Master Plan for
Punalur Town

DEPARTMENT OF TOWN & COUNTRY PLANNING
MUNICIPAL COUNCIL, PUNALUR

June 2020

FOREWORD

Punalur is one of the four urban local bodies of the Kollam District. It has got the Municipal status in November 1st April 1971. It is a town located along the eastern part of the District. The potential deriving out of the presence of the two modes of transport- road and rail - make the Municipality as an important commercial centre of the region. Traditionally it was an agricultural predominant area belonging to Elayidathu Swaroopam.

The fast pace in growth of the town and resulting issues make it necessitate a planned intervention for the growth of the town. The thought in that direction has been materialized as the "Development plan for Punalur Town" which is ready now. I am happy to place it before the people of Punalur, as it is through them, the Town has to take shape as envisaged in the Plan.

I compliment the Department of Local Self Government Planning, Government of Kerala for their efforts in materialization of the Master Plan for Punalur Town. The challenge 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 benefits from the plan.

Nimmy Abraham
Chairperson
Punalur Municipality

Kollam
13.01.2021

PREFACE

Punalur is a hilly town of Kollam District, wherein topography plays a major role in shaping of the town. The department of Town and Country Planning made attempts in 1990's itself for the preparation of a Master Plan for the Town, but the attempts were left in halfway. Government vide G.O (Rt) No. 3982/2008/LSGD dtd. 13.11.2008 has decided to prepare master plan for 32 towns in the 1st phase and for 29 towns including Punalur Town in the 2nd phase vide order G.O (Rt) No. 1376/2012/LSGD dtd. 17.05.2012. Government vide G.O (M.S) No. 157/2017/LSGD dtd. 10.08.2017 approved to publish the draft master plan for Punalur town and was published in the Government Gazette dtd. 28.11.2018. Based on the objections and suggestions obtained from the public, the draft master plan is revised by the special committee.

Punalur town is a commercial centre of second order in the District scenario developed in between Kollam and Shenkottai by the side of National Highway 744. The town is well connected by rail and road to other developed centre. Punalur Municipality being located adjacent to Western Ghats and blessed with Kallada River thrived upon agricultural activities and forest goods based industries. The presence of National Highway and Railway line opened up new avenues of developmental activities in agriculture, trade and commerce and traditional industries. The establishment of Punalur Paper Mill had paved red carpet for initiating industrial development in Punalur. This transformation has resulted in concentrating all the urban activities by the side of National Highway resulting a ribbon development along the side of NH leaving large chunk of area relatively undeveloped.

As Punalur Municipality is well connected to other developed centres in the district and higher order public amenities are already developed to a certain extent, it is identified as a second order settlement in the Integrated District Development Plan of Kollam District (IDDP). Hence the Municipality plays an important role in the development of the sub region supporting about 16 surrounding local bodies. Master Plan for Punalur Municipality tries to identify the present capability of this regional sub centre in catering the needs of service settlements and suggests how the Municipality can move forward the sub region so that the development vision of the district as defined in IDDP can be materialized.

The preparation of draft Master Plan involved extensive data collection and analysis, identification of development issues setting up of goals and objectives, formulation of development concept and carving out policies and strategies followed by detailed sectoral proposals. Municipal council headed by the present Chairperson Smt. Nimmy Abraham and former Chairmen Sri. Adv. K.A. Latheef, Sri. M.A. Rajagopal, Smt. Radhamani Vijayanand, Smt. Vimala Gurudas and Smt. Gracy John and the special Committee extended all supports for completing the draft plan in time.

The sustained collective efforts of the special committee, working groups, Resource Person and the Planning Team culminated in the documentation of this Master Plan. I take this opportunity to appreciate the leadership provided by the Municipal Council and Special Committee. As the planning exercise encompassed various sectors, it required the support and positive interaction with many public and private agencies/departments, I acknowledge their collective contribution and co-operation. I also appreciate the officials of the Kollam District Office of the Department, for their efforts in the time bound preparation of the Plan. I appreciate the consistent efforts of the officials at the Chief Town Planner (Planning)'s office for giving timely guidance and instructions throughout the process.

I am sure that the Master Plan of Punalur Municipality will provide the frame work for orderly developments in the Punalur Municipal area so that the town becomes more productive, sustainable and livable and also strengthen the Punalur Sub region of the District of Kollam.

Thiruvananthapuram
13.01.2021

K.S.Girija
Chief Town Planner (Planning)

Acknowledgements

The task of preparation of Master Plan especially based on spatial planning approach and ensuring people's participation definitely requires a dedicated team who can co-ordinate various agencies and activities. Participation bacame the most important aspect in planning after 73rd and 74th constitutional amendment. Hence special attention was given for ensuring the participation of various stake holders such as elected representatives, line departments, common public and other NGOs. With the co-operation of these stake holders, the process of preparation of draft Master Plan involving systematic data collection, wide range of analyses, evolving development vision and formulating detailed proposals is completed.

Municipal Council of Punalur played a major role in this regard. I acknowledge with gratitude the guidance and involvement of Smt. Nimmy Abraham present Chairperson and Sri. Adv. K.A. Latheef, Sri. M.A. Rajagopal, Smt. Radhamani Vijayanand, Smt. Vimala Gurudas and Smt. Gracy John former Chairperson of the Municipality. The support and guidance of Sri. S. Biju, former Vice Chairman of the Municipality needs special mention. Smt. T.M. Sudha, Chief Town Planner (Rtd) ,Smt. Darley. D. S. Mony, Chief Town Planner (Planning)(Rtd) and Sri. Shaji Joseph Chief Town Planner (Rtd) have provided constant motivation and inspiration in accomplishing this study. Their advices and patronage are gratefully acknowledged. The guidance and advices given by Smt. K. S. Girija, Chief Town Planner (Planning) and Sri Gigi George, Chief Town Planner, Smt. P.R. Ushakumari Senior Town Planner (Planning) Sri. J. Jayakumar, Senior Town Planner (Planning) helped the planning team to prepare the Master Plan adhering to various planning principles and practices. I sincerely acknowledge the invaluable support rendered by them. The consistent support and consultation rendered by Smt. J. Durga (Rtd.), Smt. Asha Ajoy Ghosh Town Planners and other staff are also sincerely acknowledged. Sri. K. Baiju, former District Town Planner, is acknowledged for his contributions and involvement . As the planning exercise encompassed various sectors, it required the support and positive interaction with various agencies and line departments. It would be unfair if their collective contribution and co-operation are not acknowledged. The contributions by the Municipal Council, the special committee Working groups and Sri. R. Sugathan, resource person were highly significant in arranging discussions with other stake holders, data collection, analysis and formulation of the Master Plan and I take this opertunity to acknowledge their valuable contribution.

An exclusive planning team was constituted in the office of District Town Planner, Kollam in connection with the preparation of this plan with Sri. Sirajudeenkutty. Y, Present Deputy Town Planner as team leader and Smt. Manju. B.R, Ist grade Draftsman as supporting staff. I would like to express my sincere appreciation to Sri. Arun Joseph, Deputy Town Planner and Sri Vishnu Ravi Moorthy,Assistant Town Planner who co-ordinated the republishing process and other stake holders discussions and seminars . I also appreciate Smt. Manju. B.R, Ist Grade Draftsman; Smt. Anzi. A, Planning Assitant (GIS) and Sri. Vinodkumar. C and Sri Kunjumon S, Computer Assistant (Office) for extending their sincere and dedicated assistance. All the staffs of the District Town & Country Planning Office, Kollam have participated in various stages of preparation of Master Plan. I am sure that the team spirit of all the staffs in the District Office ensured the timely completion of the draft Master Plan and I sincerely acknowledge their whole hearted participation.

Kollam **Shary M V**

13.01.2021 **District Town Planner**

CONTENTS

			Page No.
Chapter 1	**- Introduction**	**-**	**1**
1.1.	Regional Setting	-	1
1.2.	History of Development and Culture	-	1
1.3.	Geography	-	2
1.3a.	Topography	-	3
1.4.	Climate	-	3
1.5.	History of Governance	-	3
1.6.	Need for Plan	-	3
1.7.	Earlier Planning Efforts and Studies	-	4
Chapter 2	**- Demography**	**-**	**5**
2.1.	Population and its Growth Pattern	-	5
2.2.	Literacy	-	7
2.3.	Inference	-	8
Chapter 3 - Employment		**-**	**9**
3.1.	Workers	-	9
3.2.	Work Participation Rate	-	9
3.3.	Occupational Structure	-	10
3.4.	Spatial Distribution of Workers	-	11
3.5.	Occupational Structure - Temporal Variation	-	12
3.6.	Category of Workers	-	12
3.7.	Inference	-	13
Chapter 4 - Land Use		**-**	**15**
4.1.	General Analysis of Land Use	-	15
4.1.1.	Residential Land Use	-	15
4.1.2.	Commercial Land Use	-	17
4.1.3.	Industrial Land Use	-	18
4.1.4.	Public & Semi Public	-	18
4.1.5.	Agricultural Land Use	-	19
4.1.6.	Government Forest	-	19
4.2.	Inference	-	20
Chapter 5 - Economic Aspects		**-**	**21**
5.1.	Industry	-	21
5.1.1.	Existing Industries	-	21
5.1.2.	Industrial Production	-	21
5.1.3.	Spatial Distribution	-	22
5.1.4.	Problems and Potentials	-	22
5.1.5.	Inference	-	23
5.2.	Trade and Commerce	-	23
5.2.1.	Present Scenario	-	23
5.2.2.	Markets	-	23
5.2.3.	Commercial Centres	-	24

5.2.4.	Facilities at Commercial Centres	-	24
5.2.5.	Existing Hierarchy of Commercial Nodes	-	25
5.2.6.	Street Vendors	-	25
5.2.7.	Problems and Potentials	-	26
5.2.8.	Inference	-	26
5.3.	Tourism	-	27
5.3.1.	Tourism Attractions of Punalur	-	27
5.3.2.	Problems	-	27
5.3.3.	Potentials	-	28
5.3.4.	Inference	-	28
5.4.	Agriculture Sector	-	28
5.4.1.	Area Under Cultivation	-	28
5.4.2.	Important Crops and Production Details	-	28
5.4.3.	Problems and Potentials	-	30
5.4.4.	Inference	-	30
5.5.	Animal Husbandry	-	31
5.5.1.	Meat Production	-	32
5.5.2.	Milk Production	-	32
5.5.3.	Problems	-	32
5.5.4.	Potentials	-	32
5.5.5.	Inference	-	33
Chapter 6 - Traffic and Transportation		**-**	**35**
6.1.	Existing Road Network	-	35
6.2.	Transport Terminals	-	36
6.2.1.	Bus Terminals	-	36
6.3.	Bottlenecks and Missing links	-	36
6.4.	Punalur Railway Station	-	37
6.5.	Volume and Capacity Utilization on Important Roads	-	37
6.5.1.	Traffic volume on major roads	-	37
6.5.2.	Capacity of Roads	-	40
6.6.	Speed and Delay Studies	-	41
6.7.	Pedestrian Survey	-	44
6.8.	O D Survey	-	44
6.9.	Modal Split	-	45
6.10.	Parking Survey	-	45
6.11.	Parking accumulation	-	46
6.12.	Issues and Potentials	-	46
Chapter 7 - Water Supply		**-**	**47**
7.1.	Distribution System	-	47
7.2.	Treatment Facilities	-	47
7.3.	Scarcity	-	47
7.4.	Inference	-	48

Chapter 8 - Sanitation - 49
8.1. Generation and Collection - 49
8.1.2. Existing Treatment Facilities - 50
8.1.3. Problems - 50
8.1.4. Potentials - 50
8.1.5. Inference - 50
8.2. Sewarage System - 50
8.2.1. Inference - 51
Chapter 9 - Energy - 53
9.1. Connection Details - 53
9.2. Consumption Details - 53
9.3. Distribution Network - 53
9.4. Problems - 54
Chapter 10 - Education - 55
10.1. Educational Institutions - 55
10.1.1. Institutions up to Higher Secondary Level - 55
10.1.2. Higher and Professional Education - 55
10.1.3. Other Institutions - 58
10.1.4. Educational Facilities - Comparative Study With Planning Standards - 58
10.2. Status of Education - 58
10.3. Inference - 59
Chapter 11 - Health - 61
11.1. General - 61
11.2. Existing Health Care Facilities - 61
11.3. Incidence of Epidemics - 61
11.4. Details of Ongoing and Committed Projects Under Health Sector with Agency - 61
11.5. Problems - 63
11.6. Inference - 63
Chapter 12 - Recreational Facilities and Other Civic Amenities - 65
12.1. Recreational facilities - 65
12.1.1. Parks and Open Spaces - 65
12.1.2. Play Ground - 65
12.1.3. Theatres and Auditoriums - 65
12.2. Other Civic Amenities - 65
12.2.1. Town Hall - 65
12.2.2. Reading Rooms and Library - 65
12.2.3. Crematoria and Burial Ground - 65
12.2.4. Others - 65
12.3. Inference - 66
Chapter 13 - Housing - 67
13.1. Category of Houses - 67
13.2. Housing Shortage - 67
13.3. Sub Standard Housing Areas - 67

13.4. Spatial Distribution - 70
13.5. Inference - 70
Chapter 14 - Special Concern Areas - 71
14.1. SC Population - 71
14.2. ST Population - 71
14.3. BPL Index - 72
14.4. Literacy - 72
14.5. Occupation - 73
14.6. Other Aspects - 73
14.7. Problems - 74
14.8. Inference - 74
Chapter 15 - Environment and Heritage - 75
15.1. Environment - 75
15.1.1. Sensitive or Fragile Areas - 75
15.1.2. Natural Hazard Vulnerable Areas - 76
15.2. Heritage Centers - 77
15.3. Inference - 77
Chapter 16 - Administration and Finance - 79
Chapter 17 - Findings& Conclusions - 81
17.1. Findings from IDDP Kollam - 81
17.2. General Findings - 81
Chapter 18 - Development Concept and Proposed Land use - 87
18.1. Projections - Population and Workers - 87
18.1.1. Population projection - 87
18.1.2. Workers Projection - 87
18.2. Deriving Functions - 87
18.3. Defining Form - 89
18.4. Proposed Land Use Map - 2031 - 93
Chapter 19 - Sectoral Proposals - 97
19.1. Industry - 97
19.2. Trade and Commerce - 97
19.3. Agriculture - 98
19.4. Tourism - 98
19.5. Stadium - 99
19.6. Recreational open space and water retension area - 99
19.7. Solid Waste and Septage Management - 99
19.8. Public Office Complex - 100
19.9. Drinking Water - 100
19.10. Power - 101
19.11. Traffic and Transportation - 101
19.12. Pedestrian facilities - 105
Chapter 20 - Punalur- A Smart Town by 2031 - 107
Zoning Regulations - 109

FIGURES

Figure 1.1.	Location of Punalur Town in Kollam District	-	1
Figure 1.2.	Topography of Punalur	-	3
Figure 2.1.	Decadal wise population growth of Kollam district	-	5
Figure 2.2.	Decadal wise population growth of Punalur	-	5
Figure 2.3.	Comparison of population of Punalur with other Towns in Kollam district	-	5
Figure 2.4.	Comparison of population with surrounding LSG's	-	5
Figure 2.5.	Ward wise distribution of population	-	6
Figure 2.6.	Decadal growth rate of population in Punalur Town	-	6
Figure 2.7.	Decadalwise population Growth Rate from 1971-2011	-	6
Figure 2.8.	Comparison of growth rate of Punalur Town with nearby LSGs in the district	-	6
Figure. 2.9.	Comparison of population density with the District (2011 census)	-	7
Figure 2.10.	Comparison of population density of Punalur with other Towns in the District	-	7
Figure 2.11.	Comparison of population density of Punalur with nearby LSGs (2011 census)	-	7
Figure 2.12.	Ward wise distribution of population Density(2011 census)	-	7
Figure 2.13.	Comparison of literacy rate of Punalur Town with District and State	-	8
Figure 2.14.	Female literacy rate of Punalur Town	-	8
Figure 2.15.	Comparison of literacy rate of Punalur Town with Towns and Corporation	-	8
Figure 3.1.	Variation of number of workers in Punalur Town	-	9
Figure 3.2.	Comparison of WPR of Punalur Town with Kollam corporation and District	-	9
Figure. 3.3.	Comparison of WPR with other Towns	-	9
Figure 3.4.	Comparison of WPR with nearby LSGs	-	10
Figure. 3.5.	The temporal variation of WPR in Punalur Town during 1981-2011	-	10
Figure. 3.6.	Percentage of main workers, marginal workers and non workers	-	10
Figure. 3.7.	Variation in number of workers (1981-2011)	-	10
Figure. 3.8.	Classification of main workers in Punalur Town	-	11
Figure. 3.9.	Spatial distribution of total workers in Punalur Town	-	11
Figure.3.10.	Ward wise distribution of cultivators	-	11
Figure.3.11.	Ward wise distribution of agricultural workers	-	12
Figure.3.12.	Ward wise distribution of household industrial workers	-	12
Figure.3.13.	Ward wise distribution of other workers	-	12
Figure 3.14.	Temporal variation of workers	-	12
Figure.4.1.	Land use of Punalur Town	-	16
Figure 4.2.	Land use breakup of Punalur Town	-	17
Figure.4.3.	Ward wise Land Use break up	-	17
Figure 4.4.	Concentration Index of Residential land use in Punalur Town	-	17
Figure 4.5.	Percentage of Residential land use based on total area - Comparison with other urban LSGs	-	18

Figure 4.6.	Percentage of Residential land use based on total area - Comparison with nearby LSGs	-	18
Figure 4.7.	Concentration Index of Commercial land use in Punalur Town	-	18
Figure. 4.8.	Concentration index of Industrial land use	-	18
Figure. 4.9.	Concentration index of Public & Semi Public land use	-	19
Figure 4.10.	Concentration index of Agricultural land use	-	19
Figure 4.11.	Percentage of Agricultural land use comparison with other urban LSGs	-	19
Figure 4.12.	Percentage of Agricultural land use comparison with nearby LSGs	-	19
Figure 5.1.	Details of industrial production from micro level industries	-	22
Figure 5.2.	Spatial distribution of small scale industrial units and that of micro industrie	-	22
Figure 5.3.	Concentration index of commercial land use	-	23
Figure 5.4.	Important commercial centers and nodes	-	25
Figure.5.5.	Spatial Distribution of paddy in Punalur Town	-	29
Figure.5.6.	Spatial Distribution of Rubber in Punalur Town	-	29
Figures 5.7.	Cattles in the Town as per 2004 quinqunniel census	-	31
Figures 5.8.	Cattles in the Town as per 2008 quinqunniel census	-	31
Figure. 6.1.	Road network of Punalur town	-	35
Figure 6.2.	Bottlenecks / congestion areas in Punalur Town	-	36
Figure 6.3.	Traffic flow pattern in Punalur Town	-	37
Figure 6.4.	Figure 6.4. Peak hour traffic flow in PCU at TB junction and KSRTC junction in Punalur Town	-	42
Figure 6.5.	Peak hour traffic flow in PCU at Post Office junction and Chemmanthoor junction in Punalur Town	-	43
Figure 6.6.	Peak hour traffic flow in PCU at Market junction in Punalur Town	-	44
Figure 7.1.	Water scarcity in Punalur Town	-	47
Figure 7.2.	Water scarcity in Punalur	-	48
Figure 8.1.	Street cleaning areas in Punalur town	-	49
Figure 8.2.	Spatial distribution of sanitation facilities used by the people in Punalur Town	-	50
Figure 8.3.	Wardwise details of plot size in Punalur Town	-	51
Figure 9.1.	Details of power connections	-	53
Figure 9.2.	Power consumption details	-	53
Figure 9.3.	Distribution network details within the town (66 KV and above)	-	54
Figure 10.1.	Ward wise distribution of schools	-	55
Figure 10.2.	Educational Status of Punalur Town	-	59
Figure 10.3.	Comparison of educational qualification of Punalur Town with other Towns in the district	-	59
Figure.11.1.	Location of hospitals	-	62
Figure.13.1.	The ward wise distribution of types of houses	-	67
Figure 13.2.	Household size	-	67
Figure 13.3.	Location of slums	-	69
Figure 13.4.	Ward wise distribution of houses	-	70
Figure 14.1.	SC Concentration Index of Punalur Town	-	71

Figure 14.2. Comparison of SC population with other urban LSGs - 71
Figure 14.3. ST Concentration index of Punalur Town - 71
Figure 14.4. Comparison of ST population with other urban LSGs - 72
Figure 14.5. BPL Concentration Index of Punalur Town - 72
Figure 14.6. Educational Status of SC Families in Punalur Town - 72
Figure 14.7. Educational status of ST families - 72
Figure 15.1. Water Bodies in Punalur Town - 75
Figure 15.2. Paddy fields in Punalur Town - 75
Figure 15.3. Location of Kavu's and ponds in Punalur Town - 76
Figure 15.4. Hazard Zonation Map for Punalur - 77
Figure 16.1. The Expenditure statement for the last three consecutive years - 80
Figure 18.1. Population projection of the Town - 87
Figure 18.2. Workers projection of the Town - 87
Figure 18.3. Importance of agriculture sector - 87
Figure 18.4. Importance of commercial sector - 88
Figure 18.5. Importance of Industrial sector - 88
Figure 18.6. Importance of tourism sector - 88
Figure 18.7. Commercial activity areas - 89
Figure 18.8. Expansion of town centre - 89
Figure 18.9. Activity zones - 89
Figure 18.10. Simple bridge connecting the two half of the town - 90
Figure 18.11. Ring roads connecting the commercial nodes and bridging the two half of the town - 90
Figure 18.12. Ring road alignment - 90
Figure 18.13. Proposed road network of the town - 91
Figure 18.14. Development concept - 92
Figure 18.15. Vacant lands within the core area - 92
Figure 18.16. Expansion of Stadium and proposed Municipal Office - 93
Figure 18.17. Proposed road as per DTP scheme - 93
Figure 18.18. Proposed road - 93
Figure 18.19. Proposed Recreational and Water recharging area and Parking lots - 94
Figure 18.20. Proposed land use map 2031 - 96
Figure 19.1. Proposed industrial estate - 97
Figure 19.2. Proposed commercial activity area - 97
Figure 19.3. Tourism activity area - 99
Figure 19.4. Recreational open space / water retension area and stadium - 99
Figure 19.5. Multi level waste management with decentralized waste management facilities - 100
Figure 19.6. Proposed public office complex - 100
Figure 19.7. Proposed Ring Road Network - 102
Figure 19.8. Proposed road network - 103
Figure 19.9. Proposed Parking facilities in Municipal area - 105

TABLES

Table 1.1.	The distance from important Commercial centers	-	1
Table 3.1.	Details of main workers	-	10
Table 4.1.	Land use of Punalur Town	-	15
Table 4.2.	Comparison of Commercial Land Use with other urban LSGs	-	18
Table 5.1.	Details of small scale industries	-	21
Table 5.2.	Details of micro level industries	-	21
Table 5.3.	Commercial Land use in urban LSGs	-	23
Table 5.4.	Details of the facilities in important junctions	-	24
Table 5.5.	Values of CCFI, CCI and existing hierarchy of commercial nodes in Punalur Town	-	25
Table 5.6.	Details of Street Vendors	-	26
Table 5.7.	Important crops cultivated in the Town	-	28
Table 5.8.	Live stock details	-	31
Table 5.9.	Details of meat production	-	32
Table 5.10.	Details of milk production	-	32
Table 6.1.	Daily traffic volume observed on major road links within Punalur Municipal area	-	38
Table 6.2.	Volume-capacity ratio of major road links in Punalur Municipal area	-	39
Table 6.3.	Speed flow pattern observed along major roads	-	40
Table 6.4.	Peak hour pedestrian cross movements at major locations in Punalur town	-	41
Table 6.5.	Mode-wise distribution of inter-city goods traffic in Punalur town	-	44
Table 6.6.	Percentage distribution of parked vehicles according to parking duration in Punalur town	-	45
Table 7.1.	Details of the distribution network	-	47
Table 8.1.	Details of waste generation in Punalur Town	-	49
Table 8.2.	Details of market waste in Punalur Town	-	49
Table 9.1.	Details of power connections	-	53
Table 9.2.	Power consumption details	-	53
Table 10.1	Number of institutions	-	55
Table 10.2	Details of Schools	-	56
Table 10.3	Facilities available in schools	-	57
Table 10.4.	Details of Arts & Science colleges	-	57
Table 10.5.	Details of Professional colleges	-	58
Table 10.6.	Details of teachers / students ratio	-	58
Table 10.7.	Planning standards in educational sector	-	58
Table 11.1.	Allopathic system of hospitals	-	61
Table 11.2.	Ayurvedic system of Hospitals	-	62
Table 11.3.	Homoeopathic system of Hospitals	-	62
Table 11.4.	Details of diseases in Punalur	-	63
Table 12.1.	Details of theatres	-	65
Table 12.2.	Deatils of auditoriums and halls	-	65

Table 12.3. Details of public library and reading rooms - 66
Table 12.4. Details of other facilities in the Town - 66
Table 13.1. Details of Slums in Punalur Town - 68-69
Table 14.1. Comparison of SC population with other urban LSGs - 71
Table 14.2 Occupational Status of SC families - 73
Table 14.3 Occupational status of ST Families - 73
Table 14.4 Details of SC Landless families - 73
Table 14.5 Details of Land less ST Families - 74
Table 15.1 Details of Kavu's in punalur Town - 75
Table 16.1. Income and expenditure statement for the last three consecutive years - 79
Table 18.1. Land use break up as per proposed map - 95

Process of preparation of the Punalur Master Plan

The preparation of master plan for Punalur was started based on the GO (Rt) No. 1376/2012/LSGD dated, 17.05.2012. Taking into account the spirit of 74th constitutional amendment, the GO stipulates a participatory approach for the preparation of the plan. The plan preparation is envisaged as a joint venture of the Municipality and Town and Country Planning department.



Vikasana Seminar

As stipulated in the G.O, the council of the Punalur Municipality constituted a Spatial Integration Committee (SIC) which is headed by the Chairperson, where as the Kollam District office of the Town and Country Planning department constituted a planning team consisting of an Assistant Town Planner, Planning Assistant and a Surveyor. These two teams worked together for the preparation of the plan. The plan preparation in the municipality started with a seminar conducted on 21.07.2012, with the participation of Punalur MLA as well as the general public about the necessity of a


Vikasana Seminar

master plan for the municipality and to ensure their participation in the process of preparation of the plan. The data collection and land use survey was performed by the planning team, socio economic survey was performed by survey trainees selected by the Municipality/ Spatial Integration Committee and trained by the planning team and traffic and transportation was conducted by NATPAC. The data so obtained were analysed by the planning team, where as the interpretation of the result of the analysis was done jointly by the planning team and Spatial Integration Committee. The Spatial Integration Committee meeting convened three times at various stages of the plan preparation. The ward wise land use map was corrected and refined with the help of councillors. The development aspiration of the councillors


Stakeholders discussion

were also collected through a format designed for it and this was used in assessing the sector wise problems and potentials. Before finalising the proposals a series of discussions were held with the councillors.



Draft plan presentation

The draft plan so prepared was presented before the Chief Town Planner (Planning) on 02.12.2014. The plan modified incorporating the suggestions of Chief Town Planner were discussed with the council on 19.01.2015. After the discussion a site visit was done in the presence of Chairperson, Vice Chairman, Standing committee members etc on 02.02.2015 to assess the suitability of locations for various proposals



Site visit with Chairperson and councillors

The draft master plan for Punalur town was published in Government Gazette dtd. 07.11.2017 vide G.O (M.S) No. 157/2017/ LSGD dtd. 10.08.2017 and SIC revised the draft based on objections and suggestions obtained from public.



Chapter 1
Introduction

1.1. Regional Setting

Punalur is a hill town, the second largest town situated at the eastern side of Kollam district and near Tamil Nadu-Kerala border. The town is located by the western side of Sahya mountain and at the banks of Kallada river. Punalur Municipal area falls in the revenue villages of Punalur, Valacode and Karavalur. The Town has an extent of 34.44 sq.km and has 35 wards. Population as per 2011 census is 46,702. Punalur Town is about 45 km east of Kollam town and 75 km north of Thiruvananthapuram city. The location of Punalur Town in Kollam District is shown in figure 1.1.

Piravanthoor, Vilakudy, Karavaloor, Yeroor, and Thenmala are the neighbouring local bodies of Punalur Town . The regional commercial centers around Punalur are Kottarakkara, Anchal, Pathanapuram and Kadakkal. The distances to the above centers are given in table 1.1

Name of the commercial node	Heirarchy in the District	Distance (km)
Kollam Corporation	Ist	45
Kottarakara	(IInd)	19
Anchal	(IInd)	8
Pathanapuram	(IInd)	12
Kadakkal	(IIIrd)	25

Table 1.1 The distance from important Commercial centers

1.2. History of Development and Culture

Punalur is a town on mountain path, which had good relations with Tamil Nadu to the East since ancient times. Since located in the foothills of Western Ghats, it is also known as the "Lap of the western Ghats. Punalur being part of Pathanapuram taluk were inhabited since before the Indus Valley Civilization, Punalur is described

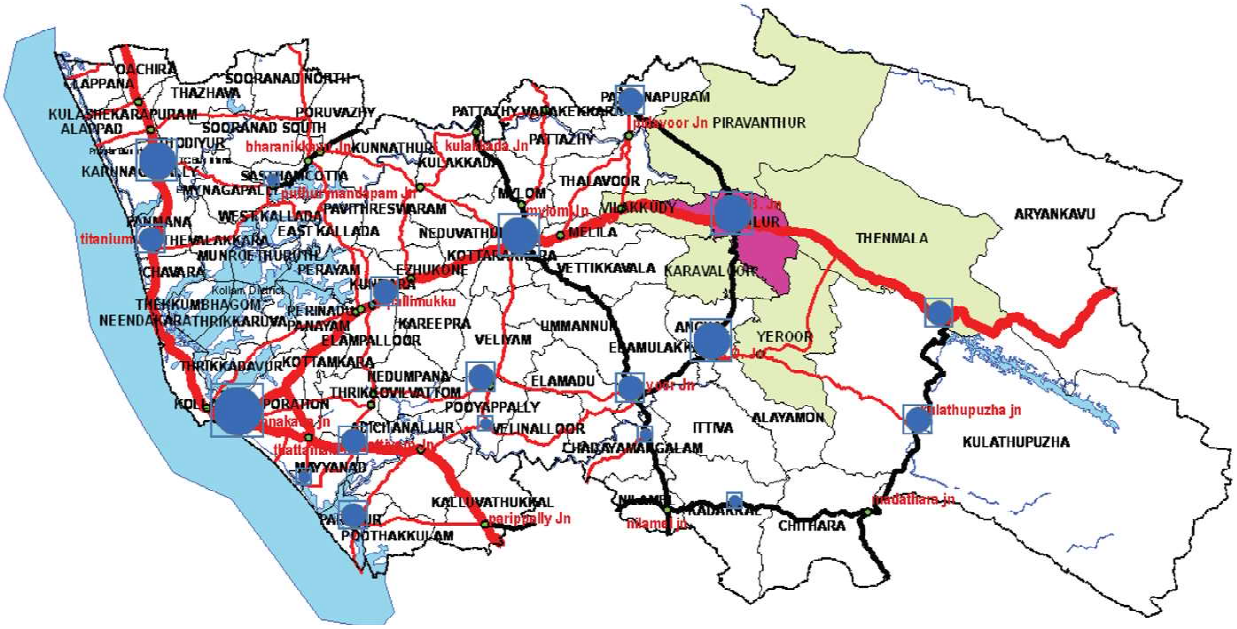


Figure 1.1 Location of Punalur Town in Kollam District

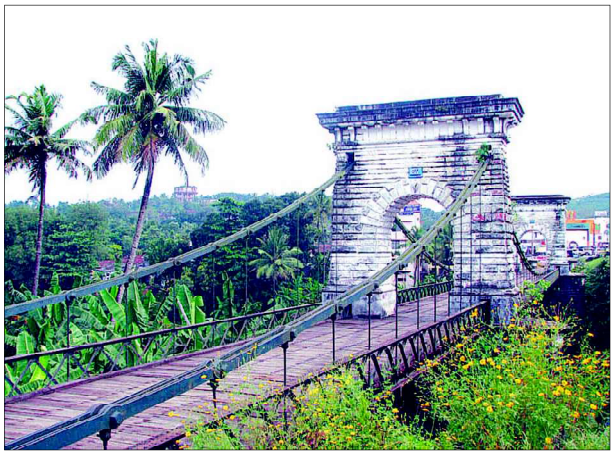
in inscriptions of Mithranandpuram and Vellayani. Britishers had a good hold in this part due to its rich agricultural background.

Portuguese Captain Road Drigs tried to establish his supremacy over the black pepper trade in 1552, but the local traders were not interested and so they transported the pepper to Tamil Nadu in about 500 bullock carts. This act of the local traders evoked the anger of the Captain and he sent his troops and killed many people. The Taluk headquarter was shifted from Pathnapuram to Punalur ,after an attack at Pathnapuram, in 1880. This helped in the growth of Punalur . Later flow of goods to and from Tamil Nadu started flowing through Punalur. Punalur is the first settlement after the majestic Western ghats.The opening of Punalur Suspension Bridge increased the importance of Punalur as the centre of trade, between Tamilnadu and Kerala.

Punalur also served as pivot point in the rise of independence movement and also against the rule of Diwan. Many meetings were centered around Punalur due to the close proximity to Tamilnadu. Many important decisions on planning and attacking Tirunelveli collector was taken in Punalur.

Cultural history of Punalur reflects in the work of traditional and modern artists and performing groups of music, drama, cinema etc. especially acclaimed contributions of Punalur N. Rajagopalan Nair, Punalur Balan and Lalithambika Antharjanam in Theatre and Malayalam literature.

Punalur is known as the "Land of Hanging Bridge". The marvelous Hanging Bridge, constructed under the guidance of Engineer Albert Henry within a period of 2212 days between 1872 and 1877 continues to be an Engineering Marvel even today. Kallada River runs across Punalur and this is one of the few towns in India where a river runs across the town. The very name of Punalur was derived from water. 'Punal' means 'Water' and 'Ooru' means 'Place'. Tamil traders from across the border frequented this place due to the easy availability of water and they named this place accordingly. The Punalur Paper Mills, established in 1850's, was the first industry in Kerala and a pioneer in the industrial revolution of Kerala. Punalur became an important trading / transport centre between Kollam and Shenkottai (Tamilnadu) during the administration of Travancore Kingdom.



Punalur Suspension Bridge

1.3. Geography

Punalur has an average elevation of 56 meters. Punalur lies on latitude $9^0 0'0"$ North and longitude 76^0 92' East and 34 M above MSL bounded by undulating area of hills and valleys. Kallada River which divided the town in to two. Kelankavu and Vilakkuvettam ward are high hill lands. Many tourists have visited scenic spots along the Kallada River. The Palaruvi Falls is 35 kilometers from Punalur. The first eco-tourism project in Kerala is only 20 kilometers from Punalur on NH 744 towards Shenkottai.

1.3a. Topography

On comparison of the contour map of the town and the nature of physical development in the land use map, it can be seen that the flat terrain of the town is almost fully inhabited and highland region is predominant with rubber plantation. It can be concluded that the terrain of the town act as a constraint to the development of the town (Fig 1.2).

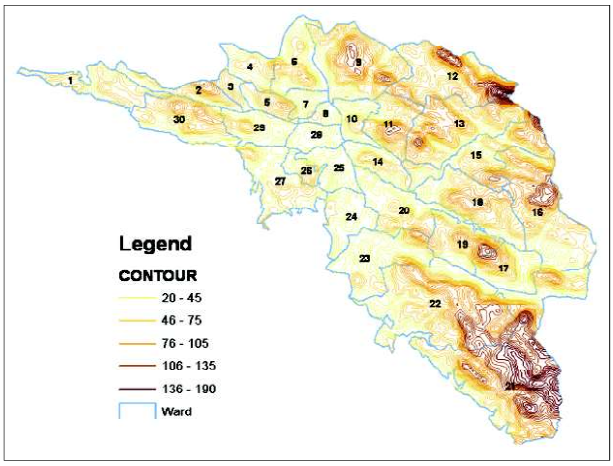


Figure 1.2. Topography of Punalur

1.4. Climate

Even though located near the Western Ghats, Punalur is the hottest place in Kerala and has recorded a temperature of even 44 °C (111 °F) in 2009. The summers of 2007 and 2009 were the hottest in Punalur's history when the maximum temperature hovered around 40 °C (104 °F) for many days. Punalur also holds the record for the lowest temperature recorded in lowland and midland regions of Kerala; with 12.9 °C (55.2 °F) on January 8, 1968. Generally minimum temperature in January–February months on a cloudless day can be as low as 15 °C (59 °F) and as high as in March–April (40 °C (104 °F)).

1.5. History of Governance

Until 1734 Punalur was under the direct rule of the Ilayidathu Swaroopam later it was occupied by Marthanda Varma and came under the rule of Travancore. Punalur become an important trading and transport center between Kollam and Shenkottai (Tamil Nadu)during the administration of Travancore Kingdom. During 1940 the administration of Punalur was by a village union consisting of few members. During 1952-53 duly elected Panchayat assumed charge of the town. On 1st April 1971, Punalur panchayat was upgraded as Town with the current administrative boundaries. Punalur Town has an area of 34.44 sq.km and had a population of 46702 as per 2011 census. For administrative purpose the municipal area has divided into 35 wards at present. There are three revenue villages within Punalur town area, namely Karavaloor, Valakkode and Punalur villages.



Meter gauge rail way line (Pathimunnu Kannara Palam)

1.6. Need for Plan

The following facts are considered to prepare a new development plan for Punalur town.

- Increased urban activities necessitate the accommodation of higher order infrastructure facilities
- According to development concept of IDDP, Punalur Town is a second order settlement in the District
- More planned transportation network for connecting nodes and settlements internally



- Town witnessed with drastic changes in land uses
- New participatory planning process in which various stake holders are given opportunity to participate actively in formulating proposals.
- Government decided to have development plans prepared for the Towns in the state (administrative and financial sanction was given as per G.O (Rt) No. 1376/2012/LSGD dtd. 17.05.2012
- Resolution has been passed by the council of Punalur Town for the preparation of statutory development plan.

1.7. Earlier Planning Efforts and Studies

Three DTP schemes were prepared for the Punalur town. DTP schemes for 1. Market area Punalur, 2. KSRTC bus stand and environs Punalur, 3. Chemmanthur area Punalur. These DTP scheme were sanctioned by the Government. The main objective of the scheme were ensuring smooth traffic flow of the town, development of civic amenities, and zoning regulations to ensure the desired development in the designated use zones. Also an earlier attempt was made to prepare a master plan for the Punalur and a draft report were also prepared. The main components of the plan were land use plan, communication plan and zoning regulations.

Chapter 2
Demography

2.1. Population and its Growth Pattern

As per 2011 census, the total population of Kollam district is 26,35,375. District is placed in the 7th position as far as population size is concerned in the state level. The decadal variation in the size of population of the district over the last five decades is shown in figure 2.1.

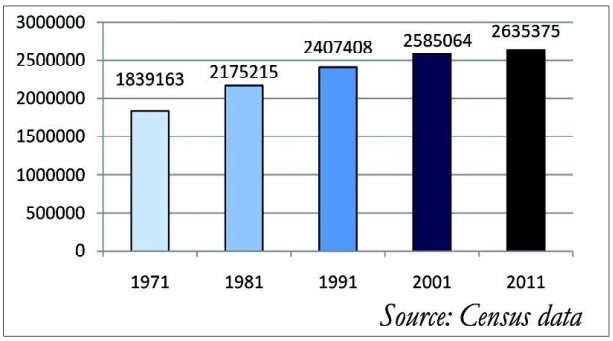


Figure 2.1. Decadal wise population growth of Kollam district

The population of Punalur Town as per 2011 census is 46,702. The decadal population growth of Punalur Town is shown in figure 2.2. While analyzing the past trends it is found that the decadal population with in the Town is gradually increased up to 2001 census and decreased from 2001 to 2011. This pattern is not matching with the population figures of the District.

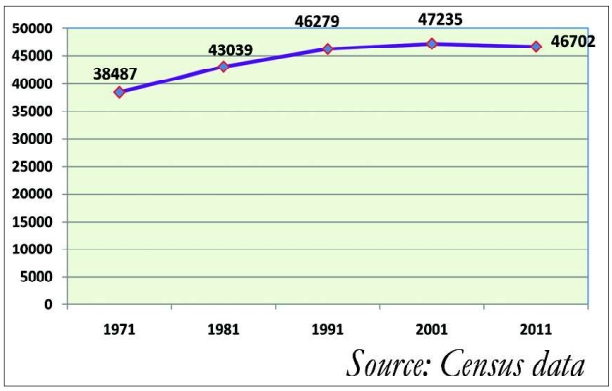


Figure 2.2. Decadal wise population growth of Punalur

While comparing the population of Punalur Town with other Towns in Kollam district, Punalur stands in the second position (figure 2.3).

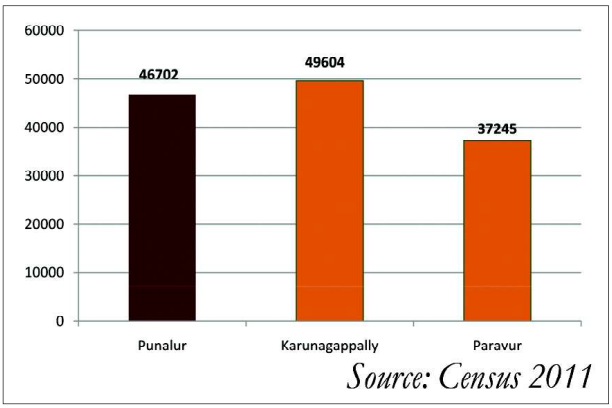


Figure 2.3. Comparison of population of Punalur with other Towns in Kollam district

Comparison of population of Punalur Town with near by LSGs is shown in figure 2.4.

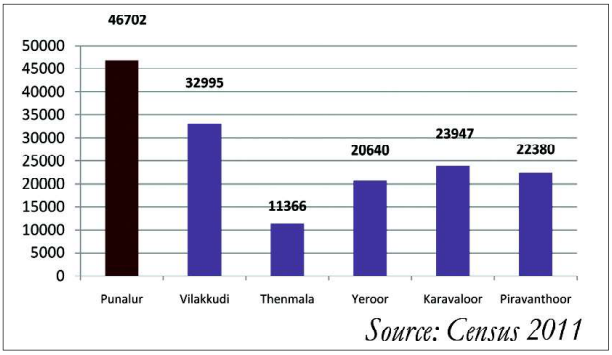


Figure 2.4. Comparison of population with surrounding LSG's

The population of Punalur Town is the highest when compared to surrounding LSGs. Thenmala has the least population.

Population Distribution

Ward wise population distribution of Punalur Town as per 2011 census is shown in figure 2.5.

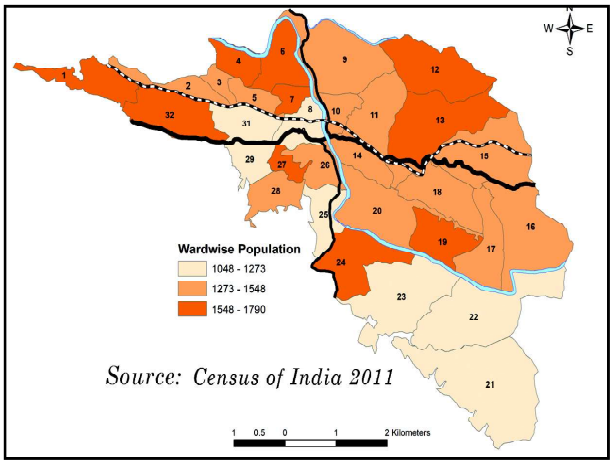


Figure 2.5. Ward wise distribution of population

Wards located near NH and SH shows high population size.

Decadal growth rate of Population

Decadal growth rate of population in the Municipal area is shown in figure 2.6.

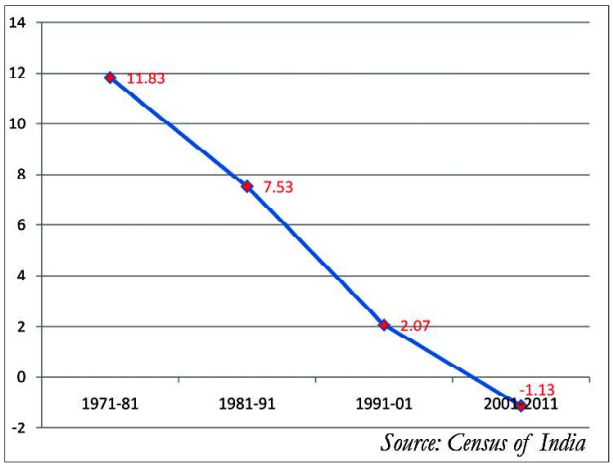


Figure 2.6. Decadal growth rate of population in Punalur Town

The population growth rate shows a declining trend in the Municipal area. During the period from 2001-2011, Punalur Town witnessed negative growth rate of -1.13. Population growth rate of Punalur Town is low when compared to Kollam district. The decadal growth rate of population of Kollam district is 1.95%. The decline the plantation activities in the region and closure of Punalur Paper Mill resulted in weakness of the economic base and resulted in low population growth.

The decadal growth rate of Punalur Town with other Towns in the district and that of Kollam District during the period from 1971 to 2011 is shown in figure 2.7

The figure shows that both Paravur and

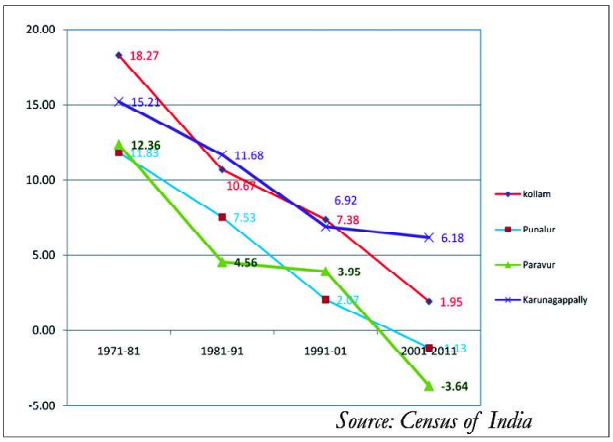


Figure 2.7.Decadal population Growth Rate from 1971-2011

Punalur Town has recorded negative growth rate. However the growth rate of Punalur Town is slightly higher than Paravur Town.

The comparison of growth rate with nearby LSG's are shown in figure 2.8.

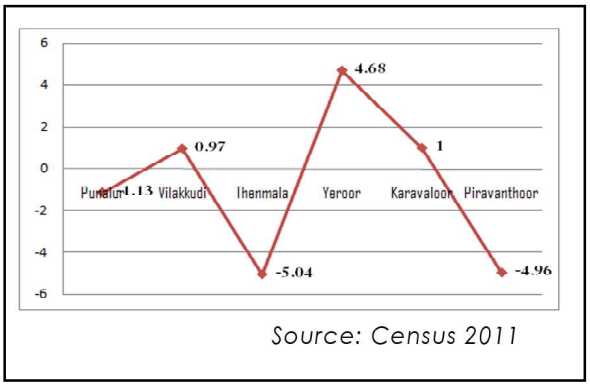


Figure 2.8. Comparison of growth rate of population - Punalur Town with nearby LSGs in the district

Yeroor Gramapanchayat has the highest growth rate of 4.68%. Except Yeroor, Karavaloor and Vilakkudi Gramapanchayats, all the other LSGs show negative growth rate. Punalur falls in a region of low population growth in the District.

The reason for negative growth rate is presumed as the reduction in the job oppertunities in plantation sectors, mainly in rubber plantation. Another reason is the closure of Punalur Paper Mill. These two factors leads to outmigration and negative growth rate of population.

Density of Population

As per 2011 census, the density of Punalur is 1356 persons per sqkm. The comparison of population density with Kollam District is shown in figure 2.9. The population density value of Punlaur is higher than the District average.

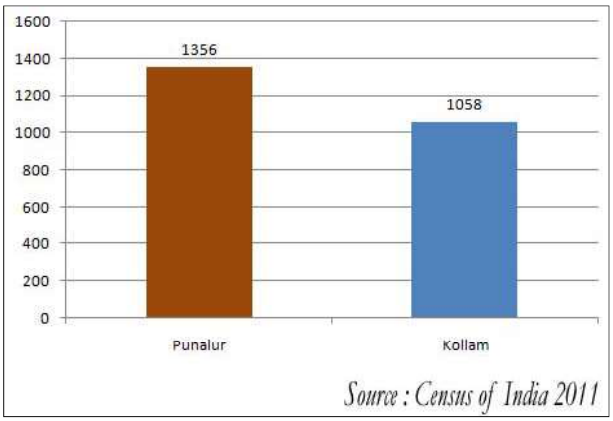


Figure. 2.9. Comparison of population density with the District

The comparison of population density with other Towns in the district is shown in figure 2.10. When compared with other Towns, Punalur has the least population density.

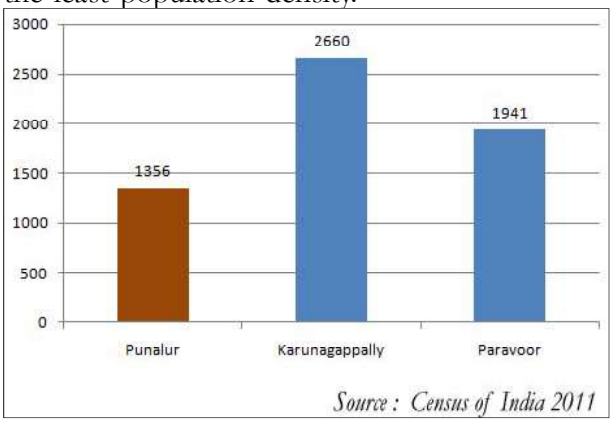


Fig. 2.10. Comparison of population density of Punalur with other Towns in the District

The comparison of density of population of Punalur Town with surrounding LSGs is shown in figure 2.11. The population density of Punalur is comparitively high comparing to adjacent LSGs, other than Vilakkudi. Among the nearby LSGs Vilakkudi is having the highest population density.

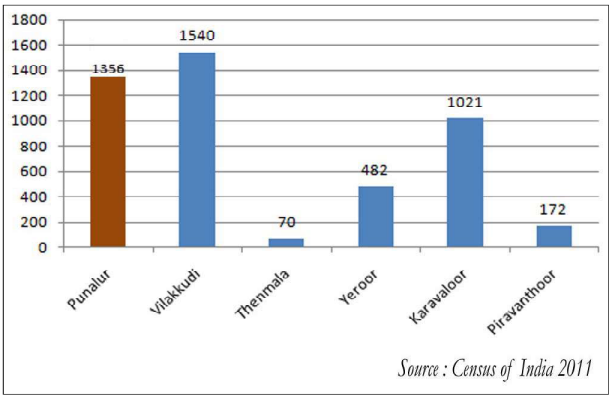


Figure. 2.11. Comparison of population density of Punalur Town with nearby LSGs

The ward wise distribution of population density is shown in figure 2.12. The highest concentration is seen in wards 3 , 7, 9 and 30.

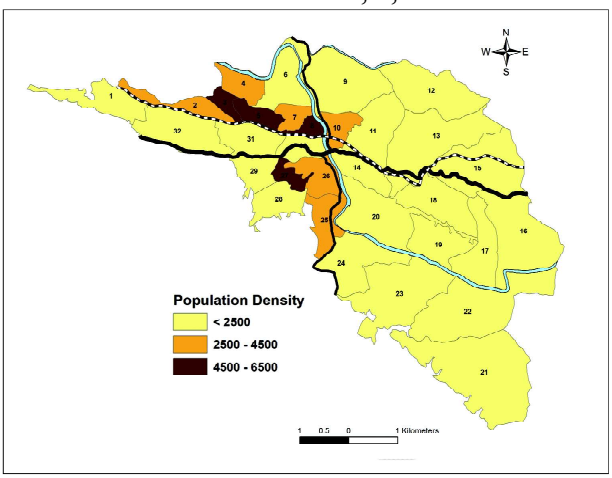


Figure 2.12. Ward wise population Density (2011 census)

2.2. Literacy

According to 2011 census, literacy rate of Punalur Town is 94.31% (figure 2.13) which is slightly higher than that of the district figure of 94.09% and the state (94%). Out of the total population of 46702 persons, 39976 are literates. The

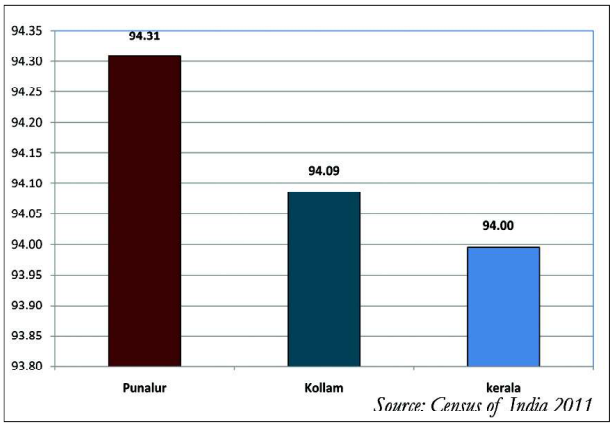


Figure 2.13. Comparison of literacy rate of Punalur Town with District and State

female literacy rate of Punalur Town is 92.7% which is higher than the corresponding district figure of 92.31%. Males have a higher literacy rate of 96.13 .The male literacy rate is slightly higher than the district average of 96.09%. Out of the total literates, 19150 are males and 20826 are females. It is to be noted that the numbers of female literates is higher than that of male literates. The female literacy rate of Punalur Town in 2001 and 2011 census is shown in figure 2.14.

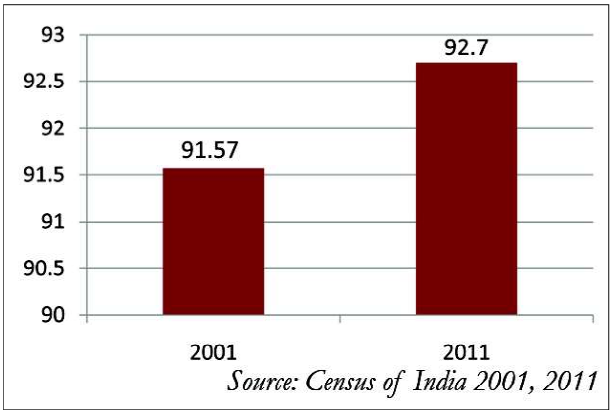


Figure 2.14. Female literacy rate of Punalur Town

In 2011 census, the literacy rate of female has improved. The comparison of literacy rate with Kollam Corporation and other urban LSGs in the District is shown in figure 2.15.

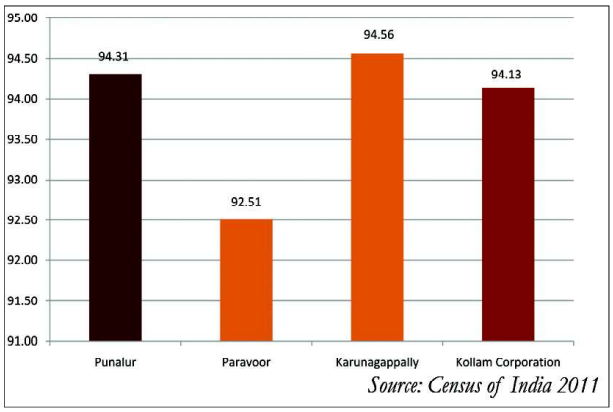


Figure 2.15. Comparison of literacy rate of Punalur Town with other Towns and Corporation

Punalur Town is in the second position while comparing the literacy rate with other Towns in the District and Kollam Corporation. Karunagappally has the highest literacy rate and Paravur has the least.

2.3. Inference

The population of Punalur Town as per 2011 census is 46702 which is low comparing to the recently formed Town in Kollam District viz Karunagappally but higher than the other Town in Kollam District viz Paravur Town. Total population in the Town is declining for the last one decade with a negative population growth rate of 1.13%. Even though the growth rate is negative, the growth rate in Punalur Town is slightly above that of Paravur Town. Most of the nearby LSGs of Punalur Town also shows negative growth rate. Hence it may be assumed that the growth of population of the Punalur follows a general pattern of declining growth rate. The population density of Punalur Town is 1356 which is low compared to other Towns in the district, which are located near the coastal area. The literacy ratio of the Town is 94.31% which is comparatively high and literacy rate among women is found increasing here. This is an indication of women employment in the Town.



Chapter 3
Employment

3.1. Workers

According to 2011 census the number of workers in Punalur Town is 15025.In 1991 and 2001 it was 14293 and 13239 respectively. The number of workers is seen increasing from 2001 to 2011 in the Town. The variation of number of workers is shown in figure 3.1.

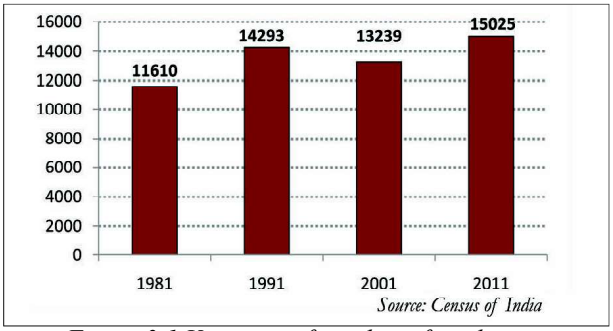


Figure 3.1 Variation of number of workers in Punalur Town

The number of female workers is 3481 which is 23.17% of total workers. The total number of male workers is11544 which are 76.83% of total workers. The percentage of women workers is less than the District average of 29.35%.

3.2. Work Participation Rate

The Work Participation Rate indicates the share of total population provided with any kind of employment for meeting their livelihood demand. The WPR of Punalur Town is 32.17% which is lower than the average District figure of 34.61% and that of Kollam Corporation 34.34%. The WPR of Punalur as per census 2001 was 28% (figure 3.2). The comparison of WPR of Punalur Town with Kollam Corporation and district in 2001 and 2011 census is shown in figure 3.2. From the figure it can be seen that the rate of increase in WPR of Punalur Town is high comparing to the district and Kollam Corporation.

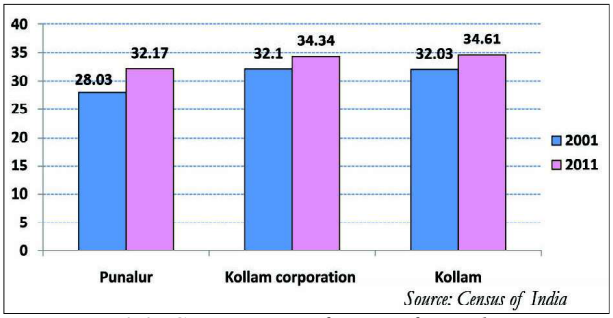


Figure 3.2. Comparison of WPR of Punalur Town with Kollam Corporation and District

The comparison of WPR with other Municipal councils in the district is shown in figure 3.3. From the figure it is found that WPR (2011) of Punalur Town is the highest when compared with other Towns in Kollam District. Prominence of plantation workers in the Punalur region is the main reason for higher value of WPR in Punalur.

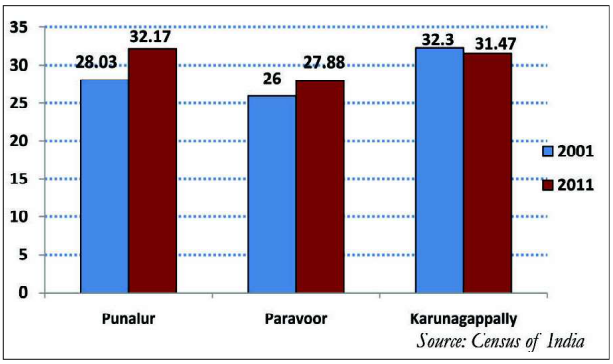


Figure. 3.3 Comparison of WPR with other Towns

The WPR of Punalur Town with nearby LSGs are shown in figure 3.4. From the figure it can be seen that WPR of Punalur Town is comparatively low.

The variation of the work participation rate during the period from 1981-2011 is shown in figure 3.5. The work force participation rate has

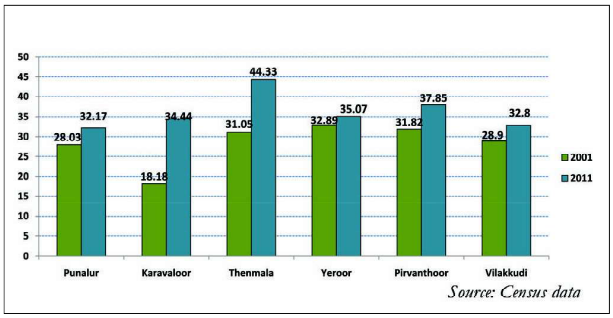


Figure 3.4 Comparison of WPR with nearby LSGs

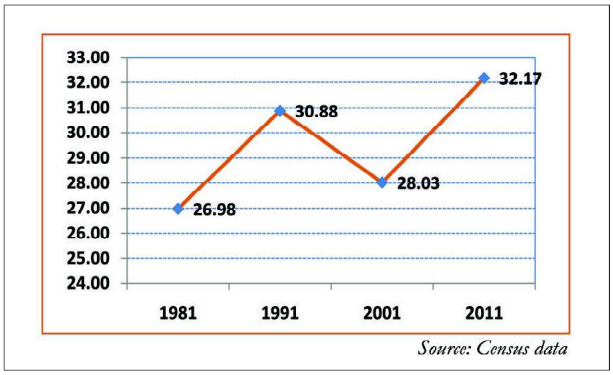


Figure. 3.5 The temporal variation of WPR in Punalur Town during 1981-2011

increased from 26.38% to 30.88% during the period 1981-1991 and there is a decrease from 30.88% to 28.03% during the period 1991-2001 and still in 2011 it is increased to 32.17.

3.3. Occupational Structure

As per census the total workers constitute two categories, main workers and marginal workers. The total workers constitute 32.17% of the total population of Punalur, of this 27% are main workers and 5% are marginal workers (figure 3.6).

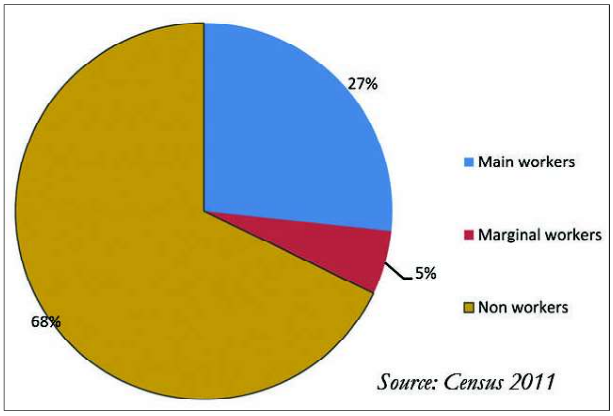


Figure. 3.6 Percentage of main workers, marginal workers and non workers

The absolute figures of main workers and marginal workers are 12461 and 2564 respectively. The figure shows that out of the total population 26% are main workers.

Marginal workers in Punalur Town is 17% of the total workers and which is more than that of Kollam Corporation (14.32%) and Karunagappally Town (16%) and less than that of Paravur Town (22.94%).

The variation of total workers and main workers from 1981-2011 is shown in figure 3.7. It is observed that the number of main workers is also increasing along with increase in total workers during the past one decade.

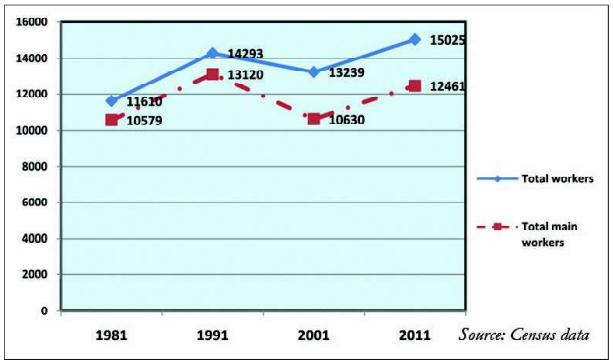


Figure. 3.7 Variation in number of workers (1981-2011)

The main workers are further classified into 4 categories namely main cultivators, main agricultural labourers, main house hold industrial labours and main other workers. The details are shown in table 3.1 and figure 3.8.

The relative predominance of household industrial workers (2%) when compared to other municipal areas in the District shows the significance of small scale industrial workers in Punalur.

Category of workers	Number
Cultivators	392
Agricultural labourers	875
House hold industrial labourers	228
Other workers	10966

Source: Census 2011

Table 3.1. Details of main workers

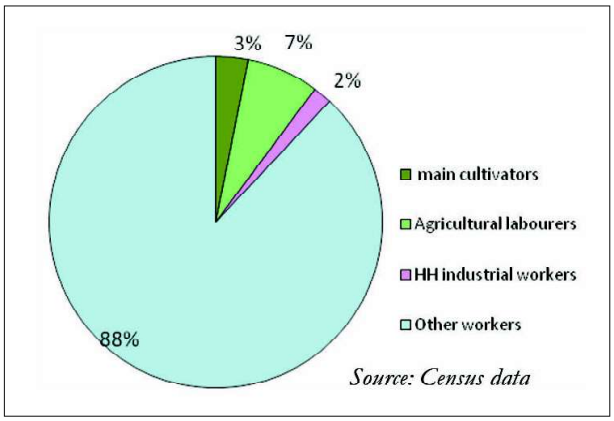


Figure. 3.8. Classification of main workers in Punalur Town

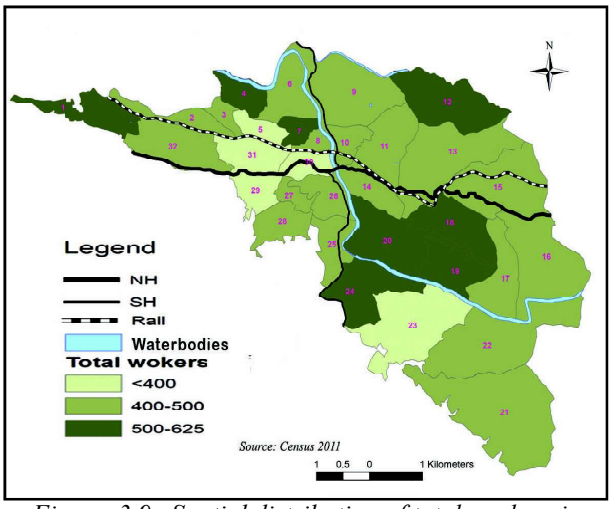


Figure. 3.9. Spatial distribution of total workers in Punalur Town

On examining the share of cultivators, agricultural labourers and household industrial workers in the workforce, it can be understood that the main cultivators constitute only about 3% of the main workers whereas district averages of the percentage of main cultivators is 4.54%. The percentage of agricultural labourers is 7% which is higher than the district average of 6.2%. Itmay be noted that large number of people in Punalur are employed in plantation sector but they are not counted as agricultural workers since it is included as other workers in census. Household industrial workers in Punalur constitute 1.5% of the workforce which is equal to the District figure of 1.5%. This shows that the economic base of Punalur Town is least dependant on primary sector (with the exception of plantation workers) even though the Municipal area falls in the rural belt of the district. If plantation sector is also considered as primary sector, then it may be persumed that this sector has got significance in the development of the area.

3.4. Spatial Distribution of Workers

The spatial distribution of total workers in Punalur Town is shown in figure 3.9.

The spatial distribution of cultivators in Punalur Town is shown in figure 3.10. Spatial distributions of cultivators in Punalur Town shows that they are concentrated mainly in south east side of the Town and in wards 1, 2, 10, 12, 13, 28 and 32. From the distribution map it can be seen that cultivators are mainly concentrated outside the city centre.

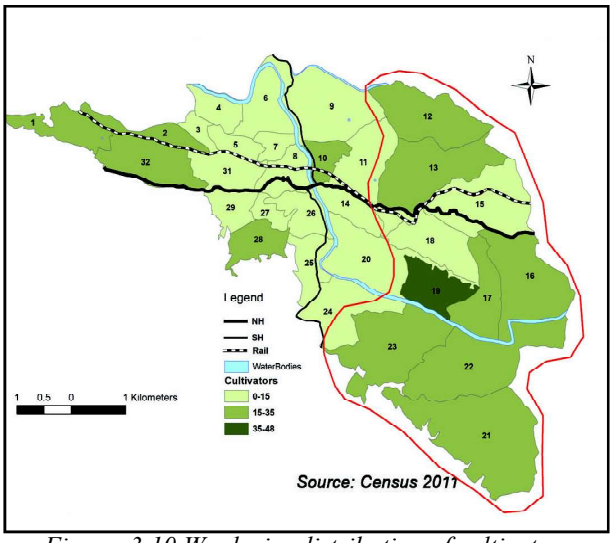


Figure. 3.10 Ward wise distribution of cultivators

The spatial distribution of agricultural workers are shown in figure 3.11. The agricultural workers are concentrated in wards 15, 18, 21, 22 and 32 of the Town.

The concentration of both cultivators and

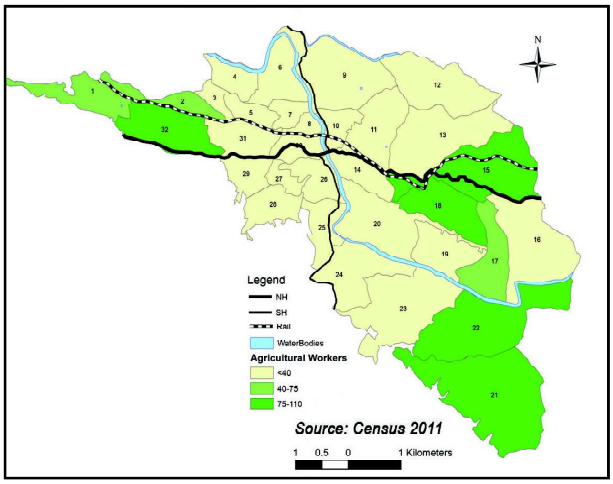


Figure. 3.11 Ward wise distribution of agricultural workers

agricultural labourers are seen in wards 21, 22 and 32. The household industrial workers are concentrated in wards 7, 14 and 31 of the Town (figure 3.12).

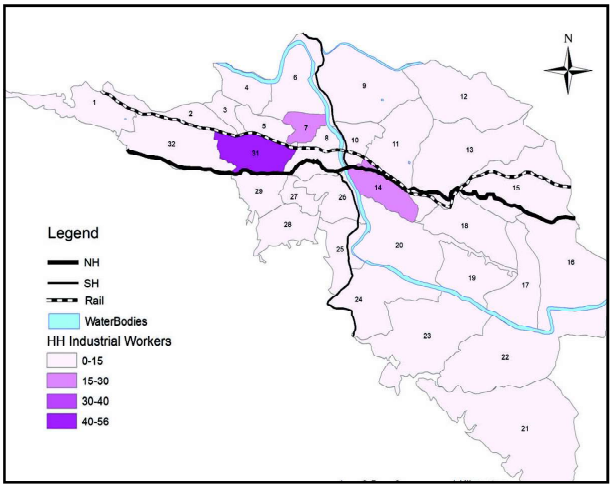


Figure. 3.12. Ward wise distribution of household industrial workers

The spatial distribution of other workers are more in wards in 1, 4, 7, 10, 12, 19 and 24 (figure 3.13).

3.5. Occupational Structure - Temporal Variation

The number of workers in various categories from 1981 to 2011 in the Town is shown in figure 3.14. The number of cultivators and agricultural labourers are increased from 1981 to 1991 and then drastically decreased in 2001 and 2011

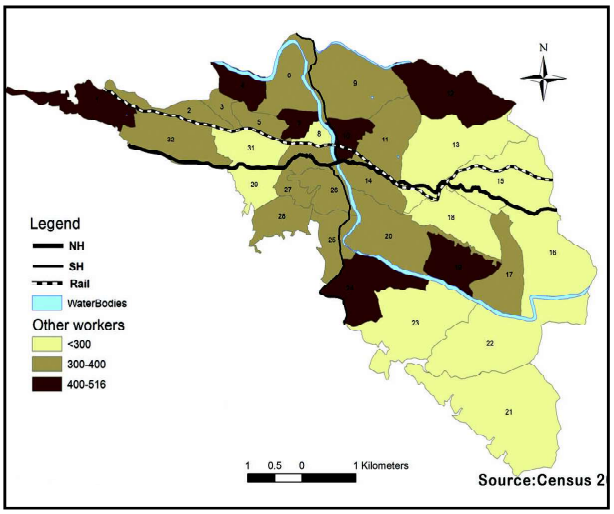


Figure. 3.13. Ward wise distribution of other workers

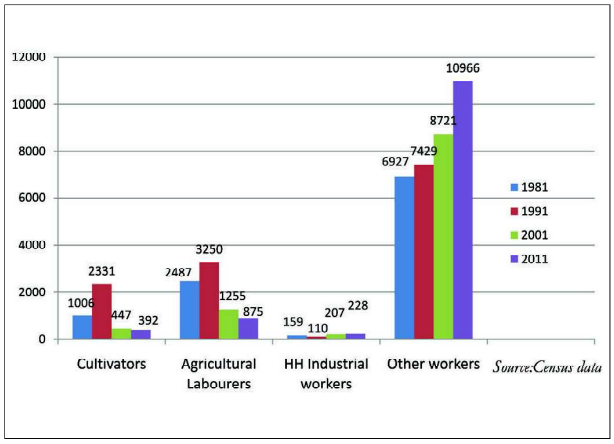


Figure 3.14. Temporal variation of workers

census, whereas the number of other workers has increased constantly from 1981 to 2011. The number of house hold industrial workers show steady increase from 1991-2011. This is a clear indication of the weakening of the primary, mainly the agricultural sector, in the Town and the presence of household industries as an economic base.

3.6. Category of Workers

The analysis of the socio economic survey shows that 6% of the total workers are engaged in industrial sector, agriculture workers and cultivators together constitute 19%, 10% are employed in government sector and 13% are working abroad. This shows that primary, secondary and tertiary sectors are more or less have equal importance in



the category of workers in the Town. This can be taken as an indication of the diversed economic base of the town.

3.7. Inference

According to 2011 Census the WPR of Punalur Town is 32.17%. Over the last ten years the WPR is increased from 28.03 to 32.17. It means that the economic base of Punalur Town is strengthening even though the WPR value is less when compared with district average. When plantation workers are also taken in to account that primary sector is seen significant role in the economic development of the Town. The percentage of household industrial workers in Punalur is comparatively higher showing the predominance of household industries in Punalur. The analysis of the composition of workers shows that the economic base of the Town has bearing on all the three sectors of development primary, secondary and tertiary sectors.



Chapter 4
Land Use

4.1. General Analysis of Land Use

The land use pattern by which the available land within the town is put to use, decide the spatial structure and character of any town. The existing land use of the area gives an indication of the existing sectors of development. The existing land use map of Punalur Town is shown in figure 4.1. Kallada River divides the geographical area of the town in to two and the nature of development show varying character in these two parts, which is evident from the land use map. Majority of the physical development is seen at the western side of the River, whereas agricultural activity is predominant in eastern side of the town.

The Land use breakup of Punalur Town is shown in table 4.1 and figure 4.2. From the figure it is observed that the majority of land (54.32%) is used for dry agricultural purpose. The residential area is only 26.2%. Area of water body is 3%, urban land use including industrial, commercial, transportation, public and semi public togother account only 5.62%. According to District Census Hand Book 2001, about 10% of the land is under Government forest. But this doesn't mean that this area still remains as a natural forest now. The land use survey revealed that most of the land is under rubber plantation with residential developments sparsely located.

The ward wise land use breakup of the Town is shown in figure 4.3. From the figure it is observed that the agricultural area is concentrated in the eastern side of the Town, residential and commercial area is concentrated in the town centre.

4.1.1. Residential Land Use

The concentration index of a particular land use for a ward is calculated as the share of that particular land use in the ward divided by the share of the same land use of the planning area.

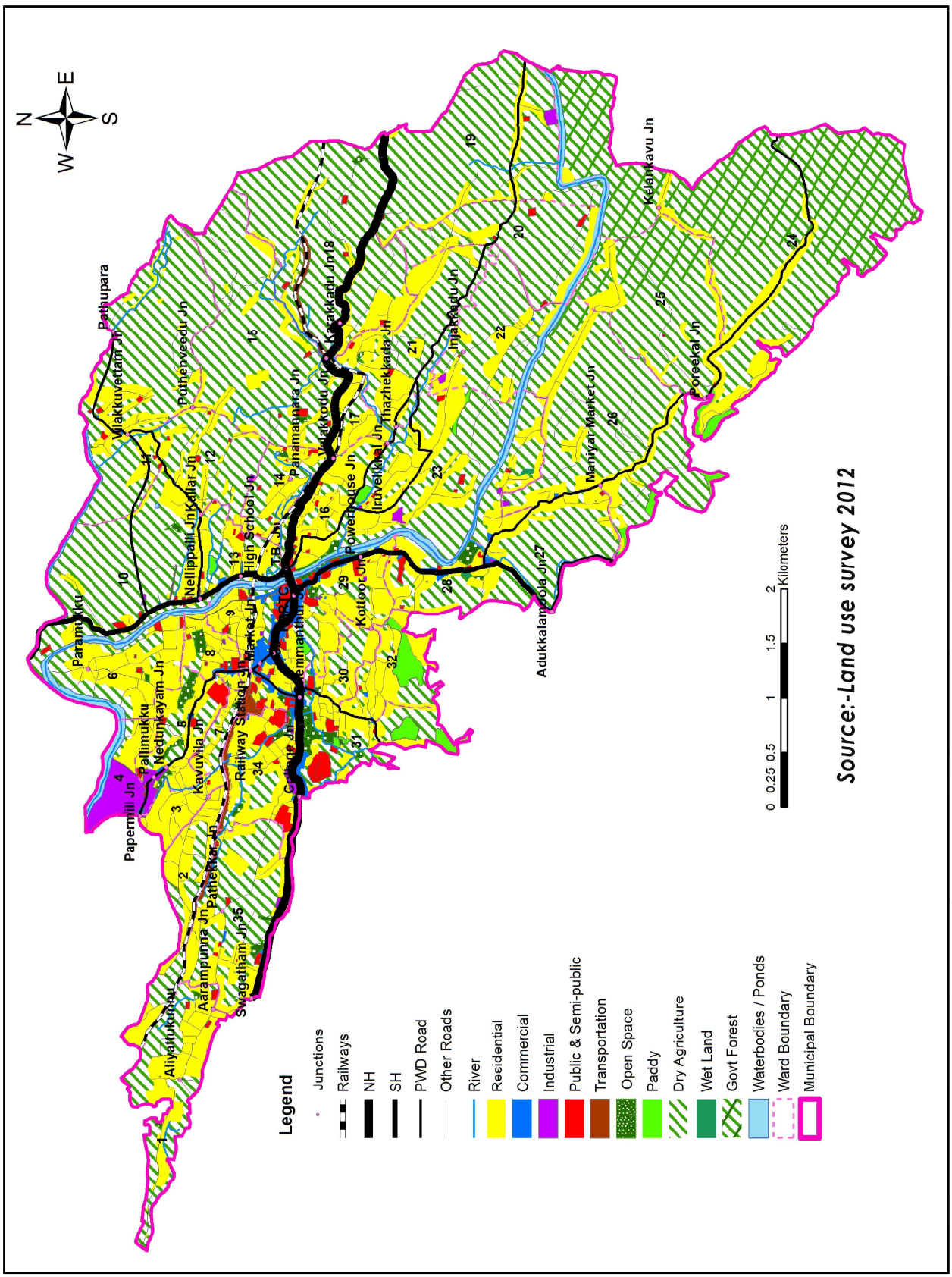
The spatial distribution of the concentration index value of residential land use in Punalur Town is shown in figure 4.4.

From the figure it is observed that the residential concentration is more in the Town area where NH -744 and SH-48 passess through. The

Land use	Residential	Commercial	Industrial	Public & Semi public	Agricultural	Park & Open space	Transportation	Govt Forest	Water bodies	others	Total
Extend in km^2	9.00	0.36	0.30	0.60	18.71	0.32	0.67	3.65	0.82	0.01	34.44
Percentage of Land use	26.15	1.06	0.87	1.75	54.32	0.89	1.94	10.61	2.39	0.03	100.00
Percentage of Land use based on total habitable area (ie, Excluding water body area)	26.78	1.08	0.90	1.79	55.64	0.91	1.99	10.87			

Source : Land use survey 2012

Table 4.1 Land use of Punalur Town


N
E
S
W
Source:-Land use survey 2012
Legend
Junctions
Railways
NH
SH
PWD Road
Other Roads
River
Residential
Commercial
Industrial
Public & Semi-public
Transportation
Open Space
Paddy
Dry Agriculture
Wet Land
Govt Forest
Waterbodies / Ponds
Ward Boundary
Municipal Boundary
0 0.25 0.5 1 1.5 2 Kilometers
Pathupara
Vilakkuvettam Jn
Pothenveedu Jn
Nellippalli Jn
Kallar Jn
High School Jn
TB Jn
Panamaplavu Jn
Vadakkodu Jn
Kizhakkadu Jn
Powerhouse Jn
Iruveliyal Jn
Thazhekkada Jn
Injakkadu Jn
Kelamkavu Jn
Maniyar Market Jn
Poreekal Jn
Adukkalamoola Jn
Paramukku
Papermill Jn
Pallimukku
Medunkayam Jn
Kavuvila Jn
Railway Station Jn
Market Jn
Kottoor Jn
College Jn
Aayiratukunnu
Aarampunna Jn
Pathekkar Jn
Swagatham Jn
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
34
35

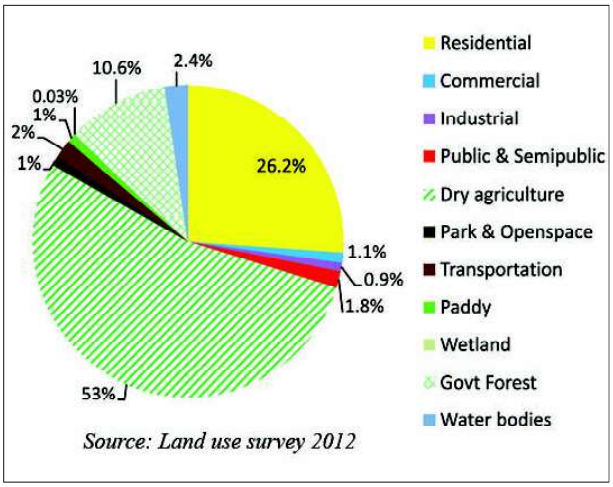


Figure 4.2. Land use breakup of Punalur Town

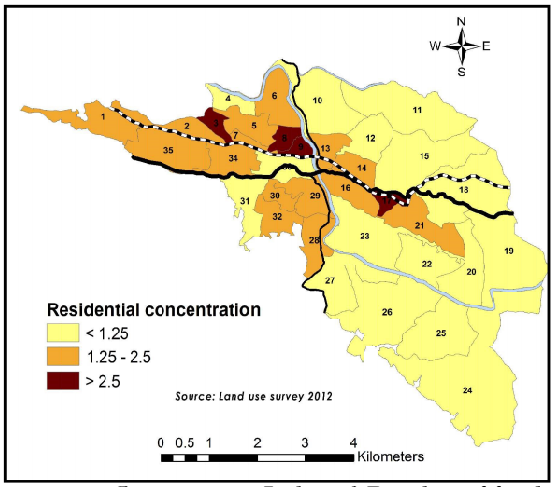


Figure 4.4. Concentration Index of Residential land use in Punalur Town

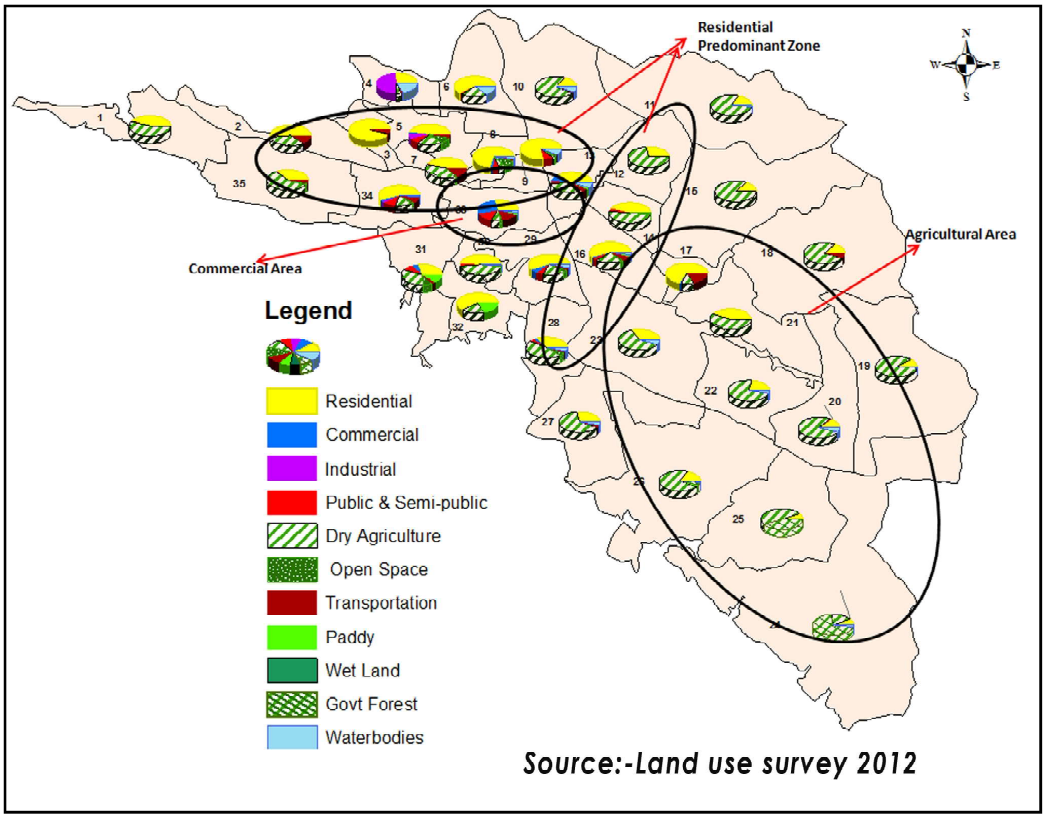


Figure. 4.3. Ward wise Land Use break up Punalur Town

wards 3, 8, 9 and 17 shows higher residential concentration. The comparison of percentage of residential land use with other Towns in the district and Kollam corporation is shown in figure 4.5. From the figure it is observed that Punalur Town has the least share of residential land use.

The comparison of percentage of residential land use with nearby LSGs is shown in figure 4.6. From the figure it is observed that Punalur Town is in the second position. Vilakkudi Gramapanchayat has the highest residential land use.

4.1.2. Commercial Land Use

The concentration index of commercial land of Punalur Town is shown in figure 4.7. The figure shows that commercial land concentration is more in the centre of the town where NH and SH meet (ward 33).

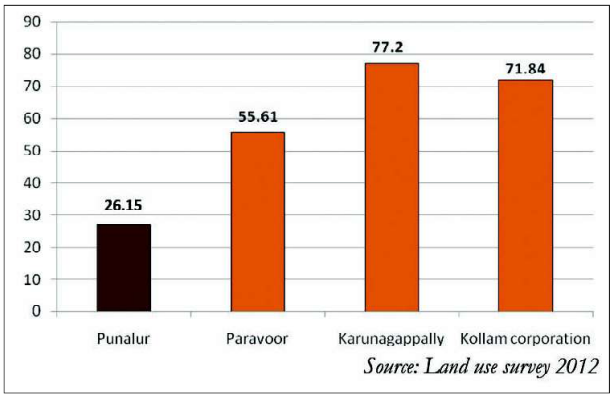


Figure 4.5 Percentage of Residential land use based on total area - Comparison with other urban LSGs

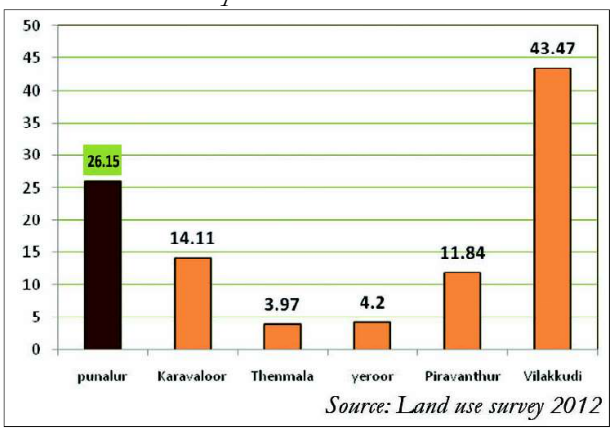


Figure 4.6 Percentage of Residential land use based on total area - Comparison with nearby LSGs

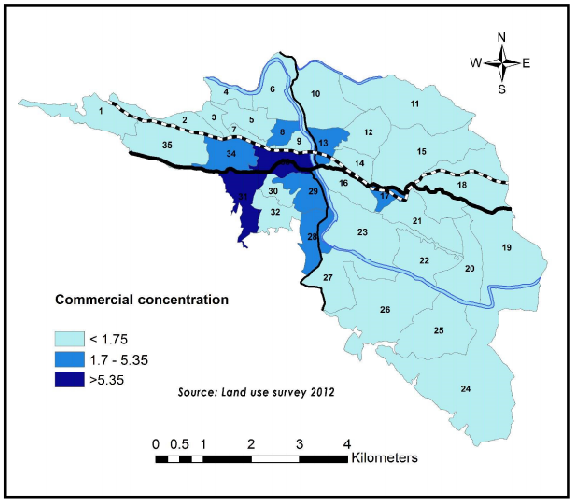


Figure 4.7 Concentration Index of Commercial land use in Punalur Town

The comparison of commercial land of Punalur Town with other urban LSGs except Kollam Corporation is shown in table 4.2

The total commercial area is more in Punalur than other towns and the percentage of commercial land use is more in Karunagappally Town. As per UDPFI guidelines the commercial area required for a class II town is 2-3 %. Hence it is seen that all the Towns including Punalur do not have adequate space allocation for commercial activities.

Sl No	Town	Total Commercial area (km^2)	Share of commercial land use
1	Punalur	0.36	1.04%
2	Paravoor	0.13	0.83%
3	Karunagappally	0.27	1.50%

Source: Land use survey 2012

Table 4.2. Comparison of Commercial Land Use with other urban LSGs

4.1.3. Industrial Land Use

The concentration index of industrial land use is shown in figure 4.8. The highest concentration is seen in ward numbers 4, 5 & 34.

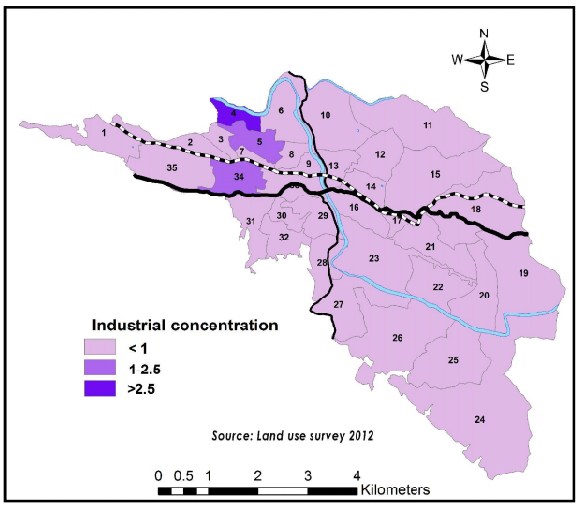


Figure. 4.8 Concentration index of Industrial land use

4.1.4. Public & Semi Public

The concentration index of public and semi-public land use is shown in figure 4.9. From the figure it is observed that the public and semi public activities are concentrated in Town area especially in wards 5, 9, 29, 31 and 34.

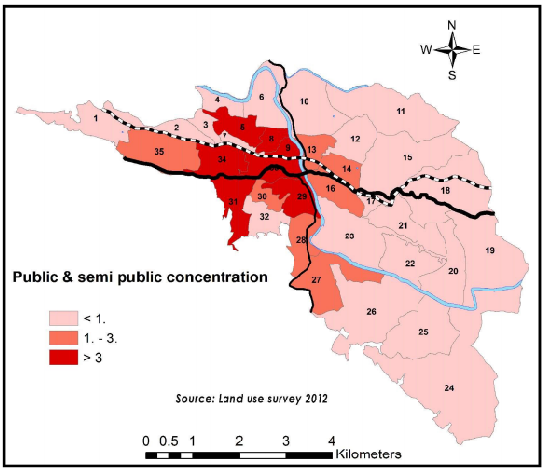


Figure. 4.9 Concentration index of Public & Semi Public land use

4.1.5. Agricultural Land Use

The concentration index of agricultural land use is shown in figure 4.10. From the figure it is observed that the agricultural concentration is more in eastern side of the Town.

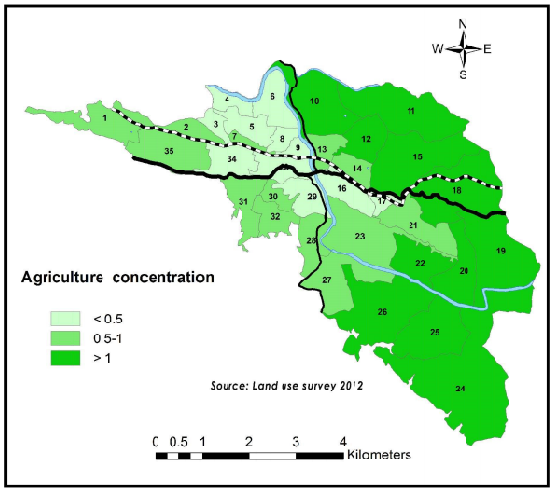


Figure 4.10. Concentration index of agricultural land use

The comparison of agricultural land use with other urben LSGs are as shown in figure 4.11. From the figure it is seen thet Punalur Town has the highest share of agricultural land use.

The comparison of agricultural land use with nearby LSGs is shown in figure 4.12. From the figure it is seen that the surrounding LSGs of Punalur Town except Vilakkudi have more importance than Punalur Town.

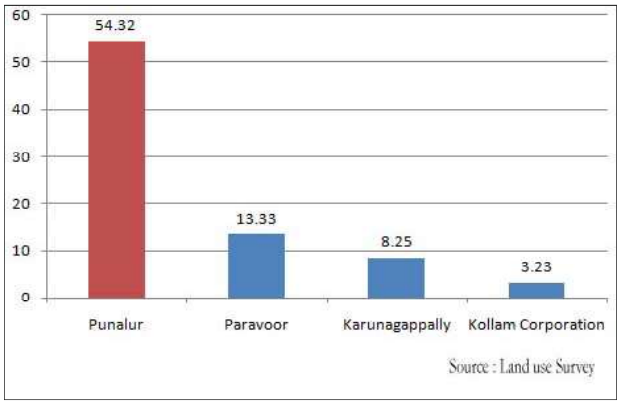


Figure 4.11. Percentage of Agricultural land use comparison with other urban LSGs

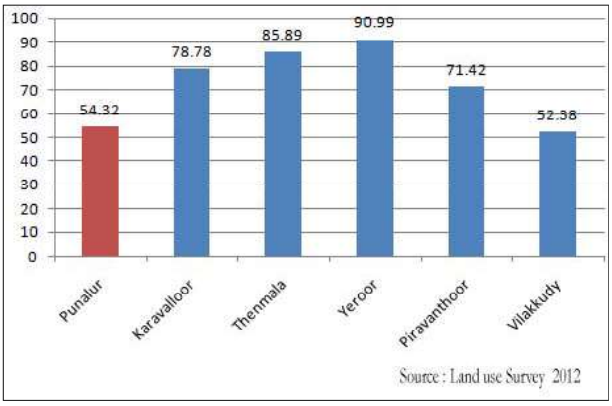


Figure 4.12. Percentage of Agricultural land use comparison with nearby LSGs

4.1.6. Government Forest

According to District Census Hand Book 2001, 10% of the total area of Punalur is identified as Government forest land. This area is demarcated as Government forest in existing land use map. The present scenario is that most of these land is under rubber plantations with settlements located in a few places.

4.2. Inference

From the analysis of land use it is observed that more than 50% of the total geographical area is used for agricultural activities and 26% is used for residential activities. The commercial area of the town is concentrated in the core of the town mainly in wards 9,14,29,31,33 and 34 along the side of NH and SH. Residences are concentrated



in the north – west – portion of the Town. Agricultural activities are concentrated in the eastern side. Commercial activity is seen concentrated in the central portion of the town. Topography of the town act as a constraint to the future development of the town.



Chapter 5
Economic Aspects

In this chapter analysis pertaining to the sectors which supports the economic development of Punalur Town is included. From the primary survey Industries, Trade and Commerce, Tourism and Agriculture are found as the key sectors of economic growth.

5.1. Industry

5.1.1. Existing Industries

Industries have a major role in the development of a particular area. Once Punalur was known for Punalur paper mill, the large scale industrial unit functioned in Punalur. However this unit was closed in 1987 due to lack of raw materials. Now discussions are going on for reneval of this industry. In addition to Punalur paper mill so many small scale and micro level industries are established in Punalur Town. The details of small scale and micro level industries in Punalur are shown in table 5.1 and 5.2 respectively. It is estimated that about 556 people are engaged in small and micro industrial units in Punalur Town.

Industrial land use comprises 0.78% (0.27 km^2) of the total area of the Town. As per national standard (UDPFI) the share of industrial land use for a town like Punalur is 3 - 4%. Comparison with the standards show that industrial base of Punalur is not that strong at present.

Type of Industry	Total Numbers	No. of employees
Food based	9	168
Agro based	8	123
Rubber based	3	66
Cement based	7	100
Plastic based	1	5
Forest based	5	93
Textiles	8	128
Chemical	1	12
Engineering	13	203
Electronics	2	51
Others	48	402

Source: Primary survey 2012

Table 5.2. Details of micro level industries

5.1.2. Industrial Production

Due to the proximity of forest area, most of the industrial production in Punalur is based on forest based raw material. News print was the major produce till the closure of Punalur paper mill. Among the five number of small scale industrial units functioning in the Town, 2 units utilize agriculture produce (Rubber) as raw material.

Sl No	Ward No	Name of Industry	Rubber Based	Plastic based	Electronics	Others	Type of products	No of Employees
1	13	Solve Plastic Products Pvt.ltd		1			PVC pipes	33
2	15	Fancy Paper Boxes				1	Carton boxes	13
3	11	Skimmed Rubber	1				Rubber products	10
4	16	Crumb Rubber	1				Rubber products	21
5	9	Murugha Pharma			1		Allopathy Medicines	NA

Table 5.1. Details of small scale industries **Source: Primary survey 2012**

This shows the potential of agriculture or forest based industrial development in Punalur Town. The details of industrial production from micro level industries are as shown in figure 5.1.

From the figure, industrial production of major share of micro level industries can't be bracketed in to any particular category. However among the remaining industries, forest / agriculture based industries are dominating over the other types of industries like cement, chemical, engineering based industries.

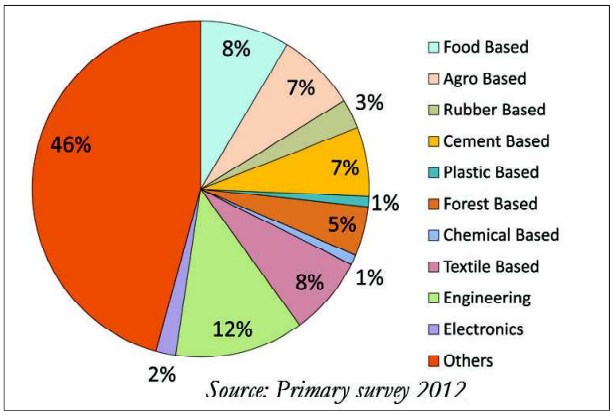


Figure 5.1. Details of industrial production from micro level industries

5.1.3. Spatial Distribution

The spatial distribution of small scale industrial units and that of micro industries is shown in figure 5.2. From the spatial distribution map it is seen that number of industrial units are more in ward 10.

5.1.4. Problems and Potentials

Problems

- Delay in renewal of Punalur Paper Mill
- Non availability of raw materials is a problem for paper industry

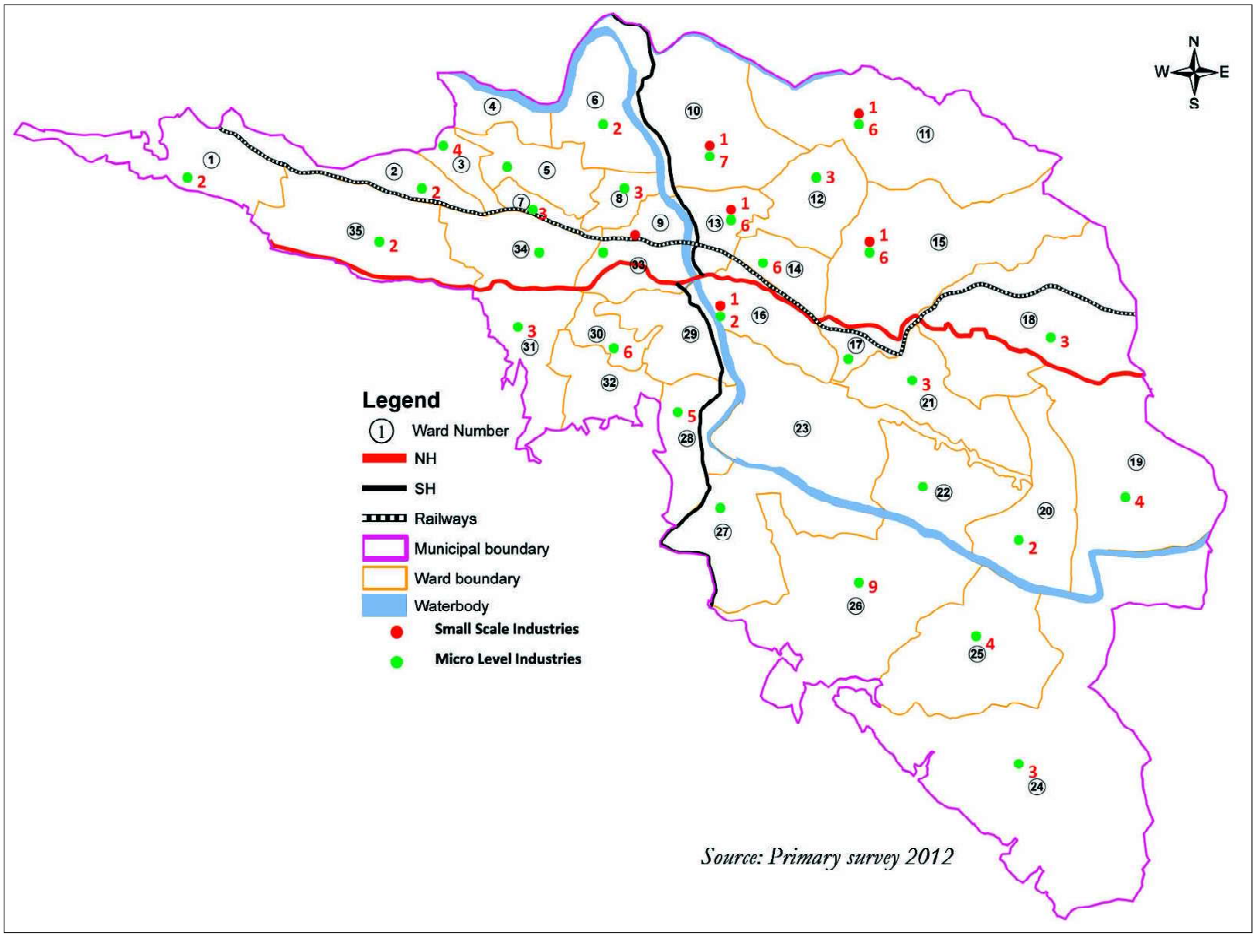


Figure 5.2. Spatial distribution of small scale industrial units and that of micro industries



- Closure of small scale industries due to non availability of labourers and raw materials

Potentials

- There is a scope for starting rubber based industries
- Reopening of paper industry will boost-up the economic base of the town.
- Industrial estates can be started
- Micro level industries can be promoted with the aid of trained staffs

5.1.5. Inference

Punalur is having a scope for development of small scale industries utilizing the agricultural and forest besed raw materials. Plenty of land though undulating, are available in Punalur, but other infrastructure facilities such as building, power, transportation facilities are not available. Better connectivity through road and rail also increses the chances for Punalur to develop in the industrial sector. It can be seen that agro based industries can be promoted especially, rubber industries.

5.2. Trade and Commerce

5.2.1. Present Scenario

Out of 34.44 km^2 of geographical area, only 0.36 km^2 (1.04% of total area) is used for commercial purpose. The comparison of commercial land use of Punalur Town with other urban towns is shown in table 5.3.

The total commercial area is more in Punalur than other towns and the percentage of commercial land use is more in Karunagappally Town. The ward wise concentration index of the Town is shown in figure5.3.

Sl No	Town	Total Commercial area (km^2)	% of commercial land use
1	Punalur	0.36	1.04
2	Paravoor	0.13	0.83
3	Karunagappally	0.27	1.5

Table 5.3. Commercial Land use in urban LSGs

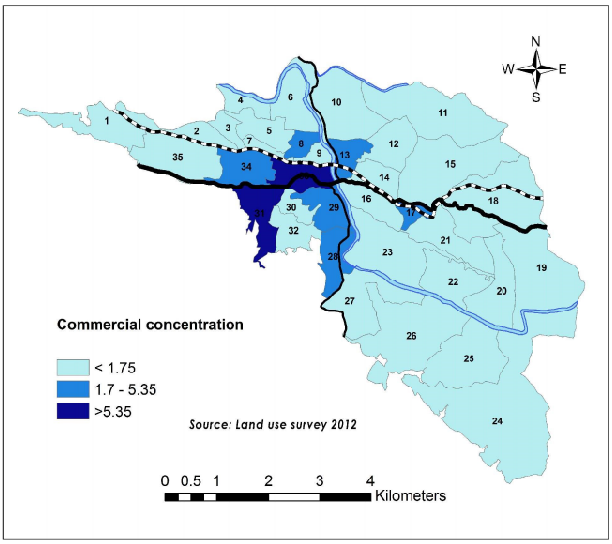


Figure 5.3. Concentration index of commercial land use

Commercial concentration is more in ward 33 and the concentration is more in the centre of the town where NH and SH meets.

Large number of textiles, jewelers, retail and whole sale shops, workshops are located in the centre of the town near NH and SH.

5.2.2. Markets

There are three markets in Punalur. Sree Ramavarmapuram market in market junction and other two are Kalayanad and Maniyar market. The main market of Punalur, Sree Ramavarmapuram market is located in the centre of the town, which consists of vegetable shops, fish market, dry fish market, grocery shops, whole sale provisions etc is seen inside the market.

5.2.3. Commercial Centres

Commercial centres are concentrated in the centre of the town. The commercial activities in Punalur are very low when compared to the required standards for a medium town.

5.2.4. Facilities at Commercial Centres

The present status of commercial centres in Punalur Town were assessed based on primary survey. Details collected on retail shops, wholesale shops, commercial offices and other higher order facilities. The shops / facility are classified into local, sectoral and district level based on the level of service it provided. Local level service is that service in which only local people depends. While in sectoral level facility the neighbouring LSGs also depends and in the district level facility entire people in the district depends. The details of the shops/ facilities in important junctions are listed in table 5.4.

Retail Shops

Maximum number of retail shops are seen in Railway station junction (66). The second largest position is KSRTC junction (65) followed by Post Office junction (46).





Sree Ramavarmapuram Market

Wholesale Shops

Maximum number of wholesale shops are located at Railway station junction (11).

Sl. No	Junction	Retail shop			Wholesale			Commercial			Others			Higher order		
		Local	Sector	District	Local	Sector	District	Local	Sector	District	Local	Sector	District	Local	Sector	District
1	Railway station jn	66	7	0	11	1	0	18	0	0	4	0	0	4	2	0
2	Post Office jn	46	1	0	4	1	0	7	1	0	2	0	0	2	0	0
3	Chemmanthoor jn	35	2	0	1	1	0	21	0	0	4	1	0	6	4	0
4	KSRTC jn	65	0	0	3	0	0	10	0	0	2	0	0	4	0	0
5	TB jn	21	0	0	3	0	0	7	0	0	2	0	0	2	0	0
6	Tholikode jn	15	0	0	3	0	0	13	0	0	0	0	0	2	0	0
7	College jn	18	0	0	2	0	0	14	0	0	2	0	0	9	2	0
8	Nellippally jn	9	0	0	0	0	0	6	0	0	1	0	0	6	0	0
9	Kalayanad jn	12	0	0	0	0	0	7	0	0	1	0	0	0	0	0
10	High school jn	14	0	0	0	0	0	11	0	0	0	0	0	0	0	0

Source: Junction survey 2012

Table 5.4. Details of the facilities in important junctions



Commercial Offices

Commercial offices are more in Chemmanthoor junction (21 nos.).

Other Commercial Facilities

Other commercial facilities are more in Railway station junction and Chemmanthoor junction (4 nos.). It is noted that higher order commercial facilities are more (9 nos.) in College junction.

5.2.5. Existing Hierarchy of Commercial Nodes

After collecting data on various commercial facilities available at the commercial nodes, due weightage is assigned to each type of facilities according to level of service to calculate the Cumulative Commercial Facility Index (CCFI). Further to this the Combined Commercial Index (CCI) of a particular node is obtained by multiplying CCFI with the percentage of commercial land use of that node with that of Punalur Municipal area. From the analysis of facilities it is found that some facilities such as retail shops and commercial offices are available in all junctions, hence a weightage of 1 is assigned to this facilities. In the case of wholesale shops out of 10 junctions, only 7 junctions have that facility, hence a weightage of 1.4 (10/7) given for that facility. Similarly weightage 1.25 to higher order facilities and 1.25 to other facilities are assigned. For local level facilities, weightage of 1 and for sector level facilities weightage of 2 is given. By multiplying the number of facilities with the weightage of that facility weightage due to level of service CCFI will be obtained. The values of CCFI and CCI are shown table 5.5.

The first order junctions in Punalur are Railway station junction, KSRTC junction and Post Office junction. Chemmanthoor junction and College junction belongs to second order. Tholikode junction and TB junction are third order and Nellippally junction, Kalayanad junction and High School junction are belongs to fourth order node. The existing hierarchy of commercial nodes in Punalur Town is shown in figure 5.4.

Junctions	CCFI	% of commercial land use	CCI	Order of Jn
Railway station Jn	124.86	0.1372549	17.1	Ist
KSRTC Jn	85.14	0.17647059	15	
Post office Jn	69.45	0.21176471	14.7	
Chemmanthoor Jn	92	0.10980392	10.1	IInd
College Jn	53.79	0.13333333	7.17	
Tholikode Jn	34.14	0.09019608	3.08	IIIrd
TB Jn	39.43	0.05882353	2.32	
Nellippally Jn	22.5	0.03921569	0.88	IVth
Kalayanadu Jn	22	0.02352941	0.52	
High school Jn	24	0.01960784	0.47	

Table 5.5. Values of CCFI, CCI and existing hierarchy of commercial nodes in Punalur Town

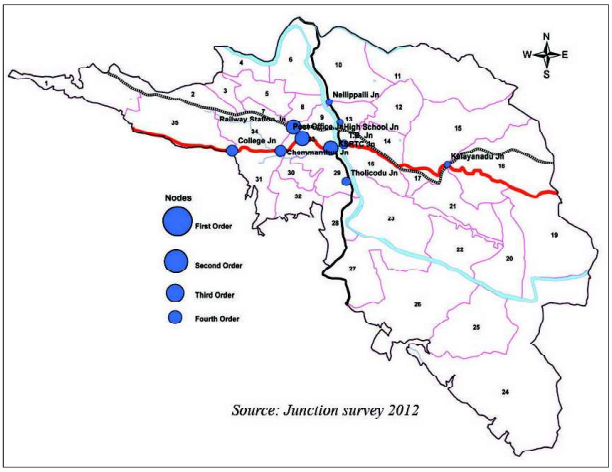


Figure 5.4. Important commercial centers and nodes

5.2.6. Street Vendors

The details of street vendors in Punalur Town is shown in table 5.6. Street vendors are more in Punalur Town and the main location is near to Sree Ramavarmapuram market. Vending of fruits, garments, tea, snacks, vegetables, cloths

Sl No	Area of concentration of informal sector activities	Type of activity – fruits and vegetables, garments, tea and snacks, home appliances, books etc	Extent of informal sector activity in each area (no of shops/cart), no of street Vendors	No of units under Informal sector activity having the approval of Local body- Location wise	Labour force (man, women, children separately) in informal sector
1	T B junction	Fruits,Garments,Tea& Snacks	3	Nil	6
2	Nellippally	Fruits,Tea&Snacks	2	Nil	3
3	Kalayanadu	Tea&Snacks	1	Nil	2
4	Market	Fruits, Tea, Garments	10	Nil	4
5	K S R T C	Fruits, Vegetables, Tea & Snacks	4	Nil	5
6	Near Govt hospital	Mattress, Cloths, Fruits,Cool drinks	7	Nil	7
7	Katchery road	Fruits , Cloths, Teastall	3	Nil	3

Source: Junction survey 2013

Table 5.6. Details of Street Vendors

and miscellaneous items are seen. These street vendors do not have any approval from local bodies.

5.2.7. Problems and Potentials

Problems

- Commercial centers are highly congested in the centre of the town near NH and SH and have no sufficient parking area.
- Market is functioning without any solid waste treatment facilities.
- Ineffective utilization of Kalayanad and Maniyar market.
- The informal sector activities are more in Market junction and which affects Pedestrians and vehicular movement.
- Comfort stations are not working properly.

Potentials

- Renovation of Kalayanad and Maniyar market.
- To develop sree Ramavarmapuram market to act as a commercial sub centre.
- Well connected to Tamil nadu.

5.2.8. Inference

Junctions of Punalur has developed in a hapahazard manner which needs extension for parking, loading and unloading, spaces for street vendors. The Ramavarmapuram market in Punalur is congested due to lack of enough space. The meat and fish stall are functioning in an unhealthy manner. Opening of Punalur - Shenkottai railway line increases transportation of goods and services along with passengers. Commercial centers of junctions in the planning area facing a lot



Street vendors near Sree Ramavarmapuram market

of problems. It is proposed to develop the area in a planned way, which will increase the facilities and creates healthy environment.

5.3. Tourism

In recent times tourism has emerged as one of the few economic alternatives to develop the economy of the states/district/towns. It has been recognized as an important sector for the development on account of its potential for generating income and employments.

5.3.1. Tourism Attractions of Punalur

Punalur is famous for its suspension bridge and has been presented as an excellent monument of engineering skill. It spans over Kallada River at the heart of the town. Thousands of tourists visit suspension bridge during Sabarimala season. Following places are identified as tourist spots in and around Punalur Town.

1. Sides of Kallada River offer many picturesque spots
2. Punalur suspension bridge
3. Agasthyamalai Bio – reserve
4. Shenthuruni forest Thenmala
5. Eco tourism Thenmala (excellent spots for adventure tourism)
6. Palaruvi water falls
7. Punalur town is busy transit camp station during Sabarimala seasons
8. Sasthamconam temple
9. Roman Catholic Church
10. Alenchary Jamieath Pally
11. Vattapada Ove
12. Kannyarkulangara
13. Pothenpara Kayam
14. Chenkulam Thuruth
15. Vallimantheri water falls
16. Pattani Kayam (sand bunds)
17. Punalur Paper Mills and its surroundings

Since Punalur Town is situated very close to Palaruvi water falls, Shenthuruni wild life sanctuary, eco tourism spot at Thenmala etc; it has got enough potential to develop infrastructure facilities for supporting tourism activities in the eastern part of Kollam district.

In addition to the above tourism attractions, temples dedicated to Sastha at Achankovil, Aryankavu and Kulathupuzha are visited by large number of pilgrims. The festival Therottam and Pushpabhishekam of Achankovil temple are famous. Sabarimala pilgrims use Punalur town as a transit camp station during the Sabarimala season.

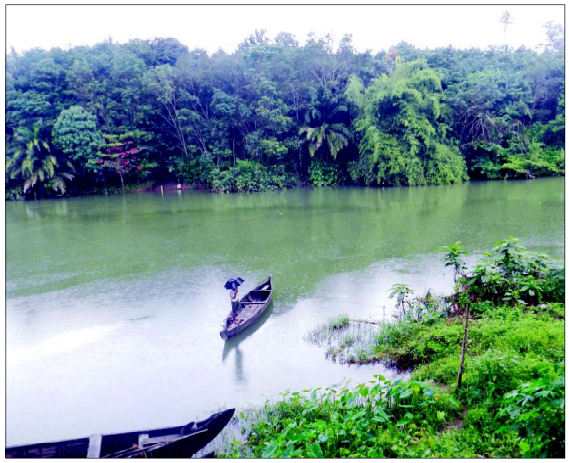
5.3.2. Problems

1. Lack of proper infrastructure facilities
2. Roads to destination need to be improved and maintained properly
3. Lack of boat jetties and other basic amenities
4. Proper parking spaces are required at all destinations

5. Lack of proper waste management
6. Lack of guided tours
7. Lack of tourism study centre
8. Lack of proper guidance to pilgrim tourists

5.3.3. Potentials

1. Renovation and landscaping of Punalur suspension bridge
2. Construction of pilgrim amenity centre at Punalur town mainly aimed to Sabarimala pilgrim season
3. Thenmala, Achankovil, Palaruvi, Kulathupuzha, Schenthurini wild life sanctuary are the nearest main tourist attraction places of Punaur town



Kallada River



Punalur Suspension Bridge

4. Punalur – Shenkottai railway line is the most tourist attractive railway line for the scenic beauty of mountains and many picturesque spots in Western Ghats.

5.3.4. Inference

Presence of tourism products such as Palaruvi water falls, Thenmala eco tourism centre, Shenturuni forest area available near Punalur Town can be considered as potentials for developing infrastructure facilities required for the tourists. Punalur can act as a base for providing tourism infrastructure to tourists visiting the nearing tourist spots.

5.4. Agriculture Sector

5.4.1. Area Under Cultivation

Agricultural sector, mainly dry agriculture is an important segment in Punalur Town. Out of the total area of the Town 34.44.sqkm, dry agriculture crops are grown in 22.17 square kilometers. This forms 64 per cent of the total area of Punalur.

5.4.2. Important Crops and Production Details

Important crops and its production in the Town is shown in table 5.7. From the table it can

Type of crops	Area (Ha)	Production (Kg)	Productivity (Kg/Ha)
Paddy	10	34000	3400
Coconut	200	560000	2800
Banana	300	2528400	8428
Pepper	176	1584000	9000
Arecanut	7	14000	2000
Rubber	2328	4339392	1864
Other crops	95	532500	5605

Source:agricultural department 2012

Table 5.7. Important crops cultivated in the town



be observed that rubber, banana, coconut, pepper are the major crops in Punalur. Paddy cultivation is marginal as far as area under cultivation of crops is considered. However paddy / low lying land need to be preserved for maintaining environmental balance. Hence a detailed analysis of major crops and paddy is carried out and reported as follows.

Paddy Cultivation

The paddy cultivation is practically nil within Punalur Town (figure 5.5). The figure shows that paddy area spreads near the side of Kallada River. Out of 9622 Ha of paddy in Kollam district, only 10 Ha is now cultivated in Punalur Town. Production is 0.34 MT and productivity is 3400 Kg/Ha which is high compared to district (2854 Kg/Ha).

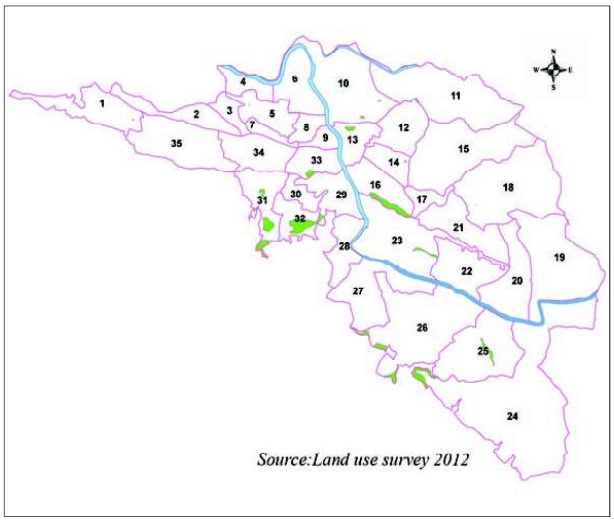


Figure.5.5. Spatial Distribution of paddy cultivation in Punalur Town

Rubber Cultivation

Rubber cultivated area in Punalur Town is shown in figure 5.6. Rubber is the main crop in Punalur Town. Out of 34.44 sq km of total area of Punalur 21.83sqkm of land is used for Rubber cultivation i.e. 63%of land is used for Rubber cultivation. 4.54% of the total rubber cultivated area in Kollam district (48087 Ha) is in Punalur Town. Production in Punalur Town is 43.39 MT and that of district 83267 MT. The productivity of Rubber is 1864 Kg/Ha which is more than that of district productivity (1214 Kg/Ha).

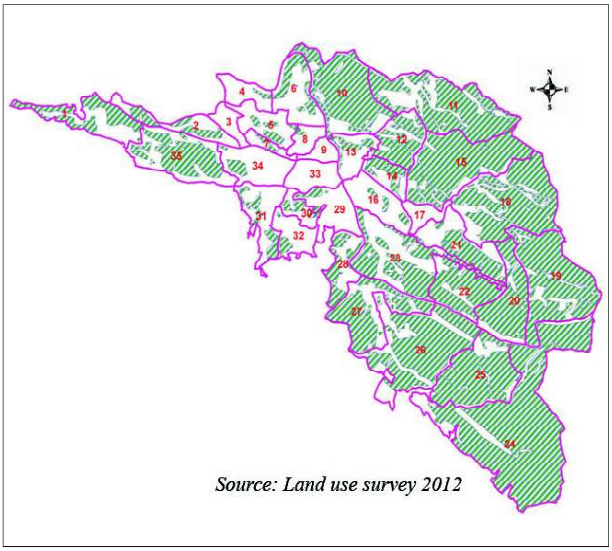


Figure.5.6. Spatial Distribution of Rubber cultivation in Punalur Town

Coconut

Coconut is the traditional crops of Keralites. Only 200 Ha are used in coconut cultivation, which is 0.39% of the total coconut cultivated area in the district (50320 Ha). Production of coconut in Punalur Town is 5.6 MT and productivity is 2800 numbers which is lower than that of district production (5672 numbers).

Banana

300 Ha area is used for banana cultivation in Punalur Town. Which is 3.85% of the total banana cultivated area in the district (7774 Ha). The production of banana in Punalur Town is 25.28 MT and that of district is 124476 MT. Productivity of banana is 8428 Kg/Ha which is lower than that of district figure (16127 Kg/Ha).



Rubber cultivation in Punalur



Banana cultivation in Punalur

Pepper

Pepper cultivated is 176 Ha which is 1.8% of the total pepper cultivated area in the district (9689 Ha). Production is 15.84 MT and the productivity is 9000 Kg/Ha which is higher than district figure (464 Kg/Ha).

5.4.3. Problems and Potentials

Problems

1. Paddy is not profitable compared to other crops.
2. Scarcity of labourers and wage rate is high.
3. Removal of clay for manufacture of bricks and tiles makes the land unsuitable for paddy cultivation.
4. Difficulty for irrigation and adequate irrigation facilities are not available.
5. Threat of paddy from animals.
6. Conversion of paddy land into other crops , garden land and residential land.
7. Scarcity of rubber tapping labours
8. Lack of sufficient quantity of good quality coconut seedlings for good planting.
9. Area under the crops is considerably less.
10. Non availability of labourers for plant protection and harvesting.

Potentials

1. Paddy land which is kept fallow can be brought under cultivation by providing adequate irrigation system.
2. Existing paddy land can be strictly conserved for paddy cultivation.
3. By adopting modern mechanism for the solution of scarcity of labours
4. Maximum revenue is generated from Rubber to raise the economical status.
5. Possibility of additional revenue is generated from Rubber through Apiculture, Intercropping of Banana, and Pineapple etc.

5.4.4. Inference

Wet land converted into garden land , paddy fields being kept fallow, scarcity of labourers, High labour cost, Non availability of quality planting materials, problems of marketing the agricultural commodities non availability of irrigation facilities are the main problems of agricultural sector.

By adopting the future strategies for attaining sufficient measures for increasing the production in crops and economic development in agriculture sector in the planning area.



5.5. Animal Husbandry

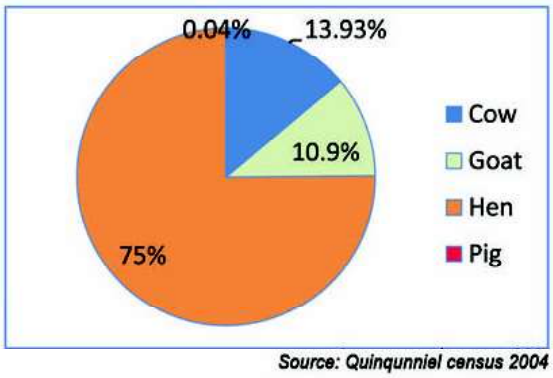
As per the District Plan of Kollam (IDDP), Punalur Town lies in Agro development and Multifunctional zone where in there is scope for intensive animal husbandry activities. However data from Punalur shows that animal husbandry sector is not a promising sector here.

As per 18th quinqunniel census 2008 there are 1008 cows, 1656 goat, 9371 hen and 19 pigs In the Punalur Town. The details are shown in table 5.8. The comparison of cattles in the Town as per 2004 and 2008 quinqunniel census is shown in figures 5.7 and 5.8 respectively.

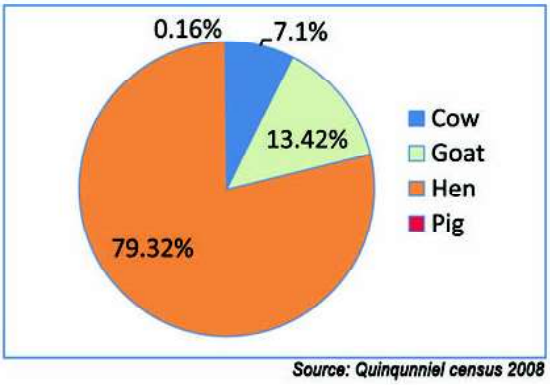
Sl. No	Name of Ward / Place	Live stock population			
		Cow/ Buffalo	Goat	Hen	Pig
1	AaramPunna	48	50	220	0
2	Kanjiramala	38	55	250	0
3	Chalakkode	30	55	176	0
4	Paper Mill	30	48	158	0
5	Nedumkayam	25	45	162	0
6	Sasthamkonam	10	48	288	0
7	Mussavari Kunnu	26	48	310	0
8	Nethaji	25	55	310	0
9	Bharanikavu	25	52	368	0
10	Nellippally	35	60	225	19
11	Vilakkuvattam	42	68	356	0
12	Kallar	26	50	275	0
13	High School	20/3	46	212	0
14	Thumbode	20	58	255	0
15	Kalayanadu	38	65	288	0
16	Valakkode	20	50	224	0
17	Karakkadu	38	48	226	0
18	Thamarapally	38	35	312	0
19	Placherry	45	48	285	0
20	Mylakkal	35	38	234	0
21	Gracing Block	38	45	380	0
22	Kakkode	38	40	308	0
23	Ayikkarakonam	38	55	290	0
24	Kclamkavu	30/3	35	386	0
25	Astamangalam	35/2	40	298	0
26	Maniyar	28/2	32	310	0
27	Paravattam	25	42	363	0
28	Tholikkode	15	35	241	0
29	Power House	18	32	218	0
30	Komalam Kunnu	20	45	245	0
31	College Ward	15	48	318	0
32	Kakhkummukal	28	42	210	0
33	Town Ward	17/2	35	218	0
34	Chemmanthoor	20	50	220	0
35	Pathekkar	29	58	232	0
Total		1008/12	1656	9371	19

Source: Quinqunniel census 2008

Table 5.8. Live stock details



Figures 5.7. Cattles in the Town as per 2004 quinqunniel census



Figures 5.8. Cattles in the Town as per 2008 quinqunniel census

From the figure it can be noticed that the population of cow/buffallow in the Town is decreasing while population of goat is slightly increasing.

5.5.1. Meat Production

Only one slaughter unit is available in Punalur. Details is shown in table 5.9.

Ward No.	Name of Ward/Place	Quantity of production per month (Kg.)
32	Town Ward	24750

Source: Primary survey 2012

Table 5.9. Details of meat production

5.5.2. Milk Production

The milk production in Punalur depends upon dairy farms. There are 4 dairy farms in Punalur. The total quantity of milk production is 445 litres. Details are shown in table 5.10.

Ward No.	Name of Ward/Place	Name of Dairy Farm	No. of Cattle	Quantity of Milk produced per day (specify unit)
II	Kanjiramala	Beena	5	75 Litres
X	Nellippally	Nirmala Giri Ashram Mukkada	10	140 Litres
XXXIII	Town ward	Ismail & Karim	7	100 Litres
XIII	High school	Shaik Ismail, Punalur	7	130 Litres
Total			29	445 Litres

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

Table 5.10. Details of milk production

5.5.3. Problems

- Increasing price of cattle/poultry feeds
- Lesser yield from animals
- Low price of milk/egg/meat for farmers
- Higher rate for curing/controlling diseases
- Unavailability of medical facilities in adjacent Veterinary hospitals
- Insurance problems in insuring animals
- Poor structure of cattle sheds
- Improper disposal of cattle wastes
- Higher price for high breeding animals
- Spreading of viral/bacterial diseases in poultries.
- Lack of proper awareness among the farmers.
- The agricultural crisis badly affect the animal husbandry sector.

5.5.4. Potentials

- Nutritional feeds can be supplied with subsidies for promoting cattle/poultry farming
- Grass farming can be promoted
- Loans/grants can be given to groups/NGOs for starting cattle/poultry farming
- Veterinary hospital can be raised to high level treatment system
- Local bodies/ Veterinary departments can provide fund for building high level cattle sheds/hatcheries
- Cattle feed plants can be started
- Slaughtering units can be well equipped with waste disposal
- Good quality meat production can be achieved
- Insurance policies have to be made friendly for farmers
- Promote milk/egg/meat distribution system



- Price of milk/meat/egg etc has to maintained so as to avoid the lose for farmers
- Provide numeration to farmers as per productivity from their farms
- Supply of high breed animals can be done through local bodies/ Veterinary department
- Small bio gas plants can be started and connections can be given to adjacent houses depending upon quantity of production

5.5.5. Inference

Animal husbandry promoting schemes are necessary to improve milk and meat production. Poultry farms can help women empowerment. Subsidies and other grants from various sectors can attract farmers to start the above units.

Even though Punalur has enough space for developmental activities in Animal husbandry sector, facing lot of problems like Fodder cultivation, Cost of feeds, pricing system etc. The supporting infrastructure facilities including health care, and marketing have to be strengthened, modern abattoirs, meat processing plant etc have to be established for promoting the production of Beef, Cattle and Broiler.

Though animal husbandry sector is not a promising sector in the Town, there is scope for its improvement in tandem with agriculture sector.



Chapter 6
Traffic and Transportation

In this chapter the existing transportation network of Punalur is analysed. The study is based on the report of NATPAC prepared as part of the Master Plan.

6.1. Existing Road Network

The National Highway 744 (Kollam - Shenkottai - Thirumangalam) passes through Punalur Town. The Main Eastern Highway, which is Punalur – Pathanamthitta - Muvattupuzha Road (SH – 08) originates from TB junction and connects Muvattupuzha in Eranakulam district. Punalur – Anchal - Ayoor Road (SH – 48) connects Punalur to Thiruvananthapuram via Anchal and Ayoor. There are a number of other roads leading to places outside as well as within the town (Figure 6.1). They are:

- Punalur –Kariyara Road via Punalur Paper Mill (MDR)
- Chemmanthur to Narikkal road
- Tholikkodu to Maniyar road
- TB Jn to Pappannur road via Aikkarakonam
- Aikkarakonam – Chengulam road
- Nellippally to Pathupara road

The Hill Highway (SH-59), the longest state highway in Kerala is passing through Punalur. The Hill Highway starting from Nandarapadvu in Kasaragod district to Parassala in Thiruvananthapuram district, with a length

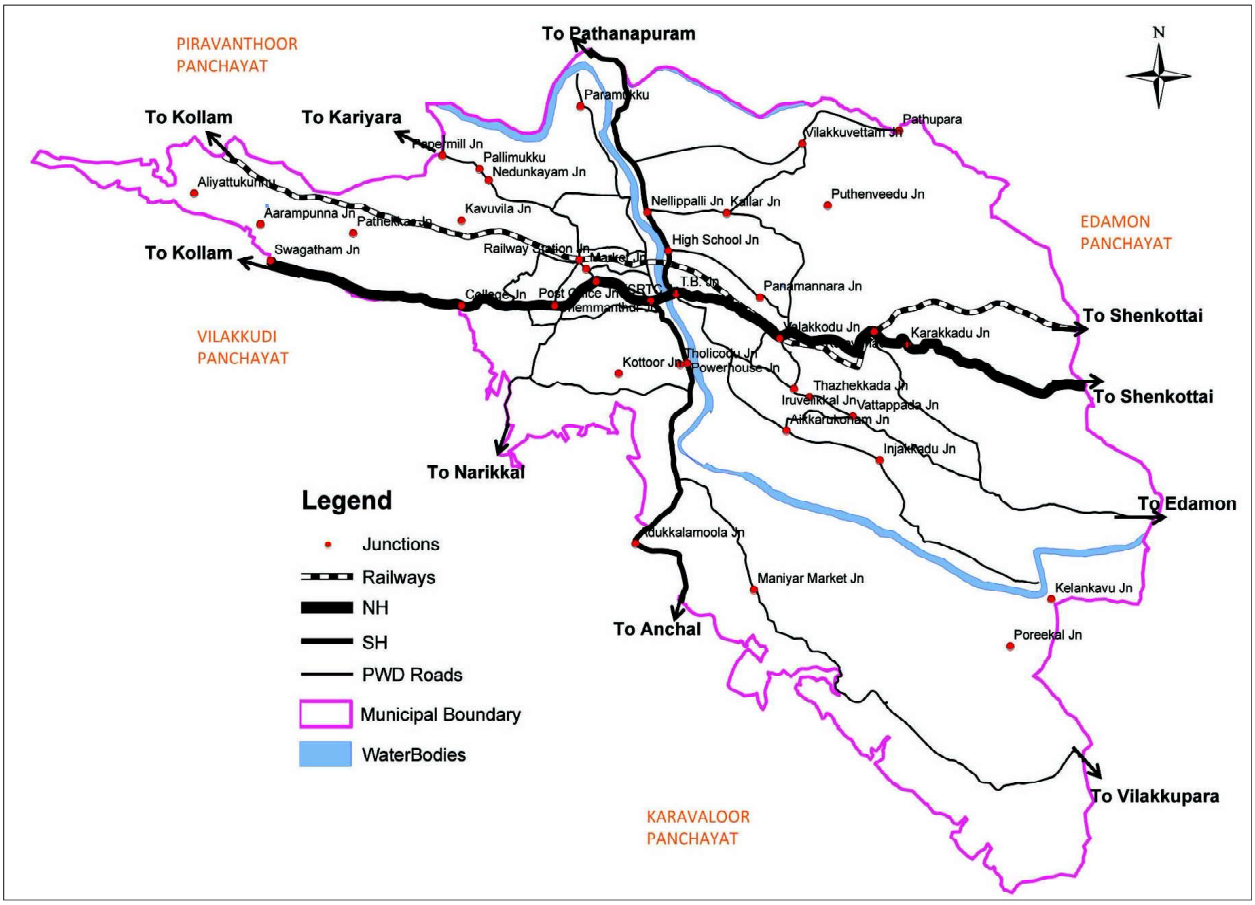


Figure. 6.1. Road network of Punalur town

of 1,332 km is traversing through the study region.

6.2. Transport Terminals

6.2.1. Bus Terminals

KSRTC bus terminal: Punalur town has a KSRTC Bus Station at the intersecting point of NH 744 and SH 48. The bus station handles both long distance and mofussil services operated by KSRTC from various depots across the State. The bus terminal needs to be designed properly to regulate the entry and exit of buses so that multiple conflict points on the Punalur-Anchal road are minimized. It is also suggested that adequate passenger amenities and proper boarding/ alighting facilities are provided at the bus station.

Private bus stand: Private bus stand is located on NH 744 near Chemmanthoor junction from where private buses are operated to various destinations like Kottarakkara, Kariyara, Anchal, Narikkal, Maniyar, Edaman etc.

6.3. Bottlenecks and Missing links

Intersections are the bottleneck locations that hamper the free flow of traffic. Therefore there is a need to design the intersections for streamlining traffic flow and minimizing conflict points. The following intersections in Punalur town need to be taken up for detailed design considering the existing traffic flow and the need for future road widening (fig 6.2).

On NH 744

(i) Valakkode Jn
(ii) TB Jn
(iii) KSRTC Jn
(iv) Post Office Jn
(v) Chemmanthoor
(vi) College Jn

On Pathanapuram road

(i) High school Jn

On Paper Mill road

(i) Market Jn

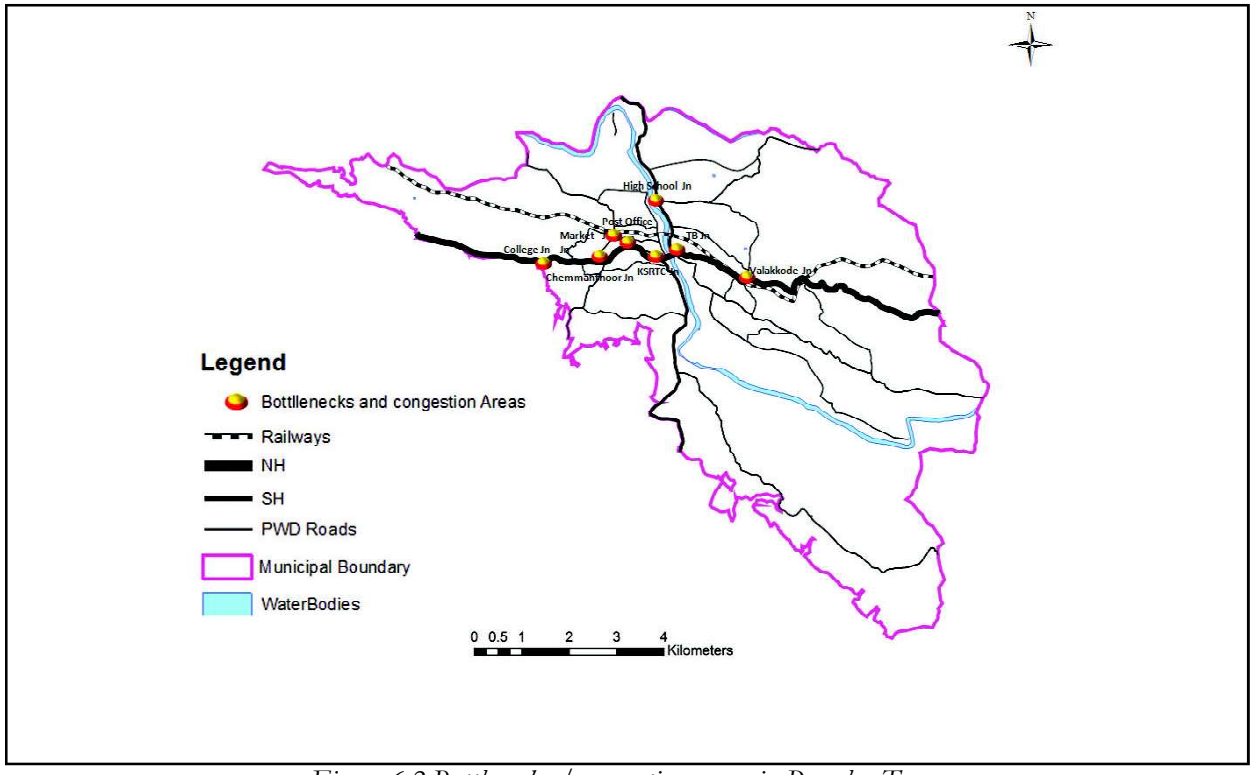


Figure 6.2.Bottlenecks / congestion areas in Punalur Town

6.4. Punalur Railway Station

Punalur railway station lies on the new broad gauge line of Kollam-Shenkottai which further connects to other railway stations in the upcountry. At present, Kollam -Thambaram tri weekly Express train is operated in addition to other passenger train. Express train services may be operated to be from Kollam to places like Chennai, Madurai and Thuthukudi in Tamil Nadu. Punalur is now connecting to Kollam, Madhura,Thambaram, Kanyakumari and Guruvayur by passenger trains.

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

Based on the same, it is estimated that about 950 passengers had originated from Punalur railway station in a normal working day.

6.5. Volume and Capacity Utilization on Important Roads

6.5.1. Traffic volume on major roads

Traffic volume and its composition was collected for selected roads. Table 6.1 gives daily traffic volume observed on major road links within Punalur Municipal area. The base year daily traffic volume on the existing road network of Punalur town is indicatively presented in figure 6.3.

At central area of the town, as high as 21,839 PCU of daily traffic volume was observed on the road section between Hospital road junction and KSRTC junction which forms a part of Kollam-Thirumangalam National highway. In other stretches of the town, the traffic volume varied

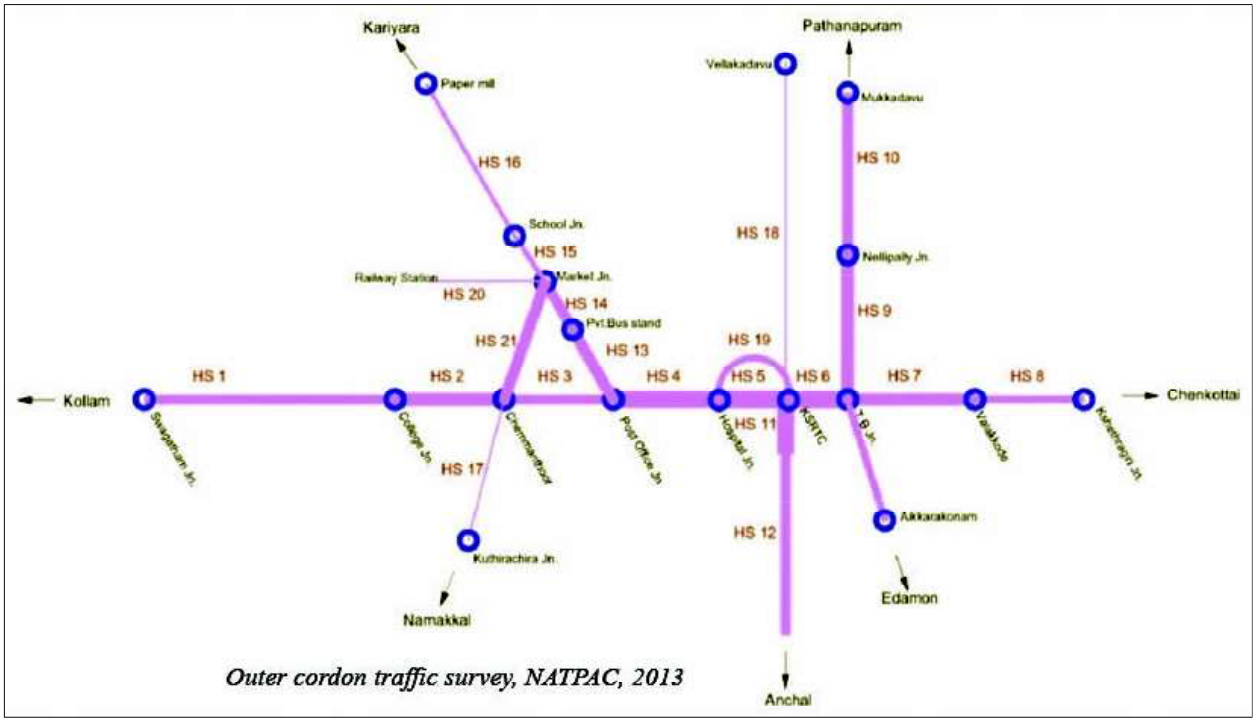


Figure 6.3. Traffic flow pattern in Punalur Town



Sl. No.	Type of vehicle	Chudukatta on Anchal Road			Kshetragiri on Chenkottai road			Paper Mill on Kariyara road			Mukkadavu on Pathanapuram road			Pine Apple Jn on Kollam road		
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
1	KSRTC Bus	97	117	214	82	91	173	11	16	27	155	168	322	215	178	393
2	Private bus	231	249	480	27	3	30	5	5	11	183	201	384	2	1	3
3	Other buses	18	55	73	43	22	65	-	-	-	25	68	93	30	19	49
4	Mini-bus/tempo	46	342	388	137	55	192	-	6	6	71	194	266	8	23	31
5	Car/van/jeep	1344	1545	2889	691	804	1495	536	360	896	1218	2072	3290	1546	1219	2765
6	Pass. Auto	642	1135	1778	313	288	601	1413	1119	2532	613	1451	2065	735	509	1244
7	Two-wheeler	1787	1909	3696	727	769	1495	1267	791	2058	1246	2132	3378	1989	1623	3612
8	MAT	14	57	71	183	367	550	-	4	4	113	167	280	166	273	439
9	Truck	86	92	178	153	332	485	13	9	22	156	245	401	137	203	340
10	Mini-truck/tempo	232	219	451	104	214	318	139	72	211	178	271	448	128	199	327
11	Goods auto	89	231	321	67	52	119	55	101	156	71	163	234	82	55	137
12	Bi-cycle	10	-	10	-	3	3	12	9	21	1	8	10	7	5	12
13	Others	27	168	195	-	-	-	-	-	-	-	5	5	7	5	12

Source: Outer cordon traffic survey, NATPAC, 2013

Table 6.1. Daily traffic volume observed on major road links within Punalur Municipal area.



from 11,028 PCU on the one-way street of Post office Jn-Chemmanthoor Jn stretch to 21,263 PCU on KSRTC Jn-TB Jn stretch. The lowest daily traffic volume of 8,460 PCU was observed on the rural stretch of NH from Vazhakkode to Kshetragiri Jn.

On the Punalur-Anchal State Highway, the traffic volume on KSRTC junction-Vettippuzha bridge section was 20,000 PCU due to the location of KSRTC station and the resultant heavy volume of passenger autos. In the rural section of Punalur-Anchal SH, the traffic volume was only 12,422 PCU/ day.

On the state highway, the traffic volume varies from 13250 PCU (for the stretch between Nellippally junction - Mukkadavu junction) to 15794 PC (for TB junction - Nellippally junction).

On the Kariyara road, the road stretch between Market Junction and Post Office carried

Sl. No.	Name of road section	Length (Kms)	Capacity	Volume	VC ratio
1. KOLLAM-THIRUMANGALAM NATTONAL HIGHWAY					
1	Swagatha Mukku Jn - College Jn	2.6	15000	10892	0.73
2	College Jn - Chemmanthoor Jn	0.6	15000	15018	1
3	Chemmanthoor Jn - Post Office Jn	0.5	15000	11028	0.74
4	Post Office Jn - Hospital Road Jn	0.3	15000	20538	1.37
5	Hospital Road Jn - KSRTC Jn	0.4	15000	21839	1.46
6	KSRTC Jn - TB Jn	0.3	15000	21263	1.42
7	TB Jn - Vazhakkode	1.3	15000	14072	0.94
8	Vazhakkode - Kshetragiri Jn	3.8	15000	8460	0.56
II. PUNALOOR-MOOVATTUPUZHA STATE HIGHWAY					
9	TB Jn - Nellippally Jn	1.1	15000	15794	1.05
10	Nellippally Jn - Mukkadavu Jn	1.7	15000	13250	0.88
III. PUNALOOR-ANCHAL ROAD					
11	KSRTC Jn - Vettippuzha Bridge	0.2	15000	20000	1.33
12	Vettippuzha Bridge - Chudukatta	3.3	15000	12422	0.83
IV. KARIYARA ROAD					
13	Post Office Jn - Pvt Bus stand	0.15	12000	14093	1.17
14	Pvt Bus stand - Market Jn	0.15	12000	12789	1.07
15	Market Jn - School Jn	0.2	12000	6457	0.54
16	School Jn - Paper Mill	2.1	12000	5147	0.43
V. NARIKKAL ROAD					
17	Chemmanthoor Jn - Kuthirachira Jn	1.3	9000	2635	0.29
VI. OTHER ROADS					
18	Sivan Kovil road	1	9000	2295	0.26
19	Hospital road	0.4	9000	7864	0.87
20	Railway Station road	0.4	9000	2785	0.31
21	Chemmanthoor Jn - Market Jn	0.6	9000	13828	1.54
22	TB Jn - Aikkarakonam	1	9000	4380	0.49

Outer cordon traffic survey, NATPAC, 2013

Table 6.2. Volume-capacity ratio of major road links in Punalur Municipal area



traffic ranging between 12,789 PCU and 14,093 PCU on account of the location of market and private bus station and one-way regulation in force. Beyond Market Junction, the traffic volume hovered around 5,500 PCU.

Traffic volume of 13,828 PCU was observed on the Chemmanthoor-Market junction road section which is a one-way street. Passenger autos and cars constituted the biggest chunk of motor vehicles plying on this road.

6.5.2. Capacity of Roads

The traffic volumes observed at different road stretches were compared with the capacity of those road sections, estimated based on the road inventory survey, to evaluate the volume-capacity ratios (V/C ratio) of different road sections within the study area

For working out the capacity of different road sections the information compiled during the road inventory survey was compared with the

Sl. No.	Name of road section		Length (Kms)	Time taken (Sec)		Speed (Km/Hr)		Delay	
				With delay	Without delay	With delay	Without delay	Time (Sec)	Cause
	1. KOLLAM-THIRUMANGALAM NATIONAL HIGHWAY								
1	Swagathamukku Jn	College Jn	2.6	239	239	39.16	39.16		
2	College Jn	Chemmanthoor Jn	0.6	57	52	37.89	41.54	5	bus station
3	Chemmanthoor Jn	Post Office Jn	0.5	122	120	14.75	15	2	Parking
4	Post Office Jn	Hosspital Jn	0.3	44	39	24.55	27.69	5	Congestion
5	Hospital Jn	KSRTC Jn	0.4	50	44	28.8	32.73	6	Congestion
6	KSRTC Jn	TB Jn	0.3	40	39	27	27.69	1	Congestion
7	TB Jn	Vazhakkode	1.3	168	146	27.86	32.05	22	Parking, work
8	Vazhakkode	Kshetragiri Jn	3.8	462	450	29.61	30.4	12	Construction work
	II. PUNALOOR-MOOVATTUPUZHA STATE HIGHWAY								
9	TB Jn	Nellippally Jn	1.1	119	117	33.28	33.85	2	Speed breaker
10	Nellippally Jn	Mukkadavu Jn	1.7	138	134	44.35	45.67	4	Pedestrian
	III. PUNALOOR-ANCHAL ROAD								
11	KSRTC Jn	Vettipuzha Bridge	0.2	40	35	18	20.57	5	KSRTC Station
12	Vettipuzha Bridge	Chudukatta	3.3	340	340	34.94	34.94		
	IV. KARIYARA ROAD								
13	Post Office Jn	Pvt Bus stand	0.15	21	21	25.71	25.71		
14	Pvt Bus stand	Market Jn	0.15	18	18	30	30		
15	Market Jn	School Jn	0.2	27	23	26.67	31.3	4	Congestion
16	School Jn	Paper Mill	2.1	199	199	37.99	37.99		
	V. NARIKKAL ROAD								
17	Chemmanthoor Jn	Kuthirachira Jn	1.3	162	159	28.89	29.43	3	Pedestrian
	VI. OTHER ROADS								
18	Sivan Kovil road		1	152	152	23.68	23.68		
19	Hospital road		0.4	93	91	15.48	15.82	2	Parking
20	Railway Station road		0.4	50	50	28.8	28.8		
21	Chemmanthoor Jn	Market Jn	0.6	80	80	27	27		
22	TB Jn	Aikkarakonam	1	150	150	24	24		

Outer cordon traffic survey, NATPAC, 2013

Table 6.3. Speed flow pattern observed along major roads



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 volume capacity ratio of major roads within Punalur Municipal area is given in table 6.2. Many road sections within the study area were over utilized with traffic volume more than their carrying capacity.

The road sections over utilized and having high V/C ratio include:

(i) Chemmanthoor Jn-Market Jn road with v/c ratio of 1.54

(ii) Hospital road Jn-KSRTC Jn road with v/c ratio of 1.46

(iii) KSRTC Jn-TB Jn road with v/c ratio of 1.42

(iv) Post office Jn-Hospital road Jn road with v/c ratio of 1.37

(v) KSRTC Jn-Vettippuzha Jn with v/c ratio of 1.33

(vi) Post office Jn-Private bus stand with v/c ratio of 1.17

(vii) Pvt Bus stand-Market Jn road with v/c ratio of 1.07

(viii) TB Jn-Nellippally Jn road with v/c ratio of 1.05

It could be easily observed that most of these road sections are located within the CBD area of the town. All the road stretches in the rural sections were comparatively less utilized with respect to their carrying capacity.

6.6. Speed and Delay Studies

Speed and delay survey was conducted on all the homogenous sections in Punalur town. Test runs were carried out on these sections during peak and off-peak period of the day to determine average travel speed of traffic (table 6.3).

As part of the study, speed flow survey was carried out along 22.4 Km of road stretches within the Punalur Municipal area. The road sections included parts of National Highway and two State Highways and district roads in the CBD area. The survey was carried out by '*moving-car-observer*' method to get the maximum accuracy. Trial runs were made during peak and off-peak hours to obtain the average journey speed of the existing road network. The major delay on the network along with duration and causes of delay were also recorded. The speed flow pattern observed along major roads is given in table 6.3.

Sl. No.	Location	Direction	Peak Hour	Up	Down	Total
1	KSRTC Jn	Anchal arm	11.00-12.00	850	731	1581
		Shenkottai arm	08.45-09.45	1078	717	1795
		Kollam arm	16.15-17.15	768	954	1722
2	Market Jn	Post Office arm	16.15 - 17.15	583	516	1099
		Chemmanthoor arm	18.15 - 19.15	95	109	204
3	Post Office Jn	Chemmanthoor arm	12.00-13.00	594	655	1249
		KSRTC arm	12.15-13-15	445	458	903
4	TB JN	Pathanapuram arm	15.00-16.00	23	24	47
		Shenkottai arm	12.15-13.15	43	43	86
5	Chemmanthoor	Market Jn arm	09.30-10.30	117	170	287

Outer cordon traffic survey, NATPAC, 2013

Table 6.4. Peak hour pedestrian cross movements at major locations in Punalur town

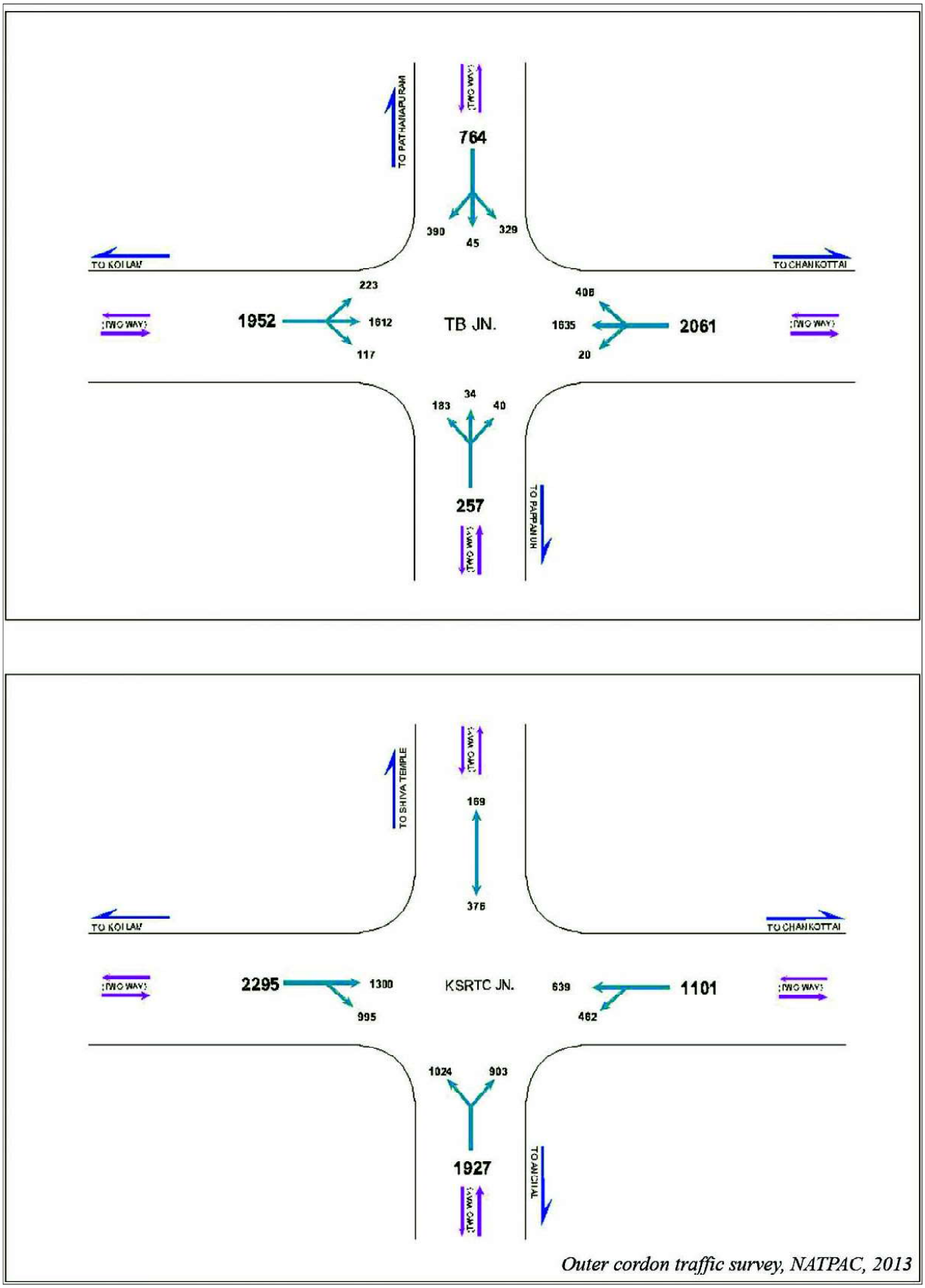


Figure 6.4. Peak hour traffic flow in PCU at TB junction and KSRTC junction in Punalur Town

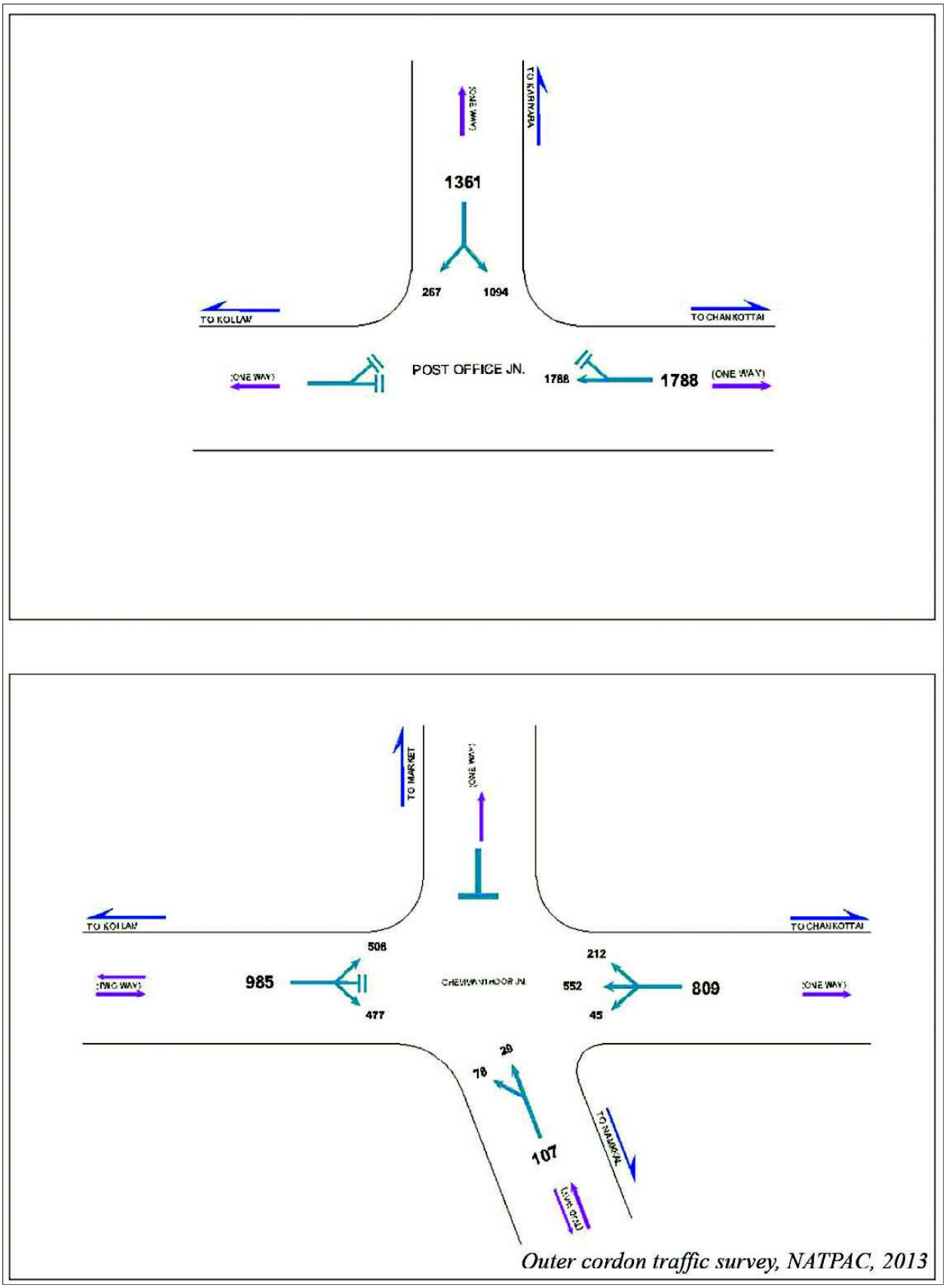


Figure 6.5. Peak hour traffic flow in PCU at Post Office junction and Chemmanthoor junction in Punalur Town

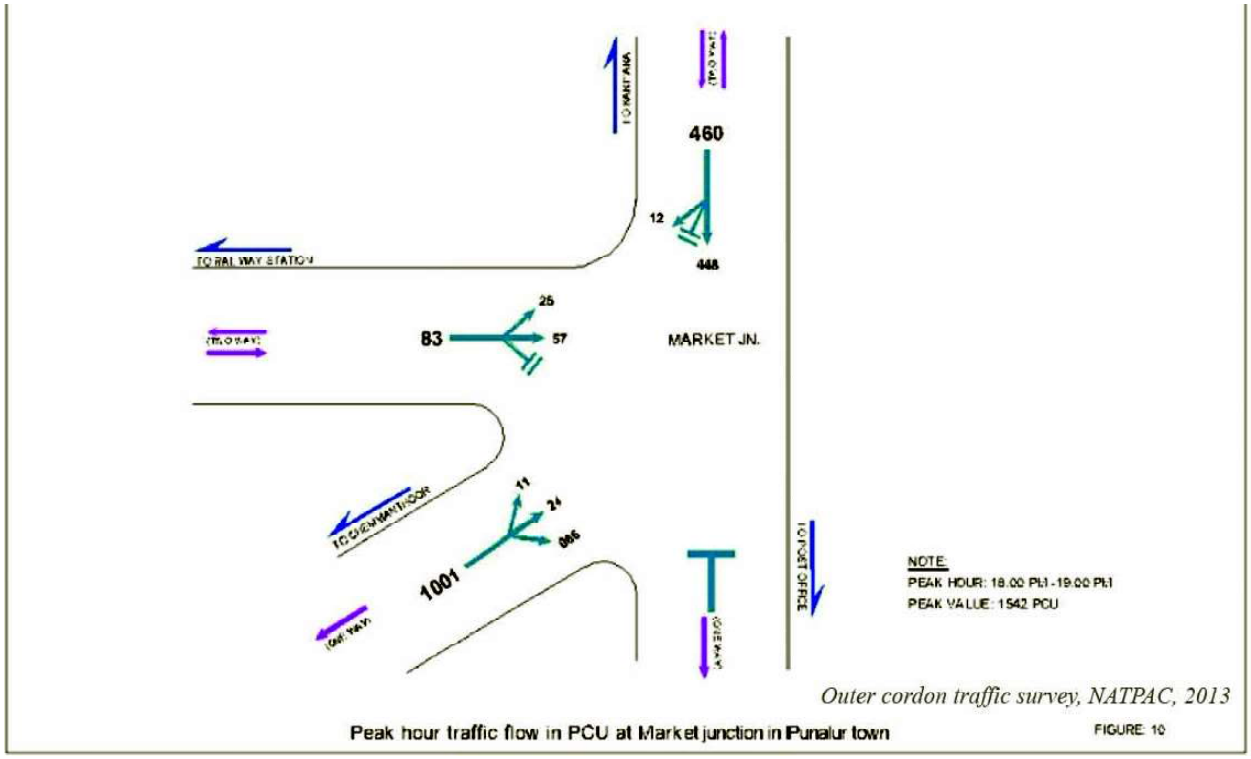


Figure 6.6. Peak hour traffic flow in PCU at Market junction in Punalur Town

6.7. Pedestrian Survey

Pedestrian volume survey was carried out for a period of four to eight hours during the peak periods. Locations selected for pedestrian survey are given below.

(i) T B Jn - Four arms

(ii) KSRTC Jn Three arms

(iii) Post Office Jn - Three arms

(iv) Chemmanthur Jn - Four arms

An analysis of the volume of pedestrian traffic at major traffic generating areas was carried out to ascertain the interference of pedestrian traffic on selected roads. Table 6.4 gives the peak hour pedestrian cross movements at selected locations in Punalur town. As high as 5,100 cross movements were observed around KSRTC junction area, followed by 2,100 pedestrian crossings around Post office junction area and 1,300 crossings at Market junction area.

6.8. O D Survey

Origin-destination survey was conducted at five major outer cordon points leading to the study area and Punalur railway station. The survey was carried out for a duration ranging between eight and 24 hours. Figure 6.4, 6.5 and 6.6 shows the location of outer cordon survey points selected for the origin – destination survey. Selected outer-cordon survey locations are given hereunder:

Sl. No.	Mode	No. of vehicles	Quantity (tonnes)	Per cent
1	Truck	1793	11087	77.06
2	Mini-truck	1390	2401	16.69
3	Goods auto	853	900	6.25
4	Total	4036	14388	100

Outer cordon traffic survey, NATPAC, 2013

Table 6.5. Mode-wise distribution of inter-city goods traffic in Punalur town



(i) Chudukatta Jn on Punalur – Anchal Road (SH 48)

(ii) Kshetragiri Jn on Punalur-Shenkottai Road on NH 744

(iii) Punalur Paper Mill on Punalur-Kariyara Road

(iv) Mukkadavu Jn on Punalur – Pathanapuram Road (SH 8)

(v) Pineapple Jn on Punalur - Kollam Road on NH 744

A total of 3,528 vehicles of different categories were interviewed as part of OD survey which constituted nine per cent of the total traffic passing through the survey locations. At Pine Apple Jn on Kollam side, as many as 11 per cent of vehicles were interviewed, followed by about 10.9 per cent of the total vehicles at Kshetragiri on Shenkottai side, eight per cent each on Paper mill road and Anchal road respectively.

The sample size of passengers interviewed at Punalur railway station was 21.6 per cent in the case of alighting passengers and 15.9 per cent in the case of boarding passengers

6.9. Modal Split

Modal split of Goods Traffic

Inter-city goods transportation in the study region has been handled by a fleet of goods carriers consisting of 1,793 trucks, 1,390 mini-trucks/ tempos and 853 autorikshaws. The quantum of goods transported through Punalur town accounted for 14,388 metric tons, of which the share of trucks formed a whopping 77 %, followed distantly by mini-trucks 17% (2,401 MT) and goods autos by 6% (900 MT). Mode-wise quantum of inter-city goods transported through Punalur town is given in table 6.5.

6.10. Parking Survey

Parking accumulation and duration survey

Sl. No.	Name of road section	<30	30-60	60-90	90-120	120-150	>150	Total
1	Punalur-Anchal road: KSRTC Jn-Vettippuzha bridge	76	12	10	2	1	-	100
2	Punalur-Anchal road: Vettippuzha to Tholikkode	75	15	4	3	1	2	100
3	NH-744:Shenkottai side to TB Jn	56	27	6	3	5	3	100
4	NH-744: TB Jn	63	17	7	7	5	1	100
5	NH-744: TB Jn-KSRTC Jn	69	18	2	6	2	1	100
6	NH-744: KSRTC Jn-Post Office Jn	76	16	7	1	1	-	100
7	NH-744: Post Office Jn-Chemmanthoor Jn	78	14	6	1	1	1	100
8	Chemmanthoor Jn-Market Jn	73	16	5	3	1	2	100
9	Market Jn to Post Office Jn	66	18	10	4	1	1	100
10	Hospital road	61	16	14	8	-	-	100
Total		70	17	7	3	2	1	100

Outer cordon traffic survey, NATPAC, 2013

Table 6.6. Percentage distribution of parked vehicles according to parking duration in Punalur town

were carried out at all the major road stretches where the parking accumulations were found to be high. The survey was carried out for a period of four to eight hours during the peak periods. The registration plate method was used to collect the data on parking duration and accumulation of all categories of vehicles. The major road stretches selected for parking survey is given below:

(i) NH 744: TB Jn to Shenkottai side

(ii) NH 744: TB Jn-Suspension bridge

(iii) NH 744: Suspension Bridge to KSRTC Jn

Parking surveys were carried out on major road sections of Punalur town to obtain the peak parking demand and parking duration of vehicles on these road sections.

6.11. Parking accumulation

Demand for parking of vehicles along major roads and intersections within the study area was analyzed to ascertain the accumulation of parked vehicles on these road sections. Table 6.6 gives the peak time parking demand on different road sections and intersections within the study area.

The NH road section running through the town area accommodated the maximum number of 323 vehicles consisting of 51 vehicles along Shenkottai arm of TB junction, 46 vehicles within TB junction area, 45 between Suspension bridge and KSRTC Jn, 87 vehicles between KSRTC Jn and Post office Jn and 94 vehicles between Post office Jn and Chemmanthoor Jn.

While Pathanapuram road did not have much parking activities, Anchal road from KSRTC Jn to Vettippuzha Bridge and beyond accommodated 149 vehicles inclusive of 60 two wheelers and 50 cars/vans/jeeps.

The one-way street of Chemmanthoor Jn to Market Jn had 71 vehicles parked on its sides comprising mostly of cars and autos. Similarly, the one-way street from Market Jn to Post office Jn had to put up with 105 vehicles consisting mostly of autos and two wheelers.

Duration of Parking

An analysis of duration of parking of vehicles at various locations has been carried out to identify the short and long term parking demand. Table 6.8 gives the percentage distribution of parked vehicles at major intersections and road stretches within the study area according to duration of parking.

It could be found that more than 70 per cent of the vehicles were parked for less than 30 minutes. A little more than 17 per cent of the vehicles were parked for duration of 30-60 minutes and more than seven per cent of vehicles for duration of 60-90 minutes. Negligible quantum of vehicles was found parked for duration exceeding 90 minutes.

6.12. Issues and Potentials

Issues

1. In the central area of the Town there is acute congestion leading to chaotic traffic flow.
2. Haphazard parking of the vehicle where parking facilities are not provided.
3. Off loading of goods on road side, uncontrolled loading /unloading operation of trucks/lorrys.
4. The right of way occupied by street venders.
5. Narrow roads in the central part of the Town.
6. The KSRTC bus station, private bus station and railway station are located in three different parts of the town.



Chapter 7
Water Supply

In the chapter the availability of water, treatment facilities and nature of scarcity of water are detailed out. As per the socio - economic data, major source of drinking water (65%) is the private wells in each house.

7.1. Distribution System

The distribution network by Kerala Water Authority (KWA) has an effective role in distribution of water. As per the secondary data the length of the pipe network is 200 Km in Punalur. Number of pipe connections are 4600 and total quantity supplied / day is 4.2 MLD. The source of water is Kallada River. The details of distribution system is shown in table 7.1. The coverage of piped water supply is only 40% as per Water Authority.

dried in summer season. Due to the geographical peculiarity of Punalur hilly terrain, runoff is very high. And also Punalur experiences the highest temperature. The details regarding wardwise scarcity of water is shown figure 7.1. Extreme scar-

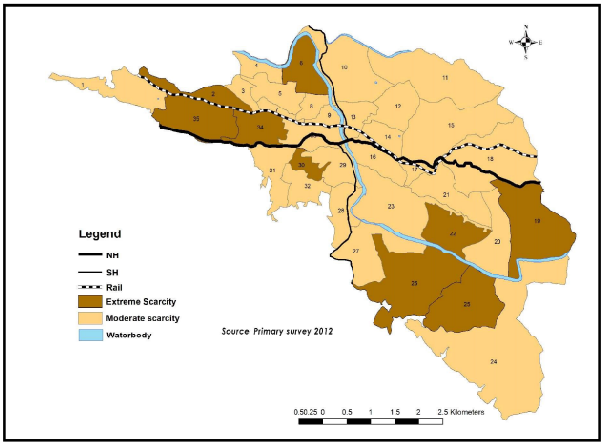


Figure 7.1. Water scarcity in Punalur Town

Sl. No	Net work	Sources	Area of coverage (wards)	Number of houses covered/ No. of connections	No and Capacity (ML)of OH tank	Total Quantity supplied /day	Quality of water (properly treated/only chlorination/ no treatment)
1	200KM	300 mm Pipe to 40mm pvl pipelines	35 wards	4600	18,00,000 (Eighteen lakhs litres)	4.20 MLD	Properly treated

Table 7.1. Details of the distribution network

7.2. Treatment Facilities

There is one water treatment plant of KWA, working in High school junction ward. The capacity of this system is 9 MLD. Rapid Sand Filter is used for purifying water.

7.3. Scarcity

Contrary to the meaning of the place name 'place of water', 43% of the wells in Punalur get

city is noted in 9 wards, all other wards have moderate scarcity. Water scarcity as per socio economic survey is shown in figure 7.2. From the figure it can be observed that 29% of people in Punalur Town experiences water scarcity.

In Punalur Town, the total requirement of drinking water is around 54 lakh liter per day. It has 460 public stand posts in the different parts

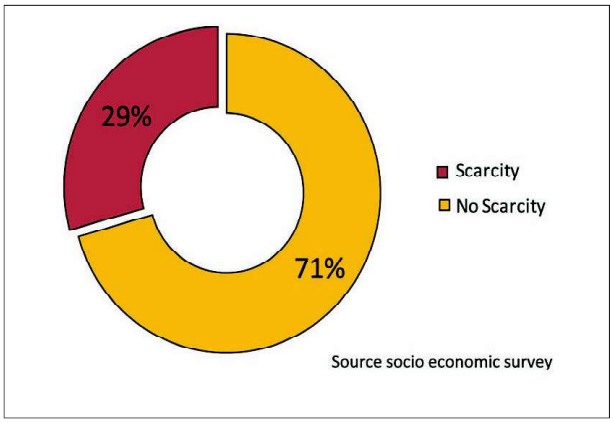


Figure 7.2. Water scarcity in Punalur

of the Town; most of them have very irregular water distribution system. The geographical peculiarities and present positions of the drainage systems the rainfalls the drainages get clogged and damaged. The conditions of existing rivers as natural drains for storm water is deteriorating, dumping of domestic waste from markets, hotels, sewage overflow to rivers unscientific and discriminate methods of sand mining causing problems.

7.4. Inference

Piped water supply covers only below 50% of the Punalur Municipal area. The Town has a number of traditional water sources, which have been neglected recently resulted the degradation of traditional water sources and environment.



Chapter 8
Sanitation

This chapter covers the solid waste collection and treatment facilities in the town. A drainage and sewerage system is absent in the town.

8.1. Generation and Collection

The waste generation in Punalur Town is assessed as 12 tones/ day and per capita waste generation is 212 gm. The waste collection is limited to the town wards (10 wards). The waste is collected mainly from commercial establishments, shops, markets, houses near the town. The details are shown in table 8.1. Street cleaning areas in Punalur town is shown in figure 8.1.

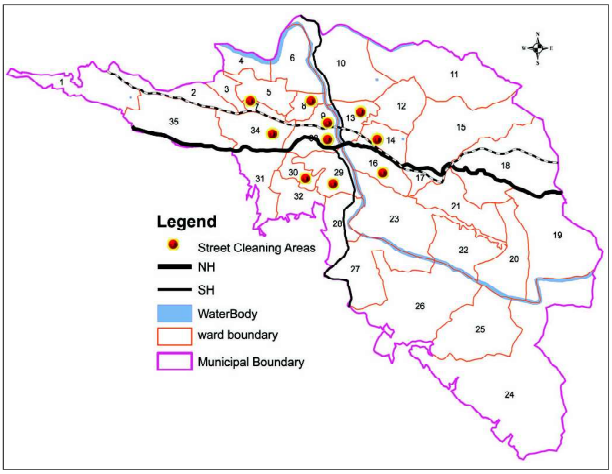


Figure 8.1.Street cleaning areas in Punalur town

Market Waste

There are three markets in the Punalur municipal area. The main market Sree Rama Varmapuram situated in the town area and other two are named Kalayanad and Maniyar. The markets alone generate 4.25 tones of waste. The details of market waste is shown in table 8.2.

source		No. of units	Quantity 12.5 Tones/day
Domestic waste		47235	3 tones
Commercial waste (shops,		1180	5.5 tones
Institutional waste (offices, schools		14	1 tone
Hotels and restaurants		41	1.5 tone
Slaughter houses	Authorized	1	0.5 tone
	Unauthorized	Nil	Nil
Chicken stalls		10	0.25 tones
Hospitals and healthcare		10	0.25 tones
Drain cleanings			0.25 tones
Road sweepings			0.25 tones
Construction material / debris			Nil
Others (like peeling sheds, cow sheds, piggery units etc)			Nil

Table 8.1. Details of waste generation in Punalur Town

Vegetables		Fruits		Meats		Fish	
No. of units	Quantity (Tones/day)	No. of units	Quantity (Tones/day)	No. of units	Quantity (Tones/day)	No. of units	Quantity (Tones/day)
32	3	8	0.5	6	0.5	8	0.25

Table 8.2. Details of market waste in Punalur Town

There is no scientifically designed secondary storage system existing in Punalur. The present practice is heaping of waste in the street and municipal workers collect them from designated places.

In the solid waste movement process 5 officers and 27 sanitary workers are engaged.

Health Supervisor – 1

Health Inspector – 2

Jr. Health Inspector – 3

Sanitary workers – 21

Driver – 1

Temporary workers – 8

Total – 36

8.1.2. Existing Treatment Facilities

There is no processing or treatment of solid waste in Punalur. Whatever quantity collected is dumped in the municipal dumping yard at Plachery at 7 KM away from the town area. Town possess about 2.5 acre of land as dumping site at Plachery.

8.1.3. Problems

- Waste disposal without segregation
- Disposal on busy streets, roads, parks etc
- Dumping of waste in water bodies

8.1.4. Potentials

- Placing different colour of buckets for collecting bio-degradable, non bio-degradable and hazardous materials
- Post contingent employs for segregation of waste
- Treated manure can be distributed to agricultural farmers at low cost
- Small remuneration can be collected from houses for collecting the wastes
- Availability of land for waste disposal
- Eastern part of the Town has high plot size and then promote in-site solid waste management system

8.1.5. Inference

The analysis shows that the major sources of waste in Punalur are house holds, markets, commercial establishments, hotels, restaurants and hospitals. The existing waste disposal system is inadequate in the town. The segregation of dry and wet waste at the sources and centralized system of disposals is needed. The detailed project report of UIDSSMT Schemes Punalur will resolve the issue.

8.2. Sewarage System

There is no sewerage system existing in Punalur Town. Most of the people depends on

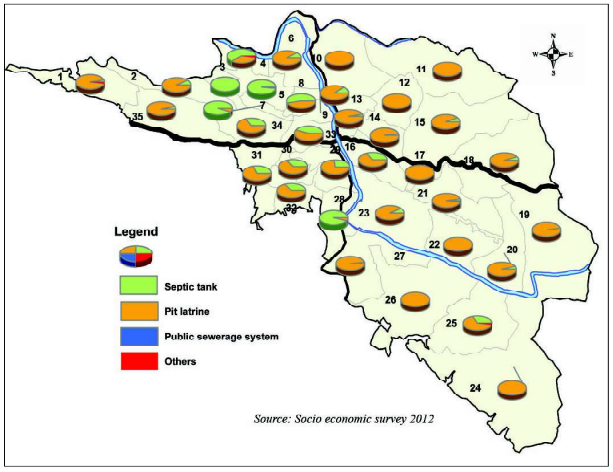


Figure 8.2. Wardwise distribution of sanitation facilities used by the people in Punalur Town

pit latrine and septic tank. According to socio economic survey 2012, people near town area largely depends on septic tank and most of the people in the Town (75.73%) especially in eastern area largely depends on pit latrine. Small percentage of people in wards 25, 4 depends on others for sanitary disposal (figure 8.2)

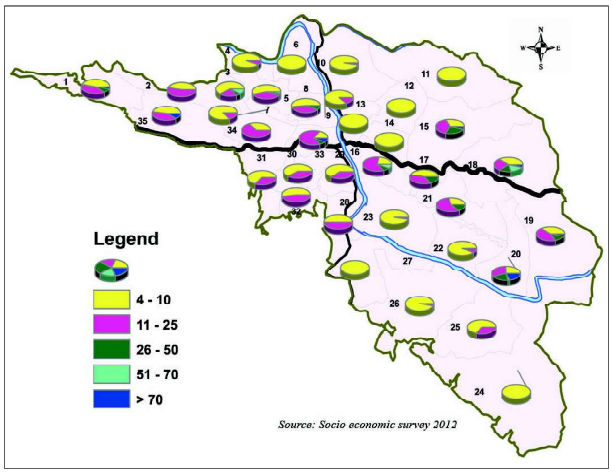


Figure 8.3. Wardwise details of plot size in Punalur Town

Also on analysing the plot size in Punalur Town based on socio economic survey, 67% of people having plot size between 4 to 10 cents (figure 8.3)

8.2.1. Inference

Punalur is not having a drainage system and sewerage system. A sewerage system is needed at least for the core of the town. The steepy terrain helps to drain the run off naturally. The solid waste collection and treatment facility is inadequate for the town.



Chapter 9
Energy

This chapter gives a summary of the connection details, consumption details and distribution network in Punalur Town.

9.1. Connection Details

There are about 19025 electric connection in the Town. Out of the total 19025 connections 16044 connections (84%) are of domestic use. The details are shown in table 9.1 and figure 9.1.

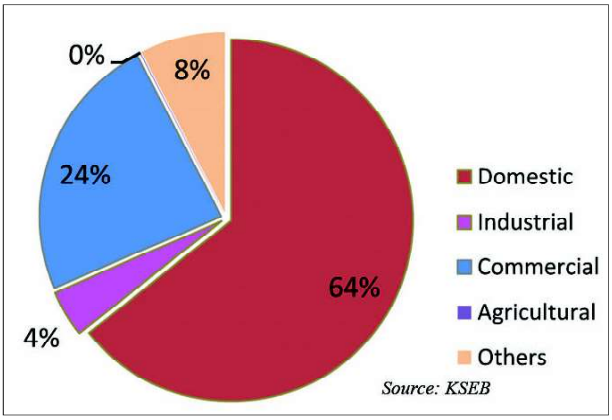


Figure 9.2. Power consumption details

Sl. No	Total Number of Connections	Category wise break – No of connections				
		Domestic	Industrial	Commercial	Agricultural	Others
1	19025	16044	168	2788	15	10

Table 9.1. Details of power connections

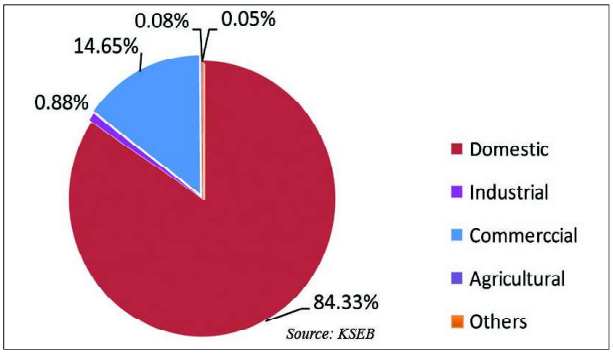


Figure 9.1. Details of power connections

9.2. Consumption Details

The consumption of electricity is 29,90,828 KWH. The break up of which is as shown in table 9.2 and figure 9.2.

From the figure it is observed that 64% of the total consumption is used for domestic purpose, 24% for commercial, 4% for industrial and 8% for other purposes.

According to socio economic survey it is found that the percentage of unelectrified houses in the Town is 0.71.

9.3. Distribution Network

Punalur Town is under the Punalur Electrical Sub Division. Distribution net work details within the Town - showing the Transmission line, Distribution Line and Supply line including generating station, substation, high tension lines(66KV and above) etc are shown in figure 9.3. From the figure it is found that 83 numbers of transformers are there in Punalur. There are 8 feeder points.

Sl. No	Total Consumption (KWH)	Category wise breakup of – Power consumption(KWH)				
		Domestic	Industrial	Commercial	Agricultural	Others
1	2990828	1923971	124832	713276	1984	226765

Table 9.2. Power consumption details

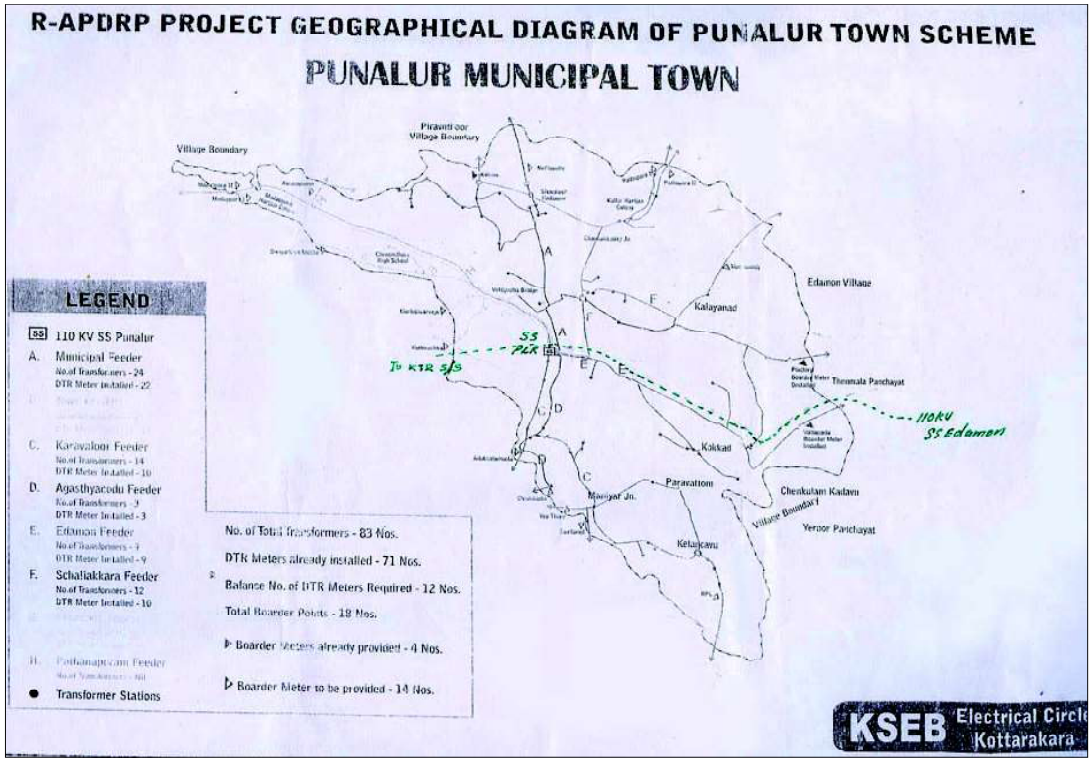


Figure 9.3. Distribution network details within the town (66 KV and above)

They are municipal feeder, town feeder, Karavalur feeder, Agasthyacode feeder, Edamon feeder, Schaliakkara feeder, Pathanapuram feeder and Kunnikode feeder.

9.4. Problems

- Frequent failure of power supply due to dripping caused by falling of coconut leaves, trees or its parts etc.
- Street lights are not working properly due to the absence of proper maintanance.



Chapter 10
Education

Punalur has many Government, aided and unaided schools which play an active role in the social development of people in Punalur. In this chapter, analysis of educational institutions, level of education and the problems faced in educational sector in Punalur Town are detailed.

10.1. Educational Institutions

10.1.1. Institutions up to Higher Secondary Level

The category wise number of educational institutions in Punalur Town is given in table 10.1 and their locations are given in figure 10.1.

Sl. No.	Type of Educational Institution	No. of Schools
1	Higher secondary school	7
2	High School	12
3	Vocational higher secondary school	1
4	U.P. School	15
5	L.P. Schools	11
6	Prc primary Schools	20
7	Anganwadi	74

Source: Socio-Economic Survey

Table 10.1. Number of institutions

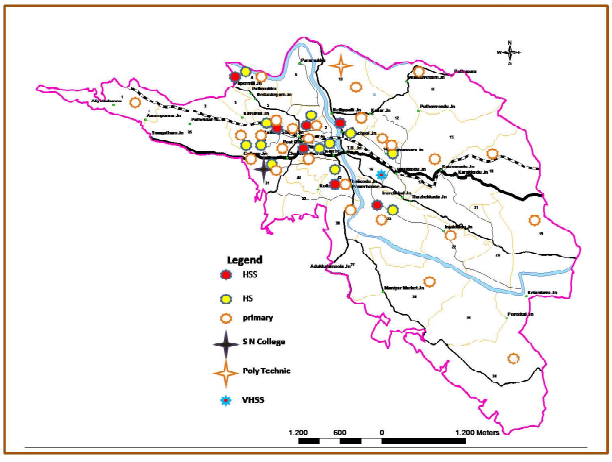


Figure 10.1. Ward wise distribution of schools

From the figure it can be seen that Pre-primary schools are situated in all parts of the Town. High schools and higher secondary schools are concentrated only in Town Area. One vocational higher secondary schools is in Valakkode ward. The details of schools are shown in table 10.2 and the facilities available in schools are shown in table 10.3. From the table we can see that 7 schools have no play ground and Govt. LPS, Vilakkuvettam has no separate toilets for girls.

10.1.2. Higher and Professional Education

Sree Narayana College is the only arts and science college in Punalur Town .Sree Narayana College was established in 1965 and managed by the Sree Narayana trust, Kollam. The Polytechnic



SN College, Punalur



Govt. Polytechnic, Punalur



Sl. No.	Name of School	Location / Ward	Category	Number of Students					Number of Teachers					Syllabus(UP to HS)	Govt/Aided/Unaided/unrecognized
				Pre-Primary	Primary	HS	HSS	VHSS	Pre-Primary	Primary	HS	HSS	VHSS		
1	PMG UPS, Punalur	Paper mill	2	31	178				1	12				State	Govt.
2	Govt.UPS, Maniyattu	XXIII	2	16	67				1	8				State	Govt.
3	VOUPS, Punalur	Thamarappally	2	54	68				3	5				State	Aided
4	Govt.LPS. Nellippally	Nellippally	2	3	35				1	4				State	Govt.
5	Govt.LPS,Valacode	Plachery	2	20	75				2	5				State	Govt.
6	Govt. LPS, Vilakkuvettom	Vilakuvettom	2	24	50				1	4				State	Govt.
7	Govt.LPS, Punalur	XXXIII	2	12	61				1	6				State	Govt.
8	LPS, Arampuna	Arampuna	2	44	70				2	4				State	Govt.
9	LPS Kelancavu	Kelancavu	2	27	49				2	4				State	Govt.
10	LPS,Tholicodu	Tholicodu	2	87	192				3	5				State	Govt.
11	Govt.LPS, Aickarakonam	Kakodu	2	12	52				1	4				State	Govt.
12	Govt.Town LPS Punalur	Town	2		18					4				State	Govt.
13	Govt.LPS, Kuthirachira	College Ward	2	19	61				1	4				State	Aided
14	St:John's LPS Punalur	Bharanikavu	2	60	503				2	13				State	Aided
15	Chaithanya LPS Valacodu	Kalayanad	2	70	155				2	5				State	UnAided
16	Govt.HSS Punalur	Town	4		180	518	730			7	30	24		State	Govt.
17	HS Chemmanthoor	Chemmanthoor	3		166	214				8	13			State	Aided
18	Boy's HSS Punalur	XIII	4		191	282	488			8	15			State	Aided
19	Girl's HSS, Punalur	XIII	3		285	297				7	16			State	Aided
20	NSVVHSS Valacode	Thumpodu	4		277	411		107		8	24		9	State	Aided
21	St.Goretty HSS Punalur	Bharanikavu	4		729	1016	455			23	36	16		State	Aided
22	SN Trust HSS Punalur	Aickarakonam	4			154	357				8	17		State	Aided
23	Fathima Public School	Chemmanthur	3	60	Primary	48			2	5(1to4), 6(5to7)	7			CBSE	Unaided
24	NPPM English &Malayalam Medium School	,,	2	50	185(1to4) 107(5to7)				2	4 (1to4)				State	Unaided
25	St.Thomas SS&HSS	Town ward	4	120	100 (1to4)	170	200		5	15 (1to7)	10	12		CBSE (1to12) State (HSS)	Unaided
26	Marigiri Vidhya Mandir EM School	College ward	3	56	240(1to4) 180(5to7)	30			2	16	2			ICSE	Unaided
27	TOCH Residential Public School	Paper mill Junction	5	247	269 (1to7)	222	48		6	15 (1to4), 7(1to4)	14	8		CBSE	Unaided
28	Sabarigiri CBSE school	Ward 28 Power house	4	180	712	331	85		6	20	19	7		CBSE	Unaided

* Category: - 1– Preprimary school (LKG, UKG, Day Care), 2 – Primary school (up to 7th), 3 – High School, 4– Higher Secondary School, 5 – Higher secondary with VHSS

Source: Secondary data 2013

Table 10.2 Details of Schools



Sl. No	Name of School	Play Ground	Separate toilets for girl student	Computer Lab	Internet	Water Availability	Source of Water	Conectivity with most Available road
1	PMG UPS, Punalur	No	Yes	Yes	Yes	Yes	Well	Yes
2	Govt. UPS, Maniyattu	No	Yes	Yes	Yes	Yes	Well	Yes
3	V.O. UPS, Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
4	Govt. LPS, Nellippally	Yes	Yes	No	No	Yes	Well	Yes
5	Govt. LPS, Valacode	Yes	Yes	Yes	No	Yes	Well	Yes
6	Govt. LPS. Vilakkuvettom	No	No	Yes	No	Yes	Well	Yes
7	Govt, LPGS, Punalur	Yes	Yes	Yes	No	Yes	Tap water	Yes
8	LPS Arampunna	No	Yes	No	No	No	Pipe line	Yes
9	LPS, Kelancvu	No	Yes	No	No	Yes	Well	Yes
10	LPS, Tholicodu	No	Yes	No	No	Yes	Pipe line	Yes
11	Govt. LPS Aickarakonam	Yes	Yes	No	No	No	Pipe line	Yes
12	Govt. Town LPS, Punalur	Yes	Yes	Yes	No	Yes	Well	Yes
13	Govt. LPS, Kuthirachira	No	No	No	No	Yes	Well	Yes
14	St. John's LPS, Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
15	Chaithanya LPS Punalur	Yes	Yes	Yes	No	Yes	Well	Yes
16	Govt. HSS, Punalur	Yes	Yes	Yes	Yes	Yes	Pipeline	Yes
17	HS Chemmanthoor	Yes	Yes	Yes	Yes	Yes	Well	Yes
18	Boy's HS Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
19	Girl's HS Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
20	NSV VHSS	Yes	Yes	Yes	Yes	Yes	Well	Yes
21	St.Goretty HS Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
22	SN Trust HSS Punalur	Yes	Yes	Yes	Yes	Yes	Well	Yes
23	Fathima PublicSchool	Yes	Yes	Yes	Yes	Yes	Well W.C	2 roads
24	NPPM	Yes	Yes	Yes	Yes	Yes	Well Municpal W.C	2 roads
25	St. Thomas HSS	Yes	Yes	Yes	Yes	Yes	„	2 roads
26	Marigiri School	Yes	Yes	Yes	Yes	Yes	Open Well Municipal WC	3 roads
27	TOCH Public School	Yes	Yes	Yes	Yes	Yes	„	3 roads
28	Sabarigiri CBSE school	Yes	Yes	Yes	Yes	Yes	Open well bore well	2 roads

Source: Secondary data 2013

Table 10.3 Facilities available in schools

Sl. No	Name of College	Location	Whether having PG course (Y/N)	Number of students course wise(UG)				Number of students course wise (PG)				Govt. / Aided/ Unaided
				BA	B.Sc	B.Com	Total	MA	M.Sc	M.Com	Total	
1	S.N. College, Punalur	Chemmanthoor college ward	Y				895				45	Aided

Source: Secondary data 2013

Table 10.4. Details of Arts & Science colleges

Sl. No	Name of College	Details of owner-ship	Location	Specify the professional courses offered	Number of students course wise		
1	Govt. Polytechnic college	Govt.	Nellippally	Diploma in computer, Electronics, Electrical	Diploma in computer – 66	Electronics – 66	Electrical - 66

Table 10.5. Details of Professional colleges

in Govt sector situated in Nellippally is the only professional institution in Punalur . The courses offered in the institutions are Diploma in computer, Electronics and electrical. The details are given in tables 10.4. & 10.5.

The teacher / student ratio in aided, unaided and Government sectors are shown in table 10.6.

10.1.3. Other Institutions

Bethel Bible College established in 1972 is the official theological training institution of the Malayalam District council of the south India Assemblies of god.

10.1.4. Educational Facilities - Comparative Study With Planning Standards

The educational facilities required as per planning standards is given in table 10.7.

Educational institutions are sufficient as per planning standard except professional colleges and ITIs.

Sl. No	Type	Teachers / Student ratio			
		Pre-Primary	Primary	HS	HSS
1	Government	1:30 to 1:35	1:25 to 1:40	1:30 to 1:40	1:30 to 1:35
2	Aided	1:30 to 1:40	1:25 to 1:40	1:30 to 1:35	1:25 to 1:30
3	Unaided	1:25 to 1:30	1:25 to 1:40	1:25 to 1:30	1:25 to 1:30

Source: Secondary data 2013

Table 10.6. Details of teachers / students ratio

Sl. No	Category	Planning Standards
1	High School	1 H.S for 13000 Ppn
2	Higher Secondary School	1 H.S.S with 8 divisions for 13000 Ppn
3	Arts & Science College	1 Arts & Science college for 80000 Ppn
4	Technical Education College	1 Professional college for 2,50,000 Ppn
5	Polytechnic College	1 Polytechnic for 36000 Ppn
6	ITI	1 ITI/ITC for 35000 Ppn
7	TTC	1 TTC for 120000 Ppn

Table 10.7 Planning standards in educational sector

10.2. Status of Education

According to socio economic survey, the percentage of people having different educational qualifications in Punalur Town is shown in figure 10.2. Out of the total educated people 50% have acquired qualification up to high school level, 14% of people are graduates, 2% of people have professional qualification and people having only primary education constitute 31%.

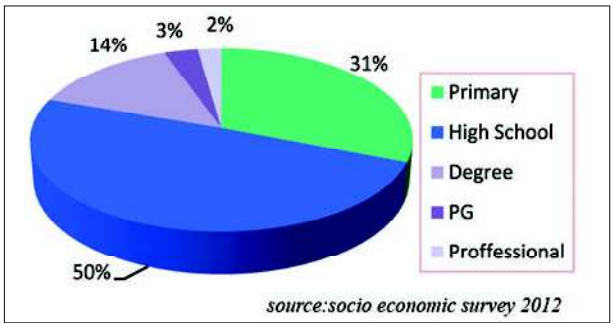


Figure 10.2. Educational Status of Punalur Municipality

Comparison of educational qualifications of Punalur Town with other Towns in the district shows that peoples having higher level of educational qualifications are more in Paravoor Town. Professionals and graduates are less in Punalur Town than other Towns (Figure 10.3).

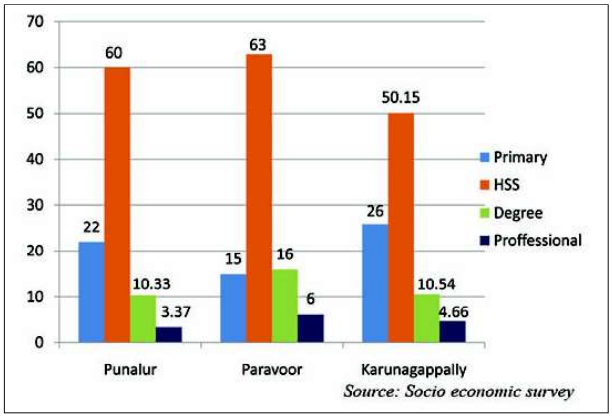


Figure 10.3. Comparison of educational qualification of Punalur Town with other Towns in the district

10.3. Inference

Punalur is having sufficient number of educational facilities up to the higher secondary school level. It is well distributed also. One arts and science college and one polytechnic are the institutions for higher studies. Though the number of educational institutions in the higher study sector are insufficient when the service area of nearby local bodies are also taken into account. The higher educational facilities in the nearby higher order settlements such as Kottarakkara, Anchal, Pathanapuram cater to the requirement of Punalur and surrounding region also.



Chapter 11
Health

11.1. General

Punalur have allopathic, ayurvedic and homeopathic system of medical facilities. The existing health care facilities are studied here.

11.2. Existing Health Care Facilities

The details of existing facilities are shown in below tables 11.1, 11.2, 11.3. The health care units mainly located in central area and peripheral area of the town, 11 nos of allopathic units, 3 nos of Ayurvedic and 3 nos of Homeopathic units are there in the core. Its services covers entire area of the Town. Figure 11.1 showing the spatial distribution of medical facilities in the Town. The spatial distribution of the health facilities shows that they are concentrated in the town centre.

11.3. Incidence of Epidemics

Punalur is prone to all kind of diseases. Diseases pattern shows that it occures in a scattered manner. 100% curing is reported in all transmitted diseases. Respiratory infection including influenza, Viral fever are affected more number of people. Acute Diarrhoel diseases and other diseases are affected to small number of people. Details are shown in below table11. 4.

11.4. Details of Ongoing and Committed Projects Under Health Sector with Agency

Committed Project:

1. Secondary Palliative Care Centre
2. Senior Citizen Home
3. Biogas Plant for waste management

Sl. No	Name of Hospital	Location	Category*	Number of beds	Number of Doctors	Govt/Private /Co-operative society
1	Pranavam Hospital	Vettipuzha	4	60	16	Private
2	Biju Dental Clinic	„	1	0	2	„
3	Sankar Eye Hospital	„	3	20	6	„
4	Childrens Clinic	Power House	1	0	1	„
5	R.Sankar Memorial Hospital	„	3	25	3	„
6	TalukHQ Hospital,Punalur	Town ward	4	144	19	Govt.
7	St.Thomas Hospital,Punalur	Bharanikavu	3	25	7	Private
8	Poyanil Hospital	Chemmathoor	4	150	15	Private
9	ESI dispensary	Punalur	1		4	Govt.
10	Aradhana hospital	Power house	4	35	6	Private
11	Thomas memorial hospital	Elambal	3	12	2	Private

Table 11.1. Allopathic system of hospitals *Source: Local Body, DMO*

Sl. No	Name of Hospital	Location	Category*	Number of beds	Number of Doctors	Govt/ Private / Co-operative society
1	Jeeva Ayurvedic Hospital	Karacode	1	0	1	Private
2	Kottakkal Arya Vaidhyasala	1	1	0	1	Private
3	St. Thomas Hospital, Punalur	Bharanicavu	1	0	1	Govt.

Table 11.2. Ayurvedic system of Hospitals *Source: Local Body, DMO*

Sl. No	Name of Hospital	Location	Category*	Number of beds	Number of Doctors	Govt/ Private/ Co-operative society
1	St.Thomas Hospital Punalur	Bharanicavu	2	5	2	Private
2	Govt. Thaluk Homeo Hospital	Valacode	2	25	4	Govt.
3	Govt.Homeo Dispensary	Railwaygate	1	0	1	Govt.

Table 11.3. Homoeopathic system of Hospitals *Source: Local Body, DMO*

*Category 1 – Clinics only OP, 2 – Hospitals with 24 hrs service, 3 – Hospitals with single Operation theatre, 4 – Hospitals with more than one OT, 5 – Hospitals with advanced diagnostic facilities like CT scan, EEG etc., 6 – Super specialty hospitals, 7 – Referral Hospital (Govt. Sector).

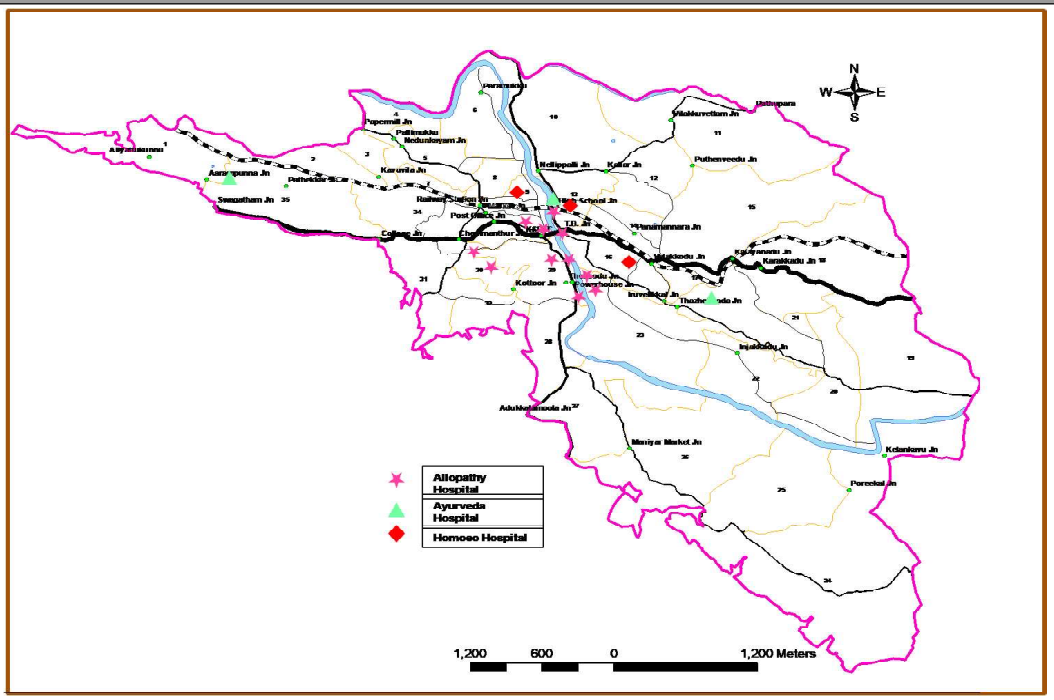


Figure. 11.1. Location of hospitals



Name of the disease	Number of persons affected	% of Curing	Prominent location
Acute Diarrhoel Disease	357	100	Scattered
Acute respiratory infection including Influenza	4429	100	Scattered
Pneumonia	11	100	Scattered
Entric fever	3	100	Scattered
Dengue	11	100	Scattered
Viral Hepatitis A	14	100	Scattered
Viral Hepatitis B	5	100	Scattered
Chickenpox	9	100	Scattered
TB	3	100	Scattered
Viral fever	4166	100	Scattered
Measils	4	100	Scattered
Mumps	8	100	Scattered

Source: Primary survey 2012

Table 11.4. Details of diseases in Punalur

4. Supplementary Sewage Drainage Project
5. Additional Water Supply Scheme (Bore well)
6. Eco-friendly Hospital- Sanctioned
7. Mobile Mortuary

Ongoing Projects

1. Modernization Laboratory & Radiology& Pharmacy
2. New born 1 cu unit
3. Cardiac Unit
4. Dialysis Unit
5. Blood Bank
6. Freezer Unit

11.5. Problems

- Bed facilities available are less in number
- Unavailability of well equipped testing laboratories
- Lack of awareness programmes

11.6. Inference

Taluk head quarters hospital and ESI dispensary are the only allopathic government hospitals in Punalur. Hence government has to develop infrastructure facilities as well as implement well equipped clinic and testing laboratories in the hospitals. In Ayurvedic hospitals beds has to add along with infrastructure facilities.



Chapter 12
Recreational Facilities and Other Civic Amenities

12.1. Recreational facilities

Recreational facilities such as parks and open space, play grounds, theaters are very essential for improving the living standard of people. In this chapter analysis on recreational facilities available in Punalur Town is included.

12.1.1. Parks and Open Spaces

Primary survey shows that very less number of parks and open spaces are available in the Town. There is only one park namely Jawahar Balabhavan park situated in Town ward. The extent of the park is only 20 cent. As per planning norms about open spaces, at the rate of 10-12 m^2/ person should be provided in a Municipal area.

12.1.2. Play Ground

Chemmanthoor play ground is situated in College ward. The extent of the play ground is 2 Hectare.

12.1.3. Theatres and Auditoriums

The town has three cinema theatres. The details are shown in Table 12.1.

Sl No	Cinema Halls	Place	Capacity
1	Raj Theatre	Post office Junction	400
2	Thai Lekshmi	TB Junction	400
3	Sree padmanabha	Post office Junction	300

Table 12.1. Details of theatres

The town has 8 numbers of auditoriums and halls. The details are shown in table 12.2.

12.2. Other Civic Amenities

Sl No	Auditorium	Place	Capacity
1	Swayamvara hall	Cutchery	600
2	Raja Rohini Hall	Cutchery	600
3	JayaKumar Hall	Cutchery	600
4	N S S Auditorium	Cutchery	250
5	Victoria Auditorium	Mussavari Kunnu	430
6	Shallom Hall	Town ward	300
7	CSI Church Auditorium	Town Ward	500
8	Triveni Auditorium	Market ward	200

Table 12.2. Deatils of auditoriums and halls

12.2.1. Town Hall

There is a community hall situated in Town ward, the capacity is only 75 seats.

12.2.2. Reading Rooms and Library

There are many reading rooms and libraries situated in different parts of the Town. The details of public library and reading rooms is given in table 12.3.

12.2.3. Crematoria and Burial Ground

There is a public crematoria located near Tholikode. Two crematoriums owned by churches, one is situated in Tholikode and other is in Plachery.

12.2.4. Others

There are four petrol pumps in the Town, two LPG godown and one fire station is situated in Tholikode and Police station of the Town is in Chemmanthoor ward. The details are given in table 12.4.



Sl No	Name	Location	Year of start	No of Books available
1	Kalayanad peoples Library and Sports and Arts Club	Kalayanad	1965	5229
2	K. Krishna Pillai Smaraka Library and Reading Room	Tholikode	2000	1204
3	Grama Sevaka Samithy	Maniyar	1955	3033
4	Sahrudaya Vayana sala	Kalayanad	1995	1083
5	Sree Narayana Library & Arts Club	Vattappada	1965	3025
6	Balan Memmorial Public Library	Punalur	1950	14123
7	Public Library &Reading Room	Kakkode	1999	1565
8	Public Library	Aikkara konam		
9	Yuva Prathibha Arts & Sports Club	Kalayanad	1995	

Table 12.3. Details of public library and reading rooms

Sl No	Facilities	Name/ numbers	Location/ward	Extent/capacity/ service area
1	Petrol pumps	IOC	Tholikode, Nellippally, KSRTC, Main road, post office junction & Chemmanthoor	Municipal area
2	LPG godown	Eastern Gas agency,Ganga Prasad gas agency		Pathanapuram Taluk
3	Fire Station	1	Tholikode -1	Municipal area
4	Police Station	1	Chemmanthoor -1	Municipal area

Table 12.4. Details of other facilities in the Town

12.3. Inference

Even though Punalur is the oldest Town in Kollam district, it is devoid of recreational facilities. Hence there is a need for developing additional recreational areas by utilizing the bank of Kallada River. All the existing facilities are to be maintained properly.

Chapter 13
Housing

13.1. Category of Houses

The nature of the settlement depends upon the type of houses in the locality and housing is one of the major needs of every human being. Socio economic survey conducted in punalur Town in the year 2012 reveals that the total number of houses in the Town is 11300. About 46.55% of houses are pucca, 48.61% are moderate and 3.41% fall under kutcha houses. Also about 0.63% houses are huts which are not suitable for inhabitation.

According to the secondary data collected from the Town, the total number of houses is 13049, of which 6054 houses are pucca, 5894 houses are moderate and 1101 houses are kutcha. The ward wise distribution of different types of houses is shown in figure 13.1. From the figure it is observed that the share of pucca houses is more in the town area near NH and SH. Pucca and moderate are seen more in Punalur Town. Pucca houses are more near town area. Kutcha houses are seen especially in the North West side of the Town. Moderated houses are more in south east side.

13.2. Housing Shortage

About 92.33% of house holds have their own land according to socio economic survey. The average household size of the District is 4. It is estimated that, there is a shortage of about 1030 houses in the town. The comparison of household size of Punalur Town with district and other Towns are shown in figure 13.2.

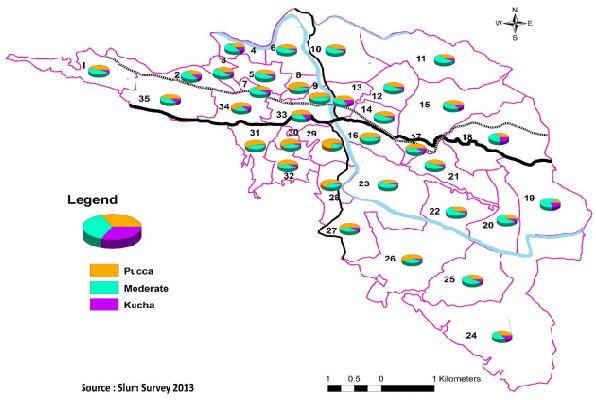


Figure 13.1.The ward wise distribution of types of houses

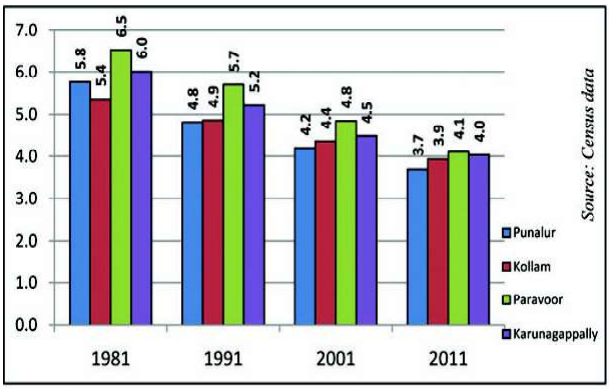


Figure 13.2. Household size

13.3. Sub Standard Housing Areas

The substandard housing area in the Town are surveyed for availability of basic infrastructure facilities like housing condition, road, water supply, sanitation facilities (taking the report of Urban Slums in Kerala as reference) and these are graded.

As per the survey conducted there are 59 slums in Punalur Town.

The details of sub standard housing areas as per primary survey conducted in 2012 are given in table 13.1

Sl No	Name of slum	Name of Ward	Area of slum	Total Houses	For dwelling purpose only		
					Pucca	*Semipucca*	*Katcha*
1	Mutharamcovil	Tholicodu	20 cent	5	5		
2	Kalingumukal	Kalingumukal	65 cent	8	1	7	
3	Vazhavila	Komalamkunnu	50 cent	18	14	4	
4	Kunnumpuram	Komalamkunnu	1 Acres	4	4		
5	Charuvila	Komalamkunnu	35 cent	12	7	5	
6	Adichan	Paravattom	21.25 cent	10	3	3	4
7	Panicker (Kailasom)	Paravattom	2 Acres	35	25	2	8
8	Pezhumvila	Paravattom					
9	Chettukuzhy	Maniyar	2.5 acres	30	30		
10	Vambay	Maniyar	35 cent	17	17		
11	New colony	Maniyar	45 cent				
12	Michabhoomi	Ashtamangalam	1Acre	10	6	4	
13	Kanjirakunnu	Ashtamangalam	10cent	4	4		
14	Chinnamvetti	Ashtamangalam	50cent	13	10	3	
15	Moodakkavu	Ashtamangalam	40 cent	8	6	2	
16	Vallimanoor	Kelankavu	2.50 Acre				
17	Koodakkulam	College ward	40 cent	13	8	5	
18	Kaduvakkuzhy	College ward	1.5 acres	43	36	7	
19	Chowka (Kuttikkatu)	Town	60 cent	19	2	8	9
20	Maruthamon	Town	50 cent	12		11	1
21	Thengumthara	Chemmanthoor	60 cent	25	24	1	
22	Karippuram	Pathekkar	43 cent	14	14		
23	GandhiNagar	Pathekkar	1.60 Acres	32	32		
24	Cherikonam	Pathekkar	75 cent	25	20	3	2
25	Aliyattukunnu	Arampunna	40 cent	8	6	2	
26	Maruthacode	Arampunna	1.5 acres	46	20	26	
27	Kanjiramala	Kanjiramala	30 cent	15	7	8	
28	Kallumala Harijan colony	Papermill	1.5 Acre	40	5	35	
29	Vanchiyoor	Nedumkayam	60 cent	19	10	9	
30	Mussavarikunnu Harijan colony	Mussavarikunnu	40 cents	14	1	13	
31	Halwa colony	Mussavarikunnu	40 cents	21		21	
32	Sasthamkonam melathil	Sasthamkonam	1 Acres	25	4	21	
33	Aikkodu	Sasthamkonam	18 cents	6	5	1	
34	Paramukku (vallakkadavu)	Sasthamkonam	25 cents	5	1	4	
35	Moorthikkavu	Bharanikkavu	30 cents	8		8	
36	Attumala	Highschool	1.25 Acres	46	8	32	6
37	Nearwater tank	Highschool	1Acres	12	1	11	



38	Chandanasseri	Highschool	40 cent	13	5	8	
39	Kallar Neithmukku	Nellippally	2 Acres	43	20	23	
40	Maramcodu	Thumpodu	1.80 Acres	60	35	20	5
41	Panthrandekkar-Kaithodu	Kallar	54 cent				
42	Neithumukku Chemmanthoorbhagum	Kallar	12cent	4	1	2	1
43	Neithumukku Chemmanthoorbhagum	Vilakkuvettom	10 cent	3	1	2	
44	Ambalamkunnu	Vilakkuvettom	25 cents	8	2	5	1
45	palodu	Kalayanadu	1.30 Acres	32	5	22	5
46	Vambay	Kalayanadu	105cent	35	30	5	
47	Thondiyodu	Kalayanadu	30 cent	11	7	3	1
48	Michabhoomi	Valacodu	21 cent	7	2	1	4
49	Koothanadi	Karakkadu	27 cent	7	6	1	
50	SC colony	Gracing block	1Acres	30	6	24	
51	ST colony	Gracing block	36cent	12	5	7	
52	Esther colony	Kakkodu	1.5 Acres	7	4	3	
53	Kurumakkadu-Thekkumvila	Kakkodu	1Acre	22	5	17	
54	Kakkode colony (Near public library)	Kakkodu	60 cent	6	6		
55	Gracing Block	Thamarapally	1.5Acres	34	15	12	7
56	Elappuppara colony	Thamarapally	2Acres	50	45	5	
57	Kochuplachery (EMS colony)	Mylakkal	40 cent		13 under construction		
58	Vellamkonam	Mylakkal	1.80 Acres	50	35	12	3
59	Vattappada	Plachery	3 Acres	50	45	5	

Table 13.1. Details of Slums in Punalur Town

Location of such areas are shown in figure 13.3. From the figure it can noticed that more sub standard housing areas are concentrated near the side of Kallada River.

Grading of Sub Standard Housing Areas

The basic facilities of each sub standard housing areas are noted during the survey and a weightage is fixed based on the infrastructure fa-

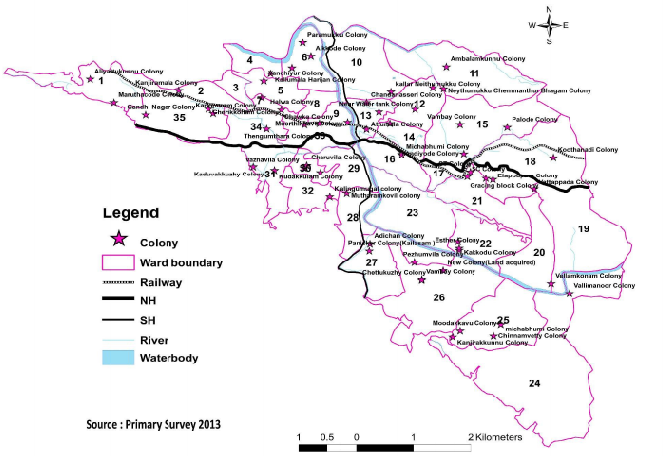


Fig 13.3. Location of slums

cilities such as access of road, population density, SC/ST population, drainage facilty, number of street light etc. Colony area for which the combined weightage 40 or above are treated as D grade colonies.

D grade colonies are: Adichan, Chettukuzhi, Kanjirakunnu, Moodakkavu, Neithu mukku, Chemmanthoor bhagam, Palode, Thondiyode, Michabhoomi, ST Colony, Gracing block, Elappuppara

C grade Colonies are:

The combined weightage 30 to 39 is treated as C grade colonies. Kalingumugal, Kunnumpuram, Charuvila, Panicker, Vambay, Michabhoomi, Cherikonam, Aliyattu kunnu, Marutha kode, Kanjiramala , Kallumala Harijan Colony, Halwa colony, Sasthmkonam melathil, Aikkode, Paramukku, Moorthikavu, Attumala, Vellamkonam, Ambalam kunnu, Vambay, SC Colony, Esther Colony, Kallar neithu mukku, Maramkode .

B Grade colonies are :

The colonies with combined weightage 20 to 29 is treated as B Grade colonies.

Chinnamvetti, Koodakkulam, Chowkka , Karippuram, Gandhi Nagar, Vanchi, Mussavari kunnu Harijan Colony, Near water Tank, Chandanasseri, Vattappada.

A Grade Colonies are :

The colonies with weightage less than 20 is treated as A Grade Colonies.

Mutharam Covil , Vazhavila , Kaduvakkuzhi, Maruthamon, Thengumthara, Kurumakkadu Thekkumvil.

13.4. Spatial Distribution

The spatial distribution of houses are shown in figure 13.4. From the figure it can be seen that

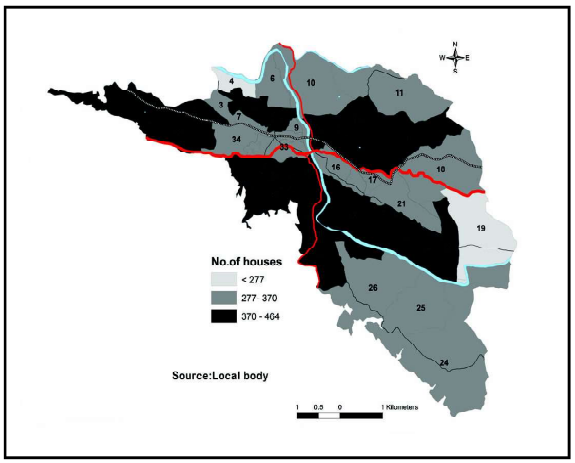


Figure 13.4. Ward wise distribution of houses

more number of houses are concentrated near the side of NH and SH.

13.5. Inference

In slums and other backward settlements, lack of infrastructure facilities, drinking water, sanitation and poor condition of the houses are major problems

Chapter 14
Special Concern Areas

14.1. SC Population

According to 2011 census SC population of Punalur Town is 4054, which is about 8% of the total population of the Town. The SC concentration index of Punalur Town is shown in figure 14.1. From the figure it is observed that SC concentration is more in eastern side of the Town.

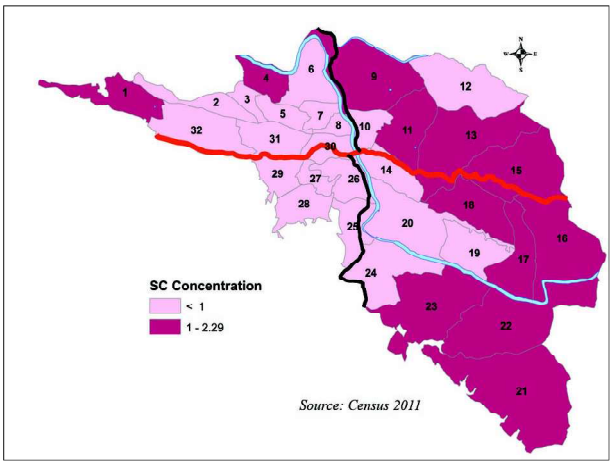


Figure 14.1. SC Concentration Index of Punalur Town

The comparison of SC population with other Towns in Kollam district in the year 2001 and 2011 is shown in figure 14.2. SC population in Punalur Town is the lowest among other Towns of the district.

The trend of SC population from 1971 to 2011 census is shown in table 14.1. From the table it is observed that growth rate of SC population is less in Punalur when compared with other urban LSGs.

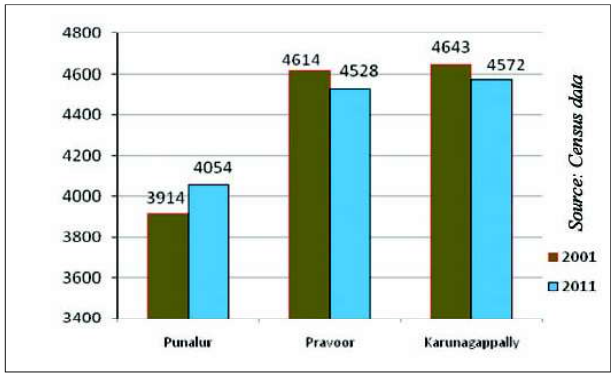


Figure 14.2. Comparison of SC population with other urban LSGs

14.2. ST Population

As per 2011 census, ST population in the Town is 356. The ST concentration index of Punalur Town is shown in figure 14.3. The ST concentration is more in ward 18 and 23.

The comparison of ST population in the year 2001 and 2011 with other urban LSGs are

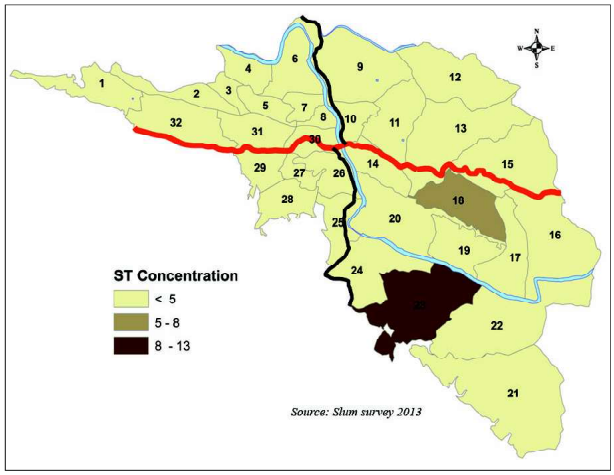


Figure14.3. ST Concentration index of Punalur Town

Name	1971	1981	1991	2001	2011
Punalur	3072	3971	4150	3914	4054
Kollam	216782	268189	305717	322805	328263
Paravoor	3141	3805	4371	4614	4528
Karunagappally	3423	3962	4509	4643	4572

Source: Census data

Table 14.1. Comparison of SC population with other urban LSGs

shown in figure 14.4. From the figure it is observed that the ST population is more in Punalur Town. However ST population in Punalur is decreasing from 2001 to 2011 unlike other urban LSGs.

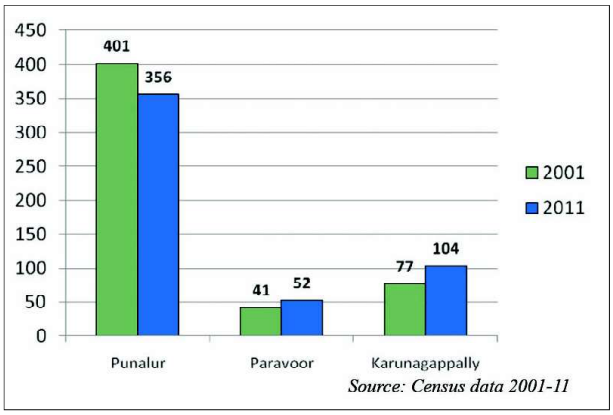


Figure 14.4 Comparison of ST population with other urban LSGs

14.3. BPL Index

The BPL concentration index according BPL survey 2009 is shown in figure 14.5.

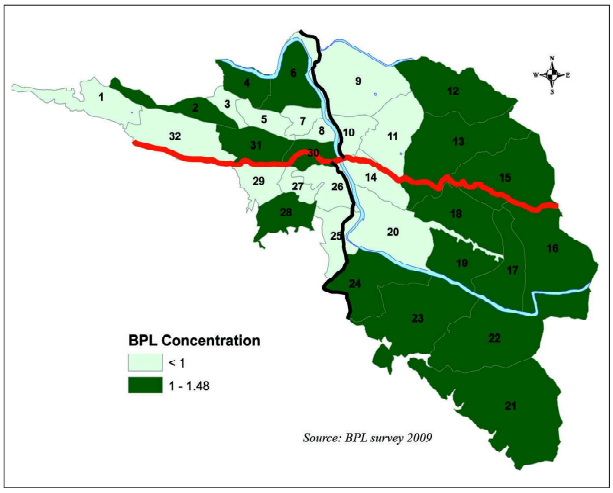


Figure 14.5. BPL Concentration Index of Punalur Town

From the above figure it can noticed that BPL concentration is more in eastern side of the Town.

From the analysis of SC, ST and BPL concentration index we can see that SC and BPL concentration is high in eastern side of the Town and SC concentration is more in ward 18 and 23.

14.4. Literacy

The educational status of SC families in Punalur Town is shown in figure 14.6. From the figure it is observed that 12% of the total SC population are illiterates, 63% has educational qualification up to primary level and 14% of the total population have qualified up to SSLC .

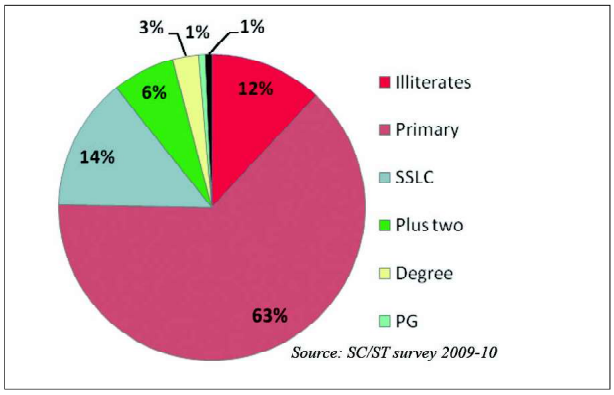


Figure 14.6. Educational Status of SC Families in Punalur Town

The educational status of ST families in Punalur Town is shown in figure 14.7. From the figure it is noticed that 25% of the total SC populations are illeterates, 62% has educational qualification up to primary level, 9% has qualified up to SSLC level and 4% completed plus two. Hence literacy rates among SC/ST families are high compared to others.

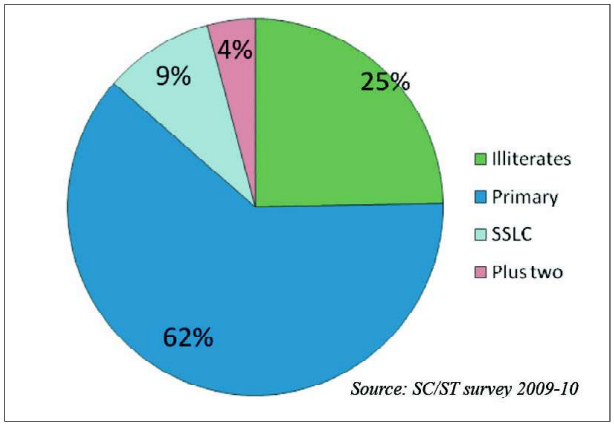


Figure 14.7. Educational status of ST families



14.5. Occupation

Occupational status of SC families in Punalur Town is shown in table 14.2

Sl. No	Occupation	Male	Female	Total
1	Permanent - Government	22	11	33
2	Permanent - Private sector	6	3	9
3	Temporary - Government	1	3	4
4	Temporary - Private sector	55	54	109
5	Self employment - Agriculture sector	1	0	1
6	Other self employment	16	10	26
7	Labourer - other than agriculture sector	9	7	16
8	Labourer - agriculture allied sectors	632	226	858
9	Labourer - construction field	90	14	104
Total employment		832	328	1160

Source: SC/ST survey 2009-10

Table 14.2 Occupational Status of SC families

Out of the total 4054 population only 1160 are workers. 33 peoples are working in Government sector, 858 peoples are working in agriculture-allied sector and 104 persons are construction workers.

Occupational status of SC families are shown in table 14.3. Out of the total 401 population only 6 persons have Government job, 20persons engaged in the collection of medicinal herbs, 72 are non agricultural labourers and 7 are agricultural labourers

Sl. No	Main Work	Family		Person (above 5	
		Number	%	Number	%
1	Collection of medicinal herbs	8	10.53	20	8.23
2	Agricultural labours	4	5.26	7	2.88
3	Non agricultural labours	50	65.79	72	29.63
4	Government / Semi Government job	5	6.58	6	2.47
5	Permanent job in private sector	0	0	2	0.82
6	Permanent job in forest areas	0	0	5	2.06
7	Others	9	11.84	0	0
8	Unemployed	0	0	131	53.91
Total		76	100	243	100

Source: SC/ST survey 2009-10

Table 14.3 Occupational status of ST Families

14.6. Other Aspects

The details of landless SC families are listed in table14.4. Total number of landless SC families in Punalur is 18. The number of landless and houseless ST families and the conditions of their houses are listed below in table 14.5.

Sl. No	Colony / Ward	Lives in Colonies	
		Total Families	Landless Families
1	Panamannara	11	1
2	Thazhe palode	20	1
3	Mylakkal	27	5
4	Gracing block (right)	17	2
5	Vilakkuvettam Panathumkara	8	3
6	Maruthakode	25	1
7	Kallumala	25	2
8	Aikkottu Kadav	8	1
9	Vallakadav	9	2

Source: SC/ST survey 2009-10

Table 14.4 Details of SC Landless families



Sl. No	Landless, Houseless families	Houseless Families	Kutcha houses	Semi pucca houses	Pucca houses
1	7	11	20	20	25

Table 14.5 Details of land less ST families Source: SC/ST survey 2009-10

14.7. Problems

i. SC population is mainly concentrated in colonies.

ii. ST population is concentrated in hilly near forest areas.

iii. Educational backwardness.

iv. Unemployment.

v. Landless families.

vi. SC ST is engaged in low paid un skilled work.

14.8. Inference

Providing shelter to the houseless SC/ST families and rehabilitation of landless families. Provide additional Educational assistance to improve Educational status of the community and prevailing unemployment among SC/ST families.



Chapter 15

Environment and Heritage

15.1. Environment

Kallada River, one of the most important rivers of Kollam flows through the city centre of Punalur Town, dividing the town in to two. The geographical features of the town is characterized by hills, valleys, and plain area on the top of the hills. Punalur is the hottest place in Kerala and records the coldest temperature in low land regions of Kerala. Hence issues related to climate change is very significant in Punalur Town.

15.1.1. Sensitive or Fragile Areas

Sensitive /fragile area includes water bodies, sacred groves, paddy or low lying lands and hills.

Water Bodies

In addition to Kallada river many other streams and natural ponds are available in the planning area. The spatial distribution of these water bodies are shown in figure15.1.

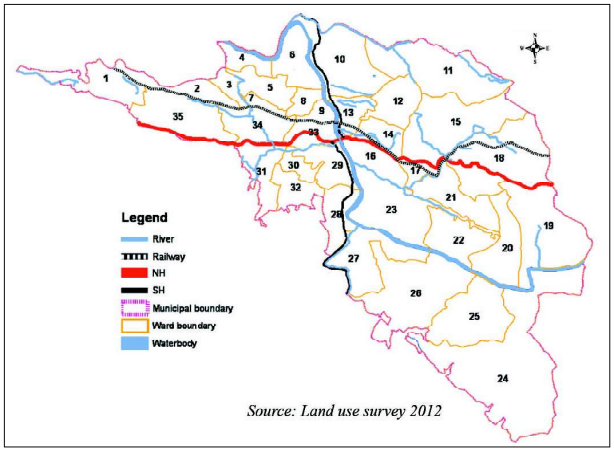


Figure 15.1. Water Bodies in Punalur Town

Paddy Fields

The total area of paddy fields in Punalur Town is 40 Hectare ie 1.16% of the total area of the Town (Figure 15.2). In this, only 10Hectare is now cultivating. Paddy / low lying lands are considered as natural water recharging agencies. Hence conservation of paddy / low lying lands is very much important for manufacturing environmental balance.

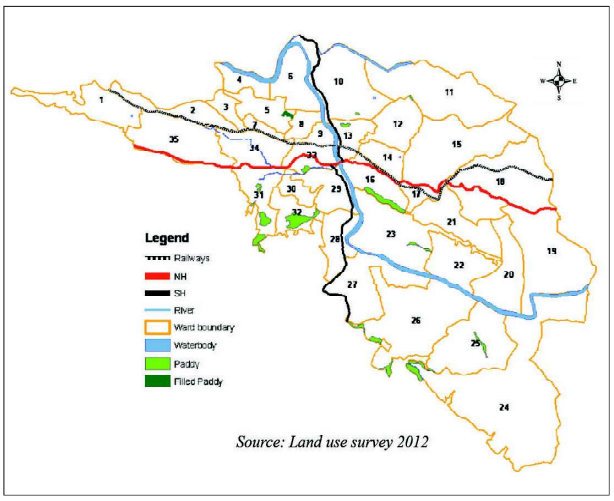


Figure 15.2. Paddy fields in Punalur Town

Hills

The steeply terrain of Punalur mainly in Kelankavu and Vilakkuvettam wards also forms a part of the environmentaly sensitive areas within the town.

Sacred Groves

There are so many sacred grooves associated with temples in the planning area .The details of the sacred grooves are shown in table 15.1. The location of sacred grooves and ponds in the Town is shown in figure 15.3.

Sl. No	Ward Name	Name and Type	Species wise Flora (major)
1	Town ward	Kavu	Pala, Aal
2	Klayanad	Adivayalil Muhurthikavu	Aal, Elanji, Kanjiram, Koovalam
3	Bharanikavu	Moorthikavu	Pala, Aal
4	Sasthamkonam	Aikkodukavu	Pala, Aal
5	Kelankavu	Vallimathoor kavu, Ashtamangalam kshethra kavu, Mulavettikonam kshethra kavu	Pala, Aal
6	Ashtamangalam	Chavarupara kavu	Anjili, Maruthu, Aal
7	Thamarappally	Vilangara kavu	Pala, Elanji, Aal
8	Chemmanthoor	Kavu	Pala, Elanji, Aal
9	Arampunna	Aliyattukunnu kavu, Ayiravalli temple kavu	Aal, Pala
10	Mylakkal	Karakkadu chavarukavu, Irukarathathi kavu	Aal, Pala
11	Nethaji	Sivankovil temple kavu	Pala, Aa, Elanji
12	Tholikode	Mutharammankovil kavu, Manthramoorthi mutharamman kavu	Pala, Aal

Source: Local body

Table 15.1 Details of Kavu's in punalur Town

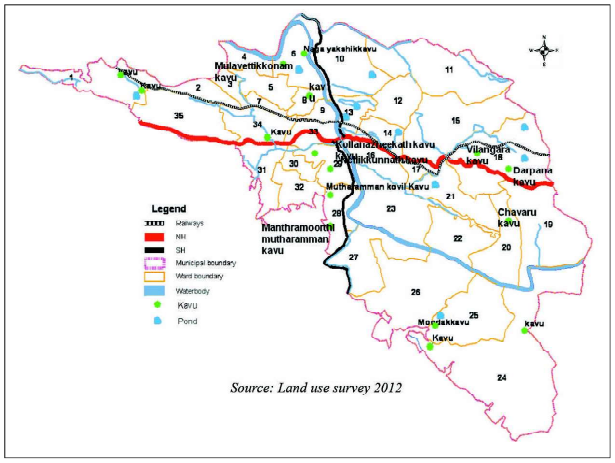


Figure 15.3. Location of Kavu's and ponds in Punalur Town

15.1.2. Natural Hazard Vulnerable Areas

As per the District Disaster Management plan for Kollam-2015, natural hazards to which the district is vulnerable are flood, sea erosion, drought, earthquake, cyclones, landslide/ mud flow/ debris flow and thunder & lightning. From the various natural hazard susceptibility map and frequency of occurance prepared for the district taluk wise shows that the Punalur taluk where the municipality lies is vulnerbale to flood, landslides and have reported cases of tremor and lightning. When the past 10 years is taken into consideration, the natural hazards that took place in the taluk are flood and landslides which took place in august 2018.

Even though the taluk is highly vulnerbale to landslides/ mud flow/ debris flow, no such cases has been reported for municipality over past few years. During the mega flood 2018, certain parts within the municipality areas got flooded. Most of the inundated areas were close to Kallada river.

A report, Redevelopment strategy in the context of mega flood 2018, has been prepared for the district by which developable land in the district is categorised under four zones viz. No Development Zone, High Risk Zone, Moderately Safe Zone and Safe Zone. No development zone constitutes of Ecologically sensitive areas such as wetland, paddy, water bodies, forest etc. which are forbidden from any forms of development involving any perma-

nent constructions. High risk zone comprises of area which are highly susceptible for natural hazards and are seen abutting Kallada river. The Moderate safe zone area requires special care while building structures and are mainly concentrated on western side of the municipality. The safe zone are the zones for future development which are seen on the eastern side as well as on the southern side of the municipal area as shown in Figure 15.4. Around 25% of land under the municipality falls under high risk zone and no development zone.

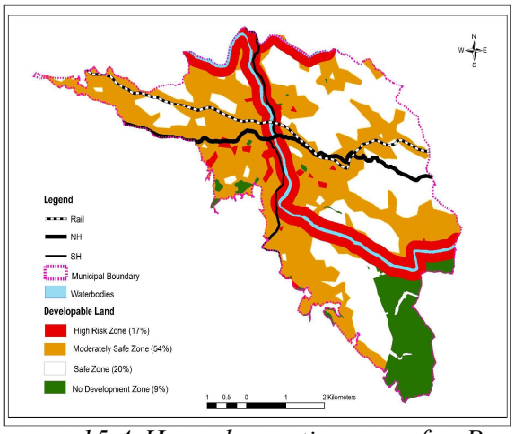
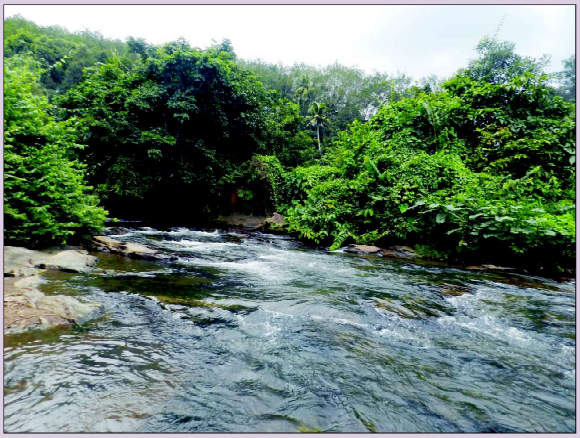


Figure : 15.4 Hazard zonation map for Punalur



Kallada River



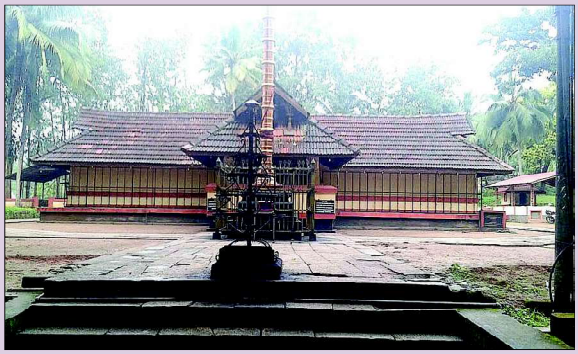
Bharanikavu Temple

15.2. Heritage Centers

The important heritage centre in Punalur Town is the marvelous Suspension Bridge constructed in 1877 under the guidance of Engineer Albert Henry. Other heritage buildings are listed below.



Punalur Suspension Bridge



Sivan Kovil

15.3. Inference

Main water source is Kallada River. Hence the river has to be preserved from pollution and Side protection is necessary to avoid side erosion. Conserve the existing paddy fields, Heritage centers and sacred groves. Around 25% of land under the municipality falls under high risk zone and no development zone.

Chapter 16
Natural Hazard Vulnerability Areas

16.1. Natural Hazard Vulnerable Areas

Disasters are unpredicatable in nature. Kerala State Disaster Management Policy defines disaster as 'a serious disruption of the functioning of a society caused by a hazard or otherwise, having widespread human, material or environmental and other losses, which exceed the ability of the affected society to cope using its own resources.'

As per the District Disaster Management Plan for Kollam-2015(DDMP), natural hazards to which the district is vulnerable are flood, sea erosion, drought, earthquake, cyclones, landslide/ mud flow/ debris flow and thunder & lightning. From the various natural hazard susceptibility map and frequency of occurance prepared for the district taluk wise shows that the Punalur taluk where the municipality lies is vulnerbale to flood, landslides and have reported cases of tremor and lightning(as shown in figure 16.1,16.2,16.3). When the past 10 years is taken into consideration, the natural hazards that took place in the taluk are flood and landslides which took place in August 2018.

Even though the taluk is highly vulnerbale to landslides/ mud flow/ debris flow, no such cases has been reported for municipality over past few years. In Punalur municipal area's flood prone areas are mainly along the sides of Kallada river.

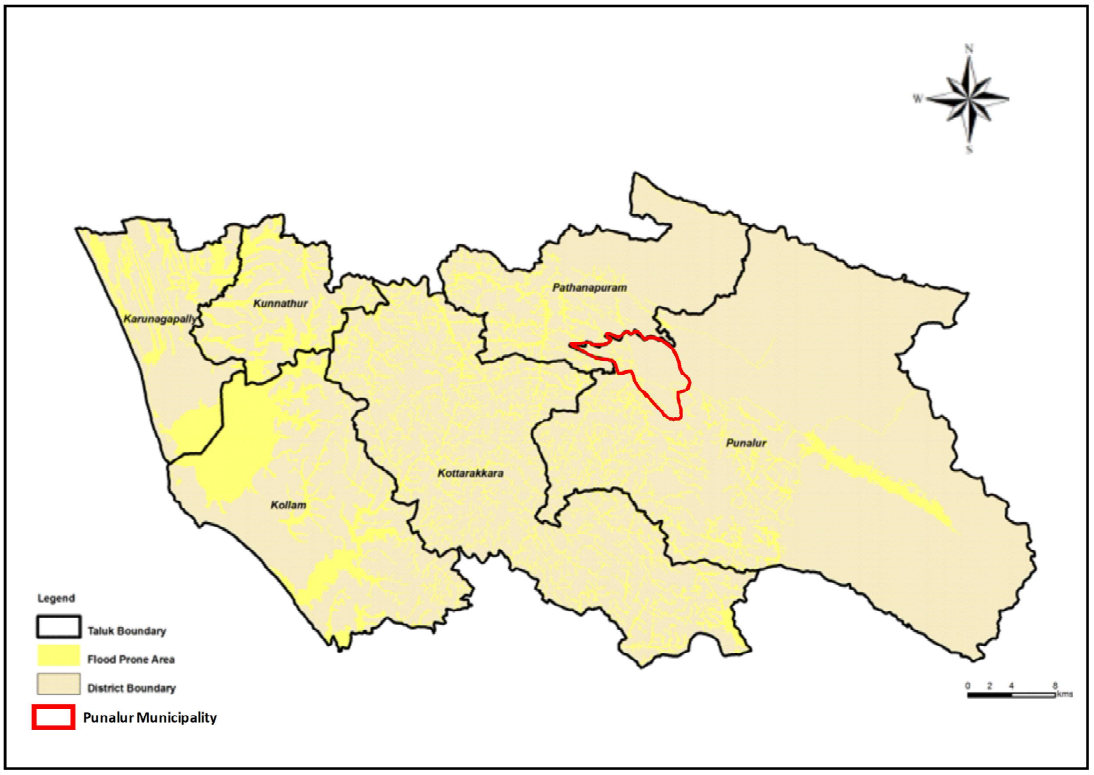


Figure 16.1 Flood prone areas in Kollam district overlayed with Punalur (Map compiled from DDMP, 2015)

In the case of lightning, previous reported events and lightning frquency were taken into consideration, from which it is understood that major portion of municipal area falls under zero frequency and no case of casualties on past events were reported.During the mega flood 2018, certain parts within the municipality areas got flooded. Most of the inundated areas were close to Kallada river.

Main cause of flood in the region was due to opening of spillway shutters of Thenmala reservoir. Maximum height of shutter opening was 3.60m and shutters were raised to 2.60 m. The water level rose up to 10 m towards banks and to a height to 1.5-2 m.

There was no cases reported in terms of loss of life, connectivity and infrastructures. The flood affected areas in Punalur town is shown in figure 16.4.

During the year 2019 another flood affected the state adversely and no such cases were re-

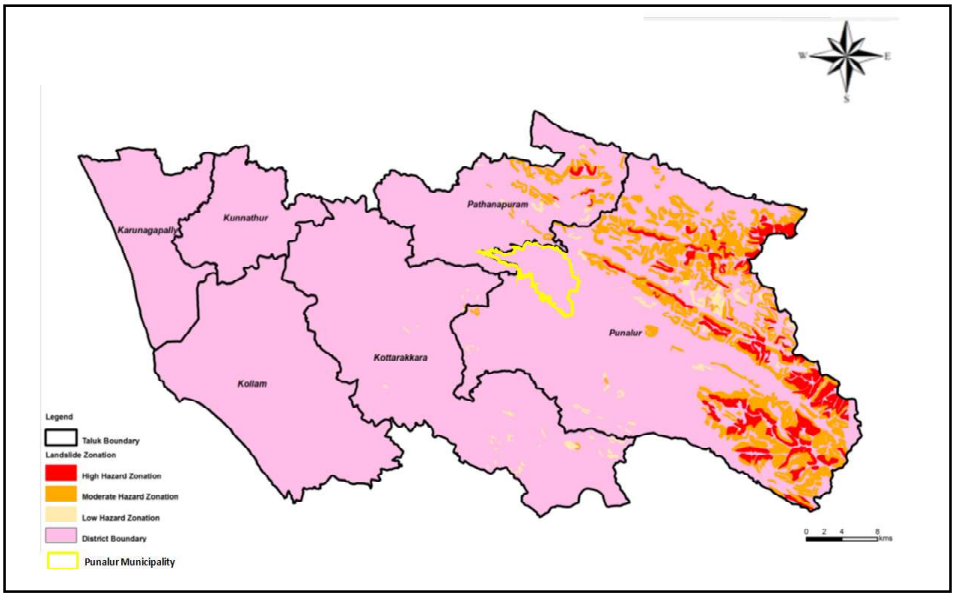


Figure 16.2 Landslide prone areas in Kollam district overlayed with Punalur (Map compiled from DDMP, 2015)

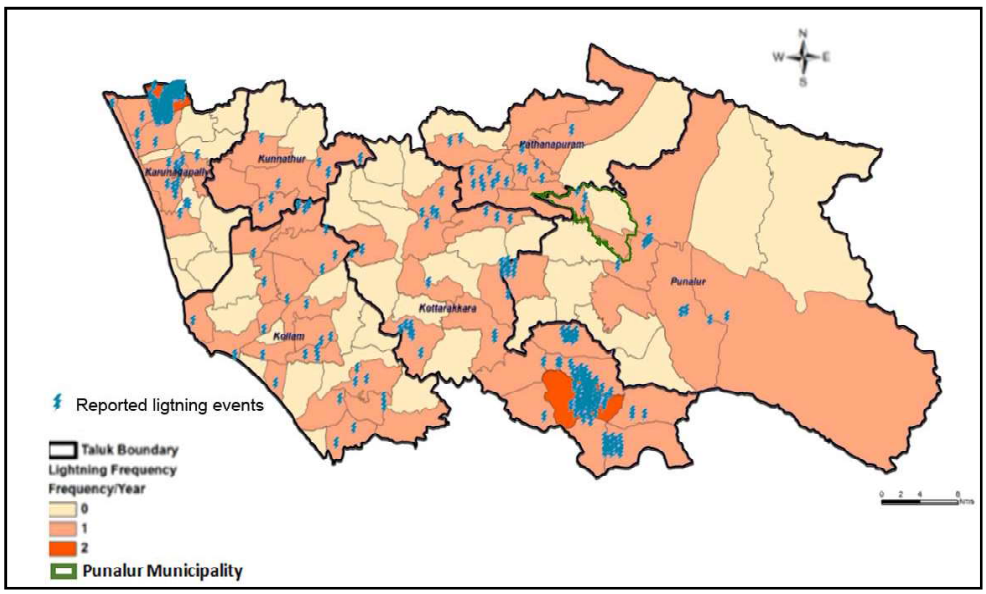


Figure 16.3 Lightning prone areas in Kollam district overlayed with Punalur (Map compiled from DDMP, 2015)

ported from Punalur town.

16.2. Inference

Even though Punalur taluk is highly vulnerbale to landslides/ mud flow/ debris flow, no such cases has been reported for planning area Only a small portion of planning area has reported lightning cases with a frequency of 1 lightning/year and majority of area falls under no frequency.The areas adjacent to river banks were inundated during flood of 2018 and no such cases were reported in the following year.

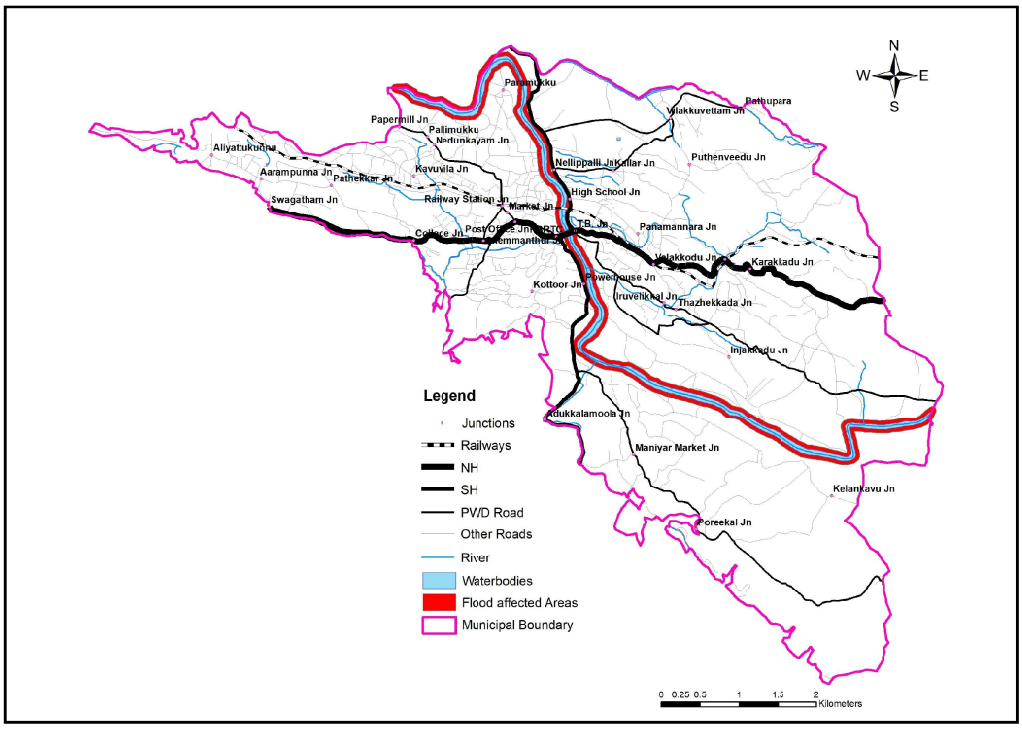


Figure 16.4 Flood afffected areas of Punalur town in 2018



Chapter 17
Findings& Conclusions

17.1.Findings from IDDP Kollam

1. Punalur Town is a IInd order settlement and IInd order commercial node, identified as one of the potential growth centre of the district. The centre part of the town act as a commercial centre serving the entire area of the Town and surrounding Grama Panchayats. However the proximity of Anchal, Pathanapuram, Kottarakkara, the prominent commercial nodes of the District closely located to Punalur, limits the service area of Punalur in to nearby five local bodies, Thenmala, Aryankavu, Piravanthur, Vilakkudi and Karavalur.
2. Punalur Municipal area is identified to have rural character which indicates the area is suitable for agriculture and agriculture allied activities.
3. Punalur Town is included in the agro development zone and IInd order multifunctional zone in this zone dry crops like rubber, pineapple, pepper are more suitable for cultivation and intensive animal husbandry activities.
4. Existing National Highway, Kollam – Shenkottai – Thirumangalam passes through Punalur Town which is proposed to be widened to 30 m (four lane carriage way)

Existing State Highway – Punalur – Muvattupuzha (SH 8) and Ayoor – Punalur (SH 48) roads proposed to widening for 30 m (four lane carriage way)

17.2. General Findings

1. From the study of contour map of Punalur Town, it seen that 25.43% land have a slope of below 30%. Kallada River divides the geographical area of the Town in to two and the nature of development on either side of the river is different. Majority of the physical development is seen along the western side of the river, where as on the eastern side agricultural activity is predominant. The terrain also plays an important role in deciding the type of activity that can come over a place. This is very much relevant in the case of Punalur. The terrain of Punalur rises steeply towards its eastern side limiting the physical development in that locality.
2. On comparison of the contour map of the town and the nature of physical development in the land use map, it can be seen that the flat terrain of the town is almost fully inhabited; highland region is predominant with rubber plantation. It can be seen that the terrain of the town act as a constraint to the development of the town.
3. The study of land use of Punalur Town shows that 54.32% is under agricultural use. The agricultural activity is comparatively more intensive than the other Towns in the district. It is seen that Punalur Town is predominantly agricultural.
4. 26% area of the town is categorized under residential use having potential for agricultural development.

5. Residences are concentrated in the north – west – portion of the Town. Agricultural activities are concentrated in the eastern side. Commercial activity is seen concentrated in the central portion of the town.
6. Population of Punalur Town is 46702, which is 1% of the total population of the District.
7. Growth rate of population is (-1.13), is less when compared to the District average of 1.95%. Punalur town shows negative population growth during the period 2001-11 mainly due to the closure of the Punalur paper mill and decrease in the plantation activities. At the same time workers details shows the diversified nature of development (primary, secondary and tertiary) in Punalur. Hence it is presumed that there is no chance for the negative population in future, but the present population (2011) will remain as such for the plan period (2011-2031). At the same time Punalur is to cater the higher order needs of the nearby 5 local bodies, whose total population is 1,47,534 (as per 2011 census). This analysis shows the importance of Punalur town in the tertiary sector.
8. Population Density is 1356, which is less than other Towns.
9. The work participation rate of Punalur Town is 32.17%, shows an increasing trend.
10. About 88% of the total workers belong to other workers category.
11. The analysis of the socio economic survey shows that 6% of the total workers are engaged in industrial sector, agriculture workers and cultivators together constitute 19%, 10% are employed in government sector and 13% are working abroad. This shows that primary, secondary and tertiary sectors have equal importance in the Town. This is taken as an indication of the diversed economic base of the town.
12. Planning area is blessed with large extent of land with rural nature and has very potential for agriculture and horticulture activities.

Agricultural Sector

1. The fact that Punalur is the agro-development zone of the district shows the importance of agriculture in Punalur. The analysis of the existing land use also shows that 54% of the total area of the Town is under dry agriculture use, mainly rubber plantation. The comparatively higher percentage of agricultural labours and cultivators also shows the importance of the agriculture in the Town. The sloping terrain of the region also limits the activity, other than agricultural, in major portion of the Town. All these factors leading to the conclusion that agriculture will be an economic base of the Town in the future too.
2. Rubber is the major crop in Punalur.
3. Nearly 60% of the total area is used for agriculture purpose in Punalur.
4. General character of settlement shows that most of items are rural in nature and residences are spatially distributed around all the wards, indicating that there is scope for developing agriculture sector as well as the animal husbandry activities.
5. The people within the Town are interested to migrate in to the rural areas. Also there is a tendency to convert agricultural land especially in paddy fields into other non agricultural and



residential purpose. This indicates the reduction of agriculture area and destruction of the economic base of the rural area of the Town.

6. Occupational structure of the Town shows that more than 88% of total workers engage in non agriculture activities. It indicates that the agriculture land should be put in to optimum use.

7. The low population growth rate and low work force participation rate which indicates a decline in local economic activities.

8. The spatial analysis of the settlement shows that the major portion of the Town is occupied by agricultural and agriculture allied activity zones. Animal husbandry also has immense scope of development.

9. Sparsely distributed crop cultivated in the entire area of the Town. The cultivation of rubber and existing paddy cultivation has to be sustained. The cultivation such as coconut, jackfruit, vegetables and fodder cultivation can be promoted.

10. The consumption pattern shows that there is good demand of agricultural products and animal husbandry products .

Animal Husbandry

1. Enough space for developmental activities of animal husbandry sector in Punalur Town. Supporting infrastructure facilities have to be strengthened.

2. Fodder cultivation has to be promoted. The fallow land can be utilized for the fodder cultivation.

3. Commercial dairy units can be promoted in the field of milk production sector.

4. Strengthening of poultry rearing by enough supply of quality chickens and feeds at affordable costs

5. Meat and meat products has to be improved by providing modern facilities.

6. Population of cow and Buffalo's are decreasing.

Industrial Sector

1. The land for industrial purpose is nominal in the Town. 29% of the total industrial area, in which the Punalur paper mill occupies major portion of the industrial area.

2. Plenty of land is available, in the Town but adequate infrastructure facilities such as building, power, transportation etc are not available.

3. The large scale industries Punalur Paper Mill, Travancore Plywood Industries are closed which affect the reduction of employment and economic base of the Town.

4. Potential to start up new industries in the ward of agro allied and forest based products in the ward. Punalur is rich in agricultural resources such as rubber plantation, forest and its products. The neighboring forest area gives an important base for forest based industries.

Transportation

1. From the analysis it is seen that Punalur town and its surrounding area needs a well planned traffic net work.

2. V/C ratio of most of roads in the town is greater than one which shows that the width of roads needs to be increased.

3. During the peak hour traffic, the portion of

national highway (NH 744) in the central area of the town is fully congested affecting the movements of vehicles, goods and pedestrians

4. The district roads, taluk roads and town roads passing through the Town. The level of service of these roads are quite substandard because of poor road geometrics, the roads in general are very narrow and are not adequately serving the requirements of the vehicular traffic.

5. Punalur railway station is an important station in between Kollam and Shenkottai.Train services has been extended to Thambaram recently. The platform and other facilities like parking, access, vehicles parking for warehousing, quarters, drainage and sanitary facilities at station are quite inadequate.

6. Level crossing can be removed by constructing ROB at Market jn Punalur and improvements of junctions, bus stops etc

Education

1. Lack of sufficient infrastructure facilities
2. No proper utilization of government fund and schemes
3. Unaided schools are becoming major attractions due to the lack of training, management, and function of government schools
4. Lack of quality improvement program for teachers
5. More number of VHSS is needed in Punalur region
6. Needs for general awareness of education in the low income groups of the society.
7. As per planning standards the education institutions are available in the Punalur Town except professional colleges.
8. Infrastructure facilities are not sufficient in Government schools.

Water supply

1. Nearly 83% of people are depending on wells as source of drinking water and scarcity of drinking water is a serious problem in many areas of the Town.
2. The present water supply system is not serving the needs of all the inhabitants in town and elevated portions.
3. Availability of annual rain, suitable terrain and buildings shows the potential for rain water harvesting
4. Water logging is a problem along the sides of roads and portions of town due to the absence of storm water drainage.
5. The solid waste disposal system in the Town is not effective.
6. At present there is no sewage treatment and disposal facilities.

Commercial Sector

1. First order commercial centre of Punalur is Chemmanthoor junction, KSRTC junction, Post office junction and market junction. IInd order commercial centres are College junction and Tholikode junction.
2. First order commercial centre are highly congested and having no sufficient parking space. There is no adequate drainage facility. No proper system for collection of solid waste and its processing scientifically.



Environment

1. About 9% of the municipality falls under no development zone.
2. About 17 % falls under high risk zone
3. There is 17 number of sacred groves,15 ponds and 40 Hectare of paddy area which include 1.25% of the total area of the Town.
4. Paddy fields and ponds are the recharge basins and they shall be conserved.



Chapter 18

Development Concept and Proposed Land use

In this chapter the future likely functions of this town, supporting spatial form depicted through future network, future activity pattern and future hierarchy of nodes are discussed. The resulting proposed land use map of the town is also detailed out.

18.1. Projections - Population and Workers

18.1.1. Population projection

Population of Punalur town is projected based on the natural growth rate, considering the negative growth rate during 2001-2011. Accordingly the population of Punalur town is estimated as 44,874 by 2031 (Fig. 18.1).

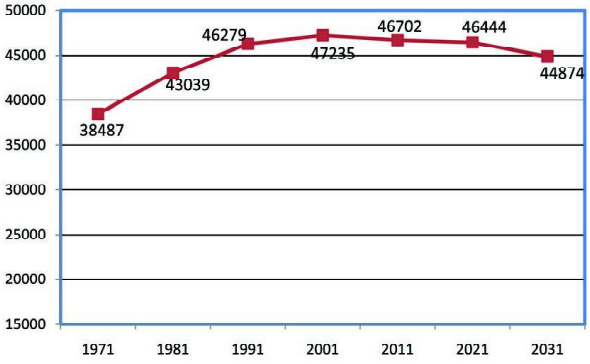


Figure18.1. Population projection of the Town

18.1.2. Workers Projection

Assuming the same workforce participation rate of 32.17 as in 2011 for 2021 and 2031, the total number of workers is estimated for 2021 and 2031 and the same is shown in figure 18.2.

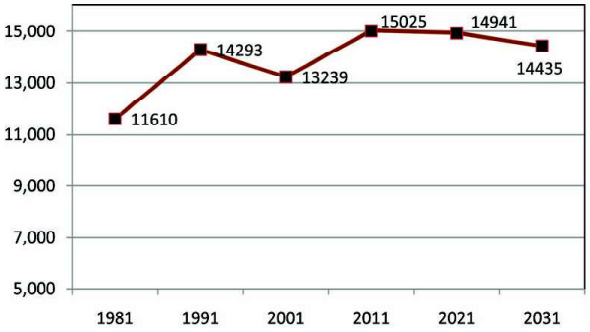


Figure18.2. Workers projection of the Town

18.2. Deriving Functions

- Punalur town shows negative population growth during the period 2001-11 mainly due to the closure of the Punalur paper mill and decrease in the plantation activities. At the same time workers details shows the diversified nature of development (primary, secondary and tertiary) in Punalur. Hence it is presumed that there is no chance for the negative population growth in future, but the present population (2011) will remain as such for the plan period (2011-2031) also. At the same time Punalur is to cater the higher order needs of the nearby five local bodies, whose total population is 1,47,534 (as per 2011 census). This shows the important role of Punalur town in the tertiary sector.

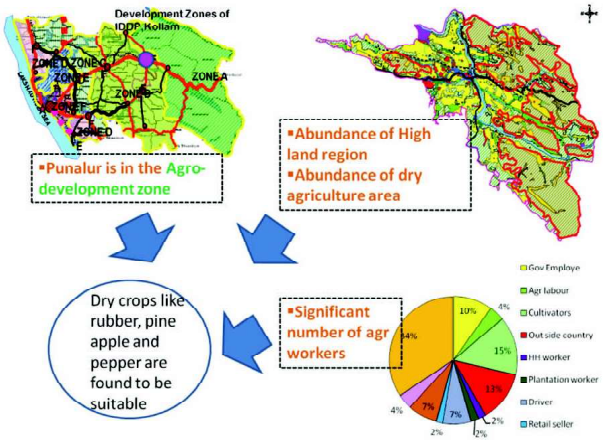


Figure 18.3. Importance of agriculture sector

- The fact that Punalur is the agro-development zone of the district shows the importance of agriculture in Punalur (Fig. 18.3). The analys is of the existing land use also shows that 54.32% of the total area of the Town is under dry agriculture use, mainly rubber plantation. The comparatively higher percentage of agricultural labours and cultivators also shows the importance of the agriculture in the Town. The sloping terrain of the region also limits the activity, other than agricultural, in major portion of the Town. All these factors leading to the conclusion that agriculture will be an economic base of the Town in the future too.
- Punalur town is designated as a second order commercial node of the district. It is to act as a service provider of the nearby LSGs. The revival of the Punalur paper Mill to its past glory is expected any time. This will boost up the commercial sector of the town. Also the completion of Kollam – Punalur – Shencottai railway line will increase the importance of Punalur town as a commercial node of the region. All these factors point towards the importance of the commercial sector in the future in Punalur (Fig. 18.4).
- The proximity of Punalur to forest, the predominance of rubber plantation and spurt in household industrial activities paves way for forest produce based industries and rubber based industries in the town (Fig. 18.5).

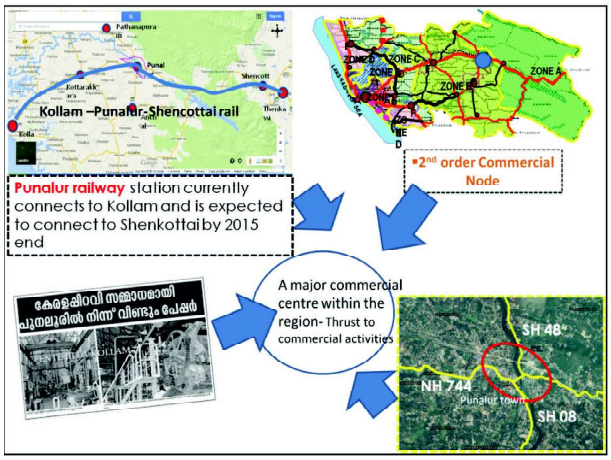


Figure 18.4. Importance of commercial sector

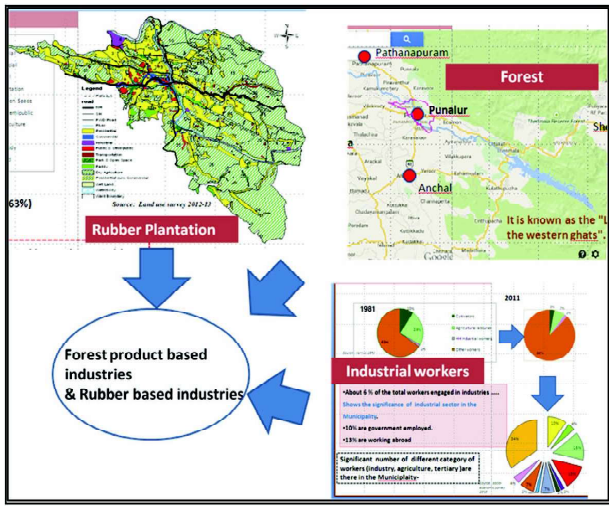


Figure 18.5. Importance of Industrial sector

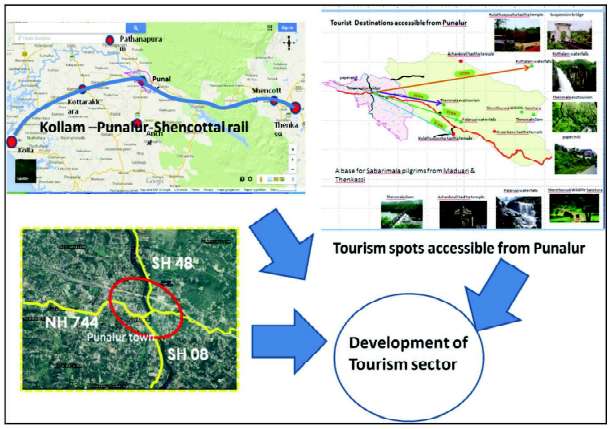


Figure 18.6. Importance of tourism sector

- Punalur town as such have not much tourist attractions now (Fig. 18.6). But Palaruvi waterfalls, Thenmala eco-tourism, Kuttalam, Sastha temples etc are tourism spots accessible from the town within 50-30 km. This emphasis the role of Punalur as a base for tourist. Tourists halting at Punalur can visit all these places within 1 or 2 hours. Also even now Punalur is a base for Sabarimala



pilgrims from Madurai and Thenkasi. This increases the chances of development of tourist infrastructure – hotels, taxis, roads in the Town. Along with this tourism potential spots adjacent to the Kallada River located within the Town can also be flourished. All these factors show that tourism is a future economic base of the Town.

- It can be concluded that Punalur is having scope for development in commercial, agriculture, tourism and small scale industries in the future.

18.3. Defining Form:-

- The environmental sensitiveness of the town deriving out of the proximity of Western Ghats, the steep terrain on the eastern side of the town and the Kallada River passing through the town are the major factors determining the suitable activity within the town. The existing land use, terrain and the presence of different transport routes (Railways, NH, SH) makes the central area of the town suitable for high intensive activities like commercial, public and semi public institutions, transportation uses etc. The town portion on the western side of the river, where comparatively flatter terrain exists, is suitable for moderately intensive activity like high to moderate residential activities. The area adjacent to major roads through the eastern part of the town is taken as suitable for low intensive residential activities because of the comparatively flat nature of the terrain, whereas the remaining portion in the eastern part is suitable for agricultural plantation only because of the undulating and steep terrain.
- The analysis of the future functions of the town shows that the town is to develop further in the commercial sector(Fig. 18.7). The land use pattern of the town shows that commercial land use is concentrated in the centre of the town at present.

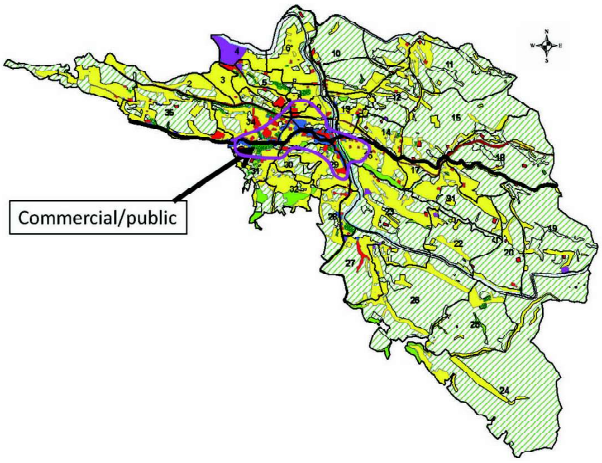


Figure 18.7. Commercial activity areas

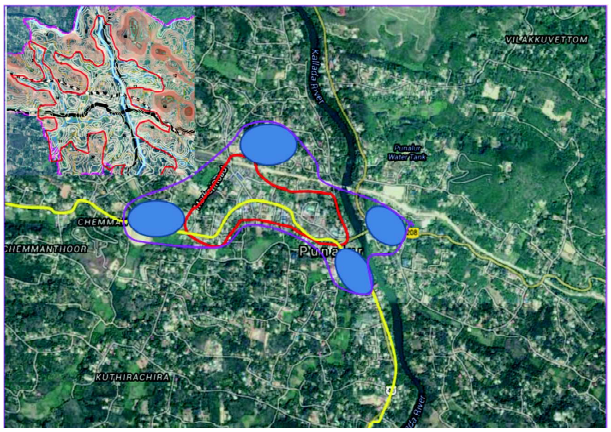


Figure 18.8. Expansion of town centre

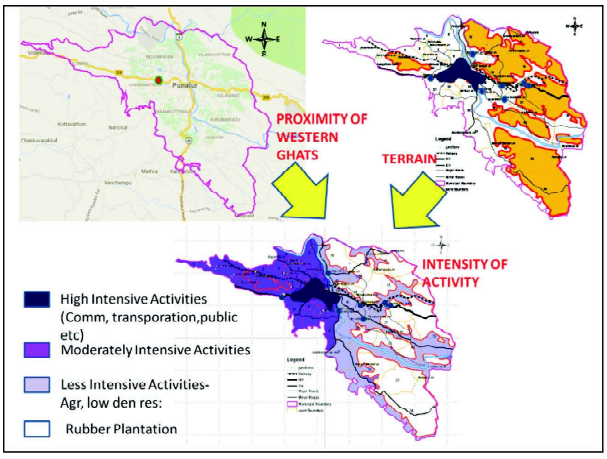


Figure 18.9. Activity zones

- When one thinks about the future expansion of the commercial area of the town, it can be seen that Kallada River, railway line and the

terrain, limits the area of future expansion of the town centre. However the underpass near railway station below the railway line opens up the area towards Bethel Bible College for commercial development (Fig. 18.8). The railway line, river and terrain limits the expansion of the town towards TB junction of the town, however whatever suitable land available in this direction is expected to develop as commercial area as an extension of the existing commercial centre due to the connectivity through the bridge across Kallada River. The major expansion of the existing commercial centre is expected towards Chemmanthur because of the suitable nature of terrain and presence of the National Highway.

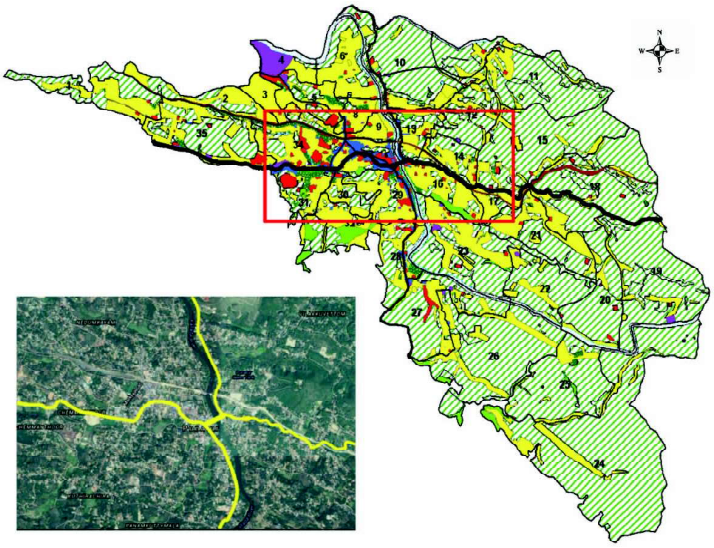


Figure 18.10. Simple bridge connecting the two half of the town

- At the same time smaller commercial nodes will be developed in SN college junction, Nellippalli junction, Kalayanad junction and Tholikode junction. The activity zones so derived is shown in figure 18.9.

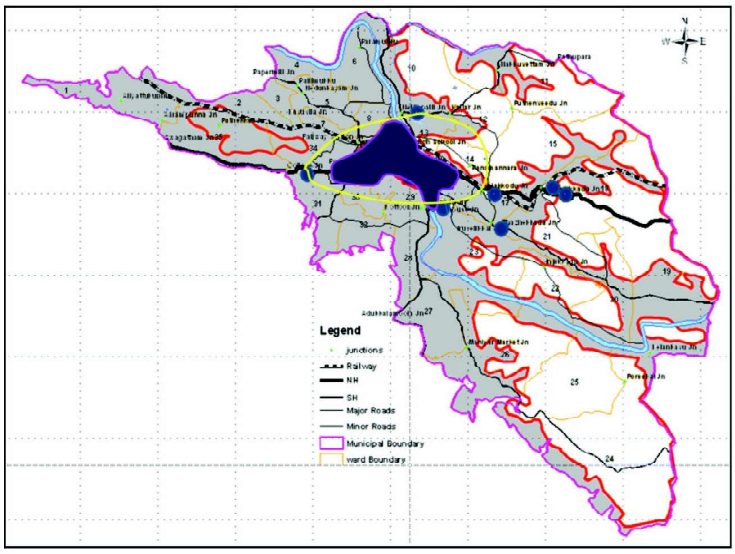


Figure 18.11. Ring roads connecting the commercial nodes and bridging the two half of the town

- Punalur town is divided in to two parts by the Kallada River which flows almost in the middle of the geographical area of the town. There is only one bridge across the Kallada River which con-

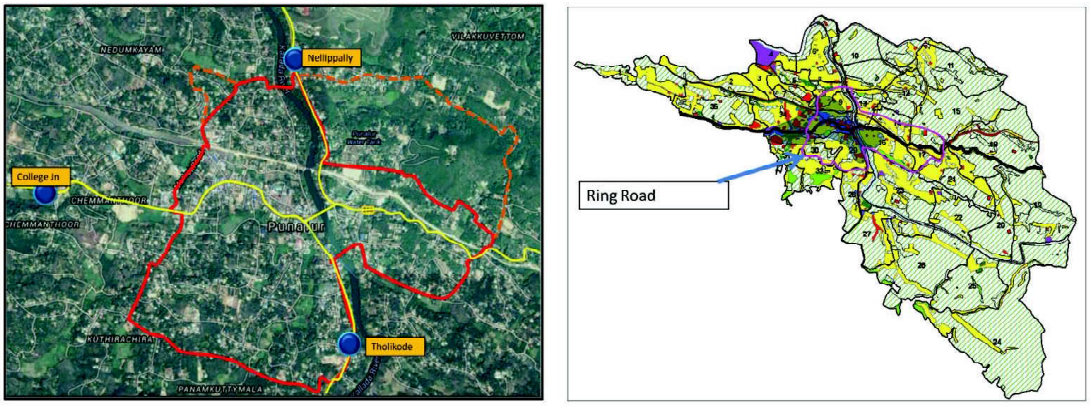


Figure 18.12. Ring road alignment



nects the two portions of the town and all the traffic through National Highway and the state highways passes through this single bridge making it a bottleneck (Fig. 18.10). Hence it is a necessity for the Punalur town from the traffic point of view as well as the safety and security aspects, more bridges are required connecting two portions of the town.

- Hence a ring road is proposed which connects the commercial nodes and crosses the Kallda River at two points within the town.

The appropriate alignment of this ring road is shown in figure 18.11 & 18.12.

- All the radial roads which ends at the ring road other than NH and SH is of secondary importance. The NH and SH passing through the town is the primary roads and other roads are taken as tertiary roads. The proposed road network of the town is shown in figure 18.13.
- Overlaying the activity zones and proposed transportation network, the final form of the town is derived which the future development concept of the town manifested spatially (Figure 18.14).

- **Detailing of the town core taking in to account the DTP Schemes**: - The land use of the core shows that there are plenty of vacant lands within the core (Figure 18.15).

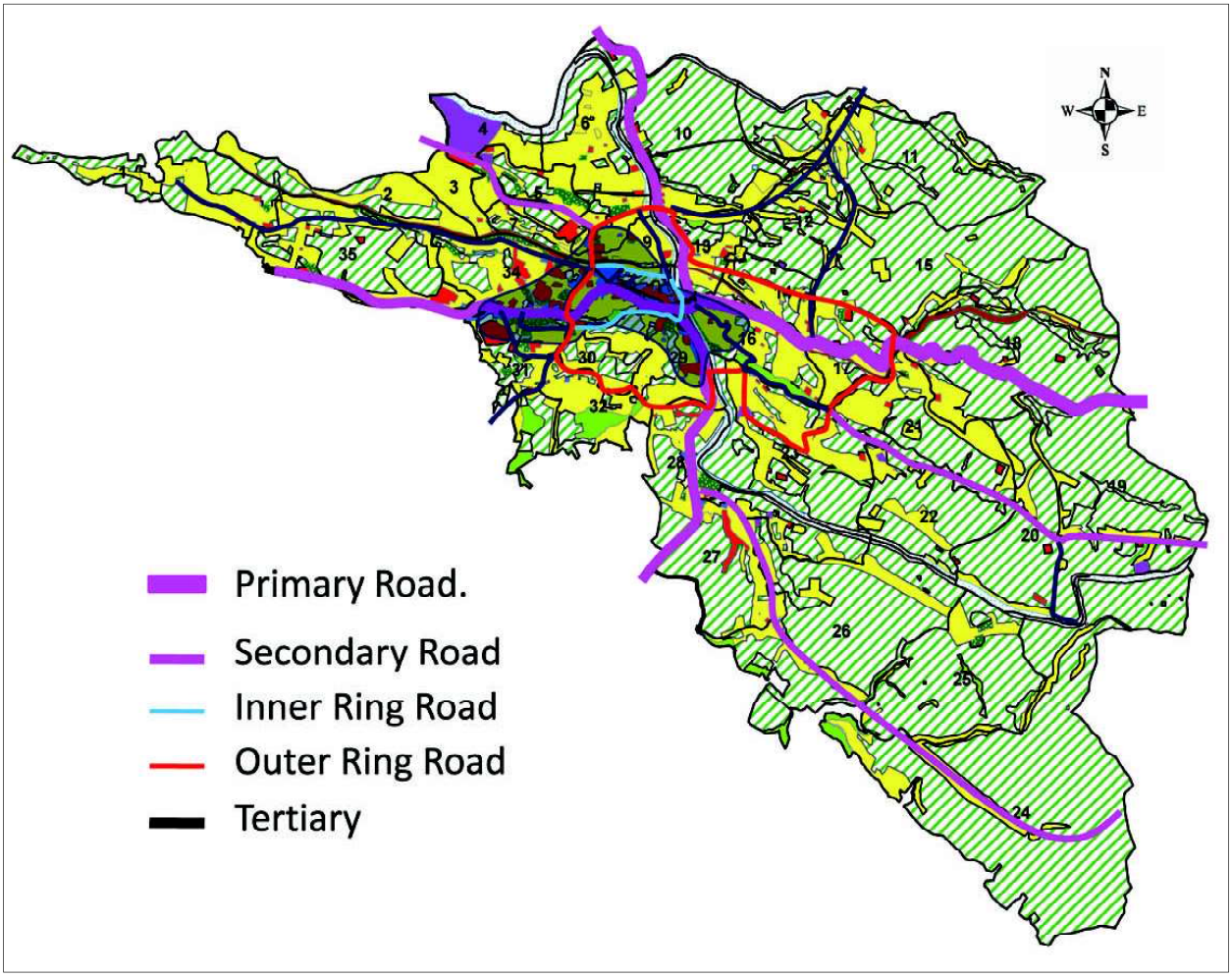


Figure 18.13. Proposed road network of the town

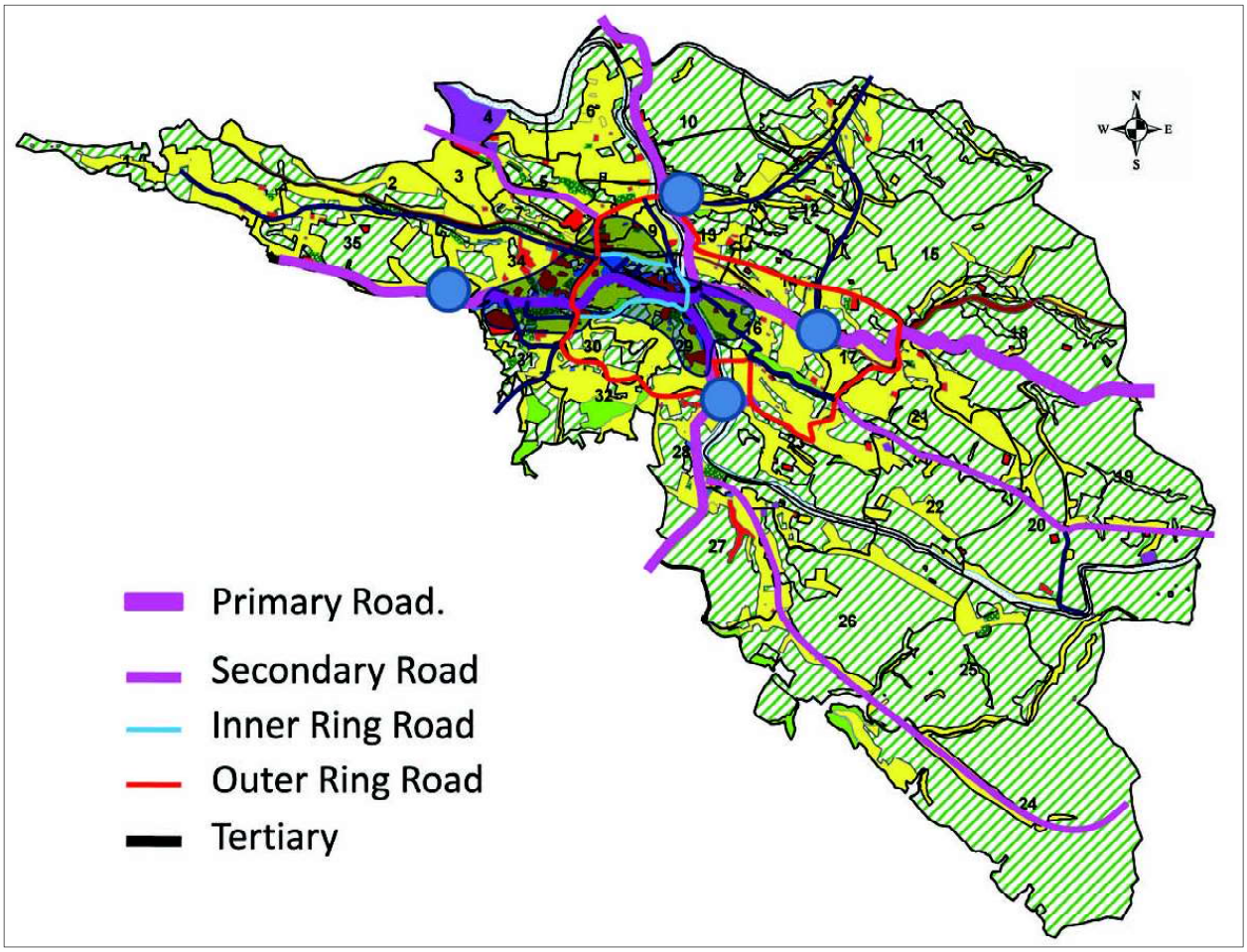


Figure 18.14. Development concept

- The DTP Scheme for Market junction is aimed at expansion of commercial area. Accordingly the vacant land adjacent to the existing market area is earmarked for expansion of market area. This will facilitate the implementation of waste treatment facility including sewage treatment plant.
- DTP Scheme for Chemmanthur area proposes a stadium at Chemmanthur (Figure 18.16). The land for the stadium is acquired and the stadium construction work is halfway. But as per the acquired land orientation of the stadium is not correct. Now it is

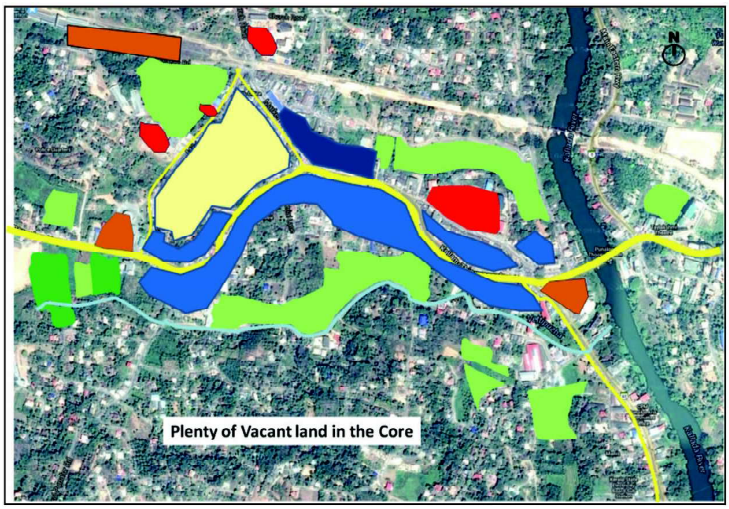


Figure 18.15. Vacant lands within the core area

in the east west direction, however inorder to change the orientation of the stadium from the present east west direction to north south direction, more land towards the south direction of the existing stadium area

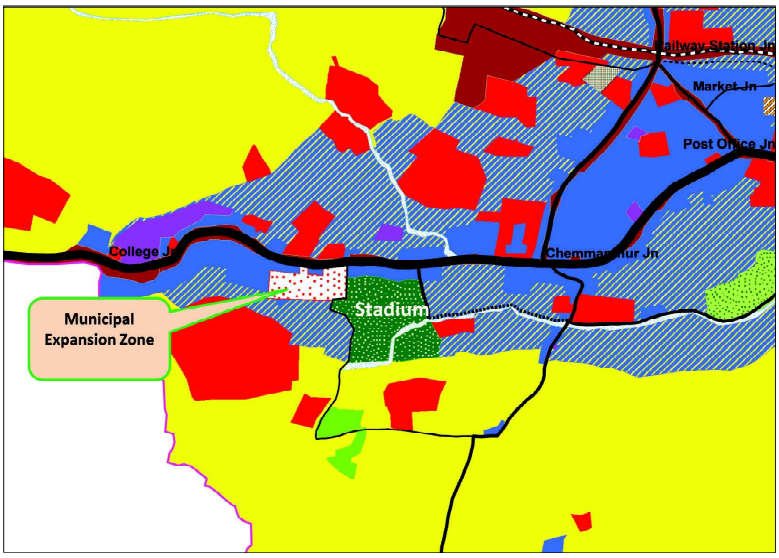


Figure 18.16. Expansion of Stadium & proposed Municipal office

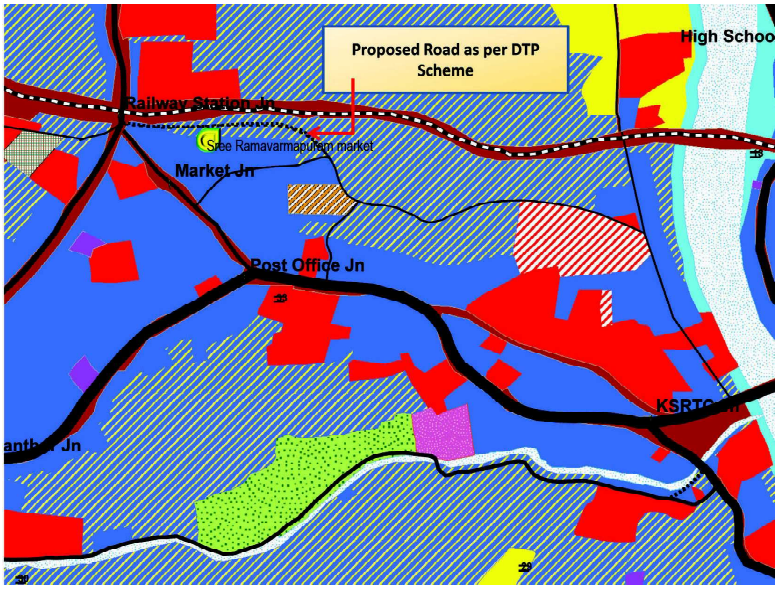


Figure 18.17. Proposed road as per DTP scheme

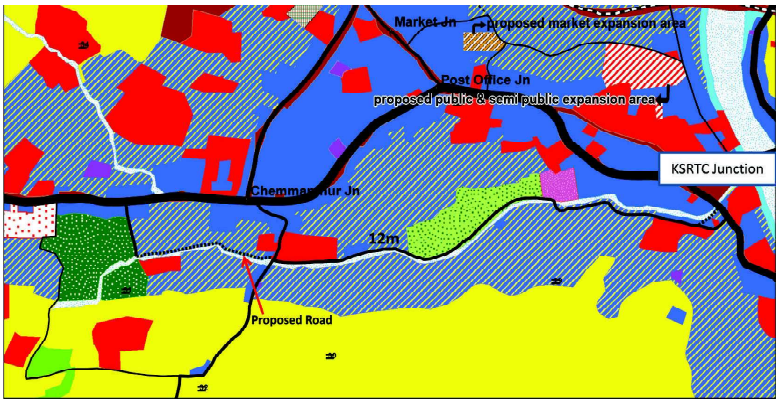


Figure 18.18. Proposed Road

is earmarked for the extension of the stadium. Considering the ease of access from highway, a municipal expansion zone with town hall and other incidental uses are proposed adjacent to municipal stadium.

- The DTP Scheme for KSRTC bus stand area provides an area for new KSRTC bus stand to the south west of KSRTC junction. However most of this area was utilized by private parties by challenging the DTP Scheme at court. Also it is suggested that the present KSRTC bus stand area can be developed in two levels so that the capacity can be increased further. Hence the area earmarked for new bus stand in the DTP scheme is proposed for Residential Mix Zone, in the Master plan.
- As the expansion of Municipal office and other public aminities to be provided by the Municipality are not found practical in the area public and semi public suggested in DTP Scheme for market area. The vacant land to the west of stadium is suggested for expansion of Municipal office and for other amenities such as Municipal town hall etc.
- Considering all the three DTP Schemes for the Punalur (DTP

Scheme for market area, DTP Scheme for Chemmanthur area, DTP Scheme for Bus stand area) together a road is proposed starting from the Railway station Junction passing behind the market and ending at Sivan Kovilroad (Figure 18.17).

- And also another road starting from KSRTC junction and ending at Stadium is also proposed (Figure 18.18). These will act as a ring road through the town core, easing the traffic through the existing roads (NH) and traffic congestion at the core of the city.
- The low lying land within the core located near Post office junction is proposed as a recreational and water recharging area with proposed parking lots (Figure 18.19).

18.4. Proposed Land Use Map - 2031

The land use of the Town is derived according to the development concept. The planning area is classified into various zones for regulated development and are named Residential zone, Residential mix zone, Commercial zone, Industrial zone, Public and semi public, dry agriculture zone, paddy/ low lying land, Government forest , Waterbodies and Special zones.

As the name indicates, Residential zone demarcates the area for residential purposes. This zone permits residential buildings and certain commercial activities related to residential activities.This zone is proposed around the Residential mix zone and is concentrated more towards western side of the planning area.

Residential mix zone proposed over the planning region is a mixed type land use where two types of land uses are clubed viz. Residential and commercial. This zone is proposed at the core area so that the urban potential of the planning area in terms of commercial is made use to certain extent. Proposed ring roads and topographical parameters are taken into considertation for demarcating this zone. Commercial activities are mixed with residential activities for this zone.

Commercial zone stands for the intense commercial activity areas where prime activity involves trade and commerce. The exisitng commercial zones are retained for this zone.

Industrial zone accounts for industrial activities. The obnoxious and nuissance nature industries that are not preferred near residential and other activites are to be considered at this zone.

Public and semi public zones are the zones where Government /public sector offices and other public buildings are functioning. Public utility areas are also categorised under this zone.

Traffic and transportation zone includes construction that form an integral or essential part of transport terminals. Parking plaza and other incidental uses of transportation are considered here.

Dry agriculture zone indicates the zone for

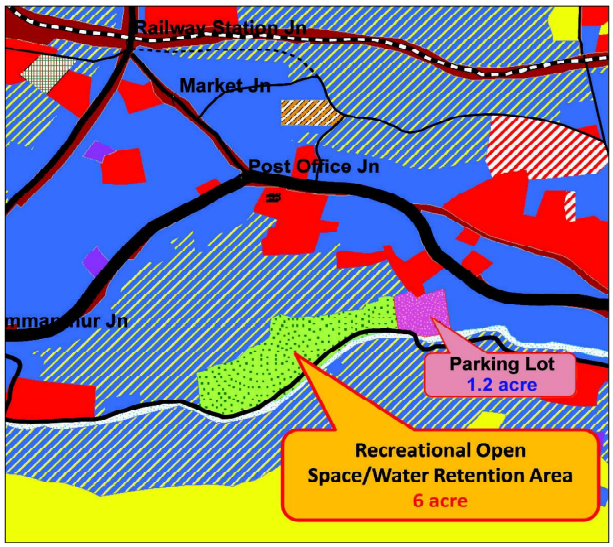


Figure 18.19. Proposed recreational and water recharging area and parking lots



agricultural activities such as agriculture, horticulture, fodder cultivation etc. Intense farming or agricultural activities are promoted here in addition to small residential, industrial and commercial activities to certain extend.

Paddy/ low lying land, as the name suggests stands for paddy cultivation and are to be retained and conserved in environmental point of view.

Government forest is the natural forest area as per records of forest department. The ownership of land wis vested with Forest department.

Water bodies of the planning area are to be conserved and are classified under this zone. In additional to general conservative measures, a 15 m no development zone is proposed on any plot boundary abutting Kallada river.

No development zone is a zone which may extent to a width of 15m or width of the water body as per revenue record which ever is less. Provided along the either side of such water bodies that are flood prone or environmentaly sensitive. This zone is designated as such to provide amble space for water retention and to reduce the risk of flooding.

Land use map is shown in the figure 18.20. Land use break up as per the proposed land use map is shown in table 18.1. The different activities permitted / restricted / prohibited in each of the land use is shown in the zoning regulations.

Landuse	Area(Sq.km)
Residential Zone	11.1664
Residential Mix Zone	0.8687
Commercial Zone	0.3906
Existing/Proposed Industrial Zone	0.3236
Existing/Proposed Public & Semi-public Zone	0.6139
Traffic & Transportation Zone	0.6545
Dry Agriculture Zone	15.2515
Paddy/Low Lying Land	0.3123
Government Forest	3.6012
Waterbodies/Ponds	0.8209
No Development Zone	0.3205
Special Use Zone	
Municipal Expansion Zone	0.0102
Recreational Open Space & Water Retension Area	0.0225
Tourism Project Area - I	0.0318
Tourism Project Area - II	0.0081
Lorry Parking	0.0027
Parking lots	0.0046
Stadium	0.0299
Market Expansion	0.0031
Total	**34.44**

Table 18.1. Land use break up as per proposed map

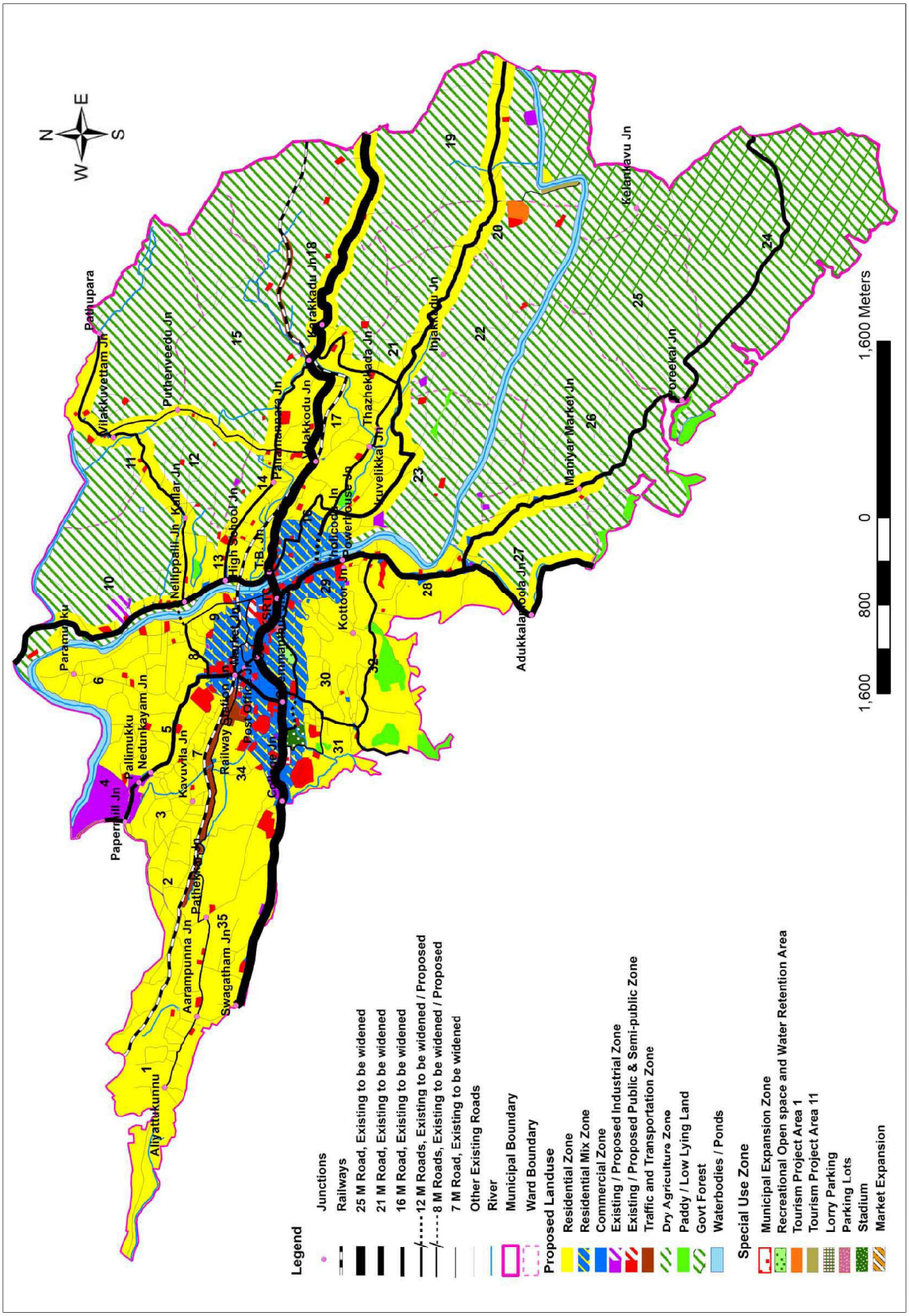


Figure 18.20. Proposed land use map 2031



Chapter 19
Sectoral Proposals

This chapter explains the development proposals of various sectors.

19.1. Industry

- Most of the land in Punalur is under dry Agricultural use and hence there is a big scope for rubber based or forest based industries in Punalur.
- An industrial estate is proposed in the north – east position of the Town near Be-be estate and along the side of SH Punalur Muvattupuzha road. The area has low density population and has good connectivity also. The area is proposed for the development of small scale industries especially forest based and rubber based industries. The area of the proposed estate is 10 acre and its location is shown in figure 19.1
- Reopening of Punalur Paper Mill by adopting modernization, diversification, and privatization with joint venture operation.
- Renovation of Kerala agro fruit product.

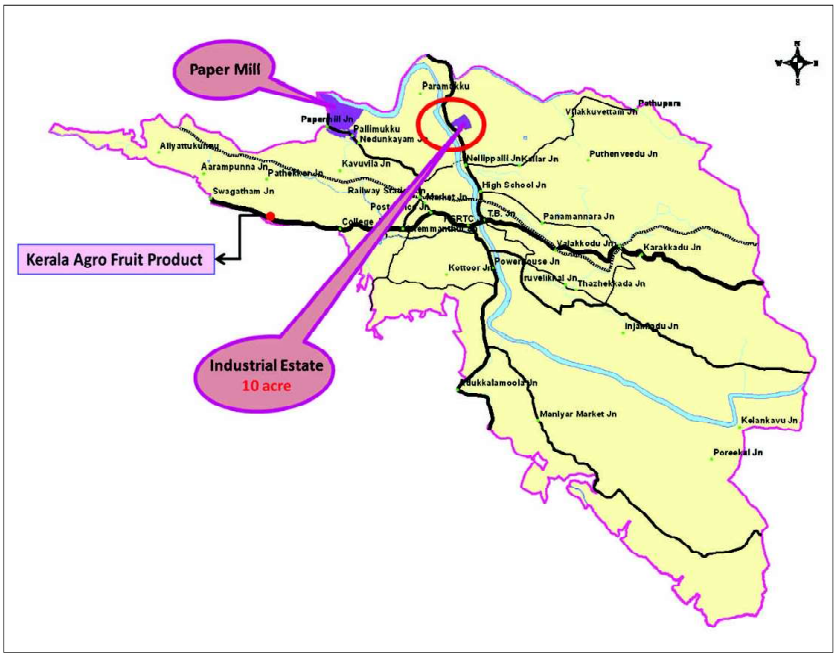


Figure 19.1. Proposed industrial estate

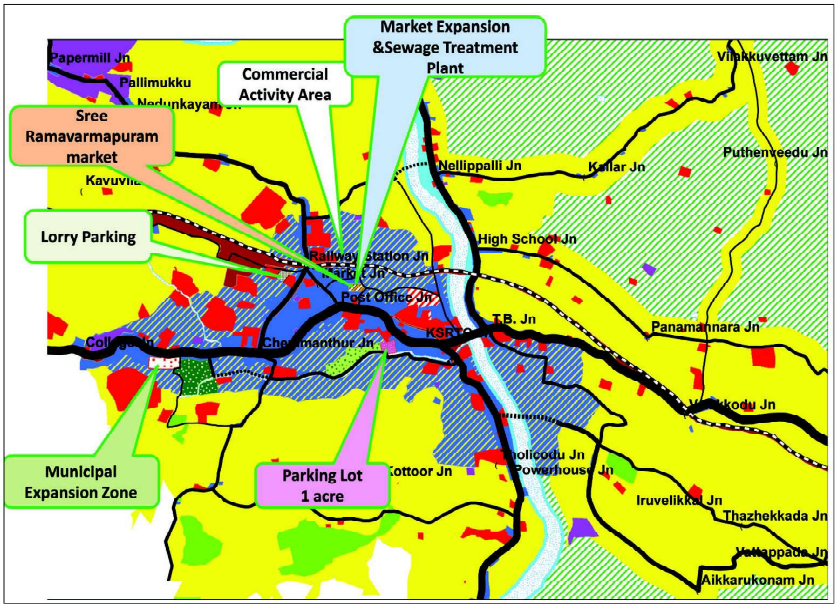


Figure 19.2. Proposed commercial activity area

19.2. Trade and Commerce

In Punalur town the commercial area is mainly concentrated in KSRTC bus stand, TB junction Post Office junction and Chemmanthoor junction. These junctions are located along 1.15

km length of the NH 744.

The major proposals for the commercial sector in Punalur are as follows.

- Expansion of the existing commercial activity area
- Parking area near Town and lorry parking area near Railway station.
- Expansion and redevelopment of Sri Ramavarmapuram market as a commercial sub centre and renovation of Kalayanad and Maniyar markets.
- Waste treatment plant and loading and unloading spaces have to be made mandatory in all markets.

Proposed Commercial Activity area is shown in figure 19.2.

19.3. Agriculture

Geographical area of the Town is about 34.44 km^2, out of the Agriculturable area of 18.71km^2 about 60% is under rubber cultivation and 2% in paddy cultivation. The Existing area of rubber cultivation is to be retained and productivity is to be increased. Banana and Pineapple can be cultivated as intercrops in rubber plantation area. Honey rearing is a good source of supplementary income for rubber farmers. Apiculture is to be implemented with linking of Khadi & Village Industries and Horticorp department. The productivity of coconut is being poor in the Town. It is essential that 50% of existing palms needs to be replanted.

- Quality planting material generation and distribution
- It is essential that the intensive cultivation can be undertaken to reduce the dependency on vegetables from other states, hence high-tech vegetable cultivation is proposed. And also promote vegetable cultivation on building terrace and grow bag vegetable cultivation in all houses with the help of agricultural department.
- To improve the financial status of coconut cultivators through measures like promotion of Neera.
- Promote new farming techniques like precision farming, protected farming etc.
- Provide a trading centre for storing and marketing the agriculture and rubber products.
- To enable farmers to get a fair prize for their produce, primary markets including collection centres is indented for the direct sale of agriculture produce by farmers to traders. In such areas facilities like space for lodging of item, sale area, weighing, transporting etc will be provided and direct sale to consumers, labour banks, mechanization and seed procurement also will be arranged. It can be suitably located in any of the rubber plantation area.
- Fencing proposed to protect crops from animal threat in the peripheral area of the forest coming in the boundary of the Town.

19.4. Tourism

Punalur town is considered as a tourism destination by promoting pilgrim tourism, village tourism and heritage tourism. Railway connectivity also enhances the tourism potential of Punalur. Tourism is not an important sector in Punalur now. Since Punalur Town is situated very close to Palaruvi waterfalls, schenthurini wild life sanctuary ecotourism spot at Thenmala, Achankovil, Arayankav and Kulathupuzha temple, it has got



enough potential to develop infrastructure facilities for supporting tourism activities in the eastern part of Kollam district. Sabarimala pilgrims use Punalur town as a transit camp station during the Sabarimala season.

- **Tourism project area 1**- The land under the possession of the Municipality in Vattappada (10 acre) is proposed as tourism project area. Open air recreational facilities Eco walk ways, park, zoological & botanical garden, bird sanctuary angling point etc are proposed in this location.
- **Tourism project area 2**- There is a scope for water tourism in vattappada at Kallada River. The total area for the proposal is 5 acre. Eco walk ways, Guided boat sides, water sport facilities, tourist resorts, angling point, open air recreational facilities etc are proposed for this site.

Other Proposals

- Renovation of suspension bridge.
- Tourism information centre in town area.
- Beautification of Kallada River.
- Proposal for providing quality basic amenities to meet the requirements of pilgrims, facilitation centres consisting of hall, toilet blocks, providing drinking water, bathing ghats, vehicle parking, club, restaurants etc. Figure 19.3 shows the Tourism activity area in Punalur.
- The Renovation of snanaghattam near TB junction

19.5. Stadium

- **Expansion of the existing Stadium at Chemmanthoor:** Approximately 7 acres of land on southern side of the existing Stadium is reserved for the expansion of the Stadium. Figure 19.4 shows the area for expansion of the existing stadium.

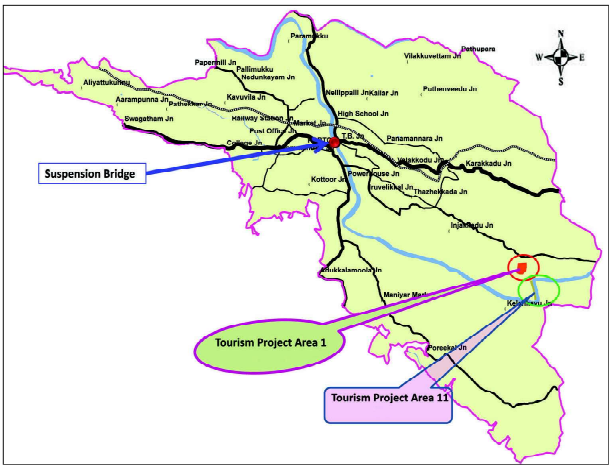


Figure 19.3.Tourism activity area

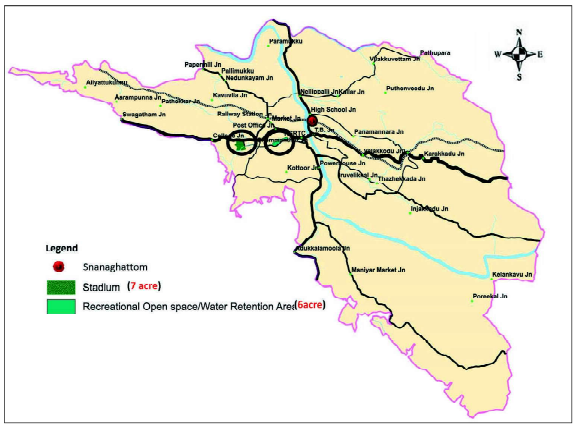


Figure 19.4.Recreational open space / water retention area and stadium

19.6.Recreational open space and water retention area

- Recreational open space and water retention area is proposed along the side of MLA road behind Post office junction. The total area for this proposal in 6 acre. Open air stadium, open air theatre, park, play ground, agriculture, horticulture, fish farms etc are to be proposed in this area. Recreational open space and water retension area is also shown in figure 19.4.

19.7. Solid Waste and Septage Management

The existing solid waste treatment plant is

at Plachery. It is not functioning properly. A modern solid waste treatment plant is proposed in this location besides the miniature liquid waste treatment plant at market.

- Decentralized waste management facilities to be implemented in all the residential areas through residents associations.
- Solid waste treatment plants in hotels, restaurants, other major commercial establishment, apartments etc are to be ensured.
- Promote biogas plant, pipe compost for waste treatment in each house hold.
- Segregation and collection of solid waste with the help of Kudumbasree.

Awareness through Anganwadi, Asha workers etc. Inform the public on how to segregate waste at source into biodegradable (wet) and non bio – degradable (dry) waste. Multi level waste management with decentralized waste management facilities is shown in figure 19.5.

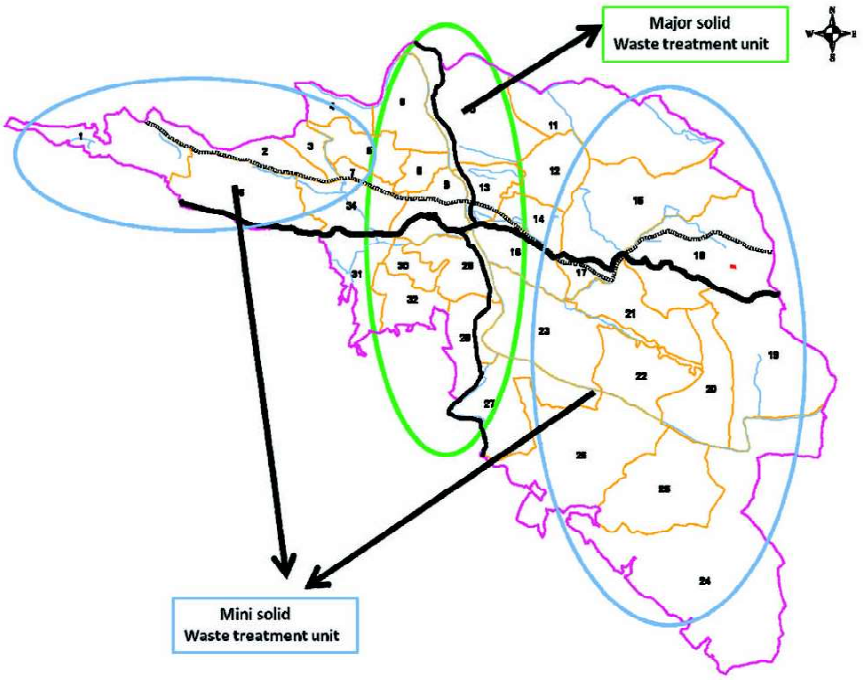


Figure 19.5. Multi level waste management with decentralized waste management facilities

At present sewage generated from the home holds is disposed using individual septic tank. As the average size of plots owned by individual home holds within the city centre viz ward 7, 8, 9, 16, 23, 29, 30, 31, 33, 34 is found small, concentration of septic tanks can lead to well water pollution. Hence it is proposed to provide liquid waste treatment plant for the city centre area in the special zone for market ex-

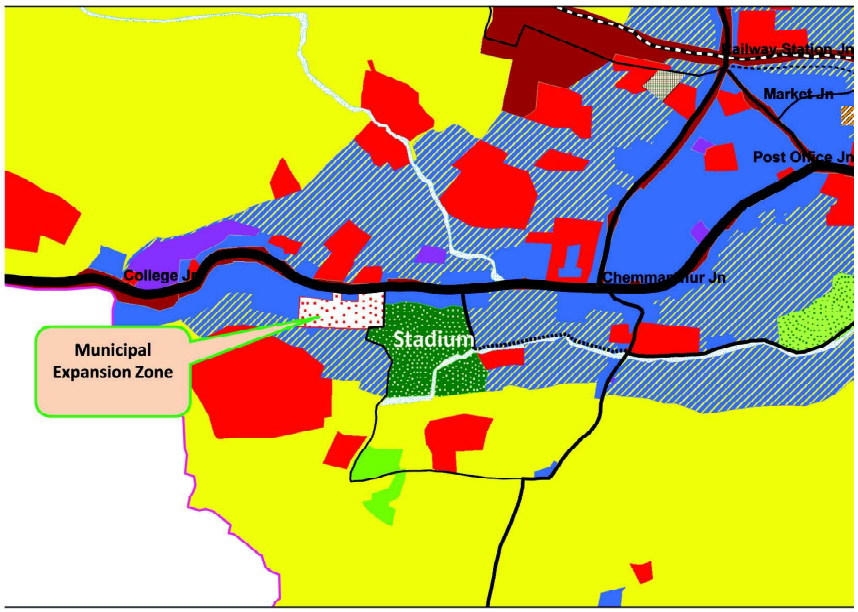


Figure 19.6. Proposed public office complex



pansion and sewage treatment plant after conducting a detailed feacibility study. Since the implementation of sewage treatment plant may take considerable time, septage treatment facility is suggested as an immediate solution for sewage management. Septage treatment facility may be provided in the plot identified for solid waste treatment plant.

19.8. Public Office Complex

Public office complex is proposed adjacent to the proposed stadium as part of expansion of Municipal office and other public buildings. A municipal town hall is also proposed adjacent to the stadium and public office complex. This is designated as a special zone having an area of 2.52 acre (Figure 19.6).

19.9. Drinking Water

The Kerala water authority has a proposal of Urban Water Supply Scheme to cater a water demand of 12.5 MLD for the entire area (34.44km^2) of the Town. The new proposals consists of a treatment plant of 12.5MLD at panagad in Kallada River. The existing scheme has a 9 MLD conventional water treatment plant located at Valacode in Punalur Town, but it treats 4.5 MLD only now. Shortage of water is there in high level areas of wards in Arampunna, Kanjrampala, Sasthamkonam, Pathekar, Ashtamangalam, Kelankavu, Gracingblock, Aikkarakonam, Vilakkuvettam, Komalamkunnu etc.

19.10. Power

- A feasibility study is proposed for a mini hydel power project generating a power of 1 MW by constructing a check dam across the Kallada River at Mukkadavu.
- Biogas plant of capacity 10 tones of solid waste is proposed for the Town. Location of the proposed biogas plant is in Plachery near to the existing solid waste treatment plant.
- Solar power panels in houses to save power in domestic uses are proposed.

19.11. Traffic and Transportation

Planning of long term transport infrastructure plan requires assessment of growth potentials of the major transport corridors as well as future land use development of the town. Alternative road development schemes have been suggested based on the evaluation of the anticipated traffic on the existing network. The long term development strategy for the town should aim at decongesting the center core by way of augmenting road capacity and scientific design of intersections, development of radial roads, widening of existing roads, expansion of KSRTC bus stand in two levels and proposals for fly overs along with provision of appropriate parking and pedestrian facilities to ease the traffic problems at the core area of Punalur town.

Primary Road

The primary roads passing through Punalur is the National highway 744 providing connectivity to state and district head quarters, SH-08 Punalur-Moovattupuzha road and SH 48 Punalur-Ayoor road provide connectivity to neighboring towns within and outside the district.

Ring Road

A ring road connecting all the commercial nodes of the town and crossing the kallada River at two points within the town is proposed. The alignment of the road is shown in figure 19.7. It crosses NH at Chemmanthoor junction and Kalayanad junction and passes through Railway

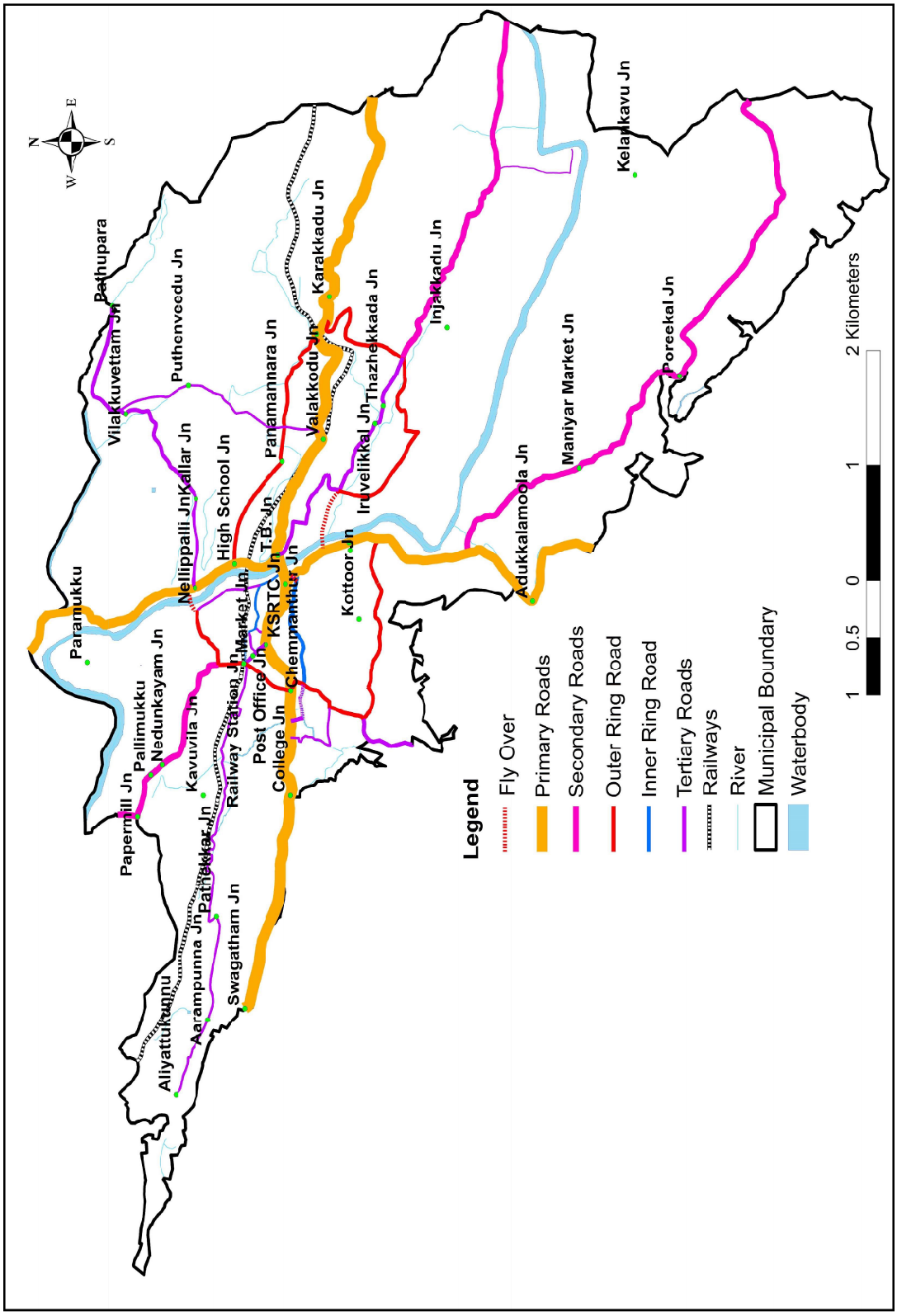


Figure 19.7. Proposed ring road network

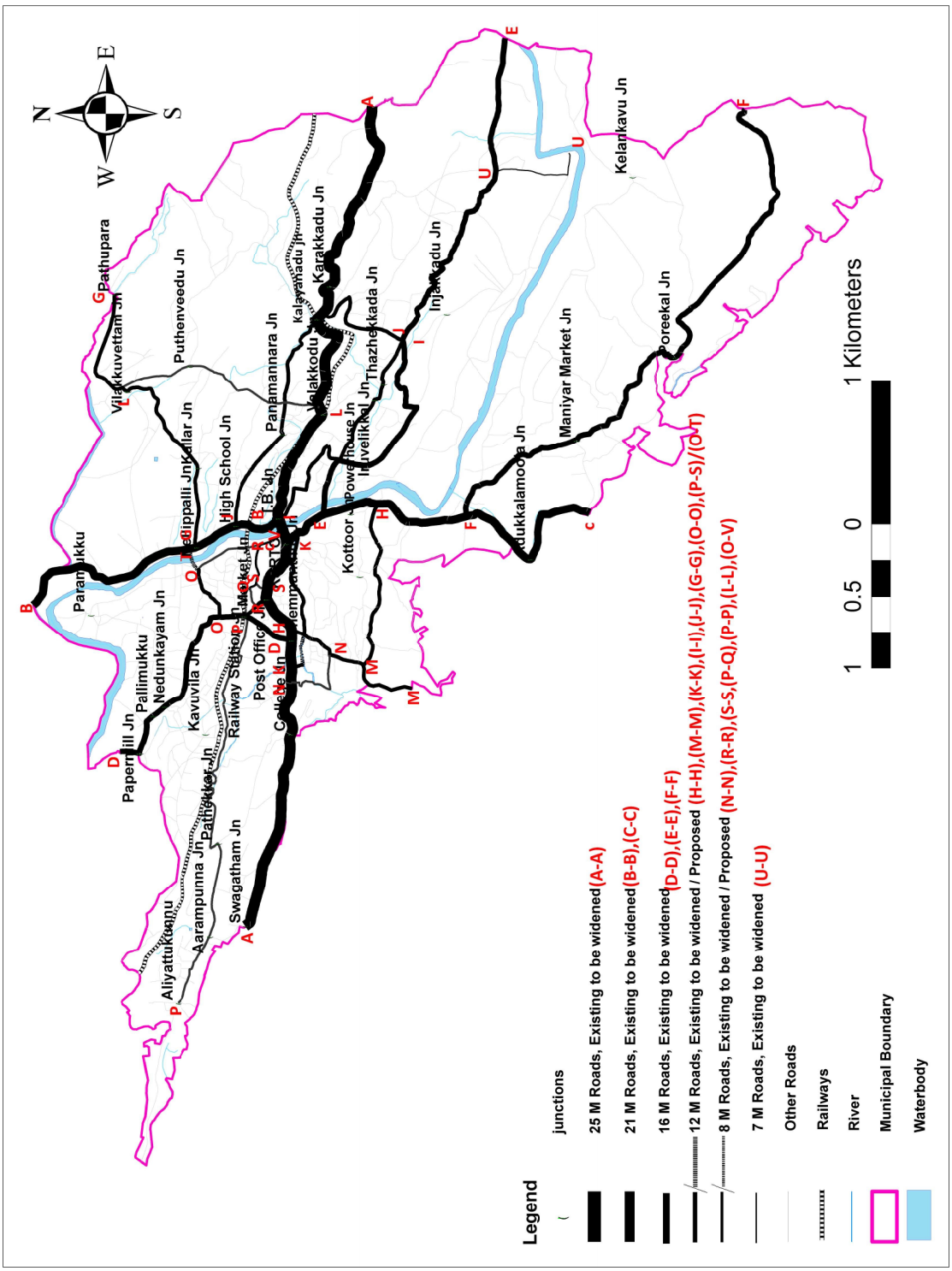


Figure 19.8. Proposed road network

station junction, Nellippally junction, High school junction, Panamannara junction, Vattappada junctions, Power house junction, Sabarigiri School junction via Kuthirachira LPS and reaches in Chemmanthoor junction. The proposed width of the right of way of the road is 12m, except for the stretches from Power house junction to Vattappada junction, Chemmanthoor junction to the junction where the road crossing at Paper Mill road (near Barath matha ITC) for this part the proposed width of right of way is 16 m.

Secondary road

All the radial roads which ends at the ring road other than NH and SH are taken as secondary roads. The alignment of the roads is shown in figure 19.7. The secondary roads are Paper mill road, Edamon road, Maniyar road and Vilakkuvettam road. The proposed right of way width of Paper Mill road, Edamon road and Maniyar road is 16 m and the width of Vilakkuvettam road is 12m.

Other roads

- Extension of MLA road and reaches in NH 744 near Stadium. The proposed right of way width is 12 m.
- Road from Aliyattukunnu to Railway station junction parallel to railway line. The proposed right of way width is 8 m. This would serve as parallel road for the portion of NH-744 between Arampunna to Railway station junction.
- Road near P.O junction to market road. The proposed right of way width is 8 m.
- Road from Valakkode to Vilakkuvettam. The proposed right of way width is 8 m.
- Sivan kovil road. The proposed right of way width is 8 m.
- Road from TB Junction to Vattappada junction. The proposed right of way width is 12m.
- Road from Nellippally to Pathupara. The proposed right of way width is 12 m.
- Road from Railway station junction to Post office junction. The proposed right of way width is 8m.
- Road from Market junction to Market Road. The proposed right of way width is 8 m.
- Road starting from Kuthirachira LPS to Karavaloor. The proposed right of way width is 12 m.
- Road passing below MarigiriVidhyamandir to Stadium. The proposed right of way width is 8 m.

Internal ring road

An internal ring road is proposed around the core of the commercial area. This ring road passes through Chemmanthoor junction, Railway station junction, pass through the market area and joins Sivan Kovil road passess through KSRTC junction and joins MLA road.

Road to Tourism spots

- To promote the tourism activity a tourism road is proposed through tourism activity area I and II. The proposed right of way width is 7m.
- The proposed road network is shown in figure 18.7 & 18.8.

Intersection improvement

Intersections are the bottle neck locations that hamper the free flow of traffic. Therefore there is a need to design the intersections for streamlining traffic flow and minimizing conflict points. The following intersections in Punalur town need to be taken up for detailed design considering the existing traffic flow and the need for fur-

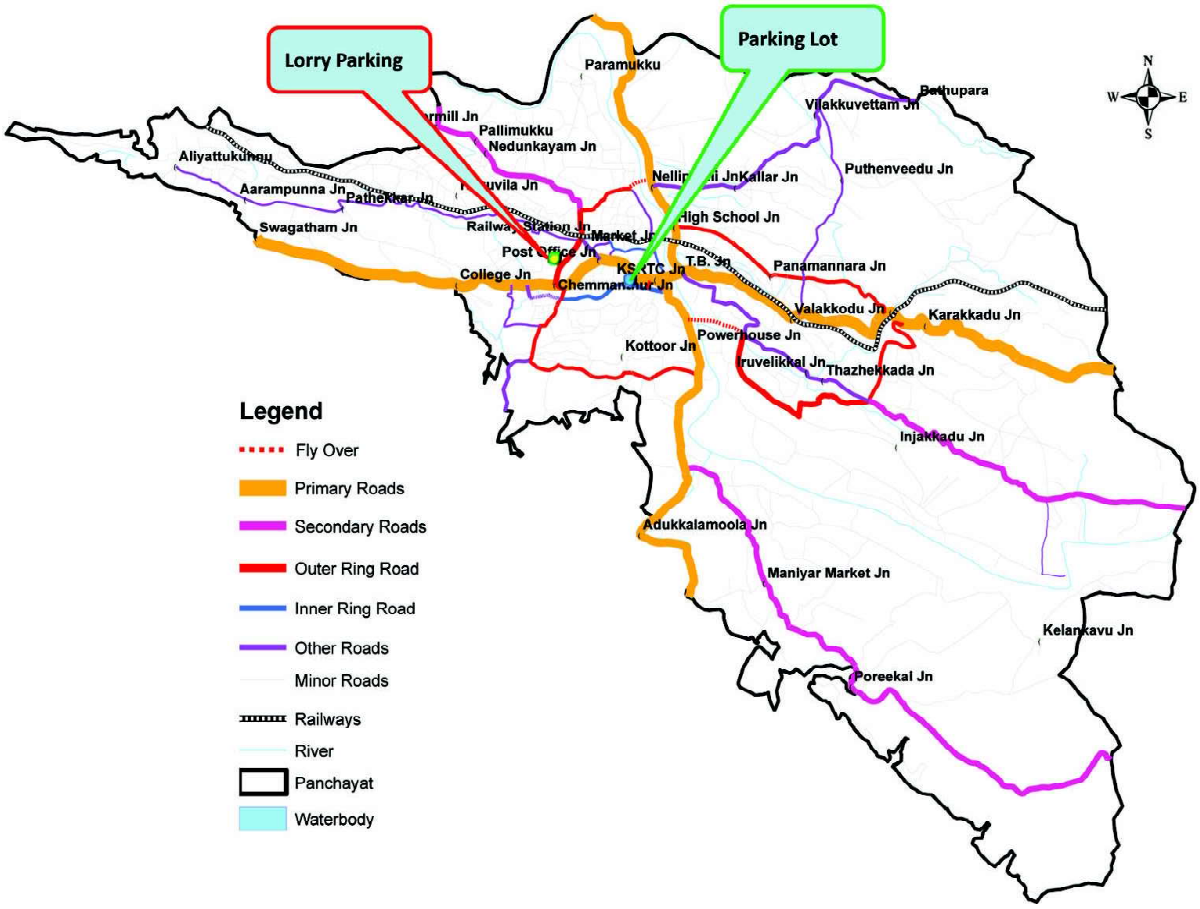


Figure 19.9. Proposed parking facilities in Municipal area

ther road widening.

Valakkode junction, TB junction, KSRTC junction, Post office junction, chemmanthoor junction, college junction, High school junction & Market junction.

New Bridges

Two Bridges are proposed, one is at Nellippally junction and other near Power house junction, where the ring road crosses the Kallada River.

Proposal for Expansion of KSRTC Bus Stand Area

The existing KSRTC bus stand area is proposed to expand vertically to accommodate more buses and to ease out traffic conjestion after making a detailed study on various routes.

Parking facilities

Considering the parking demand observed at many of the road stretches. Parking area is proposed in the core area of the town near to post office junction adjacent to proposed recreation and water recharging zone. A lorry parking area is proposed near to the railway station. Figure 19.9 shows the proposed parking areas.

19.12. Pedestrian Facilities

The pedestrian facilities suggested for Punalur town is discussed in the following section:

Footpath or walkways: Footpaths and walkways are "pedestrian lanes" that provide people with space to travel within the public right-of-way,



separated from roadway vehicles. Sidewalks bring in significant reduction in pedestrian collisions with motor vehicles. For Punalur town, considering the existing pedestrian demand, sidewalks with a width of 1.5m to 2.5 m is proposed for various types of roads including Primary (2.25m to 2.5m), Secondary (2.0m) and Tertiary roads (1.5m).

(ii) Crosswalks facilities: Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Crosswalks are often installed at intersections and other selected locations. Marked crosswalks are desirable at some high pedestrian volume locations (often in conjunction with other measures) to guide pedestrians along a preferred walking path. For Punalur town, zebra cross markings are desirable at the approach roads of major intersections. Apart from these intersections, cross walk markings need to be provided at major activity locations such as KSRTC bus station, Private bus station, bus stops, Hospitals, Market area and in front of important educational institutions.

(iii) Grade-separated pedestrian facilities: Grade separated facilities like pedestrian foot bridges and underpasses allow uninterrupted access to pedestrian movement, separated from the vehicular traffic. However, these should be a measure of last resort. It is usually more appropriate to use traffic-calming measures or install a pedestrian-activated signal that is accessible to all pedestrians. This is an extremely high-cost and visually intrusive measure. Such a facility must accommodate wheel chair persons. These measures include ramps or escalators, but results in long crossing distances and steep slopes that discourage its use.

Studies have shown that many pedestrians will not use an overpass or underpass if they can cross at street level in about the same amount of time. Overpasses work best when the topography allows for a structure without ramps. Underpasses work best when designed to feel open and accessible. Grade separation is most feasible and appropriate in extreme cases where pedestrians must cross roadways of high speed, high-volume arterials. Pedestrian underpass/overpasses are proposed at KSRTC junction covering all the approach arms of the KSRTC junction as well from public offices, health facilities and commercial facilities located above the main road. This would help in safe movements of pedestrians to and from KSRTC station without blocking traffic on the roads.

Detailed engineering surveys need to be carried out before finalizing the exact location and design of the pedestrian facilities at the proposed sites.



Chapter 20

Punalur- A Smart Town by 2031

- Various settlements within the town and activity nodes are to be interconnected through a transportation network consisting of roads of varying hierarchy. An inner ring road through the core of the town ensures connectivity through commercial hub of the town and helps to ease traffic congestion. An outer ring road, connects various activity nodes and ensures better connectivity between the two halves of the town situated on either side of Kallada River. A set of radial roads terminating at the outer ring roads ensures connectivity of various settlement with the core of the town.Two parking lots, one lorry parking lots near to railway station and a car parking lots beside MLA road near to water retetinon area are proposed to be developed as organized parking areas.
- Expansion of stadium and a park cum water retention area are proposed within the core of the town as breathing space of the town.
- A drainage network consisting of drains by the side of roads ultimately draining in to the Kallada River and water retention area are proposed for proper drainage of rain water
- A decentralized system of solid waste collection from household waste treatment plant, to sub-regional level plant serving 10-15 wards to town level treatment plant is proposed for Punalur town. A miniature liquid waste treatment plant is proposed Sree Ramavarmapuram Market expansion zone.

ANNEXURE - I

List of non-obnoxious and non - nuisance type of service or light industries

1. Aerated water and fuit beverages
2. Apparel making
3. Assembly of air coolers and conditioners
4. Assembly of bicycles, baby carriage and other small non motorized vehicles.
5. Atta - chakkies
6. Ayurvedic medicinal formulations, Ayurvedic health club
7. Bakery products, biscuits, confectionaries
8. Bamboo and cane products (only dry operations)
9. Boat Building Yard
10. Block making for printing
11. Card board or corrugated box and paper products (paper or pulp manufacturing excluded)
12. Carpet weaving
13. Cement and concrete products (where crusher is not used)
14. Chilling plants and cold storage
15. Coir (without bleaching / dyeing)
16. Concrete batching plants
17. Cotton and woolen hosiery / Cotton and silk printing
18. Electro plating
19. Electronics and electrical goods
20. Electronics equipment (Assembly)
21. Engineering workshop and general fabrication works (without any chemical treatment)
22. Embroidery and lace manufacturing
23. Flour mills (job work only)
24. Foam bed, latex thread
25. Foot wear (rubber and PVC)
26. Furniture making
27. Fountain pens
28. Garment stitching, tailoring
29. Gold and silver smithy
30. Gold and silver thread sari work
31. Ice-cream or ice making
32. Insulation and other coated papers (paper or pulp manufacturing excluded)
33. Jobbing and machining
34. Light engineering
35. Laundry, dry cleaning and dyeing
36. Manufacturing of formulated synthetic detergent products
37. Manufacture of soaps involving process without generation of trade effluents (saponification of fats and fatty acids only)

38. Mineralized water
39. Musical instruments manufacturing
40. Oil ginning / expelling
41. Optical frames
42. Paint (by mixing process only)
43. Paper pins and U-clips
44. Power looms / hand looms (without dyeing & bleaching)
45. Photo and picture framing
46. pressure testing units
47. Printing press
48. Rice mullors
49. Rope (cotton and plastic)
50. Rubber gloves other than that for surgical and medical purpose
51. Rubberized coir mattresses
52. Scientific and mathematical instruments
53. Sports goods
54. Steeping and processing of grains
55. Small foundries
56. Tissue culturing
57. Toys
58. Water softening and demineralization plants
59. Watch, pen and spectacles repairing

ANNEXURE-II

List of obnoxious or nuisance industries subject to objectionable sounds, dust, odours, fumes, effluents or porcesses grouped under Indian standard Industrial Classifiction to be located in Industrial zones vide regulation (13) of Part IV.

Manufacture of Food Stuff

1. Slaughtering, presrvation of meat and fish and canning of fish

Manufacture of Beverages

2. Production of distilled spirits, wines, liquor etc from alcoholic fruits and malts in distillery and brewery
3. Prdouction of country liquor and indigenous liqour such as toddy, liquor from Mahua, palm juice.

Manufacture of Textiles

4. Dyeing and bleaching of cotton

Manufacture of wood & Wooden Products

5. Sawing and planning of wood and creosoting
6. Wood seasoning
7. Manufactur of veneer & plywood
8. Paper, pulp and straw board

Manufactur of Leather & Leather Products

9. Currying, tanning and finishing of hides and skins and preparation of finished leather.

Manufacture of Rubber Petroleum & Local Products

10. Manufacture of tyres and tubes and tyre re- trading
11. Manufacture of indusrial and synthetic rubber
12. Reclamation of rubber
13. Production of petroleum, kerosene and other petrol products in refineries

Manufacture of Chemical and Chemical Products

14. Manufacture of basic industrial chemicals such as acids, alkalies and their salts, not elsewhere specified (specially sulphurious, sulphuric, nitric, hydrochloric etc aids, ammonia chlorine and bleaching powder manufacture)
15. Manufacture of dyes, paints, colours, ink powder, varnishes, printing ink etc.
16. Manufacture of fertilizers (specially from organic materials)
17. Manufacture of disinfectants an insecticides
18. Manufacture of Ammunition, explosives and fire works
19. Manufacture of matches

Manufacture of Non- metallic mineral products other than Petroleum and Coal

20. Manufacture of cement and cement products
21. Manufacture of lime
22. Manufacture of Plaster of paris

Manufacture of Basic Metals and their Products

23. Manufacture of iron and steel including sheeting, refining, rolling and conversion into basic forms
24. Manufacture including smelting, refining etc of non - ferrous metals and alloys in basic forms
25. Manufacture of ornaments

Manufacture of Machinery (other than transport) and Electrical Equipment

26. Manufacture of all kinds of battery

Miscellaneous items not covered above

27. Incineration, dumping and reduction of offal, dead animals, garbage or refuse
28. Manufacture of gelatin and glue
29. Fat, tallow, grease or lard refining or manufacture
30. Bone meal, bone grist and bone powder
31. Manufacture of cashew nut shell oil and other similar types of nuisance industries

(Note: In addition to the above industries categorized as 'Red' by Kerala State Pollution Control Board are also to be treated as obnoxious and nuisance industries)