Atal Mission for Rejuvenation and Urban Transformation

LSGD Planning, Kannur

MASTER PLAN
FOR
KANNUR CITY, 2041



MASTER PLAN FOR KANNUR CITY, 2041

UNDER AMRUT SCHEME

Prepared by

KANNUR CORPORATION

&

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING,KANNUR

GOVERNMENT OF KERALA

FEBRUARY 2024

FOREWORD

Kannur has its origin from "Kaanathoor", a coastal village formed by the silt deposited from Kaanam Puzha. In olden days there was a fort on the western side of Kaanathoor, known as "Katlayi Kota", which once flourished as the capital and great trading centre of Kolathiri Rajas. Kannur is the place where the only Muslim royal family in Kerala ruled with its headquarters at "Arakkal Kettu", near the present Kannur city. Kolathiri gave them a separate territory covering the Kannur bazaar for their control and they virtually became a power in respect of trade and political influence. Kannur city was once a stall for horses imported from Arabia and Kutch. The Portuguese traders got permission to build a fort in Kannur from Kolathiri in 1505 AD and St. Angelo's fort was built by Sir Francisco de Almeida.

This AMRUT Master Plan for Kannur Municipal Corporation can be figuratively called its manifesto of developments and is aimed at determining the future of the city has been formed recently by the adding the surrounding Panchayats to erst while Kannur Municipality and it is the right time for us to equip ourselves to rise to the occasion for utilizing in maximum the opportunities lying ahead. On this occasion, it is with great pleasure that I present this Master Plan for Kannur City. The Plan is intended, to be used as a general guide for the future development of land within the Corporation area for many years to come.

The plan is the product of extensive community participation over the last few couple of years. The contribution of every citizen and stakeholder who participated in the preparation of Master Plan can be seen in the following pages. Special thanks are extended to the members of Council, Municipal Standing Committee, Special Committee and its Working Groups who volunteered their precious time to guide the planning process, with their diligence and hard work. I appreciate the efforts put in by the officials of the LSGD Planning, Kannur who prepared this development plan through a process of people's participation, carefully understanding the aspirations and expectations of the citizens of the city.

Contained within this report are people's aspirations, dreams, and vision for transforming Kannur city into a smart urban centre with multifunctional zone for providing all basic facilities required for a district headquarters, this Master Plan aims

at developing a vital central commercial area at the heart of the city, It also includes ideas for the urbanization of surrounding areas for a sustainable development, and for laying the foundation for a strong economy by utilizing the potentials offered by the traffic corridors, airport, seaport and the proposed inland navigation to exploit canal tourism potentials available in and around the city, educational infrastructure and commercial activity nodes to be created outside the city centre for a balanced growth of the corporation area. It depicts a Transportation Plan for accommodating all future needs to provide smooth transit for all road users. The Master Plan also includes strategies for developing a city that enriches our lives with more urban and civic amenities with precautions to ensure qualitative life without much damage to the present environment.

I hope that you will read this plan with great enthusiasm and will find that it addresses the critical problems in the development scenario of the city. Finally the plan is open-ended allowing for revisions and additions every five years. And I hope this open-ended nature of the plan will help us fine-tune the proposed incentives and regulations, as and where defects are identified at later stage.

Kannur

MUNICIPAL CORPORATION OF KANNUR

MUSLIH MADATHIL
Mayor
Kannur Corporation

PREFACE

The 74th Constitutional amendment and subsequent state legislations have put forward a paradigm shift in the development planning process. The focus has shifted from physical planning to spatial planning for economic and social development. The inclusiveness of the development process is another important consideration in the nation at present. The Planning Commission, Government of India, in the Approach to 12th Five Year Plan, articulated this view as following *"Urban planning cannot be limited to spatial allocations and engineering solutions: It must encompass and connect various socio-technical considerations too"*. The Development Plan has multiple objectives in this backdrop - to ensure efficiency of built form of the town so as to augment economic development, facilitate inclusive and faster development by the impetus given to various sectors of economy and put in place a regulatory mechanism for limiting the anthropogenic threats to the already depleting environmental resources by keeping the demands of development well within the carrying capacity of our precious environment.

Kannur is one of the highly urbanized districts of Kerala, with nearly two-third of its population living in urban areas as per the census 2011. The population of the urban areas of Kannur district is increasing. This is contrary to the general trend of rural areas of coastal belt that are gradually urbanized. This necessitated a study on the urbanization pattern of the District. Planners have to study the process of urbanization of an area because this is one of the main criteria considered to be crucial in the planning process. The LSGD Planning has been instrumental in the preparation of Town Planning Schemes in the State as per the provisions contained in the Town Planning Acts in force. Accelerated urbanization in the State, a fact underlined by the 2011 Census of India figures, made it imperative to prepare Master Plans for all urban settlements in the State on a priority basis. The Department has taken up the challenging task of preparation of 32 Master Plans in the first stage and further 29 in the next stage to cover all the municipal areas in the State. Kannur Municipal Corporation was included in the latter scheme list of 29 plans.

Among the five hundred cities that have been selected under AMRUT, Kannur Municipal Corporation is also included. Hence the preparation of Master Plan materialized by focusing on the thrust areas of AMRUT Mission. Water supply,

sewerage and septage management, storm water drainage to reduce flooding, non-motorized urban transport, green space/parks are the thrust areas of the mission. Kannur city is famous for its tourism potential such as St. Angelo fort, Payyambalam Beach, Light house, Arakkal Kettu etc. These tourism spots have played a major role in development of the city. The development strategy of the city is based on its historical, social and cultural aspects ensuring the people's participation in all stages of planning.

I take this opportunity to appreciate efforts of the officials of the Kannur District office of the Department, especially Sri. Ravi Kumar P, Town Planner, Sri. Sooraj T C, Smt. Sanma Jishnudas, Deputy Town Planners Sri. Nidheesh K P, , Smt. Jiji Bhaskaran P and Sri. Rijesh N M, former Deputy Town Planners and Akhil.V, Assistant Town Planner and Sri Ranjith K V, Town Planner (Rtd), Sri. Sathyababu K, Deputy Town Planner (Rtd), in the preparation of this document played anchor role in this regard, right from conceptualization to completion. I also appreciate the consistent efforts of Sri Pramod Kumar C P, Chief Town planner, Sri. J Jayakumar, Additional Chief Town Planner(Rtd), Sri.Ajay Kumar S, Senior Town Planner, Smt.Asha Ajoy Ghosh, Smt. Oormila Raj.U, Town Planners, Smt. Raji S S , Smt.Sindhu Rani.P.V, Deputy Town Planners and other officials of Planning Wing of this Office for their efforts in vetting and finalizing the AMRUT Master Plan for Kannur City.

Certainly, this plan document for Kannur city will provide a frame work for development of the city for years to come.

Thiruvananthapuram

OFFICE OF THE CHIEF TOWN PLANNER
THIRUVANANTHAPURAM

29/4/2024

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ACKNOWLEDGEMENT

The Master Plan for Kannur Town (present Corporation area) is prepared as a part of preparation of Master Plans for towns in the Kerala State vide GO (Rt.) No.181 LSGD Dated 25/01/2015 of Local Self Government Department as a part of AMRUT Scheme. A methodology was evolved for the preparation of Master Plans at the State level and the same was adopted with suitable modifications at the City level. People participation has been a crucial element in the methodology. The Master Plan once sanctioned shall give directions to the development process in the Corporation area for years to come. Suitable provisions for monitoring and review of the Master Plan is inbuilt. This AMRUT Master plan is a GIS based Master Plan which is formulated by using spatial data and attributes for analysis part and proposal part. Moreover, this is a 'Risk Informed Master Plan' in which the disaster occurred during mega floods 2018 and 2019 has been studied and based on this risk zones have been identified and certain regulation have been imposed for saving the life and property during a future hazard moreover the Sponge City concept and Resilience City concept have been adopted as far as possible by creating conservation zones which include paddy fields, wet land, mangrove area etc.

I take this opportunity to appreciate the interest and enthusiasm shown by the Honourable Mayor and Deputy Mayor in the preparation of this master plan. The role of former Mayors and Deputy Mayors also has to be acknowledged here. I should like to place on record my gratitude towards Sri. K Sudhakaran, Honourable MP of Loksabha, Dr. V Shivadas, Honourable MP of Rajyasabha, Sri. Kadannapaly Ramachandran, Honourable MLA and Sri. Sumesh K V, Honourable MLA for their valuable suggestions in the preparation of this Master Plan report. We have heavily relied on statistical data from various Development Departments. Their readiness to share the data is gratefully acknowledged. The collection of data, analysis and preparation of this report would not have been possible without the active involvement and painstaking efforts taken by Councillors of Kannur Corporation, as well as members of Special Committee and its various Working Groups.

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Kannur

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RAVIKUMAR P
Town Planner
LSGD Planning, Kannur

CONTENTS

PART I - STUDY AND ANALYSIS

Chapter 1 - Introduction..... 1 - 12

1.1 General..... 1
1.2 The Corporation area..... 1
1.3 Need for Master Plan..... 4
1.4 Delineation of planning area..... 5
1.5 Organizational structure..... 5
1.6 Methodology..... 6
1.7 People's participation in the preparation of Master Plan..... 7
1.8 Earlier planning efforts and its appraisal..... 8
1.8.1 Development plan for Kannur Municipal area – 2031..... 9
1.9 Conclusion..... 10

Chapter 2 - Profile of the City..... 13 - 22

2.1 Location..... 13
2.2 Connectivity..... 13
2.3 Area and population..... 15
2.4 Administrative division..... 16
2.5 Soil..... 18
2.6 Physiography..... 18
2.7 Climate..... 19
2.8 History..... 20
2.9 Natural resources..... 22

Chapter 3 - Regional Settings & Urbanization Trends in the District.... 23 - 32

3.1 Regional linkage..... 23
3.2 Urbanization..... 24
3.3 Hierarchy of settlements..... 27
3.4 Functional character of the Corporation area in the district..... 28
3.5 Population concentration pattern..... 29
3.6 Activity pattern of the towns in the district..... 29
3.7 Connectivity..... 30
3.8 Spatial structure of the district..... 31
3.9 Inference..... 32

Chapter 4 - Demography..... 33 - 44

4.1 Population size..... 33
4.1.1 Comparison with district and state..... 33
4.1.2 Comparison with other Municipal Corporations in Kerala..... 34
4.1.3 Comparison with neighbouring local bodies..... 34
4.2 Population distribution..... 34
4.3 Growth pattern..... 36
4.3.1 Comparison with district and state..... 37
4.3.2 Comparison with other Municipal Corporations in Kerala..... 37
4.4 Population density..... 38
4.4.1 Comparison with other Municipal Corporations in Kerala..... 38
4.5 Sex ratio..... 39
4.5.1 Comparison with district and state..... 39
4.5.2 Comparison with other Municipal Corporations in Kerala..... 40
4.6 Child sex ratio..... 40
4.7 Literacy rate..... 41
4.8 Age-sex pyramid..... 41
4.9 Inference..... 42

Chapter 5 - Occupational Structure..... 45 - 50

5.1 Workers..... 45

5.2 Work participation rate..... 46

5.2.1 Temporal variation - comparison with district and state..... 46

5.2.2 Comparison with other Municipal Corporations in Kerala..... 46

5.2.3 Comparison with other Municipalities in District..... 47

5.2.4 Male and female WPR comparison with other Municipal Corporations in Kerala..... 47

5.2.5 Comparison of decadal variation of gender based work participation rate..... 47

5.3 Occupational structure..... 48

5.4 Inference..... 49

Chapter 6 - Land Use..... 51 - 62

6.1 Land use at city level..... 52

6.2 Comparison of existing land use with planning standards..... 52

6.3 Land use concentration pattern..... 54

6.3.1 Residential concentration..... 55

6.3.2 Industrial concentration..... 55

6.3.3 Commercial concentration..... 56

6.3.4 Public and semi-public concentration..... 57

6.3.5 Paddy concentration..... 58

6.3.6 Dry agriculture concentration..... 58

6.3.7 Recreational concentration..... 59

6.3.8 Transportation concentration..... 59

6.3.9 Water bodies other major land uses..... 60

6.4 Inference..... 60

Chapter 7 - Agriculture & Allied Sectors..... 63 - 72

7.1 Agriculture..... 63
7.1.1 Existing status..... 64
7.1.2 Inference..... 67
7.2 Animal husbandry..... 68
7.2.1 Existing status..... 68
7.2.2 Inference..... 70
7.3 Fisheries..... 70
7.3.1 Existing status..... 70
7.3.2 Development potentials..... 71
7.3.3 Development issues..... 72
7.3.4 Inference..... 72

Chapter 8 - Industries..... 73 - 78

8.1 Existing status..... 74
8.2 Development potentials and problems..... 76
8.3 Inference..... 77

Chapter 9 - Trade and Commerce..... 79 - 86

9.1 Existing scenario..... 79
9.1.1 Important commercial nodes and their hierarchy..... 79
9.1.2 Informal sector/ street vendors..... 82
9.2 Development potentials and problems..... 83
9.3 Inference..... 84

Chapter 10 - Tourism, Culture & Heritage..... 87 - 100

10.1 Existing status..... 87
10.2 Types of tourism..... 88
10.2.1 Beach tourism..... 88
10.2.2 Pilgrim tourism..... 92
10.2.3 Cultural tourism..... 93
10.2.4 Heritage tourism..... 94
10.2.5 Other tourist spots influencing Kannur Corporation area..... 96
10.3 Potentials and problems..... 99
10.4 Inference..... 100

Chapter 11 - Traffic and Transportation..... 101 - 120

11.1 Analysis of existing status..... 101
11.1.1 Road network..... 101
11.1.2 Vehicle population..... 103
11.1.3 Traffic volume studies..... 104
11.1.4 Capacity utilization..... 106
11.1.5 Characteristics of intercity passenger and vehicular traffic..... 107
11.1.6 Characteristics of public transport..... 109
11.1.7 Speed and delay characteristics..... 110
11.1.8 Parking facilities..... 111
11.1.9 Pedestrian movements..... 113
11.1.10 Accident prone locations..... 114
11.1.11 Hierarchy of traffic nodes..... 116
11.1.12 Railway transport..... 116
11.1.13 Water network..... 116
11.1.14 Airways..... 117
11.2 Development potentials and problems..... 117
11.3 Inference..... 118

Chapter 12 - Water Supply..... 121 - 132

12.1 Existing status..... 121
12.2 Sources of water supply..... 121
12.3 Treatment, storage and distribution..... 122
12.4 Water scarcity..... 124
12.5 Ongoing schemes..... 126
12.6 Potentials and problems..... 128
12.7 Inference..... 130

Chapter 13 - Drainage, Sewerage & Solid Waste Management..... 133 - 144

13.1 Drainage..... 133
13.1.1 Analysis of existing status..... 133
13.1.2 Ongoing projects..... 135
13.1.3 Potentials and problems..... 135
13.2 Sewerage system..... 136
13.2.1 Analysis of existing status..... 136
13.2.2 Completed and Ongoing projects..... 137
13.2.3 Potentials and problems..... 138
13.3 Solid waste management..... 138
13.3.1 Analysis of existing status..... 138
A Collection..... 140
B Disposal..... 140
C Treatment..... 141
13.3.2 Ongoing projects..... 143
13.3.3 Potentials and problems..... 143
13.4 Inference..... 144

Chapter 14 - Energy..... 145 - 150

14.1 Existing status..... 145
14.1.1 Consumption..... 146
14.1.2 Connection and distribution..... 146
14.1.3 Other sources of energy..... 148
14.2 Development potentials and problems..... 148
14.3 Inference..... 150

Chapter 15 - Education..... 151 - 160

15.1 Analysis of existing status..... 151
15.2 Educational status..... 152
15.3 Educational institutions..... 152
15.3.1 Primary schools..... 153
15.3.2 High schools..... 153
15.3.3 Higher secondary schools..... 153
15.3.4 Special schools..... 154
15.3.5 Higher educational institutions..... 154
15.4 Potentials and problems 159
15.5 Inference..... 160

Chapter 16 - Health..... 161 - 172

16.1 Analysis of existing scenario..... 161
16.1.1 Major hospitals in Kannur Corporation area..... 162
16.2 Health issues in the Corporation area..... 167
16.2.1 Epidemics..... 167
16.2.2 Life style diseases..... 167
16.2.3 Covid-19..... 169

16.3 Potentials and problems..... 169
16.4 Inference..... 171

Chapter 17 - Housing..... 173– 184

17.1 Existing status..... 173
17.1.1 House hold size..... 173
17.1.2 Zone wise comparison..... 174
17.1.3 Overall housing scenario in the planning area..... 174
17.1.4 Flats in Corporation area..... 177
17.1.5 Slums..... 177
17.1.6 SC/ST Colonies..... 179
17.1.7 Housing for poor..... 182
17.2 Potentials and problems 183
17.3 Inference..... 184

Chapter 18 - Recreation & Civic Amenities..... 185 - 194

18.1 Recreational facilities..... 186
18.1.1 Parks..... 186
18.1.2 Open spaces..... 187
18.1.3 Cinema theatre..... 189
18.1.4 Ponds..... 189
18.1.5 Swimming pools..... 189
18.1.6 Assembly halls..... 190
18.1.7 Sports and arts training centres..... 190
18.1.8 Libraries and reading rooms..... 191
18.2 Civic amenities..... 192
18.2.1 Police station and fire station..... 192
18.2.2 Post Offices and telephone exchanges..... 193

18.2.3	Burial grounds and crematorium.....	193
18.2.4	Comfort stations.....	193
18.2.5	Oil and gas filling stations.....	193
18.2.6	Public Offices.....	193
18.3	On-going projects.....	193
18.4	Potentials and Problems.....	193
18.5	Inference.....	194

Chapter 19 - Social Welfare..... 195 - 202

19.1	Analysis of existing status.....	195
19.1.1	Scheduled Caste / Scheduled Tribe (SC/ ST).....	195
19.1.2	Below poverty line (BPL).....	196
19.1.3	Children.....	196
19.1.4	Women.....	197
19.1.5	Differently abled persons.....	198
19.1.6	Old aged people.....	199
19.1.7	Social welfare pension / Financial aids.....	199
19.2	Development potentials and problems.....	199
19.3	Inference.....	200

Chapter 20 - Environment..... 203 - 210

20.1	Existing status.....	203
20.1.1	Sensitive / Fragile areas.....	204
20.1.2	Pollution.....	206
20.2	Conservation efforts.....	207
20.3	Development potentials and problems	208
20.4	Inference.....	208

Chapter 21 - Municipal Finance..... 211 - 214

21.1 Municipal finance..... 211
21.1.1 Analysis of existing status..... 211
21.1.2 Sources of fund..... 213
21.2 Municipal Governance..... 213
21.3 Development potentials and problems..... 213
21.4 Inference..... 214

Chapter 22 – Disaster Management-Risk Assessment..... 215 - 246

22.1 Introduction..... 215
22.2 National policy..... 216
22.3 State policy..... 216
22.4 District level study of disasters..... 217
22.4.1 Flood..... 219
22.4.2 Landslide and landslip..... 221
22.4.3 Drought..... 223
22.4.4 Thunder and lightning..... 224
22.4.5 Epidemics/pandemics..... 225
22.4.6 Coastal related disasters..... 225
22.4.7 Earthquake..... 226
22.4.8 Air accidents..... 226
22.4.9 Chemical and industrial disasters..... 227
22.4.10 Fire..... 227
22.5 Kannur city - study of disasters..... 227
22.5.1 Micro watersheds of Valapattanam river in the study area 227
22.5.2 Flood..... 228
22.5.3 Epidemics/Pandemics..... 231
22.5.4 Drought..... 232

22.5.5	Coastal hazards	232
22.5.6	Fire	233
22.6	Hazard analysis	234
22.7	Analysis of critical facilities	235
22.8	Integrated analysis of land use v/s hazard zone	237
22.9	Analysis of hazard zone v/s distribution of infrastructure and identification gap	238
22.9.1	Analysis of rescue related infrastructure	238
22.9.2	Need of permanent shelters	238
22.9.3	Safe route and potential camp locations of Kannur Municipal Corporation	243
22.9.4	Analysis of catchment of shelters against settlement	244
22.10	Mitigation measures	244
22.10.1	Flood	244
22.10.2	Epidemics/Pandemics	244
22.10.3	Drought	244
22.10.4	Coastal area disasters	245
22.10.5	Fire	245
22.11	Inference	245

Chapter 23 - Spatial Structure..... 247 - 256

23.1	Functional character	247
23.2	Activity pattern	249
23.3	Hierarchy of settlements	251
23.3.1	Existing hierarchy of settlements	252
23.4	Existing hierarchy of nodes	252
23.5	External development thrust	253
23.6	Existing road network	254
23.7	Existing spatial structure	256

23.8 Inference..... 256

Chapter 24 - Projected Requirements..... 257 - 226

24.1 Population..... 257
24.1.1 Arithmetical increase method..... 257
24.1.2 Geometrical increase method..... 258
24.1.3 Incremental increase method..... 258
24.1.4 Decreasing rate method..... 259
24.2 Work force..... 260
24.3 Water supply..... 260
24.4 Solid waste and sewerage..... 262
24.5 Energy..... 262
24.6 Education..... 263
24.7 Health..... 264
24.8 Housing..... 264
24.9 Recreation and civic amenities..... 265
24.10 Social welfare..... 265
24.11 Traffic and transportation..... 266
24.12 Inference..... 272

PART II - DEVELOPMENT VISION

Chapter 25 - Summary of Analysis & Regional Linkage..... 273 - 284

25.1 Major findings of spatial analysis..... 273
25.1.1 Regional study..... 273
25.1.2 Demography..... 274
25.1.3 Occupation..... 274
25.1.4 Existing land use..... 274
25.2 Major findings of sectoral analysis..... 274

25.2.1	Sectors of economy	275
25.2.2	Sectors of physical infrastructure	277
25.2.3	Sectors of social infrastructure	279
25.2.4	Disaster management	282
25.2.5	Linkage of development parameters of spatial and sectoral analysis	283
25.3	Inference	283

Chapter 26 - Vision, Goals & Objectives..... 285 - 288

26.1	The vision statement	285
26.2	Goals	285
26.3	Aim and objectives	286
26.3.1	Goals	286
26.3.2	Objectives	286

Chapter 27 - Development Concepts, Policies & Strategies..... 289 - 298

27.1	Suggested city form and development direction	289
27.2	Suggested settlement pattern	291
27.3	Suggested hierarchy of nodes	293
27.4	Suggested road network	293
27.5	Suggested spatial structure	295
27.6	Envisaged city functions	296
27.7	Development concept	296
27.8	Policies and strategies	297
27.8.1	Policies	297
27.8.2	Strategies	297

PART III - LAND USE PLAN AND SECTORAL PROPOSLS

Chapter 28 - Proposed Land Use Plan..... 299 - 309

28.1 Existing scenario..... 299
28.2 Proposed land use pattern..... 299
28.3 Built-up zone..... 303
28.4 Green-blue zone..... 307
28.5 Special zone..... 309
28.6 Risk area..... 309

Chapter 29 -Traffic and Transportation Plan..... 311 - 332

29.1 Transport development plan for Kannur Corporation..... 311
29.2 Transportation Plan..... 313
29.3 Road widening proposals..... 314
29.3.1 Major roads in the city..... 314
29.4 NH bypass..... 321
29.5 Coastal highway from Azheekkal port to Edakkad..... 322
29.6 Junction improvement proposals..... 322
29.6.1 Other junctions to be improved..... 326
29.7 Parking facilities..... 326
29.7.1 On street parking..... 326
29.7.2 Pay and park..... 326
29.7.3 Multi-level car parking..... 326
29.8 Pedestrian facilities..... 326
29.8.1 Sidewalks or walkways..... 328
29.8.2 Marked crosswalks..... 328

29.8.3	Sky walks……	329
29.9	Cycle tracks……	329
29.10	Public transport system……	329
29.10.1	Renovation of old bus stand and KSRTC bus stand……	329
29.10.2	Strengthening of public transport system……	329
29.10.3	"Sugama"- mini bus service of Kannur Corporation……	330
29.11	Other proposals……	330
29.11.1	Bus bays with Hi-tech waiting shelters……	330
29.11.2	Truck terminal……	330
29.11.3	Beautification of major roads and junctions……	331
29.11.4	Marine walk/ride……	331
29.11.5	Shuttle service at tourist destinations……	331
29.11.6	Public information system……	331
29.11.7	Prepaid auto and taxi stand……	331
29.11.8	Traffic regulations like odd even system……	331
29.12	Railway over bridges (ROB)……	331
29.13	Other modes of transportation……	332
29.13.1	Waterways……	332
29.13.2	Rail connectivity……	332
29.13.3	Air connectivity……	332
29.14	Inference……	332

Chapter 30 - Sectoral Proposals…… 333 - 350

30.1	Recreation and civic amenities……	333
30.2	Trade and commerce ……	334
30.3	Industries ……	335
30.4	Water supply ……	336
30.5	Drainage, sanitation and solid waste management ……	337
30.6	Tourism, culture and heritage ……	338

30.7	Housing	340
30.8	Energy	340
30.9	Education	340
30.10	Health	341
30.11	Social welfare	341
30.12	Agriculture and allied sectors	342
30.12.1	Agriculture	342
30.12.2	Animal husbandry	345
30.12.3	Fisheries	345
30.13	Environment and disaster management.....	346
30.14	Municipal finance and Governance.....	350

Chapter 31 – Priority Action Plan, Fiscal Requirement And Resource Mobilization..... 357 - 361

31.1	Industrial park at Pallipoyil.....	351
31.1.1	Location details.....	351
31.1.2	Need for the project.....	351
31.1.3	Project brief.....	351
32.1.4	Responsible agencies.....	353
31.1.5	Suggested implementation mechanism.....	353
31.1.6	Funding and resource mobilization.....	353
31.1.7	Project period and priority.....	354
31.2	Sewage treatment plant at Neerchal....	354
31.2.1	Location details.....	354
31.2.2	Need for the project	354
31.2.3	Project brief.....	355
31.2.4	Responsible agencies.....	355
31.2.5	Suggested implementation mechanism.....	355
31.2.6	Funding and resource mobilization.....	355

31.2.7	Project period and priority	355
31.3	Green park at Thottada	356
31.3.1	Location details	356
31.3.2	Need for the project	356
31.3.3	Project brief	356
31.3.4	Responsible agencies	356
31.3.5	Suggested implementation mechanism	356
31.3.6	Funding and resource mobilization	357
31.3.7	Project period and priority	357
31.4	Theyyam Museum	357
31.4.1	Location details	357
31.4.2	Need for the project	357
31.4.3	Project brief	358
31.4.4	Responsible agencies	358
31.4.5	Suggested implementation mechanism	358
31.4.6	Funding and resource mobilization	359
31.4.7	Project periods and priority	359
31.5	Sky walk	359
31.5.1	Location details	359
31.5.2	Need for the project	359
31.5.3	Project brief	360
31.5.4	Responsible agencies	360
31.5.5	Suggested implementation mechanism	360
31.5.6	Funding and resource mobilization	360
31.5.7	Phasing of selected projects	361

Chapter 32 - Smart City Components..... 363 - 369

32.1 Smart city concept of India..... 363

32.1.1 Basic criteria for selection of city/Municipal area as smart..... 364

32.1.2 Area based smart city development..... 364

32.2 Smart cities - promoting sustainable and smart cities..... 365

32.3 AMRUT (Atal Mission for Rejuvenation and Urban Transformation) Mission 366

32.4 Smart city components included in the Master Plan of Kannur City..... 368

PART IV - DEVELOPMENT CONTROLS

Chapter 33 - Zoning Regulations..... 371 - 394

33.1 General guidelines..... 371

33.2 Guidelines for large scale projects..... 377

33.3 Zoning regulations..... 379

Annexure I..... 395 - 399

Annexure II..... 401 - 402

Annexure III..... 403 - 404

LIST OF FIGURES

Figure.1.1	District map of Kannur
Figure.1.2	Location of Kannur Municipal Corporation
Figure.1.3	Organizational structure for the preparation of Master Plan
Figure.1.4	Methodology of Master Plan preparation
Figure.1.5	Location of DTP Schemes in old Kannur Municipality
Figure.1.6	Proposed land use map of Kannur Municipality as per Published Development Plan for the Town
Figure.2.1	Location of Kannur Municipal Corporation area and its adjoining local bodies
Figure.2.2	Road network of Kannur district
Figure.2.3	Ward map of the planning area
Figure.2.4	Village map of the Kannur Municipal Corporation area
Figure.2.5	Desom map of the Kannur Municipal Corporation area
Figure.2.6	Physiography of Kannur Municipal Corporation area
Figure.3.1	Regional Connectivity of Kannur Municipal Corporation area
Figure.3.2	Urban LSGs in Kannur district as per 2001 Census
Figure.3.3	Urban LSGs in Kannur district as per 2011 Census
Figure.3.4	Cumulative Functional Index (CFI)
Figure.3.5	Settlement hierarchy in Kannur district
Figure.3.6	Functional character of Kannur district
Figure.3.7	Population concentration pattern of Kannur district
Figure.3.8	Connectivity of Kannur district
Figure.3.9	Spatial structure – Kannur district

Figure.4.1	Decadal variations in population of Kannur Municipal Corporation area
Figure.4.2	Comparison of population with other Municipal Corporations in Kerala
Figure.4.3	Comparison of population with neighbouring local bodies
Figure.4.4	Ward wise population of Kannur Municipal Corporation area
Figure.4.5	Growth rate comparison of Kannur Corporation area with state and district
Figure.4.6	Comparison of population growth rate with other Municipal Corporations in Kerala
Figure.4.7	Gross population density of State, District and Kannur Municipal Corporation area
Figure.4.8	Ward wise distribution of gross population density
Figure.4.9	Comparison of gross population density of Kannur Municipal Corporation with other Municipal Corporations in Kerala
Figure.4.10	Sex Ratio - Comparison with district and state
Figure.4.11	Decadal variation in sex ratio of Kannur Corporation area
Figure.4.12	Sex Ratio comparison with other Municipal Corporations in Kerala
Figure.4.13	Comparison of child sex ratio of district and state
Figure.4.14	Comparison of literacy rate with district and state
Figure.4.15	Comparison of male and female literacy rate with state and district
Figure.4.16	Age-sex pyramid
Figure.5.1	Decadal variation of total number of workers in Kannur Municipal Corporation area
Figure.5.2	Share of main and marginal workers in planning area
Figure.5.3	WPR in Kannur Corporation area
Figure.5.4	Temporal variation in WPR - comparison with district and state
Figure.5.5	Comparison of WPR with other Municipal Corporations in Kerala
Figure.5.6	Comparison of WPR with other Municipalities in Kannur District
Figure.5.7	Comparison of male and female WPR with other Municipal Corporations in Kerala

Figure.5.8 Comparison of decadal variation of gender based WPR of Kannur Corporation

Figure.5.9 Decadal variation of main workers in Kannur Corporation area

Figure.5.10 Classification of workers

Figure.6.1 Existing land use break up

Figure.6.2 Existing land use map of Kannur Corporation area

Figure.6.3 Distribution of residential land use

Figure.6.4 Concentration pattern of residential land use

Figure.6.5 Distribution of industrial land use

Figure.6.6 Concentration pattern of industrial land use

Figure.6.7 Distribution of commercial land use

Figure.6.8 Concentration pattern of commercial land use

Figure.6.9 Distribution of public and semi-public land use

Figure.6.10 Concentration pattern of public and semi-public land use

Figure.6.11 Distribution pattern of paddy land use

Figure.6.12 Concentration pattern of paddy land use

Figure.6.13 Distribution of dry agriculture land use

Figure.6.14 Concentration pattern of dry agriculture land use

Figure.6.15 Concentration pattern of recreational land use

Figure.6.16 Concentration pattern of transportation land use

Figure.6.17 Distribution of other important land use

Figure.7.1 Existing agricultural land use

Figure.7.2 Zone wise land utilization for agricultural purpose

Figure.7.3 Paddy concentration in zone wise

Figure.7.4 Cultivation area details of cash crops

Figure.7.5 Percentage area under other crops

Figure.7.6 Details of household livestock

Figure.7.7 Location of available fish landing centres

Figure.8.1 Location of different industrial units in Kannur Corporation area

Figure.8.2 Distribution of micro, small and medium enterprises

Figure.8.3 Year wise growth of MSMEs

Figure.8.4 Types of industries

Figure.8.5 Number of labourers engaged in different MSMEs

Figure.8.6 Year wise employment growth of MSMEs

Figure.9.1 Types of commercial activities in Kannur Municipal Corporation area

Figure.9.2 Major commercial nodes in the Kannur Municipal Corporation area

Figure.9.3 Spatial distribution of informal sectors

Figure.10.1 Yearly tourist data

Figure.10.2 Monthly tourists (Year 2019)

Figure.10.3 Important tourist locations in Kannur district

Figure.11.1 Existing road network in Corporation area

Figure.11.2 Peak hour traffic flow at major intersections in the Corporation area

Figure.11.3 Traffic volume on major roads

Figure.11.4 Capacity utilization of major roads

Figure.11.5 Distribution of intercity flow of passenger movement

Figure.11.6 Distribution of intercity flow of goods traffic movement

Figure.11.7 Distribution of intercity flow of passengers based on mode of travel

Figure.11.8 Distribution of intercity flow of goods vehicles based on mode of travel

Figure.11.9 Distribution of purpose wise trips made by vehicles

Figure.11.10 Commodity wise distribution of goods traffic in planning area

Figure.11.11 Bus transport routes in Kannur Corporation area

Figure.11.12 Parking locations in the planning area

Figure.11.13 Pedestrian crossings in Kannur Corporation area

Figure.11.14 Hierarchy of traffic nodes

Figure.11.15 Existing rail network

Figure.11.16 Proposed alignment of inland water way

Figure.12.1 Sources of water supply

Figure.12.2 Details of water scarcity

Figure.12.3 Wards facing water scarcity in the city

Figure.13.1 Physiography of Kannur Corporation area

Figure.13.2 Split up of sanitary waste disposal of houses in the Corporation area

Figure.13.3 Percentage of houses and flats in the Corporation that are having facility of waste treatment

Figure.13.4 Disposal of solid waste from houses

Figure.13.5 Details of waste treatment method at own compound

Figure.14.1 Existing energy sources for cooking uses in the Corporation area

Figure.14.2 Monthly electrical consumption in the Corporation area

Figure.14.3 Location of different substations

Figure.15.1 Comparisons of literacy rate with state and district

Figure.15.2 Comparison of literacy rate with other Municipal Towns in Kannur district

Figure.15.3 Year wise comparison of male and female literacy rate

Figure.15.4 Present educational status of Kannur Corporation area

Figure.15.5 Ownership of schools

Figure.15.6 Spatial distributions of primary schools and their service area

Figure.15.7 Distribution of high schools in Kannur Corporation area

Figure.15.8 Spatial distribution of higher secondary schools and their service area

Figure.15.9 Locations of arts and science colleges in Kannur Corporation area

Figure.15.10 Locations of different professional colleges in Kannur Corporation area

Figure.16.1 Details of physical infrastructure of PHC's in the Corporation area

Figure.16.2 Details of physical infrastructure of PHC's in the Corporation area

Figure.17.1 Household size comparison with district and state

Figure.17.2 Household size comparison with other Municipal Corporations

Figure.17.3 Variation of household size in Kannur Corporation area and other urban local bodies of the district during the period of 2001 and 2011

Figure.17.4 Zone wise data of household size

Figure.17.5 Ownership of buildings

Figure.17.6 Percentage variations for different types of buildings

Figure.17.7 Percentage variations of houses in each range of plinth area (sq. m)

Figure.17.8 Percentage variations of houses in terms of number of storeys

Figure.17.9 Percentage variations in terms of material used for walls

Figure.17.10 Percentage variations in terms of material used for floors

Figure.17.11 Percentage variations in terms of material used for roofs

Figure.18.1 Location of various parks and open spaces in the Corporation area

Figure.18.2 Location of libraries in the Corporation area

Figure.18.3 Location of civic amenities in the Corporation area

Figure.19.1 Zone wise distribution of SC population in Kannur Corporation area

Figure.19.2 Zone wise distribution of ST population in Kannur Corporation area

Figure.19.3 Location of Anganwadis in the Corporation area

Figure.19.4 Ward wise details of Kudumbasree units in the Corporation area

Figure.19.5 Details of differently abled group

Figure.20.1 The location of all the eco sensitive areas in the Corporation area

Figure.22.1 Ecological Sensitive Zones as per Gadgil Report

Figure.22.2 Flood prone areas in Kannur district

Figure.22.3 Landslide susceptibility map for Kannur district

Figure.22.4 Landslide and flood affected Panchayats in Kannur district

Figure.22.5 Drought areas in Kannur district

Figure.22.6 Coastal hazard susceptibility map of Kannur district

Figure.22.7 Micro-watershed in Kannur Municipal Corporation

Figure.22.8 Inundated areas in Kannur Municipal Corporation(2018-2020)

Figure.22.9 Flood prone areas of Kannur Municipal Corporation

Figure.22.10 Flood prone areas of Kannur Municipal Corporation - Ward wise

Figure.22.11 Coastal hazard susceptibility map

Figure.22.12 Vulnerable areas of Kannur District

Figure.22.13 Location of critical infrastructures at Kannur Municipal Corporation

Figure.22.14 Flood prone areas v/s Land use map of Kannur Municipal Corporation

Figure.22.15 Location of rehabilitation centres at Kannur Municipal Corporation

Figure.23.1 Functional character of Kannur Corporation area

Figure.23.2 Ward wise classification of major land use in Kannur Corporation area

Figure.23.3 Activity pattern of Kannur Corporation area

Figure.23.4 Hierarchy of Settlements

Figure.23.5 Hierarchy of Nodes

Figure.23.6 External development thrust of Kannur Corporation area

Figure.23.7 Existing road network

Figure.23.8 Formulation of existing spatial structure

Figure.24.1 Projected population- Arithmetical increase method

Figure.24.2 Projected population-Geometrical increase method

Figure.24.3 Projected population-Incremental increase method

Figure.24.4 Projected population-Decreasing rate method

Figure.24.5 Projected WFPR

Figure.24.6 Projection - V/C ratio in major road stretches

Figure.27.1 Suggested city form

Figure.27.2 Suggested settlement pattern

Figure.27.3 Suggested road network and hierarchy of nodes

Figure.27.4 Suggested spatial structure

Figure.28.1 Proposed land use break-up

Figure.28.2 Proposed land use map

Figure.29.1 Proposed Transportation Plan-2041

Figure.29.2 Location of identified pay and park lots

Figure.31.1 Location of Proposed Industrial Park at Pallipoyil.

Figure.31.2 Location of Proposed Sewage Treatment Plant at Neerchal

Figure.31.3 Location of Proposed Green Park at Thottada

Figure.31.4 Location of Proposed Theyyam Museum

Figure.32.1 Smart solutions – Illustrative list

LIST OF TABLES

Table.2.1	Details of election wards in Corporation area
Table.3.1	Growth of population in the district
Table.3.2	Rural-Urban break up of population (Kannur district)
Table.4.1	Comparison of population of Kannur Municipal Corporation with state and district
Table.4.2	Ward wise population of planning area
Table.5.1	Category of main workers
Table.6.1	Existing land use break up
Table.6.2	Land use comparison of Kannur Municipal Corporation area with planning standards
Table.7.1	Extent of land use in Kannur Corporation area
Table.7.2	Details of yield of some crops
Table.7.3	Existing irrigation facilities
Table.7.4	Available infrastructure facilities
Table.7.5	Equipment details
Table.7.6	Farmers details
Table.7.7	Details of diary units
Table.7.8	Different means of fishing used in planning area
Table.8.1	Categorization of industries based on the investment
Table.11.1	Categorization of roads based on the material used
Table.11.2	Categorization of footpaths based on the material
Table.11.3	Growth of vehicle population in Kannur District

Table.11.4 Number of motor vehicles having valid registration in Kannur district and State in 2015

Table.11.5 Peak hour traffic volume at major intersections in the Corporation area

Table.11.6 On street Parking locations in Kannur Corporation area

Table.11.7 Parking duration of vehicles at major parking corridors in Kannur Corporation area

Table.11.8 Growth in accident in Kannur Corporation area

Table.12.1 Details of public distribution system in the Corporation area

Table.12.2 Details of water supply schemes in the Corporation area

Table.13.1 Details of commercial establishments

Table.13.2 List of Vehicles in city used for solid waste collection

Table.14.1 Details of different sections under KSEB

Table.14.2 Details of solar panels in the Corporation area

Table.16.1 Details of various hospitals in Kannur Corporation area

Table.16.2 Major Epidemics in the corporation area for the last five years

Table.16.3 Life style diseases for the last five years in the Corporation area

Table.16.4 Covid-19 cases and death in Kannur Corporation area

Table.17.1 Details of recognised slums in Corporation area

Table.17.2 Details of identified slums in Corporation area

Table.17.3 Details of identified colonies in Kannur Corporation area

Table.17.4 Zone wise details of BPL families

Table.17.5 Details of houseless families in Kannur Corporation area

Table.18.1 Details of theatres in the Corporation area

Table.18.2 Details of sports training centres in the Corporation area

Table.18.3 Details of arts training centres in the Corporation area

Table.19.1 Temporal variation of SC and ST population in the Corporation area

Table.19.2 Details of old age group

Table.19.3 Details of social welfare pension/financial aids

Table.21.1 Details of income and expenditure of Kannur Corporation area

Table.22.1 The type of disaster occurred in different local bodies in 2018 monsoon

Table.22.2 Disaster prone wards in Kannur Municipal Corporation

Table.22.3 Emergency response team & available tools at collection centres

Table.22.4 Details of camps and rehabilitation centres

Table.22.5 Details of income and expenditure of Kannur Corporation area

Table.23.1 List of wards and their functional character in Kannur Corporation area

Table.23.2 Derivation of activity pattern

Table.24.1 Final projected population in Kannur Corporation area

Table.24.2 Projection – Water supply

Table.24.3 Projection - Solid waste management

Table.24.4 Sewerage treatment plant capacity requirement

Table.24.5 Projection details of energy sector

Table.24.6 Future demand of educational institutions based on URDPFI guidelines

Table.24.7 Projection of health facilities Guidelines

Table.24.8 Projections - Housing demand

Table.24.9 Projected details of recreational and civic amenities

Table.24.10 Projected details of social welfare requirements

Table.24.11 Projection - V/C ratio in major road stretches

Table.28.1 Proposed land use break up

Table.29.1 Details of Road Widening proposals in Kannur City

Table.29.2 Details of identified pay and park lots

Table.31.1 Prospective agencies for the materialization of Industrial Park project

Table.31.2 Prospective agencies for the materialization of STP project at Neerchal

Table.31.3 Prospective agencies for the materialization of Green Park project

Table.31.4 Phasing of selected projects

ABBREVIATIONS

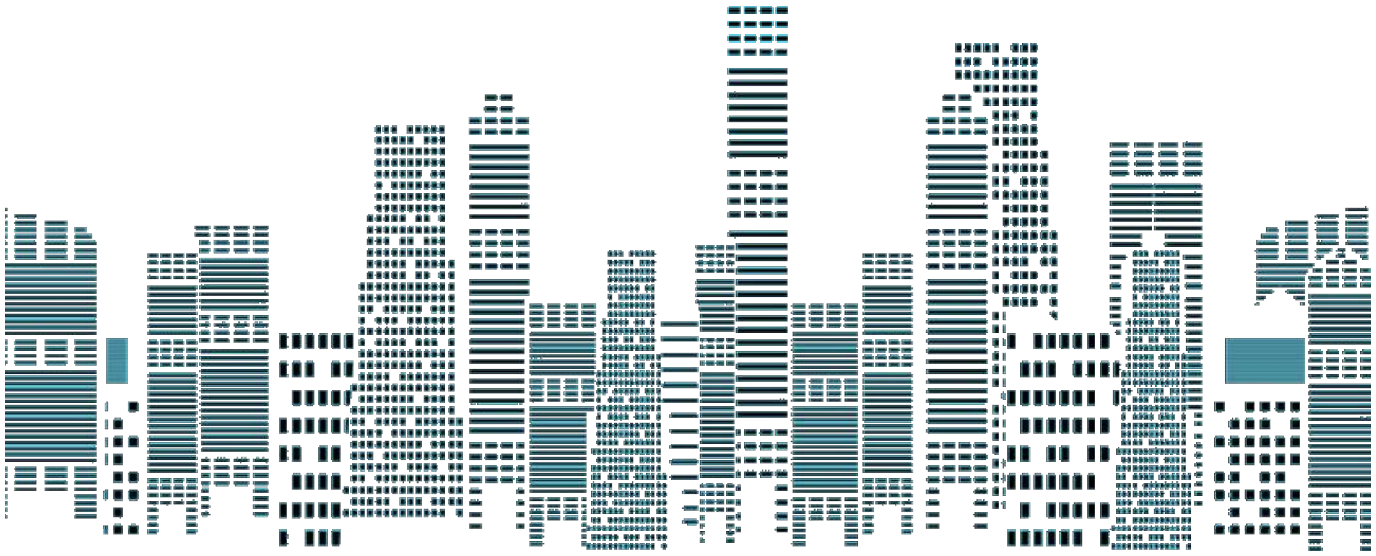
ADB	Asian Development Bank
ADS	Area Development Society
ATM	Automated Teller Machine
BMW	Bio Medical Waste
BOD	Bio Chemical Oxygen Demand
BPL	Below Poverty Line
CBD	Central Business District
CDS	Community Development Society
CFU	Colony Forming Unit
CI	Concentration Index
CIF	Cumulative Functional Index
CWRDM	Centre for Water Resources Development and Management
dB	Decibel
DDMA	Disaster Management Authority
DIC	District Industries Centre
DO	Dissolved Oxygen
DPC	District Planning Committees
DPR	Detailed Project Report
DTP Scheme	Detail Town Planning Scheme
DTPC	District Tourism Promotion Council
DUR	District Urbanization Report
FAR	Floor Area Ratio
GIS	Geographical Information System
Ha	Hectare
HORTICORP	Horticulture Products Development Corporation Ltd.
HP	Horse Power
HQ	Head Quarters
IDMST	Integrated Development of Small and Medium Towns
IFS	Indian Foreign Service
IHSDP	Integrated Housing and Slum Development Programme

IMA	Indian Medical Association
IMAGE	Indian Medical Association Goes Eco-Friendly
IT	Information Technology
KIAL	Kannur International Airport Ltd.
KINFRA	Kerala Industrial Infrastructure Development Corporation
KIRTADS	Kerala Institute for Research Training and Development studies of Scheduled Caste and Scheduled Tribe
KITTS	Kerala Institute of Tourism and Travel Studies
KMBR	Kerala Municipality Building Rules
KRFB	Kerala Road Fund Board
KSDMA	Kerala State Disaster Management Authority
KSEDM	Kerala State Entrepreneur Development Mission
KSFDC	Kerala State Film Development Corporation
KSIDC	Kerala State Industrial Development Corporation
KSPCB	Kerala State Pollution Control Board
KSRTC	Kerala State Road Transport Corporation
KSTP	Kerala State Transport Project
KSUDP	Kerala State Urban Development Project
KTDC	Kerala Tourism Development Corporation
KVASU	Kerala Veterinary and Animal Science University
KVIB	Khadi and Village Industries Board
KW	Kilo Watt
KWA	Kerala Water Authority
LSG	Local Self Government
M	metre
m^2	square metre
MDR	Major District Road
MLD	Million Liters per Day
Mg/l	Milligram per litre
MSME	Micro, Small and Medium Enterprises
MSL	Mean Sea Level
NATPAC	National Transportation Planning and Research Centre

NGOs	Non Governmental Organisations
NH	National Highway
NREGS	National Rural Employment Guarantee Scheme
NRHM	National Rural Health Mission
PCB	Pollution Control Board
PCU	Passenger Car Unit
PH	Potential of Hydrogen Ions
PPP	Public Private Participation
Pp sq.km	Persons per square kilometer
PWD	Public Works Department
RKI	Rebuild Kerala Initiative
R.S. No.	Resurvey Number
SH	State Highway
SIC	Spatial Integration Committee
SIDBI	Small Industrial Development Bank of India
SPV	Special Purpose Vehicle
Sq.km	Square Kilometer
SSA	Sarva Siksha Abhiyan
STP	Sewage Treatment Plant
TC Road	Thalassery Coorg Road
UDPFI	Urban Development Plans Formulation and Implementation
URDPFI	Urban and Regional Development Plans Formulation and Implementation
VAMBAY	Valmiki Ambedkar Avas Yojana
VCB	Vented Cross Bars
V/C Ratio	Volume/Capacity Ratio
WFPR	Work Force Participation Rate
WTP	Water Treatment Plant

PART I

STUDY AND ANALYSIS



CHAPTER 1
INTRODUCTION

Kannur is a fast developing urban city in the northernmost part of Kerala. Kannur District is known as the land of looms and lores. This chapter gives the introduction to the Municipal Corporation area, the methodology adopted, the earlier planning efforts and the need for a Master Plan.

1.1 GENERAL

Kannur district is enriched with beaches, rivers, hills, forests, wildlife sanctuaries and many historic as well as heritage sites. It was the capital of the one and only Muslim royal kingdom in Kerala, Arakkal. Kannur District witnessed one of the longest and bloodiest resistances to British rule in India, led by Pazhassi Raja during the period 1792–1806 which kept a large part of the district in a state of war. Kannur district is a famous destination for Theyyam; one of the traditional art forms in Kerala. Another feature of Kannur district is the influence of cooperative societies in different sectors. The major traditional industries that come under cooperative societies are Beedi and Handloom. Kannur district consists of two revenue divisions, which includes 5 Taluks, 11 blocks and 132 Villages. Thalassery revenue division consists of 2 Taluks namely Thalassery and Iritty. Taliparamba revenue division consists of Kannur, Taliparamba and Payyannur. At present, Kannur district has 1 Municipal Corporation, 9 Municipalities, 71 Grama Pachayaths and 1 Military Cantonment.

Kannur Municipal Corporation area, being the headquarters of the revenue district is functioning as the service centre of the entire district. It causes an unplanned growth of the town resulting in the shortage of basic infrastructure and traffic congestion.

The core area of Municipal Corporation area consists of major commercial centres, public buildings, bus terminals, railway stations, recreation spots etc.

1.2 THE CORPORATION AREA

Kannur is the newest Municipal Corporation of the state, formed on November 1, 2015. It was established as a Municipal Town on June 24, 1867 with 4 wards. As per the 2001 census, the Kannur municipal area had 39 wards, which further increased to 42 wards in 2010. The Kannur Corporation has been formed by annexing 5 surrounding Panchayaths

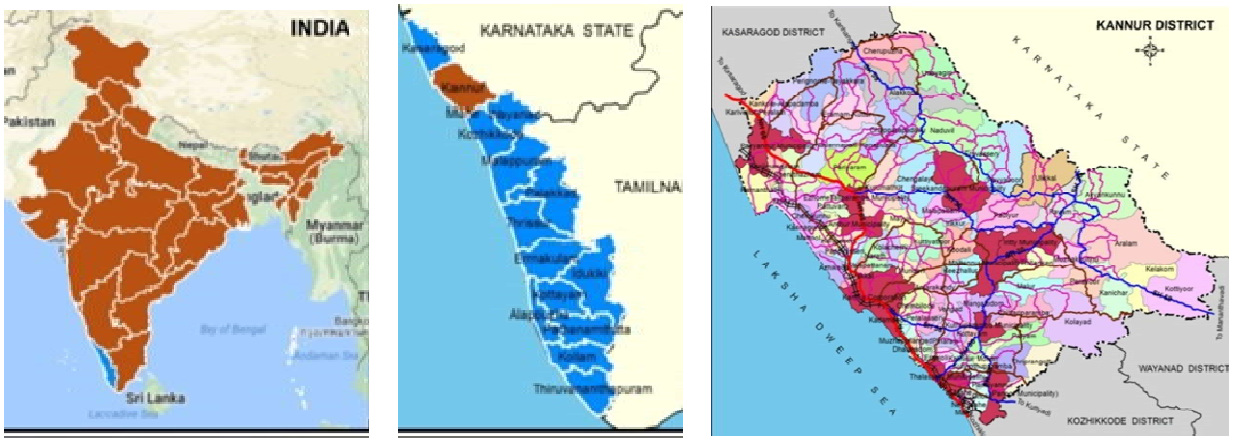


Figure.1.1 District Map of Kannur

namely Pallikunnu, Puzhathi, Chelora, Elayavoor and Edakkad to Kannur Municipality.

The Corporation area, which is a coastal city, is situated along the western border of the district Figure.1.2 indicates its location.

The famous dynasties of Chirakkal and Arakkal were based in Kannur area. Arakkal, the first Muslim dynasty in Kerala was located inside the planning area. Kannur is a major trade centre and a major connecting town to Karnataka as well as to Kozhikode.

The administrative area of Kannur Municipal Corporation area is 78.38 km^2. For the purpose of administration, it is divided into 55 wards. The Corporation area is bounded on the west by the Arabian Sea including the Cantonment board area, in the north by Azhikode, Chirakkal, Narath, Kolacherry Panchayaths, in the east by the Chembilode and Munderi Panchayaths and on the south by Kadambur and Muzhappilangad Panchayaths.

A number of institutions and establishments including administrative buildings, educational institutions, commercial shopping centers like malls etc. set up inside the planning area have accelerated its growth. Due to the presence of beaches and fishing harbour, fisheries activities are also predominant here.

Due to increasing urbanization, land under cultivation has decreased over a period of time. Therefore agriculture and allied activities are mostly concentrated outside of the CBD (Central Business District) area.

Trade and commerce activities are enriched due to the presence of NH66, SH38, Kannur Mele Chovva-Mattannur road, Kakkad road,



Figure.1.2 Location of Kannur Municipal Corporation

Thazhe Chovva-Anjarakandy road, Azheekal Ferry road etc. Apart from these major roads, there are many minor roads leading to places outside the Municipal Corporation area. Commercial enterprises strengthen the economic structure of the Corporation area, which are mainly concentrated in Caltex, Old bus stand, new bus stand, market and its surrounding areas. Kannur railway station is located in the Corporation area.

The planning area limit compromises some important beaches, heritage buildings, worship centres etc., which are now emerging as major tourist destinations in the district. The newly opened Kannur International Airport can also boost

the economic activities of the planning area.

1.3 NEED FOR MASTER PLAN

73rd and 74th Amendments of the Indian Constitution provided a new constitutional context for planning in the Panchayaths and Municipalities in India. The various development standards such as urban planning, regulation of land use, construction of buildings, planning for economic development, social justice etc. are considered as the functions of Urban Local Self Governments. The Kerala Panchayati Raj Act and the Kerala Municipality Act were enacted in 1994. It provides the necessary powers and authority to enable Panchayaths and Municipalities to function as institutions of self-government and to prepare a Master Plan for its development, in the prescribed manner with focus on Scientific Spatial Planning, taking into account its resources and fiscal investment and to submit the same to the District Planning Committees (DPC).

The Preparation of Master Plans and detailed Town Planning scheme were announced in the Budget of 2008-2009. The scheme aims to prepare statutory Town Planning Schemes for towns in the State in a time bound manner, under Town Planning Acts so as to ensure planned development.

A Master Plan is the long term perspective plan for guiding the sustainable planned development of the planning area. This document lays down the planning guidelines, policies, and development code and space requirements for various socio-economic activities for supporting the population of the planning area during the plan period. It is also the basis for all infrastructure requirements. A Master Plan will facilitate improvement of basic infrastructure including roads, power and water supply, facilities for parking, telecommunication, facilities for commercial development including modern markets, shopping centres, high level hotels, community halls and recreational facilities like parks, play grounds, stadium, and multiplex theatres. It will also accommodate systems for effective solid and liquid waste management.

According to the 2011 Census report (by Census Department of India), population of Kannur Corporation is 2,32,486, which was 2,26,435 during the 2001 census. This shows a gradual increase of population due to the trend of urbanization. The population projection using four methods of population projection is 2,54,946 by 2041.

Master Plan helps the urban local body to provide a sustainable development with some regulations and guidelines so that the growth of the Municipal Corporation area can be controlled in an organized manner so

as to prevent haphazard development.

Since the Kannur Corporation is in a fast growing stage, there is a good need of Master Plan in order to protect the environmentally sensitive areas and heritage buildings. Moreover, some of the existing physical and social infrastructure facilities are inadequate for the current demand. This Master Plan will help to meet the current and future needs of the population by providing the amenities and facilities as per standards.

The entire planning area is not fully covered in the existing development plan for Kannur Municipal Area published in 2012. It is confined to the boundary limits of erstwhile Kannur Municipality. This region being the core area had already been saturated.

1.4 DELINEATION OF PLANNING AREA

The first stage in the preparation of a Master Plan is the delineation of the planning area which is done based on the regional study, administrative boundaries, urbanization condition as per Census, Activity Pattern and various other factors like the role of Municipal Corporation area in the overall development of the region. Primary influence zones of the Municipal Corporation area are the major deciding factors.

Based on land use, population distribution and average plot size which are considered as the basic criteria for identifying the functional characters of each local body, LSGs wholly included in the first order functional zone in the district are Kannur Municipal Corporation and Thalassery Municipality. The role of the planning area as an administrative headquarters of the district in the overall development is the major factor for consideration. Moreover, the planning area is the major urban center with important commercial centers, educational institutions and major transportation nodes. All other surrounding LSGs form an urban continuum along with the Corporation area, which is functioning as the central business district of Kannur region.

So considering all these, the Planning area for the preparation of Master Plan was delineated to include Kannur Corporation which covers a geographical area of 78.38 km^2.

1.5 ORGANIZATIONAL STRUCTURE

As per the guidelines issued for the preparation of development plans, a Special Committee was constituted in Kannur Corporation as per order No. E4/21539/2001 dated 15/01/2019. The preparation of draft Master Plan including its publication and other coordinated activities are the responsibility of this Special Committee.

The Special Committee is responsible to coordinate the working group's activities and public participation. Working groups are formed with the members from various sectors such as the Departments concerned, politicians and social workers.

The Special Committee is to conduct local analysis and to give necessary support to the planning team of LSGD Planning. The organizational structure for the preparation of Master Plan is shown in Figure.1.3.

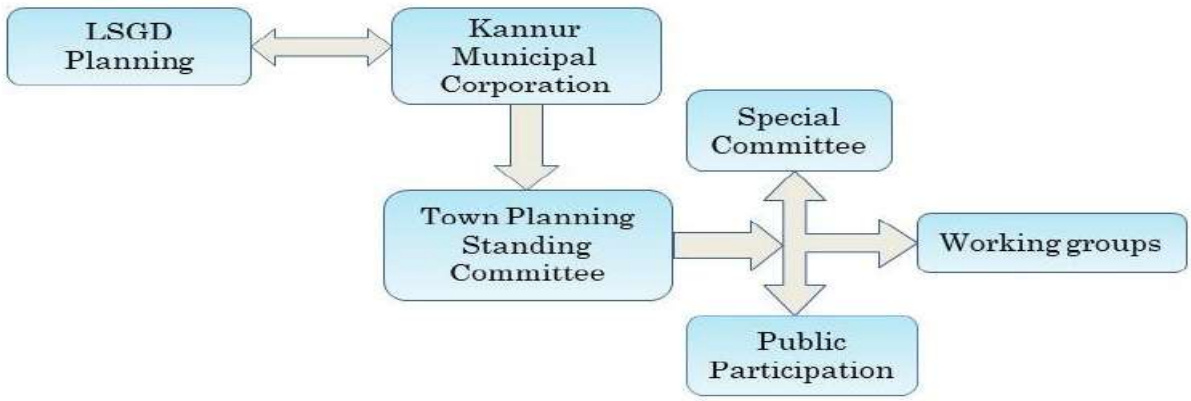


Figure.1.3 Organizational Structure for the Preparation of Master Plan

1.6 METHODOLOGY

The general process of preparation of Master Plan involves four major steps which are shown thematically in Figure.1.4. The first step of the planning process is data collection and compilation. The second step is analysis in which two types of analysis namely spatial analysis and local analysis have to be carried out. Spatial analysis is done by the LSGD Planning and local level analysis is carried out through Spatial Integration Committee (SIC) and working groups. Consolidation of findings of both the analysis will reveal the development issues. The third step is envisioning process in which development goals, objectives, concept are formed and suitable policies and strategies are evolved for achieving it. Last step of the process of planning is zoning regulations and detailing where sectoral projects, land report preparation are done.

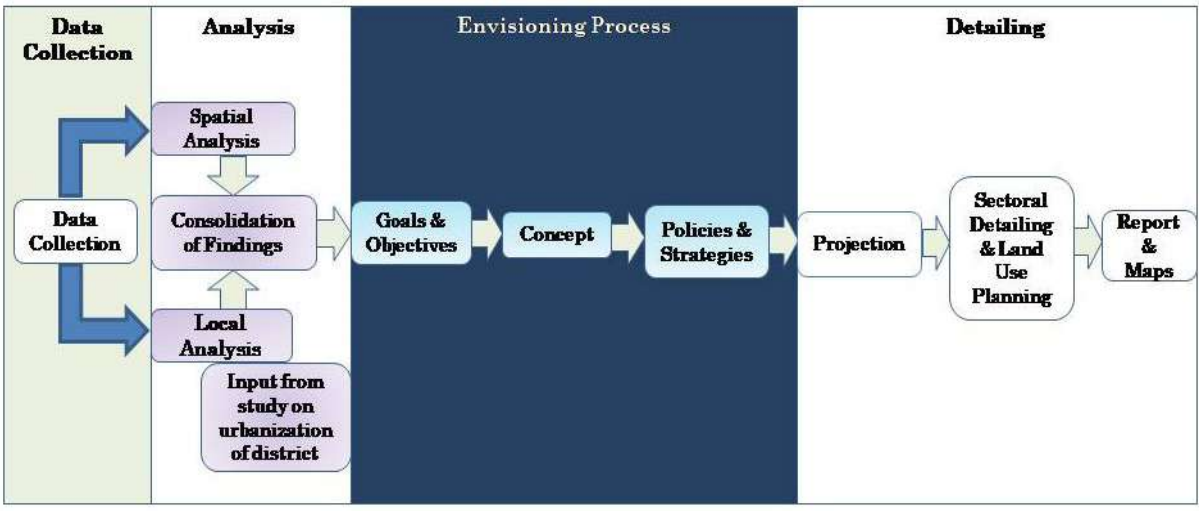


Figure.1.4 Methodology of Master Plan Preparation

1.7 PEOPLE'S PARTICIPATION IN THE PREPARATION OF MASTER PLAN

Only an effective people's participation can create a meaningful Master Plan. In the preparation of Master Plan for Kannur Municipal Corporation area, the first level of discussion with the stakeholders was socio economic survey conducted at the household level. It was done through a framed questionnaire and interviews. This has helped to identify the people's current living situations and their vision regarding the development priority in wards as well as in the Municipal Corporation area as a whole.

An initial seminar was conducted on 31.01.2019 to give awareness about the people's participation in framing of Master Plans. Corporation Mayor, Municipal councillors, Municipal Secretary and other personalities from the departments concerned and other social workers took part in the seminar and gave significant suggestions about their visions and development strategies. A Spatial Integration Committee (SIC) was framed by Municipal Chairperson on 15/01/2019 to help and monitor the work related to Master Plan.

Working group meeting was conducted from 13th June 2022 to 21st June 2022. Experts from different sectors participated in these meetings and gave suggestions for improvement of each sector. Special committee meeting was conducted at Corporation Office, Kannur on 28th June 2022.






Spatial Integration Committee




Working Group Meeting

1.8 EARLIER PLANNING EFFORTS AND ITS APPRAISAL

The first attempt for preparing a Detailed Plan and scheme was made by the District Town and Country Planning unit Kannur in the year of 1980. Detailed studies were carried out to identify the town resources, development trends and issues and to estimate the future needs and functions of the town. Various Town Planning Schemes and Development Plans were prepared in the planning area among which some of them were

completed and successfully implemented.

Kannur town has two published Detailed Town Planning Schemes at Thavakkara north and south. Another scheme for civil station area was notified and prepared, but not published. Development Plan for Kannur Municipality was published on 21.11.2012. The Figure.1.5 indicates the location of DTP schemes in old Kannur Municipality.

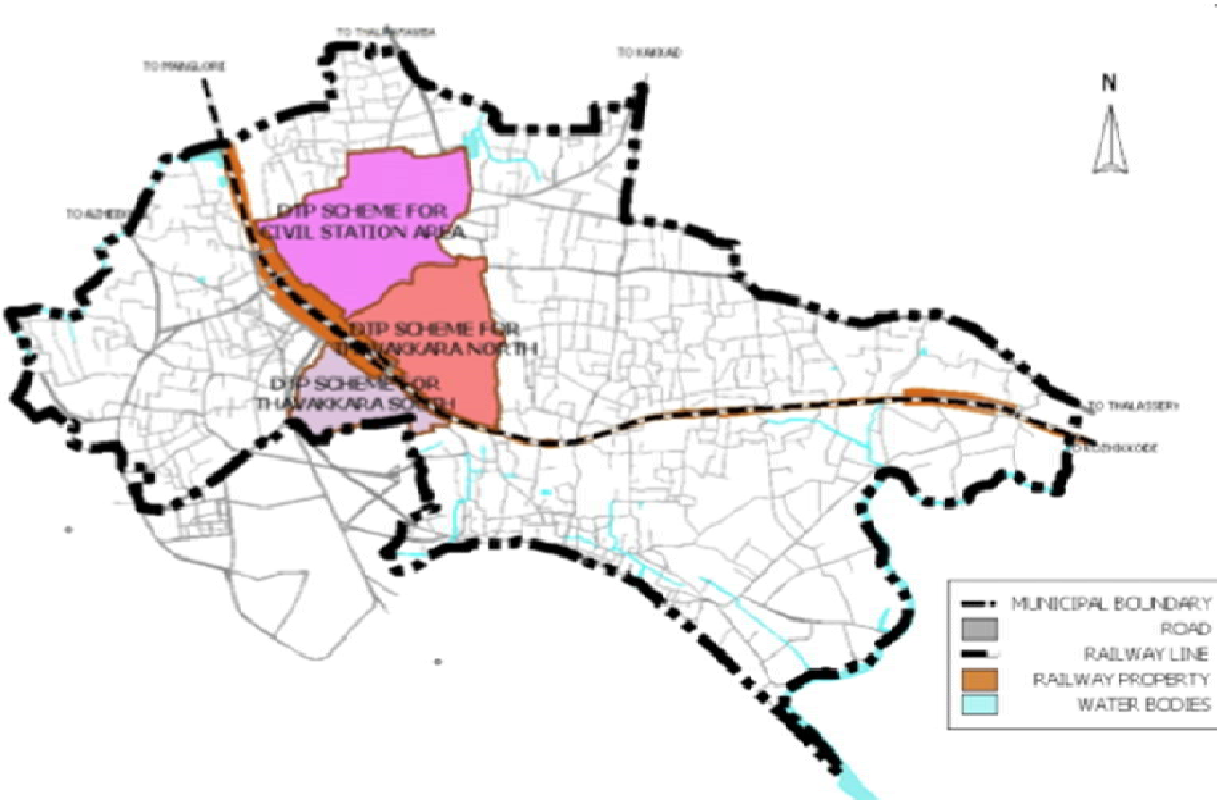


Figure.1.5 Location of DTP Schemes in old Kannur Municipality

1.8.1 DEVELOPMENT PLAN FOR KANNUR MUNCIPAL AREA - 2031

The Development Plan for Kannur town for an area of 11.03 km² was published on 2012. The sectors to study in the planning area include history, demography, occupational structure, land use, economic aspects, infrastructure (water supply, drainage, sewerage, solid waste management, traffic and transportation, education, health, recreational facilities and civic amenities), environment, housing, heritage and tourism, poverty alleviation, urban governance and financial sustainability. The plan

predicted a rise in the population from 63,795 in 2001 to 74,588 by the end of the plan period.

The important proposals envisaged in the development plan were improvement of existing transportation networks with sufficient parking area, development of industries, and zoning of commercial and administrative activities and utilization of tourism potential in the Corporation area.

The Figure.1.6 indicates the proposed land use map of Kannur Municipality as per the published Development Plan for the town.

Concept of the Development Plan was formed by considering the Municipal Corporation area as the district administrative headquarters. The major railway station and the wholesale market area at the western side enhanced its commercial potential. The long beach along the border near the town is a tourist destination.

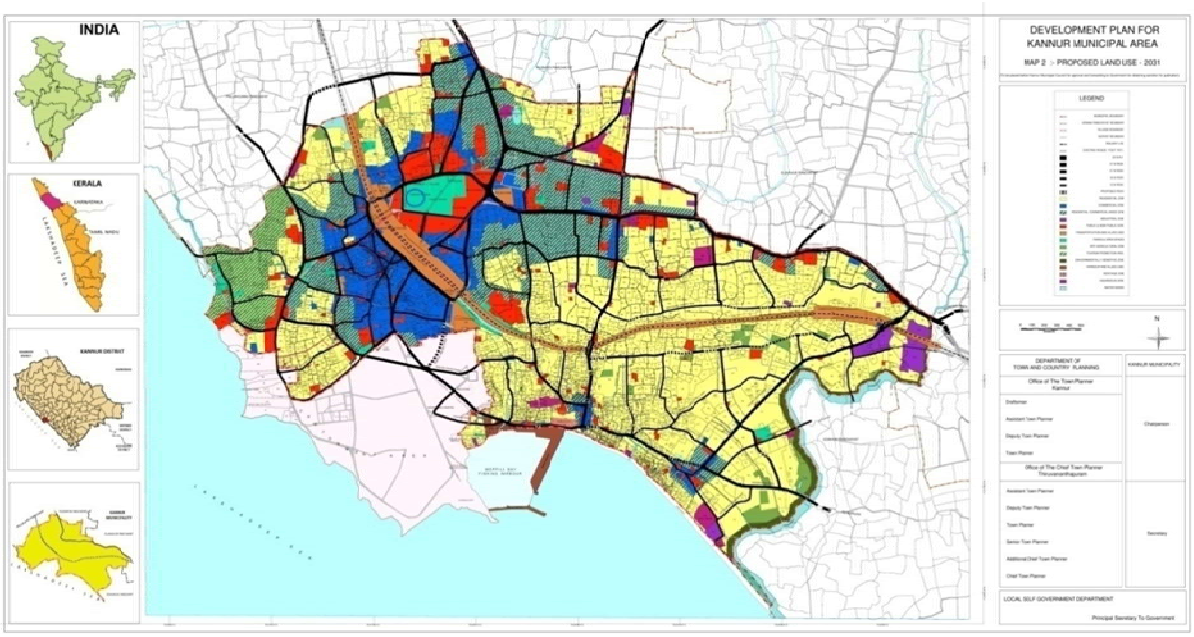


Figure.1.6 Proposed land use map of Kannur Municipality as per Published Development Plan for the Town

1.9 CONCLUSION

From the date of notification, implementations of all schemes are deemed to be started. After the formal notification of the above schemes, mainly Development Plan, the new developments are regulated as per the proposed plan. All new developments were sanctioned only after complying with the norms of road widening and zoning regulations as per the published schemes.

Even though there were complaints regarding the width of proposed roads

from the peripheral land owners, gradually they accepted the need for development. But for the secondary roads in the planning area, mainly in the existing dense residential area, there exists a wide spread unhappy situation about the 16 m and 12 m internal roads. Hence it has to be reviewed based on the context of NH Bypass, City Road Improvement Scheme etc.

Regarding zoning regulations, the pressure of land along Kanampuzha River side set apart as ecological sensitive area is tremendous without compromising the natural flow of this small water body. It is difficult to allow new construction in these areas.

The green space available in the heart of the planning area is also under tremendous pressure due the demand for to new constructions in those areas, disregarding the threat to the healthy environment of the Corporation area.

Various efforts adopted in the last few years for saving the water bodies in different parts of the planning area were partially successful. The Anakulam, Chettiyarkulam, Valiyakulam etc. were renovated and is kept clean. Similarly, such serious efforts are also required in traffic sector to improve the road network and parking facilities.

CHAPTER 2
PROFILE OF THE CITY

This chapter briefly explains the general profile of Kannur Municipal Corporation area, including its location, regional linkages, area, climate, physiography, natural resources and history etc.

2.1 LOCATION

Kannur Municipal Corporation area comes under the first order settlement of Kannur district and is located at the western side of Kannur district. The planning area lies between 11°48'26.423" to 11°55'35.762" north latitudes and 75°20'2.847" to 75°27'22.042" east longitude. The Corporation area is surrounded by eight Grama Panchayaths; Chirakkal, Azhikode, Narath and Kolacherry on the northern side, Munderi, Chembilode on the eastern side, Kadambur and Muzhappilangad Panchayaths on the southern side.

The planning area has a large coastal stretch on the western side and its location with adjoining Panchayaths is shown in Figure.2.1.



Figure.2.1 Location of Kannur Municipal Corporation area and its adjoining local bodies

2.2 CONNECTIVITY

Kannur Municipal Corporation area is easily accessible by road, rail and air. The National Highway - 66 (NH 66) passes through the planning area and connects the two major cities; Kozhikode and Mangalore with it. Kannur Railway Station, the major railway station in Kannur district is located inside the planning area. Moreover, Kannur International Airport is located 30 km away from the Corporation area.

The other major roads within the district are SH 30, SH 36, SH 38 which provides an effective connectivity between low land, mid

land and high land of the district. The major development centres within the district such as Thalassery, Payyannur, Mattannur and Thaliparamba are well connected to the planning area through a system of road network. Moreover, the State Highway 59 passing through the highland area of the district acts as an effective trade route for exporting the plantation and cash crops within the district.

Also, the railway network parallel to the coastal area brings an effective connectivity of Kannur district with neighbouring urban centres. The Kannur South – Airport railway line is a newly suggested railway route which needs further detailed studies gives hope for a rail connection to the hinterland area in future.

The major rivers of the planning area are Kanampuzha River, KakkadRiver, Thottada River and Nadal River. Kakkad River is a tributary of Valapatanam River and it flows through the northern border of the Corporation area. Kanampuzha River and Thottada River flows inside the planning area while Nadal River is through the southernmost boundary. There is no water transport system active in these areas, even though there is a boat service from Mattul and Azheekal Port up to Parassinikkadavu in Valapattanam River outside the Corporation area. Azheekal and Mappila bay are the major harbours which are located very close to the planning area. The flight schedules from Kannur International Airport can link Kannur district with the major airport cities in Kerala, India and Abroad, and provides broader air connectivity to the Municipal Corporation area. Figure.2.2 indicates the road network of Kannur district.

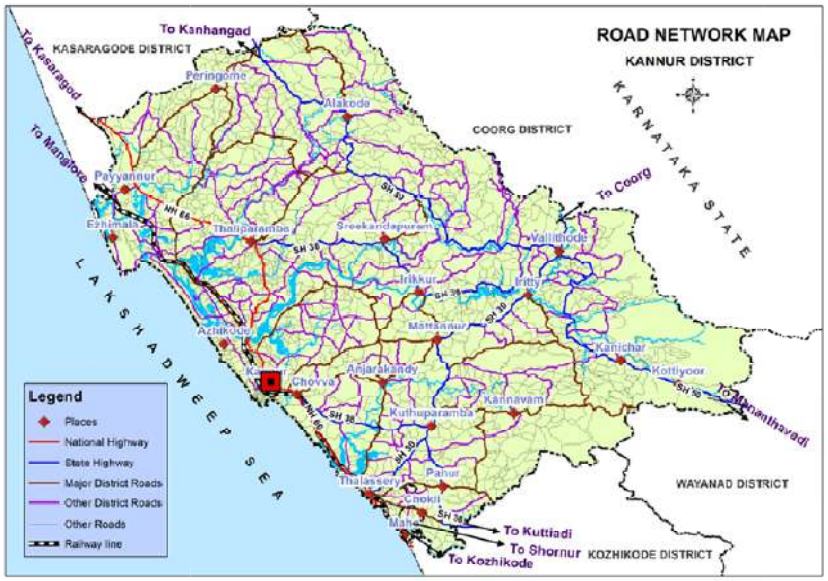


Figure.2.2 Road Network of Kannur district

2.3 AREA AND POPULATION

Kannur Municipal Corporation area having a geographical area of 78.38 km² is the largest among the 10 urban local bodies in the district.The population as per 2011 Census is 2,32,486 in which males constitute 10779 (46%) and females 125407 (54%). Total population of the planning area is constituted by eight Villages.

The decadal growth rate for 2001-2011 periods is 2.67% and sex ratio is 1171. The work participation rate of the town is 28.91% which is below the WPR value (32.66%) of the district and the state (34.78%).

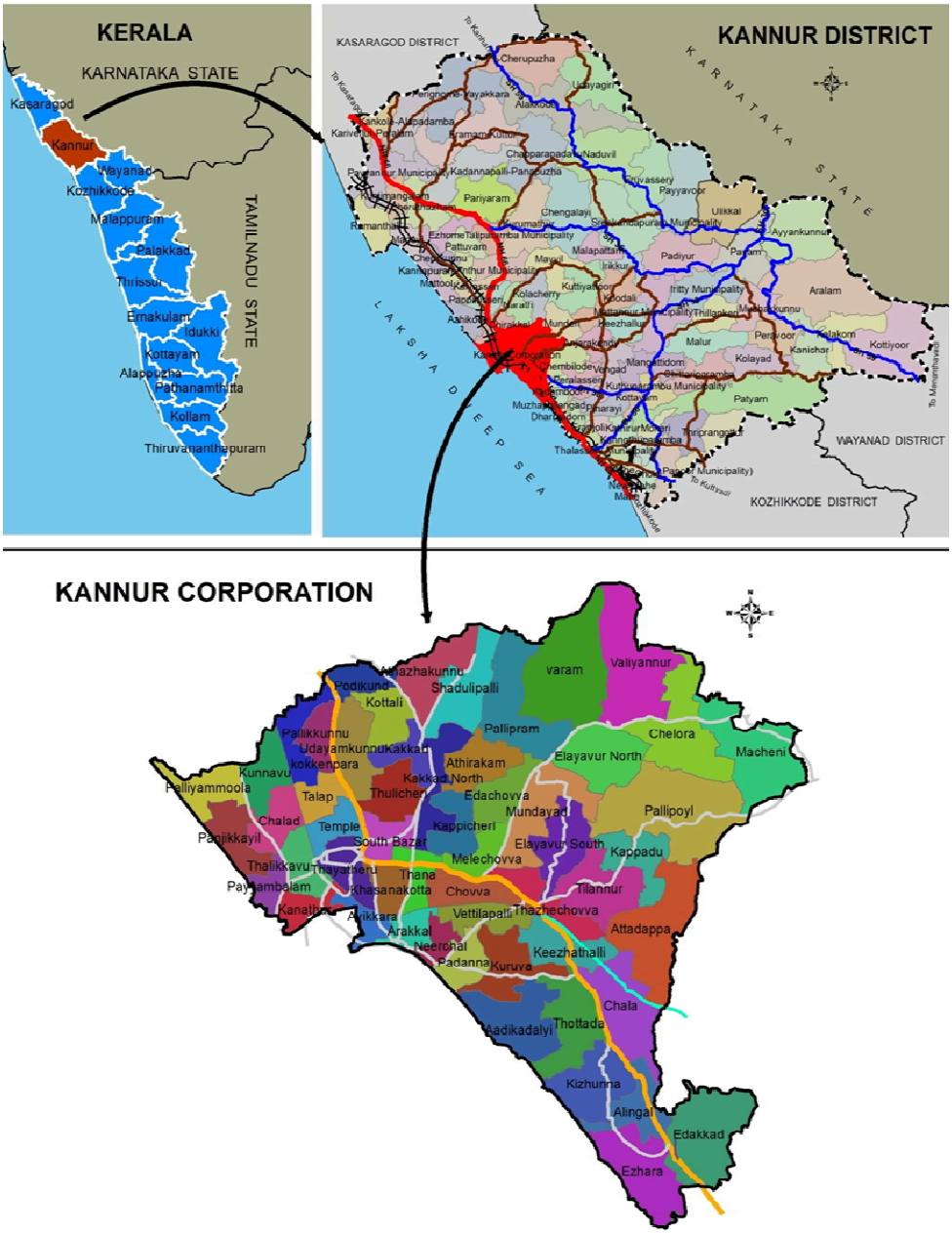


Figure.2.3 Ward map of the planning area

The Kannur Cantonment under the control of Ministry of Defence and located on the western side of the Corporation area has 6 electoral wards and an area of 1.79 km^2.

The average literacy rate is 96.54%. The male literacy rate is 97.8% and female literacy rate is 95.4%. 10.6 % of the population is less than 6 years of age. The density of population is 2967 per sq.km as per 2011 census. The ward map of the planning area is shown in Figure.2.3.

2.4 ADMINISTRATIVE DIVISION

The Kannur Municipal Corporation area consists of eight Villages and 26 Desoms. Kannur I, Kannur II, Edakkad, Elayavoor, Pallikkunnu, Puzhathy, Chelora and Valiyannur are the Villages. The Village and Desom maps are shown in Figure.2.4 and Figure.2.5 respectively. The newly formed Corporation area has 55 electoral wards. The details of election wards in the planning area are shown in Table.2.1.

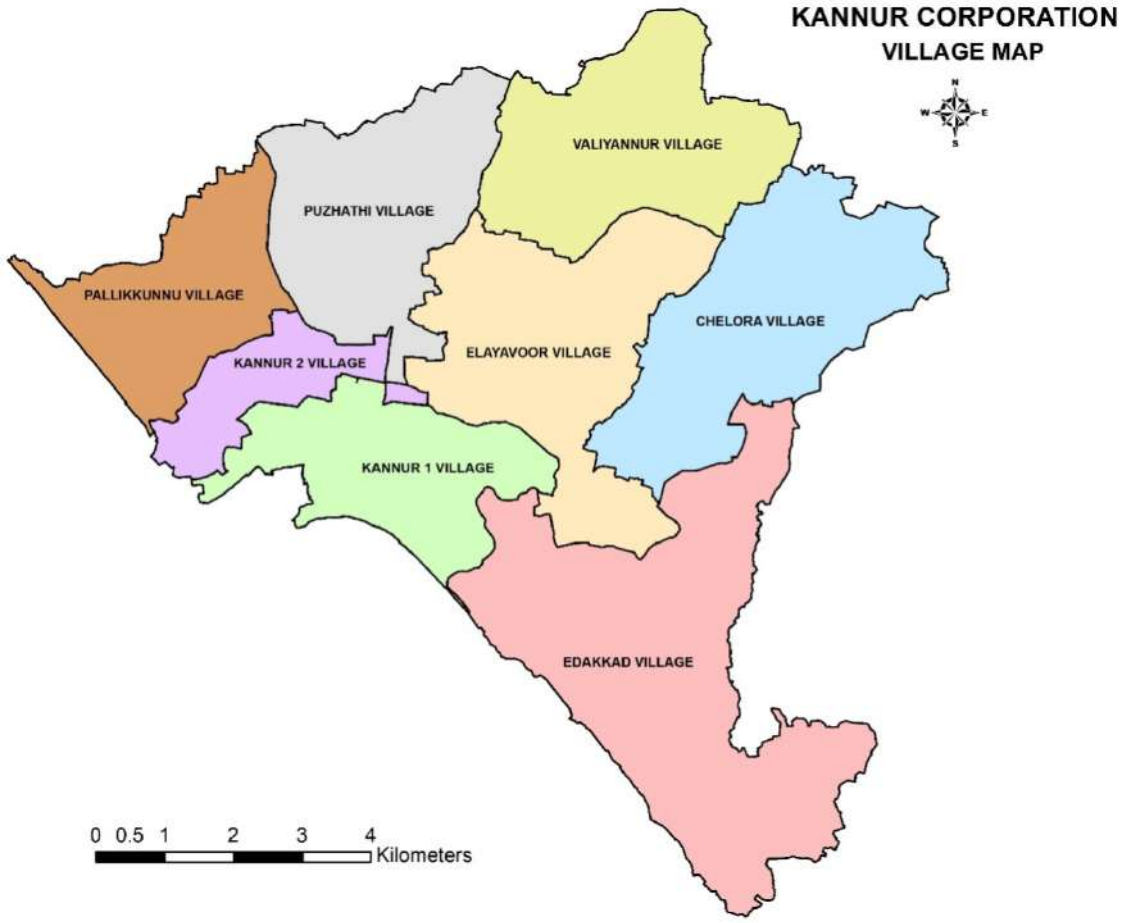


Figure.2.4 Village map of the Kannur Municipal Corporation area

Table 2.1 Details of Election Wards in Corporation Area

Ward No.	Ward Name
1.	Palliyammoola
2	Kunnavu
3	Kokkenpara
4	Pallikkunnu
5	Thalappu
6	UdayamKunnu
7	Podikkundu
8	Kottali
9	Athazhakkunnu
10	Kakkadu
11	Thulicheri
12	Kakkadu North
13	Shadhulipalli
14	Pallipram
15	Varam
16	Valiyannur
17	Chelora
18	Macheri
19	Pallippoyil
20	Kappadu
21	Elayavoor North
22	Elayavoor South
23	Mundayadu
24	Edachovva
25	Athirakam
26	Kappicheri
27	MeleChovva

Ward No.	Ward Name
28	ThazheChovva
29	Kizhuthalli
30	Thilanoor
31	Attadappa
32	Chala
33	Edakkadu
34	Ezhara
35	Alingal
36	Kizhunna
37	Thottada
38	Adikadalayi
39	Kuruva
40	Padanna
41	Vethilappalli
42	Neerchal
43	Arakkal
44	Chovva
45	Thana
46	South Bazar
47	Temple
48	Thayatheru
49	Kasanakotta
50	Ayikkara
51	Kanathur
52	Thalikkavu
53	Payyambalam
54	Chalad
55	Panjikkayil

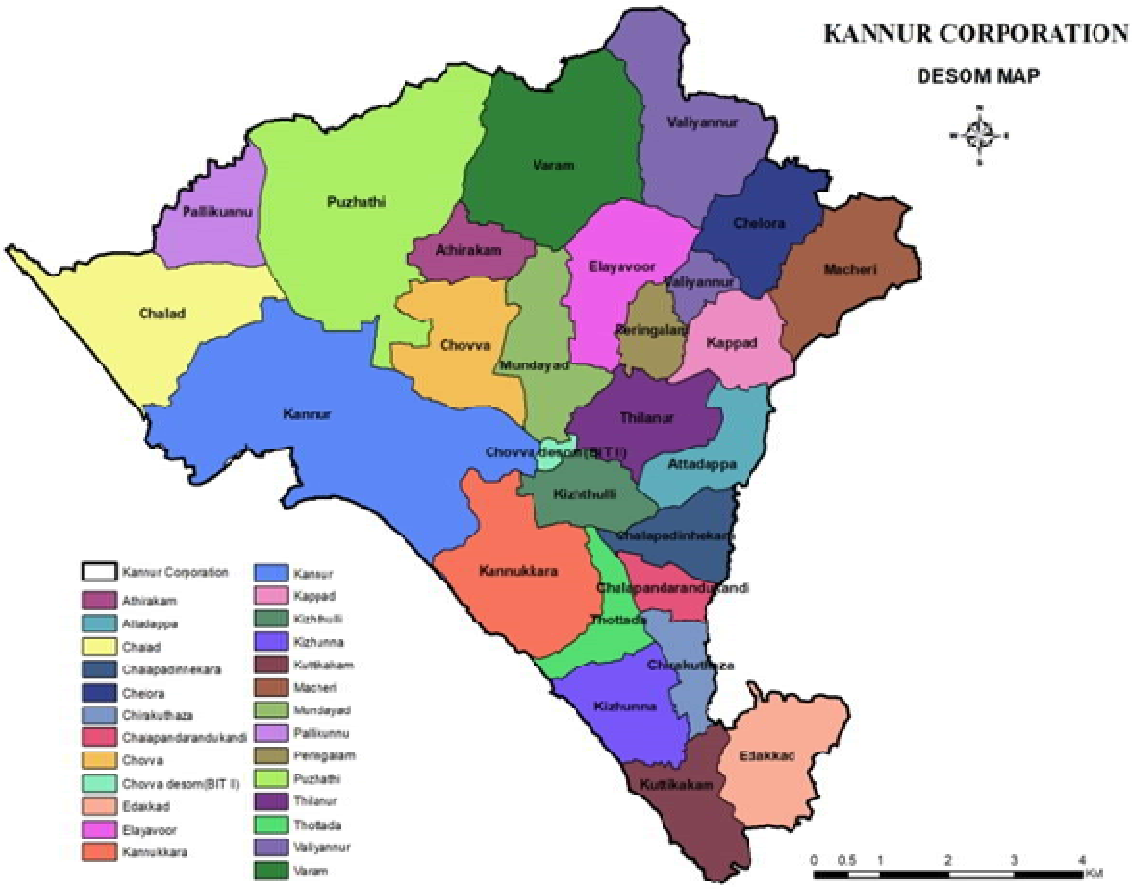


Figure.2.5 Desom map of the Kannur Municipal Corporation area

2.5 SOIL

There are mainly 3 types of soils namely laterite, brown hydromorphic soil and sandy soils. The western side of the Municipal Corporation area comprises comparatively low lying fields with late rite soil and sandy soil.

2.6 PHYSIOGRAPHY

The land in Kerala state has four natural divisions; 'The Low Lands' (up to 7.5 m above MSL), 'The Midlands' (7.5 -75 m above MSL), 'The High Lands' (75 – 750 m above MSL) and the 'The high ranges' (above 750 m MSL). The planning area is a coastal town with 17 km seashore along the Arabian Sea which comes under the Coastal Regulation Zone.

The physiography of the Corporation area is shown in Figure.2.6. From the figure, it is clear that the height above MSL varies within a range of 0 m to 65 m. The height of some portions at Pallipoyil, Chovva, Mouvvancheri, Chalakunnu, Kappatukavu, Pallikunnu etc. has a range of 50 m to 60 m from MSL and therefore can be included in mid lands group of Kerala physiographic division.

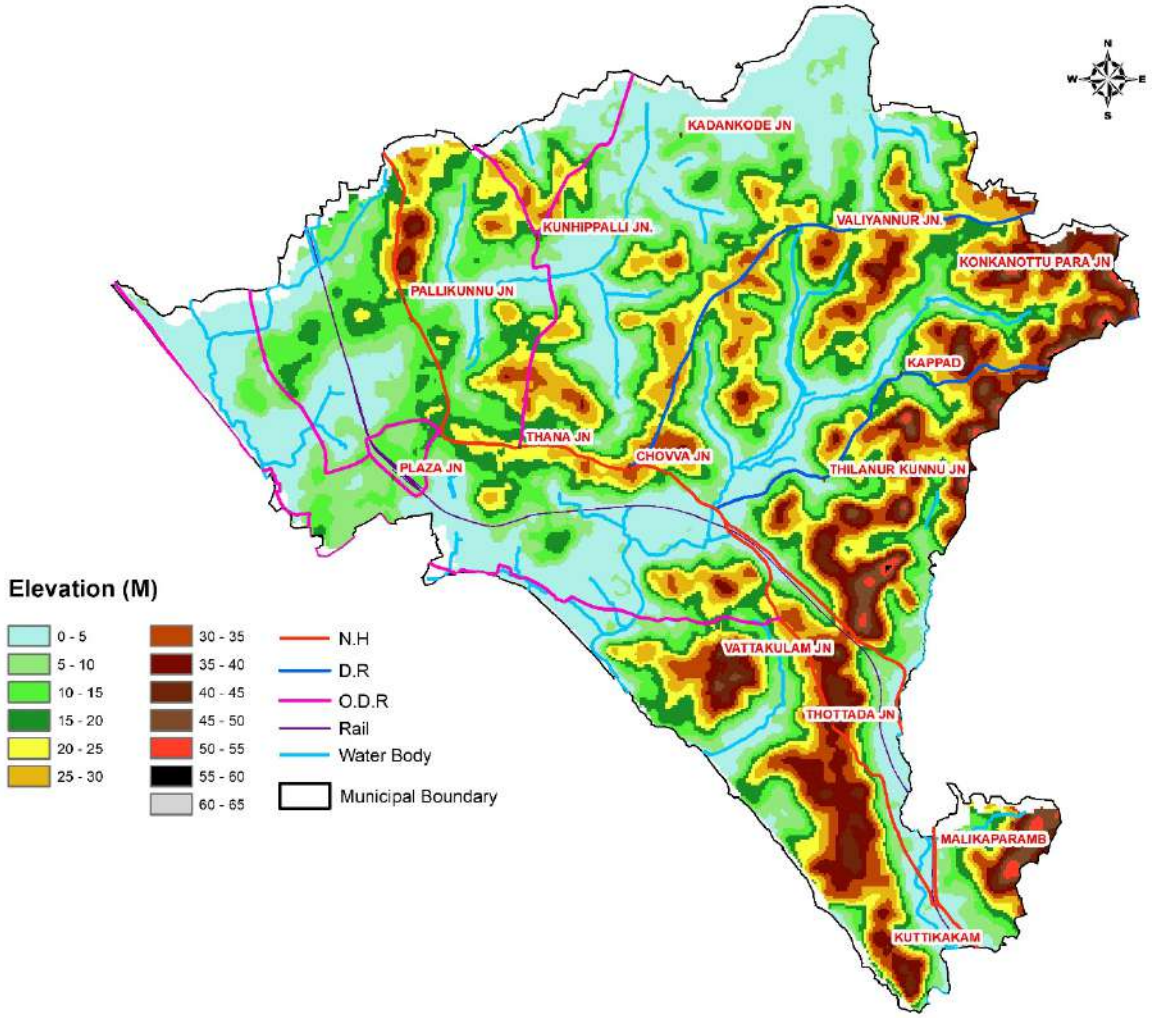


Figure.2.6 Physiography of Kannur Municipal Corporation area

2.7 CLIMATE

The climate of the planning area is fairly moderate. Rainfall is available throughout the year except during the months from January to April.

Average rainfall is 3438 mm and more than 80% of this occurs during the south-west monsoon (from June to September) followed by the north-east monsoon (November to December) which is also known as Thulavarsham. Kannur has a humid climate with an oppressive hot season from March to the end of May which is followed by the south west monsoon which continues till the end of September. October and November witness the post-monsoon (North-East monsoon) or retreating monsoon season.

During the months of April and May, the mean daily maximum temperature is about 35^{0}C. The temperature is low in December and January and the average minimum temperature is about 20^{0}C.

2.8 HISTORY

Kannur is believed to have arrived from the two words - "Kannan" (Lord Krishna) and "Oor" (Place), means that Kannoor, is the land of Lord Krishna. Another legend is that the name Kannur has its origin from "Kanathoor", a coastal village formed by the silt deposited from Kaanam Puzha. In olden days, there was a fort on the western side of Kanathoor, known as "Katlayi Kota", which once flourished as the capital and great trading centre of Kolathiri Rajas, within which there was a renowned temple of Lord Krishna. During invasion of Tippu's force, the idol of this temple was moved to a safer place and then to the present site of "Kadalayi Sree Krishna Temple".

The ancient Tamil works like "Pathittuupatt, Akananuru, Puranaruru, Chilappathikaram etc. provide some valuable information about Sangam Era, that covers the first five centuries of AD. As depicted in Sangam literature, present Kannur district was the part of Poozhinaat. Politically, the district was part of Kingdom of Ezhimala. The post Sangam period covering three centuries (sixth to eighth) is treated as the period of Brahminical influence termed as Aryan immigration.

Early in the 9th century AD, the Cheras re-established their political supremacy in Kerala under Kulasekara Varman. The second line of Chera emperors ruled till 1102 AD with their capital at Mahodayapuram. The bulk of the area comprising the present Kannur district seems to have been included in this empire. Mooshaka kings held sway over Chirakkal and Kasaragod areas with their capital near Mount Eli (present Ezhimala). The eldest brother of king Sreekantha of Mooshaka Kingdom, Vallabha established the port of Maraahi (present Puthiyangadi) at the mouth of Killa (Kuppam) River. In later days, this place came to be called Madayi. He also built the port of Vallabhapattanam which later became as Valapattanam by the 14th century AD. The old Mooshaka kingdom came to be known as Kolathunad and the rulers known as Kolathiris.

Kannur is the place where the only Muslim royal family in Kerala ruled with its headquarters at "Arakkal Kettu", near the present Kannur Corporation area. The origin of Arakkal family was during the period of Kolathiris. The Arakkal family was founded by Arayankulangara Nair, one of the ministers of Kolathiri, who got converted to Islam and married a princess of Kolathiri royal family. Kolathiri gave them a separate territory covering the Kannur bazar for their control and they virtually became a power centre in respect of trade and political influence.

In 1550, Kolathiri chieftain Alimoosa of Arakkal, conquered six more islands along with Agathi,

Kavarathy, Kalpeni, Androth and Minicoy. As a reward, Kolathiri raised his status as Aadi Raja of Arakkal and gave Kannur town along with Kannothumchal Desom under his control. Later Arakkal raja got control of all mosques in Kolathunadu and became a supreme power of this area.

Kannur city was once a stall for horses imported from Arabia and Kutch. The Portuguese traders got permission to build a fort in Kannur from Kolathiri in 1505 AD and St. Angelo's fort was built by Sir Francisco De Almeida, the first Portuguese Viceroy of India. It was a centre of trade between British and Vijayanagara dynasty.



St. Angelo's fort

In 1663,the Dutch conquered the Portuguese and captured Kannur Fort,and transferred the fort to Arakkal Beevi. In 1788, Tippu Sultan, the son of Hyder Ali arrived in Kannur with an intention to conquer Malabar. Pleased with the warm reception offered by Arakkal family, Sultan gave a larger part of land including Chirakkal Desom to Arakkal Beevi and called it "Kushanbad". In 1790, St. Angelo's fort was forcefully taken over by the British general Ambercrombi.

The freedom struggle of Kerala Varma Pazhassi Raja against the British rulers was also important in north Kerala history. The first Pazhassi revolt was during 1793-97 and the second revolt was during 1800-05.

Malabar became the part of Madras Presidency on May 21 1800. The revenue record of early 19th century indicates that the present district contains 4 Taluks namely Kavvaayi, Chirakkal, Kottayam and Thalassery. By the end of 19th century, the Chirakkal Taluk was formed by merging Kavvaayi with Chirakkal and Kottayam Taluk with Thalassery Taluk.

Kannur only a military cantonment till 1866 was declared as a Municipal Town on 24th June 1867. The Kannur cantonment, one of the 62 cantonments in the country, is adjacent to Kannur Corporation area.

Kannur, the important port on the Arabian Sea, which carried out trade with Persia and Arabia in the twelfth and thirteenth centuries, was the British military headquarters on India's west coast up to 1887.

When the States Re-organization Act of 1956 was implemented, Malabar became a part of the newly formed Kerala state on November 1st

1956. On January 1st 1957, Malabar district wasdivided into three districts namely Cannanore, Kozhikode and Palakkad.

The ancient temples and mosques with their traditional fanfare are eloquent testimony of the rich cultural and religious heritage of the region. Since olden days, Kannur has been the cradle of ageless folk art and music and hence it is popularly known as "*The city of Looms and Lores*". The district is a major centre of "Theyyam", a ritual dance of northern Kerala. Small shrines known as Kavus, associated with the Theyyam dot the district. Another attraction of Kannur is the handlooms. Kannur has been recognised as one of the nine 'Towns of Excellence' in the country in handloom export. Though the traditional handloom industry here is 400 years old, the craftsmanship of weavers here acquired fame with the launching of exports of handloom products. Kannur handloom export has an experience of last fifty years.

2.9 NATURAL RESOURCES

Kannur Municipal Corporation area is gifted with the presence of coastal stretch on the western side which plays a great role in its development.

Mappila bay, an important fisheries settlement in Kannur district is located very close to the planning area Payyambalam, Kizhunna, Ezhara etc. beautiful and attractive beaches here provide great scope in beach front tourism activities.

The rare species of Mangroves and Mangrove associates are still available in many parts of the Planning area. The temples with traditional sacred groves, rich in bio diversities are also seen in the Corporation area.

CHAPTER 3

REGIONAL SETTINGS & URBANIZATION TRENDS IN THE DISTRICT

Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities. Hence it causes a gradual increase in the proportion of people living in urban areas. It is predominantly the process by which towns and cities are formed and become larger as more people begin to live and work in central areas. Urbanization is relevant to a range of disciplines, including urban planning.

The chapter deals with regional linkage and trends in urbanization of the planning area.

3.1 REGIONAL LINKAGE

The regional setting of a planning area is determined by its hierarchy of settlement, the activity that the town has to perform in the district and its connectivity with different nearby settlements.

The Municipal Corporation area is located about 518 km north of Thiruvananthapuram, the state capital. Kozhikode, the major urban centre of north Kerala, is 90 km south of Kannur.

Another important urban centre, Mangalore of Karnataka State is located about 160 km north of Kannur. The planning area is well connected by road and rail. The NH 66 and the railway line passing through the town provide a good connectivity to other urban centres like Kozhikode, Kochi, Thiruvananthapuram on the southern side and Mangalore, Mumbai and Delhi on the northern side and Chennai, Bangaluru and Hyderabad on eastern side.

Both these linkages can play a major role in the trade and commercial activity of Kannur district by making the planning area a major trade centre. Figure.3.1 indicates its regional connectivity with other urban centres.

At present, the Corporation area is the part of Kannur Parliament Constituency. Also, there are two Legislative Assembly Constituencies; Kannur and Azheekode (Pallikkunnu and Puzhathi zones).

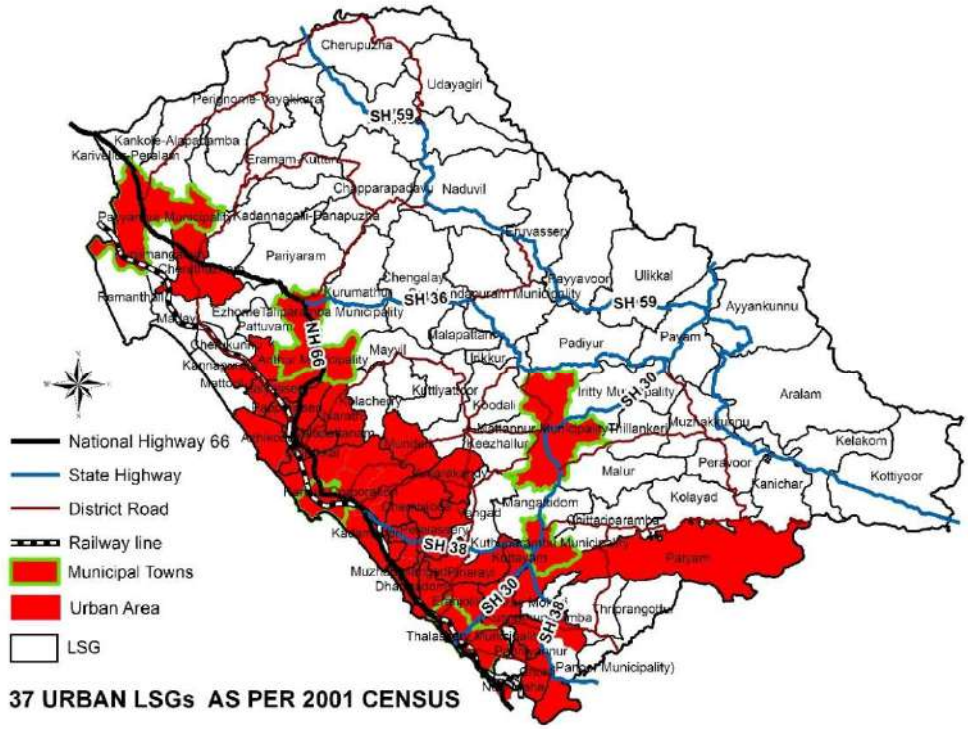


Figure.3.1 Regional connectivity of Kannur Municipal Corporation area

3.2 URBANIZATION

Urbanization has taken various forms at different times. It is the movement of people from rural to urban area, which results in a transformation from traditional economy to modern industrial activities.

In case of other metropolitan cities in India, urbanization rates are increasing because of urban migration and overcrowding of population. Kerala shows a special trend in urbanization and the main reason for that is the increasing numbers of cities and urban agglomerations. Moreover, Kerala is the best example for urban – rural continuum. All amenities and facilities inside the urban area are also



Source : District Urbanization Report

Figure.3.2 Urban LSGs in Kannur district as per 2001 Census

enjoyed and shared by the outgrowth population also.

Within a decade between 2001 and 2011, the urban population growth rate (26% and 48% respectively) of Kerala has increased by 22%. The urbanisation level of Kannur district had increased to 47% as per 2011 Census which was 26% in 2001 Census.

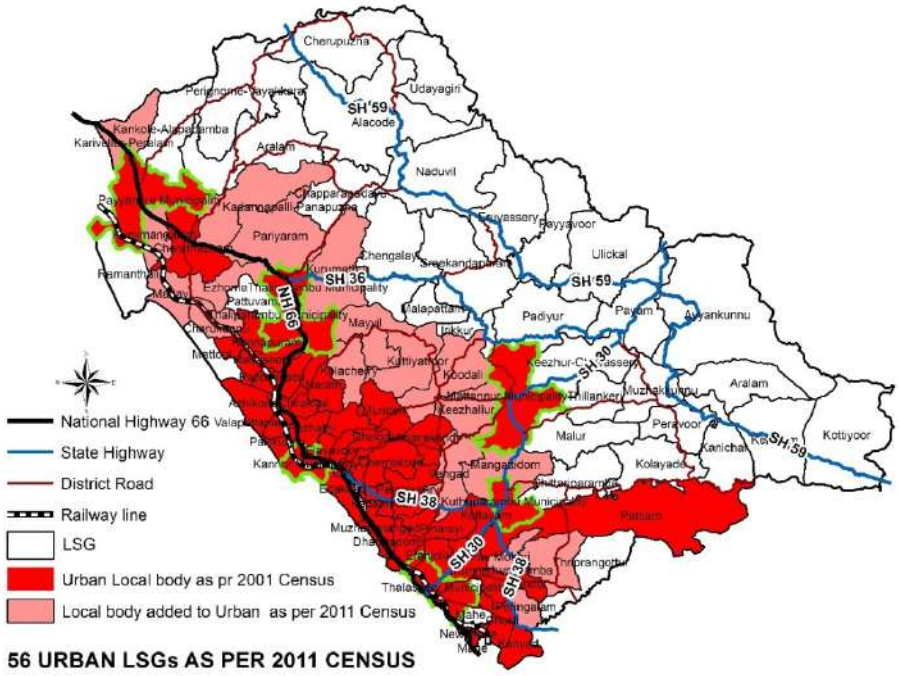
The Kannur district population is 25,23,003 as per the 2011 Census, constituting around 7.56% of the state population.

The population density of Kannur district is about 852 persons per km^2. The district has 5 Taluks namely Taliparamba, Kannur, Thalassery, Iritty and Payyannur. The population growth of Kannur district from 1991 is represented in the Table.3.1.

Table.3.1 Growth of population in the district

Census Year	Population	% decennial Variation
1991	22,51,727	16.63
2001	24,08,956	6.98
2011	25,23,003	4.73

The Figure.3.2 indicates the location of 37 urban LSGs of Kannur district as per 2001 census. From this, it is clear that the urban LSGs are mainly concentrated along the coastal stretch and both sides of NH 66. The first order urban settlements are Kannur Municipal Corporation area and



Source : District Urbanization Report

Figure.3.3 Urban LSGs in Kannur district as per 2011 Census

Thalassery Municipal Town. The other LSG mainly depend on these two for all urban services. The major supporting factors of urbanization are connectivity, functional character and activity pattern of the LSGs.

Kannur district has a tendency of spreading urbanization towards the eastern side. Thus in 2011 census, the urban LSGs rose to 56 and is shown in Figure.3.3. From this, it is clear that the numbers of urban local bodies are increasing year by year. Hence effective planning measurements are necessary to avoid the problems of overcrowding and hap-hazardous developments. This points towards the need for a Master Plan which brings an effective, efficient and sustainable development in urban areas.

Table.3.2 gives the proportion of rural and urban population of the district as well as the state. It indicates a steady progress of urbanization in Kannur district. Moreover, at present, Kannur is the highly urbanized district of Kerala, with nearly two-third of its population living in urban areas.

As per 2001 Census, Kannur district is ranked 1st in urban content (urban population 50.45%) and11th in per capita income among the districts in Kerala. But 2011 Census reveals that Kannur district has been pushed back to 4th position in urban content (65.05% urban population)

Table.3.2 Rural-Urban break up of Population (Kannur District)

Census year	Rural in %		Urban in %	
	Kannur	Kerala	Kannur	Kerala
1901	93	93	7	7
1911	92	93	8	7
1921	93	91	7	8
1931	93	90	7	10
1941	93	89	7	11
1951	91	87	7	13
1961	83	85	17	15
1971*	86	84	14	16
1981	77	82	23	18
1991*	49	74	51	26
2001	50	74	50	26
2011	35	52	65	48

Source: District Urbanization Report, Kannur

** The declination of urban population of 1971 in Kannur district is due to change in concept of urban area and the resultant declassification of urban areas of 1961 census. The high increase of urban population in 1991 is due to carving out of Kanhangad and Kasaragod Taluks having mostly rural population to form the Kasaragod district (in 1984).*

whereas, Ernakulum district which ranked second in urban content (47.6%) and 1st in per capita income as per 2001 Census, has ranked 1st in urban content (67.5%) as per 2011 census. This relative reduction in the urbanization in the district may be due to the prevalence of low income generating small-scale industries, compared to the large scale

industrialization in Ernakulam district.

Prior to the preparation of Master Plans for the Municipal Towns, under LSGD Planning, Kerala conducted a study on urbanization of each district and published the District Urbanization Report in 2011. The report presents the urbanization trend and development pattern of each district at present as well as in the future contexts. The current trend of urbanization has been studied and analysed using different growth parameters, infrastructure and urban facilities.

3.3 HIERARCHY OF SETTLEMENTS

Hierarchy value of settlements is an indication on the extent of concentration of facilities in a region. Cumulative Functional Index (CFI) method is used to find out the hierarchy of settlement. The CFI of a settlement is assessed based on the number and hierarchy of the following types of facilities in the settlement:

1. Educational facilities
2. Health Facilities
3. Markets
4. Physical infrastructure facilities
5. Transportation facilities

The weightage of each of these facilities in the district and CFI value are calculated. CFI value is plotted against the number of settlements to find out the hierarchy of settlements in the District.

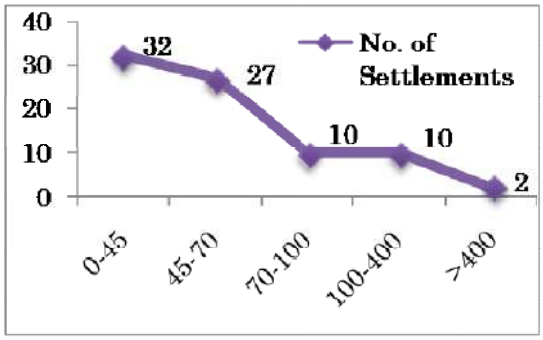


Figure.3.4 Cumulative Functional Index (CFI)

The local bodies whose CFI value is greater than 400 is considered as first order settlements, between 100-400 as second order settlements, between 70-100, 45-70, 0-45 as third order, fourth order and fifth order settlements respectively. The graph, so obtained is shown in Figure.3.4. Graph reveals that there are 2 first order settlements, 10 each second and third order settlements, 27 fourth order settlements and 32 fifth order settlements in Kannur District.

The Figure.3.5 shows the map of settlement hierarchy in Kannur district. Kannur Municipal Corporation area and Thalassery Municipal Town come under 1st order settlements. The first and second order settlements are located along National Highway and State highway.

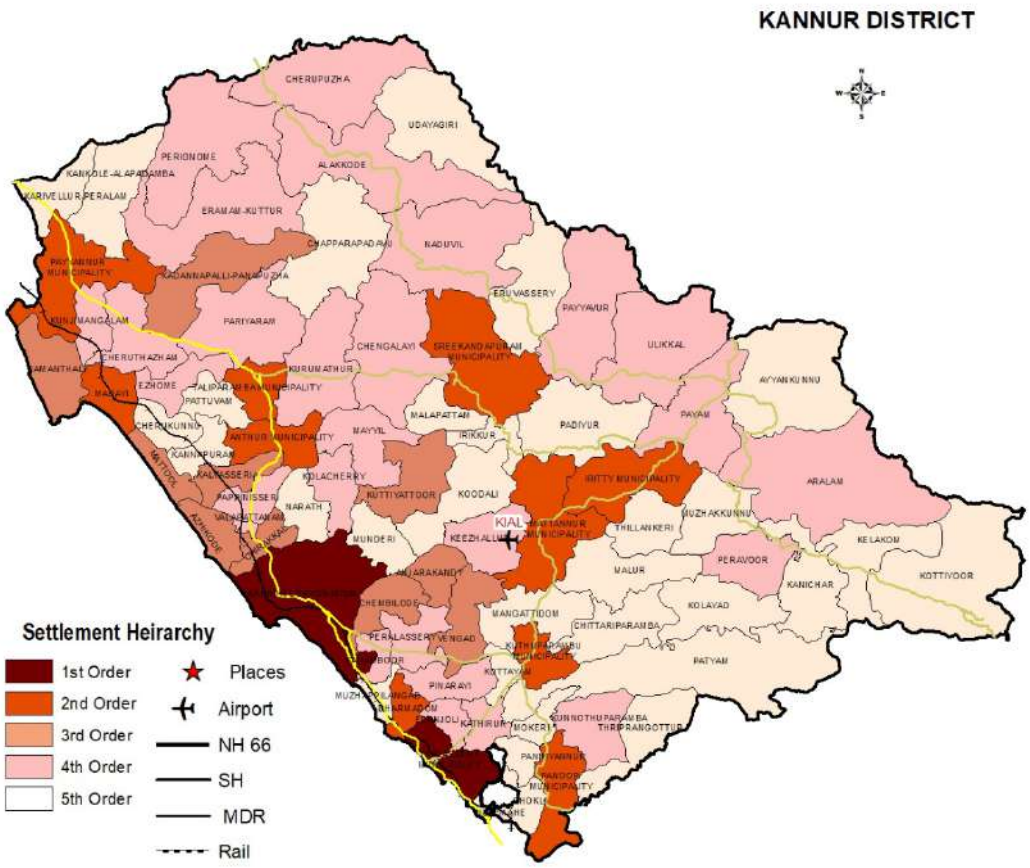


Figure.3.5 Settlement hierarchy in Kannur district

Moreover, Thalassery Municipality is considered as one of the first grade municipalities in Kerala. The majority of LSGs along the coastal stretch come under 1st, 2nd and 3rd order settlements.

3.4 FUNCTIONAL CHARACTER OF THE CORPORATION AREA IN THE DISTRICT

The functional character of a region is determined on the basis of population distribution within the region, average plot size and land use of that area. Function of a settlement is determined based on the major activity within the settlement. This may be rural if it has agriculture and allied activity or urban if it has secondary or tertiary sector activities. The methodology used here to determine the major function of the settlements is by studying the land use and the average plot size within the settlement. The LSG in Kannur district are classified as urban, semi urban, semi-rural and rural. Figure.3.6 shows the details of the Functional characteristics found in Kannur district. The ward wise study of Functional Character is shown in detail in Chapter 23 (Spatial Structure).

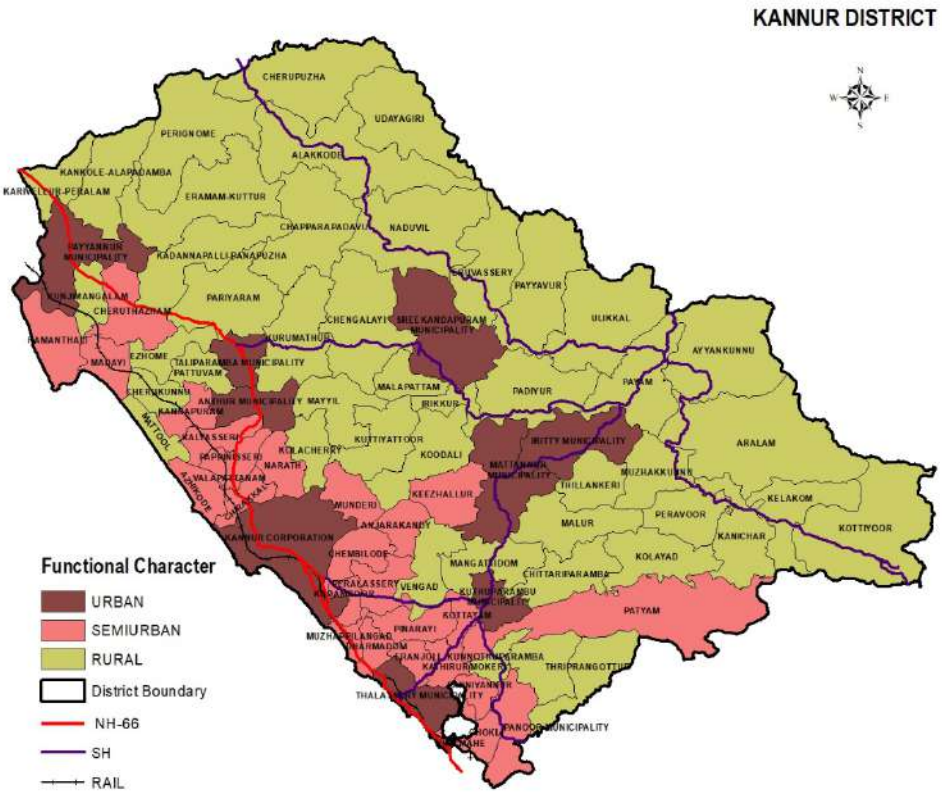


Figure.3.6 Functional Character of Kannur district

3.5 POPULATION CONCENTRATION PATTERN

From spatial distribution of local bodies, it is clear that the urban areas are mainly concentrated on coastal sides. The urbanization has gradually shifted towards midland and high land regions.

The population concentration pattern in Kannur district is shown in Figure.3.7 which depicts the majority of district population is concentrated on western side of the district. District's 1/3rd population as concentrated in 19 LSGs. Among these, 18 LSGs are very close to the coastal zone. The figure also reveals that 33% of district population is concentrated on 10.46% of district area and 50% of population is concentrated in 20.23% of the area of the district.

3.6 ACTIVITY PATTERN OF THE TOWNS IN THE DISTRICT

The activity pattern is determined based on three important parameters: land use concentration pattern, future urban profile and functional classification of that area. The Urbanisation studies conducted in the District clearly shows that Kannur Municipal Corporation area and its neighbouring Panchayaths in north and east are mainly having urban activities.

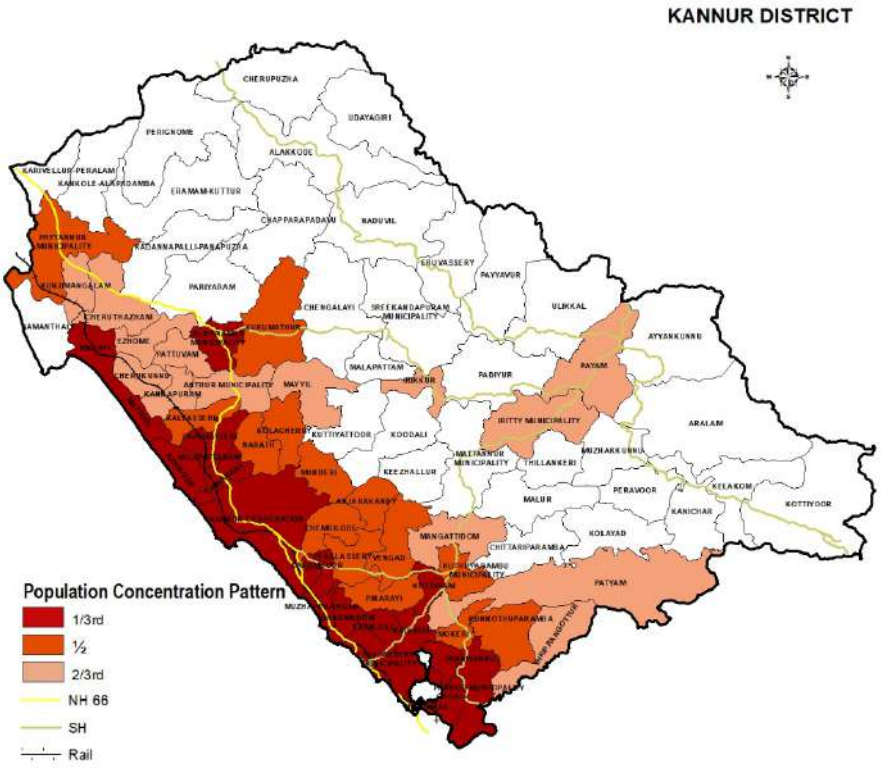


Figure.3.7 Population Concentration Pattern of Kannur District

The activity pattern arrived from the analysis shows that the urban activities are mainly concentrated in all the urban local bodies except Patyam. Mayyil. Kolachery, Karivellur -Peralam - Kankole - Alapadamba, Irikkur, Vengad, Mangattidam, Mokeri, Kunnothparamba, Peravoor, Thrippangottur, and Muzhakunnu are under urban activities.

The primary activities with agriculture being the predominant sector are concentrated mainly in local bodies like Naduvil, Kurumathur, Pattuvam, Mattool, Payyavoor, Ayyankunnu, Aralam, Kelakom, Kottiyoor, Kolyad, Thillankeri and Patyam which are along eastern side of the district. All the other local bodies come under secondary activities.

3.7 CONNECTIVITY

As mentioned in Chapter 2, Kannur Municipal Corporation area is easily accessible by road, rail and air. The National Highway-66 (NH-66) passes through the planning area connecting the two major cities; Kozhikode and Mangalore with it. The other major roads within the district are SH 30, SH 36 and SH 38 which provide an effective connectivity between low land, mid land and high land of the district. The major development centres within the district such as Thalassery, Payyannur, Mattannur and Thaliparamba are well connected



Figure.3.8 Connectivity of Kannur district

to the planning area through a system of road network. Thaliparamba is also well connected to the planning area through a system of road network. Moreover, the State Highway 59 passing through the highland area of the district acts as an effective trade route for exporting the plantation and cash crops within the district.

Kannur Railway Station, the major railway station in Kannur district is located inside the planning area. Also, the railway network parallel to the coastal area brings an effective connectivity of Kannur district with neighbouring urban centres. Moreover, Kannur International Airport is located 30 km away from the corporation area links Kannur district with the major airport cities in Kerala, India and Abroad, providing broader air connectivity to the Municipal Corporation area. Azheekal and Mappila bay are the major harbours which are located very close to the planning area.

Kannur South–Airport railway line is a newly suggested railway route which needs further detailed studies give hope for a rail connection to the hinterland area in future.

3.8 SPATIAL STRUCTURE OF THE DISTRICT

Spatial structure of the district is evolved by considering various factors such as hierarchy of settlement, activity pattern and the connectivity to

various settlements in the district. Figure.3.9 shows the spatial structure of Kannur district.

The study on urbanization of the district gives the hierarchy of the local body which forms a part of the regional road network.

The study of activity pattern based on the land use data is also an important parameter. The activity pattern of a district is the sum total of a pattern of functional character among various settlements, land use concentration pattern and urban profile within the district. This in effect integrates the land use distribution, population distribution, occupational structure, average plot size and distribution of facilities within the district.

The functional character is determined based on the population, average plot size and land use. The urban profile is derived taking in to account occupational structure, and hierarchy of settlements.

The connectivity gives the overall outline of all types of transportation networks that affect the trade and commercial activity of the district through which the economic development can be attained.

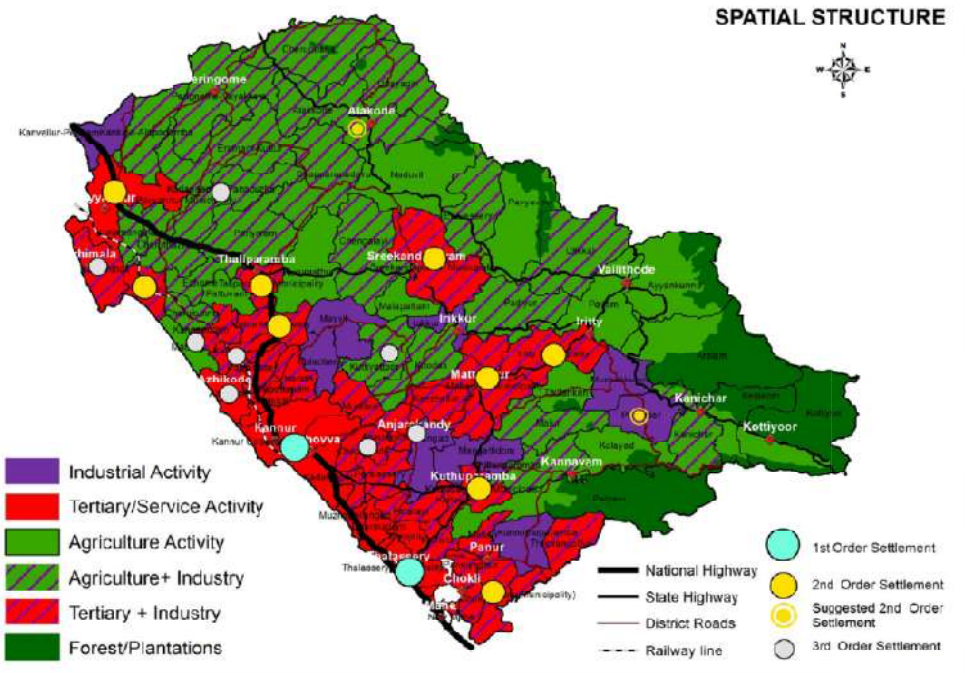


Figure.3.9 Spatial Structure – Kannur District

3.9 INFERENCE

From the above analysis, it is clear that Kannur Municipal Corporation is a highly urbanized local body with the largest population in the district. The study area comes under first order settlement with Tertiary/Service activities as predominant.

CHAPTER 4

DEMOGRAPHY

Kannur District remains the eighth position in the state in population size as per 2011 Census with 25,23,003. It ranks Third in North Kerala, just behind Malappuram and Kozhikode. Kannur Corporation area is the less populated among the six Municipal Corporations in Kerala.

The population size, population distribution, growth pattern, population density, sex ratio, literacy rate and age sex pyramid of Kannur Municipal Corporation area are analyzed and discussed in this chapter.

4.1 POPULATION SIZE

As per Census 2011, the population of Kannur District is 25,23,003 which comes to 7.55% of the population of Kerala state (3,34,06,061).

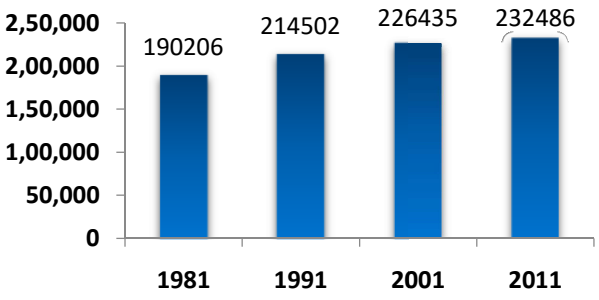


Figure.4.1 Decadal variations in population of Kannur Municipal Corporation area

The total population of Kannur Municipal area is 2,32,486 which was about 2,26,435 during 2001 Census. There is a linear increase in the population during the period from 1981 to 2011 (1,90,206 to 2,32,486) as shown in Figure.4.1.

4.1.1 COMPARISON WITH DISTRICT AND STATE

Table.4.1 shows the decadal variation of population size of Kannur Municipal Corporation area, District and State during 1981 - 2011. From this table, it is clear that population size is increasing from decade to decade.

Table.4.1 Comparison of population of Kannur Municipal Corporation with State and District

Year	Kerala State	Kannur District	Kannur Town
1981	2,54,53,680	19,30,722	1,90,206
1991	2,90,98,518	22,51,727	2,14,502
2001	3,18,41,374	24,08,956	2,26,435
2011	3,34,06,061	25,23,003	2,32,486

Source: Census 2011

The percentage of population in Kannur district with respect to that of Kerala is 7.55% while that of planning area with respect to that of Kannur district is 9.21%.

4 .1.2 COMPARISON WITH OTHER MUNICIPAL COPORATIONS IN KERALA

Comparison of population of the planning area with other Municipal Corporation areas in Kerala is shown in Figure.4.2**.** The highest population is observed in Thiruvananthapuram city whereas the least value is for Kannur Town; the recently formed Municipal Corporation in Kerala. The figure shows an increasing trend in population in Thiruvananthapuram, Kozhikode, Kochi, and Kannur except in Thrissur and Kollam.

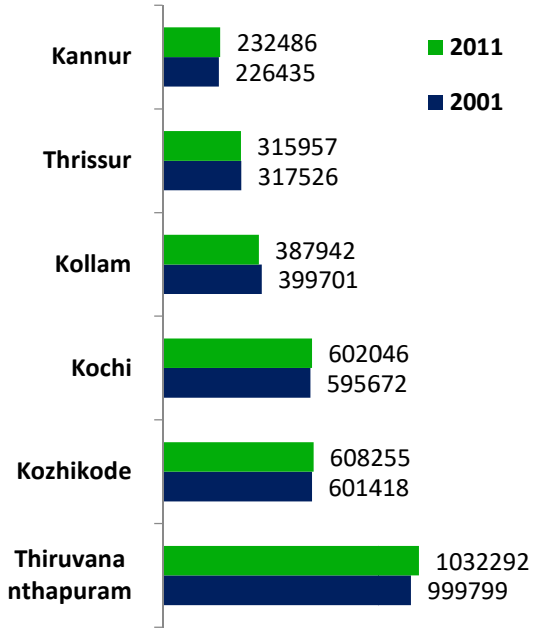


Figure.4.2 Comparison of population with other Municipal Corporations in Kerala

4.1.3 COMPARISON WITH NEIGHBOURING LOCAL BODIES

While comparing the population of the planning area with its neighbouring local bodies, it reveals that Azhikode and Chirakkal Panchayath having larger population and they fall under the category of census town.

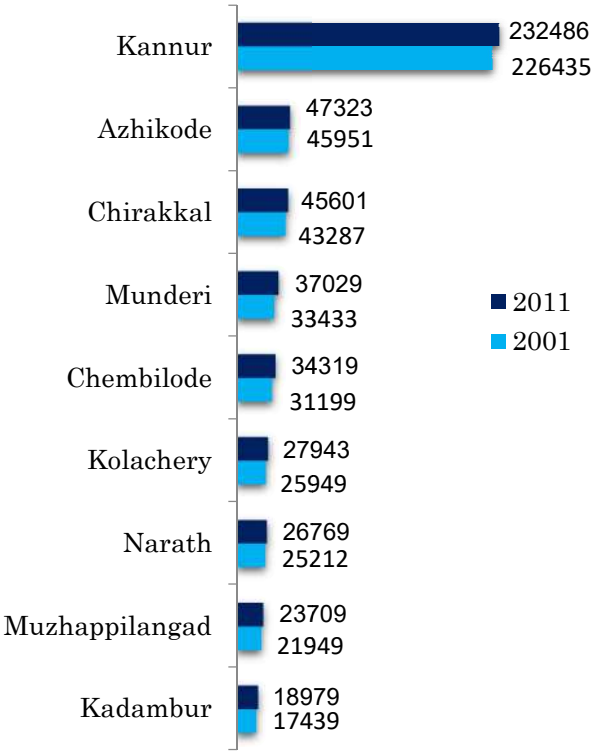


Figure.4.3 Comparison of population with neighbouring local bodies

4.2 POPULATION DISTRIBUTION

Kannur Municipal Corporation was formed in 2015 having a geographical area of 78.38 km². The old Kannur Municipal Town and its five adjoining local bodies constitute the newly formed Kannur Municipal Corporation

area. The last census was carried out in the year 2011. So the detail of population distribution in 55 wards of newly formed Kannur Corporation area is extracted from the 2011 census data and is shown in Table.4.2 and Figure.4.4. From this data, it is clear that ward wise population size of the planning area is ranges from 3500 to 5000.

Table.4.2 Ward wise Population of planning area

Sl. No.	Ward Name	Population
1	Palliyammoola	4433
2	Kunnavu	4098
3	Kokkenpara	4080
4	Pallikkunnu	4016
5	Thalappu	4211
6	Udayamkunnu	4583
7	Podikundu	4279
8	Kottali	3971
9	Athazhakunnu	4151
10	Kakkadu	3831
11	Thulicheri	4709
12	Kakkadu North	4700
13	Shadhulipalli	3933
14	Pallipram	4692
15	Vaarom	4708
16	Valiyannoor	4691
17	Chelora	4715
18	Macheri	4632
19	Pallipoyil	4373
20	Kappadu	4670
21	Elayavoor North	4471
22	Elayavoor South	4207
23	Mundayadu	4407
24	Edachovva	3843
25	Athirakam	3918
26	Kappicheri	3880
27	MeleChovva	3779
28	ThazheChovva	3956
29	Kizhuthalli	3937
30	Thilanoor	4666
31	Attadappa	4245
32	Chala	4050
33	Edakkadu	4136
34	Ezhara	3963
35	Alingal	3843
36	Keezhunna	3628
37	Thottada	4862
38	Adikadalai	4689
39	Kuruva	4666
40	Padanna	4497
41	Vethilapalli	4279
42	Neerchal	3775
43	Araykkal	4520
44	Chovva	4113
45	Thana	3922
46	South Bazaar	4023
47	Temple	4192
48	Thayatheru	3862
49	Kasanakotta	4057
50	Aikkara	3846
51	Kanathoor	4286
52	Thalikkavu	3952
53	Payyambalam	4065
54	Chaladu	4531
55	Panjikkayil	3944

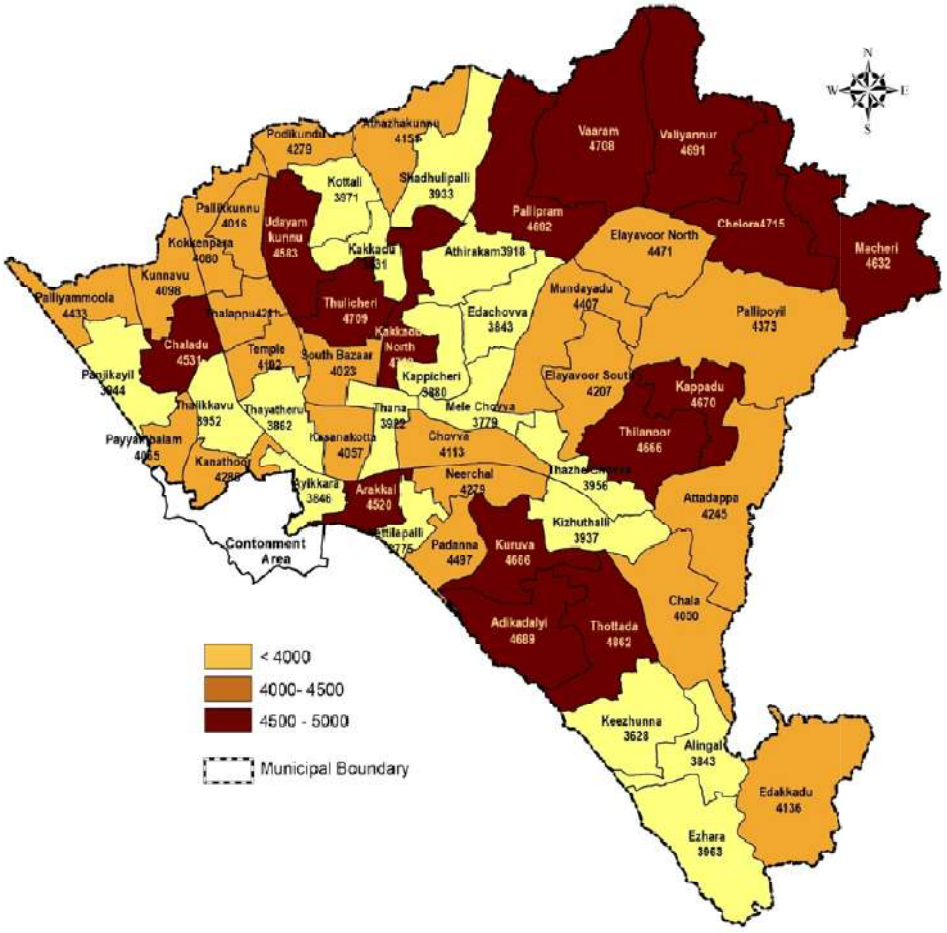


Figure.4.4 Ward wise Population of Kannur Municipal Corporation area

Highest population (between 4500 - 5000) is observed in wards namely; Chaladu, Udayamkunnu, Thulicheri, Kakkadu North, Araykkal, KuruvaAdikadalai, Thottada, Thilanoor, Kappadu, Chelora, Macheri, Valiyannoor, Vaaram and Pallipram.

Population size ranging from 4000 to 4500 can be seen in wards like Palliyammoola, Kunnavu, Kokkenpara, Pallikkunnu, Talap, Temple, South Bazar, Podikundu, Athazhakunnu, Payyambalam, Kanathoor, Kasanakota, Chovva, Vethilappalli, Padanna, Edakkad, Chala, Attadappa, Pallippoil, Elayavoor North, Elayavoor South and Mundayad. The remaining wards have the population size below 4000.

4.3 GROWTH PATTERN

The population growth rate is the rate at which the number of individuals in a population increases in a given time period (10 years) as a fraction of the initial population. A positive growth rate indicates that the population is increasing, whereas a

negative growth rate indicates that the population is decreasing.

4.3.1 COMPARISON WITH DISTRICT AND STATE

Kerala shows a constant declination in population from 1981. This is mainly because of some important factors like high literacy rate, decreasing household size and increase in the women workforce participation rate etc.

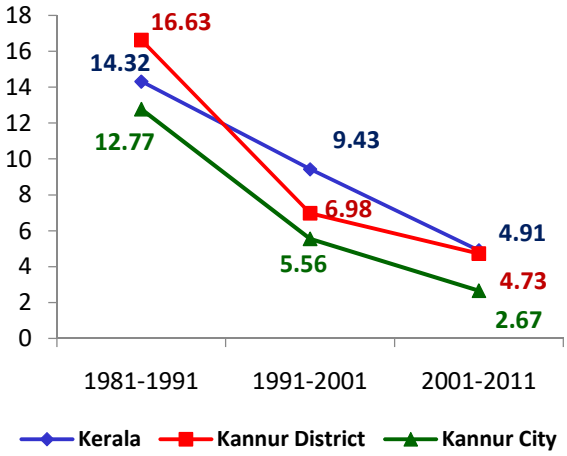
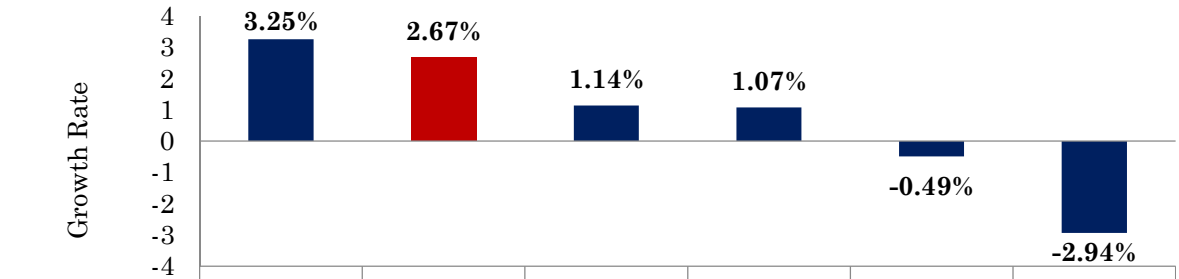


Figure.4.5 Growth rate comparison of Kannur Corporation area with State and District

A declining trend is observed in the growth rate of planning area, district and state. The growth rate of the study area is low when compared to the district and state.

4.3.2 COMPARISON WITH OTHER MUNICIPAL COPORATIONS IN KERALA

The Figure.4.6 shows the comparison of growth rate of Kannur municipal Corporation area with other municipal Corporation areas in Kerala as per 2011 Census data. It shows a negative population growth rate in Thrissur and Kollam Corporations whereas positive population growth rate is in Kochi, Trivandrum, Kozhikode and Kannur Corporations. When compared with the six municipal Corporations in Kerala, Kannur has the 2nd largest population growth rate.



	Thiruvananthapuram	Kannur	Kozhikode	Kochi	Thrissur	Kollam
Growth Rate	3.25	2.67	1.14	1.07	-0.49	-2.94

Figure.4.6 Comparison of Population Growth Rate with other Municipal Corporations in Kerala

4.4 POPULATION DENSITY

Gross population density is the number of people living per unit area (e.g. per square kilometre) considering the gross area. The gross population density of Kannur town, district and state for the last four decades are given in Figure.4.7.

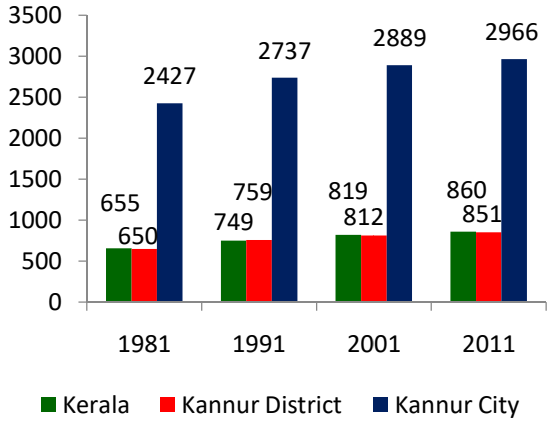


Figure.4.7 Gross population density of State, District and Kannur Municipal Corporation area

During the last four decades (from 1981 to 2011), an increasing trend is observed in population density of State, District and municipal Corporation area. The District and State have almost same value and the planning area has very large value when compared to District and State.

The Figure.4.8 showing ward wise distribution of gross population density of the planning area reveals that its value ranges from 1000 to 7500. Payyambalam, Ayikkara, Arakkal and Neerchal has the highest population density. All these wards are located in the western part of the Corporation and all these are coastal wards.

The least gross population density is seen in Vaaram and Pallipoyil wards. This is because the land use such as paddy fields, dry agriculture and water bodies are found more in these two wards compared to other wards. So it reduces the area of residential activities, hence the gross population density.

4.4.1 COMPARISON WITH OTHER MUNICIPAL CORPORATIONS IN KERALA

The Figure.4.9 shows the comparison of gross population density of Kannur Municipal Corporation area with other Municipal Corporations areas in Kerala.

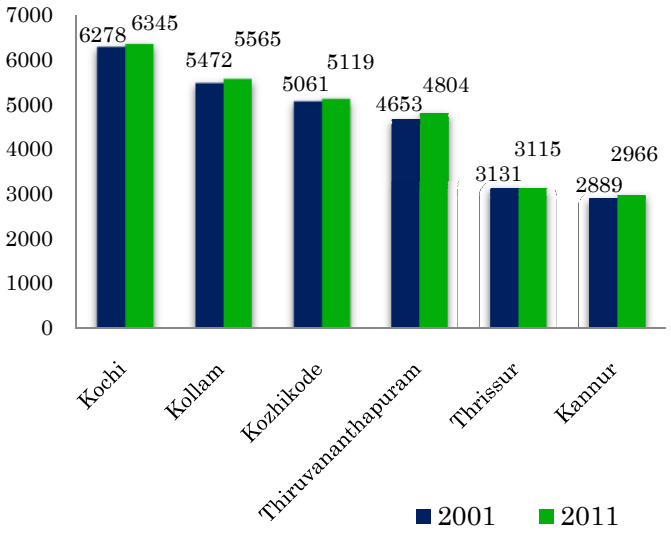


Figure.4.9 Comparison of gross population density of Kannur Municipal Corporation with other Municipal Corporations in Kerala

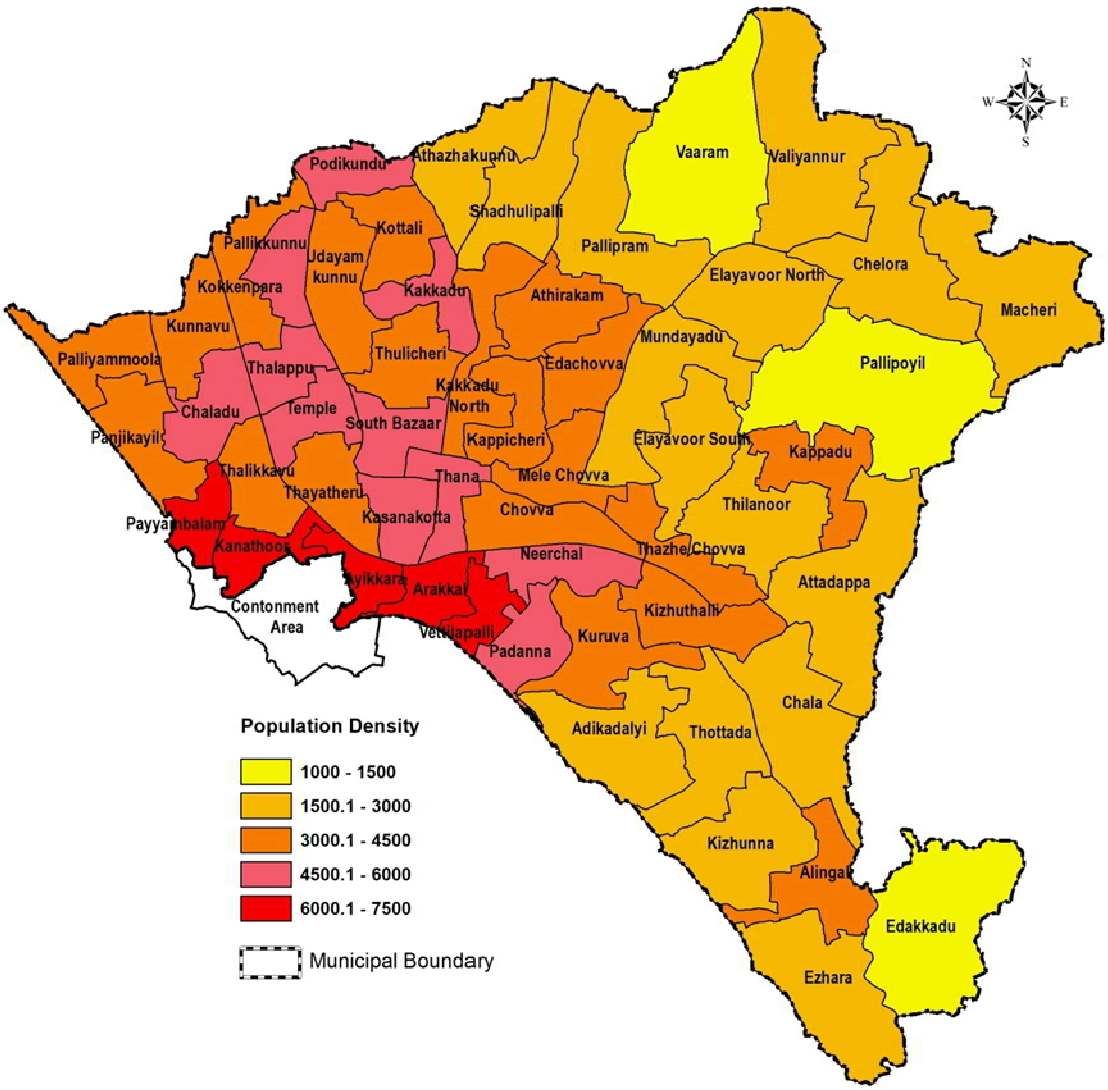


Figure.4.8 Ward wise distribution of gross population density

From the figure, it is clear that the highest gross population density is observed in Kochi and the least value is found in Kannur.

4.5 SEX RATIO

Sex ratio is defined as the proportion of female to male in a given population, usually expressed as the number of females per 1000 males.

4.5.1 COMPARISON WITH DISTRICT AND STATE

Comparison of sex ratio of the planning area with those of district and state as per 2001 and 2011 Census is shown in Figure.4.10. The values in 2001 as well as 2011 are 1106 and 1171 respectively which are higher when compared to the district and state values.

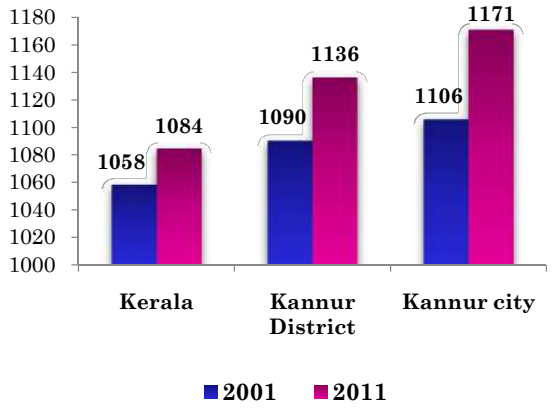


Figure.4.10 Sex Ratio - Comparison with District and State

Also, the Figure.4.11 indicates the decadal variation in sex ratio of the Corporation area which shows a sharp increase.

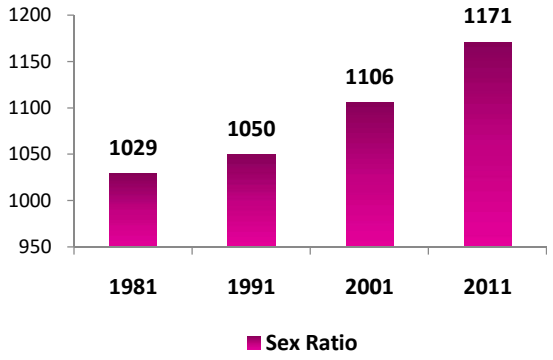


Figure.4.11 Decadal variation in sex ratio of Kannur Corporation area

4.5.2 COMPARISON WITH OTHER MUNICIPAL CORPORATIONS IN KERALA

The Figure.4.12 shows the sex ratio comparison of Kannur Municipal Corporation area with other Municipal Corporations in Kerala. Among these, Kannur has higher sex ratio (1171).

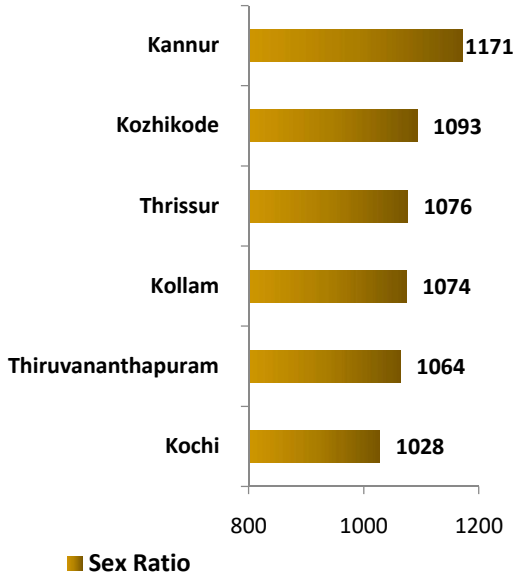


Figure.4.12 Sex Ratio - Comparison with other Municipal Corporations in Kerala

4.6 CHILD SEX RATIO

The age group of 0 to 6 year old constitutes the child population. The comparison of child sex ratio in state, district and the planning area are shown in Figure.4.13. From this figure, it is clear that Kannur Corporation area has smaller value than that of state and district.

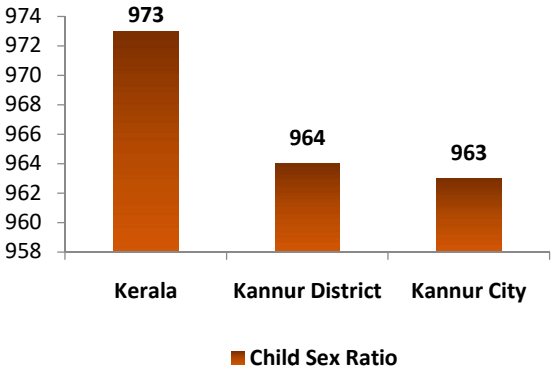


Figure.4.13 Comparison of Child Sex Ratio of District and State

4.7 LITERACY RATE

As per 2011 Census, the literacy rate of the planning area is 96.55%, where as that of state and district is 94% and 95.1% respectively and is shown in Figure.4.14. The Corporation area has a higher literacy rate when compared to the district and state average value.

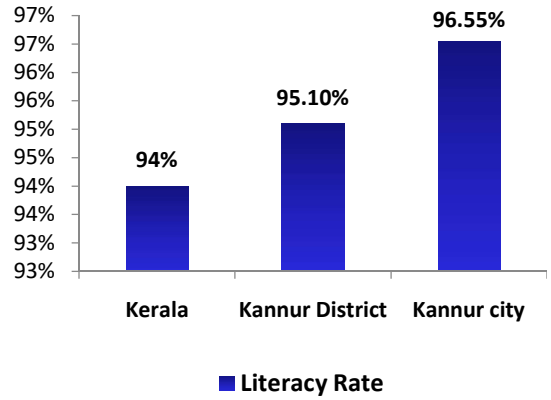


Figure.4.14 Comparison of Literacy Rate with District and State

Kannur Corporation area has a male literacy rate of 97.87% and female literacy rate of 95.44%.

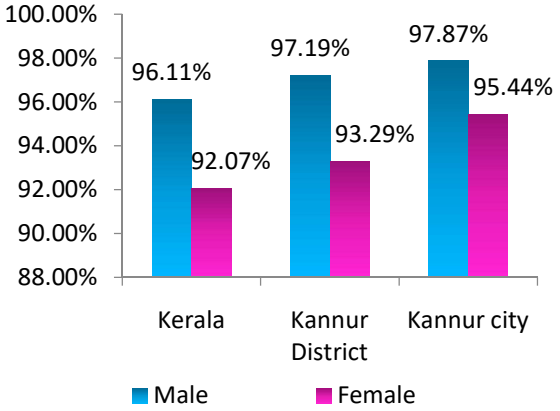


Figure.4.15 Comparison of Male and Female Literacy Rate with state and district

The comparison of male and female literacy rate with that of district and state is shown in Figure.4.15. It shows that both male and female literacy rate of the study area is higher than that of state and district values. It also reveals that the male and female gap in literacy is very much less in the study area.

4.8 AGE - SEX PYRAMID

A Population pyramid, also known as age - sex pyramid is a graph that shows the age – sex distribution of a given population. Sex is shown on the left/right sides, age on the y-axis, and the percentage of population on the x-axis.

Population pyramids are often viewed as the most effective way to graphically depict the age and sex distribution of a population, partly because of the very clear image these pyramids present.

A great deal of information about the population divided on the basis of age and sex can be read from a population pyramid, and this can shed light on the extent of development and other aspects of the population. A population pyramid also tells how many people of each age group live in the planning area. Generally, when a population is growing steadily, the longest bars of the graph will appear at the bottom of the pyramid and will generally decrease in length as the top of the pyramid is reached, indicating a

large population of infants and children it declines toward the top of the pyramid due to the death rate.

The age-sex pyramid of Kannur Corporation area is shown in Figure.4.16 which reveals that, the highest percentages of male and female population are in the age group of 36 to 40. The majority of population falls in the age group ranging from 26 to 50. In case of aged people, as the general trend, percentage of females in age group of 65 and above is more than that of the male population.

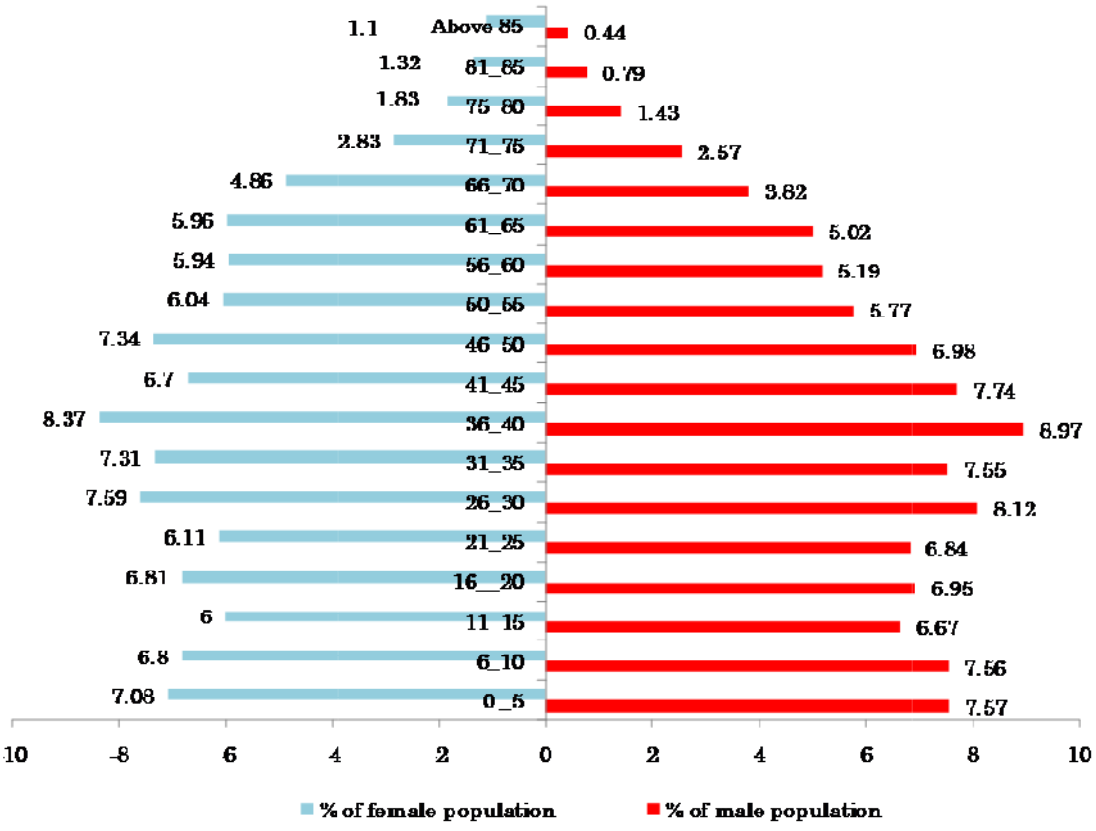


Figure.4.16 Age Sex Pyramid

4.9 INFERENCE

As per 2011 census, the population of Kannur Municipal Corporation area is 2,32,486 (9.21% of Kannur district) which is the least value when compared with other Municipal Corporations in Kerala.

Even though the population size of the planning area, district as well as state is found increasing by decades, the growth rate of population shows a declining trend.

The highest population is seen in wards of Chelora, Elayavoor, Edakkad

and Puzhathi zones of the Corporation area.

The population density of Kannur Corporation is 2966 which ranks least when compared to other municipal Corporations in Kerala. Among the six zones of the planning area, the Kannur zone area has the highest ward wise gross population density.

Sex ratio of the planning area is 1171 which is higher when compared to that of the district, state as well as other Municipal Corporations in Kerala. The decadal variation of sex ratio shows a sharp increase for the study area. But in the case of child sex ratio, Kannur Corporation area has smaller value than that of state and district.

The literacy rate of the planning area is 96.55% which is higher than the district and state values. Also, the gap between male and female literacy rate (97.87% and 95.44% respectively) is comparatively less.

The study of age sex pyramid reveals that, high percentage of female as well as male population is seen in the age group of 36 to 40.The majority of population falls in the age group ranging from 26 to 50. In case of aged people, the planning area follows the common trend as the percentage of females in age group of 65 is more than that of males.

CHAPTER 5

OCCUPATIONAL STRUCTURE

Study and Analysis of existing pattern of employment is to be carried out for understanding the future needs and potential of the planning area. This Chapter explains the existing status of workers, work force participation rate, occupation structure, development trend and issues.

5.1 WORKERS

According to Census of India, all persons engaged in 'work' defined as participation in any economically productive activity with or without compensation, wages or profit are workers. The reference period for determining a person as worker and non-worker is one year preceding the date of enumeration.



Figure.5.1 Decadal variation of total number of workers in Kannur Municipal Corporation area

The workers are classified as main and marginal workers. Main workers are those workers who had worked for the major part of the reference period i.e, 6 months or more. Marginal Workers are those workers who had not worked for the major part of the reference period i.e, less than 6 months.

The total number of workers within the planning area as per 2011 Census is 67,203 among which 88.52% of workers are main workers and 11.48% are marginal workers. The Figure.5.1 shows the decadal variation of total number of workers which indicates a gradual increase.

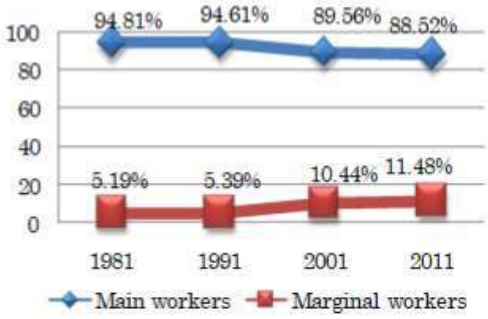


Figure.5.2 Share of main and marginal workers in planning area

Figure.5.2 is the graph showing the share of main and marginal workers in the corporation area. It reveals that,

the overall share of main workers is gradually reducing year by year but at the same time, the share of marginal workers in the employment sector is increasing.

5.2 WORK PARTICIPATION RATE

As per Census, definition of Work Participation Rate (WPR) is the share of the total population engaged in any kind of employment. The WPR in the corporation area is shown in Figure.5.3. According to the figure, the WPR has increased from 25.31% to 28.91% during the period from 1981 to 2011.

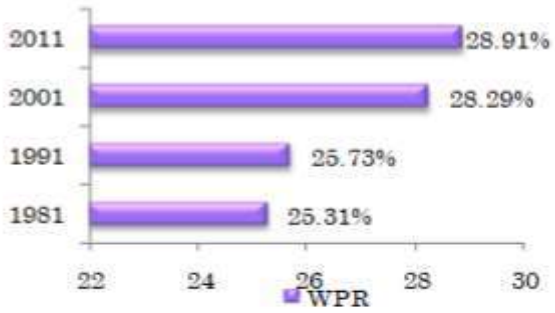


Figure.5.3 WPR in Kannur Corporation area

5.2.1 TEMPORAL VARIATION - COMPARISON WITH DISTRICT AND STATE

The comparison of temporal variation in work participation rate of Kannur Municipal Corporation area with district and state is given in Figure.5.4. From this figure, it is clear that the planning area has very low value when compared with the other two.

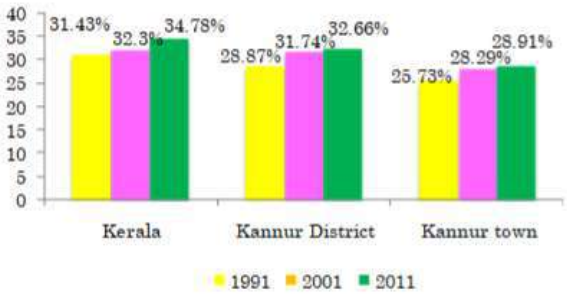


Figure.5.4 Temporal Variation in WPR - comparison with district and state

5.2.2 COMPARISON WITH OTHER MUNICIPAL CORPORATIONS IN KERALA

The Figure.5.5 shows the comparison of work participation rate of Kannur Municipal Corporation area with those of other Municipal Corporations in Kerala. Kochi; the industrial and commercial capital of Kerala shows the highest work participation rate (38.03%) whereas Kannur shows the least value (28.91%).

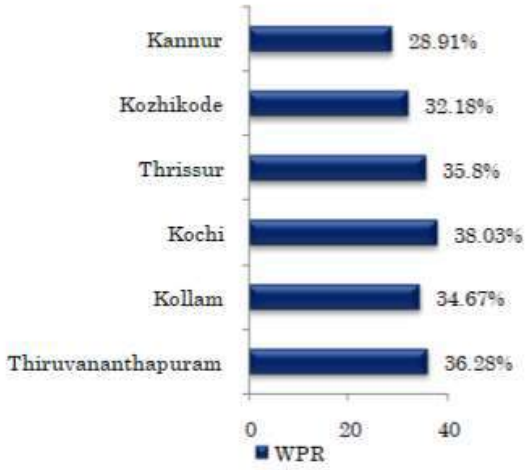


Figure.5.5 Comparison of WPR with other Municipal Corporations in Kerala

5.2.3 COMPARISON WITH OTHER MUNICIPALITIES IN DISTRICT

Work Participation Rate of the planning area is compared with other municipalities in the district and is shown in Figure.5.6. The figure reveals that Mattannur has the highest value (36.75%) followed by Payyannur (35.34%) and Sreekantapuram (35.04%). The planning area comes in eighth position.

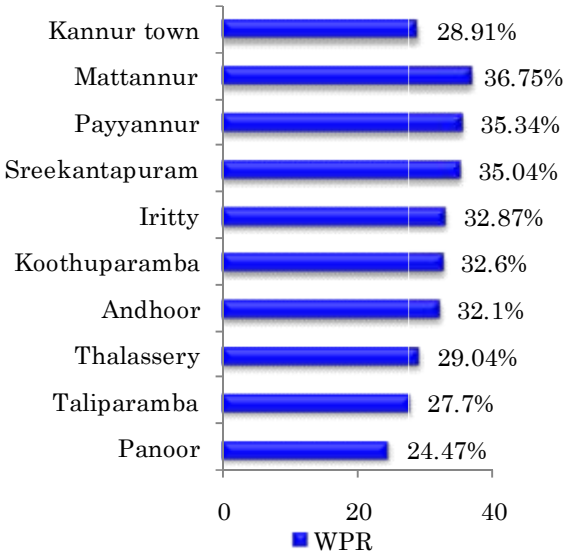


Figure.5.6 Comparison of WPR with other Municipalities in Kannur District

5.2.4 MALE AND FEMALE WPR COMPARISON WITH OTHER MUNICIPAL CORPORATIONS IN KERALA

While comparing the WPR of male and female population of other Municipal Corporations in Kerala, Kannur shows the least value which is clearly shown in Figure.5.7.

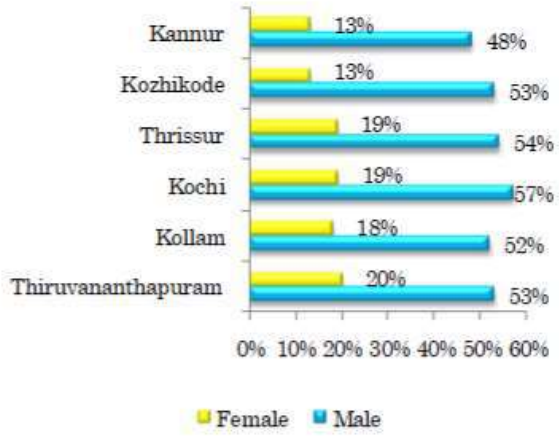


Figure.5.7 Comparison of Male and Female WPR with other Municipal Corporations in Kerala

5.2.5 COMPARISON OF DECADAL VARIATION OF GENDER BASED WORK PARTICIPATION RATE

The Figure.5.8 shows the comparison of decadal variation of male and female work participation rate of Kannur Corporation area.

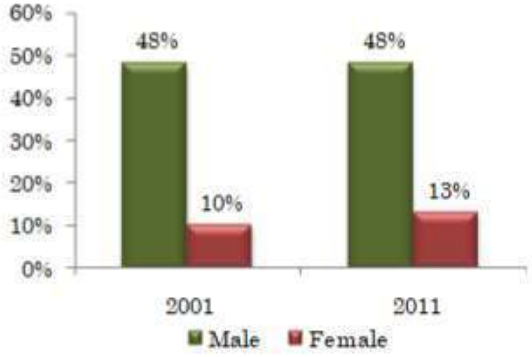


Figure.5.8 Comparison of decadal variation of gender based WPR of Kannur Corporation

The male WPR is maintaining a constant value but female WPR has gradually increased from 10% to 13%

during the period 2001 to 2011. But still, the work participation rate of female is very low compared to that of male.

5.3 OCCUPATIONAL STRUCTURE

A fourfold classification of main workers as cultivators, agricultural labourers, household industrial workers and other workers as per 2011 Census are shown in Table.5.1.

Table.5.1 Category of main workers

Category of workers	Number
Cultivators	161
Agricultural Labours	614
House Hold industrial labours	1045
Others	57668

Source: Census Data, 2011

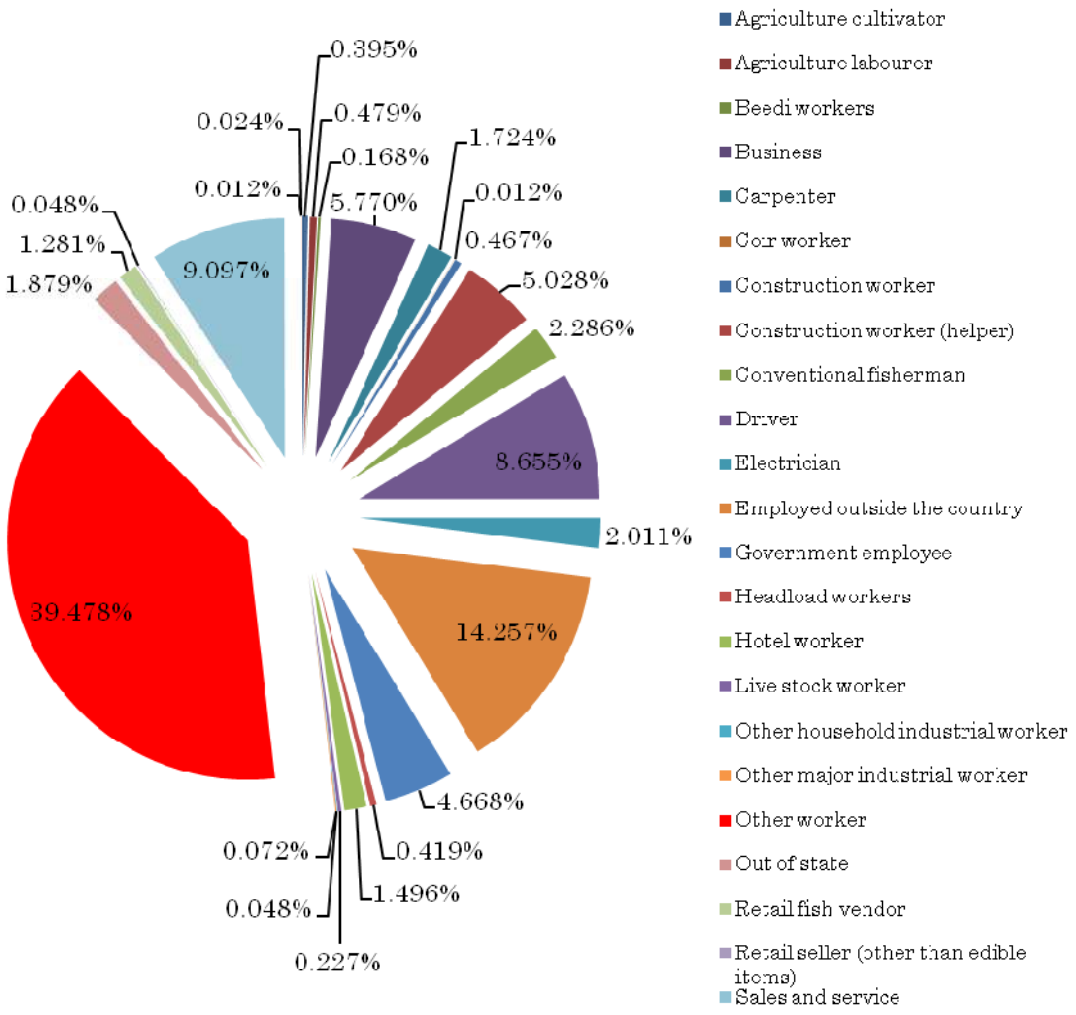
From the table, it is clear that the majority of the main workers in the planning area comes under other workers category which includes industrial sector, construction, engineering, other services etc.

The Figure.5.9 shows the decadal variation of main workers in Kannur Corporation area which indicates that the percentage of share of other workers has gradually increased within the planning area.



Figure.5.9 Decadal variation of main workers in Kannur Corporation area

The percentages of workers are involved in different works based on the socio economic survey is shown in Figure.5.10. From this, it is clear that about 39.48% of workers involved in other workers category.



Source: Socio economic survey, 2018

Figure.5.10 Classification of workers

5.4 INFERENCE

As per 2011 Census, the Work Participation Rate of Kannur Corporation area is 28.91%, which is very low when compared to District and State value. The planning area ranks 6th in Work Participation Rate among the six Municipal Corporations in Kerala and 8th among ten Municipalities in Kannur district. Female WPR in the planning area is 13%. According to the Census data, number of main workers is high which indicates that people are engaged in service, productive economic sectors throughout the year. The contribution of other workers has increased over decades. Occupational structure of Kannur town indicates that the workers involved in primary sector are less. The data obtained from socio economic survey indicates that in this town, tertiary activities are predominant.

CHAPTER 6

LAND USE

Land use refers to the manner of utilisation of land including its allocation, development and management. Municipal Governments divide the land for various land uses like agriculture, residential, commercial, public and semi-public, transportation, recreational, industrial etc. This is inevitable for an urban area to function effectively and to meet all the needs of citizes.

The land use of an area is classified based on major activity of that area. Land use analysis has a key role in spatial planning in which, use of every part and parcel of land is to be specified, both existing and acquired in future. This is to understand the predominant economic activity of the area and to assess the availability of suitable land for the future urban development activities of the Corporation area.

Spatial analysis is carried out by conducting primary survey of existing land use in all 55 wards. The chapter deals with the existing land use, land use breakup, ward wise distribution as well as concentration of major land uses etc. of the planning area.

Table.6.1 Existing land use break up

Sl. No.	Land Use	Area (sq. km)	% Area
1	Residential	41.478	52.92
2	Dry Agriculture	15.339	19.57
3	Road	4.270	5.45
4	Water Body	3.450	4.40
5	Paddy	2.916	3.72
6	Vacant Land	2.503	3.19
7	Commercial	1.556	1.99
8	Wetland	1.311	1.67
9	Educational	0.910	1.16
10	Religious	0.698	0.89
11	Public and Semi Public	0.686	0.87
12	Industrial	0.593	0.76
13	Recreational Open space	0.480	0.61
14	Railway Property	0.477	0.61
15	State Govt Property	0.383	0.49
16	Transportation	0.332	0.42
17	Recreational Built up	0.178	0.23
18	Health Services	0.176	0.22
19	Mangrove	0.171	0.22
20	Mixed	0.106	0.14
21	Solid Waste Management	0.084	0.11
22	Public Utilities	0.071	0.09
23	Central Govt Property	0.065	0.08
24	Wasteland	0.064	0.08
25	Communication	0.039	0.05
26	Traffic Related	0.031	0.04
27	Others	0.012	0.01
Total		**78.38**	**100**

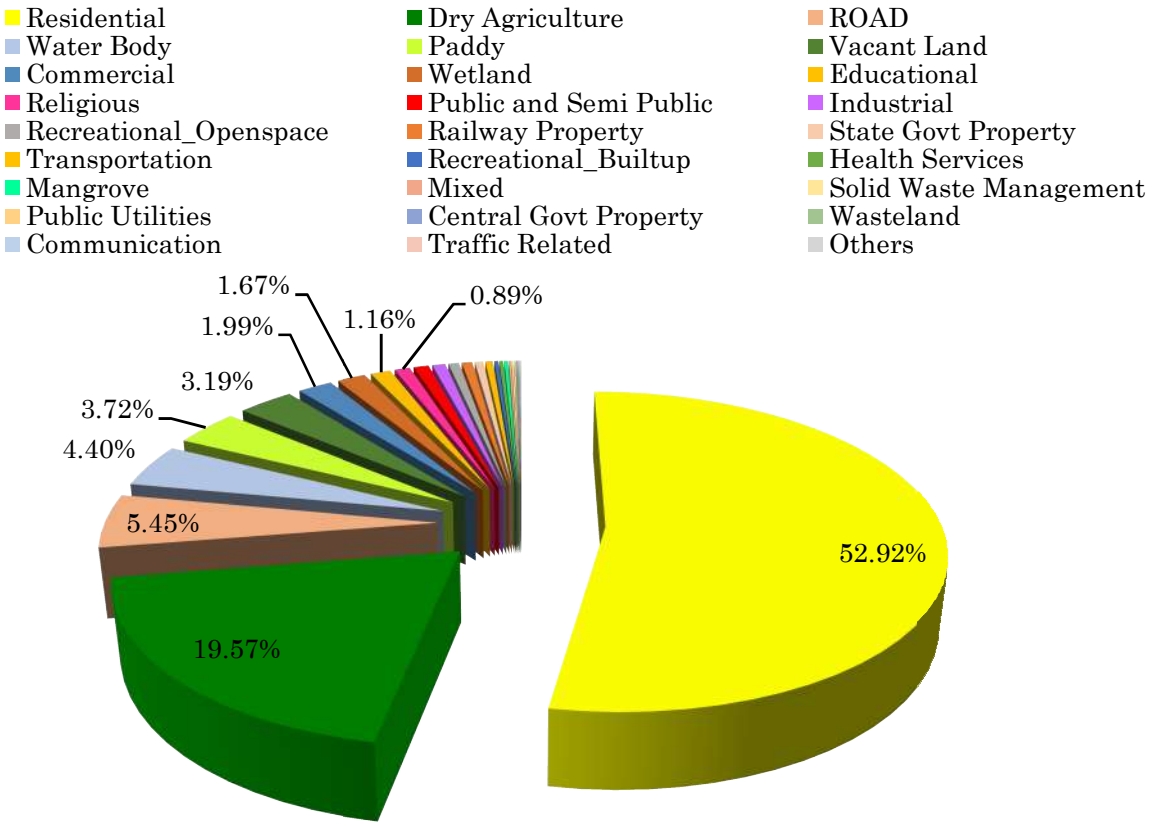


Figure.6.1 Existing land use break up

6.1 LAND USE AT CITY LEVEL

The existing land use breakup of Kannur Municipal Corporation area based on the land use survey conducted with help of satellite images provided by NRSC (National Remote Sensing Centre) is shown in Figure.6.1 and Figure.6.2 and the break up details are tabulated in Table.6.1.

The total land area of the planning area is 78.38 km² out of which 41.478 km² (52.92%) is residential land. The second highest land use is for dry agriculture which contributes 15.339 km² (19.57%). The water body, paddy field and vacant land constitutes 3.45 km² (4.40%), 2.916 km² (3.72%) and 2.503 km² (3.19%) respectively. Other categories of land uses are road (5.45%), commercial (1.99%), wetland (1.67%), educational (1.16%), religious (0.89%), public and semi-public (0.87%), industrial (0.76%), recreational open space (0.61%), railway property (0.61%) etc.

6.2 COMPARISON OF EXISTING LAND USE WITH PLANNING STANDARDS

For the comparison of land use of Kannur Corporation area with

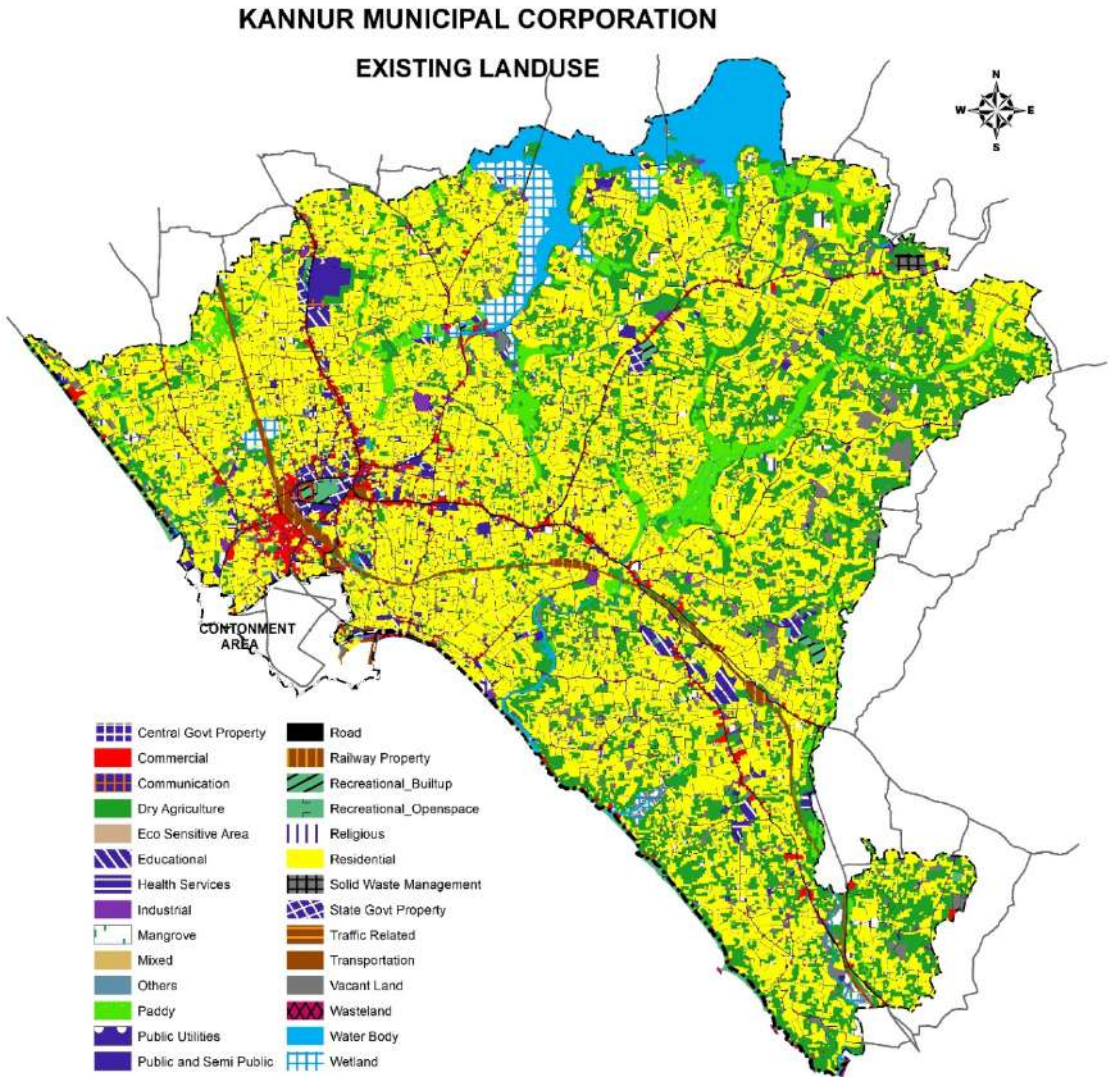


Figure.6.2 Existing land use map of Kannur Corporation area

planning standards, the town has to be categorized based on urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines.

Since the planning area is having population between 50,000 – 5,00,000, as per URDPFI guidelines, it falls under the category of Medium Town. Accordingly, the development area is calculated as the sum total of the land use area of residential, commercial, industrial, public and semi-public, recreational, transport and communication. The value is 52.09 km^2 which accounts to 66.46% of the total area.

Table.6.2 gives the land use comparison of the planning area with planning standards. The table reveals that major portion of the developed area is occupied for residential use (79.72%) which is far beyond the requirement (43%-48%). All other land uses are below the requirement.

Table.6.2 Land use comparison of Kannur Municipal Corporation area with planning standards

Sl. No.	Land use	Area in km²	Existing % of total area	% of developed area	Requirement as per medium plain town as per URDPFI standard
1	Residential	41.478	52.92	79.72	43-48
2	Commercial	1.556	1.99	2.99	4-6
3	Industrial	0.593	0.76	1.14	7-9
4	Public and semi public	3.073	3.92	5.91	6-8
5	Recreational	0.658	0.84	1.26	12-14
6	Transport and communication	4.671	5.96	8.98	10-12
	Total	**52.030**	**66.382**	**100.00**	

6.3 LAND USE CONCENTRATION PATTERN

Land use pattern is the layout or arrangement of uses of the land. It gives an idea about where a particular land use is concentrated within the study area. The concentration pattern of a land use can be ascertained by the Concentration Index of the land use which is calculated as follows.

The concentration index value may be greater than one, equal to one or less than one. The wards with concentration index greater than one indicates that the land use under consideration is intensively concentrated in these wards. According to the above method, the concentration indexes of various categories of land uses are analysed.

Concentration index of a land use in a ward = {(Area of that land use in the ward/ Total area of the ward)} / {(Area of that land use in municipal town/ Total area of the municipal town)}

6.3.1 RESIDENTIAL CONCENTRATION

The residential land use distribution and ward wise residential land use concentration of Kannur Corporation area is shown in Figure.6.3 and Figre.6.4 respectively. In the planning area, the residential land use concentration index ranges from 0.01 to 1.50. Highest value is observed in Palliyamoola, Kokkenpara, Talap, Podikund, Kottali, Khasanakotta, Thana, Arakkal, Neerchal, Vettilapalli, Kappicheri, Melechovva, ThazheChovva, Thottada, Adikadalayi, Kuruva, Padanna.

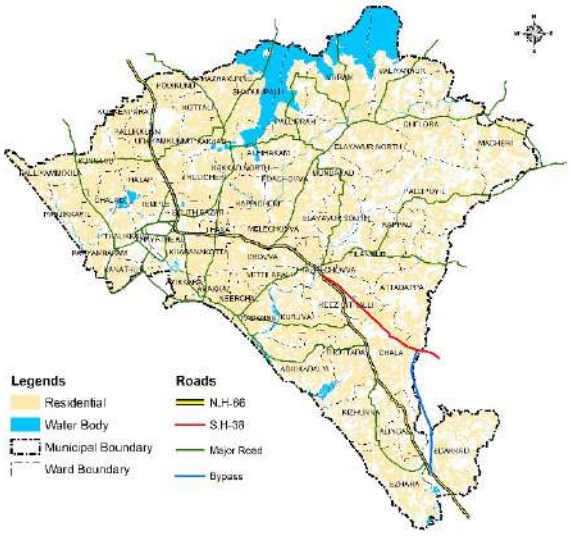


Figure.6.3 Distribution of residential land use

Kizhuthalli, Attadappa, Thilanur, Elayavur South, Elayavur North, Edachovva, Thulicheri, Kakkad, Udayamkunnu, Kunnavu, Panjikkayil, Thalikkavu, Payyambalam, Kanathur, Ayikkara, Pallikkunnu and Kappad wards (1.01 to 1.50). Chalad and Thayatheru have the minimum (0.01 to 0.50).

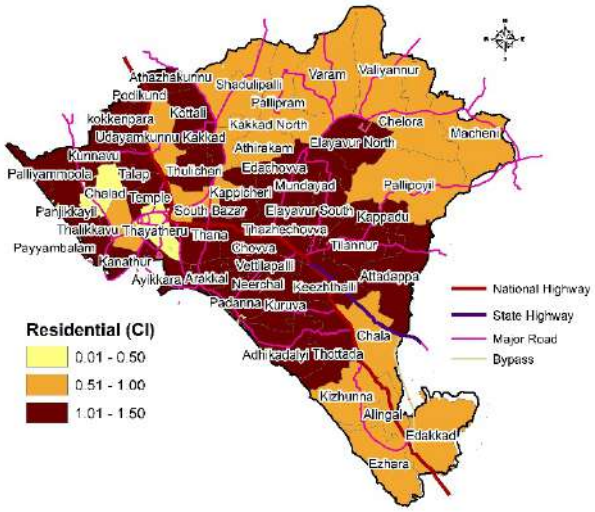


Figure.6.4 Concentration pattern of residential land use

6.3.2 INDUSTRIAL CONCENTRATION

The distribution and concentration index of industrial land use in the Corporation area shown in Figure.6.5

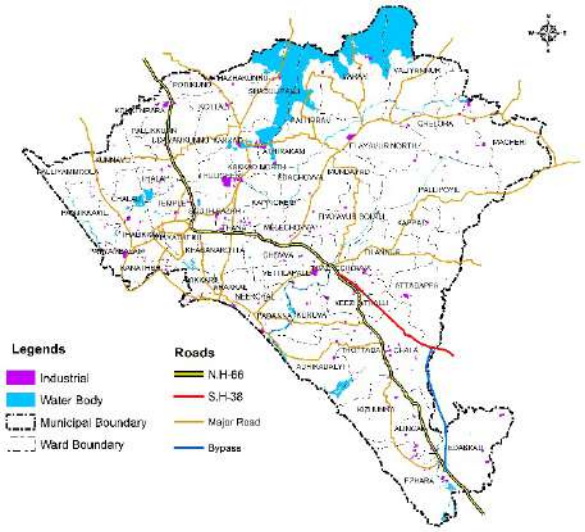


Figure.6.5 Distribution of industrial land use

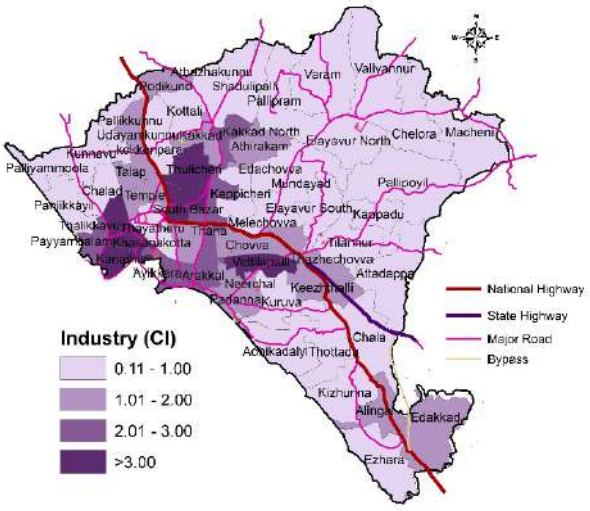


Figure.6.6 Concentration pattern of industrial land use

and Figure.6.6 respectively. The presence of industries in an area represents the urban nature of that town. The industrial land use concentration index of the planning area ranges from 0.11 to 3.00 and above 3.00. Highest value is seen Thulicheri, South Bazar, Vettilappally, Thalikkavu and Kanathur wards (>3) due to the presence of Cannanore spinning mill and Dhanalakshmi weaving mill etc.

Payyambalam, Ayikkara, Arakkal, Kappicheri, Thana and Kakkad North wards have the second highest industrial concentration index (2.01 to 3.00) followed by Pallikkunnu, Talap, Temple, Khasanakotta, Padanna, ThazheChovva, Edakkad, Kizhuhalli, Chovva, Neerchal, Podikkund, Athirkam, Kakkad and Alingal wards (1.01 to 2.00). Remaining wards have industrial concentration index ranging from 0.01 to 1.00.

6.3.3 COMMERCIAL CONCENTRATION

The Figure.6.7 and Figure.6.8 represents the distribution and concentration index of commercial land use in Kannur Municipal Corporation area respectively.

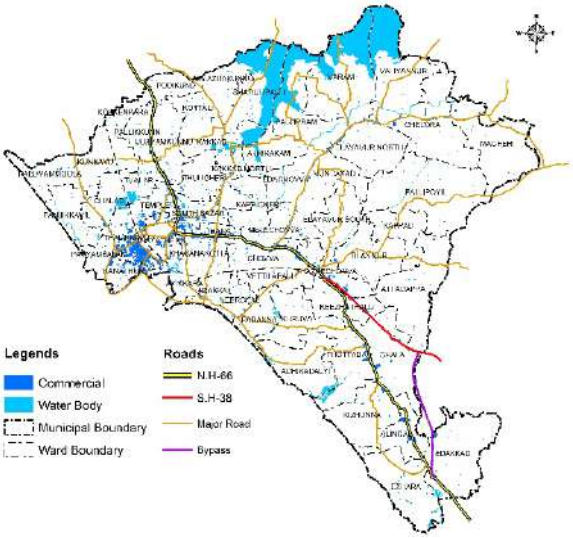


Figure.6.7 Distribution of commercial land use

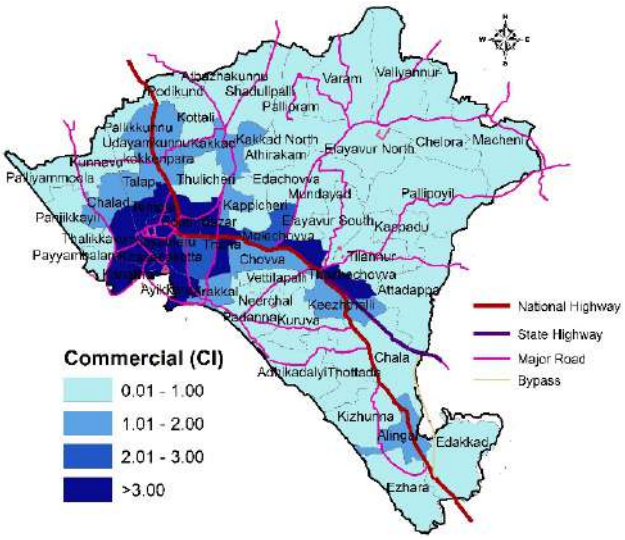


Figure.6.8 Concentration pattern of commercial land use

From the figures, it is evident that the commercial land use is mainly concentrated in the wards situated at the core of the planning area. Thayatheru, Temple, South Bazar, Thana and ThazheChovva wards have the value above 3.00 which is the highest. The second highest commercial concentration is observed in Khasanakotta, MeleChovva and Thayatheru wards (2.01 to 3.00) followed by Chalad, Talap, Pallikkunnu, Udayamkunnu, Kakkad, Kakkad North, Arakkal, Chovva, Keezhthalli and Alingal (1.01 to 2.00). All other wards have concentration index less than one.

6.3.4 PUBLIC AND SEMI PUBLIC CONCENTRATION

The public and semi-public land use distribution includes government establishments, educational facilities, health facilities, social institutions and religious institutions.

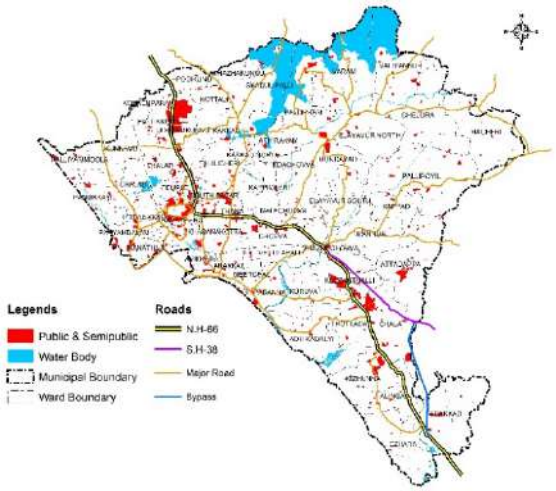


Figure.6.9 Distribution of public and semi-public land use

Figure.6.9 and Figure.6.10 represents the ward wise distribution and concentration pattern of public and semi-public land use in Kannur Municipal Corporation area.

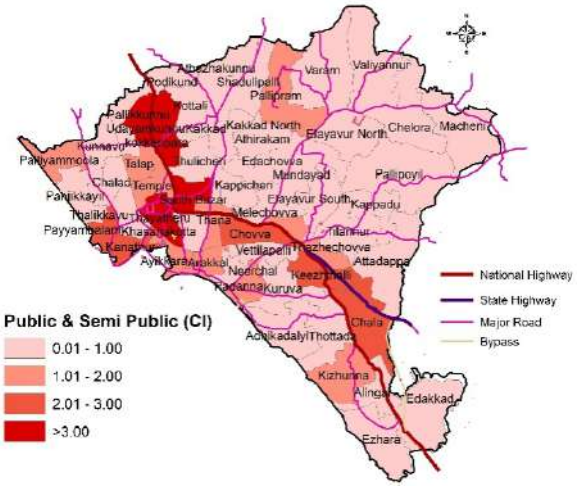


Figure.6.10 Concentration pattern of public and semi-public land use

The concentration index is observed to vary from 0.01 to 3.00 and above 3.00. Pallikkunnu, Thayatheru, Udayamkunnu South Bazar wards have value above 3.00 which is due to the presence of government establishments like Kannur Municipal Corporation Office, Taluk Office, Civil Station, Kannur University, Stadium, Court Complex, Veterinary Hospital, Police Headquarters, Government Sports School, Central Jail, Krishna Menon College etc.

The second highest value of public and semi-public land use concentration index is seen in Payyambalam, Kanathur, Chala, Keezhuthalli and Chovva wards (2.01 to 3.00).

6.3.5 PADDY CONCENTRATION

Paddy land use distribution and concentration of the planning area shown in Figure.6.11 and Figure.6.12 respectively.

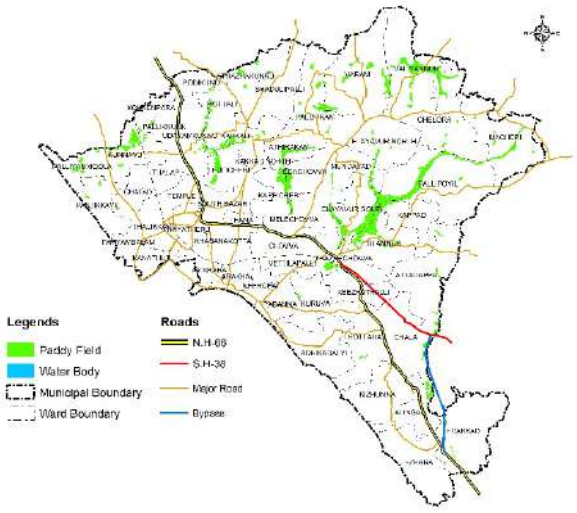


Figure.6.11 Distribution pattern of paddy land use

The figures reveal that the paddy land use is scattered and situated mostly in the north eastern wards of the Municipal Corporation with concentration index ranging from 0.01 to 6.00.

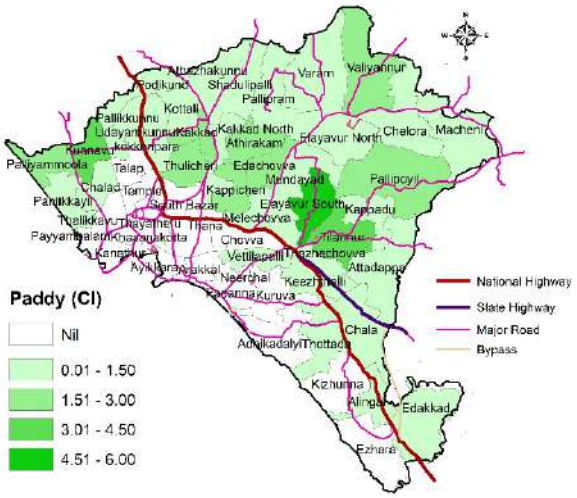


Figure.6.12 Concentration pattern of paddy land use

Higher value is seen in wards situated apart from the town centre or in peripheral wards. Paddy land predominant wards are Elayavur South with concentration index ranging from 4.51 to 6.00 followed by Thilannur and Kunnavu (3.01 to 4.50). Palliyamoola, Kakkad, Thulicheri, Athirakam, Kappicheri, Edachovva, Pallipoyil and Valiyannur wards have concentration ranging from 1.51 to 3.00. Talap, Temple, South Bazar, Thalikkavu, Payyambalam, Kanathur, Ayikkra, Thayatheru, Thana, Arakkal, Khasanakotta, Neerchal, Padanna, Kuruva, Chovva, Aadikadalayi, Kizhunna and Ezhara wards have zero paddy land use concentration because of the urban character of most of these town wards.

6.3.6 DRY AGRICULTURE CONCENTRATION

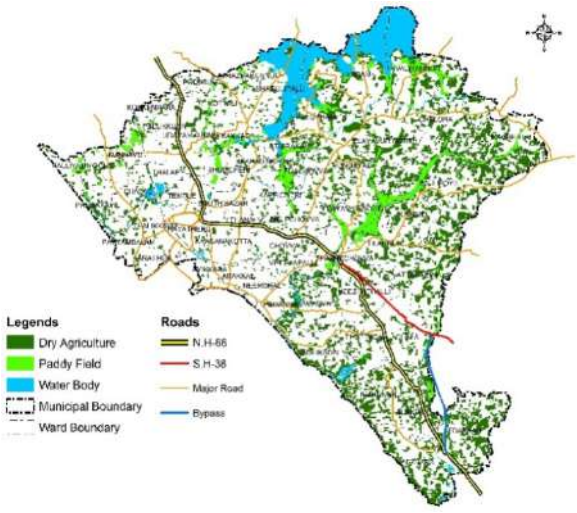


Figure.6.13 Distribution of dry agriculture land use

Dry agricultural land use distribution and its concentration pattern in the planning area are shown in Figure.6.13 and Figure.6.14 respectively.

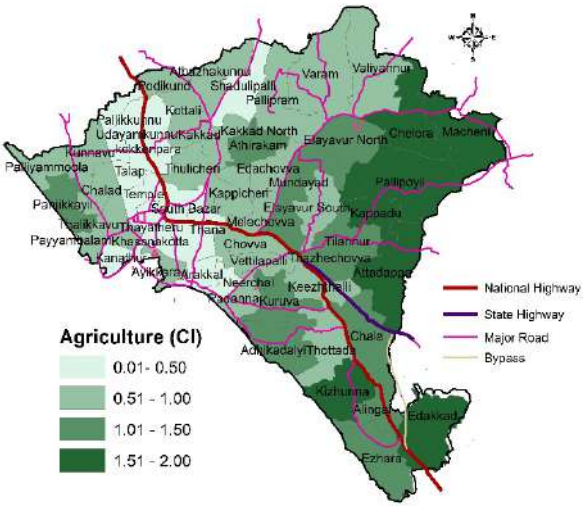


Figure.6.14 Concentration pattern of dry agriculture land use

The figure indicates that the dry agricultural land is scattered in all wards with concentration index ranging from 0.01 to 2.00. Higher value is seen in Chelora, Macheri, Pallipoyil, Kappad, Attadappa, Kizhunna, and Edakkad wards (1.51 to 2.00).

6.3.7 RECREATIONAL CONCENTRATION

Recreational land use includes parks and open spaces of the Corporation area. The concentration of recreational land use is shown in Figure.6.15 which indicates higher concentration is seen in Mundayad, Thayatheru wards of the planning area with concentration index above 3.00.

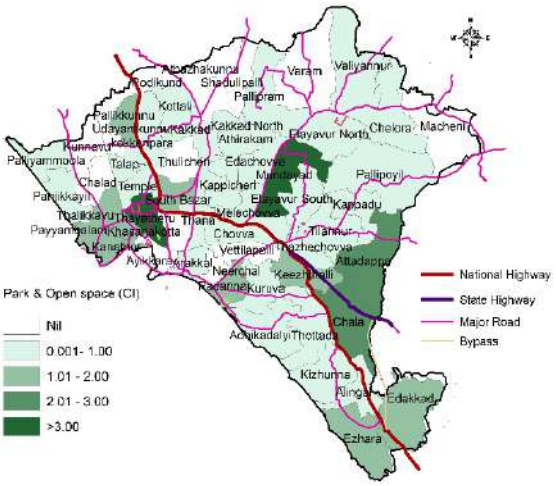


Figure.6.15 Concentration pattern of recreational land use

This is due to Indoor Stadium, Jawahar Municipal Stadium, Police Maidan, Town Square, CollectorateMaidan, Cannanore District Badminton Indoor Court etc.

6.3.8 TRANSPORTATION CONCENTRATION

Transportation land use includes road, railway, bus stand, taxi stand, auto stand, parking lots etc.

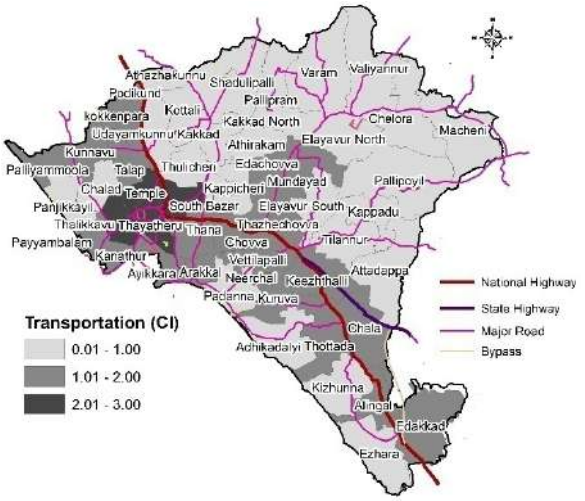


Figure.6.16 Concentration pattern of transportation land use

In Kannur Municipal Corporation area, the transportation concentration index ranges from 0.01 to 3.00 and it is shown in Figure.6.16. The higher concentration is seen in Thayatheru, Thalikkavu, Temple and South Bazar wards (2.01 to 3.00) followed by Edakkad, Alingal, Thottada, Chala, Keezhuthalli, Kuruva, ThazheChovva, Vettilapally, Chovva, MeleChovva, Edachovva, Mundayad, Thana, Arakkal, Payyambalam, Kanathur, Ayikkara, Palliyamoola, Kunnavu, Talap, Kokkenpara wards (1.01 to 2.00). This is due to the presence of Railway station, new bus stand, KSRTC stand, auto and taxi stands, old bus stand etc.

6.3.9 WATER BODIES AND OTHER MAJOR LAND USES

Other major land uses in the planning area includes vacant land, wetlands, mangroves etc. The major rivers flowing through the Corporation area are Kanampuzha, Kakkad river and Kattampally river (Varamkadavu and Pullooppikadavu). ThottadaPuzha, AyyarathPuzha (NadalPuzha) are other minor rivers. Anakulam, Chettyarkulam, Valiyakulam are important ponds in the planning area. Mangroves are identified in the portion of Kattambally River, Thottada River etc.

Pazhassi Canal; a major canal mainly runs through Puzhadi, Elayavur and Chelora zones of the planning area. It comes under Pazhassi Irrigation Project (PIP) in the Valapattanam River. Other thodes and canals flowing are Andathodu, Padannathodu, Ammayithodu, Valiyathodu, Cheloravayalthodu, Macheryvayalthodu and Athirakam Canal etc.

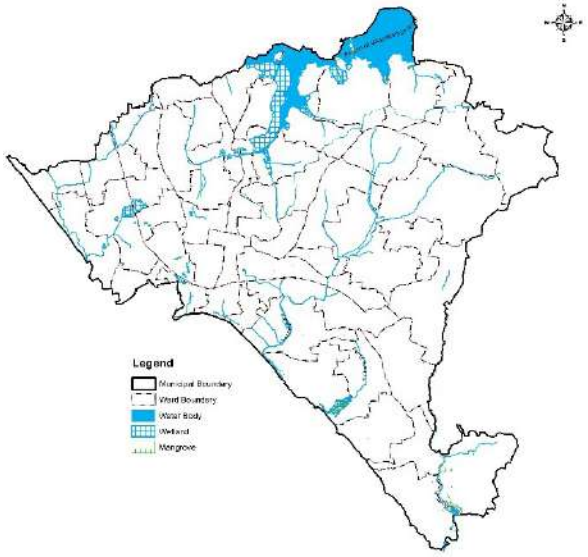


Figure.6.17 Distribution of other important land use

The Figure.6.17 shows the location of other land uses including water bodies in Kannur Municipal Corporation area.

6.4 INFERENCE

The land use of Kannur Corporation area reveals that the major portion the area is occupied for residential use. The second highest land use is dry agriculture areas. The paddy activities are mainly concentrated in the north-eastern and

eastern parts while the dry agriculture is more prominent in eastern part. The planning area is blessed with three major rivers and two minor rivers which enhance agricultural activities to a large extent. Non-agricultural activities including residential, commercial, public and semi-public, industrial land use are mainly concentrated in the middle portion along the major corridors. Activity pattern and functional character are the two major urban parameters determined by the analysis of land use concentration pattern in conjunction with demographic details, hierarchy of junctions, hierarchy of settlements etc.

CHAPTER 7

AGRICULTURE & ALLIED SECTORS

Agriculture is one of the most important sectors in urban area. Urban agriculture is part of the urban ecological system and can play an important role in the urban environmental management system.

This chapter deals with the analysis of significant primary production sector in planning area which includes Agriculture, Animal Husbandry and Fisheries. The existing scenario, major issues and future potentials are studied here.

7.1 AGRICULTURE

Urban agriculture can be defined as the growing of plants and the raising of animals within and around cities. The most striking feature of urban

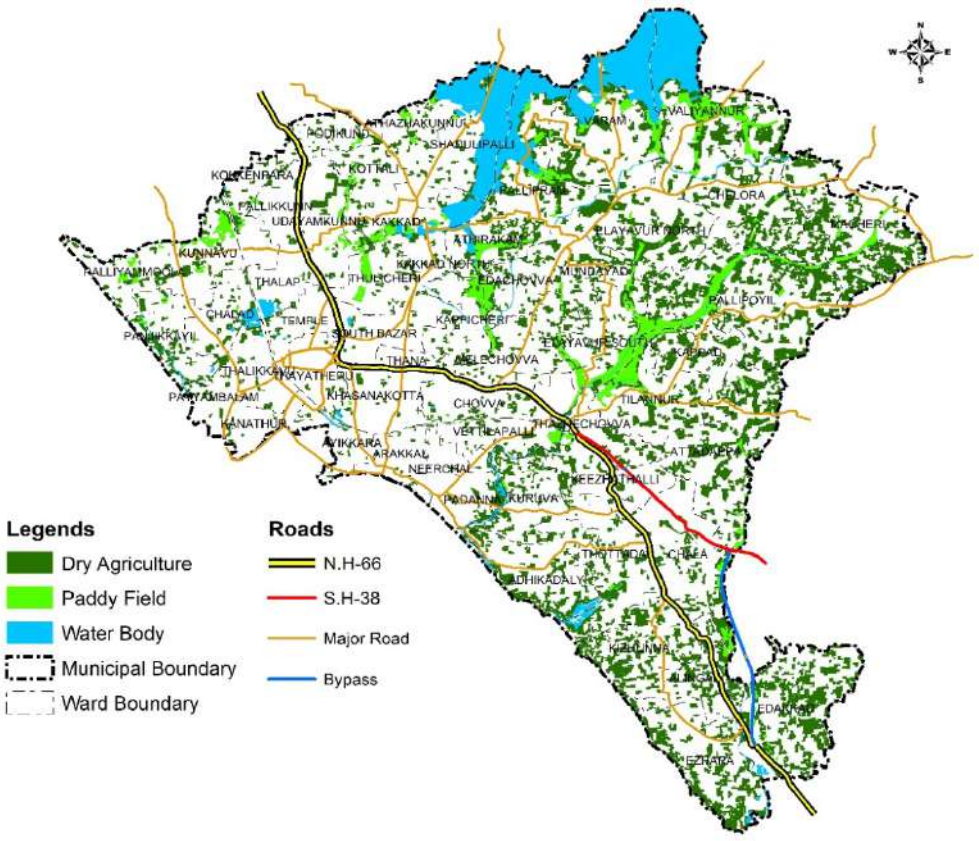


Figure.7.1 Existing agricultural land use

agriculture is that it is integrated into the urban economic and ecological system. The urban agriculture is embedded in and interacting with the urban ecosystem. Such linkages include the use of urban residents as labourers, use of typical urban resources (like organic waste as compost and urban wastewater for irrigation), direct links with urban consumers, direct impacts on urban ecology (positive and negative),It being part of the urban food system, competing for land with other urban functions, is influenced by urban policies and plans.

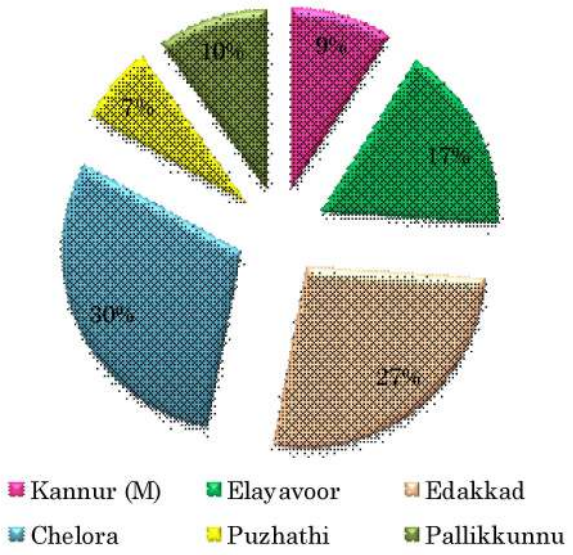
7.1.1 EXISTING STATUS

Kannur Corporation area is formed by merging Kannur Municipality with surrounding five Grama Panchayaths.

The existing agricultural land distribution is shown in Figure.7.1. From the figure, it is evident that the agricultural activities are predominant in north eastern and eastern part of the planning area. Area under dry agriculture activities is only 15.339 km² (19.59%) whereas that of paddy cultivation is 2.916 km² (3.72%).

Chelora, Macheri, Pallipoyil, Kappad, Attadappa, Edakkad and Kizhunna are the wards where dry agricultural activities are predominantly concentrated.

The zonal wise land utilization for agricultural purpose is shown in Figure.7.2. out of the entire agricultural activities in the planning area, about 30% of the activities are concentrated in Chelora zone and 27% of activities are concentrated in Edakkad zone. Agriculture activities within Pallikunnu (10%), Kannur (9%), and Puzhathi zones (7%) are the least as these areas are highly urbanized.



Source: BSLLD data Kannur Corporation, 2017

Figure.7.2 Zone wise land utilization for agriculture purpose

The Table.7.1 shows the extent of total agricultural land use in Kannur Municipal Corporation area which indicates, that good stretches land remain uncultivated.

Table.7.1 Extent of land use in Kannur Corporation area

Sl. No.	Particulates	Area (km^2)
1	Total Geographical area	78.38
2	Land put to agriculture use	55.37
3	Cultivating land	52.49
4	Waste land (cultivable)	0.81
5	Waste land (non-cultivable)	1.03
6	Waste land (meadows)	0.03
7	Cultivating paddy land	1.0976
8	Non cultivable paddy land	0.5220
9	Cultivable non cultivating paddy land	0.8424

Source: Vikasana Report 2017, Kannur Municipal Corporation

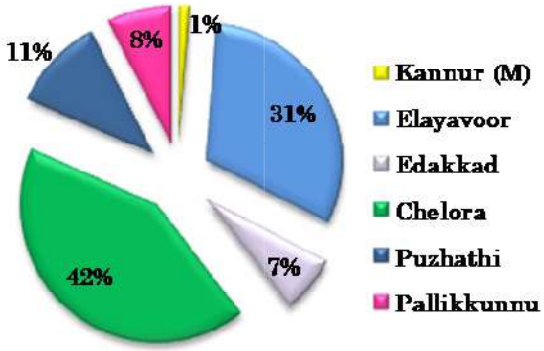


Figure.7.3 Paddy Concentration in zone wise

The Figure.7.4 shows the percentage area under different cash crops among which coconut cultivation land constitute the major percentage. The remaining categories range from 0 to 10%.

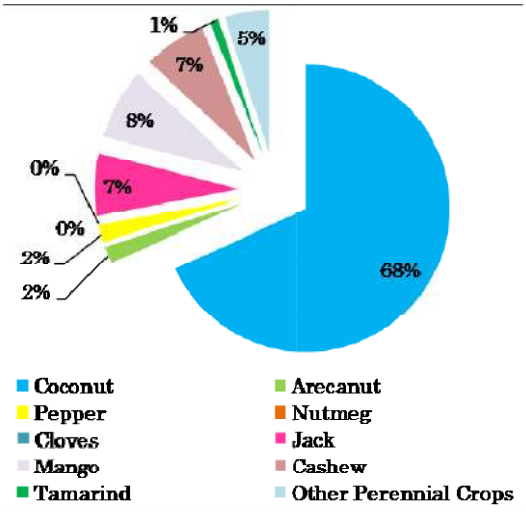


Figure.7.4 Cultivation area details of cash crops

Major Crops

- ***Paddy***

The zonal wise paddy concentration is shown in Figure.7.3 which reveals that maximum share of paddy concentration in the planning area is located in Chelora zone (42%) followed by Elayavoor (31%) and Puzhathi Zone (11%). The least concentration is found in Kannur zone which is due to high urbanization activities. Due to the urbanization trend, the paddy fields are vanishing day by day and existing paddy fields need protection in the future.

Other Crops

The percentage of area under other crops like Tapioca, Turmeric, Pulses, Plantain, Vegetables and other tubers constitutes the major contribution (63%) followed by Plantain (17%) and other tuber crops (10%).

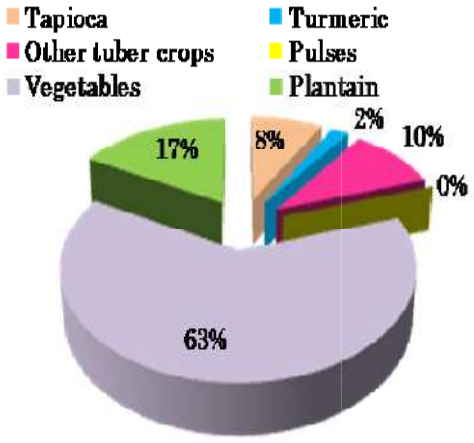


Figure.7.5 Percentage area under other crops

The details of the yield of some crops are given in Table.7.2.

Table.7.2 Details of yield of some crops

Crop	Yield/Year
Paddy	3MT/Ha
Coconut	40 Nuts/Pollen
Plantain	15 MT/Ha
Vegetables	10MT/Ha
Tapioca	15MT/Ha
Other tuber crops	25MT/Ha
Spices	1.5MT/Ha

Source: Vikasana Report 2017, Kannur Municipal Corporation

Irrigation Facilities

The entire planning area is not covered by any proper irrigation facilities. Mostly, ponds and wells are used for irrigation purpose. The source for existing irrigation facilities in Kannur Municipal Corporation area is listed in Table.7.3.

Table.7.3 Existing Irrigation Facilities

Sl. No.	Irrigation Facility	Number	Area (Ha)
1	Public Pond	51	35
2	Private Pond	30	13.5
3	Public Well	-	-
4	Private Well	19715	1284
5	Bore well	237	39
6	Streams	44	104

Source: Vikasana Report 2017, Kannur Municipal Corporation

The two major rivers in the planning area; Kanampuzha and Kattamballi also facilitate local irrigation.

Infrastructure Facility

The agricultural infrastructures facilities available within the planning area are shown in Table.7.4 which indicates that only considerable amount of facilities are currently available to boost the agriculture sector.

Table.7.4 Available Infrastructure Facilities

Agricultural Infrastructure	Number
Krishibhavan	6
Nurseries	7
Organic manure units	17
Fodder units	8
Agri - related Govt. institutions	2
Marketing centers	6
Poly houses	10
Fertilizer depots	16
Pesticide depots	5

Source: BSLLD data Kannur Corporation, 2017

Equipment Facilities

The Table.7.5 shows the details of equipment provided by the Krishibhavan to support the agricultural activities. The table reveals that basic equipment isavailable in each zone, but is minimal.

Table.7.5 Equipment Details

Sl. No.	Equipments	Number
1	Tractor	4
2	Tiller	7
3	Sprayer	55
4	Thresher	1

Source: BSLLD data Kannur Corporation, 2017

Farmers Details

The Table.7.6 shows the details of farmers in the Corporation area. Approximately 17,504 farmers are engaged in agricultural activities out of which 6,264 farmers are registered under farmer's registration scheme.

Table.7.6 Farmers Details

Sl. No.	Particulars	Number
1	Total farmers	17504
2	Farmers registered under Farmers Registration Scheme	6264
3	Farmers receiving assistance/subsidy under various schemes	8336
4	No. of farmers enrolled for Karshaka Pension	916
5	Farm families	9020
6	Farmers enrolled in Power Tariff Scheme	70

Source: BSLLD data Kannur Corporation, 2017

7.1.2 INFERENCE

From the analysis of agriculture sector in the planning area, agriculture cannot be promoted as a key sector because the area has already shifted from agriculture to non-agriculture activities and the extent of land available for agriculture use in the Corporation limit is less. During the analysis, the following issues are identified:

- Lack of trained laborers for paddy cultivation
- Lack of proper irrigation facilities
- Lack of infrastructure facilities
- Lack of agricultural markets

- Lack of support for urban farming activities
- Lack of supply of good quality seeds at right time
- Absence of agro clinical service centres
- Saline water intrusion at coastal area affecting the productivity of coconut
- Lack of programs to promote cultivation in fallow land

Various trainings and supports may be provided to promote urban agricultural activities such as production of vegetables and fruits at ones own houses and compounds. Also agricultural activities can be promoted in the areas where the mixed agriculture and residential land use is largely found.

7.2 ANIMAL HUSBANDRY

Animal husbandry is a branch of agriculture concerned with the care and management of livestock. It deals with the feeding, breeding, housing and health care of livestock for getting maximum benefits. Livestock refers to farm animals (domesticated animals) such as cow, sheep etc. kept by humans for useful commercial purpose. It also includes poultry farming and fisheries. While analysing the physical and production status, it is revealed that animal husbandry sector has enough potential in the planning area.

7.2.1 EXISTING STATUS

The details of number of animals in the planning area are analysed from livestock Census 2019. Total number of cattle, goat, pig, and poultry are 2007, 1541, 59, and 42282 respectively. Number of families involved in animal husbandry sector are 1202.

The Figure.7.6 shows the zone wise household livestock details of Kannur Municipal Corporation area. Household poultry is largely concentrated in Edakkad zone followed by Chelora, Puzhathi and Elayavoor zone. Household cattle production is mainly concentrated in Chelora followed by Edakkad and Elayavoor zones. The least number of livestock production is seen in Pallikkunnu zone.



Regional Poultry Farm, Mundayad

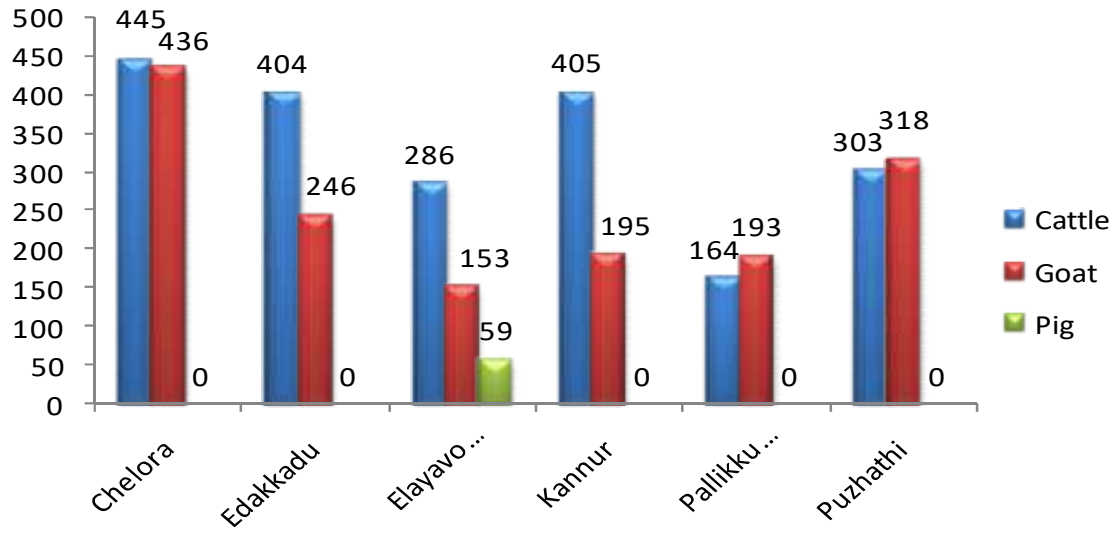


Figure.7.6 Details of household livestock

Infrastructure Facilities

Regional Poultry farm, Mundayad is the only one government farm in the planning area and it is one of the few Regional Farms of KERALA, attached with Piggary. It has got a high tech breeding laboratory for the latest chicken breeds. Their exporting target is Chicken/eggs up to 23 million US dollar per year.

Moreover, in private sector, about 25 dairy farms, 15 goat farms and 1 poultry farm are functioning in the Corporation area. Five veterinary hospitals, six veterinary sub centres etc. are present in the planning area to provide medicine and treatment facility to various household animals.

Regional Disease Diagnostic Laboratory, Kannur

This institution is functioning along with the District Veterinary Centre campus at Kannur. Recently, the laboratory has been upgraded as a Regional Disease Diagnostic Laboratory under Chief Disease Investigation Office, Palode with a view to look after the disease conditions of the northern districts of Kerala. The main aim of the institution includes:

- Disease investigation
- Diagnosis and forecasting of major diseases
- Outbreak management
- Disease surveillance
- Monitoring health status in livestock and poultry farms
- Conducting training programmes, awareness camps etc.

- Collection, preservation and despatch of samples for National surveillance of certain diseases

Slaughter house

One slaughter house is located at Kakkad town which is owned by the corporation.

Dairy Units

The Table.7.7 shows the details of dairy units in Kannur Corporation area. About 5 dairy units are functioning in the planning area with a total production of 2 lakh litre per year.

Table.7.7 Details of Dairy units

No. of Dairy Units	No. of Members	No. of Producers	Production (year)
5	533	490	2 Lakh Litre

7.2.2 INFERENCE

The planning area has considerable share in both animals and production of milk. Increasing urbanization activities has reduced the availability of fodder. The cost of feed has increased so that cattle rearing has become non profitable for small scale farmers. However, the scope of development of animal husbandry sector in future will be promoted because of availability of infrastructure facilities such as Veterinary hospital, Disease Diagnostic Laboratory etc. Animal Husbandry activities are suitable in the semi urban and rural wards.

7.3 FISHERIES

Western boundary of the Municipal Corporation area completely falls in coastal stretch. Hence marine fishing sector has higher importance in the planning area. Large number of fishermen families resides in Arakkal, Thayyil, City, Ayikkara, and Vethilapally wards. Considerable extent of Kattamballi River at Pulluppikadavu provides potential for inland fishing activities too. However, compared to marine fishing, inland fishing is unorganized and has not at all flourished in the planning area. Hence fisheries sector can be considered as a potential production sector.

7.3.1 EXISTING STATUS

Natural Resources

The western side of Kannur Municipal Corporation area is blessed with a sea shore of 17 km length which is about 20.73 % of coastal stretch of the District. From the primary survey, it is found that the main marine fish landing centre within the planning area is Mappila bay and the other landing centres are Ezhara, Kizhunna and Kadalayi area whereas inland

fishing activities are mainly concentrated at Kattamballi River side. Figure.7.7 shows the location of potential fishing areas in the Corporation area.



Figure.7.7 Location of available fish landing centres

Human Resources

As per Vikasana Report 2017, about 1666 persons registered as fisherman and 270 persons registered as allied employees. As per fisheries department record, four areas are identified as fishing villages They are Thayyil, Kannur City, Edakkad and Kannur Ulnadan. These fishing villages are located at Puzhathi, Kakkad, Kottali, Athazhakunnu, Shadhoolipalli, Valiyannur, Chelora, Varam, Ezhara, Edakkad, Kizhunna, Thottada, Adhikadalayi, Kuruva, Padanna, Neerchal, Arakkal, Ayikkara and Payyambalam wards.

Table.7.8 Different means of fishing used in planning area

Non-Motorized	OBM	Trasler	IBM	Thanguvallam
48	592	46	7	9

Infrastructure

The major means of fishing includes catamaran, small canoes, out board motor fitted boats, mechanized boats and fishing nets. The different means of fishing practiced in planning area are represented in Table.7.8.

The ancillary facilities including fish markets, curing yard, drying yard and ice plants etc. are available at Ayikkara area. The major fish markets are located at Ayikkara, Kakkad, Varam, Central market and Thazhe Chovva area.

7.3.2 DEVELOPMENT POTENTIALS

- Presence of large coastal stretch opens up scope for new fish landing centres, Matsyabhavan, Fish drying units etc.
- Scope for establishment of micro enterprises for value added products

- Utilizing the potential of Kannur International Airport, Azheekode Sea Port for setting up of Export units

7.3.3 DEVELOPMENT ISSUES

From the sectoral analysis, the following problems are identified in fisheries sector:

- Increasing price of kerosene and diesel resulting in increased cost of fish collection
- Inadequate facilities for keeping fishing net, boats etc.
- Absence of periodic maintenance of coastal road
- No effective waste disposal system in market
- Absence of fish farms
- Absence of adequate value addition and export units

7.3.4 INFERENCE

The availability of water resources offers great potential on fishing activities in the planning area. Lack of sufficient infrastructure facilities as well as encouragement to the fishermen is a major issue of this sector. Hence it should be addressed. Also, ornamental fish culture is an emerging sector with opportunities for self-employment and income generation, A new market exclusively for such fish farmers to sell their products is essential to fetch fair value.

CHAPTER 8

INDUSTRIES

Industry can be defined as an economic activity concerned with the processing of raw materials and manufacture of goods in factories. The industrial sector is the leading segment that is producing employments at a quicker pace as our populace is increasing. Hence the rate of unemployment can be reduced and also, the standard of living of the people can be raised. Industries will contribute to the development of tertiary sector, i.e. trade, transport & communication, banking, insurance etc.

This chapter deals with the present status of industrial development in Kannur Municipal Corporation area and its problems and potentials.

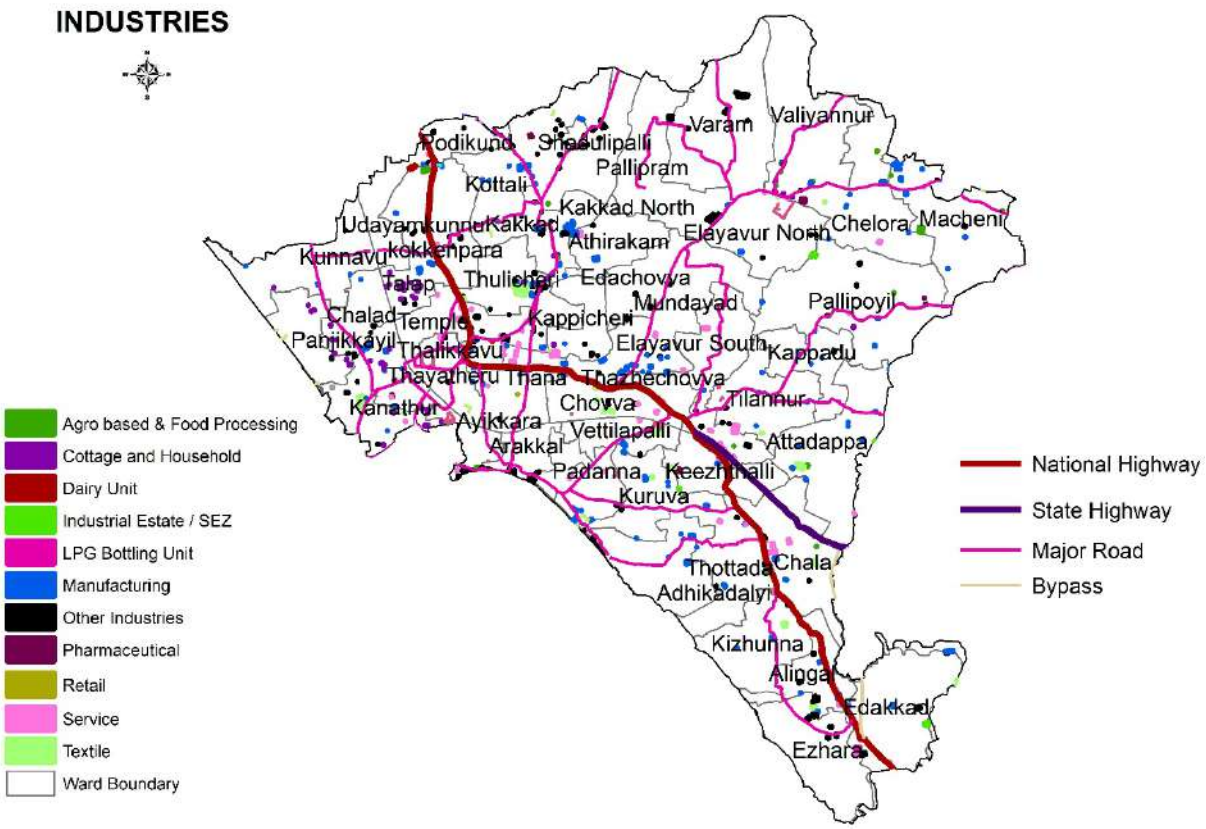


Figure 8.1 Location of different industrial units in Kannur Corporation area

8.1 EXISTING STATUS

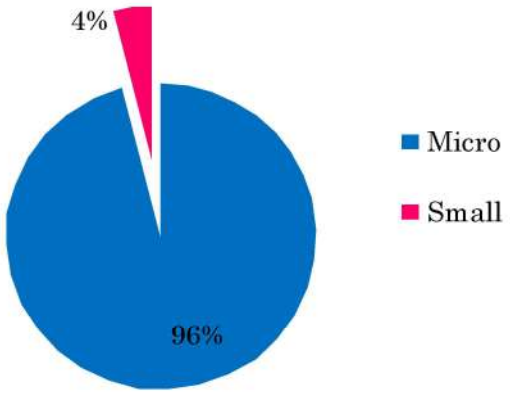
For the purpose of categorization of industrial sectors, "Range of Pollution Index", is used as the basic criteria. Industrial sectors having pollution index score of 60 and above are grouped under red category while score of 41 to 59 grouped under orange category. Pollution Index score of 21 to 40 is in green category and 0 to 20 is in white category. In the Corporation area, all the industries are under either orange or green category. Location of different industrial units in the planning area is shown in Figure 8.1.

According to MSME Act 2006, manufacturing and service enterprises are classified mainly into three categories; micro, small and medium industries on the basis of investment and the classification is shown in Table.8.1.

Table.8.1 Categorization of industries based on the investment

Category	Micro	Small	Medium
Manufacturing nterprises	Up to 25 lakhs	25 lakhs to 5 Crores	5 Crores to 10 Crores
Service enterprises	Up to 10 lakhs	10 lakhs to 2 Crores	2 Crores to 5 Crores

The distribution of Micro, Small and Medium Enterprises (MSME) in the planning area is shown in Figure.8.2 which indicates that 96% of the industries mainly fall under micro category (694 nos.). Only 4% are small scale industries (29 nos.).There are no medium scale industries in the Corporation area.



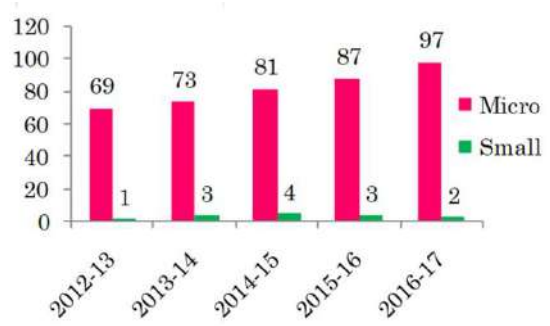
Source: Industrial potential survey, 2016-2017

Figure.8.2 Distribution of Micro, Small and Medium Enterprises

Graphical representation of year wise growth of MSMEs from 2012 to 2017 is shown in Figure.8.3 which reveals that the number of MSMEs registered per year in the town shows an increasing trend in the case of micro industries while there shows a decreasing trend during the period from 2015 to 2017 for small scale industries.

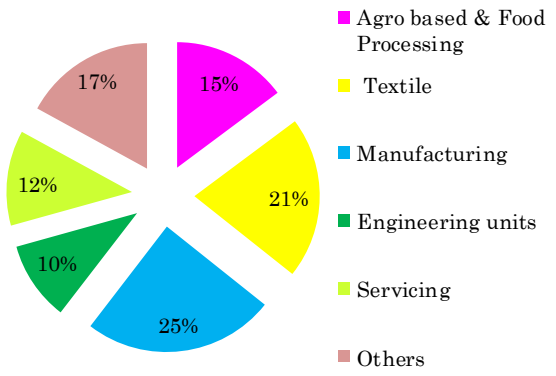
Industries in the planning area are again categorised based on the type of raw material used for their manufacture as well as the type of goods or service either they produce or provide. On that basis, the details of

existing MSMEs in Corporation area are shown in Figure.8.4 which depicts that, most of the industries are manufacturing (25%) and textile (21%) type.



Source: Industrial potential survey, 2016-2017

Figure.8.3 Year wise growth of MSMEs

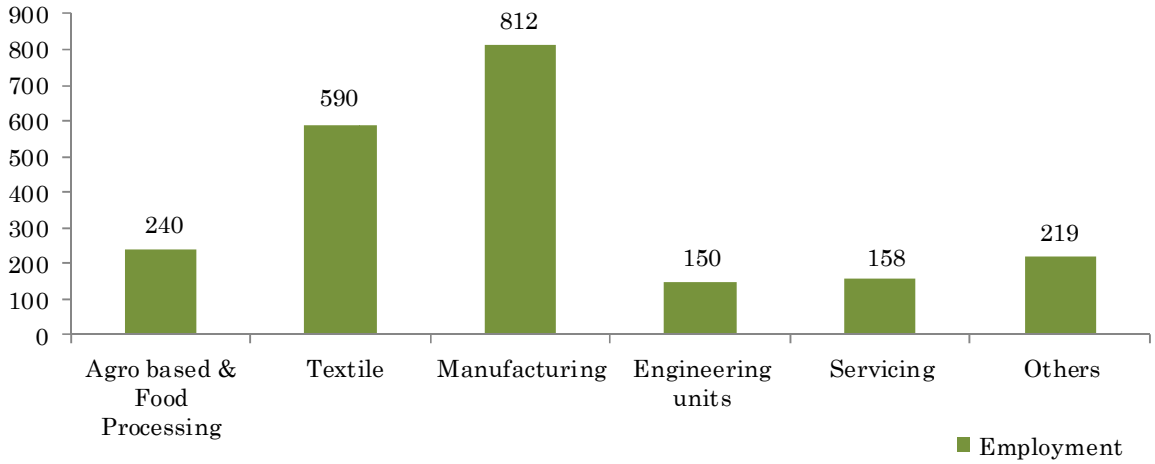


Source: Industrial potential survey,2016-2017

Figure.8.4 Types of industries

Number of labourers engaged in various industrial units in the planning area is illustrated in the Figure.8.5. The figure reveals that the total number of workers involved in industrial activities are 2169 and among these, most of the workers are engaged in readymade garments and embroidery, followed by paper (282) industries.

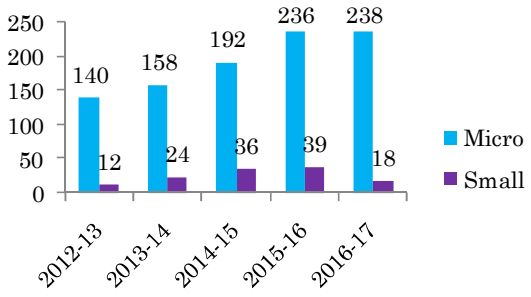
The employment growth of MSMEs from 2012 to 2017 is shown in Figure.8.6. While analysing the figure, it becomes clear, from 2015 to 2017, only a meagre increase of labours can be seen in both categories.



Source: Industrial potential survey, 2016-2017

Figure.8.5 Number of labourers engaged in different MSMEs

The total number of persons employed in traditional industries like handloom and beedi units are 396 (Vikasana Report, 2017-2022).



Source: Industrial potential survey, 2016-2017

Figure.8.6 Year wise employment growth of MSMEs

At present, the Kannur Municipal Corporation area has two mini industrial estates, which are at Marakkarkandi (Kannur zone), and at Edakkad (Edakkad zone). Also, there are two mini industrial centres in Chelora zone (Mini industrial centre, Kappadu and Women mini industrial centre, Chelora). Apart from these, three large scale industries are also there in the planning areas which are Kerala State Handloom Development Corporation Limited, Cannanore Co-operative Spinning Mills Limited and Milma.

According to Vikasana Report 2017-2022, prepared by the Municipal Corporation, the project proposals include local economic development, establishment of more industrial estates and providing of training in production.



Kannur Dairy

8.2 DEVELOPMENT POTENTIALS AND PROBLEMS

The study of existing status of industries in Kannur Municipal Corporation area shows that industrial activities are minimum. Only 0.593 km^2 (0.76%) of total area is occupied by industrial land use.

Since the Municipal Corporation area is blessed with a variety of factors such as good soil, favourable climate, enormous fishing potential, sufficient water availability and good infrastructure facilities like roads, rail, electricity etc., there is a scope for the development of industries. The new international airport KIAL as well as the Azhikkode seaport will be a great fortune for the industries in future. Thottada has recently launched many automobile ventures of various companies resulting in the demand of automobile technicians. A large number of textile industries are also spread over the surroundings of Polytechnic College at Thottada.

Also, there is a potential for the development of micro enterprises like agro and food processing unit, garments, embroidery unit, paper industries and automobile engineering units etc. Spinning mill industries still have a significant position in the industrial picture of the planning area. Excess vehicular volume tends to increase the number of automobile workshop and service units. Moreover, there is a rise in the manufacturing units. The mini industrial estates at Marakkarkandy and Edakkad as well as the industrial centres at Chelora and Kappad can be developed into major industrial areas.

Major problem in the planning area is the unavailability of vacant lands for developing new industrial units. Shortage of skilled labourers is another problem in the industrial sector. Improper marketing facilities of the products of micro scale industries adversely affect their development. Large scale industries are very less in number and there are no medium scale industries. Also, some of the industries were shutdown within the Corporation area. Better trade centres are to be provided, in order to have a permanent market for industrial products. There is lack of availability of raw materials essential for the development of small scale industries.

8.3 INFERENCE

Kannur Municipal Corporation area is an industrially backward area in the district. Only three large scale industries are there in the planning area. Kerala State Handloom Development Corporation Limited, Cannanore Co-operative Spinning Mills Limited and Milma are the large scale industries. The Corporation area shows backwardness in medium industrial category. There are no medium scale industries. But two mini industrial estates and two mini industrial centres are there in the planning area.

The industries of Handloom and Cotton textiles, Timber and Plywood, Milma, Fibre foam, Splints and Veneers, Bricks and Tiles, Beedi and Cigarette, Coir etc. are set up in and around the Corporation area.

Shortage of experienced labourers, which is the major issue of the industrial sector, can be tackled by conducting training programs in different fields. Banks and other financial institutions should come forward with loans of low interest rate for promoting entrepreneurs.

Land cannot be made available for establishing new industrial units in the planning area due to its high population density and higher land cost. But projects like the extension of built up area of the existing industrial estates at its maximum extremities, conducting proper awareness and

training programmes, awareness seminars, workshops, providing financially supporting schemes for local people, creating good platforms for the marketing of industrial products, etc. should be implemented. This can attract the people and become the way to setting up of more start-ups in this sector.

CHAPTER 9

TRADE AND COMMERCE

Trade and commerce plays a pivotal role in shaping the development of any city's economy by making a significant contribution in terms of tax revenues and providing gainful employment. It attracts the public to the city leading to the overall economic growth. Thus a city grows as its trade and commerce flourish.

This chapter deals with the various commercial activities taking place within the Municipal Corporation area and existing trade centres. Also, the chapter discusses the hierarchy of commercial clusters in the Corporation boundary, economic profile such as key economic drivers of the Corporation, spatial distribution of economic activity, a brief on informal sector activity in the city and the problems and potentials of the Corporation area.

9.1 EXISTING SCENARIO

Trade is the basic component of economic activity. As trade and commerce flourishes, the city grows. At present, the commercial activities as well as trade centres are mainly concentrated in and around Kannur zone. Ayikkara fish market, South Bazar, Central market, Varam fish market, Kakkad fish market are the important markets in the Municipal Corporation area. The data regarding commercial activities in the planning area is shown in Figure.9.1 and it shows that most of the commercial activities are based on hotels, tea shops, mobile shops, bakeries and textiles.

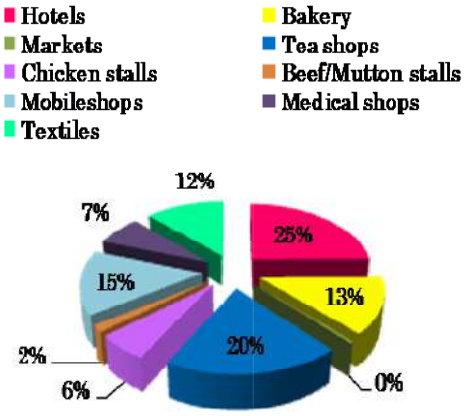


Figure.9.1 Types of commercial activities in Kannur Municipal Corporation area

9.1.1 IMPORTANT COMMERCIAL NODES AND THEIR HIERARCHY

Based on the existing status of commercial centres and their potentiality, hierarchy of commercial

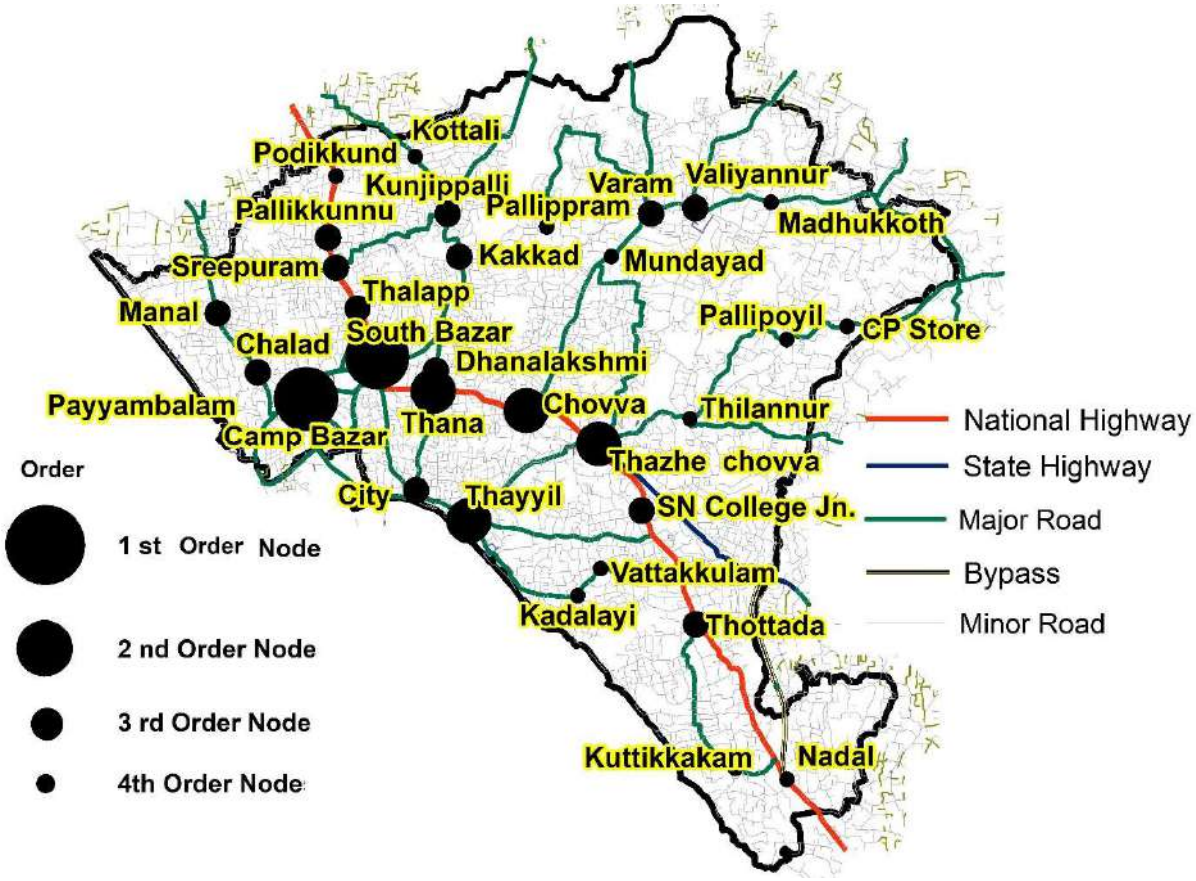


Figure.9.2 Major commercial nodes in the Kannur Municipal Corporation area

nodes in the Municipal Corporation area were identified. The spatial distribution of commercial nodes of different hierarchies is given Figure.9.2.

The figure indicates that Kannur zone (erstwhile Kannur municipality) is one of the first order commercial towns over a century and it is the most important commercial centre of the district. The central commercial area of old bus stand, new bus stand and the establishments on the either sides of the Thavakara main road, Fort road, Plaza junction to Prabath junction road, Railway station road and NH 66 passing through the Corporation area constitute the highest trade and industries related activity zone.



Plaza Junction

Thus the major commercial nodes are located along the straight stretch of roads and on all important intersections of roads where there is high concentration of commercial activities occur. In the case of linear development, commercial activity or physical developments are there within a distance of 250 m. Since it is an important port town during ancient days, traders from all over the world came here to buy various items like spices, coconut oil etc.

Kannur and Caltex are coming under first order commercial nodes which include Plaza Junction, Central Market, Thavakkara, Prabhath Junction etc. Shopping malls, hotels, textiles, retail and whole sale shops, banks, bus stand, railway station etc. are located in these nodes. The central market is acting as an important collection as well as the distribution of food materials and general provisions brought from other areas and neighbourhood locality. Electronics, medical stores, textiles, stationery fancy, footwear shops, hotels and bakery are the other major trading places.



Collectorate Road

South Bazar; a market place on the NH 66 from Kannur to Taliparamba is very near to Caltex junction. Many government offices including District Collectorate, Taluk Office, Corporation Office, KSEB, Police Station etc. are located here. From Caltex, vechiles take diversions to bus stand, city, and all other parts of the planning area. The wholesale and retail of building materials and hardwares are also predominant activities here. Because of the traffic signal, free movement of the vehicles occur and hence only less traffic congestion and accidents occur. Pedestrians can cross the road easily because of the traffic signal. KSRTC depot is also located here. South Bazaar, a major commercial street of the area is always in traffic congestion. This is one of the main problems in this area.

Thana, City, Mele Chovva and Thazhe Chovva are second order commercial nodes. Thana is a commercial suburb in Kannur City. It is a junction of roads connecting Thana - Kakkad Road and Thana - Anayidukk Road to NH 66. Some shopping centres and private hospitals, KWA, Auditoriums, Car and Bike showrooms, Construction materials shops etc. are situated around Thana. The District Ayurveda Hospital is also situated there. The headquarters of North Malabar chamber of commerce is also situated nearby. Mele Chovva and Thazhe Chovva areas consist of commercial

shops including medical shops, hospital, service centre, schools etc. City area is the old main town centre of the planning area. Even though many old shops are there, some of them are decaying.

Ayikkara fish market also exists in the City area. The commercial centres there are significant in their way Ayikkara fish market, will be active in the morning itself. All types of fishes are available there. It is close to Ayikkara fishing harbour.Entry fee is charged for four wheelers but the area is left always unclean and the buildings need maintaince.

Talap, Sreepuram, Pallikunnu, Kunhippally, Kakkad, Thottada, Dhnalakshmi, SN College Junction, Vaaram, Valiyannur are third order nodes in Kannur Corporation area. Shopping malls, super markets, hospitals, schools, theatres, colleges, shops, medical stores, restaurants, tea shops, temples etc. are located in these areas.

Apart from the retail trade centres in the CBD, there are small scale commercial nodes that are distributed all over the planning area satisfying the daily needs of the residents. Podikkund, Kottali, Pallippram, Mundayad, Madhukoth, Pallippoyil, CP store, Thillannuur, Vattakkulam, Kadalayi, Nadal etc. are some fourth order nodes in the planning area. Even though it is well connected and serviced by road to all major cities, the development of commercial activities is haphazard in the Municipal Corporation area.

9.1.2 INFORMAL SECTOR/ STREET VENDORS

Urban planning in developing countries; particularly in cities with rapid urbanization is facing a problem with the informal sector it consists of all jobs which are not recognized as normal income sources, and on which taxes are not paid. Informal sector consists of retail or service unit, stationery or mobile, working without roof or in small kiosks on roadside. The informal sector mainly comprises of street vendors who offer goods or services for sale to the public without having a permanent built-up structure but with a temporary static structure or mobile stall (or carried as head load).Such unplanned growth affects the urban order and cleanliness of the city. Thus, conflicts arise between urban authorities trying to keep their cities clean and the urban informal sector operators who need space for their activities.

The spatial distribution of street vendors of the planning area is shown in Figure.9.3. About 200 street vendors

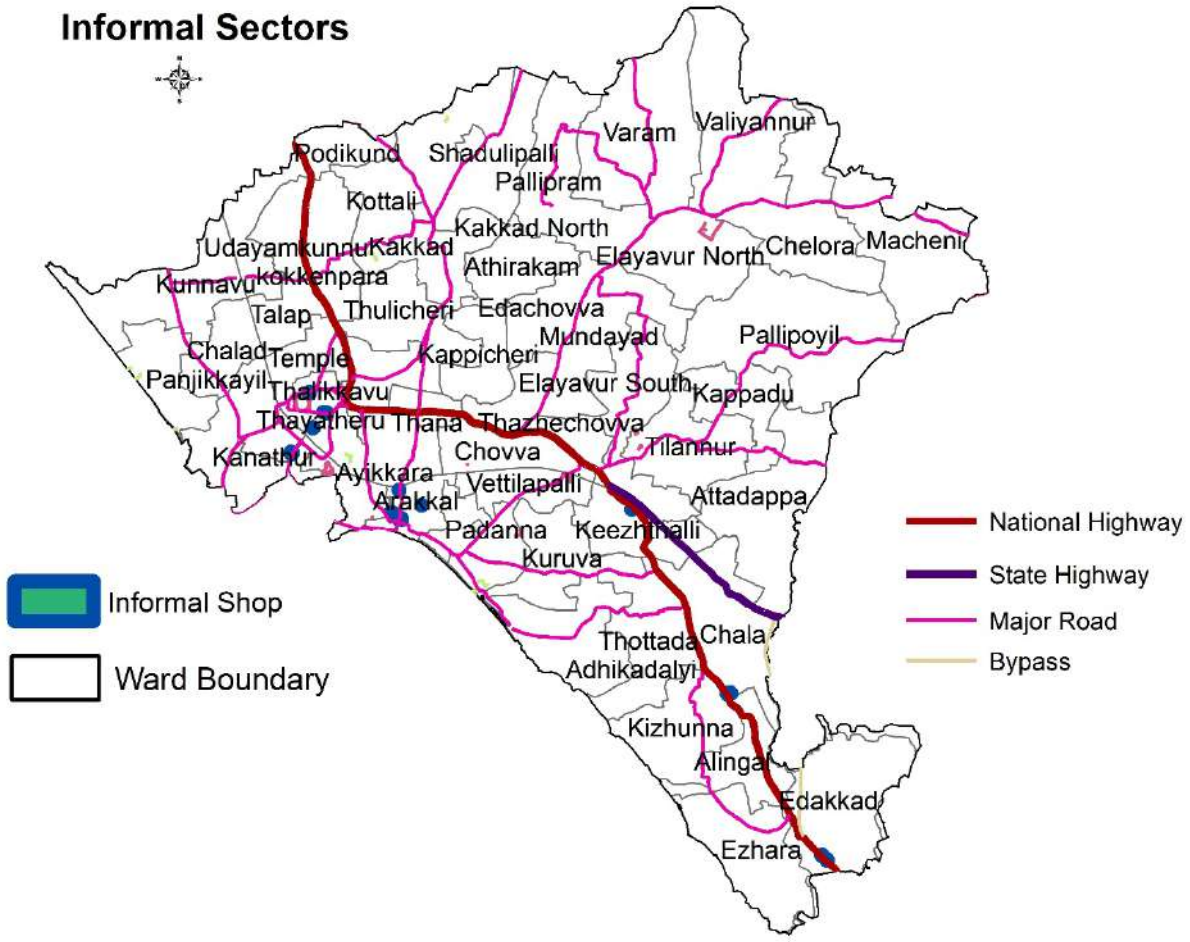


Figure.9.3 Spatial distribution of informal sectors

find their livelihood there though their distribution is not uniform. Informal sector activity is managed by fruit vendors, dress materials and tea stall owners. Higher concentration is seen in stadium, market, plaza junction etc. Tendency of street vendors is to settle in areas where there is constant movement of people. Higher concentration is seen in the Stadium, Market, Sub jail road, Press club road, Station road etc.

9.2 DEVELOPMENT POTENTIALS AND PROBLEMS

Kannur Municipal Corporation area is the district headquarters, which indicates its commercial importance. Commercial centres are concentrated in the central area of the district. The major problem faced by the city is the congestion at commercial units due to insufficient space. It is due to vehicular and pedestrian traffic beyond the capacity

of the existing facilities. It prevents smooth manoeuvring of vehicles causing frequent traffic block and also lack of basic infrastructure facilities.

The Corporation area is centrally located in the district and has good connectivity with all parts of the district and many commercial centres within the central area are lying close to bus terminals which only make the city congested. The problems due to the narrow road network at market area and lack of parking facilities, and proper signals, insufficient loading and unloading facilities, narrow roads and congested street in busy market area are the main disadvantages of the planning area.

Ayikkara fish market is not maintained properly. Not only Ayikkara market, but also the central market is also not maintained properly. Solid waste management is the main issues occurring there. Lack of public comfort stations is adversely affecting the hygienic condition of the Corporation.

In the planning area, there exist a large number of informal sector units which are not organized clusters. Organised informal units with their eating places with casual shopping facilities are needed to be provided at all the informal potential areas.

The location of stationery units is not uniform and it should be ensured that such activities shall not be concentrated on single location. The increased number of informal sector as well as the lack of sufficient public comfort stations is other issues faced by the planning area.

Since the major commercial nodes have easy access from bus terminals, functioning of weekly markets will be very useful for the people as well as the farmers. Well planned weekly markets should be started at every commercial node.

9.3 INFERENCE

At present, the development of trade and commerce in Kannur Municipal Corporation area is very encouraging. The first order commercial nodes are mainly concentrated in town wards or Kannur zone; (the erstwhile Kannur municipality). It is the main commercial node which is mostly characterized by congestion due to vehicular and pedestrian traffic beyond the capacity of the existing facilities. Narrow roads and lack of parking areas are the main issues in the Corporation area which prevent smooth manoeuvring of vehicles causing frequent traffic block The Corporation has to acquire suitable land for truck terminals, parking plazas etc.

Since major commercial centres within the central area are lying close to bus terminals, the development of bus terminals are very essential. The existing commercial nodes require

further development to catalyze the economic development and to provide the people a healthy town.

Ayikkra market as well as the central market should be well maintained and developed for the convenience of the people. The location of present stationery units shall be considered for relocation or improvement. The local authorities should take new designs of stalls, push-carts and mobile van of various sizes and should provide cleaning facilities. Proper waste collection facilities should be provided to every shop.

In new urban areas, informal bazaars could be part of the planned commercial areas at two levels. These could be implemented in the initial planning stages along with development of residential areas. There are large numbers of informal sector units in the city but they are not organized clusters and are mainly concentrated in Stadium and Plaza areas only. There is a need to provide for organised informal eating places along with casual shopping. An informal unit shall not be permitted within a distance half of the width of the road from an intersection. The areas of informal sector shall have suitable public conveniences and solid waste disposal arrangements.

Weekly markets, the traditional style of retail shopping is quite popular in Kerala, especially among the lower and middle income groups. They have a good potential in the planning area. These markets should be operating in a systematic manner choosing locations central to a large population centres either on vacant land or on the roadsides. Major commercial nodes can be taken as their location. Parking and other open spaces within the service markets, commercial centres could be so designed that weekly markets can operate in these areas during non-working hours.

Establishment of more comfort stations and ensuring of their regular maintenance by the authority at every major commercial centre is essential for making the planning area healthy as well as hygienic.

CHAPTER 10

TOURISM, CULTURE & HERITAGE

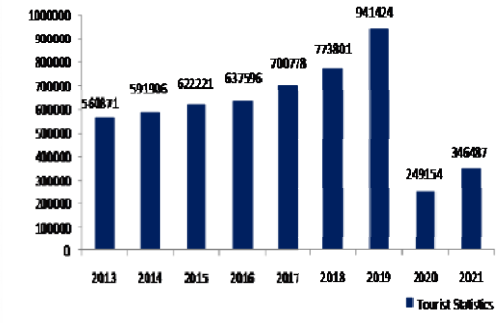
Tourism has emerged as a fast growing economic activity of great importance throughout the world. It has a vital role in the development of different destinations all around the world. When systematically planned and effectively managed, it not only becomes a marketable commodity but also helps to improve the environment and the infrastructure benefiting the local population. Cultural tourism is the subset of tourism concerned with a traveller's engagement with a country or region's culture, specifically the lifestyle of the people in those geographical areas, the history of those people, their art, architecture, religion, and other elements that helped shape their way of life.

10.1 EXISTING STATUS

Kannur is famous for its beaches, mangroves, bird sanctuary, historic temples and churches, unexplored back waters, Ayurveda and Kalari healthcare systems and the delicious Malabari cuisine. With the Western Ghats in the east and Arabian Sea in the west, Kannur district is bounded by wealth of natural beauty.

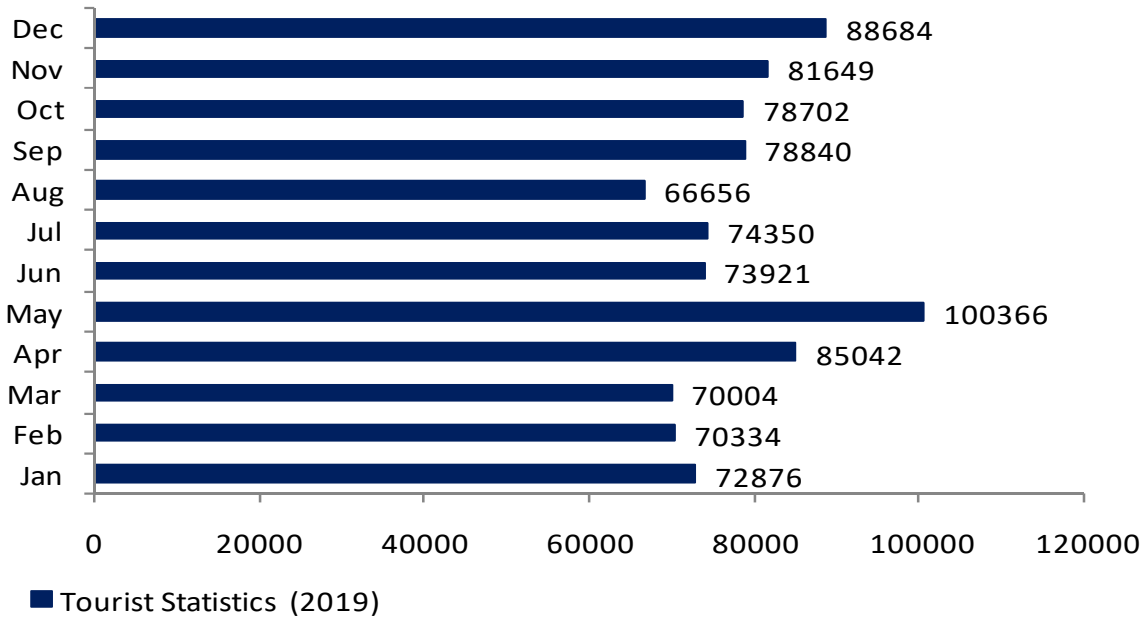
In addition, Kannur is the home of Kerala folklore academy. A large number of folk plays and dances are prevalent among the scheduled castes and tribes there. Each tribe has their own glorious collection of folk plays and dances which are performed during festivals. Theyyam or Theyyattam is an ancient and still popular ritual dance. It's a unique combination of dance, music and worship. It reflects the main features of a tribal culture. It is generally performed in front of the village shrines. There are a large number of temples in Kannur where Theyyam is performed.

Also, Kannur is rightly described as "The land of Looms and Lores". It is well known for its handlooms and is one of the major handloom textile exporters in India. There are a large number of tourist locations in the district.



Source: Tourism Department

Figure.10.1 Yearly Tourists data



Source: Tourism Department

Figure.10.2 Monthly Tourists (Year 2019)

The number of tourists from 2013 to 2021 in Kannur district is shown in Figure.10.1. It is clear that the number of tourists is increasing every year. But due to Covid-19 the number of tourist decreased in 2020 and 2021. The monthly count of tourists in the district in 2019 is shown in Figure.10.2. During the vacation months like May, December, November, April and September, the number of tourists is large. There is a rise of tourists in the month of may.

Since Kannur City is a main halt station for most of the tourist spots of the district, even if they are not in the Corporation boundary, they have to be mentioned in the list of tourist spots influencing the Municipal Corporation area. Important tourist locations in Kannur district are shown in Figure.10.3. The location of Kannur Corporation is also shown in the same.

Different types of tourist spots within and near the city are listed below.

10.2 TYPES OF TOURISM

10.2.1 BEACH TOURISM

Kannur is gifted with immense natural beauty with the Arabian Sea on its west. The Corporation area has a 17 km long coastline.

Payyambalam Beach

Payyambalam beach is one of the beautiful beaches in Kannur. It is located 2 km away from the core of planning area as well as railway



Figure.10.3 Important Tourist Locations in Kannur District

station. This beach is famous for its flat laterite cliffs that just into the sea. The well laid gardens and the massive landscaped mother and child sculpture make it extremely captivating. The beach has been pictured in many south Indian movies also.

There is a park located near the Payyambalam beach. It has ticketing system. But entrance to beach is completely free. The beach houses many leisure activities for children. Camel safari and other activities are also going on there. A cremation ground is also situated in the beach, where the eminent personalities from Kannur are resting in peace.

The beach recently introduced an open-air gym, called 'The Amphibian: Where Man Meets Sea', which is barely 150 m from the sea. It is touted as country's first beach to introduce a gym in a move to motivate people to take fitness seriously, along with some fun of course. Anybody visiting this beach to spend some relaxing time can also opt for a workout session by the seaside.



Payyambalam Beach

In fact, this is a better idea than the other options such as jogging or going for a walk on the seashore. This beachside gym also boasts of having a special section designed for children, which includes activities like rock climbing. This is to motivate people to try adopting a healthy lifestyle.

Payyambalam beach is a clean and beautiful beach. People come in hundreds to enjoy the beach and it has got high potential for tourism. But there is lack of facilities to support a large number of tourists. There is no public transportation system near to the beach. Private vehicle is the only mean to reach there. There should have good advertisement and signage about the beach to attract more people from distant places

Light House

Kannur light house is Kerala's first light house and it is the only one light house of Kannur. This 75 feet height lighthouse was first built in the early months of 1903. It a balcony with a light that is lit as the evening breaks in to alert the seamen of the land. Since the lighthouse stands at a considerable height, one is delighted with an enchanting and panoramic view of the entire city of Kannur, the limitless Arabian Sea, the Baby Beach and even parts of Payyambalam Beach. Light house is located about 3.5 km away from the core area.



Light House

Baby Beach

Baby beach is another spectacular beach of Kannur and it is a small and beautiful beach near Payyambalam Beach. It is just 3 km way from the core of the Corporation area. It is well known as beach lover's paradise. It is a small but clean beach. The savoury feel of this racy Baby Beach invites people to spend some good time in the evening. Since baby beach is located in the Cantonment area, the entry is restricted at times.

Ezhara beach

Ezhara Beach lies close to Kizhunna Beach, and both are often referred to as twin beaches. Ezhara on the southern side has a rocky shore bordered by lush green palm trees. This is another pristine stop to capture sunset at its best. The experience of swimming in the coves is truly amazing. The white sandy stretch cradled with palm trees is quiet, peaceful and untouched by commercialisation. The rocky terrain in contrast with the palms looks like a painting. It is located about 12.3 km from Kannur City.

Thottada Beach

The untouched beauty of Thottada beach makes it one of the most popular places to visit in Kannur. It is located about 7.4 km from Kannur bus stand. The beach is completely segregated from concrete jungles and offers a place full of serenity and tranquillity to its visitors. The cleanliness and solitude offered by this beach are truly unsurpassed.

Muzhappilangad Beach

Muzhappilangad is the longest driving beach in Asia and is featured among the top six best beaches for driving in the world by BBC article for autos. Among the list of six, it is the only one in Asia. It is located about 15 km from the core of the Municipal Corporation area and 8 km from Thalassery. The beach festival is celebrated in the month of April and it is one of the important tourist attractions in the district.



Muzhappilangad Beach

Muzhappilangad offers some of the most stunning views of the yellow and orange sun setting along the golden sandy beaches of Malabar Coast.

This 4 km stretch drive is providing adventure sports like paragliding, parasailing and microlight flights. Other attractions include water sports, power boating or a simple catamaran ride. Photography enthusiasts can take breathtaking shots of the ocean and food lovers can munch on authentic Malabar snacks sold on the beach. There is no fee charged to enter the beach but for driving a vehicle on the beach, ten rupees is charged.

Kizhunna Beach

It is located about 11 km from Kannur. This beautiful stretch of sand is one of the most secluded beaches in Kerala.

Meenkunnu Beach

Meenkunnu beach at Azhikode Village is about 12 km from Kannur. It is a beautiful beach full of golden sands and tall palms. The place has a slow pace. It is an area of fishing hamlets. As the name says, the beach indicates a strong fishing tradition of beach side villages. Different types of fishing and catching fish right at the beach by the people is an interesting view here. This beach is indeed a refreshing choice for those who find Payyambalam beach a bit touristy and crowded. Meenkunnu beach is 10 km north of Payyambalm along the same stretch of shoreline. The cliff on top of this beach is a good view point.

Chala Beach

Chala beach is just a short stroll away from Meenkunnu beach located 12 km away from the core planning area. Appearing as a northern extension of Mennkunnu itself, Chala beach is narrower although cleaner. It is also more visitors oriented with a beach garden and well laid out beach entrance. This beach strip is remote and so gives privacy.

Ezhimala

Ezhimala is located about 55 km from Kannur. A hillock, which is 286 m high, rises above the beautiful beach here. Carved stone pillars and an efficient burial chamber can be seen at the foot of the hills. The hills are well known for its rare medicinal herbs. A Naval Academy, one of the largest of its kind in Asia, is located here. Permission is required for entry.

Choottad Beach

With casuarina trees providing shade and the beach facing Ezhimala, Chootad Beach is also noticed in the tourist map of Kerala. It shares its borders with Kuppam River on one side and sea on the other. 286 metres above, Ezhimala gives a mesmerizing sight from the beach. The clean sea shore and surroundings attract many tourists.

Under the aegis of the District Tourism Promotion Council, there is a beach park and other facilities. In the Kuppam River near the beach, there are facilities for pedal boats and speed boats. On walking in between the casuarinas trees and reaching the top, there are facilities to sit and relax in soothing breeze.

10.2.2 PILGRIM TOURISM

Parassinikkadavu Temple

It is located in the north east part of Kannur. It is about 18 km away

from Kannur bus stand. The Sri Muthappan Temple of Parassinikkadavu stands on the banks of the Valapattanam River and is one of the most important shrines here. This pilgrim centre is famous for the Muthappan Theyyam performed every morning and evening. Visitors can go around the temple and even enter the sanctorum of the temple renowned for its unusual offering of dried fish and toddy to the deity. A Kathakali Club at the temple arranges shows on request after 11 in the night, which lasts for 2.5 hours.



Parassinikkadavu

Andalurkavu

It is a famous and prominent temple in Andalur in Dharmadam village, located about 17 km away from the core of the corporation area.the Lord Rama and the main festival is celebrated in mid February, the first week of the month "Kumbam" of the Malayalam calendar.



Theyyam

Theyyam or Theyaattam is the main ritual of worship. It is one of the rare places where Yuddha Kanda of Ramayana, the great epic is visualised and performed.

Rajarajeswara Temple

It is a Shiva temple located in Taliparamba, about 23 km away from Kannur bus stand. The temple is regarded as one of the existing 108 ancient Shiva Temples of ancient Kerala. It also has a prominent place amongst the numerous Shiva temples in South India.

10.2.3 CULTURAL TOURISM

There are a number of festivals across the breadth and length of Kannur which underlines the scope for cultural tourism promotion. Kannur district is known as “the land of looms and lores”, because of the loom

industries and ritualistic festivals held in temples. The district is a major centre for Theyyam, a ritual dance of northern Kerala. Small shrines known as kavus, are associated with the Theyyam.

The flavours of Kannur region are unique making it a paradise for food lovers. "Thalasseryi Dum Biriyani" is one of the tempting dishes every traveller should taste at least once in their lifetime. The list of other lip smacking items includes Ari Unda, Neypathiri, Unnakkaya, Pazham Nirachathu, Elayada, Kalathappam and Kinnathappam. Thus, it is an irresistible place for all food lovers.

10.2.4 HERITAGE TOURISM

St. Angelo's Fort

St. Angelo's Fort is one of the historical forts in Kannur district located about 3 km from the city. This sea front laterite fort was constructed in 1505 AD by Don Francisco De Almeda with the consent of the ruling Kolathiri Raja. The fort is a composite feature of the Portuguese, Dutch and the English architecture (colonial architecture).

After changing hands from the Portugese to the Dutch and then to the English, the fort became one of the important military centres of the British in Malabar. St. Angelo Fort offers a fascinating view of the Mappila Bay fishing harbour.



St. Angelo's Fort

Ammunition dumps, stables, underground jails, secret tunnels to the sea and an old dilapidated chapel are well preserved within its precincts.

Even though the fort is located close to the core planning area, there is no public transportation network available. The visitors can depend only on auto or private vehicles. Since there is no auto stand, the return journeys of the visitors is very difficult and are forced to walk or depend on autos that came for unloading other passengers.

Arakkal Kettu Museum

This historical museum, which faces the Arabian Sea is located about 3 km from Kannur bus stand. It was actually a section of the Arakkal Kettu (Arakkal Royal Palace) which was the residence of the former Arakkal Ali Rajas, the only Muslim royal family of Kerala.



Arakkalkettu Museum

Protected by archaeological and tourism department, this palace complex is today a museum housing splendid display of numerous artefacts and heirlooms belonging to the Rajas. Presently, the palace is in a completely deteriorated state even though some parts of the palace are functional (Durbar Hall, Masjid).

Gundert Bungalow

It is located about 20 km from Kannur. Dr. Herman Gundert, the revered German missionary, scholar and lexicographer lived in this bungalow for 20 years from 1839. It was here that the first Malayalam dictionary and the first Malayalam newspaper – Paschimodayam – took shape. The bungalow is at present occupied by a technical training institute.

Chirakkal

Chirakkal is located 6 km from Kannur City. There is a splendid folklore museum here. In an effort to preserve the rich heritage of the 130 year old abode of Chirakkal family, the Chirakkal Kovilakam was converted into a museum. The Kolathiri Rajas once lived here.

Kerala Folklore Academy

Kerala Folklore Academy, an independent centre for cultural affairs, was established on 28 June 1995. The main objective of the Academy is to promote and protect the traditional art forms of Kerala. Kerala Folklore Academy, an autonomous centre for cultural affairs, is located about 7 km away from Kannur. The institution was constituted by the Government of Kerala and functions under the Cultural Affairs Department, Government of Kerala. The institution provides financial assistance to folk artists. Economic aid programs and academic councils are conducted to promote the traditional Kerala art forms.



Kerala Folklore Academy

Malayalam Kalagramam

It is located about 29 km away from the core of the Corporation area. This renowned centre for arts and culture conducts courses in painting, sculpture, music, dance and pottery. The centre also has an art gallery, exhibition hall, library, a 300 seat auditorium, a sculpture garden, cottages for staff and students, separate guest houses for visitors and a canteen.

10.2.5 OTHER TOURIST SPOTS INFLUENCING KANNUR CORPORATION AREA

Vismaya Water Theme and Amusement Park

It is situated near to the famous Muthappan temple in Parassinikadavu. It was officially inaugurated in August 2008 and since then it has become one of the favourite holiday destinations in Malabar.



Vismaya Water Theme and Amusement Park

The park is wholly operated by the rain water collected by the reservoir spread over two acres of land with a capacity of 50 million litres of water. It is located about 18 km away from Kannur bus stand.

Parassinkkadavu Snake Park

It is located in the Anthoor Municipality about 16 km from core of Kannur Corporation area. The Snake Park is in Parassinikkadavu, 2 km from National Highway (NH). The park houses a variety of snakes and other small animals, including the Spectacled Cobra, King Cobra, Russell' sviper, Krait and various pit vipers. There is also a large collection of non-venomous snakes including pythons. The park is dedicated to the preservation and conservation of snakes, many species of which are gradually becoming extinct.

Parassinikkadavu

It is located about 18 km from Kannur. The DTPC provides pleasure boating and house boat cruises at the Parassini River. Accommodation is available nearby. The snake park here is the only one of its kind in the state. Snake demonstrations conducted every hour draw large crowds. Vismaya Infotainment Centre, one of the largest water theme parks is situated here.

Sadhoo Merry Kingdom

It is the most modern man made sophisticated water theme park, situated on a hillock at Chala Hills. It s located 6 km away from Kannur City/ Railway Station.

Munderi Kadavu Bird Sanctuary

It is a Biodiversity rich wetland area located about 14 km away from Kannur bus stand. This area is famous for migratory birds. Munderi Kadavu is a part of Katampally Wetlands which comprises nearly 4000 acres of marshland, used for paddy cultivation known as 'Kaippad'.



Munderi Kadavu Bird Sanctuary

Vellikkeel Eco-Tourism

It is a tourist place that is open to people to enjoy the flora and fauna of Vellikkeel. Located about 18 km away from Kannur core area, it is a nature lover's delight. This eco-tourism is an ideal destination for one-day trips or getaways from the city. One can do boating in the serene lake of Vellikkeel or have peaceful nature walks by the lake. The surrounding greenery and mountains will refresh your senses.

Aralam Wildlife Sanctuary

It is the northernmost wildlife sanctuary of Kerala, southwest India. It is 55 km^2 in area and located on the western slope of the Western Ghats. It was established in 1984. The headquarters of the sanctuary is near Iritty. Aralam Wildlife Sanctuary is situated in the south east part of Kannur District. It is about 62 km away from Kannur City.

Pazhassi Dam and Garden

It is located 37 km east of Kannur. It is an ideal retreat for tourists. This dam site is famous for its scenic beauty.

Vayalapra Floating Park

The Vayalapra Floating Park, also known as V-Pra Park is one of the beautiful picnic spots in Kannur to spend with family and children. It is located about 26 km away from Kannur bus stand. The park started by District Tourism Promotion Council (DTPC), Kannur offers various tourism activities like Pedal Boating and Kayaking.

Madaipara

Madayipara is a flat topped hillock located in the Madayi Village of Kannur district. It is typical Laterite foothills of the Western Ghats. Kuppam River, a major river in Kannur district flows along the place touching this hillock. Madayipara is an ecological paradise rich with wide species of flora and fauna. It has a rare collection of insect - eating plants. It is also home to hundreds of birds and butterfly species. The place has religious significance as well. Madayikkavu, Vadukunda Temple and Malik Dinar mosque are situated here. The Madayi Kavu also known as Thiruvarkadu Bhagavathi Temple is of Goddess Kali, and the Vadukunda Temple is dedicated to Lord Shiva. Malik Dinar Mosque is believed to have been originally built by Malik Ibn Dinar, a Muslim preacher. The Madayi Kavu is considered to be the mother of all Bhadrakali temples of North Kerala and this kavu hosts the Pooram festival, which is a ritual ceremony found in North Malabar region.

Palakkayam Thattu

It is a beautiful and well maintained hill station located about 46 km away from Kannur City. This lesser-known location with a misty mountain in the Western Ghats has an altitude of 3500 Ft from Mean Sea Level.

Paithalmala

Paithalmala is just a few kilometers away from Palakkayam Thattu. It is one of the safest hill stations in Kannur for spending time with family. Palakkayam Thattu is undoubtedly a beautiful place for hang out with friends and family. It offers a good off road experience too if you are interested in off road. It is about 63 km away from Kannur City.



Paithalmala

Kanjirakkolly

Kanjirakolly Hill Station is one of the emerging tourism destinations in Kannur district of Kerala, situated in the Western Ghats, along with the other Hill stations in Kannur, Palakkayam Thattu and Paithalmala. Kanjirakolly Hill station, situated about 54 km from Kannur town, is the new tourist destination identified by Kerala Tourism. To explore the tourist attractions here, Kerala Tourism has

launched the first phase of developmental works here. Govt. has laid the foundation stone for a tourist facilitation centre recently.

Kanmath para and Sashi para are the View point of Kanjirakolly. Alakapuri waterfall here is the most attractive of all the monsoon scenes. It is essentially a picturesque land of imposing mountains, beautiful valleys and lovely rippling streams. From Sashippara we can see Kanjirakolly Valley, Coorge Forests of Karnataka and other villages. It is an enchanting destination for trekkers, photographers and nature lovers.

10.3 POTENTIALS AND PROBLEMS

The name of Kannur has been marked in the modem history of Kerala for its vast array of heritage buildings and its most enticing culinary culture. The planning area has immense potential for development of tourism sector with a clean and beautiful environment. Kannur Corporation area is a sandy strip of land interlocked with beaches and estuaries. There are some environmentally sensitive areas having reasonable amount of mangroves like Kanampuzha and Thavakkara South.

St Angelo's Fort is definitely one of the most popular and frequently visited attractions of Kannur and for more reasons than one. The polished yet prehistoric structure of this fortress oozes with unadulterated elegance and overwhelming power. Standing ashore in the Arabian Sea, St Angelo's Fort enjoys a panoramic and unobstructed view of the diorama created by the merger of the magnetic waves and the azure waters. It also overlooks the mesmerising Mopilla Bay, a natural harbour.

The fort is mainly famous for the gripping history and the intriguing tales it has to tell. Walking around the walls of this majestic fort, the visitors can almost picture the battles that this fortress has seen. The tombstones of the soldiers who lost their lives fighting for the fort, barracks and an old chapel altogether constitute the heritage potential of the planning area.

Even though the St. Angelo's fort, light house, Payyambalam beach, baby beach etc. are very close to the city, the accessibility to these places is very difficult and also the road conditions are very poor. Public transportation facilities are to be provided.

The city lacks in tourist infrastructure. The marketing efforts are minimal. Taking into account the tourist inflow into the city the available facilities is found to be insufficient. The tourism within Kannur Corporation area is sadly remains as one day tour. Thus the tourists from Karnataka or other districts come here in the morning and

return by evening due to the very lack of infrastructure ignorance about tourism in Kannur due to the absence of its tourism profile.

10.4 INFERENCE

Though there are quite a number of tourist spots in and around Municipal Corporation area, it is unfortunate that some of these centres and their potentials still remain unidentified and unexplored at international levels.

There is a scope for a boating service through Varamkadavu Pullooppikadavu and Munderykadavu. Due to the presence of bird sanctuary, it can be enhanced as a tourist spot. There are some environmentally sensitive areas having reasonable amount of mangroves in Kanampuzha and Thavakkara South. Conservation of these areas is very important.

The new international airport offers great potential to this sector. Traditional Ayurvedic treatment can be rejuvenated and be introduced there by promoting health tourism within the planning area. Since Kannur has a potential of cultural tourism like "Theyyam", the seasonal scope of that can be utilised to attract foreigners.

Moreover, new tourism circuits need to be developed by connecting the various tourist destinations of Kannur District as well. It is necessary to provide basic amenities including accommodation facilities at all prominent tourist spots considering the growth of this sector in the near future along with enhancement of public transportation.

The details of tourist spots and available infrastructure can be made available to the tourists and public by providing an e-platform like internet, mobile applications etc. proper sign boards, names of roads as well as exact location of tourist spots can be displayed using LED display to encourage tourism.

CHAPTER 11

TRAFFIC & TRANSPORTATION

Transportation is considered as the main sector of economic growth and development of an area. Many growing cities face the challenges in transportation like inadequate road width, uncontrolled development along the road side which limits the opportunity of expansion of road, high growth of motor vehicles day by day, inadequate parking spaces etc.

This chapter analyzes the details of available means of transportation such as road, railway, waterway and airways in the planning area and describes its present network, potentials and problems.

11.1 ANALYSIS OF EXISTING STATUS

11.1.1 ROAD NETWORK

Even though there are a large number of roads connecting places within the city and outer areas, the existing road network within the Municipal Corporation area has no well-defined pattern. National Highway No. 66 is the major road passing through the core area from south to north direction and other roads deviate from NH 66 in the east and west directions. As the Arabian Sea forms the western boundary of the planning area, the roads leading in the western direction lead to places within the city including many beaches while the roads in the eastern direction connect major settlements outside the planning area.

The roads connecting the Corporation area to outside could be defined as ring road and there are seven such major roads in the planning area. They are Kannur-Thalasserry road (NH 66), Thazhe Chovva to Koothuparamba road (SH 38), Thazhe Chovva to Anjarakandy road, Kannur - Mattannur road, Kakkad-Pullooppi road, Kannur-Thaliparamba road (NH 66) and Alavil - Azheekkode road.

Apart from these major roads, there are many minor roads leading to places outside the Municipal Corporation area. All the radial roads are linked by minor roads and they do not have any definite pattern. The city roads are maintained by both PWD and the Municipal Corporation.

Existing road network in the Corporation area is shown in Figure.11.1 and reveals that the road



Figure.11.1 Existing road network in the Corporation area

network is of concentric pattern with two circular roads. The first circular road originating from Gandhi Square on NH 66 passes through Kannur Railway Station, Muneeswaran Kovil Junction and terminates at Gandhi Square. The second concentric road originates from Station Road, passes through New Bus Stand Junction, SBI Junction, Prabhat Junction and Girls High School Junction and terminates at Muneeswaran Kovil Junction. These two concentric roads are linked by a radial road from Plaza Junction to City Junction via District Hospital which connects Arakkal Museum and St. Angelo Fort. The Cantonment area is connected to the city centre by this road. Payyambalam beach, major tourist centre in the city is also connected to this circular road.

Categorization of roads and footpaths based on the material used, as obtained from Vikasana Report, 2017 - 2022 is illustrated in Table.11.1 and Table.11.2 respectively. As per the tables, majority of roads in Kannur City are tarred (507.632 km) followed by earthen (166.965 km) and metal road (25.386 km).

Table.11.1 Categorization of roads based on the material used

Sl. No.	Type of roads	Length (km)			
		Width up to 3m	Width from 3m - 6m	Width above 6m	Total
1	Earthen Road	32.193	134.264	0.508	166.965
2	Metal Road	19.388	5.898	0.1	25.386
3	Tar Road	49.612	385.055	72.965	507.632
4	Concrete Road	3.757	2.141	0	5.898
Total Length (km)					**705.881**

Source: Vikasana Report,2017-2022

Table.11.2 Categorization of footpaths based on the material

Sl. No.	Type of footpath	Length (km)		
		Width up to 3m	Width from 3m - 6m	Total
1	Concrete Footpath	76.897	1.567	78.464
2	Inter lock Footpath	0	0.12	0.12
3	Footpath	49.605	0	49.605
Total Length (km)				**128.189**

Source: Vikasana Report,2017-2022

The Vikasana Report 2017 - 2022 also reveals that the total length of tarred roads need to be renovated is 262.935 km and that of earthen road is 16.73 km. The length of metal roads need to be renovated is 3.78 km. The lengths of new tarred and earthen roads need to be constructed are 92.228 km and 103.66 km respectively.

11.1.2 VEHICLE POPULATION

Growth trend: The trend in vehicular growth has been phenomenal all over the State and Kannur is no exception to this. The growth of motor vehicles in Kannur district during the period from 2005 to 2015 is given in Table.11.3. It can be seen that the vehicle population in Kannur district has grown by more than three times during the last ten years.

No. of vehicles in 2015 in Kannur District: The number of motor vehicles having valid registration in Kannur district and Kerala State in 2015 is given in Table.11.4.

Table.11.3 Growth of vehicle population in Kannur District

Year	No. of Vehicles	Growth Index
2005	1,61,150	100.00
2006	1,85,061	114.84
2007	2,10,070	130.36
2008	2,32,737	144.42
2009	2,57,384	159.72
2010	2,86,993	178.09
2011	3,32,990	206.63
2012	3,82,680	237.47
2013	4,14,593	257.27
2014	4,64,885	288.48
2015	5,12,320	317.91

An analysis of the existing vehicle population shows that major share of nearly 47 per cent of the total vehicle population in the district continued to be two-wheelers, followed by 22 per cent of cars.

11.1.3 TRAFFIC VOLUME STUDIES

The peak hour traffic volume at major intersections is given in Table.11.5 and it is spatially represented in Figure.11.2. It could be seen that Thana Junction recorded the highest peak hour traffic volume of 5,102 PCU, Stadium Junction with 4,511 PCU, followed by Mele Chovva Junction with 3,997 PCU, Caltex with 3,865, South Bazaar Junction with 3,686 PCU and Gandhi square junction with 3,520 PCU in that order. Four intersections had traffic volume between 3,000 and 3,500 PCU, seven intersections between 2,000 and 3,000 PCU, ten intersections between 1,000 and 2,000 PCU and the remaining eight intersections had traffic below 1,000 PCU.

Table.11.4 Number of motor vehicles having valid registration in Kannur district and State in 2015

Sl. No.	No. of Vehicles	Kannur District	Kerala
1	Four wheelers & above	39,700	4,11,349
2	Three wheelers including Tempos	10,203	1,54,609
3	Stages carriages	2,142	31,286
4	Contract Carriages / Omni Buses	23,525	1,45,646
5	Cars	1,13,566	17,02,925
6	Taxis	15,920	2,14,216
7	Jeeps	5,346	73,700
8	Auto rickshaws	51,037	7,31,000
9	Scooter/ Motor cycles	2,42,881	58,28,817
10	Tractors	1,038	15,293
11	Tillers	330	5,414
12	Trailors	249	2,411
13	Others	6,383	1,04,579
Total		**5,12,320**	**94,21,245**

Table.11.5 Peak hour traffic volume at major intersections in the Corporation area

Sl. No.	Name of intersection	No. of arms	Peak hour traffic (PCU)	Peak hour		
1	Thottada	3	969	8.45	-	9.45
2	JTS Junction	3	944	11.30	-	12.30
3	ThazheChovva Bypass	4	3,135	8.30	-	9.30
4a	ThazheChovva (Mattannur road)	3	3,110	12.00	-	13.00
4b	ThazheChovva (Thayyil road)	3	2,993	12.00	-	13.00
5	MeleChovva	3	3,997	15.45	-	16.45
6	Thana	4	5,102	16.30	-	17.30
7	Caltex	3	3,865	9.15	-	10.15
8	Gandhi Square	4	3,520	9.30	-	10.30
9	South Bazaar - Kakkad Rd Junction	3	3,686	12.30	-	13.30
10	AKG Junction	3	3,404	12.30	-	13.30
11	Pallikkunnu old P O	4	2,981	17.00	-	18.00
12	PodikunduMilma Junction	4	2,442	12.30	-	13.30
13a	PuthiyaTheru (Kunhippally Rd)	3	2,733	17.00	-	18.00
13b	PuthiyaTheru (Kattampally Rd)	3	2,882	17.00	-	18.00
14	Chala	3	1,949	17.00	-	18.00
15a	Movancherry (Chala Rd Junction)	3	668	8.45	-	9.45
16a	Mundayad (Kakkad Rd)	3	1,799	17.30	-	18.30
16b	Mundayad (chelora Rd)	3	1,771	17.30	-	18.30
17	Vaaram	3	1,382	8.30	-	9.30
18	Valiyannoor	3	1,620	9.15	-	10.15
19a	Echur (chelora Rd Junction)	3	1,239	12.00	-	13.00
19b	Echur (Movancherry Rd Junction)	3	1,266	12.00	-	13.00
20	Korjan School Junction	3	925	12.30	-	13.30
21	Kakkad - Pallippuram Rd Junction	3	993	12.30	-	13.30
22a	Kunhippally (Pallikkunnu Rd Junction)	3	901	9.45	-	10.45
22b	Kunhippally (Kannadiparamba Rd Junction)	3	887	9.45	-	10.45
23	Kottali	3	432	12.45	-	13.45
24	Chalad	4	1,641	16.45	-	17.45
25	Plaza Junction	3	2,830	9.30	-	10.30
26	MuneeswaranKovil Junction	3	3,113	12.00	-	13.00
27	Stadium Junction	4	4,511	9.30	-	10.30
28	Prabhat Junction	3	2,097	15.45	-	16.45

The traffic volume in the Municipal Corporation area is shown in Figure.11.3. It reveals that NH stretch between Thazhe Chovva and Highway Junction carried traffic volume in the range of 2000 to 5000 PCU and the

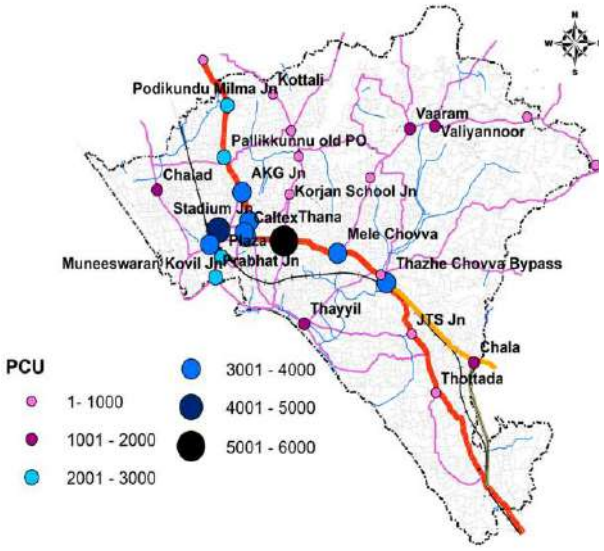


Figure.11.2 Peak hour traffic flow at major intersections in the Corporation area

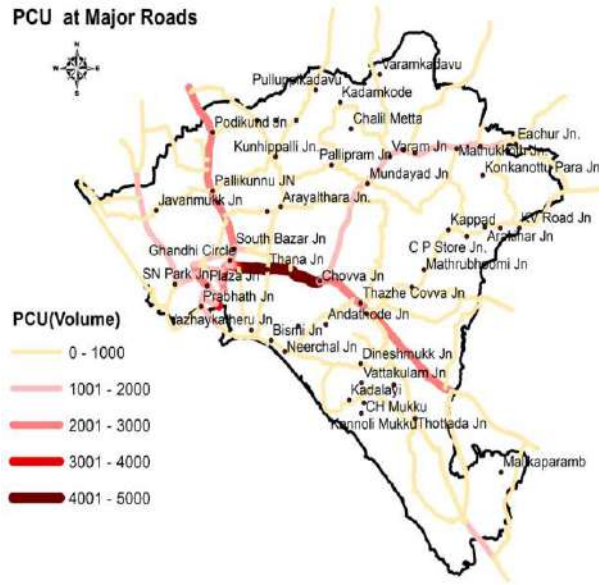


Figure.11.3 Traffic volume on major roads

highest volume is shown between Thana Junction and Manorama Junction. However, between Naadal Gate and Thazhe Chovva via Thottada, the traffic volume was below 1,000 PCU only. Within the CBD area of the city on the circular road from and to Gandhi Circle via Railway Station, the traffic volume ranged between 1,000 and 4,000 PCU.

11.1.4 CAPACITY UTILIZATION

Capacity utilization of the road stretches is measured by volume-to-capacity ratio (V/C Ratio). It is the ratio of volume of traffic plying on the road stretch to the capacity of the road stretch. For working out the capacity of different road sections, the information compiled during the road inventory survey was compared with the specifications of IRC-106-1990 (Guidelines for capacity on urban roads). While working out the capacities, due consideration was given to carriage-way width, junctions, parking, lateral clearance, shoulder, surface condition etc.

The traffic volume observed at different road stretches were compared with the capacity of road sections, to calculate the volume-capacity ratio (V/C ratio) of different road sections within the planning area. Many road stretches within the Corporation area were over utilized to the extent of more than 1.5 to 2 times of their carrying capacity resulting in congestion, accidents and declining travel speed. The entire NH section between Thazhe Chovva and Puthiyatheru is over utilized to the extent of more than 1.5 times their present volume even though some of the stretches have four lane divided

carriageway. Koothuparamba road, Kattampally road, Thazhe Chovva - Mattannur road and Azheekkal road are also severely congested as reflected in the high V/C ratio.

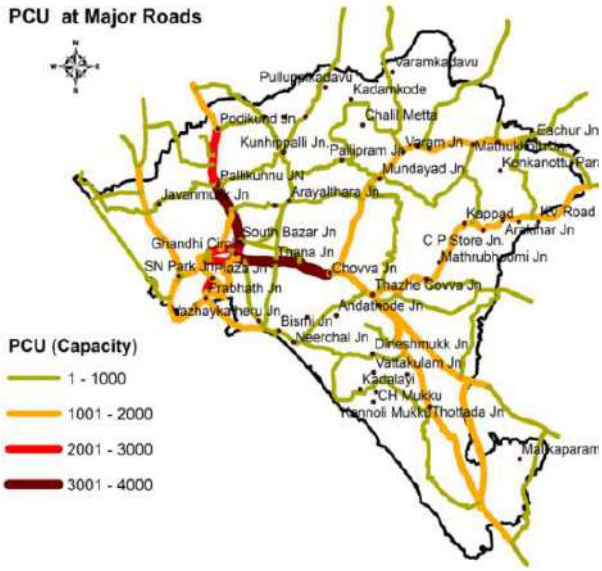


Figure.11.4 Capacity utilization of major roads

Within the planning area, most of the roads including the circular road from Gandhi Circle via Railway station are found to be congested with V/C ratio more than two in many stretches. Figure.11.4 exhibits the over utilized roads in Kannur City.

11.1.5 CHARACTERISICS OF INTERCITY PASSENGER AND VEHICULAR TRAFFIC

The O-D pattern of inter-city passenger traffic revealed that there were about 1.78 lakh internal-external trips (Study region to outside study region), out of 4.30 lakh inter-city passenger trips. They constituted 42% of total trips. A total of 2.00 lakh trips were external - internal trips (outside study region to study region) constituting 46% of the total trips. External-external trips to the tune of 35,000 were performed through the study region and they were about 8% of the total trips. About 4% of the trips contribute to internal to internal movements. Pattern of inter-city passenger movements are shown in Figure.11.5.

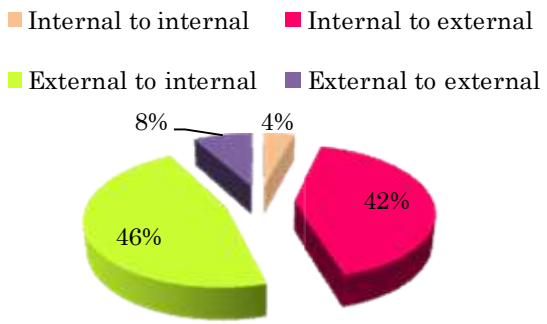


Figure.11.5 Distribution of Intercity Flow of Passenger movement

But in case of goods traffic movement, external to internal traffic constitutes 40%, internal to external traffic is 16%. The external to external traffic is about 44% as shown in Figure.11.6.

Distribution of intercity passengers as well as goods vehicles according to

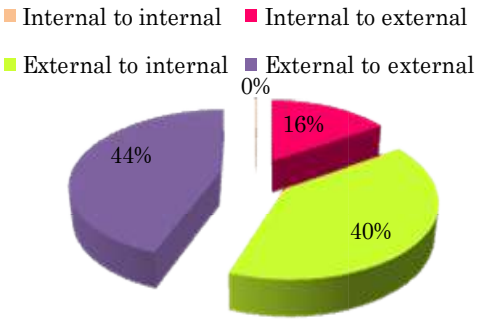


Figure.11.6 Distribution of intercity flow of goods traffic movement

the mode of travel is shown in Figure.11.7 and Figure.11.8 respectively. Almost 58% of the passengers depend on bus and 21% depends on mini bus/car and 13% depends on two-wheelers. Moreover, it is seen that 8% depends on auto rickshaw for travelling purpose. In the case of goods vehicles, about 42% depends on MAT/truck while 30% depends on goods auto. About 28% depends on mini truck/tempo for transportation.

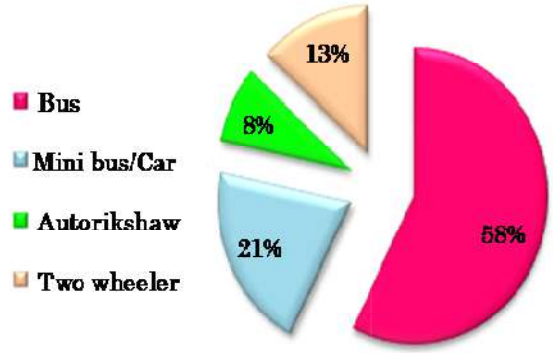


Figure.11.7 Distribution of Intercity Flow of passengers based on mode of travel

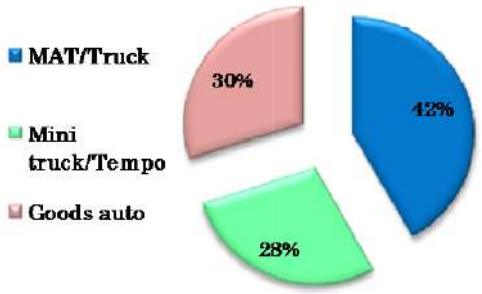


Figure.11.8 Distribution of Intercity Flow of goods vehicles based on mode of travel

The distribution of purpose wise trips made by vehicles is shown in Figure.11.9.

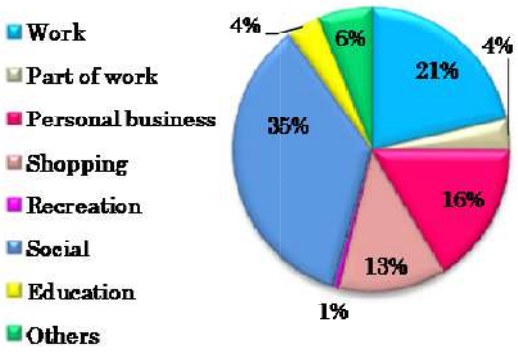


Figure.11.9 Distribution of purpose wise trips made by vehicles

It reveals that 35% of the trips were for social purpose. About 25% were work oriented followed by personal business and shopping purposes. The educational trips contribute about 4% of the total trips.

Figure.11.10 shows the commodity wise distribution of intercity goods traffic in Kannur City. The analysis of commodities carried indicated that construction materials was the largest commodity carried by goods vehicles contributing a major share of 51%, a trend seen in most of the urban areas in the state, followed by agricultural products (19%) and industrial goods (12%).

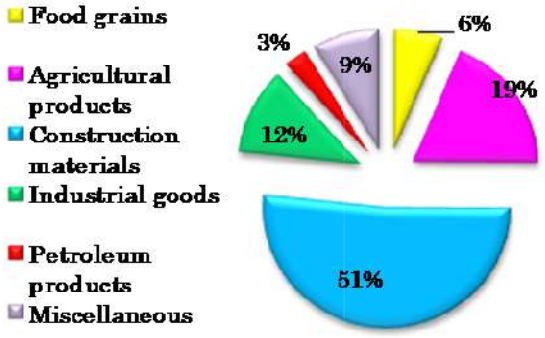


Figure.11.10 Commodity wise distribution of goods traffic in the planning area

11.1.6 CHARACTERISTICS OF PUBLIC TRANSPORT

TRANSPORT

Public transport services are met by both KSRTC and private buses in the Corporation area. KSRTC Bus stand at Caltex by the side of NH 66, Hospital bus stand, Old bus stand near Stadium and New bus stand at Thavakkara are the four bus stations in Kannur. The KSRTC services are operated from KSRTC bus stand; private buses are operated from Hospital bus stand as well as New bus stand. All the city services of KSRTC buses touch both New and Old bus stands. Similarly, most of the private buses touch the Old bus stand.

In the planning area, more than 1,100 buses are operated from/through various bus stations with about 3,500 trips per day. The highest number of buses is operated from Thavakkara bus stand, followed by Hospital Bus stand and KSRTC station. Maximum number of trips are operated towards Thaliparamba/Kattampally direction (1,200 trips), followed by 678 trips towards Mattannur direction via both Echur and Movancherry, 472 trips towards Thalasserry direction and 357 trips towards Koothuparamba direction via Chala. Bus transport routes in the Corporation area are marked in Figure.11.11.

Apart from buses, Intermediate Public Transport (IPT) modes which consist of auto rikshaws and taxis are the other major public transport modes in the city. There are 28 auto stands and 14 taxi stands located within the Municipal limit of study area. Apart from the above, one prepaid auto stand and a taxi stand are located within the railway station area.

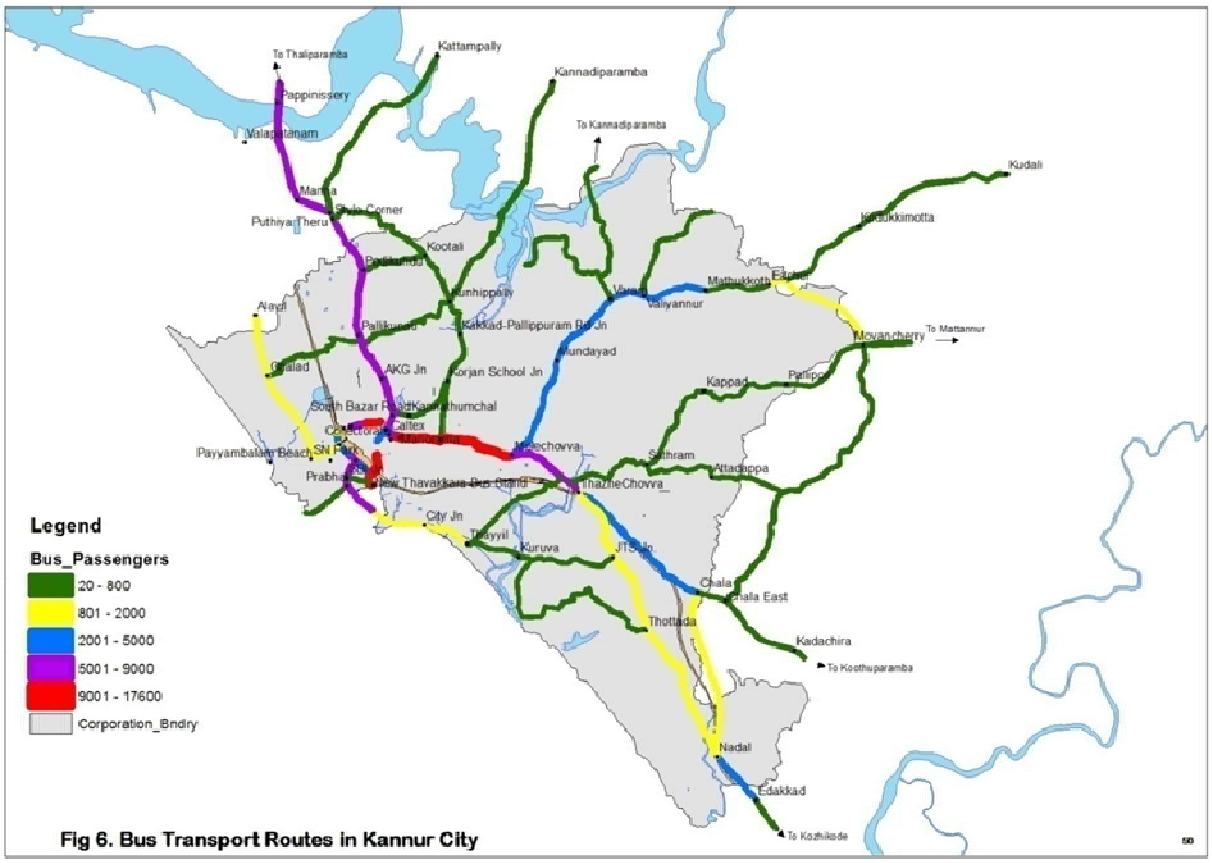


Figure.11.11 Bus transport routes in Kannur Corporation area

11.1.7 SPEED AND DELAY CHARACTERISTICS

To assess the average journey speed during peak hours, speed and delay survey was conducted along major roads. The journey speed in NH-66 from Edakkad Town to High Way Junction was found to vary between 12 and 37 km/hr. There were delay of more than 20% of travel time due to closure of railway gates at two places and traffic congestion at other places. The travel speed was found to be reasonably high on NH bypass which did not have major disturbances all along. Similarly on other roads leading to outside the planning area, relatively high level of speed was witnessed.

Within the CBD area of the city, the travel speed was found to be quite low with less than 12 km/hr observed between Plaza and Railway station, followed by 14 km/hr between Railway Station and Muneeswaran Kovil Junction. Overall, 24 km/hr was the average speed between Gandhi Circle and Gandhi Circle via Railway station and Stadium.

Other roads which witnessed lower speed were the stretch between Plaza Junction and Prabhat Junction with a speed ranging between 12 km/hr and 18 km/hr. It could be summarized that the average speed of travel in the

Corporation area is 30 km/hr with delay accounting for more than 7% of the total travel time. However, within the CBD area, the average travel speed observed was 23 km/hr with delay of 5%.

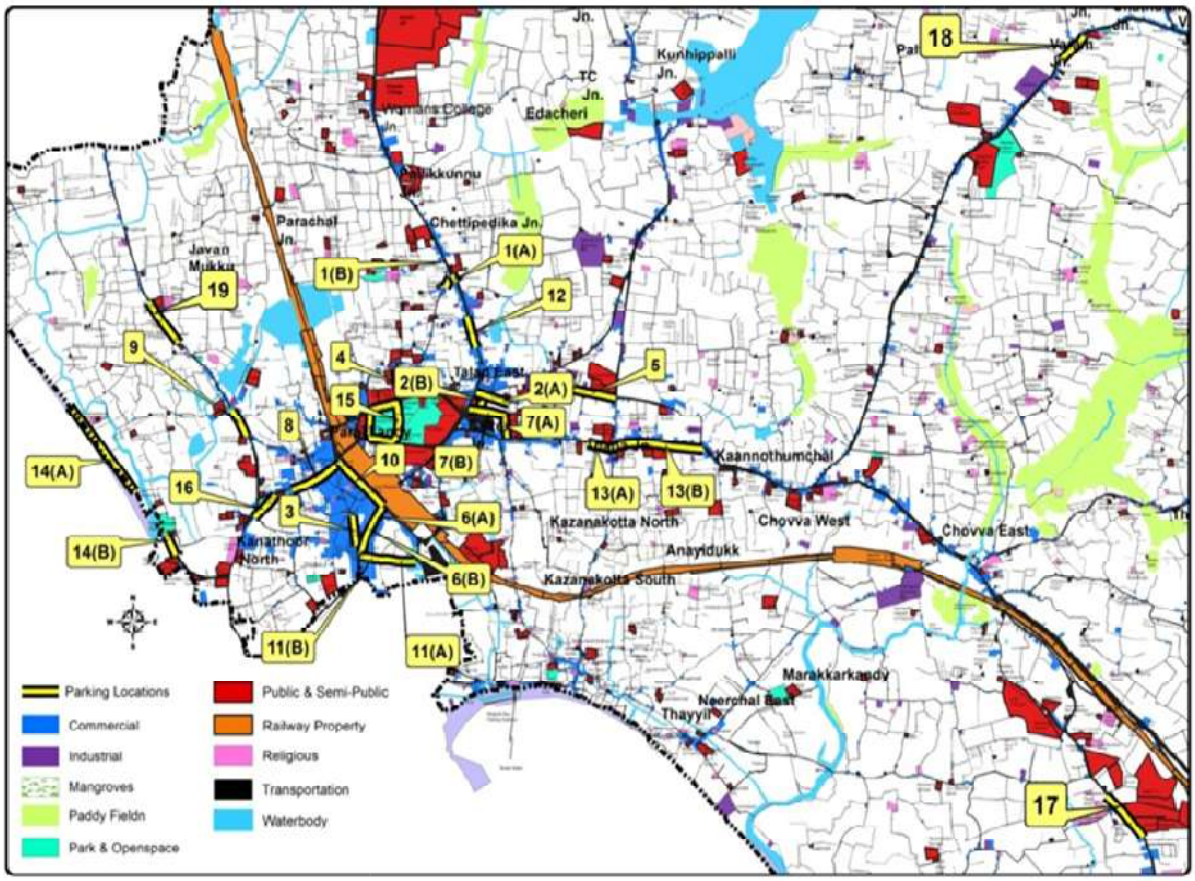


Figure.11.12 Parking locations in the planning area

11.1.8 PARKING FACILITIES

From the reconnaissance survey, it has been identified that most of the parking locations are concentrated within the core area. So the study will be more focused in this area even though other areas are also considered. The major areas of concern are: Plaza area, Gandhi Square, Thana Junction, Mele Chovva, Thazhe Chovva, Caltex, AKG Junction, Puthiyatheru and Chalad. The four major stretches of the Corporation area having more number of parked vehicles are Thazhe Chovva to Chala, Mele Chovva to Thazhe Chovva, Varam to Valiyanoor and Plaza to Muneeswaran Kovil. The major freight routes are Thazhe Chovva to Chala, Pallikunnu to Podikundu and Plaza to Thavakkara.

Parking survey was carried out at all the major road stretches where the parking accumulations are found to be

high. The surveys were conducted for 6 hours of peak hours each day. The number plate method was used to collect data on parking duration and accumulation of all categories of vehicles on major parking corridors. In certain other locations, only parking accumulation of vehicles was observed. The locations selected for on street parking survey are shown in the Figure.11.12 and the details are given in Table.11.6.

City outskirts have less dense roads and most of the main roads have wide unpaved shoulder. So availability of on-street parking is more in those areas compared to the vehicle concentration and space availability of the core area, It is the main area that is affected by parking problems. (problems due to lack of parking space and due to parking at unauthorised spaces)

Table.11.6 On street Parking locations in Kannur Corporation area

Sl. No.	Location	Stretches
City Core Areas		
1	AKG Junction	A) AKG to Caltex.
		B) AKG to Madharao Hospital
2	Ashoka Hospital Area	A) NH to TATA Motor Finance
		B) Hospital to K M I Shopping Mall
3	Bank Road	
4	Corporation Office	Corporation to Chinmaya
5	Dhanalakshmi Hospital	Hospital Junction to Rd towards ABC Emporium
6	Fort Road	A) Plaza Jn to Indian Coffee House
		B) Indian Coffee House to SBI
7	K S R T C Stand	A) Sub registrar road
		B) Sannidhanam road
8	Kavitha Theatre Road	
9	Passport Office Road	Syndicate Bank to Beach Rd
10	Railway station Road	Plaza to MuneeshwaranKovil
11	Pvt. Bus Stand - Bank Road	A) Circle to Snehalayam Rd
		B) Snehalayam Rd to Bank Road
12	South Bazaar	

13	Thana	A) Sadhoo auditorium to Water tank
		B) Water tank to Kannothumchal
Recreational Areas		
14	Payyambalam	A) Beach Rd
		B) Beach to Urusuline School
15	Stadium Area	
16	S N Park	
City Outskirts		
17	Thottada	
18	Varam	
19	Chalad	

By overlaying the major parking locations over land use of the area, it is observed that most of the parking locations are along commercial stretches and institutional buildings. This is due to lack of provision of required parking spaces for these shops and institutions. In the core area, parking is erratic and most of the drivers park wherever they find space.



Un authorized parking near Central Market

In market area, two-wheelers, parked in the major parking corridors are parked for duration of less than 30 minutes. A little more than 17% of the vehicles parked for a duration of 30 to 60 minutes. Only about 14% of the vehicles parked for more than one hour.

11.1.9 PEDESTRIAN MOVEMENTS

Pedestrian cross movements in the planning area are shown in Figure.11.13. From the figure, it is clear that pedestrian crossings are mainly observed at Gandhi Circle, followed by Puthiyatheru area with peak hour pedestrian cross movements of 4,428 and 4,352 respectively. Other important locations with considerable pedestrian movements are Caltex area (3,194), Thana (2,804) Stadium

Table.11.7 Parking duration of vehicles at major parking corridors in Kannur Corporation area

Duration (Mints)	Vehicles									
	Bus	Mini bus	Car/Van/Jeep	Pass Auto	Two wheeler	Truck	Mini truck	Goods auto	Total (No.)	Percentage to total
< 30	2	1	516	198	682	4	32	46	1,481	69.14
30 - 60	-	-	131	41	173	10	5	7	367	17.13
60 - 90	-	-	44	8	65	-	3	5	125	5.84
90 - 120	-	-	23	-	25	1	1	3	53	2.47
120 - 150	1	-	14	-	10	1	-	-	26	1.21
150 - 180	-	-	12	1	16	2	-	-	31	1.45
180 - 210	-	-	3	-	9	-	-	-	12	0.56
> 210	-	-	21	-	22	4	-	-	47	2.19
Total	3	1	764	248	1,002	22	41	61	2,142	100.00

The road section between Railway Station and Plaza had the highest pedestrian lateral movements of 1,546 during peak hour, followed by Stadium-Thalap road with 1,124 movements and Plaza to Prabhat with 1,108 movements.

Pedestrian vehicle conflicts are seen at major activity areas along NH. Especially Mele Chovva, Thana, Caltex, Gandhi Circle, Puthiyatheru are witnessing huge pedestrian conflicts necessitating suitable counter measures. Within the CBD area, Railway station area and Muneeswaran Kovil area are experiencing severe pedestrian vehicle conflicts warranting grade separated facilities.

11.1.10 ACCIDENT PRONE LOCATIONS

Accident data for the years namely 2013, 2014 and 2015 were collected from State Crime Records Bureau Thiruvananthapuram to assess the accident scenario in the planning area, locations of accidents and accident severity. Details of accidents reported according to accident severity during these years (2013, 2014 and 2015) are given in Table.11.8. It could be seen that 311 accidents were reported in the year 2013, which increased to 390 in 2015.

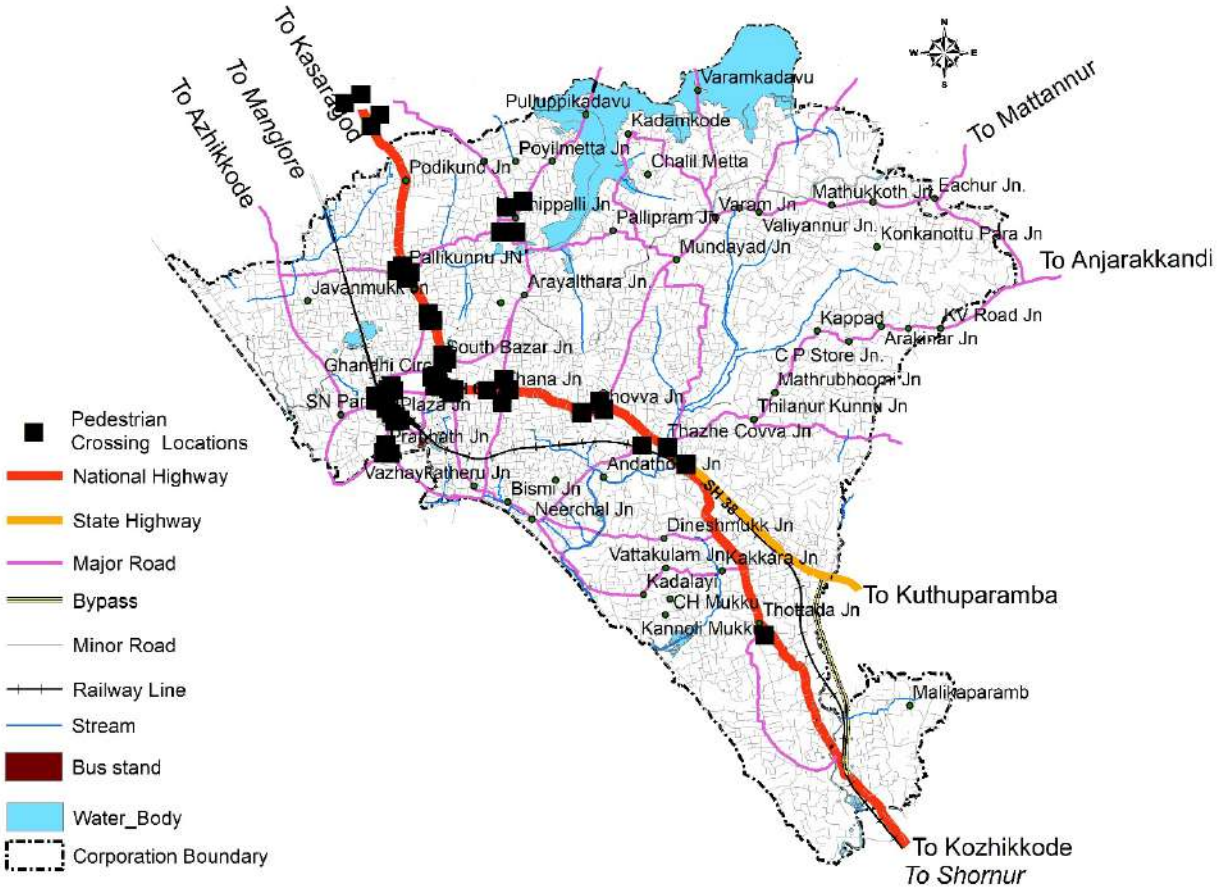


Figure.11.13 Pedestrian crossings in Kannur Corporation area

In the case of accident victims, the increase was from 434 to 561 during the same period. Most of the accidents were found to be simple ones (54%), followed by grievous ones in the year 2015. Fatalities were reported in the case of 9% of accidents.

Also, as per the data, major accident prone locations in the planning area are Thana area (38), Kannothumchal (36), Pallikkunnu (32), ThazheChovva (29), Chala (27) and MeleChovva (27) etc.

Table.11.8 Growth in accident in Kannur Corporation area

Year	No. of Accidents				No. of Causalities			
	Fatal	Grievous	Simple	Total	Fatal	Grievous	Simple	Total
2013	23	80	208	311	25	90	319	434
2014	33	97	187	317	34	119	302	455
2015	37	144	209	390	37	154	370	561

11.1.11 HIERARCHY OF TRAFFIC NODES

South Bazar and Camp Bazar area come under under first order due to its prime location as they contain markets. Chovva, City, Thana and Thazhe Chovva come under second order. Thirteen third order and twelve fourth order nodes exist in the Municipal Corporation area. The hierarchy of traffic nodes in the planning area is shown in Figure.11.14.

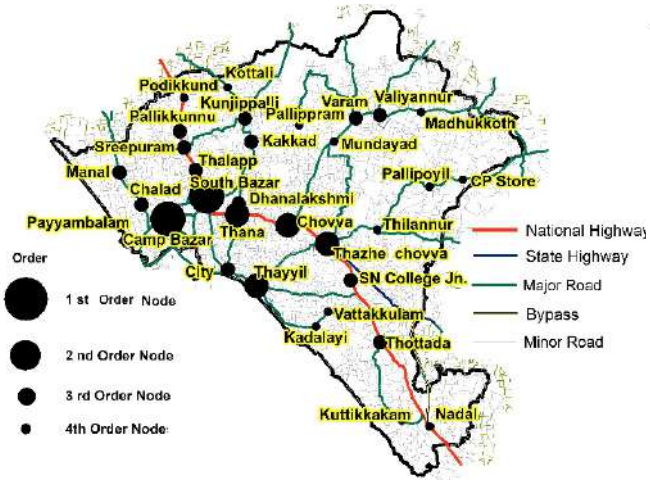


Figure.11.14 Hierarchy of traffic nodes

11.1.12 RAILWAY TRANSPORT

Kannur Corporation area is connected by a broad gauge railway line from Shoranur to Mangalore and then to Panavel via Konkan railway. The railway stations located within the planning area are Kannur and Kannur South. Kannur Railway Station is one of the major stations of the Southern Railway, under the jurisdiction of the Palakkad Division. The existing rail network in the Corporation is shown in Figure.11.15. All trains including the Thiruvananthapuram Rajdhani Express and Kochuveli Garib Rath stop at Kannur. Six daily trains and around 15 weekly or bi-weekly trains connect Kannur to the capital Thiruvananthapuram.

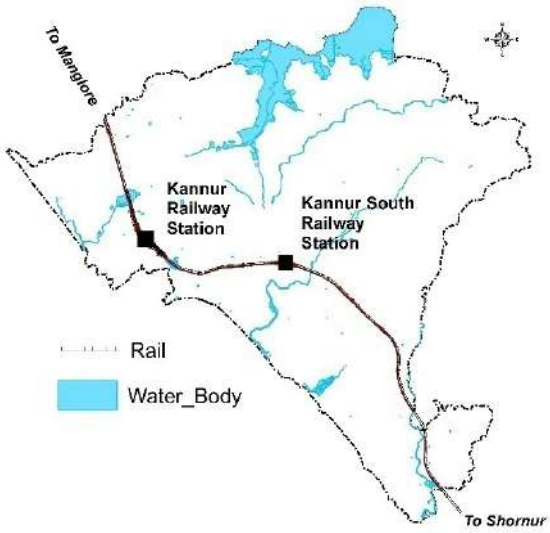


Figure.11.15 Existing rail network

11.1.13 WATER NETWORK

Kannur is an ancient Seaport. The nearest all-weather seaport is Mangaluru in Karnataka state. Azheekkode port lying outside the planning area has been included for developing coastal shipping by the Government of India under the National Maritime Development Programme (NMDP). The proposed stretch of West Coast Canal or National Waterway No. 3 from Beypore to Kasargod which is a

continuation of existing network through Kollam-Kottappuram-Beypore is passing through the Corporation area and it is spatially shown in Figure.11.16. In Kannur district, it connects Mahe River with Kavvayi River.

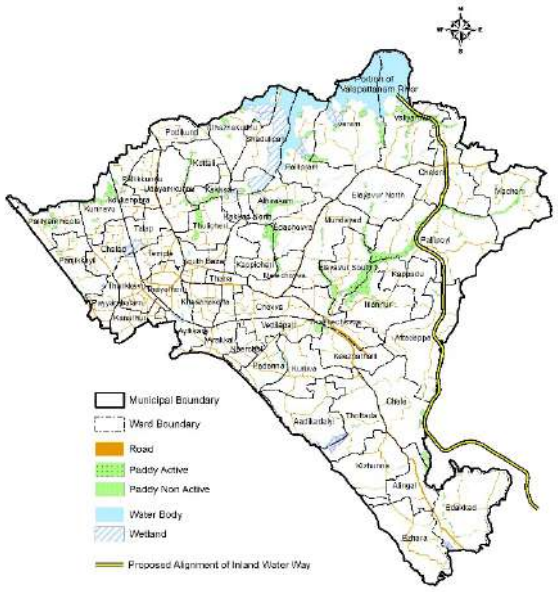


Figure.11.16 Proposed alignment of inland water way

11.1.14 AIRWAYS

Kannur International Airport is at Mattannur in Kannur District, 25 km east of the CBD of the planning area. It is the fourth international airport in Kerala. The airport has a 4,000 m runway (the longest in the state), art passenger terminal and other amenities. It is well connected by a comprehensive network of roads.



Kannur International Airport (Mattannur)

11.2 DEVELOPMENT POTENTIALS AND PROBLEMS

Kannur Corporation area is a major transit centre which is well connected by road and rail. The planning area is blessed with good road connectivity. One national highway (NH 66) and one state highway (SH 38) pass through the city providing interstate as well as inter district connectivity and this offers great potential regarding transportation sector. The Kannur-Mattannur road is connects the Corporation area to Kannur International Airport. Kannur Railway Station, the major railway station in the district is located within the planning area. Kannur South Railway Station is also located in the Corporation area. Also, the proposed stretch of West Coast Canal or National Waterway No.3 from Beypore to Kasargod is passing through the Municipal Corporation area. Thus, the existing system of transportation network will definitely promote trade and commercial activities of the city and will reflect in all production sectors.

The planning area is served by public transport system consisting of both State owned Kerala State Road Transport Corporation (KSRTC) and private buses. A well developed new Bus stand with spacious amenities for parking and other facilities functions at Thavakkara for providing the inter - regional services. All buses except City services are operated from here. Apart from these, the bus stand near the Govt. Headquarters Hospital provides facility for intra - regional services.

Like any urban centre in the state, Kannur Corporation area also faces problems in Traffic and Transportation system. Poor surface conditions, increasing number of personalized vehicles, inadequate width of roads in the central part of the city, heavy movement of vehicular and pedestrian traffic, lack of adequate pedestrian facilities, lack of proper parking lots which leads to unorganized street parking, movement of inter-city bus traffic on congested urban roads due to the location of intercity bus stands within the central area of the city, encroachment of right-of-way, lack of bus bays, bottlenecks due to level crossings, absence of proper traffic signs and markings are other issues faced in the planning area. Also, due to the lack of proper drainage facilities, water logging is identified in certain low lying areas.

The old bus stand and KSRTC stand have poor infrastructure facilities like dilapidated roads, lack of comfort stations, rest rooms etc. Water logging is also seen in these areas. Due to the lack of truck terminals and parking facilities, the markets are facing traffic congestion. The stretch of NH 66, Kannur to Mattannur road, Gandhi circle to Railway station stretch etc. are highly congested as the V/C ratio at these areas are above 1. Hence essential development plans and techniques are needed for the smooth flow of traffic in future.

11.3 INFERENCE

Being the district headquarters and important trade, commerce and tourist centre of Kannur District, the administrative needs of the entire population of Kannur district are to be met by the infrastructure of Kannur Corporation area. This should be the important parameter in its planning. The traffic and transportation sector has great significance in the development of the city as it can promote all other production sectors by providing smooth accessibility and connectivity. The improvement and maintenance of existing roads and the construction of new roads will enhance the trade and commercial activities, tourism, industries, education, health, etc. of the planning area.

Traffic congestion is observed along the stretches of NH 66, from Kannur to Mattannur road and from Gandhi circle to Railway station which can be controlled by introducing traffic

control/signal system as well as widened roads. The water logging issues in the Corporation area can be solved by the introduction of scientific drainage system. The introduction of parking as well as pedestrian crossing facilities within the planning area is essential to cater to the future traffic. There are footpaths in almost all major roads, but pedestrian crossings are not arranged properly. The goods traffic in the market centres is the most neglected one. Insufficient loading and unloading facilities, terminal facilities, provision for taxi stand, truck terminal, organised parking centres or plazas, connectivity of missing links and proper circulation pattern for the traffic are the important needs of the city. The existing Railway station which is the important one in the district, the high potential of Kannur International Airport, proposed inland water network all together will promote trade and commercial activities of the city and this in turn will get reflected in all production sectors.

CHAPTER 12

WATER SUPPLY

Availability of potable water has become the major concern of all communities in the whole world. Availability of drinking water, good sanitation and pollution free environment are the three essential factors of a healthy society. Generally, health and sanitation are linked to safe drinking water. Pollution of the existing water courses is a major problem in the global context.

The chapter analyses the existing status and development issues of provision of drinking water in the Corporation area.

12.1 EXISTING STATUS

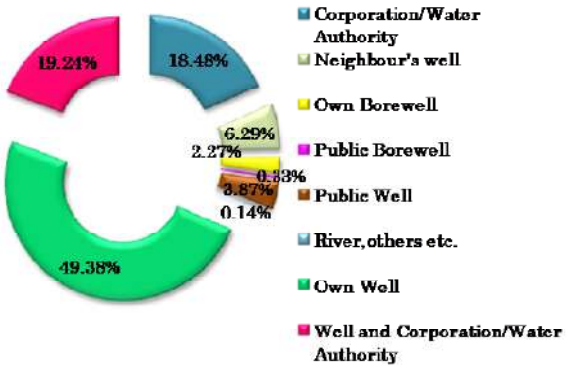
Kannur Municipal Corporation and Kerala Water Authority are the statutory authorities in charge of supplying and maintaining water supply facilities in the Corporation area. The supply of potable water including planning, design, construction, implementation and management are coordinated by these two authorities.

The total water consumption of a city comprises the domestic and non domestic consumption, including the water requirement for industrial, commercial and institutional uses, fire fighting, hospitals, hotels, theatres etc.

12.2 SOURCES OF WATER SUPPLY

As per socio economic survey conducted in 2018, the sources of water for domestic use are shown in Figure.12.1. All the settlements in the Corporation mainly depend on the ground water extracted through wells, tube wells as the source of water for meeting their daily needs. In addition they depend on pipe water supply by Kerala Water Authority and Kannur Municipal Corporation especially when wells dry up.

From the graph, it is clear that the principal sources of water for domestic



Source: Socio Economic Survey, 2018

Figure. 12.1 Sources of water supply



Pazhassi Dam

use are open wells that is; about 51.65% of the households in Kannur depends only on own sources like well (49.38%) and bore well (2.27%) for water. About 19.24% of the households have two sources both own well and water supplied by the Kerala water authority. About 6.29% of people depend on neighbours well for their daily needs.Users of public wells (3.87%) and public bore well (0.33%) constitute 4.20% of the households. About 18.48% people depend only on Corporation or Kerala Water Authority. Very less percentage of households use river as their source of water (0.14%).

The major rivers flowing through the Corporation area are Kanampuzha, Kakkad puzha and Kattampally puzha (Varamkadavu and Pullooppikadavu). Thottada Puzha, Ayyarath Puzha (Nadal Puzha) are other minor rivers. Anakulam, Chettyarkulam, Valiyakulam are important ponds in the Corporation area.

Pazhassi Canal; a major canal is mainly flowing through Puzhathi, Elayavur and Chelora zones of the planning area. It comes under Pazhassi Irrigation Project (PIP) in the Valapattanam River. Other ditches and canals flowing are Andathodu, Padannathodu, Ammayithodu, Valiyathodu, Cheloravayalthodu, Macheryvayalthodu and Athirakam Canal etc.

For public water supply system, the main source is the Pazhassi reservoir in Valappatanam River at Veliyambra; 40 km away from the city and was introduced in Kannur City in 1971. The yield from this source is 30 MLD which is about 129 LPCD. Among this, 20MLD is distributed for Kannur Corporation area and 10 MLD is for three adjoining Panchayats Chirakkal, Azheekkod and Valappattanam.

12.3 TREATMENT, STORAGE AND DISTRIBUTION

The intake well as the booster station along with the 30 MLD Water Treatment Plant is located near Chavasseri Paramba. The filtration is done by means of conventional rapid sand filtering system and the disinfection by gas chlorination. The treated water is conveyed through gravity from the treatment plant sump to the Overhead Storage Reservoir (OHSR) tank through DI pipes. The existing asbestos cement pipelines

Table. 12.1 Details of public distribution system in the Corporation area

Sl. No.	Zone/Area of coverage	Source	No. of houses covered/No. of connections	Capacity of OHSR (LL)	Total quantity supplied per day	Quality of water
1	Elayavoor Zonal Area	Elayavoor OHSR (Overhead Storage Reservoir)	4353	8	8	Properly treated
2		Mele Chovva OHSR		28	28	,,
3	Kannur Municipality	Thanna OHSR	11858	40	40	,,
4		Kasankkotta OHSR		2.25	2.25	,,
5		Sangeetha Theatre OHSR		16	16	,,
6		Kodapparamba OHSR		10	10	,,
7	Puzhadi Zonal Area	Kakkad OHSR	3600	2.5	2.5	,,
8		Payangodanpara OHSR		1.5	1.5	,,
9	Pallikunnu Zonal Area	Pallkkunnu OHSR	2415	4.5	4.5	,,
10		JICA OHSR		25	25	,,
11		ChakkattilPeedika OHSR		3	3	,,
12	Edakkad Zonal Area	Chala GSLR (Ground Level)	3968	4	4	,,
13		Vattakulam OHSR		8.5	8.5	,,
14	Chelora Zonal Area	Varam OHSR	1322	6.33	6.33	,,
15		Chelora OHSR		7.95	7.95	,,

from the reservoir at the Pazhassi project site to the town are also replaced by new Ductile Iron (DI) pipe as a part of safety. In Kannur Municipal Corporation area, the replacement works have been already completed. There are two shifts in six hours for water supply in the planning area. The details of public distribution system in the Corporation area are shown in Table.12.1.

As per the table, Kerala Water authority covers all the six zones under Kerala Water Supply Scheme. To meet the gap in the present demand, water is to be conveyed from transmission main of the new JICA (Japan International Cooperation Agency) Pattuvam scheme having 90 MLD supply; 10 MLD is supplied for Kannur Corporation and for that, feeder lines have been laid up to the proposed OHSR at Jail compound

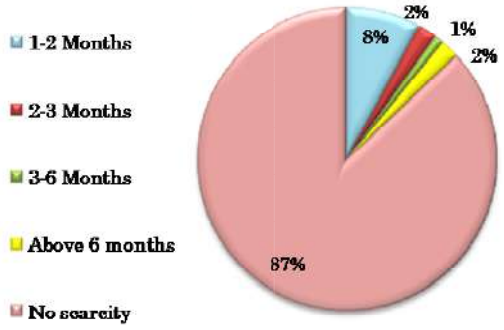
Pallikkunnu near Post Office. The tank has a capacity of 24 LL and is constructed near the old tank and supply is done for both Palikkunnuand Puzhathi (12 LL each). Under the scheme, supply will be shared between the existing consumers as well as the new beneficiaries. The application process is going on so that the updated number of beneficiaries is yet to be determined.

Other than these systems, there are two OHSR tanks each having 25000 L capacities for the colonies Kunnumkai Ambedkar Colony, Poilmotta Ambedkar Colony, Padannathode Chalad Colony with wells as the source. Bleaching is the only treatment carried out there. During summer seasons, there are some issues regarding water scarcity.

During dry months Kannur Municipal Corporation itself provide tanker water to Sangeetha, Thana, Kasankotta, Kodaparamba regions of the Corporation and the neighbouring regions like Chala, Avera and Vattakulam.

12.4 WATER SCARCITY

The Figure.12.2 shows the details of water scarcity in the Corporation area as per the socio-economic survey. The graph reveals that 87% of the population do not face scarcity of drinking water. About 8% population suffers 1-2 months scarcity and 2% population suffers 2-3 months. About 1% population suffers 3-6 months scarcity and 2% population suffers more than 6 months scarcity. Generally about 13% people are facing different types of scarcity.



Source: Socio Economic Survey, 2018

Figure 12.2 Details of Water Scarcity

The public water distribution in Kannur zone is about 8 hrs per day; morning 5 am to 9 am and evening 8 pm to 12 pm. The geography of the zone is in such a way that there are undulations from zero to thirty meter height. The old water supply distribution network laid years back was not able to cover some elevated areas and the scarcity of water occurs in several areas. Kakkad, Thilleri, S N Park, Kodaparamba, Talap, Uppaala Valappu, Doby Lane, Cantonment, Kasanakotta Kunnu, Jannath Nagar and Ayikkara are the places facing severe scarcity of drinking water in Kannur Zone. Salinity issues occur in Kakkad region.

In Pallikunnu zone, the water supply is done once in two days (4 hrs) and the scarcity of water occurs in

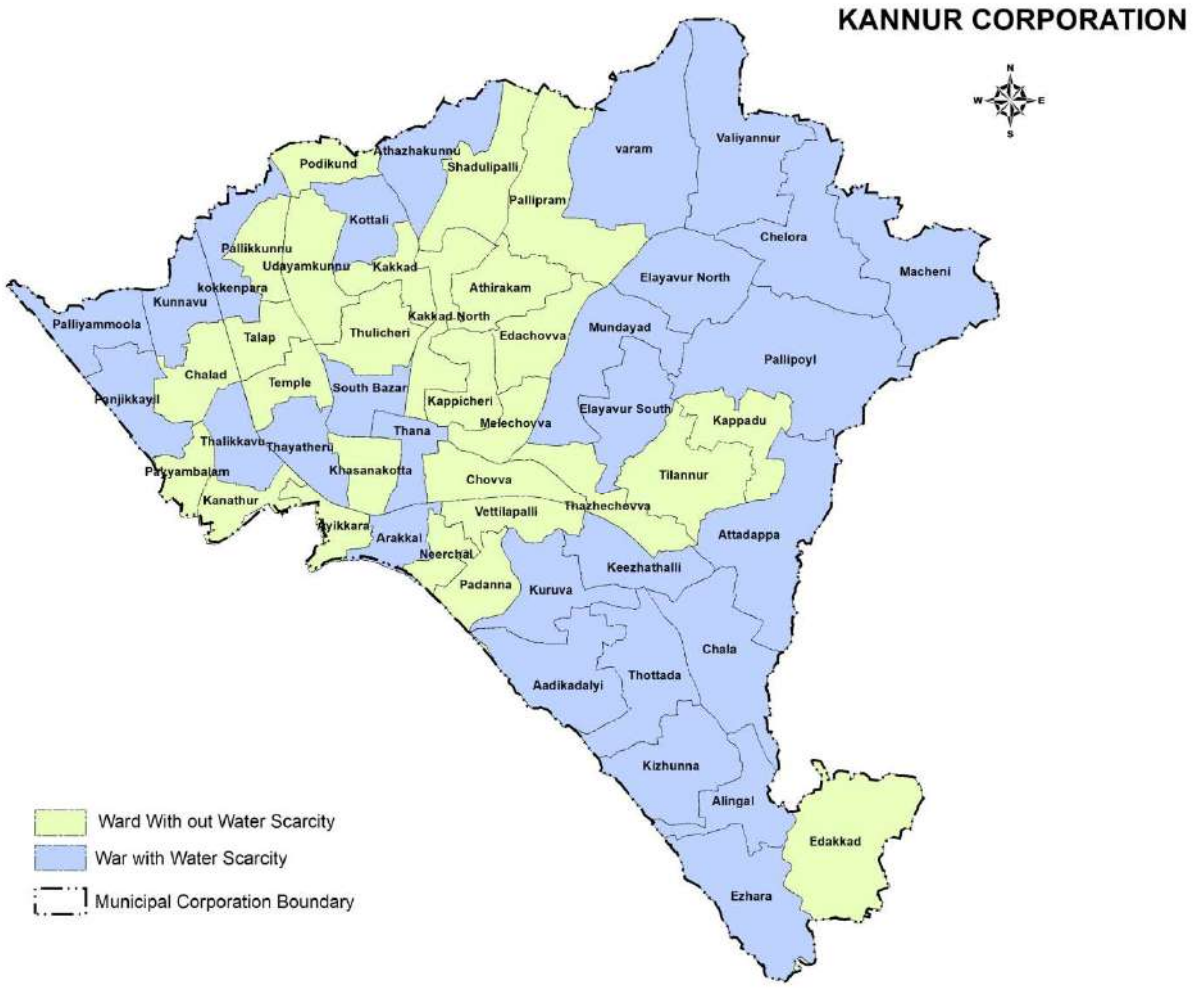


Figure 12.3. Wards facing water scarcity in the city

many parts of the zone such as Chalad, Manal, Kokkenpara, Kunnavu, Palliymoola etc. The issue of salinity also occurs in these areas. In Podikkund Laksham Veedu Colony, the one and only available well is contaminated resulting in scarcity of water. Even though Chelora region is having 24 hrs of water supply, Thankenkunnu, Puliyanchal, Muttolnpara, Vellappara, Varam Kadavu, Chalil Motta of the Chelora zone are facing water scarcity. The salinity issues are there in Varam region.

In Edakkad zone, supply is done once in two days (4 hrs). Chalakunnu Laksham Veedu colony, Attadappa Nalamkutti Kettakalkila as well as the high laying areas of the zone faces scarcity.

In Puzhathi zone, water supply is done for 4 hrs daily. But Podikkund Poyil Valappu, Salem nursery school region and Pullooppi Kadavu also faces water scarcity. Among these, Pullooppi area is having salinity issues. There exists scarcity in high lying areas of Puzhathi zone.

In Elayavoor zone, water supply is done for 4 hrs. In addition to all these, the antiquated network systems cause leakage of water and affect the quality of available water. It also adversely affects the efficiency of the existing water supply network which can also lead to scarcity. The wards facing water scarcity are shown in Figure.12.3.

12.5 ONGOING SCHEMES

- **Japan International Cooperation Agency (JICA) Sponsored Water Supply Scheme (JICA Pattuvam Scheme)**

Japan International Cooperation Agency (JICA) was launched in 2006 under Kerala Water Authority (KWA). The total envisaged capacity is 90 MLD. The source of the project is the reservoir of the Pazhassi irrigation project; the Pazhassi Reservoir with water treatment plant located nearby. This project is in advanced stage of completion and is expected to be commissioned shortly. The project also aims at augmentation and rehabilitation of the existing system. Under this project, reservoirs have been newly constructed for the towns like Pattuvam, Kurumathur, Panniyur, Kuttiyeri, Koovery, Mattul, Kadannappally, Panappuzha, Pariyaram, Ezhome, Kallyasseri, Pappinissery, Cherukunnu, and Kannapuram villages as well as Taliparamba municipality. The responsibility of augmentation, implementation, operation and maintenance including cost recovery are dealt by Kerala Water Authority. Now, it is decided to supply 10 MLD of water for Kannur Corporation area and for that, feeder lines being land up to the proposed OHSR at Jail compound Pallikkunnu near Post Office. From the newly constructed tank which is having a capacity of 24 LL and 12 LL of water is supplied for Palikkunnu and Puzhathi zones each. Under the scheme, supply will be done both for the existing consumers as well as the new beneficiaries.

- **AMRUT (Atal Mission for Rejuvenation and Urban Transformation)**

Under AMRUT Scheme, the following projects have been proposed:

1. Rehabilitation of existing old network, valves, house service connection and inter connections with existing lines and providing flow metres etc. including road reformation charges. By this, the per capita supply may increase from 90 LPCD to 150 LPCD.
2. Enhancement of treatment plant from 30 MLD to 40 MLD including modernisation of existing treatment plant which is expected to increase the per capita supply from 90 LPCD to 100 LPCD.

Laying of gravity main from JICA

Table.12.2 Details of water supply schemes in the Corporation area

Sl. No	Name of Scheme	Zone	Source of water	Implementing Agency	Pump set	Treatment system	Duration of distribution	Availability during summer	No. of beneficiary units				No. of public taps
									Domestic	Non domestic	Special	Industry	
1	Kannur Water Supply Scheme Kannur	1,2, 3,4, 5 & 6	4	1	1	1	1	1	9665	2236	54	25	448
2	WSS to VaramThakkali peedika	4	1	1	1	2	1	1					
3	ARWSS to Edakkad	1	4	1	1	1	3	1	4528	202	62	4	197
4	WSS to Edakkad zone2 Kosormoola	2	1& 4	1	1	2	1	1&2					
5	WSS to Elayavoor	-	4	1	1	1	1	1	4289	350	43	5	111
6	RWSS to Poyilmotta Ambedkar colony	3	1	1	1	2	2	2	40				19
7	RWSS to Padannathode	2	1	1	1	2	2	2	40				10
8	WSS to Puzhathi (Payangodanpaara&Pallikkunnu Tank supply)	3	4	1	1	1	2	1	3661	296	30	2	150
9	WSS to Pallikunnu (Pallikkunnu Tank &Chakkattil peedika tank Supply)	2	4	1	1	1	2	1	2544	188	8	3	112
10	WSS to Anjarakkandi Peralassery& adjoining	4	4	1	1	1	2	1	3150	8	121	3	135

Zone: *Kannur-1, Pallikkunnu-2, Puzhathi-3, Chelora-4, Edakkad -5, Elayavur- 6*

Source of water: *Well- 1; Borewell- 2; Pond- 3; River- 4; Rain harvest- 5; Others- 6*

Implementing agency: *KWA-1,Local body-2,Govt Agencies-3,Private Agencies-4, Others-4*

Pump set:*Electric- 1; Non Electric- 2; No- 3*

Reason for not working:*Work not completed- 1; Work not started- 2; Maintenance needed- 3; Non availability of water- 4; Lack of Electric connection- 4; Others- 5*

Reason for incompletion:*Lack of sufficient fund- 1; Work stopped by contractor- 2; Public protest- 3; Non availability of water- 4; Project abandoned- 5; others- 6*

Treatment system: *Available-1, not available-2*

Duration of distribution:*Daily 24 hours- 1; Daily few hours- 2; Alternate days- 3; One or two days in a week- 4; Now and then-5*

Availability during summer*: Adequate-1, Inadequate-2*

1. Project at Mangattuparamba to Pallikkunnu OHSR of capacity 24 LL for Pallikunnu and Puzhathi providing house connection and inter connection with existing line.
2. Laying Conveyance main/pumping main from Melechovva to OHSR at Edakkad including supply erection of pump sets.

This scheme also decided to construct a 14 LL Capacity OHSR at Thottada of Edakkad Zone in the planning area and the works are completed. Laying of new distribution line and providing new service connections at Elayavoor and Edakkad Zones are also completed.

The details of public water distribution in the planning area are given in the Table.12.2. From that, it is clear that there exist 10 different schemes for public water distribution in the planning area among which only one is covered for all the six zones; Kannur water supply scheme.

scarcity of fund as well as water are some important reasons for the delay in progress. Only 40% of the schemes are providing 24 hours of water distribution and others have intermittent supply. About 40% of the schemes are not having any treatment system thus the quality of the water in such cases are doubtful.

12.6 POTENTIALS AND PROBLEMS

Under AMRUT scheme, there are so many proposals like rehabilitation of existing old network, valves, house service connection and inter connections with existing lines and providing flow metres etc. including road reformation charges, all of which may increase the per capita supply from 90 LPCD to 150 LPCD. Enhancement of treatment plant from 30 MLD to 40 MLD including modernisation of existing treatment plant which may yield an increase in the per capita supply from 90 LPCD to 100 LPCD.Other schemes under

AMRUT are laying of gravity main from JICA project at Mangattuparamba to Pallikkunnu OHSR of capacity 24 LL for Pallikunnu and Puzhathi providing house connection and inter connection with existing line, laying conveyance main/pumping main from Melechovva to OHSR at Edakkad including supply erection of pump sets, construction of a 14 LL capacity OHSR at Thottada of Edakkad Zone, laying of new distribution line and providing new service connections at Elayavoor and Edakkad Zones etc.

Kannur Municipal Corporation itself provide tanker water to Sangeetha, Thana, Kasankotta, Kodaparamba regions of the Corporation area and the neighbouring regions like Chala, Avera and Vattakulam. If these provisions are increased to higher regions as well as places affected by water scarcity due to salinity it will solve most of the drinking water issues in Corporation.

In Kannur Corporation area, ground water is the principal sources of water for domestic use. Those without well mainly depend on Kerala Water Authority. The major source of public water supply in the planning area is the Valappatanam River and Pazhassi reservoir.

The Kannur water supply scheme, which is outdated, needs rehabilitation of transmission lines and strengthening of under sized mains. Inadequate main supply and outdated distribution network are the major problems. Still there are so many regions those require sufficient water supply lines. Thus a well-designed distribution network is to be established urgently to cope with the increasing demand. Palliyamoola, Kunnavu, Elayavoor South, Keezhunna, Thayatheru, Thottada, Ezhara, Vaaram, Elayavoor north, Valiyannoor, Chelora, Panhikkayil, Keezhuthalli, Macheri, Attadappa, Adikadalayi, Chala, Thana, Kuruva, Araykkal, Alinkeel are the wards facing lack of sufficient pipeline facilities. The extension of existing network based on demands without strengthening transmission mains render the distribution network unbalanced.

Another issue the Corporation area is facing is that the available and potential sources are not protected. Most of the wells area are bacteriologically polluted and also found to have faecal contamination. The protection as well as recharge of wells is required. The public wells in the wards of Kokkenpara, Thalikkavu, Athazhakkunnu, Kottali, South bazar, Pallippoyil, Araykkal require artificial recharge immediately.

Krishna Menon College area as well as some parts of Puzhathi zone is located at elevated position and is facing water scarcity. Varam region is having salinity issues in drinking

water. In Elayavoor zone, the very old network systems cause leakage of water and affect the quality of available water as well as the efficiency of the existing water supply network. It leads to scarcity. Leakage issues are also there in several places. So in order to avoid such issues, rearrangement of the distribution network is necessary and the old and damaged AC pipeline in the system has to be replaced with D.I. pipes completely.

Present water tariff is not enough to maintain the scheme. Lack of efficient cost recovery approaches add on to the financial burden. Lack of effective communication and complaint redressing system affects the efficiency of the system.

Legal provisions to establish availability of water supply facility while giving development or building permits, are not in place at present. So demand for water supplying after completion of the project cannot be met. The new buildings in will have to depend on unhygienic sources. Hence regulations to ensure availability of drinking water for major projects from public or private water supply system before granting building permits are to be framed.

Conservation of all existing water sources like ponds and setting up independent water supply schemes would address the water shortage at micro level.

12.7 INFERENCE

The existing water supply network in Kannur Corporation area is insufficient. Inadequate main supply and out dated distribution network are the major problems faced by the planning area. There are so many wards those mainly requiring artificial recharge immediately. Also, there exists scarcity of drinking water in several elevated regions like Krishna Menon College area as well as some parts of Puzhathi zone.

In addition to these, the antiquated network system causes leakage of water and affects the quality of water available. Necessary remedial measures are to be adopted by the authority to provide treated water for domestic uses. The continuous checking of the old pipe network connections is to be done to avoid leakage as they affect the quality of available water as well as the efficiency of the existing water supply network which can also lead to scarcity. The tanker lorry supply is to be increased to higher regions as well as places where water scarcity is affected due to salinity. Proper ground water storage facilities, well water recharging, renovations of ponds or other natural bodies should be done. The idea and relevance of water conservation is to be conveyed properly to the people as we are facing the occurrence of flood in the last two years.

Identification of new sources like desalination plants for use in areas like coastal belts can be explored. Rain water harvesting in all public buildings as well as all large scale building projects has immense potential in the planning area, which shall be compulsorily explored on an urgent basis using policy and enforcement measures. GIS Mapping of Water Supply utility, proper Energy Audit studies, automation of cost recovery mechanisms, Water Quality monitoring using latest equipment, communication strategy development and online complaint registration facilities etc. would help improve the efficiency of the system.

CHAPTER 13

DRAINAGE, SEWERAGE & SOLID WASTE MANAGEMENT

Drainage is the natural or artificial removal of a surface's water and sub - surface water from an area with excess of water. When an area is urbanized, trees and vegetation are removed, the drainage pattern is altered, conveyance is accelerated and the imperviousness of the area is increased because of the construction of residential or commercial structures and roads. Increased imperviousness decreases infiltration with a consequent increase in the volume of runoff. The improvements in a drainage system will help the removal of surface water in the urbanized area faster. Sewerage refers to the infrastructure that conveys sewage. It encompasses components such as receiving drains, manholes, pumping stations, storm overflows and screening chambers of the sanitary sewer. Sewerage ends at the entry to a sewage treatment plant or at the point of discharge into the environment. Solid waste management is the process associated with the control of generation, storage, collection, transportation, treatment and disposal of solid material that is discarded or is no longer useful together with monitoring and regulation of the waste management process. Improper disposal of solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to out breaks of vector borne diseases that are spread by rodents and insects. Solid waste management deals with complex challenges; hence pose various economic, administrative and social problems which need attention.

In this chapter, the details of existing drainage and issues in sewerage and solid waste management system in Kannur Municipal Corporation area are discussed.

13.1 DRAINAGE

13.1.1 ANALYSIS OF EXISTING STATUS

At present, there are so many issues regarding drainage in the Municipal Corporation area.

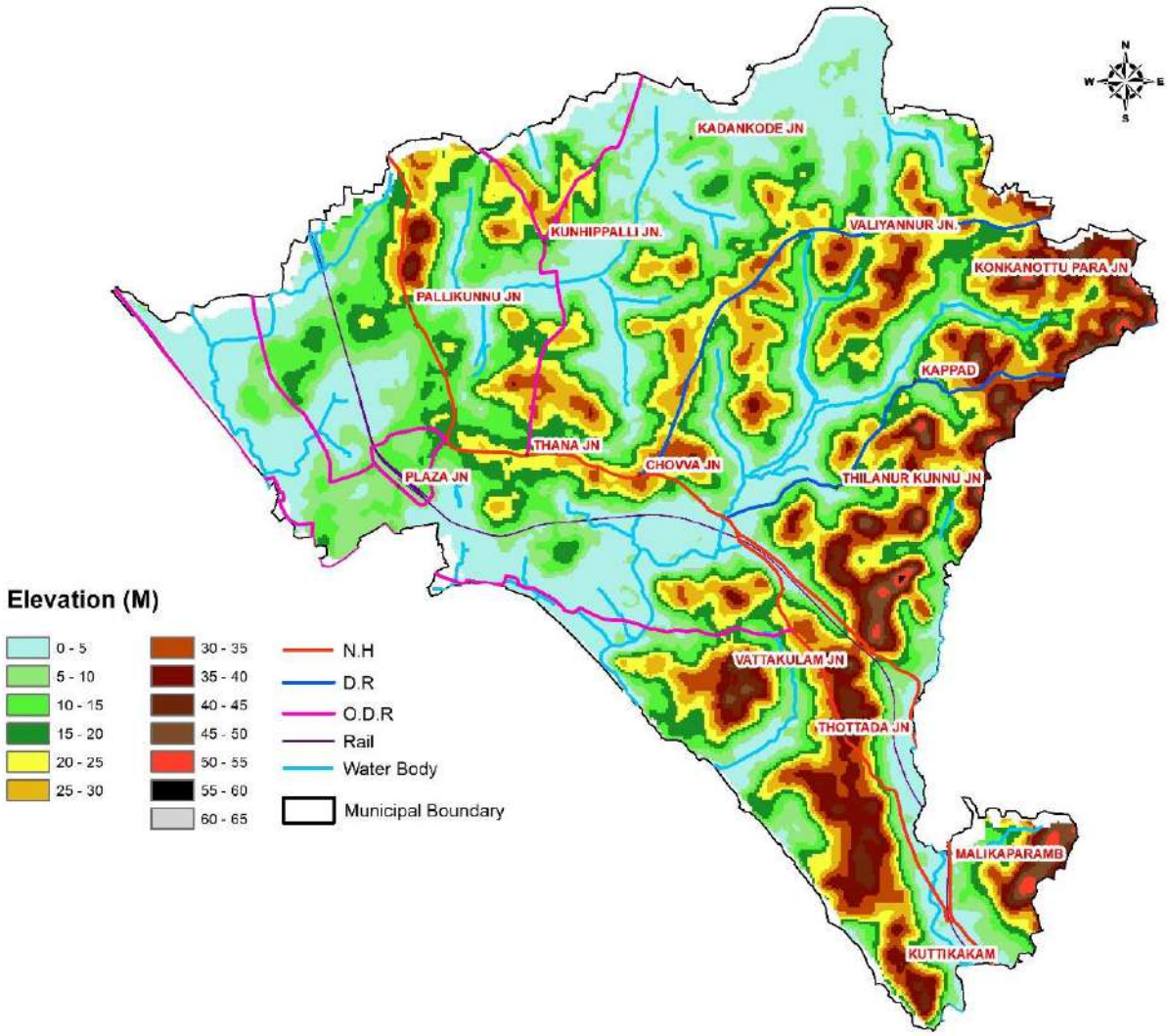


Figure.13.1 Physiography of Kannur Corporation area

Topography

Figure.13.1 shows the topography of the planning area. It reveals that low lying areas are mainly located along the river sides of the Corporation area with an altitude ranging from 0 to 65m above M.S.L (Mean Sea Level) which indicates its good natural drainage condition.

The major rivers flowing through the planning area are Kanampuzha, Kakkad puzha and Kattampally puzha (Varamkadavu and Pullooppikadavu). Thottadapuzha, Ayyarathpuzha (Nadalpuzha) are other minor rivers. Kanampuzha River originates from Ayyappanmala in Munderi Panchayth, once the centre of the Bhoodan Movement. The river flows through Macheri, Vattappoyil, Peringalayi, Kappad, Thilannor, Elayavoor, Thazhe Chovva, before joining the sea at Adikadalayi in Kannur Corporation area.

Pazhassi canal; a major canal is mainly flowing through Puzhathi,

Elayavur and Chelora zones. It is coming under Pazhassi Irrigation Project (PIP) in the Valapattanam River. Other riverlets and canals flowing through the Corporation area are Andathodu, Padannathodu, Ammayithodu, Anjukandythodu, Chalathodu, Mullangandithodu, Varamvayalthodu, Valiyathodu, Cheloravayalthodu, Macheryvayalthodu and Athirakam canal etc.

Even though so many natural drains are there, the planning area has no planned drainage network. The existing drains were designed to cater to the storm water and hence proper flow of water happens only in the rainy season. The road side drains are connected to the natural drains. Most of the road side drains are in seriously damaged condition. Of the existing drains, many of them are not interconnected. However, the connectivity to the main outlets of the existing drains has been lost due to the damage of natural drains. Moreover, there are issues threatening health and environs, due to the discharge of sullage from residences and wastes from hotels into storm water drains frequently. The drains are also filled by wastes and their side walls are damaged. So water becomes stagnant and this restricts the natural flow and creates chance for the breeding of mosquitoes. During the rainy season the unexpected flooding takes place and this causes much difficulty to residents, pedestrians and vehicle traffic. Kakkad area near corporatioin area was flooded during 2019 flood as the Kakkad River, overflowed. Many families in the area were had to be evacuated.

13.1.2 ONGOING PROJECTS

Under AMRUT Scheme by Corporation, there are new proposals for the planning area in drainage system. It includes coverage of storm water drainage network, the construction and rejuvenation of primary drains and secondary drains at Thottadapuzha and its connecting drains, Varam, Varamvayal, Katampallipuzha and their connecting drains. Also, there is a proposal for the construction of sea shore structures at Payyambalam, Thottada, Ammayithodu areas for eliminating sand deposits.

13.1.3 POTENTIALS AND PROBLEMS

Even though the low lying areas are mainly located along the river sides of the Municipal Corporation area with an altitude ranging from 0 to 65m above M.S.L, it indicates the good natural drainage condition of the planning area. But the available road side drains are not designed to carry such large quantities. Thus if proper maintenance as well as construction of new drains are done, it will certainly improve the durability of such roads

and will obstruct the spreading of epidemics due to un hygienic situations.

At present, there is no proper drainage system in the Corporation area. It creates many issues regarding the drainage system. Majority of the road side drains like Muzhathadam, Capitol mall area, Mele Chovva, Sanjay Road, Azhikkodan Nagar, Ramatheru Mandapam, Ambika Road, Irattakkannan Palam, MLA Kumaran Road, Manal – Muthappan Kavu Road, Pamban Raghavan Road, Mundachali Road etc. are in deteriorated condition and are neither covered nor interconnected. Thus the connectivity to the main outlets of the existing drains has been lost. So it is most necessary for Kannur Corporation area to have a well-designed drainage network. The existing storm water drainage network is insufficient and proper maintenance is needed throughout the network. Discharging of waste water and sullage from residences, hotels and other institutions into storm water drains frequently is a health threat to the people and the environment. The drains are have also become stagnant by the filling of wastes and damaged side walls which restricts the natural flow and creates chance for the breeding of mosquitoes. During the rainy season, the unexpected flooding takes place and this causes much difficulty to residents, pedestrians and vehicle traffic. Near Kannur University building, the Railway underpass area is flooded for every rain. Similarly, so many places like Sreepuram, Kakkad etc. are there in the planning area facing such issues. There is no waste- water treatment plant in the planning area and thus creates severe unhygienic situation especially in Padanna area. Also the main riverlets near Idachery, Kappicheri, Kayappuramthodu and Thulichery need construction of side walls.

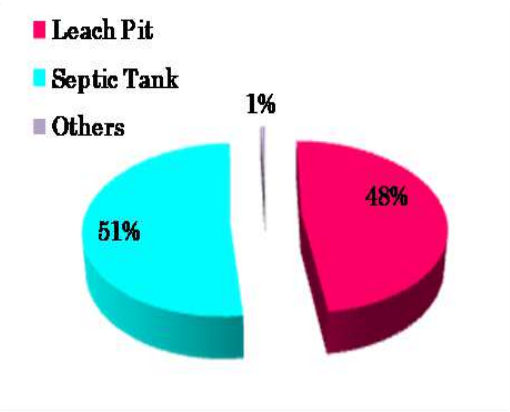
13.2 SEWERAGE SYSTEM

13.2.1 ANALYSIS OF EXISTING STATUS

In the Municipal Corporation area, there is no public sewerage system. Human faeces are the main item of waste. All the houses and commercial as well as institutional establishments depend on on-site sanitation; the collection and treatment of waste is done where it is deposited by means of septic tanks, leach pit etc. The split up of sanitary waste disposal of houses in the Corporation area is shown in Figure.13.2. About 99% of the houses have either septic tanks (51%) or leach pit (48%).

However, there are some cases where discharging of sullage and hotel wastes into storm water drains causing the contamination of the water body that acts as the outlet of those drains. Hence the major water resources of town as well as the

ground water get contaminated due to this misdeed. These open drains act as sewers and as means to dispose of sewage into the canal.



Source: Socio Economic Survey

Figure.13.2 Split up of sanitary waste disposal of houses in the Corporation area

There are so many commercial establishments, restaurants and Corporation owned buildings without any latrine facilities which will be a matter of public concern. The inadequacy of public comfort stations makes the use of open spaces for excretion by the people very common. It creates many hygienic problems and during rainy season, the whole area is spread with remains of human faeces and urine, leading to health hazards.

13.2.2 COMPLETED AND ONGOING PROJETCS

Under AMRUT Scheme by Corporation, there is a proposal for the construction of a Septage Treatment Plant of 0.1 MLD capacity near Chelora Trenching Ground.

Padannapalam Sewage Treatment Plant



A 1 MLD Sewage Treatment Plant with a total length of 12.017 km sewer to take up the sewerage system network has been established at Padannapalam near KSEB substation having a plot area of about 60 cent under AMRUT scheme. It covers the wards of Thalikkavu and Kanathoor. Rotating Media Bioreactor (RMBR) is the method adopted here. The outlet of the plant at Padannapalam is Padannathodu.

In RMBR method, the sewage water from all the shops and institutions enters into a large machine, Rotating Media Bioreactor, which is located inside the STP. The oxidation takes place inside the RMBR and the outlet is connected to an outside tank, where it is treated with alum and stored for the Primary Treatment. When the sedimentation of the wastes takes place after a certain period, the supernatant is carefully removed by pipe to Secondary Treatment chamber, which is a double chamber attached by pipes only. The bottom sediments of the sewage from

the primary treatment chamber are removed by a motor separately and dried under the sun in a sludge trolley for drying. The effluent from the secondary treatment chambers are passed through the sand chamber followed by carbon (charcoal) chamber to the Ozonator, where it is processed and sent to Tertiary Treatment chamber through a pipe, from where, the water is released to creek and river. After drying, the sludge is converted to manure soil which is stored in sacks behind the STP and given to farmers and gardeners. Chlorinated water is sprinkled by the workers in and around the area of STP.

13.2.3 POTENTIALS AND PROBLEMS

Majority of houses and major commercial establishments have constructed septic tanks for disposal of sewage. In spite of the importance of the town, a planned sewerage system is not established there through most essential. Even though some areas have open drains along the roadside, whose purpose was to carry storm water into the canal, they are misused for disposing of sewage into it. The waste water discharged into the natural drains or canals is without any treatment.

Thus the setting up of a sewerage system with sewage treatment plant is the most necessary thing and immediate attention required to be given to insist all establishments to set up toilet facilities with on-site sanitation. Also, it is necessary to provide adequate number of comfort stations at suitable places in this headquarters town in order to keep an environment free of human excretion. It is a major fact of concern that in the areas namely Padanna, Anakkulam and Manjappalam, the ground water is found polluted due to the infiltration of wastewater.

Even though, constructions of new Sewage Treatment Plant near Padannapalam will be very useful, it only covers wards of Thalikkavu and Kanathoor. More Sewage Treatment Plants are to be constructed to cover all the wards.

13.3 SOLID WASTE MANAGEMENT

13.3.1 ANALYSIS OF EXISTING STATUS

Public places, shops, institutions, houses, flats etc. are the major sources of solid wastes in Kannur Municipal Corporation area. The percentage of houses and flats in the Corporation that are having facility of waste treatment at the source is given below in the Figure.13.3.

Even though facilities for solid waste treatment at houses as well as flats are there, the available percentage is just below 20%. Houses in Pallikkunu zone are having the least facilities. Flats in Edakkad,

Chelora and Elayavoor have comparatively higher facilities and Puzhathi and Kannur zones have the least.

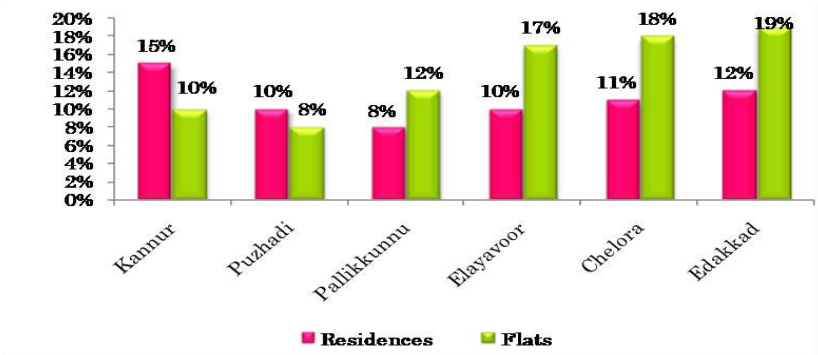


Figure.13.3 Percentage of houses and flats in the Corporation that are having facility of waste treatment

Table.13.1 Details of commercial establishments

Sl. No.	Zone	Number of Commercial Establishments						Total
		Hotels	Bakery	Markets	Tea Shops	Chicken Stalls	Beaf/Mutton Stalls	
1	Puzhadi	12	8	-	16	13	5	54
2	Pallikkunnu	15	18	-	15	2	2	52
3	Elayavoor	11	15	-	13	3	3	45
4	Edakkad	19	21	-	10	10	-	60
5	Chelora	9	19	1	11	4	-	44
6	Kannur	181	48	3	131	26	6	395
Total		**247**	**129**	**4**	**201**	**50**	**16**	**650**

The details of commercial establishments that produce solid wastes in each zone are shown in Table.13.1. Apart from these, there are five fish markets; Ayikkara fish market, Kakkad fish market, Varam fish market, South Bazar and Kannur Central market. Also, one slaughter house attached with a bio gas plant is there in Kakkad town of Puzhathi zone.

The sanitation facilities in these markets are very poor. Due to lack of maintenance, these places also face unhygienic situations. The total quantity of waste generated in the planning area is about 100 ton/day among which non-biodegradable solid waste is about 28 ton/day.

A. COLLECTION

Kannur Corporation area is well known for its scenically beautiful beaches. Also, due to its cultural heritage, it is a major tourist destination too. Tourism activities are a major factor in waste generation. The wastes generally consist of organic waste and high quantum of plastic bottles used by the tourists, which are non-bio degradable. Apart from these tourist spots, there are so many places where wastes are generating.

Solid waste is collected from various parts of the town. There are several waste collecting points in different parts of the Corporation by providing bins and containers for the collection of waste. Primary collection of non-biodegradable wastes in the Corporation area is done through Haritha Karmasena and it is mainly concentrated in twenty town wards. These collected wastes are sent to the collection centre; Material Collection Facility (MCF) located at Chelora.

MCF is a centre where non - combustible solid waste can be temporarily stored by the local body or any person authorized by the ULB to facilitate segregation, sorting and recovery of various components of waste by informal sector of waste pickers or any other work force engaged for the purpose before the waste is delivered or taken up for its processing or disposal. There are 5 sanctioned MCFs among which, only three are functioning; those at Chelora, Edakkad and Thayyil areas. Due to lack of space, MCFs at Parakandi and Puzhathi have not yet started.

The daily trips of collection are being done in the core planning area, others on alternate days. The wastes in these points are collected by means Corporation vehicles. The list of vehicles in the town for solid waste collection in the Corporation area is shown in Table.13.2. The facility for waste collection should be improved by means of providing more vehicles as well as labourers.

Table.13.2 List of Vehicles in city used for solid waste collection

Sl. No.	Name of vehicle	Numbers
1	Dumper Placer	1
2	JCB Excavator	2
3	Hitachi Excavator	1
4	Mini Tipper	1
5	Tractor	1
6	Auto	3
7	Mini Lorry	1
8	Lorry	1

B. DISPOSAL

The disposal of solid waste from houses is shown in Figure.13.4 which indicates that people use municipal collection facilities, garbage bins, open

space, own compound etc. for the disposal of solid wastes. About 97% of the houses use their own compound for waste disposal. About 2% use garbage while only 1% uses municipal collection facility.



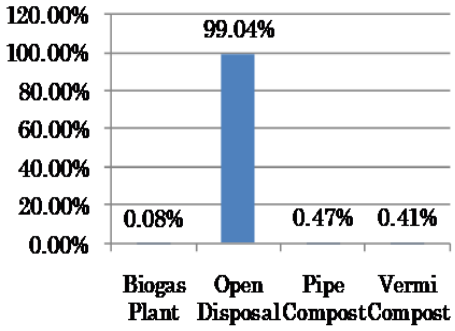
Source: Socio Economic Survey, 2018

Figure.13.4 Disposal of solid waste from houses

C. TREATMENT

I. Treatment of Waste Disposed in Own Compound

The wastes disposed at own compound is treated by means of bio gas plants, pipe compost, vermi compost and landfills.



Source: Socio Economic Survey, 2018

Figure.13.5 Details of waste treatment method at own compound

About 99.04% of the houses dispose the waste simply throwing into the compound without any treatment. Only very less percentage are adopting treatment methods like gas plants, pipe compost, vermi compost. The graphical representation is shown in Figure.13.5.

II. Treatment of Waste collected by Corporation

- **Bio Degradable waste**

Thumboormuzhi Model Treatment

For bio degradable waste, Thumboormuzhi model treatment is used.



Thumboormuzhi model aerobic systems near stadium corner, Kannur

It is one of the world's most efficient and cost effective waste management models. This model adopts layering technique and a single layer may hold as much as 500 kg of wet organic waste. Nature friendly microbial consortiums and other materials are used to begin the compost process.

This model is one of the most successfully run waste transformation models.

In Kannur Corporation area, five Thumboormuzhi model aerobic composting systems are proposed for Payyambalam, Parakkandi and Stadium area. Among these, one plant is successfully functioning in Stadium corner having a capacity of two tons (4 units having 50 kg), but its capacity is very less and is limited for selected public buildings (Corporation building and court) to use. For supervision, a night squad is working to ensure whether any illegal dumping of waste occurs there.

- **Non Bio Degradable Waste**

For the disposal and treatment of non-bio degradable wastes, Kannur Corporation has a trenching site at Chelora with an extent of 23 Acres. A total of 5 ton of segregated non-biodegradable waste is transported to the site per day. Haritha Karma Sena is handling the segregation of waste in trenching ground.



MRF unit at Chelora

But it is not efficient enough right now they deposit or dump both organic and inorganic wastes (like rexine) in the trenching ground without any treatment.

Only Chelora plant has Material Recycling Facility (MRF). The wastes collected from houses after cleaning are segregated and then shredded into small pieces by means of plastic shredding unit and then transferred into MRF. It contains Services of Plastics Processing Machineries and recycling process. Here, the segregated as well as cleaned plastic wastes are converted into small pieces by means of plastic shredding units. The other non-bio degradable wastes that are not treated are just dumped at the Chelora trenching ground.

Street sweeping in main roads is done daily whereas in sub roads, it is done on alternate days. The collected wastes are transferred to the vehicle operated by the Corporation to secondary collection points and then to Chelora trenching ground. The sweepers are employed on contract basis and the entire collection is done manually.

- **E-Waste**

E-Waste is collected by Haritha Karma Sena. It is transported to Chelora trenching ground.

13.3.2 ONGOING PROJECTS

- Waste **- to - energy plant**

Under AMRUT Scheme by Corporation, to ensure effective solid waste management, the Kannur Corporation has installed a state-of-the-art machinery at the Chelora Trenching Ground to remove the waste accumulated over the past 60 years using bio-mining. The plant has been set up at Chelora under the State government's initiative to set up waste-to-energy plants in seven districts. Kerala State Industrial Development Corporation Ltd. (KSIDC) is the nodal agency for establishing the waste-to-energy plants. This project is similar to waste to energy plant at Jabalpur in Madhya Pradesh. The waste is being burnt at a large burner in the plant and the gas generated thus was emitted after treatment. The other salient features include Flue Gas Treatment and water and ash treatment, which ensures that all the waste generated as a part of the processes are also treated before emission.

- **Aerated (Turned) Windrow Composting Unit**

An aerated windrow composting unit having an area of 500 sq. m is also proposed at Chelora. This method is to accommodate large volumes of diverse wastes, including yard trimmings, grease, liquids and animal by-products (such as fish and poultry wastes) with frequent turning and careful monitoring. This method is suitable for large quantities, such as that generated by entire communities and collected by Corporation.

13.3.3 POTENTIALS AND PROBLEMS

In Kannur Municipal Corporation area, even though there are some waste collection facilities (monthly only), all of the wards are not covered. Hence there arises the need for decentralised waste management system in the planning area irrespective of the distance from the town centre, by incorporating the help of any private agency. Since Thumboormuzhi model of waste treatment plant is a very widely accepted method of treatment, its use in the Corporation area will be very effective. But the coverage of all the wards is to be ensured.

Thumboormuzhi model of waste treatment plant can be implemented in every ward. To treat bio degradable wastes, ring compost or pipe compost bin can be provided. The MRF at Chelora is not working effectively and its proper functioning should be ensured. Also, door to door waste collection centres are not there in all the wards; hence it is necessary to provide door to door waste collection facilities under payment which can be utilised for the maintenance of the utensils.

13.4 INFERENCE

Kannur Corporation area is blessed with three major and two minor rivers and the physiographic conditions are good for drainage as the low lying areas are mainly located along the water bodies. But proper maintenance of existing drains in the planning area is very less. Hence the urban storm water drainage collection and conveyance systems have to be designed in such a way that flooding is avoided and transportation is not adversely affected. It is a proven fact that there should be a good drainage system for roads and it will certainly improve the durability of such roads. For that not only workers, but also machinery facilities should be provided. For that new schemes should be established. There shall be a good network of drainage by providing culverts, conduits etc. The unwanted land use conversions are to be strictly prohibited which affect the natural drainage of the area. The natural drains are very useful as they are helpful in collection of storm water during rains to permit percolation into the soil and helps in slow discharge into the natural stream.

Improved sanitation play a major role in the overall well-being of the people, with a significant bearing on the infant mortality rate, death rate, longevity and productivity. Lack of sufficient comfort stations makes the Corporation area unhygienic. In the areas like Padanna, Anakkulam and Manjappalam, the ground water is found polluted due to the infiltration of wastewater. The newly established Sewage Treatment Plant near Padannapalam only covers wards of Thalikkavu and Kanathoor. Hence it is necessary to cover all the wards and for that, more Sewage Treatment Plants are to be constructed.

Waste management is important because improperly stored refuse can cause health, safety and economic problems. The available waste collection facilities are not covered for all the wards. Hence decentralised waste management system all over the Corporation area is to be initiated. Localized collection and processing techniques need to be introduced. Thumboormuzhi model of waste treatment plant can be implemented in every ward. To treat bio degradable wastes, ring compost or pipe compost bin can be provided. The efficiency of the existing treatment facilities like MRF at Chelora is to be ensured. Advanced technologies like of Vermi Composting may be introduced. E-Waste treatment plant should be established at Chelora.

CHAPTER 14

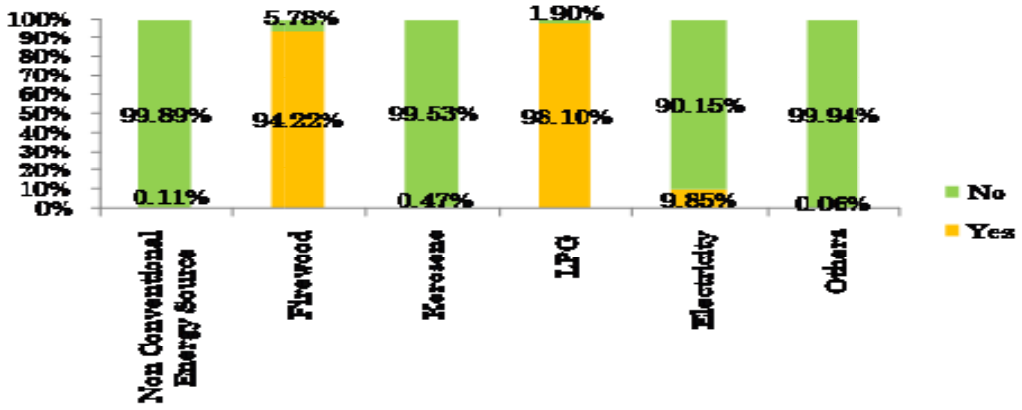
ENERGY

Energy is one of the most fundamental parts of our universe. It is essential to human life and all living organisms. It is the basic necessity for the economic development of a country. The forms of energy are electricity, solar energy, wind energy, nuclear energy, biomass energy (energy from plants), geothermal energy, fossil fuels (coal, oil and natural gas), hydro power, ocean energy and nuclear energy. Energy provides us with light, heat, refrigeration, communication, elevators, entertainment etc. Thus energy use can be divided into four economic sectors such as residential, commercial, transportation, and industrial. Energy supply and consumption practices are deeply influenced by the social structures in which they take place.

The chapter deals with the existing status of energy sources and their potentials and problems in Kannur Corporation.

14.1 EXISTING STATUS

As per socio economic survey (2018), the data regarding the usage of existing energy sources for cooking uses in the Corporation area is shown in Figure.14.1 which indicates that fire wood and LPG are mainly used for cooking purposes. Also, it is clear that the conventional energy sources are less in usage.

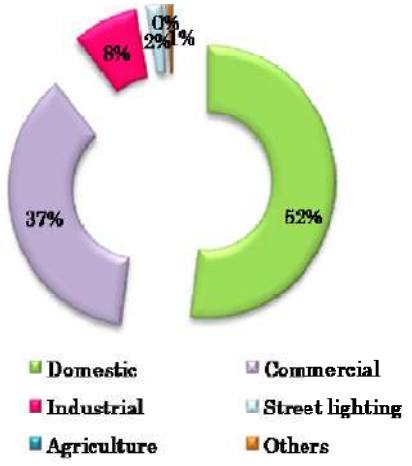


Source: Socio economic survey, 2018

Figure.14.1 Existing energy sources for cooking uses in the Corporation area

14.1.1 CONSUMPTION

The main source of power consumption in Corporation area is electricity. Electrical energy is popular because it is so easily transmitted from one place to another, and can be converted into other forms of energy easily. The survival of industrial undertakings and our social structures depends primarily upon low cost and uninterrupted supply of electrical energy. In fact, the advancement of a country is measured in terms of per capita consumption of electrical energy. Thus energy sector in the planning area is mainly handled by Kerala State Electricity Board (KSEB) which is the chief agency of the state to generate, transmit and distribute power to the consumers. Based on the purpose, the power consumption is categorized as domestic, industrial, commercial, construction, street lights and agriculture.



Source: Socio Economic Survey, 2018

Figure.14.2 Monthly electrical consumption in the Corporation area

Monthly average energy consumption details of Kannur Municipal Corporation area for the year 2018 is obtained from different sections of KSEB and it is graphically shown in Figure.14.2. From the figure, it is clear that about 52% of energy is utilized for domestic purposes followed by commercial (37%) and industrial uses (8%). About 2% of electrical energy is consumed by street lights whereas only very less percentage of energy is used for agriculture and other activities. Lower value of consumption for agriculture reveals that the planning area has lower trend in agriculture activities.

14.1.2 CONNECTION AND DISTRIBUTION

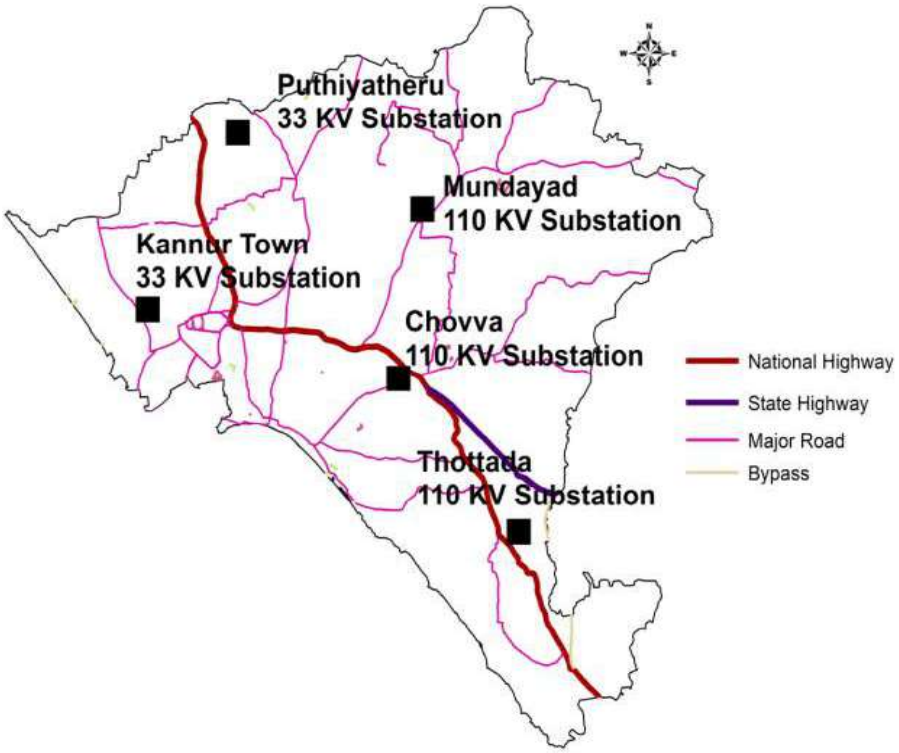
The entire Corporation area falls under the sections Kannur, Pallikkunnu, Chovva, Azhikode, Thayyil, Burnassery and Echur. The details of the sections and location of substations are given below in the Table. 14.1. Altogether, there are five sub stations that serve power transmission for the whole Corporation area among which, Azhikode is located outside the boundary. Moreover, all houses in the planning area are electrified. The location of different substations within the Corporation area is shown in Figure.14.3.

Table.14.1 Details of different sections under KSEB

KSEB Section	Kannur	Pallikunnu	Chovva	Azhikode	Thayyil	Burnassery	Echur
Number of Substations	2	1	3	1	2	3	1
Location of substation (details)	*Chovva 110 kv Substaion *Mundayad 110 kv substation	*Puthiyatheru 33 kV Substation (Podikkundu- Kottali Road)	*Mundayad 110 kv substation *Chovva 110 kv substation *Thottada 33kv substation	*Azhikode 110 KV Substation	*Chovva 110kv Substaion *Thottada substation	*Chovva 110 kv Substation *110 kv Substation Azhikode *Kannur Town 33kv substation	*Mundayad 110 kv substation



Puthiyatheru 33 kV Substation (Podikkundu- Kottali Road)



Source: KSEB Sections

Figure.14.3 Location of different substations

14.1.3 OTHER SOURCES OF ENERGY

Other sources of energy in the Corporation area include petroleum products and solar energy panels. Kannur, Thayyil, Azhikode and Burnasseri sections are using solar panels. The use of non-conventional energy did not have much popularity and thus the use is very minimal. Some residential occupancy is using biogas plants for cooking gas. People are not aware of the vast possibilities of non-conventional energy sources and it points out the need to conduct various programmes for creating the awareness in them. The details of solar panels are given below in the Table.14.2.

There is only one electric charging station at Chovva. At present, there are 25 petrol pumps and they are widely distributed along the major road networks catering to the need of transportation, industrial and commercial sectors.

14.2 DEVELOPMENT POTENTIALS AND PROBLEMS

Now days, the consumption of energy is increasing every year which is mainly in the domestic and commercial sectors. In the Corporation area, as per 2018 data, both domestic and industrial sectors together constitute about 89 per cent of the

Table.14.2 Details of Solar Panels in the Corporation area

Sl. No.	Name of Section	Domestic	Commercial	Industrial	Street lighting	Agriculture	Others
1	Kannur	43	7	0	0	0	4
2	Thayyil	10	1	0	0	0	0
3	Azhikode	17	5	0	0	0	0
4	Burnasseri	15	6	0	0	0	0

Source: KSEB Sections

total energy consumption. Domestic use itself consumes about 52% whereas commercial sectors consume 37%.

Considering the rapid pace of urbanization, increasing affluence and a fast growing services sector, the possibilities of the demand letting up in these sectors seems to be remote. Also, the Corporation area is the administrative headquarters of the district and it contains many commercial nodes.

Since the planning area is having 17 km coastal stretch, there arises the scope of tidal power as energy source. The feasibility of the project has to be checked out. There is one electric charging station in the Corporation area.

The proposed waste to energy plant at Chelora under the State Government's initiative to set up waste-to-energy plants in seven districts will be a great achievement for the planning area. KSIDC is the nodal agency for establishing the waste-to-energy plants. This project is similar to waste to energy plant at Jabalpur in Madhya Pradesh, The waste is being burnt at a large burner in the plant and the gas generated thus was emitted after treatment.

The street lights are not covered for the entire planning area. The rate of consumption, especially in domestic sector is increasing even though energy efficient products like LED bulbs are available in the market. It is due to the increase in number of houses and the usage of high Watt equipments like air conditioners (AC), Fridge, Washing machine etc. Even in small commercial and service centres, like ATM's, high capacity air conditions are installed which consumes more units. It results in the increased power consumption.

More electric charging stations should be established in the planning area to reduce the carbon dioxide emissions.

14.3 INFERENCE

At present, the power supply is done through 6 substations under 7 sections. In the modern world, while considering the rapid pace of urbanization, increasing affluence and a fast growing services sector, the possibilities of the demand for energy consumption is very high.

The installation and use of solar panels and bio gas plants in houses should be encouraged so that domestic consumption of electrical energy can be reduced to a great extent. For effective supply of electricity, underground cable system can be implemented. The proposed waste to energy plant at Chelora will be a great attempt by the government which can be implemented ward wise in small scale later. The 17 km coastal stretch can be utilised as tidal power. The feasibility studies should be carried out.

The wastage of energy can be reduced by bringing awareness among the public about proper utilization and conservation of electrical energy. The Corporation and K.S.E.B together can encourage the use of LED bulbs by supplying it to the consumers.

Green house technology in building makes it environmentally responsible and resource efficient throughout its life cycle by efficiently using energy, water and other resources. The Corporation should give serious consideration to find ways to decrease energy consumption. Thus it is necessary to go for modern techniques in construction to reduce heat generation and net zero energy building. To make this possible, various passive elements such as louvers, fins and extended roof coverings etc. can be added to reduce solar heat gain. Large openings at vantage locations increase ventilation and comfort to the end- user.

CHAPTER 15

EDUCATION

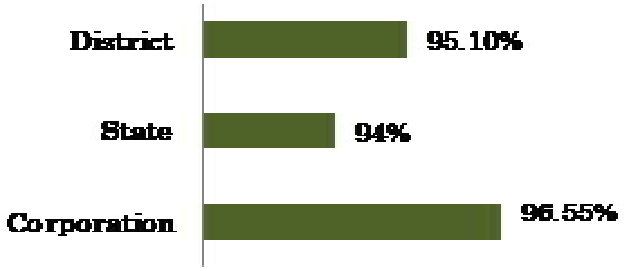
Educational area is one of the essential areas of interest in various development schemes of the State Government. Right to education is the fundamental right of any human being. In the context of right to education act, it can be said that Kerala State has fulfilled the need for establishment of schools within the area prescribed except in forest areas.

This chapter mainly deals with the existing development scenario, levels of education, existing problems, potentials and spatial distribution of major institutions in Kannur Corporation, their facilities and ownership.

15.1 ANALYSIS OF EXISTING STATUS

Level of Education

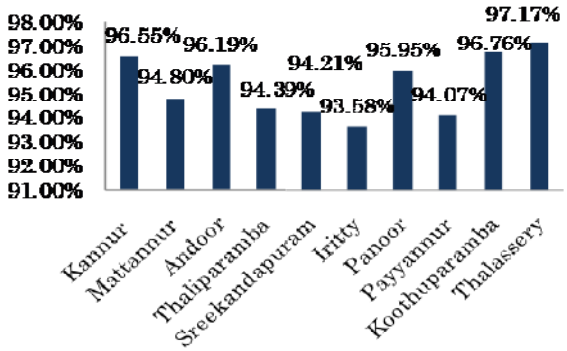
As per 2011 Census, the comparison of literacy rate of Kannur Corporation with the state and Kannur district is shown in Figure.15.1. It indicates that the Corporation area (96.55%) has a higher literacy rate when compared to the state (94%) and district (95.1%) average value.



Source: Census Data, 2011

Figure.15.1 Comparisons of literacy rate with state and district

The comparison of literacy rate of Kannur Corporation with other Municipal Town bodies in the district is shown in Figure.15.2 and from that, it is clear that the planning area has 3rd rank.



Source: Census Data, 2011

Figure.15.2 Comparison of literacy rate with other municipal towns in Kannur district

The first position is for Thalassery followed by Koothuparamba. All the urban local bodies have a literacy rate above 93% which shows the higher educational status of the district.



Source: Census Data, 2001 & 2011

Figure.15.3 Year wise comparison of male and female literacy rate

The year wise comparison of male and female literacy rate of the planning area is shown in Figure.15.3. This reveals that, the gap between male literacy rate and female literacy rate has decreased over the decade.

15.2 EDUCATIONAL STATUS

The present educational status of Kannur Corporation area as per socio economic survey conducted in the year 2018 is shown in Figure.15.4. The survey reveals that the majority of people come under high school educated group. Even though the percentage of illiterate population is very less, the lower percentage of degree educated population shows the backwardness in the educational status.

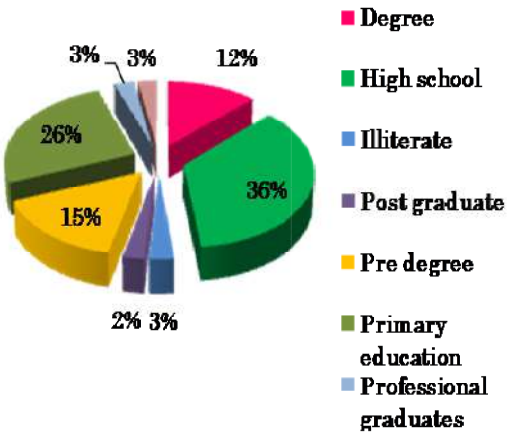


Figure.15.4 Present educational status of Kannur Corporation area

15.3 EDUCATIONAL INSTITUTIONS

There are 126 schools among which 23 are government schools, 76 aided schools and 27 unaided schools. Among these, 4 are pre-primary, 49 LP schools, 42 UP schools, 3 high schools (High School only), 25 higher secondary schools, 1 technical high school and 2 vocational higher secondary schools.

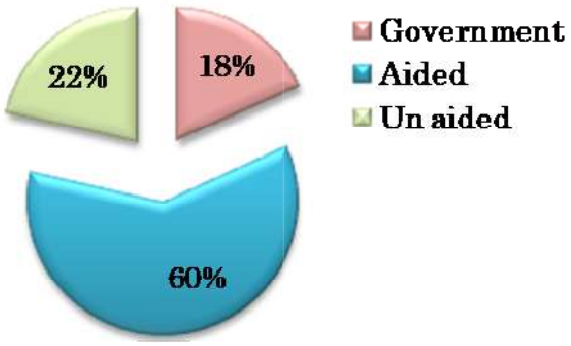


Figure.15.5 Ownership of schools

The ownership of the schools is shown in Figure.15.5. It is clear that the majority of the schools are aided and government schools are very less than the unaided schools in the planning area.

15.3.1 PRIMARY SCHOOLS

The total number of primary schools in the Corporation area is 49. Two of them have pre-primary section too. To analyse the adequacy of primary schools with respect to the service areas, a maximum distance of 1 km is to be assumed as the convenient distance for a child to reach school without any difficulty.

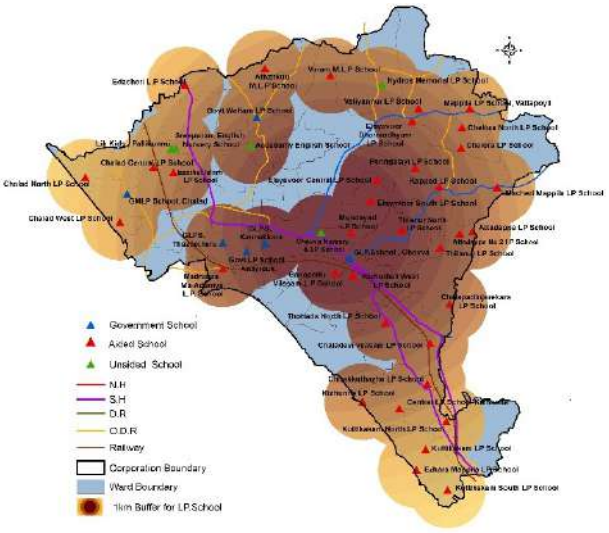


Figure.15.6 Spatial distributions of primary schools and their service area

The spatial distribution of primary schools with their service area is shown in Figure.15.6. From that, it is clear that in some areas, schools are less when compared to other areas indicating that the distribution of schools is not even. Also, almost all the parts of the planning area is serviced by primary education.

15.3.2 HIGH SCHOOLS

The total number of high schools in the Corporation area is 4 (High School only). Two of them have pre-primary as well as primary sections. Among the 4, one is Government Technical High school and three are unaided schools.

The spatial distribution of high schools indicating their uneven distribution is shown in Figure.15.7.

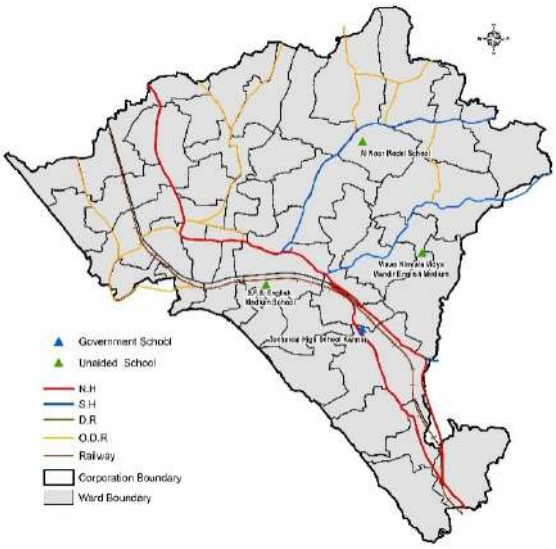


Figure.15.7 Distribution of high schools in Kannur Corporation area

15.3.3 HIGHER SECONDARY SCHOOLS

In the planning area, there are 27 higher secondary schools. 11 of them

are primary to higher secondary section. Out of these, 8 schools are in government sector, 9 are in aided and 10 are in unaided sectors. Among the 8 government schools, 2 are VHSS. There is a Kendriya Vidyalaya in the containment area.

To analyse the adequacy of higher secondary schools with respect to the service areas, a maximum distance of 2 km is to be assumed as the convenient distance for students to reach school without any difficulty. The service area of each school is shown in Figure.15.8. While analysing the map, it is clear that the influence of higher secondary schools is less in Edakkad zone compared to other areas.

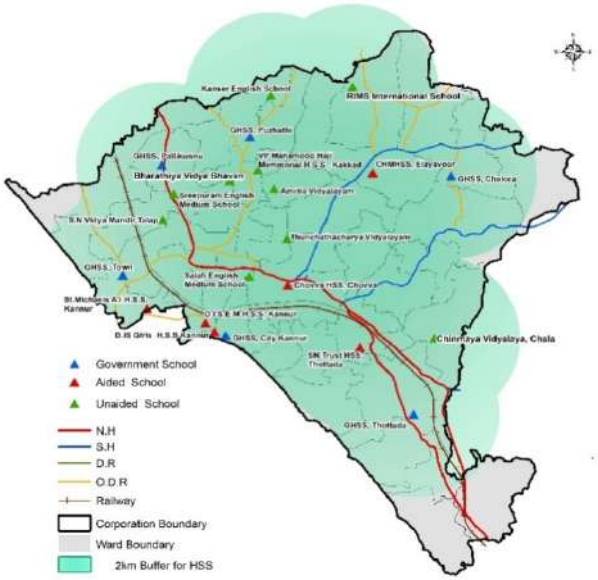


Figure.15.8 Spatial distribution of higher secondary schools and their service area

15.3.4 SPECIAL SCHOOLS

Caps Special School and Ashrayam Special School are the two special schools for mentally challenged students in the Corporation area. Caps Special School, established in 2004 consists of grades from 1 to 8. It is co-educational and doesn't have an attached pre-primary section. Ashrayam Special School, located at Thottada was founded in 1980.

15.3.5 HIGHER EDUCATIONAL INSTITUTIONS

Kannur University

Kannur University was established by the act 22 of 1996 of Kerala Legislative Assembly. The act envisages that the University shall establish, maintain, manage and develop campuses at Kannur, Kasargod, Mananthavady, Payannur, Thalassery, Kanhangad and such other places as are necessary for providing study and research facilities to promote advance knowledge in Science and Technology and other relevant disciplines.

The administrative section of Kannur University is located at Thavakkara. The academic sections of the university are located at Mangattuparamba, Payyannur, Edat, Palayod and Neeleswaram.

Arts and Science Colleges

There exist 6 arts and science colleges among which one is in Government sector, one is aided and

four are private. The location of different arts and science colleges in the Corporation area is shown in the Figure.15.9.

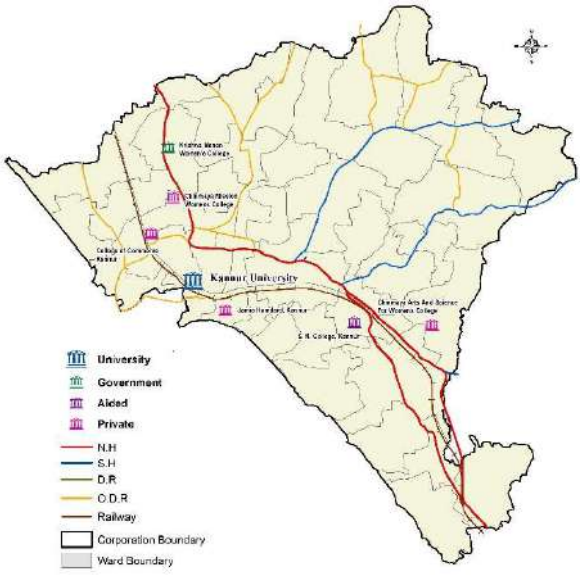


Figure.15.9 Locations of Arts and Science Colleges in Kannur Corporation area

- **Krishna Menon Memorial Government Women's College**

Krishna Menon Memorial Government Women's College, Kannur at Palikkunnu which is affiliated to Kannur University was established in 1975. It offers courses in the streams of Arts and Science with degrees like BA, BSc and MA.

- **S.N College**

Sree Narayana College Kannur at Thottada which is affiliated to Kannur University was established in 1960. It offers course across the streams of Arts, Science, Commerce & Banking, Management and degrees like BSc, BA, BBM, B.Com and MSc.



S.N College

- **Chinmaya Mission College for Women**

Chinmaya Misson College for women Kannur at Talap was established in 1975. Like any other Chinmaya Edcational Institutions, this college also offers education with a difference through the Chinmaya Vision Programme (CVP). Courses offered are BBA, BCA, BSc Maths, Commerce and English.

- **Chinmaya Arts and Science College for Women (CASCW)**

The college is located at Chala, Thottada and it runs under "Chinmaya Mission" which was established in 1951. Chinmaya Mission offers education through Chinmaya Vision Program which helps in integrating the best culture with academic excellence. The college

was established in 2003. It is affiliated to Kannur University.

- **Jamiya Hamdard, Kannur**

Jamia Hamdard, Kannur Campus is ideally located in the heart of Kannur City, which is conducive for academic, intellectual and physical pursuits. The Campus is located very near to Arakkal Palace and Kannur Cantonment and is only a few kilometers away from Kannur Railway Station, Kannur New Bus Stand, Kannur University Thavakkara Campus.

The Kannur Campus came into being because of the tremendous efforts taken by Late E. Ahamed Sahib, Former Union Minister; Government of India. His foresight and vision resulted in this Campus, where he selflessly channelized his personal efforts for the cause of education to all. He had the conviction that it was the only way to bring sustained betterment to the society, particularly the marginalized sections of Muslim community in North Malabar.

- **College of Commerce**

College of Commerce Kannur, near old bus stand is a famous as well as important private college of Kerala, was established in the year 1990. At the initial stage, the institute functioned in a rented building and now, it has its own building with so many class rooms accommodating digital workstation, science lab, library and separate rooms for members of faculty in various disciplines. College offers coaching classes on commerce, science, computer and different languages. It is one of the famous private colleges in Kannur district. They offer various courses like B. Com, accounting etc. The institute is very easily accessible to public transport.

Professional Colleges

In Kannur Corporation, 13 professional Colleges are there. Among these, eight are government and five are private colleges. The location of different professional colleges in the Corporation area is shown in the Figure.15.10.

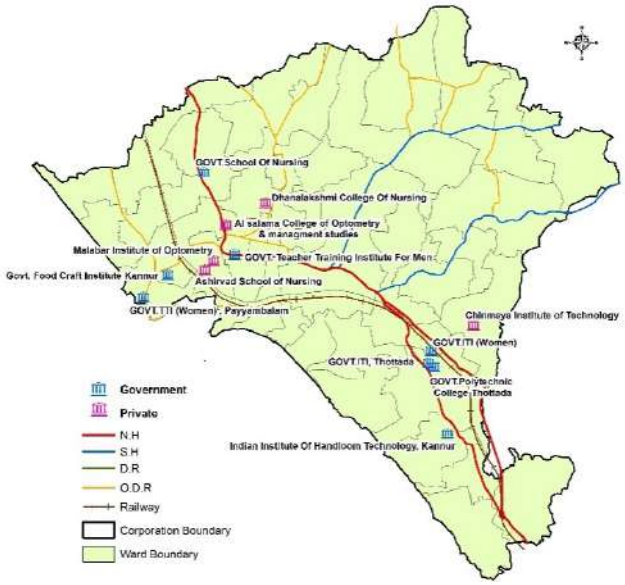


Figure.15.10 Locations of different Professional Colleges in Kannur Corporation area



Govt. Polytechnic College

- **Government Polytechnic College, Kannur**

Govt. Polytechnic College, Kannur is situated at Thottada in Kannur Coporation. It was started in the year 1958 with a view to create ample chances for the educated people to technical training and hence to increase the pool of specially trained, employed technicians.

In the beginning there were 3 year diploma courses in Civil Engineering, Mechanical Engineering and Electrical Engineering. Kannur being the land of looms and lores the 3 year diploma in Textile Technology was started Wood & Paper Technology was started later in the year 1982. A new diploma course in Electronics was started in 1987. At present there are 6 Diploma courses. Govt. Polytechnic College, Kannur is one of the biggest Institutions in Kannur District with hostel facility for boys.

- **Government Teacher Training Institute (TTI) for Women**

Government TTI for Women, Kannur is located at Payyambalam. It was established in the year 1951.

- **Government Teacher Training Institute for Men**

Government Teacher Training Institute for Men, Kannur is located opposite Chamber of commerce.

- **Government School of Nursing**

Government School of Nursing Kannur is located at Sreepuram. It was established in the year 1973

- **Government Industrial Training Institute (ITI) at Thottada**

Government ITI Kannur at Thottada which is affiliated to National Council for Vocational Training; Govt. of India (NCVT) was established on 1957. ITI KANNUR fosters a vision of academic excellence in keeping pace with the changing times.

- **Government Industrial Training Institute (ITI) for Women**

Government ITI for Women, Kannur located at Thottada, 8 km away from Kannur Bus Stand was established in 1990. The institute was affiliated to NCVT and set up with a view to uplift the women by imparting

skill development training in various areas.

- **Government Food Craft Institute**

The Food Craft Institute was founded by the Government of India and the Government of Kerala, for the purpose of imparting training to promising young men and women in various trades of the Hotel and Tourism industry. Diploma in Food & Beverage Service and Diploma in Food Production are the main courses offered here.

- **Institute of Handloom Technology**

Institute of Handloom Technology Kannur which is located at Kizhunna is an autonomous Institute under Ministry of Industries, Government of Kerala. It is the nodal agency in the State for providing Science and Technology of the traditional Handloom Textile Industry. The Institute was established and registered under the Societies Registration Act of 1860 in the year 1987 in the name of Institute of Handloom and Textile Technology (IHTT).

- **Chinmaya Institute of Techology**

Chinmaya Institute of Technology, Kannur, is a Professional Institute established by Chinmaya Mission Educational and Cultural Trust, Kannur as a Golden Jubilee project of Chinmaya Movement. Chinmaya Mission offers education with a difference through Chinmaya Vision Programme which integrates the best in our culture and philosophy with academic excellence.

Other Nursing and Paramedical Institutions

- Ashirvad School of Nursing at Thavakkara
- Dhanalakshmi College of Nursing at Kakkad
- Al Salama College of Optometry and Management Studies
- Malabar Institute of Optometry

Other Main Educational Institutions Influencing the Corporation

- Kannur Medical College, Anjarakkandy
- School of Physical Education and Sports Sciences
- Govt. Medical College, Pariyaram
- Govt. Ayurveda College Pariyaram
- School of Information Science and Technology
- SIMET College of Nursing, Mangattuparamba
- A K G Memorial Co-operative College of Nursing at Mavilayi
- Koyili College of Nursing, Kattampally

- Govt. Brennen College, Thalassery
- Sir Syed College, Thaliparamba
- Payyannur College, Edat
- NAM College at Kallikkandy
- Nirmalagiri College, Kuthuparamba
- M.G College at Iritty
- Palayad University Campus
- Kannur Engineering College
- National Institute for Fashion Technology, Dharmashala

15.4 POTENTIALS AND PROBLEMS

In the past, the number of literate females was less when compared to literate males in certain pockets of the Corporation area. In the recent years, the authorities concerned have started to resolve these problems.

As per 2001 Census, the literacy rate of the Corporation area was 95.09% of which the literacy rate of male and female are 97.62% and 92.86% respectively. At present, for Kannur Corporation area, the literacy rate is 96.55%; male and female literacy rates are 97.87% and 95.44% respectively. From this, it is clear that the male and female gap in literacy has decreased over the years in the planning area.

A Lot of educational institutions such as ITI, ITI (women), S.N College, Chinmaya Institute of Technology, Chinmaya Arts and Science College for Women (CASCW), National Institute of Handloom and Textile Technology are located at Thottada. Schools like THS, SN Trust Higher Secondary School, St. Francis EM School etc. are also located there. Therefore Thottada is known as the Educational Head Quarters of Kannur district.

One of the major issues faced by the students is the inadequacy of infrastructural facilities like play grounds, boundary walls for even primary schools, smart class rooms, computer labs, science labs, library, kitchen, urinals, water closets waste disposal facility etc., especially in Government schools. Among these good improvements have been made in matters like smart classrooms and toilets and computer labs.

Even though the educational system is improving now a days, the problem in the educational sector of the planning area is the gradual decrease in the number of students in government and government aided schools. The reason cited is the attraction of boards like CBSE/ICSE schools and their educational standard. For improving the educational standard of government schools, special coaching is being provided for students who are weaker in studies. Provision of infrastructural facilities is essential in majority of schools and the existing facilities require to be improved to meet the need.

15.5 INFERENCE

Since a lot of important educational institutions are there, Thottada is known as the educational headquarters of the district. Hence the area can be converted into education hub as education hubs are the newest development in the international higher education landscape. Because, now a day's cities are trying to position themselves as reputed centers of excellence in higher education and research.

The decreased male and female literacy rate indicates that the female education has increased in the planning area. Even though the educational system is improving now days, the problem in the educational sector of the planning area is the gradual decreasing tendency in the number of students in government and government aided schools should be avoided by providing better infrastructure facilities of the schools that can ensure both academic as well social wellbeing of the Corporation area. It can also ensure the up gradation of educational standard of the Government schools.

CHAPTER 16

HEALTH

Health, as defined by the World Health Organization (WHO), is "a state of complete physical, mental and social well - being and not merely the absence of diseases or infirmity". Good health is an essential requirement for the enjoyment of every aspect of life. The organized provision of services like prevention, treatment and management of illness and preservation of mental and physical well-being may constitute a health care system.

Health is one of the important goals of sustainable development and it is to ensure healthy lives and promote wellbeing for all the ages. Thus to solve the issues in the health sector of Kerala, the state government has initiated many projects under the scheme "Ardram", which is a part of "Nava Kerala Mission".

This chapter analyses the existing status of health sector in Kannur Corporation area including common diseases and health care infrastructure. The chapter further discusses the agencies involved, existing potentials and problems and puts forward the inference as development suggestions.

16.1 ANALYSIS OF EXISTING SCENARIO

The total population of the Corporation area is 2,32,486 and among this, 1,07,016 are men and 1,25,470 are women. As per Vikasana Report 2017-2022, the total number of child death during 2017-2018 is 12 and that of maternal death is 66. The neonatal death during the same period is 7.

Within the Corporation area, five primary health centres, one urban primary health centre, five government ayurveda dispensaries, five government homeo dispensaries are there. District Ayurveda hospital at Thana and District Homeo hospital at South Bazar are within the Corporation area boundary. Also, twenty one private hospitals as well as sixty five private clinics are there.

Urban PHC Maidanappally, PHC Chelora, PHC Edakkad, PHC Elayavoor, PHC PAllikunnu and PHC Puzhathi are the primary health centres in the planning area.

Govt. Homeo Dispensary Thayyil, NHM Ayush PHC Kappad, Govt. Homeo Dispensary Edakkad, Govt.

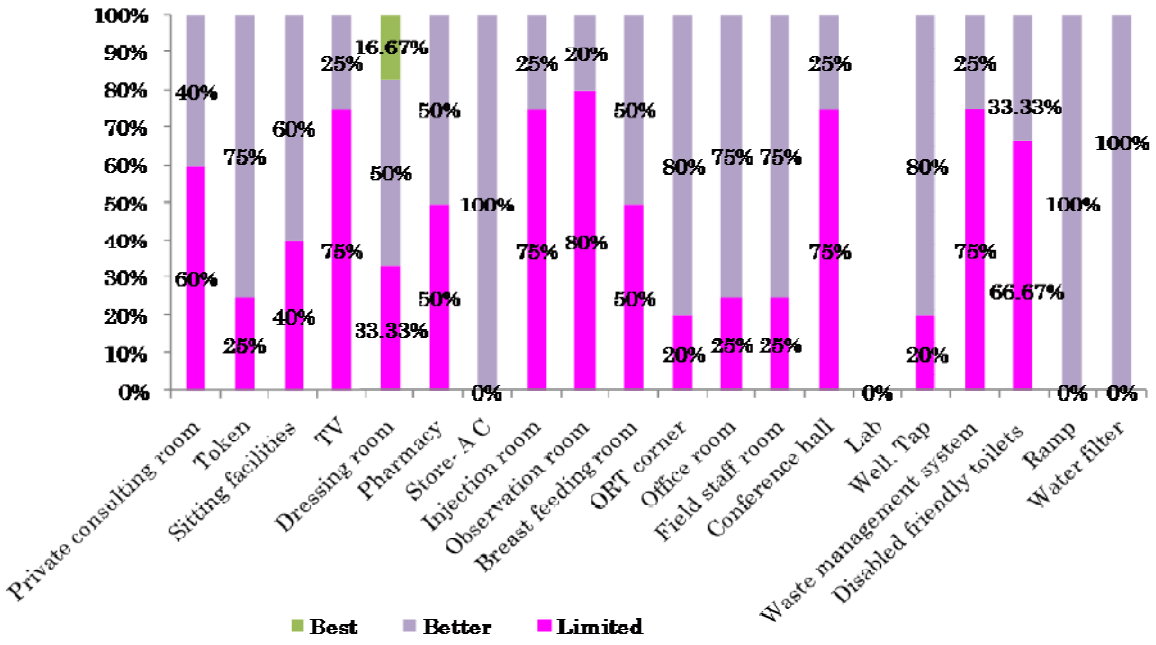
Homeo Dispensary Elayavoor and Govt. Homeo Dispensary Pallikkunnu are are the five homeo dispensaries in the Municipal Corporation area.

Analysis of existing scenario in health sector of Kannur Corporation includes the spatial distribution of various hospitals, the basic infrastructural facilities, primary health centres and private medical institutions.

It is estimated that more than 1.5 lakh people depend on the PHC's in the Corporation area every year. But the physical infrastructure of these PHCs is not up to the required limit and the details of their physical infrastructure are shown in Figure.16.1. There is no Laboratory facility and the available facilities are just limited.

16.1.1 MAJOR HOSPITALS IN KANNUR CORPORATION AREA

The total number of health care institutions in the Municipal Corporation area is 131. Among these, 78 are allopathic and 29 are Ayurvedic. The numbers of homeo and siddha hospitals are 23 and 1 respectively. Kannur District Hospital is located in the Cantonment area. Kannur District Ayurveda Hospital is at Thana.



Source: Vikasana Report, 2017-2022

Figure.16.1 Details of Physical Infrastructure of PHC's in the Corporation area

There are many private medical institutions in the Corporation area. Some like AKG memorial co-operative hospital, Koyli Hospital, Dhanalaxmi Hospital, Speciality Hospital, Ashirvad Hospital, etc. are in the core of the Corporation. Aster MIMS and BMH Gimcare are corporate hospitals in the Corporation area. There are several eye hospitals also in the Corporation area.

The spatial distribution of major hospitals in the Corporation area is shown in Figure.16.2.

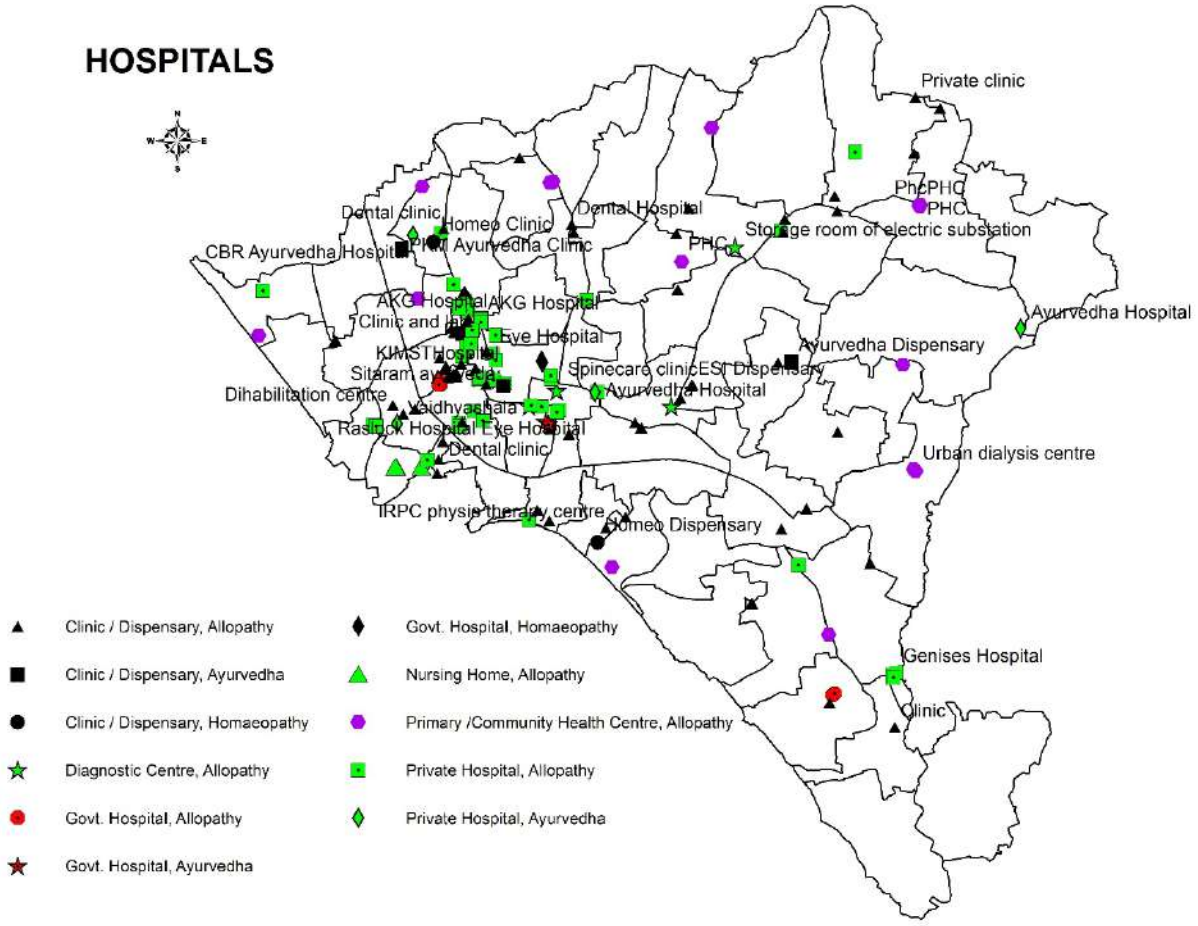


Figure.16.2 Details of Physical Infrastructure of PHC's in the Corporation area

Government Hospitals in the Corporation area

- **District Hospital, Kannur**

Kannur district hospital is located in the Cantonment area. Experienced doctors as well as good facilities and modern medical equipments has transformed it into a super speciality hospital. There are 416 beds functioning and 616 are sanctioned to be opened. The number of doctors working there are 64. General

medicine, Surgery, Gynaecology, Paediatrics, Ophthalmology, PMR, Anaesthesia, ENT, Ortho Paediatrics, Dermatology, Psychology, Forensic, Radio diagnosis, Chest diseases, Blood bank facilities are there in the hospital. Recently a separate block for male patients has been inaugurated.



Kannur District Hospital

- **District Ayurveda Hospital, Thana**

The District Ayurveda hospital, Thana is working with 6 doctors and 33 supporting staffs. There are 16 pay wards providing 100 beds. Facilities for all Ayurvedic treatments are there in the hospital.

- **District Homeo Hospital, South Bazar**

Government Homeo Hospital in South Bazar Road, Kannur is known for offering excellent patient care. The clinic is located centrally in South Bazar Road, a prominent locality in the city. There is no dearth of public modes of transport to reach the clinic from all major areas of the city. The hospital is having 3 doctors with 6 supporting staffs providing 25 beds.

- **Private Hospitals in Corporation**

The details of some important hospitals in Kannur Corporation are shown in Table.16.1.

Table.16.1 Details of various hospitals in Kannur Corporation area

Sl. No.	Name of Hospital	Facilities	No. of doctors	No. of beds
Allopathic Hospitals				
1	AKG Hospital	Hospitals with advanced diagnostic facilities like CT scan, EEG	46	450
2	Koyli Hospital	Hospitals with advanced diagnostic facilities like CT scan, EEG	46	350
3	Fathima Hospital	Hospital with single OT	5	28
4	Speciality Hospital	Hospitals with advanced diagnostic facilities like CT scan, EEG	31	100

5	Dhanalakshmi Hospital	Hospitals with advanced diagnostic facilities like CT scan, EEG	41	150
6	KIMST Hospital	Hospital with single OT	7	45
7	Ashoka Hospital	Hospitals with more than one OT	19	50
8	JJS Kannur Medical Centre	Hospital with single OT	3	21
9	Mother and Child Hospital	Hospital with single OT	8	40
10	MadhavaraoScindia	Hospital with single OT	6	13
11	Ashirvad Hospital	Hospitals with more than one OT	16	50
12	ESI Hospital	OT, Lab, X-Ray	16	50
13	MAKS Satellite Medical Centre	Hospitals with 24 hours service	5	18
14	Sree Chand Speciality Hospital	Hospitals with advanced diagnostic facilities like CT scan, EEG	30	300
15	GIMCARE Hospital	Super speciality Hospital	24	500
16	SM Hospital	Hospitals with 24 hours service	6	0
17	Chaithanya Hospital	Hospitals with 24 hours service	1	0
18	Raslock Hospital	Hospitals with 24 hours service	1	0
19	Alukal Nursing Home	Hospitals with 24 hours service	1	10
20	West Coast Nursing Home	Hospital with single OT	2	24
21	Varam hospital	Hospitals with 24 hours service	1	8
22	Al Noor Medicare	Hospitals with 24 hours service	1	13
23	Al - Salama Eye Hospital	Clinics only OP	7	0
24	Malabar Eye Clinic	Clinics only OP	2	0
25	Jyothis Eye Care Hospital	Clinics only OP	14	0
26	I Trust Eye Care	Clinics only OP	3	0
27	Vasan Eye Care Hospital	Clinics only OP	3	0
28	Vasan Dental Hospital	Clinics only OP	5	0
29	Dr.Shenoy's Dental Care	Clinics only OP	14	0
30	New Madhavi Dental Care	Clinics only OP	3	0
31	Kumars Dental Speciality Centre	Clinics only OP	3	0
32	Dente dental clinic	Clinics only OP	4	0

33	Katookkaren Dental Clinic	Clinics only OP	3	0
34	Dr. Naveen's Dental Care	Clinics only OP	9	0
35	Pearl Dent	Clinics only OP	7	0
36	Denta Care and Dental Speciality Centre	Clinics only OP	3	0
37	Royal Multy Speciality Dental Clinic	Clinics only OP	3	0
38	Oral Care	Clinics only OP	4	0
		Ayurveda Hospitals		
1	Amrutham Aryavidya Pharmacy	Panchakarma, Steam bath, Shirodhara unit, Dharapathi, ARC	3	10
2	Apthasree Ayurvedha Hospital	Marma, Panch Karma, Life Style Disease, Steam bath etc.	2	12
3	Vydhya's Ayurvedha Hospital	Pancha karma, Steam Bath,SthreeRoga, Vasthi etc.	2	4
4	P K Krishnan Vaidyar Ayurvedic Clinic	Ayurveda Treatment	2	0
5	Swastic Ayurvedic Dental Clinic	SthreeRoga, Life Style Disease, Marma, Sauna Bath, Panchakarma theatre, Steam bath apparatus, Sirodhara Unit, Dharapathi, Sitz Bath Unit, Ksheeradhooma apparatus, Vasthi etc.	4	0
6	Herbal Heritage Care	Infertlity Treatment	2	0
7	KVM Ayurvedic Hospital	Marma, Panchakarma, sthreeRoga, life style disease, pharmacologist, panchakarma theatre, Stame bath apparatus, siroddhara unit, dharavathi, ksheeradoomam apparatus, Vasthi etc.	3	0
8	Sreedhareeyam	Salakya	1	0
9	Arogya Sahakarana Ayurveda Hospital	Panchakarma	3	0
10	Tapasya Ayurveda clinic	Panchakarma, Steam bath, Shirodhara unit, Dharapathi, Vasthi etc.	2	0
11	Smrithi Ayurvedha Hospital And Research Centre	Marma, Sthree Roga, Panchakarma etc.	2	0

Homeopathic Hospitals				
1	Reinsi Homeo Clinic	Homoeo Treatment	2	0
2	Apple Homeopathy	Physiotherapy	3	0
3	Adithya Institute of Homoeopathic Medical Science	Homoeo Treatment	4	0
4	Madhava Homeo Clinic	Homoeo Treatment	2	0
Siddha Hospitals				
1	Vaidhyasramam Panchakarma Chikitsalayam	Marma, Sthree Roga, Life Style Disease	1	0

16.2 HEALTH ISSUES IN THE CORPORATION AREA

16.2.1 EPIDEMICS

Major epidemics in the Municipal Corporation area for the last five years are shown in Table.16.2. From the table, it is clear that the presence of waterborne diseases like Diarrhoea, Jaundice and Typhoid in the planning area shows the unavailability of safe drinking water in hotels as well as institutions. For drinking purpose, most of the people in the Corporation area depend on private wells and KWA pipe connections. There are so many families facing drinking water issues. So the provision of safe drinking water will be a solution to eradicate such waterborne diseases. Mosquito borne diseases like malaria and dengue fever are reported every year which shows the lack of hygienic conditions in the planning area

Also, the presence of Leptospirosis reveals that the presence of rodents is increasing in the Corporation area due to the lack of proper waste management systems.

16.2.2 LIFE STYLE DISEASES

The details of life style diseases for the last five years in the Corporation area are shown in Table.16.3 which indicate that, the rampant modernisation and urbanisation, drastic lifestyle changes, alcohol and tobacco abuse, affinity for white-collar jobs, unhealthy eating patterns, low priority for physical exercise leading to obesity and high levels of stress, are mainly the reason for the rise of such diseases like cardiac diseases, hyper tension, diabetes, cancer etc.

Table.16.2 Major Epidemics in the Corporation area for the last five years

Disease Name	2011	2012	2013	2014	2015
Dengue fever	18	36	60	31	55
Chikungunya	62	0	0	0	1
Malaria	8	15	21	20	9
Jaundice	10	37	100	10	14
Typhoid	4	10	7	28	4
Diarrhoea	297	319	339	418	386
Measles	2	1	3	10	29
Chickenpox	55	63	65	88	85
Scabies	62	55	50	59	60
Mumps	19	15	21	19	25
Leptospirosis	8	9	9	9	7

Source: Vikasana Report, 2017-2022

The increased number of cancer diseases is also seen in the planning area. Cancer can be reduced if the diagnose and treatment are done in time. At the primary stage the cost of treatments are comparatively less. Also, it is necessary to consider thyroid related issues which are also increasing in the Corporation area.

Life expectancy is the average number of years a person is expected to live. It varies across regions, time periods and age groups. If the number of people of age group 60 is increasing, the life expectancy is increasing proportionally.

Table.16.3 Life style diseases for the last five years in the Corporation area

Name of disease	2011	2012	2013	2014	2015
Cardiac disease	254	252	256	278	551
Stroke	167	167	186	272	161
Cancer	116	100	111	112	145
COPD	260	285	282	419	595
Asthma	308	332	306	325	335
Hyper tension	5142	5243	5627	5707	8566

Diabetes	4663	4610	4794	4915	7226
Kidney failure	38	35	36	37	40
Liver cirrhosis	9	9	14	10	14
IDD	22	26	31	24	21
Mental disease	10	14	12	15	16
Others	9854	9932	10370	10578	10687

Source: Vikasana Report, 2017-2022

In the Municipal Corporation area, about 16% of the total population are coming under this age group. Also, as the general trend, percentage of females in one age group of 50 and above is more than that of the male population.

In the Corporation area, about more than 2000 migrant labourers are there and most of them are working in hotels and factories. In most of the places, they are facing difficulties in basic needs. Malaria, filariasis, leprosy, tuberculosis etc. are commonly seen in these people and therefore the registration as well as the healthcare of these groups should be done regularly.

Patients, those registered under "SANTHVANA" scheme, require home care, physiotherapy etc. But there is a lack of sufficient number of physiotherapists.

16.2.3 COVID-19

During the first wave of COVID-19 infections, Kerala successfully managed to contain the pandemic. As a result, the Kerala model of managing the COVID-19 pandemic was celebrated as a success story across the globe. But Kerala failed to control the spread during second wave of COVID-19 infections. While rest of India recovered from the second wave, Kerala struggled to bring the pandemic under control. The table 16.4 shows the number of COVID-19 cases and deaths that occurred under Kannur Corporation Area.

Table.16.4 COVID-19 Cases and Death in Kannur Corporation area

	2020	**2021**	**2022 (till 31-05-2022)**
Covid-19 cases	3475	22850	10072
Covid-19 death	62	416	56

Source: DMO Kannur

16.3 POTENTIALS AND PROBLEMS

In the Municipal Corporation area, there are 131 health care institutions. Among these, 78 are allopathic and 29 Ayurvedic. The numbers of homeo and siddha hospitals are 23 and 1 respectively. Apart from these,

Kannur District Hospital has been upgraded to a super speciality hospital with specialist doctors, modern equipments and infrastructure. The Corporation area has five primary health centres, one urban primary health centre, five government ayurveda dispensaries, and five government homeo dispensaries.

There are schemes like Pradhana Manthri Mathru Vandana Yojana (PMMVY), ICDS (Integrated Child Development Services) etc. for improving nutritional and health status of children in the age group of 0-6 years and pregnant women and lactating mothers through Anganvadis. Apart from these, cash incentives are transferred to them. But as per Vikasana Report 2017-2022, the total number of child death during 2017-2018 is 12 and that of maternal death is 66. The neonatal death during the same period is 7. The statistics shows that some part of the Corporation area faces lack of sufficient healthcare facilities. Thus it should be ensured that the facilities are provided to all areas.

Healthcare industry in Kannur District stands for rapid changes in all respect so as to offer high calibre quality services with utmost dedication to the people. Even though there are several private hospitals, several reputed paramedical establishments like pathological laboratories, scanning centres etc. availability within or just outside the Corporation limits; they are not affordable to the economically weaker section of the society.

The regular maintenance of the hospital buildings is another problem that requires attention. The existing HQ hospital can be developed by enhancing the health care amenities and the number of beds. Government dispensaries, PHC's are facing issues like lack of sufficient medicines, drinking water, laboratories, waste management systems, electric connections, compound walls, cold storage etc.

There is only one super speciality hospital in the Corporation area, GIMCARE hospital at Chala. The Aster MIMS hospital at Chala which is located in Chembilode Panchayat is very close to the Corporation boundary. Apart from these two private super speciality hospitals which are within or just outside the planning area, are not easily accessible for low income groups. So the District Hospital should be further developed with all modern facilities. At present, the patients normally choose to go to super speciality hospitals in the nearby districts or Mangalore in Karnataka.

The two medical colleges in the district, one at Pariyaram and the other at Anjarakkandy, are located 30 to 20 km respectively away from the planning area. The presence of waterborne diseases like Diarrhoea,

Jaundice and Typhoid in the Corporation area shows the unavailability safe drinking water in hotels as well as institutions.

Longevity and changes in life style in the city have contributed to the growth of chronic and degenerative diseases also referred to as non-communicable diseases. These include diseases such as heart disease, stroke, high blood pressure, cancer and diabetes. Hyper tension is another major issue which leads to heart attacks, stroke and kidney failure. It is a lifelong disease and needs careful and sensible management throughout life. For that, open gyms can be proposed to develop a healthy future.

Alcohol related diseases are growing as ever. Domestic violence is also on the increase due to high alcohol consumption. Chronic alcohol use can lead to adverse immunological consequences resulting in poor response to medication and high mortality.

Kerala's surveillance and control measures against the diseases like NIPAH and COVID-19 at state level, district level and local self-government Institution level are achievements in health sector. In the upcoming years, the need for rehabilitation centres is very important for providing isolation facilities.

16.4 INFERENCE

The vision of Kerala health department is to develop the state with quality health care, affordable and acceptable to all and its mission is prevention, control and management of communicable, non-communicable and life style diseases, disaster management, healthy pollution free environment, nurturing a mind-set among the public to identify health needs and utilize health services by implementing various national health programmes. The strategy is by adopting primary health care approach based on the principles of equity, inter - sectoral co-ordination and community participation.

The basic infrastructure of the government dispensaries and PHCs are not up to the needs and they should be improved in the Corporation area. Kannur district hospital is located in the Cantonment area, which is very close to the planning area boundary. It can be developed by enhancing the health care amenities and the number of beds.

The insufficiency and inefficiency in health care available at government hospitals and clinics encourage the booming of private hospitals. As the people belonging to economically weaker section of the society cannot afford to have medical care from private hospitals, the infrastructural and service conditions of government hospitals have to be improved. The

only one super speciality hospital in the Corporation area is under private ownership. Hence it is necessary to develop the District Hospital with more infrastructures, Specialist doctors, so that good free medical care is given to the low income groups of the planning area.

The child death, maternal death and neonatal death during 2017-2018 show shows that some part of the Corporation area faces lack of sufficient healthcare facilities or lack of nutritious food. Thus it should be ensure that the facilities are provided to all categories of people.

The presence of waterborne diseases like Diarrhoea, Jaundice and Typhoid in the Corporation shows the unavailability safe drinking water in hotels as well as institutions. Since most of the people in the planning area depend on private wells and KWA pipe connections for drinking purpose, the provision of safe drinking water will be a solution to eradicate such waterborne diseases. The spreading of communicable diseases is the result of lack of clean environment. Hence city sanitation is an important fact in enhancing the health sector of the town.

As life style diseases are increasing in the Corporation area, new interventions are required to create awareness in the people about the causes and prevention of life style diseases. Also, it is necessary to frame new schemes for providing facilities for physical exercise. Open gyms will cater to the needs of even common people .

Cancer is another major disease that affects all sections of human population. So apart from Govt. Medical College Kannur and Malabar Cancer Research Centre at Thalassery, there is a scope is necessary for a cancer research centre in the Corporation area.

Establishment of new rehabilitation centres will be more useful in the future to provide isolation facilities to fight against Pandemics like NIPAH, COVID-19 etc.

CHAPTER 17

HOUSING

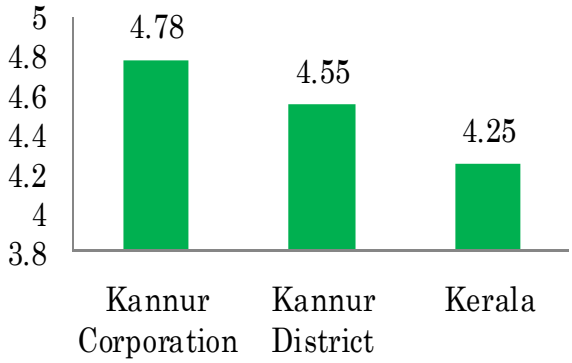
Shelter is the basic human requirement that needs to be met on priority basis. Housing sector is employment intensive because it generates employment during its construction period and also during its life for proper maintenance. The demand for housing increases due to growth of population, rapid pace of industrialization and urbanization and the emergence of nuclear families. Adequate housing includes secure land title, access to basic services, like water and sanitation, sufficient space and shelter. Housing is one of the strongest instruments we have in breaking the cycle of poverty. It is very important for carving out any future city development scenario.

The chapter provides a detailed overview of the existing housing scenario in the city in terms of present housing stock, quality of housing, details of flats, recognized as well as notified slums, potentials and problems of the housing sector etc.

17.1 EXISTING STATUS

17.1.1 HOUSE HOLD SIZE

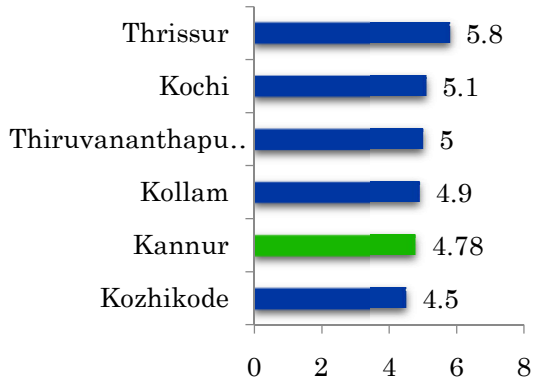
Household size is the number of members in a private household. Household size in Kannur Corporation area is compared with district and state and its graphical representation is shown in Figure.17.1. From the figure, it is clear that the planning area has a greater value (4.78) when compared to both Kannur district (4.55) and Kerala State (4.25).



Source: Census 2011

Figure.17.1 Household size comparison with district and state

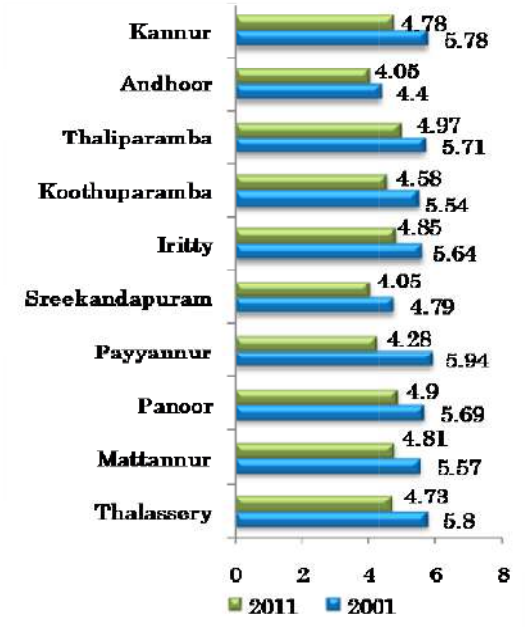
The comparison of household size in the planning area with other Corporation areas of the state is shown in Figure.17.2. Among the six Corporation areas, Kannur ranks fifth position followed by Thrissur, Kochi, Thiruvananthapuram, and Kollam.



Source: Census 2011

Figure 17.2 Household size comparisons with other Municipal Corporations

The trend in the variation of household size in Kannur Corporation area and other urban local bodies of the district during the period of 2001 and 2011 is shown in Figure.17.3.



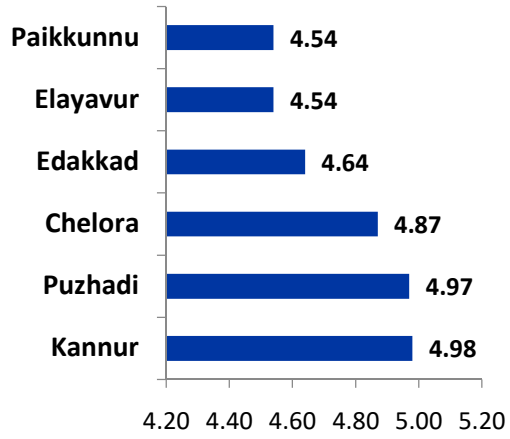
Source: Census 2011

Figure 17.3 Variation of household size in Kannur Corporation area and other urban local bodies of the district during the period 2001 to 2011

From the figure, it is clear that household size of all the municipalities' shows a decreasing trend during the last decade which is due to the increase in the number of nuclear families.

17.1.2 ZONE WISE COMPARISON

Zone wise representation of household size in Kannur Municipal Corporation area is shown in Figure.17.4 which reveals that house hold size of the planning area ranges from 4.5 to 5. Highest range of household size is seen in Kannur zone followed by Puzhathi zone.



Source: Census 2011

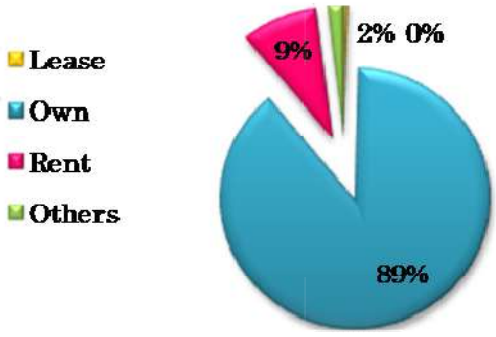
Figure 17.4 Zone wise data of household size

17.1.3 OVERALL HOUSING SCENARIO IN THE PLANNING AREA

In the Corporation area, as per the land use studies, it is clear that the concentration of residential area is

more along the stretch of NH, SH and major roads.

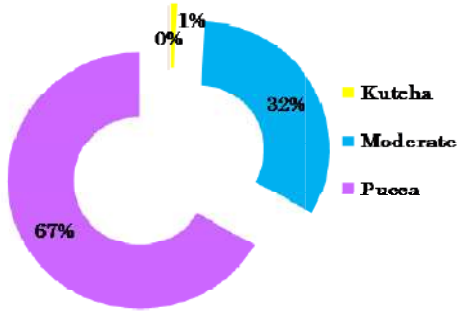
The selection of household for socio economic survey conducted in 2018 was based on random sampling method. Every tenth household as per the building number was selected for the survey.



Source: Socio Economic Survey, 2018

Figure 17.5 Ownership of buildings

Figure.17.5 shows the data obtained by socio economic survey regarding the variation of ownership of the building of the families. From that, it is clear that about 89% of the families have their own building and 9% live in rental house.

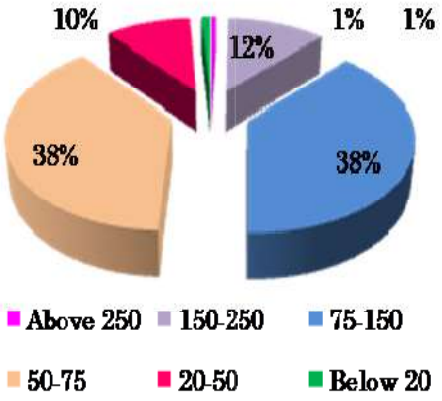


Source: Socio Economic Survey, 2018

Figure 17.6 Percentage variations for different types of buildings

The variation of different type of buildings in the Corporation area is shown in the Figure.17.6. The figure reveals that only 1% is kutcha type. Almost 99% have better houses among which 67% are pucca and 32% are moderate houses.

Figure.17.7 shows the variation of houses in each range of plinth area (m^2) based on the data collected through socio economic survey. It reveals that majority of the houses are having a plinth area ranging from 50-75 and 75-150 sq. m. each having a percentage of 38% followed by 150-250 range (12%). About 10% have an area range above 250 sq. m. Only 2% of the houses have plinth area below 50m2.

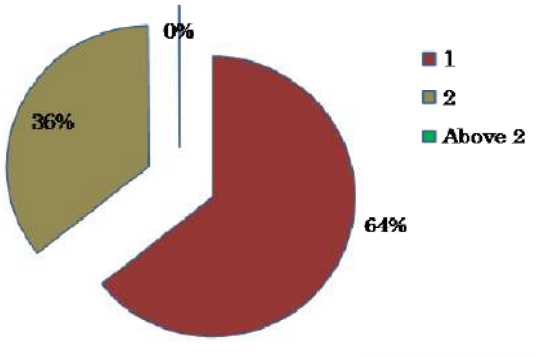


Source: Socio Economic Survey, 2018

Figure 17.7 Percentage variations of houses in each range of plinth area (sq. m)

Figure.17.8 shows the variation of houses in terms of number of buildings based on the data collected through socio economic survey. From that it is

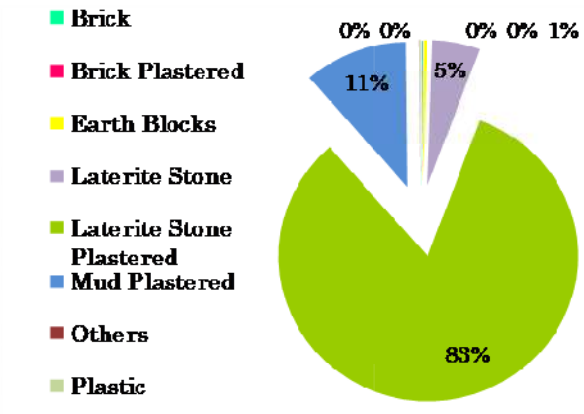
clear that about 64% of the houses are single storey and 36% are double storey.



Source: Socio Economic Survey, 2018

Figure 17.8 Percentage variations of houses in terms of number of storeys

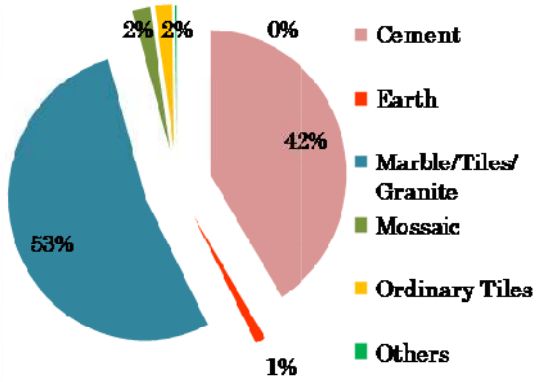
The variation of houses in terms of material used for walls based on the data collected through socio economic survey is shown in Figure.17.9.



Source: Socio Economic Survey, 2018

Figure 17.9 Percentage variations in terms of material used for walls

The figure reveals that about 83% of the houses have plastered walls of laterite stones, 11% are mud plastered and 5% are built with laterite stones only.

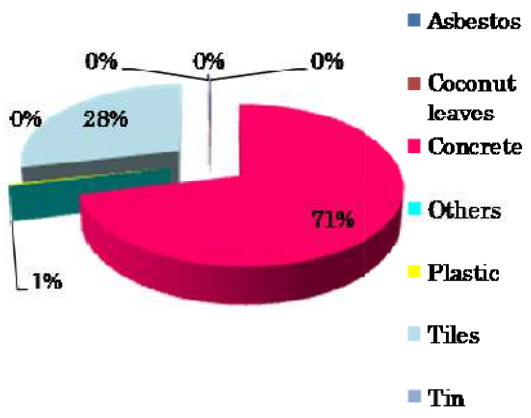


Source: Socio Economic Survey, 2018

Figure 17.10 Percentage variations in terms of material used for floors

Figure.17.10 shows the details of material used for floors which indicates that about 53% of the houses have marble/tiles/granite finished floors, 42% have cement flooring and only 5% are floored by mosaic, ordinary tiles or other type of materials.

The type of material used for roofing of houses and their distributions are shown Figure.17.11. The figure reveals that majority of the houses are concrete roofed (71%) and 28% are tile roofed. Only 1% of the houses have plastic/ asbestos/ tin/ palm leaves/ other type of roofing materials.



Source: Socio Economic Survey, 2018

Figure 17.11 Percentage variations in terms of material used for roofs

17.1.4 FLATS IN CORPORATION AREA

A survey of flats was conducted in 2021, As per the survey there are 39 occupied flats within the planning area and the total number of apartment units is approximately 2300. This is due to the hike in the cost of land which discourages the common man to buy land within the Corporation area. Automatically, they migrate to the adjacent Panchayats. Hence the number of houses other than flats decreases in the Corporation area.

Most of the flats are having number of floors above 10 and are located in town wards. This is due to the urban character of town wards.

17.1.5 SLUMS

A slum is a densely populated urban area that is characterized by a generally low standard of living. These slums sometimes seem to emerge overnight, compacting humanity into filthy, densely packed areas with poorly constructed and often dangerous home. Slum demography is being presented by the Government of India on the basis of the actual count of population.

The Slum Areas (Improvement and Clearance) Act, 1956, which was enacted by the Central Government, defined slums as (a) Areas where buildings are in any respect unfit for human habitation; or (b) are by reasons of dilapidation, overcrowding, faulty arrangement and design of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light or sanitation facilities, or any combination of these factors, are detrimental to safety, health or morals.

According to census of India, 2001 and 2011, the slum area is classified in to following three categories:-

- **Notified slums:** All specified areas in a town or city notified as 'Slum' by State/Local Government and Union Territory (UT) Administration under any Act including a 'Slum Act'.

- **Recognized Slums:** All areas recognized as 'Slum' by State/Local Government and UT Administration, Housing and Slum Boards, which may have not been formally notified as slum under any act;

- **Identified Slums:** A compact area of at least 300 populations or about 60 - 70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

In Kannur Corporation area, there are fourteen recognised slums and seven identified slums. Also, there are no notified slums.

The details of recognised as well as identified slums in the Corporation area are given in Table.17.1 and Table.17.2 respectively. Most of the slums are located in Kannur zone. The number of families living in these recognised and identified slums is 466 and 1268 respectively.

Table.17.1 Details of recognised slums in Corporation area

Sl. No.	Name of Slum	Ward Number	Name of Ward	Number of Family	Area
1	Moosaline	41	Vethilapally	32	0.26 Acre
2	Oliyathvalappu	35	Alinkeel	20	0.44 Acre
3	Ottamavu	29	Keezhuthalli	23	0.56 Acre
4	Koromvayal	28	ThazheChovva	20	0.55 Acre
5	Chittagandi	23	Mundayad	33	0.70 acre
6	Padanna Garden	23	Mundayad	22	0.84 Acre
7	Andathodu colony	21	Elayavoor North	14	0.18 Acre
8	Thazhetheru SC Colony	10	Kakkad	46	1.20 Acre
9	Erumakudi colony	8	Kottali	39	0.93 acre
10	Erumakudi South	4	Pallikkunu	39	1.16 Acre
11	Kizhekevalappu	5	Talap	41	0.80Acre
12	Padanna colony	24	Edachovva	52	1.28 Acre
13	Kizhakkekara colony	10	Kakkad	30	0.75 acre
14	Ambedkar colony	5	Talap	55	1.37 Acre

Source: BSLLD

Table.17.2 Details of identified slums in Corporation area

Sl. No.	Name of Slum	Ward Number	Name of Ward	Number of Family	Area
1	Ayittandipoovalappu	31	Attadappa	73	2.10 Acre
2	Fisherman Colony	25	Athirakam	438	11 Acre
3	Uppalavalppu	35	Alinkeel	66	0.57 Acre
4	Arayasamajam colony	26	Kappicherry	370	11 Acre
5	Elayavoor rural workers Colony	6	Udayamkunnu	126	3.10 Acre
6	PullooppiLakshamveedu Colony	7	Podikkundu	85	1.43 Acre
7	Samajvadi colony	36	Kizhunna	110	1.68 Acre

Source: BSLLD

17.1.6 SC/ST COLONIES

The details of SC/ST colonies in the planning area are given in Table.17.3. From the table, it is clear that almost all the colonies are having electricity (99.3%). Mottamal colony, Pulloopikadav colony, Poyilmotta ambedker colony and Payyiyamoola colonies are not fully electrified. Mottamal colony has the least percentage (87.5%).

Table 17.3 Details of identified colonies in Kannur Corporation area

Sl. No	Name of Colony/ Habitat	No .of Houses	No. of houses having Eectricity	No. of houses having Safe Drinking water	No. of houses having Hygienic Latrine	Whether Connected by road	No. of street lights	Infrastructure Facilities Available			
								Community Hall	TV Kiosk	Day Care centre	Patanamuri
1	Mythanipally colony	16	16	9	16	Yes	0	No	No	No	No
2	Chittamkandy colony	6	6	6	6	Yes	0	No	No	No	No

3	Puthiyavalappu colony	13	13	13	13	Yes	0	No	No	No	No
4	Vettilapalli colony	19	19	17	19	Yes	0	No	No	No	No
5	Parapuram colony	10	10	9	10	Yes	0	No	No	No	No
6	PadinhareVeedu colony	6	6	6	6	Yes	0	No	No	No	No
7	Ottamavu colony	10	10	10	10	Yes	0	No	No	No	No
8	Uruvachal colony	8	8	8	8	Yes	4	No	No	No	No
9	Chovvakunnumvayal colony	12	12	11	12	4	4	No	No	No	No
10	Thavakkara colony	29	29	29	29	Yes	6	No	No	No	No
11	Thana colony	21	21	21	21	Yes	3	No	No	No	No
12	Mottamal colony	16	14	16	14	Yes	4	No	No	No	No
13	Malabar Dying colony	7	7	7	7	Yes	3	No	No	No	No
14	Anakkulam colony	10	10	9	10	Yes	4	No	No	No	No
15	Kizhakkevalappu	21	21	21	21	Yes	7	No	No	No	No
16	Padannappalam colony	9	9	9	9	Yes	3	No	No	No	No
17	PalliyammoolaLakshamveedu	32	30	16	32	Yes	6	Yes	No	No	No
18	Kanhirathumvayal colony	15	15	10	15	Yes	1	Yes	No	No	No
19	Pal Society palliyamoola colony	6	6	3	6	No	0	No	No	No	No
20	Ambalam road palliyamoola colony	6	6	5	6	No	0	No	No	No	No
21	Chudala Road colony	10	10	9	10	Yes	1	No	No	No	No
22	Kuthonivayal colony	7	7	5	7	Yes	2	No	No	No	No
23	Athazhakunnupullo opi	41	41	1	41	Yes	5	No	No	No	No

24	Pulloopikadavulaksh amveedu	43	43	2	40	Yes	6	No	No	Yes	No
25	Poyilmottaambedker colony	34	33	33	32	Yes	8	No	No	Yes	No
26	Pulloopikadav colony	22	21	6	22	Yes	4	No	No	Yes	No
27	Kottali colony	18	18	16	16	Yes	5	No	No	No	No
28	Olathuvayalsanketham	17	17	13	17	Yes	6	No	No	No	No
29	Olattuchalsanketham	14	14	14	14	No	3	No	No	No	No
30	Kottakulamsanketham	15	15	15	15	Yes	3	No	No	No	No
31	AthazhakunnuSanketham	10	10	9	10	Yes	3	No	No	No	No
32	Arambagamsanketham	9	9	5	9	Yes	3	No	No	No	No
33	Edacheriottapedika	12	12	12	12	Yes	4	No	No	No	No
34	Karuvanchal	7	7	7	7	Yes	3	No	No	No	No
35	Vattaparambu colony	24	24	16	24	Yes	5	No	No	No	No
36	Malikaparambu colony	36	36	36	36	Yes	4	No	No	No	No
37	Palliyammoola	61	57	0	28	Yes	6	Yes	Yes	No	No
38	Kanhirathanvayal	17	17	0	17	Yes	0	Yes	No	No	No

Only 69.2% of the colonies have safe drinking water facilities. Mythanipally colony, Vettilapalli colony, Parapuram colony, Chovvakunnumvayal colony, Anakkulam colony, Palliyammoola Lakshamveedu, Kanhirathumvayal colony, Pal Society palliyammoola colony, Ambalam road palliyammoola colony, Chudala Road colony, Kuthonivayal colony, Athazhakunnu pulloopi, Pulloopikadavu laksham veedu, Pulloopikadav colony, Poyilmotta ambedker colony, Kottali colony, Olathuvayal sanketham, Athazhakunnu sanketham, Arambagam sanketham and Vattaparambu colony do not have

100% drinking water facilities.

About 94% of the families have hygienic latrine facilities. Mottamal colony, Pulloopikadavu lakshamveedu, Poyilmotta ambedker colony, Kottali colony and Palliyammoola colonies do not have 100% facilities for hygienic latrine. Palliyamoola colony has the least percentage.

Other infrastructure facilities like connection of roads networks, street lights, community halls, TV kiosk, day care centre, study room in the colonies are inadequate for the colonies. Pal Society Palliyamoola colony, Ambalam road palliyamoola colony and Olattuchal sanketham colonies have no road networks.

Also, Mythanipally colony, Chittamkandy colony, Puthiyavalappu colony, Vettilappalli colony, Parapuram colony, Padinhare Veedu colony, Ottamavu colony, Pal Society Palliyamoola colony, Ambalam road, Palliyamoola colony and Kanhirathanvayal colonies have no street lights.

Only Palliyamoola Lakshamveedu, Kanhirathumvayal colony and Kanhirathanvayal colony have community hall facilities. Only Palliyamoola colony has TV Kiosk facilities. None of the colonies have study room facilities.

17.1.7 HOUSING FOR POOR

Economic status leads to increasing the standard of living of the people. The type of ration card is an important document to prove the extent of poverty of households before the authorities. The division of ration card reveals that there are, 11450 families coming under BPL category. Kannur zone (2352) has large number of BPL families whereas Pallikkunnu zone has the least. Edakkad (2272) and Puzhadi zones (2021) are in second and third position respectively. This shows that poverty is a major problem in the planning area. Immediate steps are necessary to eradicate the poverty in these colonies, The details of BPL families in the Corporation area as per Vikasana Report 2017-2022 are shown in Table.17.4.

Table.17.4 Zone wise details of BPL families

Name of zone	No. of BPL families
Kannur	2352
Edakkad	2272
Puzhadi	2021
Chelora	1860
Elayavoor	1658
Pallikkunnu	1287
Total	**11450**

Source: Vikasana Report, 2017 – 2022

In the Corporation area, there are 4393 houseless families, out of which 2720 are landless too. Table.17.5 gives the zone wise details of houseless/landless families in the planning area. It indicates that Kannur zone has a large number of landless and homeless families, followed by Puzhathi Zone. The homeless families are also found more in Kannur zone followed by Edakkad zone.

Table.17.5 Details of houseless families in Kannur Corporation area

Details of Families	Old Kannur Municipal area	Edakkad Zone	Chelora Zone	Puzhathi Zone	Elayavoor Zone	Pallikkunnu Zone	Total
Landless and houseless Families	1270	354	250	518	93	235	2720
Houseless Families	518	409	193	188	195	170	1673

Source: Vikasana Report, 2017 – 2022

Kannur Municipal Corporation has teken up different kinds of housing schemes, initiated by the Govt. of Kerala and Govt. of India for empowering the economically weaker sections in the Corporation area. The Project offers financial benefits/funds for the beneficiaries to construct new houses, renovation of the existing houses to a liveable condition. Also, it is aimed to provide land for house construction of landless families. EMS Bhavana Nirmana Padhathi, IAY project, Ashraya project etc. are the housing schemes at present in the planning area.

17.2 POTENTIALS AND PROBLEMS

Housing sector in the Corporation area faces several issues. Only 89% of the people are having own land for houses and others still live in rental houses. From 2001 to 2011, the household size has decreased which may create more housing demand in future. As per the socio economic surveys, around 58% of the houses in the Corporation area are in good condition in terms of plinth area of building, type of building, number of storeys, construction materials used for wall, floor and roof etc. About 35% of people are in moderate level of

houses. The other 7% of the houses are in dilapidated condition and not suitable for living.

In the Corporation area, slums which are materially unfit for human habitation exist. Also, SC, ST colonies too exist here. The infrastructure facilities there are very poor and the buildings are in dilapidated conditions in the colonies. There exist so many inadequacies in terms of electricity, drinking water, hygienic latrine, street lights, community hall facilities, Kiosk facilities, study room facilities etc. too.

17.3 INFERENCE

Without a safe and secure home, education and health are not possible. The total land under residential use in Kannur Corporation area is 52.87%. The house hold size of the planning area ranges from 4.5 to 5 in every zone in which the lower values in some zones are due to the out migration in search of job whereas the higher values is due to the existence of joint family system in the planning area. Only 89% of the families have own land for houses. The decreasing trend of household size from 2001 to 2011 indicates the increasing housing demand in future. About 58% of the houses in the planning area are in good condition, about 35% of people are moderate level of houses whereas 7% of the houses are in dilapidated condition which are not suitable for living.

The infrastructure facilities of slums and colonies show so many inadequacies in terms of electricity, drinking water, hygienic latrine, street lights, community hall facilities, Kiosk facilities, study room facilities etc.

The schemes like EMS Bhavana Nirmana Padhathi, IAY project, Ashraya project etc. should be carried out effectively and should be ensured to get all the benefits of these projects to the deserving people. The infrastructure facilities of the slums and colonies should be improved and necessary rehabilitation of the people in slum areas should be done. The problem in risk prone slums and colonies should be strictly rehabilitated.

CHAPTER 18

RECREATION & CIVIC AMENITIES

Recreational and civic amenities are facilities provided for common people by the government and Municipal Corporation. These amenities are the cultural elements of a community with which residents and visitors engage. It enhances our quality of life. It also promotes life-long learning and social exchange, regional economic development etc. Examples of recreational and civic amenities include community halls, theatres, museums, sports ground, parks, reading rooms, libraries, cremation and burial grounds, fuel station, police stations, post offices, telephone exchanges and fire stations etc.

This chapter deals with the recreational and civic facilities provided in Kannur Corporation area, their present status, potentials and problems etc.

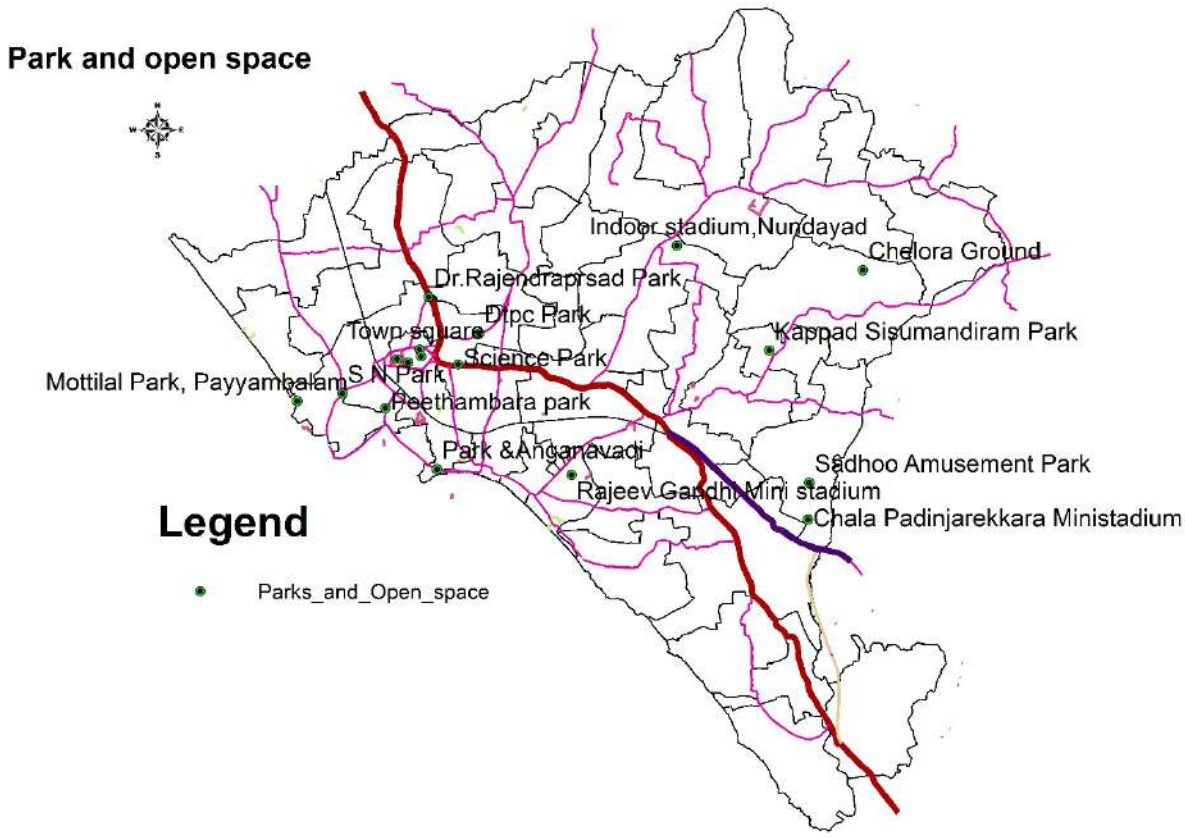


Figure.18.1 Location of various parks and open spaces in the Corporation area

18.1 RECREATIONAL FACILITIES

The existing recreational facilities in Kannur Municipal Corporation area include parks, play grounds, stadiums, auditoriums, cinema theatres, community TV centres, reading rooms, open air theatres, indoor stadiums, cultural centres, museums, swimming pools, arts & sports clubs etc.

18.1.1 PARKS

The Figure.18.1 shows the location of various parks and open spaces in the city. The figure indicates that the recreational centres are scattered in the study area. But the major recreational facilities are mainly concentrated in the town area. The details of some major recreational centres are given below.

- **Payyambalam Park**

The Payyambalam Park having scenic beauty is located near Payyambalam Beach on west side with backwater on the right side and Payyambalam burial ground towards north. It is located in Payyambalam ward. The infrastructure facilities in the park are very poor. The maintenance of such a beautiful park is not done properly. The playing equipment, open stage as well as the seating facilities like benches are in dilapidated condition. Many shrubs and thorns growing near the benches make disturbance to the visitors. The absence of lawns make it child unfriendly too. The entry fee to the park is Rs. 10. If maintained properly, it would be a wonderful place for the kids to spend the evenings.



Payyambalam Park

- **Dr.Rajendra Prasad Park**

It is a triangular shaped park having an area of 0.32 acres located along Ancham Peedika-Kolathuvayal and Pamban Madhavan road. As a proposal by AMRUT scheme, the park was renovated.

- **S.N. Park**

S.N Park is the landmark of Kannur Corporation area. It is a triangular shaped land having an area of 0.89 acres located where Kannur-Azheekode road and Kannur-Payyambalam road meet. The existing park has a statue of Sree Narayana Guru at the centre and a cafeteria.

Rejuvenation of SN Park was also completed as a proposal by AMRUT scheme.

- **Palakkad Swami Mutt Park**

It is located along Kakkad road and is very near to the core area of the planning area. The park was opened recently by DTPC, Kannur. New playing equipment with good infrastructure facilities are available there.

- **Kappad Sishu Mandiram Park**

Kappad Sishu Mandiram Park is a newly constructed park near Kappad Sishu Mandiram. It is having playing equipment with garden, lawns etc.

- **Science Park**

Science Park is the park located at the heart of Kannur city to promote and spread scientific knowledge. This park is best for school study tour especially for upper primary school students and it provides practical aspect of various scientific theories of Physics, Chemistry, Biology etc.

- **Anakkulam Park**

The Anakkulam Park was a proposal by AMRUT Scheme. It is surrounded by Anakkulam pond and is located in South Bazar ward. It is very near to NH 66 and is surrounded by residential area and Holy family catholic church on the south.

18.1.2 OPEN SPACES

Presently there are two mini stadiums in the Corporation area under public sector.

- **Jawahar Municipal Stadium**

Jawahar Municipal Stadium is located in Thayatheru ward. It is mainly used for football matches. Mass events are conducted in this ground. It is the oldest yet biggest ground in Kannur. Even though it is poorly maintained, it has good ground, pavilion having a capacity of about 30,000 people for football matches. Kannur Railway Station and old bus stand are very close to the stadium.



JawaharMuncipal Stadium

- **Indoor Stadium**

It is a very good Indoor stadium in terms of the infrastructure facilities. It has a very good parking facility. International expos are conducted here. Good boxing arena, wrestling pit, multi gym, basketball court, badminton court etc. are there with a

well arranged gallery. This full air conditioned stadium can be used as the venue for marriages, great conferences etc. Indoor stadium is located in Mundayad ward and is easily accessible from Kannur International Airport, Mattannur. This stadium has to be maintained properly.

- **Police Maidan**

Police Maidan is also located in Thayatheru ward which is very close to Jawahar Stadium. It is a fairly large ground where police parades take place in Kannur District. It is the main ground for Republic day parade of Kannur District. Apart from parades, football coaching, matches and exhibitions are also conducted here. During Independence Day, the flag hoisting on behalf of district collector and other officials takes place in Police Maidan. Accessibility to the maidan is also very easy as the Kannur Railway station and old bus stand are very near to it.

- **Rajiv Gandhi Mini Stadium**

Rajiv Gandhi Mini Stadium, Marakkarkandy is located in Padanna ward. Since it is recently renovated, the mini stadium is having good infrastructure facilities.

- **Cannanore District Badminton Indoor Court**

It is located near Ashirvad Hospital, Thavakkara. It is a good place for badminton lovers.

- **Town square**

Town square is located in Thayatheru ward. It is one of the best gathering places in Kannur. Trees, lawns and benches to sit and relax are there. An open stage as well as a park is located near to it. Many cultural events take place here. It is a good open space to spend time especially in the evenings with family.

- **Collectorate Maidanam**

Collectorate Maidanam is located very close to Town square. There is an open stage located in it. It is also a major venue for so many cultural events in Kannur. It is also located in Thayatheru ward.



Town Square

Table.18.1 Details of Theatres in the Corporation area

Sl. No.	Name	Location	No. of Screens
1	Kavitha	S N Park road	1
2	Savitha film city	Padannapalam	3
3	PVS film city	Talap	2
4	NS Theatre	Caltex Junction	1

- **ChalaPadinjarekkara Mini Stadium**

It is located in Attadappa ward. At present, it is in dilapidated condition.

18.1.3 CINEMA THEATRE

At present, there are four cinema theatres with 7 screens in the Corporation area. All these theatres are located on the northern half of the planning area. The details of cinema theatres are shown in Table.18.1.

The condition of NS Theatre is very pathetic because of its poor infrastructure facilities as well as cleanliness. Proper maintenance of the theatre is needed because it is located near Caltex junction which is the main accessible location when compared to others.

18.1.4 PONDS

Anakulam, Chettyarkulam, Valiyakulam, Kannookkara pond are important ponds in the Corporation area. Among these, Anakkulam pond, which was a major source of water in the planning area till a few years back is recently renovated and opened to the public. It can be now used as an evening hangout place for the people. Also, there is a small area of land available adjacent to the pond which can be used for further development as park.



Anakkulam

Earlier, Chettiarkulam, an old pond in the planning area was also renovated and beautified which attracted a large number of visitors.

18.1.5 SWIMMING POOLS

Sports Council Swimming Pool is an important swimming pool in the Corporation area which was built at Kakkad as a part of the SMILE (Sports Minister's Infrastructural Leap towards Excellence) project under the National Games Secretariat. It is located in Kakkad North ward. It is not in use now.

18.1.6 ASSEMBLY HALLS

Rubco Auditorium and Dinesh Auditorium are the major assembly halls in the Corporation area having improved infrastructure facilities as well as capacity. District Co-operative Bank has an auditorium of its own in the Head office building.

18.1.7 SPORTS AND ARTS TRAINING CENTERS

Other types of recreational facilities are sports and arts training centres. The details of sports and arts training centres in the Corporation area are given in Table.18.2 and Table.18.3 respectively. Sports coaching centres provide practice for various sports items like Cricket, Football, Tennis, Basketball, Table tennis, Badminton and Swimming.

Table.18.2 Details of sports training centres in the Corporation area

Sl. No.	Name of Centre	Items
1	GVHSS, Kannur	Cricket, Foot ball, Tennis, Basket ball, Table tennis, Badminton
2	Kannur Spirited Youth Club	Foot ball
3	The Club City Centre	Swimming
4	Okinawan Karate Do & Sports Centre	Karate
5	Samurai Martial Arts Academy	Karate
6	MGS Kalari	Kalarippayattu

Table.18.3 Details of arts training centres in the Corporation area

Sl. No.	Name of Centre	Items
1	SangeethaKalakshetra School of Dance and Music	Classical dance, Keralanadanam, Folk dance, cinematic dance, Karnatic Music, Instrument music (Karnatic/Western), Drawing (Pencil drawing & Painting)
2	AarabhiKalakshethra	Classical dance
3	Kalagurukulam Music and Dance Academy	Classical dance, Western dance, Instrument music, Ryhm (Chenda, Edakka, Mridangam, Tabal), Karnatic Music, Light Music & Karaoke practice, Kathakali, OttanThullal, Mimicri, Mono Act Practice, Abacus, Karate &Zumba
4	SwathiThirunalKalakendram	Classical dance and Music
5	Kalanjali School of Dance	Classical dance, Keralanadanam and Folk dance
6	GVHSS, Kannur	Painting, Drawing, Dance, Music

Classes for martial arts like Karate and Kalarippayattu are also available in the planning area.Classes in Classical dance, western music, instrumental music, drawing and painting are also available.

18.1.8 LIBRARIES AND READING ROOMS

The location of libraries in the Corporation area shown in Figure.18.2 indicates that most of the libraries are concentrated in the Kannur zone. Among these libraries, 5 are public libraries.



Jawaharlal Nehru Public Library

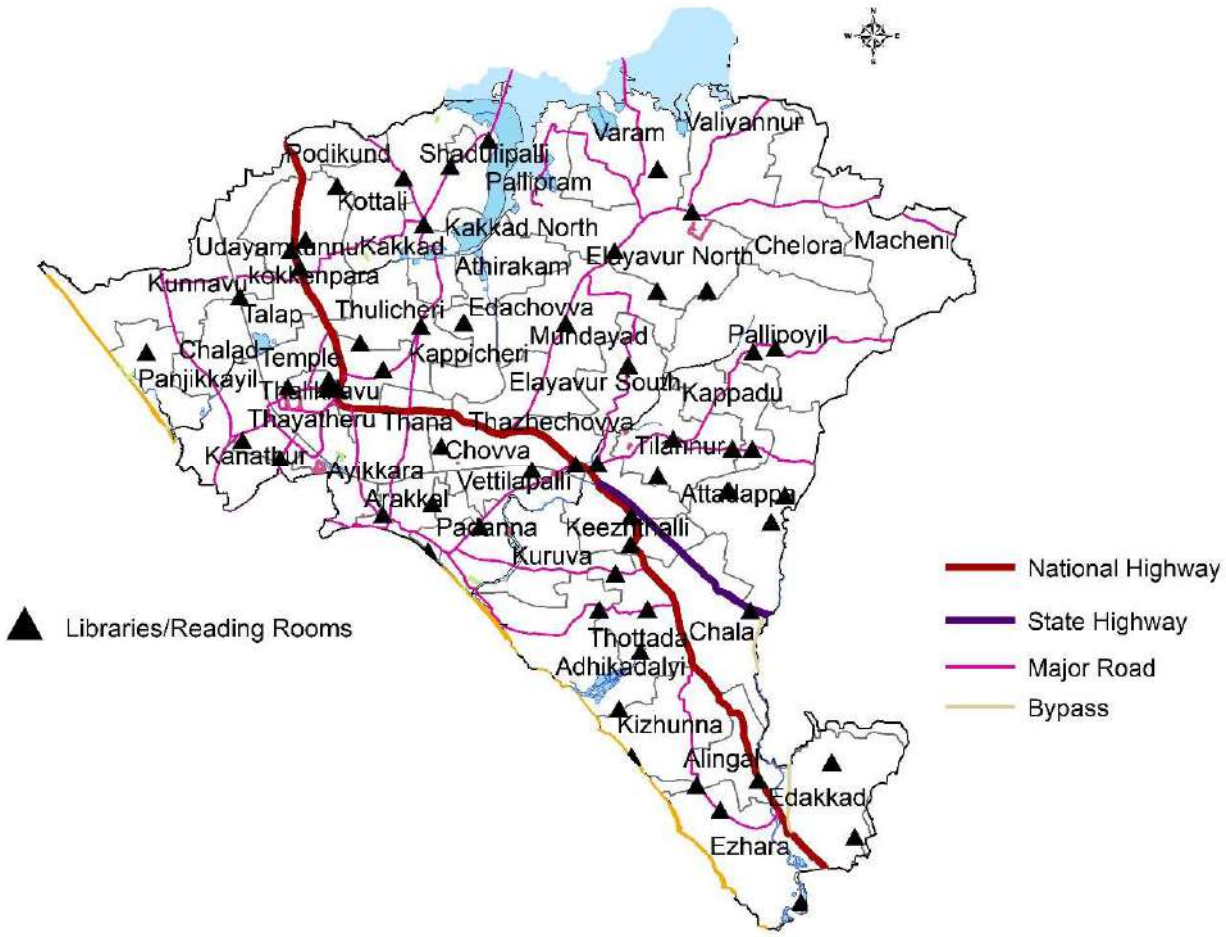


Figure.18.2 Location of libraries in the Corporation area

18.2 CIVIC AMENITIES

The facilities that are provided by the Government and local bodies for common people are called civic amenities and it includes water supply, electricity, roads, bridges, flyovers, public toilets, garbage disposal, crematorium and burial ground, railways, roadways etc. The location of different civic amenities in the Municipal Corporation area is shown in Figure.18.3.

18.2.1 POLICE STATION AND FIRE STATION

In the planning area, Town Police Station, IG Office, SP Office, Traffic Police Station, Police Control Room and Kannur City Police Station are located in the town wards. The Fire station is located in the Cantonment area.

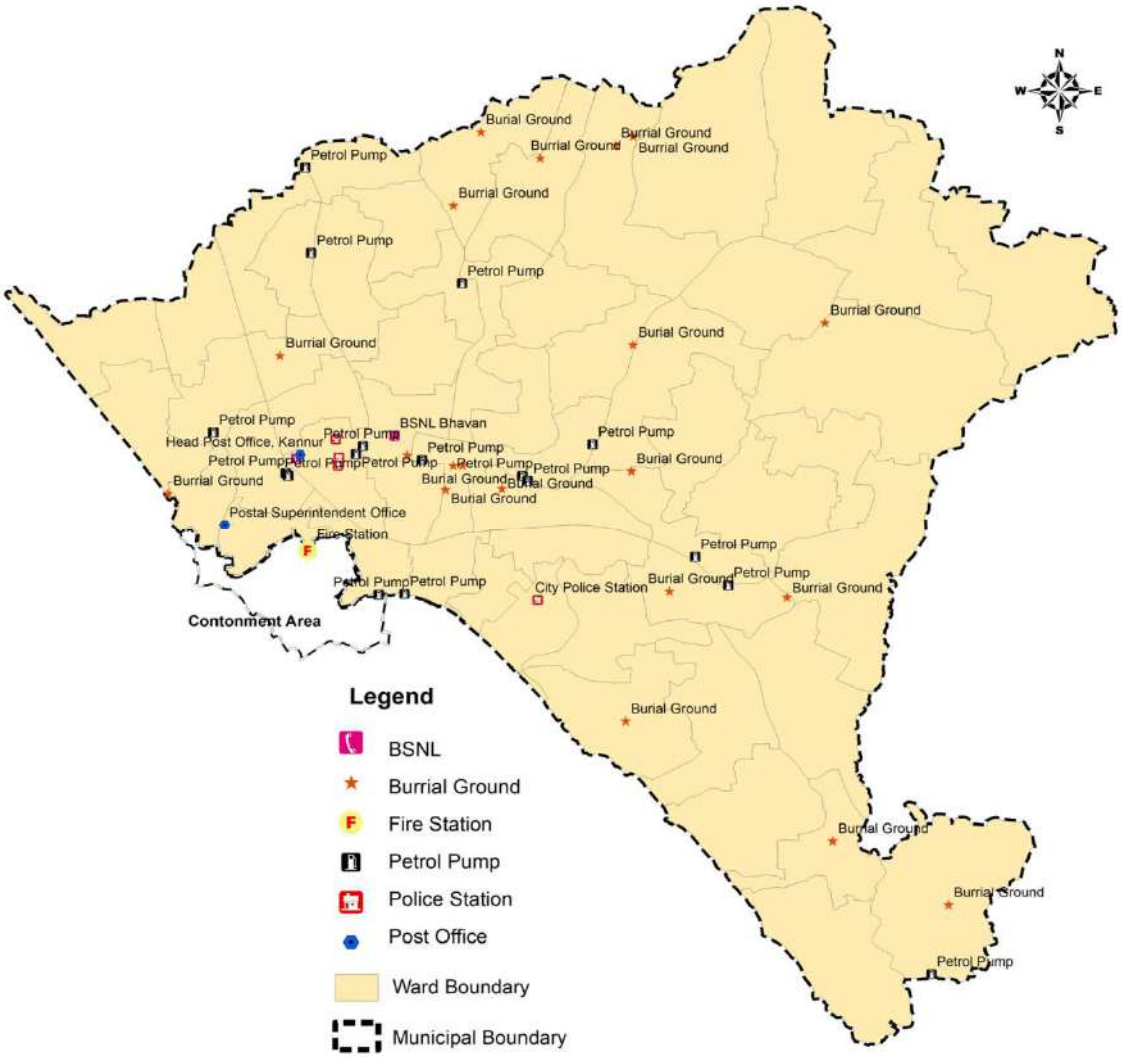


Figure.18.3 Location of civic amenities in the Corporation area

18.2.2 POST OFFICES AND TELEPHONE EXCHANGES

The Head Post Office is located in Thayatheru ward in Civil Station Compound. Other post offices are scattered in the planning area but are concentrated in town the wards mostly. The Parcel Office is located in Thalikkavu ward. The telephone exchanges within the town is located at Elayavur zone and Kannur zone; very close to the town centre.

18.2.3 BURIAL GROUNDS AND CREMATORIUM

At present, 15 public crematoriums or burial grounds are there in the planning area among which only three are under government ownership. Payyambalam, Keezhuthalli and Malikaparambu are the government owned burial grounds. Community based burial grounds are also included which are in private ownership.

18.2.4 COMFORT STATIONS

Public comfort stations are located near Stadium ground, Collectorate Compound, Town square. Only E-Toilet is provided in the Collectorate compound. Toilet provided near Town square is only for ladies. Even though public toilets are there in Bus stands, they are not clean and hygienic.

18.2.5 OIL AND GAS FILLING STATIONS

In Kannur Corporation area, there are about 10 petrol pumps and one electric charging station.

18.2.6 PUBLIC OFFICES

Civil Station, Taluk Office, Municipal Corporation Office buildings are located in the town centre. In those compounds, many government offices are working.

18.3 ON GOING PROJECTS

Under AMRUT Scheme, new parks are implemented like Chelora Park, Kappad Sishu Mandiram Park, Anakkulam Park, Avera Gama Mandiram Park and development of new Payyambalam Park.

18.4 POTENTIALS AND PROBLEMS

Parks and green spaces are treasured assets and are often central to the lives of their communities. They provide opportunities for leisure, relaxation and exercise, but are also fundamental to community cohesion, physical and mental health and wellbeing. Kannur severely lacks in developed recreational facilities such as city parks, established sports facilities, and playground etc. The available parks and playgrounds are not properly maintained so that they need proper maintenance.

As per AMRUT Guidelines, the 15% of total Area has to be developed as the Green Spaces. Several parks are considered for development under AMRUT scheme and most of those works are completed. The remaining Parks and open spaces also should be redeveloped as green spaces by means of making it nature as well as people friendly.

The water body near Thottada beach is very calm having scenic beauty. It can be developed for recreational purpose by conserving the neighbouring areas. The vast extent of Kanambuzha can also be converted for recreational purposes.

At present, there is only one open air theatre which is in the Town Square and one open stage is there in Collectorate Maidan. The open stage in the Payymbalam Park can be renovated so that it can be used for cultural events especially in the evenings. The condition of NS Theatre is very pathetic because of its poor infrastructure facilities as well as cleanliness. It can be improved by providing better infrastructure.

The major parts of the Corporation area needed to be facilitated with comfort stations. There are no art galleries and Town halls in the planning area under government ownership. Chalad Mohanan Memorial Art Gallery which is the only one art gallery is incorporated with Govt. TTI for Men.

18.5 INFERENCE

As per AMRUT guidelines, the parks and open spaces should be developed as green space. At present, there is only one open air theatre which is in the Town Square and one open stage is there in Collectorate Maidan. The open stage in the Payymbalam Park can be renovated so that it can be used for any cultural events especially in the evenings.

A Green Buffer can be proposed along the River and other Water bodies of the Corporation area which make space for children, old age people and differently abled citizens. The available open spaces may be utilized for the development of parks. A provision for the construction of one park for at least each three wards is suitable in the Corporation area. The existing facilities of the available parks needed to be improved further. More women friendly comfort stations and E-Toilets should be implemented.

CHAPTER 19

SOCIAL WELFARE

In the past, social welfare was not done in an organized manner. Social welfare signifies the attempts made by Government and voluntary organizations to provide necessary care and security and such other services to the economically weaker section of the society, socially backward classes, women, children, physically and mentally challenged, the poor, orphans, aged, sick etc. by maintaining income at an acceptable level, by providing medical care and public health services. It is also achieved by adequate housing and community development programs. Social welfare policies are important because they open up access to some of the most basic social amenities for the marginalised.

The chapter deals with the existing status of Social Welfare and its potentials and problems in Kannur town.

19.1 ANALYSIS OF EXISTING STATUS

19.1.1 SCHEDULED CASTE/ SCHEDULED TRIBE (SC/ ST)

As per census 2011, SC population size in the Corporation area is 11337 and that of ST size is 903. The temporal variation of SC and ST population in the study area during the last two decades is given in Table.19.1. The sex ratio of SC and ST population is also calculated.

Even though from 1991 to 2001, there was a slight increase in SC population, from 2001 to 2011 there shows a slight decrease. But in the case of ST population, there shows an increase during the last two decades. Sex ratio of SC as well as ST population has increased.

SC population in the Corporation area is nearly 4.88% of the total population which is higher when compared to the district (3.30%). ST population (0.39%) is very low in the

Table.19.1 Temporal variation of SC and ST population in the Corporation area

Year		1991	2001	2011
Total Population		214502	226435	232486
SC Population		11874	12657	11337
% SC Population		5.54	5.59	4.88
ST Population		48	179	903
% ST Population		0.0224	0.079	0.39
Sex Ratio	SC	1046	1079	1082
	ST	548	530	1120

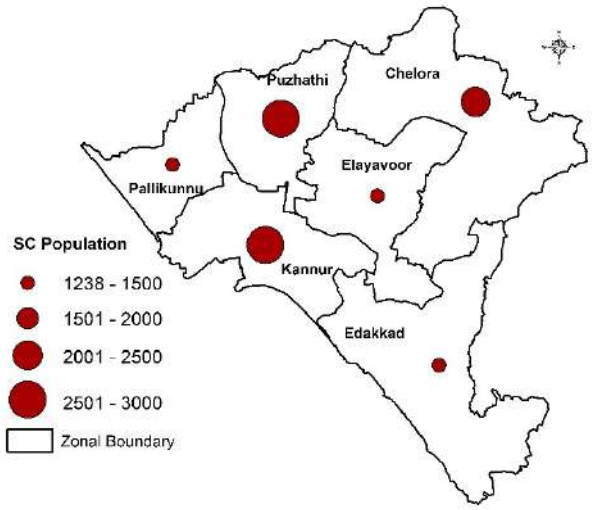


Figure.19.1 Zone wise distribution of SC population in Kannur Corporation area

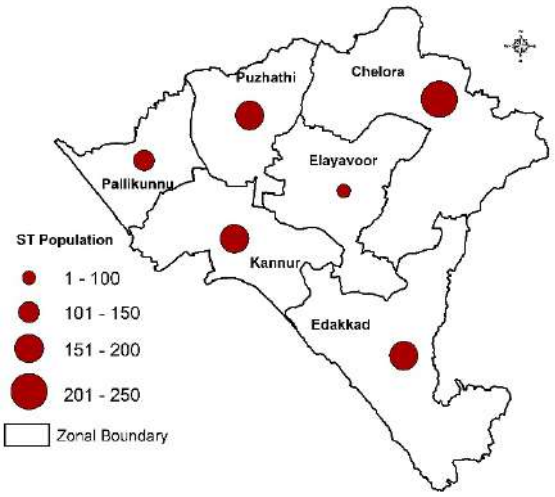


Figure.19.2 Zone wise distribution of ST population in Kannur Corporation area

planning area compared to the district average of 1.64%. The zone wise SC and ST population is shown in Figure.19.1 and Figure.19.2 respectively. It shows that the SC population is the highest in Puzhathi zone (2857) followed by Kannur (2674) and Chelora (2006). The least value of SC population is in Palliikkunu zone (1238). In the case of ST population, highest value is in Chelora zone (211) followed by Edakkad (199) and Puzhathi (166). The least population is in Elayavur zone (62).

19.1.2 BELOW POVERTY LINE (BPL)

Below Poverty Line is a benchmark used by the government of India to indicate economic disadvantage and to identify individuals and households in need of government assistance and aid. It is determined using various parameters which vary from state to state and within states. There are 11450 BPL card holders in the Corporation area. The zone wise distribution of BPL families is shown in Figure.19.3 which indicates that Kannur zone (21%) has large number of BPL families followed by Edakkad (20%) and Puzhathi (18%) zones. Pallikkunnu zone has the least. This shows that poverty is a major problem in the planning area. Hence there is a need for providing considerations to these groups aiming at their economic improvement.

19.1.3 CHILDREN

Children are the hope of their parents and simultaneously important assets for future development of any nation. But they are the most vulnerable category to exploitation and abuse. Therefore, every nation must pay full attention to its children

to ensure that they are given proper care in a congenial atmosphere where they will receive adequate opportunities and facilities for proper education, guidance and training for their overall development to become good citizens in future. The growth and development of children into mature and happy persons with attractive personalities mainly depends upon the care and attention they receive from their respective parents and the society in which they live.

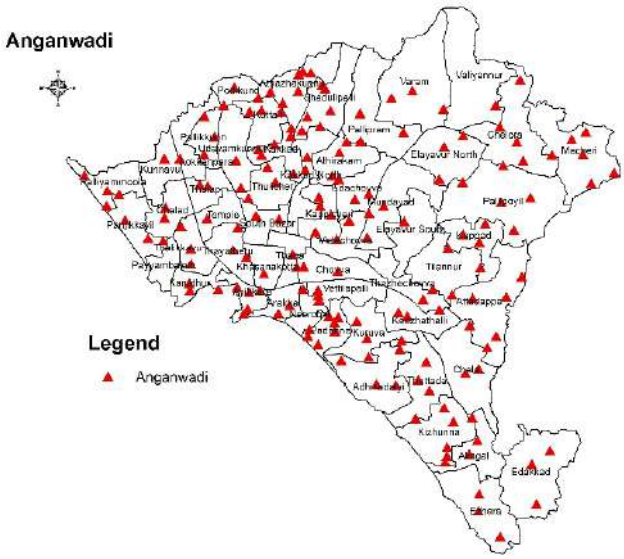


Figure.19.3 Location of Anganwadis in the Corporation area

For the comprehensive child development programs, there are 200 Anganwadis and five Sisu Mandirams in the Corporation area. The Figure.19.3 shows the location of Anganwadis within the planning area.

The number of Anganwadis in each ward is ranging from one to six. The issues faced by these Anganwadis are lack of own land, infrastructure facilities like drinking water, compound wall, toilet, electric connection, gas connection, furniture, playground, playing equipment etc.

Even though LKG, UKG schools exist in the Corporation area, they are not easily accessible to economically weaker sections. Therefore these kinds of institutions are not functioning as a factor of child development. Malnutrition issues are not a major issue while the issues related to teenage girls like child marriage, health problems are some other challenges faced in the planning area.

There are 18 orphanages distributed in the zones of Kannur (6), Edakkad (5), Elayavur (6) and Pallikkunnu (1).

19.1.4 WOMEN

Women's empowerment in India is heavily dependent on many different variables that include geographical location (urban/rural), educational status, social status (caste and class) and age. The Department of Social Welfare, in its welfare programmes for women, emphasizes the need for initiative, advancing and developing economic empowerment. A number of welfare schemes for women have been undertaken by the Government of India and the State government. In Kannur Corporation area, the active

women welfare program is mainly through Kudumbashree units and is working effectively in all wards. The ward wise distribution of Kudumbasree units is shown in Figure.19.4. About 1107 Kudumbasree units are there in the planning area.

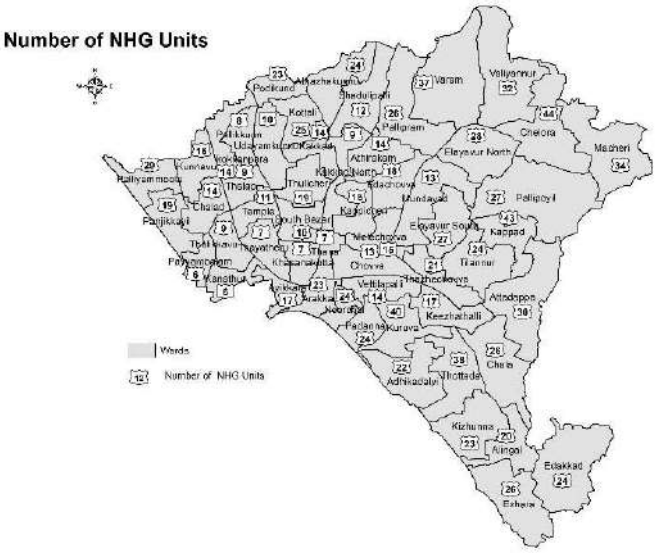
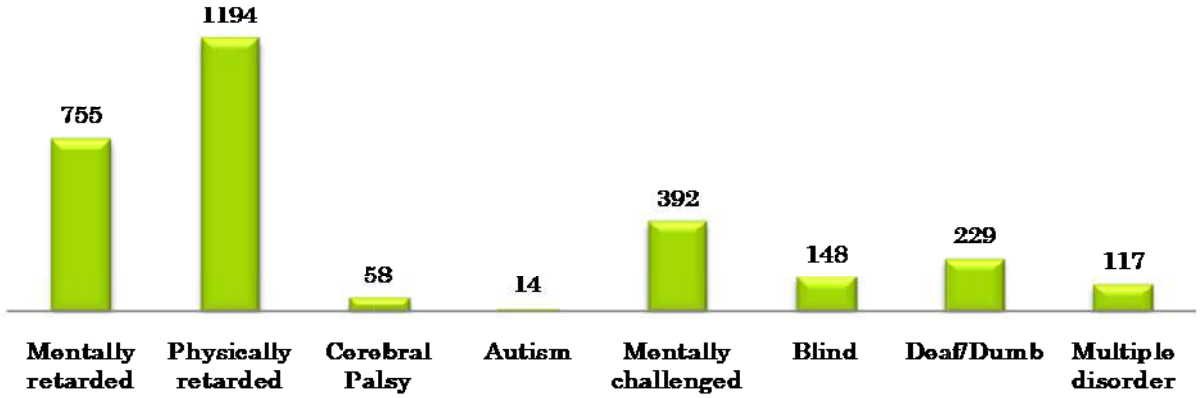


Figure.19.4 Ward wise details of Kudumbasree units in the Corporation area

There is no sufficient number of government women's hostels in the planning area. The lack of women friendly public comfort stations is one of the major problems faced by the women here.

19.1.5 DIFFERENTLY ABLED PERSONS

As per Vikasana Report 2017 - 2022, the details of differently abled groups are shown in Figure.19.5. Among these, the number of mentally and physically challenged children is 166 and 161 respectively. The number of special schools in the planning area is three. About more than 195 children are studying in these special schools. Even though there are no buds school, two buds rehabilitation centres with 33 children are there. Scholarship facilities for the children of such groups are available.



Source: Vikasana Report, 2017-2022

Figure.19.5 Details of differently abled group

19.1.6 OLD AGED PEOPLE

Aged people come under the age group above 60. Through projects like Vayomithram and Palliative care, the health issues of this group in the Corporation area have been reduced. But some issues are still there. Details regarding aged people are given in Table.19.2. Old age homes are meant for senior citizens who are unable to stay with their families or are destitute.

Table.19.2 Details of old age group

Sl. No.	Age group	Male	Female	Total
1	60-69	7928	9735	17663
2	70-79	3669	4717	8386
3	>80	1612	1430	3042

Source: Vikasana Report, 2017-2022

Among the five old age homes in the planning area, four are private and one is under NGO. The total number of community day care centres for old age groups in the planning area are four. The public places are not old age friendly.

19.1.7 SOCIAL WELFARE PENSION/FINANCIAL AIDS

Vikasana Report 2017-2022 provides the details of various financial aids provided by Government for the weaker sections of the society. The details are given in Table.19.3.

Table.19.3 Details of social welfare pension/financial aids

Sl. No.	Pension Scheme	Male	Female	Total
1	Old age pension	7834	7088	14922
2	Widow pension	0	7258	7258
3	Disabled pension	1129	775	1904
4	Agriculture labourer pension	162	860	1022
5	Unmarried women (>50 age)	0	1793	1793

Source: Vikasana Report, 2017-2022

19.2 DEVELOPMENT POTENTIALS AND PROBLEMS

Both Kudumbasree as well as Anganwadis is functioning very effectively in the Corporation area. Their large number of units itself is the major potential of the planning area which can be utilized for the uplift of the special concern section along with the economic development of the society. Kudumbashree units not only encourage women but also enhance the economic development.

The introduction as well as implementation of various government schemes for the uplift of the poor, backward classes, children, women,

aged and physically disabled persons is successful because of the availability of fund. Various activities in Anganwadis and other centres provide equal opportunity and often promote the development of children in all respects. There are 3 special schools and one buds rehabilitation centre in the Corporation area. Also eighteen orphanages, five old age homes and four community day care centres are also there.

The infrastructural facilities in Anganwadis need to be improved and maintained. The Kudumbashree units functioning within the town require gathering places for meeting and more coordination so as to make it more effective. Moreover, old age homes with proper medical facilities need to be started for the welfare of the poor and the needy. The public places are not old age friendly.

The SC/ST colonies in Kannur Corporation area are facing lack of infrastructure facilities like electricity, drinking water, sanitation, road, study rooms etc. Also, more cultural centres should be provided. Lack of job training centres is another problem faced by the special concern group. Working women's hostel and e-toilets for ladies are lacking within the planning area. Generally public comfort stations are very less. Women friendly public comfort stations are also less.

19.3 INFERENCE

The social welfare programmes ensures the safety and security of the public and is therefore essential for the well-being of the society. In Kannur Corporation area, even though 200 Anganvadi units are functioning, they face many issues like infrastructure facilities including lack of own land, drinking water, compound wall, toilet, electric connection, gas connection, furniture, playground, playing equipments etc.

In the planning area, the percentage of SC population is 4.88% whereas that of ST population is 0.39%. The weaker section of the society often remains weak due to marginalisation. Hence all available schemes and funds may be properly implemented and utilized for their uplift.

New orphanages, old age homes, day cares for old age groups, working women's hostel, centres for physically challenged, cultural centres, job training centres for women, and women friendly night stay facilities, women friendly comfort stations etc. may be established so as to promote the economic and social status of the marginalised section of our society.

Sports and various cultural activities are to be promoted among children so as to develop enthusiasm and team spirit. Special programmes and fests may be conducted for the disabled children to make them

competitive. The State and Central Government funds available need to be properly utilized for the uplift of the poor and the needy. Moreover, the rate of crimes and other malpractices can be greatly reduced by providing necessary social measures.

CHAPTER 20

ENVIRONMENT

The impacts of urbanization and climate change on the world's environment and populations are arguably two of the most pressing issues facing the world today. Even though cities comprise very less percentage of the earth's surface, there is an extraordinary concentration of population, industry and energy use, leading to a massive local pollution and environmental degradation. The ecological footprints of cities go far beyond their urban boundaries to forests, agriculture, water and other surfaces, which supply their residents so that they have an enormous impact on the surrounding rural, regional and global ecosystem.

For a liveable and healthy town, it is imperative that its planners address environmental concerns, which have deep and long standing influence on its people and land. Unplanned developmental activities and apathetic policies result in the drainage of nature and the city becomes prone to flood and pollution. Thus protection, conservation and sustainable environmental practices are the essential functions of a desirable integrated urban approach.

In this chapter, the present status of environment, its potentials and related problems are analysed for the Corporation area. Based on the analysis, various measures have been undertaken to mitigate the risk and effects of various pollutions.

20.1 EXISTING STATUS

Environmentally sensitive area includes water bodies, plantations, paddy lands, religious sites, wetlands, mangroves, heritage sites, coastal areas etc. These areas are to be conserved and areas other than the sensitive areas can be considered for development. The location of all the eco sensitive areas in the Corporation area is shown in Figure.20.1. Industrialization has resulted in many environmental problems such as water pollution, air pollution, noise pollution, generation of hazardous wastes and disasters including urban flood, landslides, coastal erosion etc.

The River Kanampuzha flowing through the southern boundary of the Kannur zone as well as Kattampally (Varam Kadavu and Pullooppi Kadavu) are fully contaminated due to the timber seasoning done in it,

dumping of plastic wastes and other solid wastes into it. It is seen that the encroachment of water bodies are done by land owners of the river shore, by depositing waste earth and debris from demolished buildings.

20.1.1 SENSITIVE /FRAGILE AREAS

I. Mangroves

There was a reasonable amount of mangroves areas in Thavakkara south and most of the area has been reclaimed/destroyed for new bus stand and Kannur University campus.

At present, the remaining mangroves are preserved undisturbed. There are some pockets of mangroves on the shores of Kanampuzha and Kattampally.

II. Water bodies

a) River

The major rivers flowing through the Corporation area are Kanampuzha, Kakkad puzha and Kattampally puzha (Varamkadavu and Pullooppikadavu). Thottadapuzha, Ayyrathpuzha (Nadalpuzha) are other minor rivers.

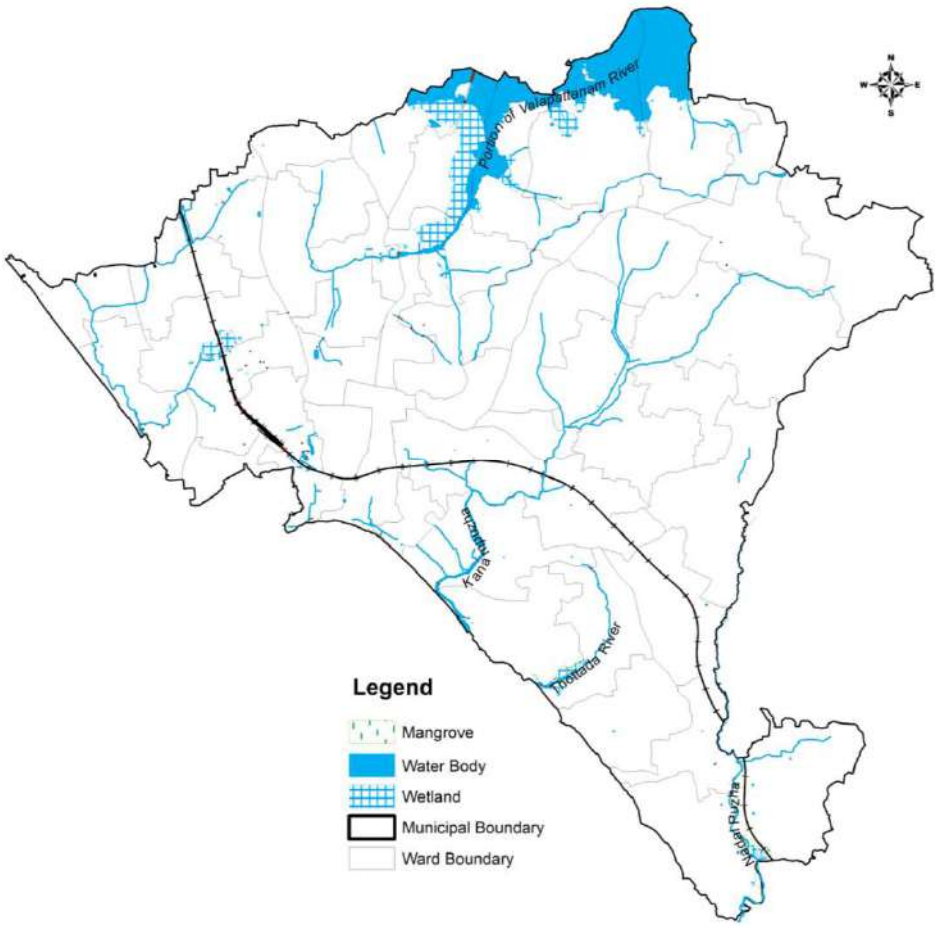


Figure.20.1 The location of all the eco sensitive areas in the Corporation area



Kattampilly River

The river banks have intense agricultural activities and are environmentally sensitive areas with a chance of flooding during monsoon. All these areas are densely populated and are known for fishing activities.

Kanampuzha River originates from Ayyappanmala in MunderiPanchayat, once the centre of the bhoodan movement. The river flows through Macheri, Vattappoyil, Peringalayi, Kappad, Thilannor, Elayavoor, ThazheChovva before joining the sea at Adikadalayi. The River is categorized in Zone I of Coastal Management Plan issued by CESS. The construction on the banks of the river is now being controlled as per CRZ Rules.

b) Ponds

Anakulam, Chettyarkulam, Valiyakulam, Kannookkara pond are important ponds in the Corporation area. Among these, Anakkulam pond, which was a major source of water in the planning area till a few years back is recently renovated and opened to the public. It can be now used as an evening hangout place for the people. Also, there is a park which is newly constructed as a part of AMRUT scheme.

Chettiarkulam, an old pond is also renovated and beautified and a large number of people are using it now.



Anakulam Pond

c) Thodes and Canals

Pazhassi Canal is a major canal mainly flowing through Puzhathi, Elayavur and Chelora zones of the Corporation area. It comes under Pazhassi Irrigation Project (PIP) in the Valapattanam River. Other riverlets and Canals flowing through the planning area are Andathodu, Padannathodu, Ammayithodu, Valiyathodu, Cheloravayalthodu, Macheryvayalthodu and Athirakam Canal etc.

III. Coastal Areas

The western boundary of planning area is bound by Arabian Sea. Coastal

Zone regulations are applicable in the coastal areas of the Municipal Corporation area which fall under Coastal Regulation Zone (CRZ) II. The coastal stretch is blessed with a continuous strip of sandy beach along a coastal stretch of 17 km on the southern side. All these areas are densely populated and are known for fishing activities.

IV. Paddy and Wetland

Paddy fields are mostly located in Elayavur, Chelora, Puzhathi and Pallikkunnu zones of the Corporation area which act as retention ponds for rain water during monsoon and in turn recharge the ground water resources. Also, these open areas act as lungs for the planning area.

In view of depleting ground water levels, paddy fields assume a vital role in the recharge of ground water. Conversion of these lands for any other use shall not be allowed.

Natural wetlands, because of their long term capacity to filter pollutants from the water that flows through them, are referred as "earth's kidneys". The Munderikkadavu wet land area in Elayavur zone is a portion of Kattampally River and the Munderikkadavu bird sanctuary is located in this marshy land which is the home of a plenty of migrant birds that reach this area. This biodiversity enriched region enhances the scenic beauty of the terrain. In the past years, this marshy land was extensively used for the cultivation of rice crops and is commonly called as Kaippadu.

20.1.2 POLLUTION

In general, environmental issues are mainly due to water pollution, air pollution, noise pollution and generation of hazardous wastes.

- ***Pollution due to industries***

For the purpose of categorization of industrial sectors, "Range of Pollution Index", is used as the basic criteria. Based on the extent of pollution, industries are categorized as red, orange and green. Industrial sectors having pollution index score of 60 and above are grouped under red category, while score of 41 to 59 grouped under orange category. Pollution Index score of 21 to 40 are green category and up 0 to 20 is included in the white category.

In the Corporation area, all the industries are under either orange or green category. The major industries in Corporation area are Kerala State Handloom Development Corporation Ltd., Cannannore Cooperative Spinning mill Limited and Milma Diary. Most of the industries in the planning area are manufacturing (25%) and textile (21%) type. The textile industry units mainly causes air and water pollution through the discharge of waste water and emission

of toxicgases such as Sulphur dioxide, oxides of nitrogen etc. Boilers, thermo pack and diesel generators used in textile industry produce pollutants that are released in to the air. Also, the water discharged from these industries contains high amount of chemicals which is harmful to every life including plants also.

The Milma units also produce waste water, which is treated from the effluent treatment plant of the diary unit located near to the Milma Diary at Podikkundu. The treated water is mainly used for plantations inside the Milma Dairy especially the curry leaf plants, cultivated there, for adding in sambharam. So the pollutants in this unit are staved off up to a certain limit.

- ***Pollution from health care institutions***

There are a number of health care institutions in the Corporation area. The sources of water pollution from hospitals are sewage and the wastes from laundry, laboratory, operation theatres, canteen, toilets, etc. Air pollution results from the functioning of generator sets and incinerators. Bio medical wastes include human anatomical waste, animal waste, microbiology and biotechnology waste, waste sharps, discarded medicines and cytotoxic drugs, soiled waste, solid waste, liquid waste, incineration ash and chemical waste.

- ***Water pollution***

As there is no proper drainage network, the road side drains end at the natural water bodies such as Ammayithodu, Kakkad and Padannathodu and finally it reaches the rivers and at last in the Arabian Sea. Due to discharge of sullage and hotel wastes through these storm water drains, the natural water bodies get contaminated. This will promote the growth of micro-organisms like pathogens which cause several intestinal diseases like Malaria, typhoid, cholera etc. The solid waste disposal in water bodies also contaminates them. The encroachment of river banks by the adjoining land holders is also a part of it.

20.2 CONSERVATION EFFORTS

Irrigation Department of Kerala has already completed efforts to conserve Kanampuzha River. As a part of this, side walls are constructed at many stretches of the river. But still many stretches need side walls. The people's participation is required to protect the river.

The mangroves on the side of river which are undisturbed to an extent, has to be protected. Even though the sea wall construction at the southern boundary is almost completed, during rainy season, the wave action damages the sea wall frequently. The Anakkulam and Chettyarkulam are also renovated recently.

20.3 DEVELOPMENT POTENTIALS AND PROBLEMS

Munderi Kadavu Bird Sanctuary; a biodiversity rich wetland area is a part of Kattampally River. It is on the suburb of Kannur. This area is famous for migratory birds. So conservation of the river is very important. Since Kanampuzha River is a perennial one; it influences the water in the nearby wells. So the waste deposition in the river is strictly avoided.

There is a scope for a boating service through Varamkadavu, Pullooppikadavu and Munderykadavu. Due to the presence of bird sanctuary, it can be enhanced as a tourist spot.

Since mangroves can hold the soil together and prevent coastal erosion, they are helpful for protecting vulnerable coastlines from wave action. Also mangrove forests provide homes for several species of plants and animals. In the Corporation area, mangroves exist mainly on the banks of Kanampuzha River and to some extent, in Kattampally also. Due to their importance, these mangrove forests deserve preservation.

The improvement of aquaculture which is already taking place in the rivers will be economically helpful to the planning area.

Conversion of paddy fields in Kanampuzha water shed to non-paddy or non-agricultural purposes is a major issue in the planning area. Due to the timber seasoning, depositing of solid wastes, plastics and sewage outlets from households, Kanampuzha River is fully contaminated. Many stretches of the River need side walls. The encroachment of water bodies is another issue faced in the planning area. Also, lack of proper drainage network, contaminate natural water bodies.

Due to all the above issues, the Corporation authorities have to give priority to protect the river and water resources. The awareness of people about the importance of environment protection is alarmingly poor in this area.

In the Corporation area, all the industries are under either orange or green category based on the “Range of Pollution Index". About 25% of the industries are manufacturing followed by textile units (21%). These industries as well as Milma units cause discharge of waste water and emission of toxic gases such as Sulphur dioxide, oxides of nitrogen etc.

20.4 INFERENCE

Developing the city in an environment ally friendly way is also a part of development plan. In Kannur Corporation area, there are so many ecologically sensitive areas. The environmental problems normally generated are related to the waste disposal, river encroachments and misuse of natural resources. The

natural drains and water bodies are required to be protected from being polluted by various causes. Unscientific use and disposal of plastic and other hazardous substances are to be taken care of with proper planning and regulations.

The conversion of paddy lands along Kanampuzha water shed has to be discouraged by adopting various measures by providing better infrastructure facilities to improve the cultivable area and productivity. Also, there is a potential for tourism development of Adikadalayi beach and Kanampuzha River. Walk ways can be constructed along the banks of River.

The eco-sensitive areas need to be protected and conserved. Measures needed to be taken by the municipal Corporation and authorities concerned to protect these environmentally sensitive areas. It can be implemented through proper action plans involving people's participation.

Also, the destruction of forests, wetlands, sacred groves and laterite hills over the last few decades makes rain water to discharge into the plateau without any percolation. Because they act as aquifers and help replenish the water table during the rainy season.

Building up of solar power plants in Kannur is a key step towards development. The purpose is to create energy that improves life for present and future generations and hence to provide sustainable solutions for society and deliver excellent value. The main aim of the project is responsible energy production focusing on low emissions; high resource efficiency and security of supply. This initiative will also inherit the sense of energy utilisation among the young citizens, and make them understand and bring the values of solar energy into the society.

CHAPTER 21

MUNICIPAL FINANCE

Municipal finances in India are characterised by the constant tension between the funds and functions of Local Governments. The main sources of municipal revenues can be boxed under the categories tax revenues, non - tax revenues, assigned (shared) revenue, grants - in - aid, loans and other receipts. Cities in India have insufficient revenue tools to meet their expenditure requirements.

Local Self - Government Institutions or Local Bodies directly influence the welfare of the people by providing civic, social and economic infrastructure services and facilities in both urban and rural areas. However, over a period of time, the functions and responsibilities of local bodies have increased considerably without commensurate enhancement of their resource base.

Constitutionally built-in imbalances in functions and finances assigned to various levels of government eventually reflect in the high dependency of local bodies on State Governments and the latter, in turn, on Central Government for funds. Moreover, in the absence of financial support coming from the upper tiers of Government, these bodies may have to resort to borrowings from financial institutions and the capital market.

The chapter deals with the existing status of Municipal finance and their potentials and problems in Kannur Corporation area.

21.1 MUNICIPAL FINANCE

21.1.1 ANALYSIS OF EXISTING STATUS

Kannur Municipal Corporation area was formed on November 1 2015; hence the data regarding income, expenditure and profit/deficit of the city is given for the period from April 2016 to March 2019. The income generated from various sources and the expenditure of the planning area for the period from 2016 to 2019 are given in Table.21.1.

The major income sources are Revenue Grants, Contributions & Subsidies as well as tax revenues. The amount utilized for Programme Expenses and Establishment Expenses are the major expenditures in Corporation area. All other expenditures are less than 10 crores.

Table.21.1 Details of income and expenditure of Kannur Corporation area

Head of Account	Year		
	2016-2017	**2017-2018**	**2018-2019**
INCOME			
Tax Revenue	17,15,48,609.88	19,39,43,088.00	15,72,23,806.00
Assigned Revenues & Compensation	6,650.00	21,569.00	29,560.00
Rental Income from Municipal Properties	2,33,20,312.00	2,51,60,603.00	2,43,40,284.00
Fees & User Charges	6,91,36,783.00	4,29,54,972.00	2,00,77,406.00
Sale & Hire Charges	16,49,145.00	2,14,45,466.00	7,39,403.00
Revenue Grants, Contributions & Subsidies	21,99,83,838.00	77,97,20,611.00	27,64,59,939.00
Income from Investments		71,70,885.00	18,586.00
Interest Earned	66,23,932.00	44,55,621.00	72,967.00
Other Income	53,44,703.00	9,80,591.00	6,41,760.00
Total	**49,76,13,972.88**	**107,58,53,406.00**	**47,96,03,711.00**
EXPENDITURE			
Establishment Expenses	19,32,81,787.00	25,47,02,276.00	25,21,47,953.00
Administrative Expenses	4,34,18,705.00	4,69,23,912.00	4,74,56,122.00
Operations & Maintenance	5,90,97,802.16	5,22,91,992.00	3,13,96,262.00
Interest & Finance Charges	17,89,659.00	3,01,012.00	8,60,880.00
Programme Expenses	3,95,93,132.00	37,27,46,564.00	43,61,12,723.00
Decentralised Plan Programme - Service Sector	2,74,09,392.00	4,41,37,037.00	4,59,66,716.00
Decentralised Plan Programme - Infrastructure Sector	4,28,30,644.00	11,19,17,276.00	8,26,85,389.00
Decentralised Plan Programme - Projects not included in Sector Division	96,58,336.00	2,10,75,625.00	94,86,583.00
Revenue Grants, Contribution and Subsidies		2,99,528.00	26,462.00
Total	**41,70,79,457.16**	**90,43,95,222.00**	**90,61,39,090.00**
Gross Surplus/Deficit of Income over Expenditure	8,05,34,515.72	17,14,58,184.00	-42,65,35,379.00
Prior Period Item	25,93,278.00	61,954.00	22,271.00
Gross Surplus/Deficit of Income over Expenditure after prior period ITEMS	**8,31,27,793.72**	**17,15,20,138.00**	**-42,65,13,108.00**

For the year 2018 to 2019, the income and expenditure data says that the planning area is facing deficit instead of gross surplus.

21.1.2 SOURCES OF FUND

The Corporation area has mainly four sources of funds which include:

- Own revenues
- State Government Aided funds
- Central Government Aided funds
- Loan from financial Institutions

To improve the financial condition of the planning area, it has to think of increasing the income from its properties and at the same time, the physical condition of such properties including buildings must be improved for durability and for attracting tenants or agents.

21.2 MUNICIPAL GOVERNANCE

Any project or programme whether it is Government sponsored or Municipal Corporation owned/sponsored, will be discussed in the Standing Committee concerned and thereafter if deserveing, it will be forwarded to Municipal Council for discussion and the Municipal Council will take a resolution and accordingly the Secretary passes orders to implement such resolutions.

A Standing Committee can accord an administrative sanction for a maximum amount of Rs.50,000/- for the implementation of a project. For amounts greater than Rs.50,000/-, the Municipal Council's sanction is required with an approval of District Planning Committee.

There are three tier Technical Advisory Groups in Kerala, namely Municipal Level Technical Advisory Group (MLTAG), District Level Technical Advisory Group (DLTAG) and State Level Technical Advisory Group (SLTAG). The MLTAG can give technical sanction for a project to a maximum amount of Rs 45,00,000/- only and if the amount is above this, technical sanction shall be accorded by DLTAG or SLTAG.

21.3 DEVELOPMENT POTENTIALS AND PROBLEMS

The trade and commercial activities as well as tourism, especially the beach tourism, in Kannur Corporation area can contribute a lot to the municipal income. The renovation and maintenance of existing parks, heritages and other tourist spots will increase the tourism potential, there by economic growth of the planning area is possible to a great extent. The proximity of international airport offers great potential on the exporting of various products like fruits, vegetables, flower, meats etc. and this can impart a momentum for raising the municipal income.

The return from agriculture sector is not sustainable and diminishing

year by year and is in turn reflected in the financial sector of the planning area. Hence, there is a need to enhance agriculture and related activities within the Corporation area.

The income from tourism sector can also be increased by conducting tourism circuits connecting the tourist spots in and around the planning area. Since it is the administrative as well as commercial centre of the district, the opening of new shopping complexes will definitely generate more income through trade and commercial activities in Corporation area. Since the proposed inland water way network is passing through here, the tourism as well as commercial potential of the planning area will increase.

Though Municipal Corporation Office as well as major government institutions is situated at the heart of the Corporation area, need of the people to come to the town centre is very large. But the infrastructure facilities are not that much good due to the lack of good conditioned road networks, traffic issues, parking facilities, comfort stations etc. The market areas which are the main commercial centres here face lack of loading and unloading facilities, widened roads, parking facilities, comfort stations, solid waste management facilities etc.

21.4 INFERENCE

Today, the sustainable source of income in Kannur Corporation area comprises Revenue Grants, Contributions & Subsidies as well as tax revenues. The commercial as well as the tourism potential of the planning area is income generating and is on the verge of development. The proper utilization of municipal assets and innovative new projects can bring sustainable income generation for the Corporation area. The upcoming inland water way network which is passing through here is the major thrust on this sector. Starting up of sub-centres at hinterland portions will be helpful for the public residing at remote wards of the Corporation area. Also, encouragement of small scale industries as well agriculture will be very useful for the Corporation area. The improvement of infrastructure facilities in the market as well as core town area can increase the income of the planning area.

CHAPTER 22

DISASTER MANAGEMENT- RISK ASSESSMENT

"Disaster" as catastrophe, mishap, calamity or grave affecting any are from natural and made causes or by accidents or negligence which results in substantial loss of life or human sufferings or damage to and destruction of property or damage or degradation of environment and is of such nature and magnitudes to be beyond the capacity of the community of the affected area.

Disasters and their management generally get discussed in their aftermath. This discussion should result in planning and preparing the strategy to tackle and mitigate disasters in a responsible and effective manner. Disasters, both natural and manmadel, are macro level unexpected events or processes, which can occur anywhere at any time. Disaster management is essentially a dynamic process. It comprises the classical management functions of planning, organizing, staffing, leading and controlling. It also involves many organizations, which must work together to prevent, mitigate, prepare for risk reduction, respond to and recover from the effects of disaster and obey the motto of "Towards a safer state".

This chapter is about the effects of various types of disasters, their dimensions and characteristics in Kannur city.

22.1 INTRODUCTION

Disasters can originate in different sources and systems, such as atmospheric, hydrometeriological, oceanographic, volcanologic, seismic, neotectonic etc. Globally, losses from natural hazards are also increasing which is mostly due to the rapid increase in human population. This unprecedented number of people has reduced resource availability and forced people to live in marginal areas where natural hazards occur more frequently and often with greater severity.

Disaster subcategory definitions:

1. **Naturally Triggered/Weather related:** Events caused by short-lived/small to meso-scale atmospheric processes (in the spectrum from minutes to days).

2. **Geological:** Events originating from solid earth.
3. **Biological:** Disaster caused by the exposure of living organisms to germs and toxic substances.
4. **Anthropogenically technologically triggered:** Disaster triggered by human intervention.

22.2 NATIONAL POLICY

- The themes underpinning the national policy are:
- Community based DM, including last mile integration of the policy, plans and execution.
- Capacity development in all spheres.
- Consolidation of past initiatives and best practices.
- Cooperation with agencies at National and International levels.
- Multi-sectoral synergy.

The objectives of the National Policy on Disaster Management are:

- Promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education.
- Encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability.
- Mainstreaming disaster management into the developmental planning process.
- Establishing institutional and techno legal frameworks to create an enabling regulatory environment and a compliance regime.
- Ensuring efficient mechanism for identification, assessment and monitoring of disaster risks.
- Developing contemporary forecasting and early warning systems backed by responsive and fail-safe communication with information technology support.
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat for ensuring safer living.
- Promoting a productive and proactive partnership with the media for disaster management.

22.3 STATE POLICY

The Kerala State Disaster Management Policy underscores an integrated approach to disaster management covering all phases of managing disasters such as:

- Pre disaster phase–Prevention, Mitigation and Preparedness
- Disaster response phase/during disaster

Post disaster phase recovery (rehabilitation and reconstruction)

The state would lay emphasis on pre disaster activities such as prevention, mitigation and preparedness in line with the paradigm shift in disaster management.

The State Government shall issue specific guidelines and devise exact measures for implementation of the State Policy during various phases of a disaster in its State Disaster Management Plan.

Pre disaster phase - Prevention, Mitigation and Preparedness

The pre disaster phase includes prevention, mitigation, and preparedness activities and all these activities together form "Disaster Risk Management".

1. **Prevention:** Measures aimed at eliminating the occurrence of a disaster event or reducing the severity of a disaster.
2. **Mitigation:** Long term measures taken in advance that decrease or lessen the impact of a disaster on society and environment by improving a community's ability to absorb the impact with minimum damage or disruptive effect.
3. **Preparedness:** Measures that enable the government, communities and individuals to respond rapidly and effectively to disaster situations and ensure that communities and services are capable of coping with the effect of disasters.

22.4 DISTRICT LEVEL STUDY OF DISASTERS

Kannur district is a multi-hazard prone district with natural disasters such as floods, landslides, drought, earthquake, coastal related disasters like cyclones, coastal erosion and tidal waves (Tsunami) and manmade disasters such as road accidents, fire accidents, bomb blasts, drowning etc. Every year, the district bears huge loss from natural and manmade disasters. It causes widespread damage to life and property. The unique geo - climatic and social condition of the district make the place more vulnerable to disasters. The coastal community faces constant threat of sea erosion while the communities living in the midland are vulnerable to flood and lightning. The hill communities are prone to land slipping and slides.

While analysing the vulnerability of the district, ecologically sensitive areas in the district as per Gadgil report is to be considered and are shown in Figure.22.1. The figure indicates Cherupuzha, Udhayagiri, Naduvil, Eruvessy, Payyavoor, Ulikkal, Payam, Ayyankunnu, Pattiom

and Kunnothuparamba are identified as Ecological Sensitive Zone 1. That means these areas required special attention in future developments. The new developments should be limited and provides only environmental friendly developments. Moreover, as per Gadgil report, Ayyankunnu, Aralam, Kelakom, Kottiyoor, Peravoor and Kanichar were identified as protected areas in Kannur District.

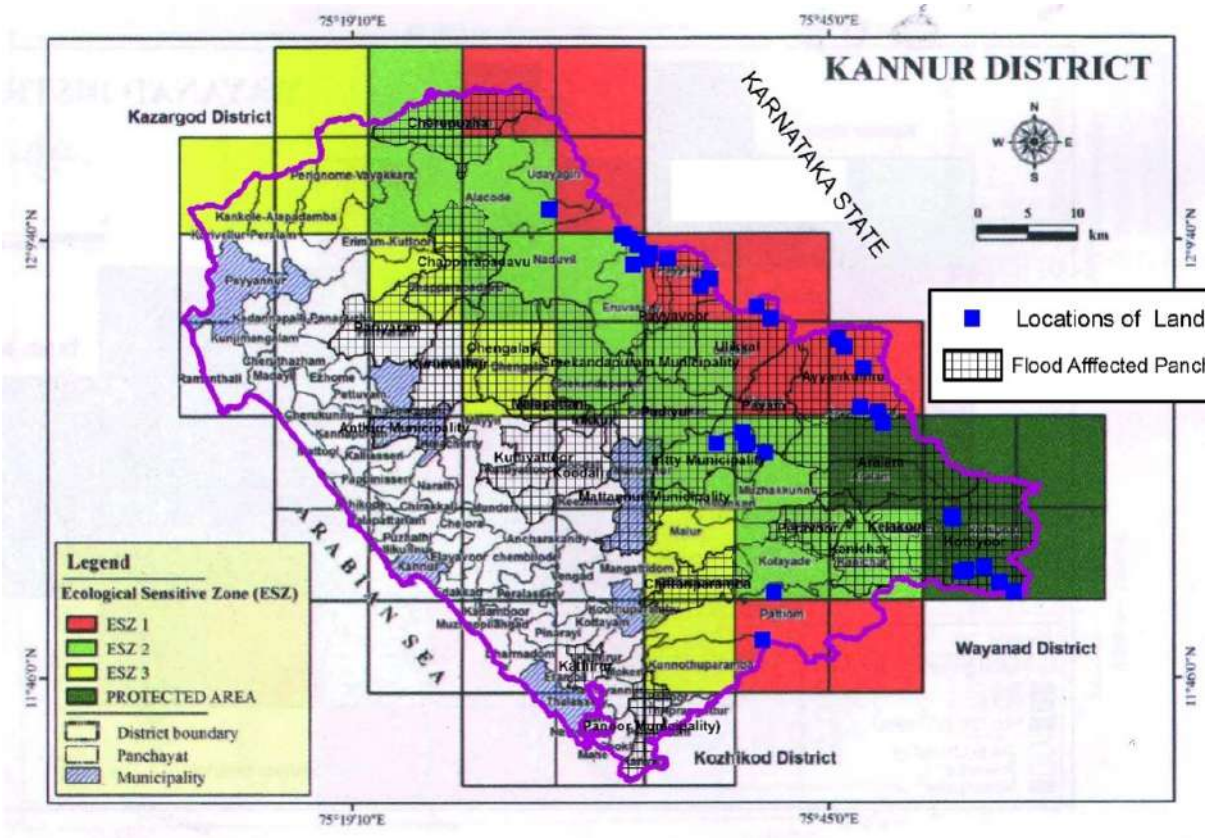


Figure.22.1 Ecological Sensitive Zones as per Gadgil Report

Since the Gagdil Committee report was criticised for being excessively environment-friendly and not in tune with the ground realities, a report on Western Ghats was prepared by K. Kasturi Rangan and it recommended prohibition on development activities in 60,000 km² ecologically sensitive area spread over Gujarat, Karnataka, Maharashtra, Goa, Kerala and Tamil Nadu.

In Kasthuri Rangan report, Aralam, Kottiyoor and Cheruvancherry Villages in the district were identified as ecologically sensitive units. It can be seen that about 10% of land area of Kannur district is zoned as ecologically sensitive area. It can be seen that about 10% of land area of District is zoned as ecologically sensitive area.

While discussing the disasters of Kannur city, the study cannot be limited within its boundary as it depends on its neighbouring areas also. Hence the district level brief study is carried out followed by the town profile.

22.4.1 FLOOD

Floods are naturally occurring events where a particular piece of land that is usually dry in condition, suddenly gets submerged under water.

The district is prone mostly to the river flood and the coastal flood. The reason for local floods found in the low lying areas of coastal region, especially in the northern part of the district, is poor drainage condition mainly due to the geography of the region. Some parts of the sea areas are below sea level and the flooded water from the rain and surge stayed there. Soil erosion and silting of river beds add to the reason.

In 2018 and 2019 years, Kerala experienced an abnormally heavy rainfall which resulted in flood and landslides after 1924. Even though the state had about 23.42% of excess water in 2018, that flood didn't adversely affect the northern part of Kerala that much whereas, during 2019 flood, those parts also got affected. Along with flood, landslides also happened.

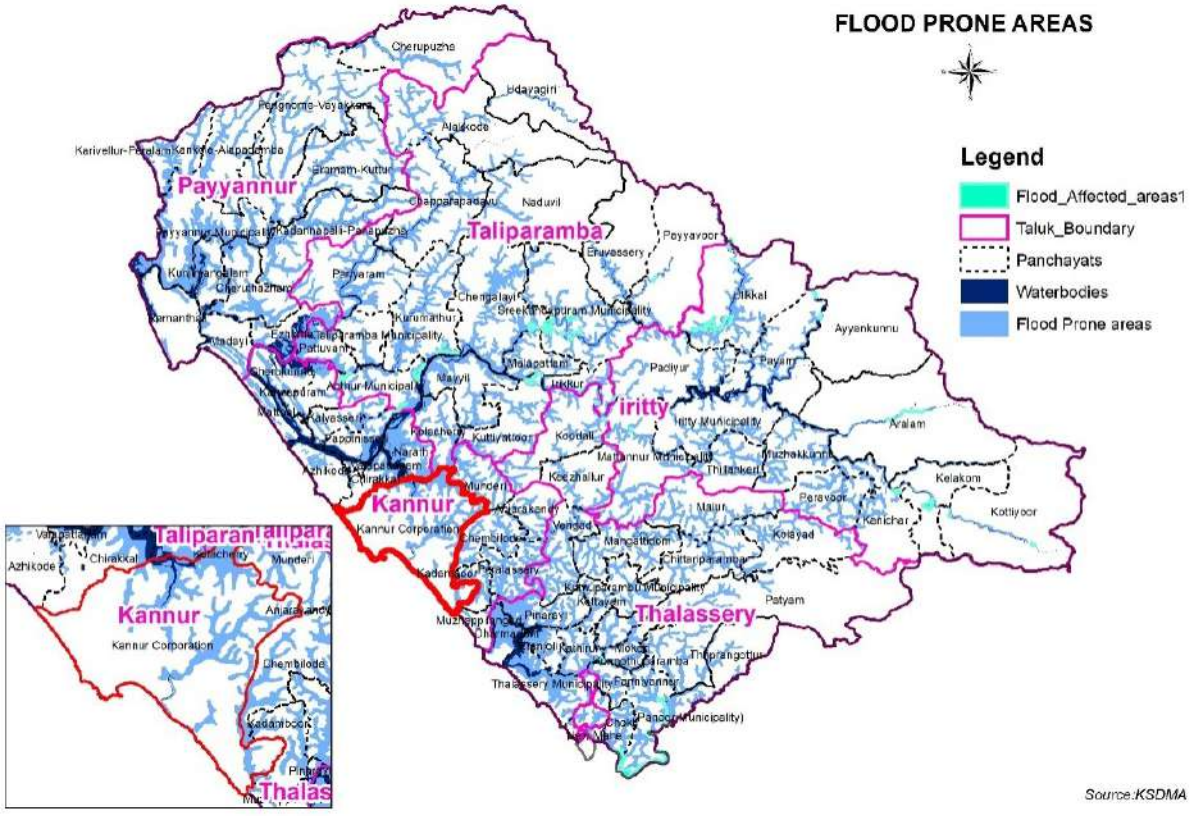


Figure.22.2 Flood prone areas in Kannur district

Kerala State Disaster Management has declared red alert in the entire state. Flooding is extremely dangerous and it results is wiping away an entire area and causes extensive damage to life and property.

The worst flood and landslide affected districts in Kerala are Ernakulum, Idukki, Pathanamthitta, Thrissur, Alappuzha, Kottayam, Palakkad, Malappuram and Wayanad. But in Kannur district, the land slide occurred in eastern part of the district and also in continuation, the moderate flood in low lying areas throughout the district.

There is no effective flood forecasting system evolved so far; but it has to be understood by incessant rains. In the mega flood, 2018 of Kannur district, about 30 people have died and over 2035 people(681 families) had to be evacuated to 22 relief camps across the District during the disaster. Also, 13 buildings were lost along with the lands around it. The number of buildings that suffered complete and partial loss is 147 and 1578 respectively.

In case of a disaster, which may be in the form of heavy floods or earthquake, there is a possibility of dam collapse. The main dam in the District is Pazhassi dam. Pazhassi dam is across of Valapattanam River at Kuiloor, Veliyambra about 38 km from Kannur and Thalassery. Pazhassi reservoir has a full Reservoir Level of 26.52 metres (87.0 ft), with an area of 650 Ha (1,600 acres) and a gross storage capacity of 97,500,000 m^3 (79,045 acre. ft) and extends up to Vallithodu about 12 km north east of the dam. The length of the dam is 245 m with a spillway of 138 m.

During 2019 monsoon, because of the failure in the shutters, the authorities could not open the shutters and this caused flooding in the upper regions of the dam especially in Iritty region. Both the urban and rural areas were flooded and huge losses to the properties occurred.

The flood prone areas of the district are shown in Figure.22.2. The low lying areas which are near to the major rivers in the district are prone to flood. Among these, Valapattanam River and Anjarakkandy River can be considered as in high risk.

Sponge cities are cities designed so that rainwater is kept and absorbed where it falls through sustainable urban drainage systems, leased from its green infrastructure. Green infrastructure technologies involve elements that allow greater permeability in the soil for rainwater absorption. Among them we can highlight: parks, drainage pavements, rain gardens, infiltration and retention wells, urban gardens and plantations, green walls and roofs.

Implementing an effective sponge city strategy requires major investment, particularly when retrofitting existing urban areas. However, compared to the costs

involved in repairing the damage caused by major flooding events a one-off investment in natural sponge city systems is common sense, potentially producing massive savings in the long run. There are also many associated benefits, including reduced pollution and the boost to mental and physical health that comes with adding more green space and water bodies in the city.

22.4.2 LANDSLIDE AND LANDSLIP

Landslide is a common phenomenon in the highland regions of the district especially during Monsoon season. The landslide susceptibility map of the district is shown in Figure.22.3.

In Kannur district, high hazard zonation area constitutes 168.7 km^2 and that of moderate hazard zonation area is 272.6 km^2. More than 5 major landslides were reported recently. Heavy casualty to human beings, properties e.g. roads, buildings and agricultural land crops have also been reported in recent years.

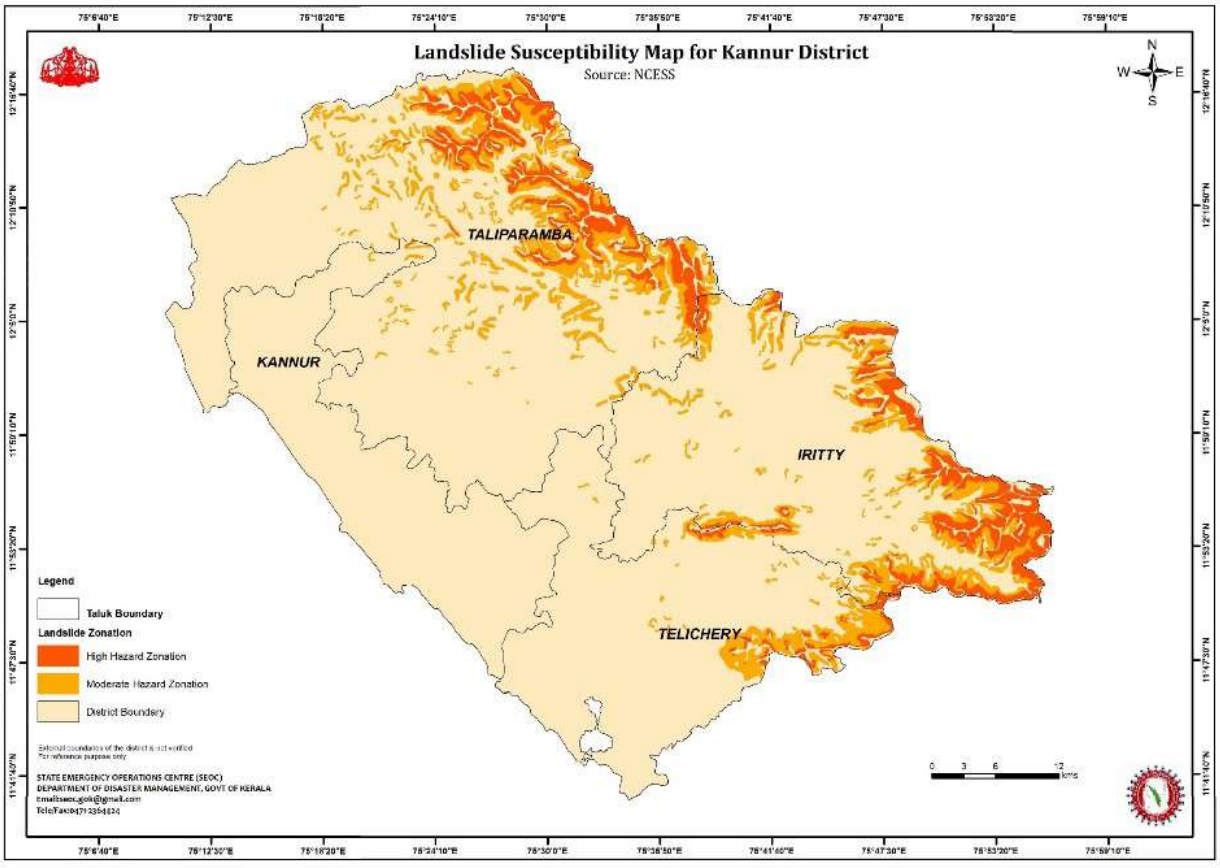


Figure.22.3 Landslide susceptibility map for Kannur district

In Kannur district, Ayyankunnu, Kottiyoor, Aralam, Eruvessy, Kelakom etc. are the moderately landslide affected areas along with the heavy rain fall in 2018 monsoon.

The Table.22.1 indicates the name of local body and the type of disaster occurred.

Table.22.1 The type of disaster occurred in different local bodies in 2018 monsoon

Sl. No.	LSGI	Village	
		Landslide	Flood
1	Eruvessy	Eruvessy	-
2	Iritty	Keezhur	Chavassery
3	Kottiyoor	Kottiyoor	Kottiyoor
4	Kathirur	-	Kathirur
5	Payam	Vilamana	Vilamana
6	Ayyankunnu	Ayyankunnu	-
7	Kuttiyattur	-	Kuttiyattur
8	Kurumathur	-	Kurumathur
9	Kelakom	Kelakom	Kelakom
10	Irikkur	-	Irikkur
11	Aralam	Aralam	Aralam
12	Alakode	Vellad	-
13	Naduvil	New Naduvil	-
14	Thripangotoor	Thripangotoor	-
15	Chengalayi	-	Chengalayi
16	Sreekandapuram	Sreekandapuram	Sreekandapuram
17	Payyavoor	Payyavoor	-
18	Panoor	-	Peringathoor, Peringalam
19	Kanichar	-	Kanichar
20	Ulikal	Vayathur	Nuchiyad, Vayathur

21	Andoor	-	Morazha, Andoor
22	Mattannur	-	Kolari

The Figure.22.4 indicates the identification of landslide and flood affected Panchayats in Kannur district. The major damages in Kannur district were due to the landslide issues. Flooding damages were comparatively low.

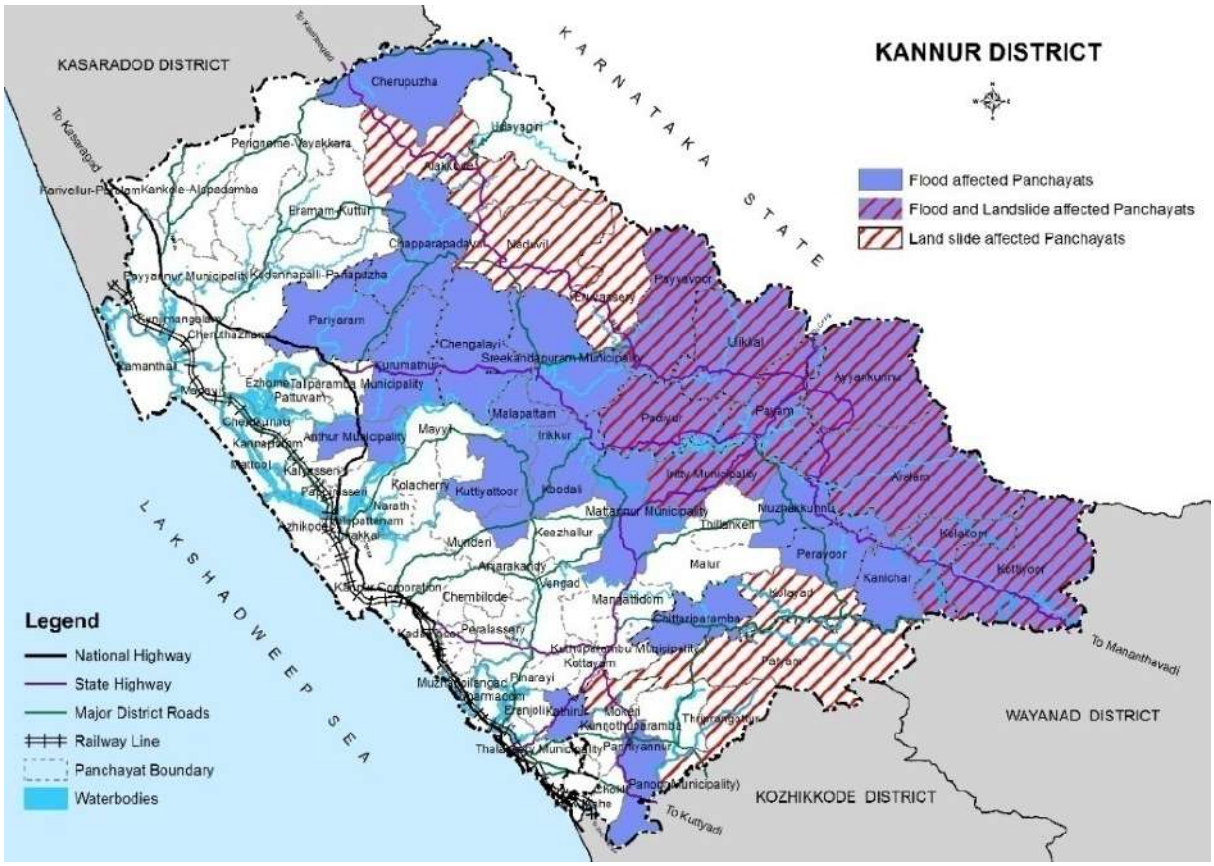


Figure.22.4 Landslide and flood affected Panchayats in Kannur district

22.4.3 DROUGHT

Drought occurs when the level of the groundwater is low and the water content in the soil is less. During last several years, many parts of the district, especially highlands faced serious problems of drought. Several hectares of agricultural land became dry and agricultural crops were lost due to drought. People were forced to walk long distance for fetching drinking water. Water scarcity intensifies during March to end of May, every year.

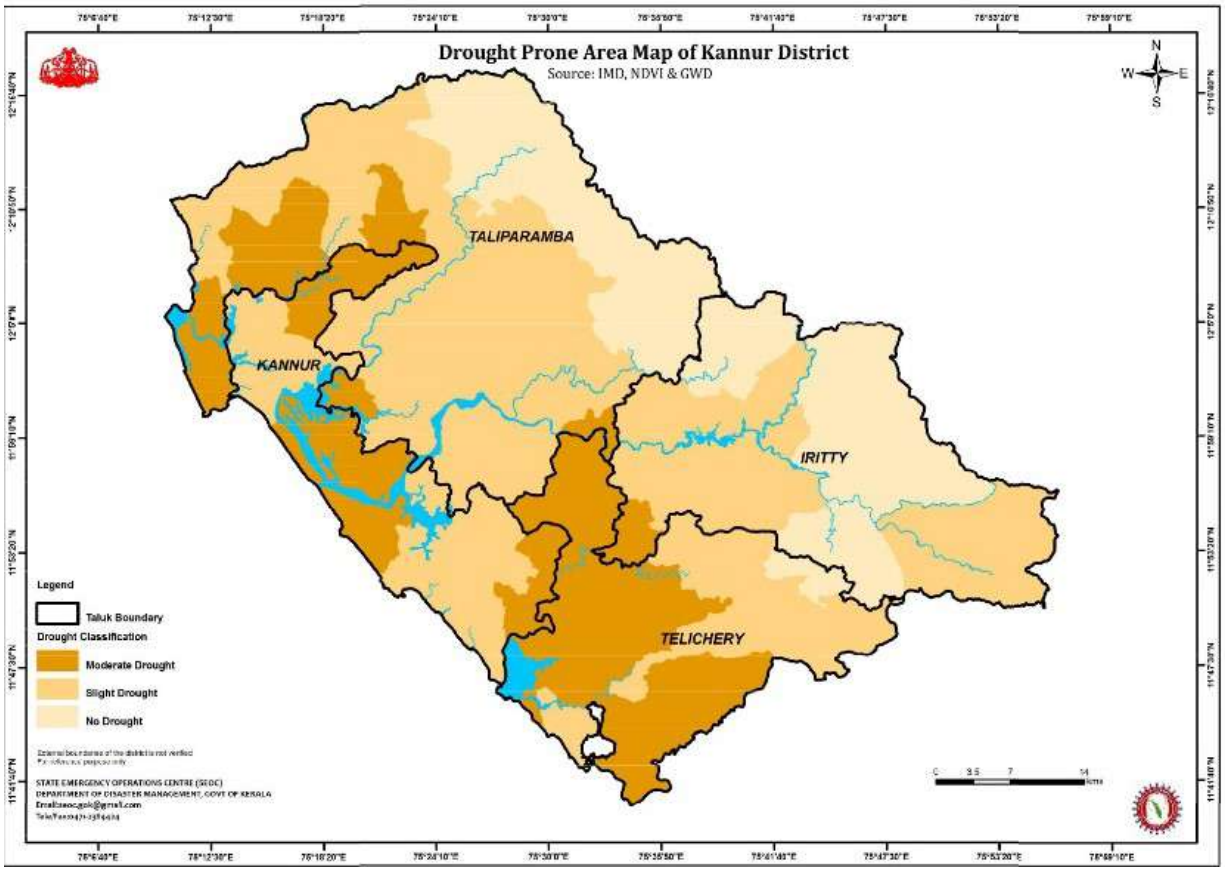


Figure.22.5 Drought areas in Kannur district

The Figure.22.5 indicates that in a given season, if the rainfall density is:

- >10% of the long period average, the area demarcated as severe drought will experience drinking water shortage.
- >26% of the long period average, the area demarcated as moderate drought will experience drinking water shortage.
- >50% of the long period average, the area demarcated as slight drought will experience drinking water shortage.

In Kannur district there are no severe drought areas whereas moderate, slight and no drought areas constitute 24.3%, 50.1% and 25.6% respectively.

22.4.4 THUNDER AND LIGHTNING

Thunder and Lightning are common phenomena in the district during both Monsoons and November rains called "Thulavarsham". Most of the casualties reported due to lightning and thunder are in Pre-Monsoon season and at the time of Thulavarsham. Losses to human lives, livestock, houses and buildings and

crops like Coconut, Arecanut and Rubber are also being reported extensively.

22.4.5 EPIDEMICS/PANDEMICS

Incidence of Epidemics like Viral fever, Leptospirosis, Hepatitis, Chikungunya, Dengue fever, Cholera, Filariasis, Typhoid etc. has become common in the district. Coastal, urban and hilly areas are more prone to epidemics. Some tribal colonies in high ranges and also fishermen colonies usually suffer from such epidemics during monsoon season.

The Pandemic, Corona Virus disease (COVID-19) is an infectious disease caused by Corona Virus. Most of the infected people will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The disease seriously affected the district also.

22.4.6 COASTAL RELATED DISASTERS

Coastal hazard susceptibility map of the district is shown in Figure.22.6 which indicates Coastal Taluks are susceptible to coastal hazards. Cyclones, boat capsizing, coastal erosion, storm surge, tsunami etc. are various types of coastal related disasters.

The Kannur district is entirely cyclone prone and a wind speed of 39 m/s can hit the district. Last year's, formation of low pressure in the Arabian Sea, caused heavy rain resulting in severe damages to district. Sometimes, with the unpredictable disturbances in the sea, boats and country crafts get capsized, trapped in to high tide and even get fully destroyed along with man missing cases. Due to bad weather, the fishermen who go for fishing are unable to reach the seashore. Several accidents have taken place in the district and many human lives have been thereby lost.

Heavy rain and landslides accompanied with the low pressure system caused severe damages to the agriculture and infrastructure in the district.

The district suffers damages from sea erosion at the time of monsoon. In Kerala, Kannur district has the longest length of coastal area. The rate of erosion is very high at areas where sea wall is not built. Coastal villages in the southern and northern end of the district face high rate of erosion.

Tsunamis are most commonly generated by earthquakes in marine and coastal regions. Major Tsunamis are produced by large shallow focus earthquakes associated with the movement of oceanic and continental plates. Under water, landslides associated with smaller earthquakes

are also capable of generating destructive Tsunamis. Other large-scale disturbances of the sea-surface that can generate Tsunamis are explosive volcanoes and asteroid impacts. In 2004 Tsunami, the coastal villages in the Kannur district got affected and one person was killed. Severe damages occurred to the sea wall.

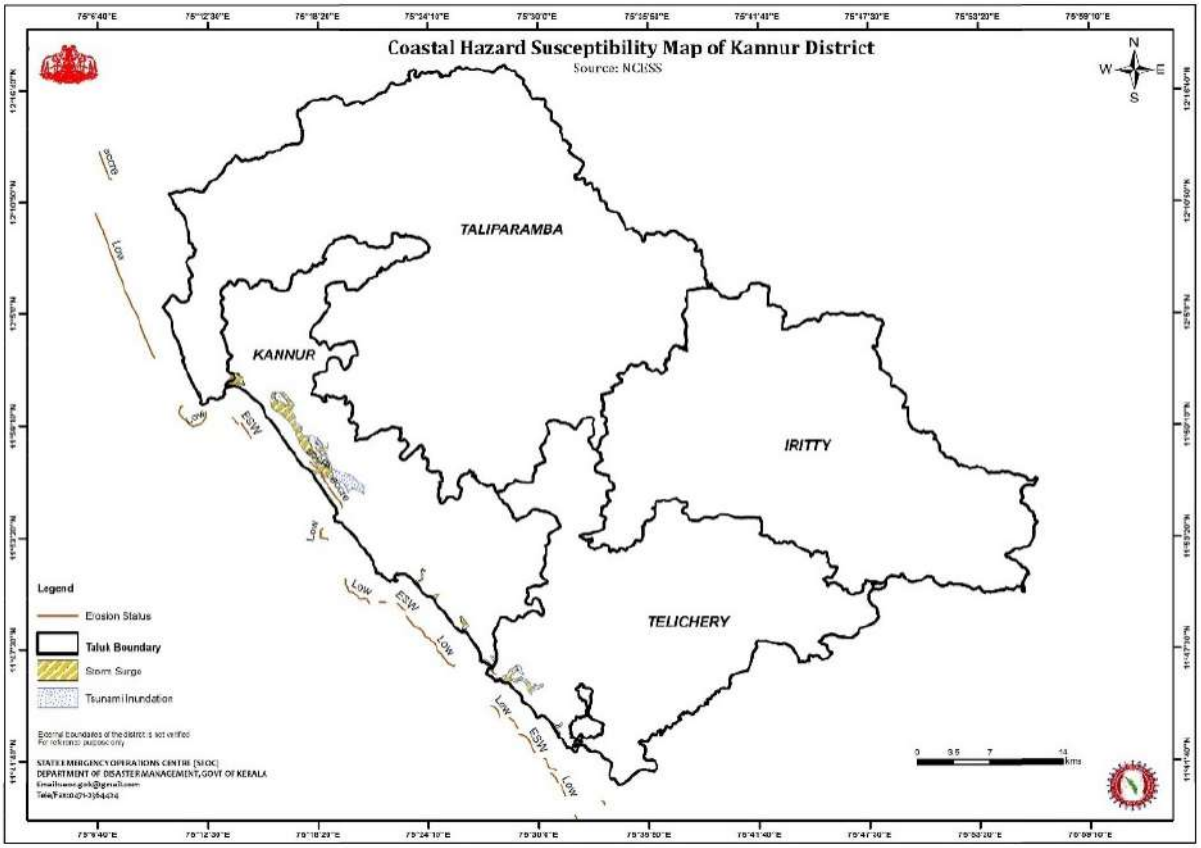


Figure.22.6 Coastal hazard susceptibility map of Kannur district

22.4.7 EARTHQUAKE

Kannur district did not experience the threat of large scale earthquake. But minor tremors have been experienced in several parts of this district especially in high ranges recently. Taliparamba, Thalassery and Mahe are the earthquake/tremor prone areas in the district. If such major disaster occurs, severe damages are likely to be caused to the structure of buildings and houses. A tremor of 1.3 in Richter scales was experienced in August 2006 in some parts of Alakode Panchayath.

The whole district comes under the Earthquake zone IV where an Earthquake of magnitude 6 may occur.

22.4.8 AIR ACCIDENTS

As the district is situated in between Mangalore, Bangalore,

Kannur and Calicut airports the chance of air crashes is very high.

22.4.9 CHEMICAL AND INDUSTRIAL DISASTERS

In Kannur district, chemical industries are rare but there are a lot of small scale industries and Petroleum storage, distribution and LPG bottling centres. The areas near to these centres are prone to disasters. As the NH-66 passes through the district, accidents may occur at the time of transportation of Petroleum products and other toxic substances. Large containers of petroleum products like benzene and chemicals such as ammonia might lead to explosion while transportation or evacuation.

Major Accident Hazard (MAH) unit in the district is Malabar Fuel Corporation Ltd. at Pallivayal, Taliparmba which is a manufacturing unit of LPG. About 20-50 staffs are working in this unit. Critical nature of Flammable and Toxic products being handled there is the main reason for considering that as a MAH unit.

22.4.10 FIRE

Fire can occur due to short circuit; human carelessness, as well as due to the explosion happened by accidents of vehicles which carry inflammable goods. Forest fire; which is another type of fire adversely affect the natural vegetation and destroy the habitats of birds and animals; hence the ecosystem.

In Kannur, there happened a fire disaster with LPG tanker explosion at Chala bypass on August 27, 2012 which led to the death and injuries of many people and animals.

22.5 KANNUR CITY - STUDY OF DISASTERS

22.5.1 MICRO WATERSHEDS OF VALAPATTANAM RIVER IN THE STUDY AREA

The major rivers flowing through the city are Kanampuzha, Kattaambally River (with major tributary Kakkad River) Thottada Puzha, and Ayyarath Puzha (Nadal Puzha) are other minor rivers. Kanampuzha River originates from Ayyappanmala in Munderi Panchayth, once the centre of the Bhoodan Movement. The river flows through Macheri, Vattappoyil, Peringalayi, Kappad, Thilanoor, Elayavoor, ThazheChovva, Marakkarkandy etc. before joining the sea at Adikadalayi in Kannur city.

Kattambally River also known as Munderippuzha is a tributary of Valapatanam River and is a vast water body located at the northern border of Kannur Municipal Corporation. Tidal water enters through Valapatanam River into this water body which makes the low lying banks marshy and the regionis called

Kaippad fields. A barrage called Kattampally spillway is constructed for regulating salt water entry into the Kattambally River. The micro watersheds in the study area are shown in Figure.22.7.

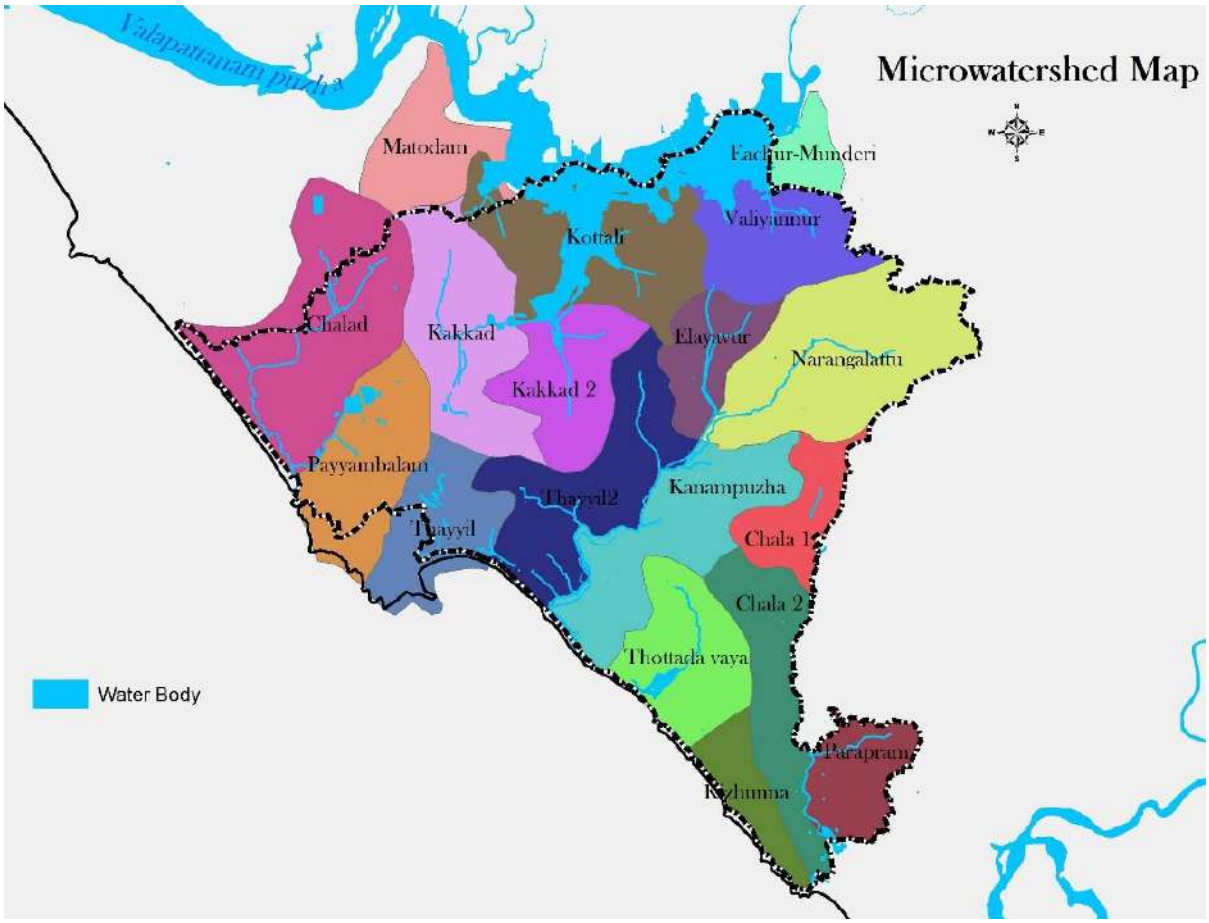


Figure.22.7 Micro-watershed in Kannur Municipal Corporation

22.5.2 FLOOD

The altitude is ranges from 0 to 75 m above M.S.L (Mean Sea Level). The low lying areas are mainly located along the river sides in the study area which are at risk in flooding.

Even though many issues are occurred in the entire Kerala during the Monsoon of 2018, the damage in town area was comparatively less. But about 45 buildings were partially damaged and one building was completely damaged.

In the monsoon of 2019, Kattampally River overflowed and areas like Athazhakkunnu, Kakkad, Pallipram, Varam, Athirakam, Thulicherry etc. were flooded. Similarly, the storm water gathered in Kanampuzha made flood along its bank in Pulukkompalam, Thazhechovva, Averappalam, Maidanappally, etc. Also, low lying areas like Thavakkara, Padannathode etc. were also affected by flood. Many families in the area were shifted to

safer locations. The relief camps were opened at Thavakkara U.P. School and Government Town Higher Secondary School.

The inundated areas of the town during the period from 2018 to 2020 are shown in Figure.22.8.

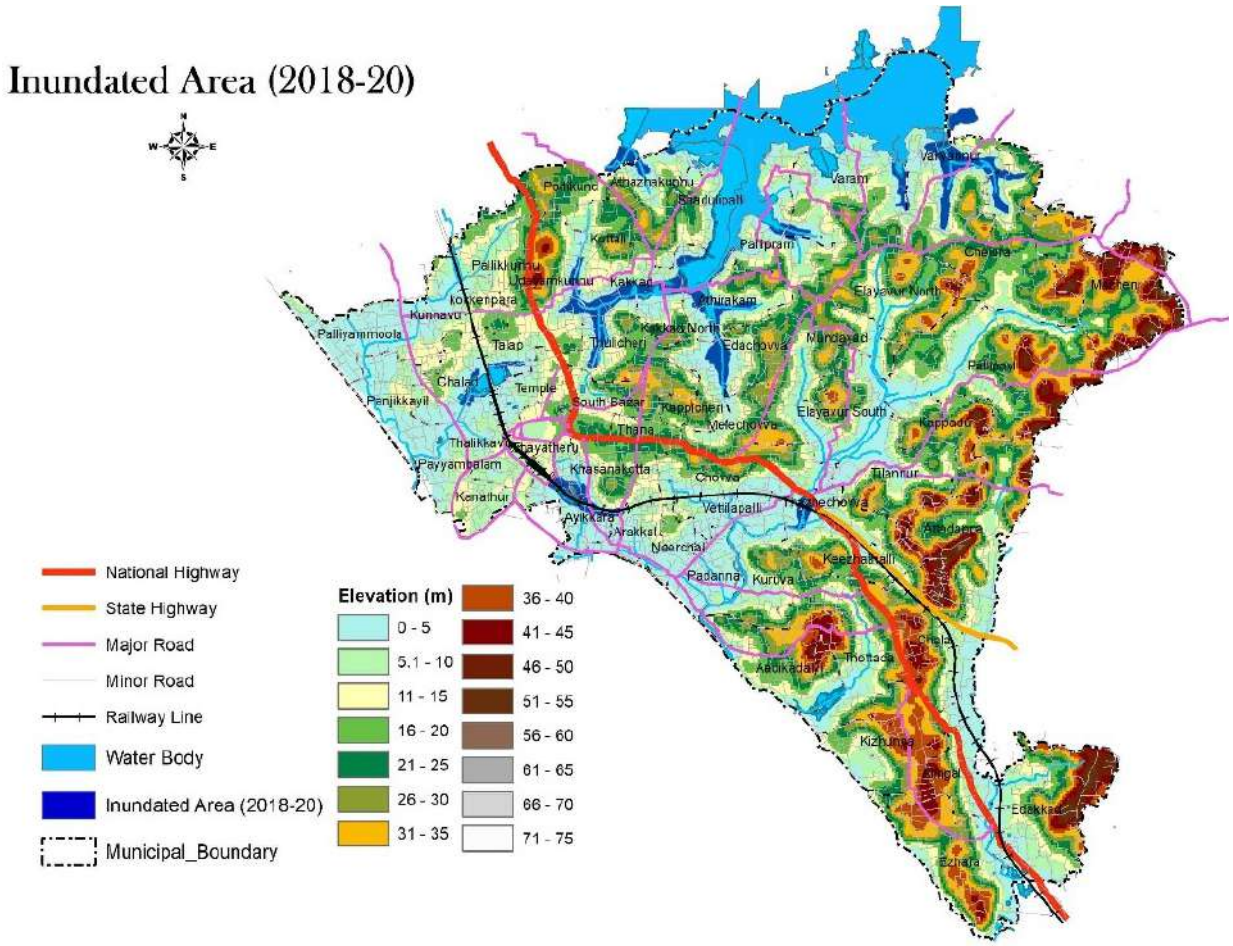


Figure.22.8 Inundated areas in Kannur Municipal Corporation (2018-2020)

The flood prone areas of the Corporation area are shown in Figure.22.9. Poor drainage condition which is mainly due to the geography of the region as well paddy and wetland reclamation and unscientific constructions in low lying areas are the main reason for flood. Since the solid waste management system is not up to the mark, the unwanted dumping of wastes is seen in natural drains which make them blocked and hence the natural flow is restricted which may cause flooding of the particular area.

The low lying areas which are near to the major rivers in the Municipal Corporation are prone to flood. Among these, Kattampally River banks can be considered as in high risk.

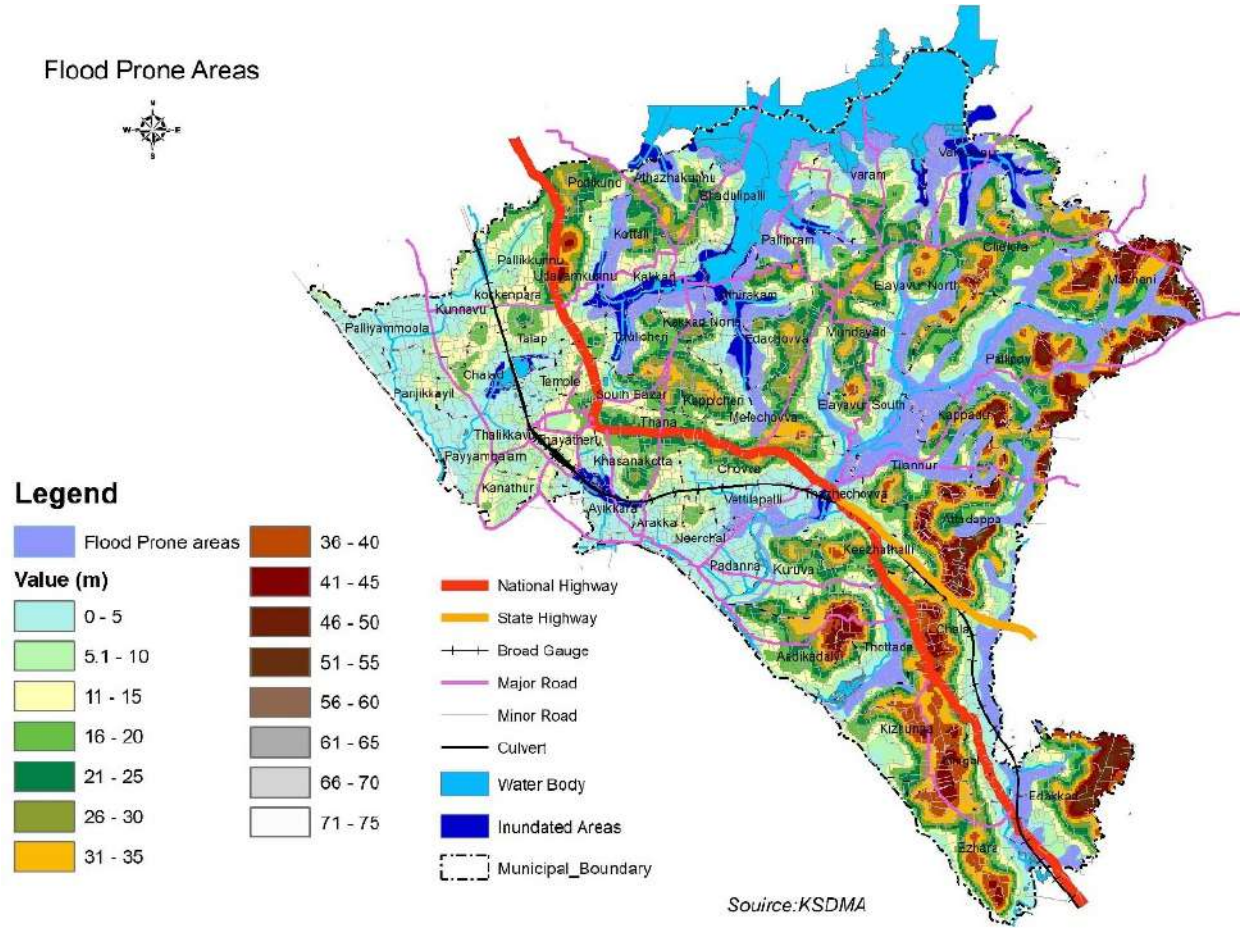


Figure.22.9 Flood prone areas of Kannur municipal town



Fire and Rescue Services personnel use an inflated boat to shift an aged woman marooned in a house at flood - affected ThazheChovva



People negotiating the floodwaters at Kakkad

As per disaster management plan for Kannur district, Elayavur and three other coastal villages; Kannur I, Kannur II and Pallikkunnu are flood prone villages. The flood prone wards are shown in Figure.22.10.

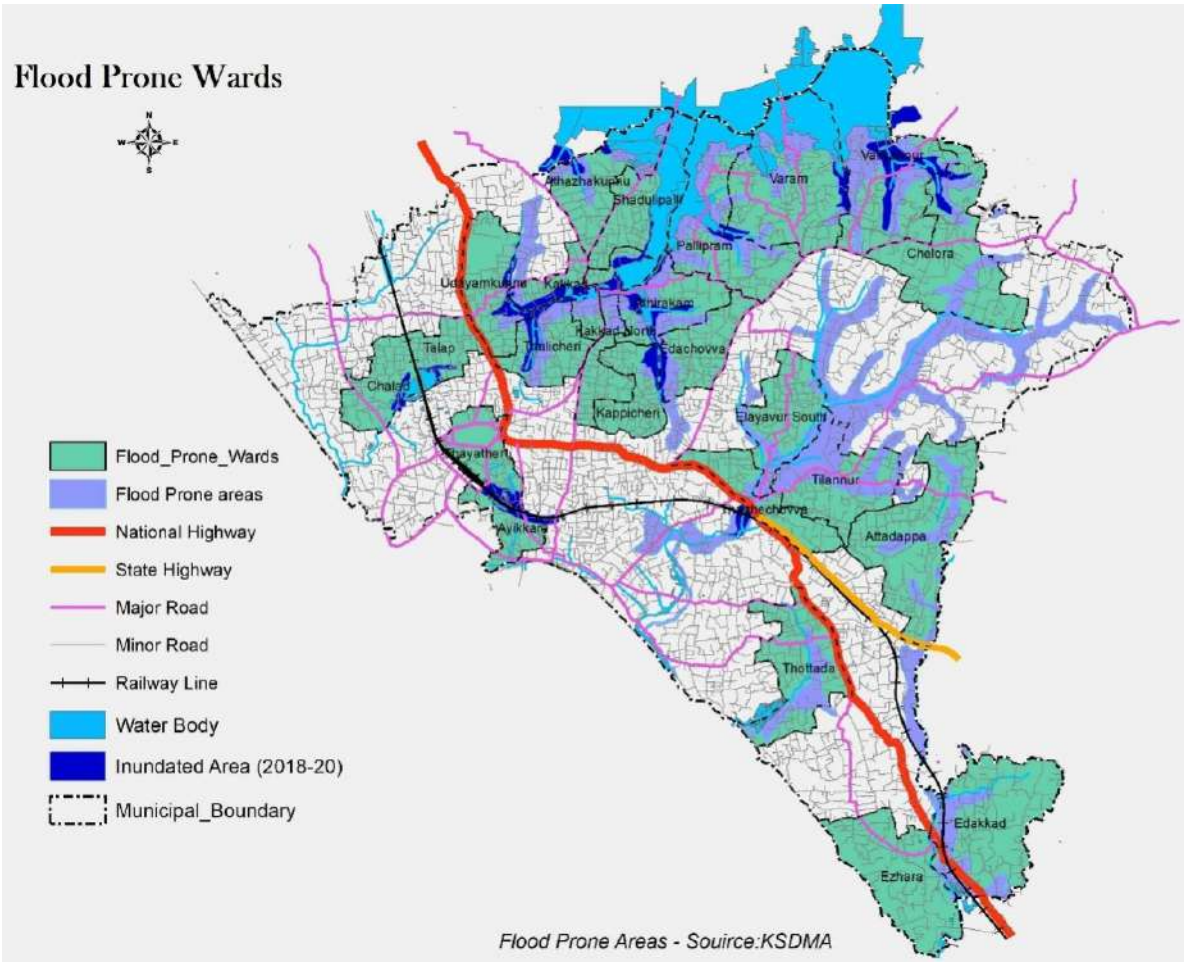


Figure.22.10 Flood prone areas of Kannur Municipal Corporation - Ward wise

22.5.3 EPIDEMICS/PANDEMICS

As in the state, national and international level, the pandemic COVID -19 affected the study area adversely. In this context, more rehabilitation centres are to be established. As a part of infrastructure developments in health sector, District Hospital was converted into Covid hospital. The private hospitals also provided 50% of the bed strength for Covid cell.

The epidemics like Diarrhoea, Jaundice and Typhoid in the city show the unavailability of safe drinking water; while that of mosquito borne diseases such as malaria and dengue fever shows the lack of hygienic conditions. Also, the presence of Leptospirosis reveals that the presence

of rodents. The counts of these epidemics are increasing every year in the city.

22.5.4 DROUGHT

Palliyamoola, Kunnavu, Kokkenpara, Pallikkunnu, Talap, Chalad and Panjikkayil wards are prone to moderate drought whereas others are prone to slight drought.

22.5.5 COASTAL HAZARDS

Since the study area has 17 km costal stretch, there is a chance to occur coastal related disasters. Coastal hazards include cyclones, boat capsizing, coastal erosion, storm surge, tsunami etc. As per disaster management plan for Kannur district, the coastal villages of the city Kannur I, Kannur II, Edakkad and Pallikkunnu are coastal hazard prone areas and it is shown in Figure.22.11.



Figure.22.11 Coastal hazard susceptibility map

22.5.6 FIRE

There was a fire disaster following LPG tanker explosion occurred at Chala bypass, on August 27, 2012. The three chambered tanker with total 16 tonnes (162.57 quintal) LPG collide with the road divider and exploded thrice. Many people as well as animals were killed and injured in that accident.

Table.22.2 Disaster prone wards in Kannur Municipal Corporation

Disaster	Prone area		No. of houses
	Ward No.	Ward name	
Flood	5	Talap	90
	6	Udayamkunnu	108
	9	Athazhakunnu	318
	10	Kakkad	209
	11	Thulicheri	415
	12	Kakkad North	152
	13	Sahdulipalli	11
	14	Pallipram	487
	15	Vaaram	229
	16	Chelora	230
	17	Athirakam	405
	22	Elayavoor South	248
	24	Edachovva	135
	25	Athirakam	405
	26	Kappicheri	50
	28	ThazheChovva	93
	30	Thilanoor	677
	31	Attadappa	250
	33	Edakkad	207
	34	Ezhara	6
	37	Thottada	344
	48	Thayatheru	80
	50	Ayikkara	120
	54	Chalad	100
Total			**5369**

Disaster	Prone area		No. of houses
	Ward No.	Ward name	
Coastal hazards	1	Palliyamoola	1284
	34	Ezhara	1153
	35	Alinkeel	971
	36	Kizhunna	1116
	37	Thottada	1611
	38	Adikadalayi	1555
	39	Kuruva	1461
	40	Padanna	1286
	42	Neerchal	1047
	43	Arakkal	1376
	53	Payyambalam	1133
	55	Panjikkayil	1351
Total			**15344**
Drought	1	Palliyamoola	
	2	Kunnavu	
	3	Kokkenpara	
	4	Pallikkunnu	
	5	Talap	
	54	Chalad	
	55	Panjikkayil	
Total			**20713**

22.6 HAZARD ANALYSIS

The analysis of hazard involves mapping of areas, which are prone to disaster so as to develop a perceptible depiction of the hazard. The analysis aims at identifying areas in which the potential impact of a disaster is higher.

According to the flood report 2018, the entire district is classified in to four zones such as high risk, moderate risk, moderately safe and safe zones which was prepared based on various parameters such as landslide susceptibility areas, slope, elevation from Mean Sea Level, presence of dam/reservoir, proximity to river and coastal areas, affected locations identified in mega flood 2018 etc. The village wise map of vulnerable areas in the District is shown in Figure.22.12. The figure indicates that the Kannur Municipal Corporation falls under moderately risky, moderately safe and safe zones. No high risk areas are there in the study area.

The local bodies which are not included either in safe zone or high risk zone are categorized as moderately safe zone. Local bodies with villages classified as either moderately safe or moderately risk fall under this category. Hence the study area is under moderately safe zone.

Disaster prone wards and the number of houses likely to be affected are given in Table.22.2. The table reveals that about 5369 houses will be affected by flood where as the houses likely to be hit by hazards are 15344. Palliyamoola, Kunnavu, Kokkenpara, Pallikkunnu, Talap, Chalad, Panjikkayil wards are the wards prone to moderate drought. Remaining wards are prone to slight drought.

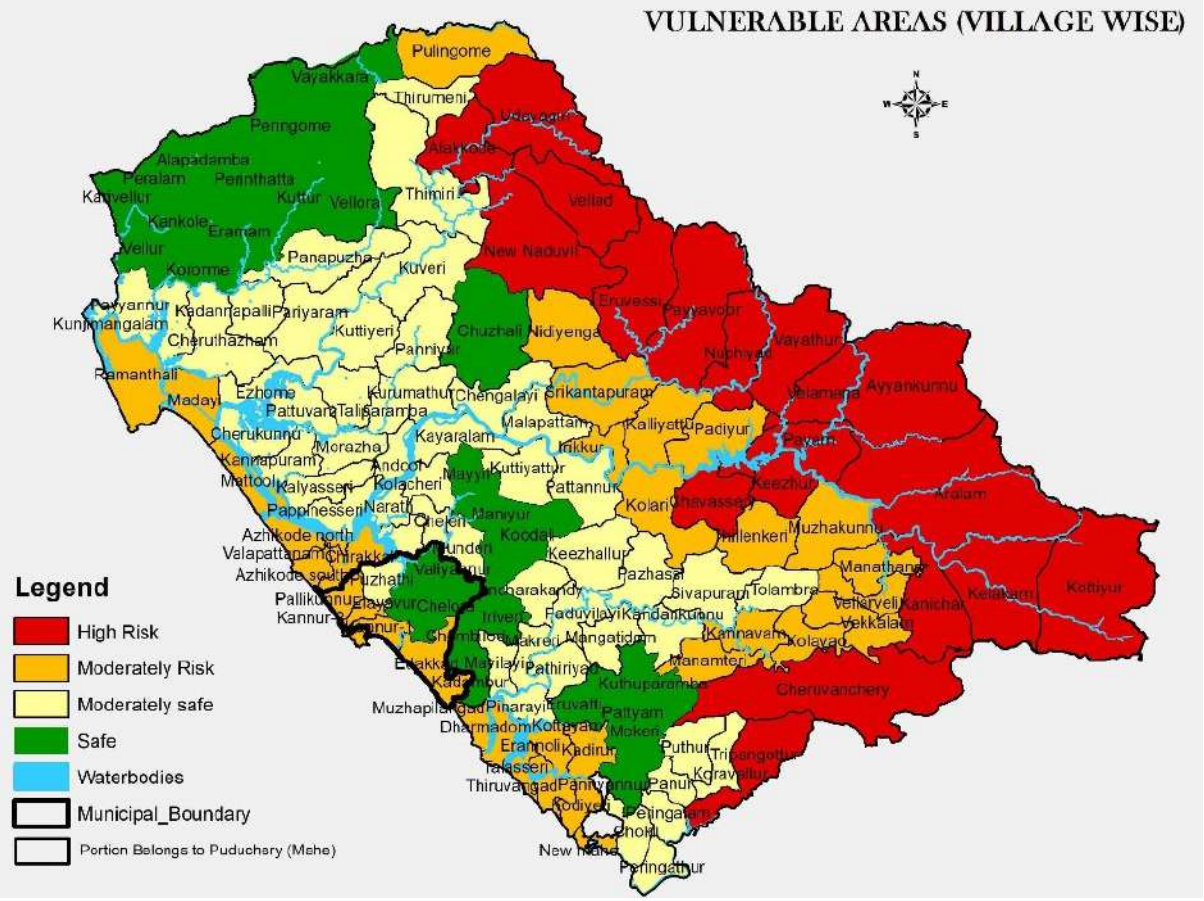


Figure.22.12 Vulnerable areas of Kannur District

22.7 ANALYSIS OF CRITICAL FACILITIES

It includes the identification of all the critical facilities in the Municipal Corporation like educational institutions, police stations, hospitals, fire and rescue stations etc. These facilities play a central role in disaster response and recovery and, hence, it is important to protect these critical facilities to ensure that disruption of

public service is minimized during the disaster. The critical facilities shown in Figure.22.13 include the following:

- Schools - 49 numbers
- Colleges - 6 numbers
- Hospitals - 25 numbers (allopathic - 23, ayurvedic - 1, homeopathic - 1)
- Primary health centres - 6 numbers
- Police Stations - 4 numbers
- Shelter Homes-1 number
- Telecom Offices
- Hostels - 15 numbers
- Key Government Offices - 4 numbers
- Cultural Centers - 1 number
- Fire Stations - 1 number

The distribution of critical infrastructures of the study area is shown in Figure.22.13.

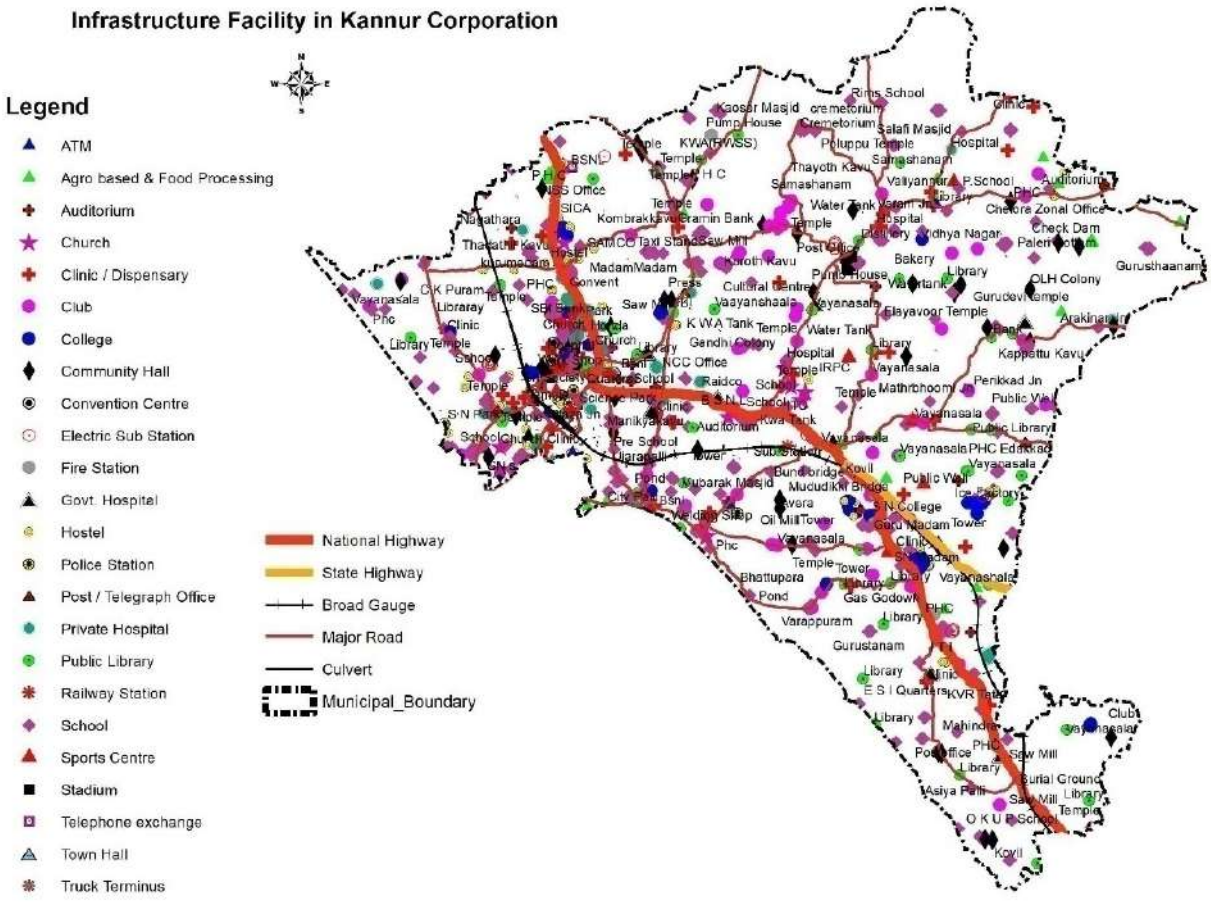


Figure.22.13 Location of critical infrastructures at Kannur Municipal Corporation

22.8 INTEGRATED ANALYSIS OF LAND USE V/S HAZARD ZONE

Figure.22.14 indicates the major land use affected by flood in the city area is mainly agriculture land use (paddy fields) followed by residential land use. Flood prone area of the town covers 6.8 km² (8.68% of the total city Corporation area).

The analysis of land use map along with hazard prone areas of Kannur Municipal Corporation shows that major portion of the hazard prone areas are environmentally sensitive areas like paddy fields, wet lands etc. Some of the residential areas located at the low lying lands adjacent to the banks of rivers and streams within the Municipal Corporation also got affected during 2019 flood. Extensive filling and land use conversion of paddy fields and ponds might be the main reason for flood water entry to the surrounding land. The silt settlement at the bottom of rivers and streams made them shallow which also contributed to the overflow of flood water.

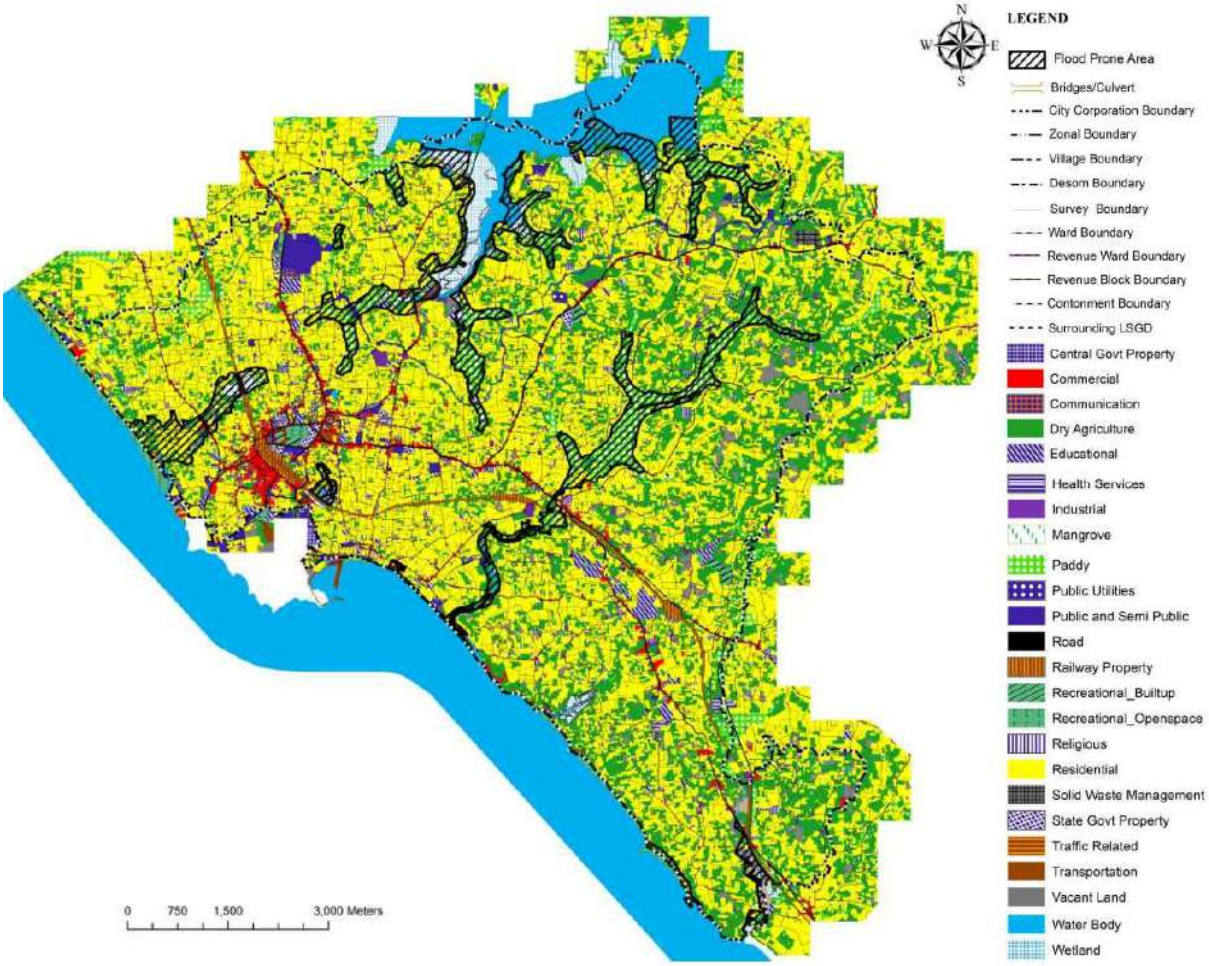


Figure.22.14 Flood prone areas v/s Land use map of Kannur Municipal Corporation

The flood prone areas of Kannur Municipal Corporation includes the banks of Kattambally River, Kanampuzha, Nadalpuzha, Padannathodeetc - strict restrictions and regulations are to be followed for building construction in these flood prone areas for the safety of life and property of people inhibiting there.

Some coastal erosion cases are reported on the beach side areas near Marakkarkandy, Neerchal, Ezhara and Ayyarath Bridge and strengthening of existing sea walls and construction of new sea wall are to be carried out to mitigate the disasters caused by coastal erosion.

22.9 ANALYSIS OF HAZARD ZONE V/S DISTRIBUTION OF INFRASTRUCTURE AND IDENTIFICATION OF GAP

22.9.1 ANALYSIS OF RESCUE RELATED INFRASTRUCTURE

Municipal Corporation Steering Committee including Mayor, Standing Committee Chairpersons, and Secretary has the responsibility to incorporate all the activities during the time of disasters. Depending upon the necessity, they can expand the committee to ensure the involvement of more members like PTA President, Head Masters, Principals, CDS Chair persons, Youth coordinators, Janamaithri Police staffs, Medical officers, Saksharataprerak, ICDS Suprevisor, and Engineer.

During the time of disasters, the emergency response team should be equipped with training and equipment. The details of various types of tools that has been provided for the emergency response team and its collection centres are described in the Table 22.3.

22.9.2 NEED OF PERMANENT SHELTERS

A total number of 13 rescue shelters were functional during the 2018 and 2019 flood whereas in the case of Covid 19 quarantine centres, Covid First Line Centres (CFLTC) as well as Domiciliary Covid Care Centre (DCC) were provided in the plan area. Sports Hostel, Thavakkara (100 beds) was used as CFLTC whereas Payyambalam (18 beds) and Govt. Polytechnic (100 beds) were used as DCC. Also, MTM School, Kannur was used for the rehabilitation of destitutes as they are the community that need prime care and attention in the pandemic situation.

Since the routine functioning of these rehabilitation centres will be affected by these disasters, it is recommended to advocate the use of multipurpose building that can be used as relief camps during the time of calamities, and as community hall for other times.

Table.22.3 Emergency Response Team & available tools at collection centres

Sl. No.	Tools/Services	Tool Collection Centres
1	Spreaders (Hydraulic), Lifting Equipments, Light Equipments, Critical Supplies – Skilled Human Resource, Fire Fighting-Protective Equipments-Personal And Specialized, Breathing Apparatus Set, Fire Fighting Equipments – Pumps, Ladder, Fire Extinguishers, Fire Rescue Tenders	Fire and Rescue Service
2	Light Equipments	Fire and Rescue Service, Jhanavi Motors
3	Lighting Arrangements	Jhanavi Motors, Fire and Rescue Service,
4	Heavy Engineering Equipments	Traffic Police, K.K.Builders, Peravoor
5	Critical Supplies – Skilled Human Resource	Husna Motor Service,Valapattanam
6	Specialized Flood Rescue Equipments	Fire and Rescue Service, DTPC, Naval Academy, Ezhimala
7	Rescue Boats	Police, Fisheries Dept, Marine Police, Fire and Rescue Service
8	Skilled Human Resource (Diverse team, Search and Rescue team for flood)	Fire and Rescue Service, Pratheeksha Timber Society, Kelakam
9	Critical Supplies (Medical Assistance, Special Vehicles etc.)	Govt. Hospital, Koyili Hospital, A.K.G Hospital, Fire Rescue Services
10	Portable Equipments	Fire and Rescue Services, Govt. Hospital, Koyili Hospital
11	Mobile Units (Lab, Medical Van etc.)	Govt Hospital , Kannur, Malabar Cancer Center, Thalassery
12	Hygiene (Water Filter, Water Tank, Reservoirs Treatment Tank)	Kerala Water Authority
13	Sanitation	Govt. Hospital, A.K.G.Hospital, VishachikilsaKendram, Pappinissery
14	Shelters - Tents	A,R, Camp, Kannur, Silpaulin, Kannur, Peekay Steels ,Thana, Fire and Rescue Services
15	Transportation- Light, Medium Vehicles	Fire and Rescue Service, A,R,Camp, Kannur,
16	Tele Communication	Police, B.S.N.L.
17	Video System	Nikshan Electronics, Kannur

18	HAM Radio Operators	DEN, Payyannur
19	Nuclear Biological and Chemical and NBC Specialized Equipments	Kerala Water Authority, Fire and Rescue Service

***Source**: Website of Kannur District*

Table.22.4 Details of camps and rehabilitation centres

Sl. No.	Ward No.	Name of institution that can be converted into camps	Ownership		Whether it can be converted into rehabilitation centre	No. of beds with social distancing	Useful and clean Toilet/ Bathroom available	
			Public	Private			Toilet	Bathroom
1	48	Thavakkara UP School	Yes		Yes	80	6	2
2	47	VHSE Sports	yes		Yes	190	10	5
3	49	Thayatheru LP School	Yes				4	0
4	52	Town school, Payyambalam	Yes		Yes	120	13	6
5	43	City Higher Secondary School	Yes				20	2
6	44	Chovva Higher Secondary School	Yes		Yes	300	30	4
7	42	Govt. UP School, Neerchal	Yes		Yes	110	13	4
8	25	Athirakam UP School	Yes		Yes	120	2	2
9	28	Govt. LP school, ThazheChovva	Yes				3	3
10	29	Keezhthalli UP School	Yes				3	3
11	21	CHM Higher Secondary School	Yes				53	3
12	4	Govt. Higher Secondary School, Pallikkunnu	Yes		Yes	120	10	4
13	9	Govt. Higher Secondary School, Puzhadi	Yes				15	0
14	50	Madrasa Madaniya LP School		Yes	Yes	60	4	2
15	50	DIS HSS (English Medium)		Yes	Yes	210	20	5
16	43	DIS HSS (Malayalam Medium)		Yes	Yes	280	37	7
17	43	City Govt. HSS	Yes		Yes	200	20	2
18	53	GVHSS Girls, Payyambalam	Yes		Yes	240	12	4

19	13	Mappila LP School, Athazhakunnu		Yes	Yes	140	20	2
20	10	BharatiyaVidyabhavan, Kakkad		Yes	Yes	150	21	3
21	41	SFS School		Yes	Yes	90	5	3
22	41	Vethilappalli Madrasa		Yes	Yes	90	10	2
23	42	NNS Auditorium		Yes	Yes	60	5	5
24	54	HIRA English Medium School, Chalad		Yes	Yes	40	9	5
25	54	GMLP School, Chalad	Yes		Yes	60	4	2
26	16	Apex English Medium School		Yes	Yes	30	4	2
27	30	Thilanur UP School		Yes	Yes	80	2	2
28	37	Cultural Centre, Thottada	Yes		Yes	20	2	2
29	32	GHSS Thottada	Yes		Yes	45	10	10
30	32	Chala Devi VilasamLP School		Yes	Yes	40	2	2
31	35	Kuttikkakam LP School		Yes	Yes	40	2	2
32	25	AmrutaVidyalayam		Yes	Yes	110	6	6
33	26	Thunchathacharya UP School		Yes	Yes	100	6	2
34	31	Attadappa LP School						
35	31	AttadappaNo.II LP School						
36	17	Chelora Govt. Higher Secondary School	Yes					
37	31	ChinmayaVidyalaya		Yes				
38	4	Carithas Hostel		Yes	Yes			
39	11	Dhanalakshmi College of Nursing		Yes				
40	3	Edacheri LP School						
41	46	Govt. TTI (Men)		Yes				
42	36	Hostel (Near Edakkad VO)						
43	5	SN Hostel, Talap		Yes				
44	11	Korjan UP School						
45	19	MacheriMappila LP School		Yes				
46	18	Macheri New UP School		Yes				
47	17	Mappila L P School, Vattapoyil						

48	19	Peringalayi LP School						
49	32	Technical High School						
50	21	Women's College, Varam						
51	32	Govt. Polytechnic College Hostel			Yes			
52	4	Auditorium (Near Mookambika Temple)			Yes			
53	18	Auditorium (Near Trenching Ground)			Yes			
54	31	ChinmayaVidyalaya Hostel 1			Yes			
55	31	ChinmayaVidyalaya Hostel 2			Yes			
56	31	ChinmayaVidyalaya Hostel 3			Yes			
57	16	Dinesh Auditorium			Yes			
58	32	Govt. Polytechnic College			Yes			
59	6	Hostel (Near jail)			Yes			
60	12	Hostel (Near Korjan School)			Yes			
61	48	Hostel (Sports Hostel)			Yes			
62	6	Hostel, Sreepuram			Yes			
63	6	Hostel, Sreepuram			Yes			
64	23	Kannur Indoor Stadium	Yes		Yes			
65	6	Krishna Menon Memorial Women's College	Yes		Yes			
66	6	Krishna Menon Memorial Women's College Hostel			Yes			
67	29	S.N College			Yes			
68	29	S.N College Hostel			Yes			
69	6	Working Women's Hostel, Sreepuram	Yes		Yes			
70	21	ElayavurDarmodaya m LP School						
71	14	Pallipram UP School			Yes			
72	9	Puzhadi North UP School						

73	29	SN Trust School						
74	36	South UP School, Kizhunna						
75	20	Thilanur North UP School						
76	21	Varam UP School						
Total		**3125**						

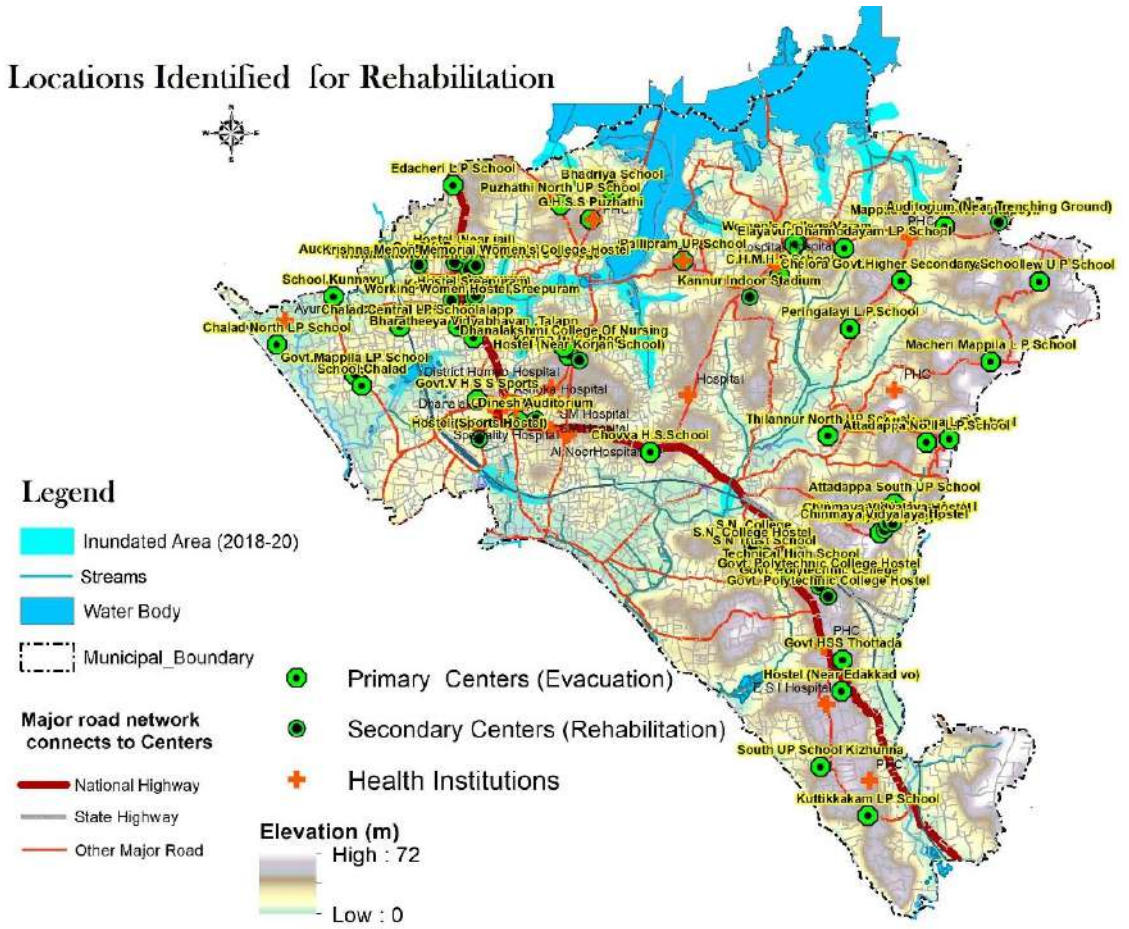


Figure.22.15 Location of Rehabilitation centres at Kannur Municipal Corporation

22.9.3 SAFE ROUTE AND POTENTIAL CAMP LOCATIONS OF KANNUR MUNICIPAL CORPORATION

Details of safe route and potential camp locations of the study area is shown in Figure.22.15.

From the map, it is clear that all potential camps are located within a shorter distance from hazard prone areas and safer routes are also available for easy evacuation. Also, most of these rehabilitation centres are located along the NH and other major roads.

Since these centres are at 50m above MSL, none of these centres as well as the network will be affected by flood.

22.9.4 ANALYSIS OF CATCHMENT OF SHELTERS AGAINST SETTLEMENT

Details of the number of the maximum number of people with social distancing that can be accommodated and the actual number of people that were actually needed to be accommodated during the flood 2018 and 2019 were studied.

From the Table.22.2 and 22.4, the number of people to be accommodated with social distancing is higher than that of the capacity available. Hence it is necessary to establish more rehabilitation centres with best infrastructure for multipurpose facilities as they can be used not only as evacuation centres during calamities but also as DCC/CFLTC camps. Also they can be used for the rehabilitation of the destitutes too. The infrastructure facilities like kitchen, toilets and bathrooms need to be upgraded in the identified camps.

22.10 MITIGATION MEASURES

22.10.1 FLOOD

- Proper warning to the people in right time
- Finding location for rehabilitation centres
- Provide swimming training to the people
- Teach people in the area how to prepare an emergency kit at any time
- Paddy and wetland conservation
- Proper maintenance of drainage network
- Mental and physical assistance to face after effects
- Special attention is needed in the flood prone areas
- KMBR 2019 rules should be strictly enforced when building application is received

22.10.2 EPIDEMICS/PANDEMICS

- Ensure hygienic lifestyle for people
- Provide better treatment facilities
- Provide sufficient health service
- Proper warning to the people at the right time
- Awareness campaigning
- Finding location for rehabilitation centres
- Mental and physical assistance to face after effects

22.10.3 DROUGHT

- Rain water harvesting as well ground water recharging techniques
- Initiatives to recycle polluted water
- Awareness of water conservation
- Conservation of existing water bodies

22.10.4 COASTAL AREA DISASTERS

- Proper warning to the people at the right time
- Finding location for rehabilitation centres
- Awarness in preparing an emergency kit at any time
- Special attention is needed in the coastal erosion prone areas
- KMBR 2019, CRZ rules should be strictly enforced when building application is received

22.10.5 FIRE

KMBR 2019 rules should be strictly enforced when building application is received

22.11 INFERENCE

After studying various disasters affected in the district as well as city level, some mitigation measures are recommended.

Since the Corporation area comes under moderately safe condition, adopting these measures will be useful to reduce the severity of a disaster due to these natural as well as unexpected calamities. There is a good road network connecting all the important identified rehabilitation centres which are located at 50m above MSL; None of these centers as well as the network will be affected by flood. Also, they should be for multipurpose usage with suitable infrastructure facilities like kitchen, toilets and bathrooms. Hence they can be used not only during natural calamities, but also for quarantine centres like DCC/CFLTC camps. Also they can be used for the rehabilitation of the destitutes too.

Road conditions can be improved by building proper drainage, solid waste disposal units and public toilets which are the hallmarks of a healthy city too.

Regulations in the land use pattern are necessary to minimise the causalities caused by hazards. Hence the sustainable development of the study area can be ensured which will be helpful for the conservation of ecosystem as well as nature which in turn plays a role in the reduction of natural calamities up to a limit.

The major hazard found out within the Corporation area is the presence of flood plain areas along the rivers and streams. Some development regulations in the form of built-form regulations are necessary within this risk area for mitigating the disaster, for easy evacuation, and also for saving the life and property of the inhabitants there.

Occasional coastal erosion at two or three areas is another hazard and strengthening of existing seawalls and construction of new seawalls are the only solution for mitigating the damages caused by the high tidal waves.

CHAPTER 23

SPATIAL STRUCTURE

This chapter deals with the study of functional character, activity pattern, hierarchy of settlements and nodes, external development thrust, existing road network and Spatial Structure of Kannur Corporation area.

23.1 FUNCTIONAL CHARACTER

Functional character of a region is determined based on the population distribution within the region, average plot size and land use of that area. The major activity within the Corporation area decides its function. The ward may be rural if agriculture and allied activities are high, whereas urban, if secondary or tertiary sector activities are predominant. Based on this, the wards are classified as Urban, Semi Urban and Rural.

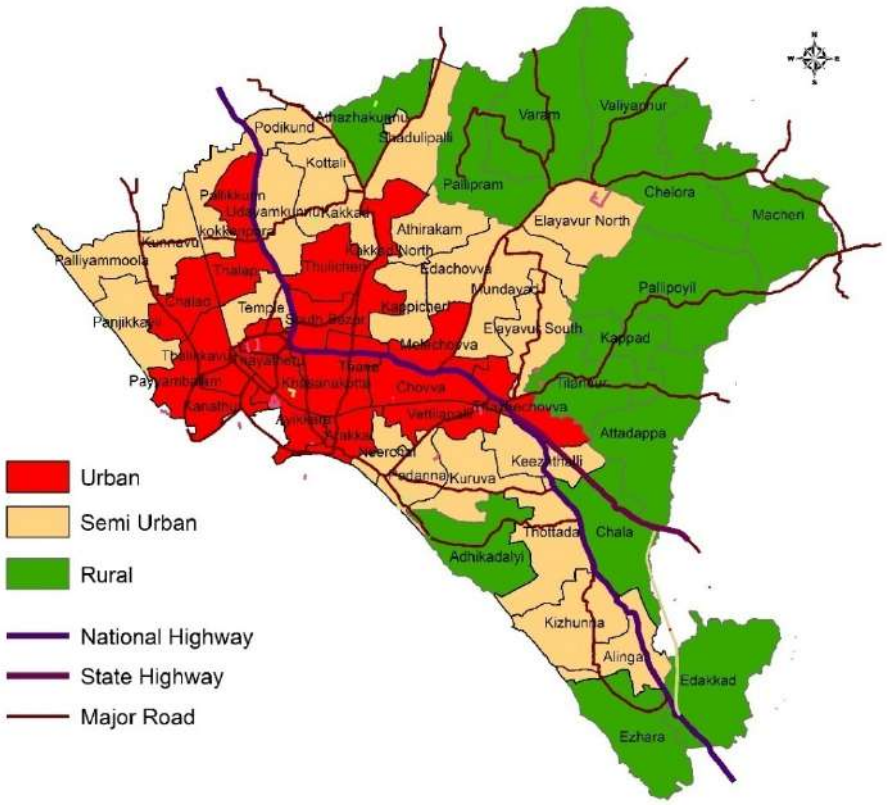


Figure.23.1 Functional Character of Kannur Corporation area

Functional character is derived from tool kit. In order to formulate the functional character, it includes the ward wise population, ward wise area and various land uses such as residential, commercial, industrial, agricultural, transportation, water bodies and vacant lands. Mainly, urban characters are observed in core town wards.

Table.23.1 List of wards and their functional character in Kannur Corporation area

Ward Name	Functional Character	Ward Name	Functional Character
Adhikadalyi	Rural	Macheri	Rural
Alingal	Semi	Melechovva	Urban
Arakkal	Urban	Mundayad	Semi
Athazhakunnu	Rural	Neerchal	Semi
Athirakam	Semi	Padanna	Semi
Attadappa	Rural	Pallikkunn	Urban
Ayikkara	Urban	Pallipoyil	Rural
Chala	Rural	Pallipram	Rural
Chalad	Urban	Palliyamoola	Semi
Chelora	Rural	Panjikkayil	Semi
Chovva	Urban	Payyambalam	Urban
Edachovva	Semi	Podikund	Semi
Edakkad	Rural	Shadulipalli	Semi
Elayavur North	Semi	South Bazar	Urban
Elayavur South	Semi	Temple	Semi
Ezhara	Rural	Thalap	Urban
Kakkad	Semi	Thalikkavu	Urban
Kakkad North	Urban	Thana	Urban
Kanathur	Urban	Thayatheru	Urban
Kappad	Rural	Thazhechovva	Urban
Kappicheri	Semi	Thottada	Semi
Keezhathalli	Semi	Thulicheri	Urban
Khasanakotta	Urban	Tilannur	Rural
Kizhunna	Semi	Udayamkunnu	Semi
kokkenpara	Semi	Valiyannur	Rural
Kottali	Semi	Varam	Rural
Kunnavu	Semi	Vettilapalli	Urban
Kuruva	Semi		

Urban, Semi Urban and Rural are the various functional characters observed in the Corporation area. The ward wise functional character is listed in Table.23.1 and it is represented in Figure.23.1 which indicates that it is clear that the majority of wards in the planning area are classified as Semi Urban (23) followed by Urban category (18). The eastern part of the Corporation area comes under rural category.

23.2 ACTIVITY PATTERN

Activity pattern is decided based on the existing land use and functional character. Land uses are broadly divided into three; Urban, Secondary and Primary land use. Primary land use includes agricultural land, irrigation lands and water bodies whereas secondary land use includes residential and vacant lands. Industries, public and semi-public, commercial, transportation etc. are considered in urban land use. Ward wise classification of major land use pattern in Kannur Corporation area is shown in Figure.23.2. From the figure, it is clear that the urban land use classification is concentrated in central wards and scattered along the major transportation network.

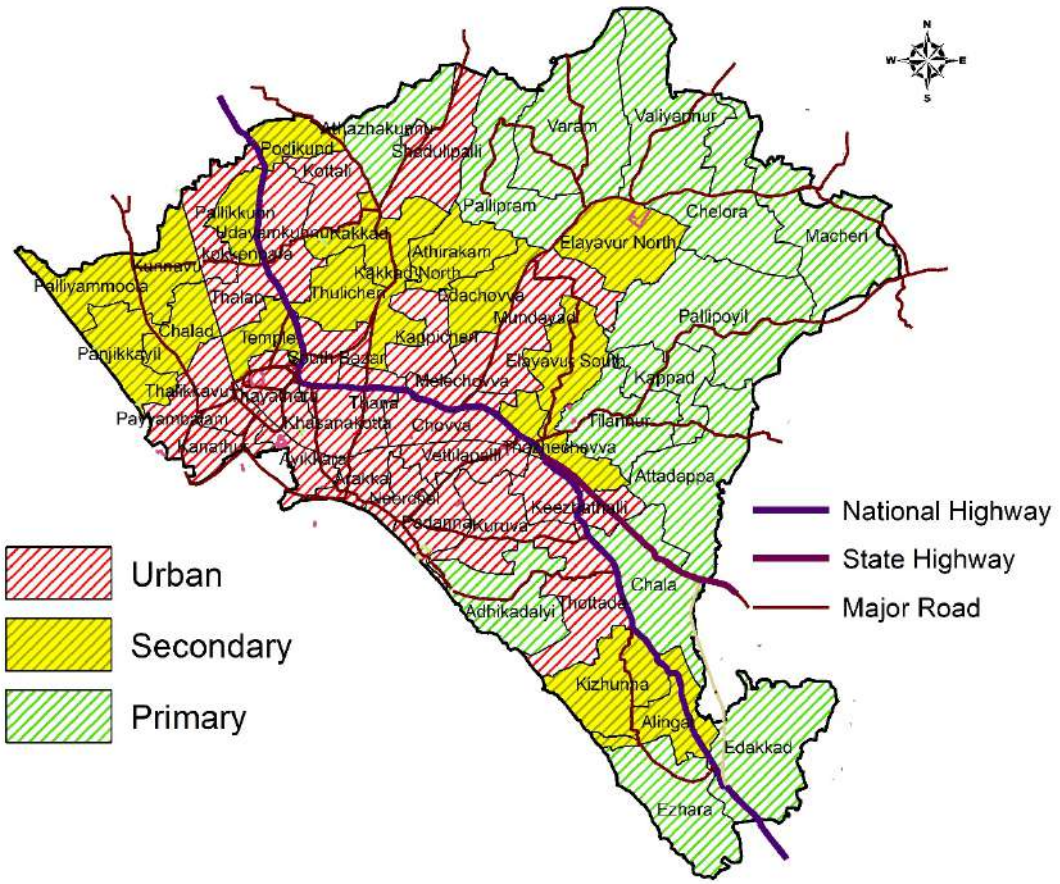


Figure.23.2 Ward wise classification of major land use pattern in Kannur Corporation area

Around these urban wards, secondary pattern is located. The remaining wards which are located along north-east and eastern periphery of the planning area come under primary land use category.

Derivation of the activity pattern of Kannur Corporation area by merging the major land use concentration with the functional character is given in Table.23.2. According to the table, the activity pattern of the Corporation area is derived and is shown in Figure.23.3. The derived activity pattern shows much similarity with land use concentration of the planning area.

Table.23.2 Derivation of Activity Pattern

Sl. No.	Combination of Land Use Concentration and Functional Character		Activity Pattern
	Land use Pattern	Functional Character	
1	Primary	Rural	Primary
2	Secondary	Rural	Primary
3	Primary	Semi urban	Secondary
4	Secondary	Semi urban	Secondary
5	Secondary	Urban	Urban
6	Urban	Semi urban	Urban
7	Urban	Urban	Urban

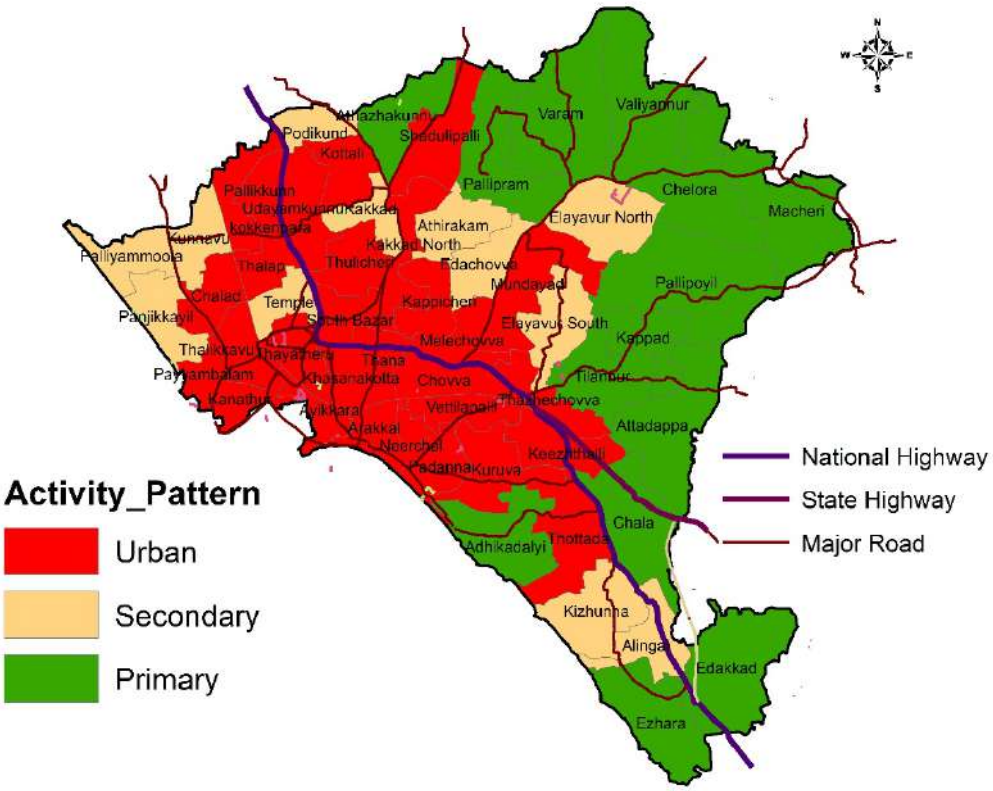


Figure.23.3 Activity Pattern of Kannur Corporation area

The wards which are concentrated along NH66 and other major roads reflect urban activity pattern. The wards which surround the urban activity wards show the secondary activity. All the remaining wards show the primary activity and these wards are located along the north eastern and eastern side of the city.

23.3 HIERARCHY OF SETTLEMENTS

One of the uniqueness of spatial planning is the identification of the hierarchy of various settlements of a region based on certain factors like the trend of physical development, location importance; rural or urban, administrative status of settlements, trend of urbanization etc. Cumulative functional index (CFI) method is used to find out the hierarchy of settlement. The CFI of a settlement is assessed based on the number and presence of the facilities in the settlement such as educational facilities, health facilities, market Facilities in agriculture and allied sector, physical infrastructure facility and transportation facility.

As per District Urbanization Report of Kannur District 2011, the old Kannur Corporation is categorized as 1st order settlement in the district.

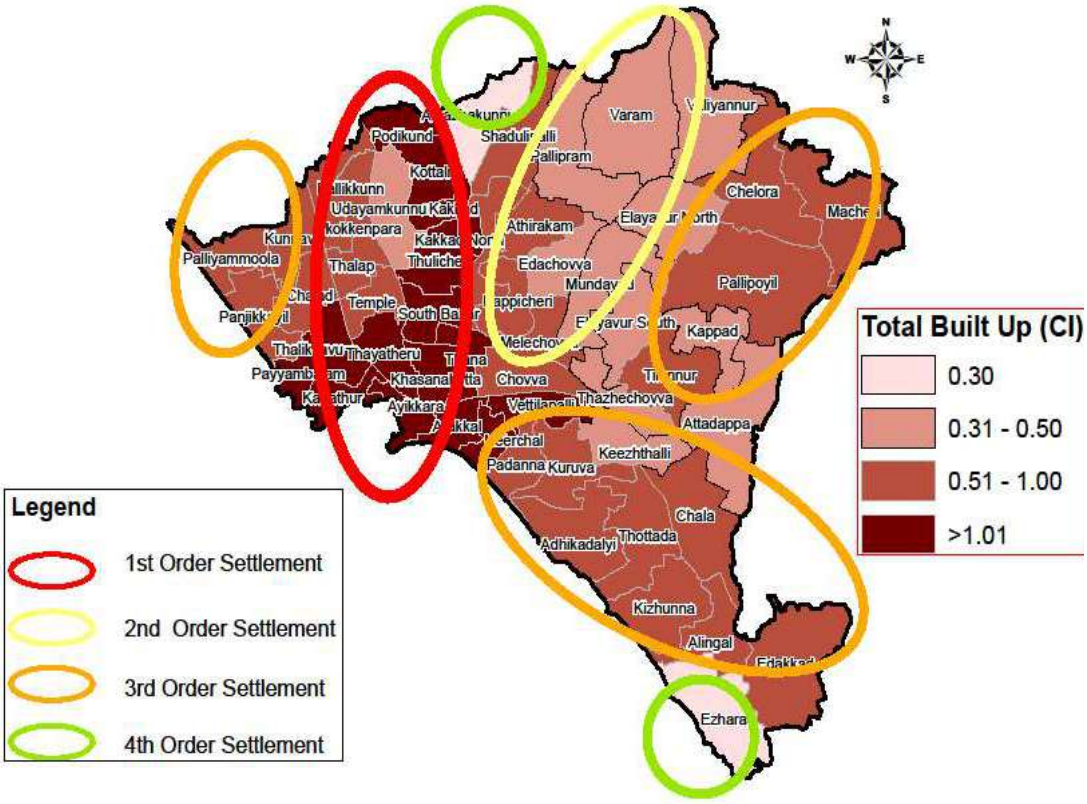


Figure.23.4 Hierarchy of Settlements

23.3.1 EXISTING HIERARCHY OF SETTLEMENTS

The existing Hierarchy of settlement in Kannur Corporation area is analysed based on the urban settlement of the planning area. In order to identify the urban settlement, the built up land use concentration is analysed. The hierarchy of settlement is broadly classified into four namely, 1st order settlement, 2nd order settlement, 3rd order settlement and 4th order settlement.

The area with the highest built up concentration (value greater than 1) is categorized as 1st order settlement. This region is seen in the western side of the planning area and located along National Highway side. In this region, transportation, trade and commerce, education, health and basic amenities are largely concentrated. Similarly, 2nd and 3rd order settlement are seen adjacent to 1st order settlement where built up concentration is moderate (between 0.3 to 1). The remaining portion of the planning area is categorized as 3rd order settlement where concentration of primary activities is high. The Figure 23.4 shows the hierarchy of settlement of Kannur Corporation area.

23.4 EXISTING HIERARCHY OF NODES

Hierarchy of nodes in Kannur municipal Corporation area is categorized into four, 1st order, 2nd order, 3rd order and 4th order nodes based on their significance.

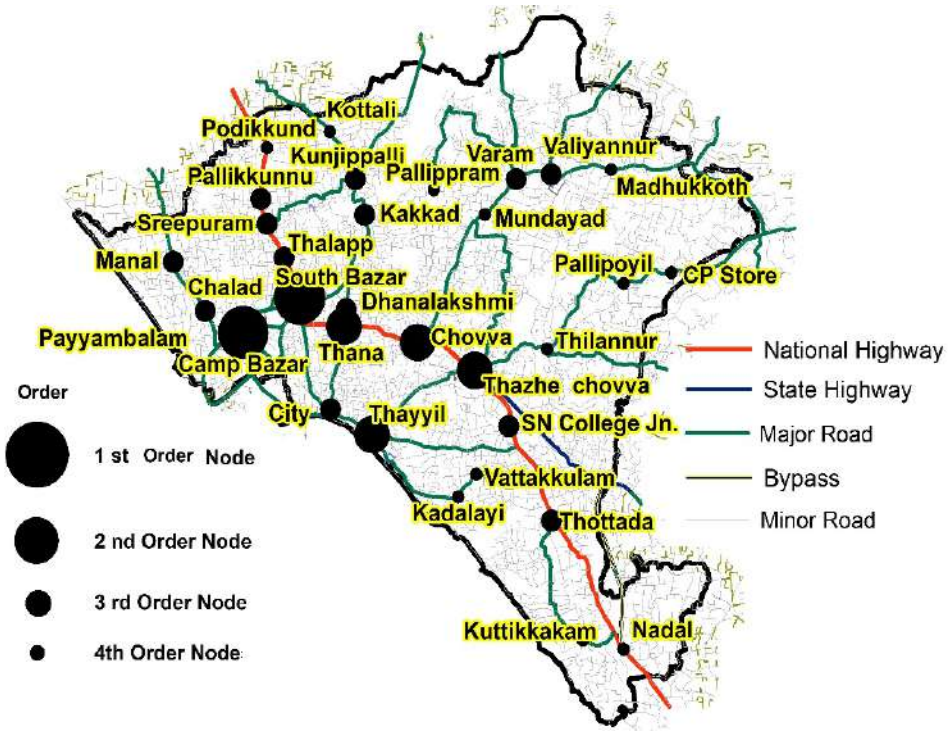


Figure.23.5 Hierarchy of Nodes

The Figure.23.5 shows the hierarchy of nodes in planning area. Caltex, New bus stand area, Plazza and Railway station area are marked as 1st order nodes. Thana, Mele Chovva, Thazhe Chovva and City junctions are categorized as 2nd order node. Remaining nodes are come under third and fourth order. The Figure.23.5 shows the hierarchy of nodes in the planning area.

23.5 EXTERNAL DEVELOPMENT THRUST

The major external development thrusts in Kannur Corporation area are Pariyaram Medical College, Ezhimala Naval Academy, Azheekkal Ferry, Parassinikadavu Muthappan Temple, Kannur Military Contonment and Kannur International Airport. Location of external development thrusts in the planning area is shown in Figure.23.6.

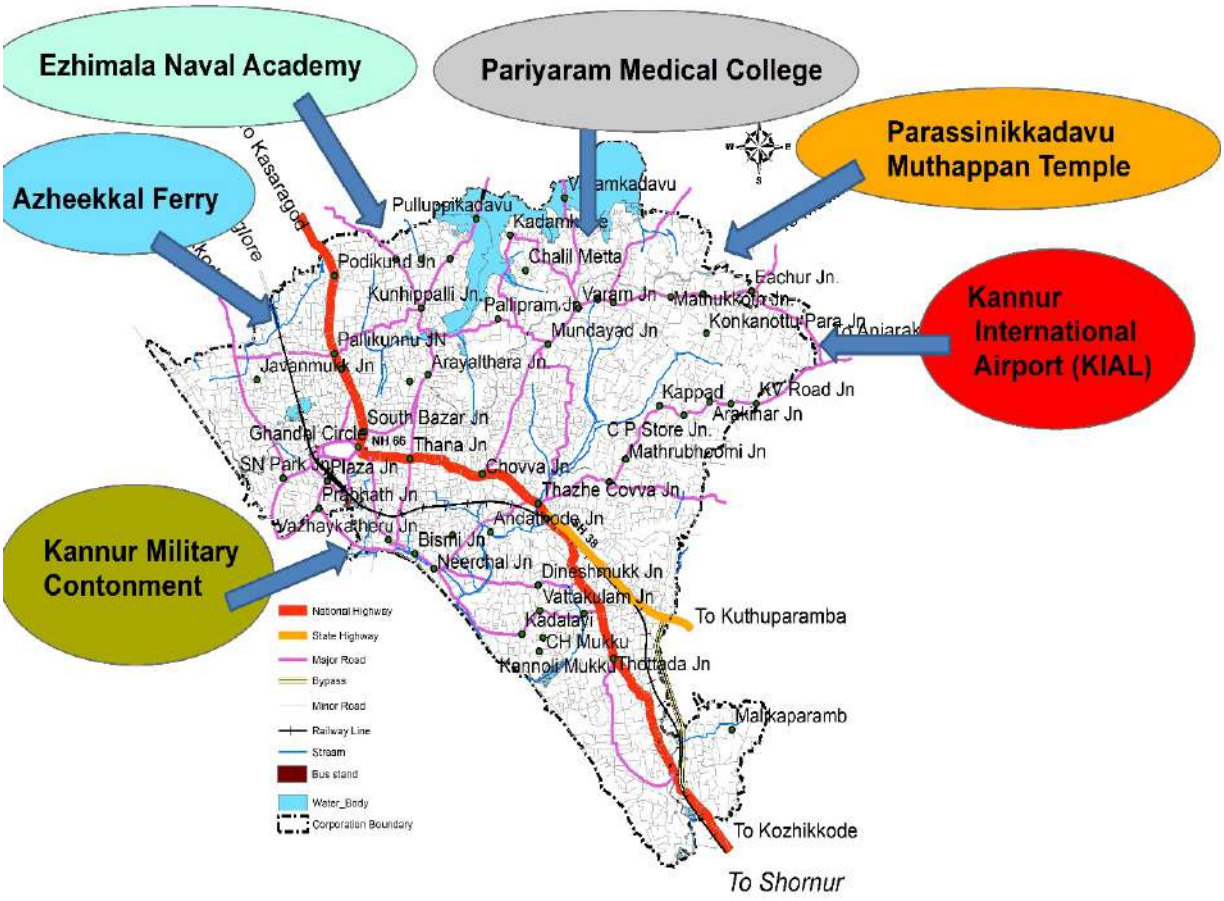


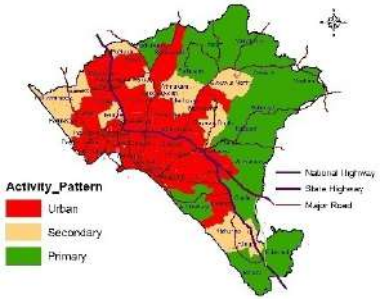
Figure.23.6 External Development Thrust of Kannur Corporation area

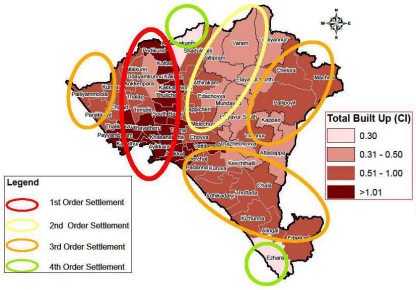
23.6 EXISTING ROAD NETWORK

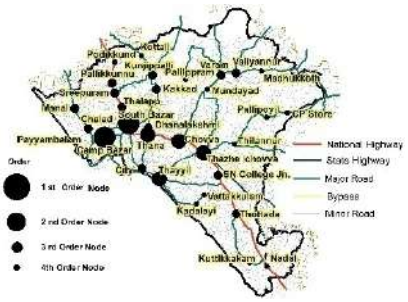
The spatial structure of any city is highly influenced by its accessibility or road connectivity of the city. Roads and Railway are the existing mode of transportation facilities within the planning area. Road connectivity is the major mode of transportation. National Highway 66 and State Highway 38 are the major road network in Kannur Municipal Corporation. NH66 passes through the CBD of the planning area in South North direction by dividing the entire area into two parts, Coastal area and non-coastal area. SH38 starts from Kannur Municipal Corporation area and it connects Kannur to Kuttiyadi. The major District Roads in the planning area includes Thazhe Chovva-Anjarakkadi Road, Kannur-Melechovva-Mattannur Road, Kakkad Road, Azhikode Road, ThekkilepeedikaThayyil Road. Figure.23.7 shows the existing Road network of the planning area.



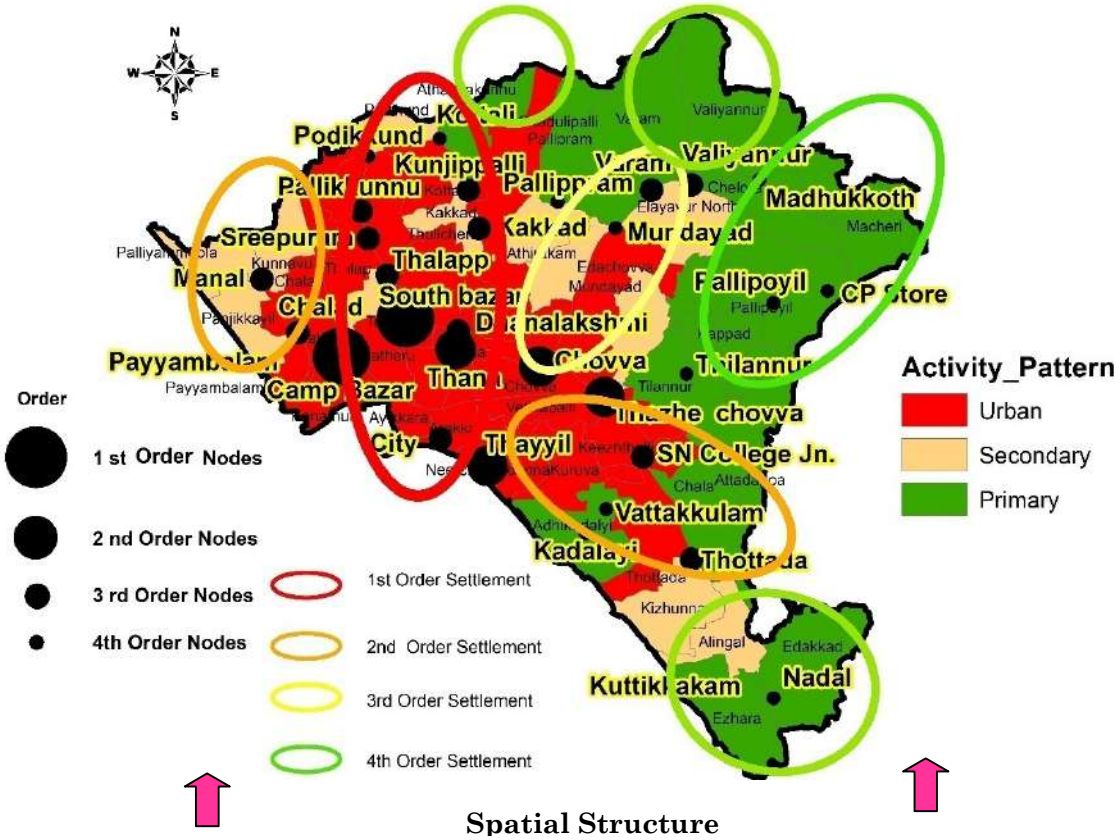
Figure.23.7 Existing Road Network



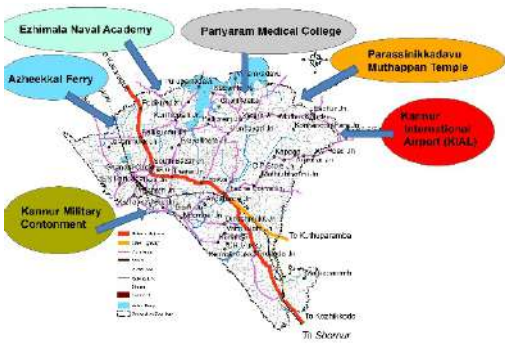




Activity Pattern Hierarchy of Settlement Hierarchy of Nodes



Spatial Structure



External Development Factor



Existing Road Network

Figure.23.8 Formulation of Existing Spatial Structure

23.7 EXISTING SPATIAL STRUCTURE

Existing Spatial Structure of planning area is derived from the analysis of various parameters such as Activity pattern, Hierarchy of Settlements, Hierarchy of nodes, External Development Thrust and Existing Road Network. Formulation of Spatial structure of Kannur Corporation area is shown in Figure.23.8. From that, it is clear that the wards located at CBD area and situated along NH 66 show the urban character. 2nd and 3rd order settlements are seen in wards showing secondary activity whereas 4th order settlements are in wards with primary activity.

23.8 INFERENCE

Spatial Structure is derived from the detailed analysis of various parameters like activity pattern, functional character, road network, hierarchy of settlements and nodes. Urban character reflects along the major transportation corridor especially along NH66 where the 1st order settlement and nodes are identified. Urban Rural Continuum is observed from CBD to the peripheral portion of the Corporation area.

CHAPTER 24

PROJECTED REQUIREMENTS

A Development Plan is prepared to allocate the resources optimally so as to meet the requirement of future population in a sustainable manner and also to enhance the quality of life of people.

In order to allocate the resources, future requirements need to be assessed. The study on projected requirements is about predicting the future as accurately as possible using all of the information available. Forecasting is a common statistical task in planning, where it helps to inform decisions about the scheduling of production, distribution and provides a guide to long-term strategic planning.

In this chapter, the data regarding various sectors of the Corporation area are projected using different principles for identifying the future requirements. The obtained values are compared with Urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines.

The projections have been done for population, work force participation rate and for the requirement of water supply, solid waste management, education, housing, health, traffic and transportation, energy and recreational facilities. The data obtained were already discussed in the chapters of respective sectors.

24.1 POPULATION

Population projections are the estimates of the population for future dates. The population of 2021, 2031 and 2041 for Kannur Corporation area is projected assuming that the same trend of population growth will be continued in future also.

The methods employed for projecting the population of the planning area are Arithmetical Increase method, Geometrical Increase method, Incremental Increase method and Decreasing Rate method. The average values of the above 4 methods is taken as the final population figures of 2021, 2031 and 2041.

24.1.1 ARITHEMETICAL INCREASE METHOD

In this method, the average increase of population per decade is calculated from the past records and added to the present population to find out the population in the next decade.

However, this method gives a low value of projected population. Figure.24.1 represents the graph showing the projected values obtained from Arithmetical Increase method.

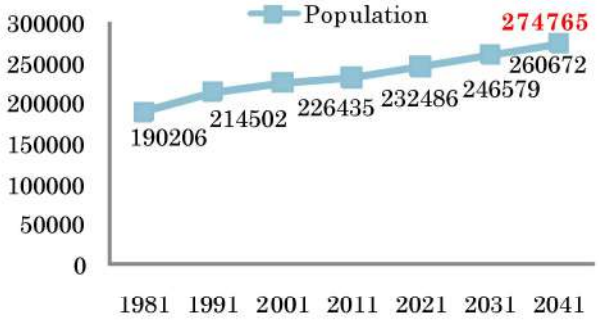


Figure.24.1 Projected population - Arithmetical increase method

The graph reveals that the decadal variation of total population has an increasing trend. The present population of the planning area is 2,32,486 as per 2011 census and the projected values are 2,46,579, 2,60,672 and 2,74,765 for the years 2021, 2031 and 2041 respectively.

24.1.2 GEOMETRICAL INCREASE METHOD

In this method, the percentage increase is assumed to be the rate of growth and the average of the percentage increase is used to find out the future increment in population. This method gives much higher values.

The projected population for the years 2021, 2031 and 2041 are 2,45,738, 2,59,745 and 2,74,550 respectively as shown in Figure.24.2. This method also shows that the decadal variation of total population has an increasing trend.

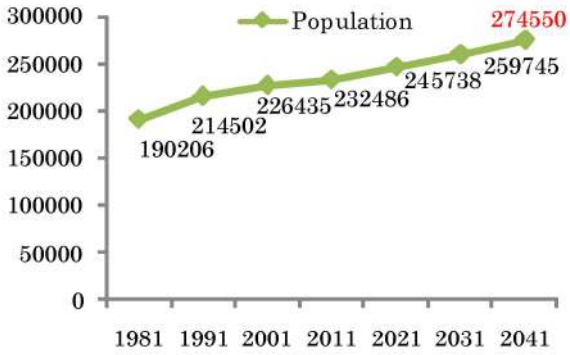


Figure.24.2 Projected population - Geometrical increase method

24.1.3 INCREMENTAL INCREASE METHOD

In this method, the increment in arithmetical increase is determined from the past decades and the average of the increment is added to the average increase.

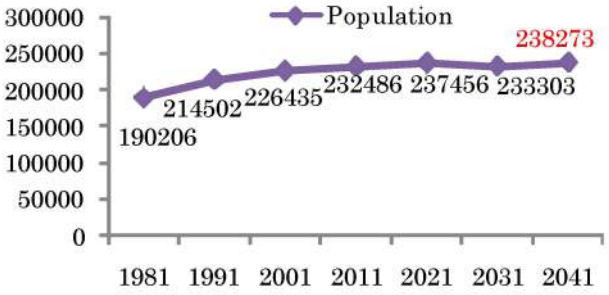


Figure.24.3 Projected population- Incremental increase method

The graphical representation showing the projected values is given in Figure.24.3. The figures obtained are 2,37,456, 2,33,303 and 2,38,273 for the years 2021, 2031 and 2041 respectively. It also indicates that the decadal variation of total population has an increasing trend.

24.1.4 DECREASING RATE METHOD

In this method, it is assumed that the rate of percentage increase decreases and the average decrease in the rate of growth is calculated. Then the percentage increase is modified by deducting the decrease in the rate of growth. Figure.24.4 shows the projected figures of population for 2021, 2031 and 2041. The projected population obtained by decreasing rate method shows a decreasing trend. The values obtained are 2,32,431, 2,32,313 and 2,32,195 respectively.

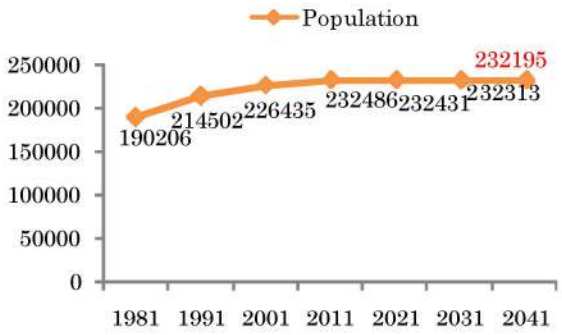


Figure.24.4 Projected population - Decreasing rate method

The values of projected total population obtained by the above four methods differs slightly and hence the average of the values obtained by four methods are taken as the population figures of Kannur city for the year 2021, 2031 and 2041 and are illustrated in Table.24.1

Table.24.1 Final projected population in Kannur Corporation area

Year	Arithmetical increase	Geometrical increase	Incremental increase	Decreasing rate	Average value of four methods
2021	2,46,579	2,45,738	2,37,456	2,32,431	**2,40,551**
2031	2,60,672	2,59,745	2,33,303	2,32,313	**2,46,508**
2041	2,74,765	2,74,550	2,38,273	2,32,195	**2,54,946**

Thus, it can be concluded that the total projected population figures of Kannur Corporation for the years 2021, 2031 and 2041 will be 2,40,551, 2,46,508 and 2,54,946 respectively.

24.2 WORK FORCE

The Work Force Participation Rate (WFPR) is an important factor which determines the urban trend of the planning area. Hence WFPR for the years 2021, 2031 and 2041 is projected using the trend line method.

Figure.24.5 gives the projected Work Force Participation Rate of the Corporation area which reveals that the actual WFPR has an increasing trend but it is found to be low when compared to the district and state average as explained in Chapter 5 - Occupational Structure. The projected values for the years 2021, 2031 and 2041 obtained from the trend line method are 29.19%, 30.52% and 31.85% respectively.



Figure.24.5 Projected WFPR

24.3 WATER SUPPLY

The projections on future demand for water are detailed in Table.24.2. As per the projected data, the total storage capacity required during 2021, 2031 and 2041 are 60.60 MLD, 62.10 MLD and 64.23 MLD respectively and ultimate demand for water in the Corporation area is estimated as 65 MLD. The domestic demand, non-domestic demand, fire demand and unaccounted consumption are taken into account to calculate the future

demand of water in the study area.

Under AMRUT scheme, there are many proposals like rehabilitation of existing old network, valves, house service connection and inter connections with existing lines and providing flow metres etc. including road reformation charges which all may increase the per capita supply from 90 LPCD to 150 LPCD, enhancement of treatment plant from 30 MLD to 40 MLD including modernisation of existing treatment plant which may result in increasing the per capita supply from 90 LPCD to 100 LPCD. Laying of gravity main from JICA project at Mangattuparamba to Pallikkunnu OHSR of capacity 24 LL for Pallikunnu and Puzhathi providing house connection and inter connection with existing line, laying conveyance main/pumping main from Melechovva to OHSR at Edakkad including supply erection of pump sets, construction of a 14 LL capacity OHSR at Thottada of Edakkad Zone, laying of new distribution line and providing new service connections at Elayavoor and Edakkad Zones etc. Thus the future demand can be met from these projects.

Table.24.2 Projection – Water Supply

Year	2021	2031	2041	Remarks
Projected Population	2,40,551	2,46,508	2,54,946	
a) Domestic Demand (MLD)	32.47	33.28	34.42	135 lpcd
b) Non Domestic Demand (MLD)	6.75	6.92	7.16	20.8% of a
c) Fire Demand(MLD)	0.39	0.40	0.42	1% (a+b)
Unaccounted - For Water (UFW)	5.94	6.09	6.30	15% (a+b+c)
Total Water Demand for the study area(MLD)	45.56	46.69	48.29	
Storage capacity required	15.04	15.41	15.94	33% of supply
Total storage capacity required	**60.60**	**62.10**	**64.23**	

24.4 SOLID WASTE AND SEWERAGE

The amount of solid waste that is likely to be generated and collected during 2021, 2031 and 2041 is projected based on URDPFI standard and is given in Table.24.3 which reveals that the projected value of solid waste including 30% extra likely to be generated is estimated as 152 Ton/day for the year 2041. The future requirement of the capacity of sewerage treatment plant in the Corporation area is given in Table.24.4. As per planning standards, the total waste water that will be generated in 2041 is forecast as 61.95 MLD.

Table.24.3 Projection - Solid Waste Management

Year	2021	2031	2041	Remarks
Projected Population	2,40,551	2,46,508	2,54,946	
Solid waste generated (Ton/day)	108.25	110.93	114.73	Per capita generation of waste per day- 450gms
Including 30% extra(Ton/day)	**140.72**	**144.21**	**149.14**	

Table.24.4 Sewerage treatment plant capacity requirement

Year	2021	2031	2041	Remarks
Projected Population	2,40,551	2,46,508	2,54,946	
Waste water(Litre/day)	25979508	26622891	27534141	Per capita generation of waste water per day- 108 Litres
Peak factor	2.25	2.25	2.25	
Total waste water (MLD)	**58.45**	**59.90**	**61.95**	

24.5 ENERGY

The projection detail of energy sector is given in Table.24.5. As per the planning standards, there is no shortage in the case of 110 KV substation, petrol pumps and LPG godown/gas godowns.

Table.24.5 Projection details of energy sector

Category	As per planning standard	Existing Number	Demand 2041	Shortage
110KV substation	1/ 1.5 lakh	2	2	Nil
Petrol pumps	-	25		Nil
LPG Godown/Gas Godown	1/ 40,000 to 1/50,000	Nil	5 to 6	Nil

24.6 EDUCATION

Based on URDPFI Guidelines, the requirement of educational institutions for 2041 has been projected and the shortage calculated is given in Table.24.6. According to URDPFI Guidelines, future demand of educational institutions by the year 2041 is expected mainly for Schools for physically challenged, Engineering College and Medical College etc. At present, such institutions are not there within the planning area. However, these facilities are available in the adjacent Panchayaths.

Also, the existing educational institutions like Primary school, Senior secondary school, Schools for mentally challenged, ITC/ITI, Arts and Science College, Polytechnic, Other Professional Colleges, Nursing and Paramedical Institutes etc. can meet their future demand too.

Table.24.6 Future Demand of educational institutions based on URDPFI guidelines

Sl. No.	Category	Existing Nos.	Standard Recommended	Demand 2041	Shortage
1	Primary school	53	1 in 5,000	51	Nil
2	Senior secondary school	73	1 in 75,000	3	Nil
3	School for physically challenged	Nil	1 in 45,000	6	**6**
4	School for mentally challenged	2	1 in 10 lakh	0	Nil
5	I.T.C/I.T.I	2	1 in 10 lakh	0	Nil
6	Arts & Science College	6	1 in 1.25 lakh	2	Nil
7	Polytechnic	1	1 in 10 lakh	0	Nil
8	Engineering College	Nil	1 in 10 lakh	0	**1**

9	Medical College	Nil	1 in 10 lakh	0	1
10	Other Professional Colleges	5	1 in 10 lakh	0	Nil
11	Nursing & Paramedical Institutes	5	1 in 10 lakh	0	Nil

24.7 HEALTH

The demand for health facilities for the year 2041 has been projected according to URDPFI Planning standards. Data regarding the projections is given in Table.24.7 which indicates that, 11 dispensaries, 2 multi-speciality hospitals and 1 intermediate hospital are required to serve the people of the planning area by 2041.

Table.24.7 Projection of health facilities Guidelines

Sl. No.	Category	Standards Recommended	No. of Beds	Existing no. of units	Demand of units by 2041	Shortage	Existing no. of Beds	Demand of beds 2041	Shortage
1	Dispensary	1/15,000 population	-	6	17	11	Nil	Nil	Nil
2	Multi - Speciality Hospital	1/1 Lakh population	200	1	3	2	500	200	Nil
3	Speciality Hospital	1/1 Lakh population	200	3	3	Nil	1100	600	Nil
4	Intermediate Hospital (Category A)	1/1 Lakh population	200	2	3	1	250	400	150
5	General hospital	1/2.5 lakh population	500	1	1	Nil	616	500	Nil

24.8 HOUSING

Based on planning standards, the housing demand is calculated by considering a population of 4.5 persons per dwelling unit for the years 2021, 2031 and 2041. The details are given in Table.24.8. The total shortage of houses by 2041 will be 12,658 including the existing shortage of 6,884 houses.

Table.24.8 Projections - Housing Demand

Year	Population	Existing no. of houses	No. of houses required	Replacing of dilapidated and old houses (8% of total houses)	Existing housing shortage	Additional no. of houses required for the added population		Total shortage
						Added population	Required no. of houses	
2011	2,32,486	48,673	51,664	3,894	6,884			6,884
2021	2,40,551					8,065	1,792	8,677
2031	2,46,508					5,957	1,324	10,000
2041	2,58,469					8,438	1875	**11875**

24.9 RECREATION AND CIVIC AMENITIES

At present, the recreational and civic amenities are in the Corporation area are not in the extent of requirements of future population as per URDPFI standards. The existing facilities as well as the future requirements of recreational facilities based on these standards are given in Table.24.9.

24.10 SOCIAL WELFARE

The projection details of social welfare requirements are given in Table.24.10. As per planning standards, there is no shortage in the case of Anganwadi, Old age homes and Orphanages.

Table.24.9 Projected details of recreational and civic amenities

Name	As per planning standard	Existing Value/Number	Requirement by 2041	Shortage by 2041
Open Space	1.4 Ha - 1.6 Ha per 1000 persons	32.186 Ha	182.10 Ha to 159.34Ha	149.914 Ha to 127.154 Ha
Community Hall	1/15,000	57	17	Nil
Police Station	1/90,000	5	3	Nil
Fire Station	1/2 lakh	Nil	1	1
Post Office	1/15,000	7	17	10

Table.24.10 Projected details of social welfare requirements

Name	As per planning standard	Existing Number	Requirement by 2041	Shortage by 2041
Anganwadi – Housing area/cluster	1/5,000	200	51	Nil
Old age homes	1/5 lakh	5	1	Nil
Orphanages	1/10 lakh	18	0	Nil

24.11 TRAFFIC AND TRANSPORTATION

The traffic and transportation has great significance in the development of an area and hence the projection of requirements in this sector has to be done with great care and attention. The study report of National Transportation Planning and Research Centre (NATPAC) reveals that at present, the V/C ratio of all road sections of National Highway 66 is greater than one indicating that the volume of traffic has already exceeded the road capacity in the base year itself. Moreover, the projected value of V/C ratio (2036) is found high in most of the roads which necessitates the widening of roads in future. Similarly, internal ring road of the Corporation area from Caltex Junction to Caltex Junction via Railway Station, Stadium will be the worst affected network by the year 2036**.** Important collector and sub arterial roads in the planning area are also exceeding their capacity gradually focusing attention for further strengthening and widening. The projected traffic on the existing road network implies that the existing road network would not be able to handle the traffic in the horizon years without up gradation of the transport infrastructure facilities. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, flyovers, bypasses and link roads is a must considering the dramatic increase in the traffic volume.

Figure.24.6 shows the projected V/C ratio of major roads forecast for the year 2036 and Table.24.11 gives the estimated daily traffic for different horizon years on various road stretches in Kannur Corporation area.

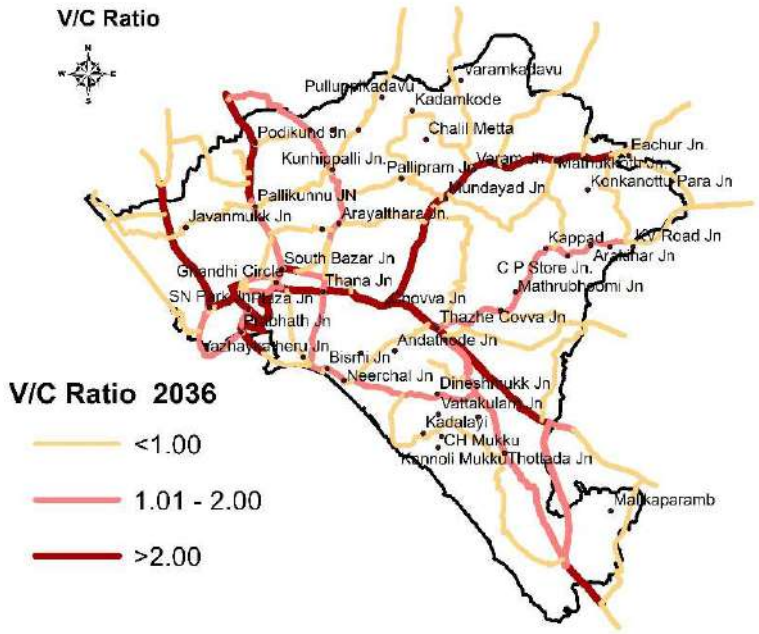


Figure.24.6 Projection - V/C ratio in major road stretches

Table.24.11 Projection - V/C ratio in major road stretches

Sl. No.	Name of Road section	Capacity (PCU)	2016		2026		2036	
			Traffic Volume (PCU)	V/C Ratio	Traffic Volume (PCU)	V/C Ratio	Traffic Volume (PCU)	V/C Ratio
1. NH 66								
1	Edakkad - Nadal Gate	1,500	1,534	1.02	2,498	1.67	3,698	2.47
2	Nadal Gate - ThottadaJn	1,500	708	0.47	1,152	0.77	1,706	1.14
3	ThottadaJn - JTS Jn	1,500	932	0.62	1,518	1.01	2,247	1.5
4	JTS Jn - ThazheChovva bypass	1,500	698	0.47	1,137	0.76	1,683	1.12
5	ThazheChovva bypass - MeleChovva	1,500	2,869	1.91	4,672	3.11	6,916	4.61
6	MeleChovva - Thana Jn	3,600	4,143	1.15	6,748	1.87	9,988	2.77
7	Thana Jn - ManoramaJn	3,600	4,316	1.2	7,029	1.95	10,405	2.89
8	ManoramaJn - Caltex Jn	3,600	3,798	1.05	6,186	1.72	9,156	2.54
9	Caltex Jn - Gandhi Circle	3,600	2,633	0.73	4,289	1.19	6,349	1.76
10	Gandhi Circle - South Bazaar	3,600	2,319	0.64	3,777	1.05	5,590	1.55
11	South Bazaar - AKG Hospital	3,600	2,889	0.8	4,705	1.31	6,965	1.93

12	AKG Hospital - Pallikkunnu	3,600	2,675	0.74	4,357	1.21	6,450	1.79
13	Pallikkunnu - Podikkundu	3,000	2,612	0.87	4,254	1.42	6,297	2.1
14	Podikkundu - Stylo Corner	1,500	2,412	1.61	3,928	2.62	5,815	3.88
15	Stylo Corner - PuthiyaTheru	1,500	2,550	1.7	4,153	2.77	6,147	4.1
16	PuthiyaTheru - Highway Jn	1,500	2,343	1.56	3,817	2.54	5,649	3.77
2. Edakkad to Kadambur (outside study area)								
17	Edakkad - Kadambur	900	287	0.32	385	0.43	469	0.52
3. NH bypass								
18	Nadal Gate - ChalaJn	1,500	842	0.56	1,371	0.91	2,029	1.35
19	ChalaJn - ThazheChovva bypass	1,500	2,340	1.56	3,812	2.54	5,642	3.76
4. SH-38: ThazheChovva to Kuthuparamba								
20	ChalaJn - Chala East	1,200	931	0.78	1,378	1.15	1,852	1.54
5. Chala to Chembilode to Mowancherry (Outside study area)								
21	Chala East - Movancherry	1,200	166	0.14	245	0.2	329	0.27
6. Thillannur to Attadappa road								
22	Thillannur - Attadappa	900	99	0.11	132	0.15	161	0.18
7. ThazheChovva to Movancherry road								
23	ThazheChovva - Thillannur	1,200	561	0.47	913	0.76	1,351	1.13
24	Thillannur - Kappad	1,200	561	0.47	913	0.76	1,351	1.13
25	Kappad - Pallipoyil	1,200	561	0.47	913	0.76	1,351	1.13
26	Pallipoyil - Movancherry	1,200	476	0.4	775	0.65	1,148	0.96
8. MeleChovva to Mattannur								
27	MeleChovva - Mundayad	1,200	1,400	1.17	2,280	1.9	3,376	2.81
28	Mundayad - Vaaram	1,200	1,731	1.44	2,819	2.35	4,173	3.48
29	Vaaram - Valiyannur	1,200	1,367	1.14	2,226	1.85	3,295	2.75
30	Valiyannur - Mathukoth	1,200	1,319	1.1	2,148	1.79	3,179	2.65
31	Mathukoth - Eachur	1,200	1,176	0.98	1,915	1.6	2,834	2.36
9. VaaramJn to Kannadiparamba								
32	Varam - Kannadiparamba	900	303	0.34	407	0.45	496	0.55
10. Valiyannoor to Naayattupara								
33	Valiyannur - Mattannoor	900	385	0.43	517	0.57	631	0.7
11. Kunhippally to Kannadiparamba								
34	Kunhippally -	900	411	0.46	552	0.61	673	0.75

	Kannadiparamba							
12. South Bazaar to Sylo Corner via Kunhippally								
35	South Bazaar - Kannothumchal Rd	900	1,277	1.42	1,716	1.91	2,092	2.32
36	Kannothumchal Rd - Korjan School Jn	900	446	0.5	599	0.67	730	0.81
37	Korjan School Jn - Kakkad	900	908	1.01	1,220	1.36	1,488	1.65
38	Kakkad - Kunhippally	900	822	0.91	1,105	1.23	1,347	1.5
39	Kunhippally - Kootali	900	605	0.67	813	0.9	991	1.1
40	Kootali - Stylo Corner	900	803	0.89	1,078	1.2	1,315	1.46
13. Puthiyatheru to Kattampally (Outside study area)								
41	PuthiyaTheru - Kattampally	1,200	872	0.73	1,290	1.08	1,734	1.44
14. SN Park Jn to Azheekkode								
42	S N Park - Chalad	1,200	1,590	1.32	2,353	1.96	3,162	2.64
43	Chalad - Alavil	1,200	1,486	1.24	2,199	1.83	2,955	2.46
15. Azheekkode to Highway Jn on NH 66 (outside study area)								
44	Azheekkode - Highway Jn	1,200	1,074	0.89	1,589	1.32	2,136	1.78
16. Azheekkode to Dharmadam Beach road via Payyambalam Beach								
45	Azheekkode - Payyambalam Beach	900	81	0.09	109	0.12	133	0.15
46	Payyambalam Beach - Girls HS	900	191	0.21	257	0.29	313	0.35
17. Gandhi Circle to Gandhi Circle via Railway station								
47	Gandhi Circle - Civil Station Jn	2,400	1,246	0.52	1,844	0.77	2,479	1.03
48	Civil Station Jn - Police Club Jn	2,400	2,355	0.98	3,486	1.45	4,685	1.95
49	Police Club Jn - AshirwadJn	1,200	3,101	2.58	4,590	3.83	6,169	5.14
50	AshirwadJn - ThavakkaraJn	1,200	2,594	2.16	3,840	3.2	5,160	4.3
51	ThavakkaraJn - Plaza Jn	1,200	1,623	1.35	2,402	2	3,228	2.69
52	Plaza Jn - Railway Station	1,200	2,235	1.86	3,308	2.76	4,446	3.71
53	Railway Station - MuneeswaranKovil	1,200	2,247	1.87	3,325	2.77	4,469	3.72
54	MuneeswaranKovil - Padannapalam Rd	1,200	2,269	1.89	3,359	2.8	4,514	3.76

55	Padannapalam Rd - Stadium Jn	1,200	1,682	1.4	2,490	2.07	3,346	2.79
56	Stadium Jn - Town Square	2,900	1,912	0.66	2,830	0.98	3,804	1.31
57	Town Square - Gandhi Circle	2,900	1,721	0.59	2,548	0.88	3,424	1.18
18. Caltex Jn to Civil Station Jn								
58	Caltex Jn - Civil Station Jn	1,200	1,299	1.08	1,922	1.6	2,583	2.15
19. Plaza Jn to City Jn via PrabhatJn								
59	Plaza Jn - SBI Jn	2,900	1,803	0.62	2,668	0.92	3,586	1.24
60	SBI Jn - PrabhatJn	1,200	1,870	1.56	2,768	2.31	3,720	3.1
61	PrabhatJn - Hospital Bus Stand Jn	1,200	1,368	1.14	2,024	1.69	2,720	2.27
62	Hospital Bus Stand Jn - City Jn	1,200	-	-	-	-	-	-
20. Prabhat to MuneeswaranKovilJn via S N Park								
63	PrabhatJn - Govt HS	1,200	948	0.79	1,403	1.17	1,885	1.57
64	Govt HS - SN Park Jn	1,200	758	0.63	1,122	0.94	1,508	1.26
65	SN Park Jn - MuneeswaranKovil	1,200	1,711	1.43	2,532	2.11	3,403	2.84
21. Thavakkara to SBI Jn via New Bus Station Jn								
66	ThavakkaraJn - New Bus Station Jn	1,200	3,554	2.96	5,261	4.38	7,070	5.89
67	New Bus Station Jn - SBI Jn	1,200	1,912	1.59	2,830	2.36	3,804	3.17
22. Other roads								
68	Police Club Jn - Stadium Jn	2,400	1,855	0.77	2,745	1.14	3,689	1.54
69	AashirwadJn - Police Club Jn	1,200	1,561	1.3	2,311	1.93	3,105	2.59
70	Town Square - AKG Hospital	1,200	554	0.46	819	0.68	1,101	0.92
71	City Jn - ManoramaJn	900	-	-	-	-	-	-
72	City Jn - Thana Jn	900	640	0.71	860	0.96	1,048	1.16
73	Thana Jn - Dhanalekshmi	900	688	0.76	925	1.03	1,127	1.25
74	Dhanalekshmi - Korjan School Jn	900	497	0.55	667	0.74	813	0.9
75	South Bazaar - Dhanalekshmi	900	948	1.05	1,274	1.42	1,553	1.73

76	Dhanalekshmi - Kannothumchal	900	501	0.56	673	0.75	821	0.91
77	ThazheChovva - Thayyil	900	501	0.56	673	0.75	820	0.91
78	Thayyil - City Jn	900	840	0.93	1,128	1.25	1,375	1.53
79	JTS Jn - Thayyil	900	796	0.88	1,070	1.19	1,304	1.45
80	Kizhuthally - Avera	900	-	-	-	-	-	-
81	ThottadaJn - Kuruva	900	299	0.33	401	0.45	489	0.54
82	NadalJn - ThottadaJn	900	-	-	-	-	-	-
83	Chala - Attadappa	900	-	-	-	-	-	-
84	ThazheChovva - Attadappa	900	-	-	-	-	-	-
85	ThazheChovva - Mundayad	900	-	-	-	-	-	-
86	Mundoor Indoor Stadium - CheloraGHS	900	103	0.11	138	0.15	168	0.19
87	Kappad - Mathukoth	900	-	-	-	-	-	-
88	Eachur - Pallipoyil	900	84	0.09	112	0.12	137	0.15
89	Movancherry - Eachur	900	445	0.49	598	0.66	729	0.81
90	Vattapoyil - MavilaChal	900	-	-	-	-	-	-
91	Varam - Kadankod	900	293	0.33	393	0.44	479	0.53
92	Kadankod - Pallippuram	900	-	-	-	-	-	-
93	Kakkad - Mundayad	900	294	0.33	395	0.44	482	0.54
94	Mudayad - Arayalthara	900	-	-	-	-	-	-
95	Thalappavu - Kakkad	900	-	-	-	-	-	-
96	Kunhippally - Pallikkunnu	900	311	0.35	418	0.46	509	0.57
97	Kottali - Podikkundu	900	388	0.43	522	0.58	636	0.71
98	DD Kendra - Kanathur	900	-	-	-	-	-	-
99	DD Kendra - Raja's HS	900	-	-	-	-	-	-
100	Pallikkunnu - Chalad	900	328	0.36	440	0.49	537	0.6
101	Chalad - Palliyamoola	900	45	0.05	60	0.07	74	0.08
102	Manal - Palliyamoola	900	-	-	-	-	-	-

24.12 INFERENCE

As per URDPFI guidelines, the demand for water supply, solid waste and sewerage, energy, education, health, housing, recreation and civic amenities, social welfare, traffic and transportation for the projected population for the years 2021, 2031 and 2041 are calculated.

In the case of water supply, according to the standards, the total storage capacity required during 2021, 2031 and 2041 is 60.60 MLD, 62.10 MLD and 64.23 MLD respectively and ultimate demand for water in is estimated 65 MLD. Since there are so many upcoming projects, the demand can be met from them.

In the case of solid waste and sewerage, the projected value of solid waste including 30% extra likely to be generated is estimated as 150 Ton/day for the year 2041 and 61.95 MLD of total waste water which necessitate the improvement of existing capacities.

There is no shortage in the sectors like energy as well as social welfare for the projected population. But the future demand of educational institutions by the year 2041 is expected mainly for Schools for physically challenged, Engineering College and Medical College etc. which are absent in the planning area even though these facilities are available in the adjacent Panchayaths.

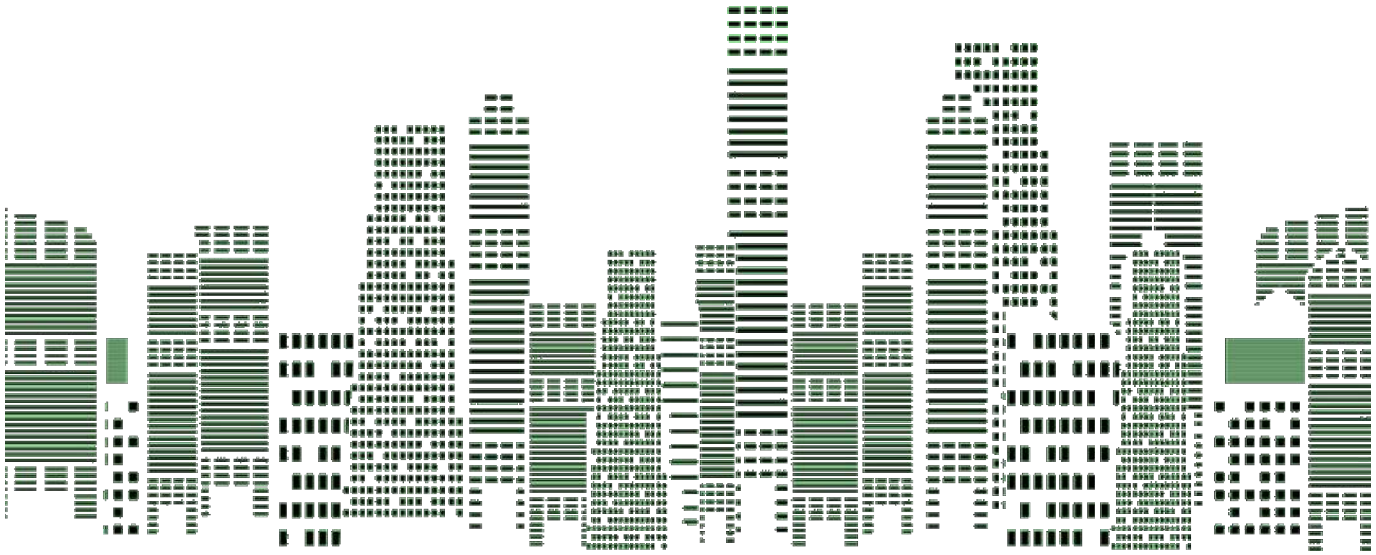
In the case of health sector, 11 dispensaries, 2 multi-speciality hospitals and 1 intermediate hospital are required by the year 2041. The total shortage of houses by 2041 will be 11,875 including the existing shortage of 6,884 houses.

Also, the recreational and civic amenities in the Corporation area are not in the requirements of future population as per URDPFI standards which should be improved.

The projected value of V/C ratio (2036) is found high in most of the roads which necessitates the widening of roads in future. Otherwise, these roads are not able to handle the traffic in the horizon year. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, flyovers, bypasses and link roads are necessary for considering the dramatic increase in the traffic volume.

PART II

DEVELOPMENT VISION



CHAPTER 25
SUMMARY OF ANALYSIS & REGIONAL LINKAGE

Kannur Municipal Corporation area has great significance as an administrative district centre with higher commercial, educational and tourism potential. The problems and potential of each and every sector in the planning area has been sorted out.

The study and analysis part in the Master Plan is broadly classified into two, spatial analysis and sectoral analysis. The spatial analysis includes the study on regional settings, demography, occupational structure and existing land use. Sectoral analysis deals with the detailed study of each development sector identified within the planning area. Detailed summary and findings of study and analysis are described in this chapter.

25.1 MAJOR FINDINGS OF SPATIAL ANALYSIS

Regional study, demography, work force and existing land use are the various factors considered in spatial analysis. The major findings obtained from spatial analysis are given below.

25.1.1 REGIONAL STUDY

Kannur Municipal Corporation constitutes an area of 78.38 sq.km. area and with 8 villages and 26 Desoms. The planning area is surrounded by 8 Panchayaths and Kannur Cantonment. There are two rivers flowing through the Corporation area namely Kattampally River (Varamkadavu and Pullooppikadavu) and Kanampuzha. Kattampally River also known as Munderipuzha is a tributary of Valapatanam River and flows through the northern border of the planning area and Kanampuzha River flows inside it. Thottadapuzha, Ayyarathpuzha (Nadalpuzha) are other minor rivers.

Kannur Corporation area is easily accessible by road, rail and air. The National Highway-66 (NH 66) connects the two major cities Kozhikode and Mangalore with Kannur. State Highway-38 (SH 38) starts from Thazhe Chovva. Kannur Railway Station in Kannur district is a major railway station located inside the planning area. Moreover, Kannur International Airport is located 30 km away from the core town area. Commercial activities are mainly

concentrated at Caltex, Old Bus stand, New Bus stand, Railway Station and Thana area.

25.1.2 DEMOGRAPHY

As per census 2011, the population of Kannur Corporation area is 2,32,486, which was about 2,26,435 during 2001 census. Chalad, Udhayamkunnu, Thulichery, Kakkad North, Varam, Pallipram, Valiyannoor, Chelora, Macheri, Kappad, Thilanoor, Arakkal, Kuruva, Adhikadalayi and Thottada are the wards having a population range of 4500 to 5000. Growth rate during last decade is 2.67% which is lower when compared to District and State. Population density of the planning area is 2967 persons per sq.km. Sex ratio and Child sex ratio are 1171 and 963 respectively whereas the literacy rate is 96.55%. Projected population for the year 2041 is 2,54,946.

25.1.3 OCCUPATION

As per 2011 census, the Work Participation Rate in Kannur municipal Corporation area is 28.91%, which is very low when compared to District and State values. The planning area ranks sixth position in Work Participation Rate among the six Corporation areas in Kerala and eigth position among ten urban local bodies in Kannur district.

The female WPR in Kannur Corporation area is 13%. Comparing the census data, number of main workers is high which indicates that peoples are engaged in service or productive economic sectors throughout the year whereas the workers involved in primary sector is less. Also, the contribution of other workers increases across decades.

25.1.4 EXISTING LAND USE

The study of existing land use in Kannur Corporation area reveals that the major portion of the area is occupied by residential use. The second highest land use is dry agriculture areas. The paddy activities are mainly concentrated in the north - eastern and eastern parts while the dry agriculture is more prominent in eastern part.

The Corporation area is blessed with three major rivers and two minor rivers which enhances agricultural activities to a large extent. Non agricultural activities including residential, commercial, public and semi public, industrial land use are mainly concentrated in the middle portion along the major corridors.

25.2 MAJOR FINDINGS OF SECTORAL ANALYSIS

Based on the function, development sectors are mainly grouped into three categories as sectors of economy, sectors of physical infrastructure and sectors of social infrastructure.

25.2.1 SECTORS OF ECONOMY

- **Agriculture**

In Kannur Corporation area, from the land use analysis, it is clear that about 19.7% of total area is used for dry agricultural purpose and 3.74% of total area is used for paddy cultivation. It is also found that agriculture cannot be promoted as a key sector because the area has already shifted from agriculture to non agriculture activities and the extent of land available for agriculture use in the planning area limit is less.

- **Animal Husbandry**

Animal Husbandry is a weak sector in the Corporation area though there exists a considerable demand for milk, meat and egg. Increasing urbanization activities has reduced the availability of fodder and the increased cost of feed which in turn makes cattle rearing a non profitable activity for small scale farmers. One slaughter house is located within the Corporation area. However, the development of animal husbandry sector in future will be promoted because of availability of infrastructure facilities such as Veterinary hospital, Disease Diagnostic Laboratory etc. Animal Husbandry activities are suitable to the semi urban and rural wards.

- **Fisheries**

Western boundary of planning area completely falls in coastal stretch. Hence fishing sector is highly important in the planning area. Large numbers of fishermen families reside in Arakkal, Thayyil, City, Ayikkara and Vethilapally. Considerable extent of Kattambally River at Pulluppi kadavu provides potential for inland fishing activities. Currently fisheries and its allied activities are less in planning area limit. Availability of water resources offers huge potential for fishing activities in future.

- **Industries**

Kannur Corporation area is an industrially backward area in the district. There are only three large scale industries. The industrial activities are minimum in the planning area (0.578 km^2). Kerala State Handloom Development Corporation Limited, Cannanore Co-operative Spinning Mills Limited and Milma are the large scale industries. There are no medium scale industries which indicate the backwardness in medium industries. The soil, climate, availability of water, harbour, transportation connectivity like road, rail, air, inland water transport etc. are the enormous potentials of the planning area in industrial sector. Also, there is a potential for the development of micro enterprises like agro and food processing units,

garments, embroidery unit, paper industries and automobile engineering units etc. The traditional industry in the planning area shows a declining trend.

Some industries of handloom and cotton textiles, timber and plywood, milma, fibre foam, splints and veneers, bricks and tiles, beedi and cigarette, coir etc. are set up in and around the Corporation area. Thottada has very recently harboured many automobile ventures of various companies. One of the issues the production sectors mainly face is lack of experienced labourers. The mini industrial estate at Marakkarkandy and Edakkad can be developed into a major industrial area.

- **Trade and Commerce**

Kannur Corporation area is the district headquarters, which indicates its commercial importance. Commercial centres are concentrated in the central area of the planning area. Narrow roads and lack of parking areas are the main issues in here which prevents smooth manoeuvring of vehicles causing frequent traffic block and also lack of basic infrastructure facilities.

The important markets in the Corporation are Ayikkara fish market, South Bazar, Central market, Vaaram fish market and Kakkad. The maintenance of the markets is not done properly.

There are no organized clusters of informal sector units in the planning area. The increased number of informal sector and the lack of sufficient public comfort stations are other issues faced by the planning area. The location of stationery units is not uniform and should be ensured that such activities shall not be concentrated in single location.

Since the major commercial nodes have easy access from bus terminals, functioning of weekly markets will be very useful for the people as well as the farmers. Establishment of more comfort stations and ensuring of their regular maintenance by the authority at every major commercial centre will be effective for making the Corporation area healthy as well as hygienic.

- **Tourism, Culture and Heritage**

The name of Kannur has been marked in the modem history of Kerala for its vast array of heritage buildings and its most enticing culinary culture. The Corporation has immense potential for development of tourism sector with a clean and beautiful environment. Kannur city is a sandy strip of land interlocked with beaches and estuaries. There is a scope for a boating service through Varamkadavu, Pullooppikadavu and Munderikadavu. Due to the presence of bird sanctuary at munderikadavu, it can be enhanced as a tourist spot.

There are some environmentally sensitive areas having reasonable amount of mangroves like Kanampuzha and Thavakkara South. Conservation of these areas is very important.

Since Kannur has a potential of cultural tourism due to "Theyyam", the seasonal scope of that can be utilised especially by foreigners. The traditional medical treatment facilities can be rejuvenated and be introduced there by promoting health tourism within the planning area. The proximity of the new International Airport will be very helpful to attract the foreigners.

Even though St. Angelo's fort, light house, Payyambalam beach, Baby beach etc. are almost very close to the town, the accessibility to these places are very difficult and also the road conditions are very poor. Thus tourism circuits need to be developed by connecting the various tourist destinations of Kannur District as well.

25.2.2 SECTORS OF PHYSICAL INFRASTRUCTURE

- **Traffic and Transportation**

Kannur Corporation is the district headquarters and important trade, commerce and tourist centre of Kannur District. Hence the traffic and transportation sector has great significance in the development of the study area as it can promote all other production sectors by providing smooth accessibility and connectivity. In the study area, the present value V/C ratio for most of the road sections of National Highway 66 is greater than one indicating that the volume of traffic has already exceeded the road capacity. Traffic congestion is observed in the stretch of NH 66, Mele Chovva to Mattannur road and Gandhi circle to Railway station which can be controlled by introducing traffic control/signal system as well as widened roads. The water logging issues in the study area can be solved by the introduction of scientific drainage system.

There are footpaths in almost all major roads, but pedestrian crossings are not arranged properly. The goods traffic in the market centres is the most neglected one. Insufficient loading and unloading facilities, terminal facilities, provision for taxi stand, truck terminal, organised parking centres or plazas, connectivity of missing links and proper circulation pattern for the traffic are the important needs of the town. The existing Railway station which is the important one in the district, the high potential of Kannur International Airport, proposed inland water network all together will promote trade and commercial activities of the town and will reflect in all production sectors.

The improvement and maintenance

of existing roads and the construction of new roads will enhance the trade and commercial activities, tourism, industries, education, health, etc. of the study area.

- **Water Supply**

In Kannur Corporation, ground water is the principal source of water for domestic use. The remaining population mainly depends on Kerala Water Authority. The major source of public water supply in Kannur Corporation is the Valappatanm River and Pazhassi reservoir. But the existing water supply network in Kannur Corporation is insufficient. In addition to this the antiquated network system causes leakage of water and affects the quality of water available. The continuous checking of the old pipe network connections is to be done to avoid leakage as they affect the quality of available water as well as the efficiency of the existing water supply network which can also lead to scarcity. The tanker lorry supply is to be increased to higher regions as well as places where water scarcity is affected due to salinity which can control most of the drinking water issues in study area. Proper ground water storage facilities, well water recharging, renovations of ponds or other natural bodies should be done.

Under AMRUT scheme, there are many proposals like rehabilitation of existing old network, valves, house service connection and inter connections with existing lines and providing flow metres etc. including road reformation charges which all may increase the per capita supply from 90 LPCD to 150 LPCD, enhancement of treatment plant from 30 MLD to 40 MLD including modernisation of existing treatment plant which may result in increasing the per capita supply from 90 LPCD to 100 LPCD, laying of gravity main from JICA project at Mangattuparamba to Pallikkunnu OHSR of capacity 24 LL for Pallikunnu and Puzhathi providing house connection and inter connection with existing line, laying Conveyance main/pumping main from Melechovva to OHSR at Edakkad including supply erection of pump sets, construction of a 14 LL Capacity OHSR at Thottada of Edakkad Zone, laying of new distribution line and providing new service connections at Elayavoor and Edakkad Zones etc. These projects will be very effective to meet the future demand.

- **Drainage, Sewerage and Solid Waste Management**

Kannur Corporation is blessed with three major and two minor rivers and the physiographic conditions are good for drainage as the low lying areas are mainly located along the water bodies. But proper maintenance of existing drains in the study area is neglected. Hence the urban storm water drainage

collection and conveyance systems have to be designed in such a way that flooding is avoided and transportation is not adversely affected. It is a proven fact that there should be a good drainage system for roads and it will certainly improve the durability of such roads. The unwanted land use conversions should be strictly prohibited as they adversely affect the storm water drainage.

There are no sewage treatment plants in the Corporation. Lack of sufficient comfort stations makes the study area unhygienic. In areas like Padanna, Anakkulam and Manjappalam, the ground water is found polluted due to the infiltration of wastewater. The newly proposed Sewage Treatment Plant near Padannapalam only covers wards of Thalikkavu and Kanathoor. Hence it is necessary to cover all the wards and for that more Sewage Treatment Plants are to be constructed.

The available waste collection facilities are not covered for all the wards. Hence decentralised waste management system in all the Corporation wards is to be initiated. Localized collection and processing techniques need to be introduced. Thumboormuzhi model of waste treatment plant can be implemented in every ward. To treat bio degradable wastes, ring compost or pipe compost bin can be provided. The efficiency of the existing treatment facilities like MRF at Chelora is to be ensured. A Waste to Energy Plant is proposed at Chelora as state government's initiative.

- **Energy**

The power supply is done through 6 substations under 7 sections. Among the 5 substations, three 110KV substations and three 33KV substation exist. One of the substations is outside the Corporation boundary (Azhikode 110 KV). As per planning standard, there is no shortage in the case of 110KV substations, petrol pumps and LPG godown/gas godowns**.** The proposed waste to energy plant at Chelora under the State government's initiative to set up waste-to-energy plants in seven districts will be a great achievement for the Corporation. The use of non-conventional energy did not have much popularity and thus the use is very minimal. There is only one electric charging station in the study area. Some residential occupancy is using biogas plants as cooking gas.

25.2.3 SECTORS OF SOCIAL INFRASTRUCTURE

- **Education**

Kannur Corporation has great potential regarding education sector. Various educational institutions within the study area include Kannur University along with 6 Arts and Science Colleges, 1 Polytechnic, 2

ITI/ITC, 5 other Professional Colleges including TTI, Handloom Technology Institute, Craft Institute, 5 nursing and Paramedical Institutions are there in the Corporation. The Thottada area can be developed as an educational hub as it contains so many educational institutions.

Based on planning standards, the existing number of educational institutions like primary school, senior secondary school are adequate. Schools for physically challenged, Engineering College and Medical College etc. are not there in the study area. However, these facilities are available in the adjacent Panchayaths.

- **Health**

Under Corporation, five primary health centres, one urban primary health centre, five government ayurveda dispensaries, five government homeo dispensaries are there. District Ayurveda hospital at Thana and District Homeo hospital at South Bazar exist within the Corporation boundary. The basic infrastructure of the government dispensaries and PHCs are not up to the needs which should be improved. Kannur District Hospital is located in the Cantonment area, which is very close to the Corporation boundary.

The child death, maternal death and neonatal death during 2017 - 2018 shows that even some part of the Corporation area faces lack of sufficient healthcare facilities and lack of nutritious food. Thus it is to be ensured that the facilities are getting for all categories.

The presence of waterborne diseases like Diarrhoea, Jaundice and Typhoid indicates the unavailability of safe drinking water in hotels as well as institutions. Hence city sanitation is an important fact in enhancing the health sector of the planning area. Apart from waterborne diseases, life style diseases are also increasing in the Corporation area. Thus new interventions are required to bring the people who are suffering from such life style diseases under medical care. Cancer is another major disease that affects all sections of human population. So apart from Kannur Medical College, Malabar Cancer Research Centre at Thalassery, a specialised cancer centre provides treatment for cancer not just for the Corporation area, but even for the entire state and beyond.

Establishment of new rehabilitation centres will be more useful in the future to provide isolation facilities for fighting against Pandemics like COVID-19.

- **Housing**

The household size in the Corporation is 4.75. Higher household size value is seen in Kannur zone followed by Puzhathi zone. The lower values in some zones are due to the

out migration in search of job whereas that of higher values is due to the existence of joint family system in the planning area. About 89% of the people are having own land for houses and others still live on rent or other ways. From 2001 to 2011, the household size is decreasing which may create more housing demand in future. About 58% of the houses in the planning area are in good condition in terms of plinth area of building, type of building, number of storeys, construction materials used for wall, floor and roof etc. About 35% of the people are in moderate level of houses. The other 7% of people are living in dilapidated houses and huts which are not suitable for living.

The infrastructure facilities of slums and colonies shows a lot of inadequacies in terms of electricity, drinking water, hygienic latrine, street lights, community hall facilities, Kiosk facilities, Patanamuri(Study room) facilities etc. They should be improved.

- **Recreation and Civic Amenities**

At present, there are 57 community halls, 5 Police stations including 1 SP Office, 7 Post Offices in the Corporation area. The park and open space constitute about 32.186 Ha which is not upto the planning requirement. At present, one open air theatre which is in the Town Square and one open stage in Collectorate Maidan are there. The open stage in the Payymbalam Park can be renovated so that it can be used for any cultural events especially in the evenings.

- **Social Welfare**

In Kannur Corporation area, 200 Anganwadies and 1107 Kudumbasree units are functioning very effectively. Kudumbashree units not only encourage women but also enhance the economic development of the planning area. The Anganwadis pose so many issues like lack of own land, infrastructure facilities like drinking water, compound wall, toilet, electric connection, gas connection, furniture, playground, playing equipments etc.

The percentages of SC and ST population are 4.88% and 0.39% respectively. The weaker section of the society often remains weak due to negligence by the authorities; hence all available schemes may be properly implemented and funds utilized for their uplift. There are 5 orphanages and 18 old age homes in the planning area which satisfies the planning standards.

- **Environment**

In Kannur Corporation area, there are so many ecologically sensitive areas. The environmental problems normally generated are related to the waste disposal, river encroachments and misuse of natural resources. The

natural drains and water bodies are required to be protected from being polluted by various causes. Unscientific use and disposal of plastic and other hazardous substances are to be taken care of with proper planning and strict regulations.

The conversion of paddy lands along Kanampuzha watershed has to be discouraged by adopting various measures by providing better infrastructure facilities to improve the cultivable area and productivity. Also, there is a potential for tourism development of Adikadalayi beach and Kanampuzha River. Walk ways can be constructed along the banks of River.

The eco sensitive areas need to be protected and conserved and necessary measures are to be taken by the Corporation authorities and environmental property agencies to protect these areas.

25.2.4 DISASTER MANAGEMENT

Disaster management strategies can effectively reduce the adverse effects and vulnerability at the time of natural hazards. The district level as well as Corporation area level study on various disasters indicates that the planning area comes under moderately safe zone. Based on that, some mitigation measures are recommended. Adopting these measures will be useful to reduce the severity of disaster due to natural as well as unexpected calamities

In the planning area, the major disasters affecting are flood and coastal hazards. Also, some slight as well as moderate drought prone wards are there. Fire and epidemics/pandemics are also seen in the Corporation area. Flood has affected Housing sector, Electricity sector, Agriculture and other production sectors. Majority of the new buildings were affected due to flood which is a serious concern that needs to be addressed.

The land use in the planning area is divided into two categories, risk zone I and risk zone II. The flood prone areas come under risk zone I area whereas coastal erosion prone areas under risk zone II. The delineation of these two categories are based on KSDMA, "Nammal Namukkai" reports.

Rescue shelters with multipurpose usage need to be proposed. There is a good road network connecting all the important identified rehabilitation centres within the planning area. Also, both the road networks as well as the rehabilitation centres are safe from flood. The rehabilitation centres should be for multipurpose usage with suitable infrastructure facilities like kitchen, toilets and bathrooms. Hence they can be used not only during natural calamities, but also for quarantine centres like DCC/CFLTC camps. Also, they can be used for the rehabilitation of destitutes too.

Land use regulations are necessary

to minimise the causalities caused by hazards. Construction of sea walls is the solution for coastal erosion related issues. The sustainable development of the Corporation area can be ensured which will be helpful for the conservation of ecosystem as well as nature which in turn will play a role in the reduction of natural calamities up to a limit.

25.2.5 LINKAGE OF DEVELOPMENT PARAMETERS OF SPATIAL AND SECTORAL ANALYSIS

The study of development sectors of Kannur Corporation area reveals that the core area and the stretch along the NH 66 have high built up, commercial, public and semi-public and residential land use. The wards with urban activity mainly include South Bazar, Thayatheru, Thana, Thalikkavu, Payyambalam, Ayikkara, Arakkal, Kakkad, Thulicheri, Talap, Chalad, Neerchal, Chovva, Mele However, the wards in the eastern and southern periphery of the planning area have less built-up area but agricultural activities are above average. Agriculture predominant wards in the planning area include Thilanur, Elayavur South and Kunnavu. The SC/ST concentration is high in the zones of Kannur, Puzhathi and Chelora.

25.3 INFERENCE

The available spatial and sectoral assets of Kannur Corporation area indicates that the town has great potential regarding trade and commerce, tourism, education and industrial sector and hence requires optimum utilization. Also the planning area is the administrative centre of the district. Thus the planning interventions shall focus on identifying such potentials and linking those synergies to enable the city to function as a multi-functional city giving prior importance for the conservation of ecology, water bodies, wetlands and mangroves.

CHAPTER 26
VISION, GOALS & OBJECTIVES

26.1 THE VISION STATEMENT

A Master Plan is a dynamic long term planning document that provides a conceptual layout to guide future growth and development, which makes the connection between use of lands, buildings and surrounding environment. It is aimed at protecting public health and safety and promoting general welfare. From the study and analysis, the vision formulated for sustainable development of Kannur Corporation area is as follows:

"To develop Kannur Corporation area as a district administrative centre which is a safe, resilient, vibrant, sustainable and clean city that supports industrial and tourism development having adequate infrastructure facilities and smooth mobility so as to serve as a nucleus city for the entire district without affecting the environment as well as the cultural heritage".

26.2 GOALS

Kannur Corporation area has strong potentials in the sectors like trade and commerce, tourism, education and health. In addition to this, the planning area has a good agricultural potential in its peripheral area where paddy and dry agriculture areas are largely concentrated. The potentials in the above sectors are used as the platform for the future development of the planning area. At present, trade and commerce sector is highly important in CBD area whereas in its periphery, the sector is comparatively week. So, enhancement of trade and commerce at peripheral area is a need. Hence the prime goal is ***"To develop Kannur Corporation area as a successful district administrative centre by ensuring the sustainable development in economic, physical, social and environmental sectors".***

The following goals are set out for the development of the planning area:

- Emphasize the Corporation area itself as an urban body by intensive urbanization and accelerating the economic development of the city by enhancing various sectors such as trade and commerce, tourism, education and fisheries for the future growth.

- Enhance tourism by utilizing the heritage sites and valuable pilgrim centres.
- Promote industrialization based on the strong platform of traditional industries in the planning area.
- Evolve a smooth and efficient mobility plan for handling the future traffic.
- To make a sustainable development strategy for the planning area.
- Promote paddy cultivation, dry agriculture and animal husbandry activities in peripheral potential areas.
- Conserve environmentally sensitive area and heritage buildings.
- Formulating development concept based on the vision evolved.
- Control the spatial development of the planning area to facilitate more efficient use of land resources.
- Preservation of environment and enhancing of qualitative life.

26.3 AIM AND OBJECTIVES

For achieving the above said goals, aim and objectives are formulated.

26.3.1 GOALS

To develop the city through proper management of land use with optimum utilization of all resources as an easily accessible administrative centre this also supports tourism with adequate infrastructure.

26.3.2 OBJECTIVES

- To encourage people for cultivating vegetables and other crops using urban farming technologies.
- Restoration of paddy cultivation.
- To promote the export of fish products.
- To develop new service centres to expand the existing commercial centres for promoting the trade and commerce activities.
- Providing marketing facilities to enhance the potential of traditional industries.
- Provide more infrastructure facilities such as water supply, solid waste management, sewage disposal, drainage etc.
- To provide better circulation pattern to ease the future development.
- Provide all necessary facilities for enhancing the tourism potential in the Corporation area.
- Promote Eco-tourism at Varam Kadavu.
- Conserve the heritage centres and environmentally sensitive areas.
- Equitable distribution of services to the entire planning area.

- Provide adequate civic amenities and recreational facilities.
- Give special attention to the welfare of weaker sections such as Children, Women, Aged people,Physically and mentally challenged people etc.
- To strengthen the governing system for effective implementation of the projects and programmes.
- To prepare a detailed disaster management plan.
- To formulate suitable development control regulations for optimum land use.

CHAPTER 27

DEVELOPMENT CONCEPTS, POLICIES & STRATEGIES

27.1 SUGGESTED CITY FORM AND DEVELOPMENT DIRECTION

Development concept of an area is derived from the development objectives. The existing problems and potentials of each sector studied are considered for the formulation of development concept. Also, the spatial particulars of the area are considered along with the above parameters. Suggested spatial structure for the area has to be first evolved for the formulation of the Concept Plan.

The analysis of existing land use pattern of Kannur Corporation area shows that the urban activities are mainly concentrated in Caltex and its surroundings. This area is acting as the Central Business District (CBD) of the planning area. Caltex junction has numerous public buildings such as Civil Station, Collectorate, District Treasury, Municipal Corporation Office, Taluk Office, SP Office etc. Plaza, Thana, Mele Chovva, Thazhe Chovva, Old bus stand and New bus stand area are the other major commercial centres of the planning area.

The presence of famous Arakkal palace, Light house, St.Angelo's fort and long stretch of beach area offer new development from the tourism point of view to the Corporation area. The environmental sensitive areas includes the water body, water logged areas, paddy and mangroves.

Outer portion of CBD area has large concentration of residential and dry agriculture land use. Major development thrust is offered by the existing National Highway passing through the centre of the planning area and railway line passing parallel to the National Highway. The proposed National Highway bypass, proposed inland water route will also boost the future development activities of the City area.

Kannur University campus, Handloom Technology, SN College, Polytechnic, Food Craft Institute, Krishna Menon College etc. are the major institutions within the planning area. All of these factors are

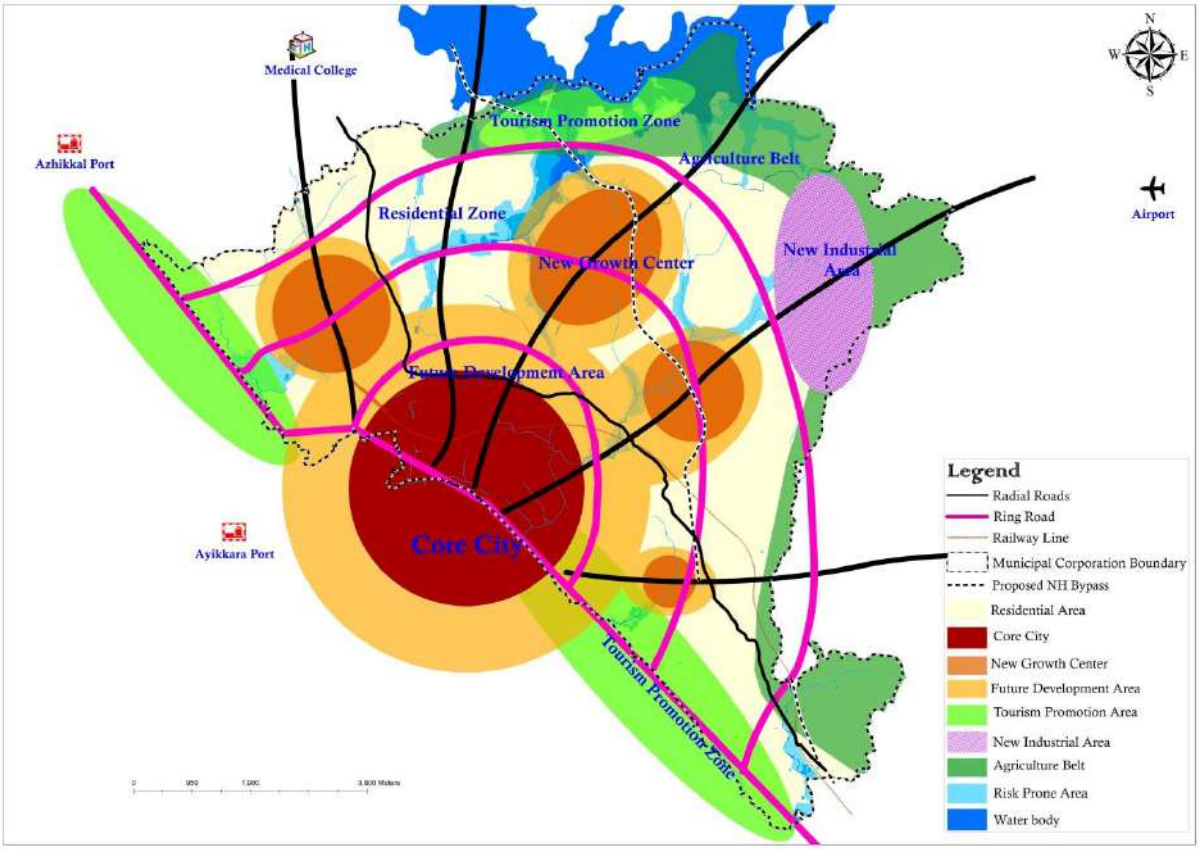


Figure.27.1 Suggested City Form

considered to shape the suggested city form and development direction. The Figure.27.1 represents the suggested city form pattern of the Corporation area.

The existing commercial activities are mainly concentrated at Caltex, Plaza, Thana, Old bus stand and New bus stand area. The city has to function as District Head Quarters in a regional context. There are many public and semi-public buildings within this core area. The city core area has residential units and service industries and these are to be retained to a certain extent. In this context, the CBD (Central Business District) area or the city core area is suggested as multi function zone which promotes all type of development activities including commercial, industrial, high rise residential activities etc.

Also, Mele Chovva, Thazhe Chovva, Varam, Pallikkunnu, Thottada etc. are now emerging as satellite nodes around the main CBD and are other important commercial centres. These are suggested as new growth centres for serving the interior parts of the Corporation area. These new growth centres can reduce regional imbalance to a certain extend and can provide

pivotal role in reducing the traffic congestion in the CBD area.

When the developments and growth become saturated in the City core area, urban sprawl occurs to the neighbouring area. The surrounding area of CBD and new growth centres are the places where future developments are expected to be flourish. In these fast developing areas, commercial residential mix activities are suggested which is extended along major roads and commercial nodes. The commercial residential mix growth promotes both commercial as well as residential activities.

After these areas of mixed growth, the scope for commercial development declines but there will be a high demand for residential developments. These residential areas suggested are have prime importance for residential activities, but certain commercial and industrial activities are inevitable for sustaining the residential areas.

These residential areas of the Kannur Municipal Corporation are surrounded by dry agriculture areas especially in the eastern side of the city and therefore an agriculture belt is proposed along the eastern periphery of the city in the Suggested City Form. Residential and dry agriculture land uses are essential in the suggested city form, the former for catering to the future housing demand and the latter for creating a green environment.

The city has large extents of beaches and also vast inland water body areas in Kattampally river banks. For utilizing maximum potentials of tourism, tourism promotion areas are suggested along the entire coastal stretch and also at the inland waterfront areas.

27.2 SUGGESTED SETTLEMENT PATTERN

Based on the suggested city form and development direction, the suggested settlement pattern of the planning area is formed and is shown in Figure.27.2.

Residential Settlement Patterns

The suggested residential settlement pattern of the Corporation area includes residential area, mixed area, multi function zone, green belt area and also tourism promotion zone.

Multi function zone is located within the core area of the planning area and are mainly intended for commercial and public activities. Higher order residential developments like flats and apartments as well as trade and commerce, workshops, auto mobile industry, educational institutions, hospitals etc. are expected to flourish here. Residential mix areas are aimed at the development of both residential as well as commercial activities. Since these mixed areas are

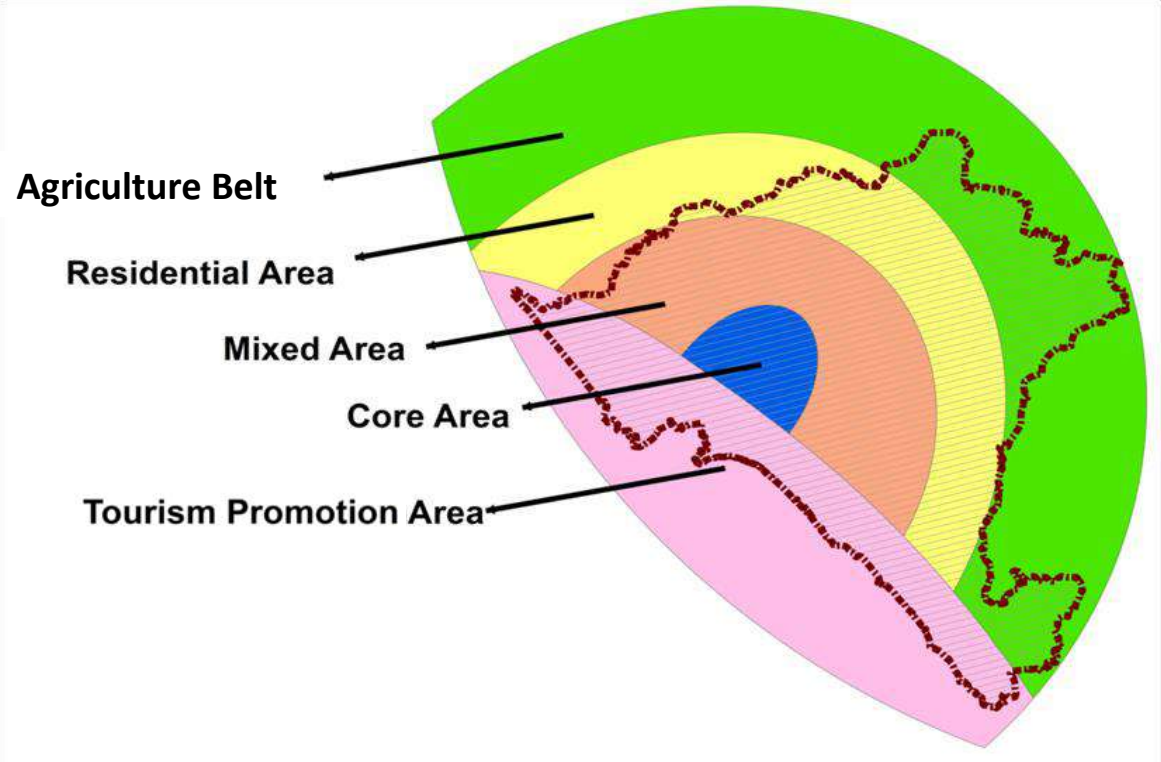


Figure.27.2 Suggested settlement pattern

located along major corridors, preference is given for commercial activities without affecting any harm to the existing houses. These residential mix areas are surrounded by residential areas which are for meeting the future housing demand.

The eastern boundary of the planning area is suggested as a green belt area where agriculture activities and low density residential activities are allowed. Even though the predominant intention of tourism development zone, which is mainly distributed along the coastal stretch of the planning area, is the enhancement of tourism activities; Residential activities along with resorts and homestay are also permitted in these areas.

Urban Settlement Patterns

For a town, urban activity areas are essential to sustain itself as an urban body which attracts people from outside the town. The suggested multi function zone within the core area already exists as the main urban centre of the planning area promotes all type of development activities like commercial, industrial etc. The residential mix area along major corridors which promotes the

commercial activities too can develop as an urban centre. The proposed commercial nodes, Industrial Park, NH bypass, Inland waterway etc. will definitely promote urban activities of the planning area.

Green - Blue Area

'Green' stands for trees, lawns, hedgerows, parks, fields and forests; while 'Blue' infrastructure refers to water bodies like rivers, canals, ponds, wetlands, floodplains and water treatment facilities. The green-blue concept refers to urban planning where water bodies and land are interdependent, and grow with the help of each other while offering environmental and social benefits. Since the sustainable development of a town can only be achieved by preserving its quality of environment, a blue-green area is suggested for Kannur Corporation area to retain all its existing water bodies, water logged areas, mangroves, paddy fields, dry agriculture areas, parks and open lands etc.

Sponge city concept helps the sustainable development of Kannur City. A sponge city is an urban area which has been designed to cope with excess rainfall using a variety of techniques. Existing urban areas often have to deal with flooding caused by heavy rain, high tides or swollen rivers, and sponge city design can mitigate or prevent such events by providing the area with the ability to naturally absorb the water.

27.3 SUGGESTED HIERARCHY OF NODES

Analysis of the existing nodes and transport junctions reveals that there exist two first order nodes; Camp Bazar (Market area) and South Bazar (Caltex area). The second order nodes are Thana, Chovva and Thazhe Chovva whereas third order nodes are Manal, Pallikkunnu, Sreepuram, Vaaram etc. while Thilanur, Mundayad, Nadal etc. are fourth order commercial nodes.

Since Kunjippally junction is the major junction from which the roads to Puthiyatheru and Pulloopi kadavu diverge it is the major serving area for Kakkad, Kottali, Pallipram, and so can be suggested as a second order node. Kakkad, Thayyil and Vaaram junctions are suggested as third order nodes. All the fourth order nodes like Thilanur, Nadal, Mundayad etc. are suggested as third order commercial nodes. Kadalayi, Vattakkulam, Mathukkoth, Nadal etc. are suggested as fourth order nodes.

27.4 SUGGESTED ROAD NETWORK

The suggested road network diagram for Kannur Corporation area is shown in Figure.27.3. The suggested urban form recommends higher order

developments as multi function zone within the core area, and mixed zone along major corridors. For sustaining these activities, a higher level of connectivity is necessary. As a result, the access routes are reinforced with new connection roads and link roads in these areas.

The suggested road network system has radial-ring road pattern. Major radial roads like NH (Kannur-Thalassery Road and Kannur-Thalipparamba Road), Kannur-Mattannur Road, Kannur-Anjarakandy Road, Kannur-Pulloppikadavu Road, Kannur Azheekode Road, Kannur-Kuruva-city and radiates toward outside in all directions. These radial roads are connected with existing link roads for ensuring efficient mobility. An inner ring road encompassing core city centre connecting Old Bus Stand-Caltex Junction –Thavakkara Railway Under Bridge-Railway Station Road-Muneeswaran Kovil Old Bus Stand Road is proposed along the city core. Also, for the development of hinterlands and underdeveloped areas, connectivity is to be improved and road widening proposals are suggested for all important roads.

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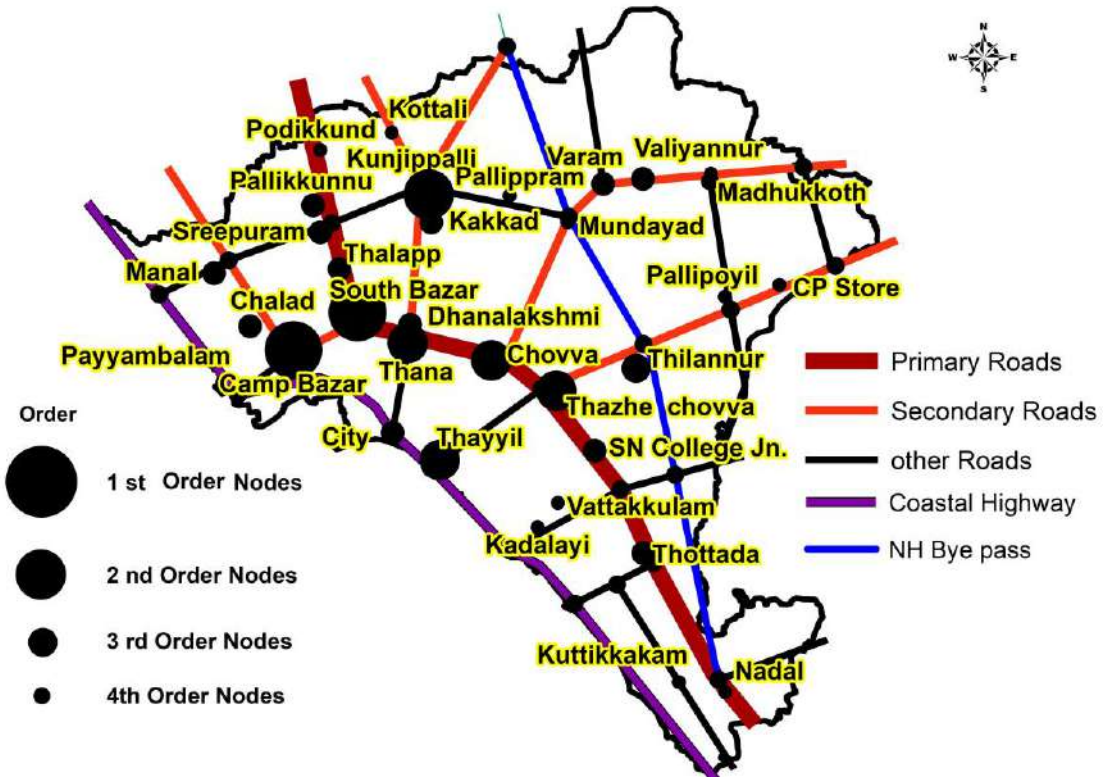

Figure.27.3 Suggested Road Network and Hierarchy of Nodes

The Conceptual Plan of the connectivity diagram for the planning area reveals that NH exists as the central back bone and SH 38, Alavil - Azheekode road, Kakkad - Pullooppi road, Kannur - Mattannur road, Thazhe Chovva - Anjarakandy road are the major arterial roads for the network. All other minor roads function as feeder roads to this network system.

27.5 SUGGESTED SPATIAL STRUCTURE

The suggested spatial structure of the Corporation area is developed by overlaying the suggested hierarchy of nodes and suggested connectivity over the activity pattern as shown in Figure 27.4. The activity pattern of the wards of the planning area is obtained by correlating the major land use concentration of the ward with its functional character.

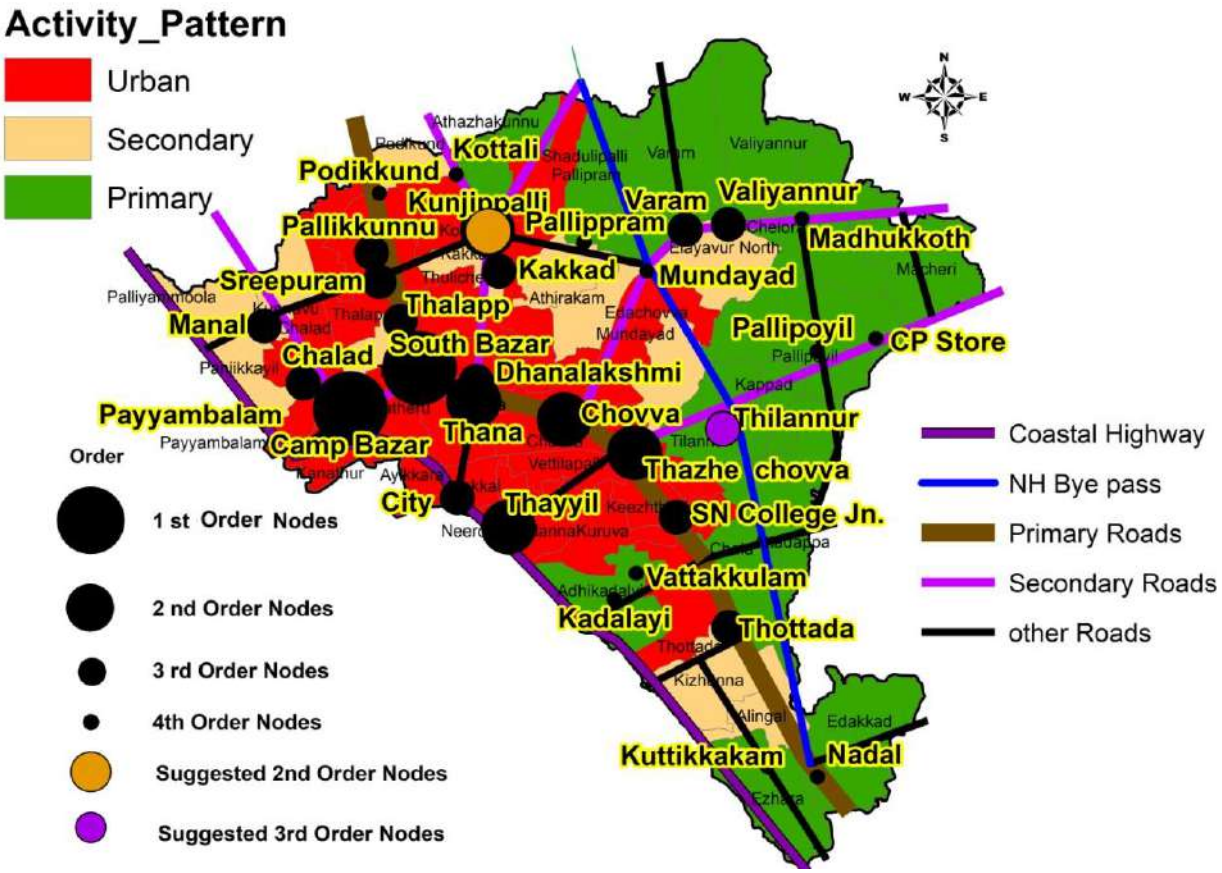

Figure.27.4 Suggested Spatial Structure

The suggested spatial structure reveals that Kakkad junction and Kunjipally junction; the suggested second order nodes are located along Kakkad-Pullooppi road in the northern part of the planning area. Varam and Thayyil are other suggested second order nodes. For enhancing the developments in hinterlands, thirteen third order nodes are suggested; in the south-east parts of the city which are in scattered manner. Moreover, the proposed NH bypass will connect some of these suggested nodes.

The urban activity wards are seen in the core area, located in the northern part of the planning area. The wards with secondary activity are mainly concentrated near urban activity wards. Most of the wards in the southern and eastern periphery are suggested as primary activity in the spatial structure which highlights agriculture as an important sector in the development scenario of the Corporation area. Due consideration is to be given to the environmental conservation for achieving a better qualitative life for the citizens.

27.6 ENVISAGED CITY FUNCTIONS

The major envisaged city functions of Kannur Corporation area are detailed below:

- As an administrative service centre of the entire district, supported with integrated infrastructure facilities.
- As a quality living environment for the resident people of the Corporation area.
- As an economically developing town by supporting trade and commerce, tourism, education and fisheries.
- As an industrially developing town enhancing the traditional industries in the planning area.

27.7 DEVELOPMENT CONCEPT

A Development Concept is formulated for Kannur Corporation area with an intention to emerge as a 'Smart City' based on the vision, goals, aim and objectives formed. The major features of development concept are described in short below.

1) Land Use Pattern and Zoning

Proposed land use pattern decides the future usage of available land within the planning area for different purposes whereas zoning regulations are the major tools for controlling the development in the desired manner. Keeping in mind a balanced growth, the future land use pattern is designed and is broadly categorized into three types namely Built-up zone, Green-Blue zone and Tourism promotion zone.

2) Development of Nodes

- Kakkad, Kunjippally, Thayyil and Varam junctions and their surrounding areas are suggested as second order nodes to enhance the commercial activities.
- CP Store, Kadalayi, Kottali, Madhukoth, Mundyad, Nadal, Pallipoyil, Pallippram, Payyambalam, Podikkund, Thilanur, Vattakkulam, Kuttikkakam; are suggested as the fourth order nodes for the overall development of the surrounding hinterlands.

3) Mobility Plan

- Widening of existing roads to accommodate the future traffic.
- Other transportation facilities like bus bays, truck terminal, parking plaza and parking lots, fly over, walk way, pedestrian crossing facilities, junction improvements etc.
- Strengthening of Public Transport System.

4) Sectoral proposals and projects to accomplish the aim and objectives

- Focusing on production sectors for a stable economy.
- Augmentation projects for promoting tourism activities.
- Providing maximum facilities and amenities in the service sectors for the well being of the public.
- Due consideration on environment for sustainable development and qualitative life.

27.8 POLICIES AND STRATEGIES

Considering the development potential, demand for physical development and the need to conserve certain features, the following policies and strategies are considered.

27.8.1 POLICIES

The plan aims at achieving an urban structure in which component development areas form an integrated system and each area is allowed to expand in an orderly manner.

The proposal shall keep in view that the optimum and exact utilization of land, a valuable and limited resource will be implemented

27.8.2 STRATEGIES

- Environmental protection and sustainable development for surveillance of natural eco-system, conservation of paddy fields, water bodies and protection of flora and fauna through traditional methods.
- Strategies for exploiting the maximum opportunities offered by

the forthcoming NH bypass, inland waterway etc. in all possible sectors like tourism and hospitality, health-care, higher education, trade and commerce, and industry etc.

- Strategies to enhance the economic growth through optimum utilization of resources such as adoption of advanced processing methods for value addition, promotion of commercial and industrial growth centres etc.
- Strategies for the provision of equitable distribution of facilities by developing regional growth centres.

PART III

LAND USE PLAN &
SECTORAL PROPOSALS



CHAPTER 28

PROPOSED LAND USE PLAN

28.1 EXISTING SCENARIO

The existing land use analysis indicates that highest distribution is residential land use with 41.478 km² (52.92% of total land area) followed by dry agriculture 15.339 km² (19.57%). Total water body, paddy field and vacant land constitute 3.45 km² (4.40%), 2.916 km² (3.72%) and 2.53 km² (3.20%) respectively.

28.2 PROPOSED LAND USE PATTERN

To facilitate the future development as per the concept, the existing land use pattern is to be altered and the proposed land use pattern is to be located spatially. In this chapter, the proposed land use pattern for the horizon period is arrived and presented. The proposed land use plan for the Kannur City has been prepared for the year 2041. The

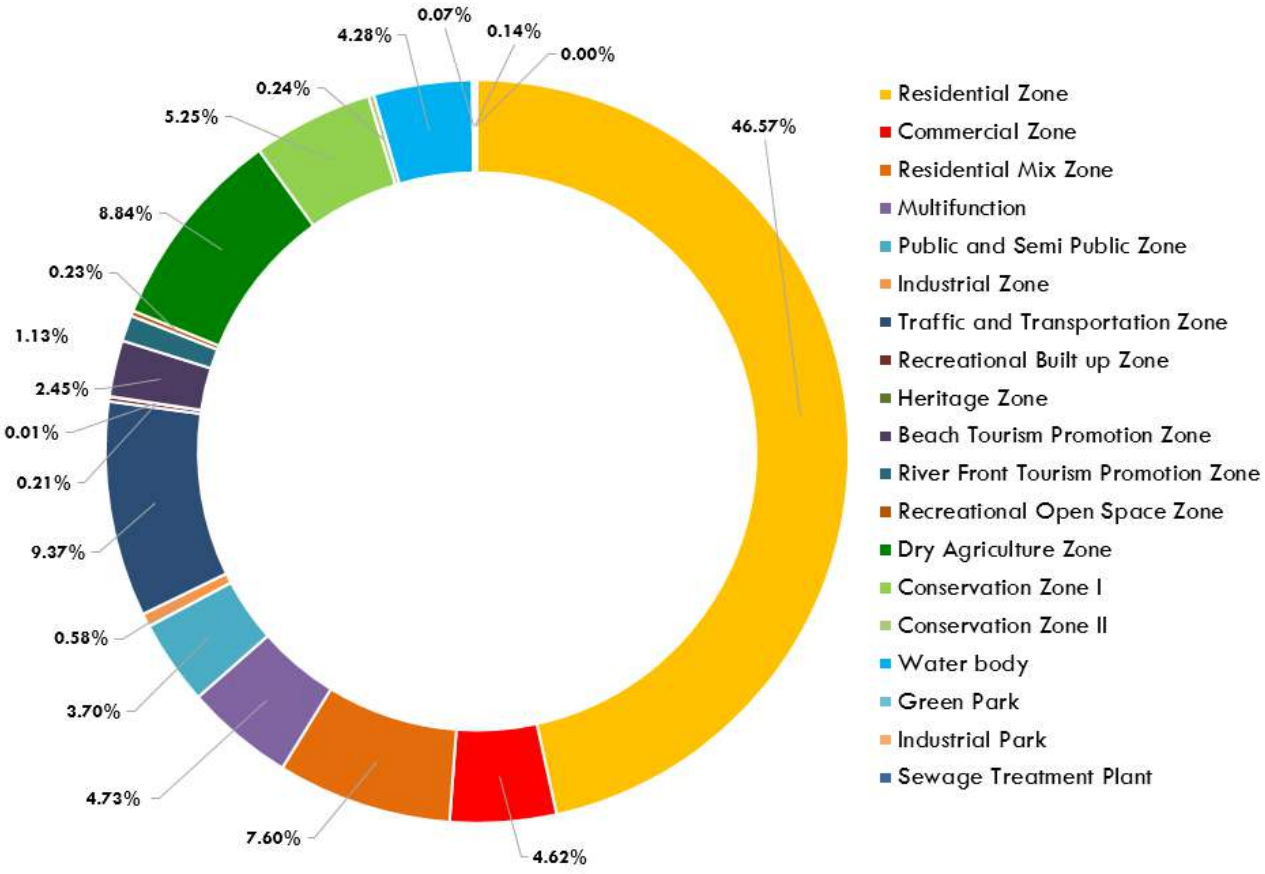

Figure 28. 1 Proposed land use break-up

proposed land use plan was derived on the basis of studies and analysis of work force pattern, population structure, existing land use forms; various sectors belong to economic, social, and physical of the planning area.

The proposed land use break-up, and the area break up of each of the land use zones are given in Figure.28.1, and Table.28.1 respectively. The Proposed Land Use map of Kannur City is shown in Figure 28.2. (Map Legend is shown in the following page).

The proposed land use zones are mainly classified into Built-up Zone, Green -Blue Zone and Special Zone and are further subdivided as per the development concept formulated.

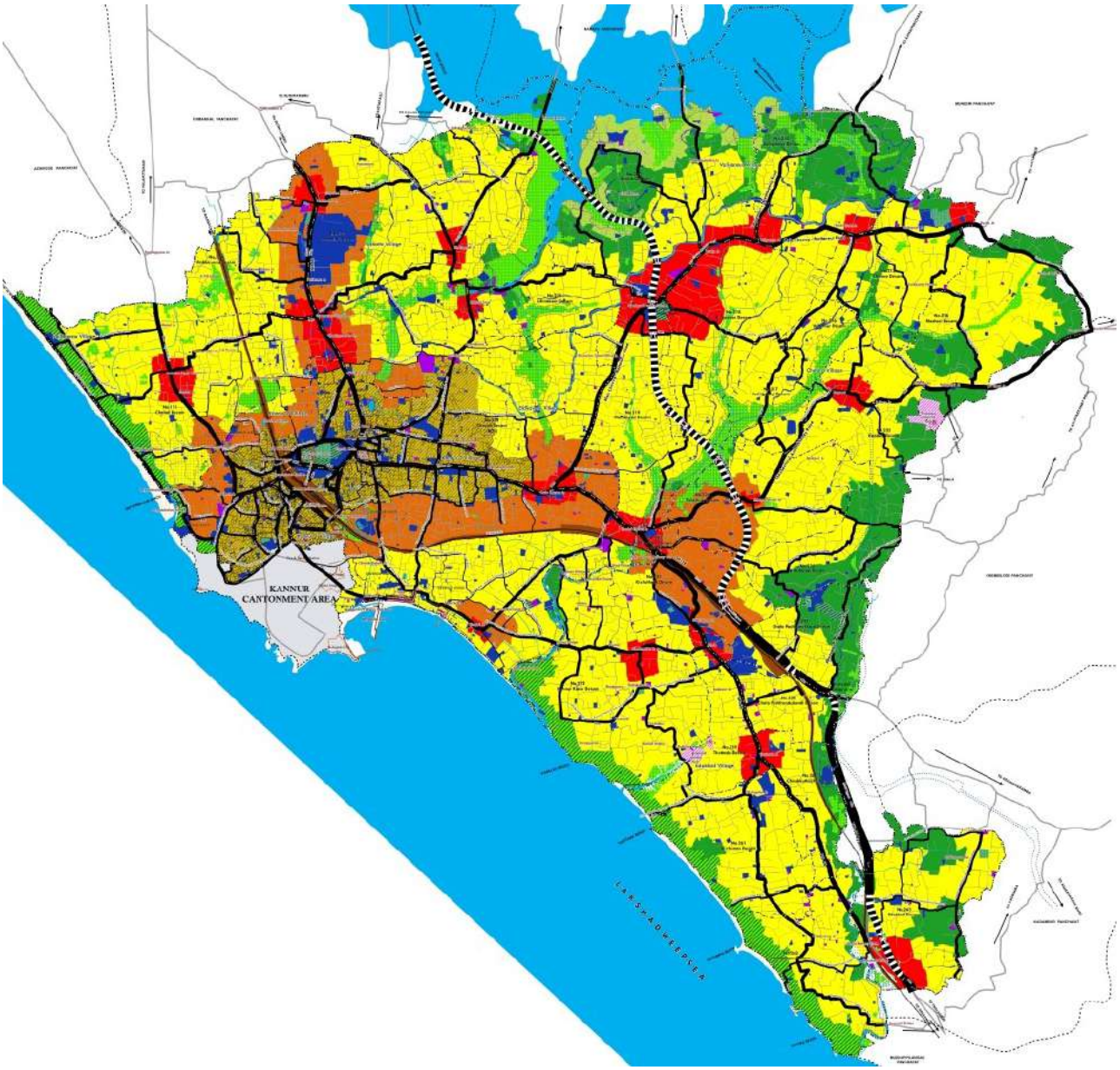

Figure 28. 2 Proposed land use map

LEGEND

Administrative Boundaries

- City Boundary
- Village Boundary
- Desom Boundary
- Revenue Ward Boundary
- Cantonment Boundary
- Neighbouring Local Body Boundary
- Existing Road
- Railway Line
- Sandy Beach

Proposed Widening of Roads

- 45 m
- 24 m
- 21 m
- 18 m
- 16 m
- 14 m
- 12 m
- 10 m
- 8 m
- 7 m

- N H 66 (Proposed Bypass Alignment width 45 m)
- Bridge/Flyover/Underpass
- Proposed Inland Water Way
- Proposed Viaduct
- Proposed Bridge/Flyover/Underpass
- Heritage Street

Proposed Land Use

I. Built-up Zone

- Residential Zone
- Commercial Zone
- Residential Mix Zone
- Multi-Function Zone
- Public and Semi Public Zone
- Industrial Zone
- Traffic and Transportation Zone
- Recreational Built Up Zone
- Heritage Zone
- Beach Tourism Promotion Zone
- River Front Tourism Promotion Zone

II. Green - Blue Zone

- Recreational Open Space Zone
- Dry Agriculture Zone
- Conservation Zone -I
- Conservation Zone -II
- Water Body

III. Special Zone

- Special Zone
- A Green Park
- B Industrial Park
- C Sewage Treatment Plant

Risk Area

- Risk Area (Flood Prone Area Overlay)

Table 28. 1 Proposed land use break-up

Sl. No.	Land Use	Area in km²	% of Total Area
I. BUILT-UP ZONE			
1	Residential Zone	36.500	46.57
2	Commercial Zone	3.617	4.62
3	Residential Mix Zone	5.956	7.60
4	Multi-Function Zone	3.705	4.73
5	Public and Semi Public Zone	2.900	3.70
6	Industrial Zone	0.455	0.58
7	Traffic and Transportation Zone	7.343	9.37
8	Recreational Built up Zone	0.161	0.21
9	Heritage Zone	0.010	0.01
10	Beach Tourism Promotion Zone	1.919	2.45
11	River Front Tourism Promotion Zone	0.887	1.13
Total for Built-up Zone		**63.453**	**80.96**
II. GREEN-BLUE ZONE			
12	Recreational Open Space Zone	0.184	0.23
13	Dry Agriculture Zone	6.928	8.84
14	Conservation Zone-I	4.116	5.25
15	Conservation Zone-II	0.185	0.24
16	Water Body	3.353	4.28
Total for Green-Blue Zone		**14.766**	**18.84**
III. SPECIAL ZONE			
A	Green Park	0.054	0.07
B	Industrial Park	0.107	0.14
C	Sewage Treatment Plant	0.001	0.00
Total For Special Zone		**0.162**	**0.21**
Total		**78.38**	**100**

Note: Risk Area (Flood prone area) is overlaid over other land uses and hence will not contribute to the percentage of land use area.

I. Built-up Zone

These are the land use zones where urban activities are concentrated. Built-up zone is essential for sustaining the urban nature and urban status of the planning area. In Kannur Corporation area, total built up zone includes Residential Zone, Residential Mix Zone, Commercial Zone, Multi-function Zone, Public and Semi-Public Zone, Industrial Zone, Traffic and Transportation Zone, Recreational Built up Zone, Heritage Zone, Beach Tourism Promotion Zone and River-front tourism Promotion Zone. Total share of built-up land use zone comprises 80.96% of total area of the planning area.

II. Green-Blue Zone

Green-Blue zones which are the lungs of the city constitute 18.84% of the planning area. It consists of Recreational Open Space Zone, Dry Agriculture Zone, Conservation Zone-I will act as a sponge city consisting of Paddy and Wetlands, Conservation Zone II (Mangroves) and Water Body. Green-Blue Zones are essential for sustaining the urban life with recreation, leisure and refreshment. Extensive built-up development is not allowed in this zone and these zones are essential for keeping the environmental quality of the city.

III. Special Zone

Special Zones are those which are proposed to be acquired by the LSGI or any other agency concerned within a specific period to implement specific projects.

Special Zones of the proposed land use map consists of a total area of 16.20 Ha which occupies 0.21% of the total planning area, The projects in Special Zone include Green Park at Thottada, Industrial Park at Pallipoyil and Sewage Treatment Plant at Neerchal.

28.3 BUILT-UP ZONE

1. Residential Zone

The area set aside as exclusive residential zone in the proposed land use plan is 36.50 sq.km and this constitutes 46.57% of total area of the town. Most of the existing residential areas, located away from the core centre of the town and major traffic corridors are retained as residential zone in the proposed land use plan. All sorts of residential buildings consisting of single or multifamily dwellings, residential flats/ apartments, residential quarters, night shelters, orphanages, old age homes etc. are permitted in this zone to cater to all future housing demands. Necessary incidental uses like commercial activities service industries, etc., essential for the residential community are also permitted in Residential Zone.

2. Commercial Zone

Urban activities are mainly concentrated in Caltex, South Bazar, Plaza, Market area, Old bus stand and New bus stand area and their surrounding regions. Hence this area can be considered as the Central Business District (CBD) of the Corporation area. Caltex junction has numerous public buildings such as Civil Station, Collectorate, District Treasury etc. In this context, this area is set aside as multi-function zone in the proposed land use map.

Apart from this CBD area, Thana, Mele Chovva, Thazhe Chovva, are the other major commercial centres in the planning area.

The NH bypass road intersects the Kannur-Mattannur airport road at Indoor Stadium, Mundayad and this region has got great potential to grow up as a commercial node in the recent future.

Since Kunjippally junction is the major tri-junction from which the roads to Kakkad, Puthiyatheru and Pulloopikadavu emerge, it is the major serving area for Kakkad, Kottali, Pallipram areas. And hence it can be suggested as a second order commercial node.

Similarly junctions and nodes like Kakkad, Manal Junction, Pallikkunnu area, Podikundu Juntion, Mathukoth Junction, Kappad, Thilanur, Mathrubhumi Junction, S.N.College-JTS area, Thottada Junction, Dineshmukku Junction, Edakkad area, Thayyil Junction, etc have great potential for growing as commercial centres to cater to the needs of surrounding area.

All the above said places except the CBD area having commercial growth potential are zoned as Commercial Zones in the proposed land use plan. The total land use area under commercial zone is 3.617 sq.km and it constitutes 4.62% of Kannur Corporation area.

All existing residences and new residential buildings are also permitted here.

3. Residential Mix Zone

Residential mix zones are provided along the NH, Major Roads and adjacent to the proposed Multifunction Zone. It is also proposed around the major commercial nodes as per their hierarchy. This mix zone can create a platform for the future expansion of the commercial zone in that direction and also accommodate the development needs around city core and other commercial nodes. In residential mix zone residential uses and commercial uses are permitted but with prime importance for residential use. Mixing of uses in the same building can also be encouraged in this zone if such option arises. The total land use area earmarked for this zone is 5.956 sq.km which accounts to 7.60% of total area of the city.

4. Multi-Function Zone

Multi-Function Zone is proposed in and around the city core area and consists of 3.705 sq.km area, which is about 4.73% of the total planning area. This zone with multifunction activities is essential for the expansion of the city from its growth centre to the surrounding area. Public activities, commercial activities and limited residential activities can co-exist here. In this zone, service industries, commercial activities like trade and commerce, automobile workshops, service industries, educational institutions, hospitals, transport terminals, social welfare centres, higher order residential developments like flats and apartments etc. are expected to flourish.

The Shoranur-Mangalore railway line and NH 66 are passing through the centre of this zone which will help the area to develop as a Multi-Function Zone exactly.

5. Public and Semi Public Zone

The importance of the city as a regional centre and as a District Headquarters is to be enhanced by providing maximum public services within the Corporation boundary. All existing public and semi-public land uses are to be retained as such and this zone includes the Central/State/Local Government offices and buildings, public institutions, educational buildings, religious buildings and hospitals scattered throughout the city. The total land use area under public and semi-public zone is 2.90 sq.km and it constitutes 3.70% of Kannur Corporation area.

6. Industrial Zone

In order to promote the industrial activities for the economic growth of the city, all existing industrial premises are retained as such in the proposed land use also. The mini industrial estates at Marakkarkandy and Edakkad as well as the industrial unit at Chelora, the large industries like Kerala State Handloom Development Corporation Limited, Cannanore Co-operative Spinning Mills, Limited and Milma Unit at Podikkundu etc. can be utilized for a giant leap in the industrial sector. For these, more infrastructural facilities are to be provided and new industrial ventures are to be set up. The total land use area set aside as Industrial Zone in the Proposed Land Use plan is 0.455 sq.km which has a share of 0.58% of total area of the city.

7. Traffic and Transportation

The Traffic and Transportation Zone includes the proposed road network area, existing bus stands, parking bays and lots, improved road junctions, bus bays, railway station, traffic islands, truck terminals etc.

An efficient transportation network is to be materialized for accommodating the heavy traffic flow expected in the coming

years. The widened existing roads as well as proposed roads including NH bypass and other link roads are included in this zone. This is to obtain a smooth conveyance facility for the city.

The total area of traffic and transportation land use proposed is 7.343 sq.km which contributes to 9.37 % of total municipal land area.

8. Recreational Built-up Zone

Recreational built-up zone which includes built-up spaces like stadiums, indoor stadiums, swimming pools, clubs and all other buildings associated with recreational activities. This zone in a city provides the necessary facilities for amusement, leisure, recreation and refreshment etc. to the public.

The existing recreational built-up zone in Kannur Municipal Corporation includes Indoor Stadium at Mundayad, Jawahar Municipal Stadium, Cannanore District Badminton Indoor Court, Indoor Badminton Court at Kakkad, Tennis Court etc.

The total land use area falling in this recreational built-up zone is 0.161 sq.km and constitutes of 0.21% of Kannur Corporation area.

9. Heritage Zone

The Arakkal Dynasty was the one and only one Muslim Dynasty in Kerala who ruled Kannur area and Lakshadweep for centuries. The Arakkal palace is a historically valuable monument and is now functioning as a museum. It is also a well-known tourist spot within the Kannur Municipal Corporation area. The building kept as museum is to be protected and preserved for the generation to come. Therefore this monumental building is earmarked as heritage zone. The total area of this zone is 0.01 sq.km and constitutes of 0.01% of Kannur Corporation area.

10. Beach Tourism Promotion Zone

Payyambalam beach with its surrounding area is the major tourist attraction in Kannur Corporation area limits. The lengthy beach from Payyambalam to the northern border Palliyanmoola and the beaches and seashore areas from Kanampuzha to the Ayyarath River (Nadalppuzha) at the southern border provides immense tourism potential to the city. Many tourist resorts and home stay facilities hadf already started in Adikadalayi, Kizhunna, Thottada, Edakkad, Payyambalam, Panjikkai and Palliyanmoola areas. These beach side areas are designated as Beach Tourism Promotion Zone in the proposed land use plan where all tourism facilities are to be promoted for the enhancement of local economy.

The total area set aside as Beach Tourism Promotion Zone is 1.919 sq.km which constitutes 2.45% of Corporation area.

11. River-Front Tourism Promotion Zone

Kannur Municipal Corporation has Kattampally River at the middle north border which creates beautiful water front areas in a vast extent of land. The so called Kaippad fields in this region are famous for fishing activities and it is an abode for many bird species including migratory birds. The river front areas at Kallukettuchira, Athazhakkunnu, Pulluppikkadavu, Kakkad, Pallipram, Varamkadavu, Purathiyil, etc have got tourism potential and this region can be earmarked for river front tourism promotion zone. Tourism promotion activities along with existing inland fishing and other activities are suggested here.

The total area set aside as River Front Tourism Promotion Zone is 0.887 sq.km which constitutes 1.13 % of Corporation area.

28.4 GREEN-BLUE ZONE

12. Recreational Open Space Zone

Recreational Open Space Zone which includes mainly parks and open space in a city provides the necessary facilities for amusement, leisure, recreation and refreshment etc. to the public.

The existing parks and play grounds include Police Maidan, Town Square, Collectorate Maidan, S.N. Park, Dr. Rajendra Prasad Park, Anakkulam Park, etc and also the available open spaces like beaches etc. within the city. Most of them are concentrated in the core area itself. The proposed parks like River side Park at Kakkad Puzha etc. are also included in this zone. The total land use area falling in this recreational open space is 0.184 sqkm and constitutes of 0.23 % of Kannur Corporation area.

13. Dry Agriculture Zone

In the existing land use map, the dry agriculture areas are scattered in all wards and shows higher concentration in Chelora, Macheri, Pallipoyil, Kappad, Attadappa, Kizhunna, and Edakkad wards. Retaining of agricultural activities in the existing lands can bring economic growth through cash crops. In addition to this, the dry agriculture zone is helpful in enriching the greenery of the city. A green belt area is provided as Dry Agriculture zone along the eastern side border and also at some other portions of the Corporation area. As residential pockets are already developed in this zone, residential use and its incidental uses are also to be allowed under unavoidable circumstances. The total area of dry agriculture land is 6.928 sq.km which comes to 8.84 % of total study area.

14. Conservation Zone-I

The existing paddy fields widely spread throughout the city are retained as such in the Proposed Land Use plan also. The Kappadvayal with Kanam Puzha

flowing through it was once considered as the granary of Kannur. At present, most of the paddy fields are lying uncultivated, but offers enough scope for agriculture development. In order to conserve these areas, active paddy cultivation need to be promoted and also strict control on conversion of paddy lands need to be exercised. All land use in this zone should be in conformation with the Paddy Land and Wetland Act in force in the State.

The wetlands are areas which are flooded with water seasonally or permanently. Kattampally river front areas, low lying areas of Thavakkara, Irattakkannan Palam at Talap, Edakkad river side etc. come under this zone. It is necessary to protect these areas as they are environmentally sensitive and feeding and breeding ground for many bird species. The total area of this zone is 4.116 sq.km which constitutes 5.25% of total area of the city.

15. Conservation Zone-II

Mangrove forests are the breeding and feeding space for many species of marine life. The mangrove areas are considered as one of the most environmentally sensitive areas of wetland as per "Ramsar Convention". All existing mangrove areas in the river side and islands should be protected and plantation of new saplings should be done for mangrove afforestation. Mangroves that are identified in the portion of Kanam Puzha River and Ayyarath Puzha (Nadal Puzha) come under the purview of CRZ Notification and hence CRZ rules are in force in such areas. All possible measures should be taken for the conservation of this distinctive ecosystem. The total land use area identified for this zone is 0.185 sq.km which is 0.24 % of total area of the city.

16. Water Body

Measures should be taken for retaining and protecting all existing water bodies within the city. The area covered by water bodies is comprised of Kanam Puzha, Kattampally River and tributaries (Kakkad, Varamkadavu, Purathiyil and Pullooppikadavu), natural drains like Andathodu, Padannathodu, Ammayithodu, Valiyathodu, Cheloravayalthodu, Macheryvayalthodu, Thottada Puzha, Ayyarath Puzha (Nadal Puzha) and other minor streams, and ponds like Anakulam, Chettiyarkulam, Valiyakulam etc.

The Kanam Puzha, Ayyarath Puzha (Nadal Puzha) and Padannathode come under the purview of CRZ Notification and hence CRZ Rules in force should be strictly enforced in such areas. All possible measures should be taken for the prevention of water pollution and contamination. The total area of this zone is 3.353 sq.km which constitutes 4.28% of total area of the city.

28.5. SPECIAL ZONE

The areas specially demarcated for certain specific projects are the following.

A. Green Park

Most of the parks in the Kannur Municipal Corporation are located within core area of the city, and newly added zones like Edakkad and Chelora lack urban parks. A well organised park is essential for the citizens and children and can contribute to city life in many aspects.

An organised green park is suggested near Thottada Thode at Thottada.

B. Industrial Park

Though Kannur was famous for handloom and beedi industries, modern industrial establishments are meagre in Corporation area with the exception of a few Spinning mills. All types of industries cannot be provided in residential areas. For promoting industrial growth, an industrial park is earmarked as a special zone near Pallipoyil, where all sorts of industries can be promoted.

C. Sewage Treatment Plant

Neerchal thodu is now functioning as waste water drain through which urban wastes are flowing to the sea and this cause pollution and related hazards in the area. A sewage treatment plant is necessary and is proposed near the confluence of drain with sea.

28.6. RISK AREA

The areas within the Municipal Corporation falling in different zones identified as vulnerable to flood disaster are demarcated as risk area and overlaid above the respective zones. The built form regulations as listed at the end of this chapter are to be followed in this risk area (Flood Prone area).

The flood-prone areas like Kakkad, Edachery vayal, Shadulikkadavu, Athazhakkunnu, Athirakam, Pulluppikadavu, Varam kadavu, Purathiyil etc. where flood water from Kattampally River enters, the low lying areas near Kappad vayal, Thazhechovva, Kuruva, Maidanappally, etc. on the banks of Kanampuzha, flood banks of Edakkad river, low lying areas around Padannathodu etc. are included in Risk Area.

CHAPTER 29

TRAFFIC & TRANSPORTATION PLAN

In Kannur city, road network system is the major mode of transportation facility available for the people. The existing road network system has a radial-ring road pattern. The roads connecting the city Corporation area to outside can be defined as radial roads and there are seven such major roads in the Kannur Corporation area. They are Kannur-Thalassery road (NH 66), Thazhe chovva to Kuthuparamba road (SH 38), Thazhe Chovva to Anjarakandy road, Kannur-Mattannur road, Kakkad–Pullooppi road, Kannur-Taliparamba road (NH 66) and Alavil - Azheekkode road. While the two Coastal roads, ie Kannur HQ Hospital – Thayyil – Kizhunna - Nadal road and Kannur-Payyambalam-Palliyanmoola road can also be considered as radial roads sprading to south and north directions respectively.

There are so many cross roads or link roads connecting all these radial roads at major nodes. These cross roads when linked with others can form the so called ring roads around the city core area. The radial roads and the so formed ring roads together thus constitute web network pattern of radial-ring roads.

Apart from this, rail is another important mode of transportation in the plan area. Kannur Railway station, which is one of the major stations of the Southern Railway, under the jurisdiction of the Palakkad Division is located in the city corporation of Kannur town. Kannur International Airport is located at Mattannur in Kannur District. It is 25km east of Kannur city. It is the fourth international airport in Kerala. The proposed inland water transport network is passing through the eastern portion of planning area. The Azheekal Port located at just 12 kms away from Kannur city also connects with water transport facility.

29.1 TRANSPORT DEVELOPMENT PLAN FOR KANNUR CORPORATION

Transport Development Plan for Kannur city is prepared taking into account the existing traffic scenario and based on an evaluation of the future traffic projected on the base year network. Transport development schemes cover all the available modes of travel and are formulated so as to reduce the severe strain put on the existing road network. All committed development schemes were taken into account while formulating the Transport Development Plan.

As per traffic and transportation plan prepared by NATPAC, almost all the major road corridors in the region would be severely congested in the horizon year with the anticipated traffic more than the capacity of the roads leading to **"do-nothing option"**. The capacity utilization of major corridors of NH 66 has far exceeded their carrying capacity in the base year itself. It could be seen that these sections in the Highway will be severely affected in the horizon years. Similarly, inner ring road of Kannur city connecting Caltex Junction, Civil Station, Police Club Jn, Thavakkara Jn, Plaza Jn, Railway Station, Muneeswaran Kovil Jn, and Stadium will be the worst affected network by the year 2036. Important collector and sub arterial roads in the city are also exceeding their capacity gradually focusing attention for further strengthening and widening. The projected traffic on the existing road network implies that the existing road network would not be able to handle the traffic in the horizon years without up gradation of the transport infrastructure facilities. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, flyovers, bypasses and link roads is a must considering the dramatic increase in the traffic volume.

As like any urban city in the state, Kannur city also faces the following problems in Traffic and Transportation system. The major traffic and transportation problems being faced by the plan area are:

- Inter-mixing of intra-city and inter-city traffic in the absence of adequate bypasses
- Poor surface conditions
- Increasing number of personalized vehicles
- Inadequate width of roads in the central part of the city
- Heavy movement of vehicular and pedestrian traffic
- Lack of adequate pedestrian facilities
- Unorganized on-street parking in the absence of proper parking lots
- Movement of inter-city bus traffic on congested urban roads due to the location of intercity-bus stands within the central area of the city
- Encroachment of right-of-way
- Bottlenecks due to level crossings
- Absence of proper traffic signs and markings

Being the district headquarters and an important regional centre for trade, commerce and tourism in Kannur District, the administrative needs of the entire

population of Kannur district are to be met by infrastructure of the study area, which should be an important parameter in its planning. Regional connectivity has a major role to play in ensuring the bond between the district headquarters and other parts of the District. Since the most important problem of the plan area is the insufficient width of NH 66 and inadequacy of the internal ring roads to cater to the high volume of traffic, the development strategy should address the issues of traffic congestion comprehensively and adopt adequate capacity augmentation schemes so that frequent and regular traffic hold-ups are minimized.

Apart from this, the impact of Kannur Airport and Azheekkal Sea port should be addressed in terms of connectivity to the airport and sea port respectively.

Also at present, very few grade separated facilities are available to cross the railway line and they too are of inadequate width necessitating widening or construction of new ROB or underpasses. There is a need for construction of more ROBs to ensure uninterrupted flow of traffic between the eastern and western parts of the Kannur Municipal Corporation. Focus shall be given for parking and pedestrian activities along with smooth operation of traffic flow in the planning area. And special emphasis should also be given to develop off-street parking lots and also to provide adequate pedestrian facilities in the central business area of the city.

29.2 TRANSPORTATION PLAN

As already revealed from the existing road network pattern, a radial-ring road web pattern is suggested for the transportation plan with major arterial roads radiating from the city and connected with cross roads forming as ring roads.

The existing road network in the city are mainly linked through NH 66, SH 38, Kannur-Mattannur road, Kakkad-Pullooppikadav road, ThazheChovva-Anjarakandy road and Kannur-Alavil-Azheekkode road and most of the vehicles have to pass through these major roads to reach different places in the city.

An Inner Ring road with a proposed width of 21 metres encompassing core city centre connecting Old Bus Stand-Caltex Junction –Thavakkara Railway Under Bridge-Railway Station Road-Muneeswaran Kovil Old Bus Stand Road. Another major network identified is a network connecting Chalad-Pallikkunnu Road, Pallikkunnu - Kunjipalli Road, Kunjipalli-Kakkad Road, Kakkad - Mundayad Road, Mundayad- Thazhe Chovva Road, Thezhukkil Peedika -Thayyil Road, Thayyil- Kannur Distric Hospital Road, Kannur District Hospital - Payyambalam Beach Road, Manal-

Palliyamoola-Chalad Road. Most of the roads in this network comes under "Kannur City Road Improvement Project" (KACRIP) to be implemented through Kerala Road Fund Board (KRFB) and have a proposed width of 14 m. Thus, for ensuring smooth circulation and mobility within the city, road widening proposals are given below and are shown in the Proposed Transportation Plan –2041(Figure.29.1).

29.3 ROAD WIDENING PROPOSALS

The Volume/Capacity ratio study reveals that traffic volume passing through the major roads has already exceeded their capacity and it will be increasing by the horizon year except for a few minor roads. Therefore, road widening is essential for getting a smooth transit without congestion and traffic blocks. **Details of Road Widening proposals in Kannur City are illustrated in Table.29.1**. Name of roads having proposals for widening, their length and existing width and proposed width are given in the Table.

29.3.1 MAJOR ROADS IN THE CITY

1. National Highway (NH 66)

NH 66 (Kanyakumari-Panavel Highway) is the major arterial corridor passing through the centre of the city along north-south direction and it is the central axis or backbone of the study area around which the entire road networks will revolve around. NH-66 connects the study area with other major cities like Kozhikode, Kochi and Thiruvanathapuram in the south, while it connects to Kasaragod town and cities like Mangalore, Goa, Pune and Mumbai in the north direction. Since major parts of the NH--66 is over utilised in the base year itself, a 24m widening is proposed for its entire length within the study area. Thus, two Railway Over bridges (ROBs) at Nadal and Thazhe Chovva need to be constructed as part of widening NH 66.

2. State Highway (SH-38)

SH 38, a major road in Kannur District, originates from NH-66 at Thazhe Chovva, and finally reaches to Puthiyangadi, in Kozhikode District connecting settlements like Chala, Kuthuparamba, Kuttiyadi etc. Since this road has the same alignment of the proposed NH Bypass near Chalakkunnu and Kizhuthally area, it is necessary to widen to 45 m, ie, the proposed width of NH bypass in that parts and in other parts it is proposed to be widened to 24 m.

3. Kannur-Mattannur road

Kannur-Mattannur road is also known as airport road which connects the city to Kannur Interntional Airport at Mattannur. It starts from Melechovva and passing through Varam, Eachur, Koodali, Chalode finally meets to Thalassery-Coorg (SH 30) at Mattannur town. The proposed NH bypass crosses this road near Mundayad

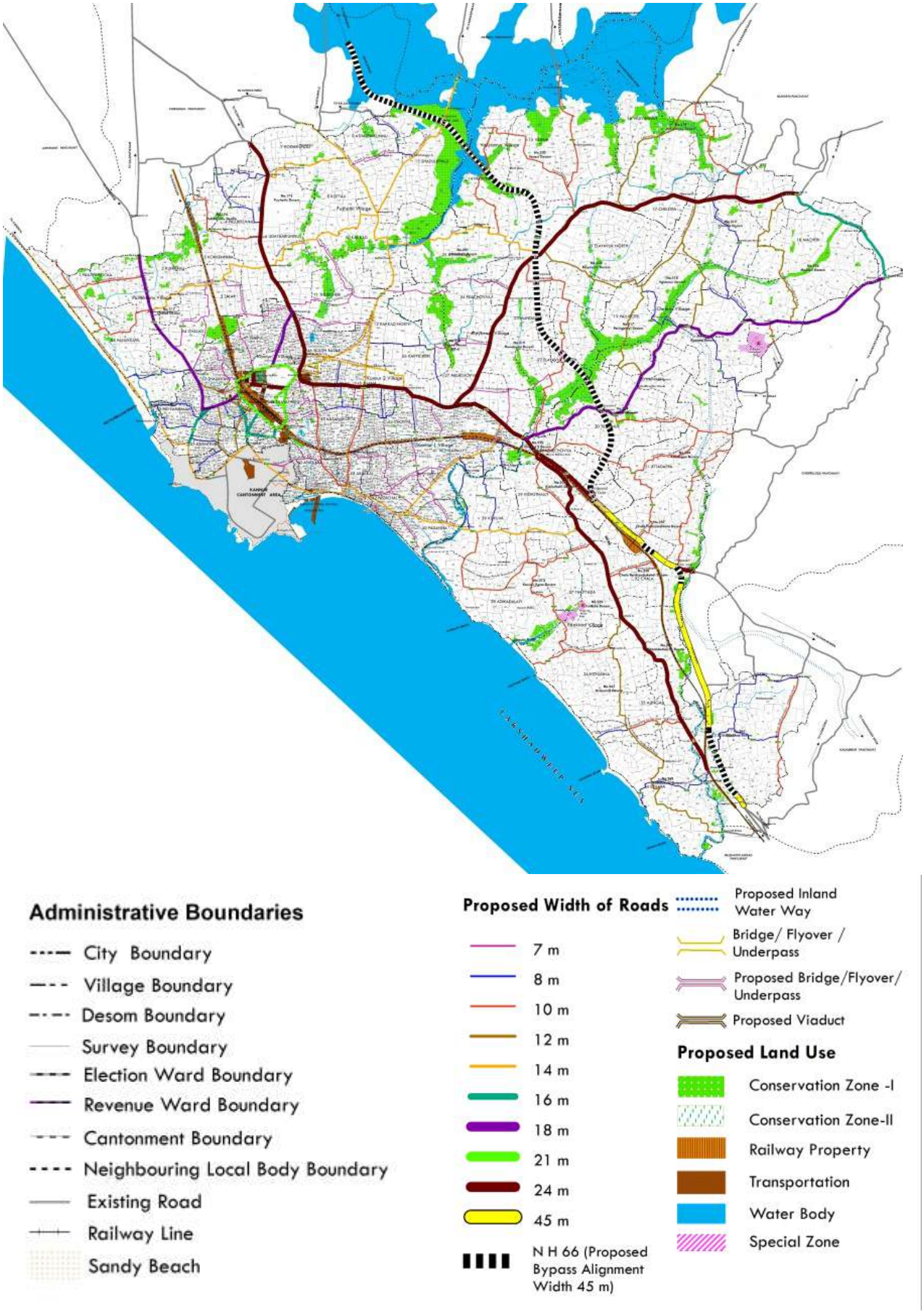

Figure 29. 1 Proposed Transportation Plan –2041

Table 29. 1 Details of Road Widening proposals in Kannur City

Road Code	Road Name	Existing Average Width (m)	Length (km)	Proposed Width (m)
RD1	NH-66 Bypass		14.956	45
RD2	NH-66	15	14.02	24
RD3	SH-38	10	1.46	24
RD4	Mele Chovva- Mattannur Road	13	7.340	24
RD5	Press Club - Old Bus Stand Entrance Road	13	0.205	24
RD6	Railway Station Road	13	0.200	24
RD7	SP Office Road-Stadium Corner Road	15	0.721	24
RD8	Ashirvad Hospital Jn. - Police Club Road	9	0.453	21
RD9	Inner Ring Road	18	3.060	21
RD10	Azhikode Road	8	3.336	18
RD11	Pamban Madhavan Road	15	0.939	18
RD12	Thazhe Chovva -Anjarakandy Road	9	7.124	18
RD13	Bank Road	7	0.515	16
RD14	Eachur Jn -Mowanchery Road	10	2.078	16
RD15	Fort Road	13	0.542	16
RD16	Govt Vocational HSS(Girls)-SN Park Road	12	0.794	16
RD17	Mahatma Gandhi Road	12	0.560	16
RD18	Ashoka Hospital - Chenoli Jn Road	8	0.428	14
RD19	Chenoli Jn - Kannothumchal Road	8	1.465	14
RD20	Kakkad - Mundayad Road	11	2.807	14
RD21	Kannur District Hospital-Thayyil-JTS Thottada Road	10	5.266	14
RD22	Kannur District Hospital - Payyambalam Beach Road	12	2.862	14
RD23	Kunjipalli - Pullupi Road	7	2.563	14
RD24	Kunjipalli Jn. - Puthiyatheru Road	7	2.019	14
RD25	Pallikkunnu - Chalad Road	6	2.365	14

Road Code	Road Name	Existing Average Width (m)	Length (km)	Proposed Width (m)
RD26	Pallikkunnu - Kunjipalli Road	7	2.409	14
RD27	Payyambalam Beach Road	9	3.204	14
RD28	Podikkundu - Kottali Road	6	1.461	14
RD29	South Bazar -Kakkad Road	10	1.493	14
RD30	Sub Registrar Office Road	8	0.384	14
RD31	Thana Jn - Kunjipalli Jn Road	8	3.084	14
RD32	Thezhukkil Peedika-Thayyil Road	10	1.981	14
RD33	Bellard Road	5	0.810	12
RD34	Eachur Bank - Pallipoyil Road	7	2.773	12
RD35	Haji Road	4	0.171	12
RD36	Kappad - Mathukoth Road	8	2.338	12
RD37	MA Road	5	0.426	12
RD38	Mundayad Indoor Stadium - GHSS Chelora Road	8	2.822	12
RD39	Onden Road	8	0.953	12
RD40	Peringalayi LP School - Peringalayi Sisumandiram Road	7	1.987	12
RD41	Sannidhanam Road	10	0.265	12
RD42	South Bazar -Mother and Child Hospital Road	8	0.181	12
RD43	Thalikkavu Road	5	0.665	12
RD44	Thottada - Kizhunna - Kuttikakkam Road	7	5.071	12
RD45	Valiyannur - Nayattupara Road	8	2.874	12
RD46	Ambika Road	5	1.585	10
RD47	Ammu Paramba -Railway Underpass Road	5	0.862	10
RD48	Attadappa - Sadhoo Amusement Park Road	6	2.838	10
RD49	Attadappa - Thankekunnu Road	6	3.702	10
RD50	Chalad Sree Dharmashastha Temple - Palliyamoola Road	4	2.420	10

Road Code	Road Name	Existing Average Width (m)	Length (km)	Proposed Width (m)
RD51	Chalad Temple- Beach Road	5	0.176	10
RD52	Chamber of Commerce Jn. - Kannur City Jn. Road	8	1.827	10
RD53	Chinmaya Vidyalaya Road	6	1.451	10
RD54	Edakkad -Malikaparamba - Kadachira Road	5	2.005	10
RD55	ESI Hospital -Vattakulam-Dinesh Corner Road	8	3.350	10
RD56	ITI - Thoniyottu Kavu-Vattakulam Road	7	1.101	10
RD57	Kizhunna Muthappan Temple - Thottada Beach Road	5	0.562	10
RD58	Kuttikakkam Co-Op Bank - Old Block Office Road	5	0.971	10
RD59	Manal-Palliyamoola Road	6	1.128	10
RD60	Pallipoyil Chembilode Road	5	0.444	10
RD61	Palliyamoola Makham Beach Road	4	0.201	10
RD62	Sathram - Attadappa Road	5	1.531	10
RD63	Thana - Anayidukku Road (B.P.Farooq Road)	8	1.622	10
RD64	Thazhe Chovva - Mundayad Road	6	3.885	10
RD65	Varam Kadavu Road	8	2.618	10
RD66	SN College Road	6	1.071	10
RD67	Varam Temple Road	7	3.838	10
RD68	Vattakulam-Adikadalayi-Kuruva Sreenarayana Va-yanasala Road	8	2.204	10
RD69	Vattapoyil Jn. -Kariyil Canal -Raghavan Master Peedika Road	4	2.082	10
RD70	Aarat Road	5	0.249	8
RD71	Andathode Jn. - Kuruva Palam Road	5	1.232	8
RD72	Arakkinar Jn. - Kayi Peedika Road	5	1.017	8
RD73	Athazhakunnu - Kallukettuchira Road	5	1.082	8
RD74	C.P Store Jn. -Attadappa LP School Road	4	1.265	8
RD75	Chovva Spinning Mill - Ganapathi Vilasam LP School Road	6	0.506	8

Road Code	Road Name	Existing Average Width (m)	Length (km)	Proposed Width (m)
RD76	Dinesh Auditorium Road	6	0.378	8
RD77	Ezhara Juma Masjid Beach Road	5	0.602	8
RD78	Ezhara-Naranath Bridge-Nadal Gate Road	4	1.179	8
RD79	Forest Office Road	7	0.548	8
RD80	Gokhale Road	6	0.367	8
RD81	Gopal Street Road	3	0.469	8
RD82	Kanathur Temple Road	4	1.386	8
RD83	Kannukkara Govt LP School Road	5	0.621	8
RD84	Kizhunnappara Guha Road	3	0.512	8
RD85	KWA - Manikka Kavu Road	5	0.513	8
RD86	KWA Sangeetha Tank- Payyambalam Beach Road	5	0.831	8
RD87	Muzhathadam Main Road	5	0.376	8
RD88	Nadal- Oorpazhachikavu Temple -Malikaparamba Road	6	1.422	8
RD89	Oorpazhachi Kavu- Kannachankandy Mandappan Kavu- Crusher Road	4	1.847	8
RD90	Patiam Road	4	1.919	8
RD91	Payyambalam Park Road	7	0.426	8
RD92	Payyambalam Post Office Road	7	0.440	8
RD93	Peringalayi LP School - Kappad Jn Road	4	1.208	8
RD94	Rajiv Gandhi Road	6	0.968	8
RD95	Red Cross Road	6	0.568	8
RD96	Sadhoo Beedi Company - Dharma Samajam UP School Road	5	2.024	8
RD97	Savitha Talkies - Beach Road	4	1.145	8
RD98	Thana SC Hostel - Manikka Kavu Road (Adv.C.C.Halim Road)	4	0.424	8
RD99	Thayatheru - Thana Road	5	0.816	8
RD100	Thilleri Road	6	0.622	8

Road Code	Road Name	Existing Average Width (m)	Length (km)	Proposed Width (m)
RD101	Uruvachal Jn. - Murudukki Bridge -Kuruva Road	5	1.430	8
RD102	Anayidukku Railway Gate - Kodaparamba-Azad Road	4	1.211	7
RD103	Anjukandy- Chirakkalkulam Road	6	0.944	7
RD104	Arayalthara Athirakam Road	4	2.234	7
RD105	Edachovva -Canal - Chovva Vayanashala Road	4	0.986	7
RD106	District Ayurveda Hospital Road	3	0.330	7
RD107	Edachery Sunday Ground-Canal-Spinning Mill Road	4	1.122	7
RD108	Jayanthi Road	4	0.862	7
RD109	Johnmill Road	4	1.213	7
RD110	Kottali Samskarika Nilayam Road	5	0.832	7
RD111	Lokanath Road	6	0.592	7
RD112	Maidanapalli Road	6	0.731	7
RD113	Marakkarkandy - Kuruvapalam Road	5	0.651	7
RD114	Marakkarkandy Jn - Kannukkara Bus Stop Road	6	0.837	7
RD115	Mele Chovva- Pathiriparamba Road	5	0.600	7
RD116	Neerchal - Ottamavu-Andathode Road	5	1.399	7
RD117	Padannapalam-Erinjattuvayal- MLA Kumaran Road	4	1.555	7
RD118	Parakkandy Road	4	0.276	7
RD119	Passport Office - Thalikkavu Road	4	0.510	7
RD120	Sree Muthumariyamman Kovil Road	4	0.233	7
RD121	Talap - Kakkad Spinning Mill Road	5	1.614	7
RD122	Talap Juma Masjid -Kottammarkandy Road	6	0.758	7
RD123	Thalikkavu - Manjappalam Road	5	0.957	7
RD124	Thayatheru -State Ware House Road	4	0.647	7
RD125	Thayatheru- Thavakkara Road	4	0.657	7
RD126	Thayyil Islahi Centre - Kannur City Police Station Road	6	0.405	7
RD127	Thayyil-IRPC-Santhwana kendram Road	5	0.431	7
RD128	Thezhukkil Peedika-Janakeeya Road-Elayavur South Road	5	1.358	7
RD129	Valiyavalappukavu - Caltex Jn Road	4	0.461	7
RD130	Yogasala - Talap Road	4	1.861	7

Indoor Stadium, and therefore has to carry traffic to and fro from bypass road. The traffic volume had already exceeded the capacity of this road. And also there exists a proposal for upgrading this road to NH status. Considering all these things, a 24 m widening is proposed here in line with the widening proposal of NH-66.

4. Thazhe Chovva to Anjarakandy road

It is a major road starting from Thazhe Chovva junction which is the shortest road from Kannur Head Quarters to Mattannur Airport. The entrance to airport also lies on this road. But due to the narrow width, frequent bends traffic becomes slow in this road and leads to heavy congestion. This road has been proposed to be widened to 18 m so that existing issues can be reduced and can function as an Airport road.

5. Thana-Kakkad-Pulluppi road

It is the main road that connects the Corporation to neighboring Panchayats like Narath, Kolachery, etc lying on the eastern side. It has a branch road emerging from Korjan School and reach is to South Bazar.

This road also functions as a bypass for deviating the traffic from NH. The road widening proposal is such that 14 m widening for stretch from Thana to Kunjippalli, 14 m for the rest of the road ie Kunjippalli to Pulluppikadav, while 14 m widening is also suggested for the portion between South Bazar and Korjan School. Another branch from Kunjippalli-Kottali Road and Kunjippalli Jn. - Puthiyatheru Road, are also given 14 m widening proposals.

6. Kannur-Alavil-Azhikode road

Azheekkal Harbour is the main potential of this road. Due to the concentration of a large number of commercial establishments and residential areas along its sides, traffic on this road is heavy. The connectivity of the harbor and port with railway station is through this road and hence a road widening proposal of 18 m is given for this road.

29.4 NH BYPASS

The National Highway Authority of India has started the construction of new bypass parallel to existing NH 66 with a Right of Way (ROW) of 45 m having a four line carriageway. The alignment passes through the Corporation area. The proposed bypass having a length of 26 km starts from the existing NH 66 at Kalliasseri passes through Puzhathi, Vaaram, Elayavur, Thilanur, Thankekkunnu and Kizhuthalli and from there, it is merging with the NH 66 at Thazhe Chovva and merging with existing Chala bypass and finally ends at Edakkad to NH 66. This road will be the major corridor in the future.

29.5 COASTAL HIGHWAY FROM AZHEEKKAL PORT TO EDAKKAD

In order to serve the coastal areas better which would also enhance the tourism potential, Government has proposed to have a Coastal Highway starting from Azheekkal Port located outside study region but part of the influencing area of Kannur City, passing through Palliyamoola, Payyambalam Beach, Thottada, and terminating at Edakkad on NH. Most of the roads that would form part of the coastal highway already exist and new roads have to be constructed wherever connectivity is not available.

29.6 JUNCTION IMPROVEMENT PROPOSALS

Intersections are the vehicle conflict points and are prone to accident risk. Therefore it is necessary to properly design the intersections for streamlining traffic flow and also for minimizing conflicts points. The following junctions are to be included in the first priority list and need to be provided with intersection improvement plans including signaling to impart traffic discipline and safety along with smooth mobility.

1. Thazhe Chovva Bypass Junction

This junction is the intersecting point of NH 66 with NH bypass. The four arms are leading to Mele Chovva, Thankekkunnu, Chala and Thottada. Located amidst medium level commercial facilities, it is a major traffic bottleneck due to the location of railway crossing very close to the junction. Frequent closure of railway gate causes huge vehicle queue and traffic holdup. A combination of factors like wide open area at the bell mouth of bypass, location of commercial areas close to the junction on the Mele Chovva arm and absence of any traffic regulatory measures at the junction, makes the junction a chaotic one during peak hours. Considering the traffic issues witnessed at the junction, it is to be improved with proper signaling, crossing, islands, CCTV facilities etc.

2. Thazhe Chovva- Anjarakkandy Road Junction

It is a four armed staggered intersection located on NH 66, separated by a bridge. The road to Anjarakkandy via Movancherry leads from this junction. Medium level commercial establishments are dotting all the arms of the junction. Junction improvement works with essential widening; signaling, crossing, islands, CCTV facilities etc. are required as an immediate measure to mitigate the congestion here.

3. Mele Chovva

It is a 3 legged intersection. It is located on NH 66. The 3 arms are towards Thana, Thazhe Chovva and

Mundayad directions respectively. Major landmarks of the junctions are the commercial area on both side of Thana-Thazhe Chovva road stretch, a temple and water tank located on right side of Thana- Thazhe Chovva stretch and bus stops located at Mundayad arm. A median of short length is provided on the Thazhe Chovva arm. The junction is witnessing frequent traffic jams during peak hours due to inadequate junction area to handle large conflicting movements of traffic. Considering the traffic issues witnessed at the junction improvement should be done immediately for this important node of the city.

4. Thana

Thana is one of major intersections located on NH 66. The four arms of the intersection lead towards City, Caltex, Korjan School and Mele Chovva directions respectively. Medium to large scale commercial areas are present on all arms of the intersection. Close to the intersection are located the office of Kerala Water Authority, Juma Masjid, and Specialty hospital generating large volume of vehicular, parking and pedestrian activities. An auto stand, taxi stand and bus stop are located on the Caltex Arm of the junction. Traffic signal, islands, crossings, CCTV facilities etc. are to be provided at the junction to regulate the flow of traffic.

5. Caltex Junction

Caltex along with Gandhi Circle and Civil Station junction are the central areas of Kannur city and they handle the highest traffic volume. These three intersections are located in a triangular shape with Caltex on the south, Gandhi circle on the north and Civil Station junction on the west. Caltex and Civil Station junctions are having three arms each while Gandhi Circle has four arms.

6. South Bazaar – Kakkad Road Junction

South Bazaar is another major traffic bottleneck area in Kannur city located on NH 66. The third arm of the junction leads to Kakkad on the eastern direction. It is found to be inadequate to handle the large volume of traffic on the NH and substantial traffic moving towards Kakkad direction. Located amidst medium to large scale commercial establishments, traffic generation and pedestrian movements are very high resulting in traffic issues. The proposal at this junction is that the two roads leading to Kakkad should be merged to form a four lane road with channelizing island.

7. AKG Junction

AKG Junction is a 3 armed intersection located on NH 66. The 3 arms are towards South Bazaar, SPCA Jn, and Puthiyatheru directions. AKG hospital is

the major landmark of the city which is located on the junction itself on NH stretch. The road towards SPCA serves as one-way street with traffic not allowed towards Gandhi Library. Detailed improvement proposal for the junction is needed based on existing topographic features and traffic flow.

8. Mundayad Indoor Stadium

It is a 4 arm staggered intersection located on Mele Chovva- Mattannur road. Two road leads from the road, one towards Chelora on the south and other towards Kakkad in the north, at a close interval of about 200m. There were minimal commercial establishments located on the main road and an Indoor stadium is located on the southern side of the main road. Considering the future development here when the proposed NH bypass is complete, there is a need for junction improvement immediately like signals, crossings, traffic islands, CCTV facilities etc.

9. Varam

It is a 3 arm intersection located on MeleChovva – Mattannur main road. A road to Vaaramkadavu deviates from the junction in the northern direction. Small commercial buildings are located on the main road. Considering the existing traffic flow, it needs sufficient improvement proposals to this junction.

10. Kunjippalli Junction

Kunjippalli is a 4 arm staggered intersection located on Kannur-Puthiyatheru road via Kakkad. One road deviates to Kannadiparamba from this junction and another one to Pallikkunnu at a close interval in the opposite direction. The road at the junction is quite narrow and unable to cater even to the limited traffic movements causing occasional traffic blocks. Small and medium size commercial establishments are dotting the entire junction area and turning movements are found to be quite difficult due to location of buildings at the bell mouth area. Considering the traffic problems observed at the junction, a channelizing island is proposed at the bell mouth of Kannadiparamba and Puthiyatheru arms involving considerable land acquisition.

11. Chalad

Chalad is a four arm intersection located on Kannur-Azhikode main road. The main road is intersected by the road from Pallikkunnu on NH 66 to Palliyamoola on the west. The road is found to be narrow at the junction area with inadequate turning radius for both Palliyamoola and Pallikkunnu bound traffic movements. Although the turning movements are negligible, they cause traffic hold up during such movements. The presence of Azheekkal Sea Port is the main potential of this junction, there is a

need for junction improvement immediately with signals, crossings, traffic islands, CCTV facilities etc.

12. Plaza Junction

Plaza junction is one of the major junctions in Kannur city located on Railway Station Road. A road to Prabhat leads from this junction forming a 'T' intersection. The junction is located amidst high level commercial buildings. Eastern side of Railway station road has the railway line close to the road at a gap of about 300 m. Railway station is located close to the junction. Frequent traffic problems are observed at the junction caused by conflicting movements of traffic consisting of both heavy and light vehicles which necessitates an intersection improvement plan.

13. Muneeswaran Kovil Junction

It is another major junction in Kannur City handling large volume of vehicular and pedestrian traffic. Located close to the railway station on the railway station road, the road to SN junction deviates from this junction making it a three arm intersection. Located amidst Market, Temple and large commercial areas, the junction presents a chaotic situation during peak hours. A taxi stand and petrol bunk are also located close to the junction, generating additional traffic movements and conflicts. A necessary improvement work including pedestrian crossings is required as an immediate measure to mitigate the congestion here.

14. Stadium Junction

Stadium Junction is another major activity centre in Kannur City. It is a four arm junction located on the main road between Muneeswaran Kovil and Municipal Office Junction. The road from Caltex through Police Club Junction lands at the junction and another minor road lead to Talap. Old bus stand and Kannur stadium are located close to the junction. Around the Stadium, there are small commercial centers creating lot of vehicular, pedestrian and parking demand. Large numbers of vehicles are parked around the Stadium. Traffic movements are regulated through a central island with channelizing medians on the three major arms of the junction. Considering the existing traffic problems and geometric setting, the intersection should be improved by suitable road markings and signs.

15. Prabhat Junction

Prabhat Junction is a three arm intersection, located close to the cantonment area. The three arms of the junction lead towards City, SN Park and Plaza directions respectively. KV school area is present between the SN Park and City road stretch. Rotary and channelizing islands are provided at the intersection. An auto stand is located at the beginning

of SN park road stretch on left side and bus stop at City-Plaza stretch. Traffic problems are witnessed due to location of bus stop close to the junction. Considering the existing traffic problems and geometric setting, the intersection must be improved by suitable road markings and signs.

16. Thayyil Junction

It is a 3 arm intersection located on City-Thazhe Chovva road. The road to Kuruva leads from the junction making it a three arm intersection. Small commercial establishments are there around the junction area. Occasional bus movements towards Kuruva side create traffic problems at the junction due to inadequate bell mouth at the Kuruva arm. The junction should be improved by necessary facilities. Pedestrian crossings are required as an immediate measure to mitigate the congestion here.

29.7.1 OTHER JUNCTIONS TO BE IMPROVED

Junction improvement projects are suggested on later phase at Valiyannur junction, Korjan School Junction, Kakkad-Pallipram road junction, Kottali junction etc.

29.7 PARKING FACILITIES

29.7.1. ON STREET PARKING

One side street parking is suggested in the 13 stretches of road shown in figure below. The identified road stretches are Railway land in front of Plaza-Muneeswaran Kovil Road, Payyambalam Beach Road, Payyambalam GHSS-Payyambalam Park, SN Park- in front of Theatre, SN Park road, Plaza-Prabath Junction, Thavakkara SBI Junction, Sub Registrar Road, Thalap road, Kannothumchal-Thana Road, Dhanalakshmi Hospital to Kakkad road, Railway station East gate to civil station-road stretch.

29.7.2. PAY AND PARK

Available locations that can be converted for pay and park uses are shown in Figure.29.2 and details are given in Table.29.2.

29.7.3. MULTI LEVEL CAR PARKING

Multi-level car parking method is proposed in the Civil Station, Collectorate, ground opposite Railway East Gate and SBI junction.

Pedestrians are the most neglected group in the road development and these pedestrians include men, women, children, disabled and the elderly people. Footpaths are often reduced to widen roads, which affect the safety and comfort of pedestrian movement.

29.8 PEDESTRIAN FACILITIES

The pedestrian facilities that need to be considered are:

Table 29. 2 Details of identified pay and park lots

Code	Survey Number	Area(m^2)	Area (Cents)
P01	5P, 6, 7P	4170	103
P02	226, 225	4423	109
P03	239, 240, 241, 242, 243	3546	88
P04	10P	1242	31
P05	180P	2180	54
P06	218P	777	19
P07	36P	2259	56
P08	203P	1384	34
P09	183P	1904	47
P10	215P	565	14
P11	164, 165p, 163p	3969	98
P12	238P, 250P	1182	29
P13	251P	572	14
P14	30P	391	10
P15	82P	2459	61
P16	77P, 78P, 80P, 253P, 252P	1523	38
P17	112P	3776	93
P18	Cantonment Area	1438	36
P19	886P	1666	41
P20	546P	360	9
P21	645P	1545	38
P22	56P	401	10
P23	56P	787	19
P24	337P,336P	3555	88
P25	788P	668	17
P26	788P	565	14
P27	577P	1192	29
P28	579P	2015	50
P29	585P,584P,583P,589P,587P,855	6329	156
P30	973P	452	11
P31	456P,557P	2583	64
P32	605,603P	1418	35
P33	322P	1160	29
P34	250P	5767	142
P35	614P,615P,635P,645P,648P, 650P	12402	306
P36	144P	1235	31

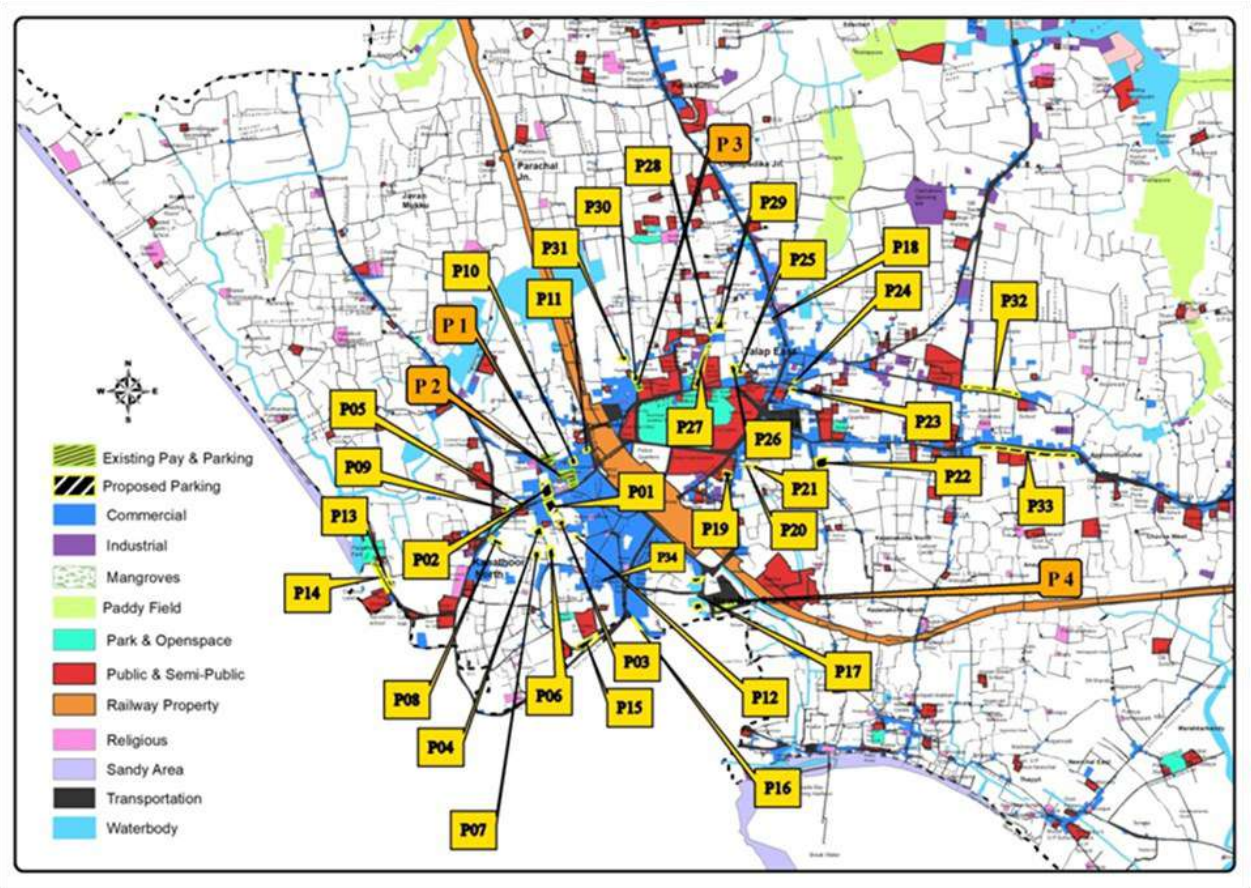

Figure 29.2 Location of identified pay and park lots

29.8.1. SIDEWALKS OR WALKWAYS

Sidewalks and walkways are "pedestrian lanes" that provide people with space to travel within the public right-of-way, that is separated from vehicles. Sidewalks are associated with significant reductions in pedestrian collisions with motor vehicles. For Kannur Corporation, considering the IRC code provision, sidewalks with a width of 1.5m to 2.5m is proposed for all types of roads including arterial roads.

It is better to complete the road widening works before commencement of the sidewalks projects. But in unavoidable places with high pedestrian volume and where safety of pedestrians is under threat, the sidewalks may be constructed as an immediate measure.

29.8.2. MARKED CROSSWALKS

Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Crosswalks are often installed at signalized intersections and other selected locations. Marked crosswalks are desirable at some high pedestrian volume locations (often in conjunction with other measures) to guide pedestrians along a preferred walking path.

29.8.3. SKY WALK

Examining the volume of pedestrian at urban centre, a sky walk proposal is introduced by Connecting Railway Station, old bus Stand, Corporation office, Town square, KSRTC Bus Stand, Caltex junction, Collectorate, Kannur University, New Bus stand, and Market. Ramps with sufficient gradient are the best option for exit / entry to the walkway from these points.

Location details, need for the project, project brief, responsible agencies, suggested implementation mechanism, funding and resource mobilization, project period and priority of some selected priority projects are given in Chapter 31 Priority Action Plan, Fiscal Requirement and Resource Mobilization.



29.9 CYCLE TRACKS

Separate bicycle tracks are proposed on major roads as they contribute physical, mental, environmental well-being of the people.



29.10 PUBLIC TRANSPORT SYSTEM

Public transportation systems include a variety of transit options such as buses, light rail, and subways. These systems are available to the general public involve, changing fare and keeping time schedule.The purpose of introducing and expanding the existing public transportation is to increase the access to it and the use of it. It is also to reduce traffic congestion.

29.10.1 RENOVATION OF OLD BUS STAND AND KSRTC BUS STAND

Since the infrastructure facilities of these two bus stands are insufficient, renovation should be done by means of provision of modern waiting shelters with seating facility, display board of bus timings, Wi-Fi facility, F.M Radio, music system, waste bins, drinking water facilities, coffee shops, comfort station etc.

29.10.2 STRENGTHENING OF PUBLIC TRANSPORT SYSTEM

There are hinterlands and remote areas in the study area that have comparatively less connectivity to the city or major roads. For serving the public, the followings methods for strengthening the public transport system shall be adopted:

- Extension of existing bus services to remote areas using methods of alternate service, alternate day services, weekly services etc.
- Circuit services connecting hinterlands.
- Operation of more services of K.S.R.T.C.

29.10.3 "SUGAMA"- MINI BUS SERVICE OF KANNUR CORPORATION

For the interior portion of the Corporation area having only narrow roads and which is not connected by bus service, a public transport system with mini bus services seems to be ideal. Municipal Corporation should take initiatives to start such mini bus service to cover the entire region with the assistance of financial institutions and co-operative banks and with co-ordination of Motor Vehicle Department, KSRTC, RTO, etc. The methods described in the above proposal can be adopted here also for covering all the remote portions of the city.

29.11 OTHER PROPOSALS

29.11.1 BUS BAYS WITH HI-TECH WAITING SHELTERS

The stopping of buses at bus stop on road makes traffic block forcing vehicles behind for unnecessary halts and delay. Construction of bus bays along road side is the best remedial measure and should be adopted wherever possible. And modern waiting shelters with seating facility, display board of bus timings, Wi-Fi facility, F.M Radio, music system and waste bins are to be provided for the comfort of passengers. Methods like sponsorship, advertising etc. can be adopted for fund raising. New bus bays are proposed at Vaaram Post Office, Kannothumchal, Melechovva, Talap, Thana, and Caltex.

29.11.2 TRUCK TERMINAL

There are no truck terminals in the markets within the plan area. Since the Airport and the Azheekal sea port can certainly generate large scale cargo movement through the city, a truck terminal is necessary at there. All modern facilities like comfort station, parking yard, loading and unloading facilities, fuel filling station, service station, weigh bridge, rest rooms, dormitories, booths for booking agents, restaurant, toilets etc. are to be arranged in the truck terminal. The ideal location of a truck terminal is near the major corridor but away from the residential areas.

29.11.3 BEAUTIFICATION OF MAJOR ROADS AND JUNCTIONS

Name boards and sign boards for all roads, landscaping and tree plantation of major roads, drains and slab covers to all the roads, comfort stations, waste bins etc. must be immediately provided at every road stretch of the study area.

29.11.4 MARINE WALK/RIDE

A separate track for both walking and bicycles is proposed at the entire stretch of the Coastal Highway from Azheekkal Port to Edakkad. It will be very helpful to encourage the tourism activities of the study area. Necessary eating arrangements, street lights, FM radio, free Wi-Fi etc. should be provided.

29.11.5 SHUTTLE SERVICE AT TOURIST DESTINATIONS

A shuttle service should be provided by connecting all the tourist destinations within the study area. Mini buses may be used for this and it should cover the bus stand as well as railway station.

29.11.6 PUBLIC INFORMATION SYSTEM

By making use of Intelligent Transport System (ITS), adequate public information system is to be provided at all bus stops, terminals and in the transit vehicles for helping the commuters. Measures need to be evolved to provide separate colouring schemes for public transport buses for easy identification of desired destination points.

29.11.7 PREPAID AUTO AND TAXI STAND

Prepaid auto and taxi stand must be provided at Railway station and all the bus stands.

29.11.8 TRAFFIC REGULATIONS LIKE ODD EVEN SYSTEM

Since the number of vehicles entering the city increases day by day, it is necessary to regulate it. For that, regulations like odd even system can be adopted. The system allows the vehicles having registration number ending with odd numbers and even numbers on alternate days. The smooth working of the system should be ensured by charging fine in the case of violations. For the effectiveness, policy level strategies should be adopted.

29.12 RAILWAY OVER BRIDGES (ROB)/ FLYOVERS

The Kannur Municipal Corporation area is divided into two halves by the railway line passing from the north to south direction. Underpasses or fly overs are located at very few points only. For ensuring smooth mobility and interconnection between East and West parts of the town, Railway Over Bridges/ Flyovers are proposed at Pallikkunnu gate near Zonal Office, Anayidukku Railway Gate, Thazhe Chovva Gate, Railway Gate near Thezhukkil Peedika and at Nadal gate at Edakkad.

29.13 OTHER MODES OF TRANSPORTATION

29.13.1 WATERWAYS

The proposed stretch of West Coast Canal or National Waterway No. 3, from Beypore to Kasargod which is a continuation of existing network through Kollam-Kottappuram-Beypore, passes through Kannur Corporation. In Kannur district, it connects Mahe River at south with Kavvayi River.

29.13.2 RAIL CONNECTIVITY

The study area has a broad gauge railway line from Shoranur to Mangalore and then to Panavel via Konkan railway. The railway stations located within the study area are Kannur and Kannur South. Kannur Railway Station is one of the major stations of the Southern Railway, under the jurisdiction of the Palakkad Division. All trains including Thiruvananthapuram Rajdhani Express and Kochuveli Garib Rath stop at Kannur. Six daily trains and around 15 weekly or bi-weekly trains connect Kannur to Thiruvananthapuram.

29.13.3 AIR CONNECTIVITY

Kannur International Airport is located in Mattannur Municipality. As it has great impact in the traffic scenario of the planning area, the linkage with the Airport should be strengthened by means of safe and continuous traffic flow.

29.14 INFERENCE

Based on detailed traffic and transportation studies, projection of traffic volume on major roads has been carried out for various horizon years considering the growth potentials of the study area. Based on traffic projection, a long term transport plan has been prepared considering all modes of traffic like road, rail and air so that a sustainable, people friendly city can be created.

CHAPTER 30

SECTORAL PROPOSALS

Sectoral proposals and projects for Kannur Corporation were prepared on the basis of the discussion with the Special Committee of working groups on the primary and secondary data collected and the local level analysis and the spatial analysis of the data. The feasible suggestions were incorporated. The economic feasibility and the environmental feasibility, etc. are considered for finalizing the proposals. In this chapter, the details of all projects and proposals including activities and agencies to be involved, proposals and prioritization of projects are given in the subsequent tables.

Most of the proposals and guidelines prepared are based on people's aspirations raised in working groups of Special Committee. The Municipal Corporation can include these proposals in its Annual Plan for implementation.

The components or elements described here for each project are not complete in all aspects, any suitable or essential component required can also be included in the project during the stage of preparation of DPR (Detailed Project Report) or during implementation stage. Location details, need for the project, project brief, responsible agencies, suggested implementation mechanism, funding and resource mobilization, project period and priority of some selected priority projects are given in Chapter 31 Priority Action Plan, Fiscal Requirement and Resource Mobilization.

30.1 RECREATION AND CIVIC AMENITIES

- **Green park at Thottada**

At present recreational area constitute 1.26% of the developed area of Kannur Municipal Corporation, which is far below the standards. As per URDPFI guidelines, medium plain town should have 10% to 12% area as recreational space. To develop recreational space within city area, a Green Park is proposed at Thottada. This organised park shall have the facilities like walkways, jogging tracks, lawns, botanical gardens, exhibition halls, children's play area, open air theatre, artesian emporium, swimming pool, comfort station, and fountains. It helps for physical as well as mental health development of the people.

Land identified : Resurvey numbers 14 (P), 28(P), 29 (P) of Thottada Desom and 53 (P) of Kannur Karar Desom of Edakkad Village, Area: 5.40 Ha

- **Construction of New Park**

A new park is proposed near Kazanakotta Anganwadi with necessary play units for children, planting trees, gardening, landscaping, beautification works etc.

- **Renovation of Payyambalam Park**

Payyambalam Park is getting damaged due to negligence and improper maintenance. This proposal includes site clearing, fencing, planting trees, gardening, landscaping, beautification works, installation of play units for children, posting of gardener/ watchman, maintenance works etc. Necessary funds can be raised by sponsorship and advertisement.

- **Construction of Art Gallery and Town Hall**

Art gallery and Town Hall can promote the socio cultural activities of the resident community of the area. There should be facilities for conducting film festivals, drama, study cum show programmes etc.

- **Mini Stadium Renovation**

Mini stadiums at Chala-Padinjarekkara as well as Kakkad are to be renovated by means of providing suitable infrastructure facilities.

30.2 TRADE AND COMMERCE

Kannur city is the district headquarters and the major whole sale trade centre. For promoting the trade and commercial activities of the city, following projects and proposals are made.

- **Market Complex at South Bazaar**

A market complex is proposed at Corporation Land near Ashoka Hospital. It will promote the commercial activities within the city and act as a source of income for the Corporation. The lower floors of building may be allotted for commercial activities and upper floors for proposed Theyyam Museum and Hantex Emporium.

Land identified: - The Corporation land in T.S. No.788, Revenue Block-15, Revenue Ward-1, Kannur-2 Village.

- **Renovation of Existing Markets**

The existing markets like Ayikkara fish market, Central market, Kakkad fish market and Vaaram fish markets are proposed to be renovated by providing the basic infrastructure facilities like loading and unloading facilities, comfort station, parking facilities, waste treatment plants and storage facilities etc.

- **Weekly Markets for Farmers and Cottage Industries**

Setting up of weekly markets at suitable locations can promote the selling of agriculture products of farmers, products of Cottage industries,

Kudumbasree products, etc.

- **Trading Centre for Informal Sector**

There are large numbers of informal sector units in the city but there are no organized clusters. Along the important road stretches as well as junctions, a separate location for each type of informal activities can be proposed. It should be done by means of layout plans which represent what type of informal is to be allocated in which stretch or junction. Since the traders are not that much educated, the layout plans should be easy for them to understand. The informal activities should be done by obtaining permit or sanction with respect to the layout plan. Supervision of the activities by the authority is needed to avoid unauthorized establishments and anti-social activities. Informal sector eating places are also proposed near the Stadium area and Payyambalam beach side.

30.3 INDUSTRIES

Kannur Corporation is an industrially backward area in the district. Only three large scale industries are there in the Corporation. Kerala State Handloom Development Corporation Limited, Cannanore Co-operative Spinning Mills Limited and Milma are the large scale industries. Though there are no medium scale industries, three mini industrial estates exist in the study area.

Some small scale industries have also been set up in and around the city area. The major issues that the production sectors face are lack of experienced labourers, raw materials, land, financial support etc. Thus focus is to be given for strengthening the existing units as well as industrial estates with all necessary infrastructures.

- **Industrial Park at Pallipoyil**

The famous handloom and beedi industries that flourished decades ago and supported the economic base of the city region have now declined. An industrial park is essential for the city to revitalize its industrial base. An industrial park which envisaged to house all types of industrial units, IT/ ITES/ Software/ Hardware units, engineering industries, handloom/apparel units, service industries etc. is proposed at Pallipoyil.

Land identified: - Resurvey number 64 (P) at Kappad Desom and resurvey numbers 92 & 93 at Macheri Desom of Chelora Village. **Area**: - 10.70 Ha

- **Strengthening of Mini industrial Estates**

The mini industrial estates at Marakkarkandy and Edakkad are to be strengthened by promoting the establishment of new units along with necessary infrastructure facilities. The industrial estate at Chelora located in

Valannur Desom of Chelora Village has an area of 0.789 acre. Considering the strategic location, it is proposed to expand it with inclusion of a part of adjacent municipal land (Resurvey. No. 2 (P) of Valannur Desom of Chelora Village).

Land identified: - Resurvey Number 2 (P) of Valannur Desom of Chelora Village, **Area:** - 2.184 acre

- **Agro-Based Cottage Industries**

Coconut handicrafts, mats like "Thazhappai" are economically important to supplement the income of marginal farmers and labourers. Traditional areas of such activity will be selected and promoted. Advanced technologies can be incorporated to suit international demand. Tourism can also be associated with the proposal. Making of bags, kits etc. of these types shall also be encouraged.

- **Fish Processing, Exporting Unit and Ice Plant**

A sea food as well as the inland fish products processing and exporting unit along with an ice plant is proposed near Mappila Bay which will increase the economic development of the study area. The potential of the fishing activities of the study area will be the key factor for the development of this industrial unit.

- **Entrepreneurship Development Training Centre**

Entrepreneurship development training is conducted by the industrial department. But there is no permanent hall for conducting these programs. Hence a training centre is proposed in the premises of District Industrial Centre. Necessary support should be given by the Municipal Corporation.

- **Handloom & handicraft emporium**

A modern showroom exhibiting all indigenous handloom and handicraft items in association with Hantex at SN park area can market the Kannur brand product.

- **Exhibition cum trading centre**

Marketing is the major problem faced by industrialists working in small scale and cottage industrial sectors. A permanent outlet for their products is necessary for strengthening these units. A suitable location can be identified.

- **Encouragement to household industries**

30.4 WATER SUPPLY

- **Installation of New Water Storage Tanks in Water Scarce Areas**

The proposal includes activities like selection of locations, purchase / acquisition/relinquishment of land, installation of water tanks at elevated areas, supply of water to this tank with the co-operation of Ground Water

Department and KWA.

Location –Kazanakotta Anganwadi

- **Construction of Public Wells and Deepening of Existing Wells**

The proposal includes activities like selection of locations, purchase/ acquisition/relinquishment of land, digging of wells, deepening of existing wells, repair and maintenance works, etc. with the co-operation of Ground Water Department and Kerala Water Authority.

- **Rain Water Conservation Projects**

Ground water is found depleting in the area and therefore all practical measures for replenishing and recharging of ground water are to be adopted.

- **Conservation of existing natural water bodies**

30.5 DRAINAGE, SANITATION AND SOLID WASTE MANAGEMENT

- **Sewage Treatment Plant at Neerchal**

The sewage generated in houses and various establishments are disposed-off through on-site sanitation systems (septic tanks or leach-pits). An STP is proposed at the mouth of Neerchal Thodu. Project helps to reduce wastewater stagnation, ground and surface water pollution, odour nuisance, insanitary conditions, mosquito breeding, and the spread of water borne & vector borne diseases.

Land identified: - T.S. number 1144(P) at Block 15, Revenue Ward 5, of Kannur-1 Village., Area: - 0.10 Ha

- **Drainage with covering slabs to Major Roads**

Roads without side drains are easily vulnerable for deterioration due to the stagnation of storm water in monsoon season. And drains without proper cover slabs cause several health hazard issues and accidents to passengers. A well designed cover slab system with pavements can be used as sidewalks for pedestrians and also for the beautification of the city. Therefore, this project shall be implemented to major roads within the Corporation

- **Rejuvenation of Existing Thodes (Riverlets)**

Rejuvenation of river lets by removing grass weeds, silt deposit, mud etc. and deepening as well as protection works of their sides are to be done.

- **Comfort Stations**

Comfort stations are proposed at markets, bus stands, truck terminals, bus bays, parks and other public places. Regular maintenance as well as the cleaning is to be ensured.

- **Waste Collection Bins**

Waste collection bins are proposed to be placed along major roads as well as

other public places like bus stands, bus bays, parks etc. The bins should be separate for bio degradable and non-bio degradable wastes.

- **Bio-gas plants at Markets, Slaughter house, farms, etc.**

Bio-gas plants are proposed at major markets, bus stand, slaughter houses and farms, etc. for the disposal of generated waste in the source point itself. Some of the slaughter wastes can be used as food for the proposed rescue cum rehabilitation centre for stray dogs. Human excreta fed biogas plant system can also be implemented in various comfort stations within the city.

- **E-Waste Treatment Facilities**

A secondary e-waste collection centre at Chelora trenching ground is proposed and a ward wise door to door collection is to be provided.

- **Modern Slaughter House**

A modern slaughter house where scientific and hygienic slaughtering of animals with proper waste management as per pollution control norms and compliance of environmental laws, so as to ensure supply of safe and hygienic meat to the consumers with minimum manual handling. A suitable location can be identified.

30.6 TOURISM, CULTURE AND HERITAGE

Tourism, Heritage and Culture are linked sectors and most of the tourist spots are historically important. Tourism, with its strong potential, is one of the most important sectors in the development scenario of the city and has got an essential role to play.

- **Theyyam Museum**

Theyyam is usually performed in a particular season in the small shrines called Kavus and many tourists domestic and foreign pay a visit during this Theyyam season. If a theyyam museum is arranged with video show of recorded performances, the tourists will get a chance of enjoying this folk lore art in off-season also. The miniatures of different Theyyams can be made and sold here with the help of Theyyam artists. Upper floors of proposed commercial complex building proposed near Ashoka Hospital, South Bazar is identified for Theyyam Museum.

Location – T.S.No.788, Revenue Block-15, Revenue Ward-1, Kannur-2 Village.

Area - The total land extend for this complex is 13 Ares.

- **Kakkad River Side Park**

A park is proposed near Kakkad River. A walkway is proposed along the side of this road and all facilities like resting places, comfort stations/e-toilets,

Wi-Fi facility, FM radio, display of major tourist destinations in the surrounding area, dust bins etc. are to be provided to get a calm atmosphere for people gathering there. Acquisition of surrounding land is required.

Location – Resurvey Nos. 21, 22 (P). Athirakam Desom, Elayavoor Village

- **Bio Park at Edakkad**

The mangroves near Thottadapuzha and its adjacent area are proposed to be protected and more mangrove plants can be planted. A walkway along the banks of the river to neighbouring beach, as well as a suspension bridge to cross the river is also proposed here without affecting the ecosystem.

Location – Thottada Desom {33(P), 34, 37 (P)} and Kannur Karar Desom {(120,119, 118(P)}

- **Bird Watch Tower at Vaaram Kadavu**

A bird watch tower is proposed at Vaaram Kadavu which will promote the tourism activities. The nearby Munderikkadavu area in Munderi Grama Panchayat is now growing as a centre for bird watching and many people use this area as a picnic spot. Similarly, the Varam Kadavu area can also be promoted as a picnic spot by installing a watch tower for observing birds. The watch tower can provide a panoramic view of the vast water stretches of Kattamballi backwater area.

- **Encourage Water Sports and Air Sports Activities in Beaches**

It is proposed to promote various water sports activities like boating, diving, kite boating, fishing, swimming as well as air sports activities such as parachuting, paragliding etc. in the beaches. The safety should be ensured. All the activities should be provided with reasonable prices.

- **Heritage Conservation**

The historically important buildings such as Arakkal Palace, Parsi Bungalow etc. are proposed to be protected. All necessary measures for the preservation of these valuable inheritances are to be taken. Mobilization of financial grants and aids, prevention of encroachments, repairs and maintenance works, people's participation in the conservation works, etc. are some activities involved in this project. This will promote the tourism activities in these places.

- **Boat Service and Rope Way Along Kattampally Puzha**

The Kattambally River is a tributary of Valapatanam River and spreads over a vast extent of area with its tidal backwater entry. A boat service is proposed through Vaaram Kadavu Pullooppi Kadavu and Munderi Kadavu.

A well designed rope way to reach

Munderi Kadavu and back to Pullooppi Kadavu is also proposed here. Rope way is a pleasurable experience to tourists. The panoramic view of the vast river and its beautiful islands, the bird sanctuary as well as the proposed butterfly park all will constitute a pleasant experience to the tourists.

30.7 HOUSING

- **Housing Scheme for Urban Poor**

New housing schemes can be proposed to the urban poor consisting of homeless and land less BPL families. The Life Mission project recently launched by Govt. of Kerala may be taken as model for this.

30.8 ENERGY

- **Streetlights in Every Street and Colony**

Street lights are proposed at every street and colony.

- **Solar panels in all Government Offices and Public Buildings**

Solar energy is an infinite non-conventional energy resource and should be utilized in all possible manners to avoid future energy crisis. Government offices and public buildings are the best places to install solar panels as an illustration for the public. Installation of Solar heaters for hospitals can also be included in this project.

- **Establishing More Electric Charging Stations for Vehicles along major roads**

30.9 EDUCATION

- **Students Facility Centre at 'Thottada Educational Hub'**

Thottada area which is having a large number of educational institutions is now developing as an educational hub. Around 13 educational institutions are there in this area, which include primary schools to professional Colleges. The higher educational institutions viz, SN Arts &Science College, Govt. Polytechnic College, Govt. Industrial Training Centre, Govt. Industrial Training Centre for Woman, Institute of Handloom Technology, Chinmaya Arts and Science College Chala, Chinmaya Institute of Technology etc. offer different courses and career development opportunities for students all within a short area. In addition to this, a Technical High School is also located in this region which helps to improve the technical skills at school level itself and is very helpful to the higher education in technical studies.

A student facilitation centre is proposed for this education hub. Library, reading room, internet facilities, Photostat machine, career development counselling cell, Civil Service Coaching Centre, Job fair etc. shall be the component of this project.

Development of human resource is

crucial for the industrial development of any nation. Upgrading of skills is an important component of Human Resource Development. Training imparted in institutions alone is not sufficient for acquisition of skills and needs to be supplemented by training at the workplace. The proposed educational hub can be linked with industries to establish training centres for imparting practical job skill training with a view to meeting the requirements of skilled manpower for industry.

- **'Vidyaveethi'- Student's walkway from Chalakkunnu to Polytechnic Campus**

Most of the students from Koothuparamba side to the above mentioned educational institutions in Thottada area get down from bus at Chalakkunnu and make a walk to the institutions through Polytechnic Campus. They have to cross the railway track and the path is not completely safe. A safe and student friendly walkway is proposed from Chalakkunnu to Polytechnic Bus Stop. A foot over bridge over railway line, resting places and roof covering at necessary areas, CCTV surveillance, drinking water facility, comfort Station, paintings on walls etc. are the components of this project.

30.10 HEALTH

- **Mini Gym**

Location- Town square and other parks

- **Life Style Disease Detection Centres**

Location- Bus stands and Corporation office area

- **Isolation Hospital for Epidemics**
- **Paramedical Research and Training Institute**
- **Ayurveda Dispensary at Varam**
- **Renovation and modification of Thottada ESI Hospital**

30.11 SOCIAL WELFARE

- **Improvement Works for SC/ST Colonies**

The proposal includes construction, repair and maintenance of approach roads, construction and repair of houses to eligible families, installation and maintenance of water supply schemes, community septic tank, construction and repair of community halls, cultural centres, burial grounds, Study room facilities, compound walls etc.

- **Ladies Rest Rooms and She-Toilets at Major Centres**

Ladies rooms, feeding room and toilet facilities are essential for female passengers and working are to be built at

different parts of the city.

- **Infrastructure Development of Anganwadis**

It is proposed to provide own land to Anganwadis along with basic infrastructure facilities, mini park, etc.

- **Encouragement of Kudumbasree**

The Kudumbasree activities can be encouraged by giving them financial assistance and support to start new ventures like hotels, handicrafts making, small scale industries etc. Small scale industrial activities and necessary trading centres should be given. Necessary training programs can be provided.

- **Cultural Centres**
- **Establishing Buds School**
- **Women Friendly Night Stay Facilities**
- **Renovation of Vayojanakendram**
- **Training centres for women**
- **Men's Hostel**

30.12 AGRICULTURE AND ALLIED SECTORS

30.12.1 AGRICULTURE

Some of the areas of former Panchayats, now annexed to Corporation have still rural nature. And therefore, agriculture and related sectors like animal husbandry and fisheries have to play an unavoidable role in the development scenario of Kannur city. High concentration of agricultural land use is seen in wards situated apart from the city centre. Agriculture oriented wards in Kannur Corporation include Thilanur, Elayavur South and Kunnavu. Mappila Bay is the only one marine fish landing centre in the Corporation area while Kattampally and Vaaram Kadavuhave potential for inland fishing. Since the entire city has about 17km long coastal stretch, the fisheries sector has a great potential in the local economy.

Paddy cultivation needs to be promoted for maintaining the environmental balance. Active paddy cultivation is to be brought back in all paddy fields which are now kept idle and uncultivated. Shortage of trained labourers is also a major problem in paddy cultivation. Fragmentation of land and small scale farming, etc. often result in less profit and methods like group farming and collective farming are the remedial measures for this. Cultivation of rice varieties like Basmati rice, Nhavara rice, Jeerakasala, Gandhakasala, Matta rice etc. can be experimented with arrangement for sufficient processing and marketing facilities. Existing irrigation facilities are to be improved and new projects are to be set up for supporting the agricultural activities. Also, as a matter of policy, organic farming and homestead cultivation practice are to be encouraged

for better health of the people and for a clean environment.

Coconut and cashew are the major cash crops cultivated. Production, productivity and processing of these cash crops with value addition are to be enhanced for the economic growth of the city. Apart from these, vegetables are also cultivated. The high demand for vegetables from organic farming both at domestic and outside should be utilized.

The Kannur International Airport at Mattannur is a major thrust for export of vegetables as well as fish products.

The city has high potentials for animal husbandry sector with its vast services. Even though the infrastructure facilities are good in the case of animal husbandry, the production is not up to the mark. So, necessary steps have to be taken for utilising the maximum potential.

Considering these facts following projects and proposals are made in agriculture and allied sectors.

- **Agriculture Labourer Bank**

Shortage of trained labourers is one of the main problems being faced by agriculture sector at present. But, in contrast, the problem of unemployment also exists in Kerala. In this context, an agriculture labourer bank can be formed with the labourers interested in agriculture sector and can be made readily available for the agriculturalists. The labourer bank can be attached to the Krishi Bhavan or Municipal Corporation Office.

- **Agriculture Information Centre**

A knowledge sharing centre namely, 'Agriculture Information Centre', with facilities for training and coaching for farmers, sales and hiring of tools and implements, introduction of new trends and methods of agriculture, etc. is proposed near Krishi Bhavan or Municipal Corporation Office, as a part of Master Plan.

- **Cultivation of Medicinal and Special Rices**

The proposal aims to promote the cultivation of special rice varieties like, Njavara, Chennellu, Basmati, Jeerakasala, Gandhakasala, Matta etc. which have got high demand in market now. The cultivation of medicinal paddy may help to maintain health security as well as the commercialization through value addition product development. The existing paddy lands and uncultivated paddy lands can be utilized for this project. Processing is the main issue regarding these varieties and if adequate mills and implements are provided this issue can be resolved.

- **Herbal Garden**

Since the medicinal and aromatic plants are invaluable biological resources, closely associated with health care,

traditions, and culture, they are used to treat diseases and some of these traditional medicines are still included as part of the habitual treatments. Hence it is necessary to promote Herbal Gardens at school level also, which will be a fun-filled learning activity for the children where they get the opportunity to learn about the medicinal plants by actually planting the medicinal herbs and watching them grow in their gardens, and by exploring information about them from various sources. The task of making the garden itself has been enriching in terms of making children realize the importance of team work such as detailed planning and allocation of tasks within a team.

- **Homestead Vegetable Cultivation**

All possible measures and promotional activities are to be adopted for homestead vegetable cultivation to avoid the use of poisonous vegetables obtained from the market. The methods like grow bags, terrace cultivation, etc. can be adopted to overcome the problem of land constraint.

- **Restoration of Vegetable Cultivation at Uncultivated Lands**

The available fields in the city that are kept idle without cultivation can be used for promoting vegetable cultivation. The land can be obtained on lease from the owners and the involvement of farmer's societies and school children can be effectively utilized for the success of the project. If any land is available in the school premise, that can also be used for this project. The participation of children can develop a new culture of agriculture among the new generation an make them aware of the benefits of agriculture.

- **Organic Farming**

Organic farming refers to agricultural production systems reliant on green manure, compost manure, biological pest control, and crop rotation to produce crops, livestock, and poultry. Organic farming is dependent on developing ecological biodiversity in the plantation farm to interrupt the habitation of pests and diseases, and ensuring meaningful maintenance and improvement of soil fertility. It uses the technology of crop rotation and biological pest control methods. Products yielded through organic farming have been in great demand since the last decade or so. And now it is a Government policy to promote organic farming for the better health of the citizens and also for making self-sufficiency in vegetable production.

- **Polyhouse/Greenhouse Cultivation**

It is the cultivation of crops under completely controlled environmental conditions like temperature, humidity, fertilizers, etc. with the automated system. Generally cucumber, brinjal, tomato, bell pepper and cut flowers like rose, orchid

etc. are cultivated in polyhouse condition. As the crops grown in open field are exposed to varied environmental conditions like attack of insects, pests and diseases, the poly houses provides more stable and suitable environment for the crops.

- **Promote the use of Bio Fertilizers**

Bio fertilizers contain living organisms which promotes the growth by increasing the availability of primary nutrients to the host plant. It can be effectively used in cultivation of rice and other staple crops, commercial crops such as cotton, sugarcane, etc. and also in vegetable and fruit cultivation.

- **Agriculture Exhibitions**

In order to augment agriculture and allied sectors, related exhibitions should be conducted at Police Maidan or Collectorate ground every year. In such expos, introduction of organic farming, traditional farming with their methods, equipment used in Kerala in the past years etc. can be shown. Also, ornamental fish exhibition can be conducted here.

- **Encourage agriculture in schools**
- **Promote Coconut Cultivation in Dry Agriculture Fields**
- **Lift Irrigation Projects**
- **Urban Terrace Farming**
- **Training centres for agricultural labours**

30.12.2 ANIMAL HUSBANADRY

The livestock population of the study area is mainly concentrated in Chelora zone. At present, the activities of the sector are very poor though there are so many infrastructure facilities. So, to bring more people into animal husbandry sector, it is necessary to establish mobile veterinary clinic units. This can reduce the inconvenience and hardships of farmers to take sick animals to the veterinary hospital.

- **Rescue Cum Rehabilitation Centre for Stray Dogs**

A rescue cum rehabilitation centre is proposed by following ABC (Animal Birth Control) Rule strictly. The slaughter wastes can be used as food for these animals which will be useful to reduce the slaughter wastes. Suitable location for the project is to be identified.

- **Small Scale Dairy Farms**
- **Small Scale Goat/Pig Farm Units**
- **Poultry/Quail Farm Units**
- **Fodder Cultivation**
- **Mobile Veterinary Clinic Unit**

30.12.3 FISHERIES

- **"Malsyakendram"- Fisheries Activity Centre At Varam**

Inland fishing activities are active in Vaaram Kadavu and Pullooppi Kadavu area and there are some fish farms in the waterlogged areas of Kattampally River; a tributory of Valapattanam River. A fisheries activity centre, namely "Malsyakendram" can be started in the nearby area in order to strengthen the fisheries activities there. This can be worked as a facilitation centre for the fish farmers for promoting the inland fisheries activity. Vaaramkadavu as well as Pulloopikadavu area is now emerging as a tourist spot. The centre can also be worked out, as an outlet of fish catch and processed fish food products.

- **Marine Fish Landing Centre**

At present, Mappila Bay is the only one marine fish landing centre in the study area. Ezhara, Kizhuna and Adikadalayi have great potential for marine fishing. Hence it is necessary to promote the fishing activities there by means of providing basic infrastructure.

- **Aquaculture in Ponds**

Aquaculture is proposed in Anakulam, Chettyarkulam, Valiyakulam ponds and also in Kanampuzha, Kakkadpuzha and Thottadapuzha. The proposal includes fresh water fish culture, paddy cum fish culture, integrated pig cum fish culture, integrated duck cum fish culture, integrated poultry cum fish culture, etc.

- **Aqua Park**

The marine ornamental species offer immense export potential in the global markets. It is proposed to establish an aqua park with marine aquarium, fresh water aquarium, ornamental fisheries training centres, aquarium shops, ornamental fish breeding facilities, lab etc.

- **Renovation of Existing Fish Markets**

It is proposed to develop the infrastructure facilities of Ayikkara, Varam and Kakkad Fish markets immediately by means of providing storage, transportation, assembling and selling, drying facilities, comfort station, parking facilities, drainage system, waste disposal system etc.

30.13 ENVIRONMENT AND DISASTER MANAGEMENT

- **Multipurpose rescue shelter (MRS) with life line store**

Multi-purpose rescue shelters are to be built as a disaster mitigation projects near flood prone zones for accommodating people during emergency situation.If the camps prolong for a long time, the normal function of institutions which act as temporary rescue shelters may get affected. In addition, these shelters may not have sufficient Kitchen and bathroom facilities. Therefore, multi-purpose rescue shelters can be proposed at Thaze Chovva, Kuruva, Marakkarkandy, Padannathode, Athazhakunnu, Varam,

Parathiyil etc. During the time of disaster, it can be used as Rescue shelter and other time can be functioned as Auditorium, Skill development centres, marketing place for Kudumbasree and Cottage industries etc.

The facilities in Multi-purpose Rescue Shelters included

- Bed space accommodation
- Ample toilets
- Kitchen and dining arrangements (Stock of firewood/cooking gas, vessels etc.)
- Store room for medicines and provisions,
- First Aid facilities
- Bore well and hand pumps
- Dress washing and drying facilities
- Wireless communication facilities with control room, hospitals, etc
- Solar lighting, Solar water heater, Inverter facilities

Necessary items to be store in life line stores are fiber boat and life jackets, hammers, wood cutter, Generator, Pumps, Motors, Cutting Machines, Drilling machines, Axes, Petrol, Diesel, Kerosene, First Aid facilities and Oxygen Cylinders, Lanterns, torch, lights, cantles, matchbox, lighters, Stretchers, Ropes, ladders, Testers, Wireless communication facilities, loudspeakers, etc.

The responsible agencies for the project are Corporation, Revenue Department, District Disaster Management Authority (DDMA), Kerala State Disaster Management Authority (KSDMA), Fire and Rescue Department, Police Department, etc.

- **Renovation and beautification of rivers**

It is proposed to renovate Kanambuzha, Kakkad Puzha, Thottadapuzha by constructing side walls, installation of nets for prohibition of waste dumping, installation of CC camera, etc.

- **Protection of Rivers Shores and Streams**

Shore protection of Kattampally River and other streams is proposed and a green belt zone with no construction is preserved around it. Buffering with trees, screw-pine cultivation, bamboo cultivation, mangrove plantation and other eco-friendly activities also can be provided.

General proposals for Reducing Pollution

I) Air Pollution

1. The enforcement of PUC Test (Pollution under Control Test) is now mandatory at 3 or 6 months interval and the MVD (Motor Vehicle Department) and Traffic police can monitor this.
2. Reduce the number of private vehicles

on road by implementing efficient and convenient public transport system like mini bus services to all remote routes with adequate time interval.

3. Organization of car-free day at least once in a week.

4. Odd even number system (vehicle number ending in odd number andeven number may be allowed to enter the city only on alternate day in turn) can be adopted to reduce the number of vehicles.

5. Put up safe and attractive walking and bicycle lanes to encourage walking and cycling to reduce pollution to an extent.

6. Initiatives for shared transport systems like carpooling, shared auto-rickshaws, cabs, etc. should be considered seriously as alternatives to combine the comfort of private and affordability of public transport. Collection of special fee for cars/private vehicles with single passenger through Motor Vehicle Department and Traffic Police.

7. Checking of adequate tyre pressure should be made mandatory for public as well as private vehicles, because a low tyre pressure can increase pollution and fuel consumption.

8. Burning of waste without segregation along road sides and open plots should be regulated to curb plastic fumes from polluting the atmosphere.

9. Industrial norms are to be abided by, and Kerala State Pollution Control Board has to strictly implement it. Shift from fossil fuel based engines to clean technology like solar, electricity, battery powered, CNG, etc. should be encouraged by reducing tax for those who implement it.

10. Adequate green belt should be provided around all industrial units/ buildings/roads to reduce pollution by dust as well as carbon emissions.

II) Water Pollution

1. Promotion of organic farming and use of organic manures instead of chemical fertilizers.

2. Use of biological control of pests instead of pesticides.

3. Strict prohibition of washing of vehicles at streams and rivers.

4. Replacing of existing leach pit tanks with septic tanks especially at river side and stream sides.

5. Mandatory use of septic tanks for new houses and buildings

6. Installation of sewage treatment plants at major drains and streams.

7. Frequent testing of ground water and rivers for contamination and adopting remedial measures to control water pollution as per the directions of Kerala State Pollution Control Board, KWA and Ground water Department

8. Monitoring of industries and hospitals for abiding norms of Kerala State

Pollution Control Board

III) Land Pollution

1. Adherence to 3-R, Reduce waste, Reuse any item that we can and to Recycling of possible things.
2. Personal litter should be disposed properly. We can separate household waste at home for recycling. More than half of the household waste could be recycled or re-used but once it is mixed up, it becomes difficult to separate different components for recycling.
3. Prohibition and ban on plastic items of hazardous type.
4. Promoting the culture of using paper bags and cloth bags.
5. Promoting organic farming
6. Avoiding use of pesticides
7. Installation of collection point for collecting e-wastes including batteries
8. Promoting and buying of bio-degradable products
9. Active participation of Kudumbasree units for the collection of solid waste
10. Installation of more dust bins at various parts of the city
11. Use of different coloured dust bins for the segregated collection of solid waste

IV) Noise Pollution

1. Noise level norms need to be strictly enforced for vehicles and monitored regularly. Restrict the running of heavy vehicle during day time.
2. Use of diesel engine fitted autos, which are noisy should be avoided in the city.
3. Public transport buses should be properly maintained and lubricated to avoid noise pollution.
4. Resurfacing roads with law noise materials for areas with extremely high traffic.
5. Houses near busy roads should be provided with noise insulation packages consisting of Venetian blinds and materials for secondary glazing.
6. Public and private official buildings near busy roads should install noise insulation for the comfort of employees there.
7. Planting of trees at road sides and residential areas is a good way to reduce noise.
8. Use of loud speakers/crackers for public and private functions (rallies, demonstrations, religious rituals in temples, cultural programs and festivals) should adhere to the noise pollution norms and it should be strictly enforced.
9. Proper training and equipment should be provided to police to ensure noise control.
10. Plantation of trees around buildings (schools, hospitals, houses, offices)

should be encouraged.

11. Noise zoning should be enforced in accordance with the Noise Pollution (Regulation and Control) Rules, 2000 and awareness among residents should be created.

12. Proper maintenance of mechanical components of equipment should be strictly followed in all industries.

13. Ensure that all industries abide by CPCB (Central Pollution Control Board) specifications for noise standards.

14. Adequate lubrication to machine parts and providing removable insulation jackets to machines can reduce noise to a large extent.

30.14 MUNICIPAL FINANCE AND GOVERNANCE

- **Good Governance**

For becoming a smart city, smart governance is required and the components include

1. Strengthening of e-governance, RTI Cell, RTS Cell, Citizen Forum, etc.
2. Renewal and publication of brief-lets for municipal services.
3. Awareness and training program for public participation and co-ordination.
4. Monitoring cell for accountability and transparency.

- **New Office Complex for Municipal Corporation**

The existing Corporation office is very old and not spacious for accommodating the routine functions. Construction of new building complex for Corporation Office shall be completed urgently.

- **Proposals for Sustainable Income Generations**

Sustainable income generation proposals and financial aids from various funding agencies are essential for developing a stable financial background for the Corporation in the coming years. Some proposals for income generation are as follows:

1. Plantation of commercial trees like Teak, Mahogany, Jack, tamarinds, etc. on Corporation lands, vacant lands and on road sides.
2. Men's Hostel
3. Municipal Guest House
4. Conducting mini bus services
5. Paid parking systems
6. Construction of commercial and residential buildings for rent
7. Promoting tourism activities
8. Preparation of resource plan
9. Reforms in tax collection
10. Installation of LED display advertisements on major roads

CHAPTER 31

PRIORITY ACTION PLAN, FISCAL REQUIREMENT AND RESOURCE MOBILIZATION

The projects proposed in various development sectors are prioritized in this chapter with due regard to their significance in the socio-economic development of the city and its region. The action plan to execute the projects, its scheduling or phasing along with agencies involved, funding and resource mobilization also suggested.

The components or elements described here are suggestions, and any suitable or essential components required can also be included in the project during the stage of preparation of DPR or during implementation stage. The fiscal requirement calculated for each project is by rough estimate only, and the actual amount shall be calculated while preparing DPR (Detailed Project Report) during implementation stage.

Land demarcated for special zone may be acquired or arranged by Land pooling method, or through PPP.

Phasing

Master Plan has a time period of 20 years and this is divided into 4 phases. Each phase has 5 year time period. Suggestions for phasing of the selected priority projects are enlisted in the table given at the end of the chapter.

31.1 INDUSTRIAL PARK AT PALLIPOYIL

31.1.1 Location Details

For promoting all types of industrial activities in the Corporation area, an industrial park is designated as a special zone near Pallipoyil. 10.70 Ha land is identified in resurvey number 64 (P) at Kappad Desom and resurvey numbers 92 & 93 at Macheri Desom of Chelora Village.

31.1.2 Need for the project

Though Kannur Corporation is the head-quarter of the district, the industrial activities within the city are meagre except for a few mini-industrial estates. The famous handloom and beedi industries that flourished decades ago and supported the economic base of the city region have now declined. An industrial park is essential for the city to revitalize its industrial base.

31.1.3 Project brief

The industrial park is envisaged to house all types of industrial units, IT/ ITES/ Software/ Hardware units, engineering

industries, handloom/apparel units, service industries etc. Green belts may be developed around the park or individual unit wherever essential as suggested by Pollution Control Board or other responsible authorities concerned. The Figure 31.1 shows the location of Industrial park at Pallipoyil.

The industrial park may also promote establishment of household industries, micro, small, and medium enterprises (MSME) and eventually act as a catalyst the industrialization and economic growth of the region. Industrial Park may provide developed plots or built-space or both for prospective entrepreneurs for setting up industrial units.

The project also involves creation of suitable infrastructure like road, power, water, sanitation & drainage and common facilities. The project is aimed to serve the following industrial sectors:

- Agro-based industries and value addition of the agro-products.
- Handloom/power loom and apparel units
- Engineering and electronic based industries.
- MSME Units
- IT Software/Hardware units
- Other prospective industrial units

The following amenities and common facilities are generally suggested for the project

- Truck parking and dormitory facility
- Administrative building
- Community hall, recreational spaces, banks and ATMs, restaurants
- Wastewater Treatment Plant (CETP)
- Water tank/OHT
- Solid Waste Management

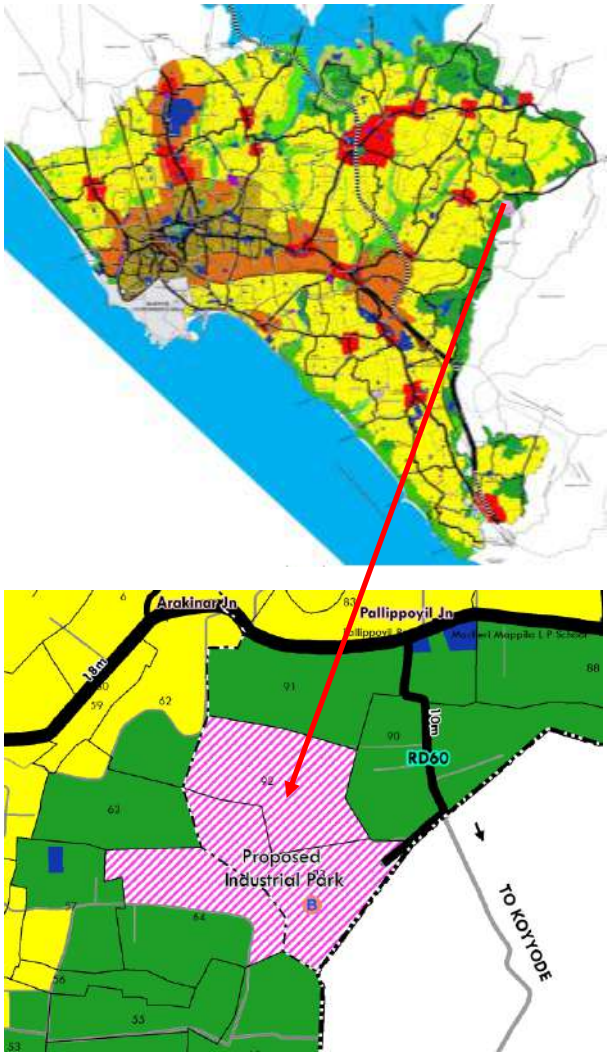

Figure 31.1 Location of the proposed Industrial Park at Pallipoyil

Apart from the above common amenities, Industrial park may also include industry related facilities like R&D centres, material-testing centres, QC laboratories, and training centres, weigh bridge, exhibition cum business centre, marketing centres etc., if found essential.

31.1.4 Responsible agencies

Municipal Corporation can facilitate the materialization of the project. Table No 31.1 enlists various prospective agencies and their roles in materializing the project. Alternatively, prospects for PPP can also be explored.

Table 31.1 Prospective agencies for the materialization of Industrial Park project

Role	Responsible Agencies
Initiation, Facilitation, Co-ordination	Municipal Corporation
Preparation of DPR, project implementation, allotment of units and operation of the park	KINFRA, Department of Industries& Commerce, DIC
Applicable in the case of PPP	Private Developer/entity

31.1.5 Suggested implementation mechanism

Implementation of industrial park project can be done through public agencies like KINFRA/DIC or through Public Private Partnership (PPP) mode. The Municipal Corporation can act as a facilitator in bringing the project to reality.

Alternatively, if developed under PPP mode, the land may be purchased/ acquired for the project by the Government agency. In such a situation, land cost may be the public share and the development cost will constitute private share for the project.

The Municipal Corporation may facilitate to get necessary clearances and shall develop external infrastructure like road access, street lighting, etc. under Municipal functions, awareness creation.

31.1.6 Funding and Resource Mobilization

It is suggested that the public agency may bear the cost of procurement of land. Development of industrial Park and supporting infrastructure may either be undertaken directly by the public agency or the private agency (if implemented in PPP mode). The Municipal Corporation shall bear the cost of developing the external infrastructure like road access, street lighting, etc. which comes under Municipal functions.

Approximate cost of the project is Rs. 55 crore.

31.1.7 Project periods and priority

The purchase of land, development of infrastructure facilities etc. can be carried out in the first 5 years. The project can be formulated and implemented in the second and third phase.

31.2 SEWAGE TREATMENT PLANT AT NEERCHAL

31.2.1 Location Details

An STP is proposed at the mouth of Neerchal thod at T.S. number 1144(P) at Block 15, Revenue Ward 5, of Kannur-1 Village. Figure 31.2 shows the location of Sewage Treatment Plant at Neerchal.

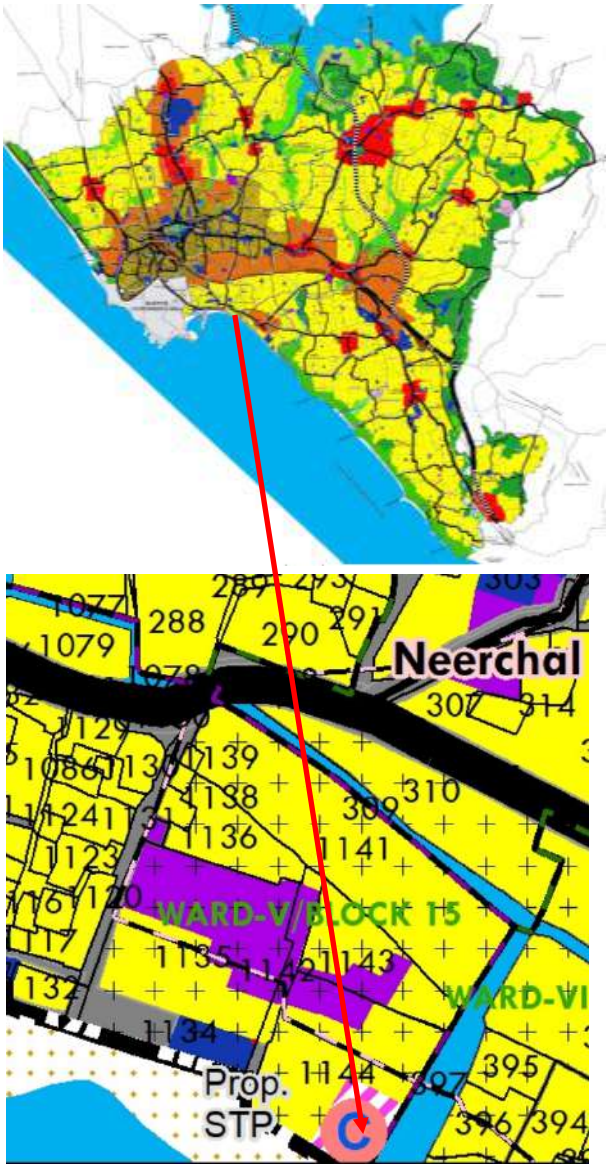

Figure 31.2 Location of the proposed Sewage Treatment Plant at Neerchal

31.2.2 Need for the project

The Municipal Corporation has just started the functioning of a Sewage Treatment Plant at Padannathodu area and currently there is no sewerage treatment facility in the other parts of the Corporation area. The sewage generated in houses and various establishments are disposed-off through on-site sanitation systems (septic tanks or leach-pits). There is a threat for pollution of ground water and severe risk to public health. The sullage (grey water) from the commercial establishments directly flows into the roadside open drains and the waste water finds its way to road side drainages without proper treatment. This leads to wastewater stagnation, ground and surface water pollution, odour nuisance, insanitary conditions, mosquito breeding, and the spread of water borne & vector borne diseases.

The mouth of Neerchal thod where it joins the Sea is the best example for the above said scenario and is now observed as a major threat to the public health. If the grey water in the stream is treated

before it is released to the sea the place can be turned into a pleasant location and can be used for public activities.

31.2.3 Project brief

Establishment of STP involves land acquisition, demand and capacity assessment, technical design, preparation of DPR, fund raising, tendering, construction works, setting up of the plant, operation and maintenance etc. The residual wastes generated as byproduct in the plant can be converted to manure.

31.2.4 Responsible agencies

Table 31.2 shows the Prospective agencies for the materialization of the project.

Table 31.2 Prospective agencies for the materialization of STP project at Neerchal

Role	Responsible agencies
Initiation, Facilitation, Co-ordination	Corporation
Demand assessment, Land procurement, Design, construction, operations and maintenance.	Kerala Water Authority,
Finance and funding	State and Central Government Schemes/ KIIFB/ RKI/KWA.

31.2.5 Suggested implementation mechanism

The Municipal Corporation may facilitate to get necessary clearances and shall develop external infrastructure like road access, street lighting, etc. that comes under Municipal functions. They shall also create awareness on the merits and essentiality of the project.

It is recommended that the Kerala Water Authority may be the responsible authority for the project. KWA may assess demand, procure land, design, construct, operate and maintain the project.

31.2.6 Funding and Resource Mobilization

The Municipal Corporation shall at their cost develop external infrastructure like road access, street lighting, etc. that comes under Municipal functions. Funding for procurement of land and implementation of project shall be met from State and Central Government Schemes/ KIIFB/ RKI/KWA. Cost for operation and maintenance may be met from KWA.

Approximate cost of project is ten crore rupees.

31.2.7 Project Period and Priority

Proposals on waste management sector are given highest priority. So the implementation of this special zone project should be done in first phase itself and

can be completed within five years.

31.3 GREEN PARK AT THOTTADA

31.3.1 Location Details

An area of 5.40 Ha in resurvey numbers 14 (P), 28(P), 29 (P) of Thottada Desom and 53 (P) of Kannur Karar Desom of Edakkad Village is identified for Proposed Green Park. Figure 31.4 shows location of Green Park.

31.3.2 Need for the project

Parks and open spaces are vital in an urban area for maintaining the health of the public and also for the mental and physical growth of the children. They can be considered as the lungs of the city where people can get leisure and enjoyment. At present parks and open spaces constitute a meagre 0.84% of the Municipal Corporation area, which is far below the standards. Most of the parks in Kannur Corporation are located within the heart of the city and therefore new parks are to be set up outside the city core area.

31.3.3 Project brief

The project involves development of park and play area for the mental and physical health of the residents. The green park shall cater to people of all ages. This organised park shall have the facilities like walkways, jogging tracks, lawns, botanical gardens, exhibition halls, children's play area, open air theatre,

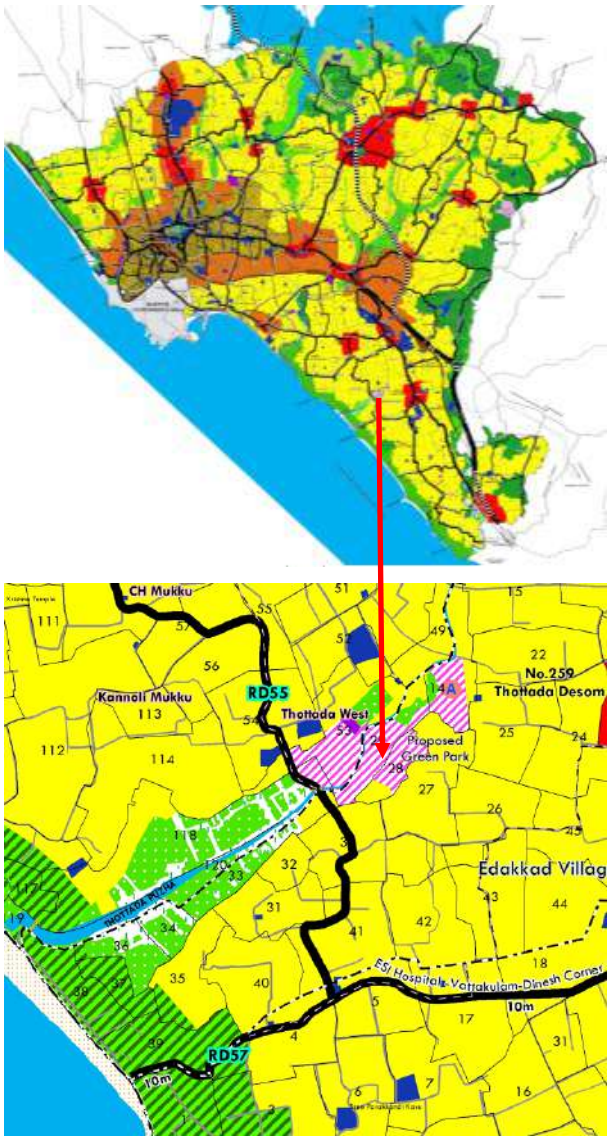

Figure 31.3 Location of the Proposed Green Park at Thottada

artesian emporium, swimming pool, comfort station, and fountains.

31.3.4 Responsible agencies

Prospective agencies for the materialization of the project are described in table 31.3.

31.3.5 Suggested implementation mechanism

Table 31.3 Prospective agencies for the materialization of Green Park project

Role	Responsible Agencies
Initiator, Facilitator, Procurement of Land and Implementation	Corporation
Finance and funding	Central/State Schemes, KIIFB, Financial Institutions
Maintenance	Sponsors
Afforestation and plantation Activities	Social Forestry Department

The Municipal Corporation has to procure the land from private owners and develop the park. Municipal Corporation may develop the project. The scope for PPP for selected components may also be explored. Mechanism for maintenance through sponsorships may also be explored.

31.3.6 Funding and Resource Mobilization

In addition to the own fund, Municipal Corporation may explore funding/ resource mobilization through Central/ State Schemes, KIIFB, and Financial Institutions etc. Scope for PPP as funding mechanism may also be explored by incorporating remunerating components for value capture mechanism. For implementation and maintenance of selected components, scope for sponsorship may also be examined.

The approximate cost of the project is Rs. 30 crore.

31.3.7 Project periods and priority

Being a special zone project, this may be assigned top priority and land procurement may be completed within first phase itself. Project can be implemented in stages from second to fourth phase.

31.4 THEYYAM MUSEUM

31.4.1 Location Details

Theyyam Museum is proposed near Ashoka Hospital, South Bazar at T.S. No.788, Revenue Block-15, Revenue Ward-1, Kannur-2 Village. The total land extend for this complex is 13 Ares. The lower floors of the building complex for commercial/remunerative uses as value capture mechanism. An emporium for exhibition and sale of indigenous handloom and handicraft items is also proposed in this building complex.

31.4.2 Need for the project

Kannur is popularly known as the 'land of looms and lores. The main folklore in Kannur district is 'Theyyam' performance, a ritual form of dance worship. Theyyam has a tradition spanning thousand years.

Theyyam is usually performed in a particular season in the small shrines called Kavus and many tourists- domestic and foreign visit Kerala during this Theyyam season. Being a devotional and ritual performance, the tourists coming in off-seasons can hardly watch this art form performed. If a Theyyam museum is arranged with video show of recorded performances, the tourists will get a chance of enjoying this folk lore art in off-season too. The miniatures of different Theyyams can be made and sold here with the help of Theyyam artists.

31.4.3 Project brief

The facilities suggested for inclusion in the proposed project are:

- A museum for exhibiting Theyyam form and related items (Preferably upper floors)



Figure 31.4 Location of the proposed Theyyam Museum

- An art emporium for selling miniatures of Theyyam and other items
- A mini movie show for exhibiting recorded Theyyam performances and heritage of Kannur (Preferably upper floors)
- An information centre for tourists
- 'Aniyara' (Back stage) - a hall for making handicrafts by retired artists.
- An emporium for exhibition and sale of indigenous handloom and handicraft items.
- Shops and other commercial use as value capture mechanism (Preferably lower floors)

31.4.4 Responsible agencies

The responsible agencies for the project are Municipal Corporation, DTPC and Tourism Department, Folklore Academy, Cultural Department etc.

31.4.5 Suggested Implementation Mechanism

The implementation of the project can be done by Corporation. The land is owned by Municipal Corporation and the construction works of the Commercial Complex building can be carried out by the Corporation. As the location has high land value and South Bazar area have high commercial potential the lower floors of the complex building shall be used for

commercial purposes and the upper floors can be used for Theyyam Museum and also for the above mentioned handicraft emporium.

A committee including Mayor and selected Municipal Councillors, representatives from Folklore Academy, DTPC, Theyyam Artists, Cultural Activists, etc. may be formed for the functioning and maintenance of this museum. This museum can function as a meeting place for active and retired Theyyam artists within the district and also for finding livelihood opportunities for retired artists.

31.4.6 Funding and Resource Mobilization

The Commercial Complex with Theyyam Museum and Handicraft emporium is proposed with a total built-up area of 3500 sq.m and an approximate cost of Rs.7 Crore is required for the building construction of the entire complex and another one Crore for setting up the Theyyam Museum.

In addition to the own fund, Municipal Corporation may explore funding/ resource mobilization through Central/ State Schemes, KIIFB, and Financial Institutions etc. For implementation and maintenance of selected components, scope for sponsorship may also be examined.

31.4.7 Project period and priority

The commercial floors in the proposed complex building can earn revenue for the Corporation and the setting up of Theyyam Museum can encourage tourism sector and also will make a livelihood opportunities for old and retired Theyyam artists. In this context, the project can be commenced at the earliest and shall be completed in the first phase.

31.5 SKY WALK

31.5.1 Location Details

The sky walk is a project intended for pedestrians, connecting locations like Railway Station, New Bus stand, Old Bus stand, Market area, Stadium, Corporation Office, Town square, Caltex, KSRTC Bus stand, Civil Station and Kannur University.

31.5.2 Need for the project

Pedestrians are the most neglected road users while planning and designing the road transport infrastructure. Significant portions of road users killed in the road accidents are pedestrians. Present approach for planning and designing for pedestrian traffic is not user -friendly especially in the core area. Hence there is a need for an innovative strategy to guarantee the safe and secure passage of pedestrian traffic along and across crowded roadways in urban areas like Caltex junction, Muneeswaran kovil Junction, Thavakkara, Stadium etc.

Given the volume of pedestrian traffic and the risk that it poses to the movement on the urban road network owing to the constant flow of high-speed vehicle traffic, it is necessary to provide pedestrian-only facilities that are free from vehicular traffic and simultaneously reducing vehicular pedestrian conflicts at major junctions and nodes.

31.5.3 Project brief

Examining the volume of pedestrian in the core area, a sky walk is proposed by connecting railway station, old bus stand, Corporation Office, town square, KSRTC Bus Stand, Caltex junction, Collectorate, Kannur University, New Bus Stand, and market. Ramps with sufficient gradient or steps supplemented with lift are the best option for exit/entry to the walkway from these points. It is recommended that the walkway be powered with solar energy. Prospects for rain water recharge may also be explored. Also, it acts as an aesthetic element and develops a comfortable microclimate.

Safety and security features like panic alarm button to be installed at a regular intervals. Adequate lighting well-lit areas ensure safety and give a sense of openness. The covered walkway shall be inviting, lively and creating a welcome ambience. CCTV camera surveillance is also recommended as additional safety measure.

31.5.4 Responsible agencies

The responsible agencies for the project are Municipal Corporation, Kerala State Transport Project (KSTP), Public Works Department (PWD), Indian Railway, sponsors, etc.

31.5.5 Suggested Implementation Mechanism

The Municipal Corporation has shall take up action for getting clearances from respective land owners such as PWD, Railways, etc. after finalising the alignment. Involvement of agencies like KSTP, PWD, etc in the implementation of the project, may be explored. The scope of PPP for selected components may also be explored. Mechanism for maintenance through sponsorships may also be explored.

31.5.6 Funding and Resource Mobilization

In addition to own fund, prospects for resource mobilization including funding from agencies like KSTP, PWD, etc. for the implementation of the project, may be explored. The scope of PPP for selected components may also be explored.

Sponsorship and advertisement through display boards are other methods of fund raising for the operation and maintenance of the project. The project cost is estimated at Rs. 50 crore approximately.

31.5.7 Project period and priority

The project can be carried out in phases spanning all the four phases.

31.6 Phasing of Selected Projects

Table 31.4 Phasing of Selected Projects

Sl. No.	Name of the Projects	Phase 1	Phase 2	Phase 3	Phase 4
		0 to 5 years	5 years to 10 years	10 years to 15 years	15 years to 20 years
1	Industrial Park at Pallipoyil				
2	Sewage Treatment Plant at Neerchal				
3	Green Park at Thottada				
4	Theyyam Museum along with Emporium				
5	Skywalk				

CHAPTER 32

SMART CITY COMPONENTS

A city can be defined as smart when investments in various sections can promote and attain sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory governance.

It uses information and communication technologies (ICT) to increase operational efficiency, share information with the public and improve both the quality of government services and citizen welfare.

The smart city infrastructure is introductory step for establishing the overall smart city framework and architecture. Very few smart cities have recently been established in the world i.e. Dubai, Malta and Singapore. The presence of heritage as well as beach tourism along with high level shopping centres and large number of educational institutions imparts the potential for Kannur city to upgrade itself as a Smart City. The goal of becoming a smart city cannot be achieved within two or three years; but starting with all possible and available components of smart city and through systematic planning and adopting accurate strategies, the good can be reached gradually.

Smart cities can be identified (and ranked) along six main axes or dimensions. These axes are: smart economy; smart mobility; smart environment; smart people; smart living; and, finally, smart governance. These six axes connect with the traditional regional and neo-classical theories of urban growth and development. In particular, the axes are based on theories of regional competitiveness, transport, information and communication technology, economics, natural resources, human and social capital, quality of life, and participation of citizens in the governance of cities.

32.1 SMART CITY CONCEPT OF INDIA

A city equipped with basic infrastructure to give a decent quality of life, a clean and sustainable environment through application of some smart solutions is a smart city by Indian standards.

The core infrastructure elements in a Smart City would include adequate water supply, assured electricity supply, sanitation, including solid waste management, efficient urban mobility and public transport, affordable housing, especially for the poor, robust IT connectivity and digitalization, good governance, especially e-Governance and

citizen participation, sustainable environment, safety and security of citizens, particularly women, children and the elderly and health and education.

As far as smart solutions are concerned, an illustrative list is given Figure.32.1.

32.1.1 BASIC CRITERIA FOR SELECTION OF CITY/MUNICIPAL AREA AS SMART

1. Implementation of e-governance and online grievance redressal mechanism
2. Publication of e-news letters
3. Putting all government expenditure online for public
4. Track record of paying salary to employees
5. Track record of urban reforms and citizen participation that are being introduced

32.1.2 AREA BASED SMART CITY DEVELOPMENT

1. Retrofitting

An area consisting of more than 500 acres will be identified with citizen



Figure.32.1 Smart solutions - Illustrative list

participation. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart.

2. Redevelopment

Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land-use, higher FSI and high ground coverage.

3. Green field

Introduce smart solutions in a vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population.

4. Pan-city development

It consists of application of selected smart solutions to the existing city-wide infrastructure. Application of smart solutions will involve the use of technology, information and data to make infrastructure and services better. Intelligent traffic management system, waste water recycling, smart metering for water management etc. are essential requisites

32.2 SMART CITIES: PROMOTING SUSTAINABLE AND SMART CITIES

Large-scale urbanization in India has put severe strain on urban infrastructure which includes water supply, roads and transport, water and sanitation, drainage and solid waste management etc. If the momentum of economic growth is to be maintained, challenges thrown up by large-scale urbanization need to be addressed on priority. The efficiency of cities in the country largely depends on how well they are planned; how well they are developed and how efficiently they are managed.

Given that the thrust areas of the 12th plan focus on sustaining economic growth and promoting sustainability and inclusive growth, managing urban development, requires an approach that is both efficient and equitable through developing sustainable and smart cities.

A smart city will have to address the efficient use and allocation of present resources that ensure economic viability of cities, and equitable distribution (access to and availability) of resources. This may be achieved through responsive land-use planning, from both a policy perspective and physical planning perspective.

A sustainable smart city has to consider issues related to revitalisation and renewal; low rise versus high rise;

heritage and built form; land use transport integration; environmental conservation; mainstreaming disaster management; climate change mitigation and adaptation; inclusiveness, etc.

One of the challenges is to create a policy environment where representatives of all sections of people may participate has become one of the greatest challenges. Power should lie in the hands of people as they live in the city and have the right to the citygovernance includes both power and control which is in the form of accountability, equity and transparency.

This can be achieved first by making plan formulation, implementation and enforcement in at Municipal Corporation level.

32.3 AMRUT (ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION) MISSION

The purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to:

- Ensure that every household has access to a tap with the assured supply of water and a sewerage connection.
- Increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks)
- Reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). All these outcomes are valued by citizens, particularly women, and indicators and standards have been prescribed by the Ministry of Housing and Urban Affairs (MoHUA) in the form of Service Level Benchmarks (SLBs).

Among the five hundred cities that have been selected under AMRUT, Kannur cityhas been included. Hence the preparation of Master Plan should be considered by focusing on the thrust areas of AMRUT mission. Water supply, sewerage and septage management, storm water drainage to reduce flooding, non-motorized urban transport green space/parks are the thrust areas of the mission.

The components of the AMRUT consist of the following:

1. Water Supply

- Water supply systems including augmentation of existing water supply, water treatment plants and universal metering.
- Rehabilitation of old water supply systems, including treatment plants.
- Rejuvenation of water bodies specifically for drinking water supply and recharging of ground water.
- Special water supply arrangement for

difficult areas, hill and coastal cities, including those having water quality problems (e.g. arsenic, fluoride)

2. Sewerage

- Decentralised, networked underground sewerage systems, including augmentation of existing sewerage systems and sewage treatment plants.
- Rehabilitation of old sewerage system and treatment plants.
- Recycling of water for beneficial purposes and reuse of wastewater.

3. Septage

- Faecal Sludge Management- cleaning, transportation and treatment in a cost-effective manner.
- Mechanical and biological cleaning of sewers and septic tanks and recovery of operational cost in full.

4. Storm Water drainage

- Construction and improvement of drains and storm water drains in order to reduce and eliminate flooding.

5. Urban Transport

- Footpaths/ walkways, sidewalks, foot over-bridges and facilities for non-motorised transport (e.g. bicycles).
- Multi-level parking.
- Bus Rapid Transit System (BRTS).

6. Green space and parks

Development of green space and parks with special provision for child-friendly components.

7. Reforms management & support

- Support structures, activities and funding support for reform implementation.
- Independent Reform monitoring agencies.

8. Capacity Building

- This has two components- individual and institutional capacity building.
- The capacity building will not be limited to the Mission Cities, but will be extended to other ULBs as well.
- Continuation of the Comprehensive Capacity Building Programme (CCBP) after its realignment towards the new Missions.

9. Indicative (not exhaustive) list of inadmissible components

- Purchase of land for projects or project related works
- Staff salaries of both the State Governments/ULBs.
- Power
- Telecom

- Health
- Education
- Wage employment programme and staff component.

Some of the important issues that need to be brought into sharper focus as per the guidelines for smart city incorporating the AMRUT mission and the steps taken in the Master Plan are as follows:

1. Regional planning to be made mandatory

Kannur Municipal Council has already taken resolution for the preparation of a Master Plan for the city vide No E4-21539/2001 dated 14/03/2017.

2. Formulating transport and major infrastructure plans

Transportation network and Mobility Plan have been prepared as part of Master Plan along with a detailed map of proposed road network. Necessary road widening as well as junction improvements are proposed.

3. Resisting development in flood plains or along coastal areas. These areas may be utilised as parks or tourism promotional zones.

Developmental activities are restricted along the sides of rivers and streams with buffer. The buffer areas and coastal areas are proposed as tourism promotion zones.

4. Defining role of settlements in the region

A proposed land use pattern and detailed zoning regulation are also prepared as part of Master Plan.

5. Considering building codes, zoning laws and policies that encourage the best use of the land

All efforts have been taken to minimize the contrast between optimum use of land and hazard proneness by adopting suitable zoning regulations and provisions in the Kerala Municipality Building Rules. Provisions as per the silence zone guidelines are also incorporated in the Master Plan.

6. Development of green space and parks with special provision for child - friendly components.

Construction of new parks a well as renovation of existing parks are proposed.

32.4 SMART CITY COMPONENTS INCLUDED IN THE MASTER PLAN OF KANNUR CITY

- Beautification of city and major roads
- Agriculture zone as green area for the town to keep the ecological balance of the town
- Buffer zone along the sides of rivers

and streams to protect the natural flow

- Organic cultivation for smart health and smart living
- Solar lighting system to promote non-conventional energy use
- Water Supply Scheme by KWA to cover entire area ensuring that treated water reaches all
- Clean city projects which can improve hygiene, health as well as tourism
- Installation of dust bins for segregated collection
- Construction of comfort stations and she-toilets
- Bus bays and hi-tech waiting shelters
- Sewage plant
- Construction of drains and cover slabs
- Good governance project for smart governance which includes strengthening of e-governance, monitoring cell, Citizen Forum, etc.
- Proposals for sustainable income generation
- Green Park and new park projects
- Disaster management projects – Multipurpose Rescue shelters with lifeline stores.

PART IV

DEVELOPMENT CONTROLS



CHAPTER 33
ZONING REGULATIONS

33.1 General Guidelines

1. All future developments shall be in conformity with the provisions of the Master Plan for Kannur City.
2. For the implementation and enforcement of the proposals envisaged in this Master Plan, Kannur Municipal Corporation area has been zoned under various categories as shown below.

I Built-up Zone

1. Residential Zone
2. Commercial Zone
3. Residential Mix Zone
4. Multi-Function Zone
5. Public and Semi Public Zone
6. Industrial Zone
7. Traffic and Transportation Zone
8. Recreational Built Up Zone
9. Heritage Zone
10. Beach Tourism Promotion Zone
11. River-Front Tourism Promotion Zone

II Green-Blue Zone

12. Recreational Open Space Zone
13. Dry Agriculture Zone
14. Conservation Zone-I
15. Conservation Zone-II
16. Water Body

III Special Zone

A. Green Park

B. Industrial Park

C. Sewage Treatment Plant

Risk Area

(Flood prone area overlay)

Details regarding the nature of uses '**permitted**' and uses '**restricted**' in each zone are given in the following table below. These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the Master Plan.

3. **Uses 'permitted'** in a zone cover the uses that can be normally accommodated in the relevant zone. Such uses may be permitted by the Secretary, Kannur Municipal Corporation (hereinafter referred to as Secretary). In some cases, it may be possible to permit some other uses also, which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually examined based on their performance characteristics and special locational factors. Such cases which come under this category are classified as "Uses Restricted".

   a) **Uses Restricted - 1** Category deals with the restricted uses that may be permitted by the Secretary with the concurrence of the Town Planner of the Local Self Government Department (Planning), Kannur having jurisdiction over the area (hereinafter referred to as Town Planner).

   b) **Uses Restricted - 2** Category deals with the restricted uses that may be permitted by the Secretary with the concurrence of the Chief Town Planner concerned of the Local Self Government Department (Planning).

4. **'Uses Prohibited'** are various objectionable uses in each zone which shall not be permitted under normal circumstances. All uses which do not come under 'Uses Permitted' or 'Uses Restricted' shall be considered as 'Uses prohibited'.

5. Any use not specified either in the 'uses permitted' or 'uses restricted' category of a particular use zone but which is of a similar nature to any use 'permitted' or 'restricted' in that particular use zone, may be permitted by the Secretary with the concurrence of the Town Planner.

6. In order to conserve the heritage character of Arakkal Kettu area, with due regard to the historical significance and architectural character of the area, it is zoned as Heritage Zone with relevant regulations.

7. Zoning regulations are not intended to prohibit existing uses that have been lawfully established prior to the enforcement of these regulations, unless otherwise specifically mentioned in this Master Plan. Zoning Regulations are essentially intended to help the competent authority in taking decision regarding granting or refusal of permits for land development and construction of buildings/structures.

8. If any portion of a zone is put to a "Use Prohibited" as stated in Para 4, before coming into operation of this Master Plan, such use shall be termed as non-conforming use. A non-conforming use may be allowed to continue in its existing location and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary. The total built up area of such non-conforming use shall not exceed 1.5 times the existing built up area.

9. Existing areas and structures of archaeological importance and religious uses may be permitted to continue in all the zones and shall be treated as permitted uses.

10. Subjected to zoning regulations of the respective use zones, more than one use may be combined in a building/plot, provided that the area of individual uses shall be limited to that prescribed for each such use in the zoning regulation for the respective zone.

11. All future developments shall also be in conformity with the provisions of Kerala Municipality Building Rules (KMBR), unless otherwise specified in these regulations or in any Detailed Town Planning Scheme in force.

12. Provisions under the Kerala Conservation of Paddy Land and Wet Land Act, 2008, Disaster Management Act, Archaeological Sites and Remains Act, Coastal Zone Regulations, Aircraft Act 1934, Environment Protection Act 1986, and any other applicable statutes as amended from time to time will prevail over the respective provisions of this Master Plan.

13. Silence Zone, as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000 as amended from time to time, shall be applicable to such areas under this Master Plan.

14. Regulation of constructions and land developments on the sides of new road/roads proposed for widening as per the scheme shall be governed by the distance from the centre line of the road, unless otherwise specified in the Master Plan or Detailed Town Planning Scheme in force or any Detailed Road Alignment approved by the Government. If widening on one side of any stretch of the road is constrained due to the physical barriers of water body zone, railway land, protected archaeological monuments/sites then the road widening in that stretch shall be accounted from the other side. In the case of constructions for which building permits have been obtained prior to coming into force of this Master Plan; a deviation up to 10% of total built-up area but limited to 100 m^2 , may be permitted by the Secretary irrespective of the

road widening line provided the completed construction is otherwise in accordance with KMBR.

15. No person shall construct any building or structure in lands coming under road widening proposal other than a compound wall or bridge, path or similar constructions used solely for entering in to the building. The owner shall have no right to claim compensation if the above said constructions are required to be demolished at the time of road widening.

16. In the event of change in alignment of roads included in the road widening proposals in the Master Plan and road widening/development proposals under Kannur City Road Improvement Project by Kerala Road Fund Board (KRFB), after the commencement of land acquisition of such alignment, during its implementation by the implementing agency, the land use of the land parcels in stretches excluded from the original alignment shall be permitted to be changed to adjacent land use zone by the Secretary.

17. Operational constructions as defined in the Kerala Town & Country Planning Act 2016 shall be treated as permitted uses in the Master Plan Area.

18. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required on any of the provisions of the Master Plan in consultation with the Chief Town Planner concerned.

19. Expansion / Modification of existing Public and Semi Public Institutions, Hospitals and Educational institutions and their incidental uses to adjacent plots shall be treated as permitted use irrespective of the zoning regulations proposed in such plots, except in Heritage Zone and Conservation Zone-II, subject to Kerala Conservation of Paddy Land and Wet Land Act, 2008, Coastal Regulation Zone notifications , and any other applicable statutes.

20. Uses Permitted / Uses Restricted in Residential Mix Zone, Commercial Zone, Public & Semi-Public Zone shall be permitted by the Secretary, if not allowable otherwise as per the zoning regulations applicable, on both sides of the following roads (as per Master Plan for Kannur Municipal Corporation) in Residential Zone, Residential Mix Zone, Beach Tourism Promotion Zone, River-Front Tourism Promotion Zone and Dry Agriculture Zone in land up to a depth shown against each road in the table given below; provided that in the case of Uses Restricted , Secretary shall give permission only after obtaining concurrence from Town Planner / Chief Town Planner as the case may be.

If a plot extends beyond the above said boundary, the uses as additionally permitted or restricted as above may be made applicable for the entire plot, if so required by the applicant.

Sl. No	Name of Road	Depth
1	National Highway	250 m
2	State Highway	250 m
3	All roads having an existing or proposed width of 14 m or above	250 m
4	All roads having an existing or proposed width of 10 m or above	100 m

21. Disaster mitigation projects by competent authorities shall be permitted in all zones.

22. Transmission/telecommunication towers, wireless stations, Electric Vehicle Charging Stations, ATMs, water tanks, and public utility buildings/structures shall be treated as permitted uses in all zones except in Conservation Zone-II and Water Body Zone.

23. Projects of Central/State Government, Local Self Government Institutions, Public Sector Undertakings and other Government Institutions may be permitted with the concurrence of the Town Planner in all zones except Heritage zone and Conservation Zone-II, if such uses are not included in the permitted uses or restricted uses as per the zoning regulations applicable.

24. No building construction other than compound wall, shall be allowed up to a certain width on the landward side of the following water bodies:

Sl. No	Name of Water body	Distance from water body up to which no construction is allowed
1	Rivers - Kattampally River, Kakkad River	3 m
2	Kanampuzha and Tributaries, Thottadapuzha, Edakkad puzha (Ayyarath Puzha) and Tributaries	2 m or width of stream whichever is less
3	Padanna Thodu and its Tributaries, Andathodu, Ammayi Thodu, Neerchal	2 m or width of stream whichever is less

25. In case of uncertainty in identifying the alignment and boundary of thodu, canal, river, existing public road, railway line and in the absence of survey boundaries for the same in the Proposed Land Use Maps, it shall be referred to the actual position on ground as well as revenue records and decision taken by the Secretary in this regard shall be final.

26. Minor shift in cadastral overlay with respect to land use and road network layers if observed while examining Proposed Land Use Maps and Proposed Road Network Map, shall be duly considered, during enforcement. Wherever necessary, site inspections and verification of revenue particulars shall be resorted to.

27. If different land use zones fall within a single plot, all uses permitted as per zoning regulations of such land use zones may be permitted by the Secretary in the plot. If application submitted includes any of the restricted uses and not included in such permitted uses, the Secretary shall issue permit with the concurrence of the Town Planner/Chief Town Planner, as the case may be. However, for the part of the plot which comes under Water Body zone, Conservation Zone-I, Conservation Zone-II, Heritage Zone, Special Zone, and Recreational Open Space Zone this provision shall not be applicable.

28. For all roads with widening proposals, the mandatory open yards required as per KMBR, shall be given from the widening line of these roads. However, in cases where such open yard from proposed widening line, is not available, Secretary may still consider further extension or addition to existing authorized single family residential buildings, without change in occupancy, provided the extension or addition is otherwise in accordance with KMBR; subject to the condition that aforementioned extension or addition does not affect the road widening line and maintains the present building line of the existing building.

29. All constructions in plot area exceeding 0.50 Hectare shall be supplemented with landscape plan ensuring 10% of green cover, and this shall be left unpaved.

30. Every building should be provided with appropriate technique such as pipe composting/biogas plants/vermi composting, etc. for processing organic waste at source itself. Proper drawings should be supplemented with the building permit applications.

31. Fisheries related activities/uses are permitted in areas within a distance of 500 m from High Tide Line of Sea irrespective of other zoning regulations and subject to satisfying the provisions of CRZ Notification and other rules in force except at Special Zone and Heritage Zone.

32. Only the existing areas under Public and Semi Public Uses and Industrial Uses are intended to be included under Public and Semi Public zone and Industrial Use zone respectively. If any private land put under uses other than those permitted or restricted in the above zones has got included within such zones, permitted or restricted uses of any of the adjacent land use zone in the Proposed Land Use map, and related regulations shall be made applicable to that land by the Secretary after due verification of ownership documents.

33. If public activity or industrial activity ceases or does not exist in a private land, permitted/restricted uses in any of the adjacent land use zone and related regulations shall be made applicable to that land, subject to the condition that Secretary has to ensure that there are no records available with Kannur Corporation regarding any proposal for acquiring that particular land for any public use or industrial use at the time of application for building construction or land development.

34. In the event of change in alignment of inland navigation canal in the Master Plan, after the commencement of land acquisition of the new alignment, Secretary shall permit the change of land use of land parcels in stretches excluded from the original alignment to adjacent land use zone.

33.2 Guidelines for Large Scale Projects

Large scale development projects in an area 1 Hectare or more, exceeding an investment of ₹ 100 Crores, which provide direct employment (after commissioning of the project) to the tune of not less than 500 may be permitted in Built-up zone (except Heritage Zone) and Dry Agriculture Zone if not included in the permitted uses or restricted uses as per zoning regulation applicable. In such cases, the recommendation of a committee with constitution as below shall be obtained, subject to satisfying the procedures laid out here under and the Secretary shall comply the same while issuing permit.

Also, adequate provision shall be made for supporting infrastructure such as water supply, sewerage, solid waste management, power supply etc. Separate systems for management of solid waste and sewage shall be provided and maintained by the developer at his cost. The project shall be completed within a period of 5 years or as suggested by the Committee.

Procedure to be followed

a) The developer shall submit the project report, detailing the demand, feasibility and Environment Impact Assessment aspect of the project, together with the approval, if necessary, obtained from the Ministry of Environment and Forests, Government of India to the Convener of the committee and the Convener shall make all arrangements for convening meeting of the committee at the earliest and the committee shall make all arrangements for convening meeting of the committee at the earliest and the committee shall consider and dispose of the project report within a period of one month from the date of receipt of the same.

b) The constitution of the committee shall be as given under:

Additional Chief Secretary/ Principal Secretary/ Secretary, Local Self Government Department (as the case may be)	-	Chairperson
Director, Local Self Government Department (Urban)	-	Member
Chief Town Planner Local Self Government Department (Planning)	-	Convenor
The District officer of the LSGD (Planning) having jurisdiction over the district concerned	-	Member
Secretary(s) of Local Self Government(s) concerned	-	Member(s)

c) The Convener shall fix the venue, date and time of the meeting in consultation with chairperson and shall be responsible for safe custody of records and communications thereof.

d) The meeting shall be presided over by the Chairperson or in his absence by a member authorised by him.

e) The quorum of the meeting shall be majority of the total number of members of the committee for the project.

f) The developer shall also produce before the committee, all required clearances from the State and Central Government agencies concerned.

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
A. BUILT-UP ZONE			
1 RESIDENTIAL ZONE			
1.1	All residential buildings including flats/ apartments, Residential Quarters, Lodges, Night Shelters, Hostels, Boarding Houses, Guest Houses, Home stays, Resorts, Orphanages, Old Age Homes, Religious Institutions	Places of Worship. Cremation Ground, Burial Ground/ Common Vault, Crematorium,	Multiplex Complex
1.2	Commercial establishments, Shops, IT/ Software Units, Commercial Offices, Professional Offices, Banks & other Financial Institutions, Restaurants, Canteen, Hotels, non-hazardous material Godowns/Warehouses - **All uses with total floor area of building/ buildings limited to 2500 m^2**	LPG distribution centres (excluding bottling plants and bulk storage)	
1.3	Cottage Industries including coir, Service Industries of non-obnoxious and non-nuisance nature (See Annexure-I).	Solid Waste Management units, Sewage/Septage Treatment Plant	
1.4	Automobile workshops for two/ three wheelers – Total floor area limited to 500 m^2.	Fuel filling stations	
1.5	Hospitals, Clinics and Health Care Institutions with total floor area limited to 1500 m^2	Hospitals and Health Care Institutions with total floor area above 1500 m^2 provided that the access road has an existing width (ROW) of 8 m minimum	

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
1.6	Public Utility areas and Public Utility Buildings, Community facilities such as Community Halls, Recreational Clubs, Social Welfare Centres, Gymnasium/Yoga Centres, Health Clubs, Swimming Pools, Beauty Parlours, Arts and Cultural Centres, Internet Cafes, Libraries, reading rooms etc.		
1.7	Plant Nurseries, Pump House, Dairy farms Poultry farms, Kennels, Livestock Farms, Fish farm and seed farm.		
1.8	Utility Installations and Civic Amenities essentially serving the needs of residential community such as post office, police station, telephone exchange, fire station, tot lots, parks, play grounds, water treatment plants, and electric substations.		
1.9	Wells and Irrigation Ponds incidental to community needs.		
1.10	Taxi/Jeep/Auto rickshaw stands, Parking Buildings and Parking Plazas		
1.11	All educational buildings, Day Care Centres, Crèche, Nursery Schools and Kindergartens		
1.12	Turf Courts, Open Air Theatre, Indoor and Outdoor Courts, Stadium		
1.13	Convention Centres/ Auditorium/ Wedding Halls/Movie Halls/ Community Halls/ Exhibition Centres, Museum and Art Gallery—Total Floor area up to 1500 **m^2**	Convention Centres/ Auditorium/ Wedding Halls/ Movie Halls/ Community Halls/ Exhibition Centres, Museum and Art Gallery, IT/ITES Parks – Total Floor area above 1500 m^2 provided that the access road has an existing width (ROW) of 8 m minimum	

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
2 COMMERCIAL ZONE			
2.1	All Commercial Establishments / Buildings, Shops, Malls, Shopping Complexes, Restaurants, Markets, Hotels, Office Buildings, IT/ Software units, Banking and Financial institutions, Commercial Offices, Professional Offices, ATMs .	Fuel filling stations	Multiplex Complex
2.2	Residential Buildings, Residential flats/ apartments/quarters, Hostels and Boarding Houses, Night Shelter, Orphanages, Old Age Homes, Care Homes, Guest Houses , Lodges, Home Stay, Serviced Villas, Resorts, Religious Institutions, Places of Worship	LPG bottling plants and bulk storage	
2.3	Cottage industries, automobile workshops, automobile service stations, cold storage, Service industries of non-nuisance nature (See Annexure-I), saw mills, weigh bridges, printing press, IT hardware / electronic industries, marble and granite storage / cutting centres	Solid waste management units, Water Treatment Plant/ Sewage/ Septage Treatment Plant	
2.4	Godowns/ Warehouses/ Storage/Stacking Yards for storage of Non-hazardous materials, LPG distribution centres		
2.5	All assembly buildings, Social Welfare Centres, Libraries and Reading Rooms, exhibition centres, art gallery, museum, auditorium, convention centres , Public Utility areas and Public Utility Buildings		
2.6	All educational buildings ,Day care, Crèche, Nursery/ Kindergarten.		
2.7	Swimming Pools, Tot lots/Parks/ Playgrounds, Fair grounds, Open Air theatre, Gymnasium, Yoga centre, Health Club, Indoor and Outdoor courts, Stadium, Turf Courts , Recreational Facilities.		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
2.8	Hospitals, Clinics, Diagnostic Centres.		
2.9	Parking plaza, multi-level parking units, parking lots, parking grounds, pay parking units, Transport terminals, bus stand, lorry terminals and all vehicle stands.		
2.10	Plant Nursery, Storage of Agricultural Produces and Seeds, Pump House, Wells and Irrigation Ponds.		
2.11	Dairy Farm/Poultry Farm/Piggery Farm/ Livestock Farms, Fish Farms, Seed Farms, Aquaculture.		
3 RESIDENTIAL MIX ZONE			
3.1	All uses that are permitted in Residential Zone.	All restricted-1 uses allowed in Residential Zone.	Multiplex Complex
3.2	Shops, Malls, Shopping Complexes, Professional Offices, Commercial Offices/ Establishments, IT/ Software units, Banking and Financial institutions, Restaurants/ Canteens, Hotels	IT/ ITES parks	
3.3	Service Industries of non-obnoxious and non-nuisance nature (See Annexure I), LPG distribution centres , Automobile workshops/ Automobile Service stations, Storage/ Godown/Warehouse of Non-hazardous materials	Fuel filling stations, , LPG bottling plants and bulk storage	
3.4	Recreational Parks, Fair Grounds, Open Air Theatre, Open Grounds, Walk Ways, Cycling Tracks, Swimming Pool, Tot Lots, Parking Grounds, Gymnasium, Yoga centre, Health club, Indoor courts.	Solid waste management units, Water Treatment Plant/ Sewage/ Septage Treatment Plant	
3.5	All Hospitals & Health Care Institutions		
3.6	All Assembly Buildings		
3.7	All Educational Buildings		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
4 MULTI FUNCTION ZONE			
4.1	All uses permitted in Commercial Zone, Public and semi-public Zone, Residential Mix Zone, Traffic and Transportation Zone, Recreational Open Space Zone, Recreational Built-up Zone	All uses restricted-1 in Commercial Zone, Public and semi-public Zone, Residential Mix Zone, Traffic and Transportation Zone, Recreational Open Space Zone, Recreational Built-up Zone if not otherwise included in the Uses Permitted	Multiplex Complex
5 PUBLIC AND SEMI PUBLIC ZONE			
5.1	Local/State/Central Government/Public Sector Offices, Other Related Public Buildings and Buildings for Public Purpose, Public Utility Areas and Buildings, All Office and Assembly Buildings, Educational Buildings, Banking and Financial Institutions, Commercial Buildings, Comfort Stations, ATM, Religious Buildings, Places of worship, Hospitals, Health Care Institutions, Irrigation projects and incidental activities.	Solid waste management units, Water Treatment Plant, Sewage/ Septage Treatment Plant	Multiplex Complex
5.2	Residential uses incidental to Public and Semi-public use like Residential Quarters and inspection bungalows/ guest houses, Residential Quarters, Hostels and Boarding Houses, Night Shelters, Orphanages/Old Age Homes/Guest houses /Lodges.	Cremation Ground, Burial Ground/ Common Vault, Crematorium	
5.3	Indoor and Outdoor Courts/Stadiums, Parks, Fair grounds, Play grounds, recreational activities, Turf courts	Fuel filling stations	
5.4	Parking buildings, parking units, all vehicle stands, Non-motorised transportation facilities		
5.5	Godowns/Warehouse, storage of non-hazardous materials, Industries listed in Annexure-I, Other incidental uses supplementing the main use		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
6 INDUSTRIAL ZONE			
6.1	All non-obnoxious and non-nuisance type industries listed in Annexure I, Automobile Workshops & Automobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish and Meat Processing Units, Printing Press, Water Treatment Plants, Marble and Granite Storage and Cutting Centres, Industrial Estates & Industrial Parks, IT/ITES software units	Obnoxious and nuisance type Industries listed in Annexure-II LPG distribution centres , LPG bottling plants and bulk storage	
6.2	Godowns/Warehouses/Storage of non-hazardous material, stacking yards, weigh bridge.	Storage of Explosives & Fire Works, Gas Godowns, Crusher Units	
6.3	Dairy and Dairy Farms, Dairy related Industries, Poultry Farms, Piggery Farm, Smoke House.	Fuel Filling Stations	
6.4	Government or Public Sector Offices, Public Utility Areas & Public Purpose Buildings.	Solid waste management units, Slaughter House	
6.5	Residential use incidental to industrial use, Any other activity essentially incidental to Industrial use	Container Terminals with access width of 18 m minimum	
6.6	Commercial Buildings incidental to Industrial Use with floor area up to 500 m^2	Cremation Ground, Crematorium, Burial Ground, Common Vault	
6.7	Transport Stations incidental to industrial use.		
6.8	Sewage Treatment Plants, Dry Cleaning Plants, Power Plants, Sub-stations.		
6.9	Tot lots/Parks/Play grounds, Turfs, Open Air Theatre, Swimming pool, other recreational facilities.		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
7 TRAFFIC AND TRANSPORTATION ZONE			
7.1	Transport terminals including constructions that form an integral or essential part of the terminal.	Public buildings/ Government (Local/ State/ Central) or Public Sector Offices, Buildings for public purposes, Public Utility Areas and Buildings	Multiplex Complex
7.2	Any remunerating uses attached to the transport terminals as value capture mechanism such as Commercial Buildings , Malls, Retail Shops, Hotels, Restaurants, Canteens, Convention Halls, Movie Halls, Lodges and Dormitories etc.	Fuel Filling Stations	
7.3	Roads, Parking yards, Parking plazas, Facilities for motorised and non-motorised transportation.		
7.4	Weigh Bridge, Automobile Service Station / Workshop		
7.5	Tourism facilitation centres, Staff Quarters, Offices, Night Shelters, Guest Houses etc. incidental to the transport terminals		
8 RECREATIONAL BUILT UP ZONE			
8.1	Amusement park, Clubs, Gymnasium, Stadium, Swimming Pools. Indoor stadium, Turf courts, Amphitheatre, Convention centres, Movie Halls, Tourism facilitation and allied centres.		
8.2	Any remunerating uses attached to the recreational built-up zone as value capture mechanism such as Commercial Buildings, Retail Shops, Restaurants, Canteen, etc.		
9 HERITAGE ZONE			
	As per provisions of Section 91, sub-section (3), clause (iv) of the Kerala Town and Country Planning Act 2016, the regulations detailed hereinafter shall apply to conserve the character of the following heritage area/buildings with due regard to the historical significance and architectural character of the area.		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
	Heritage Zone consists of Arakkal Kettu (Arakkal Museum) and buildings situated along the sides of Ayikkara-Kannur City Jn road segment, starting from Ayikkara Muhyidheen Juma Masjid Jn. to Isinkhanni Mosque near Kannur City Jn.		
	Notwithstanding anything contained in the zoning regulations of the Master Plan and subjected to modifications as prescribed hereunder, no development, redevelopment, construction including additions, alterations, repair, renovations, replacement of special and architectural features, demolishing of any part or whole thereof in respect of any objects in the area, coming under this zone shall be allowed except with prior written recommendation of the Kerala Art & Heritage Commission constituted by the Government under Section 86 of the Kerala Town and Country Planning Act 2016 and Rule 103 of the Kerala Municipality Building Rules 2019, in order to conserve the heritage character of the area. Provided that, no area or buildings or objects, which in the opinion of the said Commission have architectural, aesthetic, archaeological, cultural or historic value will be allowed to be altered from the existing condition without the written recommendation of the Commission. Provided also that, new constructions and additions or alterations to existing buildings may be permitted in this area with additional regulations namely:-		
	i) The Arakkal Museum which is marked as Heritage Zone is a protected monument of the Department of Archaeology. Hence all regulations under Kerala Ancient Monuments and Archaeological Sites and Remains Act 1968 are applicable in the area.		
	ii) The façade of the proposed constructions and street character shall be in harmony with the architectural character of the Heritage Zone and as per the advice of the Commission.		
	iii) A height restriction of 10 m shall be imposed for all proposed construction in the Heritage Zone and in the adjoining plots along Ayikkara-Kannur City Jn road segment (marked as **Heritage Street** in Proposed Land Use Map).		
	iv) Provided further that, the use or reuse of any site or building shall be as per the recommendations of the Commission.		
	v) The Art & Heritage Commission, if found necessary ,may entrust the above regulatory aspects to a Committee/Subcommittee constituted for the purpose by the Commission. Concurrence shall be allowed by this Committee/Subcommittee , subject to the provisions and regulations of this Master Plan. Changes if any required in the above regulations shall be permitted by the Commission on receipt of the recommendation of the Committee/Subcommittee.		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
10 BEACH TOURISM PROMOTION ZONE			
10.1	All uses that are permitted in Residential Mix Zone.	All Restricted-1 uses allowed in Residential Mix Zone	Multiplex Complex
10.2	Tourist information centres, Tourism facilitation centres, Tourist homes, Resorts, Ayurvedic resorts, Dormitories, Home stays, Boarding houses, Lodges	Fuel Filling Stations	
10.3	Restaurants, Canteens, Hotels, Bakeries, Shops, Shopping malls, Emporiums, Commercial Establishments, Professional and Commercial offices, Exhibition halls, Wedding halls, Auditoriums, Convention centres, Movie Halls, Museums	Ice plants	
10.4	Amusement Parks, Zoological and Botanical Gardens/ Bird Sanctuary, Watch Tower, Camping Site, Swimming Pools, Stadium, Library and Reading rooms, Plant Nursery, Pump house, Wells and Irrigation Ponds, Agriculture, Animal husbandry and Horticulture including incidental uses such as cattle shed, Fodder cultivation, Pastures, Grazing grounds, Fish Farms, Seed Farms, Storage of Agricultural products and seeds		
10.5	Parks/Playground, fair grounds, Public buildings/ Government (Local/ State/ Central) or Public Sector Offices, Buildings for public purposes, Public utility areas and Public utility buildings, Turf courts, Parking Lots, Parking yards, Parking Buildings, Vehicle stands and stations.		
10.6	Fish Markets, Fish and marine food processing units, fish fertilizer units, Net mending yards and sheds, All incidental uses related to fishing		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
11 RIVER-FRONT TOURISM PROMOTION ZONE			
11.1	All uses that are permitted in Residential Zone.	All Restricted-1 uses allowed in Residential Zone	
11.2	Commercial Establishments, Restaurants, Canteens, Hotels, Bakeries, Food stalls, Food streets, Shops, Shopping malls, Emporiums, Professional and Commercial offices, Banking and Financial Institutions, Exhibition Halls, Wedding Halls, Auditoriums, Convention Centres - All uses with Floor area limited to 4000 m^2	Fuel Filling Stations	
11.3	Tourist information centres, Tourism facilitation centres, Tourist homes, Resorts, Ayurvedic resorts, Dormitories, Home stays, Boarding houses, Lodges	Ice plants	
11.4	Amusement Parks, Zoological and Botanical Gardens/ Bird Sanctuary, Watch Tower, Camping Site, Swimming Pools, Stadium, Library and Reading rooms, Plant Nursery, Pump house, Wells and Irrigation Ponds, Agriculture, Animal husbandry and Horticulture including incidental uses such as cattle shed, Fodder cultivation, Pastures, Grazing grounds, Fish Farms, Seed Farms, Storage of Agricultural products and seeds		
11.5	Parks/Playground, fair grounds, Public buildings/ Government (Local/ State/ Central) or Public Sector Offices, Buildings for public purposes, Public utility areas and Public utility buildings, Turf courts, Parking Lots, Parking yards, Parking Buildings, Vehicle stands and stations.		
11.6	Fish Markets, Fish processing units, Net mending yards and sheds, Other incidental uses related to fishing		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
B. GREEN-BLUE ZONE			
12 RECREATIONAL OPEN SPACE ZONE			
12.1	Any construction/land development essential for the development/ improvement of open air recreational facilities.		
12.2	Watch Towers, Walk Ways (Preferentially eco-friendly walkways), Water Sports Facilities, Amphitheatre, Fair Grounds etc. and similar uses		
12.3	Public Utility Areas and Buildings which will not affect the character/use of the area.		
12.4	Tot Lots, Park, Play Grounds, Turf Courts, Open Air Stadium/Courts, Open Air Theatre, Zoological and Botanical Garden, Bird Sanctuary, etc. and similar uses.		
12.5	Tourism facilitation and allied centres.		
12.6	Restaurants/cafeteria incidental to main use floor area limited to 200 m^2		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
13 DRY AGRICULTURE ZONE			
13.1	Agriculture, horticulture and fodder cultivation, pastures, grazing ground, and other types of cultivation including social forestry.	Cremation ground/ crematorium, burial ground, common vault.	
13.2	Dairy Farms, Fish farms, Seed farms, Poultry farms, Plant nursery, pump house, wells and irrigation ponds.	Slaughter house.	
13.3	Residential Buildings, Home Stays, Farm Houses, Lodges, Hotels, Resorts Library and Reading Rooms, Gymnasium, Yoga Centres and other Recreational Activities.	Industries listed in Annexure-II	
13.4	Orphanages, Old Age Homes, Places of Worship and Religious Buildings Educational Buildings, Day Care Centres and Crèche, Public Utility areas and Public Utility Buildings Tot Lots, Parks, Playgrounds, Turf Courts	Storage of explosive and fireworks, gas, godowns , dumping yard, ready mix concrete plants , Fuel Filling Stations	
13.5	Shops, professional offices, commercial offices and establishments, banking and financial institutions, Gymnasium, Yoga Centres, restaurants, canteens– All uses with total floor area of building limited to 1000 m^2	Isolation Hospital	
13.6	Hospitals and Health Care Institutions with total floor area limited to 1500 m^2 Auditorium/Wedding Halls/Community Halls with total floor area limited to 1500m^2 Stacking yards, Godowns/Warehouses/ Storage - non-hazardous materials	Hospitals and Health Care Institutions with total floor area above 1500 m^2 provided that the access road has an existing width (ROW) of 8 m minimum	
13.7	Agro-based industries, Cottage industries, non-obnoxious and non- nuisance type industries (See Annexure I), Automobile workshops for 2/3 Wheelers, Saw Mills, Weigh Bridge		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
14 CONSERVATION ZONE-I			
All constructions in Conservation Zone– I shall be in accordance with Kerala Conservation of Paddy and Wetland Act, 2008 and subsequent amendments.			
14.1	If a paddy land or wetland gets duly converted as per the provisions of Kerala of Paddy and Wetland Act, 2008; those uses for which the permission for change of nature of land is granted, shall be permissible in that land.		
14.2	If a plot included in the Conservation Zone-I as per Proposed Land Use Map is not included as Paddy Land or Wet Land in existing Land Revenue records ; permitted/ restricted uses of any land use zone adjacent to Conservation Zone-I shall be applicable to that plot also.		
14.3	Paddy cultivation, Agriculture/ Horticulture/ Fodder cultivation, Aquaculture/ Pastures/ Grazing grounds, Fish Farms/ Seed Farms/ Pump House (up to 10 m^2) / Wells and Irrigation Ponds		
14.4	Minor Public Utility area & Public utility buildings which will not affect the character of the area.		
14.5	Boat jetties, bridges, retaining walls, Bird Sanctuaries, fish landing centres, water landings, Bathing Ghats, fish farms and protective works, water sports.		
14.6	All amenities and constructions requirement for projects for inland navigation, irrigation, water supply, electricity and other utilities of Government, Local Self- Government and other Government Institutions		
14.7	All amenities and constructions related to Eco-tourism, Warehouses and godowns for storage of Agricultural Commodities, Farm houses, Poultry Farms/Dairy Farms		

Sl. No.	Uses Permitted	Uses Restricted -1	Uses Restricted -2
15 CONSERVATION ZONE-II			
15.1	Mangrove afforestation, plantation of new seedlings of suitable mangrove variety, Bird Sanctuaries		
15.2	Any Constructions/ land developments strictly in conformity with the Coastal Regulation Zone Notification in force.		
16 WATER BODY			
16.1	Boat jetties, bridges, retaining walls, embankments, Bird Sanctuaries, fish landing centres, water landings, pump houses, Bathing Ghats, fish farms, aquaculture and protective works, water sports River protection works		
16.2	All amenities and constructions requirement for projects for inland navigation, irrigation, water supply, electricity and other utilities of Government, Local Self- Government and other Government Institutions		
16.3	All amenities and constructions related to Eco-tourism		

C. SPECIAL ZONE

The land specially demarcated for certain projects as Special Zone such as Green Park, Industrial Park and Sewage Treatment Plant has to be procured as per the provisions of the Kerala Town & Country Planning Act 2016, by Kannur Municipal Corporation or other agencies concerned. If the proceedings to procure such land have not been initiated within 5 years from the date of sanctioning of this Master Plan, the areas so specifically demarcated may be released and assigned to a use permitted/restricted in any of the adjacent land use zones in the Proposed Land Use Map by the Secretary with the concurrence of the Town Planner based on the application for building permit received.

A	**Special Zone A - Green Park at Thottada (Area: 5.40 Ha)**
	Resurvey numbers 14 (P), 28(P), 29 (P) at Thottada Desom and 53 (P) at Kannur Karar Desom of Edakkad Village. All permitted and restricted uses as mentioned in Recreational Open Space Zone are allowed here. Any remunerative uses attached to the green park as value capture mechanism such as retail shops, restaurants, canteen, jogging tracks, exhibition halls, open air theatre, artesian emporium, tourism facilitation centres, indoor swimming pools, comfort station etc.
B	**Special Zone B- Industrial Park at Pallipoyil (Area: 10.70 Ha)**
	Resurvey numbers 64 (P) at Kappad Desom and 92, 93 at Macheri Desom of Chelora Village All permitted and restricted uses as mentioned in Industrial Zone are allowed here. Industrial units, IT/ ITES/ Software/ Hardware units, engineering industries, service industries etc. are permitted. Green belt for industrial area wherever essential, as instructed by related agencies like Pollution Control Board.
C	**Special Zone C - Sewage Treatment Plant at Neerchal (Area: 0.10 Ha)**
	Resurvey Numbers 1144(P) at Block 15, Revenue Ward 5, of Kannur-1 Village. Sewage Treatment Plant and its incidental uses along with beautification works like gardening etc.

RISK AREA	
	The areas within the Municipal Corporation falling in different zones identified as vulnerable to flood disaster are demarcated as Risk Area and overlaid above the respective land use zones.
	The flood-prone areas like Kakkad, Edachery vayal, Shaduli kadavu, Athazhakkunnu, Athirakam, Pulluppi kadavu, Varam kadavu, Purathiyil etc. where flood water from Kattampally River enters, the low lying areas near Kappadvayal, Thazhe Chovva, Kuruva, Maidanappally, etc. on the banks of Kanampuzha, flood banks of Edakkad river, low lying areas around Padannathodu etc. are included in Risk area.
	Uses Permitted
	Uses permitted/uses restricted in the respective land use zone lying under the risk area will be allowed in the risk area subjected to built-form regulations given below.
	Built form regulations
	All new houses shall have at least one bedroom, one toilet in upper floor. It shall also have open balcony or open terrace or open passage in upper floor or an open staircase connecting the upper floors to the ground.
	Floor levels of all buildings shall be at a height of minimum 1 meter above the existing ground level or on stilts of height minimum 1 meter from existing ground level. Non-habitable uses like parking, turfs, accessory sheds, outdoor toilets, storage place for wooden logs etc. may be permitted below this height.
	Height of compound wall shall not exceed 1.50 m and no sharp edged projections shall be fixed on the compound walls.
	All electrical plugs, switch board, light points etc. shall be installed only above 1.20 m from floor level in ground floor.
	50% of setback/yard area should be kept unpaved.

ANNEXURE 1

Type of non - obnoxious and non-nuisance type of service or light industries permissible in residential zone

1. Production of copra
2. Processing of areca nut
3. Rice and Flour Mills.
4. Production of rice, flour etc., by hand pounding.
5. Processing of Cardamom, ginger, pepper etc.
6. Production of Khandsari from sugar-cane
7. Carrying and preservation of fruits and production of jam, jelly etc.
8. Processing and preservation of cashew nuts.
9. Bakeries.
10. Production of Dairy Products.
11. Oil mills (vegetables)
12. Extraction of oil by ghani.
13. Manufacture of hydrogenated oil.
14. Manufacture of “aval” (Beaten rice) appalam.
15. Production of vinegar.
16. Manufacture of soda, water, lemonade etc.
17. Manufacture of Ice.
18. Manufacture of ice cream.
19. Processing, packing and distribution of tea.
20. Processing, grinding, packing and distribution of coffee.
21. Manufacture of syrup.

22. Manufacture of beedi.
23. Manufacture of Cigar.
24. Manufacture of tobacco snuff.
25. Manufacture of chewing tobacco.
26. Cotton ginning, clearing, pressing etc.
27. Cotton spinning other than in Mills
28. Cotton spinning and weaving in Mills.
29. Cotton weaving in handloom.
30. Cotton weaving in power looms.
31. Handloom weaving.
32. Khadi Weaving in Handloom.
33. Printing of cotton textiles.
34. Manufacture of Cotton thread, rope twine etc.
35. Jute spinning.
36. Manufacture of jute products including repairing of gunny bags.
37. Weaving of silk by Handloom.
38. Manufacture of hosiery goods.
39. Making of embroidery products
40. Tailoring
41. Manufacture of quilts and mattresses.
42. Manufacture of Coir and Coir Products.
43. Manufacture and assembling of umbrellas and production of spare parts of umbrellas.
44. Repairing of umbrellas.
45. Manufacture of wooden furniture and fixtures.

46. Manufacture of structural wooden goods such as doors, beams etc.

47. Manufacture of wooden industrial goods such as parts of handloom ambarcharka, bobbers etc.

48. Manufacture of wooden utensils, photo frames, toys, etc., and photo framing.

49. Cane industry including baskets, weaving etc.

50. Manufacture of miscellaneous wooden articles such as sticks, sandals, rules etc.

51. Manufacture of paperboard and paper hand.

52. Making of paper boxes, bags, envelopes, etc.

53. Printing and publishing of newspapers and periodicals.

54. Printing and publishing of books.

55. Miscellaneous printing works including type cutting, book binding.

56. Manufacture and repairing of leather shoes and chappals.

57. Manufacture of leather products such as suitcase, bag, etc.

58. Vulcanizing and repairing of tyres and tubes.

59. Manufacture of rubber gloves.

60. Manufacture of Rubber products such as rubber sheets, nipples and rubber shoes including smoke-rubber.

61. Manufacture of pharmaceuticals, chemicals, Ayurvedic medicine, etc.

62. Manufacture of agarbathi and other cosmetics.

63. Manufacture of plastic products such as nameplates, etc.

64. Manufacture of lemongrass oil, candles, etc.

65. Manufacture of cement products such as well-keros, tube, closets, etc.

66. Manufacture of structural stone goods, stone crushing, stone carving, stone dressing, marble carving, etc.

67. Manufacture of stone wares.

68. Manufacture of stone images.

69. Manufacture of chinaware's and crockery.

70. Manufacture of large containers and chinaware.

71. Manufacture of glass and glass products.

72. Manufacture of clay models.

73. Manufacture of iron and steel furniture.

74. Manufacture and repairing of brass and bell metal products.

75. Manufacture of aluminium utensils and other products.

76. Manufacture of tin cars and copper vessels.

77. Electroplating, tinplating, welding, etc.

78. Manufacture of agricultural implements, screws, etc. (blacksmith and foundry)

79. Manufacturing, assembling and repairing of machinery such as water pumps, oil mill chuck, etc.

80. Manufacture of small machine tools and machine parts.

81. Manufacture of sewing machine parts and assembling and repairing of sewing machine.

82. Manufacture of electrical machinery and repairing of electric motors, armature winding, etc.

83. Manufacture and repairing of electric fans.

84. Charging and repairing of batteries.

85. Repairing of radios, microphones, etc.

86. Manufacture of electric meters, production of electric and allied products, repairing and servicing of electrical appliances.

87. Bodybuilding of motor vehicles.

88. Manufacture and repairing of motor engine parts and accessories.

89. Serving and repairing of motor vehicles.

90. Manufacture of cycles, parts and accessories.

91. Manufacture and repair of boats and barges.

92. Manufacture and repairing of animal drawn and hand drawn vehicles.

93. Repairing of photographic equipment, spectacles, etc.

94. Manufacturing of medical instruments.

95. Repairing of watches and clocks.

96. Manufacture of Jewellery.

97. Manufacture, repair and tuning of musical instruments.

98. Manufacture of sports goods, balloons, etc.

99. Ivory, carving and ivory works

100. Industries classified in to GREEN category by State/Central Government

101. Miscellaneous non-nuisance industries other than those included in Annexure 2 list.

ANNEXURE 2

List of obnoxious or nuisance industries subject to objectionable odours, fumes, effluents or processes

(Grouped under Indian Standard Industrial Classification)

I Manufacture of Food Stuff:

(1) Slaughtering, preservation of meat and fish and canning of fish.

II Manufacture of Beverages:

(2) Production of distilled spirits, wines, liquor, etc., from alcoholic malt, fruits and malts in distillery and brewery.

(3) Production of country liquor and indigenous liquor such as toddy, liquor form mahua, palm juice.

III Manufacture of Textiles:

(4) Dyeing and bleaching of cotton

IV Manufacture of Wood and Wooden Products:

(5) Sawing and planning of wood.

(6) Wood seasoning and creosoting

(7) Manufacture of veneer and plywood.

(8) Paper, pulp and straw board.

V Manufacture of Leather and Leather Products:

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

VI Manufacture of rubber, petroleum and coal products:

(10) Manufacture of tyres and tubes.

(11) Manufacture of Industrial and synthetic rubber.

(12) Reclamation of rubber.

(13) Production of petroleum, kerosene and other petroleum products in refineries.

(14)Production of chemicals and chemical products.

VII Manufacture of chemicals and chemical products:

(15) Manufacture of basic industrial chemicals such as acids, alkali and their salts not elsewhere specified (especially sulphurous, sulphuric, nitric, hydrochloric acids, etc.) ammonia, chorine and bleaching powder manufactures.

(16) Manufacture of dyes, paint, colours and varnishes, printing ink.

(17) Manufacture of fertilizers (Especially from organic materials).

(18) Manufacture of disinfectants and insecticides.

(19) Manufacture of ammunition, explosive and fireworks.

(20) Manufacture of matches.

VIII Manufacture of Non-metallic mineral products other than petroleum and coal:

(21) Manufacture of cement and cement products.

(22) Manufacture of Lime.

(23) Manufacture of Plaster of Paris.

IX Manufacture of basic metals and their products:

(24) Manufacture of iron and steel including smelting, refining, rolling and conversion into basic forms.

(25) Manufacture including smelting, refining, etc., or nonferrous metals and alloys in basic forms.

(26) Manufacture of Armaments.

X Manufacture of machinery (other than transport) and electrical equipment:

(27) Manufacture of all kinds of battery.

XI Miscellaneous items not covered above:

(28) Incineration, reduction or dumping of offal, dead animals' garbage or refuse.

(29) Manufacture of gelatine and glue.

(30) Fat, tallow, grease or lard refining of manufacture.

(31) Bone meal, bone grist and bone powder.

(32) Manufacture of cashew nut shell oil.

(33) Other similar types of nuisance industries.

ANNEXURE 3

Survey numbers included in Risk Area of Kannur Municipal Corporation

VILLAGE NAME	REVANUE WARD	BLOCK NO	TS NO
KANNUR 1 VILLAGE	4	3	105, 109, 112, 113, 114, 117, 120, 121, 123, 133
		21	921P,922P,923P,924P
	5	15	1134,1135,1136,1138,1139,1140,1141,1142,1143,1144,
	6	6	310
		7	336, 337, 391, 395, 396, 398,399, 400P, 408,409,410,411P, 413,414, 418, 420, 421, 422, 423, 424
			466, 469, 470, 471, 473, 475, 489, 490,491,492,493,494,495,496,989,990,991,993, 994,995,
		8	602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 613, 614, 616P,620,621P,625P,626P,628P
			629P,630P,631P,
		10	703P,704,705P
		11	710P, 711,712,713P,714P
		12	715P,716P,718P, 719P, 720P,721P,722P,723P,725P
		13	726P,742P,727P,728P,729,730P,731P,733P,734P
		18	859P,860P,861P,862P, 863P,864P,865P, 866P, 867P
		19	936 P, 941P, 943, 944,945P, 947P,948,949P,966,967,968,969
KANNUR 2 VILLAGE	1	1	1, 2, 3, 4, 5, 7P, 8P
		2	50, 51, 52, 55P,63P
	3	1	1, 2, 3

VILLAGE NAME	DESOM NAME	RESURVEY NO.
Pallikunnu Village	Chalad Desom	63P, 69, 70, 71,73, 74, 75,76, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87P, 88,89, 90P, 99P, 100,101,102,103P,104P
		111, 112,113, 114,157,158,159P,160P
Puzhathi Village	Puzhathi Desom	36P,37P,38,39P,40P,47P,48P,49,50,58P,59P,60P,61,62P,68P,69,70,71,72P,78P,79,80,81,82,
		83,84,98P,99P,100P,112P,133,135,138,139,140,141P,144P,145P,153P,154P,157P,159,160P,161P
		162P,165P,172P,173P,174P,175P,177P,178P,179P,180P,182P,183P,184P,185P,186P,190P
		192P,195P,196P,197,198,199,200P,201,202,203,204,205P,209P,210P,211,212,213P,214P,216P,218P
Valiyannur Village	Valiyannur Desom	20,21,22,27,28P,29P,35,36,37,38P,39P,49,50,55,63,67,68P,71P,72P,75,76P,77P,78P,80P,81,104P,106P
	Varam Desom	2P,4,5,17,18,19,20,21,22,23P,24P,25,26P,27P,31P,32P,33,39P,40,41,77,78,79,80,81,90,103P,104
		1,06,11,51,16,145
Elayavoor Viilage	Athirakam Desom	1P,11P,12,13P,14P,15,16,17P,19P,20P,21P,22P,32P,34P,35,36P,37P
	Puzhathi Desom	8,12,13,14,15,16,17,20,21,22,50,51,64
	Mundayadu Desom	55,56,57,60,61,62,63,67,68,74,75,76,77,78P,79,80P,81,82,86P,87P
	Elayavoor Desom	61, 62, 70,71,72,73,74, 88,89,90,
	Chovva 2 Desom	107P ,108P,109,110,111,112,113,
Chelora Village	Chelora Desom	45,48,49,50,51,52,69,71
	Macheri Desom	68P,69P
	Valannur Desom	5,8,9,14,15,16,17,20,21
	Kappad Desom	29,30
	Peringalayi Desom	15,19,26,29
	Thilannur Desom	1,2,4,5,6,7,8,9,11,12,13,68,77,78,79,80P,81P,82P
Edakkad Village	Kannukkara Desom	7P,8P,9P,10P,11P,12P,13P,15P,16P,17P,18P,19P,20,21,22P,23P,24P,73P,74P,75P,76P,
		77P,78P,79P,80P,81P,82,83P,84P,90P,
	Kuttikakam Desom	3P,5P,12P,16P,17P,52P,53P,54P,55,57P,62P,70P,74P,75,76,77P,78P,79P,80P
	Edakkad Desom	35,37,38,39,40,55,56


AMBALAM BEACH PARK
TPG KANNUR