IMPROVEMENT

NSS medical mission junction is the first order node in the Pandalam municipality and need special attention. The intersection of MC road and Kayamkulam road in an acute angle creates visibility problems. Absence of bus bays and bus stops both in MC road and Kayamkulam road creating traffic block. Lack of open spaces/tot lot/ recreational spaces is experiencing in the locality. In order to address the problem and to ensure planned growth a plan is needed for this area. The existing condition of the area is shown in Figure 33.19 and the proposed concept plan is shown in Figure 33.20. The components of this project are - Bus bays and bus stops, comfort stations, Park, natural rainwater recharging zone, Planned auto and taxi stands and Junction improvement. The scaled map of proposed NSS Medical Mission junction with survey numbers, boundaries and area are given in

Figures 33.21. Project can be implemented by Municipality / Tourism Department and Public works Department.



Figure 33.19 Existing Condition NSS Medical Mission Junction



Figure 33.20 NSS Medical Mission Junction improvement project -

33.4.1 Bus bays

Three bus bays are proposed under this project. One Bus bay is proposed near the proposed park on MC road side for the buses proceeding to Adoor side and second one is proposed near Medical Mission Hospital for vehicles coming to Pandalam town though M.C.Road and Kayamkulam Road. Third one is proposed in Kayamkulam road for buses moving towards Kayamkulam side. The bus bay provides better seating and music facilities etc. Project is to be prepared and implemented by PWD Roads. A model for the proposed bus bays is shown in Figure 33.22.

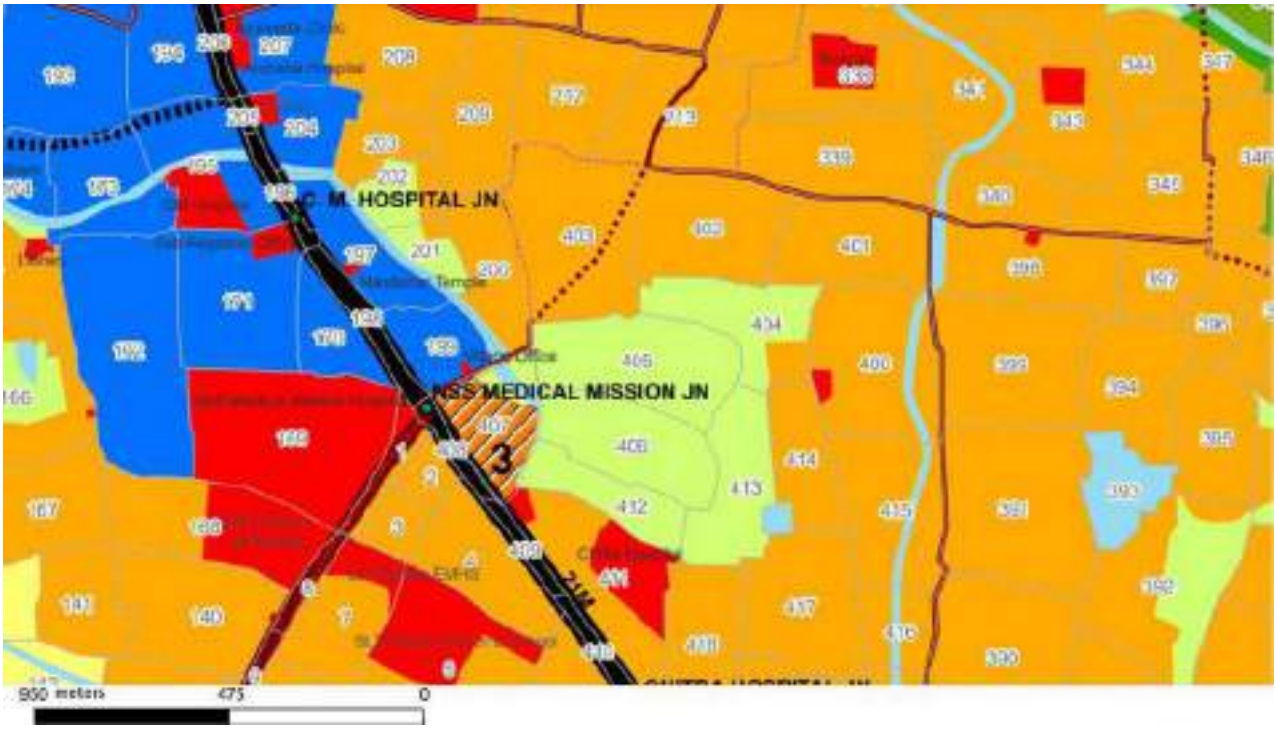


Figure 33.21 The scaled map of Project for NSS Medical Mission Junction

33.4.2 Public comfort station

A public comfort station is also providing near the bus bay in between the park and the bus bay.

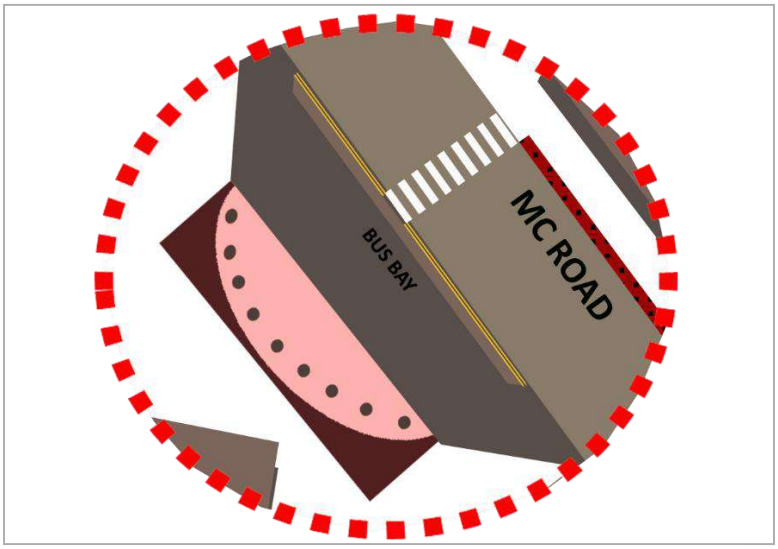


Figure 33.22 Details of Bus Bays

33.4.3 Park

The proposed park consists of green spaces, rainwater recharging pond, open stages for public programs, resting spaces, comfort station, cultural centre etc. The details are shown in Figure 33.23.

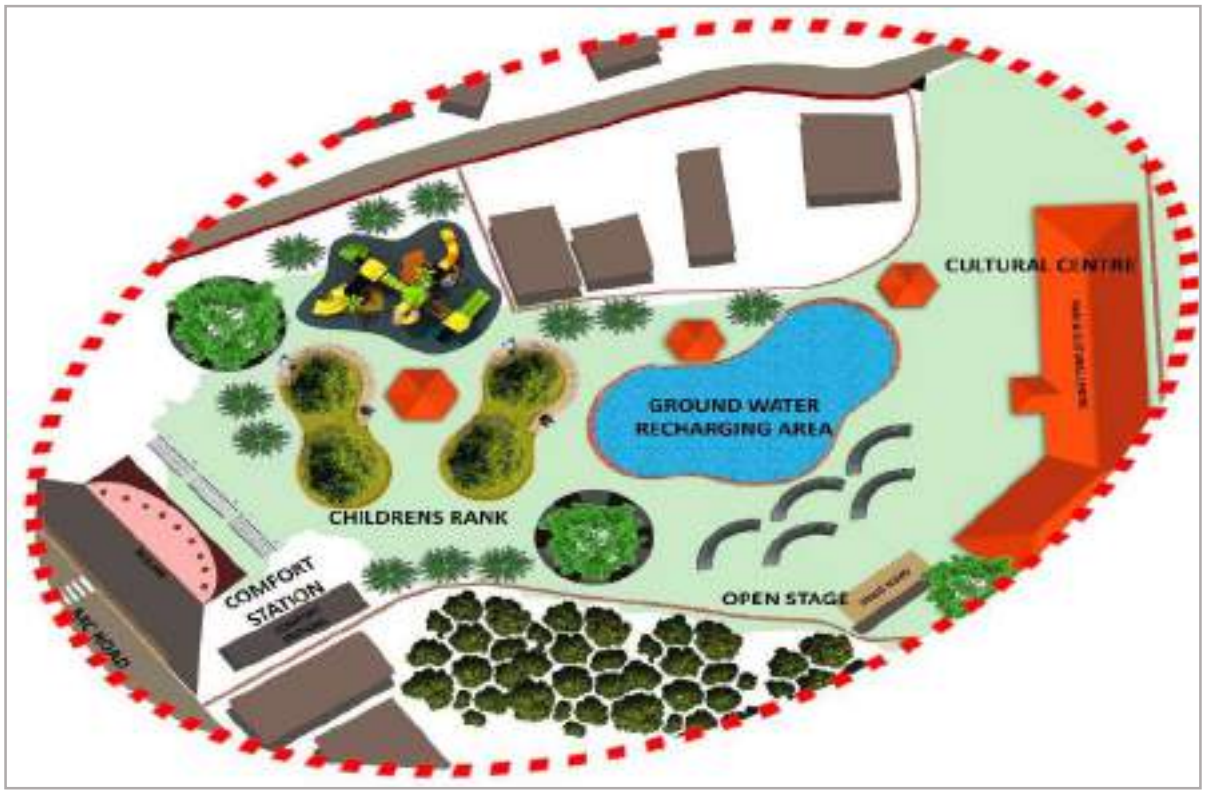


Figure 33.23 Details of proposals of NSS Medical Mission Jn improvement project

33.4.4 Junction Improvement

The NSS medical mission junction faces several issues. As mentioned earlier, the acute angle of intersection of two roads affects the visibility of the junction and it has to be improved. Foot paths are provided on both the sides considering the high pedestrian movement. A proper signal system is also proposed for the intersection. The details are shown in Figure 33.24.



Figure 33.24 NSS Medical Mission junction improvement

33.5. PROJECT FOR STADIUM AND TOWN HALL NEAR KADAKKADU

The Pandalam Municipality lacks a town hall / auditorium and stadium. The land in the north east of the town, near Kadakkad, which is under the possession of the Municipality can be utilized for this purpose. A stadium and a town hall are proposed in this area under this project. A road is also proposed around the stadium connecting the Kadakkadu and MC road near police station which helps to bypass and decongest the town centre. The stadium is proposed in the existing Municipal ground. A road from MC road near Police station to pathanamthitta road via stadium is to be developed for the future needs. The details are shown in Figure 33.25 and 33.26. The scaled map of the area proposed for Stadium and Town hall with survey numbers, boundaries and area are given in Figures 33.27. Project can be implemented by Municipality, PWD Roads, Sports and Youth affairs Department.



Figure 33.25 Proposed project at Kadakkadu area

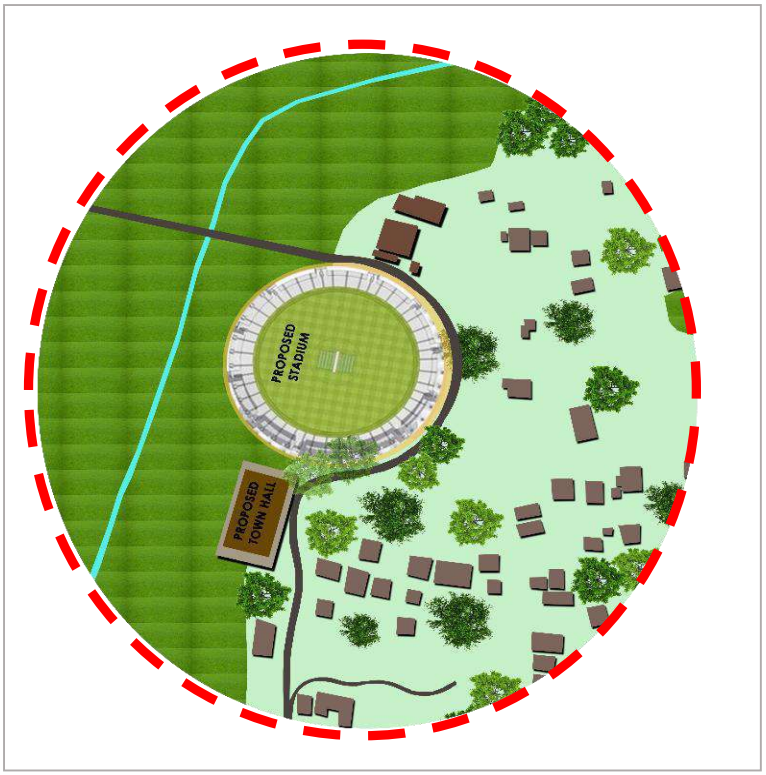


Figure 33.26 Proposed stadium and Town hall at Kadakkadu



Figure 33.27 Scaled map of the site Project for stadium and Town hall near

33.6 PROJECT FOR PARK NEAR THIKOOTTATHIL PADI

A park is proposed near Thikoottathilpadi. The land proposed for the park is under private ownership. But two existing public ponds are there in the proposed park area. It can be developed as a neighborhood level park for the inhabitants. The component of the project are ground water recharging pond, street furniture, Childrens Park, gathering space, two ponds etc. Existing condition is shown in Figure 33.28. The proposals are shown in Figure 33.29 . The scaled map of proposed park near Thikkoottathil padi with survey numbers, boundaries and area are given in Figures 33.30. The project is can be implemented by Municipality / Tourism Department.



Figure 33.28 Existing condition of Thikoottathilpadi



Figure 33.29 Proposed park at Thaikkttathilpadi

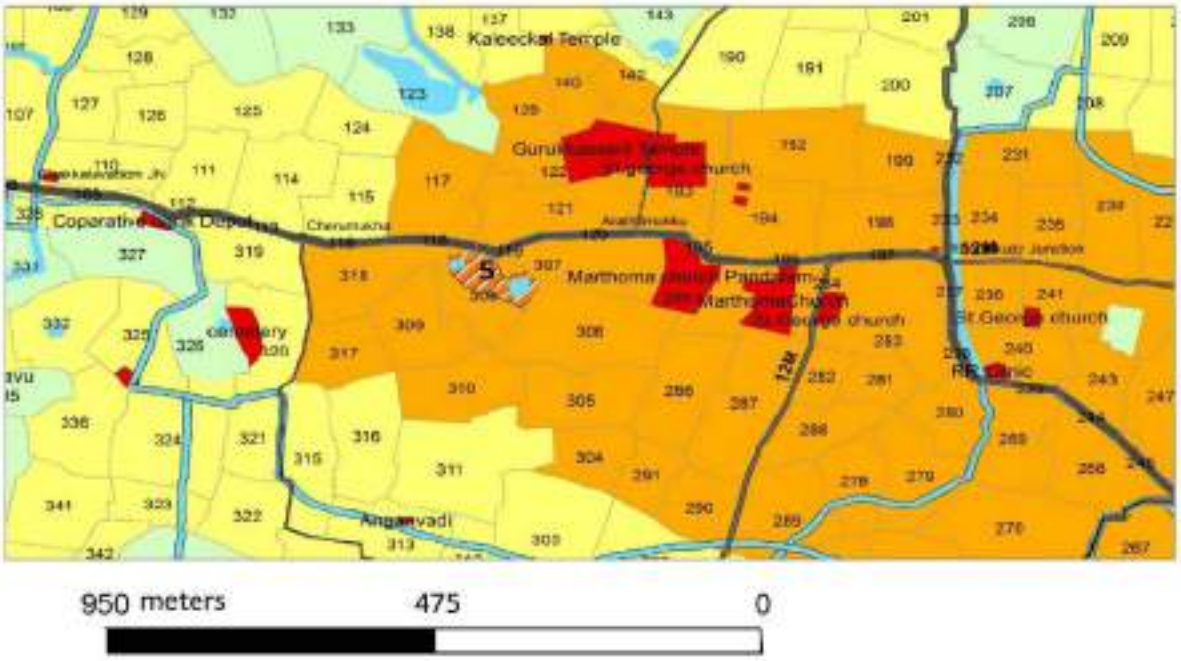


Figure 33.30 Scaled Map of the site of Project for park near Thykoottathilpadi

33.7 PROJECT FOR PICNIC VILLAGE AT CHERICKAL

The presence of vast water body/paddy field and rural nature of the area provide enough potential to develop a regional level picnic spot in Cherickal area, in western part of the town. The proposed project area consists of private land as well as revenue purambokku area. The Cherickal area has many people who have talent in craft making. The proposed tourism picnic spot consists of a craft museum, food court, local food stalls, fishing points, toilet complexes, shops, children's park, parking spaces, aquarium, Nakshatra vanam, Smrithivanam (the crematorium space) gathering spaces etc. The details of the proposed project is shown in Figure 33.31.



Figure 33.31 Cherickal Picnic spot development

The scaled map of proposed picnic village at Cherickal with survey numbers, boundaries and area are given in Figures 33.32. The project can be implemented by Municipality / Tourism Department.

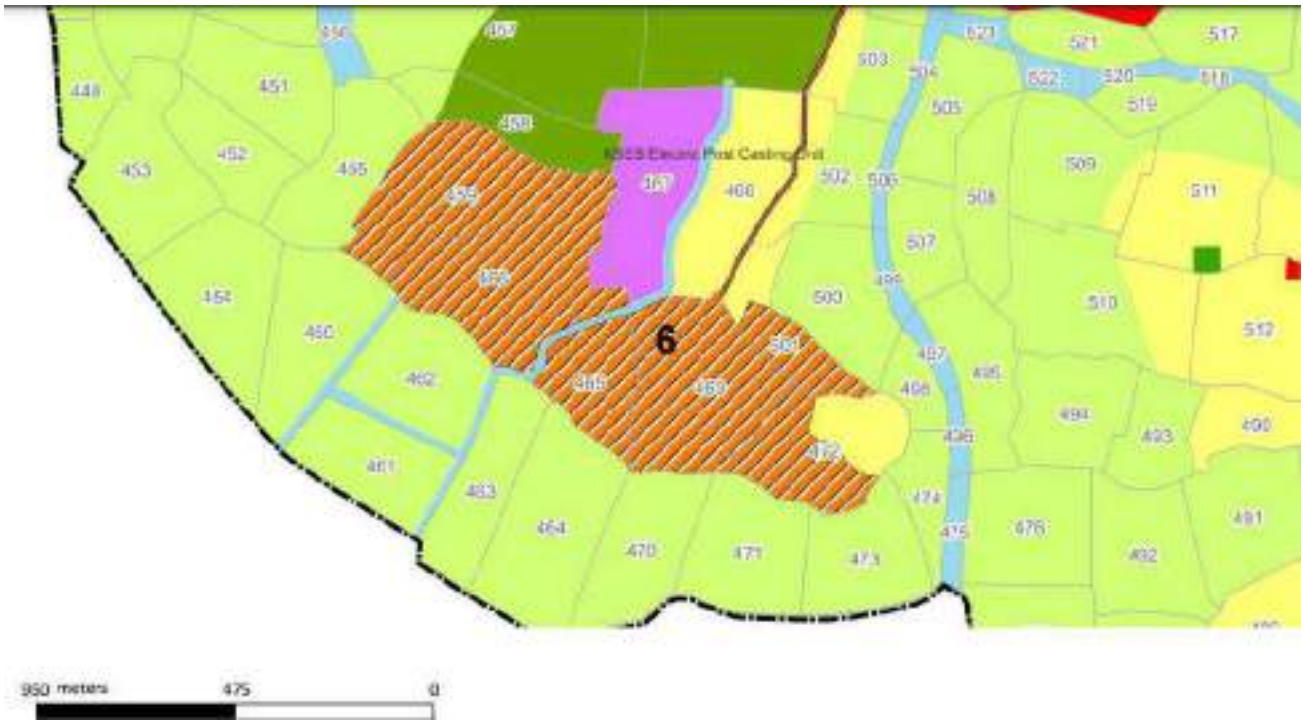


Figure 33.32 Project for Picnic village at Cherickal

33.8 PROJECT FOR PARK AT KURAMPALA

Parks for active recreation is not available in Pandalam Municipality. A neighborhood level park is proposed near Kurampala junction on the western side of M.C.Road for the residents of the southern part of the municipality. The proposed park consists of ground water recharging ponds, gathering space, playing area, parking area, restaurant etc. The land for the project is fully under private ownership.

Figure 33.33 shows the location of the park and the figure 33.34 gives an enlarged view of the park. The scaled map of proposed Kurampala Park with survey numbers, boundaries and area are given in Figures 33.35. Project can be implemented by Municipality / Tourism Department.

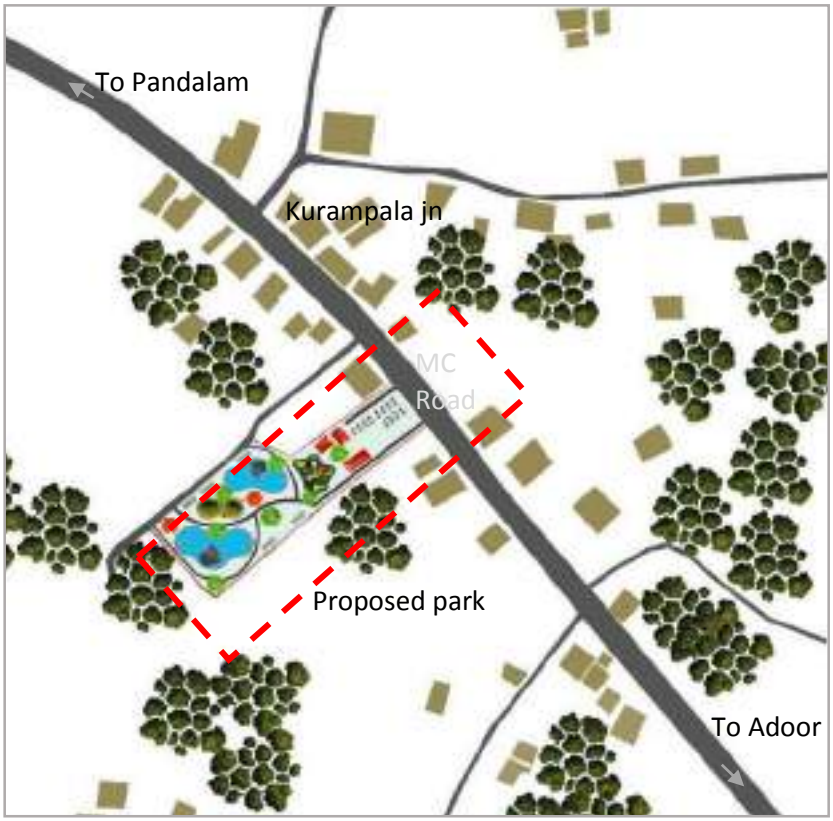


Figure 33.33 Key map- Proposed Kurampala Park



Figure 33.34 Project for park at Kurampala



Figure 33.35 Scaled Map of the site for Proposed Park at Kurampala

33.9 PROJECT FOR VIEW POINT AT ATHIRAMALA

Athiramala is the elevated point in Pandalam Municipality with an elevation of 133m above MSL and a large area in and around the Municipality can be viewed from this point. Eventhough the scenic beauty attracts people to this point its potential has not fully utilized. The required minimum facilities are not available in this area. The area adjacent to Athiramala temple can be developed as picnic spot. Provision of view points with adequate safety measures is the major component of this project. A telescope is to be installed in this point in order to increase its attraction. Provision of infrastructural facilities like tot lots, comfort station, locker facilities, gathering area, parking facilities, tea stalls, lighting arrangements etc. are the related proposals for the area. There is proposal for improvement of the roads to Athiramala from Kurampala in M.C.Road (through Kurampala -Pazhakulam road) with proper signages, protection measures and street lighting. Project for preventing soil erosion and landslides are also to be done as part of the project. Model

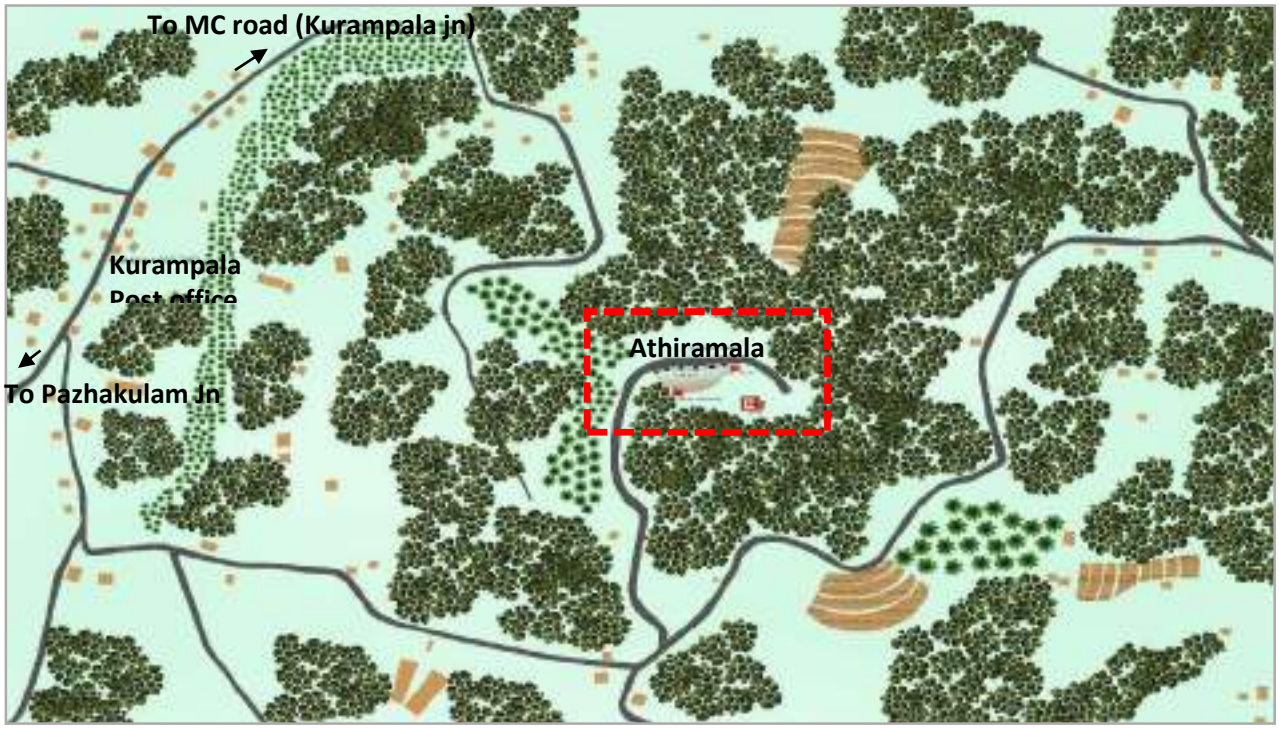


Figure 33.36 Key map - Proposed View point at Athiramala

agriculture and cattle farms are also to be established in the surrounding area as part of this project. The location of the project area is shown in Figure.33.36 and detailed plan of the view point is shown in Figure.33.37. The scaled map of proposed view point at Athiramala with survey numbers, boundaries and area are given in Figures 33.38. The land for the project is fully under private ownership. The project can be implemented by Municipality and Tourism Department.

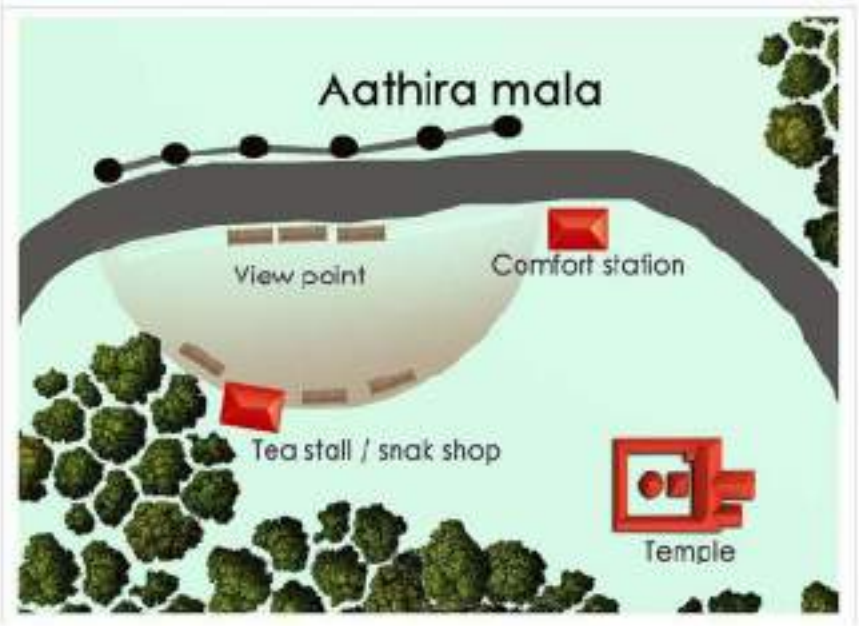


Figure.33.37. Detailed plan of the view point at Athiramala

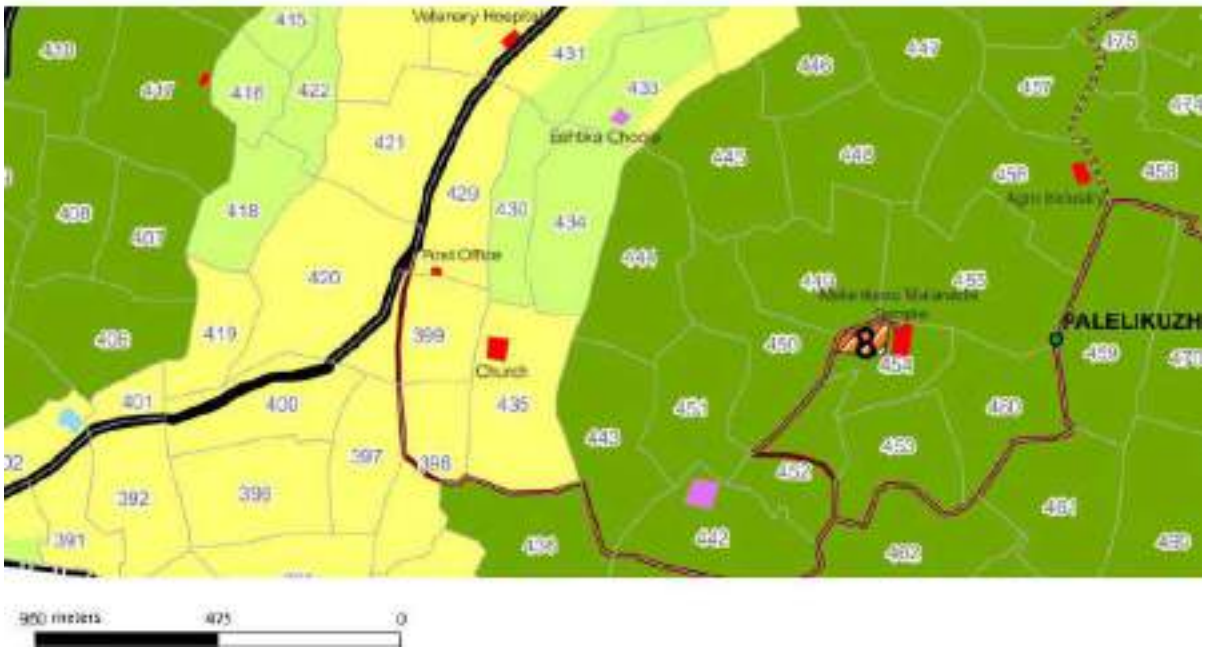


Figure 33.38 Scaled Map of the site of project for view pint at Athiramala

33.10 PROJECT FOR PARK NEAR PUZHIKKADU

A park and a swimming pool are proposed near Poozhikkad considering the presence of a pond, scenic beauty and for the need of local people. So this area can be developed to a park cum swimming pool. Figure 33.39 shows the existing condition of the project area. The proposed project area consists of private land as well as public land.



Figure 33.39 Existing Condition of park at Puzhikadu

The proposed park cum swimming training centre consists of boating and recreational area along with ground water recharging zone, swimming training centre, parking facilities, park, street furniture, dress changing rooms with comfort stations, waste disposal units etc. Figure 33.40 shows the proposed park area. The scaled map of proposed park near Puzhikkadu with survey numbers, boundaries and area are given in Figures 33.41. The project can be implemented by Municipality and Tourism Department.



Figure 33.40 Proposed Park near Puzhikkadu



Figure 33.41 Scaled Map of site of Project for park near Puzhikkad

33.11 SOLID WASTE MANAGEMENT PLAN

Solid waste management is one of the major problems in the central area and densely populated wards of the town. The present solid waste management system near the market of the town needs to be shifted and decentralized solid waste management units are proposing to convert Pandalam as a zero-waste municipality. For the identification of the location of the site criteria like average plot size of wards, population density, accessibility to the units etc are considered. These units are limited to those who do not have adequate space in their compound for the disposal of the waste. Those who have large plots, can dispose their waste on their own compound. The suggested locations of the solid waste management units is shown in Figure 33.42. These are not exact specific locations for the project. But these locations indicates the priority wards for locating solid waste management units. The project can be implemented by Municipality / Suchitha Mission

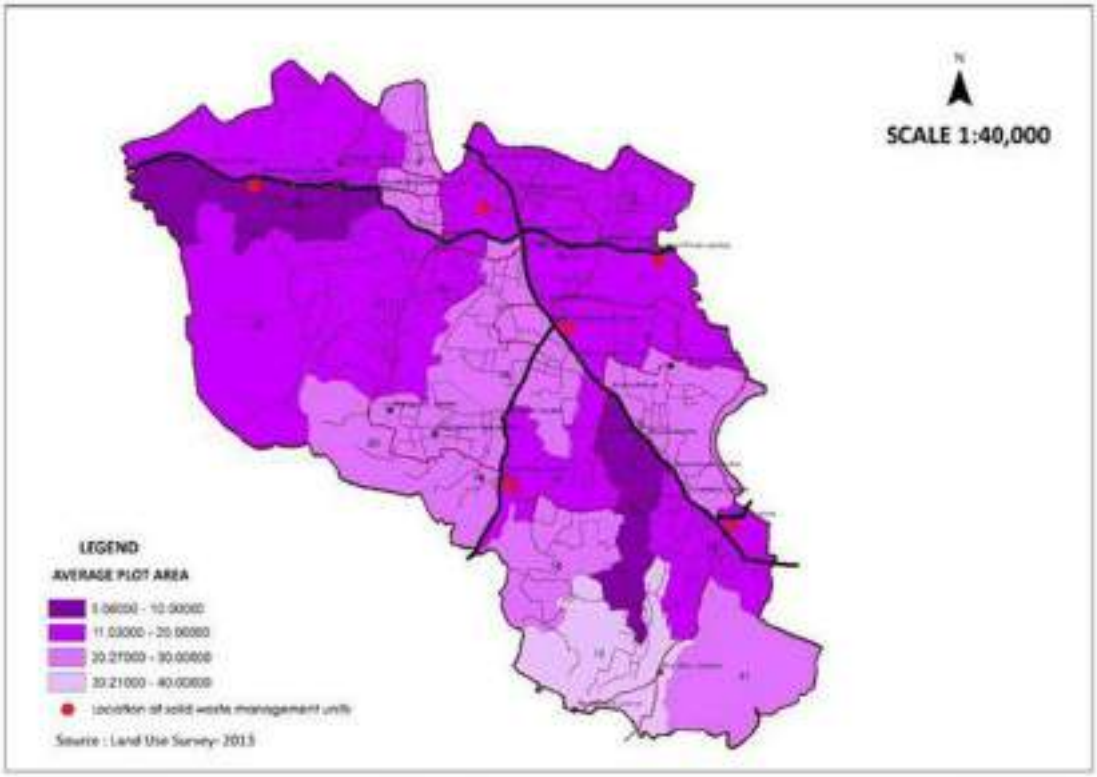


Figure.33.42 Suggested locations of the Solid waste Management units

The plan for two typical solid waste management units are given in Figure 33.43

The suggested model units consist of three parts that is dry waste collection unit, wet waste collection unit, and e-waste collection unit. A storage space for the collected waste is also there along with aerobic bins for wet waste.



Figure 33.43 Typical model for solid waste management unit

Plastic waste and e-waste need to be collected by scrap dealers and e-waste dealers. The plastic waste is shifted to the plastic shredding units and the plastic waste can be converted into briquettes or it can be converted to granules which can be mixed along with bitumen in road construction.

PART.IV

DEVELOPMENT REGULATIONS

34. ZONING REGULATION

34.1 INTRODUCTION

Zoning is a device used in land use planning of a Master Plan. The word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another. Zoning Regulations are the means to achieve development of a use zone as envisaged in the Master Plan. In other words Zoning Regulations are laws that define and restrict how to use a particular property coming under a Master Plan. Thus it is the public regulation of land and building use to control the character of a place.

The development suggestions of a Master Plan will be spatially located in proposed land use plan. Planning area is zoned under various categories such as *residential use zone, residential mixed use zone, commercial use zone, public and semi-public use zone (existing and proposed), industrial use zone, dry agriculture use zone, paddy field and wet land zone, sacred groves zone ,water body/canal, Green strip and special zones etc. for securing* the most efficient and effective use of land in public interest. Therefore, a set of zoning regulations for the implementation and enforcement of the proposals envisaged in the Master Plan will also be part of the Master Plan. Zoning regulations specifies the details regarding the nature of uses *'permitted'*, uses *'restricted'* and uses *'prohibited'* in each zone.

34.2 ZONING REGULATIONS

34.2.1. All future developments shall be in conformity with the provisions of this Master plan and future construction shall conform to the Kerala Municipality Building Rules in force unless otherwise specified in this regulations. But the provisions of the Master Plan shall prevail over the respective provisions of the Kerala Municipality building Rules.

34.2.2.For the implementation and enforcement of the proposals envisaged in the Master plan for Pandalam, areas have been zoned under various uses such as *residential, commercial, residential mixed, public and semi-public, industrial, dry agriculture, paddy/environmentally sensitive area, water bodies and special zones etc.* in addition to that green strips are proposed along major water bodies of the town. Details regarding the nature of uses "permitted", uses "restricted" and uses "prohibited" in each zone are given in subsequent Paragraphs.

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, Pandalam Municipality, hereinafter referred to as Secretary. In some cases it may be possible to permit some other uses also, which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually studied based on their performance characteristics and special location 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 Town Planner of the District office of the Local Self Government Department Planning (LSGD Planning). having jurisdiction over the area.

Uses **Restricted -2** Category deals with the uses that shall be restricted by the Secretary with the concurrence of the Chief Town planner, Head of office of the District Office of the Local Self Government Department Planning (LSGD Planning). The application for concurrence shall be forwarded to the Chief Town planner through Town Planner.

"Uses prohibited" enlists the various objectionable uses in each zone which shall not be permitted under normal circumstances.

34.2.3. Zoning regulations are not intended to prohibit existing uses that have been lawfully established prior to the enforcement of these regulations. They are essentially intended to help the competent authority in decisions regarding granting or refusal of planning permissions for

land use conversions and construction of buildings /structures or any other matter specifically mentioned in these regulations.

34.2.4. If any space in a zone is put to a "**Uses Prohibited**" as stated in Para 34.2.2, before the sanctioning of the scheme, such use shall be termed as nonconforming use. A non-conforming use may be allowed to continue in its existing location and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary with the concurrence of the Chief Town Planner concerned.

34.2.5. Existing areas and structures of archaeological importance, agriculture uses and religious uses may be permitted to continue in all the zones and shall not constitute non conforming uses.

34.2.6. Regulation of constructions and/or land developments on the sides of new roads/roads proposed for widening as per the Plan shall be governed by the distance from the centre line of the road (right of way), unless otherwise specified in the Plan or in any detailed road alignment plan approved by the Chief Town Planner concerned.

34.2.7. Constructions and/or land developments, if any, in paddy lands and in wet lands, shall be in conformity with the Paddy land and Wet Land Act in force in the state.

34.2.8. The provisions of Noise Pollution (Regulation and Control) Rules 2000, at places notified as 'silent zones' by respective government orders shall be followed.

34.2.9. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required in any of the provisions of the scheme in consultation with the Chief Town Planner concerned.

34.2.10. Any use not specified either in the 'uses permitted' or 'uses restricted category of a particular use zone, but which is of a similar nature to any use permitted or restricted in that particular use zone, can be considered by the Secretary, with the concurrence of the Chief Town Planner concerned.

34.2.11. The zoning regulation of Master Plan for Pandalam is given in the following table.

Paragraph No.	Uses permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
1	2	3	4	5
34.2.11.1	**RESIDENTIAL USE ZONE**			
	All residences, Residential Flats / Apartments and its incidental uses	Transmission towers, Telecommunication towers and Wireless Stations		Any other uses not specified in column 2,3 and 4
	Addition, alteration or reconstruction of existing Places of Worship	Places of Worship		
	Shops, Commercial offices, Restaurants/hotels and Professional Offices, Banking and Financial institutions, Gymnasium / Yoga Centers,- all subject to the condition that total floor area of the building shall be limited to 250 sq m.	Convention Centers/Auditoriums - floor area upto 500 sq m provided that the access road has a minimum width of 7.00 m or as prescribed in the building Rules whichever is high.	.	
	Hospitals/Nursing homes upto10 beds, Clinic (Outpatient)	Hospitals upto 25 beds		
	Cottage and manufacturing Industries, Service Industries of non-nuisance Nature (See Annexure 34.1) engaging not more than 6 workers without power or 3 workers with power limited to 5 HP as per Annex 34.1	Automobile workshops for 2 / 3 wheelers- floor area upto 200 sq m provided that the access road has a width of **5m** minimum or as prescribed in the building Rules whichever is high		
	Day Care and Crèche, Nursery / Kinder Garden, Educational institutions up to Higher secondary, Library and Reading Rooms.	All higher level educational institutions subject to the condition that the minimum width of access to the plot shall be 8.00m or as prescribed in the		

		building Rules whichever is high		
	Tot Lots/Parks/Play Grounds	Indoor/Outdoor game stadium, subject to the condition that the minimum width of access to the plot shall be 8.00m or as prescribed in the building Rules whichever is high		
	All Local/ State/ Central government offices	Other Public Utility Areas & Buildings		
	Orphanages / Old Age Homes /Dharmasala, Ashram / Mutt, Night shelters, Convents			
	Plant Nursery, Agriculture seed farm, Pump House, Wells and Irrigation Ponds			
34.2.11.2	**COMMERCIAL USE ZONE**			
	All Shops including shopping Complexes, Shopping malls, Multiplex, Hypermarkets, Automobile showrooms, Restaurants, Hotels, Professional offices, Commercial Offices & Establishments, Banking and financial institutions			Any other uses not specified in column 2,3 and 4
	All residences, Residential Flats / Apartments and its incidental uses			
	Addition, alteration or reconstruction of existing Places of Worship	Places of Worship		
	Clinics, Diagnostic Centers and hospitals up to 50 beds provided that the access road has a width of 7m minimum	Hospitals & Health Centers above 50 beds provided that the access road has a width of 12m minimum		
	Orphanages / Old Age Homes /Dharmasala, Ashram / Mutt, Night shelters, Convents			
	All Local/ State/ Central government offices			
	IT Software units			

	Movie Halls, Auditorium / Wedding Halls / Community halls, Indoor games stadium, Convention Centers, Exhibition centers and art gallery			
	Godowns/Warehouses/ Storage of non hazardous materials, stacking yards		Fuel Filling Stations	
	Gymnasium / Yoga Centers			
	Automobile workshops, Automobile Service Stations			
	Cottage, Service and manufacturing Industries, Cold storage, Service Industries of non-nuisance Nature (See Annex 34.1 , with number of workers limited to 19 without power or 9 workers with power limited to 30 HP), weigh bridges, Printing Press, IT Hardware / Electronic Industries, Marble and Granite storage/cutting centers, saw mills			
	Day Care and Crèche, Nursery Schools, Kindergarten, Expansion of existing educational and medical institutions, Govt. or Public sector offices			
	Public utility areas & buildings			Any other uses not Specified in column 2,3 and 4
	Transmission towers, Telecommunication towers and Wireless Stations			
	Social Welfare centers, Library and Reading Rooms			
	Parks & playgrounds, Open air Theatre			
	Night Shelters, hostels and boarding houses, lodges and guesthouses,			
	Parking Plazas, Transport terminals			
34.2.11.3	**RESIDENTIAL MIXED USE ZONE**			
	Land to a depth of 250 m from central line of road (right of way) on either sides of the roads having proposed width of 21 m and 18m, 100 m from central line of road			

	(right of way) on either side of roads having proposed width of 7m and 12m in Residential and Dry Agriculture zones are also deemed as Residential mixed Land use zone.			
	All uses mentioned in Residential Use Zone and Commercial Use Zone			
34.2.11.4	**EXISTING PUBLIC AND SEMIPUBLIC USE ZONE /PROPOSED PUBLIC AND SEMIPUBLIC USE ZONE**			
	All uses mentioned in Residential Mixed Use Zone			
	Additions and alterations to the existing buildings/addition of new block(s) without altering the use, Buildings incidental to the main use. Skill development centers, Training centers, Agriculture farms and allied activities			Any other uses not Specified in column 2,3 and 4
	All Local/ State/ Central government offices			
34.2.11.5	**INDUSTRIAL USE ZONE**			
	All uses mentioned in Residential Mixed Use Zone			
	Industrial use including, IT parks and buildings/premises incidental to the industrial use. Skill development centre/ Training centre			Any other uses not Specified in column 2,3 and 4
34.2.11.6	**DRY AGRICULTURE USE ZONE**			
	Agriculture, Horticulture, Plant Nursery, Fish Farms, Seed Farms, Pump House, Wells and Irrigation Ponds, Storage of Agricultural Produces and Seeds	Places of Worship		Any other use not specified in column 2,3 and 4
	All residential buildings with floor area up to 1000 sq m, Orphanages, Old Age Homes, Dharmasala, Ashram/Mutt	Fish/meat processing centers, diary farms, poultry farms, piggery farms		
	Shops, Professional Offices, Commercial Offices/ Establishments, Banking and Financial institutions, Restaurants/Canteens - floor area upto 200 sq m	Transmission towers, Telecommunication towers and Wireless Station		
	Clinics (Outpatient) and Diagnostic centers - floor area up to 200 sq m			

	Cottage Industries, Service manufacturing Industries of non-nuisance Nature (See Annexure 34.1) engaging not more than 6 workers without power or 3 workers with power limited to 5 HP	Service and manufacturing Industries of non-nuisance nature(See Annexure 34.1) engaging not more than19 workers without power or 9 workers with power limited to 15 HP	Cremation ground / crematoriu m, burial ground, common volt	
		Automobile workshops for 2/ 3 Wheelers		
	All Local/ State/ Central government offices, Public Utility Areas & Buildings	Godowns / Warehouses / Storage - non hazardous, more than 500sq m floor area, Gas godowns		
	Day Care and Crèche, Nursery / Kinder Garten / Schools upto Higher Secondary level	Stacking Yards, Saw Mills	Storage of explosive and fire works	
	Gymnasium / Yoga Centers - floor area up to 100 sq.m			
	Library and Reading Rooms			
	Tot Lots/Parks/Play Grounds			
	Social Welfare centers up to 200 Sq.m floor area.			
	The following uses are permitted, provided that the access road has a minimum width of 7 m			
	Residential buildings with floor area above 1000 sq:m and up to 3000 sq m			
	Weigh bridge			
	Shops, Professional Offices, Banking and Financial Institutions of floor area up to 500 sq m			
	Markets			
	Hospitals & Health Centers – floor area above 200 sq:m and upto 500 sq m			
	Stacking Yards			
	Godowns / Warehouses / Storage - non hazardous - floor area up to 500 sq m			
	Auditorium/ Wedding Halls/ Community Halls – floor area upto 500 sq m			

	The following uses are permitted, provided that the access road has a minimum width of 12m			
	Residential buildings with floor area above 3000 sq m	Higher education above Upper primary school		
	Hospitals & Health Centers – floor area above 500 sq m			
34.2.11.7	**PADDY FIELD& WETLAND ZONE**			
	Paddy Cultivation	Minor Public Utility areas & buildings which will not affect the character of the area, Tourism activities satisfying the provisions of Kerala Paddy and Wet land conservation ACT.		Any other use not specified in column 2,3 and 4
	Agriculture/Horticulture/ Fodder cultivation, Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction.	Maintenance and extension of existing authorized buildings upto 200sq:m floor area		
	Constructions/ land developments in conformity with the Conservation of Paddy Land and Wet Land Act in force in lands Designated as paddy land or wetland under the said Act			
	All uses permitted in Residential use zone in plot which is classified as dry land (Purayidam) in basic tax receipt (BTR) as on 14.01.2020			
34.2.11.8	**SACRED GROVES ZONE**			
	All existing sacred groves Ponds, water bodies, shall be conserved			
34.2.11.9	**WATER BODY/ CANAL**			
	All existing water bodies and irrigation canals shall be conserved.			Any other uses not specified

34.2.11.10	**GREEN STRIP** A green strip of 10.00m width along the sides of Achankovil River excluding those areas where river bank roads are proposed. A green strip of 5.00m width along the sides of a part of Kurumthottiyam thodu with survey numbers 79, 78, 63, 62, 57, 55, 30, 31, 49, 42, 235 and 234 of Pandalam village excluding those areas where roads are proposed.			
	Agriculture/ Horticulture/ vegetable/ Fodder Cultivation, Fish Farms, River training works, Boat Landing centers, Hooking platform, Any construction essentially incidental to water supply/ irrigation schemes, bridges			Any other uses not specified
	Maintenance / addition to the existing authorised buildings to a total built-up area upto 150 Sq.m including existing area.			
34.2.11.11	**Special Zones**			

Special zones include the areas specifically demarcated for certain specific projects. Specified activities are to be permitted by the Municipal Secretary with the concurrence of the Town Planner of the District office of the Department of Town and Country Planning having jurisdiction over the area. No other activity unless otherwise specified shall be permitted in these areas.

Special zone.1	**Project for Central Area**	Construction of office complex, municipal office building, commercial complex, market re-structuring, Traffic terminals with all connected facilities, All Local/ State/ Central government offices, amphi theatre / open stage, Public Utility Areas & Buildings, renovation of Kurunthottiyam thodu and water front development, construction of stalls, waste management unit etc. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as commercial use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.2	**Project for Pandalam palace and premises**	All pilgrim amenities including resting rooms; comfort stations; locker rooms, parking facilities, heritage walk way, amphi theatre / open stage, auditorium, parks, office buildings,

		conservation work of existing temple, palaces and connected buildings. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.3	**Project for NSS medical mission Junction improvement**	Parking facilities, walk ways, street furniture, food courts, restaurants, children's park, opens stage, eating places, cultural centres, solid waste treatment units, comfort stations. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.4	**Project for Stadium and Town Hall near Kadakkad**	Stadium and all connected structures and buildings and uses, town hall, parking facilities, resting places for visitors. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.5	**Project for Park near Thikoottathilpady**	Parking facilities, walk ways, street furniture, food courts, restaurants, children's park, opens stage, eating places, cultural centres, solid waste treatment units, comfort stations. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone except water body in the existing Land Use Map .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.6	**Project for picnic village near Cherickal**	Parking facilities, walk ways, street furniture, food courts, restaurant, craft museum, fishing points, water front structures, children's park, aquarium, nakshtravanam,

		smrithivanam (cremation place), open grounds, comfort stations, open stage. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Dry agriculture use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.7	**Project for Park at Kurampala**	Parking facilities, walk ways, street furniture, food courts, restaurants, children's park, opens stage, eating places, cultural centres, solid waste treatment units, comfort stations. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.8	**Project for view point at Athiramala**	Construction of locker rooms, parking facilities, walk ways, street furniture, tea stall/restaurant, view point structures, resting places, comfort stations. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Dry agriculture use zone .Any construction in such deemed zone shall be with the prior approval of District Town Planner.
Special zone.9	**Project for Park at Poozhikkad**	Parking facilities, walk ways, street furniture, food courts, restaurants, children's park, opens stage, eating places, cultural centres, solid waste treatment units, comfort stations. If this project is not initiated within a period of 10 years, only the area coming under private ownership shall be deemed to be zoned as Residential mixed use zone except water body in the existing Land Use Map .Any construction in such deemed zone shall be with the prior approval of District Town Planner.

34.2.12 List of Roads.

21m Wide Road

1. M.C Road from Municipal boundary (Achankovil River bridge) to Municipal boundary (Pallimukku) via Manikandan Althara junction and Chithra hospital junction

18m Wide Road

1. Mavelikkara - Pathanamthitta Road in between the municipal boundaries.
2. Kayamkulam Road from Medical Mission Hospital junction to Municipal Boundary.

12m Wide Road

1. Road from Mutter junction to Kurampala Puthenkavil temple junction via Poozhikkad junction
2. Road from Manikandan Aalthra to KSRTC Bus Station(Existing and proposed)
3. Road connecting Manikantan Althara and Muttar (proposed road)
4. Proposed road connecting road 2 and 3.
5. New road connecting MC Road (near CM Hospital junction) and Muttar Puzhikkad road
6. Pazhakulam road from Puthenkavu junction in MC Road to municipal boundary near Thandanuvila HSS via Puthenkavil temple
7. Pazhakulam road from Kurampala Petrol pump junction to Municipal boundary via Post office.
8. Keerukuzhy Road from Kurampala junction to municipal boundary

7 m Wide Road

1. Road from Mahadevar temple to junction near Mudiyoorkkonam in Mavelikkara road. (Existing and proposed)
2. Road from cherumukha jn to Cherikkal road.
3. Road between MET School jn and Cherikkal ITI jn.
4. Road between Mavelikkara road and road no.3 under 7m wide proposal
5. Road from Mavelikkara road to Mahadevar Temple
6. Road from Mangaram school jn to Mahadevar Temple

7. Road from Kadakkad to proposed Stadium
8. Road from Kadakkad temple jn to Kadakkad church road
9. Road from MC road, near NSSGHS to Pathanamthitta road near Kadakkad
10. Road from MC road, near NSSGHS to to Muttar jn..
11. Road from MC road, near NSS College entry to western side
12. Road from Kadakkad to Medical Mission Hospital junction (existing and proposed)
13. Road from MC road, near southern boundary of NSS College to road 12
14. Road between Kadakkad and Road no.13 under 7m wide proposal
15. Road from Kayamkulam road near Poozhikad chira to jn near Vayojana vinjapana kedram.
16. Road from Kurampala - Keerukuzhy road to Pathanamthitta road at Kadakkad temple jn.
17. Road connecting Road no.16 under 7m wide proposal and road no 12.
18. Road connecting Road no.17 under 7m wide proposal and Sankarathilpadi jn
19. Road connecting Road no.18 under 7m wide proposal and road no.16 under 7m wide proposal
20. Road connecting Road no.16 under 7m wide proposal and Edayadiyil jn
21. Road connecting Road no.16 under 7m wide proposal and pynamood jn
22. Road from Kayamkulam Road (between MM Hospital and Chiramudi Jn) to Edayadiyil jn
23. Road connecting Sankarathil Padi and Puthenkavil temple jn - Poozhikkad road
24. Road connecting Thandanuvila school-Puthenkavil temple road and Kurampala-Poozhikkad road
25. Road connecting road no.24 under 7m wide proposal and Pazhakulam Road
26. Road between Perumpaloor Temple Vanchi mukku and Post office jn.(Existing and proposed)
27. Road connecting road no.26 under 7m wide proposal and municipal boundary near Paranthal

28. Malankavu Malanada temple link road
29. Road connecting Manikantan Althara to Muttar jn via Govt UPS Mangaram.
30. Road connecting Police station junction in MC Road to stadium.
31. Road from Kunnikuzhy Junction in Mavelikkara Road to Municipal Boundary.
32. Road connecting Cherickal Road and Mannam Ayurveda Medical College Junction(Existing and proposed)
33. Road from Cherickal to municipal boundary (near cashew factory)
34. Road connecting Cherickal and proposed Picnic village
35. Road from vayojana vinjapana kendram to Pathanamthitta-Mavelikara road near Muttar jn.
36. Road from pynamoodu jn (MC road) to Puthenkavil temple jn

34.2.13. Subject to zoning regulations of the respective use zones, more than one uses may be combined in a building, provided that the 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.

34.2.14. Irrespective of zones and uses permitted/restricted in the zones, the provisions of Kerala Conservation of Paddy and Wet Land Act 2008 shall be followed where ever the Act is applicable.

34.2.15. In the case of concurrence issued for constructions involving filling of wetland, low lying land and paddy fields, various mitigation measures including proper drainage measures has to be specified and local bodies has to ensure that same are provided / enforced. Nessasary permission from the concerned department shall be obtained for filling and development of wet land, low lying land and paddy fields.

34.2.16. If a plot under a particular survey number/numbers included in a single document registered before date of sanction of this plan, falls under two different zones, zoning of major portion (more than 50%) is applicable to the whole plot

34.2.17**.** The powers entrusted to the authorities for approval of usage of plot and layout shall be in compliance with the building rule applicable for the area is to be followed as such unless otherwise specified in this regulations.

34.2.18. For the purpose of these regulations, floor area means the total floor area of the building in all floors.

34.3 LARGE SCALE DEVELOPMENT PROPOSALS

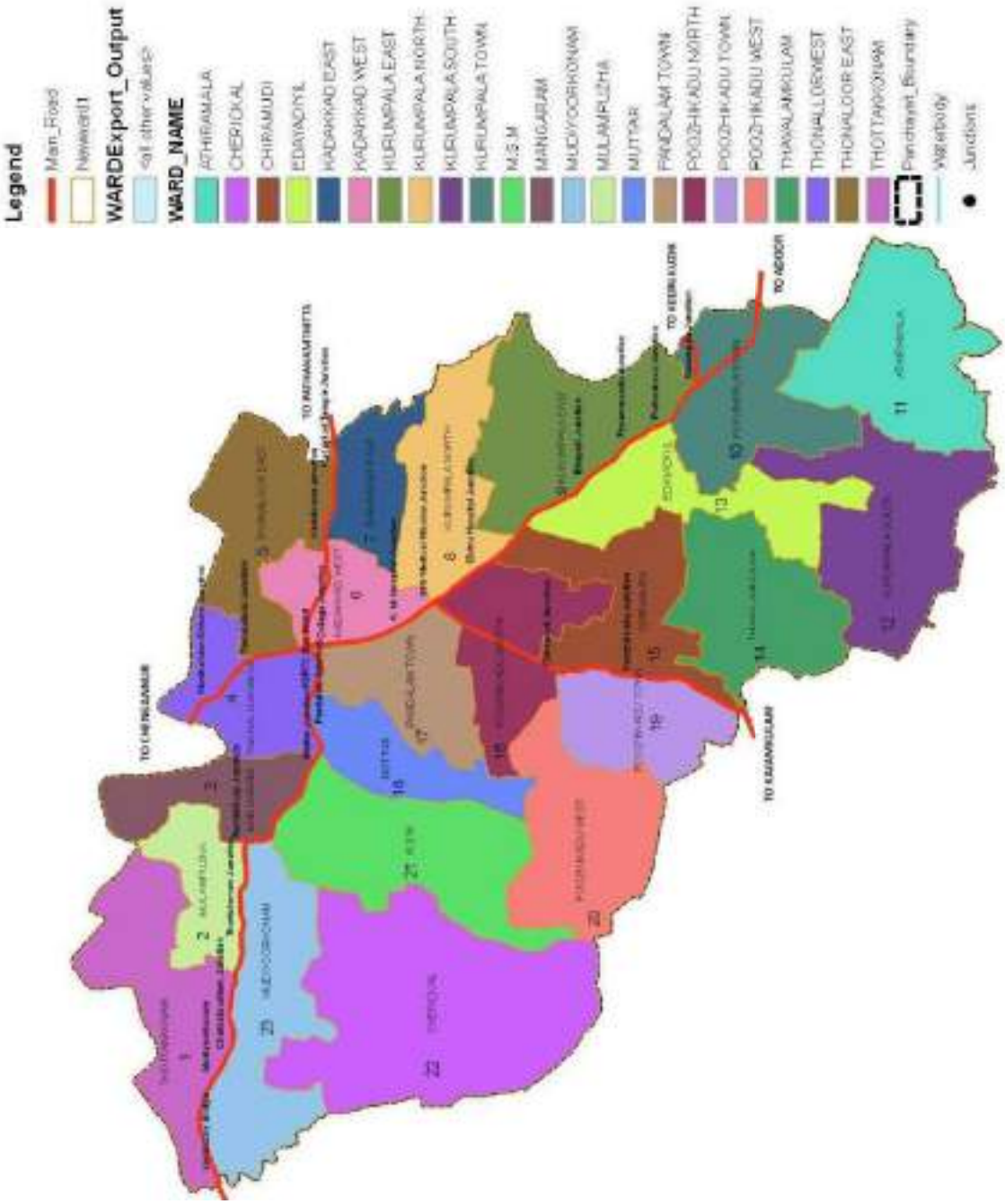
Large scale development proposals in an area not less than 2 Hectares which provide direct employment (after commissioning of the project) to the tune of not less than 50, Higher education and Research Centers may be permitted in all zones except following zones namely Paddy, Environmentally sensitive, water body, irrigation canals and special zones; if not already included under 'use permitted' or 'uses restricted' category as per these regulations subject to the satisfaction of relevant Acts and rules in force and also 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 the Chief Town Planner concerned of Kerala State Town and Country Planning Department, the Town Planner, District office of the Kerala State Town and Country Planning Department, Pathanamthitta and the Secretary, Pandalam Municipality and satisfying the following conditions. The secretary Pandalam Municipality is the convener of the committee.

- The developer shall produce project-cum-feasibility report and Environmental Impact Assessment Report, if required, of the project to the convener of the committee, 30 days in advance of the committee meeting.
- The developer shall produce before the committee all required clearances from the State and Central Government agencies concerned.
- 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 cost.
- Adequate MoU between the developer and the Secretary, Pandalam Municipality shall be undertaken to bring this into effect.
- The project shall be completed within a period of 3 years if not specified otherwise.
- The maximum FAR shall be 2.5 and minimum access width to the plot shall be 12m.

ANNEXES

ANNEXE 2.1

WARD MAP PANDALAM 2011



ANNEXE 4.1

WARD WISE LAND USE BREAK UP

SL.NO	ward name	Residential	Commercial	Industrial	Public	Agricultural	Total Park & Open Space	Total Transportation	Transportation - Bus terminal	Water bodies
1	THOTTAKKONAM	0.6251	0.0009	0.0024	0.0257	0.5504	0.0000	0.0269	0.0000	0.2380
2	MULAMPUZHA	0.3654	0.012	4E-04	0.009	0.241	0.0076	0.0111	0.0000	0.0134103
3	MANGARAM	0.306	0.0077	0.0000	0.0130	0.2306	0.0167	0.0126	0.0000	0.1534
4	THONNALLOOR WEST	0.4296	0.0203	0.0012	0.0396	0.1341	0.1027	0.0611	0.0198	0.1192
5	THONNALLOOR EAST	0.6405	0.0073	0.0000	0.0684	0.2280	0.0005	0.0136	0.0000	0.2416
6	KADAKKADU WEST	0.3811	0.0345	0.0000	0.0986	0.1162	0.0000	0.0293	0.0000	0.0202
7	KADAKKADU EAST	0.3276	0.0000	0.0003	0.0470	0.2001	0.0131	0.0109	0.0000	0.0210
8	KURAMPALA NORTH	0.4193	0.0142	0.0000	0.0138	0.4448	0.1769	0.0236	0.0000	0.0020
9	KURAMPALA EAST	0.7463	0.0069	0.0000	0.0195	0.6776	0.0100	0.0279	0.0000	0.0050
10	KURAMPALA TOWN	0.2822	0.015	0.0024	0.0043	0.9820	0.005	0.0239	0.0000	0.0254
11	ATHIAMALA	0.3254	0.0000	0.0037	0.0235	1.2268	0.0000	0.0000	0.0000	0.0365
12	KURAMPALA SOUTH	0.3076	0.0033	0.0000	0.0044	1.3196	0.0000	0.0071	0.0000	0.0031
13	EDAYADIYIL	0.2159	0.0000	0.0000	0.0335	0.8107	0.0276	0.0113	0.0000	0.0183
14	THAVALAMKULAM	0.3905	0.0000	0.0000	0.0069	0.8595	0.0001	0.0000	0.0000	0.0370
15	CHIRAMUDI	0.2577	0.0040	0.0093	0.0172	0.8400	0.012	0.016	0.0000	0.0288
16	POOOZHIKKADU NORTH	0.3469	0.0109		0.0220	0.6681	0.0075	0.0192	0.0000	0.0184
17	PANDALAM TOWN	0.5662	0.0575	0.0104	0.0805	0.1729	0.0193	0.0287	0.0000	0.0014
18	MUTTAR	0.2671	0.0025	0.0033	0.0036	0.4559	0.0082	0.00004	0.0000	0.0097
19	POOOZHIKKADU TOWN	0.3064	0.0000	0.0003	0.0108	0.5650	0.0010	0.0006	0.0000	0.0340
20	POOOZHIKKADU WEST	0.2294	0.0000	0.0000	0.0014	1.1374	0.0026	0.0000	0.0000	0.0481

SL.NO	ward name	Residential	Commercial	Industrial	Public	Agricultural	Total Park & Open Space	Total Transportation	Transportation - Bus terminal	Water bodies
21	MSM WARD	0.4870	0.0014	0.0049	0.0887	0.7830	0.2243	0.0091	0.0000	0.0863
22	CHERICKAL	0.3024	0.0000	0.0506	0.0220	2.4639	0.1454	0.0063	0.0000	0.0678
23	MUDIYORKONAM	0.6164	0.0095	0.0000	0.0515	0.7608	0.0000	0.0058	0.0000	0.0403

ANNEXE 4.2

CONCENTRATION INDEX OF LAND USE

Sl No	Wards	Residential land use	Commercial land use	Industrial land use	Public land use	Agricultural land use	Total Park & Open Space	Transportation land use	Water bodies	Activity pattern
1	THOTTAKKONAM	1.30	0.08	0.54	0.68	0.66	0.00	1.60	5.24	Residential
2	MULAMPUZHA	1.69	2.19	0.18	0.56	0.65	0.00	1.47	0.66	Commercial
3	MANGARAM	1.26	1.31	0.00	0.69	0.55	0.00	1.48	6.71	Commercial
4	THONNALLOOR WEST	1.44	2.79	0.44	1.71	0.26	0.00	5.87	4.25	Commercial
5	THONNALLOOR EAST	1.63	0.76	0.00	2.23	0.33	0.00	0.99	6.52	Residential
6	KADAKKADU WEST	1.71	6.33	0.00	5.68	0.30	0.00	3.76	0.96	Commercial
7	KADAKKADU EAST	1.61	0.00	0.15	2.97	0.56	0.00	1.54	1.10	Residential
8	KURAMPALA NORTH	1.16	1.61	0.00	0.49	0.71	0.00	1.87	0.03	Commercial
9	KURAMPALA EAST	1.52	0.58	0.00	0.51	0.80	0.00	1.63	0.11	Residential
10	KURAMPALA TOWN	0.64	1.36	0.57	0.13	1.29	0.00	1.56	0.61	Commercial
11	ATHIAMALA	0.61	0.00	0.73	0.57	1.34	0.00	0.00	0.73	Agriculture
12	KURAMPALA SOUTH	0.57	0.25	0.00	0.11	1.42	0.00	0.38	0.06	Agriculture
13	EDAYADIYIL	0.59	0.00	0.00	0.59	1.28	0.00	0.88	0.53	Agriculture
14	THAVALAMKULAM	0.92	0.00	0.00	0.21	1.17	0.00	0.00	0.93	Agriculture
15	CHIRAMUDI	0.66	0.42	2.53	0.57	1.25	0.00	1.19	0.79	Agriculture
16	POOOZHIKKADU NORTH	0.97	0.00	0.01	0.79	1.08	0.00	1.53	0.54	Agriculture
17	PANDALAM TOWN	1.84	7.65	3.57	3.36	0.33	0.00	2.67	0.05	Commercial
18	MUTTAR	1.08	0.41	1.39	0.19	1.07	0.00	0.00	0.41	Residential
19	POOOZHIKKADU TOWN	1.02	0.00	0.11	0.46	1.09	0.00	0.06	1.20	Agriculture
20	POOOZHIKKADU WEST	0.49	0.00	0.00	0.04	1.41	0.00	0.00	1.10	Agriculture
21	MSM WARD	0.88	0.10	0.94	2.06	0.82	0.00	0.47	1.66	Residential
22	CHERICKAL	0.31	0.00	5.51	0.28	1.42	0.00	0.18	0.72	Agriculture
23	MUDIYORKONAM	1.27	0.80	0.00	1.36	0.91	0.00	0.34	0.88	Residential

ANNEXE 4.3

FUNCTIONAL CHARACTER OF WARDS

	Population density				% Non agriculture				Plot size					
Name of Ward	**725-1113**	**1113-1502**	**1502-1890**	**1890-2279**	**16-32**	**32-48**	**48-65**	**65-81**	**26-51**	**51-77**	**77-102**	**102-127**	**Rank**	**Character**
Thottakkonam				4				4	4				12	URBAN
Mulampuzha				4			3		4				11	
Mangaram				4			3		4				11	
Thonnalloor West			3					4	4				11	
Thonnalloor East				4		2			4				10	SEMI URBAN
Kadakkadu West			3				3		4				10	
Kurampala North		2						4	4				10	
Kurampala East			3				3		4				10	
Kadakkadu East			3				3			3			9	
Kurampala South			3		1				4				8	SEMI RURAL

Name of Ward	725-1113	1113-1502	1502-1890	1890-2279	16-32	32-48	48-65	65-81	26-51	51-77	77-102	102-127	Rank	
Edayadiyil		2				2			4				8	
Thavalamkulam	1						3		4				8	
Pooozhikkadu West			3		1				4				8	
Msm Ward			3		1				4				8	
Cherickal			3		1				4				8	
Mudiyorkonam		2				2			4				8	
Athiamala			3		1					3			7	
Pooozhikkadu North		2			1				4				7	
Pandalam Town	1					2			4				7	
Kurampala Town		2					3					1	6	RURAL
Chiramudi		2			1						2		5	
Muttar	1					2						1	4	
Pooozhikkadu Town		2			1							1	4	

ANNEXE 7.1

NODE STUDY

SL NO	NODE	Weightage	ARATHI MUKKU		MANIKANDAN ALTHARA		MUTTAR		CHERIKKAL		KUNNIKKUZHI MUKKU		MANNAM MEDICAL COLLAGE		KURAMBALA		THAVALAKULAM	
			No	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*
1	AKRE SHOP	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0				0.0
2	ADARAM EZHUTHU	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
3	ADVOCATE OFFICE	17		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0
4	AKSHAYA CENTRE	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0	1.0	8.5		0.0
5	ALUMINIUM FABRICATION	2.8		0.0	1.0	2.8	1.0	2.8		0.0		0.0		0.0	2.0	5.7		0.0
6	APARTMENTS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
7	ANGANWADI	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
8	ATM POINTS	8.5		0.0		0.0		0.0		0.0		0.0		0.0	1.0	8.5		0.0
9	AUTOMOBILE SPARE PARTS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
10	AUDITORIUM	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
11	AUTO OIL & LUBRICANTS SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
12	AUTO STAND	3.4	1.0	3.4		0.0		0.0		0.0	1.0	3.4		0.0	1.0	3.4		0.0
13	AUTO WORKSHOP	4.3		0.0		0.0	1.0	4.3		0.0		0.0		0.0	1.0	4.3		0.0
14	AYURVEDA SHOPS	5.7		0.0		0.0		0.0		0.0		0.0	1.0	5.7		0.0		0.0
15	BAKERY	2.1	2.0	4.3	2.0	4.3	4.0	8.5		0.0	2.0	4.3		0.0	5.0	10.6		0.0
16	BAKERY & STATIONARY	17		0.0		0.0		0.0		0.0		0.0	1.0	17.0		0.0		0.0
17	BANKS	5.7		0.0		0.0		0.0		0.0		0.0		0.0	2.0	11.3		0.0
18	BARBAR SHOP	1.9	2.0	3.8		0.0	4.0	7.6	1.0	1.9	1.0	1.9		0.0	1.0	1.9		0.0
19	BATTERY SHOP&WORKS	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

20	BEAUTY PARLOR	5.7	1.0	5.7		0.0		0.0		0.0		0.0		0.0	1.0	5.7		0.0
21	BIKE WORKSHOP	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0	1.0	5.7		0.0
22	BEVERAGES GOVT.	17		0.0		0.0		0.0		0.0	1.0	17.0		0.0		0.0		0.0
23	BOOK SHOP	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
24	BUILDERS & ARCHITECH	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0	2.0	11.3		0.0
25	CAR WORKSHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
26	CAR ACCESSORIES	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
27	CATTLE FEED	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
28	CEMENT SHOP	3.4		0.0		0.0	2.0	6.8		0.0	1.0	3.4		0.0	2.0	6.8		0.0
29	CERAMIC TILES & MARBLES	5.7	1.0	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
30	CHICKEN MEAT CENTRE	5.7		0.0		0.0		0.0		0.0	1.0	5.7		0.0		0.0		0.0
31	CHURCH	17	3.0	51.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
32	COMFORT STATION	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0
33	CO-OPERATIVE& OTHER SOCIETIES	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
34	COMPUTER CENTERS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
35	COMPUTER SALES & SERVICES	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
36	CULTURAL CENTRE	17	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
37	CURTAIN & UPHOLSARY WORKS	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
38	CYCLE SHOP	17		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0
39	DRIVING SCHOOL	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
40	EDUCATION INSTITUTIONS	3.4	1.0	3.4	2.0	6.8	1.0	3.4		0.0		0.0		0.0		0.0		0.0
41	EGG SHOP	17		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0
42	ELECTRICAL SHOP	3.4		0.0		0.0	1.0	3.4		0.0	1.0	3.4		0.0	3.0	10.2		0.0
43	ELECTRONIC REPAIR	2.4		0.0		0.0		0.0		0.0	1.0	2.4		0.0		0.0		0.0
44	ELECTRONIC SHOPS	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0	1.0	5.7		0.0
45	ENGINEERING & LAITH WORKS	2.8	1.0	2.8	1.0	2.8		0.0		0.0	1.0	2.8		0.0		0.0		0.0
46	FERTILISER SHOP	3.4	1.0	3.4		0.0		0.0		0.0	1.0	3.4		0.0		0.0		0.0
47	FIRE WOODS SHOP	8.5	2.0	17.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
48	FINANCIERS & GOLD LOAN	2.1		0.0		0.0	1.0	2.1		0.0	1.0	2.1		0.0	3.0	6.4		0.0
49	FISH MAERKET	8.5		0.0		0.0		0.0		0.0	1.0	8.5		0.0		0.0		0.0
50	FLOUR MILL	4.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

51	FRUITS STALL	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
52	FRIDGE REPAIR	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
53	FURNITURE & MATRESS SHOPS	5.7		0.0		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0
54	FURNITURE WORKSHOP	4.3	1.0	4.3	1.0	4.3		0.0		0.0		0.0		0.0	1.0	4.3		0.0
55	GAS STOVE SHOP	17		0.0		0.0	2.0	34.0		0.0		0.0		0.0		0.0		0.0
56	GLASS &PLYWOOD SHOP	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
57	GRANITE WORKS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
58	GOVERNMENT INSTITUTIONS	5.7		0.0		0.0	1.0	5.7	1.0	5.7		0.0		0.0		0.0		0.0
59	GOLD SMITH	4.3	1.0	4.3		0.0	1.0	4.3		0.0		0.0		0.0	1.0	4.3		0.0
60	HARDWARE SHOP	3.4	1.0	3.4		0.0		0.0		0.0	1.0	3.4		0.0	3.0	10.2		0.0
61	HEAVY WORKSHOP	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
62	HIRING CENTRE	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
63	HOME APPLIENCES SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
64	Allopathyclinic/HOSP.	3.4		0.0		0.0	1.0	3.4		0.0	1.0	3.4	1.0	3.4	1.0	3.4		0.0
65	Ayurveda CLINIC	5.7		0.0	3.0	17.0		0.0		0.0		0.0		0.0	1.0	5.7		0.0
66	Homeoclinic	4.3		0.0		0.0	2.0	8.5		0.0		0.0		0.0	1.0	4.3		0.0
67	INSURANCE AGENCY OFFICE	8.5		0.0	1.0	8.5	1.0	8.5		0.0		0.0		0.0		0.0		0.0
68	DENTAL CLINIC	17	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
69	IORINING CENTRE	5.7		0.0	1.0	5.7	1.0	5.7		0.0		0.0		0.0		0.0		0.0
70	IORN& STEEL ,CEMENT SHOPS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
71	JOB CONSULTANCY	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
72	JEWALLERS	17		0.0		0.0		0.0		0.0		0.0		0.0	1.0	17.0		0.0
73	JYOTHISHAAYALAM	8.5	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
74	KINDER GARTEN	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
75	LAB	4.3	1.0	4.3		0.0	1.0	4.3		0.0		0.0		0.0		0.0		0.0
76	LIBREARY & READING ROOM	8.5		0.0		0.0		0.0	1.0	8.5		0.0		0.0		0.0	1.0	8.5
77	LODGING	2.8		0.0		0.0		0.0	1.0	2.8		0.0		0.0	1.0	2.8		0.0
78	LOUNDRY & DRY CLEANING	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0		0.0
79	LOTTERY SHOP	3.4		0.0	1.0	3.4	1.0	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0
80	LP SCHOOL	4.3		0.0		0.0		0.0	1.0	4.3		0.0	1.0	4.3		0.0		0.0
81	MAVELI / LABHAM	17		0.0		0.0		0.0		0.0		0.0		0.0	1.0	17.0		0.0

	MARKETS																	
82	MEAT STALL	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
83	MEDICAL SHOP	2.8		0.0		0.0	1.0	2.8		0.0	1.0	2.8		0.0	1.0	2.8		0.0
84	MOBILE RECHARGING & SERVICE	3.4		0.0		0.0	5.0	17.0		0.0	2.0	6.8		0.0	2.0	6.8		0.0
85	MARKET PLACE	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0	1.0	5.7		0.0
86	MOSQUE	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
87	NETWORK PROVIDER OFFICE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
88	NEWS BUERO	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
89	OLD WOOD SHOP	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
90	OPTICALS	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
91	PAINT SHOPS	8.5	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
92	PAINTING WORKSHOP	8.5		0.0	1.0	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0
93	PAN SHOPS	1.2	1.0	1.2	1.0	1.2	3.0	3.6		0.0	1.0	1.2	1.0	1.2	3.0	3.6	2.0	2.4
94	PARCEL SERVICE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
95	PARALLEL COLLEGE	17		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0
96	PENTACOSTAL CHURCH	5.7	1.0	5.7		0.0		0.0		0.0	1.0	5.7		0.0	1.0	5.7		0.0
97	PETROL PUMP	8.5		0.0		0.0		0.0		0.0		0.0		0.0	1.0	8.5		0.0
98	PHOTOCOPY & DTP	2.8		0.0		0.0	1.0	2.8		0.0	3.0	8.5		0.0	2.0	5.7		0.0
99	PLUMBING & WIRING SHOPS	3.4	1.0	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0
100	POOJA ITEM SHOPS	8.5		0.0		0.0		0.0		0.0		0.0		0.0	2.0	17.0		0.0
101	POWER TOOLS SHOP	17		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0
102	POLITICAL PARTY OFFICES	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
103	POST OFFICE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
104	PRINTING PRESS	5.7		0.0		0.0	2.0	11.3		0.0	1.0	5.7		0.0		0.0		0.0
105	PROVISION SHOP/LEATHER (R)	1.5	1.0	1.5	1.0	1.5	2.0	3.1		0.0	1.0	1.5		0.0	4.0	6.2	1.0	1.5
106	PROVISION SHOP (W)	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0
107	RATION SHOP	2.4		0.0		0.0	2.0	4.9		0.0	2.0	4.9		0.0		0.0	1.0	2.4
108	RESTAURANT & TEA SHOP	3.4		0.0	1.0	3.4	2.0	6.8		0.0		0.0		0.0	3.0	10.2		0.0
109	RUBBER SHOP	5.7		0.0		0.0		0.0		0.0		0.0		0.0	3.0	17.0		0.0
110	SERVICE CENTRE (WATER)	17	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
111	SMALLSCALE INDUSTRY	5.7		0.0		0.0		0.0		0.0		0.0		0.0	1.0	5.7		0.0

112	SMOKE TESTING CENTRE	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
113	STATIONARY SHOP	1.1	6.0	6.8	3.0	3.4	10.0	11.3	2.0	2.3	6.0	6.8		0.0	10.0	11.3	2.0	2.3
114	STATIONARY SHOP WHOLESALE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0	1.0	17.0
115	STICKER & NUMBER PLATES	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
116	STUDIO	3.4	2.0	6.8		0.0		0.0	1.0	3.4		0.0		0.0	2.0	6.8		0.0
117	TAIORING SHOP	1.9	4.0	7.6	1.0	1.9	3.0	5.7		0.0	3.0	5.7		0.0	4.0	7.6		0.0
118	TAXI STAND	14		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
119	TEA SHOP	1.3	1.0	1.3	2.0	2.6	3.0	3.9	1.0	1.3	1.0	1.3		0.0	2.0	2.6	2.0	2.6
120	TEMPLE	2.4	1.0	2.4	1.0	2.4	1.0	2.4		0.0		0.0		0.0	2.0	4.9		0.0
121	TEMPO STAND	17		0.0		0.0		0.0		0.0		0.0		0.0	1.0	17.0		0.0
122	TEXTILES & READYMADE	4.3		0.0		0.0	2.0	8.5		0.0		0.0		0.0		0.0		0.0
123	TICKETS & OTHERS SERVICES	4.3		0.0	1.0	4.3	1.0	4.3		0.0		0.0		0.0	1.0	4.3		0.0
124	TOOLS HIRING CENTRE	8.5	1.0	8.5		0.0		0.0		0.0		0.0		0.0	2.0	17.0		0.0
125	TOY SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
126	TYRE SHOP /RETHREDING SHOP	5.7		0.0		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0
127	UP SCHOOL	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
128	VEGITABLE SHOPS	2.1		0.0	2.0	4.3	3.0	6.4		0.0	2.0	4.3		0.0	5.0	10.6		0.0
129	VERTINIARY CENTRE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
130	VEHICLE SHOWROOM	8.5		0.0	2.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0
131	WAITING SHED FOR PASSENGERS	1.9		0.0	2.0	3.8	1.0	1.9	1.0	1.9	1.0	1.9		0.0	1.0	1.9		0.0
132		4.3		0.0	3.0	12.8	1.0	4.3		0.0		0.0		0.0		0.0		0.0
133		8.5		0.0		0.0	2.0	17.0		0.0		0.0		0.0		0.0		0.0
134		17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
135	SNDP	17	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
136	NSS	2.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	1.0	2.8
TOTAL				**247**		**174**		**439**				**137**		**32**		**360**		**40**

Sl: No	Node	Weightage >	POST OFFICE JN.		MEDICAL MISSION		EDAYADI		POOZHIKKADU		KADAKKADU		MAHADEVA TEMPLE		CHERUMALA		CHAKKALAVATTOM		MUDIYOORKONNAM	
			No	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*	*No*	*Score*
1	AKRE SHOP	8.5		0.0		0.0		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0
2	ADARAM EZHUTHU	17		0.0	11.0	187.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
3	ADVOCATE OFFICE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
4	AKSHAYA CENTRE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
5	ALUMINIUM FABRICATION	2.8		0.0	1.0	2.8	1.0	2.8		0.0	2.0	5.7		0.0		0.0		0.0		0.0
6	APARTMENTS	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
7	ANGANWADI	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
8	ATM POINTS	8.5		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
9	AUTOMOBILE SPARE PARTS	17		0.0	3.0	51.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
10	AUDITORIUM	8.5		0.0		0.0		0.0		0.0		0.0	1.0	8.5		0.0		0.0		0.0
11	AUTO OIL & LUBRICANTS SHOP	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
12	AUTO STAND	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0		0.0		0.0		0.0		0.0

13	AUTO WORKSHOP	4.3		0.0	2.0	8.5		0.0		0.0	1.0	4.3		0.0		0.0		0.0		0.0
14	AYURVEDA SHOPS	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0		0.0	1.0	5.7
15	BAKERY	2.1		0.0	10.0	21.3		0.0	2.0	4.3	2.0	4.3		0.0		0.0		0.0		0.0
16	BAKERY & STATIONARY	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
17	BANKS	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0
18	BARBAR SHOP	1.9		0.0	4.0	7.6		0.0	2.0	3.8	3.0	5.7		0.0	1.0	1.9		0.0		0.0
19	BATTERY SHOP&WORKS	8.5		0.0	2.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
20	BEAUTY PARLOR	5.7		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0
21	BIKE WORKSHOP	5.7		0.0	4.0	22.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0
22	BEVERAGES GOVT.	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
23	BOOK SHOP	5.7		0.0	1.0	5.7		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0
24	BUILDERS & ARCHITECH	5.7		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0
25	CAR WORKSHOP	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
26	CAR ACCESSORIES	17		0.0	2.0	34.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
27	CATTLE FEED	17	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
28	CEMENT SHOP	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0		0.0		0.0		0.0		0.0

29	CERAMIC TILES & MARBLES	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0
30	CHICKEN MEAT CENTRE	5.7		0.0		0.0		0.0	1.0	5.7	1.0	5.7		0.0		0.0		0.0		0.0
31	CHURCH	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
32	COMFORT STATION	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
33	CO-OPERATIVE& OTHER SOCIETIES	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0	2.0	11.3	1.0	5.7
34	COMPUTER CENTERS	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
35	COMPUTER SALES & SERVICES	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
36	CULTURAL CENTRE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
37	CURTAIN & UPHOLSARY WORKS	8.5		0.0		0.0		0.0	2.0	17.0	1.0	8.5		0.0		0.0		0.0		0.0
38	CYCLE SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
39	DRIVING SCHOOL	5.7		0.0		0.0	1.0	5.7	1.0	5.7		0.0		0.0		0.0		0.0		0.0
40	EDUCATION INSTITUTIONS	3.4		0.0	1.0	3.4		0.0		0.0	1.0	3.4		0.0		0.0		0.0		0.0
41	EGG SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
42	ELECTRICAL SHOP	3.4		0.0	1.0	3.4		0.0	1.0	3.4		0.0		0.0		0.0		0.0		0.0
43	ELECTRONIC REPAIR	2.4	1.0	2.4	1.0	2.4	1.0	2.4		0.0	2.0	4.9		0.0	2.0	4.9	1.0	2.4		0.0
44	ELECTRONIC SHOPS	5.7		0.0	3.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

45	ENGINEERING & LAITH WORKS	2.8		0.0		0.0		0.0		0.0		0.0		0.0	1.0	2.8	1.0	2.8	1.0	2.8
46	FERTILISER SHOP	3.4	1.0	3.4	1.0	3.4		0.0	1.0	3.4		0.0		0.0		0.0		0.0		0.0
47	FIRE WOODS SHOP	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
48	FINANCIERS & GOLD LOAN	2.1	1.0	2.1	4.0	8.5		0.0	2.0	4.3		0.0		0.0	1.0	2.1		0.0	1.0	2.1
49	FISH MAERKET	8.5		0.0		0.0		0.0		0.0	2.0	17.0		0.0		0.0		0.0		0.0
50	FLOUR MILL	4.3		0.0	1.0	4.3		0.0		0.0	1.0	4.3	1.0	4.3	1.0	4.3		0.0		0.0
51	FRUITS STALL	8.5		0.0	6.0	51.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
52	FRIDGE REPAIR	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
53	FURNITURE & MATRESS SHOPS	5.7		0.0	1.0	5.7		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
54	FURNITURE WORKSHOP	4.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	1.0	4.3
55	GAS STOVE SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
56	GLASS &PLYWOOD SHOP	5.7		0.0		0.0		0.0	1.0	5.7	2.0	11.3		0.0		0.0		0.0		0.0
57	GRANITE WORKS	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
58	GOVERNMENT INSTITUTIONS	5.7	2.0	11.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
59	GOLD SMITH	4.3		0.0		0.0		0.0	1.0	4.3		0.0		0.0		0.0		0.0		0.0

60	HARDWARE SHOP	3.4		0.0	4.0	13.6		0.0	1.0	3.4		0.0		0.0		0.0		0.0		0.0
61	HEAVY WORKSHOP	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
62	HIRING CENTRE	5.7	1.0	5.7		0.0		0.0		0.0	4.0	22.7		0.0		0.0		0.0	1.0	5.7
63	HOME APPLIENCES SHOP	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
64	AllopathyCLINIC/ HOSP.	3.4		0.0	2.0	6.8		0.0		0.0	1.0	3.4		0.0		0.0		0.0		0.0
65	Ayurveda CLINIC	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
66	HomeoCLINIC	4.3		0.0		0.0	1.0	4.3	1.0	4.3		0.0		0.0		0.0		0.0		0.0
67	INSURANCE AGENCY OFFICE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
68	DENTAL CLINIC	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
69	IORINING CENTRE	5.7		0.0		0.0		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0
70	IORN& STEEL ,CEMENT SHOPS	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
71	JOB CONSULTANCY	8.5		0.0	2.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
72	JEWALLERS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
73	JYOTHISHAAYALAM	8.5		0.0		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0
74	KINDER GARTEN	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
75	LAB	4.3		0.0	1.0	4.3		0.0		0.0	1.0	4.3		0.0		0.0		0.0		0.0
76	LIBREARY &	8.		0.		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

	READING ROOM	5		0															
77	LODGING	2.8	1.0	2.8	3.0	8.5		0.0		0.0	3.0	8.5		0.0	1.0	2.8		0.0		0.0
78	LOUNDRY & DRY CLEANING	5.7		0.0	1.0	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0
79	LOTTERY SHOP	3.4		0.0	2.0	6.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0
80	LP SCHOOL	4.3		0.0		0.0		0.0		0.0	1.0	4.3		0.0		0.0		0.0	1.0	4.3
81	MAVELI / LABHAM MARKETS	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
82	MEAT STALL	17		0.0		0.0		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0
83	MEDICAL SHOP	2.8		0.0	10.0	28.3		0.0	1.0	2.8	1.0	2.8		0.0		0.0		0.0		0.0
84	MOBILE RECHARGING & SERVICE	3.4		0.0	4.0	13.6		0.0		0.0	1.0	3.4		0.0		0.0		0.0		0.0
85	MARKET PLACE	5.7		0.0		0.0		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0
86	MOSQUE	5.7		0.0	1.0	5.7		0.0		0.0	1.0	5.7		0.0		0.0		0.0		0.0
87	NETWORK PROVIDER OFFICE	8.5		0.0	1.0	8.5	2.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0
88	NEWS BUERO	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
89	OLD WOOD SHOP	8.5		0.0	1.0	8.5		0.0		0.0	2.0	17.0		0.0		0.0		0.0		0.0
90	OPTICALS	8.5		0.0	3.0	25.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
91	PAINT SHOPS	8.5		0.0	3.0	25.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
92	PAINTING WORKSHOP	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

93	PAN SHOPS	1.2		0.0	5.0	6.1	2.0	2.4		0.0	7.0	8.5	3.0	3.6	2.0	2.4	1.0	1.2	1.0	1.2
94	PARCEL SERVICE	8.5		0.0		0.0		0.0		0.0	1.0	8.5		0.0		0.0	1.0	8.5		0.0
95	PARALLEL COLLEGE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
96	PENTACOSTAL CHURCH	5.7		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
97	PETROL PUMP	8.5		0.0		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0
98	PHOTOCOPY & DTP	2.8		0.0	5.0	14.2		0.0	1.0	2.8	1.0	2.8		0.0		0.0		0.0		0.0
99	PLUMBING & WIRING SHOPS	3.4		0.0	2.0	6.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0
100	POOJA ITEM SHOPS	8.5		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
101	POWER TOOLS SHOP	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
102	POLITICAL PARTY OFFICES	0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
103	POST OFFICE	8.5	1.0	8.5	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
104	PRINTING PRESS	5.7		0.0	2.0	11.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0
105	PROVISION SHOP/LEATHER (R)	1.5	2.0	3.1	3.0	4.6	2.0	3.1	2.0	3.1	2.0	3.1		0.0		0.0		0.0		0.0
106	PROVISION SHOP (W)	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
107	RATION SHOP	2.4	1.0	2.4	1.0	2.4		0.0	1.0	2.4		0.0	1.0	2.4		0.0		0.0		0.0
108	RESTAURANT & TEA SHOP	3.4		0.0	7.0	23.8	1.0	3.4		0.0		0.0		0.0		0.0		0.0		0.0

109	RUBBER SHOP	5.7	1.0	5.7		0.0		0.0		0.0		0.0		0.0	1.0	5.7		0.0		0.0
110	SERVICE CENTRE (WATER)	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
111	SMALLSCALE INDUSTRY	5.7		0.0	2.0	11.3		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
112	SMOKE TESTING CENTRE	8.5		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
113	STATIONARY SHOP	1.1	2.0	2.3	11.0	12.5	3.0	3.4	1.0	1.1	4.0	4.5	2.0	2.3	3.0	3.4	1.0	1.1		0.0
114	STATIONARY SHOP WHOLESALE	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
115	STICKER & NUMBER PLATES	17		0.0	1.0	17.0		0.0		0.0	1.0	17.0		0.0		0.0		0.0		0.0
116	STUDIO	3.4	1.0	3.4	3.0	10.2		0.0		0.0		0.0		0.0		0.0		0.0		0.0
117	TAIORING SHOP	1.9	1.0	1.9	5.0	9.4		0.0	2.0	3.8		0.0		0.0		0.0		0.0	1.0	1.9
118	TAXI STAND	14		0.0	1.0	14.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
119	TEA SHOP	1.3	3.0	3.9	7.0	9.2		0.0	4.0	5.2	4.0	5.2		0.0	1.0	1.3	1.0	1.3		0.0
120	TEMPLE	2.4		0.0		0.0		0.0	1.0	2.4		0.0	2.0	4.9		0.0		0.0	1.0	2.4
121	TEMPO STAND	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
122	TEXTILES & READYMADE	4.3	1.0	4.3	3.0	12.8		0.0	1.0	4.3		0.0		0.0		0.0		0.0		0.0
123	TICKETS & OTHERS SERVICES	4.3		0.0		0.0		0.0	1.0	4.3		0.0		0.0		0.0		0.0		0.0

124	TOOLS HIRING CENTRE	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
125	TOY SHOP	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
126	TYRE SHOP /RETHREDING SHOP	5.7		0.0	2.0	11.3		0.0	1.0	5.7		0.0		0.0		0.0		0.0		0.0
127	UP SCHOOL	5.7		0.0	1.0	5.7	1.0	5.7	1.0	5.7		0.0		0.0		0.0		0.0		0.0
128	VEGITABLE SHOPS	2.1		0.0	4.0	8.5	1.0	2.1	2.0	4.3	1.0	2.1		0.0		0.0		0.0		0.0
129	VERTINIARY CENTRE	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
130	VEHICLE SHOWROOM	8.5		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
131	WAITING SHED FOR PASSENGERS	1.9		0.0	1.0	1.9		0.0		0.0		0.0		0.0	1.0	1.9	1.0	1.9	1.0	1.9
132	Tea stall	4.3		0.0	1.0	4.3		0.0		0.0	5.0	21.3		0.0		0.0		0.0		0.0
133	Fish stall	8.5		0.0	1.0	8.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0
134	Vegetable stall	17		0.0	1.0	17.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
135	SNDP yogam	17		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
136	NSS yogam	2.8	1.0	2.8		0.0	1.0	2.8	1.0	2.8		0.0	1.0	2.8	1.0	2.8		0.0		0.0
TOTAL				83		1156		64		154		262		29		36		31		38

ANNEXE 12.1

PERCENTAGE OF BUILDING IN EACH CATEGORY OF PLOT AREA

	Total area of the residential plot							
Ward name	**Upto 3 cents**	**4-5**	**6-10**	**11-25**	**26-50**	**51-70**	**Above 70**	**Average plot area(Sqm)**
Thottakkonam	0.0	8.1	43.2	32.4	16.2	0.0	0.0	15.82
Mulampuzha	2.8	13.9	30.6	44.4	8.3	0.0	0.0	14.32
Mangaram	0.0	0.0	32.4	48.6	13.5	0.0	5.4	20.27
Thonnalloor West	6.5	6.5	29.0	35.5	22.6	0.0	0.0	17.77
Thonnalloor East	0.0	25.6	25.6	41.0	5.1	0.0	2.6	14.33
Kadakkadu West	3.2	19.4	45.2	29.0	3.2	0.0	0.0	11.03
Kadakkadu East	17.9	25.0	21.4	28.6	3.6	0.0	3.6	12.38
Kurampala North	5.1	15.4	23.1	33.3	15.4	5.1	2.6	19.44
Kurampala East	3.3	3.3	10.0	50.0	26.7	0.0	6.7	24.85
Kurampala Town	3.0	15.2	27.3	30.3	21.2	3.0	0.0	18.3
Athiramala	0.3	1.2	3.0	3.3	0.9	1.2	0.3	21.32
Kurampala South	5.7	8.6	11.4	28.6	22.9	11.4	11.4	30.21
Edayadiyil	58.1	6.5	12.9	22.6	0.0	0.0	0.0	7.13
Thavalamkulam	2.9	20.0	11.4	34.3	14.3	11.4	5.7	24.41
Chiramudi	2.6	12.8	25.6	48.7	5.1	5.1	0.0	16.53
Pooozhikkadu North	4.0	24.0	16.0	12.0	40.0	4.0	0.0	22.26
Pandalam Town	6.1	3.0	33.3	27.3	27.3	0.0	3.0	20.38
Muttar	5.9	17.6	32.4	41.2	2.9	0.0	0.0	12.09
Pooozhikkadu Town	5.7	8.6	8.6	42.9	31.4	2.9	0.0	22.63
Pooozhikkadu West	0.0	3.8	30.8	42.3	15.4	7.7	0.0	20.75
Msm Ward	7.5	5.0	47.5	35.0	5.0	0.0	0.0	12.45
Cherickal	5.4	13.5	45.9	27.0	8.1	0.0	0.0	12.39
Mudiyorkonam	56.4	17.9	20.5	5.1	0.0	0.0	0.0	5.06

ANNEXE 12.2

AVERAGE DISTANCE TO VARIOUS SERVICES

SL no	Name of Ward	Average Distance to motorable road	% saying distance to motorable road greater than 0.5 km	Average Distance to Bus stop	% saying distance to bus stop greater than 0.5 km	Average Distance Primary School	% saying distance to Primary school greater than 0.5 km	Average Distance to LP School	% saying distance to LP school greater than 0.5 km	Average Distance to UP School	% saying distance to UP school greater than 1 km	Average Distance to HS School	% saying distance to HS school greater than 3 km
1	Thottakkonam	0.57	10.5	0.88	52.6	0.78	52.6	1.53	76.3	1.68	63.2	1.68	5.3
2	Mulampuzha	0.54	15.8	0.54	15.8	0.91	44.7	0.91	44.7	0.91	31.6	0.91	2.6
3	Mangaram	0.6	24.3	0.59	27.0	0.74	63.9	0.81	66.7	0.81	11.1	0.99	0.0
4	Thonnallor West	0.55	9.7	0.55	9.7	0.55	9.7	0.55	9.7	0.56	3.2	0.56	0.0
5	Thonnallor East	0.52	7.5	0.76	57.5	0.76	60.0	0.78	60.0	0.82	22.5	2.26	30.0
6	Kadakkadu West	0.7	43.8	0.71	46.9	0.8	71.9	0.79	78.1	0.76	9.4	0.84	0.0
7	Kadakkadu East	0.5	0.0	0.64	46.7	0.5	0.0	0.5	0.0	1.5	100.0	1.5	0.0
8	Kurampala North	1.67	75.6	1.67	75.6	1.6	75.6	1.74	78.1	1.74	56.1	1.74	17.1
9	Kurampala East	0.5	0.0	0.5	0.0	0.59	36.7	0.5	0.0	0.9	40.0	0.9	0.0
10	Kurampala Town	1.23	66.7	1.42	72.7	2.67	93.9	2.77	97.0	2.95	93.9	4.73	93.9
11	Athiramala	1.71	100.0	1.79	100.0	1.79	100.0	1.82	100.0	1.93	76.5	1.97	5.9

12	Kurampala South	0.76	51.4	0.83	62.9	0.94	68.6	0.89	68.6	0.97	34.3	1	0.0
13	Edayadiyil	0.65	48.4	2.31	77.4	2.96	96.8	3.21	100.0	3.21	100.0	3.21	45.2
14	Thavalamkulam	1.08	94.3	1.09	100.0	1.16	100.0	1.16	100.0	1.11	48.6	1.24	0.0
15	Chiramudi	0.7	40.0	0.94	65.0	1.8	87.5	1.8	87.5	1.8	52.5	1.83	25.0
16	Pooozhikkadu North	0.5	0.0	0.6	28.0	1.43	88.0	1.5	88.0	1.54	72.0	1.68	4.0
17	Pandalam Town	0.5	0.0	1.37	51.4	1.42	51.4	1.42	51.4	1.42	51.4	1.42	0.0
18	Muttar	0.54	16.7	0.6	38.9	0.62	30.6	0.76	55.6	0.87	19.4	0.93	0.0
19	Pooozhikkadu Town	0.5	0.0	1.15	83.3	1.21	88.9	1.21	88.9	1.21	61.1	2.97	33.3
20	Pooozhikkadu West	0.7	15.6	2.47	100.0	2.43	100.0	2.43	100.0	2.43	97.1	3.84	85.3
21	Msm Ward	0.51	2.4	0.76	80.5	0.79	87.8	0.77	87.8	1.99	87.8	2.1	12.2
22	Cherickal	0.5	0.0	0.54	7.9	1.03	23.7	0.93	26.3	2.94	94.7	3.07	34.2
23	Mudiyorkonam	0.5	0.0	0.61	27.5	1.4	97.5	1.71	100.0	1.71	77.5	2.19	15.0

Part 2

SL no	Name of Ward	Average Distance to PO	% saying distance to PO greater than 3 km	Average Distance to Health	% saying distance to Health greater than 5 km	Average Distance to Hospital	% saying distance to Hospital greater than 5 km	Average Distance to Ration shop	% saying distance to Ration shop greater than 5 km	Average Distance to Play Ground	% saying distance to Play Ground greater than 5 km
1	Thottakkonam	1.7	5.3	4.22	26.3	4.16	26.3	1.03	0.0	2.1	10.8
2	Mulampuzha	0.6	2.6	1.75	2.9	4.33	52.6	0.75	2.6	5	100.0
3	Mangaram	1.5	0.0	1.61	0.0	1.54	0.0	0.53	0.0	1.06	0.0
4	Thonnalloor West	0.5	0.0	0.56	0.0	0.74	0.0	0.67	0.0	1.41	0.0
5	Thonnalloor East	1.1	0.0	1.18	0.0	2.91	2.5	1.34	0.0	5	100.0
6	Kadakkadu West	0.8	0.0	0.78	0.0	1.08	0.0	0.94	0.0	0.95	0.0
7	Kadakkadu East	1.5	0.0	0.75	0.0	1.5	0.0	1.5	0.0	2.5	0.0
8	Kurampala North	1.7	17.1	1.82	2.4	1.73	2.4	1.66	4.9	2.01	4.9
9	Kurampala East	2.5	0.0	5	100.0	2.9	40.0	1.11	0.0	5	100.0
10	Kurampala Town	4.7	93.9	4.91	90.9	4.88	87.9	2.34	0.0	5	100.0
11	Athiamala	1.9	2.9	2.13	0.0	3.22	26.5	1.85	0.0	3.03	0.0
12	Kurampala South	0.9	2.9	1.09	5.7	1.8	5.7	1.62	5.7	1.26	5.7
13	Edayadiyil	2.6	35.5	2.19	0.0	4.61	61.3	2.01	3.2	4.66	74.2
14	Thavalamkulam	2.3	34.3	2.25	25.7	2.83	37.1	1.14	0.0	1.25	8.6
15	Chiramudi	2.3	25.6	2.08	0.0	1.94	0.0	1.14	0.0	3.26	7.7
16	Pooozhikkadu North	3	52.0	2.82	0.0	0.9	0.0	0.96	0.0	4.65	90.0
17	Pandalam Town	1.4	0.0	1.45	0.0	1.47	0.0	1.45	0.0	1.47	0.0
18	Muttar	1.1	0.0	0.65	0.0	1.04	0.0	0.53	0.0	0.83	0.0
19	Pooozhikkadu Town	2.9	33.3	1.4	0.0	3.24	5.6	1.18	0.0	#DIV/0!	#DIV/0!
20	Pooozhikkadu West	3.7	79.4	2.51	5.9	4.05	14.7	2.64	2.9	4.17	66.7
21	Msm Ward	1.2	0.0	0.94	0.0	2.34	0.0	0.93	0.0	5	100.0
22	Cherickal	2.7	21.1	0.61	0.0	4.24	23.7	2.7	0.0	5	100.0
23	Mudiyorkonam	1.3	2.5	0.98	0.0	2.39	0.0	0.77	0.0	2.63	0.0

ANNEXE 13.1

DRINKING WATER SOURCE AND SCARCITY

Sl:No	Wards	% reported that there is scarcity of water	Well is the main source of water	Mlty/KWA is the main source of water
1	Thottakkonam	60.53	100	0
2	Mulampuzha	86.49	94.59	2.7
3	Mangaram	100	100	0
4	Thonnalloor West	100	96.77	3.23
5	Thonnalloor East	100	97.22	0
6	Kadakkadu West	100	96.77	0
7	Kadakkadu East	100	83.33	6.67
8	Kurampala North	100	87.8	2.44
9	Kurampala East	100	86.67	0
10	Kurampala Town	100	96.97	0
11	Athiamala	100	91.18	0
12	Kurampala South	100	94.29	0
13	Edayadiyil	100	96.77	0
14	Thavalamkulam	100	100	0
15	Chiramudi	100	95	0
16	Pooozhikkadu North	100	100	0
17	Pandalam Town	100	97.3	0
18	Muttar	100	100	0
19	Pooozhikkadu Town	100	97.14	0
20	Pooozhikkadu West	100	91.18	5.88
21	Msm Ward	100	95.12	0
22	Cherickal	100	76.32	7.89
23	Mudiyorkonam	100	95	2.5
Source: Socio Economic Survey 2013				

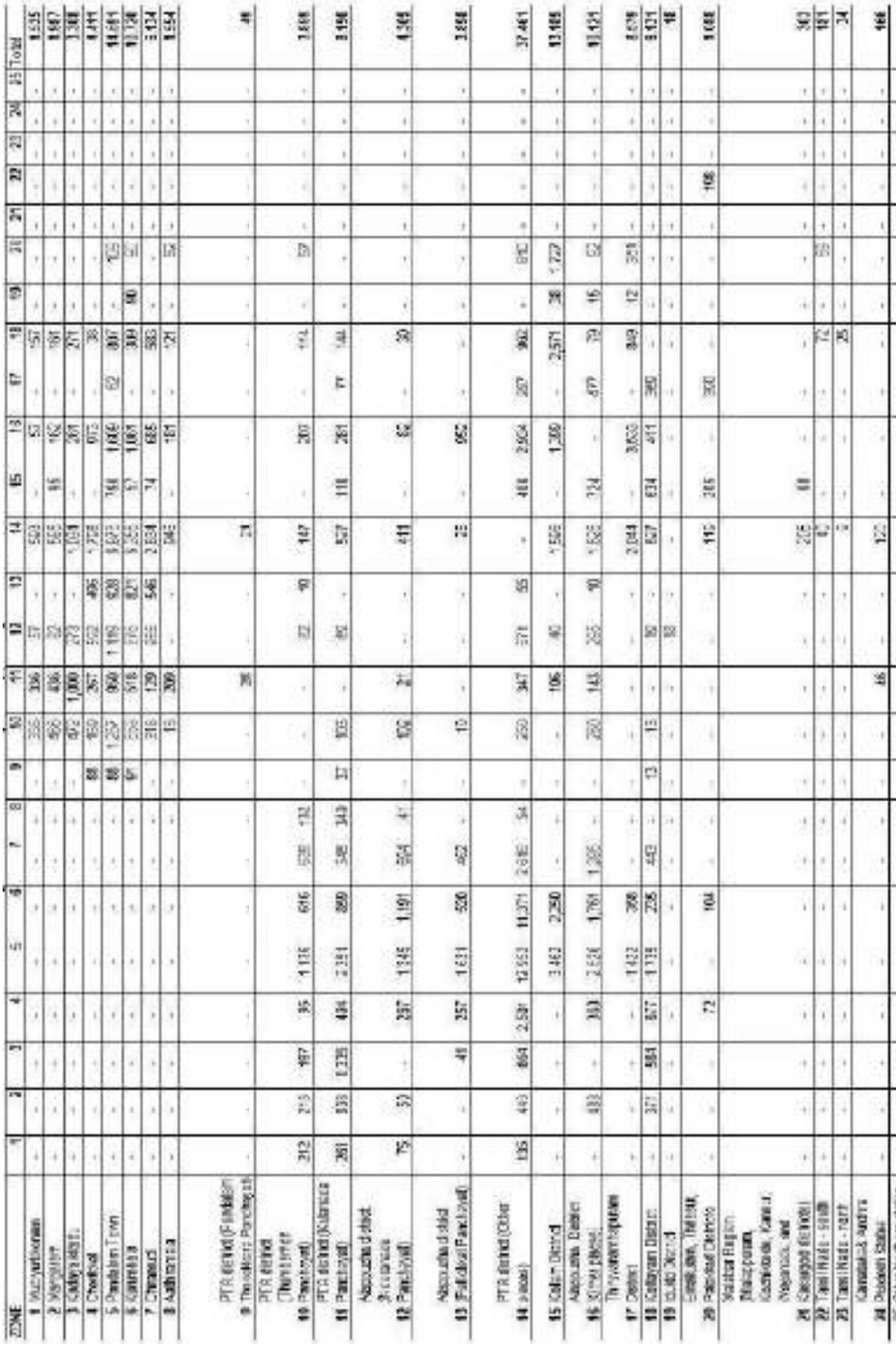
ANNEXE 14.1

Pattern of intercity daily passenger trips in Pandalam Town

Sl. No	Originating region	Terminating zones				Total	percent
		Pandalam study area	Pathanamthitta district	Other districts	Other States		
1	Pandalam study area	-	35,359	8,881	-	44,240	31.20
2	Pathanamthitta district	47,553	2,916	7,257	-	57,726	40.72
3	Other districts	18,123	7,134	13,974	198	39,429	27.81
4	Other States	-	215	166	-	381	0.27
	Total	65,676	45,624	30,278	198	141,776	100.00
	per cent	46.32	32.18	21.36	0.14	100.00	

ANNEXE 14.2

Origin-destination matrix of daily inter-city in Pandalam town passenger movements



ANNEXE 14.3

Origin-destination matrix of daily inter-city goods traffic (in tonnes) in Pandalam town

ANNEXE 14.4

Distribution of intercity goods traffic in tonnes accord ng to commodity carried in Pandalam Town

Sl. No	Name of commodity		Vehicle Type			Total
			Truck	Mini-truck	Goods Auto	
1	Foods grains	Wheat	45.05	0.00	0.00	45.05
2		Rice & paddy	34.26	41.28	18.70	94.24
3		Grains & pulses	0.00	0.00	0.00	0.00
4		Other food grains	282.56	553.80	136.86	973.21
5	Agricultural products	Fruits & vegetables	154.04	93.06	2512.96	2760.06
6		Milk & milk products	0.00	4.92	1.29	6.21
7		Coconut & copra	22.19	5.34	7.08	34.60
8		Meat	0.00	0.00	0.00	0.00
9		Fish	0.00	10.10	269.81	279.91
10		Eggs	0.00	0.00	0.00	0.00
11		Spices including rubber	0.00	0.00	0.00	0.00
12		Tea & coffee	0.00	0.00	0.00	0.00
13		Sugar	68.53	0.00	0.00	68.53
14		Bakery items	74.23	10.47	7.75	92.46
15		Beverages & toddy	4.09	0.36	1.05	5.49
16		Soda & drinks	0.00	114.29	20.77	135.07
17		Provisions	0.00	3.44	0.00	3.44
18		Hay	0.00	0.00	0.00	0.00
19		Cattle feed	0.00	0.00	0.00	0.00
20	Construction materials	Cement	897.17	234.83	74.19	1206.19
21		Quick lime (Kakka)	0.00	0.00	0.00	0.00
22		Earth & gravel	2292.85	400.21	4.95	2698.00
23		Sand & clay	2039.67	1811.13	115.56	3966.36
24		Brick & tiles	494.92	267.06	196.98	958.96
25		Granite & rubbles	299.09	0.00	0.00	299.09
26		Sanitary wares	5.27	6.23	3.36	14.86
27		Asbestos sheets	0.00	7.12	0.00	7.12
28		Paints & varnish	0.00	9.00	2.10	11.10
29		Timber	0.00	0.00	0.00	0.00

30		Firewood	0.00	14.00	0.00	14.00
31		Bamboo & wood	336.45	94.58	47.81	478.84
32		Furniture	2.77	126.65	33.68	163.10
33	**Industrial**	Steel machinery	86.74	5.63	37.53	129.90
34	**goods**	Iron & steel	900.54	110.10	273.62	1284.26
35		Aluminium	0.00	0.00	0.77	0.77
36		Electrical goods	0.00	14.53	44.62	59.14
37		Tyres & tubes	0.00	0.00	0.00	0.00
38		Spare parts	90.14	7.37	35.49	133.01
39		Chemicals & Drugs	247.76	0.00	0.00	247.76
40		Medicines	0.00	0.36	0.21	0.57
41		Fertilizers	157.36	10.68	0.00	168.03
42		Soap	0.00	0.00	0.00	0.00
43		Rubber & plastic goods	109.29	39.12	1.54	149.95
44		Glass	128.48	12.46	0.00	140.94
45		Leather goods	0.00	0.00	12.62	12.62
46		Ready-made garments	0.00	3.92	0.00	3.92
47		Stationery & paper	97.54	118.31	0.38	216.23
48		Coir & coir products	0.00	4.92	0.00	4.92
49	**Petroleum**	Motor spirit (Petrol)	2.22	0.00	0.00	2.22
50	**products**	Kerosene	0.00	0.00	0.00	0.00
51		LPG	29.09	0.00	0.00	29.09
52		Other POL products	52.03	12.73	1.54	66.29
53	**Miscellaneous**	Empty bags, tins & battles	0.00	0.00	0.00	0.00
54		Parcel	40.69	16.20	7.36	64.24
55		Ice	0.00	0.00	0.00	0.00
56		Miscellaneous	118.17	7.37	14.81	140.35
		Total	**9113.19**	**4171.53**	**3885.38**	**17170.10**

ANNEXE 14.5

DISTANCE TO BUS STOP

SL.NO	WARD NAME	AVERAGE DISTANCE TO BUS STOP	% SAYING DISTANCE TO BUS STOP GREATER THAN 0.5 KM
1	THOTTAKKONAM	0.88	52.6
2	MULAMPUZHA	0.54	15.8
3	MANGARAM	0.59	27.0
4	THONNALLOOR WEST	0.55	9.7
5	THONNALLOOR EAST	0.76	57.5
6	KADAKKADU WEST	0.71	46.9
7	KADAKKADU EAST	0.64	46.7
8	KURAMPALA NORT	1.67	75.6
9	KURAMPALA EAST	0.5	0.0
10	KURAMPALA TOW	1.42	72.7
11	ATHIAMALA	1.79	100.0
12	KURAMPALA SOUT	0.83	62.9
13	EDAYADIYIL	2.31	77.4
14	THAVALAMKULAM	1.09	100.0
15	CHIRAMUDI	0.94	65.0
16	POOOZHIKKADU NORTH	0.6	28.0
17	PANDALAM TOWN	1.37	51.4
18	MUTTAR	0.6	38.9
19	POOOZHIKKADU TO N	1.15	83.3
20	POOOZHIKKADU WEST	2.47	100.0
21	MSM WARD	0.76	80.5
22	CHERICKAL	0.54	7.9
23	MUDIYORKONAM	0.61	27.5

ANNEXE 17.1
DETAILS OF SCHOOLS

Sl. No.	Name of School	Location	Category	Number of students				
				Pre Primary	Primary	High school	HSS	VHSS
1	GOVT. UPS, POOZHIKKAD	Kudassanad P.O., Poozhikkad	1,2	36	366			
	Estd. in 1916	Survey No. 638/2						
2	GOVT. LPS,	Thottakonam	2		56			
	THOTTAKONAM							
	Estd. in 1915							
3	GOVT. HSS, THOTTAKONAM	Mudiyoorkonam P.O., Thottakonam	3		99	223		
		Pin - 689501						
	Estd. In 1915	Survey Nos. 569/34B, 569/33 A						
4	M.T.L.P.S. MUDIYOORKONAM	Mudiyoorkonam	2		14			
	Estd. In 1905	Survey No. 96/21						
5	GOVT. S.V.L.P.S. CHERICKAL	Cherickal	2		49			
	Estd. In 1107	Survey No.555/14						
6	GOVT. U.P.S. PANDALAM	Near Police Station	2		171			
	Estd. In 1872	Survey No.242/9						
7	St.Thomas English Medium H.S. Kurampala,Pandalam	M.M Junction, Pandalam	3	80	240	390		
	Estd. In 1982	Survey No.6/11.7/12						

Sl. No.	Name of School	Location	Category	Number of students				
8	Govt.H.S.S Thottakonam	Pandalam	4			356		
	Estd. In 1998	Survey No.						
9	N.S.S.B.H.S,Pandalam	Pandalam	3			594		
	Estd. In 1936	Survey No.						
10	N.S.S.H.S.S,Pandalam	Pandalam	4			319		
	Estd. In 1936 (HS),2000(HSS)	Survey No.						
11	N.S.S.E.M.U.P.School, Pandalam	Pandalam	2	149	571			
	Estd. In 1964	Survey No.						
12	Eminance Public School	Pandalam	4	167	575	249	151	
	Estd. In 1994	Survey No.						
13	Govt.UP School, Mangaram, Pandalam	Mangaram, Pandalam	2		118			
	Estd. In 1942	Survey No.251/4						
14	Govt.LP School, Edayadiyil, Pandalam	Edayadiyil, Pandalam	2		29			
	Estd. In 1937	Survey No.						
15	Amrita Vidyalayam, Kurampala, Pandalam	Kurampala, Pandalam	4	364	939	876	95	
	Estd. In	Survey No.						
16	Govt.LP School, Kurampala, Pandalam	Kurampala, Pandalam	2		31			
	Estd. In 1913	Survey No. A/200 ,130/2A						
17	G.S.V.LP School, Kadakkad, Pandalam	Kadakkad, Pandalam	2		39			
	Estd. In 1927	Survey No.212/5						

Sl. No.	Name of School	Location	Category	Number of students				
18	Vyasa Vidya Peedam,Pandalam	Near N.S.S Medical Mission,Pandalam	3	48	221	50		
	Estd. In 2003	Survey No.137/3,137/3-1-2						
19	MET Public School	Pandalam	2	60	147			
	Estd. In 1998	Survey No.						
20	N.S.S.G.H.S, Pandalam	Pandalam	3		244	640		
	Estd. In 1953	Survey No.						
21	Marthoma English Medium School,Mudiyoorkonam,Pandalam	Mudiyoorkonam,Pandalam	2	30	60			
	Estd. In 1993	Survey No.B-1 285/1						
22	M.S.M.LP School, Pandalam		2		23			
	Estd. In 1966	Survey No.380/54 A51,52						
23	G.L.P.S,Kadakkad	Kadakkad	2		52			
	Estd. In	Survey No.						

ANNEXE 17.2
FACILITIES AVAILABLE AT SCHOOLS

Sl. No.	Name of the School	Play ground	Separate Toilet for girl students	Computer lab	Internet	Water availability	Source of water	Connectivity with motorable road (connected by road having a width of 3m or more, no connectivity)
1	GOVT. UPS POOZHIKKAD	Nil	Yes	Yes	Yes	Yes	Well	
2	GOVT. LPS THOTTAKONAM	Yes	Yes	Nil	Nil	Yes	Well	Yes
3	GOVT. HSS THOTTAKKONAM	Yes	Yes	Yes	Yes	Yes	Well	Connectivity
4	M.T.L.P.S. MUDIYOORKONAM	Nil	Nil	Nil	Nil	Yes	Well	Yes
5	GOVT. S.V.L.P.S. CHERICKAL	Yes	Yes	Nil	Nil	Yes	Well	Yes
6	GOVT. U.P.S. PANDALAM	Nil	Yes	Yes	Yes	Yes	Well	M C Road
7	St.Thomas English Medium H.S. Kurampala, Pandalam	Yes	Yes	Yes	Yes	Yes	Well	Yes
8	Govt.H.S.S Thottakonam	Yes	Yes	Nil	Yes	Yes	Well	
9	N.S.S.B.H.S, Pandalam	Yes		Yes	Yes	Yes	Well	
10	N.S.S.H.S.S,Pandalam	Yes	Yes	Nil	Yes	Yes	Well	M C Road
11	N.S.S.EM.U.P.School, Pandalam	Yes	Yes	Yes	Yes	Yes	Well	Motorable
12	Eminance Public School	Yes	Yes	Yes	Yes	Yes	Well	Motorable
13	Govt.UP School, Mangaram, Pandalam	Yes	Yes	Yes	Yes	Yes	Well	Motorable
14	Govt.LP School, Edayadiyil, Pandalam	No	Yes	No	No	Yes	Well	Motorable
15	Amrita Vidyalayam, Kurampala, Pandalam	Yes	Yes	Yes	Yes	Yes	Bore Well	Motorable
16	Govt.LP School, Kurampala, Pandalam	Nil	Yes	Nil	Nil	Yes	Well	Motorable
17	G.S.V.LP School, Kadakkad, Pandalam	Nil	Yes	Nil	Nil	Yes	Bore Well	Yes
18	Vyasa Vidya Peedam,Pandalam	Yes	Yes	Yes	Yes	Yes	Well	Motorable
19	MET Public School	Yes	Yes	Yes	Yes	Yes	Well	Yes
20	N.S.S.G.H.S, Pandalam	Yes	Yes	Yes	Yes	Yes	well & Water authority	Motorable road
21	Marthoma English Medium School,Mudiyoorkonam,Pandalam	Yes	Yes	Yes	Nil	Yes	Well	Yes
22	M.S.M.LP School, Pandalam	Yes	Yes	Nil	Nil	Yes	Well	
23	G.L.P.S,Kadakkad	Nil	Yes	Nil	Nil	Yes		

ANNEXE 17.3
AVERAGE DISTANCE TO SCHOOLS

Sl:No	Wards	Average Distance Primary School	% saying distance to Primary school greater than 0.5 km	Average Distance to LP School	% saying distance to LP school greater than 0.5 km	Average Distance to UP School	% saying distance to UP school greater than 1 km	Average Distance to HS School	% saying distance to HS school greater than 3 km
1	THOTTAKKONAM	0.78	52.6	1.53	76.3	1.68	63.2	1.68	5.3
2	MULAMPUZHA	0.91	44.7	0.91	44.7	0.91	31.6	0.91	2.6
3	MANGARAM	0.74	63.9	0.81	66.7	0.81	11.1	0.99	0.0
4	THONNALLOOR WEST	0.55	9.7	0.55	9.7	0.56	3.2	0.56	0.0
5	THONNALLOOR EAST	0.76	60.0	0.78	60.0	0.82	22.5	2.26	30.0
6	KADAKKADU WEST	0.8	71.9	0.79	78.1	0.76	9.4	0.84	0.0
7	KADAKKADU EAST	0.5	0.0	0.5	0.0	1.5	100.0	1.5	0.0
8	KURAMPALA NORTH	1.6	75.6	1.74	78.1	1.74	56.1	1.74	17.1
9	KURAMPALA EAST	0.59	36.7	0.5	0.0	0.9	40.0	0.9	0.0
10	KURAMPALA TOWN	2.67	93.9	2.77	97.0	2.95	93.9	4.73	93.9
11	ATHIAMALA	1.79	100.0	1.82	100.0	1.93	76.5	1.97	5.9
12	KURAMPALA SOUTH	0.94	68.6	0.89	68.6	0.97	34.3	1	0.0
13	EDAYADIYIL	2.96	96.8	3.21	100.0	3.21	100.0	3.21	45.2
14	THAVALAMKULAM	1.16	100.0	1.16	100.0	1.11	48.6	1.24	0.0
15	CHIRAMUDI	1.8	87.5	1.8	87.5	1.8	52.5	1.83	25.0
16	POOOZHIKKADU NORTH	1.43	88.0	1.5	88.0	1.54	72.0	1.68	4.0
17	PANDALAM TOWN	1.42	51.4	1.42	51.4	1.42	51.4	1.42	0.0
18	MUTTAR	0.62	30.6	0.76	55.6	0.87	19.4	0.93	0.0
19	POOOZHIKKADU TOWN	1.21	88.9	1.21	88.9	1.21	61.1	2.97	33.3

Sl:No	Wards	Average Distance Primary School	% saying distance to Primary school greater than 0.5 km	Average Distance to LP School	% saying distance to LP school greater than 0.5 km	Average Distance to UP School	% saying distance to UP school greater than 1 km	Average Distance to HS School	% saying distance to HS school greater than 3 km
20	POOOZHIKKADU WEST	2.43	100.0	2.43	100.0	2.43	97.1	3.84	85.3
21	MSM WARD	0.79	87.8	0.77	87.8	1.99	87.8	2.1	12.2
22	CHERICKAL	1.03	23.7	0.93	26.3	2.94	94.7	3.07	34.2
23	MUDIYORKONAM	1.4	97.5	1.71	100.0	1.71	77.5	2.19	15.0

ANNEXE 17.4
DETAILS OF OTHER EDUCATIONAL INSTITUTIONS

Sl No	Name of College	Details of ownership	Location	Specify the course	Number of students course wise			
					Approved Numbers	Present numbers	Male	Female
1	Inspire Engineering Academy	Private	NSS Colllege Junction	Engineering Tuition		20		
2	OK's College	Private	Opposite NSS Colllege Junction	M.Com (M.G University)		10		
				B.Com (Kerala University)		25		
				Plus One Tuition Class		12		
				Plus Two Tuition Class		10		
3	ABACUS Talent Education Centre	Private	Muttar			12		
4	Childrens Palace-Day Care Centre	Private	Kavinte Thekkethil Junction	Day Care,Play School		22		
5	Manjima Dance and Musical Academy	Private	Mulampuzha	Classical Dance		20		
				Karnadaka Music		10		
				Violin		7		
				Keyboard		7		
				Thabala		5		
				Mridagam		2		
6	Riyans School of Music and Orchestra Group	Private	Opposite NSS Colllege Junction	Music		7		
				Violin		5		
				Keyboard		15		
				Gittar		2		
7	Grand College	Private	Opposite NSS Colllege Junction	B.Com (Kerala University)		18		
				Plus Two Tuition Class		10		
8	Athira Nritha Academy	Private	Poozhikkadu	Classical Dance		40		

				Music		12		
9	AIMS	Private	Pandalam Town	Plus One Tuition Class		16		
				Plus Two Tuition Class		Nil		
				Entrance Coaching		Nil		
10	Promise Career Guidance Centre	Private	Pandalam Junction (near bridge)	Engineering Tuition-Mechanics		9		
				Engineering Tuition-Graphics		5		
				Engineering Tuition-Maths		5		
				Spot Admission (BSc Nursing)		5		
				Spot Admission (Diploma,Engineering)		30		
11	Chinees Khumfoo and Yoga Centre	Private	Pandalam Junction	Khumfoo		56		
				Yoga		62		
12	Century College Pandalam	Private	Near Town	Open School		25		
				Education Guidance(Consultancy)		15		
13	Nakshathra Kindergarten	Private		Day Care		5		
				Play Class		15		
				LKG		16		
				UKG		6		
14	UNIQUE Academy	Private	Pandalam	Qater Prometric		2		
				Ministry of health		4		
				HAAD (DOH)		3		
15	SOFTECH Computers	Private	Opp.Pandalam Panchayat	MS Office		10		
				DTP		10		
				Accounting Package		5		
				Basic Course		8		
16	G-Tec Computer Education	Private	Pandalam	Programming Software		7		
				Accounting		15		
				Multimedia Animation		11		
				Hardware and Networking		Nil		
17	NSS Computer	Co-	Pandalam	PGDCA		6		

	Centre	operative		DCA		18		
				ADCTT		Nil		
				DWT		7		
				DOA		Nil		
				DCFM		8		
				DDTP		7		
				CWA		1		
				CCAD		6		
				CDTP		8		
				CCA		7		
18	IDEAL Computers	Private	Opp NSS Girls High School	MS Office		10		
				DCA		8		
				DOA & FA		8		
				PDCA		7		
				PGDCA		6		
				DTP		8		
				Auto CAD		5		
				Tally		10		
19	NCPT	Private	Pandalam	BBA Airline&Airport Management				
				First Year		61		
				Second Year		17		
				BBA General		7		
				Second Year				
				Third Year		12		
				BCA		13		
				First Year				
				Third Year		3		
				BSc Computer Science First Year		11		
				Bcom First Year		22		
				BSc FT First Year		6		
				Dip FT First Year		6		
				AME (First Year Dip)		23		
				AME (Second Year Dip)		33		
				Fire & Safety Eng First Year		21		

				Computerized Numerical Controls		11		
20	Computer Centre of India	Govt	Pandalam	PGDCA		10		
				DCA		25		
				Compter T.T.C		4		
				Computer Pre-Primary T.CC		Nil		
				Computerized Financial Accounding		6		
				Diploma in D.T.P		4		
				Data Entry Operator		10		
				Diploma in AutoCAD		6		
				Diploma in WEB Designing		1		
				Diploma in Office Automation		Nil		
21	Mody Computers	Private	Pandalam (JN)	DCA -6 Months		50		
				KELTRON		Nil		
				B.S.S		Nil		
				National Open School				
22	BRILLIANCE College	Private	Thonnallor	PSC Coaching		500		
				BANK Coaching		35		
23	DAN Institute of Information Technology			DCA (Diploma in Computer Application)		6		
				PGDCA		14		
				DTP		13		
				CTTC		4		
				MS Office		13		
				DCFA		13		
				DMA (Diploma in Multimedia animation)		2		
				GSD		7		
				MCFA (Master in Computerized Financial Accounting)		1		
				IELTS		Nil		
				Spoken English		5		

24	MICRO College Of Eng&Compute r Tech Pvt ITI	Private	Pandalam	COPA		17		
25	MICRO College Of Eng&Compute r Tech Pvt ITI	Private	Pandalam	MBA		22		
				B.Com with CA		10		
				BBA		15		
				BLISc		3		
26	MICRO College Of Eng&Compute r Tech Pvt ITI	Private	Pandalam	PGDCA		14		
				DCA		42		
				Financial Accounting		60		
				MS Office,DTP,AutoCAD,Tall y		180		
				Welding		20		
				Electrical		20		
27	Profesional Studies Academy	Private	Pandalam	Tally Accounting		5		
				DAC Easy Accounting		3		
				PEACH Tree		4		
				Mannual Accounting		5		
				Internet & e-mail		5		
28	Aaveny Musical Academy	Private	Arathilmukku	Musical Class		14		
				Drums		4		
				Thabala		5		
				Gittar		8		
				Keyboard		3		
29	FORCE Engineering Institute	Private	Muttar	Graphics (Engineering Tuition)		5		
30	Special Tuition Centre	Private	Arathilmukku	High School		80		
31	Farmers training Centre(Trctor training, coconut climbing etc.)	Govt	Kadackadu	Machanization training for various agricultural instruments, tractor training etc.		80		

32	Farmers training Centre(Agriculture training)	Govt	Kadackadu	Post harvest technology and value adition ofagricultural produces.		30		
				Organic farming		30		
				vegitable cultivation, kitchen garden and Terrace cultivation		30		
				New generation pesticides		30		
				Quality control of agriculture inputs		30		
				Cultivation and post harvest technology of tuber crops		30		
				Femilarisation an operation of farm mechineries		30		
				Commercial cultivation of ornamental crops		30		
				Hi-tech vegitable cultivation		30		
				Drought management with special referance to water concervation		30		
				Agmark and agricultural activities		30		
				Right to information and right to service act		30		
				Inter active training for tehnical officers and audit wing		30		
				Stress and time management		30		
33	Desh Musical Academy	Private	Medical mission junction	Musical Class		45		
				Drums		5		
				Thabala		8		
				Gittar		15		
				Keyboard		25		

ANNEXE 18.1
ALLOPATHIC HOSPITALS-DEPARTMENTS

CHRISTIAN MISSION HOSPITAL		NSS MEDICAL MISSION HOSPITAL		NSS AYURVEDA HOSPITAL		CHITHRA MULTI SPECIALITY HOSPITAL	
Category	**Number of Visiting consultant**	**Ca egory**	**Number of doctors**	**Category**	**Number of doctors**	**Category**	**Number of doctors**
ENT	1	Paediatrics	2	Gynaecology	2	Paediatrics	2
Chest physician	1	General medicine	2	General medicine	5	General medicine	1
Nephrologist	1	Psychiatry	1	Paediatrics	2	General surgeon	1
Dermatologist	1	Gynaecology	1	Orthopaedics	3	Gynaecology	1
Oncologist	1	Ophthalmology	1	ENT & EYE	2	infertility	2
Ortho pedician	2	Surgeon	1	Pancha karma	2	Orthopaedics	1
Gastrologist	1	Ortho pedic surgeon	1	Natural medicine	2	ENT	1
Neuro surgeon	1	ENT	1	Causality	2	Laparoscopic & minimal access surgery	2
Cardiologist	1	Neurology	1			Blood bank	1
Paediatrics	1	Urology	1			Dental	1
General medicine	2	Dermatology	1			Radiology	1
Psychiatry	1	Chest physician	1			Anaesthesiology	1
Gynaecology	1	Cardiology	1			Emergency medicine	1
Ophthalmology	1	Dental	1				
Ortho pedic surgeon	1	Radiology A	1				

ENT	1	Anaesthesiology	1				
Neurology	1	Paediatrics	1				
Urology	1						
Anaesthesiology	1						
Cardiology	1						
Dental	1						
Radiology A	1						
Causality	4						

ANNEXE 18.2
DETAILS OF ALLOPATHIC HOSPITALS

Sl. No.	Name of Hospital with Address,	Location, ward and surve No.	Category No	System of Medicine	Number of beds	Total number of Doctors	Government/Private/ Co-operative society
1	N.S.S.Medical Mission Hospital	Pandalam Ward No: Sy No:169/3	5	Allopathy	180	17	Private
2	Arpitha Hospital	Muttar Ward No:3 Sy No:	1	Allopathy	Nil	1	Private
3	R.R Clinic	Mangaram Ward No:2/772B Sy No:583/14A BIK Re Sy No:240/4	3	Allopathy	10	1	Private

Sl. No.	Name of Hospital with Address,	Location, ward and surve No.	Category No	System of Medicine	Number of beds	Total number of Doctors	Government/Private/ Co-operative society
		Ward No:23 Sy No:283/26					
5	C.M.S.H	Pandalam Ward No:7/151A Sy No:151A, 151B,151C	4	Allopathy	117	12	Private
6	Parayil SM Hospital	KSRTC Road, Opposite Market, Pandalam Ward No: Sy No:186/25-2, 186/25-3	2	Allopathy	6	1	Private
7	Appollo Hospital	M.C Road Ward No:5/749 Sy No:	3	Allopathy	8	1	Private
7	Christian Mission Hospital	M.C Road Ward No: Sy No:195/15	2,4,5	Allopathy	100	28	Private
8	PHC Pandalam	Kadackadu Ward No: Sy No:	1	Allopathy	Nil	1 NRHM-1	Govt
9	Koshy's Clinic Pandalam	Yhonnallur Ward No: Sy No:254/5,4	1	Allopathy	Nil	1	Private

ANNEXE 18.3
AYURVEDIC HOSPITALS

Sl. No.	Name of Hospital	Location	Category*	Number of Beds	Number of Doctors	Govt/Private/ Co-operative society
1	Mannam Ayurveda Co-operative Medical College Hospital	Mangaram, Pandalam	Ayurveda	100		Co-operative Society
2	Kottackal Aryavaidyasala	Pandalam Market	Ayurveda	Nil	1	Private
3	Sanjeevini Ayurveda Clinic	Pandalam Near Market	Ayurveda	Nil	1	Private
4	Pamboor Madam Ayurvedam	Opp:Market Pandalam	Ayurveda	Nil	4	Private
6	Govt. Ayurveda Dispensary	Kurampala Pandalam	Ayurveda	Nil	1,1 Apprentice Ship	Govt
7	Ayyappa Pharmacy	Thonnallur	Ayurveda	Nil	2	Private
8	Amrutasree Ayurvedic Centre	Thonnallur	Ayurveda	Nil	1	Private
9	Arsha Dhara Ayurveda and Panchakarma Centre	Pandalam,College Junction	Ayurveda	Nil	2	Private
10	Nagarjuna Ayurveda Ousha Sala	Pandalam	Ayurveda	Nil	1	Private

Sl. No.	Name of Hospital	Location	Category*	Number of Beds	Number of Doctors	Govt/Private/ Co-operative society
11	Kottackal Aryavaidyasala	M.C Road Pandalam	Ayurveda	Nil	1	Private
12	Priya Ayurveda Hospital	Pandalam	Ayurveda	Nil	1	Private
13	Jeeva Ayurveda Clinic	Thonnallur	Ayurveda	Nil	1	Private
14	Nagarjuna Ayurveda Ousha Sala(Carmel Ayurvedic)	Pandalam	Ayurveda	Nil	1	Private
15	Changethu Ayurveda Hospital	Medical Misson Junction Pandalam	Ayurveda	20	1	Private
16	Oushadhi Ayurveda Vaidyasala	Near N.S.S. College	Ayurveda	Nil	1	Private

ANNEXE 18.4
HOMEOPATHIC HOSPITALS

Sl.No.	Name of Hospital	Location	category	Number of beds	Number of doctors	Facilities for traucama care	Govt/Pvt/Cooperative society
1	Govt.Model Homeo clinic	Muttar	Op only	Nil	1	No	Govt
2	Upasa Hospital	Kurampala	Clinic only	Nil	1	No	Pvt
3	Ayyappa	Kurampala	Clinic only	Nil	1	No	Pvt
5	Medinova	Pandalam	Clinic only	Nil	1	No	Pvt
6	Athira Homeo	Mangaram	Clinic only	Nil	1	No	Pvt
7	Sumitra Kumar	Kadakkad	OP at Home	Nil	1	No	Pvt

ANNEXE 20.1
DETAILS OF ANGANWAADIES

AW NO	PLACE	RENTED	OWN BUILDING	REMARKS
1	CHERICKAL			NO RENT
2	MUTTAR	YES		
3	PLAVILAYIL	YES		
4	SHASTHAMVATTAM,MUDIYOORKONAM	YES		
5	ARATHILMUKKU	YES		
6	PULAYIL KOLANI		YES	
7	MANGARAM SCHOOL			SCHOOL
8	M.S.M KADAKKAD		YES	
9	KARANDAYIL	YES		
10	MANGARAM	YES		
11	THOTTAKONAM	YES		
12	THONALOOR U.P.S			SCHOOL
13	MAHILAMANDIRAM KADAKKAD		YES	
14	VEDHI JUNCTION	YES		
15	NANDYATUVILA	YES		
16	KURIKKAVIL	YES		
17	SASTHAMVILA	YES		
18	ULAMAYIL	YES		
19	KADAKKAD		YES	
20	VELACHERI	YES		
21	KADAKKAD	YES		
22	MELEDATH THEKETHIL		YES	
23	THAVALAM KULAM		YES	
24	PUZHIKKAD KUDASHANAD	YES		
25	CHINNAKADA	YES		
26	THAVALAM KULAM	YES		
27	THACHIRETH		YES	
28	MANATHARA		YES	
29	PUZHIKKAD	YES		
30	KURABHALA		YES	
31	THEKOTTU CHARIJATHI	YES		

AW NO	PLACE	RENTED	OWN BUILDING	REMARKS
32	MAVARA	YES		
33	MUKKODIYIL		YES	
34	KURABHALA	YES		
35	MEENATHERIL	YES		
36	PALAPALIL		YES	
37	THOMAS MEMORIYAL VALAKADAV		YES	
38	VALLATOOR SAMSKARIKA NILAYAM			NO RENT
39	PUVAN THITTA NEAR PERUBHALOOR	YES		
40	MYLATUKULAM		YES	
41	PARAKUNIL-KURABHALA		YES	
42	MALAMUKAL NEAR M.M.HOSPITAL	YES		
43	PALATHADAM	YES		
44			YES	
45	PATTARETH	YES		
46	MANNATH-MUDIYOORKONAM		YES	
47	THONALLOOR-KADAKKAD	YES		
48	NJAVANAMTHUDIL	YES		

ANNEXE 21.1
DETAILS OF SACRED GROVES

Sl.No.	NAME	TYPE	AREA(Ha)
1	Konathukavu	Family owned	10 cent
2	Kannamkarakkavu	Family owned	15 Cent
3	Puthuvanakkavu		12 Cent
4	Mavilayathu kavu	Family owned	15 Cent
5	Kurickasseril Kavu	Public	46 Cent
6	Daivathummootil	Family owned	4 Cent
7	Tharippottil	Family owned	6 Cent
8	Chamakandathil	Family owned	4 Cent
9	Manja iyil Kavu	Family owned	4 Cent
10	Ammoommkavu	Public	25 Cent
11	Karandayil	Family owned	15 Cent
12	Muttathukavu	Family owned	10 cent
13	Muthedathu kavu	Family owned	2 Acre
14	Varikkavelil kavu	Family owned	15 Cent
15	Perengattu kavu	Family owned	150 Cent
16	Malanada kavu	Family owned	20 Cent
17	Kaliayyathu kavu	Family owned	20 Cent
18	Pavvathu kavu	Family owned	20 Cent
19	Komattu kavu	Family owned	15 Cent
20	Kavumukkathu	Family owned	18 Cent
21	Kaleekkal	Family owned	15 Cent
22	Kadakkad Temple - kavu	Temple ownership	30 Cent
23	Madappalli melethil kavu	Family owned	5 Cent
24	Karingodathu kavu	Family owned	5 Cent
25	Panchakkunnil Kavu	Family owned	15 Cent
26	Nilakkal kavu	Family owned	5 Cent
27	Thonnalloor Temple Kavu	Temple ownership	4 Cent

Sl.No.	NAME	TYPE	AREA(Ha)
28	Manikandan thara kavu	Family owned	15 Cent
29	Kochupurayil kavu	Family owned	10 cent
30	Kothuvallil kavu	Family owned	5 Cent
31	Yakshivila kavu	Family owned	10 cent
32	Illathukavu	Family owned	15 Cent
33	Murthiayyathukavu	Family owned	50 Cent
34	Ooralisseril	Family owned	50 Cent
35	Adikkinathu kavu	Family owned	250 Cent
36	Ammoommkavu	Family owned	40 Cent
37	Asharikkavu	Public	17 Cent
38	Ilamthottathu kavu	Family owned	300 cent
39	Sasthamkavu	Public	35 Cent
40	Kottakkattuseril	Family owned	100 Cent
41	Paravazhikavu	Family owned	100 Cent
42	Pallikkethu kavu	Family owned	100 Cent
43	Ammoommakkavu	Family owned	8 Cent
44	Cheriyathu kavu	Family owned	100 Cent
45	Vellinal kavu	Family owned	20 Cent
46	Thuruthikalayil kavu	Family owned	20 Cent
47	Putherathu kavu	Family owned	100 Cent
48	Mukkodi kavu	Family owned	75 Cent
49	Puthenkavil Ambalakadavu kavu	Temple ownership	200 Cent
50	Padinjare veetil	Family owned	180 Cent
51	Perumpalur kavu	Karayogam vaka	250 Cent
52	Udayan kavu	Family owned	75 Cent
53	Puthethukavu	Family owned	60 Cent
54	Puventhitta kavu	Family owned	50 Cent
55	Palamughathu kavu	Family owned	250 Cent

ANNEXE 34.1

TYPE OF NON-OBNOXIOUS AND NON-NUISANCE TYPE OF SERVICE OR LIGHT INDUSTIRES PREMISSIBLE

1. Flour Mills.
2. Embroidery and lace manufacturing.
3. Gold and silver smithy.
4. Watch, pen and spectacles repairing.
5. Laundry, dry cleaning and dyeing.
6. Photo and picture farming.
7. Manufacture and repair of musical instruments.
8. Automobile servicing (excluding repair)
9. Radio and T.V. 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. Cardboard 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. Padlocks.
28. Sanitary fittings and other similar industries.

PANDALAM MUNICIPALITY

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING, KERALA STATE

AUGUST 2022