

FOREWORD

Kozhikode is an early bird among the cities of Kerala, which took a proactive approach towards planned urban development, as early as in the late fifties, and prepared a Master Plan. Thereafter many statutory and non-statutory efforts towards city planning followed, and the urban area has now prepared the Masterplan for the period from 2015 to 2035.

Population results of Census 2011 reveals the increasing share of the districts of north and middle Kerala in the State's population, foretelling the greater prominence the region would enjoy in the State's future. Kozhikode, being the prime urban centre of North Kerala from ancient times, therefore, has to remain equipped to benefit from this, as well as to fruitfully perform its role in the economic and social development of the region and the State. For this, land being the most scarce and expensive resource, Kozhikode Urban Area has to formulate and implement specific scientific measures in land use planning, with a long term vision and comprehensive regional outlook, first off. Besides, provision of urban services, management of ecologically sensitive areas, disaster resilience, resource mobilization etc. are to be efficiently planned to ensure the optimal use of the limited funds at the LSGIs' disposal. The Masterplan for Kozhikode Urban Area, 2035 is an effort towards these.

I sincerely appreciate the efforts of the Town & Country Planning Department under the noteworthy guidance of Sri. Eapen Varughese, Smt. T.M. Sudha, Chief Town Planners (Rtd), Sri. K. Ramanan, Chief Town Planner, Sri. Shaji Joseph, Chief Town Planner (Planning), Smt. Darley D.S. Mony, Additional Chief Town Planners (Rtd), Sri. C.J. Poulouse, Senior Town Planners (Rtd), Sri. G. Sasikumar, Town Planner (Rtd) and Sri. K.V. Abdul Malik, Town Planner, Kozhikode, who came forward to take charge of this mammoth task and put in laudable work for the preparation of a comprehensive Masterplan for Kozhikode Urban Area, with thorough participation of the people and all the stakeholders. I am immensely grateful for the interest and involvement of the people's representatives from the region in the Parliament and Legislative Assembly, Sri. M.P. Raghavan, M.P, Dr. M.K. Muneer, M.L.A, Sri. Pradeep Kumar M.L.A and Sri. Elamaram Kareem Ex.M.L.A, Sri. K.V. Mohan Kumar, Smt. C.A. Latha and Sri. N. Prasanth, District Collectors, Honorable Ex. Mayors, Scientists, Researchers, Experts and Social Activists from the region for their valuable comments. The sincere efforts of Smt. A.K. Premajam, Ex. Mayor, in materializing and publishing the masterplan need special mention. I am obliged to the members of the Joint Planning Committee, Working Groups, Council/Panchayat Members of Kozhikode Corporation and Municipalities Feroke and Ramanattukara, Gramapanchayats of Olavanna, and Kadalundi for their commendable cooperation and effort for the preparation of this Masterplan.

With great pleasure and faith, I present the Masterplan for Kozhikode Urban Area 2015 -2035, herewith. I actively exhort to implement this Masterplan in its full spirit, which

Town and Country Planning Department, Government of Kerala

would certainly help Kozhikode to ascertain its vitality in the region and the State, in the years to come. I also use this opportunity to request the wholehearted cooperation of all the stakeholders, for the successful implementation of this plan.

Thottathil Ravindran
Chairperson, Joint Planning Committee
Mayor, Kozhikode Corporation

Kozhikode
May 2017

PREFACE

As per the 73rd and 74th Constitutional Amendment Acts and the Kerala Municipalities Act, 1994 the Local Governments have the most important role in the development of their jurisdictional area and hence the 'owner' of a Masterplan ought to be the local government. However, since the Masterplan was to be prepared in accordance with the Town Planning acts prevailing in the State, Government of Kerala entrusted the Department of Town and Country Planning to anchor and provide technical support for the preparation of the Masterplan and ordered preparation/revision of development plans for 32 urban areas in the state including Kozhikode, vide G.O.(Rt).No. 3982/2008 dated 13.11.2008. Accordingly, the steps for the revision of the Masterplan for Kozhikode urban area started in 2008.

Kozhikode city and the adjoining urban areas were subjects of quite a few planning efforts. The plan in operation, the Development Plan for Calicut Urban Area (1981-2001), enforced in 1994, reached its horizon period in 2001. Considering the rapid urbanization, fringe area development and changes in building typology, a variation of the Development Plan with modified Zoning Regulations was sanctioned by the Government in June, 2007, which is still in force. The spatial and economic character of the city has changed significantly from that envisaged in the above plan.

The District Urbanisation Report prepared by the Department revealed that some of the LSGIs in the periphery of the Corporation has Secondary or Tertiary activity pattern, and functions essentially as a single conglomerate with the Corporation. Hence, these LSGIs namely Kadalundi, Feroke, Ramanattukara and Olavannawere included in the Planning Area for the Masterplan, along with Kozhikode Corporation. As all the constituent local governments in the planning area are jointly responsible for preparation of the Masterplan, a Joint Town Planning Committee was constituted, as provided in Section 38 of the Madras Town Planning Act, 1920, for coordinating and undertaking the planning activities for the planning area, vide G.O.(Rt) No. 3353/10/LSGD dated 28.10.10 and G.O.(MS) No. 13/2011/LSGD dated 14/01/2011.

The jurisdiction of this Masterplan is one among the largest dealt by the Department until now and preparation of this plan was indeed a huge task. The invaluable support and cooperation of the JPC under the leadership of Honorable Mayor Smt.A.K.Premajam and Sri. Thottathil Raveendran deserves special mention. I take this opportunity to appreciate the officials of the Regional Town Planning Office, Kozhikode, under the remarkable leadership of Sri.C.J.Poulose, Sri.G.Sasikumar and Sri.K.V.Abdul Malik, Town Planners, Kozhikode as well as Sri. T. K. Girish Kumar and Smt.Isha P.A, Town Planners, for the sincere efforts put in for the preparation of this Masterplan. The State Project Cell played an anchor role in this plan

preparation, right from conceptualization to completion and I place on record my appreciation for Sri.JacobEasow, Sri.Devarajan K, Additional Chief Town Planners (Rtd.), Smt.Darley D.S. Mony, Additional Chief Town Planner (Rtd), Smt.Ushakumari P.R, Senior Town Planner, Smt.Asha Ajoy Ghosh and Sri.Baiju K, Town Planners and other officials of the State Project Cell, for their persistent efforts to keep the project on track.

Definitely, the Masterplan for Kozhikode Urban Area will provide the necessary framework for the progress of this most prominent urban center of North Kerala. I optimistically look forward to effective implementation of this plan. I hope that this plan will soon be complemented with Detailed Town Planning Schemes for micro-level implementation.

Shaji Joseph
Chief Town Planner (Planning)
Town & Country Planning Department
Government of Kerala

Thiruvananthapuram

ACKNOWLEDGEMENTS

Kozhikode, the City of Truth, felt the need for revision of the Masterplan for Kozhikode Urban Area as early as the existing plan reached its horizon in 2001 and prepared a few non-statutory plans to address the necessity. Subsequently, the statutory revision of the existing Masterplan was initiated by the end of year 2008, as per directions of the State government. The Masterplan for Kozhikode Urban Area (2015-2035), thus prepared, covering a geographical area of 177.08 Sq.Kms, envisions developing Kozhikode as a vital city of the state.

Through and through participation of the common public in all stages of its preparation makes this Masterplan unique. Prominent personalities and public figures of the city, like social activists, historians, academicians, architects, urban designers, scientists, etc. were consulted in the process of preparation of this Masterplan. Many dynamic organisations of the citizens, engineers, developers, investors, etc. also actively pursued the Masterplan and gave their valuable opinions. The extensive publicity given by the press and other media and the discussions generated by them on their own platforms added significant value to this Plan. Many thanks are due to one and all of them.

Thorough involvement of the elected representatives of the local governments, and members of the Joint Planning Committee and working groups, under the admirable leadership of Honourable Mayors Smt.A.K.Premajam and Sri Thottathil Raveendran is worth an applaud. The concerned line departments also cooperated wholeheartedly in all the activities of the plan preparation and during the one-to-one discussions conducted with them and readily shared the data, which is gratefully acknowledged. Dr.A.Achyuthan, Prof.Vinod Kumar and Dr.M.V.L.R. Anjaneyulu, the resource persons of JPC, deserve special thanks.

The exemplary leadership and constant encouragement of Sri.EapenVarughese, Smt.T.M.Sudha, Chief Town Planners (Rtd), Sri. K Ramanan, Chief Town Planner, Sri. Shaji Joseph, Chief Town Planner (Planning), Smt.Darley D.S. Mony, Sri.JacobEasow and Sri.K.Devaragan, Additional Chief Town Planners (Rtd.) has been motivating. Smt.Ushakumari P.R, Senior Town Planner, Smt.Asha Ajoy Ghosh, Sri.Baiju K, Town Planners, offered constant guidance and unfailing support throughout the project, for which we are indebted. The efforts put in by Sri.Densil Fernandez and Smt. Oormila Raj, Deputy Town Planners are gratefully acknowledged.

Sri.C.J.Poulose, Senior Town Planner (Rtd.) led the work in the initial stages and shaped a robust data bank, the platform on which this Masterplan is prepared. The role played by Sri.G.Sasikumar, Town Planner (Rtd.) in transforming the studies into sectoral

Town and Country Planning Department, Government of Kerala

proposals is worth mentioning. Sri. T. K. Girish Kumar and Smt. Isha P.A, Town Planners, monitored the plan preparation and their persistent efforts to ensure a quality product within the given time frame is appreciated. Smt.Athira Ravi, Smt.Leelitty Thomas, and Sri.Rijesh. N.M, Deputy Town Planners, Sri. Girish Kumar. P, Sri.V. Janardhanan (Rtd), Sri.P.T.Mustafa, Sri. P.Muhammed, Sri. M Radhakrishnan (Rtd), Sri. M.P Sasidharan Pillai, Sri. Shameer K and Smt. Preeja Padmanabhan, Assistant Town Planners and Kum.Aswathy S, Planner Associate are sincerely applauded for the hard work they have put in for the preparation of this plan. The efforts put in by Town Planning Surveyors, Smt.Nisha P.S, Sri.K.Rameshan, Sri. Rajeev P.M, and Kum.SheejaThayyil, for the surveys and preparation of the maps, Sri.C.Syamprasad, Artist, for illustrations need special mention. All the staff members of the Regional Town and Country Planning Office, Kozhikode need to be specially acknowledged for their keen participation in various stages, without which this work would not have been completed in the present form and time frame.

K.V.Abdul Malik
Town Planner
Kozhikode Region

CONTENTS

FOREWORD.....	i
PREFACE.....	iii
ACKNOWLEDGEMENTS	v
ACRONYMS.....	vii
CONTENTS	ix
List of Figures	xxi
List of Tables.....	xxv
PART I: STUDY AND ANALYSIS.....	
1 Introduction	1
1.1 Urbanisation in Kerala	3
1.2 Need for the Plan	4
2 Earlier Planning Efforts and Studies	5
2.1 Interim Development Plan 1967-1981.....	7
2.2 Development Plan for Calicut Urban Area (1981 – 2001).....	8
2.3 Detailed Town Planning Schemes	9
2.4 Perspective Plan 2003	12
2.5 City Development Plan 2006.....	12
3 Planning Area Delineation and Plan Preparation.....	15
3.1 Delineation of Planning Area	17
3.2 Organisational Setup	17
3.3 People’s Participation.....	19
3.4 Planning Units	19
3.5 Scope and Limitations of the Study.....	20
4 Profile of the Planning Area	21
4.1 Location	23
4.2 Area and Population.....	23
4.3 Regional Setting	23
4.4 History and Evolution of the City	24

4.4.1	History of Governance	24
4.4.2	History of Development.....	25
4.4.3	Socio-cultural History	27
4.5	Topography	29
4.6	Climate.....	29
4.7	Natural Resources	29
4.8	Inference.....	31
5	Demography.....	33
5.1	Population and its Growth Pattern	35
5.1.1	Population Growth	36
5.1.2	Population Growth Rate	36
5.1.3	Spatial Distribution of Population	37
5.2	Urban-Rural Content & Urbanisation Trends	43
5.3	Sex Ratio	45
5.4	Child Population	47
5.4.1	Population in 0-6 Age Group.....	47
5.4.2	Child Sex Ratio.....	50
5.5	Age-Sex Pyramid.....	52
5.6	Literacy.....	54
5.7	Household Size	56
5.8	Inference.....	57
6	Employment.....	59
6.1	Workers	60
6.2	Work Participation Ratio	65
6.2.1	Male Work Participation Ratio.....	66
6.2.2	Female Work Participation Ratio	67
6.3	Occupational Structure.....	68
6.4	Inference.....	69
7	Land Use.....	71
7.1	General Analysis of Land Use.....	73

7.2	Land Use Concentration Pattern.....	75
7.2.1	Commercial Land Use	75
7.2.2	Industrial Land Use	76
7.2.3	Public and Semipublic Land Use.....	76
7.2.4	Parks and Open Spaces.....	77
7.2.5	Residential Land Use.....	77
7.3	Categorization of Residential Land Use.....	78
7.4	Functional Character of Wards	79
8	Economic Aspects.....	80
8.1	Industry.....	82
8.1.1	Existing Industrial Base	82
8.1.2	Industrial Production	85
8.1.3	Inference.....	86
8.2	Trade and Commerce	86
8.2.1	Major Commercial Centres.....	87
8.2.2	Markets	88
8.2.3	Street Vendors / Informal Sector	88
8.2.4	Spatial Distribution	89
8.2.5	Problems	89
8.2.6	Inference.....	90
8.3	Tourism.....	90
8.3.1	Places of Tourist Interest	91
8.3.2	Tourism Infrastructure.....	97
8.3.3	Problems and Potentials.....	97
8.3.4	Inference.....	98
8.4	Agriculture	98
8.4.1	Area under Cultivation.....	100
8.4.2	Important Crops and Production	100
8.4.3	Spatial Distribution	101
8.4.4	Irrigation Facilities	102

8.4.5	Problems and Potentials.....	103
8.4.6	Inference.....	104
8.5	Animal Husbandry.....	104
8.5.1	Animal Population & Produces.....	104
8.5.2	Inference.....	106
8.6	Fisheries.....	106
8.6.1	Production.....	107
8.6.2	Physical Infrastructure.....	108
8.6.3	Problems and Potentials.....	108
8.6.4	Inference.....	108
9	Traffic and Transportation.....	110
9.1	Road Network.....	112
9.2	Railways.....	114
9.3	Other Modes of Transport.....	114
9.4	Trends in Vehicle Population & Road accidents.....	114
9.5	Link Traffic Volumes.....	115
9.6	Speed and Delay Characteristics.....	115
9.7	Traffic Volume at Major Intersections.....	117
9.8	Parking Characteristics.....	118
9.9	Pedestrian Movements.....	118
9.10	Base Year Inter-City Travel Characteristics.....	118
9.10.1	Inter-city Passenger Movements.....	118
9.10.2	Railway Terminal Survey.....	121
9.10.3	Inter-city Goods Transportation.....	122
9.11	Problems and Potentials.....	125
9.12	Inference.....	127
10	Water Supply.....	128
10.1	Water Sources.....	129
10.2	Water Supply System.....	130
10.2.1	Quantity & Quality.....	130

10.2.2	Water Treatment Plants	131
10.2.3	Service Reservoirs & Distribution Network	131
10.2.4	Physical Losses.....	132
10.2.5	Water Scarcity	132
10.3	Ongoing Schemes	133
10.4	Problems and Potentials	133
10.5	Inference	135
11	Sanitation	136
11.1	Storm Water Drainage	138
11.1.1	Drainage Pattern in Planning Area	138
11.1.2	Existing Drainage Network.....	140
11.1.3	Issues.....	141
11.1.4	On-going Projects	142
11.1.5	Inference	142
11.2	Sewerage System	143
11.2.1	Existing System	143
11.2.2	On-going Project.....	143
11.2.3	Inference	145
11.3	Solid Waste Disposal	145
11.3.1	Generation	145
11.3.2	Collection and Treatment Facilities.....	146
11.3.3	Issues.....	147
11.3.4	Inference	147
12	Energy.....	148
12.1	Electricity.....	149
12.1.1	Connections.....	149
12.1.2	Consumption	150
12.2	Petroleum.....	151
12.3	Non-Conventional Sources.....	151
12.4	Problems and Potentials	151

12.5	Inference	151
13	Education.....	152
13.1	Existing Infrastructure.....	154
13.1.1	Schools	154
13.1.2	Higher and Professional Education	155
13.2	Educational Status	155
13.3	Inference	156
14	Health	158
14.1	Existing Facilities	160
14.2	Problems and Potentials	163
14.3	Inference	163
15	Recreational Facilities & Other Civic Amenities	165
15.1	Recreational Facilities	165
15.1.1	Parks and Open Spaces.....	165
15.1.2	Playgrounds/Stadia.....	166
15.1.3	Other Recreational Facilities	166
15.2	Other Civic Amenities.....	166
15.2.1	Community Halls	166
15.2.2	Reading Rooms/Libraries	167
15.2.3	Crematoria and Burial Grounds	167
15.2.4	Banking Facilities	167
15.2.5	Other Facilities.....	168
15.3	Inference	168
16	Housing.....	171
16.1	Housing Shortage.....	173
16.2	Housing Characteristics.....	173
16.3	Slums and Other Sub-Standard Housing.....	175
16.4	On-going Projects	180
16.5	Problems and Potentials	181
16.6	Inference	181

17	Special Concern Areas	183
17.1	Poverty	185
17.2	SC/ST Population	185
17.3	Elderly.....	186
17.4	Differently-abled and Specially-skilled	186
17.5	Others.....	187
17.6	Inference	187
18	Environment and Heritage	189
18.1	Sensitive /Fragile Areas.....	191
18.2	Conservation Efforts	193
18.3	Problems and Potentials	193
18.4	Inference	195
18.5	Heritage.....	195
18.6	Problems and Potentials	197
PART II: INTEGRATED DEVELOPMENT VISION		
19	Summary of Findings and Inter Sectoral Linkages	201
19.1	Regional Setting.....	203
19.2	Population	203
19.3	Employment	203
19.4	Land Use	205
19.5	Economy.....	205
19.5.1	Industry	205
19.5.2	Trade and Commerce	206
19.5.3	Tourism	207
19.5.4	AgricultureandAnimal Husbandry	207
19.5.5	Fisheries	208
19.6	Physical Infrastructure	209
19.6.1	Traffic and Transportation	209
19.6.2	Water Supply.....	210
19.6.3	Drainage.....	211

19.6.4	Waste Water	211
19.6.5	Solid Waste Disposal.....	212
19.6.6	Energy	213
19.7	Social Infrastructure.....	213
19.7.1	Education	213
19.7.2	Health.....	213
19.7.3	Housing	214
19.7.4	Sports, Recreation and Other Civic Amenities.....	214
19.8	Social Welfare and Empowerment.....	215
19.9	Heritage and Environment.....	216
20	Development Vision.....	219
20.1	Development Vision.....	221
20.2	Development Goals.....	222
20.3	Development Objectives.....	223
21	Development Concepts.....	225
21.1	Projected Population and Settlement Pattern.....	227
21.1.1	Population Projections.....	227
21.1.2	Settlement Pattern	227
21.1.3	Projected Population	229
21.2	Industrial Development	229
21.3	Commercial Centres.....	230
21.4	High Density Residential	231
21.5	Heritage and Environmental Conservation.....	232
21.6	Tourism.....	233
21.7	Connectivity Network	234
21.8	Primary Sector Development	237
21.9	Waste Management	237
21.10	Green and Sustainable Development.....	237
21.11	Development Concept of the Planning Area.....	238
PART III: LAND USE AND SECTORAL PROPOSAL.....		

22	Land Use Plan	243
22.1	Proposed Land Use Pattern	245
22.1.1	Residential Zones.....	246
22.1.2	Commercial Zone.....	247
22.1.3	Mixed Zone (Residential/Commercial).....	247
22.1.4	Multi-Functional Zone	247
22.1.5	Public and Semi Public Zone	248
22.1.6	Industrial Zones	248
22.1.7	Transport Zone	249
22.1.8	Recreational Land uses	249
22.1.9	Agriculture zone	250
22.1.10	Water Body	250
22.1.11	Cyber Park	250
22.1.12	Port and Allied Developments	250
22.1.13	HeritageZone.....	251
22.1.14	Environmentally Sensitive Area	251
22.1.15	Green Strip	251
22.1.16	Special Zones.....	251
22.2	Proposed Land Use Map	253
23	Traffic and Transportation Plan.....	257
23.1	Road Widening, Traffic Segregation and Geometric Improvements	259
23.2	Mobility Hub with Road, Rail, Water and Air connectivity at Malaparamba 261	
23.3	Loop Bus Services and Dedicated Bus Corridors for Public Transport	262
23.4	Inland Waterway Network with Connectivity to Hub	265
23.5	Mass Transit Options: Light Metro and High Speed Rail	266
23.6	Two Tier Road for by-passing New City Core	267
23.7	Seven Bus Terminals at Periphery and Bus Routing	267
23.8	Parking Plazas at Major Nodes	268
23.9	Truck Terminals and Dedicated Truck Lanes in N-S and E-W Directions..	268
23.10	Evacuation Route.....	269

23.11	Proposed Rail Extension.....	270
23.12	Flyovers.....	270
23.13	Rail Over Bridges.....	271
23.14	Junction Improvement Plans.....	271
23.15	Auto and Taxi Stands.....	272
23.16	Bus Bays.....	273
23.17	Green Corridors and Heritage walk.....	277
23.18	Development of a Walkable Community.....	279
24	Sectoral Proposals.....	283
24.1	Economy.....	285
24.1.1	Industries.....	285
24.1.2	Trade and Commerce.....	293
24.1.3	Tourism.....	296
24.1.4	Fisheries.....	302
24.1.5	Agriculture.....	305
24.1.6	Animal Husbandry.....	309
24.2	Physical and Social Infrastructure.....	310
24.2.1	Water Supply.....	310
24.2.2	Waste Management and Pollution Abatement.....	311
24.2.3	Health.....	315
24.2.4	Education.....	318
24.2.5	Energy.....	320
24.2.6	Housing.....	322
24.2.7	Sports and Recreation.....	325
24.2.8	Other Civic Amenities.....	330
24.2.9	Disaster Management.....	333
24.3	Social Welfare and Empowerment.....	333
24.3.1	Women’s Industrial Cluster.....	333
24.3.2	Women’s Entrepreneurship and Skill Development Centre.....	333
24.3.3	Friendly transportation and amenities for Women, Elderly and Differently-abled.....	333

24.3.4	Development of IMHANS – Centre of Excellence	334
24.3.5	Centre for Integrated Development of Differently-abled Children	334
24.3.6	Special Schools in Government/aided Sector	334
24.3.7	‘PakalVeedu’	335
24.3.8	Homes for Elderly in Government Sector	335
24.3.9	Pain and Palliative, Geriatric Care Centres	335
24.4	Culture and Heritage.....	336
24.4.1	Cultural Square at Mananchira	336
24.4.2	International Cultural Centre	336
24.4.3	Conservation of Tippu’s Fort.....	336
24.4.4	Establishment of an Archives of International Standards	337
24.4.5	Conservation of Old Sea Bridges of Kozhikode	337
24.4.6	SM Street Heritage Project	337
24.4.7	Revathi Pattathanam	338
24.5	Environment	338
24.5.1	Kadalundi‘Jaivagramam’	338
24.5.2	Comprehensive Plan for Development and Management of Community Mangroves Reserve at Kadalundi.....	339
24.5.3	Conservation of Ponds and Sacred Groves	340
24.5.4	Development of Botanical Garden	340
24.5.5	Development of HortusMalabaricusSasyaSaraswam.....	341
24.5.6	KottuliWetlands Management Plan	341
24.5.7	Revitalisation of Streams andWater bodies	342
24.5.8	Integrated CRZ Implementation Planfor Kozhikode Urban Area.....	342
24.6	Governance	343
24.6.1	Comprehensive Improvement in Governance.....	343
24.6.2	e - Governance	344
24.6.3	Urban Planning and Design.....	344
24.6.4	Development Assistance Utility	347
24.7	Towards Being Smart... ..	348
24.7.1	Transport.....	349

24.7.2	Spatial planning	349
24.7.3	Water supply	349
24.7.4	Solid Waste Management.....	349
24.7.5	Storm water Drainage.....	349
24.7.6	Electricity.....	350
24.7.7	Telephone connection	350
24.7.8	Wi-Fi connectivity	350
24.7.9	Health care facilities	350
24.7.10	Education	350
24.7.11	Fire fighting	350
24.7.12	Others:	350
24.8	Phasing and Costing	351
PART IV: DEVELOPMENT REGULATIONS.....		
25	Development Controls	368
25.1	Zoning Regulations.....	369
25.2	Special Rules for granting compensation for affected persons and contribution for betterment.....	400
25.2.1	Compensation for affected persons.....	400
25.2.2	Betterment Levy	400

List of Figures

Figure 2-1: <i>Vastu</i> based planned city of Calicut.....	7
Figure 2-2: Interim Development Plan 1967 - 1981.....	7
Figure 2-3: Development Plan for Calicut Urban Area 1981 – 2001.....	8
Figure 3-1: Planning Units – Kozhikode Planning Area	19
Figure 4-1: Regional Connectivity.....	23
Figure 4-2: Development and planning milestones of Kozhikode Corporation	26
Figure 4-3: Census Urban Areas - 2001 and 2011.....	27
Figure 5-1: Temporal Population Growth in Kozhikode Dt, Kozhikode Urban and Kozhikode Corporation	35
Figure 5-2: Decadal Growth Rate of Planning area compared with the region	36
Figure 5-3: % share of 0-6 age group compared with the region	49
Figure 5-4: Temporal variation of average h/h size in the region.....	56
Figure 6-1 : Temporal variation of workers in planning area in comparison with the region.....	61
Figure 6-2 : Temporal variation of workers in the constituent local governments in planning area.....	62
Figure 6-3 : Proportion of Main and Marginal Workers in comparison with the region	63
Figure 6-4 : Proportion of Main and Marginal Workers in comparison with the constituent LSGIs.....	63
Figure 6-5: Temporal variation of main and marginal workers in the region	64
Figure 6-6 : Temporal variation of main and marginal workers in the constituent local governments	64
Figure 6-7 : Temporal variation of WPR in the region.....	66
Figure 6-8: Temporal variation of male WPR.....	67
Figure 6-9: Temporal variation of female WPR.....	68
Figure 7-1: Existing Land Use Map	73
Figure 7-2: Existing Land Use Break Up	74
Figure 7-3: Commercial Land Use Concentration and its Variation.....	75
Figure 7-4: Industrial Land Use Concentration and Variation	76
Figure 7-5: Public & Semi-public Land Use - Concentration and Variation.....	77
Figure 7-6: Parks & Open spaces - Concentration and Variation	77
Figure 7-7: Functional Character	79
Figure 8-1: Hierarchy of Commercial Nodes in the District.....	87
Figure 8-2: Areas of Concentration of Street Vendors.....	89
Figure 8-3: Places of Tourist Interest Inside Planning Area	90
Figure 8-4: Production Details of Paddy.....	100
Figure 8-5: Production Details of Coconut.....	100

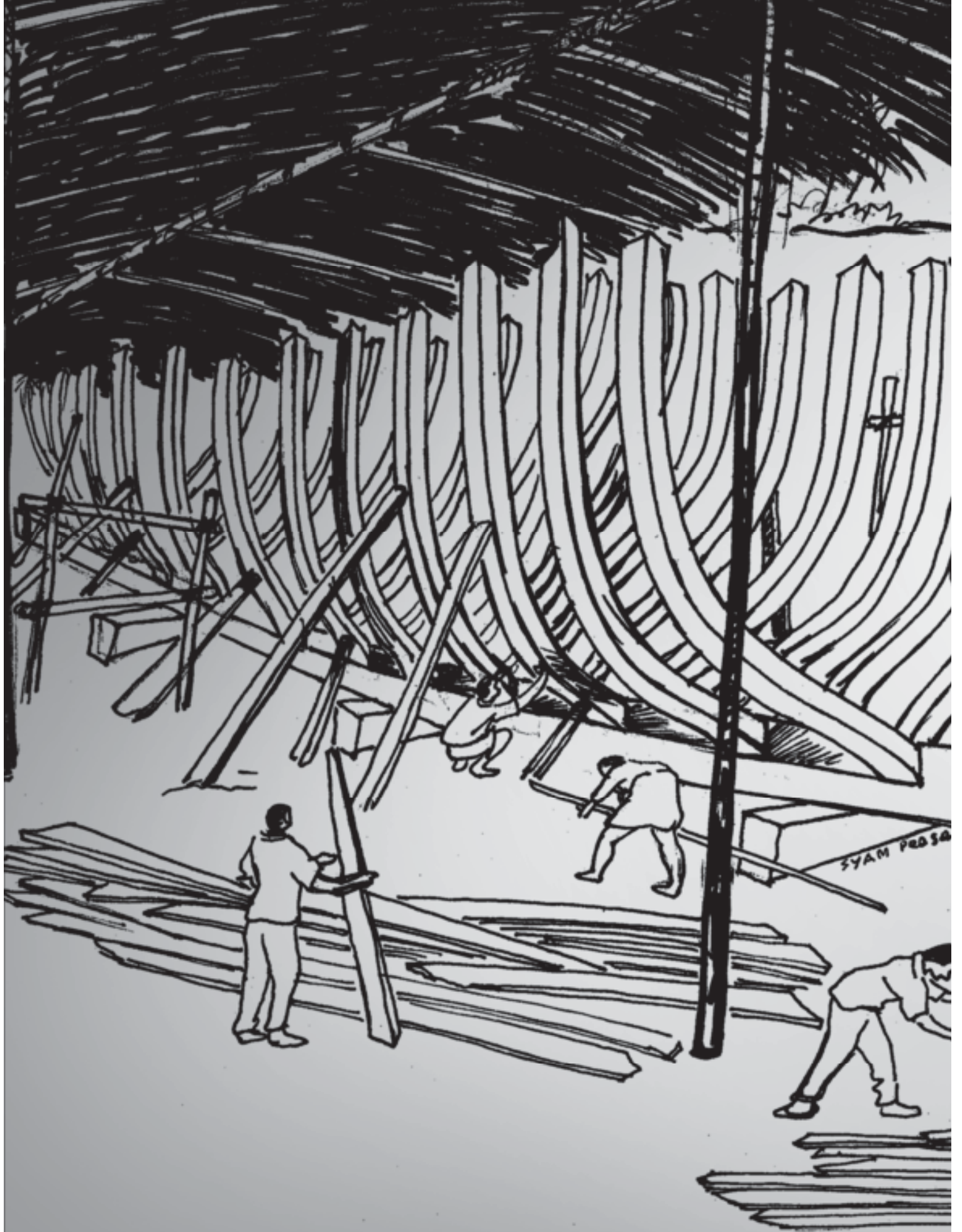
Figure 8-6: Production Details of Vegetables	100
Figure 8-7: Agricultural Land Use - Concentration and Variation	101
Figure 8-8: Variation of Concentration Index of Coconut Cultivation and Paddy Cultivation	101
Figure 8-9: Spatial Distribution of Cultivators and Agricultural Labourers in the Planning Area	102
Figure 8-10: Ground Water development in Kozhikode District (2004)	103
Figure 8-11: Sea Fish Catch/Year in million kilograms	107
Figure 8-12: Seasonal Variation in Fish Catch	107
Figure 9-1: Existing Road Network	113
Figure 10-1: Dependence on Various Water Sources in the Planning Area	129
Figure 10-2: Details of Nature of Scarcity of Water	132
Figure 13-1: Educational status	156
Figure 13-2: Female Literate concentration index	156
Figure 13-3: Literate Concentration Index	156
Figure 14-1: Details of Epidemics	162
Figure 16-1: Distribution of Typology of Houses in the LSGs of Planning Area	173
Figure 16-2: Ward wise distribution of typology of houses	174
Figure 16-3: Plot Area Details of Houses	174
Figure 16-4: Different Types of Roof	174
Figure 16-5: Different Types of Wall	175
Figure 16-6: Different Types of Floor	175
Figure 16-7: Spatial Distribution of slums	179
Figure 17-1: LSGI wise BPL population in the planning area	185
Figure 17-2: Community wise breakup of BPL population	185
Figure 17-3: SC/ST Index and variation of SC/ST Index	185
Figure 18-1: Ownership Details of Sacred Groves	192
Figure 21-1: Development Concept - Settlement Pattern	228
Figure 21-2: Development Concept - Industrial	229
Figure 21-3: Development Concept - Commercial	230
Figure 21-4: Development Concept –High Density Residential	231
Figure 21-5 : Development Concept – Environment and Heritage	232
Figure 21-6 : Development Concept - Tourism	233
Figure 21-7: Existing Road Network	234
Figure 21-8 : Growth Centres and Direction of growth	235
Figure 21-9: Connectivity of Nodes	235
Figure 21-10: Development Concept –Suggested connectivity pattern and proposed activity centres	236
Figure 21-11: Development Concept for the Planning Area	239

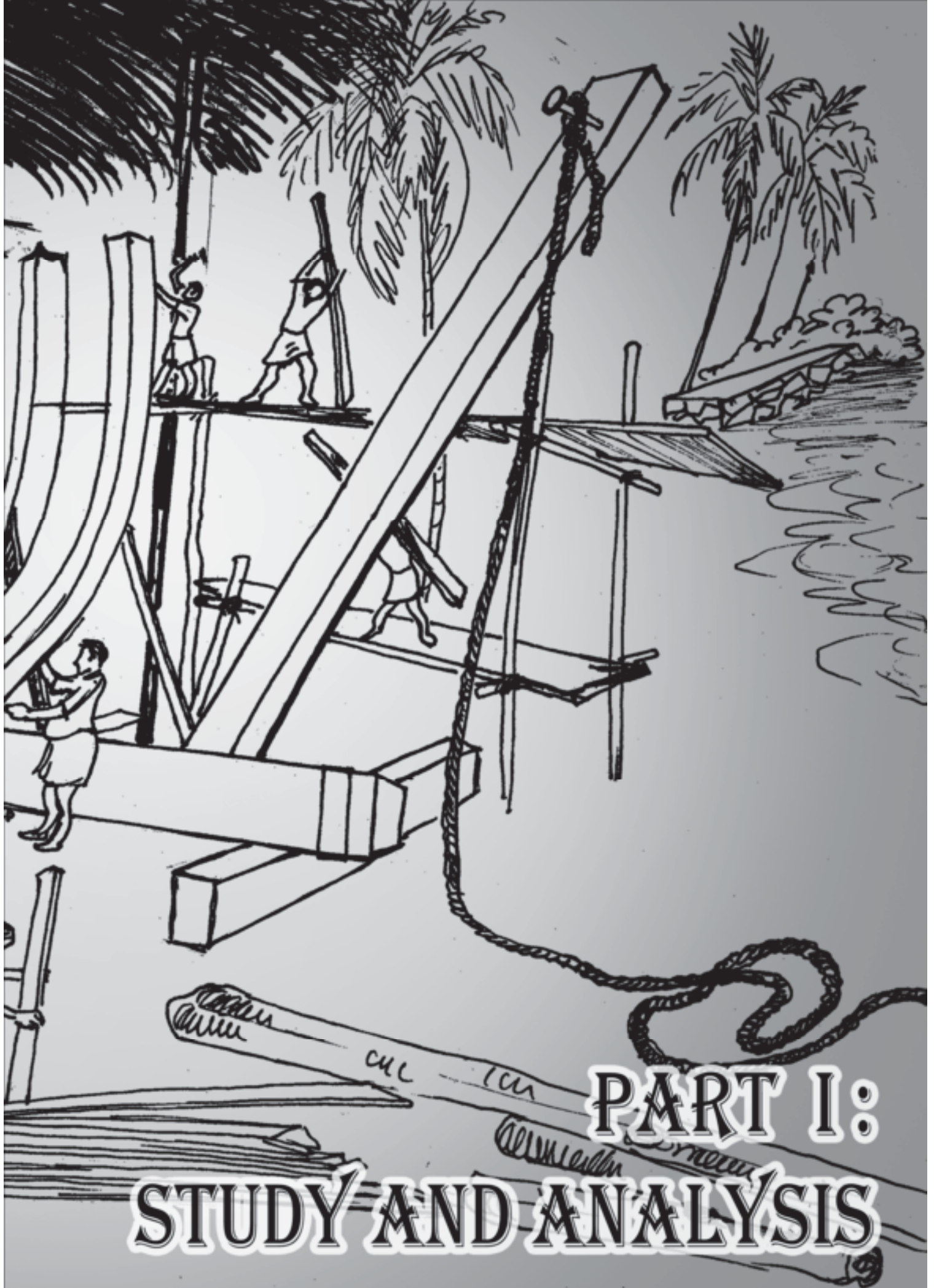
Figure 22-1 : Proposed Land Use.....	255
Figure 22-2: Proposed Land Use categories	256
Figure 23-1: Loop Bus Services and Dedicated Bus Corridors	263
Figure 23-2: Shoulder Lane dedicated route	263
Figure 23-3: An Artist's impression of the Proposed Mobility Hub	264
Figure 23-4: Dedicated Route	265
Figure 23-5: Waterway Network.....	265
Figure 23-6: Light Metro Network.....	266
Figure 23-7: Peripheral Bus Terminals.....	267
Figure 23-8: Parking Plazas	268
Figure 23-9: Proposed Truck Terminals.....	268
Figure 23-10: Evacuation Route	269
Figure 23-11: Proposed Rail Extension.....	270
Figure 23-12: Example of an Offset Crosswalk and Pedestrian Island.....	280
Figure 24-1: Proposed Knowledge Park, Ramanattukara.....	286
Figure 24-2: Bronze and Clay industrial cluster	287
Figure 24-3: Value added products suggested for production in the cluster.....	287
Figure 24-4: Bepore Port Ancillary Industries	289
Figure 24-5: Proposed Uru Making Cluster.....	289
Figure 24-6: Boat Making Industries Proposal in Feroke Panchayath	290
Figure 24-7: Revitalisation of Kallayi Industrial Area	290
Figure 24-8: Feroke Industrial Village.....	291
Figure 24-11: Industrial Estate Near Knowledge Park, Ramanattukara.....	292
Figure 24-12: Industrial Estate , Ramanattukara	292
Figure 24-13: Tourist Facilitation Centre - Ramanattukara	298
Figure 24-14: Tourist Facilitation Centre - Kadalundi.....	298
Figure 24-15: Proposed Water Sports in planning area	299
Figure 24-16: Island Tourism Project.....	300
Figure 24-17: Proposed Water Theme Park at Feroke.....	300
Figure 24-18: Kadalundi Eco Tourism Cluster	301
Figure 24-19: Aquaculture proposal in Olavanna.....	305
Figure 24-20: Aquaculture Proposal in Cheruvannur Nallalam	305
Figure 24-21: Lotus Farms proposal in Cheruvannur Nallalam.....	308
Figure 24-22: Lotus Farms proposal in Olavanna.....	308
Figure 24-23: Proposed Scientific Slaughter House at Olavanna.....	309
Figure 24-24: Proposed Scientific Slaughter House at Kothi	310
Figure 24-25: Educational Complex - Olavanna	319

List of Tables

Table 5-1: Population Growth Rate of Constituent LSGIs -2001.....	37
Table 5-2: Population growth rates (2011) of major Corporations in Kerala.....	37
Table 5-3: Share of LSGIs in population of planning area.....	38
Table 5-4: Gross, Net and residential densities in LSGIs in planning area	39
Table 6-1: Work Participation Ratio	65
Table 6-2: Comparison of WPR with Other Corporations	66
Table 6-3: Male Work Participation Ratio.....	66
Table 6-4 : Female Work Participation Ratio	67
Table 6-5: Occupational Structure in the Region and Temporal Variation	69
Table 7-1: Existing Land Use in Planning Area	74
Table 8-1: Present Status of MSM - Sector Wise Details.....	84
Table 8-2: Commodity Produced Inside the Planning Area	85
Table 8-3: Workers Engaged In Trade & Commerce Sector	86
Table 8-4: Major commercial centres in the Planning Area	87
Table 8-5: Details of Street Vendors.....	89
Table 8-6: Tourism Infrastructure	97
Table 8-7: Details of Cultivation - Crop Wise	100
Table 8-8: Details of Animal Population	104
Table 8-9: Details of Dairy Produces	105
Table 8-10: Details of Dairy Outlets and Collection Centres.	105
Table 8-11: Details of Meat Production.....	106
Table 8-12: Details of Labourers Working in the Fisheries Sector	107
Table 8-13: Fishing Sector Infrastructure Details.....	108
Table 9-1: Number of Vehicles with Valid	114
Table 9-2: Growth of Vehicle Population	114
Table 9-3: Growth in accident occurrence in Kozhikode City during 2002-09	115
Table 9-4: Volume Capacity Ratios.....	116
Table 9-5: Traffic Volume at Major Intersections	117
Table 9-6: Distribution of Inter-city Passenger Traffic According to Mode of Travel	119
Table 9-7: Distribution of Originating, Terminating & Through Passenger Trips According to Mode of Travel.....	121
Table 9-8: Details of Daily Rail Commuters	121
Table 9-9: Lead Distance of Travel by Rail Commuters.....	121
Table 9-10: Distribution of originating, terminating and through goods vehicular trips in Kozhikode study area.....	123
Table 9-11: Distribution of Goods Vehicles Passing through Outer Cordon Survey locations in Kozhikode Study Region.....	123

Table 9-12: Distribution of inter-city goods traffic according to commodity carried in Kozhikode study area.....	124
Table 9-13: Pattern of Inter-city Goods Traffic in Kozhikode Region.....	125
Table 10-1: Details of Water Treatment Plants	131
Table 10-2: Details of Distribution Network.....	131
Table 11-1: Sewer Zones – KSUDP project.....	144
Table 12-1: Category Wise Break Up: No. of Electricity Connections.....	150
Table 12-2: Category Wise Break Up: Electricity Consumption.....	150
Table 13-1: Details of Schools	154
Table 13-2: Arts and Science Colleges	155
Table 13-3: Professional & Other Colleges	155
Table 14-1: Details of Allopathic Hospitals.....	160
Table 14-2: Number of beds and doctors in Allopathic Hospitals	160
Table 14-3: Details of Ayurveda Hospitals.....	161
Table 14-4: Details of Homeopathic Hospitals.....	161
Table 15-1:Playgrounds/stadia in planning area	166
Table 15-2: Banking Facilities.....	167
Table 15-3: Details of Other Facilities like Fire Station, Petrol Pump etc.....	168
Table 16-1: Typology of Houses in the Planning Area.....	173
Table 16-2: Details of slums selected for Community Infrastructure Fund(CIF) works	176
Table 16-3: Average distance (0.0 km) of specified facilities serving the slums	178
Table 22-1: Proposed Land Use.....	253
Table 22-2: Proposed Land Use – Categorised	254
Table 23-1: Proposed Road Details	260
Table 23-2: Approximate Project Costs for Road Infrastructure Development	261
Table 24-1 : Health - Requirement 2031	315
Table 24-2 : Education - Requirement in 2031	318
Table 24-3 : Socio-cultural facilities - requirement 2031	330
Table 24-4 : Distribution Services – Requirement 2031.....	331
Table 24-5 : Other facilities - requirement 2031.....	331





PART I: STUDY AND ANALYSIS



1

Introduction



* Urbanisation in Kerala

* Need for the Plan

1.1 Urbanisation in Kerala

The peculiar nature of urbanisation in Kerala and its settlement pattern has been in focus and a subject of debate for a couple of decades now. The rural – urban continuum prevalent in the state has been responsible for the outreach of social infrastructure and services to almost all the population in the state resulting in high literacy, life expectancy, favourable sex ratio, better human resources, political awareness, public participation etc. Due to all these factors the state has Human Development Indices comparable to that of the Developed Countries which is a paradox while considering the economic scenario. In contrast the stagnation in industrial production, high unemployment among the educated, high suicide rates, poor infrastructure development, inefficient waste management measures, low levels of income etc. present a bleak picture of the State.

2011 Census shows that Kerala has undergone the highest level of urbanisation (47.72%), and that the urban population has grown by 92.72%, in the last decade. However, the urban agglomerations of Kerala are less dense when compared to their counterparts in other states and the high urbanisation trends have not significantly contributed towards the physical and economic development of the State. Besides, the urban areas of Kerala doesn't fare well when it comes to the delivery of urban services and functions.

The urbanisation in Kerala is mainly due to shift in occupational structure; the other factors, natural growth and migration, are comparatively insignificant; as revealed by the State Urbanisation Study conducted by the Department of Town and Country Planning. The study also reveals that the core of most of the urban agglomerations in the State shows stagnation and even negative population growth, whereas the fringe areas grow at a higher rate. The fringe areas however are less dense compared to the urban core, indicating the scope for further densification of the UAs. The urban core in itself also offers space for densification, in view of the under-utilized land pockets in their interiors. On the other hand, this growth pattern also cautions against an imminent degradation of the urban core, derailed growth in the fringes, uncontrollable urban spread as well as the dilution of rural as well as urban economy.

Low urban densities coupled with the high rate of urbanisation puts forth immense challenges for the decision makers and escalate the accountability of the implementers; to plan and manage the unprecedented pressure on land resources of a part of the country recognised world over for its natural heritage and bio-diversity. The urban vision of the State, "Revitalised urban areas of compact urban form, distributed in a balanced and orderly manner in the entire Kerala, that perform urban functions complimentary to the rural hinterland and act as engines of development" (Source: State Urbanisation Report, Department of Town and Country Planning), reflects this concern of the State to contain the urban spread within its current territories and to materialise the benefits of urbanisation in terms of physical and economic development. The Masterplan for Kozhikode Urban Area (2015-2035) is

endeavoured along these lines, and braces up to enhance the quality of life within the urban area, while proposing measures to strengthen its economic base.

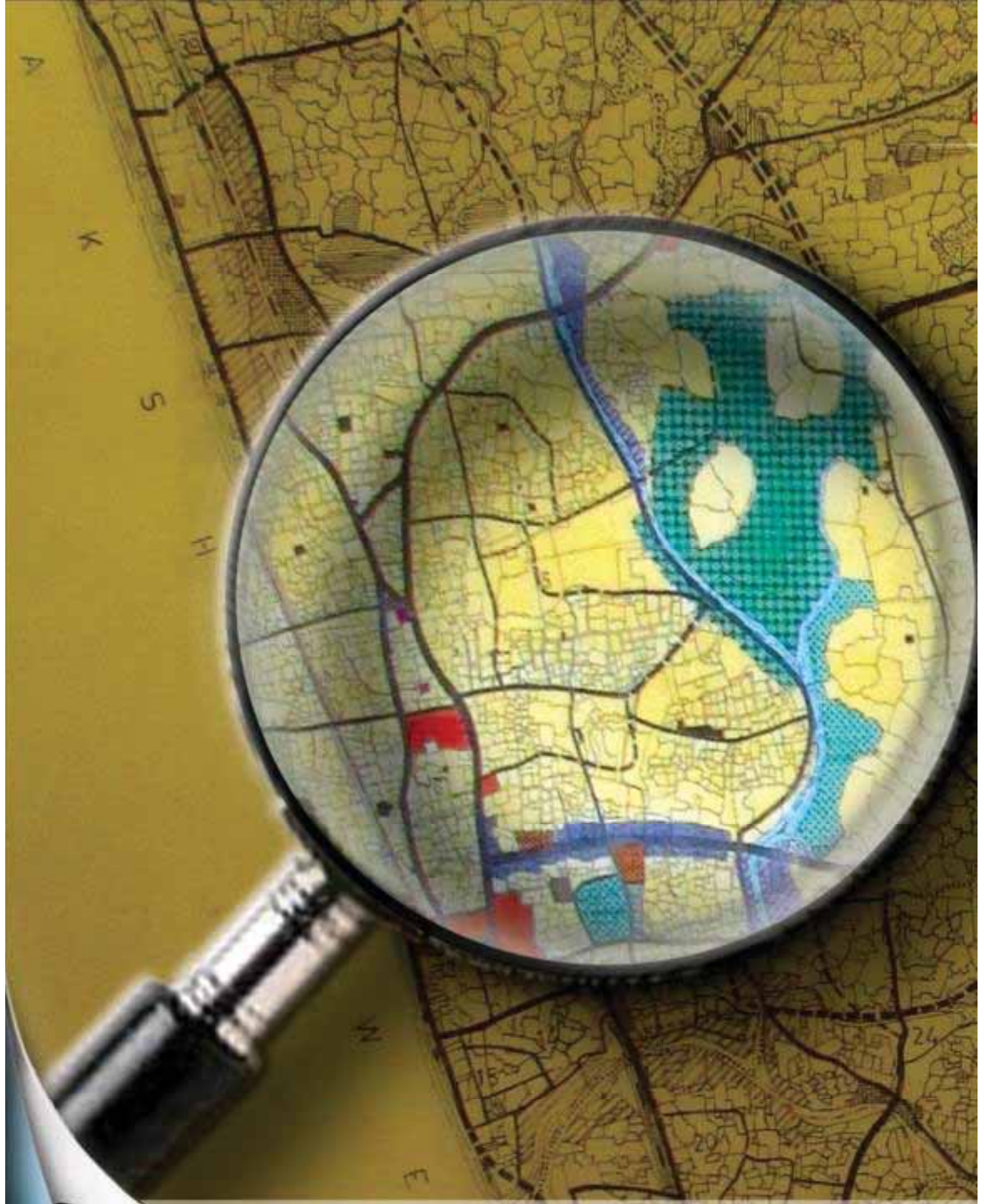
1.2 Need for the Plan

Kozhikode city is the most important urban services' provider for all districts in north Kerala. Its high order of advancement in social services as well as trade and commerce, along with tremendous development potential to add impetus to the economic development of the entire northern region of the state (erstwhile Malabar district), make Kozhikode one of the priority cities in the State.

The Development Plan for Calicut Urban Area (1981-2001), the plan in operation, was enforced in 1994 and reached its horizon period in 2001. The spatial and economic character of the city has changed significantly from that envisaged in the above plan. Kozhikode has been enlisted as one of the best liveable cities in the country and the state, and a dream destination for high quality work and life, by various studies and surveys. Many ambitious ventures like the monorail, IT & industrial parks, high end housing projects are at the anvil. However, the supporting infrastructure and urban services provision has not yet matched the expectations. The problems faced by the city from its early stages, like transportation bottlenecks, inadequacy of urban services, unsynchronized land uses and functions, weak industrial base, flooding, etc. still persist.

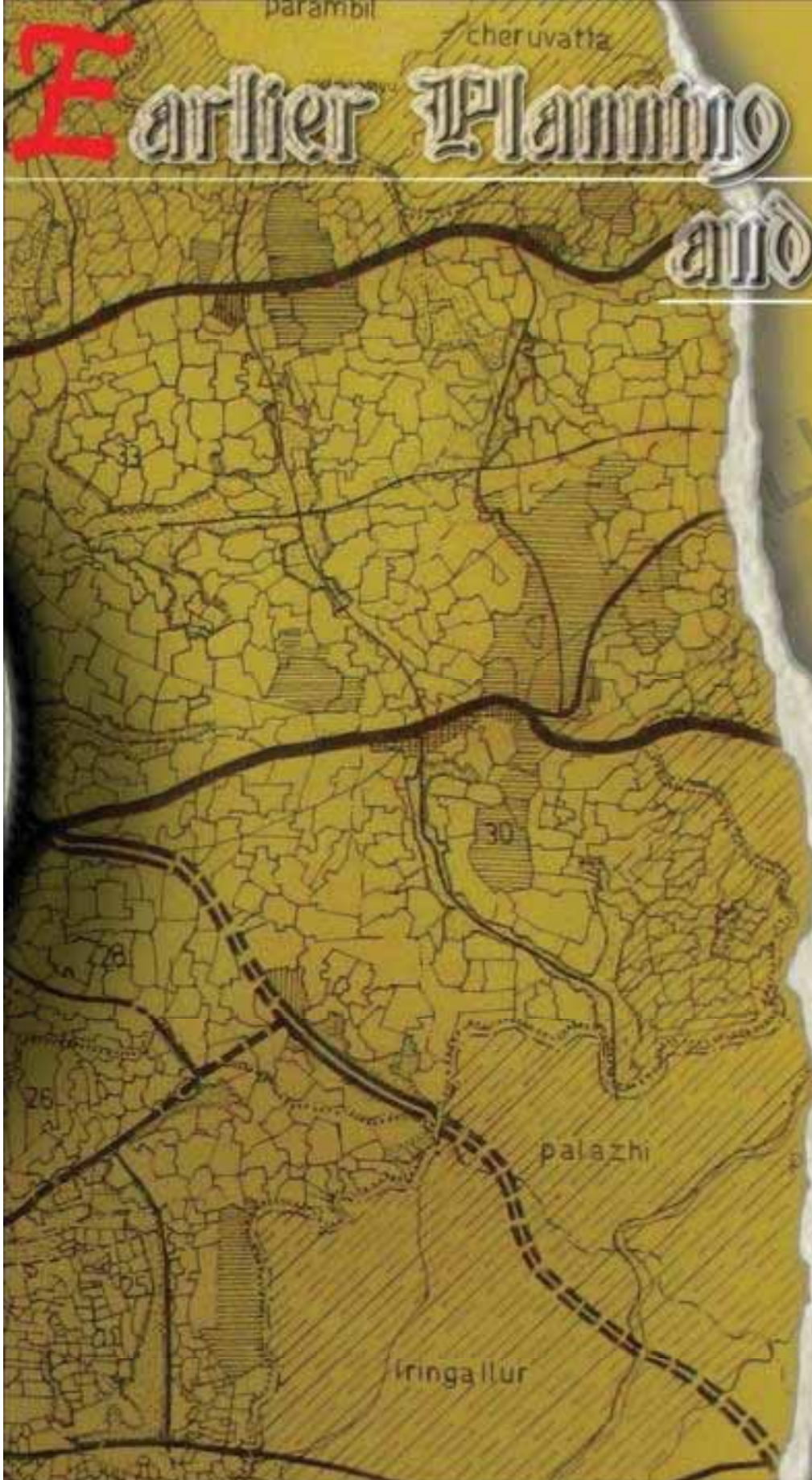
Moreover, some of the neighbouring local governments of Kozhikode Corporation spatially function as a single conglomerate with the Corporation, accommodating the spill over of population as well as many urban services and depict a complete shift from the agrarian economy and dependence on service sector. The administrative jurisdiction of Kozhikode Corporation was extended in 2010 to include a few of these, namely, Elathur, Beypore and Cheruvannur – Nallalam. The absence of timely interventions in these areas pose various threats like environmental degradation, decline in the quality of living, wastage of funds, wasteful use of the limited and valuable land resources, increased disaster vulnerability and many other vices of an organically evolving urban area. In consequence, extending the planning controls to these areas has become the need of the hour.

Thus, Kozhikode Urban Area invites urgent, specific scientific interventions with a long term vision and comprehensive regional outlook, in land use planning, provision of urban services, management of ecologically sensitive areas, disaster resilience and optimal use of the scarce funds at the LSGIs' disposal. The need for the revision of the master plan was felt by the authorities as well as the public and many non-statutory efforts like the Perspective Plan 2003 followed. Of late, considering similar situations in many other cities of the state, the government ordered preparation/revision of development plans for 32 urban areas in the state including Kozhikode, vide G.O.(Rt).No. 3982/2008 dated 13.11.2008. Accordingly, the steps for the revision of the development plan for Kozhikode urban area started in 2008.



2

Earlier Planning Efforts and Studies



CALICUT URBAN AREA
DEVELOPMENT PLAN

DEVELOPMENT PLAN

* Interim Development Plan 1967-1981

* Development Plan for Calicut Urban Area (1981 — 2001)

* Detailed Town Planning Schemes

* Perspective Plan 2003

* City Development Plan 2006.



Figure 2-1: Vastu based planned city of Calicut

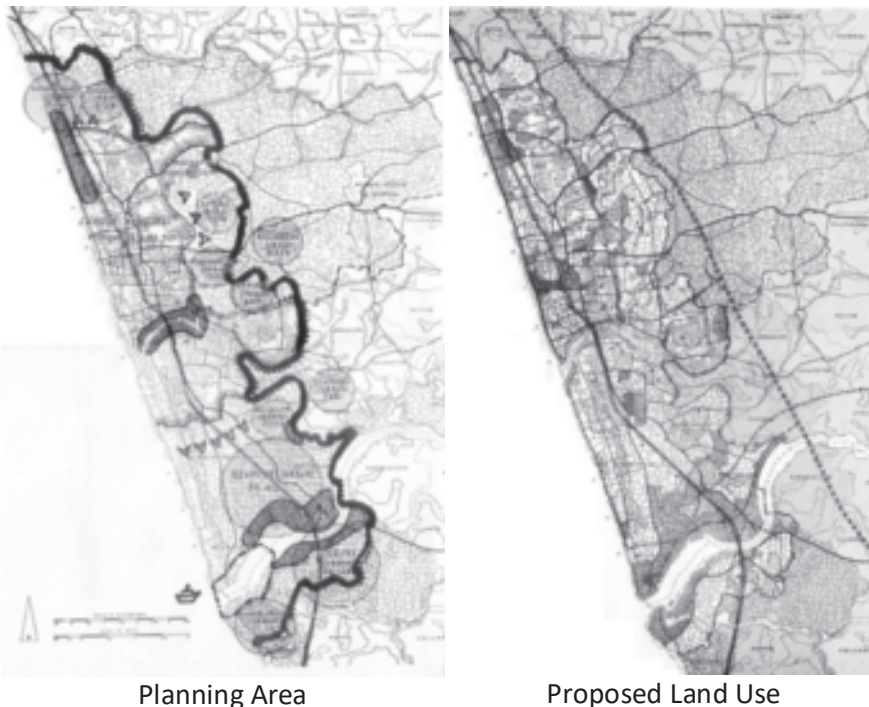
(Ref: Dr. N. M. Nampoothiri,

<http://www.malabarandkeralastudies.net>)

The historic city of Calicut is documented to have been planned under the principles of Vastu Shastra, the traditional science for planning land resources as well as buildings.

In the post-independence era, Kozhikode city and the adjoining urban areas were subjects of quite a few planning efforts, since it became the Head Quarters of the District. Kozhikode municipality was the pioneer among the cities in the State, which took a proactive approach towards planned urban development and a draft Master Plan for urban development was prepared by Sri.Rusi Khambatta for Calicut as early as 1957 – 1962. Successively, many statutory and non-statutory efforts were made towards city planning, which are briefly discussed in this chapter.

2.1 Interim Development Plan 1967-1981



Planning Area

Proposed Land Use

Figure 2-2: Interim Development Plan 1967 - 1981

A draft Master Plan for urban development of Calicut was prepared by Sri.Rusi Khambatta as early as 1957 – 1962, at the request of the Calicut Municipality and with Government sanction based on the recommendation of the Chief Town Planner; the first attempt of its kind in the state towards city planning. However this Master plan had to be modified before implementation, as the town limit was extended to 84.27 Sq.km by the end of its preparation, and the Municipality was upgraded into a Corporation, in 1962. Also the

plan had to be remoulded slightly for economic viability and feasibility.

Meanwhile, in 1962, the Town & Country Planning Department (then, the Department of Town Planning and Architecture) initiated the preparation of a Regional Development plan for the Calicut Urban Region, covering the Calicut City and 43 surrounding Panchayats, with Government sanction. Under this project, the draft Master Plan was recast for the area identified as the Calicut Urban Complex, an Interim Development Plan for the time period 1967-1981 was prepared by the Town & Country Planning department. The Interim Development Plan envisaged balanced use of urban land resources as well as adequate provision of urban services and facilities, and set aside suitable land for these purposes.

In 1980, the Calicut Development Authority, a statutory establishment under Madras Town Planning Act (1920), was formed by the government to prepare and implement General as well as Detailed Town Planning schemes for Corporation and eleven panchayats in the surroundings, namely Elathur, Kuruvattoor, Kakkodi, Kunnamangalam, Peruvayal, Olavanna, Cheruvannur-Nallalam, Beypore, Feroke, Kadalundi and Ramanattukara. Further, on the basis of the Interim Development Plan, a number of area development Plans were also prepared, published and sanctioned by the Government for implementation.

The activities of CDA and the Housing Board helped materialising the Interim Development Plan proposals to a certain extent. However, the implementation was at a slow pace, due to delay in mobilizing financial resources, acquisition of land and other procedural difficulties. Also, the absence of control in the fringe areas resulted in unchecked urban sprawl beyond the plan area, especially towards the South.

2.2 Development Plan for Calicut Urban Area (1981 – 2001)

The second statutory General Town Planning Scheme, the Development Plan for Calicut Urban Area, was enforced in 1994, which covered an extent of 111.9 Sq.km, under the Corporation and four of the eleven panchayats under the jurisdiction of CDA namely, Cheruvannur-Nallalam and Beypore Grama panchayats and parts of Feroke and Kadalundi Grama panchayats. The plan predicted a rise in the population

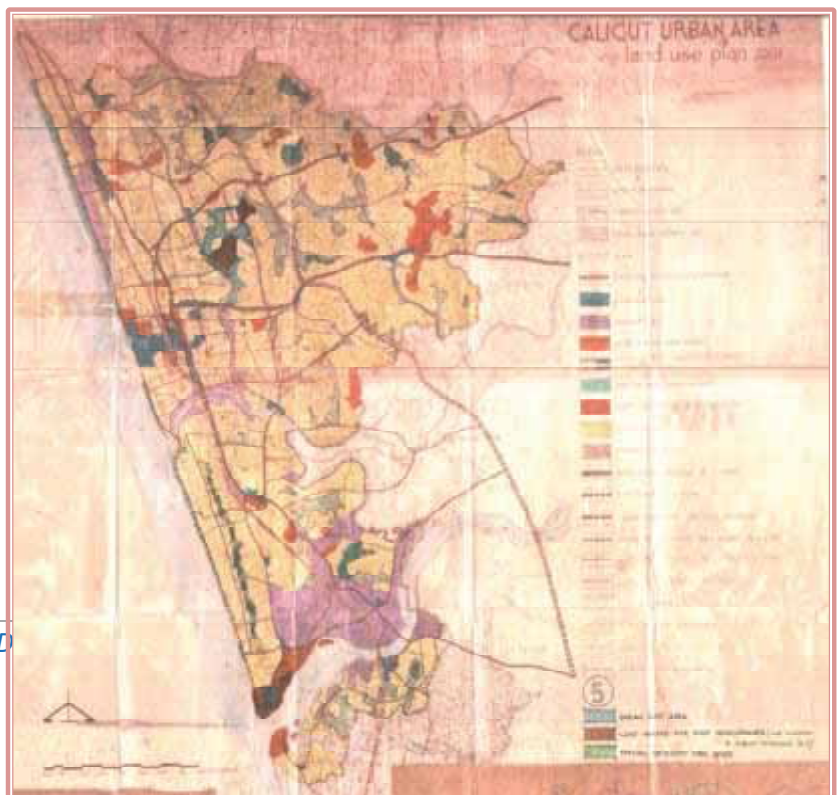


Figure 2-3: Development Plan for Calicut Urban Area 1981 – 2001

content from 4.97 lakhs in 1981 to 8.0 lakhs by the end of the plan period, and envisioned a balanced and integrated urban development to cater to the future needs up to year 2001.

The Zoning Regulations sanctioned in 1994 as part of the Development Plan (1981-2001) were modified in 2007, considering the rapid urbanization, fringe area development and changes in building typology. This variation was sanctioned by Government in June, 2007 which are still in force.

Among the major proposals formation of new 45 m wide NH bypass is now in completion stage. Mavoor road, Canal road, Kannur road, Wayanad road, Link roads in CBD, Calicut mini bypass, Kovoov palazhi road, Kovoov Vellimadukunnu road, Beach road, meenchanda - civil station road, Vellayil - CWRDM road and Francis road- Mankavu road were partially implemented. Construction free land for road widening is ensured by the road development proposals. Dream city area (Sarovaram), Beach beautification scheme, Industrial development at West hill, Cheruvannur, Kolathara, Feroke, planned residential development, Development of CBD etc. are some of the outcome of zoning. Conversion of paddy and wet lands into other use is controlled by the strict zoning regulations.

2.3 Detailed Town Planning Schemes

Subsequent to the Interim Development Plan and the Development Plan (1981-2001), many Detailed Town Planning Schemes were prepared for specific areas needing priority attention and for specific sectors of development. The implementation of these DTP Schemes was entrusted with the Calicut Development Authority. The sanctioned DTP Schemes and their features are listed below.

1. DTP Scheme for Ward 1 , West Hill area of Kozhikode Corporation

The objectives of the scheme were to widen the NH66, to enhance the internal connectivity and to promote the residential nature of the area.

Level of implementation: Planned residential development, widening of NH and Westhill - Karaparamba road etc. are partially implemented, No other proposals were implemented.

2. DTP Scheme for Ward 7(P),10& 13(P)

The objectives of the scheme were to retain existing public, semi public lands and development of green open spaces and to promote Developments at CBD by providing suitable land use zoning and road proposals.

Level of implementation: Development of green open spaces (Mananchira Square) and Road D-D (Vaikam Muhammed Basheer Road) implemented. Widening of NH66 and Oyity road partially implemented.

3. DTP Scheme for Ward 13(P)

The objective of the scheme is to develop an environment friendly CBD, to enhance the internal connectivity and to promote the commercial nature of the area.

Level of implementation: Railway station link Road B1-B1 (Jayaprakash Narayan Road) Implemented, Road E2-E2, E - E (Kamathi lane) partially completed. Commercial acquisition projects partially accomplished.

4. DTP Scheme for Sector No. 8 Ward 4&6, of Kozhikode Corporation

The objectives of this scheme were to widen NH 66, to enhance the internal connectivity and to promote the residential nature of the area.

Level of implementation: Widening of YMCA cross road and Christian college cross road were implemented. Widening of Wayanad Road, Kannur road, Gandhi road and Red Cross road are partially implemented, No other proposals implemented.

5. DTP Scheme for Big Bazaar Area Scheme No.1

The objectives of the scheme are Promoting Commercial Developments at CBD, retaining existing public & semi public areas, improving connectivity, facility for lorry parking etc. by providing suitable land use zoning and road development proposals.

Level of implementation: Road B3-B3 (Lorry stand road) partially implemented. Proposed lorry stand implemented. Commercial establishments increased.

6. DTP Scheme for Big Bazaar Area Scheme II of Kozhikode Corporation

The objective of this scheme is to enhance the internal connectivity and promoting the commercial nature of the area without affecting the comfortable living of residents in the area.

Level of implementation: Road A-A (Beach road) partially implemented. Commercial area enhanced, Central fish market improved

7. DTP Scheme for Beach Area of Kozhikode Corporation

The objective of the scheme is to retain existing green open spaces. Promoting industrial and small industrial developments by providing suitable land use zoning and road proposals.

Level of implementation: Road A-A (Beach road) implemented. Commercial area enhanced.

8. DTP Scheme for Ward 5, Sector 8 of Kozhikode Corporation

The objective of this scheme is to provide major roads around the scheme area, Enhancing the internal connectivity and promoting the residential development in the area.

Level of implementation: Roads B-B(NH), B1-B1(Christian college - Karimbanappalam), C3 - C3 (Jawahar Nagar colony road) are implemented. Road A -A (N H 66) and Road A1 -A1(Kannur road) are partially implemented, Road C1 - C1(Kottaram road) implemented partially with slight variations.

9. DTP Scheme for Ward 5, Sector 9 of Kozhikode Corporation

The objective of this scheme is to develop major roads around the scheme area, Enhancing the internal connectivity and promoting the residential nature of the area.

Level of implementation: New roads B -B (Gandhi road - Karimbanappalam), B1 - B1 (Canal road) & C - C (Jaffer Khan Colony Road) and Planned residential development implemented, widening of Road A-A (Wayanad road) partially implemented.

10. DTP Scheme for Ward 15(P)& 16 of Kozhikode Corporation

The objective of this scheme is to provide major roads around the scheme area, Enhancing the internal connectivity and to promote the residential and commercial nature of the area.

Level of implementation: Widening of roads A2 -A2 (Beach road) and B-B (Francis road) partially implemented, Ensured availability of Construction free land for road widening. Parcels of land got surrendered to government through land surrendering process on building applications.

11. DTP Scheme for Ward 15(P) of Kozhikode Corporation

The objective of this scheme is to retain existing green open spaces. Promoting industrial and small industrial developments by providing suitable land use zoning and road proposals.

Level of implementation : Road A- A(Beach Road) and widening of road C - C (Kallai - Mukhadar road) partially implemented, Industrial zone protected, Ensured availability of Construction free land for road widening, No other major proposals implemented.

12. DTP Scheme for Ward 17, Kottaparamba area of Kozhikode Corporation

The objective of this scheme is to improve major roads around the scheme, enhance commercial activity, bus terminal and improve internal connectivity

Level of implementation: Widening of Road B1 -B1 (Ram mohan road), B2 -B2 (Pavamani road), B3- B3 (Canal road) and C - C (Rajaji road) completed, widening of A-A (NH66), A1-A1(Indira gandhi road), B-B (Jail road) and C2 - C2 (stadium road) partly implemented.

13. DTP Scheme for Civil Station Area – Scheme III

The objective of this scheme is to Develop NH Bye pass, provide major roads around the scheme area, enhancing the internal connectivity and promoting the residential nature of the area.

Level of implementation: Road A-A (NH Bypass) implemented. Widening of Wayanad road partially implemented, residential nature of the area is preserved

14. DTP Scheme for Cheruvannur-Feroke Industrial Area- Scheme I, Scheme II, Scheme III and Scheme IV

The objectives of these schemes were to promote industrial and small industrial establishments without effecting residential occupants, to develop port and allied activities and to retain the wetland and paddy fields.

Level of implementation: Industrial and small industrial area enhanced and functioning as the industrial hub of the city, Feroke Kadalundy road widening implemented, Widening of BC road partially implemented. The enactment of the 73rd and 74th Constitutional Amendment Acts of 1993 entrusted the town planning function on the Local Governments, as a result of which the move to wind up Calicut Development Authority began in 1996. The functions of the CDA were delegated to the respective Local Self Governments. Thus, the Development Plan and Town Planning Schemes are being implemented presently by the Corporation.

2.4 Perspective Plan 2003

After the horizon period of the Development Plan was over, exercising the powers entrusted by the Constitutional Amendment Acts, the Kozhikode Corporation started the preparation of a new Master Plan, the Perspective Plan, for the city and 11 neighbouring Panchayats (320.9Sq.km), approximately covering up to Korapuzha in North, Kunnamangalam in the East and Chaliyar in the South.

The area between Beach and Connolly Canal, identified to be the most active zone, was treated as the core of the city. The surrounding area within the corporation formed a second zone, and the Panchayats formed the third planning zone. Non-spatial aspects were given more importance in the plan. The Perspective plan focused on rejuvenation of the trade and commerce, uplifting and up gradation of slums, betterment of urban services like provision of drinking water & sanitation facilities, decentralized and safe transportation system, developing an institutional area near the city, developing the city as an educational centre and a tourism transit point, solving environmental issues & identifying zones for various developmental activities. Programs for development within 5 years, 10 years and beyond 10 years were identified in the plan for major sectors, including preparation of a GIS based spatial Master Plan with proper legal backing, preparation of a list of works that can be implemented on priority basis till the Master Plan gets revised, constitution of a Metropolitan Planning Committee as envisaged in the C.A.A, formation of an Advisory Group for all implementation tasks related to the Master Plan, However, the Perspective Plan was intended to have no legal backing, was not notified and hence is not statutory.

2.5 City Development Plan 2006

The preparation of a City Development Plan (CDP) for Kozhikode was initiated in 2006, seeking to benefit from the Jawaharlal Nehru National Urban Renewal Mission (JnNURM), a centrally sponsored scheme. The focus and coverage of the CDP were same as those of the Perspective Plan 2003. The sectors covered include Infrastructure(Water

supply, Drainage, Sewerage, Solid Waste Management, Traffic and Transportation), Environment , Urban Regeneration , Heritage and Tourism, Social Infrastructure, Poverty Alleviation, Urban Governance and Financial Sustainability.

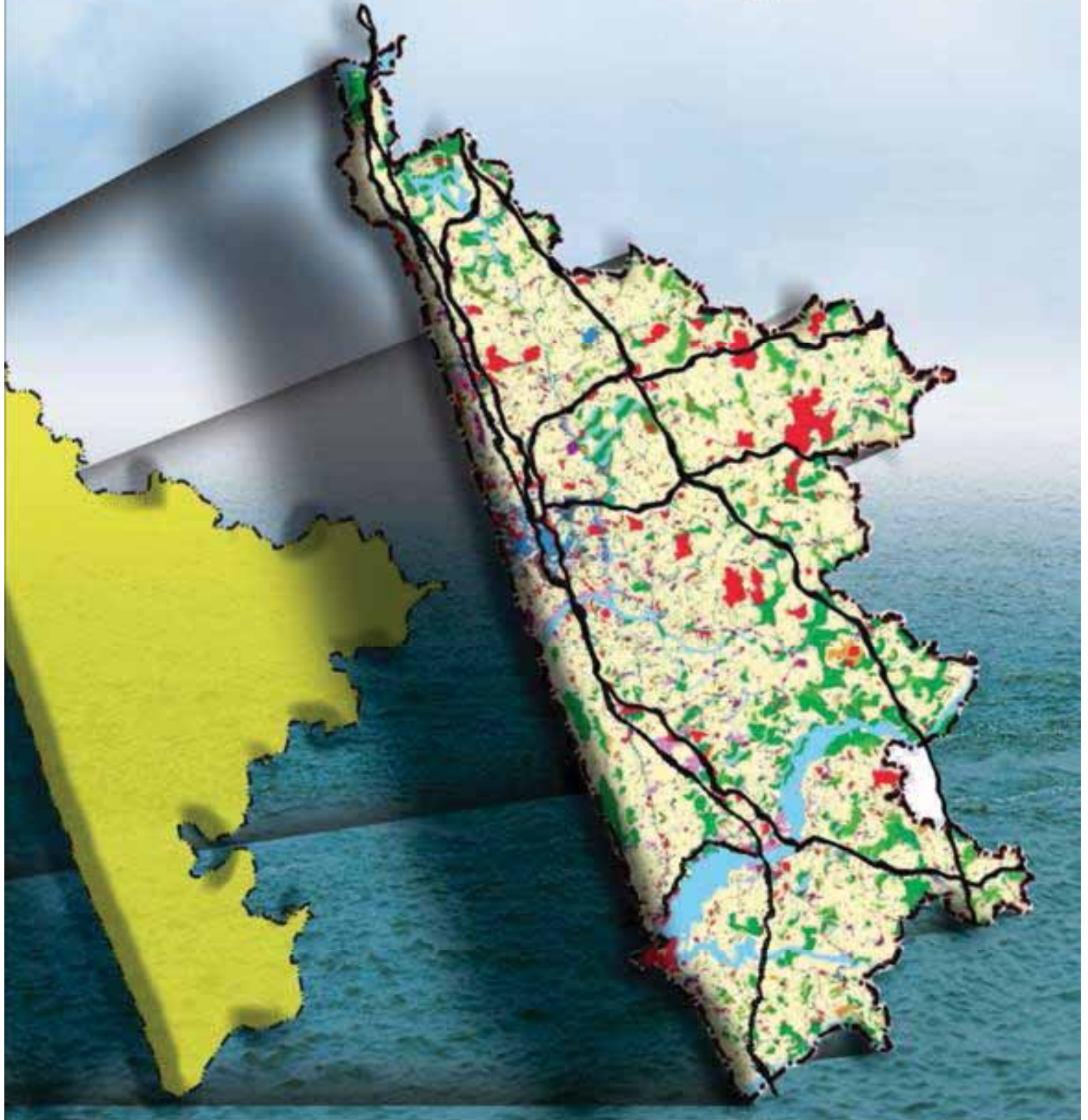
However, no grass root level consultations were carried out to evolve the general and sector wise vision. Though the entire urban agglomeration is considered as the delineated area for CDP, projects were suggested only for the city area in many of the sectors. Detailed study of the needs of the peripheral panchayats included in the Planning area was also necessary to bring out a plan based on the guidelines of JNNURM. But, the proposal to the 28 cities including Kozhikode under the Mission (JNNURM) was rejected by the Planning Commission on account of resource constraints in 2011. The city nevertheless hopes to reap the assistances as the Union government announced the second phase of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) scheme in 2012.



3

* Delineation of Planning Area
* Organisational Setup

*P*lanning Area Delmeation and Plan Preparation



* General Planning Process

* People's Participation

* Planning Units

* Scope and limitations of the study

3.1 Delineation of Planning Area

The development scenario in and around the LSGI under consideration governs the Planning Area for each Development Plan. (The detailed procedure of planning area delineation is discussed in Annex I). Thus, the planning area for the preparation of Masterplan for Kozhikode was delineated considering the



administrative boundaries, urbanisation status as per Census and Activity Pattern of the Corporation and the nearby LSGIs, as revealed by the District Urbanisation Study conducted by the Department.

The LSGIs in the periphery of the Corporation, whose Activity Pattern is Secondary or Tertiary in nature, are expected to function essentially as a single conglomerate with the Corporation. Moreover, the tertiary nature of the LSGIs confirms the

complete conversion from agrarian economy and the dependence on service sector. This calls for scientific interventions aiming at the comprehensive development of these areas and deterrence of any decline in the quality of living. Considering these, the Planning Area for the preparation of Masterplan was delineated to include five LSGIs namely, Kozhikode Corporation, Kadalundi Panchayat, Feroke Panchayat, Ramanattukara Panchayat and Olavanna Panchayat covering a geographical area of 177.08 Sq.km.

3.2 Organisational Setup

As the planning area delineated for the revision of Kozhikode Masterplan includes the Kozhikode Corporation and the four contiguous local governments of Olavanna, Ramanattukara, Feroke and Kadalundi, all these constituent local governments are jointly responsible for preparation of a Joint Town Planning Scheme (or, a Masterplan) for the area and therefore a Joint Town Planning Committee is to be constituted for the purpose, as provided in Section 38 of the Madras Town Planning Act, 1920 for planning of the region under consideration. Hence a JTPC of the LSGIs in the planning area with Kozhikode

Corporation as mother city and the panchayats of Olavanna, Feroke, Kadalundi and Ramanattukara as constituent local governments, as provided in section 38 of Madras Town Planning Act 1920, was constituted for coordinating and undertaking the planning activities for the planning area, vide the Government orders G.O.(Rt) No. 3353/10/LSGD dated 28.10.10 and G.O.(MS) No. 13/2011/LSGD dated, Thiruvananthapuram, 14/01/2011. The composition, functions and powers of JTPC are discussed in Annex II. Kerala Town and Country Planning Act 2016 came in to force on 17-03-2016 and the publishing and sanctioning procedures of this plan were done according to the act. In the act, Joint Town Planning Committee has been replaced by Joint Planning Committee.

Various agencies involved in the preparation of the Masterplan and their roles & responsibilities are presented briefly below.

<i>Agencies</i>		<i>Responsibilities</i>	
Local Government	Joint Planning Committee	Preparation, Publication and Statutory Processing of the Masterplan ,Coordination of various agencies in the preparation of draft Masterplan, Convening of meetings, Creating public awareness and ensuring public participation, adhering to timelines in preparation of Masterplan, Giving support and suggestions to the District Office of Town & Country Planning Department.	
	Spatial Integration Committee	Extend support to the District Office of the Department of Town and Country Planning in various stages of preparation of Masterplan.	
	Working Groups	Giving guidance and support to the Spatial Integration Committee for data collection, Giving necessary support to the Spatial Integration Committee during data compilation and local level analysis, Giving support during other stages of Plan preparation.	
Department of Town and Country Planning	O/O the Chief Town Planner	Project Cell	Overall Coordination, Training materials, Trainings, Check lists, Tool kits, Customised soft ware, Analysis techniques.
		Senior Town Planner of Circle	Technical support to Project Cell, Guidance to District Offices in Plan Preparation, Review and finalisation of each Plan at various stages of preparation, Statutory Processing of the Plan(s).
	District Office	District Town Planner	Overall coordination of the work at District level adhering to the approved work-plan, Guidance to Planning Team and vetting and finalisation of works done by the Planning Team at each stage, Submission of reports & maps complete in all respects-as per work plan, Presenting the works done before LSG/ Circle as and when required, Statutory Processing of Plan.
		Planning Team	Surveys, Studies & Analysis, Consultations, Plan Preparation.

Stepwise details of the General process (technical) of Preparation of Masterplan are provided in Annex III.

3.3 People's Participation

Unlike the previous development plans, the preparation of this Masterplan ensured through and through participation of the common public in all stages of the preparation.

A development seminar was conducted on 31.07.2010 to give an introduction of the Masterplan. Thorough involvement of the elected representatives of the local governments was ensured through various meetings organised at the behest of the District Town Planner in the Panchayats and Corporation. Many meetings and workshops of the JTPC, SIC and working group members were convened in all stages of the Masterplan preparation like data collection, local level analysis, envisioning and detailing. The concerned departments' representatives were also part of these meetings, seminars and workshops, besides the one-to-one discussions conducted with them.

While as many possible elected representatives, social activists, historians, academicians, architects, urban designers, scientists, etc. were consulted for the preparation of the Plan, many dynamic organisations of the citizens, engineers, developers, investors, etc. keenly participated in the process and gave their valuable opinions. Besides, extensive publicity was given by the press and other media and discussions were generated on their own platforms, all of which added substantial value to the Masterplan.

3.4 Planning Units

Various data were collected in different geographical units, due to unavailability of data on the same geographical base. The land use data for Calicut Corporation was collected on revenue ward basis, whereas those for the panchayats were collected on electoral ward basis. Similar situation persisted in Socio-economic survey as well. Besides the electoral wards various panchayats differed in their time periods. Further, the latest Census data available was based on the 55 electoral wards, which consisted of only the wards of Old Corporation. There was a wide variation in the area and population content of the wards of old corporation area and that of Panchayat, which would make an analysis on the distribution pattern of any of the

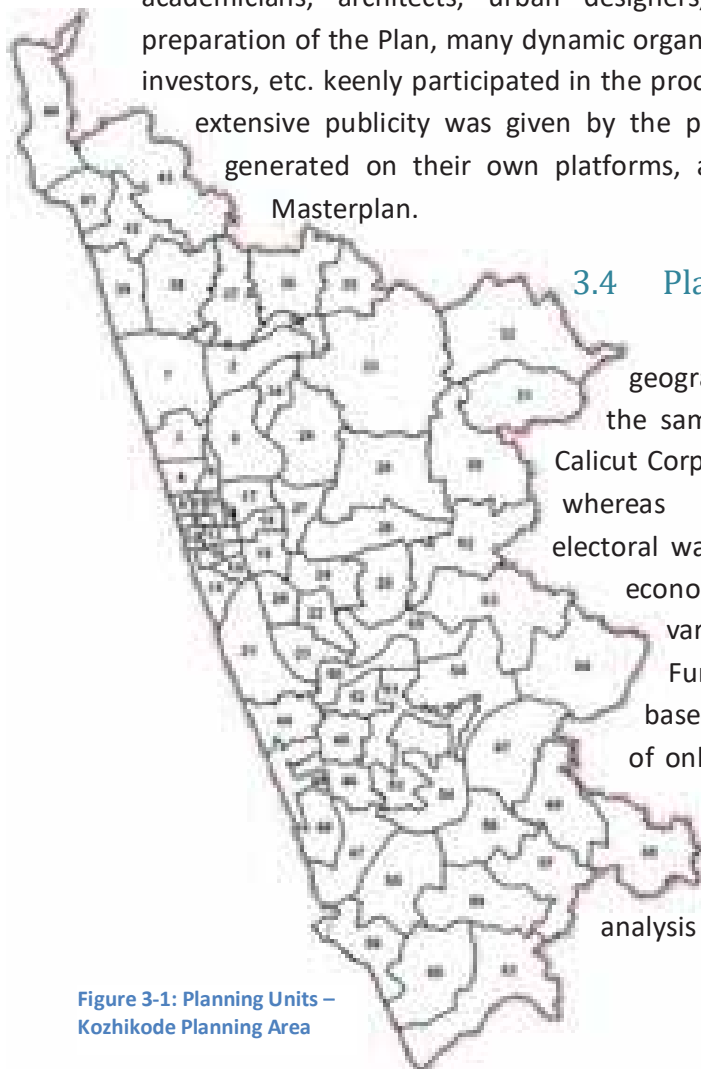


Figure 3-1: Planning Units – Kozhikode Planning Area

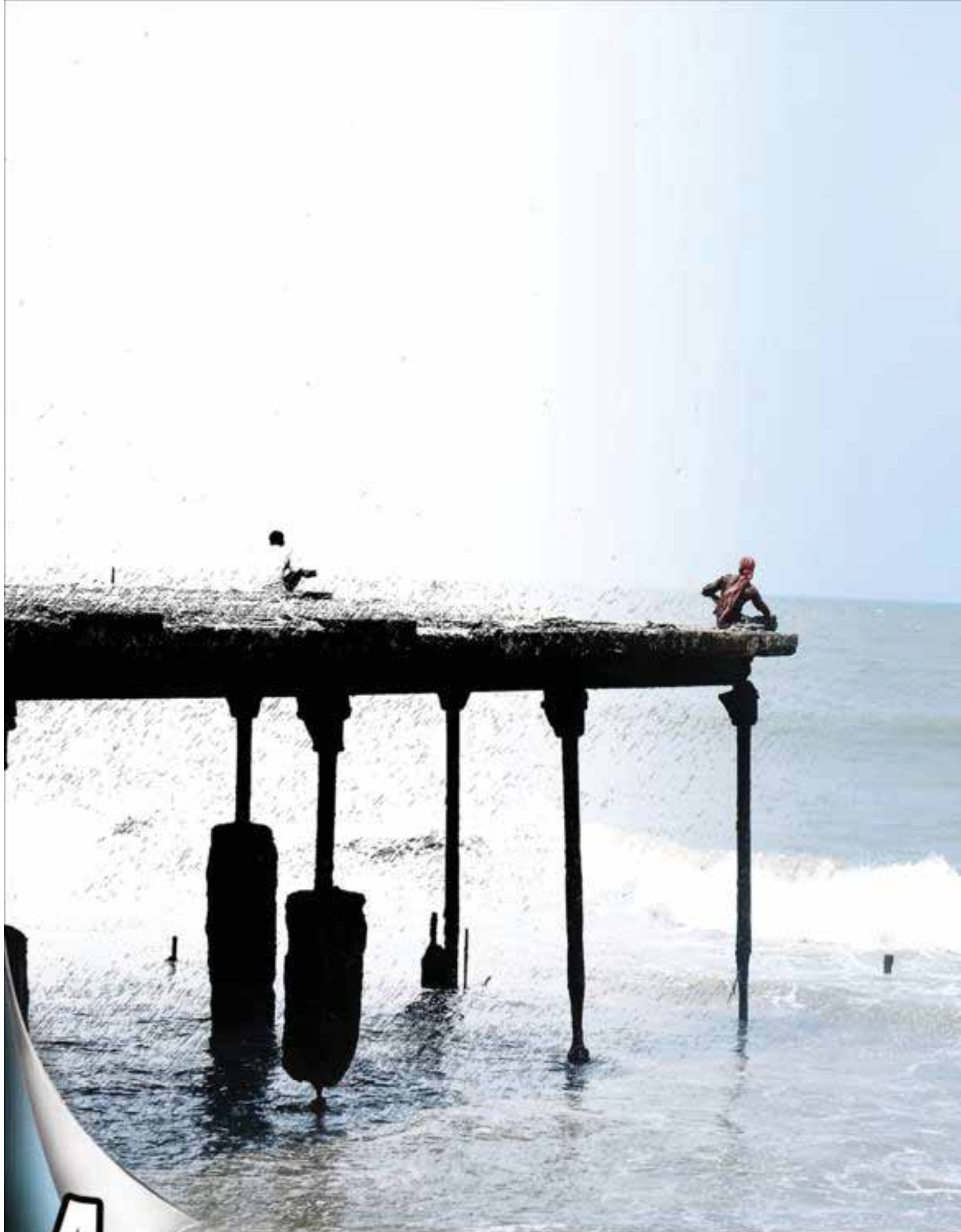
parameters based on these wards pointless. To derive comparable geographical units in the Planning area based on which the socio economic, land use and census data can be analysed and compared with each other, a common geographical basis , namely 'Planning Units', was derived.

The Socio-economic survey, census and land use data collected was reworked to these Planning Units. The Census data was interpolated to the wards used for Socio Economic Survey. Further, to make the area and population content comparable to those of old Corporation area, these wards were combined to form geographical units having comparable population to that of the wards of Old Corporation. By combining the wards having similar nature in terms of its location and activities, it was ensured that the original character of the wards was retained. Thus, the areas under the jurisdiction of panchayats formed 30 Planning units. Along with the 39 revenue wards of old corporation area, each of which formed a planning unit, a total of 69 Planning Units were formed in the Masterplan area, as given in figure 2-2. The details are presented in Annex IV.

3.5 Scope and Limitations of the Study

The land use surveys were conducted in 1:4000 (Corporation Area) and 1:6000 (Panchayat areas) scale.

Due to time limitations, the detailed road alignments of the proposed roads in the Masterplan are scheduled to be published later on.



4

* Location

* Area and Population



P

rofile of the Planning Area



* Regional Setting

* History and Evolution of the City

* Topography

* Climate

* Natural Resources

* Inference

4.1 Location

Kozhikode Corporation, the mother city, as well as, Ramanattukara and Feroke Municipalities and Olavanna and Kadalundi Panchayats, the constituent LSGIs of the planning area, forms part of Kozhikode Taluk of Kozhikode District. The planning area situated on the West Coast of Indian sub-continent and on the North West of Kerala state, at latitudes between $11^{\circ}9' N$ to $11^{\circ} 21' N$ and longitudes between $75^{\circ} 44'E$ to $75^{\circ} 51'E$ and has Korappuzha as its North boundary, Thalakkulathur, Kakkodi, Kunnamangalam, Peruvial and Perumanna panchayats on the East, Kadalundippuzha on the South and Lakshadweep Sea on the West. Kozhikode Corporation is the headquarters of Kozhikode district, covering an area of 2344Sq.km on an undulating terrain with ground level varying from 2m to 1339m from the mean sea level and bounded by Kannur district on the north, Wayanad and Malappuram district on the east, Malappuram district on the south and Lakshadweep Sea on the west.

4.2 Area and Population

Kozhikode Corporation has a population of 608255 (2011 Census), about 20% of the district, in a geographic extent of 118.59 Sq.km, which is about 5% of the District. (District

Population: 30,86,293 distributed over four taluks namely Vatakara, Koyilandy, Thamarasseri and Kozhikode). The literacy rate of the corporation is 94% while that of the district is 92%. The gross density of population in the corporation area is 5129 Persons/Sq.km while that in the district is 1317 Persons/Sq.km.

The planning area, inclusive of the Corporation and the four surrounding panchayats, has a population of 8,14,214 in an area of 177.09 Sq.km , i.e., 26.4% of the district's population in 7.56% of its extent. The gross density in the planning area is 4598 Persons/Sq.km. The literacy rate is 95%. (2011 Census)

4.3 Regional Setting

The regional setting of a town is depicted by its hierarchy in the District, the activity the town has to perform in the district scenario and its connectivity with different settlements. To

Government of Kerala



Figure 4-1: Regional Connectivity

understand the regional settings, a study of the urbanisation pattern in the district was undertaken as part of the District Urbanisation Report. It reveals that there is only one settlement in the whole district, the Kozhikode Corporation that falls in first order functional hierarchy. Kozhikode Corporation, as well as the contiguous LSGs included in the planning area namely, Kadalundi, Ramanattukara, Feroke and Olavanna shows urban activity pattern. The study predicts that the major developments will be concentrated around the first order settlement, Kozhikode Corporation. It also concludes that the tertiary activities will be concentrated in the LSGs along the coast adjacent to the first order settlement as well as the existing urban centres.

Kozhikode city is well connected with all the three modes of transport, and acts as a regional transit hub for whole of North Kerala. The nearest airport is Karipur which is located 28km away from city. The Trivandrum-Mangalore-Mumbai railway line not only connects the city with many major cities of the country, but also provides an excellent linkage between various coastal towns within the state. The city is well connected with the major coastal cities also through NH 47. The city is located 414 km north of the State capital Thiruvananthapuram. The distances from Chennai and Mangalore are 618 km and 221 km respectively. The centre of economic development of the State, Kochi is at a distance of 220 km. NH 212 gives direct connection to IT city Bengaluru. There is a continuous inland water route connecting Vatakara to Ponnani which is a part of West coast canal system connecting Thiruvananthapuram and Hosdurg. Beypore is an intermediate port in the state and is engaged in cargo transportation. There are two major ports within 250km radius i.e., Kochi and Mangalore.

4.4 History and Evolution of the City

Kozhikode, formerly called as Calicut, was the traditional capital of Northern Kerala under the Samuthiri ruler. It was the most prominent region of Malabar, which was one of the safest trading centers for Arabs, Chinese, and later on Portuguese, Dutch and finally British, which flourished on trade and commerce for nearly three centuries since the 12th century. The city still retains its regional importance being the only Municipal Corporation of Northern Kerala, the District Head Quarters and the most important transportation hub for the whole of North Kerala.

4.4.1 History of Governance

The history of the district comprises of the history of Calicut and of minor principalities of Katathanat (mostly covering present Vatakara taluk), Kurumbanat (covering present Koyilandi taluk and portion of Kozhikode taluk) and Parappanat (extending over the region of Panniyankara, Beypore and Cheruvannur of present Kozhikode taluk). It was in the beginning of the fourteenth Century that most of the district came under one ruler, when

the Samuthiris came to prominence after a series of conflicts with Rajas of Kurambanat, Beypore, Parappanat and other chieftains.

The political climate of the district took a definite turn by the arrival of Vasco-da-gama, the Portuguese navigator on May 27, 1498 at Kappad about 15 km North West of Kozhikode (Calicut). The British entered the district in the early seventeenth century and the Samuthiri gave them freedom for trade, in 1615. In 1766 Haider Ali of Mysore State began his conquest in north Kerala with his army and in 1789, his son Tippu Sultan conquered Malabar, further to which Kozhikode witnessed many changes in the social system.

Under the British Raj, Malabar (which includes Kozhikode) became part of Madras Presidency on May 21; 1800. Calicut was a Municipal Board in the District of Malabar in Madras Presidency. By the end of the nineteenth century, when the Nation witnessed the emergence of national freedom movement, Kozhikode also witnessed massive support and adherence to freedom struggles like Salt Sathyagraha (1930), Quit India Movement (1942) etc.

From 1947 to 1956, Calicut functioned as the headquarters of Malabar district of Madras state. After the reconstitution of states in 1956, the Malabar District was included in Kerala State in 1957 and Calicut was declared as the headquarters of Kozhikode district in Kerala State.

4.4.2 History of Development

Recorded history reveals that Kozhikode city was established in 1034 A.D. by the rulers, the Samuthiris, on the principles of Vastusasthra. Calicut (Kozhikode) was essentially a trading centre.

During the British Rule in 1800, Kozhikode became a Municipal Board. Several developmental measures on judiciary, communication, education and local self-governance were introduced under the British in this time period. British Collectors of Malabar like William Logan and Connolly contributed to the regional development of the town. The West Coast Trunk road (now, NH 17), the Frontier road (now, NH 212), the Railways, the Connolly canal and a number of educational institutions were some of their major developmental initiatives, which had far reaching impacts in the development history of the town.

Connolly, the Collector in 1840s is still cherished for his revolutionary effort to cultivate teak and for planning a waterway from Payyoli in Calicut to Mathilakam in Thrissur District, known today as the Connolly Canal. Though the faster development of other modes of transport has weakened its importance, with its eco-friendly nature and the increasing fuel prices, along with the substantial potential to strengthen tourism in the region, Connolly's plans of water transport are assured to be re-visited.

The town found a place in the railway map in 1858 when the works for railway line from Tirur and Beypore were started by the Madras Railway Company. This line was made

operational on 12th March, 1861. Later, railway line was extended to Calicut, and on 2nd January 1888, Calicut Railway Station was formally inaugurated as the Western Terminus of the Madras Railway.



Figure 4-2: Development and planning milestones of Kozhikode Corporation

Kozhikode Municipality was formed in 1866 under Town Improvement Act of 1865



The long extinct Bypore railway station

Courtesy: <http://calicutheritage.blogspot.in>

with an extent of 28.23 Sq.km and population of 36,602. Some parts of the city were electrified in 1934. The extent of the Municipality was increased in 1941 to 29.26Sq.km. Records reveal that the city started getting protected water supply in 1952. Kozhikode Corporation with an extent of 84.23 Sq.km was formed in 1962 annexing adjacent Gramapanchayats, as per the Calicut City Municipality Act 1961.

The city subsequently grew in to an Urban Agglomeration of 5,46,058 persons in 1981 and consisted of Kozhikode city, Olavanna, Cheruvannur, Beypore and Feroke extending over a total area of 138.35 Sq.km .

The Urban Agglomeration of Kozhikode according to 2001 census extends up to Kunnamangalam in the east, Ramanattukara in the south and Elathur in the North. Even though these areas are contiguous with the city, the linear development pattern along the road corridors have resulted in this pattern of urban sprawl leaving undeveloped areas with predominantly rural character in between these corridors.

In 2010, the administrative area of Kozhikode Corporation was extended from 84 Sq.km to 118.59 Sq.km by adding Elathur, Beypore and Cheruvannur Nallalam Panchayats.

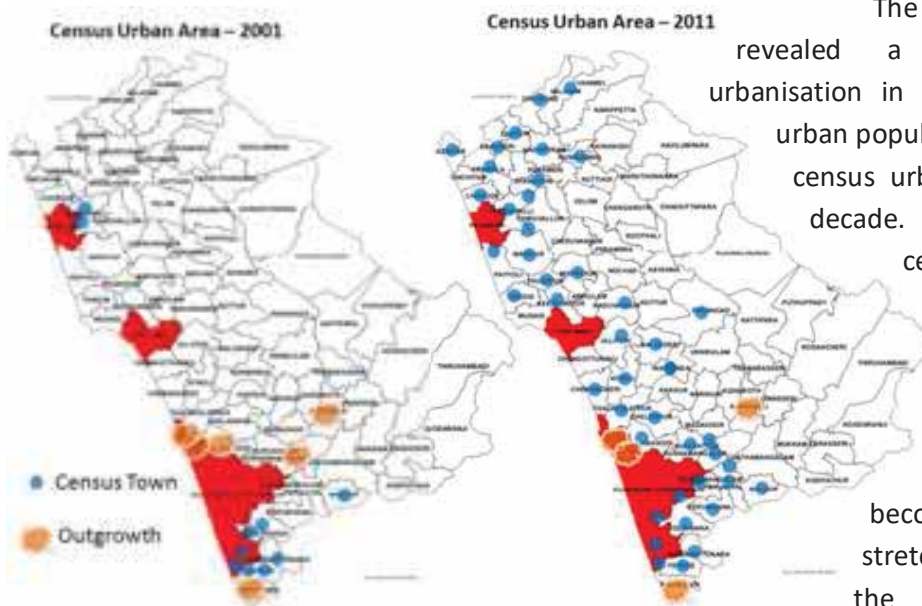


Figure 4-3: Census Urban Areas - 2001 and 2011

previous census.

The 2011 Census results revealed a stunning picture of urbanisation in the district, with 67.15% urban population and 173% increase in census urban areas in the previous decade. The spatial extents of census urban areas in the two previous censuses are depicted below. It can be seen that the Kozhikode urban agglomeration has become a continuous, vast stretch along the coast, against the three standalone urban agglomerations in the

4.4.3 Socio-cultural History

Kozhikode District is a miniature of God's Own Country, with all the state's much proclaimed attractions within its jurisdiction- the backwaters, beaches, hill stations, culture and even wild life. Calicut Corporation is placed amid these attractions and plays the role of a transit hub to the district's beautiful interiors.

The town has a great cultural and literary heritage. The region, one of the cultural treasure houses of Kerala, is hailed as the home of Kalarippayattu, Kerala's acclaimed martial art form. The place is famous for the folk songs called Vadakkan Pattukal, Mappila pattukal and Oppana, a traditional dance form of Muslim community. The indigenous cuisine and delicacies, renowned as the Malabari Cuisine, has evolved under the influences of the multi-cultural inhabitants of the past and attracts tourists from all over the world.

The Kozhikode port was an important point in the famed silk route. The city witnessed high volume of international trade. One key feature attracted the traders to this city was the honesty of the people of this city because of which the safety of the merchandise was assured. During this period most of the cities were facing looting of merchandise and vandalism evident from the ancient walled cities elsewhere in the country. Here in Kozhikode, the safety of merchandise was the norm and hence elaborate security measures were not called for. This has earned the city the title "the city of truth".



Kozhikode played a significant role in the history of Malayalam journalism, traced back to the year 1880. Kerala Pathrika, Keralam, Kerala Sanchari and Bharath Vilasam are a few of the newspapers published from Kozhikode before 1900. There were reputed centres of learning and culture in Kozhikode even during early and medieval periods.

The beginning of western education can be traced back to the first half of the 19th century, when the Basel Evangelical Mission started a primary school in Kallai. Subsequently in 1877 a school for the Rajas was started at Kozhikode.

The district contains sculptures and inscriptions which are of interest to the students of Art & History. The most important are in the Thali Temple, Muchundippalli etc. An art gallery of Lalithakala Academy and a museum are situated in the town.

4.5 Topography

Based on the topographical features, Kozhikode District can be categorized into 3 regions, viz the High Land -the mountainous region, 76m above mean sea level; Low Land - plain coastal belt, falling below 7.6m from MSL; and, Mid Land - the undulating area between two regions. The low land forms 6.7% of the total area of the district. The midlands may be further classified into low rolling terrain with slope of less than 15% and moderately undulating terrain with a slope between 15 and 25%, which covers a large area of the district. The planning area falls in the lowlands and midlands.

4.6 Climate

Kozhikode District falls within the tropical to subtropical climatic region and dominant feature is the monsoon. According to the Planning Commission of India categorisation, the District falls under West Coastal Plain and Ghats Agro Climatic Region. The climate is hot and humid with the hot season extending from March to May. The most important rainy season, the South West Monsoon from June to September, contributes about 60% of the annual rainfall. The North East Monsoon extends from the second half of October through November and contributes to about 25% of the annual rainfall. The average rainfall is 3266mm. The period between December and May is practically dry.

The maximum temperature in the region varies almost between 27°C to 33°C and minimum temperature ranges from 22°C to 27°C. April is the hottest month with mean temperature of 32.2°C and minimum temperature is 26.8°C. December is the coolest month with mean daily temperature of 21.9°C and maximum of 29.9°C. March to May constitute the very hot season. Most of the year, the percentage of humidity is very high especially in coastal region and it varies between 88.6% in July and August to 74% in April.

Winds over the study area are seasonal and significant change in wind direction and speed is evident between coastal and inland regions as well as between various localities. The dominant wind direction is the northwest. The average wind speed is generally high in April (4.4 km/hour) and least in end of the year, i.e. November or December month (2 km/hour).

4.7 Natural Resources

The planning area is blessed with abundant water resources. Three major rivers- Korapuzha, Chaliyar and most importantly, Kallai have influenced the development of Kozhikode urban area. One more river drains the planning area, namely the Kadalundi River, and form the South boundary of planning area. Kallai, on the banks of Kallai River, was a

main centre of timber trade. Chaliyar is an interstate river and the major source of drinking water in the planning area. One of the tributaries of Korapuzha, the Punooppuzha, is the other major source of drinking water. Korapuzha and Kadalundipuzha are famous for their mangrove reserves.

Kozhikode District has a coastal line of 72Km covering an area of 91 Sq.km. The corporation area has a coastline of about 22Km. A number of fishing harbours/fish landing centres are established along this coast, and fisheries contribute significantly to the local economy. There is a natural harbour at Beypore, offering ample scope for development of a harbour-centric economy.

The district has predominantly two types of soil, the sandy coastal Alluvium along the coastal belt at an average width of about 10 km and Laterite soil in major part of the district except the coastal strip. Riverine alluvium, Brown Hydromorphic and Grayish Onattukara are also found in small stretches. The alluvial soil is made from recent marine deposits. The crops irrigated in alluvial soil include coconut, tapioca, paddy and fruits. The laterite soils have poor water-holding capacity, acidic, and poor in nutrients. But, it is widely cultivated with diverse crops like coconut, tapioca, rubber, areca nut, pepper, cashew etc. with proper application of fertilizers and irrigation. The Riverine alluvium is found mainly on the banks of rivers and tributaries, on flat to gently sloping lands. They are characterised by good productivity and the usual crops cultivated in it are coconut, areca nut, banana, vegetables and fruits. Brown Hydromorphic soils are mostly confined to valley bottoms of undulating topography in the midland and to low lying areas of coastal strip. These are also found in areas of wetland. Grayish Onattukara occur as marine deposits extending to the interior up to the lateritic belt. These soils have very rapid permeability. In low-lying areas, the water table is high and drainage is a problem. Coconut, Paddy and Tapioca are the major products cultivated in these soils.

The district has dependable ground water resources as well; the stage of groundwater development during 2004 is 61.88 %, leaving scope for further development and irrigation using groundwater. The depth to water level varies from less than 2 to more than 10 in the district, except the hilly area. However, the master plan area, falling in Kozhikode and Chevayur blocks, is 'Over-exploited' and 'Semi critical' respectively, pointing towards the urgent need for recharging ground water aquifers and a comprehensive, efficient ground water resource management strategy. The quality of water from shallow and deep aquifers in the district is good for domestic and irrigation purposes. As per the drinking water standards of Bureau of Indian Standards (BIS) the groundwater of Kozhikode district is suitable for all purposes. The quality of water from deep aquifers also indicates that the water is suitable for drinking purposes. (Source: http://cgwb.gov.in/District_Profile/Kerala/Kozhikode.pdf, 2009). However, certain localities in the Master Plan Area like

Kadalundi report high salinity intrusion in the wells, which makes the water seemingly not good for consumption.

The planning area is also endowed with rich biodiversity. Kadalundi Panchayat in the Masterplan area is famous for its estuarine wetlands which house a wide variety of mangroves and their faunal associates. Kadalundi also has a renowned Bird Sanctuary which is abode for a variety of migratory birds and is a declared bio-reserve. Above 135 species of birds are found in this sanctuary, many of which are endemic, endangered and threatened. Kadalundi is also famous for a wide variety of fish, mussels and crabs. Kottuli Wetlands, an urban wetland and the largest wetland in Kozhikode city, is an ideal habitat for estuarine fish, prawns, crustaceans, molluscs, birds, the endangered Asian otter (*Lutrus lutrus*) and a wide variety of plants and mangroves. This wetland has been identified by the Ministry of Environment and Forests, Government of India, under National Wetland Conservation Programme.

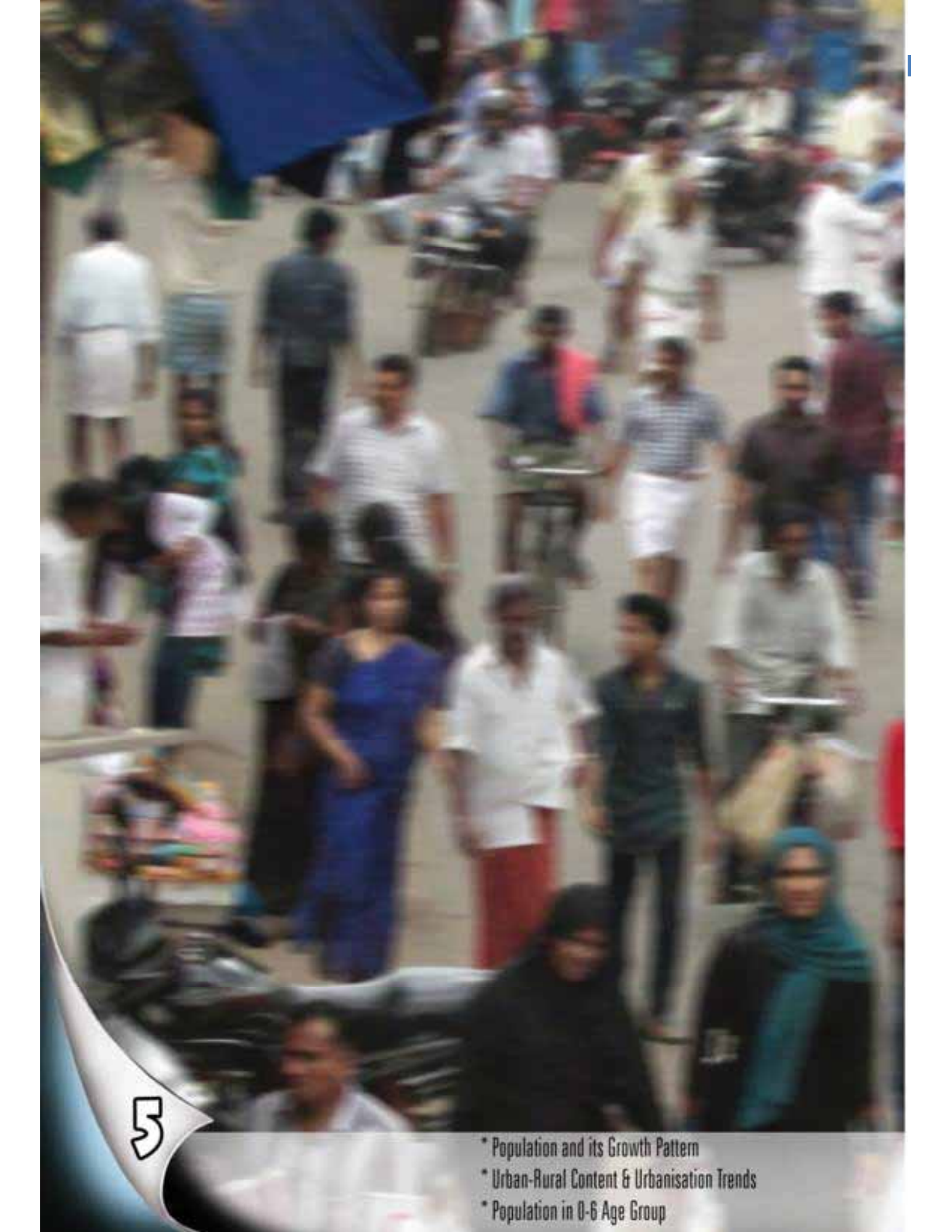
Besides, the district and the urban area are rich in Sacred Groves, the indigenous Indian way of urban forestry and biodiversity conservation and reportedly house various endangered flora and fauna, including valuable medicinal plants. The biodiversity of coastal areas, estuaries and mangroves are highly threatened with anthropogenic activities.

4.8 Inference

Kozhikode city has remained a seat of power and the most important centre of administration, trade and culture from ancient times and still retains its prominence in North Kerala. Kozhikode Corporation is located strategically with excellent air, water and road linkages and serves as a transit hub for whole of north Kerala, especially remote districts like Wayanad. From the District Urbanisation Study, it is understood that Kozhikode Corporation is expected to continue to serve as the single 1st order settlement in the district, in the Masterplan period. This point to the importance of scientific allocation of the already scarce land resources in the planning area, so as to cater to the higher order needs of the whole district, while not compromising with the quality of life offered to its residents.



Mangrove Reserves in Kadalundi



5

* Population and its Growth Pattern

* Urban-Rural Content & Urbanisation Trends

* Population in 0-6 Age Group



- * Sex Ratio
- * Child Sex Ratio
- * Age-Sex Pyramid

- * Literacy
- * Household Size
- * Inference

In 2011, Kozhikode district remains the fifth in the State in population size, as in the previous decade, with 30,86,293 persons. Besides, it ranks second in North Kerala, just behind Malappuram, the most populous district in the state. Kozhikode Corporation¹ is the third most populated among the five Municipal Corporations in the state, behind Thiruvananthapuram and Kochi, and has a population of 4,31,560 persons. (Source: Census 2011).

5.1 Population and its Growth Pattern

Kozhikode district is one among those five districts in the State of Kerala which showed an increase in their share of the State’s population, in the last decade, as per the results of Census 2011. It is noteworthy that all these districts (Malappuram, Ernakulam, Kozhikode, Palakkad and Kasaragod) are the northern districts of the state except Ernakulam. However, the increase is negligible in all four districts including Kozhikode and in Malappuram district, the increase is about 1%.

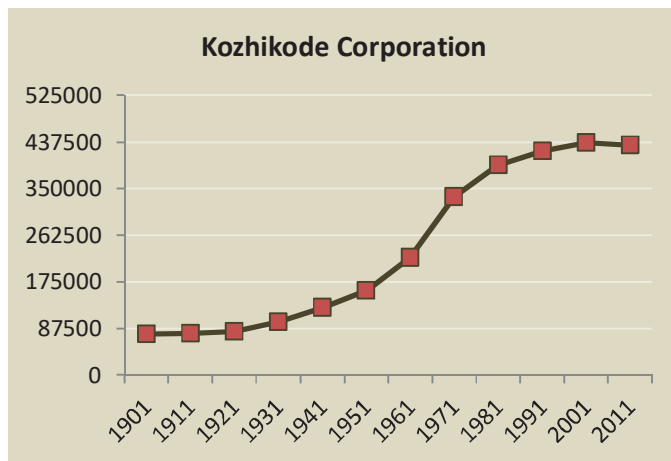
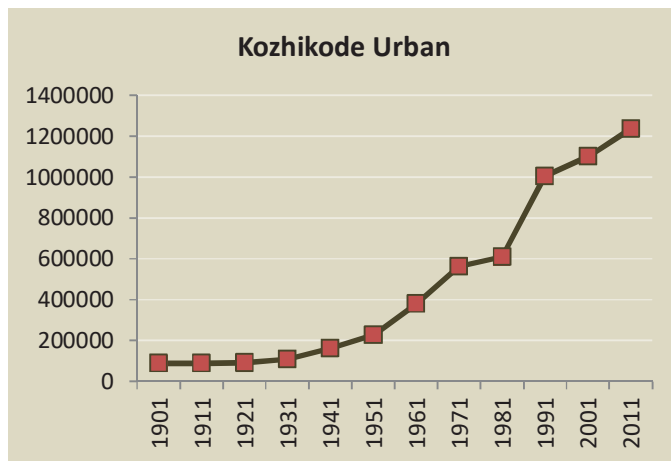
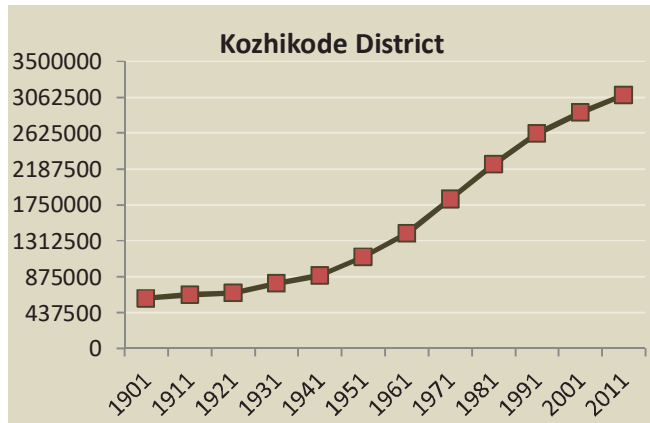


Figure 5-1: Temporal Population Growth in Kozhikode Dt, Kozhikode Urban and Kozhikode Corporation

¹The Kozhikode Corporation mentioned in this chapter refers to the administrative limits as in 2009, as considered by Census 2001 and 2011. Elathur, Cheruvannur Nallalam and Beypore, which are part of the Kozhikode Corporation since 2010, are considered as independent local governments.

5.1.1 Population Growth

The growth of population in Kozhikode district, its urban areas and the Kozhikode Corporation, during the last century is represented in Figure 5-1. It can be seen that while the population in the district and the corporation was gradually increasing, they didn't follow a similar pattern. It is evident that the population in Kozhikode Corporation was already on its trail to stabilisation. (*The urban population shows sudden fluctuation in 1981 due to reorganisation of urban areas*).

The results of first census of this century, Census 2011, revealed a striking fact that the population in the Corporation declined to 4,31,560 from that in 2001, i.e, 4,36,556 persons. However, the new corporation area (including Elathur, Bepore and Cheruvannur Nallalam panchayats) shows a slight increase in population from 6,01,887 in 2001 to 6,08,255 in 2011. The Masterplan area had a population of 6,29,302 in 1981 which gradually increased to 8,09,214 in 2011.

5.1.2 Population Growth Rate

Kerala started showing a constant decline in population growth rate since 1981 census. The net addition to the population has also been continuously less ever since. The population growth rate of the state in the last decade (2001-2011) is 4.86, less than the growth rate of 1991-2001.

The growth of population during 2001-2011 has declined in all the districts of the State including Kozhikode, when compared to the growth rate in 1991-2001. Even so, Kozhikode district is among those districts having population growth rate higher than the State average during 2001-2011, together with Kasaragod, Malappuram, Palakkad and Ernakulam, all of which fall in the middle and North Kerala. (Source: Census 2011).

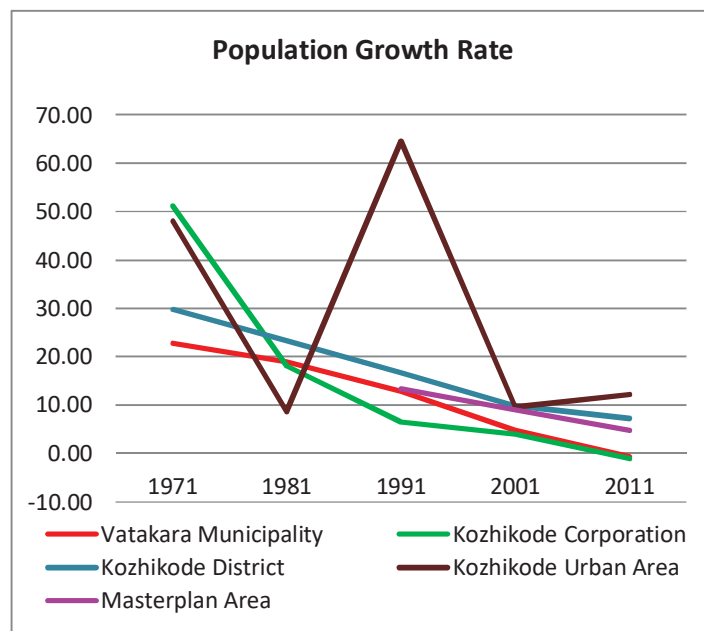


Figure 5-2: Decadal Growth Rate of Planning area compared with the region

In similar lines of that of the State and the district, the population growth rate of Kozhikode Corporation was constantly declining ever since 1971, as presented in figure 5-2. It can also be observed that the decadal growth rate of urban population in the district had

a high in 1981 (due to reorganization of areas) and remains high at 9.62% in 2001 and 12.24% in 2011 as well, when compared to that of the existing urban local governments of Kozhikode Corporation and Vatakara Municipality, which are exhibiting very low growth rates of 3.98% and 4.71% in 2001 and -0.73% and -1.14% (Negative growth) in 2011.

The Masterplan area is also registering a decline in growth rate from the previous decade's 8.93% to 4.77% in 2001-2011. The growth rates of the Masterplan area (8.93%) and the district urban population are nearly the same in 2001, pointing out the higher urbanization of the contiguous local governments of the Corporation. In 2011, growth rate of population in Masterplan area became half of that of the previous decade where as that of Kozhikode district's urban population increased from 9.62% to 12.24%, which is evident for the urban sprawl in the district from core areas to nearby rural areas.

Table 5-1: Population Growth Rate of Constituent LSGs -2001

LSGs	Population Growth Rate 2001-2011
Kozhikode Corporation	-1.14
Olavanna	23.49
Cheruvannur-Nallalam	16.64
Beypore	4.27
Feroke	7.55
Ramanattukara	18.06
Elathur	9.69
Kadalundi	8.74
Master Plan Area	4.77

Within the Masterplan area, all the other local governments show very high growth rates when compared to the Corporation in 2011. Olavanna gramapanchayat leads in population growth rate with 23.49%, followed by Ramanattukara (18.06%) and Cheruvannur-Nallalam (16.64%).

Table 5-2: Population growth rates (2011) of major Corporations in Kerala

Local Body	Population		Population growth rate (2001- 2011)
	2001	2011	
Kozhikode Corporation	436556	431560	-1.14
Kochi Corporation	595575	601574	1.01
TVM Corporation	744983	752490	1.01
Thrissur Corporation	317526	315596	-0.61
Kollam Corporation	361560	349033	-3.46

Remarkably, Kozhikode Corporation shows a negative growth rate in the last decade, as per Census 2011, as presented in table 5-2. Among the corporations of the state, Kollam and Thrissur also show a similar trend, with Thrissur having a slightly higher growth rate than Kozhikode and Kollam a far lower growth rate. Kochi and Thiruvananthapuram Corporations show positive growth rate, though as low as 1%. (Source: deduced from Census 2001 and Provisional Population Totals, Census 2011.)

5.1.3 Spatial Distribution of Population

The Masterplan area is home for 26.4% of the district's population, as per census 2011. The distribution of the population in Masterplan area among the constituent local governments is presented in the table 5-3. It can be seen that 53.00% of the Masterplan population is accommodated within the corporation limits. Of this, 35% of the population

resides in 26% of the total corporation area, to the west of Canoli Canal and North of River Kallai, the boundaries which influenced the spatial growth of the town. Among the other local governments, Beypore accounts for 8.57% and Olavanna and Cheruvannur Nallalam accounts for 8.4 and 8.18 percentages respectively. Ramanattukara accommodates the least share, i.e., 4.41%. When the new Corporation is considered, it can be seen that 75.16% of the plan population resides in its jurisdiction.

The average gross density in the Corporation is 5120 persons/Sq.km and that of the Masterplan area is 4570 persons/Sq.km as per Census 2011. Kozhikode Corporation and the Masterplan area are much ahead in density when compared to the other statutory towns of the district, Vatakara and Koyilandi having densities of 3532 and 2474 respectively, as presented in Figure 5-3.

Table 5-3: Share of LSGs in population of planning area

	Population 2011	% share
Kozhikode Corporation	431560	53.33
Olavanna	68432	8.46
Cheruvannur-Nallalam	61614	7.61
Beypore	69752	8.62
Feroke	54074	6.68
Ramanattukara	35937	4.44
Elathur	45329	5.60
Kadalundi	42516	5.25
Master Plan Area	809214	

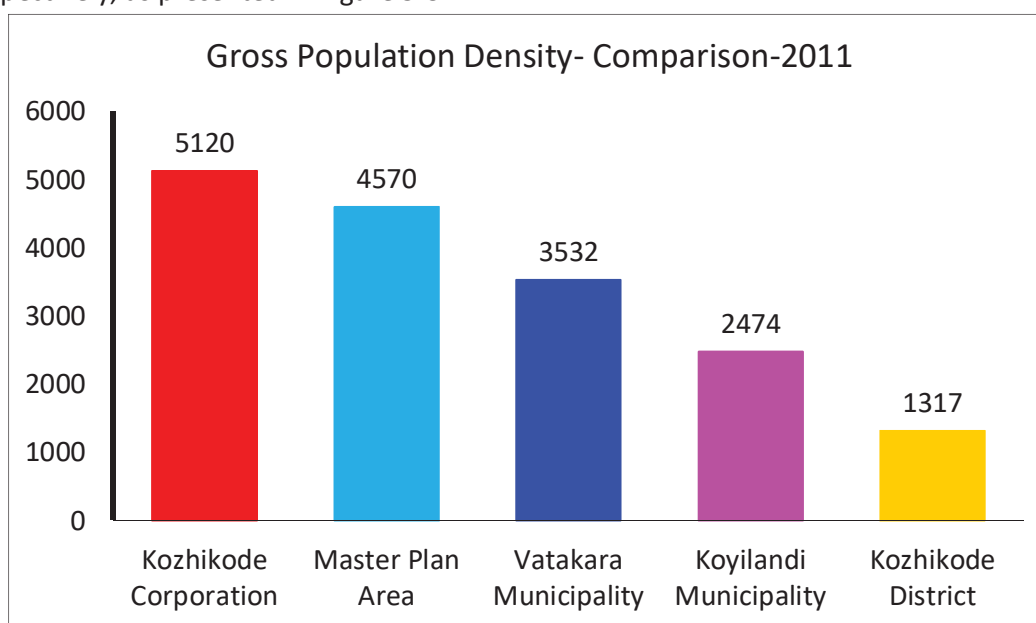


Figure5-3: Population density - comparison with the region

It can be observed from the chart below that the density in the Corporation was on rise for many decades by now, but the rate of increase was constantly decreasing over the decades. The density trends in the Masterplan area are also the same. The density in the Corporation has decreased to 5120 persons/Sq.km in 2011, as deduced from the Provisional Population Totals.

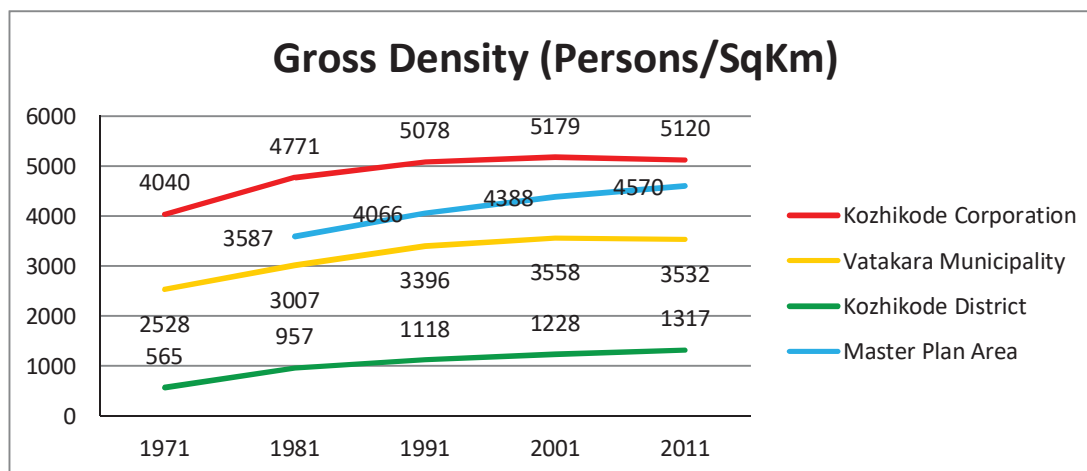


Figure 5-4: Temporal variation in Population density - comparison with the region

Table 5-4: Gross, Net and residential densities in LSGIs in planning area

	Gross Area Sq.km	Gross Density (Persons/Sq.km)	Net Area* Sq.km	Net Density (Persons/Sq.km)	Residential Area Sq.km	Residential Density (Persons/Sq.km)
Kozhikode Corporation	84.29	5120	81.24	5312	60.42	7143
Olavanna	21.43	3193	19.68	3477	12.94	5288
Cheruvannur-Nallalam	10.31	5976	9.12	6755	6.09	10117
Beypore	10.41	6700	9.42	7405	7.44	9375
Feroke	13.53	3997	11.22	4819	9.24	5852
Ramanattukara	11.71	3069	10.63	3381	7.31	4916
Elathur	13.58	3338	11.22	4040	8.15	5562
Kadalundi	11.83	3594	10.43	4076	8.12	5236
Master Plan Area	177.09	4570	162.96	4996	119.71	6802

Source: deduced from Census 2011, Existing Land Use of Masterplan area (Dept. of Town & Country Planning, 2010)

* Net area is derived by deducting the environmentally sensitive area and water bodies from the gross area.

Among the LSGIs in the Masterplan area, Beypore has the highest gross density, of 6700 Persons/Sq.km, as per 2011 Census. Cheruvannur – Nallalam ranks second to Beypore, Kozhikode Corporation only the third, and the rest of the LSGIs fall below the average density of 4570 Persons/Sq.km in the Masterplan area. Ramanattukara is the least dense with 3069 Persons/Sq.km. When the net densities are compared, the same pattern is found, with Beypore leading with a net density of 7405 Persons/Sq.km and Ramanattukara the last in the row with 3381 Persons/Sq.km. However, when the residential densities are compared, Cheruvannur- Nallalam reduces Beypore to second position with a residential

density of 10117 Persons/Sq.km, indicating that the residential pockets of Cheruvannur Nallalam are the densest within the planning area. Ramanattukara retained the lowest position in this aspect as well, with a density of 4916 Persons/Sq.km, suggesting lower density residential pockets.

When the temporal changes in gross density of these LSGIs are analysed, it can be seen that all the LSGIs in Masterplan area, especially Beypore and Cheruvannur Nallalam, shows a higher rate of increase than the Corporation ever since 1981, as represented in figure 5-6. Beypore surpassed the Corporation in gross density in the decade 1981 – 1991, and Cheruvannur Nallalam in 1991-2001.

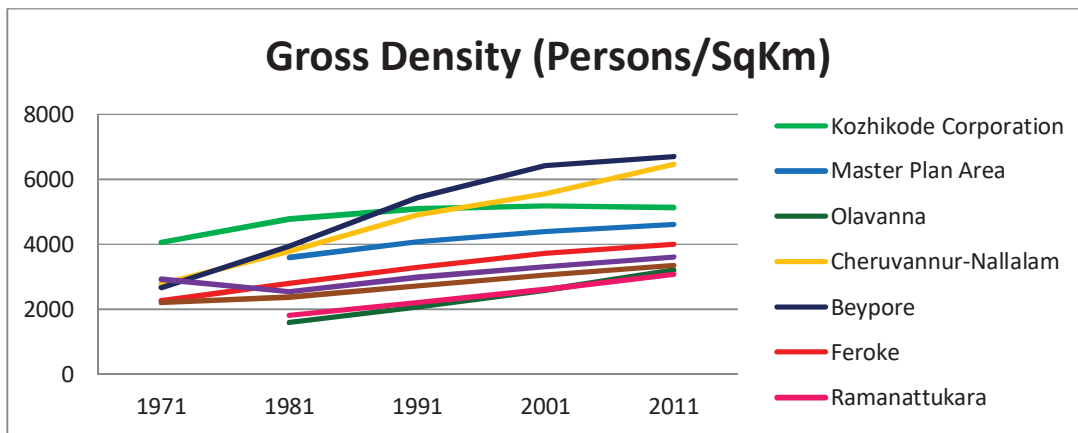


Figure5-5: Temporal variation in Population density of LSGIs in planning area

It can be observed from figure 5-6 that the Masterplan area is continuously densified, but in a declining rate since 1991. The rate of increase in density was the highest in the period 1981-1991, as indicated by the sharp incline in the graph. The rate of change of densities of all the other LSGIs showed a decreasing trend since 1981 except Cheruvannur-Nallam.

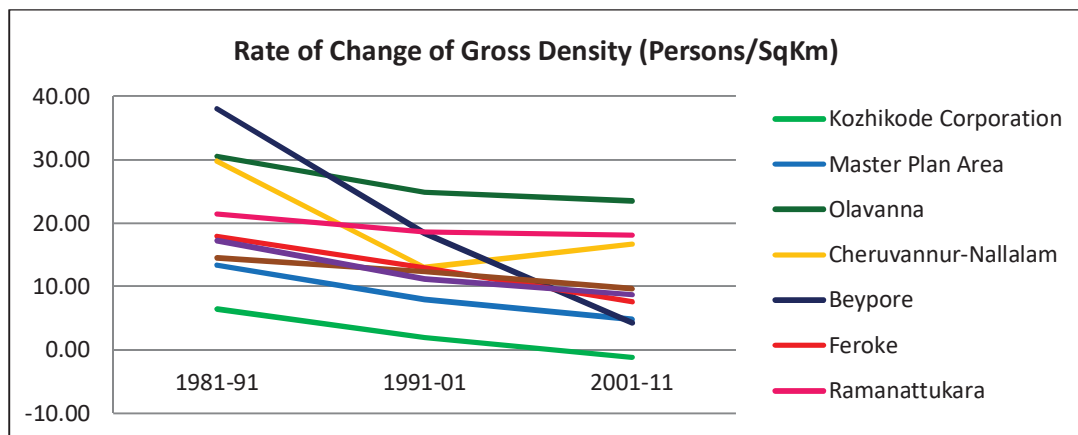


Figure 5-6: Rate of change in gross density

This indicates that the densification of all the LSGIs in the Masterplan area has slowed down ever since 1981 and only Cheruvannur-Nallam shows an exemption in the year

2011. In other words, the high densification of the Masterplan area in 1981-1991 is due to the densification of local bodies in and around the present Municipal Corporation area.

The Masterplan area is far ahead in density when compared to the nearby local governments as represented in figure 5-7. It can be seen that it has been historically so, from the figure 5-8. All the LSGIs show a gradual increase in gross density. Among the above local governments, Kakkodi and Chemanchery have the highest density.

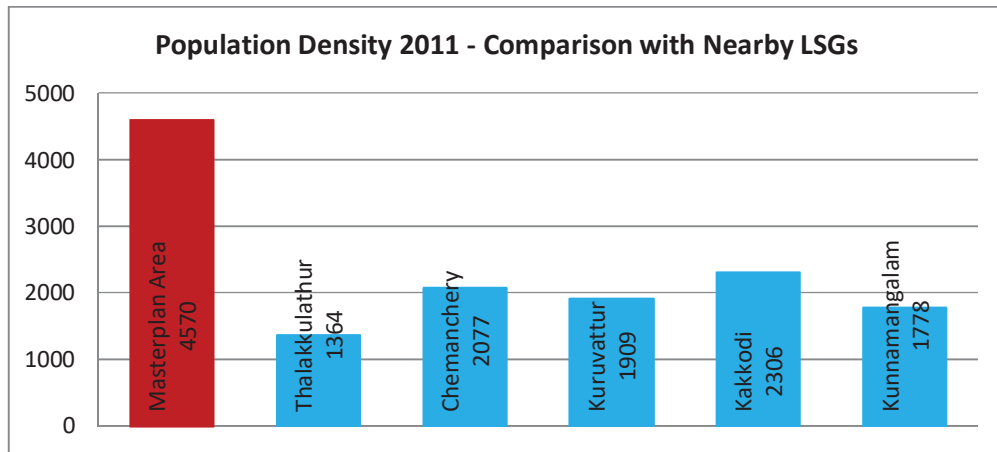


Figure 5-7: Density comparison with contiguous LSGs

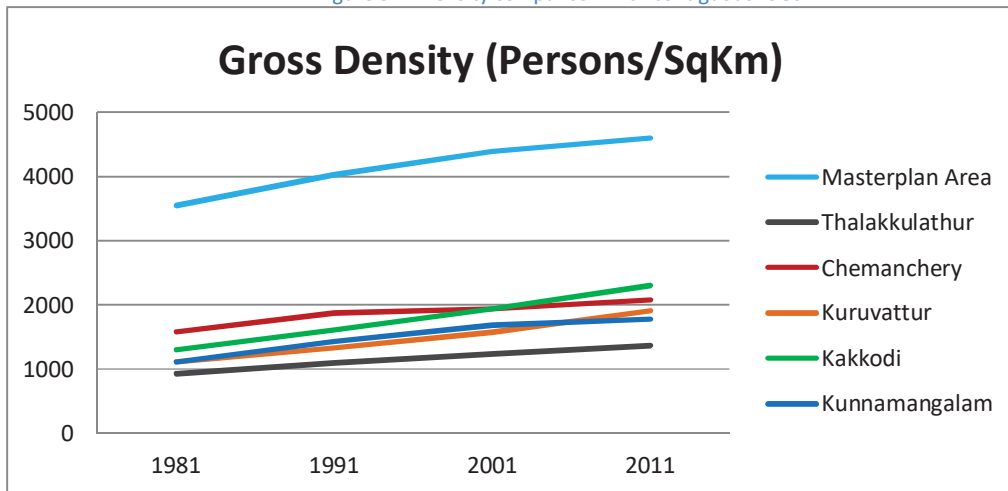


Figure 5-8: Temporal variation of Density in contiguous LSGs

But from the figure 5-9, it can be seen that, when compared to the master plan area almost all the nearby LSGs had a higher rate of increase in density ever since 1971, except Chemanchery, where the rate has become lower than that of the master plan area, in the last decade. Presently, Kuruvattur, Kakkodi and Thalakkulathur, in order, have the highest growth rates of density. Among the surrounding Local bodies Kuruvattur and Chemancheri shows increasing trend in gross density since last decade.

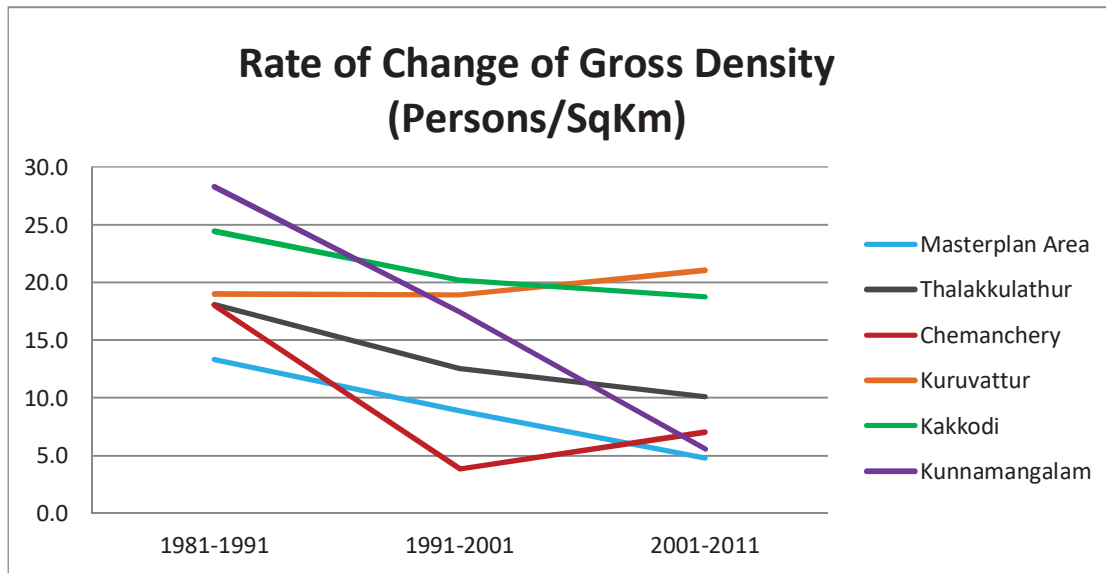


Figure 5-9: Rate of Change in Gross Density in Nearby LSGIs

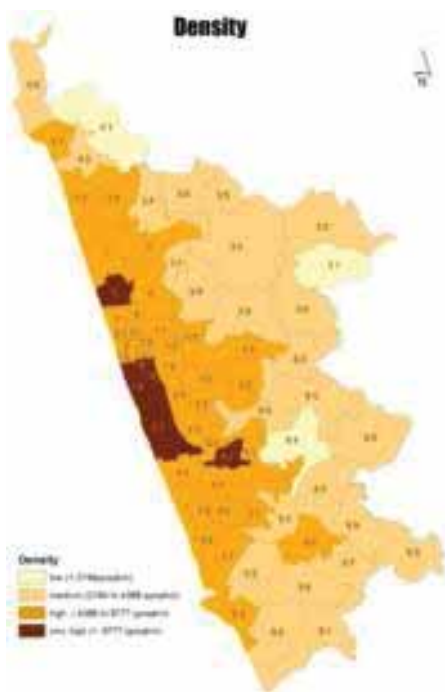


Figure 5-10: Density in planning units



Figure 5-11: Population Concentration in planning units

When the distribution of gross density among the various planning units of the Masterplan area is studied, it is observed that the coastal areas are highly dense, in line with the density distribution pattern of the whole state, and the eastern region is less dense, as represented in figure 5.10.

42 of the planning units fall above the average density of 4388 Persons/Sq.km. Six among them, i.e., planning units 15,21,3,14,16,52, in order, has the highest densities in the region, all above 8777 Persons/Sq.km., twice the average density. All these six planning units fall in the old corporation area, adjacent to the coast, except planning unit 52 which falls in Cheruvannur Nallalam Panchayat, which is now a part of the Corporation.

The population concentration pattern in the Masterplan area, i.e., the cumulative population in the order of their densities, is represented in figure 5-11 (Population Concentration). 17% of the master plan area accommodates 1/3rd of its population, 30% accommodates half of the population and 2/3rd of the total population is concentrated in 46% of the total Master Plan area. (Population density and concentration analysis with respect to planning units were done using census 2010 data, since ward wise population data of panchayats are not published till date).

5.2 Urban-Rural Content & Urbanisation Trends

As per Census 2011, 26.2% of the district’s population resides in the Masterplan area, which occupies only 7.6% of the district’s area. Of this, 14% stays in Kozhikode corporation limits, i.e., in 3.6% of the district. Out of the total Kozhikode population for 2011 census, 67.15 percent lives in urban regions of district. As far as the urban population of the district is considered, the planning area houses 39% of the district’s urban population.

Figure 5-12: Proportion of Population and Urban Population within the planning area compared to district

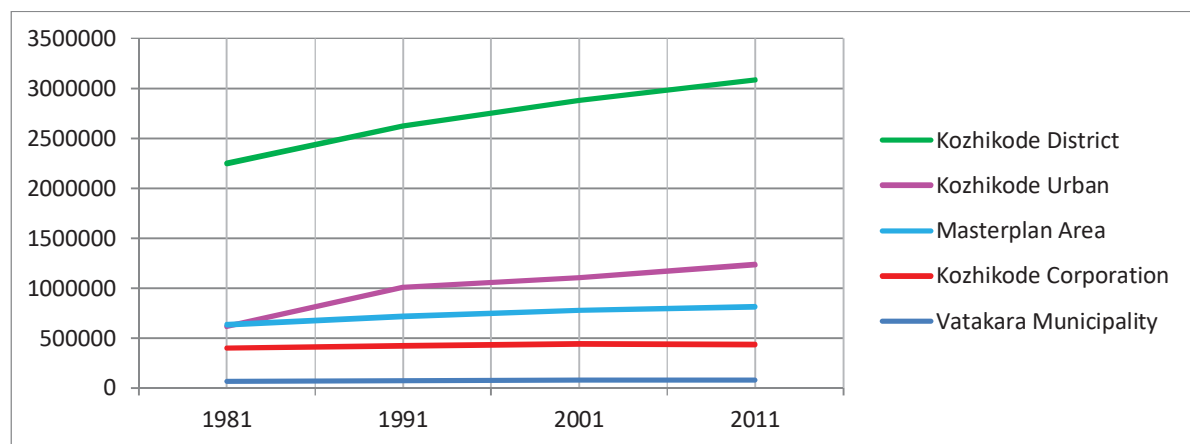
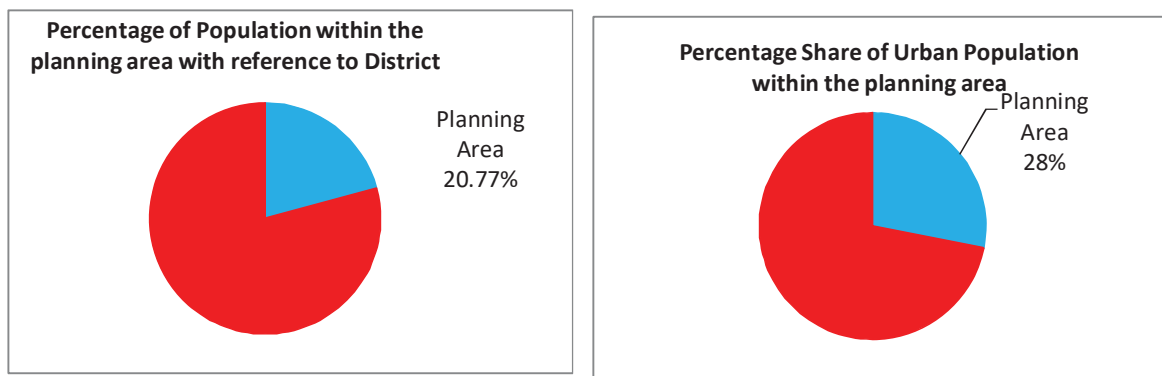


Figure 5-13: Temporal Variation of Population in Planning Area Compared with the Region

From Figure 5-13, it can be seen that the urban population in the District has been increasing at a higher rate than the rural population in the last few decades. Kozhikode District and Kozhikode District Urban are showing a higher trend in population increase, while that in Masterplan Area, Kozhikode Corporation as well as Vatakara Municipality is lesser, in the decades 1991-2001 and 2001-11. This points out that the urban content of the district is increasing more so due to the population accumulation in other census-urban areas, than due to the growth in the already established urban local governments.

The increase in the number of census towns in the district as per 2011 census points out that urbanization has spread to a lot more of LSGIs in the last decade. When the urban population grew by 88.42% in the district in the last decade, the number of census urban areas increased from 19 to 52, i.e., by 173%. The share of urban population increased from 38.25% of the district’s population in 2001 to 67.15% in 2011, which is much higher than the change in the state from 25.51% to 47.72%. (Source: Provisional Population Totals, Census 2011).

In similar lines, within the planning area, there is a wide difference in the pattern of population increase in the Masterplan area, as presented in figure 5-14. While the population growth rate of the Masterplan area is 4.77%, the constituting local governments show a range from negative to positive(-1.14% for Kozhikode Corporation and a maximum of 23.49% for Olavanna). These indicate that urbanization is more rapidly

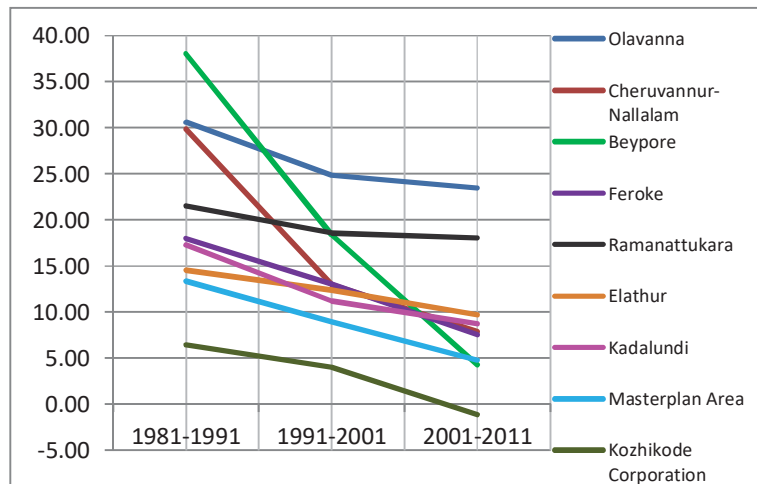


Figure 5-14: Temporal variation of population growth rate in the constituent local governments of planning area

happening in the contiguous local governments, than the Corporation, in the last few decades.

The local governments like Kuruvattoor, Kakkodi, Thalakkulathur exhibit similar growth rates as that of the panchayats in the Masterplan area like Olavanna, Ramanattukara and Bepore indicating that the fringe area urbanization has spread beyond the local governments adjoining the corporation.

Analysis of the temporal changes in population growth rate in the corporation and panchayats of planning area and surroundings, represented in figure 5-15, indicates that the growth rate of Kozhikode Corporation was the least among them since 1971-1981. Study of the temporal variations in change in gross density of the nearby local governments of the planning area indicates the high densification of the suburban areas of Kozhikode

Corporation. Panchayats of Kunnamangalam, Kakkodi and Kuruvattur got most densified in 1981-1991 and now show a declining rate of densification, similar to the Masterplan area, except Kuruvattur. Kuruvattur and Chemanchery are the only nearby panchayats exhibiting an increase in population growth rate in 2001-11. This indicates that urbanisation is aggressively spreading towards LSGIs to the north eastern region adjacent to the Masterplan area.

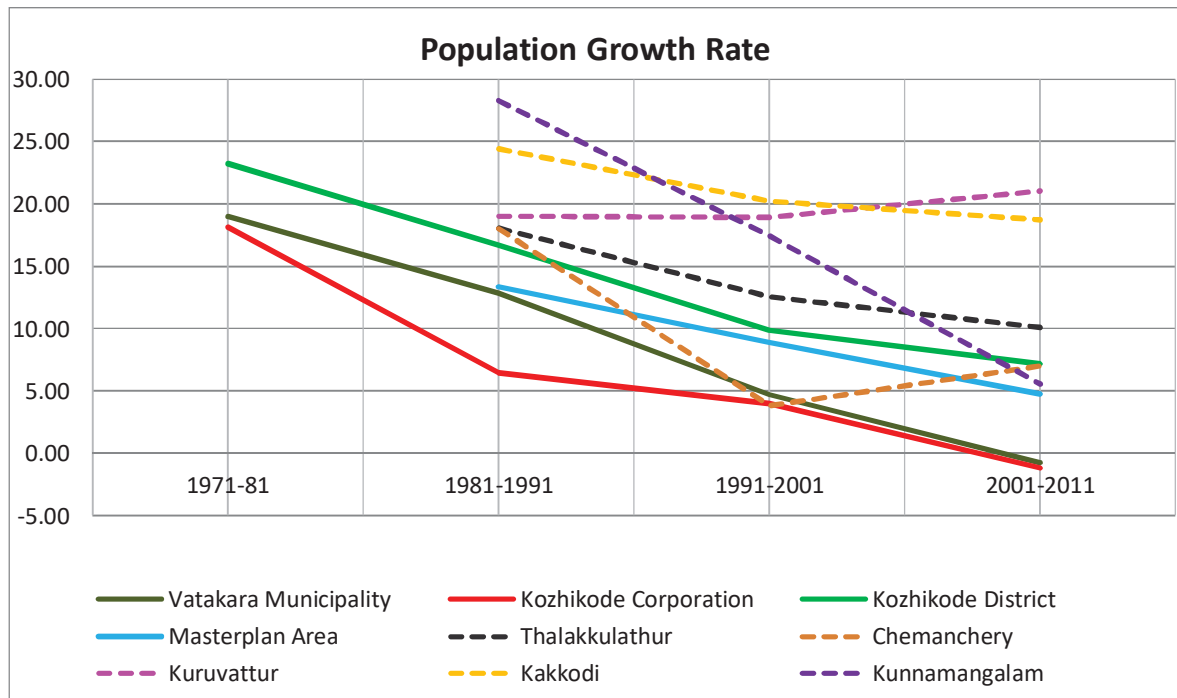


Figure 5-15: Temporal variations in the growth rate of population in LSGIs within and around in planning area

5.3 Sex Ratio

Sex Ratio is a major indicator of the social wellbeing and women-friendliness of a society. In 2011, Kerala’s sex ratio of the general population, 1084, is the highest among the states of India. The urban Kerala exhibits a higher sex ratio of 1091 when compared to rural areas (1077). The sex ratio has increased by 26 females per 1000 males than the last decade, in the state. All the districts of Kerala have a positive sex ratio in 2011.

In 2011, Kozhikode has a sex ratio of 1098 above the average sex ratio of the state. The urban (1102) and rural (1091) district also exhibit sex ratios higher than the state average (1091, 1077). Kozhikode has improved by 78 points in sex ratio between 1981 and 2011, much higher than the 52 points improvement in the state in this time period. All these exhibits the results of the improvement in health and education of the women in the district which, when compared to the averages of the state, are at a higher side. It has an urban sex ratio higher than the rural sex ratio, in line with the trend in the state. Also, the urban sex ratio of the district has improved by 94 points between 1981 and 2011, whereas the rural

sex ratio has improved by 66. The significant change in the work pattern of women between 1981 and 2011, and the associated increase in women residing in the urban areas due to employment opportunities, would have also contributed positively towards the higher change in urban sex ratio.

The sex ratio of planning area is 1083 and that of Corporation is 1093 in 2011. The sex ratio of the corporation is higher than that of the planning area.

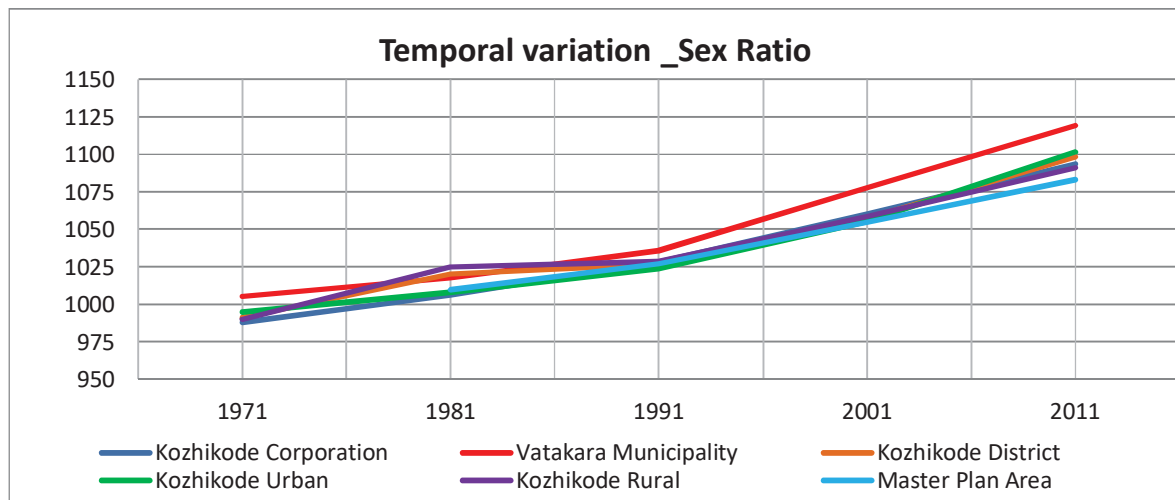


Figure 5-16: Temporal variation in sex ratio

Figure 5-16 gives the temporal variations in sex ratio of the Corporation, Planning area, District Urban and Rural and other major statutory urban areas of the district from 1971 to 2011. It can be seen that the sex ratio of the Corporation was negative and the lowest (988) when compared to the district, district urban, district rural and Vatakara Municipality in 1971, but has improved from a negative sex ratio to a positive one, and by 105 points, by 2011. It can also be observed that the average urban sex ratio was almost similar to that of corporation and planning area from 1971 to 2011. This may be associated with the increase in service sector opportunities for women, which are mainly concentrated in the major urban centres, which might have led to more women residents in the Corporation area. The sex ratio of the planning area however is less than that of the District average by 2 points in 2001 and 15 points in 2011.

Sex ratio of the constituent LSGs within planning area and their temporal changes are presented in Figure 5-17. The sex ratio varied between 1109 in Elathur to 1035 in Olavanna and Corporation, Beypore, Kadalundi and Elathur have higher sex ratios than the planning area average in 2011. It can be seen that Elathur shows higher sex ratios than the rest historically, and still has the highest sex ratio among the constituent LSGs in the planning area. Olavanna and Ramanattukara show the least sex ratios in 2001 and in 2011. All the constituent LSGs have improved the sex ratios over the time and have positive sex

ratios from 1991, except Kadalundi, which also achieved a positive ratio in 2001 the increasing trend continued in 2011.

While the sex ratio analysis presents an overall pleasing picture of in the Corporation and the planning area, it also puts forth challenges in terms of creating more employment opportunities, especially women friendly ones, to reduce the economic dependency. It also reminds the necessity of women friendly measures in all sectors and services, like education, health, water supply, sanitation, transportation, and particularly in safety and security.

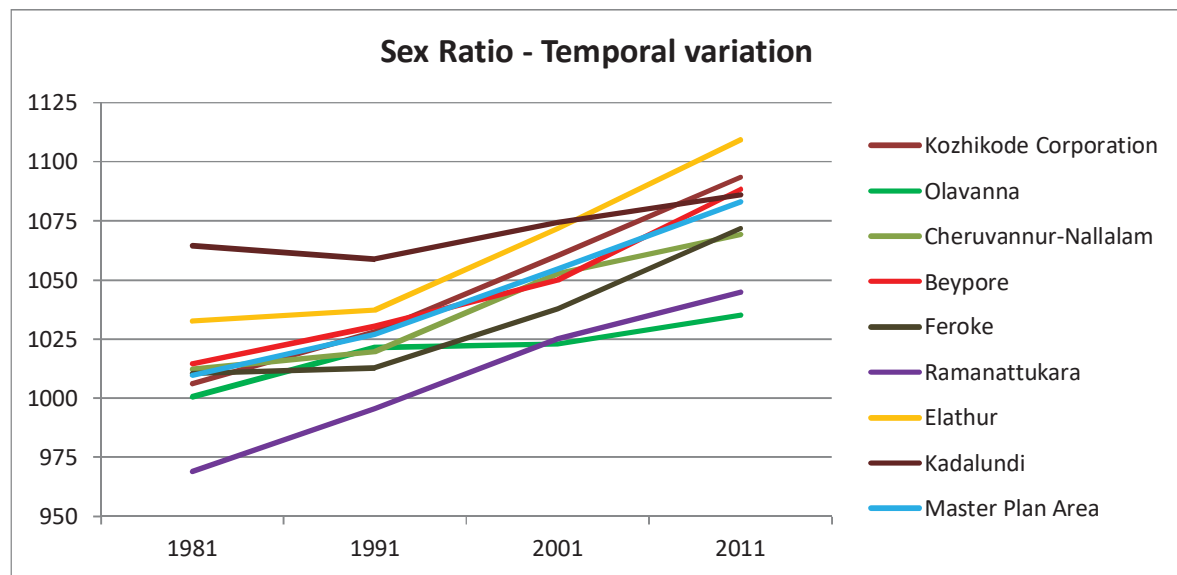


Figure 5-17: Sex-Ratio - Temporal variation in constituent LSGIs

5.4 Child Population

5.4.1 Population in 0-6 Age Group

The percentage of child population in 0-6 age- group is indicative of the birth rate prevailed during the last six years and has a positive relationship with the decadal growth-rate and hence the study of this is important. The child population in this age-group which stood at 37.93lakhs in Kerala as per 2001 Census has declined to 33.22 lakhs during 2001-2011. That is, there is a net decline of about 4.71 lakhs at the rate of about 50 thousand per year on an average, in the state. The State has thus registered a decline of-12.41% during 2001-2011 in child population in 0-6 age-group. Corresponding decline in 1991- 2001 was only 0.43 Lakhs, which shows a reduction of more than 10 times, indicating a drastic fall in fertility. In all the districts, except Malappuram district which shows a very negligible growth (0.23%), the child population has reduced in 2001-2011.

Kozhikode District registers a decrease of 6.81% in 0-6 age group population, from 3.47 lakhs to 3.23 lakhs, at the rate of 2364 children per year on an average, between 2001

and 2011. However, this is very low, compared to the decline in the state, indicating the relatively high proportions of the age group, and thus high fertility, in the district. In the urban areas of the district, this age group has grown by 59% and in the rural it has declined by 48%, in 2001-2011. This would be mainly due to the urbanisation of rural areas in the previous census, but the possible migration of new families into the urban areas may also be a contributing factor.

Table 5-5 presents the details of population of the age group 0 to 6 years in the study area. It is observed that population in 0-6 age group increased by 5.36% in the study area in the '91-'01, whereas the growth rate was a low 1.27% in the corporation, and the urban average of the district was 2.11%. But in 2001-11 population in 0-6 age group decreased by 10.40% in the study area, and the same was even less (-16.78%) in the corporation. It can also see that the growth rate of this age group in the district is only 0.19% in 1991-2001 and it has shown negative growth (-3.31) in 2001-11. Only Olavanna and Ramanattukara shows positive growth rate of 0 to 6 age group population in the planning area. These panchayats also exhibit higher population growth rates compared to that of all other local bodies in the Masterplan area.

Table 5.5: Temporal change in 0-6 Age group population and Growth rate.

<i>Local Body</i>	<i>Population 0-6 Age group 1991</i>	<i>Population 0-6 Age group 2001</i>	<i>Population 0-6 Age group 2011</i>	<i>Growth Rate 1991-2001</i>	<i>Growth Rate 2001-2011</i>
<i>Kozhikode Corporation</i>	51105	51753	43067	1.27	-16.78
<i>Vatakara Municipality</i>	9791	8968	7823	-8.41	-12.77
<i>Kozhikode District</i>	346490	347146	335645	0.19	-3.31
<i>Kozhikode Urban</i>	131429	134206	221043	2.11	64.70
<i>Kozhikode Rural</i>	215061	212940	114602	-0.99	-46.18
<i>Olavanna</i>	5678	6819	7472	20.10	9.58
<i>Cheruvannur-Nallalam</i>	7258	7746	7413	6.72	-4.30
<i>Beypore</i>	7829	8936	8118	14.14	-9.15
<i>Feroke</i>	6486	6743	6611	3.96	-1.96
<i>Ramanattukara</i>	3784	3826	4118	1.11	7.63
<i>Elathur</i>	4243	5072	4405	19.54	-13.15
<i>Kadalundi</i>	4954	5338	5025	7.75	-5.86
<i>Master Plan Area</i>	91337	96233	86229	5.36	-10.40

Lower growth rates in 0-6 age group are generally due to lower fertility rates, high infant mortality and/or out-migration of the age group. Since the fertility rates and infant

mortality rates normally don't vary too much between areas which are culturally and functionally similar, the lower growth rate in these LSGIs may not be due to out-migration of young families into other LSGIs, since this urban area have higher attraction potential than rural suburbs. The higher percentages of Kozhikode urban (64.70) and rural (-46.18) areas are only because of the conversion of formerly rural census areas to census towns in 2011 census. Most of the local bodies show negative growth in 2011 and the plan area has a negative growth of 10.40%.

The share of 0-6 age group in the total population of the district is 10.47% in 2011, against 12.06% in 2001, registering a decline of 1.59%. The urban share has declined by 1.93% and rural by 1.06%. It can be observed from the table 5-5 that the share of 0-6 age group in the total population in the district has been declining in the previous decade as well; but the rural areas showed a greater rate of decline when compared to the urban areas.

The share of 0-6 age group in planning area has decreased from 12.8 to 12.38 between 1991 & 2001 and again decreased to 10.66 in 2011. But the planning area had a lower share than the district urban in 1991, has outdone urban share in 2001 and almost same in 2011. It can also be observed from figure 5-18 that the share of 0-6 age group was lower in the Corporation than the Masterplan area in the last two decades, but in 2011, the trend reversed.

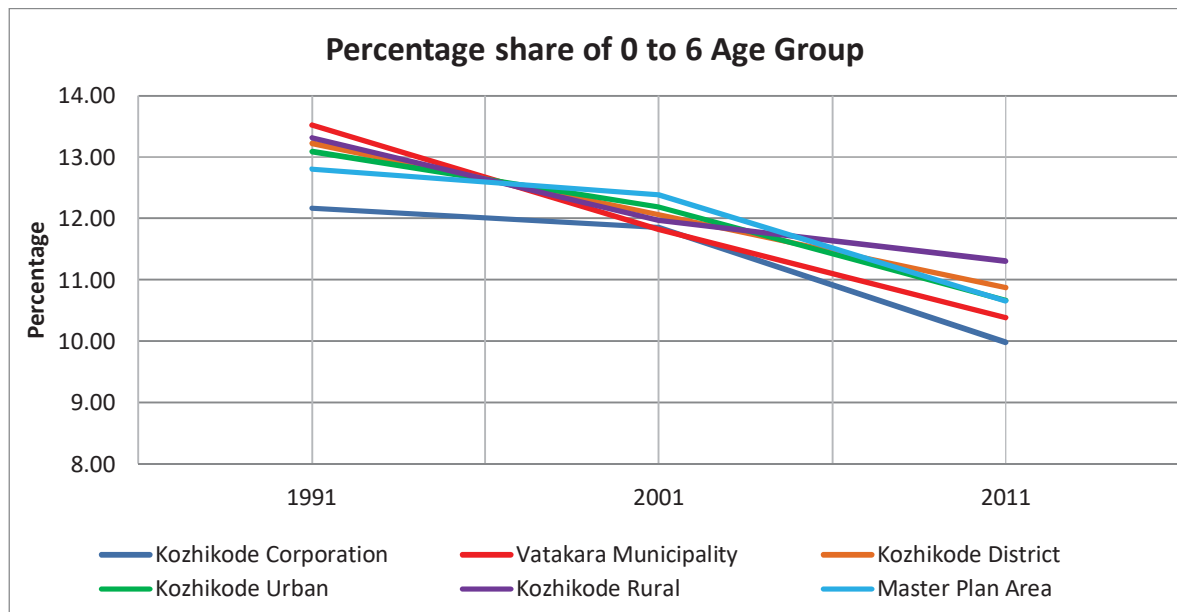


Figure 5-3: % share of 0-6 age group compared with the region

It can be seen that among the constituent LSGIs of the planning area, Ferok has the highest and Elathur has the least share of 0-6 age group as per Census 2011. All local bodies

showing decreasing trend, and the general trend of decrease in the share of 0-6 age group indicates an aging population in the study region.

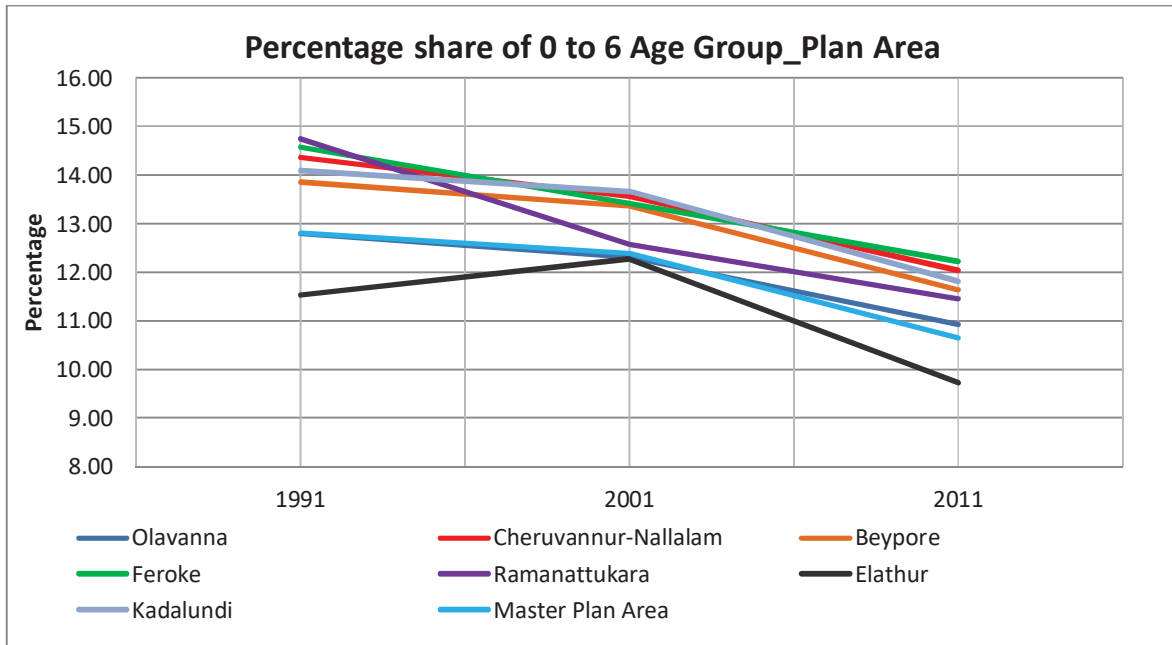


Figure 5-19: % share of 0-6 age group compared in the planning area

5.4.2 Child Sex Ratio

The sex ratio of population of 0-6 years of age has high relevance from social as well as demographic angle. An adverse child sex ratio shows that fewer girls are being born compared to boys and indicates chances of pre-birth sex selection measures and pre and post birth discrimination against the female child. A negative 0-6 sex ratio also exposes the possibility of socio-cultural factors which determines the survival chances of the female children. It's a nation – wide concern that the States that have recorded the steepest declines are from among the most economically developed ones, and even those states which are high on other social and economic development indicators show a low child sex ratio.

When the trends in general sex ratio of the state favour women, the child sex ratio generally presents a reverse scenario. The child sex ratio of the state is negative since 1991, and constantly decreasing. The child sex ratio in the state is 959 as per 2011 Census and has reduced by a point when compared to that in 2001. It's worth reflection that the state which fare well on social and human development indicators has a low 0-6 sex ratio.

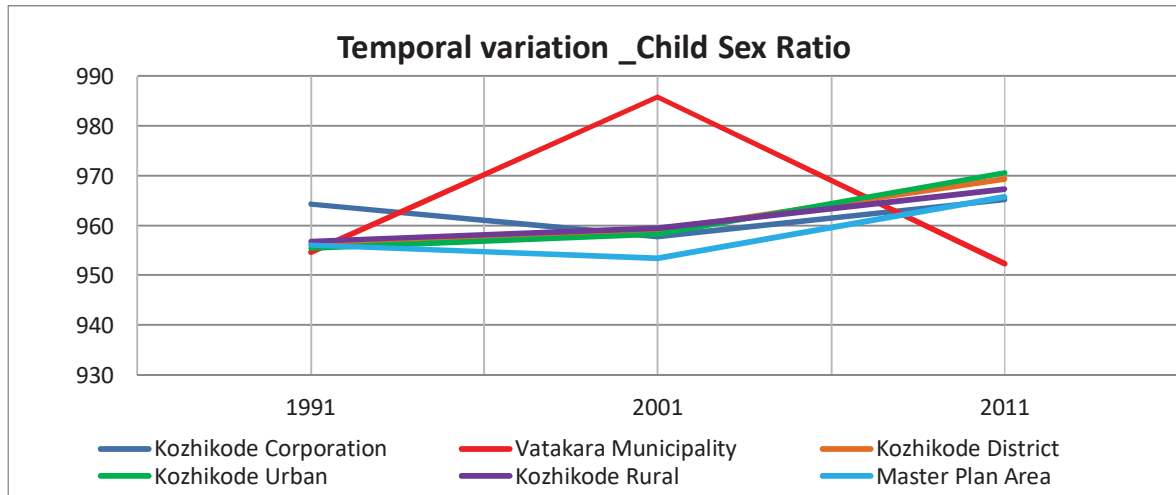


Figure 5-20: Child Sex Ratio – temporal variation in the region

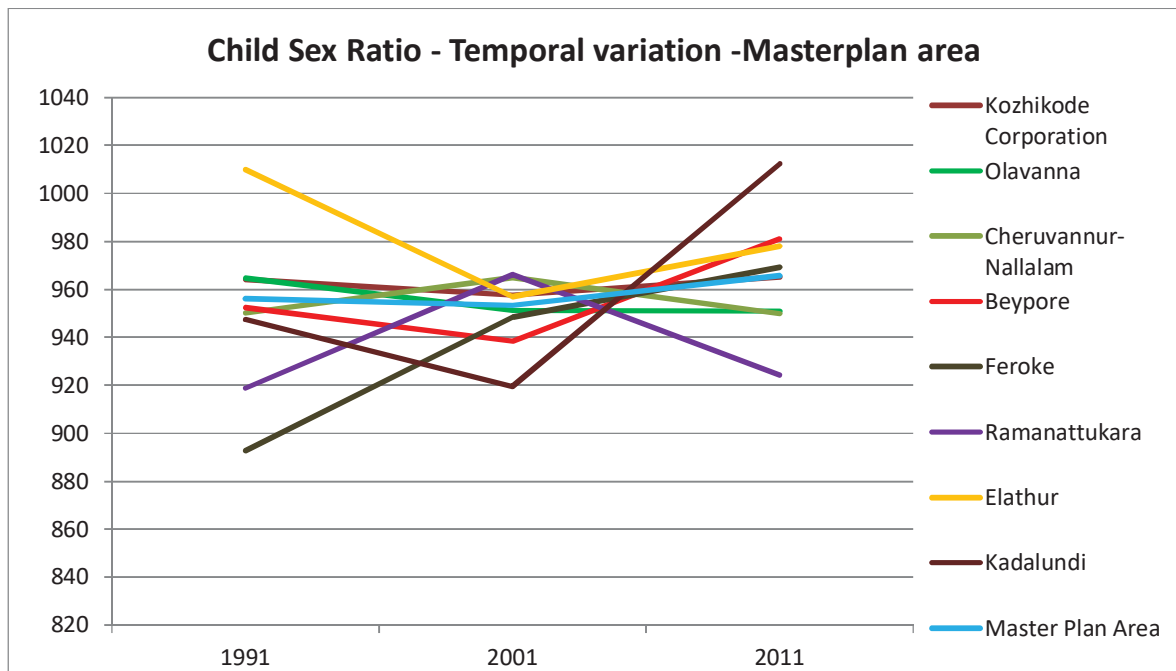


Figure 5-21: Child Sex Ratio - temporal variation in the constituent LSGIs

Kozhikode district however presents a happier picture as presented in the graph 5.20, with the child sex ratios of the District as well as Urban and Rural averages showing an increasing trend since 1991, though the ratio is still negative and the increase is marginal. In 2011, the ratio has improved by 4 points against 3 points in the previous decade. Urban and rural child sex ratio of Kozhikode District also presents an opposite trend when compared to the State. The sex ratio of children is 967 in rural areas, and the urban counterpart is 971 in 2011, follow the general child sex ratio trend of urban sex ratio higher than the rural sex

ratio, in the State. Though the urban ratio was lower than the rural ratio till 2001 as presented in Figure 5-21, the former has surpassed the latter in 2011 by 4 points. Also, both urban and rural child sex ratio has increased considerably; by 13 points and 8 points respectively, between 2001 -2011. However, this change is seemingly related to the conversion of formerly rural census areas to census towns in 2011.

Yet, the Corporation and the planning area present an opposite tendency to that of the district. The planning area had a low sex ratio in 1991, which further decreased to 953 in 2001, but showed an increase of 13 points in 2011. In whole, while the district and planning area presents a favourable and improving picture of child sex ratio in the year 2011.

The temporal variation of child sex ratio in various LSGIs in the planning area is presented in the Figure 5-20. The ratio varied between 924 in Ramanattukara to 1012 in Kadalundi, with an average of 966 for the planning area in 2011. It can be seen that Ramanattukara had highest child sex ratio in 1991, but it became lowest in the planning area in 2011 and exact opposite change happened to Kadalundi. Kadalundi is the only local body having a child sex ratio more than 1000 according to 2011 census.

Out of eight local bodies in the planning area, only Ramanattukara and Cheruvannur –Nallalam panchayats shows decrease in child sex ratio in the year 2011

5.5 Age-Sex Pyramid

The age sex structure of Kozhikode Corporation as in 2001, in comparison with the corporations of Kochi and Trivandrum is represented in the figure 5-22. It can be seen that all these corporations exhibit a slow growth with their age-sex pyramids progressing towards constrictive nature, with low proportions of 0-10 and 50+ age groups and high proportion of youth and middle-aged. This indicates declining fertility and mortality rates prevailing in these corporations, in tune with the general picture of the State. With lower fertility, fewer people have been added to the lowest bars of the pyramid, and as life expectancy has increased, a higher percentage of the population lived until old age. Thus, it is understood that the population has been aging, as the proportion of older persons in the population has been growing. This indicates a greater demand for medical and other geriatric services in these corporations, in the coming decades.

However, the proportion of persons in the 50+ age group in Kozhikode Corporation is lesser than that of Kochi and Trivandrum, indicating the relatively lower life expectancy rates prevailing in the corporation, when compared to other major urban centers of the state. Also, the proportion of 0-25 age group is higher in the study area, indicating higher fertility rates.

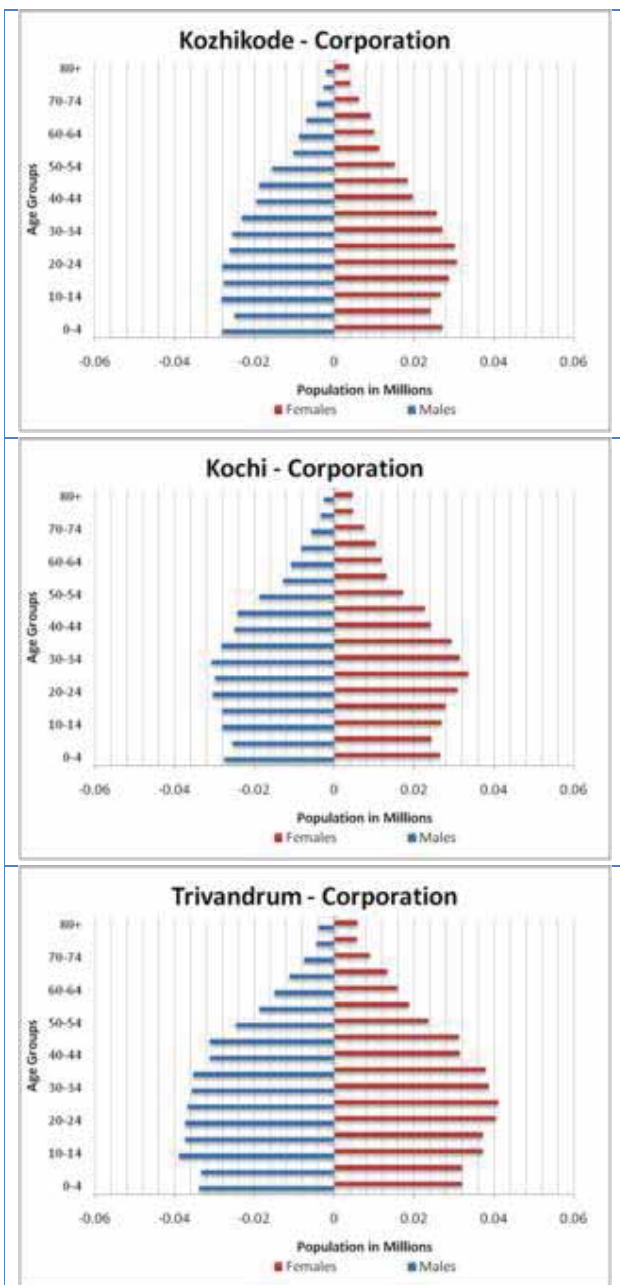


Figure 5-22: Age sex pyramid - comparison with other corporations

It can be observed from table 5-6 that Kozhikode District has a slightly lower proportion of working age (25 to 55 years) population while compared to the state. Also, Kozhikode Corporation has the least proportion of working age group while compared to other urban local bodies, indicating the relatively higher economic dependency rates prevailing in Kozhikode Corporation. It can be seen that Kozhikode Corporation exhibits a dependency ratio of 1.34, which is lower than that of the state average, but higher than that of the ULBs of Kochi, Trivandrum, Kottayam, Thrissur, Cherthala, Kollam and Alappuzha.

Kozhikode District exhibits a dependency ratio of 1.46 which is greater than that of the corporation and the state, indicating the relatively lower fertility rates prevalent in the corporation while compared to the district. Urban in-migration of workers might also have influenced the higher proportion of working age group, resulting in relatively lower dependency ratio of the corporation.

Table 5-6: Dependency Ratio across Kerala

State/District/ULB	% 0-10 age group	% of 10-25 age group	% of 25-55 age group	% of 55+ age group	Dependency Ratio on 25-55 age group
KERALA	16.67	28.13	41.09	14.03	1.43
Kasaragod	18.77	32.26	37.67	11.22	1.65
Kanhangad (M)	16.65	31.09	40.10	12.06	1.49
Kannur	16.51	29.53	40.22	13.67	1.48
Wayanad	18.31	30.36	40.98	10.27	1.44

Kozhikode	17.02	29.28	40.63	12.98	1.46
Kozhikode (M Corp)	16.83	27.45	42.74	12.89	1.34
Malappuram	21.43	34.95	33.58	9.96	1.98
Palakkad	17.10	30.28	38.77	13.76	1.58
Palakkad (M)	15.69	28.46	41.65	14.12	1.40
Thrissur	15.69	26.72	42.21	15.30	1.37
Thrissur (M Corp.)	14.77	25.24	44.59	15.33	1.24
Ernakulam	15.10	24.86	44.84	15.14	1.23
Kochi (M Corp)	15.11	25.00	45.86	13.96	1.18
Idukki	16.32	26.46	44.59	12.55	1.24
Kottayam	15.08	24.23	43.80	16.83	1.28
Kottayam (M)	14.40	24.48	43.92	17.13	1.28
Alappuzha	14.88	25.00	43.30	16.74	1.31
Cherthala (M)	13.64	22.94	46.13	17.24	1.17
Alappuzha (M)	15.85	16.53	43.86	14.45	1.07
Pathanamthitta	14.49	24.78	41.74	18.90	1.39
Kollam	15.69	26.81	42.67	14.76	1.34
Kollam (M Corp)	15.76	27.35	43.34	13.47	1.31
Thiruvananthapuram	15.94	26.32	43.32	14.30	1.31
Thiruvananthapuram (M Corp)	14.74	25.69	44.81	14.57	1.23

5.6 Literacy

Kerala has been the most literate state of the Nation and in 2011; the effective literacy rate is 93.91% against 74.04% of India. The male literacy is 96.02% while that of females is 91.98%. Male literacy rates are higher than the female literacy rate, both in urban and rural areas.

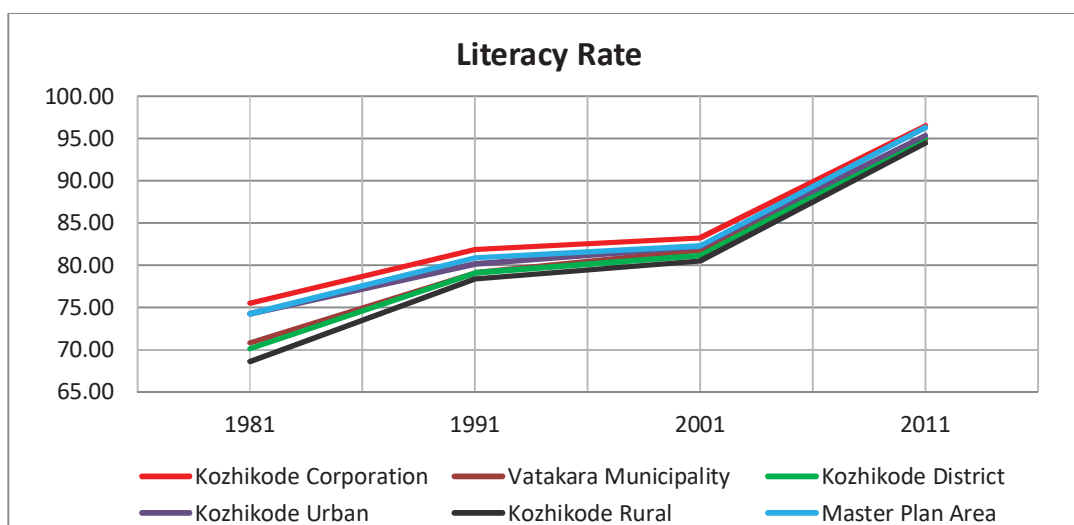


Figure 5-23 : Effective literacy rate - variation in comparison with the region

Kozhikode Dt. has an effective literacy rate higher than the state average, of 95.08%. In tune with the general scenario in the state, the male literacy rate (97.42%) is higher than the female literacy rate (92.99%) in Kozhikode as well. Also, the urban literacy rate (95.38%) is slightly higher than the rural counterpart (94.47%). The temporal variation in effective literacy rate is presented in figure 5-23. It can be seen that the literacy rates were constantly increasing and followed an almost similar pattern. Kozhikode Corporation and the master plan area have higher literacy rates than the urban average historically. The rural literacy rates have improved faster than the urban in 2001-2011, however is still lower than the urban literacy rate. Nonetheless, the urban rural gap in literacy is fast diminishing.

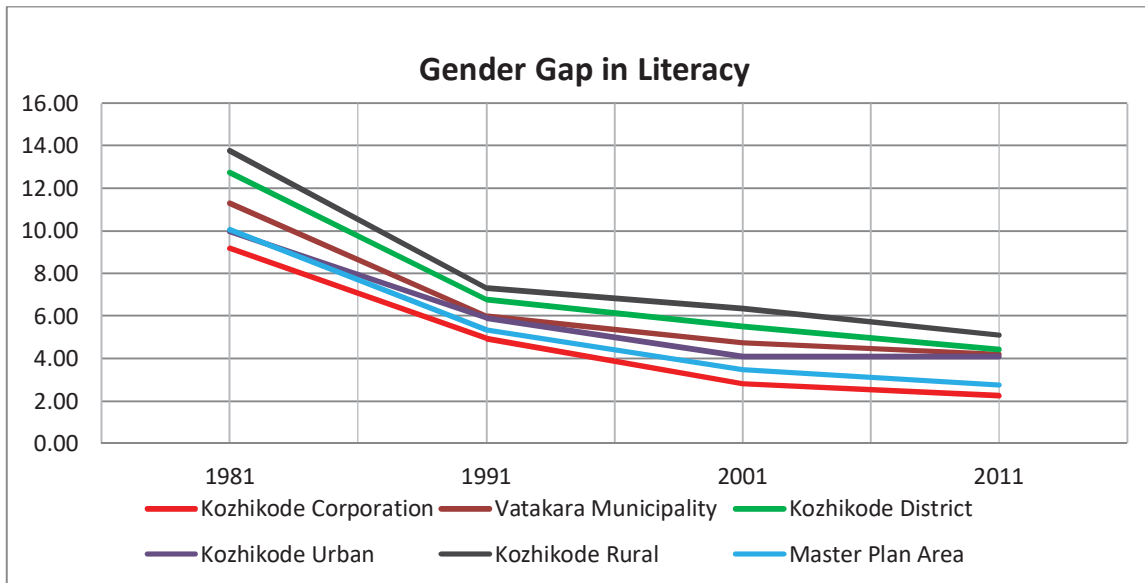


Figure 5-24: Effective Gender gap in literacy-variation in comparison with the region

The effective gender gap in literacy in the district is 4.43%, while that in urban areas is 4.10% and rural areas is 5.11% in 2011. Figure 5-24 presents the temporal variations in gender gap. It can be observed that the female literacy rates had a commendable progress in last two decades, reducing the gender gap. The urban rural difference in gender gap is also vanishing at a fast pace. Master plan area has a lower gender gap than urban average, and Kozhikode Corporation has the lowest gender gap of 2.23%.

The effective literacy rates and gender gap in constituent LSGIs in the planning area is presented in table 5-7. The variations are between 96.7 to 95.12 in effective literacy, 98.20 and 97.17 in male literacy and 95.47 and 93.14 in female literacy, in the planning region according to census 2011. Maximum gender gap in effective literacy rate of 4.15 can be seen in Kadalundi and minimum of 2.23 in Kozhikode Corporation. It can be observed that the effective literacy rate, effective male and female literacy rate are almost similar in all the constituent local bodies.

Table 5-7: Effective gender gap in literacy in constituent LSGIs and temporal variation

LSGIs	Effective Literacy Rate			Effective Male Literacy Rate			Effective Female Literacy Rate			Effective Gender Gap in Literacy		
	1991	2001	2011	1991	2001	2011	1991	2001	2011	1991	2001	2011
Kozhikode Corporation	93.16	94.38	96.53	96.43	96.71	97.71	90.00	92.21	95.47	6.43	4.50	2.23
Olavanna	93.29	93.57	96.57	97.11	96.82	98.20	89.57	90.42	95.02	7.54	6.40	3.18
Cheruvannur-Nallalam	92.7	93.81	95.56	96.62	96.82	97.17	88.91	90.98	94.08	7.71	5.84	3.09
Beypore	92.69	92.86	96.06	96.24	95.94	97.83	89.29	89.99	94.45	6.95	5.95	3.37
Feroke	90.54	92.72	95.61	95.64	96.41	97.65	85.61	89.2	93.73	10.03	7.21	3.92
Ramanattukara	92.98	93.1	95.95	96.48	96.68	97.71	89.51	89.64	94.28	6.97	7.04	3.43
Elathur	92.52	94.16	96.70	95.92	96.74	98.11	89.25	91.79	95.45	6.67	4.95	2.65
Kadalundi	89.81	92.48	95.12	95.26	96.47	97.29	84.75	88.86	93.14	10.51	7.61	4.15
Master Plan Area	92.74	93.89	96.27	96.34	96.63	97.72	89.26	91.33	94.96	7.08	5.3	2.76

5.7 Household Size

The average household size in an area gives indications of the social and family structure in an area and changes in them. It can be seen from figure 5-24 that the household size has been temporally decreasing, at an increasing rate, in the district, falling from more than 6 in 1971 to nearly 5 in 2001 and 4.4 in 2011. The rural areas of the district show a slightly lower H/H size since 1971 itself and it has reduced to below 4.5 in 2011. The H/H size in Kozhikode Corporation, Kozhikode District Urban Area and Master Plan Area is higher than the district average since 1971, and shows a similar pattern of variation, reducing from more than 7 in 1971 to around 4.5 in 2011. The higher household size in urban areas may be due to the presence of more number of Institutional H/Hs in the Urban Areas.

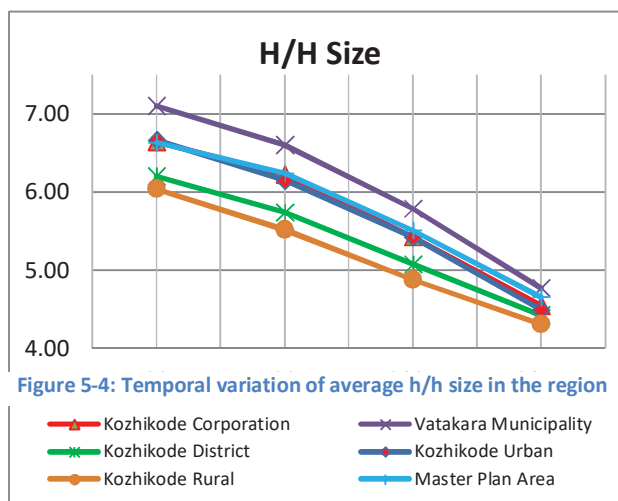


Figure 5-4: Temporal variation of average h/h size in the region

The overall declining trend in H/H size indicates the change from joint family system to nuclear family system.

Among the LSGIs in planning area, Cheruvannur Nallalam and Beypore have the highest household size in 2011. Kozhikode Corporation had the highest average H/H size in 1971, which now has a household size among the least in planning area. Kadalundi and Elathur, which also had high H/H size in 1971, also show fast decline. Olavanna shows the least H/H size in planning area, since 1971.

Table 5-8: Temporal variation of average H/H size in the constituent LSGIs

Average H/H Size	1971	1981	1991	2001	2011
Kozhikode Corporation	7.20	6.64	6.22	5.42	4.55
Olavanna	6.44	6.16	5.73	5.14	4.54
Cheruvannur-Nallalam	6.82	6.64	6.51	5.98	5.00
Beypore	6.83	6.77	6.59	5.90	4.97
Feroke	6.73	6.58	6.27	5.64	4.78
Ramanattukara	6.52	6.64	6.04	5.32	4.63
Elathur	7.09	6.86	6.20	5.53	4.60
Kadalundi	7.15	6.64	6.30	5.66	4.91
Master Plan Area	7.05	6.63	6.23	5.50	4.65

5.8 Inference

The northern districts of the State of Kerala show an increased share in the state's population as per 2011 Census. Kozhikode ranks second in population content in North Kerala, just behind Malappuram, the most populous district in the state. The urban content of Kozhikode district increased from 38.25% in 2001 against 25.51% in the state to 67.15 % in 2011 against 47.72% in the state. The population in Kozhikode Corporation was already on its trail of stabilisation for a few previous decades. In 2011, it registered a negative growth, whereas the other major urban centers of the state like Thiruvananthapuram and Kochi are showing a positive growth, though the numbers are tiny. The fringe areas of the corporation, now included in the Masterplan area, are showing high population accumulation in the past few decades.

From the analysis of temporal changes and spatial distribution of population, urban content and population growth rate, it can be inferred that the urban content of the district is increasing more so due to the population accumulation in smaller towns and the fringe areas of the major urban centres of the district, than due to the growth in the already established urban local governments. The negative growth registered by the Corporation is a matter of concern, which invites attention towards the attractiveness of the urban core as growth engine and an employment generator as well as a place for residing and investing.

Analysis of the trends in demographic parameters like proportion of 0-6 age group and age-sex pyramid indicates an aging population in the study region, pointing towards a greater demand for medical and other geriatric services in near future. However, the decline in fertility in the district is very low, compared to the decline in the state. The growth of population in 0-6 age group is negative in the master plan area, which demands urgent attention to it.

When the trends in general sex ratio of the state favour women, the child sex ratio generally presents a reverse scenario. Kozhikode district however presents a happier picture

with the child sex ratios of the District also showing an increasing trend since 1991, and a general sex ratio above the state average. However, in 2001, the district presents a favorable and improving picture of child sex ratio; the corporation and planning area showcase a discouraging picture. But in 2011 the scenario changed and all the three, the district, corporation and planning area shows increase in child sex ratio.

The declining trend in average household size indicates the change from joint family system to nuclear family system. Increasing literacy rates, decreasing gender gap in literacy and declining urban rural divide in literacy and gender gap, in general, represents a society on the path of achieving high social development.



6

E^{mp}loyment



* Workers

* Work Participation Ratio

* Occupational Structure

* Inference

Employment, being a major indicator of financial well-being of an area and its residents, is a chief parameter under study, while preparing Masterplan for any area. The analysis of the temporal changes, gender participation, duration of employment etc. reveals the economic welfare of a society.

6.1 Workers

The number of workers in the master plan area in 2011 is 2.90 lakhs, which is 32% of the total workers in Kozhikode District (9.48 lakhs). The Kozhikode Corporation accounts to 54.5% of the workers in master plan area.

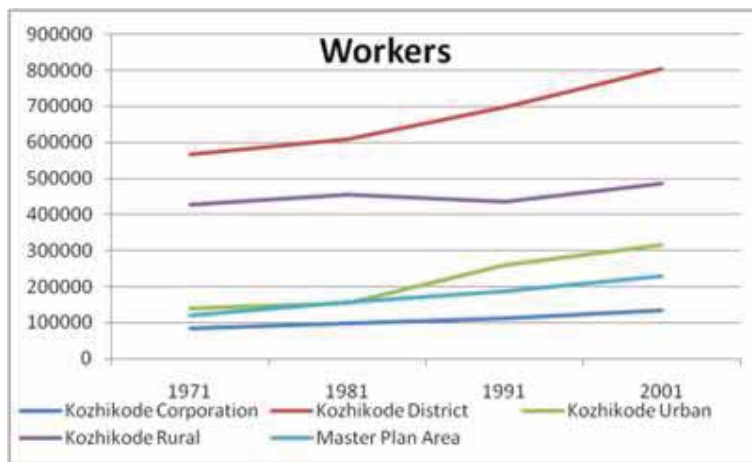


Figure 6-1 : Temporal variation of workers in planning area in comparison with the region

The chart provides the temporal variation in the number of workers in the district and its urban and rural areas, along with that of the Corporation and the master plan area. The number of workers has been increasing temporally. It can be seen that till 1981, the number of workers in urban areas of Kozhikode and the

planning area was almost the same, after which there is a significant increase in the urban workers in 1991, which is not reflected in the planning area. A corresponding decrease in the rural workers indicates that this change is due to reclassification of rural areas to urban areas. It can also be observed that the rate of increase in number of workers in the rural and the district is higher than that in the urban areas, especially in the last decade, indicating that the opportunities for work in the rural areas is increasing at a higher rate when compared to the urban areas. This may also indicate the increased employability in rural areas as well as the highly-travelling workforce of Kerala, which resides in the rural hinterland and commutes daily to the work place.

When the temporal changes of work force within the planning area is analysed, it can be seen that a great majority of workforce belonged to the Corporation, historically. However, the number of workers in the planning area is increasing at a much higher rate than the corporation, and the gap in the share of work force between the corporation and the other LSGIs of the master plan area is decreasing, as seen in chart below. This indicates increased opportunities and increase in the employability in panchayat areas, as well as

migration of workers to urban fringes. The corporation accounted for 68% of workers in the planning area in 1971, which reduced to 58% in 2001.

When the changes in the other local governments are studied, it can be seen that Beypore has traditionally accounted for highest number of workers followed by Olavanna

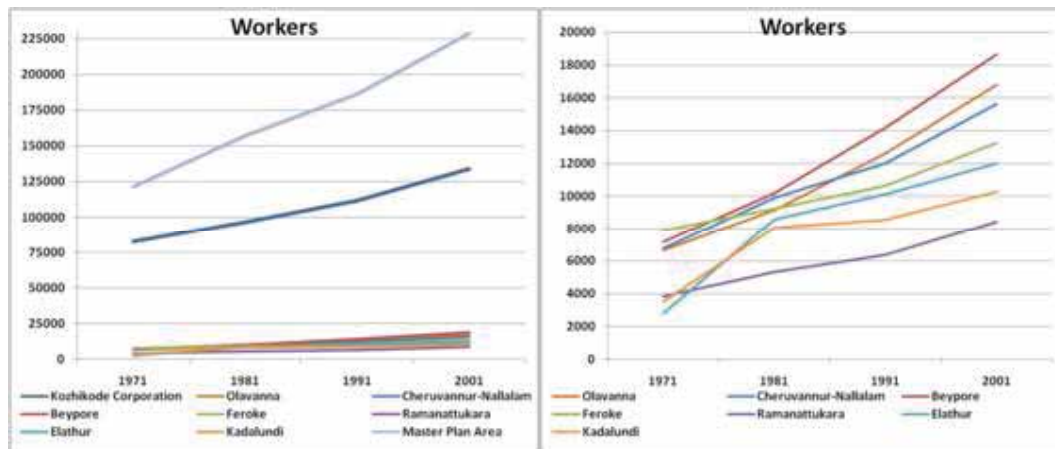


Figure 6-2 : Temporal variation of workers in the constituent local governments in planning area

and Cheruvannur Nallalam. Beypore and Cheruvannur Nallalam are industrial areas in the planning area, and Olavanna still has substantial agriculture base. These three LSGIs show the highest rate of growth in the number of workers in the last decade as well. Feroke, which had the highest number of workers in 1971, is reduced to 4th position in 2001, below the above LSGIs. This may be due to the stagnancy of tile industries in Feroke, due to the unavailability of raw materials. Elathur and Kadalundi had a significant hike in number of workers in 1981, of which Elathur maintained a considerable growth till 2001. Kadalundi showed no considerable increase in 1991, after which a significant growth is seen till 2001. Ramanattukara, which had higher number of workers than Kadalundi and Elathur in 1971, has the lowest number of workers in the planning area for the last three decades. However, it shows a considerable growth in 1991-2001.

When the main-marginal composition of workers in 2001 is studied, it can be seen that 87% of the workers in master plan area and 88% in corporation are main workers. It can be seen from the chart below that the planning area as well as the corporation have low shares of marginal workers when compared to the district, the urban average and rural average of the district. This indicates that in the planning area as well as the corporation provides its workers with work for most of the year, when compared to the urban and rural areas of the district.

When the main-marginal share of workers of the LSGIs in the planning area is studied, it can be observed from the figure 6-4, that Elathur has the least proportion of marginal workers whereas Kadalundi and Feroke has the highest. It can be seen that though Ramanattukara has the least number of workers, 87% of them are employed for more than

9 months of a year. Kadalundi and Feroke do not fare well both in terms of number of

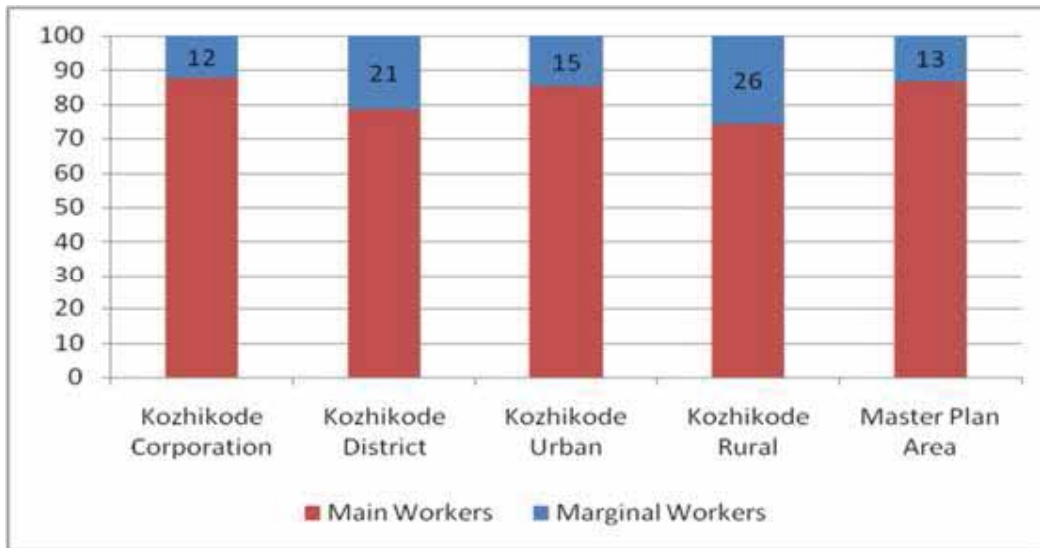


Figure 6-3 : Proportion of Main and Marginal Workers in comparison with the region

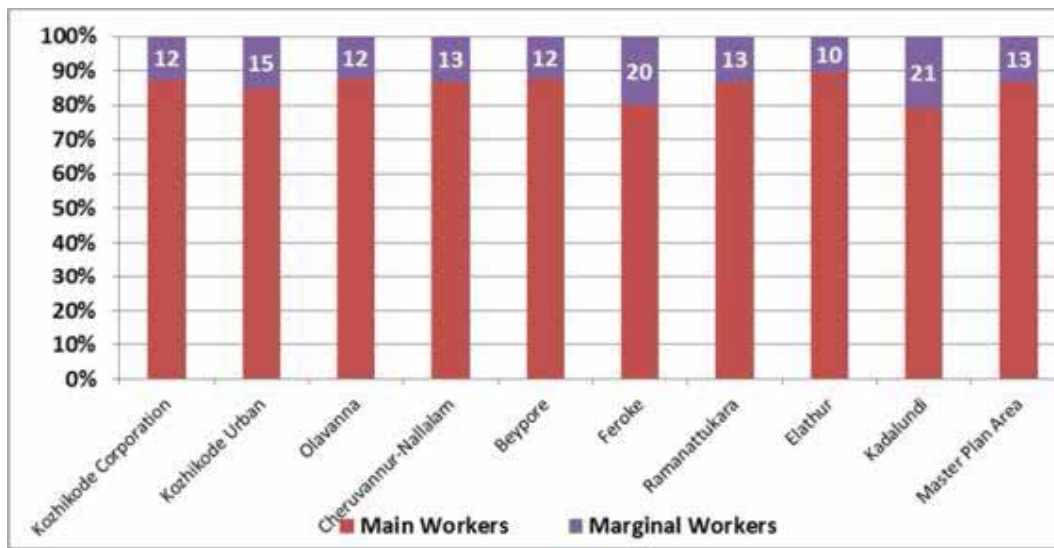


Figure 6-4 : Proportion of Main and Marginal Workers in comparison with the constituent LSGIs

workers and the share of main workers.

When the temporal variation of main and marginal workers in the region is studied, it can be seen that the main workers in the district and its urban areas increased significantly in 1991, and registers a mild growth further, whereas the rural counterpart doesn't show any considerable increase, in the last three decades. This may be associated with the increase in service sector opportunities in the urban areas and the decline of agricultural sector in the rural areas, respectively.

When the temporal change in marginal workers is analysed, it can be observed that their number in the district as well as rural areas witnessed a significant decline in 1981-

1991, which is also reflected in the urban counterparts. The fall in employment resulting from the decline in the traditional industries and indigenous economic sectors would have contributed to this decline. Again, in 1991- 2001 the number of marginal workers shot up in the rural areas and the district as a whole, may be due to the service sector opportunities created by then.

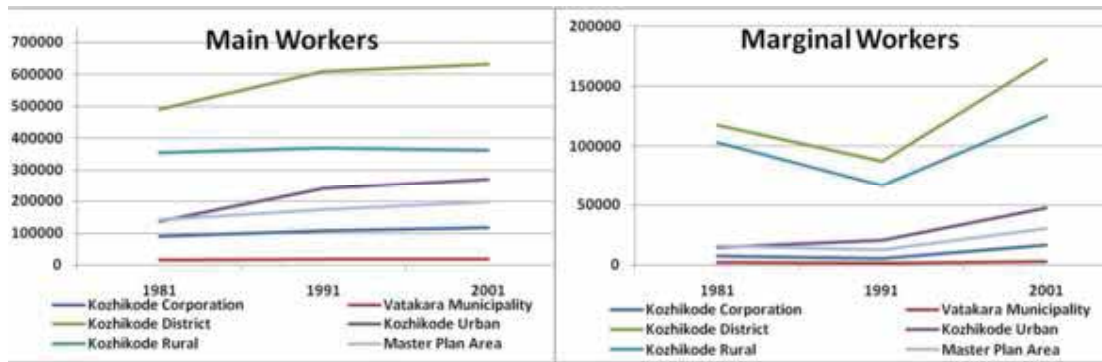


Figure 6-5: Temporal variation of main and marginal workers in the region

When the trends in other LSGIs in the planning area is studied, it can be seen that temporal changes in the number of main workers in the LSGIs in planning area follow the same as that of the trend in number of workers. The number of main workers is the highest in Beypore, followed by Cheruvannur Nallalam, Olavanna, Feroke, Elathur, Kadalundi and Ramanattukara. Similar to the trend in number of workers, though the corporation has the highest share of main workers historically within the planning area, it has gradually reduced from 63% in 1981 to 59% in 2001.

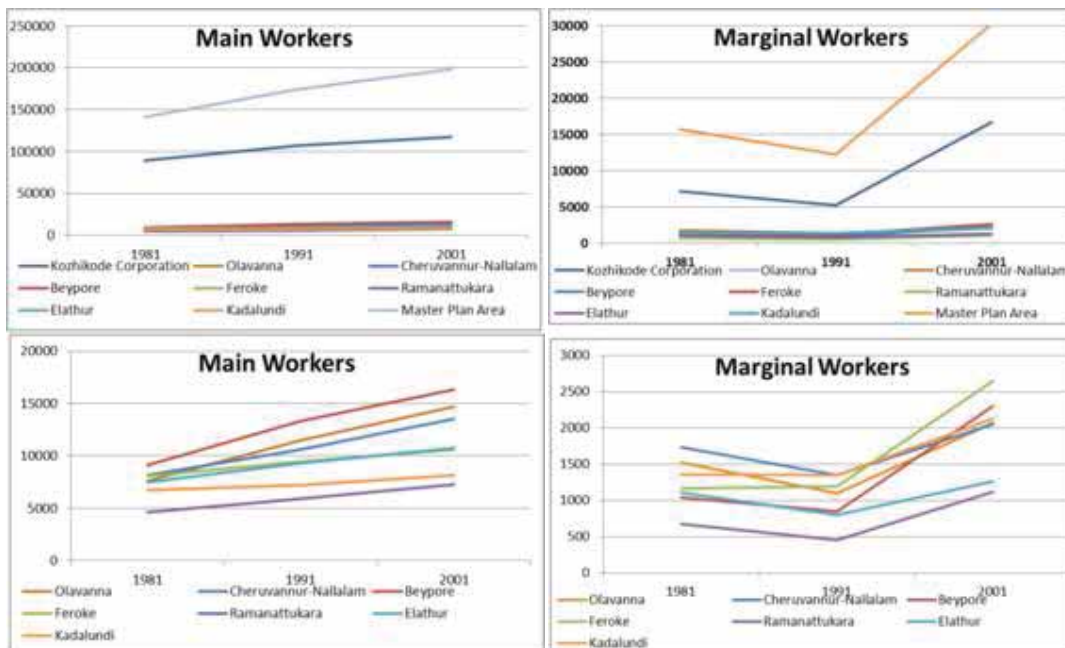


Figure 6-6 : Temporal variation of main and marginal workers in the constituent local governments

The number of marginal workers in the study area shows a decline in 1991 and again increases significantly, in line with the trend in the whole district. While closely analysing the LSGIs within the planning area, it can be seen that all the LSGIs also follow the same trend. The decline in agriculture and traditional industries in the region would have resulted in this decline in 1991, followed by the employment generated by service sector as well as other industries resulting in the high in 2001. But, contradictory to the scenario in total number of workers and main workers, the share of corporation in marginal workers in the planning area declined from 45% to 42% in 1991, but increased further to 55% in 2001. Thus, it is found that, the share of the corporation in marginal workers is increasing and that of the main workers decreasing temporally, when compared to the other LSGIs in the planning area.

6.2 Work Participation Ratio

The work participation ratio of the planning area in 2001 is 29.43%, whereas the expected WPR as per UDPI guidelines is 33%, which indicates the need for generating more employment opportunities in the planning area. Kozhikode Corporation has a better WPR of 30.64%, indicating the higher employment prospects there. However, the planning area only has a slightly better WPR compared to the district urban average of 28.71%.

Table 6-1: Work Participation Ratio

LSGI	1971	1981	1991	2001
Kozhikode Corporation	24.75	24.51	26.66	30.64
Vatakara Municipality	24.12	26.01	26.76	27.40
Kozhikode District	26.92	27.10	26.57	27.89
Kozhikode Urban	24.69	24.89	25.95	28.71
Kozhikode Rural	27.73	27.93	26.96	27.38
Olavanna	24.91	26.89	28.34	30.27
Cheruvannur-Nallalam	23.71	25.46	23.69	27.32
Beyepore	25.90	24.86	25.10	27.88
Feroke	25.82	24.46	23.91	26.35
Ramanattukara	23.94	25.16	24.83	27.63
Elathur	24.64	26.70	27.46	29.03
Kadalundi	22.65	26.90	24.28	26.27
Master Plan Area	24.74	24.96	26.11	29.43

Among the LSGIs in planning area, only Olavanna, which still has a relatively more active agricultural sector, has a better WPR of 30.27, higher than the planning area. The remaining local governments have lower WPRs the planning area as well as Kozhikode urban area average, except Elathur. Kadalundi, Feroke and Cheruvannur Nallalam have the lowest WPR in the planning area, even lower than the district rural average.

In 1971, the WPR of rural areas of Kozhikode district a high 28%, higher than that of the district and its urban areas (25%). It can be seen that the WPR of urban areas like

Kozhikode corporation, Kozhikode urban and Planning Area has been showing a general trend of increase temporally while that of the district and rural areas of the district decreased in 1991 and then increased in 2001. In 1991 – 2001 the urban WPR surpassed the rural WPR. This can be attributed to the decline of primary sector and rise of tertiary sector opportunities. While the urban WPR grew by 4 points, the rural WPR registers a net decline of 0.35 points between 1971 -2001. This indicates that the reduction in number of jobs in rural areas due to decline in agricultural sector has not yet been met by the industrial or service sector opportunities generated afterwards, when talked in terms of their proportion to the corresponding population.

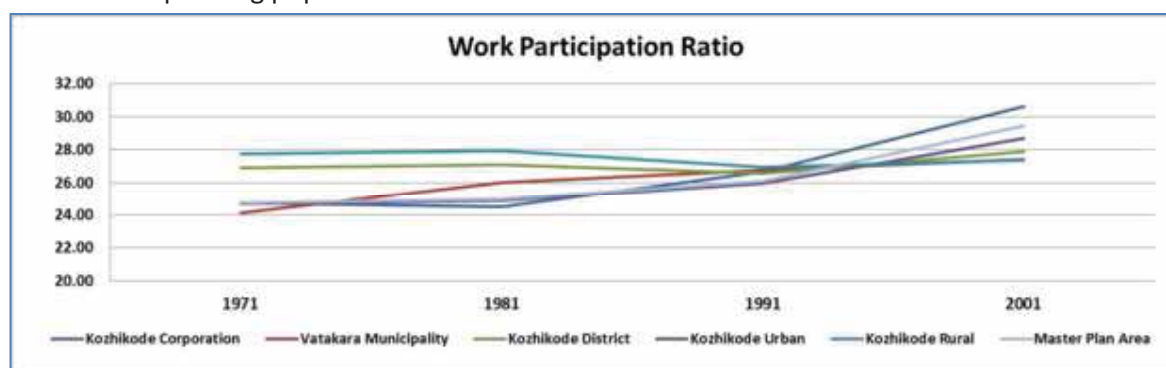


Figure 6-7 : Temporal variation of WPR in the region

Table 6-2: Comparison of WPR with Other Corporations

LSGI	WPR
Kozhikode	30.64
Thrissur	32.51
Kollam	32.19
Thiruvananthapuram	33.10
Kochi	34.37

When the work participation rate of Kozhikode Corporation is compared with that of the other corporations of the state, it can be seen that Kozhikode has the least WPR among them. Though a city of second tier importance after Kochi, along with Thiruvananthapuram, the city does not have a comparable WPR with its counterpart and other corporations of lower

importance. This indicates the necessity of creating more job opportunities in the planning area, to ensure a sustainable economy.

6.2.1 Male Work Participation Ratio

Table 6-3: Male Work Participation Ratio

LSGI	1971	1981	1991	2001
Kozhikode Corporation	42.35	42.12	46.62	52.74
Vatakara Municipality	41.97	43.35	46.31	48.93
Kozhikode District	44.20	43.15	44.59	48.66
Kozhikode Urban	42.29	42.52	45.36	50.76
Kozhikode Rural	44.89	43.39	44.11	47.36
Olavanna	43.16	45.10	49.28	54.24
Cheruvannur-Nallalam	40.27	43.01	43.00	49.88

Beypore	45.47	43.94	46.40	51.48
Feroke	42.50	40.79	42.67	47.93
Ramanattukara	40.20	42.14	43.40	48.62
Elathur	41.07	42.30	46.99	52.41
Kadalundi	40.14	42.01	43.16	48.31
Master Plan Area	42.29	42.38	46.00	51.81

The male work participation ratio is 51.81 in the planning area and 52.74 in the corporation, both of which are higher than the district urban average of 50.76.

Among the other constituent local governments, Olavanna, which has a high WPR, higher than the planning area, has a far higher male WPR of 54.24 than the corporation. Elathur and Beypore also have higher male WPR, Elathur's male WPR higher than that of the planning area and Beypore's higher than the district urban average. Feroke and Kadalundi have the lowest male WPR in the planning area, but higher than the district rural average. Ramanattukara, which has a WPR higher than Cheruvannur Nallalam, has a lower male WPR.

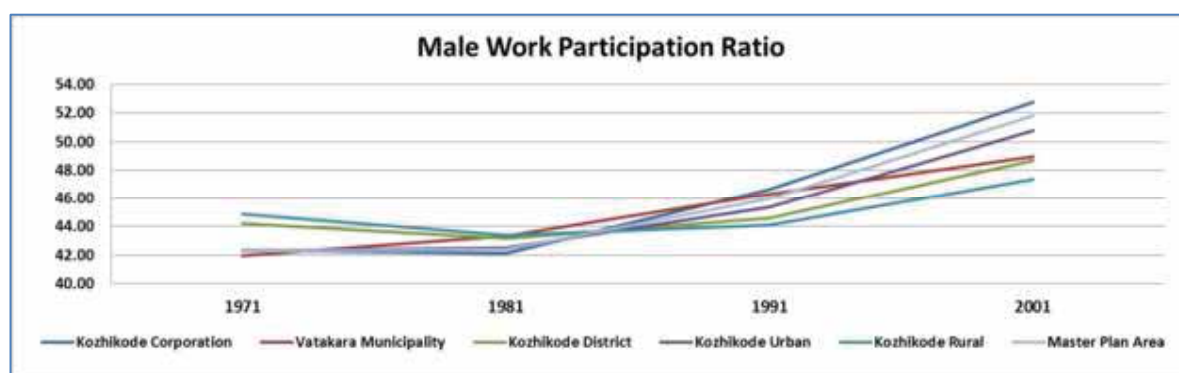


Figure 6-8: Temporal variation of male WPR

When the temporal variation of male WPR in the region is studied, it can be seen that it was lower in urban areas in 1971 than rural areas and almost stagnant till 1981, but rapidly increased and surpassed the rural areas in 1981 -1991, further. The male WPR in rural areas decreased in 1971 -1981 but shows a slow growth till 1991 and a fast growth afterwards.

6.2.2 Female Work Participation Ratio

Table 6-4 : Female Work Participation Ratio

	1971	1981	1991	2001
Kozhikode Corporation	6.94	7.01	7.23	9.81
Vatakara Municipality	6.36	8.97	7.89	7.42
Kozhikode District	9.49	11.38	9.02	8.24
Kozhikode Urban	6.99	7.39	6.98	7.82
Kozhikode Rural	10.39	12.85	10.28	8.50
Olavanna	6.13	8.68	7.83	6.83
Cheruvannur-Nallalam	6.87	8.12	4.75	5.90

Beypore	5.79	6.06	4.43	5.40
Feroke	9.05	8.31	5.39	5.55
Ramanattukara	6.89	7.64	6.18	7.15
Elathur	8.36	11.59	8.62	7.22
Kadalundi	6.19	12.70	6.45	5.75
Master Plan Area	6.96	7.72	6.75	8.21

The female work participation ratio in the planning area and Kozhikode Corporation are low, to the tune of 8.21 and 9.81 respectively. It can also

be seen that the Female WPR in the planning area is lower than the district and district rural average, indicating the effect of agricultural sector which provides more jobs for women. The lowest female WPR is in Beypore, Feroke and Kadalundi. It is notable that Beypore which fares fairly well in WPR and Male WPR has the lowest female WPR. Olavanna which has WPR and Male WPR higher than the planning area, has a median FWPR only. Feroke and Kadalundi have low WPR and Male WPR as well. Elathur and Ramanattukara has relatively higher Female WPR when compared to other LSGIs.

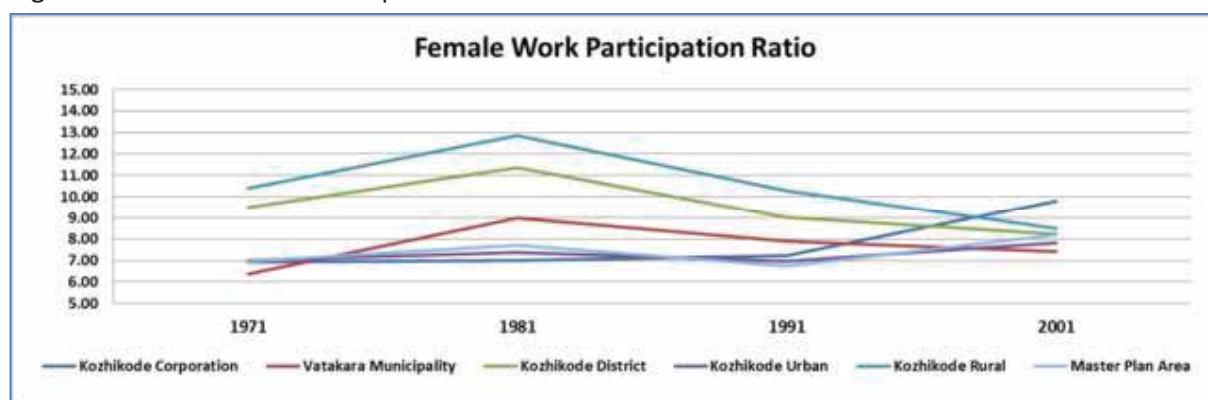


Figure 6-9: Temporal variation of female WPR

Study of temporal variation of female WPR shows that there was a decline in rural sector opportunities after 1981, represented by the downward sloping graphs for the rural areas and district, which shows a slow growth after 1991. A rise in the urban Female WPR is observed after 1991.

6.3 Occupational Structure

Workers other than cultivators, agricultural labourers and H/H industrial workers constitute 97.4% of the workers in the corporation and 96.7% of that in the planning area, in 2001. In the 'Other Workers' category, there has been a growth of about 4% in the corporation and 5% in planning area, between 1971 and 2001, indicating the growth in service sector opportunities in the constituent panchayats as well. The temporal growth in this category in the district is more than 30 points, but from a very low 55% and that in the rural areas is 35 points from a still lower 45%, which indicates the fast growth of service sector in rural areas.

Table 6-5: Occupational Structure in the Region and Temporal Variation

Worker Classification	Kozhikode Corp.		Vatakara Mlty		Kozhikode Dt.		Kozhikode Urban		Kozhikode Rural		Planning Area	
	1971	2001	1971	2001	1971	2001	1971	2001	1971	2001	1971	2001
% Cultivators	1.4	0.2	2.0	0.4	14.6	3.5	2.7	0.7	18.4	5.3	1.7	0.3
%Agricultural labourers	3.1	0.6	7.7	2.3	26.3	8.2	6.5	2.4	32.8	12.0	4.4	1.1
%HH-Industrial Workers	1.9	1.7	7.6	2.6	3.3	2.0	3.2	2.0	3.3	2.0	2.3	1.9
% Other Workers	93.6	97.4	82.7	94.7	55.8	86.3	87.6	94.9	45.5	80.8	91.7	96.7

It can be seen that in the corporation area, the cultivators decreased by 1.2% whereas agricultural labourers decreased by its double, 2.5% between 1971 and 2001. There is a slight decrease in H/H industrial workers as well. In the planning area, the cultivators decreased by 1.4% whereas agricultural labourers decreased by more than its double, 3.3%. There is a higher decrease of 0.4% in H/H industrial workers as well. When the urban average is considered, the cultivators have decreased by 2%, agricultural labourers by 4.1% and H/H industrial workers by 1.2%. Compared to other categories of workers, the decrease in agricultural labourers is on a higher side. The decrease in cultivators and agricultural worker categories in the district and its rural areas is very high and not comparable to the planning area.

6.4 Inference

Workers in the master plan area in 2011 constitute 32% of the total workers in Kozhikode District and 72.3% of that of the urban area of Kozhikode. 58.5% of the workers in master plan area belong to the Kozhikode Corporation. However, the number of workers in the planning area is increasing at a much higher rate than the corporation, indicating the increased opportunities and employability in panchayat areas. The main-marginal composition of workers in 2001 indicates that the planning area as well as the corporation provides its workers with work for most of the year, when compared to the other urban and rural areas of the district. It is also found that, the share of the corporation in total marginal workers is increasing and that of the main workers as well as total workers is decreasing temporally, when compared to that of the other LSGIs in the planning area. Kadalundi and Feroke do not fare well both in terms of number of workers and the share of main workers.

WPR in the planning area, 29.43%, doesn't match the expected urban area WPR of 33%. While the urban WPR grew by 4 points, the rural WPR registers a net decline of 0.35 points between 1971 and 2001. This indicates that the reduction in number of jobs in agricultural sector has not yet been met by the industrial or service sector opportunities generated afterwards, when talked in terms of their proportion to the corresponding

population. Though a city of second tier importance after Kochi, along with Thiruvananthapuram, the city does not have a comparable WPR with its counterpart and other corporations of lower importance. This indicates the necessity of creating more job opportunities in the planning area, to ensure a sustainable economy. Kadalundi, Feroke and Cheruvannur Nallalam have the lowest WPR in the planning area, even lower than the district rural average, indicating the necessity of creating more industrial and service sector opportunities here.

FWPR is very low and is showing decreasing trend, in all constituent LSGIs other than corporation. The lowest female WPR is in Beypore, Feroke and Kadalundi. It is notable that Beypore which fares fairly well in WPR and Male WPR has the lowest female WPR. Olavanna which has WPR and Male WPR higher than the planning area, has a median FWPR only. Feroke and Kadalundi have low WPR and Male WPR as well. Elathur and Ramanattukara have relatively higher Female WPR when compared to other LSGIs. This suggests that women centred work centres and job opportunities need to be planned for the study area, especially in Beypore, Kadalundi, Feroke, and Olavanna.

The decrease in agricultural labourers is on a higher side compared to other categories of workers in the planning area and the region, indicating the resulting shortage for agricultural labourers. The decrease in cultivators and agricultural worker categories in the district and its rural areas is very high, indicating the impending loss of rich agricultural hinterlands due to urbanisation and life style changes.





7

Land Use

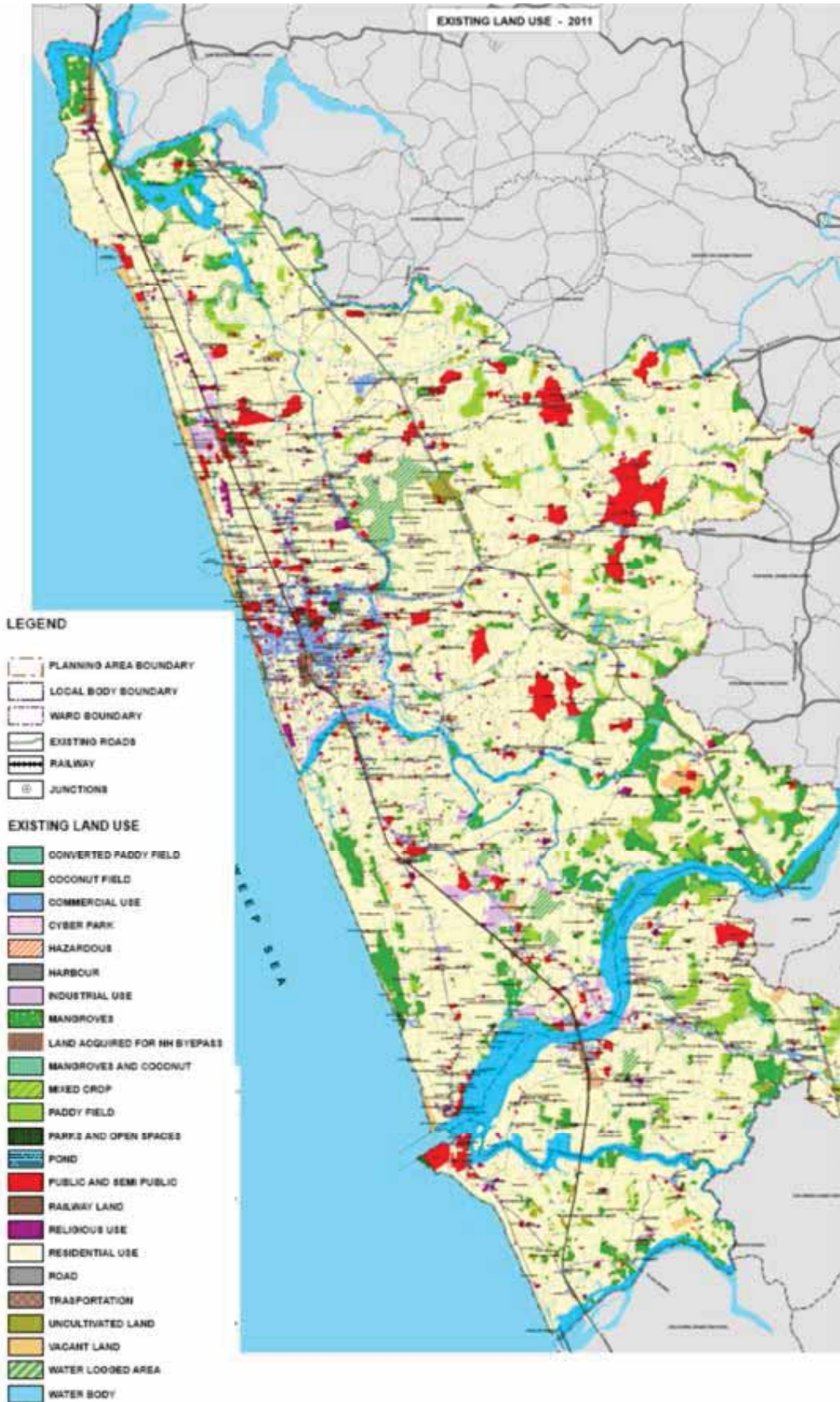


- * General Analysis of Land Use
- * Land Use Concentration Pattern

- * Categorization of Residential Land Use
- * Functional Character of Wards

7.1 General Analysis of Land Use

The existing land use of an area gives the spatial representation of the activities in the planning area. The existing land use of the planning area is represented below.



It can be seen that commercial land uses are concentrated in the city core – Valiyangadi-Palayam-Mavoor road areas, and industrial uses are concentrated in Cheruvannur – Nallalam and West Hill areas. Public and Semi-public uses are distributed all over the planning area. The existing landuse splitup in the planning area is given in table7-1.

Figure 7-1: Existing Land Use Map

Table 7-1: Existing Land Use in Planning Area

Land Use	Area (Sq.km)	% of Planning Area	% of Developable Area
Commercial	3.36	1.88	2.11
Residential	120.53	67.63	75.73
Industrial	3.26	1.83	2.05
Public ,Semipublic	7.17	4.03	4.51
Religious	1.85	1.04	1.16
Roads & Transportation	9.53	5.35	5.99
Environmentally Sensitive	7.47	4.19	
Water Body	11.57	6.50	
Parks and Open spaces	0.32	0.18	0.20
Dry Agriculture	11.41	6.40	7.17
Vacant Land	1.73	0.97	1.09
Total	178.21	100.00	100.00

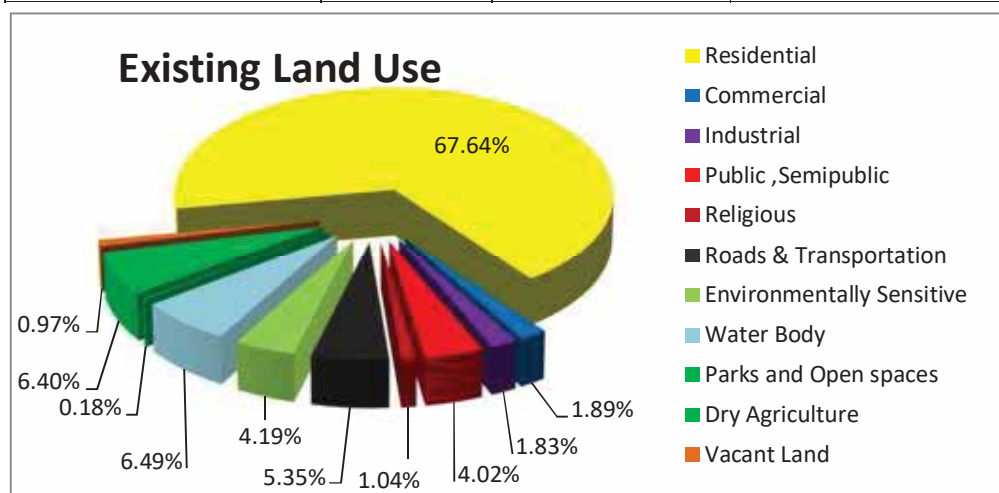


Figure 7-2: Existing Land Use Break Up

As depicted by table 7-1 and figure 7-2 , majority of the Master Plan area,68% , falls in the residential zone. Of the urban land uses namely, Public and Semi Public constitute 4% and Transport and Communication constitute 5% each of the total planning area, whereas Commercial as well as Industrial contribute approximately 2% each. Parks & Open Spaces contribute a negligible 0.2%. Dry Agricultural Land, a rural land use, contributes about 6% of the total area. Neutral land uses, namely Water body constitutes about 7%and Environmentally Sensitive Areas including Mangroves, Waterlogged Area, Cultivated/Uncultivated Paddy contributes 4% of the planning area. Vacant Landcontributes1% of the planning area.82% of the planning area has land uses of urban nature.

When compared to the UDPFI guidelines, it can be seen that the planning area has only half the required share of commercial land use and only one fifth of the industrial land use, the most productive land uses. The residential land use share in planning area is far beyond, and almost double of the required share. All the other urban land uses does not makeup even half of the requirement, the Parks & Open spaces falling short gravely, to insignificant numbers.

7.2 Land Use Concentration Pattern

7.2.1 Commercial Land Use

From the analysis of land use concentration, it can be seen that Commercial land use is concentrated in coastal and midland region of the Old Corporation Area. The highest concentration is in the CBD area as expected and then, along the sides of NH 17. The standalone concentration of commercial in North East is owing to the urban agricultural wholesale market at Thadambattuthazham.

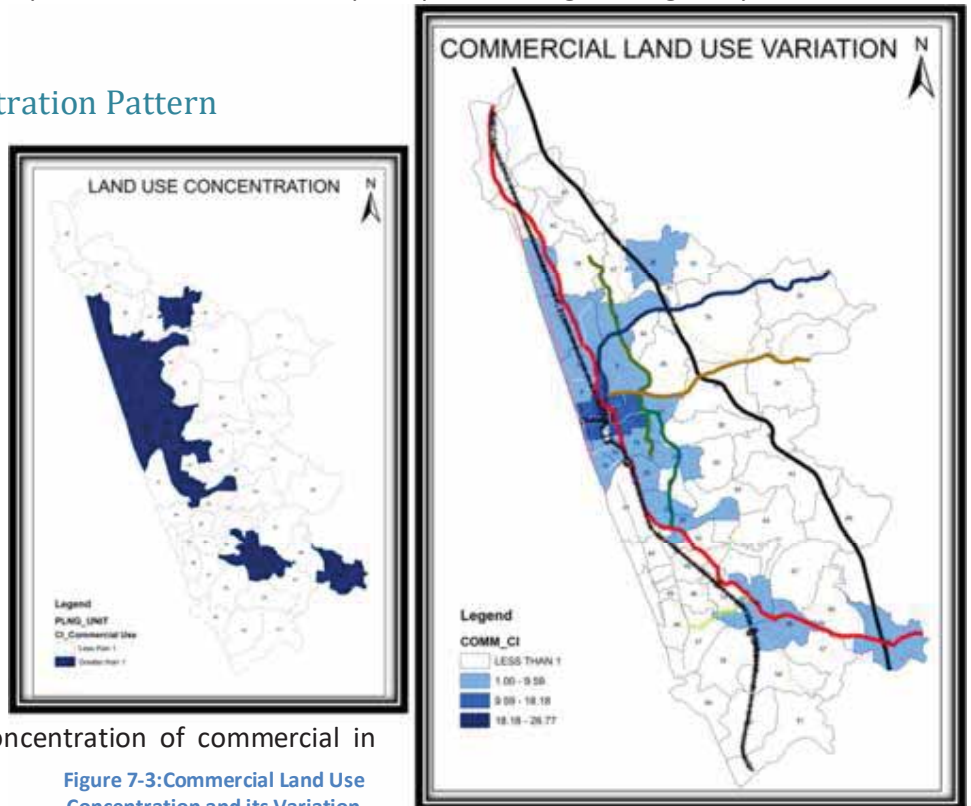


Figure 7-3: Commercial Land Use Concentration and its Variation



7.2.2 Industrial Land Use

The analysis of industrial land use concentration reveals that there are three distinct regions of industrial nature namely the Cheruvannur Nallalam industrial belt spreading to Ramanattukara and Beypore the CBD Area and the West hill region. The land intensive large scale industries in Cheruvannur area represent the highest concentration of industrial land use in the planning area. The CBD has the next highest industrial concentration.

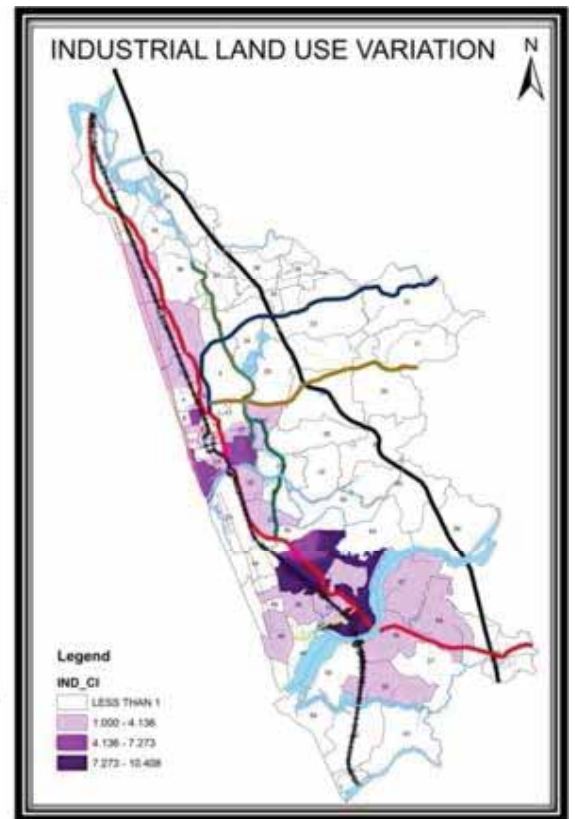


Figure 7-4: Industrial Land Use Concentration and Variation

7.2.3 Public and Semipublic Land Use

The public and semipublic uses are more concentrated in the Old Corporation Area, with the exception of Medical College area. Highest concentration of this land use is seen in Kozhikode Corporation Office area and Medical College Area.



It can be seen that the far north, south east and east regions of the planning area are devoid of any significant public and semipublic land use concentration, except for a few initiatives, which points to the requirement of a detailed analysis of adequacy of necessary public and semipublic uses like education and health care in these areas.

7.2.4 Parks and Open Spaces

The analysis (figure 7-6) reveals that south, east and south east regions of the planning area are devoid of park and open spaces.

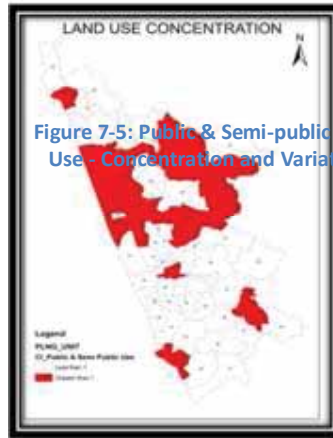


Figure 7-5: Public & Semi-public Land Use - Concentration and Variation

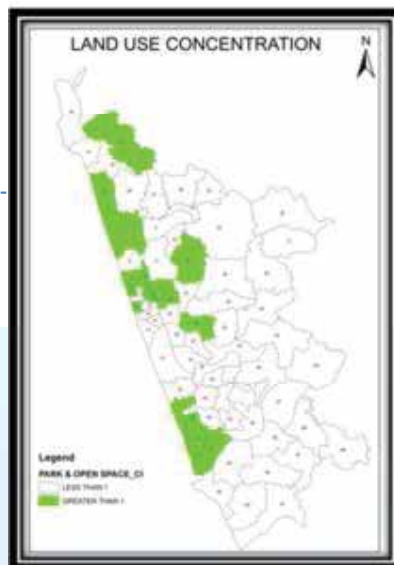
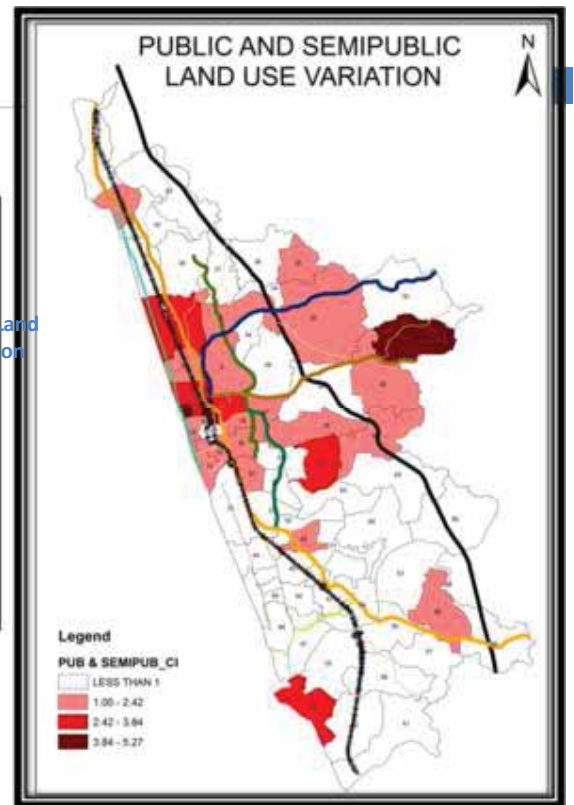
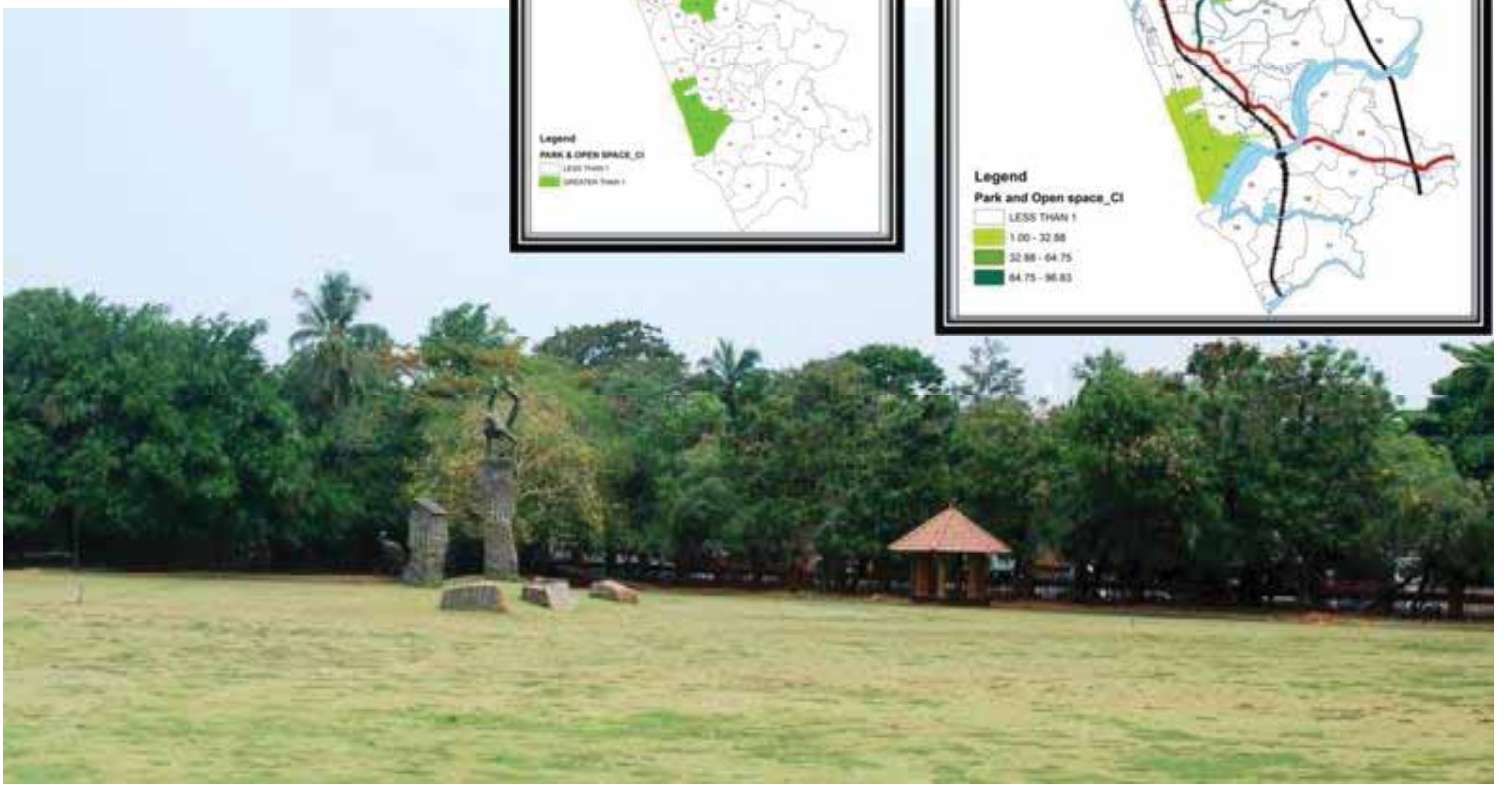


Figure 7-6: Parks & Open spaces - Concentration and Variation



7.2.5 Residential Land Use

From the analysis of land use concentration, it can be seen that Residential land use is more concentrated in the mid land region and in some coastal units. The residential concentration index is the highest in planning units 38,37,26,44,50,46,48.

7.3 Categorization of Residential Land Use

The residential land use in the planning area is mostly the homestead type of residential development, i.e., residential agricultural mix. However, these areas may sometimes be purely residential in nature which is urban in nature, and sometimes dominated by agriculture, a rural land use. Therefore, the Res/Agr mixed land use is characterised based on the plot size, (area/ the number of households), and the urban / rural nature of the residential land use is arrived at.

Average plot size (cents)	Category of Res/Agr mix
Plot size less than 25	Urban
Plot size 25-50	Semi-urban
Plot size 50-75	Semi-rural
Plot size >75	Rural

The average size of residential plots of the planning units varied between 0 to 50, indicating that the residential areas of planning unit are urban or semi urban in nature. This also indicates that there is no significant scope for agriculture as a major economic activity in the planning area.

7.4 Functional Character of Wards

The Functional Character of a planning unit denotes the character of major economic activity within the planning unit, when urban, rural or a mix of both.

The Functional Character of the planning unit can be Pucca Rural (Agriculture and allied activities), Pucca Urban (secondary sector and tertiary sector activities) or a Combination of Both (Semi Rural or Semi Urban). The criteria taken for identification of the functional character of a settlement are land use and population distribution and the average plot size within the planning unit. The procedure of deriving functional character is described in Annex 1 section 1.1.3.

The Functional Character of the various planning units in the study area is given in figure 7-7. The planning units of the planning area exhibit either urban or semi urban character. The urban character is spread along the coast and along the major transportation corridors.

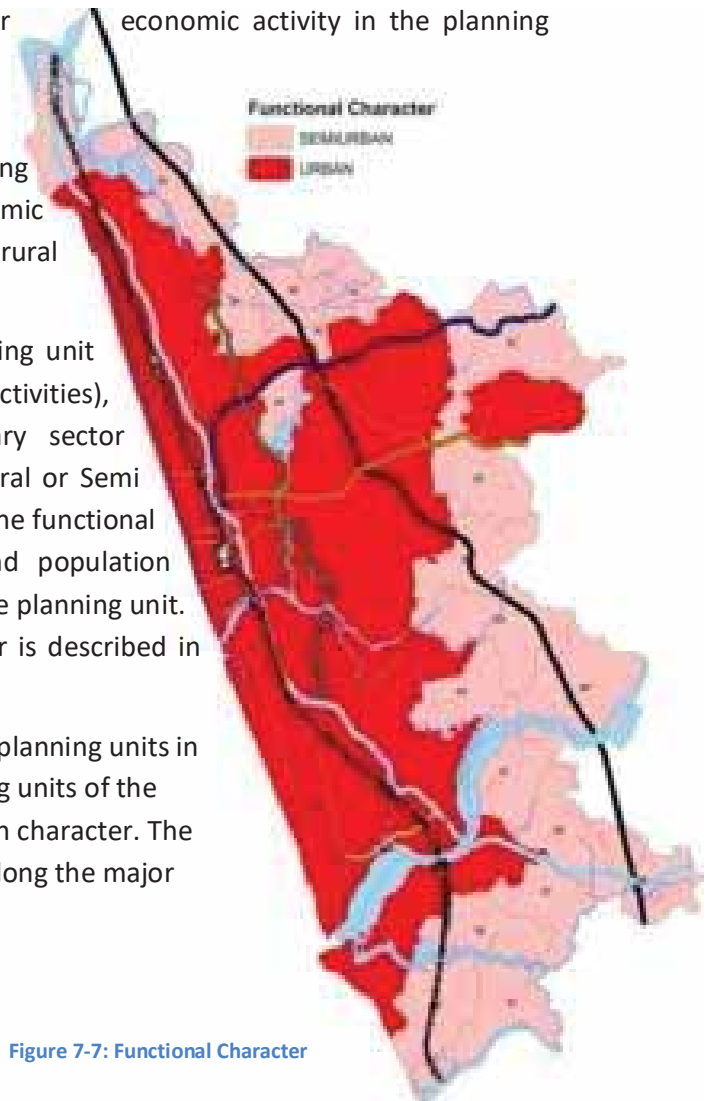


Figure 7-7: Functional Character



8



Economic Aspects



* Industry

* Trade and Commerce

* Tourism

* Agriculture

* Animal Husbandry

* Fisheries



8.1 Industry

8.1.1 Existing Industrial Base

The environment and social fabric of the planning area does not support large scale or land intensive industries and presently there is no large scale industry working in the planning area.

The following are some of the major industrial units in Kozhikode Urban area:

- 1) Steel Complex Limited, Cheruvannur
- 2) PK Steel, Cheruvannur
- 3) Parisons group of Companies, Cherooty Road
- 4) VKC Group of Companies, Kolathara
- 5) Kerala Soaps, Vellayil
- 6) Thiruvannur Cotton Mill, Thiruvannur
- 7) Ajantha Pro Prints, Mavoor Road
- 8) Khemka Flour Mill, West Hill
- 9) Ahammed Roller Flour Mill, West Hill
- 10) Koyenko Feeds, West Hill
- 11) Red Star Printers and Publishers, Joseph Road
- 12) Pee Key Roller Flour Mill, West Hill
- 13) Yenkey Roller flour Mill, West Hill
- 14) Common Wealth Tile Factory, Puthiyara and Feroke

The major industrial estates in the planning area are as listed below.

1. SIDCO Industrial Estate, West Hill: One of the major Industrial Estate of SIDCO is at West Hill in Kozhikode Corporation area which comprises 12 acre of land. But at present no vacant plot or shed is available at this Industrial Estate.
2. DA/DP West Hill: There is one DA/DP at West Hill under the Department of Industries & Commerce. 35 industrial units are working here.No vacant plot or shed is available at this Industrial Estate.
3. Nellikkode Industrial Estate: Kozhikode Corporation has developed an Industrial Estate comprising 3 acre of land at Nellikkode under People Plan Programme. The entire land is divided into different plots and all plots are already allotted to different entrepreneurs recently.
4. Industrial Plot at West Hill: Kozhikode Corporation possesses one acre Industrial land at West Hill industrial estate. Corporation is setting up a waste plastic re-Processing plant at the said land under People Plan Programme. The said project is at the final stage.
5. Beypore Industrial Estate: Corporation have an Industrial Estate at Beypore Vallancherry Vayal near Naduvattom. The construction of industrial sheds for allotment is under process under People Plan programme.
6. Cheruvannur Nallalam Industrial Estate: Corporation possess an Industrial Estate at Cheruvannur opposite to the Bamboo Tile Factory. 16 Industrial sheds have already constructed and allotted to the units. Now another 16 Industrial sheds are under construction under People Plan Programme.
7. Elathur Industrial Estate: Corporation is under possession of 1.35 acre of Industrial land at Puthoor Chali and the construction of 16 sheds is under progress under People Plan Programme. Now Corporation plan to establish a full-fledged Industrial Entrepreneurship Skill Development, Up gradation & Training Centre especially for MSME Sector, under People Plan Programme.
8. Besides the above Industrial Estates, the Industrial Estate run by Kozhikode District Panchayat at Cheruvannur Nallalam is also under the geographical jurisdiction of Kozhikode Corporation.

There are three handloom Industrial Cooperative Societies working in Kozhikode Corporation area namely Kommeri Weavers ICS, Taj Textiles ICS and Calicut Weavers ICS. Kolathara Harijan Workers Hollow Bricks ICS and Jubilee Bakery Workers ICS are the efficiently working general industrial cooperative societies in Kozhikode Corporation area.

The sector wise distribution of MSME in Kozhikode

Town and



With the arrival of IT, the economic base of the city is expected to be shifted to new-age industries.

Currently, Micro, Small & Medium Scale Enterprises form the major share of industries in planning area.

Steel industries in Cheruvannur are active and has significant influence in current local economics.

The tile industries of Cheruvannur and Feroke still has demand outside the State.

Kallai once had worlds second largest timber trade centre and the timber industry, now dying, has greatly helped the economy in the past.

Corporation is shown in Table 8.1. It can be seen that the majority of medium scale industries are textile based (12%), followed by electrical & electronics based (11%) and food based (10%).

Table 8-1: Present Status of MSM - Sector Wise Details

Sl No.	Name of Sector	No. of Enterprises	Sl No.	Name of Sector	No. of Enterprises
1	Wood Based	150	11	Wax Based	25
2	Food Based	480	12	PVC Based	40
3	Textile Based	590	13	Packaged Drinking Water	01
4	Cement Based	160	14	Paper Products	125
5	IT Based	320	15	Printing Based	170
6	Marine Based	25	16	Chemical Based	125
7	Rubber Based	25	17	Automobile Engineering Based	310
8	Fibre Glass Based	25	18	General Engineering & Light Engineering	300
9	Electrical & Electronics Based	510	19	Miscellaneous Products/Services	1229
10	Rexene Based	100	Total		4710

The economic base of the city is expected to shift towards new age industries as Kozhikode is the next IT destination in Kerala. There are no major IT parks between Kochi and Mangalore. Also the proximity of institutions of technical excellence such as NIT, IIM etc will boost the development of new age industries in Kozhikode. The major proposals in this sector are listed below.

- Uralungal Cyber Park: The first phase of the Cyber Park developed by Uralungal Labour Contract Cooperative Society is in the inaugural stage. The UL Cyber Park will have self-contained facilities required to satisfy the modern life style. The project is spread over 25.11 acre and an investment of 600 crores is planned. Direct employment to 20000 and indirect employment to 80000 is expected as part of this project. It is the first SEZ in Malabar region.
- Kozhikode Cyber Park: It is a cyber-park planned by Government of Kerala in the lines of Techno Park at Thiruvananthapuram and Info Park in Kochi to build, operate and manage IT Parks for the Promotion and development of investment in IT and ITES industries.



- Advanced Technology Park, Ramanattukara: Land acquisition for this project has been completed. The estimated cost is 400 crores and area for development is about 78 acres. The project assures an employment to 15000 persons.

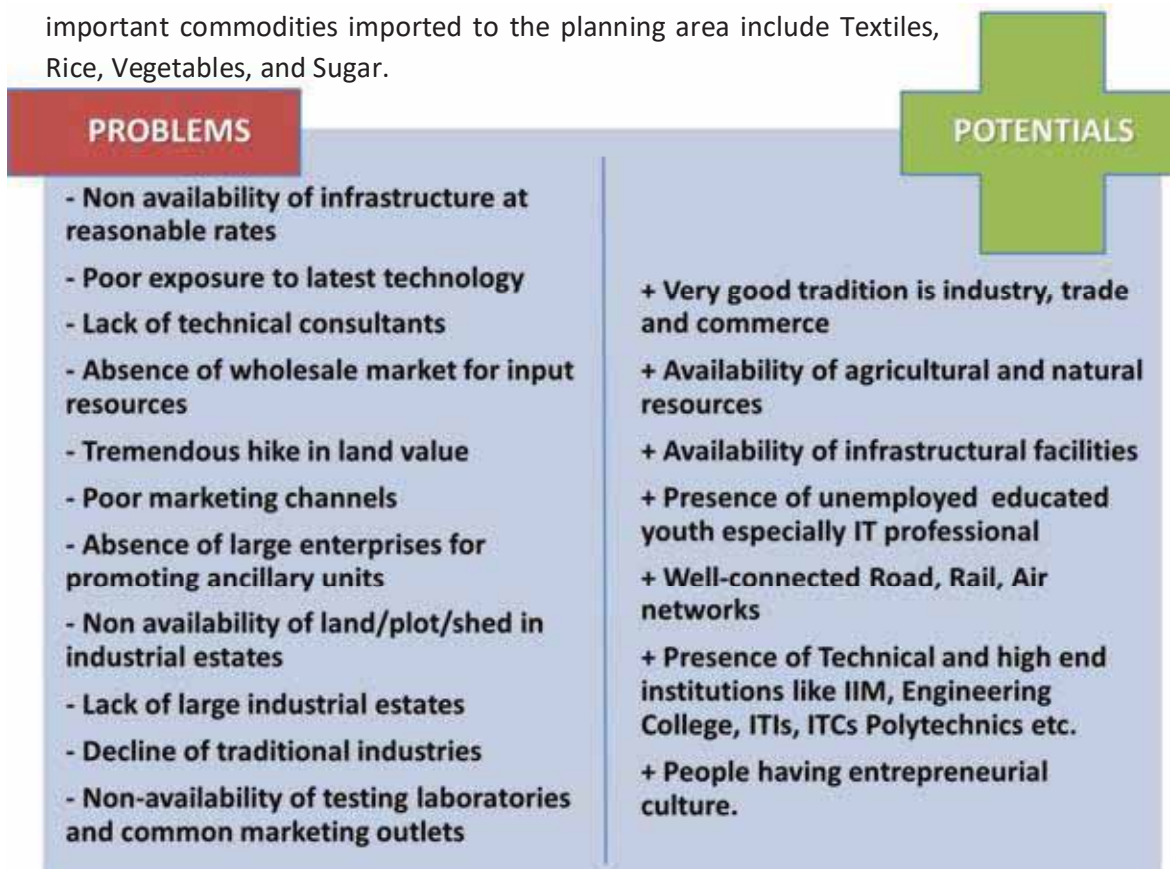
Besides, an industrial project to enhance the fisheries sector is also initiated in the planning area, namely, the KINFRA Marine Park in Beypore. Area for development for KINFRA Marine Park is about 23 acres. 10.15 crores investment is expected for this project.

8.1.2 Industrial Production

Table 8-2: Commodity Produced Inside the Planning Area

Location	Commodity Produced Inside the Planning Area	Commodity Exported from the Planning Area
Old Kozhikode Corporation	Soap, Furniture, Wooden articles	Fish, Handicrafts
Elathur	Fish products	Fish products
Olavanna	Pulp toys, Coir	Tiles, Coir
Cheruvannur-Nallalam	Steel, Clay products, chappals	Steel, Clay products, Chappals
Feroke	Tiles, Bricks, Wooden Furniture, Coir	Timber, Tiles, Rubber Chappals, Coir
Ramanattukara	Bricks, Clay products, Wooden items	Bricks, Clay products, Copra
Kadalundi	Tiles, Matches, Coir mat	Fish products
Beypore	Coir products, Timber products, Plastic products	Coir products, Timber products, Plastic products

Location wise production of commodities and exports are presented in Table 8-2. The important commodities imported to the planning area include Textiles, Rice, Vegetables, and Sugar.





8.1.3 Inference

Traditional industries

are experiencing drastic decline and new age industries are achieving momentum in the planning area. Plastic industries are coming up in Cheruvannur industrial area and Printing industries still have a significant position in the industrial picture of the study area. Steel industries are active and have a great influence on the local economy.

Earmarking suitable land for large scale private sector/public sector/PPP mode MSME industrial estates is necessary to bring in more industrial investments. Simplifying the rules and regulations pertaining to MSME sector and stream lining functions of Single Window Clearance Board would facilitate faster growth of the sector in the planning area. Besides, establishing testing laboratories, common marketing outlets and common facility centres through cluster initiatives, would ensure cost effective and good quality industrial production in the MSM sector.

8.2 Trade and Commerce

Census 2001 reveals that Kozhikode Corporation has the highest percentage of workers (25.44%) engaged in trade and commerce sector among the Corporations in the state, as presented in Table 8-3. This reveals the importance of trade and commerce sector in the economy of the study area.

Table 8-3: Workers Engaged In Trade & Commerce Sector

Municipal Corporations	Workers engaged in Trade & Commerce (%)
Kozhikode	25.44
Thrissur	22.74
Kochi	20.78
Kollam	21.37
Thiruvananthapuram	17.56

Source: Census 2001



Figure 8-1: Hierarchy of Commercial Nodes in the District

Kozhikode Corporation is the single first order commercial node in the district as per the hierarchy of nodes proposed by the District Urbanisation Report for the year 2021, as shown in Figure 8.1. Besides, there is another node, a second order node, in the planning area, at Feroke. This indicates the significance of the trade and commerce sector of

the planning area, in the regional economy.

8.2.1 Major Commercial Centres

Major centers of commercial activity in the planning area are the wholesale and retail areas at Big Bazar and Palayam, which form the Central Business District (CBD). NH66 which traverses through the CBD forms a major commercial corridor and houses both wholesale and retail activities. Besides, Wayanad road, Mavoor road, Mini bypass and Pantheerankavu road also houses wide range of commercial activities. Apart from the retail trade centres in the CBD, there are small scale commercial nodes distributed all over the planning area satisfying the daily needs of the residents like those at Feroke, Ramanattukara, Mankavu, Medical College area, Pantheerankavu, Beypore, West hill, Eranjipalam etc.

Table 8-4: Major commercial centres in the Planning Area

LSGI	No. of major commercial centres	Commercial Node/Centre
Old Kozhikode Corporation	5	Big Bazar, Palayam Road, S.M. Street, Koyenco Bazar & Grand Bazar, Focus Mall
Beypore	4	Beypore Town, Naduvattom, Arakinar, Mathottom
Cheruvannur-Nallalam	7	Nallalam Bazar, Cheruvannur, Rahman Bazar, Areecode, Kundaithode, Srambia, Modern Bazar
Feroke	6	Feroke Town, Petta, Chungam, Karuvanthuruthi, Kallampara, Nalloor Angadi
Kadalundi	3	Mannur Valavu, Kadalundi, Chaliyam
Olavanna	3	Panthirankavu, Mathara, Palazhipala

Ramanattukara	1	Ramanattukara Town
Elathur	1	Elathur Town
Total	30	

The number and listing of major commercial centres and nodes in the LSGIs of planning area are given in Table 8.4. The existing status of infrastructure at these commercial centres is not up to the mark. Only 7 of the centres have separate parking areas. Though 19 have authorized auto stands, only 12 have authorized taxi stands and 11 have authorised lorry stands. The sanitation infrastructure at these commercial centres are grossly inadequate as public comfort stations are available only at 4 of the 29 centres and 13 are not having proper drainage facilities.

8.2.2 Markets

Markets selling various kinds of hill produce and general goods are located in the big bazar area of the city which has become very congested. The sub-markets in the city area are Vegetable Market, Palayam, M.M.Ali Road, Eranhipalam Market, Central Market, Court Road, Kuttichira Market, Areekad Market, Pallikkandi Market and Mooriyadu Market.

8.2.3 Street Vendors / Informal Sector

The informal vendors earn their living by selling vegetables, fish and fruits, carrying them in pushcarts to specific locations by the side of important road margins. In most of the



cases, it is seen that these pushcarts do not move eventually and they are slowly made permanent stalls. Other vendors bring baskets of vegetables, fish and fruits and squat on the road margins to do brisk business during the morning hours or in the evening hours. Such morning / evening bazars operate in a few locations on the road margins on a daily basis. The details of street vendors are given in Table 8.5.

Table 8-5: Details of Street Vendors

LSGI	No .of Areas of Concentration	No of shops/cart	Labour Force
Old Kozhikode Corporation	22	808	2484
Beyepore	2	4	2
Cheruvannur-Nallalam	1	2	2
Feroke	3	25	25
Kadalundi	2	0	9
Total	30	839	2522

8.2.4 Spatial Distribution

The spatial distribution of commercial centres and street vendors are shown in Figure 8.2, and 8.3 respectively.

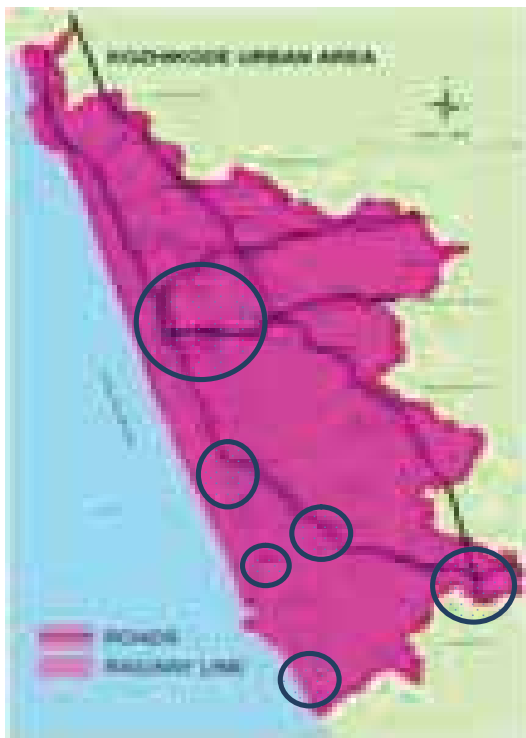


Figure 8-2: Concentration of Commercial Centres



Figure 8-2: Areas of Concentration of Street Vendors

8.2.5 Problems

Most of the zonal markets are characterized by congestion, old and dilapidated structures and lack of parking places. Zonal markets requiring reorganization are Mankavu

market. Kinasseri market, Nadakkavu market, Kallai market, Arekkadu market, West hill, and Eranhipalam. The informal markets affect the pedestrians and automobile traffic. However these markets are looked upon as a facility by the people, especially the lower income groups.

8.2.6 Inference

The trade and commerce sector of planning area has a regional significance. S M Street in the city is a trading hub which attracts people from outside the planning area and district as well. Proper infrastructure facilities, especially parking as well as sanitation infrastructure, should be provided for all markets in the planning area. Providing organized spaces for informal markets in various locations within the city will be a positive step on the part of the LSGIs, to reduce traffic congestion as well as to facilitate street vendors. Kozhikode has its brand of products such as halwa and banana chips which have markets outside the state. The specialised tiles manufactured at Feroke and its suburbs have a ready market outside the state for construction of houses. The furniture industry of Kallai is well-known. If geographical grading is attained and concerted market promotion activities are launched, these products will bring big dividends for all stakeholders. The upgradation of Beypore port will certainly give a stimulus to marine products industry and trade in all other industrial products.

8.3 Tourism

Kozhikode is famous for its boat-building yard, beaches, mangroves, bird sanctuary, timber industry, historic temples and churches, unexplored back waters, Ayurveda and Kalari healthcare systems and the delicious Malabari cuisine. There are a large number of tourist locations in the district. Tourists visiting Kozhikode are attracted more towards leisure tourism including beaches and historical monuments. Kozhikode functions mostly as a transit point for domestic and foreign



Figure 8-3: Places of Tourist Interest Inside Planning Area

tourists. There are 148 classified hotels in Kerala as listed by the Tourism Department, of which 22 hotels are located in Kozhikode city and constitute 15% of the state's total classified hotels.

8.3.1 Places of Tourist Interest

Places of tourist interest are given in the Figure 8-4 and detailed below.

1. Pazhassi Raja Museum , V K Krishna Menon Museum & Art Gallery, East Hill



Earlier known as the East Hill Bungalow, the Pazhassiraja Museum was built in 1891. The museum has on display, a rare collection of murals, earthenware, models of temples, coins, umbrella stones, burial urns and crypts. Krishna Menon Museum situated adjacent to the Pazhassi Raja Museum, the art gallery houses paintings of Raja Ravi Varma among the other collections. The museum has a section dedicated to V.K. Krishna

Menon. The personal belongings and souvenirs gifted by this world leader are exhibited here.

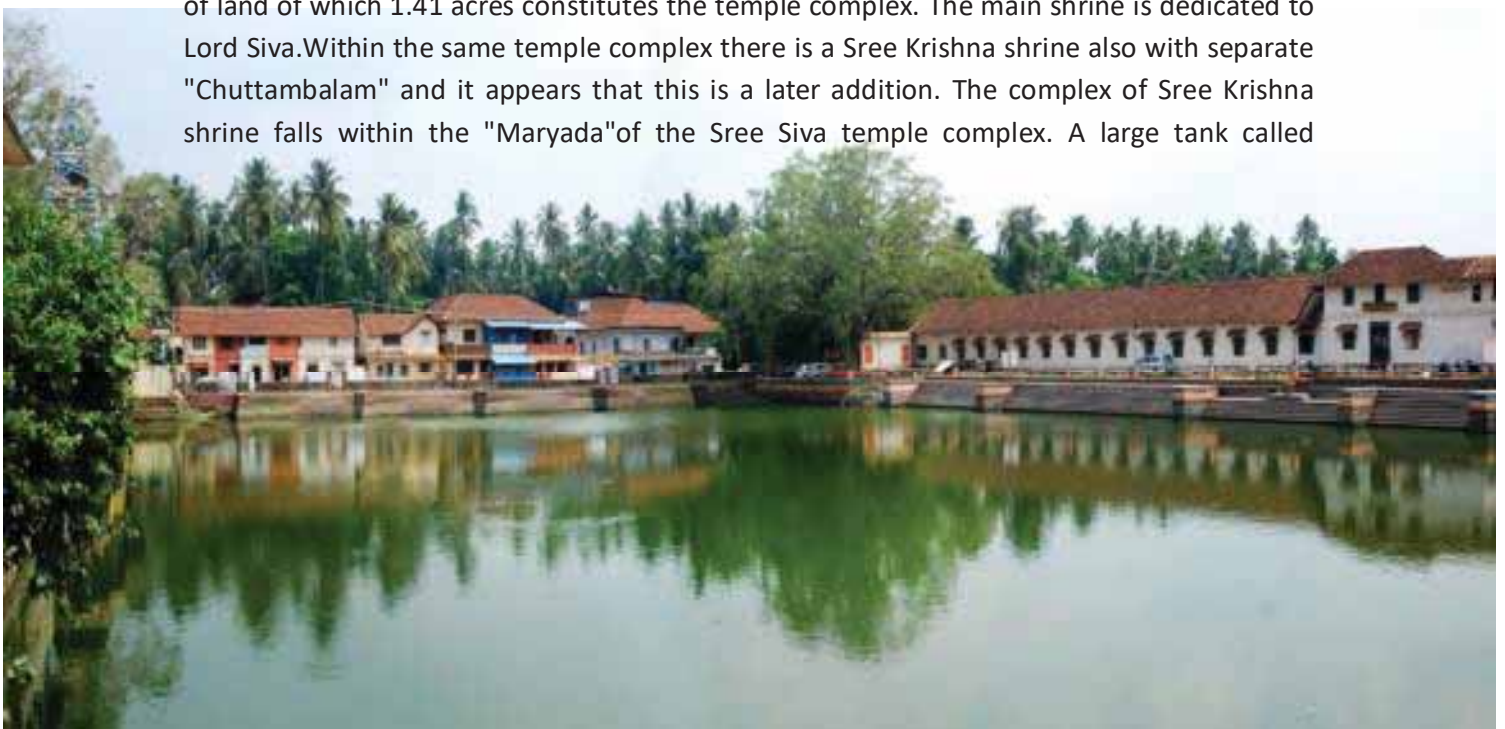
2. Planetarium

Regional Science Centre Calicut houses a 250 seater Planetarium fitted with a sophisticated Zeiss projector. The science centre abounds with puzzles which make mathematics easy. It unravels mysteries and explains things which otherwise would be called supernatural.



3. Sree Tali Siva Temple

Thali means the principal temple under a Raja or chieftain or Thaliyoothiri (Namboothiri -Chief). It is believed that Lord Parasurama propitiated Lord Siva who agreed to remain in this temple site in the form of a Swayamboo-Linga. At present the temple owns 30.56 acres of land of which 1.41 acres constitutes the temple complex. The main shrine is dedicated to Lord Siva. Within the same temple complex there is a Sree Krishna shrine also with separate "Chuttambalam" and it appears that this is a later addition. The complex of Sree Krishna shrine falls within the "Maryada" of the Sree Siva temple complex. A large tank called



“Kandamkulam” measuring about 106 m x 43 m is under the temple devaswom. The Temple, 66.50 m long from east to West 82 m wide from North to South is entered through a large gate house with usual internal platforms on either side for use by Brahmins. It also has an external verandah. The porch has fine wood carvings on its lintel and cornice, and its high front gable is supported by four wooden columns. The temple is under the control of HR&CE Department. Built in the 14th century by Swamy Thirumulpad, the Zamorin, within his palace complex, this temple was the venue of Revathy Pattathanam, the annual cultural and intellectual event. The Tali temple is a fine example of the total integration that can exist between wood and laterite, which is a remarkable feature of the Kerala style of architecture.

4. Mithqal Mosque

Located at Kuttichira in Kozhikode town, this is one of the oldest mosques in Kerala. Believed to be constructed around 700 years ago, the mosque is also known as Mithqal Palli. It was named after Nakhuda Mishkal, an Arab merchant who built this mosque. Unlike other mosques, Mithqal Palli doesn't have minarets which make it unique from other mosques.



5. Muchundippalli



Built in the 13th century in Kuttichira area, Muchundippalli is the oldest mosque in the city. It has a stone slab installed in the inscribed ancient Vattezhuthu script. The structure stands on a plinth, 1.5 m tall and has a double tiered roof with a decorated gable. The ceiling has intricate wooden carvings on it.

6. Kadalundi Bird Sanctuary

The estuary at Kadalundi is a haven for migratory birds. Thousands of migratory birds from all over the world, like Terns, Gulls, Herons, Sandpipers, Whimbrel and other exotic birds gather here during the season which starts from November and return home in April. Kadalundi also houses a community mangrove reserve and three bird watching centres. Boating facilities are available at this bio-diversity hot spot, which has immense potential to be developed as an important tourism destination in Malabar.





7. Backwaters

Unexplored, unspoiled, the backwaters of Kozhikode hold great promises of enchanting tourism options. Elathur, the Canoli Canal, Chaliyar River and the Kallai River are potential destinations for boating. Korapuzha, the venue of the Korapuzha Jalotsavam is fast becoming a popular water sport destination.

8. CSI Church

In October 1834, a group of Basel missionaries arrived in Kozhikode and set up headquarters and constructed the biggest Basel Mission church in Malabar in 1842. This church, known as CSI church today, situated in Mananchira area, has the distinction of being adorned with the only pipe organ among all the dioceses in Kerala, a gift from St. Ayden's Church in Cheltenham, England.



9. SM Street

S.M. Street is a buzzing shopping and commercial lane immediately north of Mananchira Square. The name Sweet Meat is thought to have been derived from a kind of sweet (locally called 'halwa') which was called 'sweetmeat' by European traders. S.M. Street, like the lanes of Veliyangadi, is about 600 years old and was most likely occupied by the residences and shops of sweet manufacturers from Gujarat. A now-abandoned Parsi cemetery called Anjuman, most likely built in the 17th century, is located here and finds mention in William Logan's "Malabar Manual".



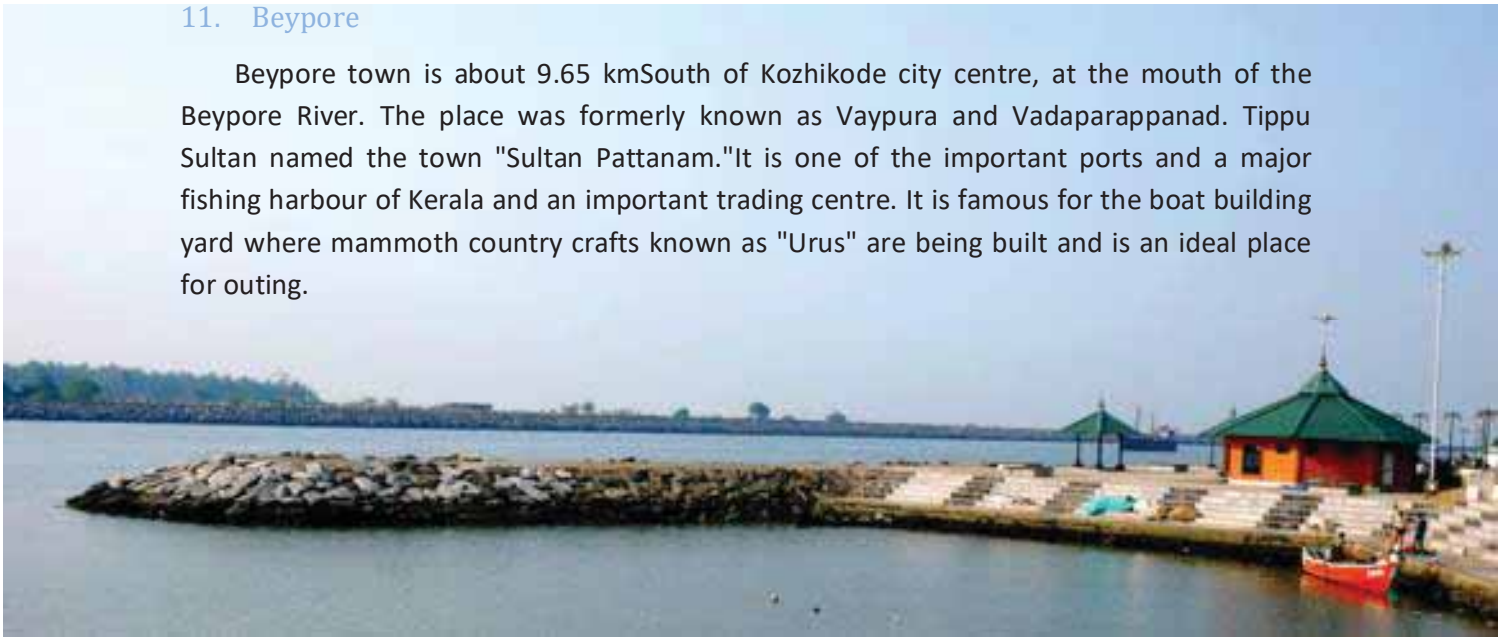
10. Cathedral of the Mother of God

The cathedral is one of the most ancient churches in the region. Pathrew De Kovilham started the Church in 1498. In 1516 it was destroyed in fire. In 1596 the church was reconstructed by father Dacosta & Schippan. In 1724 with the help of Samuthiri, the church was renovated. Stone & mortar was mainly used for the construction. From 1923 onwards it was under the control of Kozhikode Diocese.



11. Beypore

Beypore town is about 9.65 km South of Kozhikode city centre, at the mouth of the Beypore River. The place was formerly known as Vaypura and Vadaparappanad. Tipu Sultan named the town "Sultan Pattanam." It is one of the important ports and a major fishing harbour of Kerala and an important trading centre. It is famous for the boat building yard where mammoth country crafts known as "Urus" are being built and is an ideal place for outing.



12. Sarovaram Bio Park

Sarovaram Bio Park is an eco-friendly development near the city, situated adjacent to Canoli Canal. The project has been developed with an eco-friendly theme and is located in an ecosystem consisting of wetlands, mangrove forests and bird habitats. The construction has been done in traditional Kerala style. The Sarovaram project is being developed in stages, and the first few stages are complete and open to public. It is one of the more popular spots in the city to spend an evening, along with the beach and Mananchira Square.



13. Fort of Tippu Sulthan, Feroke

Ferokabad was the name proposed by Tippu Sulthan for his Capital of Malabar, today's Feroke. The remains of a fortress built by Tippu Sulthan in 1788 are still available at Feroke. The plot is under private ownership. Entry is from the top at ground level. At present the structure is partly collapsed on north & east sides.

14. Calicut Beach

The beach is the most popular retreat for locals. Beautification works have been undertaken for a few stretches, but are not well maintained. In spite of lax coastal management, it remains unexploited and visually pleasing. This shore has been a witness to many historic events, including pitched naval battles and the arrival of ships from distant lands. Several national leaders like Mahatma Gandhi, Khan Abdul Ghaffar Khan, Indira Gandhi and Krishna Menon have addressed people here. Two dilapidated piers can be seen extending into the sea, which were built around 150 years back. Numerous cranes on these piers once loaded spices and other goods destined to foreign ports like Aden, Genoa, Oslo, London, Bremen, Hamburg, New York etc.

A park maintained by the Lions club, a children's park, the lighthouse with a seafarer's memorial and a marine aquarium are along the beach. Further north to the Lions' Park is a fishing area where a French loge with factories and French settlements were located once. Near the south pier is a place called 'Horse's Jumping Point' where horses brought from Gujarat and Arabia were made to jump into the water, swim and gallop along the shore, being displayed for sale. The beach is welcoming and always offers a pleasant view which makes it one of the most often-visited recreation spots among the locals.



15. KIRTAADS

This unique museum houses the tools and devices used by the ancient tribal communities of Kerala. A good library with books on Anthropology and Sociology is an added attraction.



16. Mananchira Square

Mananchira Square, the main courtyard of the Zamorin Ruler's palace, has been developed into a well-maintained park, in the centre of Kozhikode city. It is a most frequented recreational space in the planning area. It has a green carpet lawn fenced with laterite- sculpted walls. The entire complex is circled by 250 lamp posts designed in 'colonial' style. The 'Square' has an artificial stream, a musical fountain, an open-air theatre and a music stage.

Mananchira Square gets its name after the adjacent man-made lake Mananchira or Manavedan Chira (pond), named after Manavedan Samoothiri, the erstwhile ruler of the Kozhikode Kingdom. Surrounding the Mananchira are several important establishments and built heritage like the Town Hall constructed in 1891, an important stage for several popular agitations and ceremonies during the freedom movement and thereafter; the Pattalapalli or 'Military Mosque', originally built for the Mysore soldiers who had surrounded the Palace during the 'Mysore invasion'; the Comtrust Textile Factory, established in 1884 by the Basel Mission from Germany; the C.S.I. Church, Basel Mission Complex and the BEM (Basel Evangelical Mission) Girls' School established in 1848. The public library near Mananchira square has a collection of huge variety of books from various disciplines. In total, the Mananchira Square and surrounding area is a cultural, heritage and recreational hot spot in the planning area.



8.3.2 Tourism Infrastructure

The details of tourism infrastructure in the planning area are presented below.

Table 8-6: Tourism Infrastructure

Local Body	Number of Hotels			Tourist information centre (s)	House boats	Home stay Facilities (
	Above Four *	3 */2 * hotels	Economy hotels			
Old Kozhikode Corporation	2	4	25	2	NIL	2 homes
Beypore	NIL	NIL	20	NIL	NIL	2 homes
Cheruvannur-Nallalam	NIL	NIL	12	NIL	NIL	NIL
Elathur	NIL	NIL	18	NIL	NIL	1 homes
Feroke	NIL	NIL	12	NIL	NIL	2 homes
Kadalundi	NIL	NIL	10	NIL	NIL	2 homes
Olavanna	NIL	NIL	10	NIL	NIL	NIL
Ramanattukara	NIL	2	15	NIL	NIL	NIL

Though a place of immense tourism potential, it can be seen that the planning area does not have superior quality tourism infrastructure. The available higher order facilities are concentrated in the city core.

8.3.3 Problems and Potentials

Problems

- Poor accessibility and road conditions to various tourist destinations of Kozhikode.
- Lack of variety of tourism products.
- Lack of sufficient good quality accommodation, convention and recreation facilities.
- Absence of well-coordinated and managed tourism circuits.
- Solid waste management and pollution issues at all the destinations, especially pollution in the canals and rivers prohibiting full utilization of water based recreation.
- Shortage of drinking water, drainage, transportation and sewage disposal schemes in the city.
- Lack of proper marketing of tourism potential.
- Lack of signage and amenities attracting tourism.

Potentials

- The district has got a very good network of back waters, a long beach and river front, navigable canals etc. which could be developed for boating and water sports with due consideration to the environmental impacts. The rich mangrove reserves and Kadalundi bio reserve has excellent potential for eco-tourism.
- The rich tradition of the folk/classical art forms of the district has to be highlighted. Monthly performance of art forms may be conducted at important places in the city with the co-operation off the DTPC or similar organization to attract and create

awareness among the domestic and international visitors about the art forms. There could be an open air theatre area with walkways and a cultural centre. Performances can be arranged here with the co-operation of institutions like DTPC.

- The region has got unique cuisine, the famous Malabari Cuisine, influenced by the multi-cultural and multi-ethnic past. There is a considerable influence of the Arabs and other trade community in the eating habits of the region. This can be projected as USP of Kozhikode.
- Kozhikode, having the presence of premier institutes like IIM, NIT, IISR, IMG, CWRDM, and Medical College, is a suitable location for all international conventions.
- With the presence of high quality medical facilities with rates far below the international price, Kozhikode also could be a place to attract foreigners, especially from SAARC countries and the Middle East, for undergoing treatments. The famous Ayurvedic centre of Kerala, Kottakkal Arya Vaidyasala, the one and only institution of its kind in the country, is close to this city and all kinds of advanced Ayurvedic treatments are available here.

8.3.4 Inference

The tourism potential of the planning area is grossly underutilised. The potential of Elathur backwaters, Kadalundi Mangroves and bio-reserve, Kottooli Wetlands, the long beach and river front, inland water ways, etc. shall be positively utilised for the benefit of local and regional economy. More Museums, Aquariums/Oceanariums and Zoos should be introduced in the planning area. Projects for Conservation of Heritage, including those under private ownership should be encouraged. Museum Cum Academic Centre to show case works of eminent writers of North Malabar should be established.

8.4 Agriculture

Kozhikode district has a rich heritage in agriculture and was a port city famous for pepper & spices trade. Agriculture plays a major role in the district economy. The total geographical area of the district is 2,33,330 hectares in which the net area sown is 1,63,932 hectares (70%). Cultivation of paddy is scanty in the district with a production of 3814 MT. It is sown in an area of only 3004 (1.3%) hectares. However, crops like coconut, banana, tubers and other spices and tree crops are cultivated. The LSG wise crop specialization in the planning area as per the District Urbanization Report, Kozhikode are Coconut for Kozhikode Corporation, Paddy in Ramanattukara, Coconut and Paddy in Olavanna, Mixed Crop and Paddy in Feroke and Mixed Crop in Kadalundi.

Department of Agriculture has set up many institutions in the district aimed at the development of agriculture. Major institutions in the planning area are

- Principal Agricultural Office: Located at Civil station, the District level office is to supervise and monitor the development activities in the district.

- Assistant Directors of Agriculture, Krishibhavans: The main objective of the Krishibhavans is to give all technical guidance to the farmers related to agriculture, and there are officers implementing various schemes at grass roots level.
- Farmers Training Institute: This regional level institute is situated at Feroke, Kozhikode. The institute was established with an aim to impart training on modern agriculture to the farmers, farm labourers, people's representatives and personnel of the department of agriculture from Kozhikode, Wayanad, Kannur and Kasargod.
- State Agmark Grading Laboratory: Situated at Malaparamba, the laboratory is established for grading of oils, spices and ghee, and to issue AGMARK.
- Urban Wholesale Vegetable Market: Located at Vengeri and established with financial assistance from European Economic Community, for wholesale pooling and distribution of vegetables within the State.
- Farm Information Bureau: Farm Information Bureau, situated at Vellimadukunnu, is the official spokesman of the department of agriculture in the State. The Bureau publishes fortnightly magazine named "Kerala Karshakan" which gives all information in the field of agriculture.

Besides there are a few premier institutes in the planning area conducting research in various fields of agriculture like

- Indian Institute of Spices Research: IISR is a full-fledged institute of international importance in spices research and development. Initially started as a Regional Station of Central Plantation Crops Research Institute in 1975, the institute has developed an array of varieties and suitable technologies for the spice farmers of India. The IISR also is the headquarters for the All India Coordinated Research Project on Spices being operated in 34 centers all over the country. The areas of work include development of varieties of high yield, quality and resistance, standardizing propagation methods to ensure large scale production and distribution of high yielding genotypes, development of agrotechniques for increasing production and productivity, integrated pest and disease management, post-harvest technology, socio-economic aspects of cultivation, marketing and information dissemination in spices farmers help desk etc.
- Directorate of Arecanut & Spices Development: DASD have the mandate for the development of a group of spices other than cardamom, a large number of medicinal and aromatic plants, betel vine and Arecanut at National Level. The Directorate undertakes overall coordination of all the development activities implemented by different



agencies in the mandatory crops and monitors the implementation of National Horticulture Mission in respect of spices and aromatic crops.

8.4.1 Area under Cultivation

Crop wise area of cultivation in the planning area is given in Table 8.7. It is seen that coconut is the most cultivated crop in the planning area, followed by other fruit plants, paddy and banana.

Table 8-7: Details of Cultivation - Crop Wise

LSGI		Area (Ha)											Grand Total
		Areca nut	Banana	Cashew	Cocunut	Paddy	Pepper	Pulses	Spices	Tuber Crops	Vegetables		
Kozhikode	Kozhikode Corp. (Old)		30		4956	20	0				0	4986	
	Beypore	15	5		738	1	5				15	779	
	Cheruvannur-Nallalam	12	3		650	5	5				1	676	
	Elathur	20	5	0.25	734	1	3		4	5	2	774	
Feroke			20		1025	10				10	5	1070	
Kadalundi			8		695	20				30	30	783	
Olavanna			8		1250	50					3	1311	
Ramanattukara		12	5		778	30	6	2		5	5	843	
Grand Total		59	84	0.25	10826	117	19	2	4	50	61	11222	

Source: Principal Agricultural Office, Kozhikode

8.4.2 Important Crops and Production

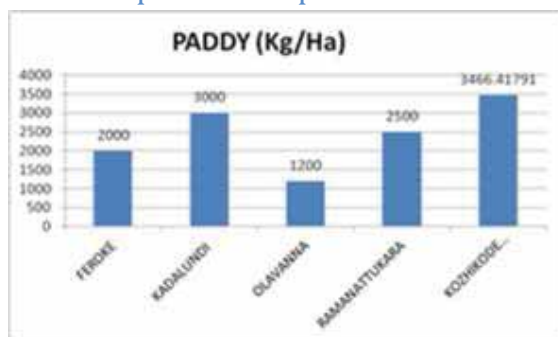


Figure 8-4: Production Details of Paddy

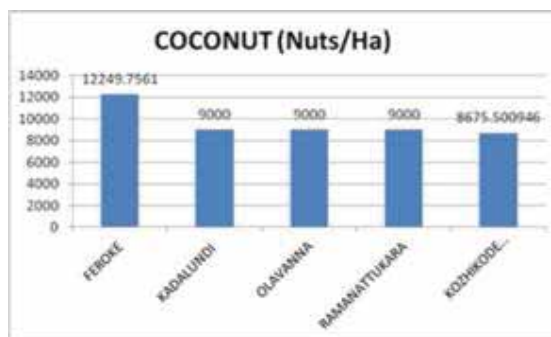


Figure 8-5: Production Details of Coconut

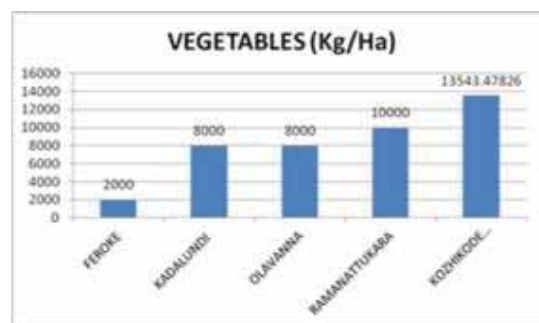


Figure 8-6: Production Details of Vegetables

Major crops cultivated in the are coconut, paddy, banana, arecanut, cashew, vegetables, tuber crops, spices, pepper etc. Major crops and their productivity are shown in Figures 8.4 to 8.6. While paddy and Vegetables has the highest productivity in Kozhikode Corporation, Coconut shows highest productivity in Feroke.

8.4.3 Spatial Distribution

Agricultural land use is concentrated mainly in the eastern peripheral regions of the planning area and in Beyporeas depicted in figure 8-7.

Figures 8.8 shows the coconut field land use variation and paddy field land use variation in the planning area. While coconut concentration is the highest in Olavanna, that of paddy is highest in Ramanattukara.

Figure 8-7: Agricultural Land Use - Concentration and Variation

The spatial distribution of cultivators and agricultural labourers, presented in Figure 8.9, shows that the concentration of cultivators and agricultural labourers is more in the eastern parts, following a similar pattern as that of coconut and paddy cultivation.

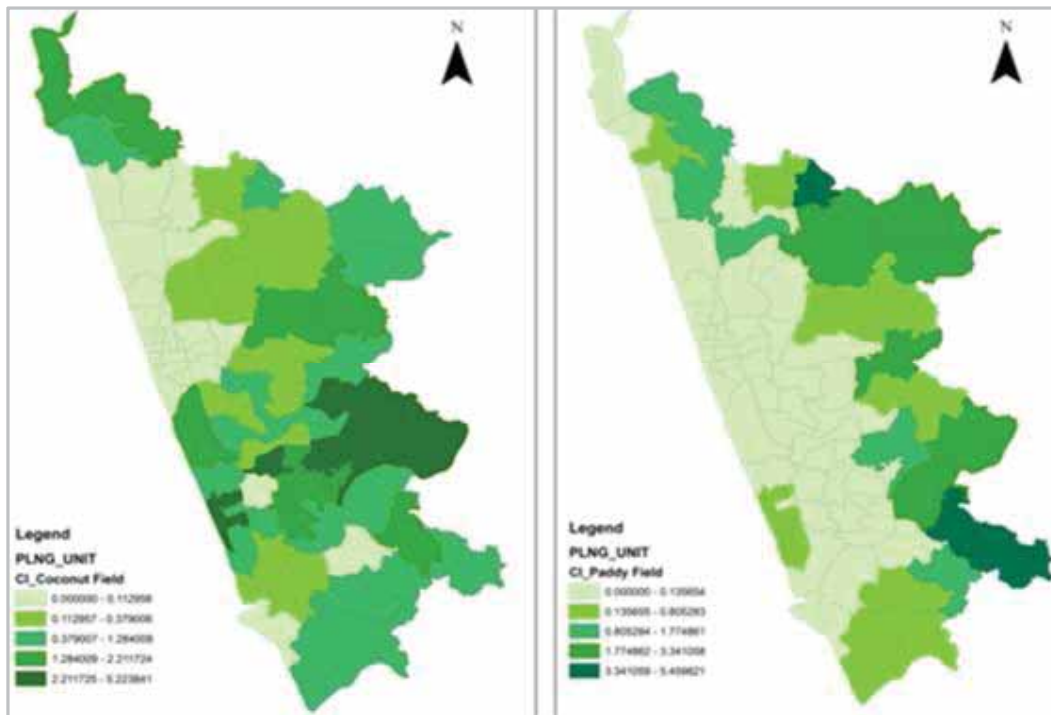


Figure 8-8: Variation of Concentration Index of Coconut Cultivation and Paddy Cultivation

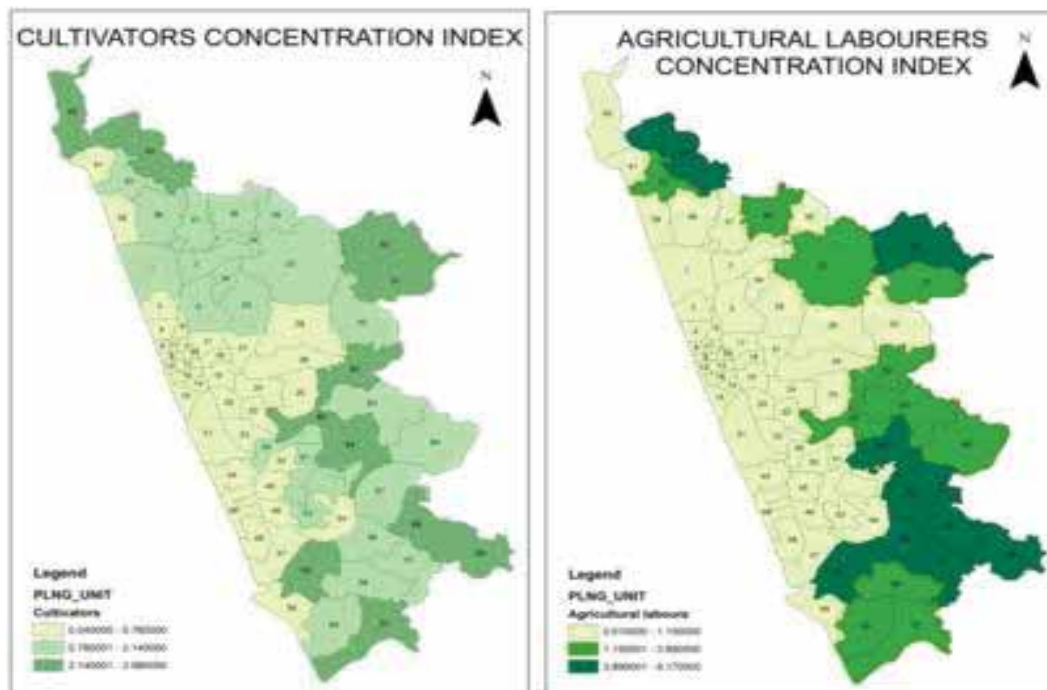


Figure 8-9: Spatial Distribution of Cultivators and Agricultural Labourers in the Planning Area

8.4.4 Irrigation Facilities

The main irrigation project which serves the planning area is the Kuttiyadi irrigation project which provides irrigation facilities for rice cultivation in 14,500 hectares of land in Kozhikode, Vadakara and Quilandy Taluks of Kozhikode district. The expected additional production of rice due to irrigation from the project is of the order of 40,550 tonnes per annum.

The depth to water level varies from less than 2 to more than 10 in the district, except the hilly area. The stage of groundwater development in the district of Kozhikode during 2004 is 61.88 %, leaving scope for further development. About 126.63 MCM of groundwater is used for irrigation out of the net annual groundwater availability of 344.81 MCM. A balance of about 120.53 MCM is left for future irrigation developments. This shows the vast scope for irrigation using groundwater. However, Kozhikode block comes under 'over-exploited' category, Balusseri and Tuneri 'critical', Chevayur 'semi-critical' and the remaining blocks are 'safe'. The master plan area, falling in Kozhikode and Chevayur blocks, is Over-exploited and Semi critical respectively, pointing towards the urgent need for recharging ground water aquifers and a comprehensive, efficient ground water resource management strategy.

The quality of water from shallow and deep aquifers in the district is good for domestic and irrigation purposes. The pH value of water ranges from 6.29 to 8.29 indicating neutral to alkaline and occasionally acidic nature. Total hardness of water samples ranges between 12 and 155 mg/l as CaCO₃ shows soft nature of the water. The qualitative studies indicate that the cations and anions are within the permissible limit. As per the drinking water standards of Bureau of Indian Standards (BIS) all the major chemical constituents including fluoride in the groundwater of Kozhikode district is within the permissible limit and is suitable for all purposes.

(Source: http://cgwb.gov.in/District_Profile/Kerala/Kozhikode.pdf, 2009).

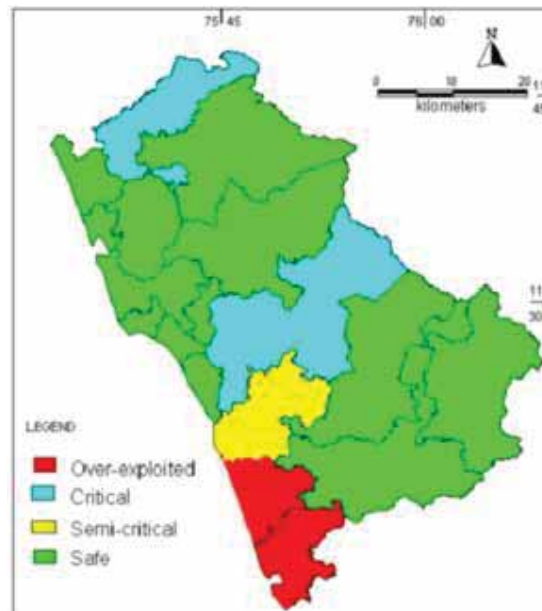


Figure 8-10: Ground Water development in Kozhikode District (2004)

8.4.5 Problems and Potentials

The agricultural sector of the planning area is under high risk due to encroachment of urban uses, lack of labourers and reduced interest in agriculture. The high demand for office/commercial/residential spaces has put high pressure on urban agricultural land and exorbitant rise in land value has fuelled conversion of wet and dry agricultural land. The indiscriminate filling up of paddy lands has tampered the natural drainage pattern and resulted in water logging problems in the remaining wet agricultural areas. The high input cost in agriculture, mainly due to labour cost, along with crop diseases, insect attacks and low returns has increased the risk of agricultural investment and is discouraging many from this sector. Saline water intrusion and lack of adequate irrigation facilities is a major problem faced by the low lying agricultural lands of the planning area. The absence/closing down of value addition options (like oil mills) in the region has reduced the price of agricultural produce (like coconut). Besides, mechanisation is barely opted for, and agricultural cooperatives are not formed/functioning in many areas. The average plot size in most of the planning area does not favour agriculture as a profitable economic activity.

However, the widespread homestead farming provides hope and shall be encouraged. Kitchen gardens, terrace farming as well as vegetable gardens in schools, vacant public lands etc. can be promoted and has immense potential to improve food security of the region. Organic farming, Floriculture and horticulture has good scope in the planning area. Initiatives like Kudumbasree, NREGA etc. can be effectively linked with

farming/horticulture/floriculture initiatives in vacant lands and uncultivated agricultural lands as well as organic farming. Mixed cropping, group farming and mechanisation can be promoted and farmers can be trained in the same for better results. Value addition industries and marketing facilities shall be encouraged in the planning area.

8.4.6 Inference

Though the exclusively agricultural land use contributes to less than 10% of the planning area, agricultural activities are performed in about 60% of the planning area, pointing out the widespread homestead cultivation. The agricultural sector is declining in the district as well as the planning area. High production cost and low price for agricultural products are major problems for the farmers. Lack of modern techniques, value addition industries and marketing facilities is a major hindrance to the growth of agricultural sector. Homestead cultivation, kitchen gardens and vegetable gardens in schools should be encouraged. Good quality seeds and fertilizers are to be supplied to the farmers and proper monitoring of the cultivation techniques should be provided. Crop diseases are to be properly attended and marketing facilities for the agricultural produces should be established in the planning area. Organic farming has immense scope in the recent times and can provide much value addition to the farmers in the planning area. Floriculture and horticulture also has good scope in the planning area and shall be promoted.

8.5 Animal Husbandry

The planning area houses various offices of the animal husbandry department of regional importance like the District Animal Husbandry Office, Intensive Cattle Development Project Office, Regional Artificial Insemination Centre, Rinderpest Vigilance Unit, District Veterinary Centre, Central Veterinary Stores, veterinary hospital at Beypore, veterinary dispensaries at Kozhikode (mobile dispensary), Kadalundi, Mannur, Olavanna, Elathur, Ramanattukara, Chulliparambu, Feroke, Pudukkaipadam and Nallalam. Also, there is a dairy training centre functioning at Beypore where dairy farmers, housewives and unemployed women, employees and members of dairy co-operatives etc. from different places are brought under one roof and imparted scientific knowledge in cattle management, fodder cultivation, manufacture of milk products, co-operation etc.

8.5.1 Animal Population & Produces

The detail of livestock population in the planning area is presented in table 8-8. Though the absolute number of livestock population is the highest in the Corporation, the analysis of cattle stock per 1000 population reveals that the Corporation has the least share. Ramanattukara and Kadalundi have the highest share of milching animals with respect to the population whereas Kadalundi and Feroke have the highest share of poultry with respect to the population.

Table 8-8: Details of Animal Population

Name of LSGI	Livestock population						Milching animals/ 1000 person	Poultry/ 1000 person
	Cattle	Buffalo	Goat	Pig	Hen	Duck		
Old Kozhikode Corporation	2561	247	1470	51	28499		10	65
Elathur	544	4	311		5847	165	21	145
Kadalundi	446	7	890		11691		34	299
Ramanattukara	603	13	492		1968		36	65
Cheruvannur-Nallalam	423	10	276	2	10518		12	184
Beyppore	700	4	800		10000		22	149
Feroke	504	17	768		11362		26	226
Olavanna	955	11	517		10999		27	198

Source: District Veterinary Hospital, Kozhikode.

The details of registered dairy farms in the planning area are given in Table 8.10. There are a total of 53 registered dairy farms in the planning area. It can be seen that though Kadalundi and Ramanattukara are ahead in the share of cattle, the registered dairy farms are the least in these LSGIs.

Table 8-9: Details of Dairy Produces

LSGIs	No. of Dairy Farms	No. of Cattle	Milk Production (ltrs/day)
Old Kozhikode Corporation	26	210	1140
Beyppore	7	47	310
Cheruvannur Nallalam	5	35	225
Olavanna	8	49	265
Kadalundi	1	6	30
Feroke	3	16	85
Ramanattukara	3	11	55
Total	53	374	2110

Source: Dairy Department, Kozhikode; URIS 2006, Kozhikode

The details of dairy outlets and collection centres are given in Table 8.10.

Table 8-10: Details of Dairy Outlets and Collection Centres.

LSGI	No. of Milk Cooperative Societies	Quantity (litres) of milk collected per month
Old Kozhikode Corporation	6	41548
Elathur	1	6720
Olavanna	4	26357
Cheruvannur-Nallalam	1	19200
Beyppore	1	12672
Kadalundi	1	10762
Feroke	1	6777
Ramanattukara	2	16212
Total	17	140248

Source: Dairy Department, Kozhikode; URIS 2006, Kozhikode

Table 8-11: Details of Meat Production

LSGI	Poultry Meat Production per month (kg)	Animal Meat Production per month (kg)
Old Kozhikode corporation	1050000	628500
Elathur	1800	13200
Beyypore	900	19650
Cheruvannur Nallalam	1500	34500
Kadalundi	1200	2550
Ramanattukara	3000	43500
Feroke	30000	19200
Olavanna	1500	11400
Total	1089900	772500

Source: Dairy Department, Kozhikode; URIS 2006, Kozhikode

Kozhikode district consumes 5683 metric tonnes of meat per annum & the demand is 33367 metric tonnes per annum. The details of meat production in the planning area are presented in table 8-11. However, there are no licensed slaughter houses in the planning area. All constituent LSGIs of the planning area only have slaughter slabs / slaughter houses which are service oriented and in most cases only perform slaughter and dressing of the animals. It is established in many incidents that the meat products in such slaughter houses are highly contaminated; poor in quality & their operation create environmental pollution too. The competency of the meat products of the region is low in the global market, both in quality & quantity.

8.5.2 Inference

Kadalundi shows relatively high potential in both poultry and animal husbandry in the planning area. The potential of this sector in the planning area can be enhanced by bringing the activities under organized/ cooperative sectors. However, the plot size in most of the planning area is not big enough to support poultry/dairy as an economic activity or livelihood. Modern slaughter houses with facilities to ensure that the animals are free from diseases, humane slaughtering, hygienic production of meat and proper utilization/ disposal of slaughter waste are necessary for supply of good quality meat products in the planning area, to improve the competency of the products and to prevent environmental pollution.

8.6 Fisheries

Kozhikode has the third longest coastline of 71 Km (12%) among the districts of Kerala. It has 34 marine fishing villages and 8 inland fishing villages, with 23,165 active fishermen (10% of State's total active fishermen) as on 2004-2005. There are 75 fishing cooperatives in the district. The district has the highest number of domestic fish markets, 376 numbers, in the state. The annual fish production of marine fishes is 15% of that of the state and that of inland fishes is 3% of that of the state. (Source: Kerala State Fisheries - District Profile 2005).

In the planning area, about 5500 labourers are working in the fisheries sector. The LSG wise details in the planning area are given in Table 8.12.

8.6.1 Production

The annual marine fish catch in the planning area is 9,79,297 kilograms and highest in the month of August, 2,67,810 kilograms. Details of annual fish catch under various fish types and seasonal variation in the planning area (Source: PANFISH Book, Kozhikode District, Dept. of Fisheries 2001) are given in Figure 8.12, 8.13 respectively. Sardinella Longipus (Nalla Mathi) and Rastrelliger kanagurtha (Ayala) are the prominent fish types available from the planning area.

Table 8-12: Details of Labourers Working in the Fisheries Sector

LSGI	No. of labourers in Fishing Sector (Inland & Sea)
Old Kozhikode corporation	2995
Elathur	1095
Beyepore	532
Kadalundi	720
Total	5342

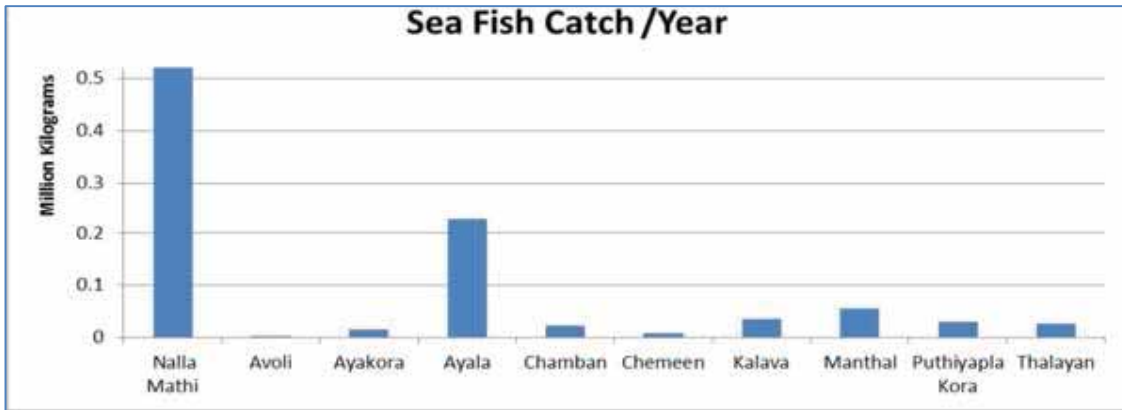


Figure 8-11: Sea Fish Catch/Year in million kilograms

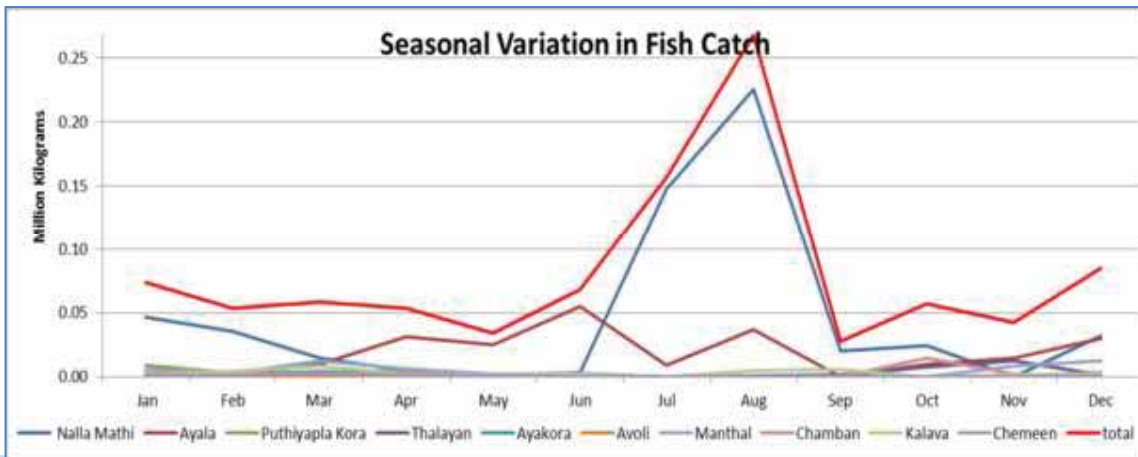


Figure 8-12: Seasonal Variation in Fish Catch



8.6.2 Physical Infrastructure

Table 8-13: Fishing Sector Infrastructure Details

LSGI	Ice plants (No.s)	Boat yards (No.s)	Boat repair units (No.s)	Fishing net making units (No.s)	Harbours (No.s)	Employment generated (Persons)
Old Kozhikode Corporation	27	0	16	1	1	166
Elathur	13	0	2	0	0	309
Beyyore	21	2	2	0	1	500
Kadalundi	2	0	0	0	0	6
Total	63	2	20	1	2	981

The details of ice plants, boat yards, repair units, harbours etc. in the planning area are given in Table 8.13.

The major fish markets in the planning area are markets at Kallai, Kinassery, Puthiyangadi, Malaparambu, Kuttichira, Pallikandi, Mankavu, Vellayil, Puthiyara, Puthiyapalam, Panniyankara, Mooriyad, Meenchanda, Kovoov, Karaparamba, Chakkumkadavu, Idiyankara, Pavamani road, Eranjipalam, and at Valiyangadi.

The fish markets in the planning area lacks adequate space for loading and unloading, parking space for trucks, cars, mini vans, motor cycles and cycles of traders and primary consumers.

8.6.3 Problems and Potentials

All the fish markets in the planning area lack adequate infrastructure facilities. Lack of modern facilities in fishing and non-availability of labourers are the major problems weakening this sector. The recently initiated development activities at Beyyore fishing harbour and the sanctioned development of Vellayil Fish Landing Centre into a full-fledged fishing harbour provides new hopes for the fisheries sector in the planning area.

8.6.4 Inference

The number of labourers working in the fisheries sector is decreasing day by day in the planning area. Modern and sophisticated techniques should be introduced in this field for attracting people to this sector and increase production. Besides, appropriate modern infrastructure facilities should be provided in the fish markets in the planning area.

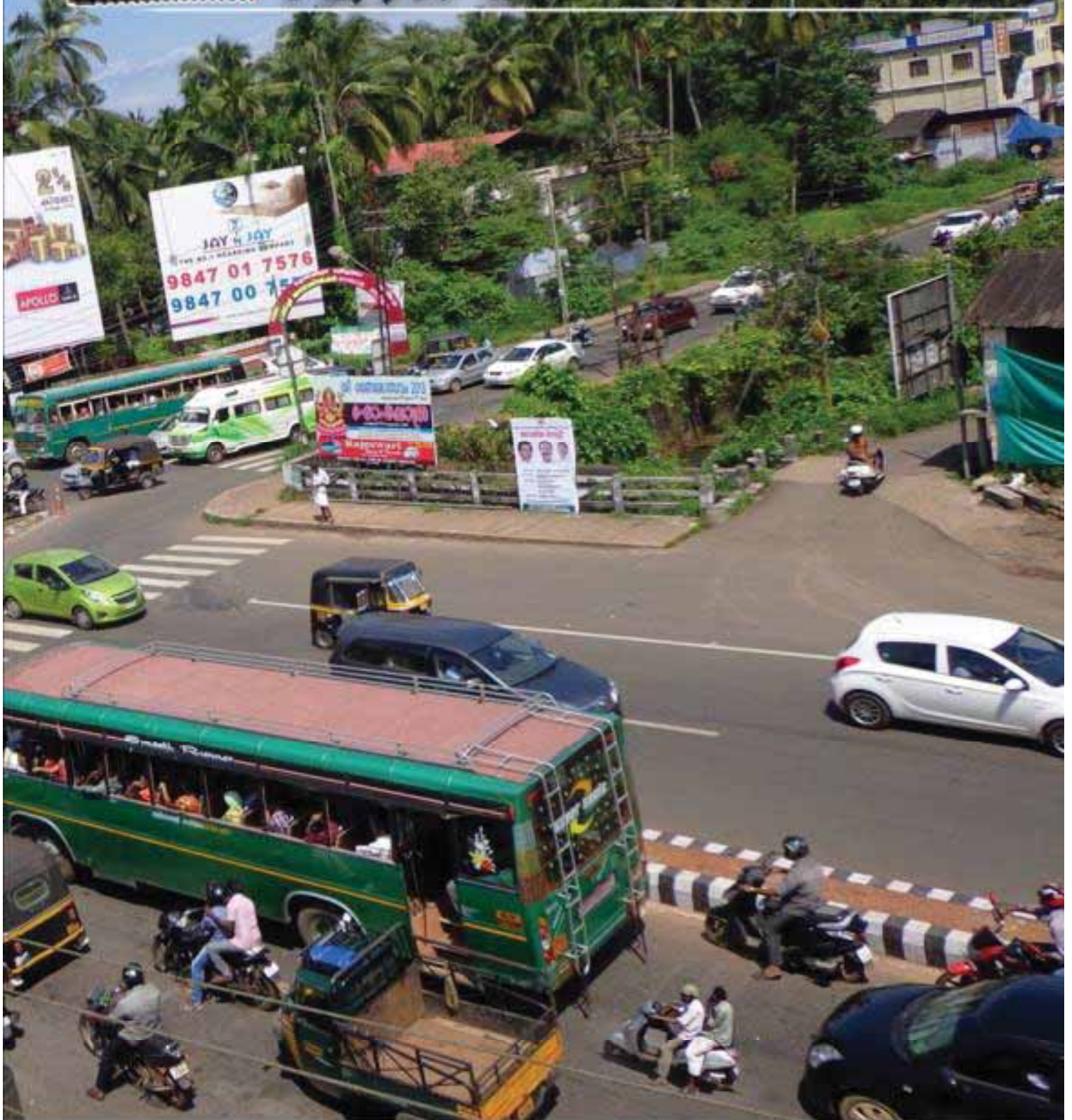




9

- * Road Network
- * Link Traffic Volumes
- * Base Year Inter-City Travel Characteristics
- * Inter-city Goods Transportation
- * Railways
- * Speed and Delay Characteristics

Traffic and Transportation



- * Other Modes of Transport
- * Traffic Volume at Major Intersections
- * Inter-city Passenger Movements
- * Problems and Potentials

- * Trends in Vehicle Population & Road accidents
- * Parking Characteristics
- * Pedestrian Movements
- * Railway Terminal Survey
- * Inference

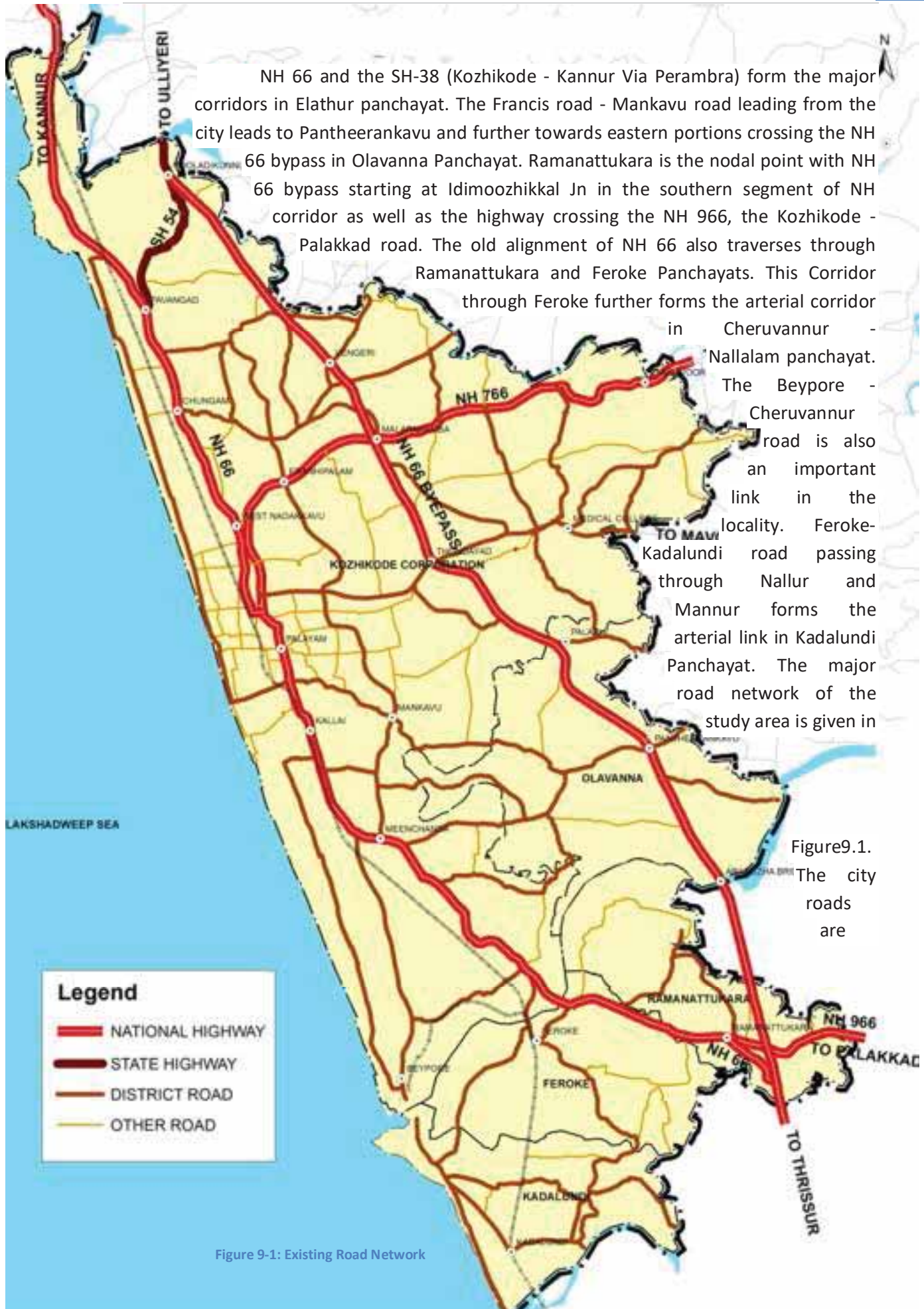
Kozhikode City is a major transit centre, and the 'Gateway to Malabar', well connected by road and rail transport. The proximity to international airport at Karipur and possibilities of inland water way network enhances the potential of the city as a transit hub. Presently, the city has three bus terminals located at IG road, Palayam, and KSRTC terminal. The study area is served by public transport system consisting of both State owned Kerala State Road Transport Corporation (KSRTC) and private buses. The mofusil services and inter-city services are provided by KSRTC buses operating from the KSRTC bus station and private buses from Palayam and IG road stands. City bus service is fully operated by private sector.

9.1 Road Network

The existing spine and spurs road network of Kozhikode city with NH 66 as the main arterial corridor is evolving into a strong grid iron network with NH 66 and its by-pass, Beach Road, NH 766, Mavoor Road and Mankavu-Pantheerankavu Road as the main arterial roads. The NH 66 from Edappalli to Panavel passes through the heart of the City. The bypass for NH 66 is under final stages of completion with four phases completed between Idimoozhikkal and Pooladikunnu. The phase from Pooladikunnu to Vengalam is under construction. National Highway No. 966 (Kozhikode - Palakkad) and No. 766 (Kozhikode - Kollegal) originate from the City. The segment of NH 766 in city is called as Wayanad road and segment of NH 66 is known as Kallai and Kannur road. Apart from these three major roads, there are a number of roads leading to places outside as well as within the City. These are:

- IG Road (Kozhikode-Medical College-Mavoor)
- Mini By-pass (Meenchantha to West Hill Chungam)
- Golf links road (Chevayur to Malapparamba)
- Beach road (Elathur Vengali to Francis road)
- Chalappuram-Mankavu- Pantheerankavu road
- Gandhi road- MCC cross road (Beach to NH 766)
- YMCA Road
- Francis road (Beach to Pushpa Jn) and
- Balusseri road (Karapparamba-Vengeri segment).





NH 66 and the SH-38 (Kozhikode - Kannur Via Perambra) form the major corridors in Elathur panchayat. The Francis road - Mankavu road leading from the city leads to Pantheerankavu and further towards eastern portions crossing the NH 66 bypass in Olavanna Panchayat. Ramanattukara is the nodal point with NH 66 bypass starting at Idimoozhikkal Jn in the southern segment of NH corridor as well as the highway crossing the NH 966, the Kozhikode - Palakkad road. The old alignment of NH 66 also traverses through Ramanattukara and Feroke Panchayats. This Corridor through Feroke further forms the arterial corridor in Cheruvannur - Nallalam panchayat. The Beypore - Cheruvannur road is also an important link in the locality. Feroke-Kadalundi road passing through Nallur and Mannur forms the arterial link in Kadalundi Panchayat. The major road network of the study area is given in

Figure9.1. The city roads are

Figure 9-1: Existing Road Network

maintained by the PWD, NHAI and the respective LSGIs. Annex 5 provides section and chainage wise observations on road inventory of major roads of study area including road width and surface characteristics.

9.2 Railways

Kozhikode is located on the Shornur- Mangalore rail corridor. NH 66 and rail line traverses through the urban area parallel to each other. Since the commissioning of Konkan Railway, a number of long distance trains through Konkan railway are being operated through Kozhikode. Nevertheless, the role of railway in inter city traffic is only nominal compared to road transport. In addition to Kozhikode, there are six other minor stations in the study area, namely, Elathur, West Hill, Vellayil, Kallai, Feroke and Kadalundi.

9.3 Other Modes of Transport

The nearest airport is at Karippur, with a table top runway, located in Malappuram district. Presently, it is an international airport. Nearly 11 km of the Canoli Canal segment of Kottappuram – Vadakara section of the Inland Waterways in Kerala is through Kozhikode City. Canal is narrow at some places and the width ranges between 8m in artificial reaches and 80m in natural reaches. Depth ranges between 0.8m and 2m. Dredging of 1.4 mts is required for the entire length. Moderate built up is observed along the canal reach and canal widening and protection work may involve modest level of land acquisition. Kadalundipuzha and Chaliyar, with inlet water body networks, provide an inland water way route of Kallampara to Beypore, further leading to Beypore river mouth and to Kolathara segment in north. Kolathara to Canoli canal is via Kallapuzha. The canal opens at Eranjikkal and further the water way traverses through Korapuzha - Akalapuzha.

9.4 Trends in Vehicle Population & Road accidents

Table 9-1: Number of Vehicles with Valid Registration in Kozhikode District (2009)

Type of Vehicle	Kozhikode District	Kerala State
Goods Vehicles	19966	246687
Three Wheelers	8447	100919
Stage Carriers	3648	41998
Two Wheelers	249863	2928226
Cars & Jeeps	75607	983507
Total	357531	4301337

be two-wheelers followed by cars and jeeps with a share of 21 per cent, similar to the pattern in the state.

The growth of motor vehicles in Kozhikode district during the period from 2000 to 2009 is given in Table 9-2.

The number of motor vehicles having valid registration in Kozhikode district in 2009 is given in Table 9-1. It can be seen that 8% of the total vehicles registered in the state is in Kozhikode district. An analysis of the existing vehicle population shows that the major share of nearly 70% of the total vehicle population in the district

continued to

Table 9-2: Growth of Vehicle Population

Year	No. of Vehicles	Index
2000 -01	169,968	100
2002-03	275,803	162.3
2004-05	259,356	152.6
2006-07	331,652	195.3
2008-09	398,158	234.3

The trend in vehicular growth has been phenomenal all over the state and Kozhikode is no exception, with a rise by more than double, between 2001 and 2009.

Table 9-3: Growth in accident occurrence in Kozhikode City during 2002-09

Year	Number of accidents in		% share of Kozhikode city
	Kerala	Kozhikode city	
2002	38,353	1,972	5.1
2003	39,496	1,843	4.6
2004	41,220	1,747	4.2
2005	41,681	1,638	3.9
2006	41,647	1,685	4.0
2007	39,916	1,763	4.4
2008	27,930	1,219	4.3
2009	26,424	1,014	3.8

The accident statistics over the last few years shows an improving situation in relation to occurrence of road accidents in Kozhikode city. The share of accidents in the city compared to overall accident scenario of the State is given in Table 9-3.

9.5 Link Traffic Volumes

For the purpose of carrying out various surveys, major roads in the study area were divided into various homogeneous sections based on road and traffic characteristics. Road and traffic characteristics were obtained based on reconnaissance survey, review of earlier reports and collection of secondary data. The details of homogeneous sections on major roads in Kozhikode with their link traffic volume are given in Annex 6. The surveys were conducted in the year 2010.

The NH 66 Bypass from Ramanattukara to Vengalam was partially completed up to Thodayad while the volume counts were carried out. Now the road has completed up to Pooladikunnu junction. Hence the through-traffic, except buses, which travelled through NH 66 and Mini bypass have now shifted to new bypass. So the present volume in all major North South roads was decreased by about 25%.

The volume capacity ratio of major roads within the Kozhikode study region is given in Table 9.4. For the calculation of V-C ratio, volumes in each links were re-calculated after considering the influence of NH 66 new Bypass. Many road stretches within the study area were over-utilized to the extent of more than two times to their carrying capacity, resulting in congestion, accidents and decline in travel speed. The capacity of IG road (Mavoor road), is reaching the saturation level of four-lane divided carriageway within the short period of its widening. However, the recently widened four lane Eranhipalam - Arayidathupalam segment of the mini bypass offers a comfortable travel.

9.6 Speed and Delay Characteristics

As part of the study, speed and delay survey was carried out on nearly 130 km of road stretches within the Kozhikode study area. The road sections included parts of National Highways 66 and 766, NH 66 bypass and other major roads.

The roads leading to peripheral areas only afforded better speed in Kozhikode study area. This included the Medical College- Karanthur segment and Medical College-

Kuttikattur stretch. The segment between Malaparamba bypass Jn to Chelavoor along with newly constructed Arayidathupalam - Eranhipalam four lane segment permitted increased speed. The NH 66 bypass road from Idimoozhikkal to Malaparamba was also recorded as a speed corridor with an average running speed of 48 Km/Hr.

Table 9-4: Volume Capacity Ratios

Sl No	Name of Road Section	Peak Hour Volume	Capacity	V-C Ratio
1	Highway Jn- Ramanattukara (NH 66)	2760.45	1800	1.53
2	Ramanattukara - Feroke (NH 66)	2700.72	1800	1.50
3	Feroke -Cheruvannur (NH 66)	3069.88	1800	1.71
4	Cheruvannur -Meenchanda (NH 66)	3413.30	1800	1.90
5	Meenchanda -Vattakkinar (NH 66)	1852.18	1800	1.03
6	Vattakkinar -Pushpa Jn. (NH 66)	3299.56	1800	1.83
7	Pushpa Jn.-Town hall (NH 66) (one way)	2340.03	1800	1.30
8	Town hall-Nadakkavu- (NH 66)-(one way)	3315.40	2400	1.38
9	Nadakkavu- Manorama Jn. (one way)	1325.94	2400	0.55
10	Manorama- Mavoor road Jn. (one way)	2899.16	2400	1.21
11	Mavoor road Jn. - BEM school (one way)	3386.24	2400	1.41
12	BEM school - Palayam (one way)	3334.43	2400	1.39
13	Palayam - Pushpa Jn. (one way)	3373.70	2400	1.41
14	Nadakkavu- West Hill	3906.10	1800	2.17
15	West Hill - Pavangad	3849.56	1800	2.14
16	Pavangad -Korapuzha	3033.14	1800	1.69
17	West Hill - Karapparamba	2343.33	1800	1.30
18	Karapparamba - Eranhippalam	2541.55	1800	1.41
19	Eranhippalam - Arayidathupalam	2122.12	3600	0.59
20	Arayidathupalam - Kalluthan Kadavu	3742.09	1800	2.08
21	Kalluthan Kadavu - Mankavu	3249.95	1800	1.81
22	Mankavu - Meenchanda	2292.95	1800	1.27
23	Chelavoor - Malaparamba (NH 766)	1212.31	1800	0.67
24	Malaparamba - Eranhippalam (NH 766)	2016.96	1800	1.12
25	Eranhippalam - Nadakkavu (NH 766)	3535.62	1800	1.96
26	Bank Rd Jn –Rajaji Rd (Mavoor Road)	3431.45	3600	0.95
27	Rajaji Road - Arayidathupalam (Mavoor Road)	4583.48	3600	1.27
28	Arayidathupalam - Thondayad (Mavoor Road)	3767.39	3600	1.05
29	Thondayad – Medical College (Mavoor Road)	2571.91	3600	0.71
30	Medical College - Karanthur	1213.96	1800	0.67
31	Medical College - Vellipparamba	1152.25	1800	0.64
32	Beypore road	1108.80	1200	0.92
33	Beypore-Cheruvannur road	919.60	1200	0.77
34	Kolathara road	548.90	900	0.61
35	Puthiyangadi-Kakkodi road	578.60	900	0.64

36	Highway Jn- Ramanattukara (NH 66)	2760.45	1800	1.53
37	Ramanattukara - Feroke (NH 66)	2700.72	1800	1.50

9.7 Traffic Volume at Major Intersections

Based on the reconnaissance survey, turning movement surveys at 23 major intersections in the study area was conducted to ascertain the peak hour demands. Major intersections selected for volume count survey with summarized traffic flow are given in Table 9.5.

Table 9-5: Traffic Volume at Major Intersections

Sl No	Name of intersection	Morning		Evening	
		Peak hour	Volume (PCU)	Peak hour	Volume (PCU)
1	Bank Road Jn	9.30-10.30	6805	5.45-6.45	6579
2	Cheruvannur Jn	9.15-10.15	4694	5.45-6.45	4578
3	Chevayur Jn	9.15-10.15	5433	4.45-5.45	5242
4	Eranhipalam Jn	9.30-10.30	6338	5.30-6.30	5605
5	Feroke Town Jn	9.15-10.15	1041	5.45-6.45	970
6	Karapparamba Jn	9.30-10.30	2172	5.30-6.30	2838
7	Malaparamba Jn	8.45-9.45	3425	5.30-6.30	3841
8	Mankavu Jn	9.15-10.15	5770	5.15-6.15	5780
9	MCC Jn	9.30-10.30	3942	5.30-6.30	4315
10	Medical College Jn	9.15-10.15	3850	4.45-5.45	3536
11	Meenchantha Jn	9.15-10.15	6314	5.15-6.15	6324
12	Palayam Jn	9.30-10.30	4862	5.30-6.30	5282
13	Pantheerankavu Jn	9.15-10.15	2783	4.45-5.45	3097
14	Pavangad Jn	9.30-10.30	2945	5.30-6.30	2879
15	Poonthanam Jn	10.45-11.45	4193	5.15-6.15	3640
16	Pottammal Jn	9.00-10.00	4292	4.45-5.45	4668
17	Pushpa Jn	9.45-10.45	6604	5.45-6.45	6906
18	Rajaji Jn	9.45-10.45	5973	4.45-5.45	6149
19	Ramanattukara	9.15-10.15	3443	4.45-5.45	3489
20	Rly Stn-Link road Jn	10.15-11.15	4098	4.00-5.00	3865
21	Thondayad Jn	9.15-10.15	6478	4.45-5.45	6843
22	Vattakinar Jn	9.15-10.15	3550	5.15-6.15	3222
23	Westhill Jn	9.30-10.30	3139	5.30-6.30	3142

The Intersections of Bank Road Jn, Rajaji Jn, Eranhipalam Jn, Meenchantha Jn, Pushpa Jn and Thodayad Jn showed a peak flow of above 6,000 PCU. These are the major road junctions in the region. The junctions of Eranhipalam, Rajaji, Pushpa, Stadium Thondayad, Malaparamba and Vengeri have been installed with traffic signals.

9.8 Parking Characteristics

Parking accumulation and duration survey was carried out at all the major road stretches where the parking accumulations are found to be high. The survey was carried out for a period of four to eight hours during the peak periods. The registration plate method was used to collect data on parking duration and accumulation of all categories of vehicles. Palayam, Oyitty road, Basheer road, Stadium-Coronation area, Railway Station Link road, Arayidathupalam and Medical College area are the major concentrations of parking in the city. In the morning hours, buses were also parked in the Karanthur road.

It is found that the Palayam area, constituted with MM Ali road and section of Kallai Road between Muthalakkulam and Link road, have the highest parking accumulation of 1,535 vehicles parked at a time on a normal working day. This necessitates introduction of a parking plaza at this area. Roads around Mananchira and Stadium together contribute a parking accumulation of 331 vehicles at a time. This demands a parking plaza in this area too.

9.9 Pedestrian Movements

Pedestrian surveys were conducted at major locations where the pedestrian cross movements were found to be high. The surveys were carried out for a period of twelve hours between 8.00 am and 8.00 pm. highest pedestrian movement of 2643 persons per hour is recorded at Head post office Junction in Kannur road. Analysis of data revealed that, pedestrian cross movement is about 2500 persons per hour in Mavoor road (Mofussil bus stand area), Head post office Junction, Palayam bus stand area and at Medical college junction. SM Street, BEM school junction, Pushpa Junction and Railway station junction are other major sections with high pedestrian cross movements.

9.10 Base Year Inter-City Travel Characteristics

9.10.1 Inter-city Passenger Movements

A study on intercity passenger movement was carried out to obtain the travel characteristics and travel demand of intercity passengers using road as transport mode. The study assesses the quantum of inter-city passengers entering and exiting the town using different modes along with their socio-economic and travel characteristics such as purpose of trip, occupational status, trip length and origin- destination of trips. This study also helps to identify trip generation and attraction potential of different zones in the town.

9.10.1.1 Volume of Passenger Vehicles Observed at Outer Cordon Points

Passenger vehicles making inter-city trips were counted at the outer cordon points and the volume of both inbound and outbound traffic were separately collected. Out of the total 81,314 passenger vehicles, the maximum of 46.9 percent was found to be two

wheelers followed by cars and jeeps (26.4%) and buses (11.6%). The contribution of three wheelers was only 10.9 percent of the total vehicles with mini buses contributing 4.1 percent of the total flow.

9.10.1.2 Modal Split of Intercity Passengers

Among the road based passenger transport vehicles, public transport vehicles like KSRTC and private buses carried the maximum number of inter-city passengers to the tune of 2.92 lakhs per day, which accounted more than 58.5 percent of the total travel demand by road. This was followed by passengers travelling by cars and jeeps with 81,702 (16.4%) passengers in a day. About 52,000 passengers were using mini-bus and tempos for their intercity travel demand accounting for 10.4 percent of the total inter-city passenger trips. 10 percent of the total trips were made by two wheelers and three wheelers carried only 4.7 percent of the total inter-city passenger trips. Table 9.6 shows the distribution of intercity passenger traffic according to mode of travel at all the ten outer cordon points of Kozhikode region. Further analysis revealed that public transport buses registered an average occupancy of 31 passengers per trip and that for a min bus/tempo services 16 passengers per trip. The occupancy of cars and auto rickshaws were found to be 3.8 and 2.6 passengers per trip respectively.

Table 9-6: Distribution of Inter-city Passenger Traffic According to Mode of Travel

Mode of travel	No. of vehicular trips	No. of passengers carried	Share of passenger carried (%)	Average occupancy per trip
Bus	9,426	292,203	58.5	31.0
Minibus/Tempo	3,256	52,101	10.4	16.0
Car/ Jeep	21,491	81,702	16.4	3.8
SC/MC	38,205	49,668	10.0	1.3
Autorickshaw	8,936	23,241	4.7	2.6
Total	81,314	498,915	100.0	

9.10.1.3 Inter-city Passengers According to Purpose of Travel

The purpose of travel by inter-city passengers has been broadly divided into eight categories namely (i) Work, (ii) Education, (iii) Shopping, (iv) Recreation, (v) Social, (vi) Back home, (vii) Medical and (viii) Others.

Out of the total 4.99 lakhs passenger trips, 178,386 trips (35.8%) were found to be back home trips, followed by work trips of 123,038 which formed 24.7 percent of the total trips. The inter-city trips made by the passengers for the purpose of shopping and for social and recreation purposes together were found to be 9.5 percent and 7.5 percent respectively.

Buses were the most preferred mode of transport for inter-city travel in Kozhikode region which carried 58.5 percent of the total inter-city passengers for various purposes. Out of the total 49,668 two-wheeler trips, 43.6 percent trips were made for work purpose and 27 percent were for back home trips. Similarly, more than 37.4 percent of the car/jeep trips were performed for work purpose and about eight percent of these vehicle trips were for medical purpose.

9.10.1.4 Inter-city Passengers According to Occupational Status

Out of the total inter-city passenger trips, the maximum of 95,932 trips (19.2%) were performed by people employed in business activity. This was followed by people employed in private service (16.4%). Unemployed people performed 12.6 percent of the total inter-city trips.

9.10.1.5 Origin-destination of Intercity Passenger Trips

Origin-destination particulars obtained from intercity passengers were utilized to build an origin-destination matrix to assess the volume of interaction taking place between different zones of the region and its hinterland. The former Kozhikode city area has been divided into eight zones. Olavanna panchayat and the former Elathur panchayat area have been added to city zones formed of south eastern portion of the city and the northern portion of the city respectively. The other zones in the study area including former Beypore panchayat, former Cheruvannur Nallalam panchayat, Feroke Panchayat, Ramanattukara panchayat and Kadalundi panchayat have been included as separate zones in the delineation of internal traffic zones in the analysis of origin-destination matrix of inter-regional passenger traffic study. The list of zones delineated is presented in Annex 7.

O – D Matrix for all passenger vehicular trips is presented in Annex 8. In the inter regional passenger traffic study it was observed that 81,314 vehicles comprising of buses, mini-buses, cars/jeeps, scooter/motor cycles and auto rickshaws were entering and exiting the region through the ten major outer cordon points carrying 498,915 passengers per day.

9.10.1.6 Pattern of Intercity Passenger Trips

The study revealed that, out of 4.99 lakhs inter-city passengers, 203,045 passenger trips, constituting 40.7%, originated (internal - external trips: study region to outside study region), from the town while 212,891 passenger trips, constituting 42.7% were attracted to various zones in the Kozhikode study area (external – internal trips: outside study region to study region). The remaining 82,979 passenger trip, which forms 16.6% of total trips were found to be through – passengers (external – external trips performed through the study region). Table 9.7 depicts the originating / terminating and through traffic in Kozhikode region.

Table 9-7: Distribution of Originating, Terminating & Through Passenger Trips According to Mode of Travel

Vehicle	Originating Passenger Trips	Attracted Passenger Trips	Through Trips	Total
Bus	124001	132411	35791	292203
Mini-bus	20541	19763	11797	52101
Car/jeep	29460	31071	21171	81702
SC/MC	20779	20858	8031	49668
Passenger auto rickshaw	8264	8788	6189	23241
Total	203045	212891	82979	498915

9.10.2 Railway Terminal Survey

Table 9-8: Details of Daily Rail Commuters

Sl. No	Station Name	Daily Traffic	Share of Passengers (%)
1	Elathur	378	1.1
2	West Hill	558	1.6
3	Vellayil	308	0.9
4	Kozhikode	33,805	87.2
5	Kallai	530	1.5
6	Feroke	2330	6.8
7	Kadalundi	298	0.9
	Total	38,207	100

passengers in these stations were surveyed as well as supported by secondary data on season tickets and information available at stations. Out of the daily rail passengers of 38,207 in the region, 87 percent availed the Kozhikode main station, followed by seven percent of passengers boarding/ alighting trains at Feroke station. Average daily traffic flow of passengers in the seven railway stations in planning area is shown in Table 9.8.

The Mangalore-Shoranur rail line traverses parallel to NH 66 bisecting the CBD of the City. Total length of broad gauge double line in the study region from Kadalundi to Korapuzha is 32.00 km. There are seven railway stations in the study region. They are Elathur, West Hill, Vellayil, Kozhikode, Kallai, Feroke and Kadalundi. The daily flow of inbound and outbound

Table 9-9: Lead Distance of Travel by Rail Commuters

Lead Distance	Share of Commuters (%)
Below 20 km	1
20 - 30 km	6
30 - 40 km	3
40 - 50 km	19
50 - 60 km	3
60 - 70 km	8
70 - 80 km	1
80 - 90 km	7
90 - 100 km	10
100 - 125 km	3
125 -150 km	2
150 - 175 km	3
175 - 200 km	12
Above 200km	21
Total	100



9.10.2.1 Travelling Distance

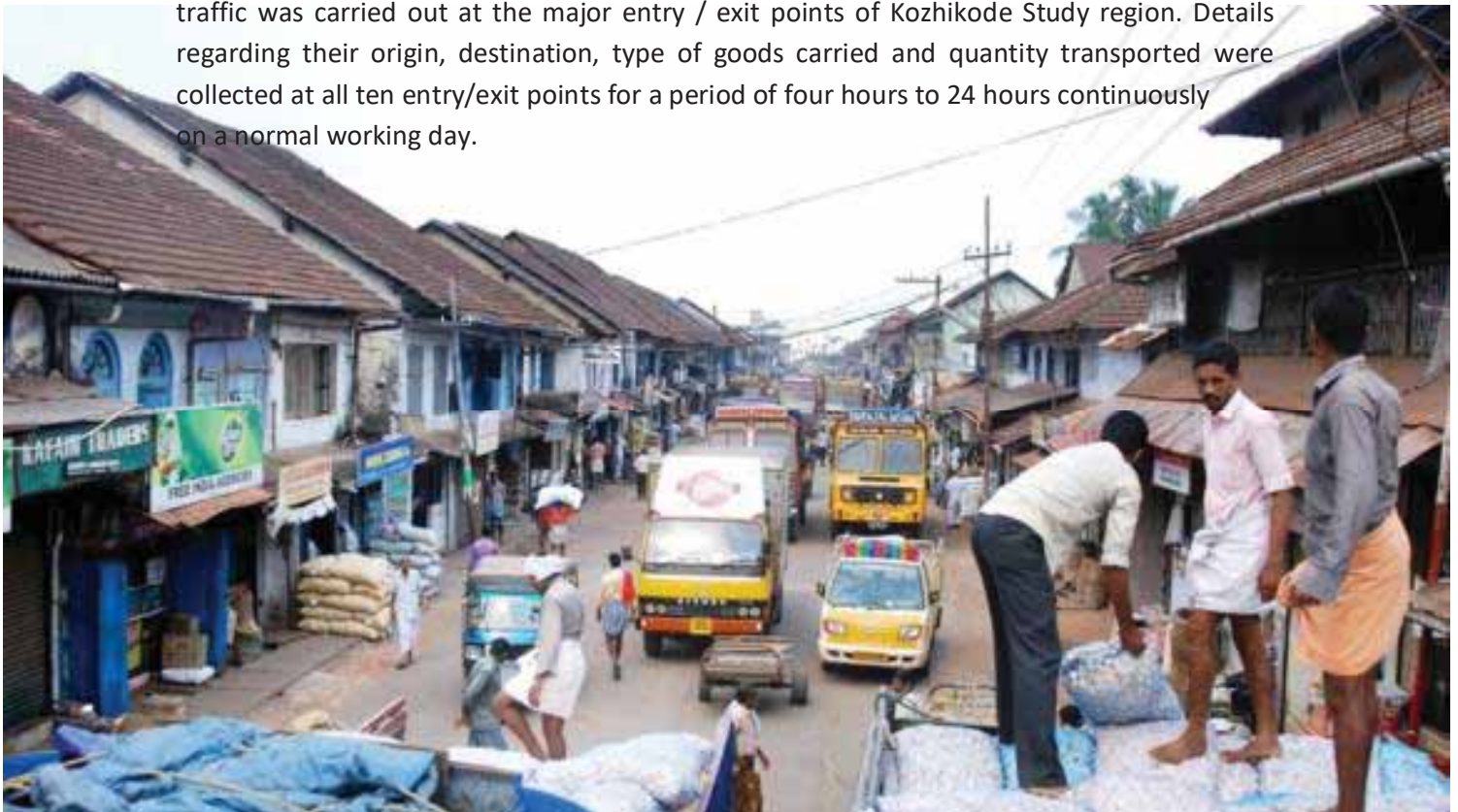
The lead distance of travel by rail commuters in the region is shown in Table 9.9. More than 70% had a travel distance of more than 50 km. Highest share, 21%, of commuters fell in lead distance category of above 200 km. Nearly one fifth of the passengers performed trips within a distance range of 40 to 50 km, while one-tenth performed trips within the range of 90 to 100 km.

9.10.2.2 Purpose of Commuter Trips

It was noticed that out of the 1,053 commuters interviewed at five railway stations in Kozhikode study area, 49 percent of them made the trips for work purpose. Back home trips accounted for nearly 22 percent of the total trips made. Educational trips were to a tune of 19 percent. Trips performed for health purpose were to a tune of four percent, whereas only one percent of the commuters made the trip for shopping purpose. Nearly one third of the commuters were found to be working in private service, and one fifth were students. They were followed by Govt. servants and business people.

9.10.3 Inter-city Goods Transportation

The transportation planning of a city has to take account of the impact of both passenger and goods traffic over the road system. The number of goods carrying vehicles of different categories and quantity of different commodities transported at inter-city level needs to be studied in detail to identify the deficiency in the road network and also to estimate the quantum of by-passable traffic. As part of the study, an assessment of goods traffic was carried out at the major entry / exit points of Kozhikode Study region. Details regarding their origin, destination, type of goods carried and quantity transported were collected at all ten entry/exit points for a period of four hours to 24 hours continuously on a normal working day.



9.10.3.1 Volume of Goods Traffic at Different Outer Cordon Points

An analysis of goods transport data has revealed that 15,280 goods vehicles consisting of multi-axle truck, lorry, tempos and auto rickshaws travelled through the region in a day. Table 9.11 presents the volume of goods carriers observed at the outer cordon points according to vehicle type and direction of movement. Out of the total 15,280 goods vehicular trips, nearly 45 percent were trucks including multi axles followed by mini-truck / tempo trips with a contribution of 40 percent to the total trips. The percentage contribution of goods auto rickshaws was found to be 15 percent.

Table 9-10: Distribution of originating, terminating and through goods vehicular trips in Kozhikode study area

Sl No	Type of Vehicle	Originating	Terminating	Through	Total
1	Trucks including MATs	1408	1612	3861	6881 (45%)
2	Mini Trucks & Tempos	2083	2235	1783	6101 (40%)
3	Goods Auto rickshaws	1332	815	151	2298 (15%)
	Total	4823 (31.5%)	4662 (30.5%)	5795 (38%)	15280 (100%)

Table 9-11: Distribution of Goods Vehicles Passing through Outer Cordon Survey locations in Kozhikode Study Region

Sl. No	Station	Direction	Trucks	Mini Trucks	Goods Autoric kshaws	Total	Grand Total
1	(NH17)Idimoozhikal	Inbound	502	400	101	1003	2233
		Outbound	644	458	128	1230	
2	(NH213)Ramanattukara	Inbound	902	491	141	1534	3142
		Outbound	827	615	166	1608	
3	(NH17)Korapuzha	Inbound	1068	699	221	1988	3976
		Outbound	1046	722	220	1988	
4	SH38Purakkattiri	Inbound	41	112	105	258	536
		Outbound	72	97	109	278	
5	Mundikalthazham	Inbound	47	120	42	209	434
		Outbound	29	144	52	225	
6	Kakkodi	Inbound	55	232	156	443	931
		Outbound	56	254	178	488	
7	Pantheerankavu-Perumanna	Inbound	29	131	113	273	552
		Outbound	25	146	108	279	
8	Veliparamba	Inbound	339	291	65	695	1127
		Outbound	180	212	40	432	
9	Kadalundi	Inbound	84	56	58	198	373
		Outbound	67	63	45	175	
10	NH212 Chelavoor	Inbound	388	414	127	929	1976
		Outbound	480	444	123	1047	
	Total	Inbound	3455	2946	1129	7530	15280
		Outbound	3426	3155	1169	7750	

Further analysis, as presented in table 9-10, showed that 38 percent of goods vehicular trips were having neither the origin nor the destination within the study region, i.e., of through traffic. It is found that 56 percent of the truck trips and 29 percent of the mini trucks were through traffic in the region. With regard to the region's inter-city goods traffic, 31.5 percent formed inbound traffic and 30.5 percent out bound.

9.10.3.2 Inter- city Goods Movement According to Commodity Carried

The commodities carried by goods vehicles were classified into 12 groups including a group of empty vehicles as given in Table 9.12. A total of 11,942 vehicles (exempt empty vehicles) consisting of multi axle trucks, trucks, mini-trucks and goods auto rickshaws were used for transporting 57,320 tonnes of various commodities through the outer cordon points of Kozhikode study region.

The analysis of commodities carried indicated that construction materials was the largest commodity carried by goods vehicles through these outer cordon points to a tune of 37 percent followed by food grains to a tune of 12.5 percent of the total commodities carried. Empty vehicles formed nearly 22 percent of the total goods vehicles entering and exiting the region.

Table 9-12: Distribution of inter-city goods traffic according to commodity carried in Kozhikode study area

Sl. No.	Commodity	No .of trips	Quantity (tonnes)	Average load (tonnes)
1	Food Grains	1047	7179.17	6.8
2	Construction materials	3756	21068.24	5.6
3	Metals and Machinery	543	2014.40	3.7
4	Grocery /Provisions	739	3586.27	4.8
5	Fish & Meat products	701	2232.79	3.2
6	Consumer items	1770	6740.06	3.8
7	Fertilizers	98	673.09	6.8
8	Petroleum Products	445	2974.92	6.6
9	Vegetable and Milk products	1092	3587.34	3.3
10	Chemicals	1373	5658.94	4.1
11	Others	378	1604.33	4.2
12	Empty	3338		
	Total	15280	57319.55	

9.10.3.3 Origin-destination of Goods Vehicles

Origin and destination particulars obtained from road side interview at outer cordon points were used to build the origin destination matrix to assess the interaction between different zones of the town and its hinter land and also to estimate the through traffic. Origin destination matrix of all goods vehicles is presented in Annex 9.

The origin destination survey of goods vehicular movement at major entry/exit points of the region showed that as many as 15,280 goods vehicles passed through the outer cordon points. Among them 11,942 carried 57,320 tonnes of various commodities in a day. Out of this trips zone 23 (all districts south of Kozhikode Via NH66) produced/attracted nearly 18 percent of the total trips. The major goods vehicular trip production zones was found to be zone-27 (Northern states), zone-15 (Kunnamangalam, Thamarassery etc Via NH 766), zone- 26 (Northern districts of Kozhikode) and zones-2 and 3 (Places in CBD with markets under influence of Wayanad road, Kannur road and arterial Kallai road). Zones in the northern portion of Kozhikode city and Zone 8 (areas south of Kallai River) also produced and attracted more number of trips in the city area within the study region.

9.10.3.4 Pattern of Inter-city Goods Traffic

Table 9-13: Pattern of Inter-city Goods Traffic in Kozhikode Region

Sl. No	Originating Region	Terminating Zones				Total	Percent
		Kozhikode Study Area	Kozhikode District	Other Districts	Other States		
1	Kozhikode Study Area		2,917	1,554	402	4,873	31.89
2	Kozhikode District	2,752	608	418	46	3,824	25.03
3	Other Districts	1,596	574	1,581	766	4,517	29.56
4	Other States	504	98	1,361	103	2,066	13.52
	Total	4,852	4,197	4,914	1,317	15,280	100.00
	Percent	31.75	27.47	32.16	8.62	100.00	

Table 9.13 shows the external-internal, internal- external and the external- external goods traffic interacting with Kozhikode region and Annex 10 provides the vehicle type wise details.

The O-D pattern of inter-city goods traffic revealed that there were 31.89 percent of internal - external trips (Study region to outside study region), out of 15280 inter-city goods vehicle trips. A total of 4825 trips were external – internal trips constituting 31.75 percent of the total trips. External – external goods vehicle trips performed was 36.35 percent of the total trips, which necessitate a truck terminal inside the study area for internal-external and external-internal trucks and a dedicated truck lane for external-external traffic.

9.11 Problems and Potentials

Like other urban centres in the State, Kozhikode also faces challenges like increased vehicular population and pedestrian flow along with constantly increasing floating population, in traffic and transportation management. The important issues faced by the planning area in transportation sector are:

- Lack of proper hierarchy of roads

- Movement of inter-city bus traffic on congested urban roads due to the location of intercitybus terminals within the central area of the city
- Inadequacies in Mass Transport System
- Increasing number of personalized vehicles
- Unorganized on-street parking in the absence of proper parking lots
- Lack of pedestrian facilities
- Narrow width of roads in the central part of the city
- Poor surface conditions
- Encroachment of right-of-way and idle parking
- Uncontrolled loading/unloading operation of trucks near godowns and wholesale markets within the central city area
- Noise and Air pollution
- Partially effective enforcement measures
- Bottlenecks due to level crossings
- Absence of proper traffic signs and markings
- Absence/inadequacy of drainage infrastructure causing flooding, interruption to traffic and deterioration of surfacing
- Haphazard laying of utility networks resulting in frequent traffic blockages during maintenance works
- Lack of co-ordination between departments causing wastage of funds

The city being an established transit hub to remote areas of North Kerala and having strong international, national, intra-state, inter-city and intra-city linkages, has ample scope to develop this sector as a major revenue provider for the planning area. The upcoming projects like mono-rail and high speed rail corridor would enhance the efficiency of mass transit within and through the planning area, and increase its significance as a transit hub.

The road network in Kozhikode study area is evolving into a strong grid iron pattern. The availability of major roads at a spacing of 0.8 to 2.5 Km in N-S direction and at 0.8 to 3.3 Km in E-W direction is a potential factor for the creation of this grid iron pattern. Besides, regulated development, accomplished by the Masterplan in force, along all the major road corridors leaves

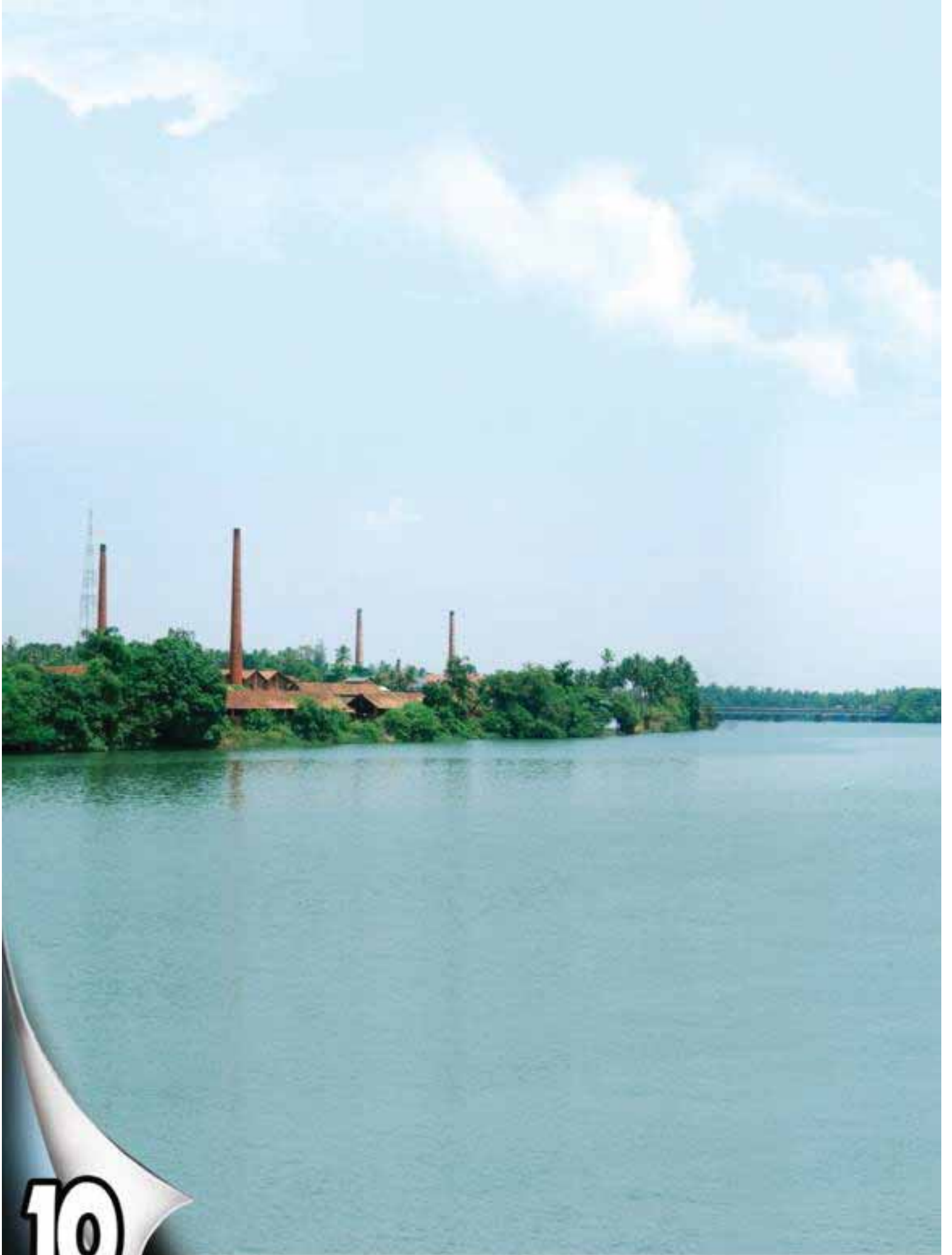


significant scope for widening and capacity improvement of the network, without much public protest. Besides, the public outlook on road widening and development of new corridors has been changing in a positive way to favour further development.

9.12 Inference

There are four main roads in N-S direction namely , NH 66 & its bypass, Mini-by-pass and beach road and three main roads in E-W direction, namely, NH 766, Mavoor Road and Mankavu-Pantheerankavu Road. While analysing the total vehicle movement in the study area, it is found that, a minimum of 14 lanes in N-S direction and 8 lanes in E-W direction are required for efficient movement of traffic (For the calculation, it is assumed as intra city traffic is 45% of total traffic and peak hour volume is 11%). Presently 10 lanes are available in N-S direction and 8 Lanes are available in E-W direction. Assuming a 4% increase in vehicle population, the projected requirement of roads is 25 lanes in N-S direction and 14 lanes in E-W direction. It is also revealed from the study that, parking plazas at Palayam and Mananchira area, pedestrian facilities at CBD (especially at Head post office junction, Moffusil bus stand area, Medical collage area and Palayam area), junction improvements and widening of almost all major junctions, establishment of truck terminals and dedicated truck lanes are urgently required in the study area, along with road widening/new roads. Besides, optimally utilising the inland waterway transport potential would not only help to link the otherwise poorly linked parts of the planning area and reduce the congestion on city roads, but also would serve as an evacuation route during emergencies.





10

* Water Sources

* Water Supply System



Water Supply



* Ongoing Schemes

* Problems and Potentials

* Inference



10.1 Water Sources

The major surface water sources for the planning area are river Chaliyar and Punoorpuzha. The present city water supply system depends heavily on ground water as well. Large tanks like Mananchira, open wells and shallow tube wells are the most utilized ground water bodies. Large water sources called *chalis* exist in panchayat areas which are made use of for community water supply schemes. Dug wells are the main source of drinking water apart from piped water supply. The well density is 258 per Sq.km and the average withdrawal of dug well is about 800 litre per day in the sandy areas. The well density is 315 per Sq.km in lateritic areas. Reported average Ground Water Table depth varies from 3m to 9m in the planning area. Annex 11 the details of water sources in the planning area.

Figure 10.1 gives the dependence of population on various water sources in planning area, as revealed by the socio economic survey. It reveals that 64.2% of the population in planning area depend on well water, and only 30% depend on protected water supply by Municipality / KWA. 33% of the houses in the planning area are covered by water supply schemes, as per data collected from the LSGIs, as given in Table 10.2.

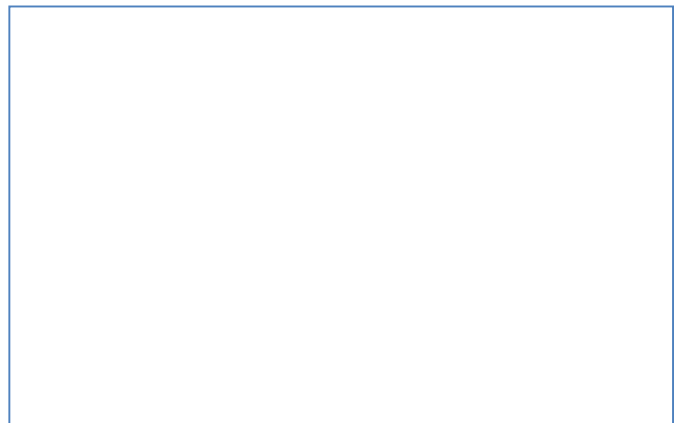


Figure 10-1: Dependence on Various Water Sources in the

10.2 Water Supply System

Piped water supply scheme was introduced in Kozhikode by the Municipality in 1952 using Poonoorpuzha as source at Poolakadavu. Considering the problems of water shortage, a treatment plant of 2.25 MLD capacity using Poonoorpuzha as source, was constructed at Moozhikkal in 1965. Subsequently a full-fledged water supply scheme to supply 54 MLD of filtered water to the city was developed at Koolimadu using water from the river Chaliyar in the year 1970. This was later augmented to 54MLD in the year 1990. The first two phases of the scheme was completed by 1996. The third phase of another 18 MLD capacity comprising of treatment plant and extension of the Kuttikattur pumping station was completed in 2005. In order to improve the supply conditions in the city an additional 4.5 MLD scheme was implemented at Moozhikkal in 1985 using the Poonoorpuzha River as source.

10.2.1 Quantity & Quality

At present the total quantity of water produced in Kozhikode City WSS is 123.25 MLD; 40 MLD from Peruvannamuzhi (JICA Scheme), 72 MLD from Koolimadu, 6.75 MLD from Moozhikkal and 4.5 MLD from Poolakadavu. Due to leakage and production losses, as per the figures of KWA the total water supplied in net is only 75.00 MLD.

The surface and ground water sources utilised for water supply in the planning area have potable water that can be used after Chlorination, except the ground water retrieved from tube wells in Feroke, Kadalundi, Beypore and Elathur, which is hard water containing Iron and salt. Studies conducted by CWRDM in various locations in the planning area regarding the ground water quality, especially bacteriological quality, have revealed that almost all samples were contaminated with Coli forms and Faecal Streptococcus was present in 90% of sampled wells. In many cases cause of contamination is of human origin. Contamination was higher in the vicinity of sanitation structures, especially in open wells situated within 10-15 m from latrines. Elevated areas had comparatively lesser level of contamination while soil samples collected from low lying areas indicated high bacterial load. Level of bacteriological contamination is very high during Monsoons.

10.2.2 Water Treatment Plants

The Kozhikode WSS has four water treatment plants with a total capacity of 144 MLD. Table 10-1 provides the details of water treatment plants in the planning area.

Table 10-1: Details of Water Treatment Plants

Location	Source of water	Capacity of the Plant (MLD)	Types of treatment
Koolimadu	Chaliyar Puzha	72	Rapid Sand Filtering, Flocculation, Coagulation, Aeration
Moozhikkal,	Poonur Puzha	11.25	Rapid Sand Filtering, Flocculation,

Poolakkadavu			Coagulation, Aeration, Disinfection
Kozhikode WSS, Malaparamba		140MLD (40MLD to city)	Pulsator Technology

10.2.3 Service Reservoirs & Distribution Network

The present storage capacity of the service reservoir is 10.80 ML. The present locations of reservoirs are at Kovoov (GLSR, 2.70 ML), Malaparamba (GLSR, 3.60 ML), Balamandiram (GLSR, 0.90 ML) and Pottammel (GLSR, 3.6 ML). In addition to the above, the upcoming new reservoirs in the city under JICA scheme are: Balamandiram (3.18ML), Malaparamba (9.98ML), Pottammal & Eravathukunnu South (11.58ML), Medical College-Kovoov (8.09ML), Easthill (7.49ML) and Eravathukunnu north (5.58ML). The existing water supply schemes in the vicinity are given in table 10.2.

Table 10-2: Details of Distribution Network

LSGI	Quality Of Water	No. of Schemes	No. of Houses Covered
Kozhikode Corporation			
Old Kozhikode Corporation	Properly Treated	1	49500
Beyepore GP	No treatment	15	2250
Cheruvannur-Nallalam GP	No treatment	21	1050
Elathur GP	After chlorination	2	2700
Feroke GP	No treatment	27	1350
Kadalundi GP	No treatment	12	2530
Olavanna GP	No treatment	43	1510
Ramanattukara GP	Chlorination	1	199
Grand Total		122	61089

The city is divided into four zones for the purpose of water distribution, namely Zone I-Malaparamba, Zone II-Pottammal, Zone III-Kovoov and Zone IV-Balamandiram. The details of distribution network and coverage are presented in table 10-2. The total length of distribution system is 636.42 Km. Some of the existing pipes were laid in 1952, while major portion of the network was laid between 1964 and 1974. There are about 49500 house connections and 2300 Public Taps. The distribution is metered except the supply through the public taps.

10.2.4 Physical Losses

The total physical loss calculated in supply is 35.5%. Around 75% of the physical loss of water is due to the leakages in deteriorated service connections & pipes. Leaks in the pipe joints of transmission and distribution network also account for the water loss.

10.2.5 Water Scarcity

Shortage of water is commonly felt in the coastal belt, elevated areas and some of the peripheral areas. The panchayat areas have their own water supply scheme wherever feasible; but the coastal Panchayats cannot depend on ground water due to salinity intrusion. The details of nature of scarcity of water in the planning area, as revealed by Socio Economic Survey, are given in Figure 10.2. It was found that about 5% of the population of the planning area faces water scarcity for more than 6 months in a year whereas 14% of the population faces water scarcity upto 6 months.

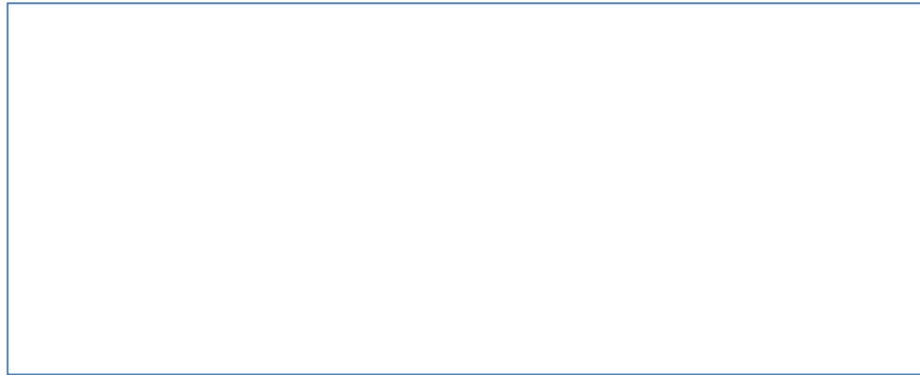


Figure 10-2: Details of Nature of Scarcity of Water

Besides, the distance to water sources was also studied as part of the Socio Economic Survey, which reveals that for around 0.02% of population, the distance to water source is more than half a kilometre. Further, for more than 1% of the population, the water supply is limited to less than an hour per day.

10.3 Ongoing Schemes

10.3.1.1 Japan International Cooperation Agency (JICA) Sponsored Water Supply Scheme

The JICA aided Water supply scheme for Kozhikode region will augment the city water supply, enhancing the capacity to 145 MLD in addition to the coverage in 14 adjoining Panchayats. Kadalundi and Olavanna are also covered by this scheme. The capacity in first phase is estimated to be 174 MLD, which can be enhanced to 210 MLD in second phase. The source is Peruvannamuzhi 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 city alone at Malaparamba (6.56 ML), Balamandiram (2.37 ML), Kovoov (8.23 ML), East Hill (7.91 ML) and Pottammal (2.18 ML). The responsibility of augmentation, implementation, operation and maintenance including cost recovery vests with Kerala Water Authority.

10.3.1.2 DANIDA Project

This project is envisaged to supply drinking water for Ramanattukara Municipality in the Kozhikode District and some Gramapanchayats of the Malappuram District. The source for this project is bore wells, which is not sufficient and at present water is being supplied once in ten days in this area.

10.3.1.3 Cheekkode Water Supply Scheme

This project is envisaged to supply drinking water for Kadalundi and Feroke Gramapanchayats in the Kozhikode District and some other Gramapanchayats of the Malappuram District. The project is nearing completion in Feroke Gramapanchayat.

10.3.1.4 Other Schemes

There are a few other committed small/medium scale water supply schemes, namely, a mini water supply scheme near Maradu in Beypore, small scale schemes in Feroke, Chungam and Perumugham and Vattaparambu water supply scheme in Kadalundi.

10.4 Problems and Potentials

There is a huge supply–demand gap in water supply in the planning area; the supply is less than 50% of the demand. Shortage of water is commonly felt in the coastal belt, elevated areas and some of the peripheral areas. Distance to fetch water exceeds 500ms in certain localities, which badly affects the health of women, they being responsible to fetch water. GWT is very shallow during post monsoon and very deep during pre-monsoon and fluctuates maximum towards eastern parts. Depletion of water sources is felt in Panchayat areas where dependence is more on ground water. Most of the wells of Corporation area are bacteriologically polluted and also found to have fecal contamination. Available and potential sources are not protected. The existing water supply scheme is very old and needs rehabilitation of transmission lines and strengthening of under sized mains. Extending the existing network based on demands without strengthening transmission mains render the



distribution network unbalanced. A well-designed distribution network is to be established urgently to cope with the increasing demand. 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 declines the efficiency of the system. Legal provisions, to ascertain availability of water supply facility while giving Development /Building permits, are not in place at present, which results in unmet water demand after completion of the project, further resulting in dependence on unhygienic sources. Hence regulations to ensure availability of drinking water for major projects from public / private water supply system before granting building permits are to be framed.

In order to rearrange the the distribution network, the old and damaged AC pipeline in the system has to be replaced with PVC Pipes. KWA under AMRUTH programme has prepared proposal to replace these pipelines, 32 pipelines, in the Corporation with PVC pipelines for an amount of 17.87 crore in first Phase. On commencement of this project Phase II project of replacement would be taken up for 14 crores. This will reduce the unaccounted flow of water by 75% and improve the water supply distribution to a great extent.

Rehabilitation of the old Water Treatment Plant at Koolimadu and booster station at Velliparamba including replacing of the old electro-mechanical equipments has been taken up in JICA programme to the tune of 42 crores and completed. This will reduce any pumping interruptions due to the defects in the electro-mechanical equipments. The JICA aided scheme will enhance the coverage and capacity of water supply in the planning area. Conservation of all existing water sources like ponds and setting up independent water supply schemes would address the water shortage at micro level. 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 equipments, communication strategy development and on line complaint redressal would help improve the efficiency of the system.

10.5 Inference

Refurbishing of Koolimadu based Kozhikode water supply scheme and satisfactory completion of the JICA project are expected to solve the water woes in planning area. System expansion including source augmentation, refurbishment of transmission mains aiming at bringing down UFW and revamping water supply equipment and pipe lines in the planning area has to be taken up. The establishment of small independent water supply schemes in selected areas for reducing the load on Kozhikode Water Supply Scheme is also equally important. Proper monitoring should be done to ensure the quality of water.



Sanitation



ED
ECT
ON



* Storm Water Drainage

* Sewerage System

* Solid Waste Disposal

11.1 Storm Water Drainage²

11.1.1 Drainage Pattern in Planning Area

Water bodies connected with the existing drainage system of Kozhikode Planning Area are Arabian Sea, Rivers (Kallai river, Korapuzha/Punoor river, Chaliyar and Kadalundippuzha), Manmade canals (EK Canal, BK Canal), Natural drains, Lagoons, and Back water reservoirs.

Kallai River: Kallai River originates from Cherukulathur Village in Kozhikode Taluk at an elevation of 45m above MSL. It is connected with Chaliyar River on the south by a man made canal starting from Mankavu, the Beypore Kallai canal (BK Canal). Kallai River is also connected with Korapuzha on the north by another man made canal, the Canoli Canal or Elathur Kallai canal (EK Canal). Kallai River passes through Cherukulathur, Kovoov, Olavanna and Mankavu before finally joining sea at Kallai. Length of the river is 22 Km. The river is tidal and has a drainage area of 96 Sq.km, whole of which falls in the district. The length of this river in Corporation limit is 6.20 km. It has a navigable length of 10 km. Study conducted by the CWRDM Kozhikode found that formation of small islands due to the deposition of clay and silt had resulted in the interruption of the flow of the river. Works including deepening of the river by de-silting and side protection to both banks, and actions to evict the encroachments are to be taken up to conserve this natural drainage.

Korapuzha/Punoor River: Korapuzha is formed by the confluence of the Agalapuzha with Poonorpuzha and joins the sea at Elathur in the north side of the city. Agalapuzha is more or less a backwater while the Poonorpuzha originates from Arikankuni in the Western Ghats situated in Wayand district at an elevation of 610 m. Poonorpuzha has a length of about 40 km. and a drainage area roughly of 624 Sq.km. The length of this river in the corporation is 11.60 km. Poonorpuzha passes through the eastern side of Kozhikode Corporation before joining with Korapuzha at Eranjikkal. It forms part of the west coast inland navigation system. The navigable length of the river is 25 km. Mangroves of Korapuzha are very famous. Since the banks of this river are eroded, premises around Chelavoor, Moozhikkal, Poolakadavu, Kannadikkal, Thaneerpanthal etc. experience frequent flooding during monsoon. So side protection is essential from Chelavoor to Thaneerpanthal. Also heavy deposits of silt are seen throughout the length.

Chaliyar River: Chaliyar, also known as Beypore River as it nears the sea, is an interstate river, 169 km long and the fourth longest river in Kerala. Of the total drainage area of 2535 Sq.km, 455.5 Sq.km falls in the district. This river is connected with Kallai by artificial Canals. The river is having a navigable length of about 70 km and motor boats can ply up to a

² KSUDP has conducted an exhaustive study on the drainage and sewerage in Kozhikode Corporation, the relevant data & analyses from which are used in this chapter.

distance of 22 km between Beypore and Vazhakkad. Chaliyar originates from Western Ghats range at Elambalri hills located near Cherambadi in the Nilgiris district of Tamilnadu and flows through Malappuram district for most of its length and then for around 17 km it forms the boundary between Malappuram district and Kozhikode district, before entering Kozhikode district for the final 10 km before joining the Arabian sea. Some of its tributaries originates from Wayand district and joins the main river in Malappuram. Chaliyar is a perennial river. It is the main source of drinking water as well, for Kozhikode. Nilambur, Edavanna, Areekode, Mavoor, Feroke and Beypore are some of the famous places along its banks.

Kadalundi River: The river takes its origin from forests of silent valley at an elevation of 1220 m above MSL. It is formed by the confluence of two main tributaries, Olipuzha and Velliyar and empties into Lakshadweep Sea at Kadalundi. The river has a total length of 130 km and drainage area of 1099 Sq.km and catchment area of 430 Sq.km. Only a small portion of the river, 14 Km length and 120 Sq.km of the catchment area, falls in Kozhikode district. The river is a part of west coast navigation system for about 23 km from Palathungal and Mannur. Kadalundi River is one of the rivers which are subjected to high flood damages.

Beypore Kallai Canal (BK Canal): This is a manmade canal connecting Kallai river at Kadupini near Mankavu and Chaliyar River at Thuvassery near Kolathara. Total length is 9.30 km, bed width is 14 m and bed level is -1.70 m. Length of this canal in the corporation area is 1.00 km. Irrigation department has undertaken the work of desilting and providing side



protection for the entire length of this canal. This canal is part of Inland Water Navigation project.

Canoli Canal (EK Canal): It is a man-made canal, named after the Malabar Collector R.Canoli of the erstwhile British regime, connecting the rivers Korapuzha in the north and Kallai River on the south of the city. This canal is having a length of 11.20, which flows through the city core of Kozhikode Corporation. The canal also known as Elathur Kallai Canal (EK Canal), was constructed in 1848 and was a major water way for shipping goods and ferrying passengers in the district till the early 1950s. As a part of the west coast canal system from Kasargod to Thiruvananthapuram, it has a prime role in the navigation map of Kerala.

Even though this canal was constructed as a navigation route, now it is the main recipient of surface water runoff and sewage from Kozhikode city and its suburbs, and discharge into Kallai River and there to Arabian sea. The canal has width varying between 6 m and 30 m. The water depth ranges from 0.50 m to 2.0 m during the monsoon. Bed level of the canal is -1.50 m. The canal is subjected to tidal action. Average low tide level is -0.50 m and average high tide level is +1.000 m. Average level of dry weather flow is +0.500 m and maximum flood level observed in the monsoon is +2.500m. Catchment area of the canal covers about 35% to 40% of the total city area.

Present condition of Canoli canal is pathetic. More than 30 water courses, small channels and *thodus* discharge into the Canoli canal, most of which are not properly designed and maintained. Original depth of this canal is considerably decreased due to accumulation of silt and growth of weeds/vegetation in the canal. Even though the sides of the canal are protected, certain portions are in a dilapidated condition and existing protection is insufficient at some other places. From Arayidathupalam to Kallai the canal has to be developed completely.

There are lot of encroachments on both banks of the canal. On account of indiscriminate discharge of waste from the toilets, drainage along with sewage and solid waste including plastic bags etc., directly into the canal through leading channels, canal water contains toxic waste and an unhygienic condition prevails in and around the canal. Ground water in this area is polluted. Dissolved oxygen and BOD in most of the areas of the canal is beyond the permissible limits as per the standards of CPCB. High pollution at Mooriyadu could be attributed to the discharge of polluted canal water into Kallai river.

11.1.2 Existing Drainage Network

Total length of roads other than PWD roads in Kozhikode corporation is 973Km. Total length of road side drain on the left side is 136.50 km and that on right side is 147.50 km. Length of primary drains (EK canal, BK canal, Nallai pond-Kallai river canal) in the corporation is 14 km. Total length of secondary drains in the Kozhikode corporation is 146 km. Length of tertiary drains is 33 km. Length of PWD/NH road is 53km. Left side drain is

19.50 km and right side drain is 21.40 km. About 50% of the existing roads in the city have side drains. About 30% of the existing drains are covered.

11.1.3 Issues

- Rapid unscientific urbanization has resulted in the formation of new residential areas formed in low lying land which has been functioning as temporary storages before discharging into main drainage channels, thereby reducing the area of storage and obstructing storm water drainage. The thickly populated area in the eastern side of the city bounded by Canoli, NH-212 and Mavoor road were formerly drainage reservoirs. Filling up of these low lying areas without providing adequate drainage facilities have resulted in the inundation of the area around Rajaji road, Ram Mohan road, Mavoor road and the premises of Sreekanteswara temple. Levelling of hills and conversion of small natural drainage channels has disrupted the natural drainage pattern of the planning area.
- Both the banks of the Punoor Puzha are highly eroded, resulting in its carrying capacity. Frequent floods occur in the adjacent places of this river especially from Kannadikal to Thanneerpanthal, due to overflowing.
- Two of the main storm water receiving and conveying water bodies are the Kallai River and the Canoli Canal. Capacity of both of these canals is reduced because of the large scale deposition of silt and other solid wastes.
- Inadequate size and improper bed slope of existing drains.
- Growth of vegetation, laying of Utility service lines through drains, installation of electric posts through drains
- Most of the colonies do not have proper drainage system. Wherever available, they are not properly designed to serve the colony.
- Isolated water logged areas exist in the city area. These isolated water bodies are not integrated with the existing drainage system.
- Presence of missing links in the drainage work causes localized drainage problems.
- Carrying capacity of the existing drains, canals and rivers is in a reduced state due to heavy deposit of silt, large scale dumping of solid wastes, growth of vegetation in them, encroachment of drainage channels and water bodies.
- Blockage of the outfall points of several drains.
- Inadequate or absence of drainage facilities in certain areas.
- Irregular and inadequate maintenances of the existing drainage system, causing life hazards.

11.1.4 On-going Projects

In the KSUDP's Master Plan, Kozhikode corporation area has been divided into three drainage zones, as Zone-A, Zone-B and Zone –C. These zones are further divided into subzones. The details of each areas are given below.

ZONE –A: This zone consists of the thickly populated area between Canoli canal on the east, Arabian Sea on the west, corporation boundary on the north, and Kallai River on the south. This area includes the CBD area.

This zone is interrupted by the presence of a close road network .So roadside drains have to be adopted as primary and collector drains. NH-17 is passing through the ridge of this area and the land on the east side of this road is slopping towards Canoli canal and the land on the western side is slopping towards the sea. So the drainage system has to be designed for draining into the sea on the western side, and draining into the Canoli canal on the eastern side. A few drains in the southernmost area are to be drained directly to the Kallai River. This zone is further subdivided into 21-sub zones

ZONE-B: Zone B comprises of the area on the southern side of Kallai River, between Corporation boundary on the south east and Arabian Sea on the west. The drainage system in this zone is to be designed so as to discharge to Kallai River. This zone is divided into 9 sub zones.

ZONE-C: Zone C includes the area on the eastern side of the Canoli canal up to the corporation boundary. Density of population in this area is low compared to other two zones. This area comprises of hills and low lying waterlogged areas. NH-17 by-pass passes across this area. Storm water is to be drained into the Canoli canal, Punoor puzha or to the waterlogged area wherever present. There are 26 sub zones in this zone.

This master plan for storm water drainage covers old corporation area of Kozhikode. The master plan has undertaken a very detailed study of the existing situation and proposes zone wise short term and long term mitigation and management measures including layout and detailed design for drains in old Kozhikode corporation area (excluding Elathur, Beypore and Cheruvannur Nallalam from present corporation limits). Hence this plan can be directly incorporated to the Masterplan for Kozhikode urban area for old corporation limits. Mitigation measures for the remaining area only need to be analysed in this Masterplan.

11.1.5 Inference

A number of natural drainage channels exist in the city .These channels mostly act as secondary drainage outlets and carrying both storm as well as waste water to the Canoli canal, Kallai River, Korapuzha or direct to sea. Most of the secondary drains are inadequate to carry the entire storm water runoff of the city particularly during the monsoon season. Major water logged area of the city is low lying plane located in the western side of the

Canoli canal. This area is parallel to the sea and extends for about a length of 8 km. Major city roads including NH17 and NH 212 pass through this area. Movement of traffic in this area is often affected.

Certain areas of the city experience water logging particularly during the monsoon. Normally water logging occurs during the period of rainfall of high intensity and / or for extended duration. Arrangements for maintaining the required environmental flow of Canoli canal to Kallai river should be made. Untreated effluents reaching the Canoli canal should be prevented through integrated sewerage treatment systems and solid waste management. Proper dredging should be carried out at the mouth of Canoli canal. Stern action should be initiated against encroachments on river banks.

Implementation of KSUDP drainage master plan is expected to solve the drainage problems in old corporation area. The drainage networks for remaining areas are to be taken up as further phases of this project.

11.2 Sewerage System

11.2.1 Existing System

There is no established common sewerage system for the planning area or the part of the planning area and the existing system of waste water treatment is mainly onsite sanitation methods like leach pit, septic tank etc. with exception of major institutions, residential complexes and hospitals. Corporation through KWA had commenced a Sewerage project in 1983-86 with LIC assistance which was abandoned midway due to shortage of further funds. However, KSUDP is implementing a new sewerage project which though may not cover the entire area but will cover the most populated central areas of the city.

At present, the household system treats the night soil from the latrines mainly through septic tanks and the other household waste water (grey water) is let into the open drain. The septic tank however may not be functioning properly and most of the households don't have facility for treating septic tank effluent through dispersion trench or other methods and the effluent finds its way to the nearest storm water drains. In many cases effluents from twin pit or poor flush toilets with septic tanks are discharged into the open drains without any treatment. The hospitals and other institutions have their own independent systems. But it is suspected that in most cases partly treated effluent will be let in to the nearest drains or water bodies. Sewage from the un-serviced areas of the city and the adjoining Panchayat areas overflows into the water bodies creating nuisance and unhygienic life conditions in the City.

11.2.2 On-going Project

The on-going KSUD Project aims at developing sewerage system for the city central areas including rehabilitation of existing schemes if any and has prepared a Master Plan for

each city for sewerage. The Master Plan divides the city based on topography, population, density, business activities etc. into five sewer zones as detailed below. Of this Zone A & B are already being taken up under KSUDP as Phase I. The master plan envisages establishment of sewerage facilities to the whole Kozhikode city in different phases and is designed for the year 2046 except for Phase I (KSUDP) for which the design year is 2041.

Table 11-1: Sewer Zones – KSUDP project

No	Zones	Boundary				Area in Km ²
		West	East	North	South	
1	Zone A	Sea	Railway line	Bhat road	Kallai river	5.8
2	Zone B	Railway line	Canoli canal	Kunduparambu Puthiyangadi road	Kallai river	13.10
3	Zone C	Sea	Corporation Boundary	Kallai river	Beyepore	7.29
4	Zone D	Canoli canal	Corporation boundary	Corporation boundary	Waynad road	51.12
5	Zone E	Sea	Kannur road	Corporation boundary	Bhutt road	1.85

Phase I involves the construction of sewerage infrastructure for Zone A & B including a Sewage Treatment Plant of 27 MLD capacity, to be established in Government land near Karimbanapalam with Canoli Canal as the receiving water body. Expected completion date of Phase I is 2012. Under phase II, in order to save cost on long pumping, decentralized STPs are proposed at five different locations with total installed capacity of 46.5 MLD. The highest plant capacity is 15 MLD and the lowest is 2 MLD. The technologies suggested are MBBR, SBR, and ASP (Improved version). The treated effluent quality will be much better than that can be discharged to surface water as per SPCB norms & provision for tertiary treatment, reuse and recycling as also being provided partly. Project envisages a total initial house connection of 48500 No's. The total length of pumping main would be 30020 meter and the working capacity of the pump sets 897.5 HP (excluding STPs). The total estimated outlay for the Master Plan is 454.70 crores (Phase II) and 121.26 crores (Phase I). Funds for the capital cost will have to be obtained as Centrally Assisted or Externally Aided Projects. The Master Plan proposals are likely to be taken up under the JNRUM program of the Government of India.

KSUDP Master Plan envisages reclamation and reuse of waste water at least partially through tertiary treatment as it would help Water Conservation, reduce load on water resources, reduce pollution of water bodies caused otherwise and will proportionately pay back the investment. However all precautionary and environmental safe guards shall be carried out to prevent health hazards through use for potable and other prohibited uses. The possible uses in the planning area would be:

1. Construction Purposes: This could be achieved by installing vending points near the Sewage Treatment Plant.
2. Service Stations and Mini Industrial Estates
3. Landscape Irrigation /Gardening Parks
4. Cleaning purposes at Railway /Bus station etc.
5. Fire protection
6. Recreational/Bathing (at prescribed standards)
7. Recreational Irrigation (Golf, Play Ground)
8. Environmental enhancement (Replenishment of Lakes, Ponds, Wet Lands etc.)

The priority area identified for tertiary treatment for reuse application preferably through wet land systems is the proposed 27 MLD STP at Karimbanappalam taken up under KSUDP. The good quality effluents can also be used to replenish the storage of the “Kalippoika” of the Sarovaram project. Here a vending point for sale of water for construction purposes can be installed. A separate reclaimed water system with pumping main and reservoirs can be constructed for the city central areas for distributing this water for non-potable uses. It is suggested that the tariff may be fixed as minimum 40% of the Potable water. The next priority may be given to the Govt. Medical College campus. In these, modern methods of treatments to higher standard are recommended. The reuse application may include toilet flushing, gardening recreational Irrigation etc.

11.2.3 Inference

The on-going and proposed phases of KSUDP Sewerage Project cover the Corporation area and are expected to solve the sewerage problems of the planning area under old corporation limits. However, the requirements of the other LSGIs in the planning area have to be addressed as next phases of the project, to ensure healthy sanitation infrastructure for the whole of planning area. The location and condition of the existing sewer lines already laid is to be identified and incorporated into the proposed sewerage system, if possible.

11.3 Solid Waste Disposal

Solid waste management is an unresolved civic problem faced by all the districts of Kerala, and especially the urban areas, Kozhikode not being an exception. However, the urban area is slightly better off compared to its counterparts, considering that it has a solid waste treatment plant and landfill site within its geographical jurisdiction.

11.3.1 Generation

Households, hotels & resorts, commercial areas including markets, offices & institutions, hospitals, marriage/community halls, residential colonies, industrial establishments and public places are the major generators of solid waste in the planning

area. Total quantity of solid waste generated in Kozhikode Corporation (Old limits) is estimated to be 250-350 Tonnes/Day. Bio - Degradable wastes contribute to 70 % while recyclable wastes like paper, plastic, metal, rubber, glass etc. constitute 15 % of the waste generated. Inert waste is 10% and others 5% of the total. In terms of percentage contribution, domestic waste generated from the house hold account for 47 percentage of total waste generated. Waste from commercial establishments and hotels account for 24 percent of the waste.

Estimates for waste generation are not available for the remaining LSGIs in the planning area, except Cheruvannur- Nallalam where 0.25 Tonnes of solid waste is generated per day. However, a rough estimate of solid waste generated in the planning area @ 500g per capita per day for the existing population of 7.77 lakhs (2001 population) is 389 Tonnes/Day.

11.3.2 Collection and Treatment Facilities

In accordance with the Solid Waste Management Rules, 2000, Kozhikode Corporation is implementing a Model Solid Waste Management Project. This centralized system involves segregated storage of the wastes at the point of origin itself and segregated collection of the same by Kudumbasree volunteers (Primary collection) using cargo Auto Rickshaws. The collected waste is moved to the 32 Secondary collection points identified by the corporation, and loaded to secondary collection vehicles (tractors/ trucks), which is then transported to Njeliyan Paramba where the biodegradable wastes are treated in a 100 TPD Composting Facility and made in to bio-manure while Non- biodegradable wastes and rejects are being used for land filling. There is daily collection and the total waste collected is 120-150 T/day. The corporation also houses a plastic waste recycling unit in West Hill.

Among other LSGIs in the planning area, Ramanattukara, Beypore, Elathur and Kadalundi does not have any solid waste collection and treatment facilities. Beypore



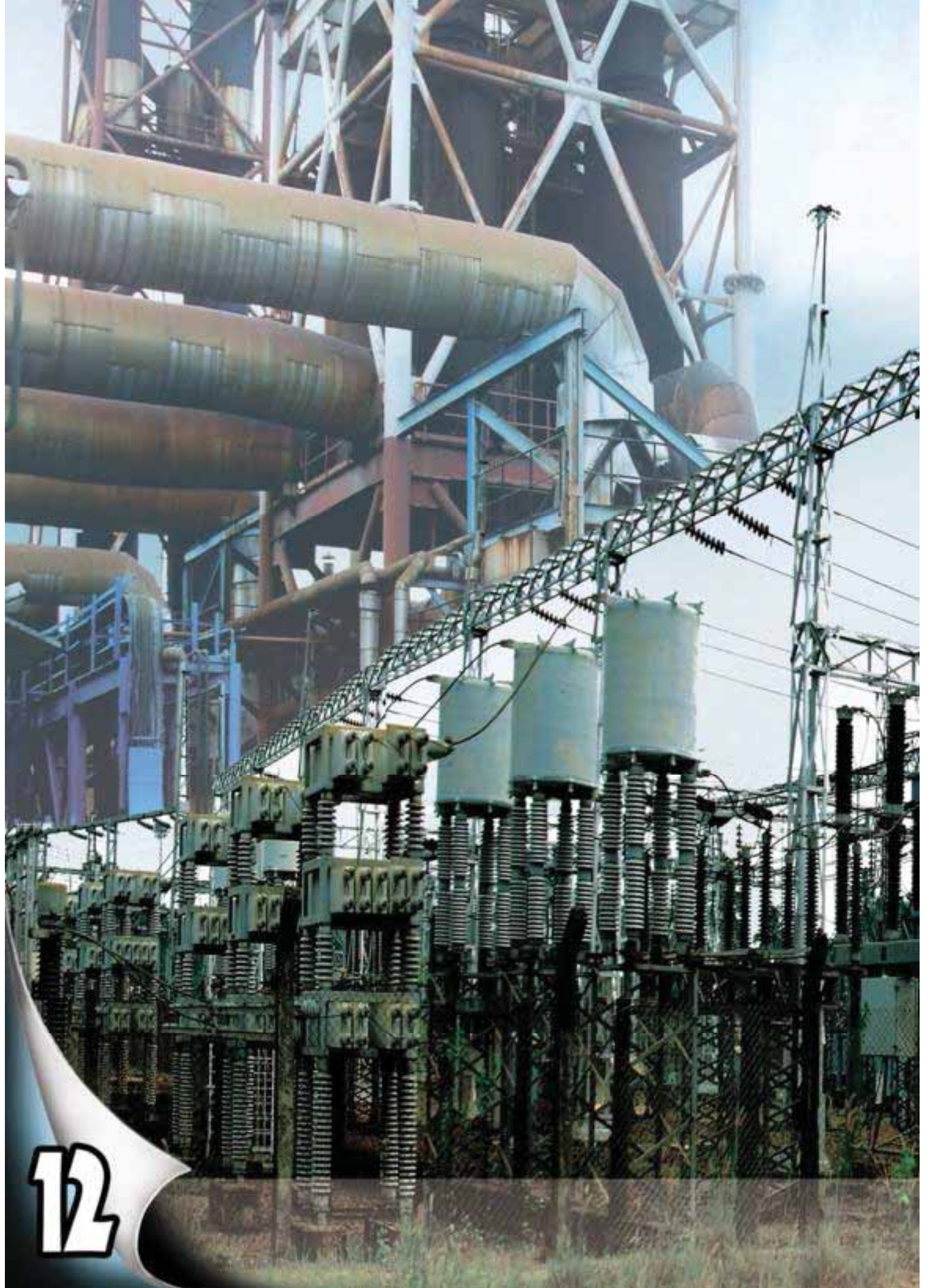
Panchayat however collects the waste from the main road sides employing sweepers on contract basis, which is burned openly in private grounds with their permission. Cheruvannur – Nallalam Panchayat collects wastes from the generating stations employing Kudumbashree members on daily basis and disposes at the Neliyanparambu yard through land filling and burning. Olavanna panchayat has daily collection facilities for bio-degradable wastes from commercial centers and disposes them with the help of Biogas plant (500Kg) at Paraparakunnu. Feroke Panchayat has a community level solid waste collection system from major solid waste generating centres like commercial centres and markets, engaging Kudumbashree persons and panchayat sweepers, and disposes it through land filling.

11.3.3 Issues

The increasing purchasing power is indirectly leading to increasing waste generation, including plastic and e-waste. The existing solid waste management system is limited to the wards in old corporation area; even among this many wards and households are not covered. Street sweeping is done only in certain central areas. The dwindling number of Kudumbashree workers volunteering for these activities has reduced the efficacy. Dumping points are not cleared regularly, waste bins are not placed at all points and the bins placed are open so that the waste is being spread by dogs and birds. Shops/stalls are not provided with separate bins; hence usually, they throw the waste to street or drains. The non-biodegradable waste is disposed without any treatment and no scientific land filling is practiced resulting in pollution of the surrounding areas. Appropriate modern technology need to be employed for processing the wastes. The LSGIs are not equipped with sufficient infrastructure and manpower to undertake and dispose /process the daily waste generated. Vigilance and enforcement measures need to be strengthened to penalize negligence in waste disposal and continuous awareness creation programs have to be taken up. Besides, decentralizing the waste management with appropriate technologies wherever possible is an imminent need as the centralized waste treatment facilities are not sustainable in the long run. The technical and administrative machinery of the LSGIs need to be strengthened to guide and manage the decentralized and centralized solid waste management measures.

11.3.4 Inference

Encouraging segregation and storage of biodegradable and non-biodegradable waste at source itself will reduce the problems connected to solid waste disposal to a considerable extent. Steps are to be taken to reduce the quantity of solid waste. Decentralization of disposal sites for non-hazardous solid waste should be implemented and self-help methods for disposal of bio degradable solid waste at source itself shall be promoted. Awareness creation among waste generators through social workers, media etc. has to be taken up more widely and continuously. The LSGIs has to be strengthened to manage solid waste with regular monitoring and levy of user charges. More land fill sites should be identified scientifically.



12



Energy

* Electricity

* Petroleum

* Non-Conventional Sources

* Problems and Potentials

* Inference

12.1 Electricity

12.1.1 Connections

The planning area has a total of 2.43 lakh power connections. There are five 110 KV and four 66 KV substations in the planning area. Sector wise break up of number of connections is given in Table 12.1. It can be seen that 75% of the connections are for domestic purposes and 21% of the connections are for commercial purposes.

Table 12-1: Category Wise Break Up: No. of Electricity Connections

Sl. No	LSGIs	Total No. Of Connections	Category Wise Break Up				
			Domestic	Commercial	Agricultural	Industrial	Others
1	Kozhikode Corporation						
	Old Kozhikode Corporation	139657	100418	37051	319	1869	NA
	Elathur	11762	9816	1698	125	123	NA
	Cheruvannur-Nallalam	7228	5729	56	280	1163	NA
	Beyepore	23003	18750	3446	187	620	NA
2	Ramanattukara	22679	17474	4171	517	517	NA
3	Kadalundi	13536	10655	2406	248	227	NA
4	Olavanna	8893	7397	1144	83	269	NA
5	Feroke	15830	11915	1288	2416	211	NA
	TOTAL	242588	182154 (75.08 %)	51260 (21.13%)	4175 (1.7%)	4999 (2.06%)	

12.1.2 Consumption

Table 12-2: Category Wise Break Up: Electricity Consumption

Sl. No	LSGIs	Total Consumption (MKWH)	Category wise breakup				
			Domestic	Commercial	Agricultural	Industrial	Others
1	Kozhikode Corporation						
	Old Kozhikode Corporation	31448905	20909531	8989817	16089	1533468	NA
	Elathur	1628392	1267662	172350	2772	185608	NA
	Cheruvannur-Nallalam	1450619	1066528	3450	183621	197020	NA
	Beyepore	5115501	3437936	566449	3990	1107126	NA
2	Ramanattukara	1902352	24627	967640	8923	901162	NA
3	Kadalundi	2410856	1736260	253528	9872	411196	NA
4	Olavanna	1362811	1012835	257934	2383	89659	NA
5	Feroke	3166000	NA	NA	NA	NA	NA
	TOTAL	48485436	29455379 (60.75%)	11211168 (23.12%)	227650 (0.47%)	4425239 (9.12%)	

The total energy consumption in the planning area is 4.85 crore MKWH. Sector wise energy consumption breakup is given in Table 12.2 .From the table it is clear that about 65% of the total consumption accounts from domestic connections and 25% accounts from commercial connections.

12.2 Petroleum

The Kozhikode Diesel Power Plant is a 128MW power generating station under the Kerala State Electricity Board. It is the second largest diesel power plant in India. Wartsila NSD's 18v46c type 8 diesel engines of each 16 MW capacity are used here with all its auxiliaries like water treatment plant, boiler, fuel treatment house and fire water pump house etc.

12.3 Non-Conventional Sources

There are no non-conventional energy sources (private or public) which are fed into the main grid. However, a few independent private initiatives which utilise solar energy, wind energy and hybrid of them to meet their energy demand are cited in the planning area.

12.4 Problems and Potentials

- Areas of low voltage in the planning area include Karuvanthuruthi, Perumugham and areas near NH substation.
- Due to the problems in the Nallalam feeder frequent power failures occur in Kadalundi area.
- There are power failure problems in Feroke area due to the change from Feroke feeder to Ramanattukara feeder.
- There are ample opportunities for development of non-conventional energy sources like wind, solar and tidal power in the planning area.

12.5 Inference

Though 100% electrification has been achieved by the KSEB, there are many areas which face low voltage problems in the planning area. Steps have to be taken to enhance power harvest from non-conventional sources. Solar power, Tidal power and Wind Power are the major potential non-conventional sources from which the planning area can harvest power.



E ducation



* Existing Infrastructure

* Educational Status

* Problems and Potentials

* Inference

There were reputed centres of learning and culture in Kozhikode even during early and medieval periods. The beginning of western education is traced back to the first half of the 19th century, when the Basel Evangelical Mission started a primary school in Kallai. The city still retains its importance in this sector and houses many premier institutions which attract scholars from all over the world. Emerging research and educational institutional area in the eastern periphery of the city comprises many institutes of national and international acclaim, like Indian Institute of Management (IIM-K), National Institute of Technology, Calicut (NIT-C), Indian Institute of Spices Research (IISR), Indian Institute of Mathematics (IIM), Centre for Water Resources Development and Management (CWRDM) etc. Major higher educational institutions in the planning area include Govt. Medical College, Govt. Homeo College, Govt. Engineering College Westhill, Govt. Poly Technic, Govt. Arts and Science College, Providence Women's College, Guruvayoorappan College, Malabar Christian College, Devagiri St. Joseph's College and Farook College.

13.1 Existing Infrastructure

13.1.1 Schools

Table 13-1: Details of Schools

LSGI	No. of Schools (Category* wise)						Student to Teacher ratio (Category* wise)				
	1	2	3	4	5	Total	1	2	3	4	5
Old Kozhikode Corporation		94	4	29	8	135	30	29	27	21	7
Beyppore	1	21		1	1	24	29	26	17	22	15
Cheruvannur-Nallalam		13	1	1	1	16	29	26	23	19	9
Elathur		12	3	1		16	19	22	20	22	
Feroke		12			1	13	45	27	38	30	15
Kadalundi		15	1	1		17	26	24	25	20	
Olavanna		15	3	2		20	17	30	24	18	
Ramanattukara		11	1	2		14	53	31	26	17	
Grand Total	1	193	13	37	11	255					

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

There are about 255 government and aided schools in the planning area. Many Unaided schools also function in the planning area. The details of govt. /aided schools are given in the table 13-1.

The results of survey reveal that the schools in the planning area are crippled by infrastructural shortcomings. 33% of schools in the planning area don't have playgrounds, 6% don't have separate ladies toilets and 3% of the schools face water scarcity. Coming to the IT infrastructure at schools, it is found that 38% of the schools don't have computer lab and 73% don't have Internet facilities.

The student teacher ratio is favourable in most of the schools in the planning area as revealed by table 13-1, except in Feroke Gramapanchayat in pre-primary and high school sections and in pre-primary and primary sections in Ramanattukara panchayat.

13.1.2 Higher and Professional Education

Table 13-2: Arts and Science Colleges

Govt. / Aided/ Unaided	No. Of Students							
	BA	B.Sc	B.Com	BSW	MA	M.Sc	MSW	M.Com
Aided	813	1042	240		199	191		47
Govt.	255	160	50		52	12		15
Unaided	260	422		40	48	54	40	
Grand Total	1328	1624	290	40	299	257	40	62

Table 13-3: Professional & Other Colleges

Category	Number of Students
Certificate Courses - Language	38
Certificate Courses - Teaching	120
Certificate Courses - Technical	3892
Degree - Engineering	785
Degree - Medicine- Dental	30
Degree - Medicine- Doctors	200
Degree - Medicine- Nursing	300
Degree - Medicine- Pharmacy	100
Degree - Teaching	825
Diploma - Medicine- Doctors	60
Diploma - Medicine- Physiotherapy	160
Diploma - Technical	1415
Diploma -Management - Hospitality	30
Higher Studies - Teaching	10
Higher Studies -Management - Business	90
Higher Studies -Medicine- Dental	16
Higher Studies -Medicine- Doctors	98
Higher Studies -Medicine- Nursing	8
Degree - Law	180
Higher Studies -Law	15
Grand Total	8372

There are 13 arts and science colleges in the planning area, of which one is in govt. sector, 5 are aided and 7 are unaided. Table 13.2 gives the details of students in these higher education institutions. Table 13.3 gives the details of professional education institutions in the planning area.

13.2 Educational Status

The effective literacy rate in the planning area as per 2001 census is 96.34%. Educational status of persons in the planning area as revealed by the socio-economic survey is given in Figure 13.1. It is found that more than two-thirds of the planning area population is school-educated. However those having higher education above degree, technical qualifications or professional graduates constitute only less than 2% each.

As shown in Figure 13.3 literates are more concentrated in the Planning units corresponding to the Old Corporation Area and in 68, 54, 46, 41, 42 and 43. Literates Concentration Index is lowest in Planning Unit 15. Figure 13.2 shows

that female literacy also show almost similar pattern to the literates' concentration index and is the lowest in Planning Unit 15.

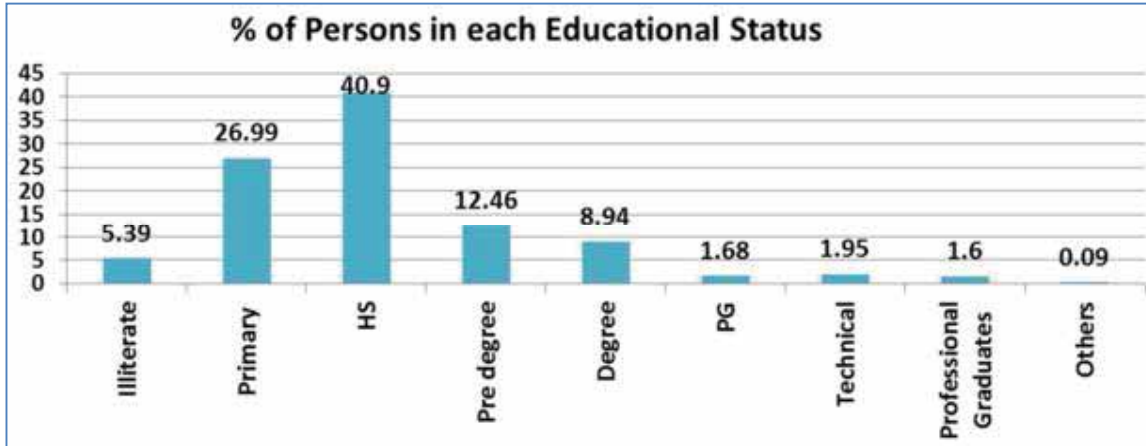


Figure 13-1: Educational status

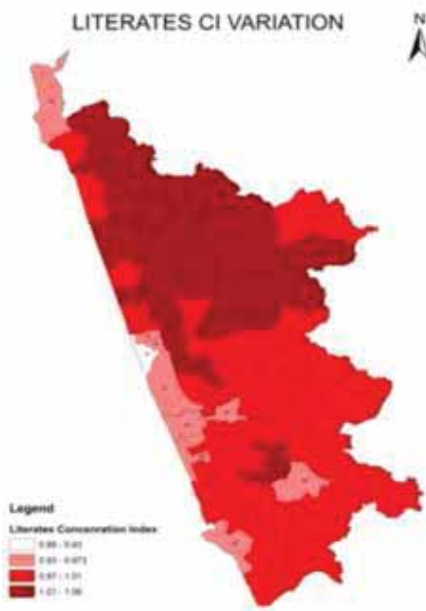


Figure 13-3: Literate Concentration Index

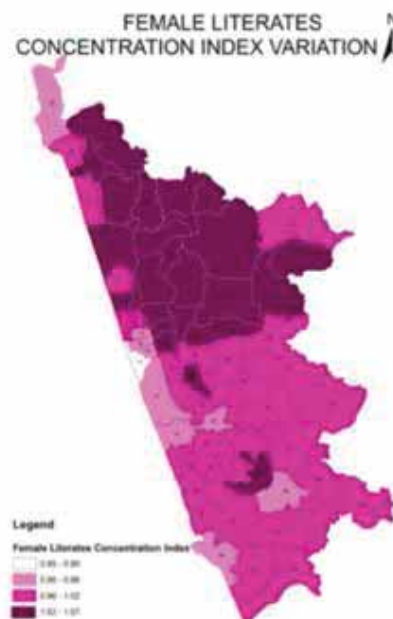


Figure 13-2: Female Literate concentration

13.3 Inference

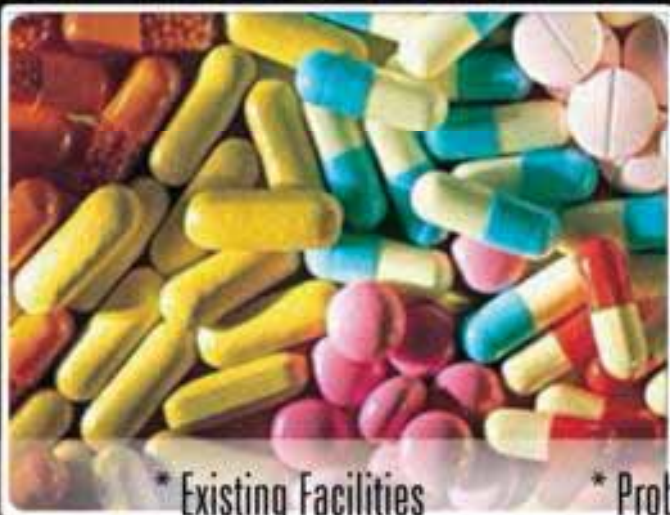
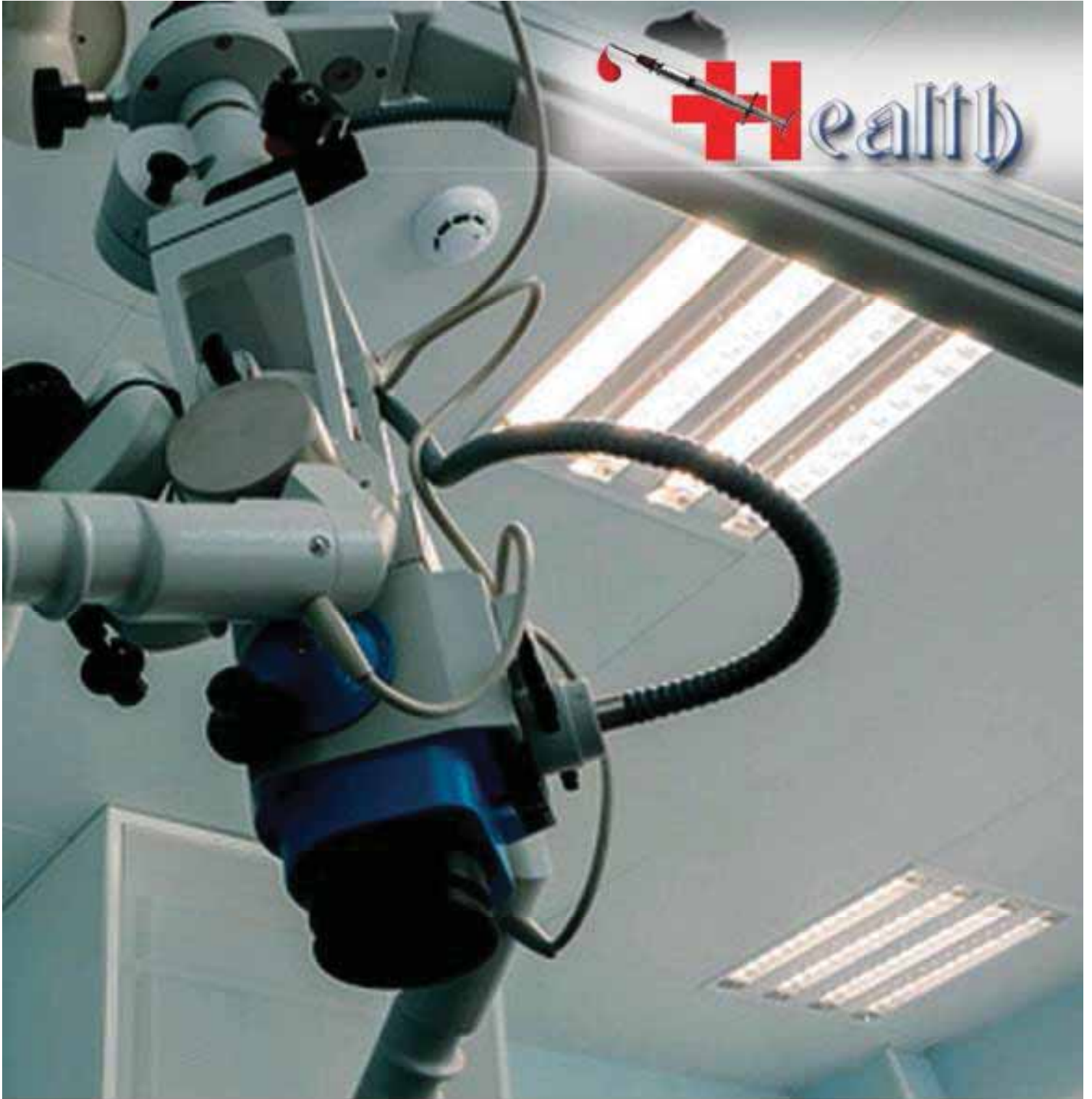
The higher education facilities in the planning area and its peripheries not only serve the region, but also are attractive for national and international scholars. As the details of schools in the private sector are not available, the adequacy of the infrastructure in this

sector could not be assessed. Nevertheless, from socio-economic survey and other investigations, the educational facilities in the planning area are adequate. But, many of the schools in govt. /aided sector in the planning area are struggling due to infrastructural shortcomings, which invite urgent attention.

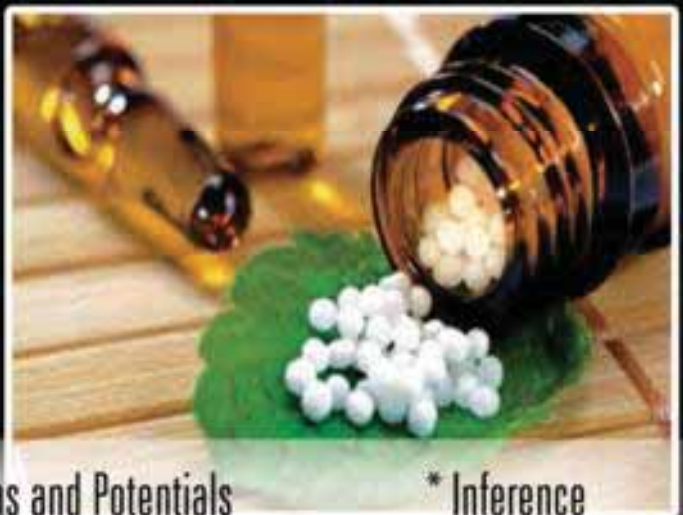


14

By: Amanda D



* Existing Facilities



* Problems and Potentials

* Inference



The health sector of the planning area has an importance beyond its geographical limits as it gives service not only to the planning area but also to the district and the surrounding districts. A number of specialised and superior institutions are working in this sector under private and public undertakings. Major hospitals in the planning area are Govt. Medical College, Govt. Homeo Medical College, Leprosy Hospital, General Hospital, Ayurveda Hospital, Baby Memorial Hospital, MIMS Hospital, National Hospital and Co-operative Hospital.

14.1 Existing Facilities

Category wise details of existing facilities are detailed below.

Table 14-1: Details of Allopathic Hospitals

LSGI	Category (Allopathic)						
	1	2	3	4	5	7	
Kozhikode Corporation	21	13	23	7	4	1	
Feroke	2	2	2				
Kadalundi	3	2	2				
Olavanna	1	2	1				
Ramanattukara		3	3				
Grand Total	27	22	31	7	4	1	

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

Table 14-2: Number of beds and doctors in Allopathic Hospitals

It can be seen that in Allopathic medicine, there are 69 hospitals in Corporation, 6 hospitals in Feroke and Ramanattukara, 7 in Kadalundi, and 4 in Olavanna. Of these 92 hospitals, 29% are

Category	Co-operative			Govt.			Private		
	No.	No. of beds	No. of Doctors	No.	No. of beds	No. of Doctors	No.	No. of beds	No. of Doctors
1				13	0	25	14	0	14
2				7	567	21	15	209	37
3				3	905	70	28	906	211
4	1	120	32	3	1075	74	3	560	96
5							4	800	145
7				1	1540	320			
Total	1	120	32	27	4087	510	64	2475	503

clinics having only OP, 24% are hospitals with 24*7 service, 34% are hospitals with a single Operation Theatre, 8% have more than one Operation Theatre and only 4% have advanced diagnostic facilities. The only referral hospital in the planning area is Kozhikode Medical College and it serves the whole of North Kerala.

There is only one hospital in co-operative sector in the planning area, as depicted in table 14.2. It can be seen that 30% of the hospitals are in govt. sector and 70% of the hospitals are in private sector. The bed to doctor ratio is 8 in govt. sector, where as it is 5 in private sector and 4 in cooperative sector, indicating the better infrastructure provided by private and cooperative hospitals.

Table 14-3: Details of Ayurveda Hospitals

Sl. No	Name & Location of Hospital	Category	No. of beds	No. of Doctors	Govt/ Private/ Co-op society
1	District Ayurveda Hospital, Bhatt Road, West Hill	District Hospital	100	6	Govt.
2	Ayushman Ayurvedic Therapeutic Centre, Puthiyara	Hospital	8	3	Private
3	Govt. Ayurveda Dispensary, Karuvisseri, Eranhipalam	Dispensary	0	1	Govt.
4	Govt. Ayurveda Dispensary, Feroke 8/4	GAD	0	1	Govt.
5	Govt. Ayurveda Dispensary, Pantheerankavu, Olavanna	GAD	0	1	Govt.
6	Govt. Ayurveda Dispensary, Ambalapadi, Elathur	GAD	0	1	Govt.
7	Govt. Ayurveda Dispensary, Ramanattukara	NRHM Dispensary	0	1	Central Scheme
8	Govt. Ayurveda Dispensary, Beypore	GAD	0	1	Govt.
9	Govt. Ayurveda Dispensary, Kadalundi	GAD	0	1	Govt.
10	Govt. Ayurveda Dispensary, Mannur, Kadalundi	GAD	0	1	Govt.
11	Govt. Ayurveda Dispensary, Kolathara, Cheruvannur-Nallalam	GAD	0	1	Govt.
12	Ayurveda Chikilsalayam, Ramanattukara	Dispensary	0	1	Private

As presented by table 14.3, there are 12 hospitals in the Ayurveda system of medicine in the planning area, of which more than 80% are government sector initiatives.

Table 14-4: Details of Homeopathic Hospitals

Sl. No	Name & Location of Hospital	Category	No. of beds	No. of Doctors	Govt/Private/ Coop society
1	Govt. Homeo Dispensary, Mankavu	1	NIL	1	Govt
2	Govt. Homeo Dispensary, Panniyankara	1	NIL	1	Govt
3	Govt. Homeo Dispensary, Beypore	1	NIL	1	Govt
4	Govt. Homeo Dispensary, Makkada, Kakkodi	1	NIL	1	Govt
5	Govt. Homeo Dispensary, Olavanna	1	NIL	1	Govt
6	Govt. District Homeo Hospital, Elathur	2	25	3	Govt

7	Govt. Homeo Dispensary, Ramanattukara	1	NIL	1	Govt
8	Govt. Homeo Dispensary, Feroke	1	NIL	1	NRHM
9	Govt. Homeo Dispensary, Kadalundi	1	NIL	1	NRHM
10	Govt. Homeo Dispensary, Cheruvannur- Nallalam	1	NIL	1	NRHM
11	Malabar Homeo Pharmacy, Ramanattukara	1	0	1	Private

Besides there are 11 hospitals in the homeopathic system of medicine, of which 10 are govt. initiatives.

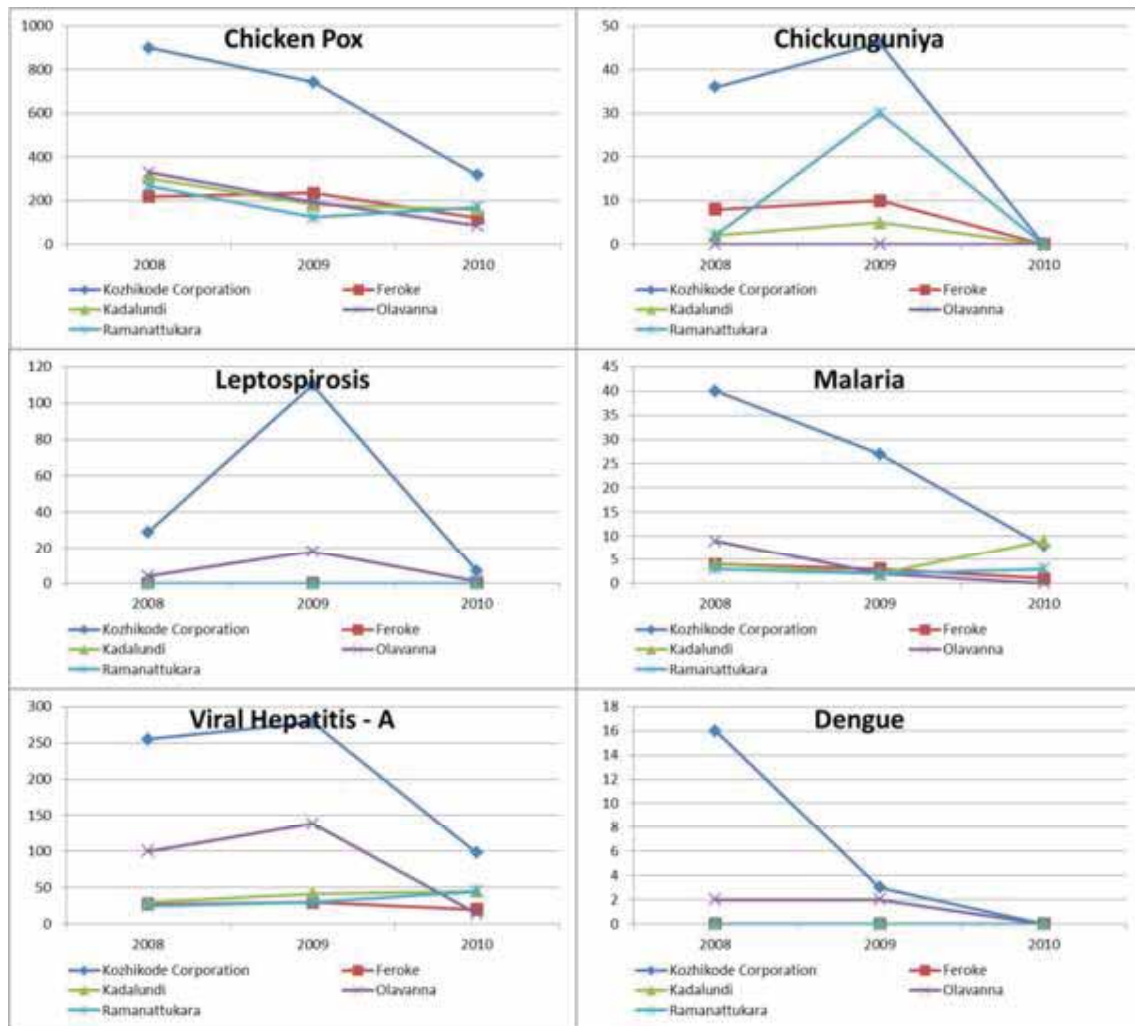


Figure 14-1: Details of Epidemics

Details of major epidemics in the area for the years 2008 to 2010 are given in Figure 14.1. While most of the epidemics are showing a decrease in occurrence over the years in all the LSGIs, Malaria and Viral Hepatitis – A shows an increased occurrence in Kadalundi and

Ramanattukara, and Typhoid shows an increase in Kadalundi, Ramanattukara and Feroke.

14.2 Problems and Potentials


The health facilities in planning area serve the whole of North Kerala. The availability of highly skilled and experienced professionals and premium infrastructure and facilities in traditional and modern medicine make it a potential spot for health tourism. However, high densification, improper waste disposal and inadequate sanitation facilities in the planning area are leading to increased health problems. The government health services provision need large-scale improvements, both in quality and quantity. Lack of adequate infrastructure and medical facilities in public health centres is a matter of concern. The public health sub centers located in Olavanna Panchayat is troubled by insufficiency of doctors and absence of in-patient facilities and lack even infrastructure for drinking water. ESI hospital, Government Ayurvedic hospital at Pantheeramkavu, and the Homoeo hospital need infrastructure augmentation.

14.3 Inference

The study reveals that, while majority of the allopathic hospitals are in private sector, in homeopathic and Ayurveda systems, most of the initiatives are in government sector. Super specialty hospitals are available both in public and private sector. The data reveals that better infrastructure is provided by private and cooperative hospitals in allopathic system, when compared to the govt. sector. Therefore, the health infrastructure in the planning area in govt. sector, need to be improved with adequate infrastructure and quality facilities. All the health centres in the planning area need up-gradation. Hospital waste disposal need special attention in the planning area. The increased occurrence of some epidemics in the LSGIs of Ramanattukara, Feroke and Kadalundi shows the need for improved provision of health and sanitation infrastructure, facilities and services in these areas.



15



Recreational Facilities & Other Civic Amenities



* Recreational Facilities

* Other Civic Amenities

* Inference

15.1 Recreational Facilities

15.1.1 Parks and Open Spaces

Out of the 17 major parks in the planning area, 16 are inside Kozhikode Corporation, that too 12 of them inside the Old Corporation limits. The main parks in the planning area are

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Corporation Park 2. Lions park 3. Ansari Park 4. Mananchira square 5. Gandhi Park 6. Hazan Koya Mulla Park 7. Vagbadananthan Park 8. Sarovaram Bio Park 9. Garudan Park 10. S.K Pottekat Park ,Puthiyara 11. Kelappan Park, Nadakavu | <ol style="list-style-type: none"> 12. Gandhi Park ,
Thadampattuthazham 13. Elathurkad Children’s Park 14. Nehru Children’s Park,
Ramanattukara 15. Beypore Panchayat Park 16. Rahman Park, Cheruvannur
Nallalam 17. Children’s Park, Cheruvannur
Nallalam |
|---|--|

15.1.2 Playgrounds/Stadia

The planning area has a total of 8 play grounds and 9 stadiums. 7 of the stadiums are mini stadiums. The only indoor stadium in the planning area is located in Kozhikode Corporation. Kadalundi panchayat lacks playgrounds. The details of play grounds and stadia in various LSGIs of the Master plan area are given in Table 15.1.

Table 15-1:Playgrounds/stadia in planning area

LSGIs	Play grounds	Stadium
Kozhikode Corporation	3	5
Feroke	1	1
Kadalundi	1	1
Olavanna	2	1
Ramanattukara	1	1
Total	8	9



15.1.3 Other Recreational Facilities

There is one magic theme park, planetarium, two museums, about 121 clubs and 2 swimming pools in the corporation area. The two open air theatres in the planning area are housed in Mananchira Square and Sarovaram. Exhibitions, festivals, and other gatherings are conducted in the area. There are 20 cinema theatres in the planning area, of which 15 are in the Corporation.

15.2 Other Civic Amenities

15.2.1 Community Halls

There are 59 community halls in the planning area, including the Victoria Jubilee Town Hall, which was constructed in 1891 as a permanent memorial for the jubilee of the reign of the Queen Victoria, and has been an important stage for several popular agitations and ceremonies during the freedom movement and thereafter. Of the community halls, 51 are within the new corporation boundaries, four in Feroke and two each in Kadalundi and Olavanna. Ramanattukara Panchayat lacks community halls.



15.2.2 Reading Rooms/Libraries

There are about 70 reading rooms/library in the planning area. Of these, 56 are within the new Corporation boundaries.

15.2.3 Crematoria and Burial Grounds

There are about 21 Crematoria/burial grounds in the planning area. There are four public burial grounds inside the Corporation limits and the remaining eleven are attached to religious institutions and privately owned. While Feroke and Ramanattukara have two burial grounds each, Kadalundi and Olavanna have one burial ground each.

15.2.4 Banking Facilities

The planning area has a total of 117 banks, together in nationalised and co-operative sectors. Of these, ninety nine are in the Corporation. Among the other LSGIs, Feroke houses the highest number (seven) of banks. Table 15-2 gives the details of nationalised, Co-operative banks and other banks in the planning area.

Table 15-2: Banking Facilities

Sl. No	Name of Local body	No. of Nationalized Commercial Banks	No. of District Cooperative Banks	No. of Service Co-operative banks & credit societies	No. of Urban Cooperative bank	No of State Cooperative bank
1	Kadalundy	1	0	2	0	0
2	Ramanattukara	2	1	1	0	0
3	Feroke	3	1	2	1	0
4	Olavanna	1	0	3	0	0
5	Kozhikode Corporation	71	13	12	2	1
	Planning Area	78	15	20	3	1

15.2.5 Other Facilities

The details of other facilities like fire station, petrol pumps etc. in various LSGIs of the planning area are given in Table 15.3. It can be seen that Olavanna and Ramanattukara panchayats do not have police stations.

Table 15-3: Details of Other Facilities like Fire Station, Petrol Pump etc.

Facilities	Kozhikode Corporation	Feroke	Kadalundi	Olavanna	Ramanattukara	Total
Fire Station	3	0	1	0	0	4
LPG Godown	10	1	1	1	1	14
Petrol Pumps	17	2	1	3	2	25
Police Station	14	1	1	0	0	16

15.3 Inference

The required recreational open spaces prescribed as per UDPFI guidelines for large cities is 1.2 to 1.4 Ha/1000 persons, which converts to 12.63 Sq.km, considering 2001 population. The currently available parks and open spaces accounts to only 0.32 Sq.km, which leaves an unmet demand for 12.31 Sq.km of recreational open spaces currently. Proper infrastructure facilities and good access are to be given for all the parks

and other public facilities. The number and capacity of community halls also does not meet the standards, in the planning area. The study reveals that Olavanna and Ramanattukara panchayats do not have police stations, Ramanattukara Panchayat lacks community halls and Kadalundi panchayat lacks playgrounds.





16

* Housing Shortage
* Housing Characteristics



Housing



* Slums and Other Sub-Standard Housing
* On-going Projects

* Problems and Potentials
* Inference

Shelter is the basic human requirement that needs to be met on priority basis. Housing sector is employment intensive; 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.

16.1 Housing Shortage

The total number of households in the planning area is 171877. The total number of occupied houses is 170207. Therefore the net housing shortage in the development area is only 1670.

16.2 Housing Characteristics

Table 16.1 and figure 16.1 shows the typology of houses in the planning area. i.e. Out of 170207 houses 13526 are under the category of kutcha houses .i.e. 7.9% of the houses are not suitable for living. Kozhikode Corporation accounts for most of the kutcha houses.

Table 16-1: Typology of Houses in the Planning Area

LSG	Pucca	Moderate	Kutcha	Total
Kozhikode Corporation				
Old Kozhikode Corporation	45536	38972	9073	93580
Bey pore	7306	4617	70	11993
Cheruvannur-Nallalam	8169	5889	0	14058
Elathur	6751	1683	1016	9451
Feroke	4042	4979	917	9938
Kadalundi	4877	2358	833	8088
Olavanna	8256	6299	1598	15953
Ramanattukara	3998	3129	19	7146
Grand Total	88935 (52%)	67926 (40%)	13526 (8%)	170207

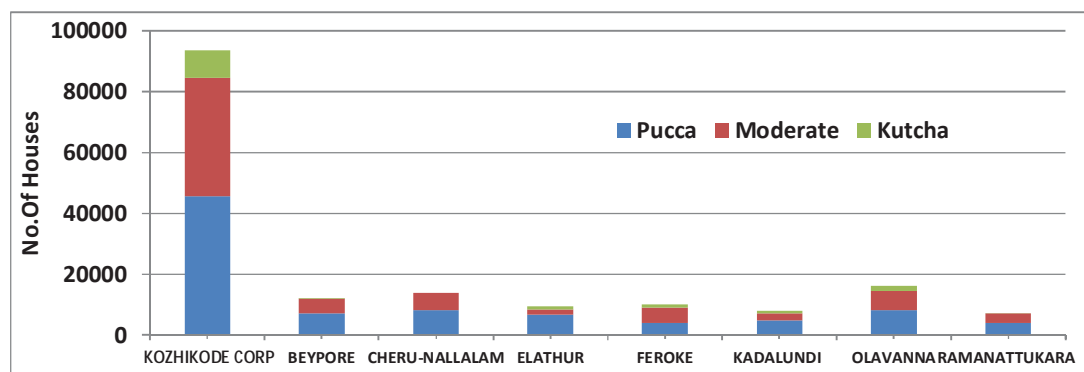


Figure 16-1: Distribution of Typology of Houses in the LSGs of Planning Area

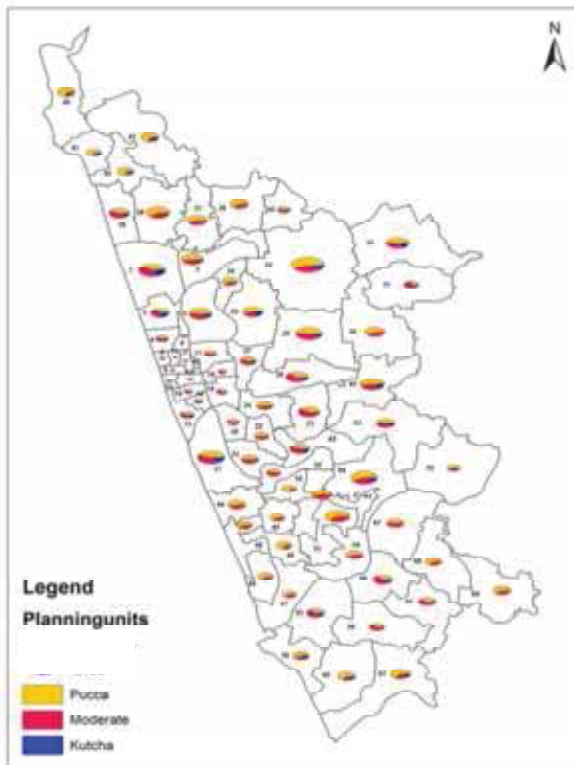


Figure 16-2: Ward wise distribution of typology of houses

The ward wise distribution of typology of houses in the planning area is given in Figure 16.2.

Socio-economic Survey reveals the nature of housing in the planning area, as discussed in the following paragraphs. A study of the ownership details of houses in the planning area revealed that rental houses contribute a share of 5.95% against 94.02% of owned houses.

From figure 16-3, it can be seen that around 7.4% of the residential plots in planning area are less than 3 cents, whereas, 23.5% of houses are in 4 to 5 cents of land, 44% of houses have around 6 to 10 cents of land and around 20% have 11 to 25 cents of land. It can also be seen that more than 4.5% of the houses

in planning area are in plots varying from 26 to 70 cents and a small portion, less than 0.5% have plots more than 70 cents.

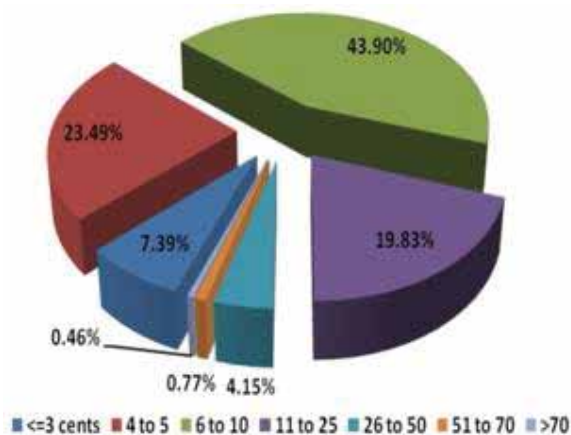


Figure 16-3: Plot Area Details of Houses

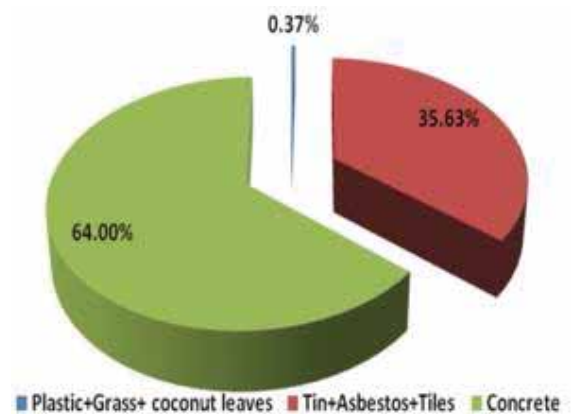


Figure 16-4: Different Types of Roof

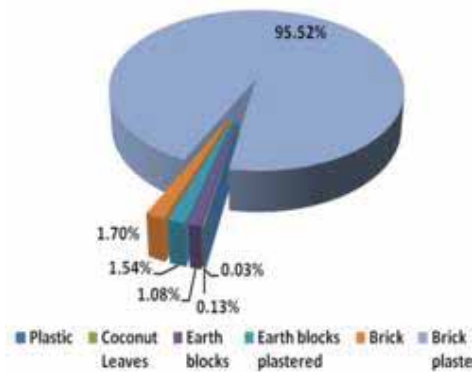


Figure 16-5: Different Types of Wall

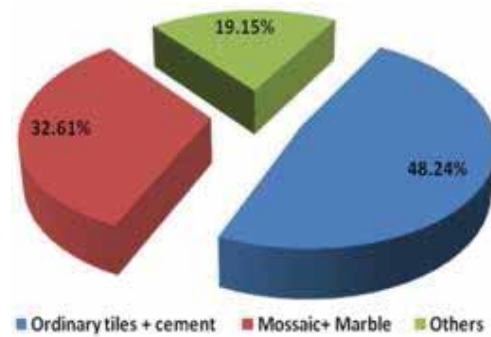


Figure 16-6: Different Types of Floor

The socio-economic survey also reveals that more than 95% of the houses in the planning area have brick plastered walls. Besides, 81% have good quality flooring. However, only 64% have concrete roofing, while around 36% have tiles/asbestos/tin roofing and 0.37% have plastic/grass/thatched roofing.

16.3 Slums and Other Sub-Standard Housing

The formation of slums and squatter settlements in major urban areas in the developing world is largely attributable to the lack of resources and capability in the public sector to adequately plan for, provide, and manage the housing, infrastructure, and services needed to match demand and stimulate economic growth. In urban areas where a high rate of population growth exerts extreme development pressures, these conditions result in the rapid expansion of slum and squatter areas. But even in Calicut, where the population has grown relatively slowly over the past few decades as a result of economic stagnation, slum areas have expanded and their environmental conditions have worsened because of limited government resources and capability.

Majority of slums in the planning area are located in the old corporation area. In other LSGs only very few clusters are noticed. In 1996, Kerala State Department of Town and Country Planning carried out a physical and socioeconomic survey and identified 79 “notified” slum settlements in Calicut City. The largest of these was Chakkumkadavu with a population of more than 5,000. In total, these slum settlements covered an area of about 386 Ha and had a population of more than 84,000 (about 19% of the population of Calicut City) The average household size is 7.46 persons; comprised more than 11,000 housing units with an average occupancy of 1.16 households per unit; and had an average gross residential density of 217 persons per ha. About half of all housing units in slum settlement were kutcha (in poor condition and not generally habitable); 38% in pucca or satisfactory condition; and 12% in good condition. Most structures were exclusively residential.

In 2001 the number of listed slums in the old corporation area was 79. According to a conservative estimate slums in Kozhikode accommodates around 12 percent of the city's population. As per 2001 census, about 65% of all poor families in the city lived in the slum settlements. About 41% of these were unemployed, 47% had some Part-time work, and only 12% had regular work. A high percentage of the slum communities are coastal settlements that heavily depend of fishing with its low seasonal incomes. Annex 12 gives the details of slums in the planning area.

Out of 79 Slums reported above, 10 slums were eliminated during the enlisting of slums as part of Rajiv Awas Yojana (RAY) as it does not match the definition of slums approved by Kudumbasree. Among the remaining 69 slums, 40 slums were selected for Community Infrastructure Fund (CIF) works under KSUDP, The details of which are given in Table 16.2.

Table 16-2: Details of slums selected for Community Infrastructure Fund(CIF) works

Sl.No	Name of Slum	Houses	Population	Area in Hectares	Density (pph)
1	Chakkumkadavu	336	2256	24	94
2	Chappayil	66	360	4.5	80
3	Chevarambalam	28	104	1.5	69
4	Chirakkuzhi padanna	60	260	2.2	118
5	Cherottuvayal	108	473	9.75	49
6	Guruveetithazham	32	151	5	30
7	Kalathilthazham	157	778	2.5	311
8	Kambrum	87	491	5	98
9	Kappakkal	192	1107	0.4	2768
10	Karurthazham	102	407	13.75	30
11	Kavilthazham	215	1037	5.25	198
12	Kommeri	133	623	0.6	1038
13	Koolithara	222	1193	30.5	39
14	Kothi	215	1439	1.5	959
15	Maloorkunnu	25	130	23.5	6
16	Manaripadam	443	2225	5.25	424
17	Maruthamoly	296	1746	1.7	1027
18	Meda paramba	94	511	0.36	1419
19	Meleripadam	38	186	5.25	35
20	Millath Colony	141	870	10	87
21	Mukhadar	178	1172	9.35	125
22	Nadhi Nagar	122	699	2	350
23	Pallikandy west	247	1340	1.4	957
24	Payyanakkal	152	768	1.3	591
25	Perumkuzhipadam	79	384	5	77
26	Puthiyakadappuram	173	849	0.25	3396

27	Puthiyakadavu	132	884	1	884
28	Puthiyara padanna	55	295	0.16	1844
29	Puthiyathoppu thoduka	18	97	1.75	55
30	Thadanilam	116	611	11.75	52
31	Thekkepadanna	218	1013	1.4	724
32	Thirumbunilam	190	822	9.6	86
33	Thirunilamparambu	58	323	6	54
34	Thiruthivayal	81	342	12.5	27
35	Thoppayil	517	3432	10	343
36	Thyottam Beach	88	379	4	95
37	Vattakundu	44	256	2.9	88
38	Veliyancheri	147	703	2.4	293
39	Vellayil North I	227	1047	21	50
40	West Hill	155	703	5.9	119

From the studies for Community Infrastructure Fund (CIF) works in 2009, the following were observed on the infrastructure facilities of these slums.

- Main approach road: Around 69 percent of the slums are accessible by good roads. For about 37 percent of the slums the main approach is mud roads, whereas 13 percent slums are reachable only through narrow lanes.
- Electricity connections: Ninety three percent of the slums report streetlights whereas only 88 percent slums report domestic connections. There is a possibility that in 1 out of the 14 slums reporting streetlights domestic connections would not have been secured.
- Water supply: Public water taps are reported to be available in about 93 percent of the slums settlements.
- Sewerage facility: Sewerage facility is reportedly not available only in 24% of the slums. The inhabitants resort to their own means to dispose their excreta, mostly by means of septic tanks and private toilets.
- Drainage facility: About 32 percent of slums do not report any drainage facility and the rest report open drains that cover a part of the population. Lack of proper drainage is a major health hazard in the slum area.
- Water logging: The survey data show that about 92 percent slums are prone to water logging. Distribution of slums reported as prone to water logging revealed that about 57 percent slums are prone to this threat only in the event of continuous rains where as 33 percent face the hazard in every rain. In 20 percent cases possibility of water logging was reported only on the occasion of high tides.
- Epidemics: 88 percent of the slums reported outbreaks of epidemics during the year prior to the date of enquiry. Further enquiry, on the nature of the epidemic, revealed that the incidence was on account of waterborne diseases in 33 percent cases and

airborne in 53 percent cases in 33 percent of the colony both air borne and water borne epidemics were reported.

Table 16-3: Average distance (0.0 km) of specified facilities serving the slums

Sl. No.	Facility	Average distance	Sl. No.	Facility	Average distance
1	Railway station	3.3	2	City Bus stop	0.5
3	Boat Jetty	6.5	4	Anganwadi	0
5	Play school	1.3	6	Primary school	0.6
7	Secondary school	1.8	8	HSS	2.1
9	College	3.2	10	PHC / PHSC	2.2
11	Govt. Hospital	3.6	12	Private Hospital	2.2
13	Medical shop	1	14	Post office	2.3
15	Public call office	0.1	16	Internet cafe	3.4
17	Fair price shop	0.3	18	Library/Study centre	1.1
19	Community hall	2.2	20	Credit coop society	1.3
21	Bank	1.1	22	Police station	2.1

- Average Distance to Facilities: Table 16.3 shows the average distance of specified facilities serving the slums. The distribution indicate that the facilities of Anganwadi, public call office, primary school, fair price shop and bus stop are available at an average distance of less than 1 km. The services of play school, secondary school, medical shop, bank, library, and credit co-operative society are available at an average distance of 1 – 2 km. It is of interest to note that Govt. Hospital is located at an average distance of about 3.6 km, whereas the services of a private hospital are available at a distance of 2.2 km.
- Household Size: A typical slum household consisted of 6.5 normal resident members. The average size of the female-headed household was 6.7 in comparison to the size of 7.8 in the male-headed households. For females, the head-of-household-ship comes when the male member either moves out for work or dies. The distribution reveals existence of differentials across social groups. OBC households reporting an average of 7.3 are much ahead of the average of 4.9 for the others' households. The higher average for OBC households is on account of the dominance of Muslim community in the OBC category.
- Type of house: In the slums the majority of the houses, to the extent of 61.15percent were semi pucca and another 31.5 percent pucca. Kutcha structures constituted about 7.6 percent.
- Source of drinking water: Treated water through pipes is the source reported by about 86 percent of the slum households; yet another 1.5 percent reported untreated piped supply. Only 9 percent of the households were seen to be depending on either bore well or well etc.

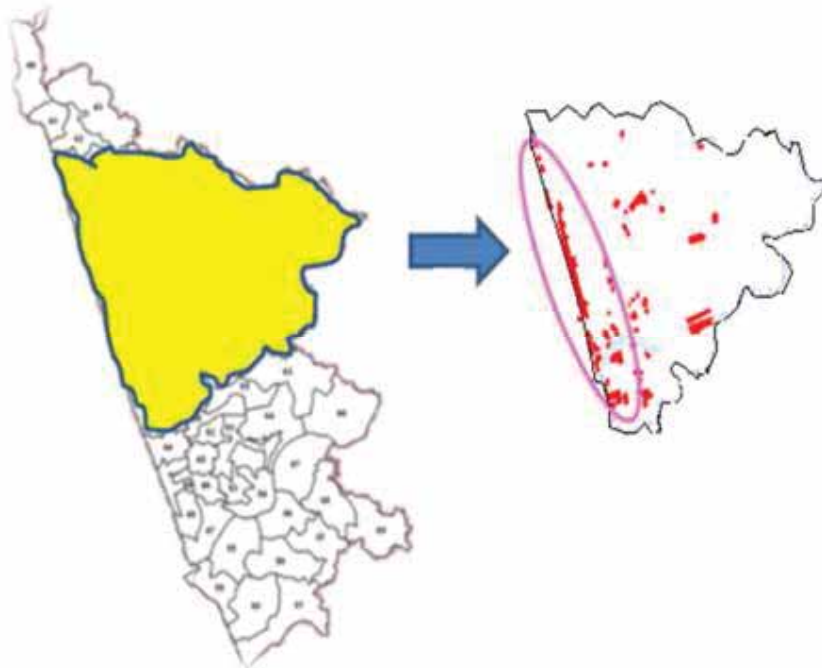


Figure 16-7: Spatial Distribution of slums

- Type of toilet: Flush toilet was not seen as common in the slum households. A good majority, to the extent of 84 percent, reported septic tank facility. About 6 percent households have either pit latrine or used some other facility.

- Drainage facility: About 20 percent slum households reported

availability of closed drain inside their house premises where about 80 percent had open drains.

- Religion: Around 53 percent households reported Islam as their religion, while 40 percent households recorded Hinduism. Only 1.7 percent households belonged to Christianity.
- Ownership of house / house site: At the aggregate level about 87 percent of the households report ownership of house site. Although differentials exist among social groups these are not very substantial. Of the 2980 households reporting owning house site only 6 percent reported having 'patta' for the land.

The spatial distribution of slums is presented in in Figure 16-7, from which it is clear that mainly the coastal area shows the concentration of slums.

There are areas characterised by sub-standard housing and poor infrastructure facilities in the other LSGIs in the planning area as well. Out of the 13 urban poor clusters, 4 clusters in Elathur Area - the Fishermen colony, Chavatt colony, Muthirakkatharammel colony and Arattumkunyu colony need immediate drainage improvement facilities. The Fishermen colony located near the fishing harbour needs infrastructure upgradation. The SC/ST colonies which were constructed under the Laksham veedu program are twin houses which are dilapidated and a few have been reconstructed as single house. Scarcity of drinking water and lack of drainage and sewerage facilities are the problems faced by these areas. The houses built under the one lakh housing scheme have become old and

deteriorated. The existing pit type latrines in almost all the houses need to be replaced by sanitary latrines.

There are 28 urban poor colonies in Beypore panchayat which need upgradation and improvement. Urban poor clusters in Cheruvannur- Nallalam area are Karimpadom, Udaya, Palattipadom, Kolatharammel, Laksham Veedu, Kannattikulam, Nathoonipadom, and New Colony. The total number of families is 350. All the 8 colonies need infrastructural upgradation. 90% of the houses need repair. About 30 houses need reconstruction and nearly 300 houses need financial assistance for maintenance.

16.4 On-going Projects

The LSGIs in the planning area have effectively utilised funds received in various schemes and projects of central and state governments and programmes like NSDP, Peoples Projects and KSUDP for improvement of slums and are continuously intervening to improve the living conditions in the slums.

KSUDP addressed improvement of 40 slums (Refer table 16.2) under Community Infrastructure Fund works. Need assessment was done in all the 40 slums and estimation of works were taken based on the needs of the residents. The strategy was to undertake all works proposed by the people living there provided land is available. As the main problem encountered in slums in Kozhikode was the absence of proper drainage, improvement of drainage was a main component in KSUDP slum improvement programmes. Besides footpaths, roads, drainage-cum-footpath were the components of CIF works of KSUDP. A minor bridge have been build up between Kavilthazham and Koolithara slums which brought huge change in the living condition of the people in these two slums. The CIF works brought considerable changes in the living condition of the people, which are evident in slums like Kavilthazham, Thirunillamparamba, Thirumumbunilam, Karoorthazham, Puthiyakadappuram, Puthiyarapadanna, Thekkepadanna, Thadanilam, Thoppayil, Puthiyathoppethoduka, Manaripadam etc. The Anganwadies constructed under KSUDP constructed with community centres at the top (1st Floor) are model ones. Besides, KSUDP Community Development Programme includes Skills Development Training, Entrepreneurship Development Programmes, establishing Micro Enterprises (Groups) and improvements to quality, cost, supply chains, or market access.

Shanthinagar Model Village, the 38 crore housing welfare project for more than 300 coastal families at West Hill beach in Kozhikode (the former Bangladesh Colony), being implemented by the Kerala State Housing Board, is a model for the whole state, a symbol of collective effort of the Government, elected representatives, bureaucrats and people who worked together to develop the best development model. Each family is being benefited with a house of 5.2 lakh in three cent plot. The project to tackle the backwardness of the locality by providing homes with basic amenities including drinking water, sewerage treatment plant, drainage channel, a primary health centre, community bio-gas plant for

disposal of generated waste, roads, footpaths, electricity anganwadis etc. The first phase of the project was recently completed and handed over to the families.

16.5 Problems and Potentials

The generally pleasant coastal environment and climate, coupled with the limited extent and low density of slum settlements in Calicut City, makes life in the city's slums generally less oppressive than in many other major cities in the country. Still, conditions are bad and deteriorating. Housing is substandard and potable water, electricity, and drainage and sanitation facilities are all in short supply. Some schemes for slum improvement failed to implement as most of the slum dwellers in the study area were land title owners and they didn't approve of giving up their land title for proposed better living in flats. Hence, only those slum improvement models where infrastructure improvements are implemented while the people in the slums retain their claims on land, will offer a practical solution for the problems faced by the slum dwellers in the study area.

16.6 Inference

Though many initiatives for slum area improvement are under progress, the studies reveal that there still exist a lot of infrastructural shortcomings. Strategies should be initiated to improve the quality of housing and drainage conditions. Vector control strategies need be strengthened to keep a check on the outbreak and spread of air borne and water borne diseases. Slum improvement models where the people in the slums retain their claims on land are found suitable for the planning area. However, construction of vertical houses (flat systems) shall be explored wherever possible, especially for multifamily households, so as to make available the land for other developmental works such as construction of Parks, Anganwadis, Community Centres etc., during slum improvement works.



17

*S*pecial Concern Areas



* Poverty

* SC/ST Population

* Other Social Groups

* Inference

17.1 Poverty

As per BPL survey 2009, there are about 51,528 Below Poverty Line (BPL) families in the planning area. This constitutes about 6.6% of the planning area population. The BPL population is more seen in Kappakal, Thoppayil, Vellayil, Varakkal, Puthiyangadi, Pokunnu, Kooror areas of Kozhikode Corporation. LSGI wise BPL population in the planning area is given in Figure 17.1.

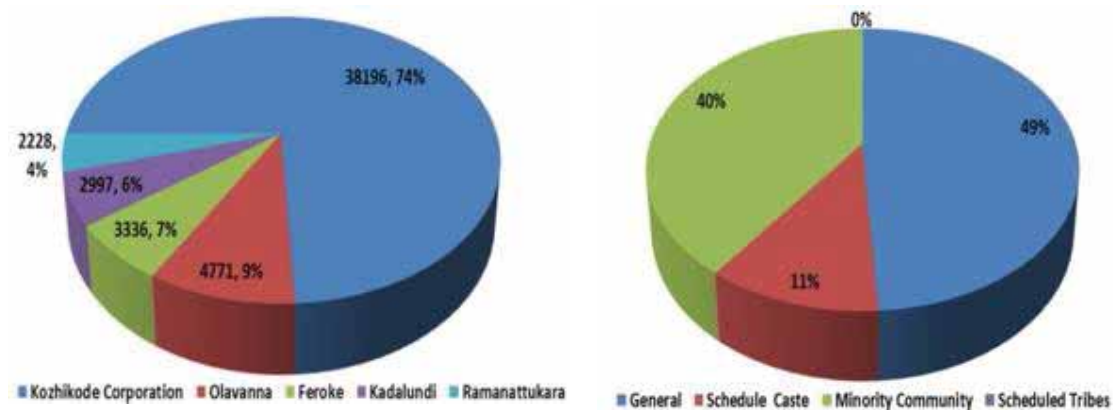


Figure 17-1: LSGI wise BPL population in the planning area

Figure 17-2: Community wise breakup of BPL population.

As depicted in figure 17.2, 11% of the BPL families are Scheduled Castes, 40% minority group and 49% general community. Scheduled tribes constitute only very small portion.

17.2 SC/ST Population

SC/ST population comes about 12.38% of the total population of planning area as per Census 2001. Concentration of SC/ST Population denoted by SC/ST index and its variation is given in Figure

Figure 17-3: SC/ST Index and variation of SC/ST Index

17.3. Figure shows that the concentration is more in Planning Units 39, 37 and 32.

The Kerala Institute for Research, Training and Development Studies of Scheduled Castes and Tribes (KIRTADS), a government organisation situated in Chevayur, works towards the development of the Scheduled Castes and Tribes by engaging in research and undertaking studies to identify problems faced by these marginalised sections of the society and by suggesting recommendations for their uplift. The institute was established in 1972 as Tribal Research and Training Centre and later converted to KIRTADS in 1979. The three separate departments – training wing, research wing and development studies wing – work towards conserving tribal history, assist students in research, conduct studies and come out with suggestions and recommendations to address the problems of these weaker sections.

17.3 Elderly

The analysis of age-sex structure reveals an ageing population in the planning area, which calls for an elderly-friendly infrastructure and society. The social and infrastructural needs of the elderly are barely addressed at present. It is suggested that social-interaction and day care facilities for the elderly may be provided in every neighbourhood, preferably with the anganwadis. Regular health check-ups and specialised medical attention shall be arranged for them. Initiatives for involving the interested senior citizens in various service initiatives by the local governments and institutions have to be formed. A geriatric speciality hospital of referral status is also a need of the hour.

17.4 Differently-abled and Specially-skilled

Another group which needs special reference is the differently-abled and specially-skilled. There is no due regard in the existing planning and design contexts favouring such a group. The neighbourhood and higher order parks having inclusive infrastructure for them, to improve the opportunities of this group for social interaction, skill development and normal living is absent in the planning area. The pedestrianized segments, cycle/two wheeler lanes, junctions and pedestrian crossings, public buildings, etc. should have friendly infrastructure for this group. The existing educational facilities for this group are in private sector, except efforts under Sarva Shiksha Abhiyan, and spatially not well distributed. There is no significant specialised health care infrastructure for them in the planning area, except the IMHANS-Child Development Services and certain recent efforts under NRHM. Hence, there is a need for education and health care institutions focusing this segment of the society, in the government sector as well, and the existing private sector initiatives may be given govt. aids. It is also suggested that day care centres for the differently-abled and specially-skilled children may also be established along with the anganwadis, with specialised personnel. Training and financial support also needs to be provided to the families of such persons, to ensure their welfare.

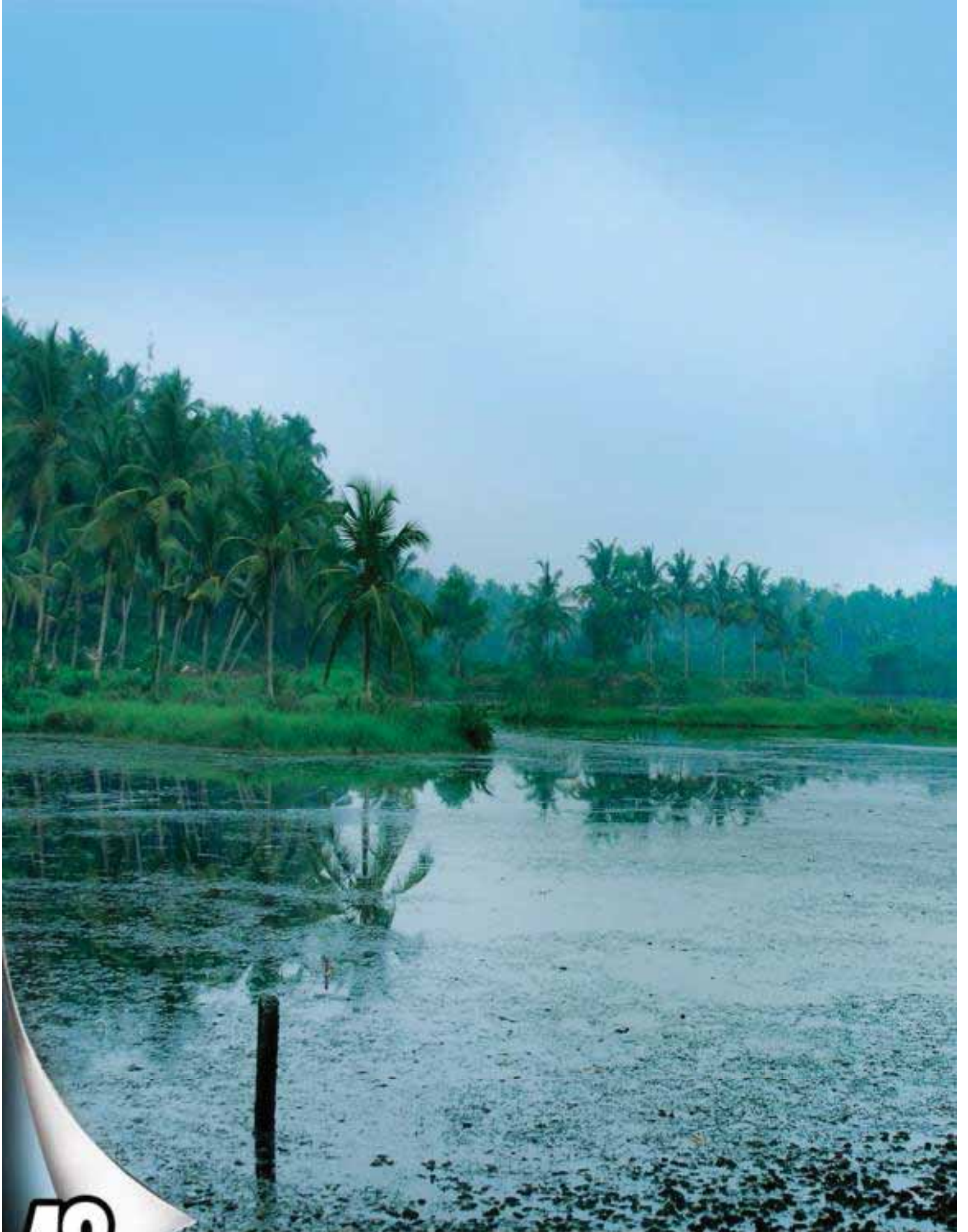
17.5 Others

The fishermen community is another section of the society which needs special attention. Though the sector contributes significantly to the economy of the planning area, most of the families of fishermen community are economically and socially backward and are devoid of a permanent source of income.

Though the planning area has a good sex ratio, the child sex ratio is decreasing, which points to the need of a girl child friendly atmosphere in the planning area. Also, with the increasing sex ratio, more women friendly employment opportunities need to be generated in the planning area. Women, especially those who belong to SC/ST, BPL or fishermen community, need to be empowered using skill and entrepreneurship development measures in women friendly fields like IT & electronics, hospitality, food processing, cosmetology, costume designing, mechanised laundry, etc. Women's safety is another area that shall be urgently improved.

17.6 Inference

BPL population is about 6.6% and SC/ST population constitute about 12% of the planning area population. The housing, education, health care and livelihood needs of the fishermen community and the BPL families are below the standards. The infrastructure & facilities in the planning area shall be customised to address the needs of the marginalised, like the elderly, women, specially-skilled, differently-abled etc. Regular health check-ups and specialised medical attention shall be arranged for the elderly section. Specialised health care, training and financial support needs to be provided for the differently-enabled, specially-skilled and their families, to ensure their welfare. Girl/Women friendly toilets need to be provided in schools, public institutions, commercial centres etc. Safety and security of women and girl children shall be ensured. The women in the area shall be empowered and made more employable, and more women friendly employment opportunities shall be created in the planning area.



18



Environment
& Heritage



* Sensitive /Fragile Areas
* Conservation Efforts

* Problems and Potentials
* Inference

18.1 Sensitive /Fragile Areas

Kozhikode, like other parts of the State, also hosts a wide range of flora and fauna. A comprehensive study on the flora of the Greater Calicut area (consisting of the western sectors of the present day Calicut and Malappuram districts, covering an area of about 600 km²) by S. Manilal(1975) records about one thousand species of flowering plants from the region, including several species recorded for the first time in India and importantly seven species new to science.

Kozhikode District has a coast line of 72 Km covering an area of 91 Sq.km. The planning area has a coastline of about 28 Km. The Coastal area is about 1.2 m above sea level, whereas the eastern part of the city is at about 15 m above sea level. Besides, the planning area has many rivers, rivulets and streams, the major rivers being Korappuzha, Chaliyar, Kallaippuzha and Kadalundippuzha, which support many indigenous aquatic and estuarine flora and fauna. Small hills dot the city terrain in eastern and central portions, which has specific significance in the drainage pattern and micro-climate of the planning area.

Kadalundi Panchayat in the Masterplan area is famous for its estuarine wetlands which house a wide variety of mangroves and their faunal associates. Kadalundi also has a renowned Bird Sanctuary which is abode for a variety of migratory birds and is declared is a bio-reserve. Above 135 species of birds are found in this sanctuary, many of which are endemic, endangered and threatened. Over 60 species of migratory birds, like seagulls,



terns, sandpipers, sand plovers, red and green shanks, turnstones etc flock here in large numbers from October to March. All of the Eleven recently discovered migratory birds in Kerala were found from Kadalundi. Panayamadu, Mannanmadu and Thattan chittimaadu are the bird watching centres in the panchayat. Kadalundi is also famous for a wide variety of fish, mussels and crabs. Korappuzha, bordering Elathur is also famous for the serene, unexplored backwater, mangroves and estuarine ecosystem.

Kottuli Wetlands, an urban wetland and the largest wetland in Kozhikode city, lying adjacent to the stretch of Canoli canal between Arayidathupalam and Eranhipalam, receives tidal influx from the Kallai and Korapuzha estuaries. This wetland is an ideal habitat for estuarine fish, prawns, crustaceans, mollusks, birds, the endangered Asian otter (*Lutrus lutrus*) and a wide variety of plants and mangroves. The original area of the wetland is 87.04 ha of which an area of 22.5 ha has been reclaimed. The wetland has an average depth of 1.0 m. Besides, it is a major receptacle of flood water from the city, a primary recharge source for wells in the vicinity, and a sink for pollutants. This wetland has been identified by the Ministry of Environment and Forests, Government of India, under National Wetland Conservation Programme. The Ministry, in 2004, had approved a programme for the conservation of the wetland under Management Action Plan for Kottuli Wetland. The portion of the wetland now relatively undamaged is mainly to the east of the Eranhipalam-Arayedathupalam stretch of Canoli Canal, and has been proposed for development of the Dream City, a tourist attraction. It comes under the Coastal Regulation Zone I of CRZ Notification. (Source: CWRDM)

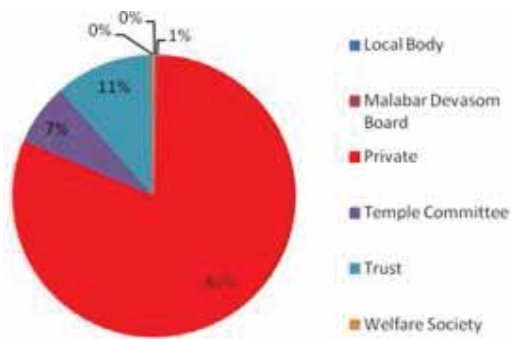


Figure 18-1: Ownership Details of Sacred Groves

Besides, the district and the urban area are rich in Sacred Groves, the indigenous Indian way of urban forestry and biodiversity conservation. The Sacred Groves within the Masterplan Area are 131 in number, 13 Ha in extent and reportedly house various endangered flora and fauna, including valuable medicinal plants. 85% of the Kavus are above 100 years of age. The ownership details of these sacred groves in the planning area is given in Figure 18.1. The ponds within the Masterplan Area are 153 in number, 21 Ha in extent. 43% of ponds in the master plan area are under private ownership.

The major portion of the forest area of Kozhikode district became part of Wayanad District, after the reorganisation of districts. Now there is a narrow belt of forest area on the eastern side of the District bordering Wayanad district. These forest areas are suitable for

growing Teak, Eucalyptus etc. However, the Masterplan area doesn't have any natural forests.

The district houses a wildlife sanctuary; the Malabar Wildlife Sanctuary located in Chakkittappara and Koorachundu revenue villages of Quilandy Taluk. Covering a total of 74.21 Sq.km, the sanctuary is a part of the Western Ghats, a biodiversity hotspot contiguous with the forests of Ladysmith Reserved Forests and Kurichiar Mala of Kalpeta Forest Range of South Wayanad Forest Division. Rich in bio-diversity, the sanctuary is an integral part of the Nilgiri Biosphere Reserve and forms an integral part of the Wayanad Elephant Reserve under Project Elephant. The sanctuary has 41 species of mammals, over 180 species of birds (out of these 12 are endemics, 6 range restricted and 5 globally threatened species), 38 types of amphibians of which 26 are Western Ghats endemics, 52 varieties of fishes including 21 Western Ghats endemics and one endangered species, 148 species of butterflies including 8 Western Ghats endemics, and 51 species of Dragon flies which include 11 species of Western endemics.

18.2 Conservation Efforts

Western Ghats Regional Centre of the Zoological Survey of India was established in April, 1980 at Kozhikode, under the Sixth Five Year Plan, and conducts research and awareness programs for not only Kozhikode but also the whole Western Ghats zone having a geographic area of nearly 1, 40, 000 Sq.km over a length of 1,600 km from Tapti river (Gujarat) in the north to Kanyakumari (Tamil Nadu) in the south. The Itty Achuthan Memorial Hortus Malabaricus Sasya Sarvaswam project, conceived by the State Forest and Wildlife Department and implemented in 2011, preserves all the herbs and plants that find a mention in the historic work Hortus Malabaricus (Garden of Malabar) by Hendrik Van Rheede, the Governor of erstwhile Dutch administration in Kochi during 1667-77. The Santhwana Vanam project in the campus of the Institute of Palliative Medicine, near Medical College, another small urban forest-cum-park, was established by the Kozhikode Forest Development Agency and the Kerala Forest and Wildlife Department in 2011. The Kadalundi – Vallikkunnu community mangroves reserve is the first community reserve of India, declared in 2007. Besides, there are many initiatives under various Govt. agencies and Non-Governmental Organisations to conserve mangroves & sacred groves, revitalise ponds, rivers and streams, and improve urban green cover etc.

18.3 Problems and Potentials

The fragile ecology along the coastline, estuaries, river and canal banks, water bodies, wetlands etc. is under constant threat of encroachment and pollution. The coastline is under threat of erosion and encroachment. The legendary Kallai River that symbolised the civilisation of Kozhikode, and the other rivers in the planning area are dying a slow death due to infestation of weeds, discharge of untreated effluent and wastes from septic tanks



into the river, dumping of hospital, slaughter and other solid waste, unprotected embankment, encroachment of the river banks for construction purposes, illegal constructions and sand mining etc. The depositing of solid wastes from construction sites had led to slow filling of the river. All these have seriously affected the bio diversity of the rivers and aquatic organisms especially fish species.

The Kottuli wetland and the adjoining Canoli canal is facing many environment problems which include reclamation for settlement and building complexes, surface run off which carry agricultural, domestic and other sources of pollution, heavy siltation due to soil erosion which reduces the depth of the water table. The ecology of the area is affected due to deforestation, over grazing, sediment input, eutrophication and pollution. A study by CWRDM (Harikumar P.S, Jisha T.S) revealed that there is enhanced concentration of trace metals in Kottuli wetland due to strong anthropogenic influences.

The efforts for comprehensive development of the community mangroves reserve has not fully materialised yet and the reserve is under threat due to indiscriminate sand mining and dumping of waste in the river.

About 30% of the ponds in the planning area are polluted and non attended. The Sacred Groves are under threat of conversion due to unprecedented pressure on land and high land values. The paddy fields are indiscriminately converted, and hillocks harshly levelled, hampering the topography, drainage pattern, food security and ecosystem of the planning area.

However, social forestry, water bodies' revitalisation and biodiversity conservation initiatives are in infant stages, providing hope.

18.4 Inference

The biodiversity of coastal areas, estuaries and mangroves are highly threatened with anthropogenic activities. The forest areas are no exception, though the magnitude of anthropogenic threats is less. Environment and biodiversity conservation initiatives have to be promoted with proper policy formulation, awareness creation and financial support. To prevent severe heavy toxic metal pollution of the Kottuli wetland area, it becomes imperative to implement timely monitoring and remediation strategies to alleviate the loadings and cumulative concentrations of trace metals in the area.

18.5 Heritage

Masterplan area is blessed with Built as well as Natural heritage areas and structures. It is essential that rich heritage of the area has to be identified and conserved. Adequate weightage has to be given for regulations for ensuring and promoting conservation or preservation of buildings, structures, areas, and precincts of historic, aesthetic, architectural and cultural significance, natural and other manmade features of environmental significance or ecological significance, scenic beauty, etc.. Major heritage areas / Structures in Plan area are listed below.

- Tali Temple
- Kozhikode Beach
- Manachira Square
- Beypore Port
- SM Street
- CSI Church
- Muchundipalli
- V K Krishna Menon Museum
- Mithqual Palli
- Sevamandiram
- Fort of Tippu Sulthan
- Sree Siva Temple Bilathikulam
- Sree Azhakoti Bhagavathi Temple
- Sree Siva Temple Thiruvannur

- Sree Durga Bhagavathi Temple , Puthur
- Sree Durga Bhagavathi Temple, Varakkal
- Roman Catholic Church, and
- Mother of God Church

Details of major heritage structures/areas are given below.

Tali Mahadeva Temple:

The Tali Mahadeva Temple was one of the two Brahmanical Royal Temples patronized by Samuthiri and is the most revered temple dedicated to Lord Shiva in the district. The two storied sanctum sanctorum which is in the shape of a chariot is adorned with decorative rural paintings on the walls and sculptures in granite.

The temple is believed to be built in the 14th Century by Samuthiri within his palace complex. It is surrounded by smaller temples, temple tank, Brahmana Madam Hall and the residences of brahmins. The area has a special character distinct from other parts of the town due to the sanctity of the place and the life style of the people. The urban development is encroaching upon this which is to be curtailed so that the area retains its original character.

Kuttichira:

Kuttichira located to the south west side of the city is a traditional Muslim settlement. With the chira at the centre and Mishkal Mosque and Jumuath Mosque and Muchundi Mosque on either ends, the Kuttichira school on one side, the area shows signs of very strict zoning followed in the ancient days with clear demarcation between public, residential and commercial areas. The inhabitants here are mostly Muslims. The residential area is characterized by very large houses accommodating many families. A unique marriage and joint family system is followed here women continue to live in their ancestral home after marriage and their husbands moves in. For every marriage in the family new a room called *Arā* is added to the house. Many of these big houses are now-ruined due to lack of proper maintenance. The Big bazaar or Valiyangadi is the commercial centre of the area, now in a ruined state.

Bilathikulam Shiva Temple:

This is a temple built in traditional Kerala style at Bilathikulam 3 km from the heart of the city. There is a small Ayyappa temple within the compound and a large pond in front. The place is a calm and quiet area.

Thiruvannur Shiva Temple:

This centuries old Shiva temple is believed to be converted from a Jain temple in the 11th century before the arrival of Zamorins. It has as an apsidal garbhagriha decorated with

typical Chola Pillars and Pilasters, Panjaras and vyalikukhas. The central shrine is relatively well preserved since 1044 AD. There are two ponds and two smaller shrines near this temple. The area is characterized by low density residential development.

Varakkal Temple:

This is considered to be the last Devi temple built by Sree Parasurama, the legendary founder of Kerala. It is situated on a hill top at West Hill, nearly 5km from the city. Vavu Bali is the important festival conducted here. Thamarakkulam is the pond attached to this temple.

SM Street

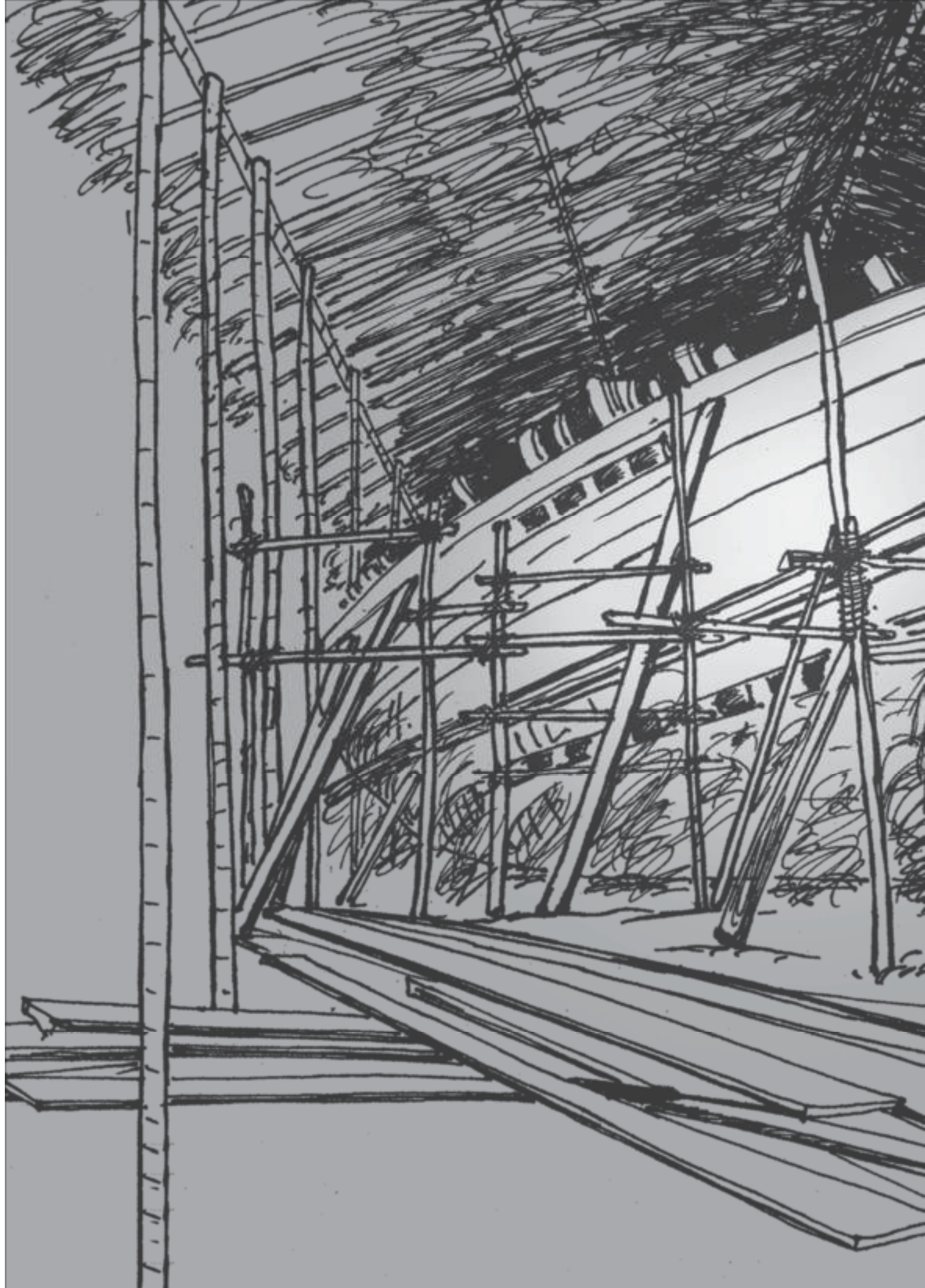
Sweet Meat Street or *Mithai Theruvu* is the busiest street in Kozhikode and derives its name from the times when the street was lined with sweet meat (halwa) stalls. Today the street bustles with shops that sell anything and everything including the famed sweets and banana chips. The conservation of SM street as a heritage is a long cherished dream of the city, the efforts for which did not materialize due to non-consensus among the various stakeholders. It is the centuries old commercial hub of Kozhikode and the retail hub of common man.

Fort of Tippu Sulthan

The planning area houses a fort built by Tippu Sulthan, in Feroke Panchayath. The 225-year old Fort was constructed in 1788, with a long tunnel to the river, when Tippu Sultan transferred the capital of his kingdom in Malabar to Feroke, which he called 'Farookhabad'. The fort, at Paramukku, in a dilapidated state, is a partially built laterite fort with a small building for storing magazine and was declared an archaeological monument in 1991 under the Protected Monuments Sites and Remains Act 1968. A 12 meter diameter well, with two mini-wells inside, is also part of the fort. The monument was under the possession of the British, Basel Mission, Comtrust (Commonwealth Trust) and afterwards, a few private individuals.

18.6 Problems and Potentials

Haphazard urbanisation and high density development near and inside the heritage area/structures are the major problem faced by them. No strict regulations are there to protect most of the above listed heritage area/structures since the Art and Heritage Commission listed only few of them as heritage area/structure. The urban development is encroaching upon all the heritage areas/structures and that changes their original character.





**PART II:
INTEGRATED
DEVELOPMENT
VISION**



19

* Regional Setting
* Population

* Employment
* Land Use

Summary of Findings



* Economy

* Physical Infrastructure

* Social Welfare & Empowerment

* Heritage & Environment

19.1 Regional Setting

District Urbanisation study reveals that Kozhikode Corporation is expected to continue to serve as the sole 1st order settlement in the district, and the most important urban centre of North Kerala, which can function as a regional capital of north Kerala, in the Masterplan period. This points to the importance of scientific allocation of the already scarce land resources in the planning area, so as to cater to the higher order needs of the whole district, while not compromising with the quality of life offered to its residents.

19.2 Population

Demographic studies reveal that the share of northern districts of Kerala in the state's population is increasing and Kozhikode District is the second most populous among them. The district also has higher-than-average population growth rate, and the urban content of the district has increased by 29%, compared to the 22% increase in the State, during 2001-2011. Kozhikode Corporation, which was already on its track to population stabilisation for a few previous decades, registered a negative growth in 2011. On the other side, the contiguous local governments of the Corporation are witnessing an aggressive urbanisation in the last few decades, with growth rates of some of them even more than six times that of the corporation, in 2001.

The negative population growth in Kozhikode Corporation, a gross density of 5179 persons/Sq.km and the soaring population densities in the fringe areas, when read along with the findings made by the State Urbanisation Report that the urban centres of Kerala tend to spread out at a density of 6000-7500 persons/Sq.km, points towards an impending decay of the urban core. The negative growth of population in Kozhikode Corporation is also to be taken seriously, when the attractiveness of the city as a job provider is considered. The corporations of Kochi and Thiruvananthapuram, exhibiting a positive growth in 2011, apparently are more attractive from the point of view of employment opportunities offered by them. However, the population accretion in the fringe areas of Kozhikode Corporation hints that the corporation is still attractive in terms of the services and employment opportunities it offers. The exorbitant land values, the stringent development controls and the crowding and congestion of the city may act as the repelling factors for growth of population in the city core while the reasonably good connectivity to the city, better environment and availability of basic amenities enjoyed by the suburbs act as a motivation for the fringe area densification.

19.3 Employment

Workers in the Masterplan area constitute more than a quarter of the total workers in Kozhikode District and about three quarters of that of the Urban area of Kozhikode in 2001. More than half of the workers in Masterplan area belong to the Kozhikode

Corporation. This lays down the importance of Kozhikode Corporation as well as the planning area, as a job-provider in the region.

The number of workers in the planning area and Work Participation Ratio has been increasing temporally, indicating the increasing opportunities and workforce potential. However, WPR in the planning area, 29.43%, doesn't match the expected urban area WPR of 33% as per UDPFI Guidelines. Though a city of second tier importance after Kochi, Kozhikode has the least WPR among the municipal corporations of the state. This shows that, though the Corporation is an important job provider in the region, it doesn't fare well when compared to its counterparts in the state, and there exists a necessity of creating more job opportunities in the planning area, not only to ensure a sustainable economy and function as a growth engine for the region but also to ascertain its position and contribution in the state's economic setting.

While the urban WPR grew by 4 points, the rural WPR registers a net decline of 0.35 points, in Kozhikode district, between 1971 -2001. This points out that the reduction in number of jobs in rural areas due to decline in agricultural sector has not yet been met by the industrial or service sector opportunities generated afterwards, when talked in terms of their proportion to the corresponding population. The work culture in the planning area, in tune with the state, favours 'white-collar' jobs, and the planning area does not offer sufficient opportunities for the highly skilled, which in turn is resulting in educated unemployment among the residents and recently, heavy in migration from outside the state to avail the unskilled/semi-skilled job opportunities.

The main-marginal composition of workers in 2001 indicates that the planning area as well as the corporation provides its workers with work for most of the year, when compared to other urban and rural areas of the district. However, the share of the corporation in total marginal workers is increasing and that of the main workers as well as total workers is decreasing temporally, when compared to that of the other LSGIs in the planning area.

Among the LSGIs in the planning area, Kadalundi, Feroke and CheruvannurNallalam has work force participation even lower than the district rural average, lowest female and male WPR, and lowest share of main workers. These strongly suggest the necessity of increasing the employability of people in this region as well as creating more industrial and service sector opportunities here. Female WPR is very low and is showing decreasing trend, in all constituent LSGIs other than corporation. Beypore and Olavanna, which fares fairly well in WPR and Male WPR, show poor Female WPRs. This suggests that women centred skill development centres, work centres and job opportunities need to be planned for the study area, especially in Beypore, Kadalundi, Feroke, CheruvannurNallalam and Olavanna.

The decrease in cultivator and agricultural worker categories is very high in the district. The decrease in agricultural labourers is on a higher side, compared to other categories of workers, in the planning area as well. These point towards the impending loss

of rich agricultural hinterlands due to urbanisation and life style changes, and urges urgent development control measures to protect and prevent the irrecoverable loss of the fertile hinterlands and policy measures to provide a boost to the agricultural sector.

19.4 Land Use

The major existing land use in the planning area is residential (68%) and the second major is water body (6.5%). 82% of the planning area has land uses of urban nature. Commercial land uses are concentrated in the city core – Valiyangadi-Palayam-Mavoor road areas, and industrial uses are concentrated in Cheruvannur – Nallalam and West Hill areas. Public and Semi-public uses are distributed all over the planning area.

Analysis of existing land use reveals that the planning area has only half the required share of commercial and one fifth of the industrial land uses, the most productive land uses, when compared to the UDPFI standards. The residential land use share in planning area is far beyond, and almost double of the required share. All the other urban land uses do not make up even half of the requirement, the Parks and Open spaces falling short gravely, to insignificant numbers. This indicates the necessity of scientific interventions in land use planning and stringent implementation of development controls, to achieve a balanced spatial distribution of various uses and check haphazard development.

Spreading of residential use consumes a lot of productive urban and agricultural lands, leaving no space for development projects and green areas. Hence, compact residential development should be promoted in the planning area. The abundant water resources and the beach front projects the water based recreation and tourism potential of the planning area.

19.5 Economy

19.5.1 Industry

The study of people's aspirations reveals that the fragile environment and social fabric of the planning area does not favour large scale, land intensive and polluting industries. There is no large scale industry presently working in the planning area. There are five Industrial Cooperative Societies and around 4710 medium scale industries working in the planning area. Majority of the medium scale industries are textile based (12%), followed by electrical and electronics based (11%) and food based (10%). Besides, there are 776 small scale industries in the planning area, majority of which are engineering based (36%) followed by forest based (18%) and agro based (14%) industries. Engineering and agro based industries are distributed in almost all the planning units, while the forest based industries are concentrated in Kallai area.

The economic base of the city is expected to shift towards new age industries as Kozhikode is the next IT destination in Kerala. There are no major IT parks between Kochi and Mangalore. Also the proximity of institutions of technical excellence such as NIT, IIM etc. will boost the development of new age industries in Kozhikode. The major proposals in this sector are Uralungal Cyber Park, Government Cyber Park, Kozhikode and Advanced Technology Park, Ramanattukara.

The major hurdle faced by the industrial sector is the unavailability of earmarked lands and infrastructure for industrial purposes at reasonable rates, and absence of standardisation and marketing infrastructure. Moreover, the clearances from various agencies required for industrial developments make the initial stage itself a strenuous process, pointing towards the necessity of a speedy clearance framework. However, the city has a good tradition of industrial entrepreneurship, availability of skilled workforce and investors, presence of premier technical institutes and good regional linkages through air, water and land, to favour industrial growth in the planning area. The expansion of Beypore port is expected not only to provide a boost to the export-import activities necessary for the industrial sector, but also to promote a variety of ancillary industrial units for the shipping industry.

19.5.2 Trade and Commerce

Kozhikode traditionally has been the most important commercial hub in North Kerala. However, the vibrant trade and commerce sector in the planning area is choked by congestion, dilapidated structures, deficiency of parking, loading and unloading spaces and lack of pedestrian friendliness. The informal markets, while attractive especially for the lower income groups and providing livelihood for many, affect the pedestrians and automobile traffic by their encroachments of roads and parking spaces. The commerce and trade sector thus needs interventions in terms of organised development and infrastructure provisions. Providing organized spaces for informal markets in various locations within the city is also necessary to ensure pleasant, walkable commercial areas. The multiple ownership pattern and tenancy issues are major hurdles faced by the authorities, while implementing development projects in commercial areas. The organic ribbon growth of commercial areas is leading to inefficient use of the prime urban lands and wastage of funds for utility creation, which needs to be checked. Compact, high density commercial development is to be promoted to achieve better efficiencies.

The planning area has its brand of products such as Kozhikodan Halva, Banana Chips, specialised Feroke roofing, ornamental and flooring tiles, Kallai furniture etc which have markets even outside the state. Geographic Indications can be developed for these products, along with strict quality control and standardization infrastructure and intensive market promotion activities, to increase the economic returns to the producers as well as to the overall economy of the planning area.

The development of Beypore port will surely provide a positive thrust to the export-import activities in the planning area, providing a better market for the indigenous products and ease in import of raw materials and resources.

19.5.3 Tourism

The planning area, with its long coast line, abundant inland waters, the world renowned ship building yard, celebrated Malabari cuisine, rich tradition of the folk/classical art forms of the district, religious and historic built heritage, wetlands, Kadalundi bird sanctuary and bird watching centres and premier institutes in science and technology, has high intrinsic potential for tourism development besides being the most important transit hub for national and international tourists to Wayanad, the evergreen paradise. However, this potential is grossly underutilised and the planning area lacks sufficient tourism infrastructure, tourism circuits as well as organised tour operations. In fact, many of the tourism hotspots are poorly linked to the transit hubs and losing its charm and quality due to encroachments, pollution, poor maintenance and lack of conservation efforts.

Tourism circuits on various themes like ecology and environment, beach and water front, education, business, religion, culture, sports etc has to be identified for the planning area with supreme quality linkages and supporting infrastructure. Home stays can be promoted in the fringe areas which would also benefit the local economy to a great extent and women in the area can be trained in hospitality and running of home stays. The planning area has got a very good network of back waters, canals and rivers, which could be developed for boating and water sports with due consideration to the environmental impacts. Projects for conservation of heritage, including those under private ownership shall be encouraged. Infrastructure for performances of folk/classical art forms and literature debates as well as business, science and technological conventions has to be enhanced. Rigorous marketing activities also have to be taken up along with the infrastructural development to tap the tourism potential in an optimal way.

19.5.4 Agriculture and Animal Husbandry

The crop specialization in the planning area as per the District Urbanization report is Coconut in Kozhikode Corporation, Paddy in Ramanattukara, Coconut and Paddy in Olavanna, Mixed Crop and Paddy in Feroke, and Mixed Crop in Kadalundi. Planning area houses many important offices and infrastructure of the Agriculture Sector like the Principal Agricultural Office, Assistant Directors of Agriculture, Krishibhavans, Farmers Training Institute, State Agmark Grading Laboratory, Urban Wholesale Vegetable Market and Farm Information Bureau.

The average size of residential plots of all the planning units in the planning area is less than 50 cents, indicating the absence of scope for homestead farming as a major economic activity in the planning area. Besides, the agricultural sector is struggling due to

lack of labourers, lack of interest, tempting land values and conversion of agricultural lands, drainage interruptions, crop diseases etc. Besides the lack of coordinated movements like group farming and absence of ensured returns or insurance for agricultural activities weakens the sector. Hence, it is ideal to endorse agricultural practices in an urban context in the planning area like terrace agriculture, vegetable gardens in schools and government lands, kitchen gardens, homestead cultivation of vegetables, tubers, yams, plantain and coconut etc, in view of promoting self-sufficiency of the households. This, along with promotion of production of manure for these crops from pipe composting of household food wastes, would also affect the reduction of municipal solid waste. Organic farming shall be promoted in the planning area, especially in environmentally sensitive areas like Kadalundi, in view of the benefits it offers for health, environment as well as the value addition and high returns for the farmers. Floriculture is another field where the planning area can focus on, as the demand for floral decoration is constantly increasing in the urban and service sector context. Agro based industries like oil and flour mills, bakeries and confectionaries and value addition initiatives need to be promoted in the planning area to ensure better market for the local agricultural products. Besides, value addition, processing, marketing, storage, export, training and skill development facilities in the planning area should be strengthened to cater to the vast hinterland of North Kerala. Most of the planning area falls in Over Exploited / Critical Categories of ground water exploitation which necessitates the implementation of a proper ground water management strategy.

For the lack of sufficient plot size, animal husbandry also cannot be promoted as an economic activity in the planning area. However, it is important to establish and strengthen the necessary infrastructure like modern abattoirs, milk collection and processing centres and dairy outlets, veterinary hospitals etc in the planning area, to ensure safe and healthy consumption of dairy and poultry products. Besides, in such pockets of the planning area where the plot size is comparatively larger to support agriculture and animal husbandry cost-effectively, such activities can be promoted. Group initiatives in poultry and cattle farming shall also be promoted.

19.5.5 Fisheries

Kozhikode district has 12% of the state's coastline. Fisheries sector is a major employment provider and contributor to the local economy. Two fishing harbors, namely Bepore which is a natural harbor and Puthiyappa, a man made port, are the focal points of fisheries sector in the planning area. However, the number of labourers working in the sector is decreasing day by day in the planning area. The recently approved up gradation of Vellayil Fish Landing Centre to a fishing harbor with modern facilities and the development of Bepore Port add to the possibilities of fisheries sector in the planning area. Modern and sophisticated techniques should be introduced in this field for attracting people to this sector and increasing production. Also proper infrastructure facilities should be provided for

the fish markets in the planning area. Fresh water aquaculture used to contribute significantly to the economy of local governments like Olavanna in the past, which has come to a halt. With its abundant inland water resources, the planning area still has good scope for aquaculture, which needs to be potentially utilized with modern techniques like cage culture, export quality shrimp/prawn/ornamental fish hatcheries etc.. The planning area is famous for Mussel and Oyster farming using traditional techniques as well as indigenous dishes made of them, which can be enhanced with modern techniques for better produce and economic returns.

19.6 Physical Infrastructure

19.6.1 Traffic and Transportation

The Spine and spur road network of Kozhikode study area is evolving into a strong grid iron network with the introduction of coastal road an NH66 By-pass. There are four main roads in N-S and three main roads in E-W direction. However, many road stretches within the study area were over-utilized to the extent of more than two times to their carrying capacity, resulting in congestion, accidents and reduced travel speed. Only those roads leading to peripheral areas afforded better speed in the study area. Palayam, Oyittyroad, Basheer road, Stadium-Coronation area, Railway Station Link road, Arayidathupalam and Medical College area have the major concentrations of parking in the city.

Analysis of the total vehicle movement in the study area reveals that a minimum of 14 lanes in N-S direction and 8 lanes in E-W direction are required for efficient movement of traffic, which indicated an additional requirement of 4 lanes in N-S direction at present. Assuming a 4% increase in vehicle population, the projected requirement of roads is 25 lanes in N-S direction and 14 lanes in E-W direction.

Out of the rail passengers alighting or boarding within the planning area, more than two-thirds commuted for work or education purpose. Of the intercity road trips as well, a quarter were work trips, which indicates a huge floating population to be served by the planning area on daily basis and the necessity of reducing work – home distances. Only 1% of the rail passengers had a lead distance of 20 km or less, which also indicates the need and scope for high speed rail network connecting the planning area.

Among the road based passenger transport vehicles, public transport buses run by the state as well as private service providers, carried about 70% of the total travel demand by road, against the 16.4% by cars and jeeps and 10% by two wheelers, in a day. However, the preference for personal transportation is increasing in similar lines with the State where the aggregate motor vehicles already exceeded the number of households. The reasons for this are incompetence of public transport, lack of a mass rapid transport systems and life style

changes. The causes of a major share of road accidents are identified as competition, speeding and road rage of private buses. All these points to the urgent need for the earliest introduction of quality public transport, dedicated public transport lanes and corridors as well as road based mass rapid transit options in the planning area. This combined with measures like car-pooling and disincentives for personal transport vehicles would decongest the roads and provide increased safety for the passengers and pedestrians. Besides, the local governments may directly involve in provision and management of good quality mass transit measures in their jurisdiction, to ensure better quality in delivery of services and increase in revenue returns.

In Goods traffic, 38% of goods vehicular trips were through-traffic, indicating the requirement for such traffic to bypass the city core. All districts south of Kozhikode (Via NH17) produced/attracted nearly 18% of the total trips. Other major goods vehicular trip production zones was found to be Northern states, then the eastern portions of the district like Kunnamangalam, Thamarassery etc. Via NH 766, then the Northern districts of Kozhikode and then the CBD with markets under influence of Wayanad road, Kannur road and arterial Kallai road. The analysis of commodities carried by goods vehicles indicated that construction materials was the largest share (37%) followed by food grains to a tune of 12.5% of the total commodities carried. With the development of Beypore Port, the cargo handling in the planning area is expected to increase many folds. This point to the necessity of terminals for trucks and other goods carriers in all directions, with facilities for storage and consolidation of goods, maintenance for road or rail cargo carriers and customs clearance services, in the outer city area and the city core. Besides, goods traffic timings in the whole of planning area need to be suitably adjusted to reduce peak time congestion.

Waterways, though a transportation mode with excellent potential, is least explored in the planning area. An inland waterway network which runs for the entire length of the planning area can be constructed by developing EK and BK canals, which would not only provide excellent connectivity for the areas having the worst connectivity at present, but also function as an emergency evacuation/ambulance route. Besides, coastal shipping through Beypore port also has good potential and shall be explored.

19.6.2 Water Supply

The municipal water supply in the planning area doesn't meet even half of the demand at present. Shortage of drinking water is commonly felt in the coastal areas, where ground water cannot be put to use due to salinity intrusion. There is a total physical loss of 35.5% in supply, of which around 75% is due to the leakages in deteriorated service connections and pipes. The system also lacks efficient cost recovery approaches as well as effective complaint redressing system.

Refurbishing of existing water supply scheme is of utmost priority, a major part of which is covered under JICA assisted mega water supply project in progress. The JICA project is expected to meet the water supply requirements of majority of the planning area till 2021. The identification and conservation of existing water sources like ponds and implementation of independent small scale water supply schemes is equally important. Proper monitoring should be done to ensure the quality of water. Rain water harvesting is a high potential opportunity, but often neglected and underutilised in the planning area, the regulations for which need to be strictly enforced. GIS Mapping of Water Supply utility and GIS based utility management and online complaint redressal systems need to be developed to efficiently deliver the services.

19.6.3 Drainage

Only about 50% of the existing roads in the city have side drains. Of this only 30% are covered drains, which cause fatal accidents to pedestrians in all seasons, especially in monsoons. Conversion of low lying lands, which has been functioning as temporary storages, has resulted in reduction of storage area and obstruction to storm water drainage, subsequently inundating the surrounding areas in monsoons. Levelling of hillocks and conversion of natural drainage channels has disrupted the natural drainage pattern of the planning area. The rivers in the study area are prone to banks erosion and silting and other solid wastes accumulation, reducing their carrying capacity. Inadequate maintenance of the drains and unscientific lying of other utilities overlapping the drains have made certain areas of the system non-functional. Besides many of the isolated flood prone areas are not integrated with the existing drainage system.

The implementation KSUDP drainage master plan, in progress, covers old corporation area of Kozhikode and gives layout and detailed design of drains in old Kozhikode corporation area. Hence this plan can be directly incorporated to the Masterplan for Kozhikode urban area for old corporation limits. Mitigation measures for the remaining area need to be addressed as further phases of this project and a comprehensive system for the planning area need to be developed. Creation of a comprehensive database, GIS based utility management and online complaint redressal systems are also essential for good quality service delivery.

19.6.4 Waste Water

There is no established common sewerage system for the whole or part of the planning area; however a KSUDP project for the same is initiated. The house hold system treats the latrine sewage using septic tanks and the grey water is let into the open drain or homestead. The hospitals and other institutions have their own independent systems, but presumably, partly treated effluents are let into the nearest drains or water bodies, as reported by the media and social groups as well as the affected parties. Same is the case

with the recently sprouting high rise residential buildings in the planning area. Studies conducted by CWRDM regarding the ground water quality have revealed that ground water in various locations in the planning area are contaminated with Coli forms and Faecal Streptococcus and that contamination was higher in the vicinity of sanitation structures.

In the ongoing project under KSUDP, sanitation improvements in non-serviced areas are proposed through developing sewerage system for the city central areas including rehabilitation of existing schemes, installation of sewage treatment plants, onsite sanitation systems and de-sludging of existing septic tanks. In the context of the JICA water supply project which, on materialisation, would also result in considerable increase in the sewage quantities, recycle and reuse of the treated water for secondary uses like gardening/irrigation and for reuse in flushing cisterns shall be promoted. In many recent building projects, dual pipelines are being laid and the treated water is reused, which need to be made mandatory for all upcoming large scale constructions. The good quality effluents from the proposed STPs can also be used to replenish the water bodies where water sports are proposed, sold for construction purposes etc. A reclaimed-water supply system with pumping main and reservoirs can be constructed for distributing this water for the secondary purposes, for the water scarce areas in the planning area. Medical College area is a priority area where the sanitation issues are to be addressed. However, KSUDP project covers only the corporation area, which has to be extended to the whole of planning area in subsequent phases. Similar to the situation in other utilities, the sector lacks a comprehensive database which needs to be developed in a GIS platform on urgent basis, for efficient utility management in future.

19.6.5 Solid Waste Disposal

In the planning area, only old Kozhikode Corporation and Cheruvannur Nallalam are served by a systematic solid waste management initiative, where the waste collection, segregation and transportation is handled by the Kudumbasree members and the treatment and disposal is done at Njeliyanparamba, which faces severe public protest. Centralised municipal waste management can no more be advocated in Kerala context, both from environmental as well as social perspectives. Hence, a twofold approach need to be adopted which has a centralised solid waste treatment and disposal facility with scientific land filling options on one hand, which will address the waste produced from densely built-up commercial core and other commercial and work centres, and aggressive decentralised solid waste management measures on the other hand, for the less dense areas. Encouraging segregation and storage of bio degradable and non-bio degradable waste at source itself will reduce the existing problems connected to solid waste disposal to a considerable extent. Individual pipe/vermin composting or biogas plants has to be promoted/mandated in all ventures having a plot size more than 10 cents whereas collective plants of similar nature can be mandated for smaller plot developments. The fleet and other infrastructure for solid waste collection and transportation have to be enhanced to meet the needs for the

planning area. Besides, administrative infrastructure of the local governments has to be strengthened to implement solid waste management measures with regular monitoring and levy of user charges.

19.6.6 Energy

Though 100% electrification has been achieved by the KSEB, there are many areas of low voltage in the planning area. However, in view of the large scale power intensive projects coming up in the planning area, new sites for locating substations are to be identified. Besides, GIS mapping of the power utility has to be taken up on emergency basis and SCADA based management has to be employed. Steps have to be taken to enhance power harvest from non-conventional sources. Solar power, Tidal power and wind power are the major potential sources from which the planning area can generate power. There are laudable initiatives from many institutions in the planning area towards sustainable energy harvest and management measures, which need to be promoted. Promotion of Green buildings is another imminent need for conservation and optimal use of the scarce power resources.

19.7 Social Infrastructure

19.7.1 Education

The educational institutions in the planning area are adequate for the existing population. However, there are inadequacies in the infrastructure provisions, which need to be addressed on immediate basis. Besides, some of the educational institutes and offices are cramped by infrastructural shortcomings, which need to be addressed by scientific planning and design interventions in the available land or relocating them to a more suitable location. Factors like the anticipated growth in IT sector and the presence of premier institutes like IIM, NIT, etc. in the vicinity, are expected to attract highly educated workforce to the planning area. To increase the attractiveness of the city for such an elite group of stakeholders, it is proposed that more schools and colleges of international standards have to come up in the planning area. Though Malabar region is famous for many literary efforts, folk arts and the general enthusiasm of its folks towards literature and arts is laudable, it lacks an educational and training institute in this field.

19.7.2 Health

Health sector of Kozhikode has significance beyond its geographical influence area, owing to presence of the premier institute, the Kozhikode Medical College which acts as a referral centre for the whole of the state, many private sector initiatives of international standards as well as its large pool of eminent specialists in various walks of medicine. However, infrastructure facilities, especially in the public sector initiatives do not match up to expectation. All the health centres in the planning area need enhancement both in terms

of the scientific and optimal use of their premises as well as employing state of the art technologies in diagnosis and treatment. The disposal of hospital waste in the planning area needs special attention. Another need of the time is a specialised centre for geriatric care, as the population of the 60+ age group is high and expected to rise further in the planning area during the plan period. Ayurveda sector shall be promoted keeping in mind the tourism possibilities as well.

19.7.3 Housing

The net housing shortage in the development area is nominal. However, the study reveals that 7.9% of the houses are not suitable for living. Rental housing contributes a share of 5.95% of total. 75% of the residential plots were less than 10 cents, indicating the urban nature of the residential areas. A conservative estimate reveals that slums in Kozhikode accommodate around 12% of the city's population. The major problems reported in the slums are water logging, epidemics and absence of domestic power connections, whereas absence of sanitation, drainage and access are reported by many. The rehabilitation of 40 slums is underway, in Community Infrastructure Fund (CIF) works under KSUDP. Remaining slums and urban poor clusters in the Panchayats in the study area are to be developed in the subsequent phases. Another concern to be immediately addressed is the housing for unskilled labour migrating to the planning area, especially those working in the construction sector.

The residential houses in the planning area are characterised by low rise high coverage buildings, which usurps a lot of land, a valuable and scarce resource in the planning area. Hence it is observed that high rise and low coverage structures and compact residential development are to be promoted in the planning area, especially in view of the housing needs resulting from the expected immigration due to IT and other employment opportunities arising in the planning area.

19.7.4 Sports, Recreation and Other Civic Amenities

Kozhikode is famous for its enthusiasm in sports, especially football, and is recognised as 'Footballer's mecca' of the south. However, there is no infrastructure of commendable quality in Sports, in the planning area. The existing corporation Stadium is choked in between major transportation terminals and commercial areas, and creates havoc and discomfort for public at the conduct of any event, which makes the need for a sports complex of international standards, located at a more suitable location, felt for the planning area.

Though the abundant waterfront of the planning area possesses a good scope for recreational facilities, it is grossly underutilised. Besides, there is no balanced spatial and hierarchical distribution of recreational land uses.

The analysis reveals that planning area lacks social interaction/assembly infrastructure like community halls, auditoriums, convention centres etc..of good quality and sufficient capacity, especially in public sector. The present gap is met by the private sector initiatives, which are mainly concentrated in the city core. It is understood that an even distribution of assembly facilities of good quality in the other parts of the planning area is necessary, which would also contribute towards curtailing the associated traffic and relieve congestion in the city core.

19.8 Social Welfare and Empowerment

The elderly is a segment of the society whose needs are barely addressed at present. Providing neighbourhood-level social-interaction and day care facilities for the elderly and provision of geriatric care facilities at doorstep shall be priorities of the health care system in the planning area. A geriatric speciality referral hospital shall be started in the planning area, catering to the whole of north Kerala, which shall also anchor research and education in geriatric care.

The differently-abled and specially-skilled citizens of the planning area also need special attention, as the existing infrastructure and facilities in the planning area does not have an inclusive design. The designs, especially those of the recreational facilities, public places, and transportation infrastructure, shall be made inclusive to enable a normal living for this group. Education and health care institutions focusing this segment of the society shall be initiated in the government sector as well, and the existing private sector initiatives may be given govt. aids. Day care facilities, preferable with the anganwadis shall be started for them and training and financial support also needs to be provided to the families of such persons, to ensure their welfare.

In general, the infrastructure and facilities in the planning area shall be customised to address the needs of the marginalised, like the elderly, women, specially-skilled, differently-abled etc.

The fishermen community of the planning area needs special attentions most of the families of fishermen community are economically and socially backward. The planning area also has an identified group of Below Poverty Line (BPL) families. The housing, education, health care and livelihood needs of the fishermen community and the BPL families are suggested to be supported by the government, to ensure basic living standards for these sections of the society.

The demographic studies reveal a decreasing child sex ratio and increasing general sex ratio, temporally. The decreasing child sex ratio urges urgent interventions to ensure a girl child friendly atmosphere in the planning area. The increasing sex ratio suggests the need for more women friendly employment opportunities and job environments in the planning area. Girl/Women friendly toilets need to be provided in schools, public

institutions, commercial centres etc.. It is suggested that preferential allocation of housing for women headed families, old and single women as well as scheduled castes and tribes has to be ensured by the local governments. Women, especially those who belong to economically or socially marginalised sections, need to be empowered by skill and entrepreneurship development measures.

19.9 Heritage and Environment

The planning area is blessed by natural as well as built heritage. However, measures to conserve them are only in the infant stages and not comprehensive. A heritage conservation plan is to be charted out on urgent basis, which should list out all the built heritages and measures to prevent any further deterioration to them, and implemented.

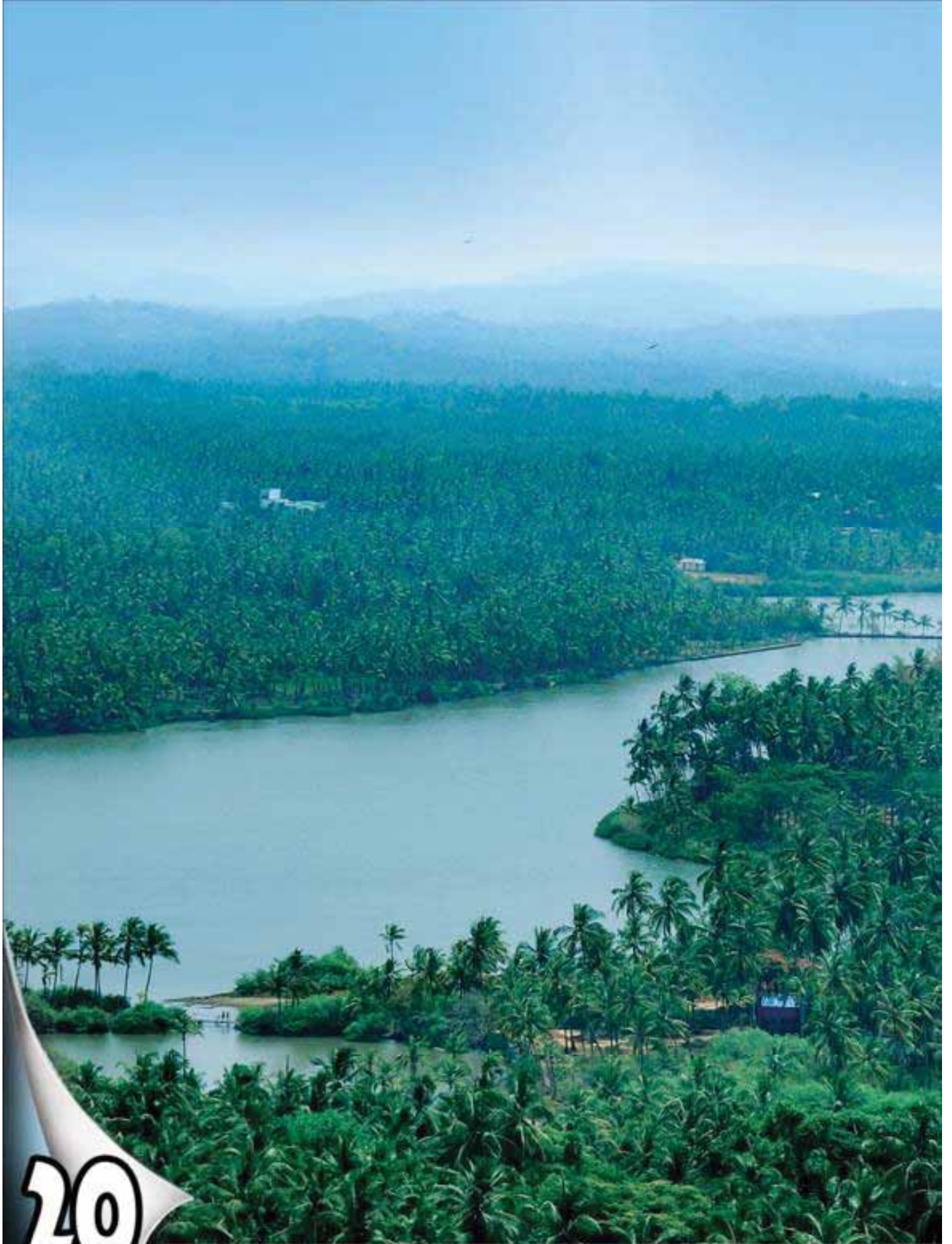
The environmentally sensitive areas and biodiversity hotspots in the planning area include coastal areas, estuaries, mangroves, river banks, wetlands including paddy fields, sacred groves and ponds. The biodiversity of these areas are highly threatened with anthropogenic activities. Kadalundi Panchayat in the planning area is surrounded by water on all sides surrounded by water, and has special significance in environment perspective. The famous estuarine wetlands of Kadalundi, a declared bio-reserve, house a wide variety of mangroves and their faunal associates and a Bird Sanctuary and are famous for a wide variety of fish, mussels and crabs. All of the Eleven recently discovered migratory birds in Kerala were found from Kadalundi. There is a need to frame measures to protect Kadalundi as a bio-diversity hot spot. It is identified that eco-friendly agricultural pursuits should be promoted in this area, to prevent any danger to the migratory birds and to prevent soil and water pollution in the area. However, this should not harm the pursuits for prosperity of the local people. Hence development nodes needs to be delineated where development activities may be permitted, keeping the rest of the area virgin. Eco-friendly tourism can be promoted in this area to promote the local economy.

Kottuli Wetlands, the largest wetland in Kozhikode city is an urban wetland identified by the Ministry of Environment and Forests under National Wetland Conservation Programme. The wetland and the adjoining Canoli canal is facing many environment problems which include reclamation for settlement and building complexes, surface run off which carry agricultural, domestic and other sources of pollution, heavy siltation due to soil erosion etc.. The ecology of the area is affected due to deforestation, over grazing, sediment input, eutrophication and pollution. Management Action Plan for Kottuli Wetland approved by the ministry need to be implemented for conservation of this area, and eco-friendly tourism activities need to be promoted.

The Masterplan Area has 131 Sacred Groves, 13 Ha in extent which house various endangered flora and fauna, including valuable medicinal plants. 85% of the Kavus are of above 100 years age 81% are under private ownership. The ponds within the Masterplan

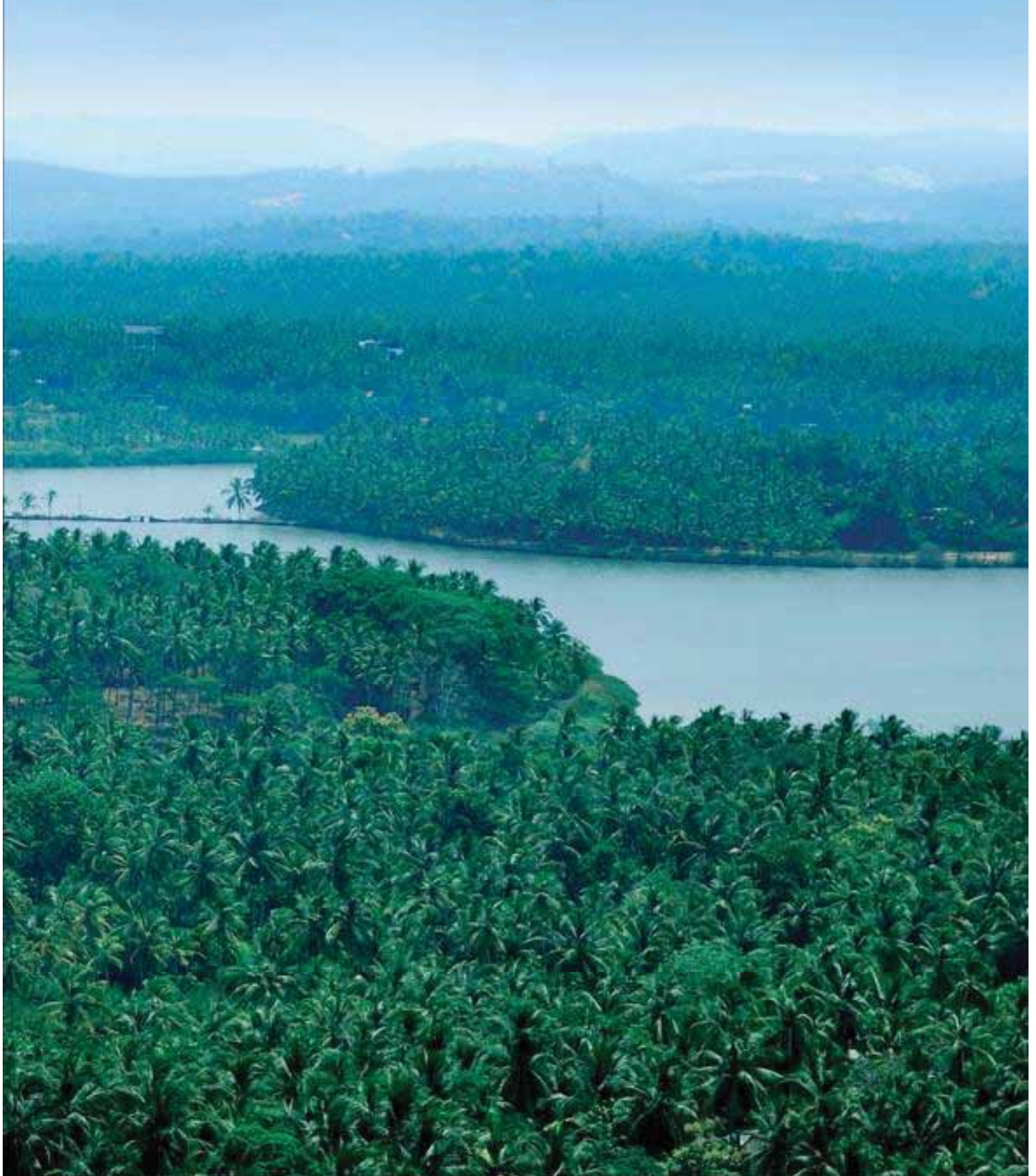
Area are 153 in number, 21 Ha in extent. 43% of ponds in the Masterplan area are under private ownership and 30% of the ponds in the planning area are polluted and non attended. A comprehensive program need to be framed for conservation of ponds and sacred groves in the planning area. The ponds should also be used for local water supply needs, after purification.

Other important environmentally sensitive areas which need to be freed from developmental pressure are the paddy fields, river banks and beach front. Policies for mobilising the financial resources required for protection of these areas by compensating for the private land under this category need to be framed. Besides, decrease in the urban green cover, aggravated by the recent boom in construction sector has to be checked to prevent deterioration of microclimate of the urban area and to reduce surface run-off. Urgent measures to increase the green cover with the help of policy measures mandating minimum green cover in various types of projects shall be framed.



20

*D*evelopment Vision



* Development Vision

* Development Goals and Objectives

20.1 Development Vision

Kozhikode in her glorious past had been an important trade centre, port, cultural centre, and administrative headquarters of an erstwhile kingdom, known for its honesty (thus the nickname “city of Truth”) –in short, a vibrant city with a human face.

With the gradual shift in the transport modes and marketing options, the economic base of the city grew weaker. This has resulted in physical decay as well, as evidenced by various derelict edifices in the old city core. In the recent past, the city has lost some of its industrial production units also. However, the city has been trying to catch up with the new economic system with modest attempts in ITES and other new generation service industries. The environmental decay and apathy crept in during the downslide needs to be checked. The city needs to reverse the adverse impacts in this transition and build upon the various inherent strength and potentials in order to regain the lost glory. So, this master plan is more about a turn around and further going forward. Considering this reality, the development vision of the city is defined as: -

A sustainable and liveable Regional Capital, with state of the art facilities ensuring quality of life for people at all levels, drawing economic momentum from new generation industries, trade and tourism, with thrust on traditional livelihood while conserving the culture and heritage of Malabar, retaining the title – **“The City of Truth”**.

DEVELOPMENT ISSUES

- Negative population growth in city core
- Increasing dependence on personal transport due to inefficiency of public transport as well as life style changes
- Congested city centre
- Low pedestrian friendliness and walkability
- Inadequate solid waste, drainage and sewerage management
- Irreversible Loss of agricultural land and resulting economic as well as drainage problems
- Absence of identified suitable lands for large scale industrial investment and unavailability of infrastructure for industrial development at reasonable rates
- Rocketing land values and unavailability of land for public purposes and services provision
- Unplanned development of urban fringe areas
- Sprawling residential development
- Incomplete / lagging implementation of plan proposals
- Inadequate disaster preparedness, no evacuation routes
- Absence of regulations/provisions for housing of the immigrant unskilled labourers

Strengths	Weaknesses
<ul style="list-style-type: none"> ✔ Strong inter-national, National and inter-state transportation linkages ✔ Major State and State Capital Region Centres ✔ Administrative Head Quarters of the District ✔ Attractive educational and health facilities both in the city and greater city region ✔ Geographically ITT target city ✔ Low Gross Density when compared to other Major urban centres ✔ Well-planned Facilities ✔ Increasing GDP ✔ Flourishing tertiary sector ✔ One of the best (subjective) in the country and the state and Green destination for high quality work and life ✔ Strong entrepreneurial culture ✔ Famous for hospitality, history and religious tourism ✔ Abundance of water front 	<ul style="list-style-type: none"> ✘ Declining traditional economy ✘ Absence of a strong industrial base ✘ Uneven densities ✘ Congested city core and coastal settlements ✘ Low pedestrian friendliness and walkability ✘ Unstable topography in the city periphery ✘ Lack of availability of unskilled labour ✘ Shortage of employment opportunities for skilled labour ✘ Deteriorating environment quality ✘ Under-utilised tourism potential ✘ Lack of successful interventions in housing of economically weaker sections ✘ Partially successful plan implementation ✘ Dependence on external sources in energy sector, un dependable power supply

Opportunities	Threats
<ul style="list-style-type: none"> ✔ Transportation projects like High Speed Corridor, Mumbai - in pipeline ✔ IT, industrial projects inside and outside the town ✔ Growing appeal as a preferred location for Large scale Commercial investments and residential projects ✔ ITT formally for infrastructural development ✔ Growth of IT and construction sector ✔ Medical and eco-tourism ✔ Industrial Cluster development programs initiated by the state and central government ✔ Developments in non-conventional energy sources 	<ul style="list-style-type: none"> ✘ Rising Land value ✘ Unchecked migration of Unskilled Labourers from other states ✘ Procedural delays and red tapes for real investments ✘ absence of full-fledged disaster management infrastructure & evacuation networks

20.2 Development Goals

The following development goals are formulated for developing Kozhikode into a vital city in the social, economic and administrative scenario of the state, anchoring on its strengths and utilizing the opportunities to the maximum, while strengthening the weak sides and preventing the threats, for the comprehensive development of the planning area.

Development Goals

- To strengthen the economic base of the city as multifunctional which promotes development in productive and service sectors (especially trade and commerce, tourism, health and education with special emphasis on new age industries).
- To promote sustainable green urban development along with conserving the resources for future generations.
- To preserve environmentally sensitive areas and heritage structures.
- To make the city as a transit camp
- To make the city as a service provider for nearby local self-government institutions.
- To ensure equitable distribution of basic facilities to all sections of people.

20.3 Development Objectives

To achieve the above stated development goals, the following objectives are framed.

To strengthen the economic base of the city as multifunctional which promotes development in productive and service sectors (especially trade and commerce, tourism, health and education with special emphasis on new age industries).

- Reinforce the role as commercial capital of Northern Kerala
- Facilitate development of the city as a Health, Education and Tourism hub
- Attract investments by demarcating Special Investment Zones, planning tools and incentives
- Ensure superior quality infrastructure to support large scale developments like Beypore Port, IT parks, Knowledge Park, Marine Park, NIRDESH, etc.

To promote sustainable green urban development along with conserving the resources for future generations.

- Conserve existing greens and promote new greens
- Prepare and implement a comprehensive Solid Waste, Sewerage and Drainage Plan
- Regulate noise levels by silence zones
- Improve urban aesthetics
- Implement Urban forestry /Social Forestry and promote bio-diversity conservation
- Promote homestead agriculture, green manures and organic farming
- Introduce mass rapid transit systems
- Create green walkways, pedestrian friendly streets, cycle tracks

To preserve environmentally sensitive areas and heritage structures.

- Protect Kottuli wetlands, Kadalundi mangrove reserves, other mangroves, other wetlands and paddy fields, sacred groves, ponds, and rivers
- Protect built heritage like Thali temple, MishkalPalli, Muchundipalli, Tippu fort, Mother of God church, V K Krishnamenon Museum, etc.

To make the city as a transit camp

- Build a Mobility hub with facilities for interchange of all modes of transport (Road, Rail, Water way and Airway).
- Introduce mono rail, loop bus services, dedicated high speed bus routes and water transport.
- Enhance efficiency of the grid iron pattern of transportation network with good connectivity to nearby local governments and districts

To make the city as a service provider for nearby local self-government institutions

- Enhance educational, health and trade and commerce sector.
- Efficient circulation network for intra zonal and inter zonal movements.
- Introduce higher order facilities like stadium, convention centre, etc.

To ensure equitable distribution of basic facilities to all sections of people.

- Implement housing schemes for urban poor, slum improvement programmes and enhance fisheries sector with model fishermen village.
- Promote disabled friendliness.





21

- * Projected Population & Settlement Pattern
- * Heritage & Environmental Conservation
- * Green & Sustainable Development
- * Industrial Development
- * Tourism
- * Land Availability for Public

Development Concepts



Welfare Activities

- * Commercial Centres
- * Connectivity Network
- * Waste Management

- * High Density Residential
- * Primary Sector Development
- * Development Concept of the Planning Area

21.1 Projected Population and Settlement Pattern

21.1.1 Population Projections

The population of the planning area at the end of the plan period is estimated considering four factors; the natural growth of population, the in-migration to the city owing to the employment opportunities, the population that can be contained by the city as well as the population needed to prevent the decay of the urban core. The details are provided in Annex 13.

The natural growth in population is calculated employing Decreasing Rate and Apportionment methods. The average of the projected values in the above methods, i.e., 8,53,971 and 8,78,266, are concluded to be the population in the planning area in the years 2021 and 2031 respectively, considering the natural growth of population alone.

The Masterplan envisages to strengthen the commercial and industrial base of the planning area, which will create more job opportunities and thus attract migration into the planning area and check the decay of urban core. The new employment opportunities and the associated population immigration are calculated assuming that the additional industrial and commercial areas required in the LSGIs in the planning area, to meet the suggested share of these land uses as per UDPFI Guidelines, will be provided. The occupant loads prescribed by National Building Code, 2005 is taken as a proxy indicator for the employment generated by this additional commercial and industrial uses of land. The approximate figures of employment generated, is arrived as 1,47,000 persons in Industrial and 3,15,000 persons in Commercial. Of this, it is assumed that 70% of the industrial employment and 80% of the commercial employment will be from the local population as well as from the nearby LSGIs, adding to the floating population in the planning area. Thus, only 30% of the industrial employment and 20% of the commercial employment is expected to migrate to the city along with their families and become permanent residents in the planning area, which means, the total workforce expected to reside in the planning area works out to be 10,7100. Assuming a family size of four, the total additional population to be considered for planning purposes is, thus, 4,28,400. Thus the population including natural growth and migration for employment is arrived as approximately 13 Lakhs.

21.1.2 Settlement Pattern

Low rise, high coverage residential developments, characteristic of the city, is already swallowing a large chunk of the productive urban as well as agricultural land of the planning area, leaving practically no space for development projects and green pockets. The proposed residential area for large towns as per UDPFI Guidelines is 35-40% of the developed area. The existing residential area is 76% of the developable area, which verifies that there is no demand for more residential area. Suggested developed area density as per UDPFI Guidelines is 100- 150 persons per hectare, whereas the existing developed area

density is 49 persons / hectare and existing residential area density is 64 persons / hectare. This suggests the ample scope for densification of the developable areas, especially residential areas, of the planning area. Besides, the census results indicate that the Corporation is being de-densified, posing an imminent threat of degradation of the urban core coupled with lose of fertile lands in the fringe areas.

On the other hand, the developments envisaged in industrial and commercial sector, especially the developments in IT sector, is expected to create a significant number of job opportunities and an associated in migration of aspirants is foreseen. It is expected that while majority of them will be floating population, a share of them along with their families deriving a compact urban settlement pattern is a vital need of the hour, equally significant



Figure 21-1: Development Concept - Settlement Pattern

to protect the urban core from deterioration, to improve work-home relationship as well as to conserve at best the existing likelihood for food security in the region.

The study area can be divided into five based on the existing densities, as presented in Figure 21-1; the Core settlement of average density of 11000 PpSqKm, the adjacent settlements of 7000 PpSqKm and 6000 PpSqKm, extended city of 5000 PpSqKm and Suburbs of 3000 PpSqKm. To derive a compact urban form, it is planned that the Core settlement shall continue with the same density, the adjacent settlements of 7000 PpSqKm should be densified as the Future city with 11000 PpHa. The settlements of 6000 PpHa should develop as High Density Residential developments of

15000 PpSqKm, except at beach front area. High density residential development at beach area may cause following problems. A) Degradation of fragile beach environment. B) Reduce the economic value of beach front residential land, since the open-up of land for high density residential might have resulted in unplanned low quality residential developments at this area. C) Create more traffic congestion, since the residential concentration is at the west side of CBD and all commercial and institutional opportunities are at the east side of CBD. This will increase east - west movements and thus congestion in city roads. Due to chances for these three problems, high density residential development at beach front area may be restricted. Those areas, where present density is 5000 PpSqKm should form the City Extension of 7500 PpSqKm and the Suburbs of 3000 PpSqKm should densify to have 5000 PpSqKm.

21.1.3 Projected Population

As detailed in section 21.1.1 the population including migration is derived as 13 lakhs. The population that can be accommodated by the planning area considering proposed densities as per UDPFI Guidelines is 19.4 Lakhs. However, the development pattern and physiography of the cities of Kerala is far different from the other major cities of the country. The State Urbanization Report observes that maximum density that is achieved by Kerala Cities is 6000 - 7500 ppsqkm, beyond which the city core shows a decreasing density and the fringes show increasing density. Considering this, the population that can be accommodated by the planning area, in the existing scenario of the state, is 12 Lakhs. Nonetheless, Masterplan takes measures to check the decay of the urban core with better infrastructure and amenities and proposes a compact settlement pattern as discussed in the preceding section, according to which a population of 12.86 Lakhs will be accommodated by the planning area. Hence, a population of approximately 13 Lakhs, is expected in the planning area, at the end of the plan period.

Thus, the total projected population of the planning area at the horizon of the Masterplan taken as 13 lakhs for calculation purposes.

21.2 Industrial Development

Kozhikode was once famous for its medium and small scale industries in wood furniture, textiles, tiles, soap manufacturing etc. But all these industries have either died out or declined and now the district has no commendable presence in the industrial scenario of the state. The negative population growth in the corporation also urges the

Figure 21-2: Development Concept - Industrial

policy makers to strengthen the industrial base of Kozhikode and make it attractive as a job provider. The recent developments in IT sector gives hope for the district, in specific the planning area. Then again, Trivandrum and Cochin, the other major cities of the state have already established themselves as IT hot spots in the state. Therefore, it is imperative for Kozhikode to develop its own IT sector in a unique manner, strong enough to stand amongst its established counterparts, to ensure growth, success and stability. The environmental and social sensitiveness, as well as the unavailability of suitable large extents of land, diminish the prospect for large scale and polluting industries in the planning area. However, the road, rail, airways and port based connectivity of the planning area will surely make it a centre of transaction of industrial goods, both raw materials and products, between the hinterland and the outside world. The recent activities related to Beypore Port development brings in the opportunity for port based industries. The

establishment of the National Institute for Research and Development in Defence Shipbuilding (NIRDESH) at Chaliyam will pave the way for the growth of ancillary industrial units.

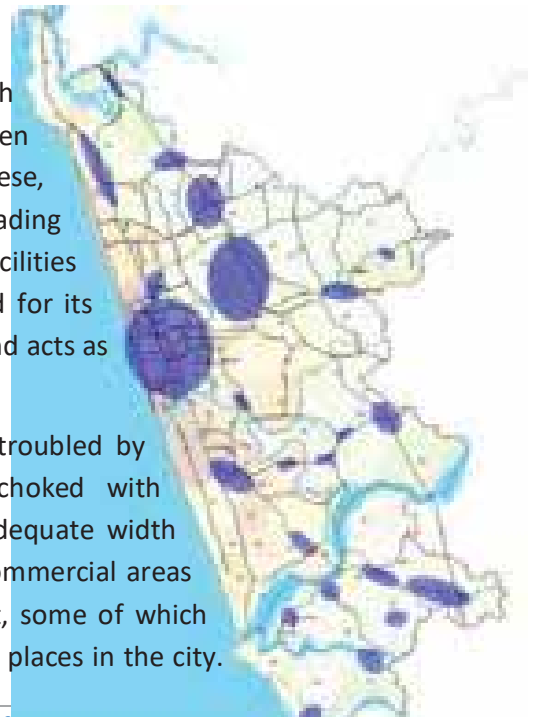
Hence, the development concept for industrial sector in planning area is 'Allocation of suitable land for industrial development and expansion of existing projects, along with policy and project measures for development of common infrastructure for production and marketing, establishment of ancillary and value-addition industries in manufacturing sector, promotion of product based industries in IT sector, revitalization of the traditional industries of wood, textile, clay and bronze based products, and thus creation of a strong industrial base for the city. Feroke is envisaged to be an industrial friendly panchayat to promote medium and small scale industries, a clay and bronze industrial area is conceived for the traditional workers in this sector in Olavanna, a hazardous storage and industrial zone is earmarked in Pantheerankavu, Heavy Industries zone is allocated in the existing industrial belt in Cheruvannur-Nallalam, land allocation for expansion of IT industries and Knowledge Park is made in Olavanna and Ramanattukara and the Kallai wood industries zone is proposed to be revitalised.

According to, the Kerala Perspective Plan 2030 (Vision Kerala2030) Kerala has to be established as one of the most attractive location for business investments in Asia. Kerala will develop its industrial sector that is: dominated by high value added activities, innovation driven and socially and environmentally sustainable. While formulating the sectoral proposals, along with development concept, consideration shall be given to this vision statement too.

21.3 Commercial Centres

Kozhikode is, historically, a city which flourished with trade and commerce since 12th century. Kozhikode was a chosen destination for trade by Arabs, Chinese, and later on Portuguese, Dutch and British, being one of the safest and trustworthy trading centres for foreigners, with ample availability of spices and facilities for storing and distribution. Even today, the city is honoured for its high entrepreneurial spirits and trustworthy trade practices, and acts as the regional commercial centre for whole of Malabar.

However, the commercial sector of the city is now troubled by infrastructure deficiencies. The old commercial core is choked with unavailability of organised parking places and streets of inadequate width and has started decaying with collapsing old buildings. The commercial areas have spread along all roads, resembling ribbon development, some of which like the Mavoor Road has become one of the most happening places in the city.



The commercial culture has started changing from the chain of retail shops to hi-tech malls and super-hyper markets. Moreover, the overwhelming growth of commercial activities in all urban centres of North Kerala has reduced the prominence of the city in the commerce of the region. The new age developments brought about in the city like IT industries are expected to boost the demand for high quality commercial and recreation centres as well as office spaces, restaurants, lodging facilities etc.. Improving the commercial base is also imperative to make the city attractive as a job provider and to retain the required population in the urban area, in the context of the negative population growth in the corporation in the last decade.

Hence, the development concept in commercial sector is 'Restoration of the prominence of Kozhikode as the prime trade centre of North Kerala utilising the opportunities for whole sale trade provided by Beypore Port for import and export, earmarking land for hierarchical development of commercial centres including high end commercial areas, promoting focused investments in commercial sector to address all sections of the society, while strictly enforcing the parking standards and implementing pedestrianisation for creation of walkable commercial streets and superior quality commercial plazas'.

While the Big Bazar, Palayam and Mavoor Road area will act as the CBD for the whole district, a new commercial mix use zone is envisaged to develop between the NH 66 By-pass and Mini By-pass between Malaparamba, Arayidathupalam, Eranhipalam and Thondayad. This area is envisaged to house the high end commercial, business, office spaces, and food and accommodation facilities demanded by the New Age industries. A second hierarchy of commercial nodes of specific nature are envisaged at major nodes like Thadambattuthazham where the wholesale trade of vegetables as well as dairy and poultry products will take place, the zone from Nadakkavu to Pavangad where automobile trade will concentrate, etc. Lower order commercial centres to cater to the daily needs of provisions, stationaries etc. are planned at every major node, throughout the planning area.

21.4 High Density Residential

In lines with the proposed settlement pattern (Refer facilities should come up in the town area itself, to prevent the urban sprawl. Thus, high rise, low coverage residential promotion zone is identified at Thondayad to Eranhipalam area. Besides, dedicated zones are to be earmarked for high density residential mix development, in the vicinity of the proposed work centres, to reduce the foot print of residential sector as well as work-home distances. Two such zones are identified, in Palazhi and Iringallur. Moreover, such high density developments are proposed in the

ry Planning Department, Government of Kerala

Figure 21-4: Development Concept –High Density Residential



important nodes in constituent panchayats of the planning area as well, aiming at retaining the green areas and urban land for more productive uses.

21.5 Heritage and Environmental Conservation

Kozhikode is famous as the City of Truth, and known world over from ancient times for its export of high quality spices, trading vessels named “Bey pore Uru’ and indigenous textiles named Calico. Its natural port facilities and flourishing trade links attracted people from various ethnicities and cultures to the city, who later became residents of this charming city and enriched the physical and cultural heritage which the city inherits today. Moreover, the city has a good literary heritage from many literature giants and has traditions of conducting festive assemblies of scholars and eminent personalities in literature, like the Revathi pattathanam which has a history dating back to ancient times.

Besides, the city is naturally blessed by its beautiful beaches, serene water bodies, wetlands and rich estuarine ecology. Additionally, the planning area inherits a large number of ponds and Sacred Groves. The development concept for Heritage and Environmental Conservation is ‘protection of the cultural ethos, conservation of the natural, built and cultural heritage, and preservation of

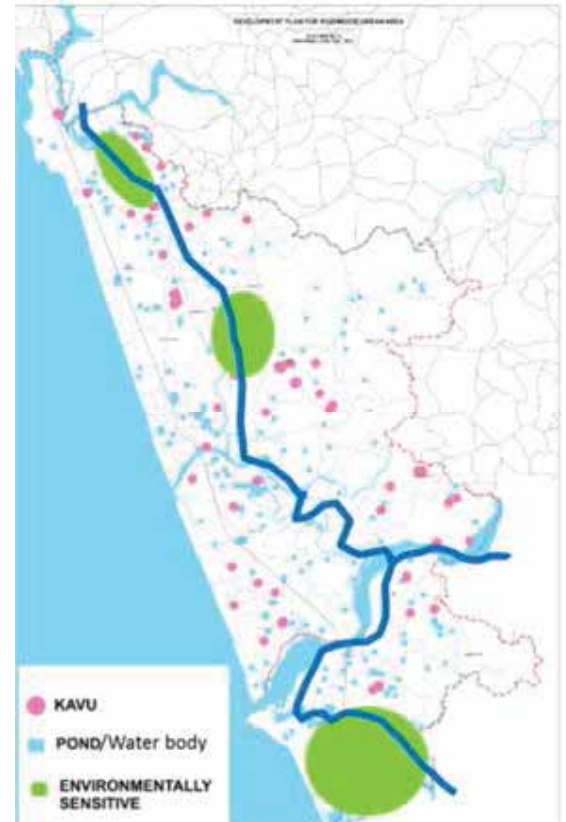


Figure 21-5 : Development Concept – Environment and Heritage



the ecology, and utilisation of these as resources for the development of tourism sector in a responsible way’.

The Masterplan identifies the important built heritage, wetlands, estuarine ecologies, ponds and sacred groves and prescribes policy, spatial, design and project measures to protect, preserve and conserve the literature and cultural, ecological, natural and built heritage. Conservation of Kottuli Wetlands/Sarovaram Bio-Park, Kadalundi bird sanctuary and mangrove ecosystem, Beach and river fronts are taken up as priority projects



Figure 21-6 : Development Concept - Tourism

by the plan. The plan also envisages improving the environmental quality by conservation of existing greens and promotion of new greens, a comprehensive solid waste, sewerage and drainage plan, regulation of noise levels by noise zones, implementation of urban forestry /social forestry and promotion of green manures and organic farming, and improvement of urban aesthetics.

21.6 Tourism

Kozhikode is a major node connecting the national and international tourists to the evergreen Wayanad forests of the Western Ghats, now a UNESCO World Heritage Site. Besides, Kozhikode’s endearing hospitality, cultural harmony and its exotic Malabari cuisine attracts many tourists, national and international. Malabar enjoyed the religious brotherhood and secularism from ancient past and the Jewish Christian-Islamic -Hindu relationship were founded on peaceful trade.

The planning area has a long and beautiful coastline, abundance of inland water bodies, multitude of built heritage of religious, cultural and administrative nature, and its own footprint in the international trade and cultural exchange from the times of King Solomon of Israel. However, the tourism potential of the planning area is not yet explored the way it deserves. In addition, being a fast growing trade centre and flanked by premier educational, scientific research and health institutes, the planning area attracts a lot of educational, business and health tourism.

‘Achieve sustained and sustainable tourism’ is the mission statement of tourism sector of Vision 2030 programme. This means

- Achieving economic prosperity through increasing tourism circulation, innovative products and services, and long term competitive and prosperous tourism businesses;

- Facilitating social equity and cohesion through community involvement in tourism planning and management;
- Promoting safe, satisfying and fulfilling visitor experiences;
- Ensuring environmental and cultural protection through upgradation of the global and local environment, and strengthening of biodiversity in tourism;
- Maintaining the unique and diverse culture by looking after the natural and cultural heritage; and
- Providing quality employment opportunities; and fair pay and conditions for all employees.

The tourism sector vision “To develop Kerala, into an up-market tourist destination with a high quality, thriving, competitive and sustainable tourism industry, which generates stable wealth, promotes environmental quality, enriches the local communities, and brings enjoyment to visitors without harming local culture and heritage” of *Vision2030* is considered along with the mission objectives while formulating the development concept as well as the sectoral proposals of tourism sector.

The development concept for tourism sector is “Establish World class tourism infrastructure in the planning area, to support the national and international tourists to Malabar region and develop the tourism within the planning area as a main economic sector, using the natural and physical resources in the sector optimally, with an integrated approach.”

21.7 Connectivity Network

Kozhikode Planning area is blessed with a good transportation network in grid iron pattern, thanks to the previous planning interventions. The city has three major North South road linkages, NH 66, NH 66 By-pass and the Beach road and five major East-West roads namely the Puthiyangadi-Kakkodi Road, NH 766, Mavoor Road, Francis Road and Kadalundi-Feroke Road, in regular intervals of about 2 Km. Besides, the city has an existing double line broad gauge rail network along the coast and a feasible water way network traversing through its centre.

The traffic congestion existing in the city is due to insufficient road widths, poor road geometrics, poor segregation of through and intra-city traffic, mixed vehicular traffic and encroachment on road sides for parking and other activities. Besides, the dependence on personal transport is increasing due to the inefficient and poor quality public transport as well as life style changes. Hence the development concept in traffic and transportation sector is ‘A strengthened public transportation network achieved by improving the existing road network with



ning Department, Government of Kerala

Figure 21-7: Existing Road Network

design and management interventions and organised parking facilities; supported by a strong waterway network, excellent connectivity of the port with the hinterland and reinforced by the introduction of supreme quality state-of-the-art mass transit measures to overcome the congestion’.

The identified growth centres in the planning area are Transport hub and surroundings, Medical College and environs, IT park and contiguous areas, Ramanattukara knowledge park and industries and Beypore port – Nirdesh Area, as shown in the figure 21-8. The suggested direction of growth is towards the east and towards the south east.

When the regional connectivity is considered, it can be seen from figure 21-9 that the Second and third order nodes are scattered, but well connected. CBD and other city nodes are also well connected.

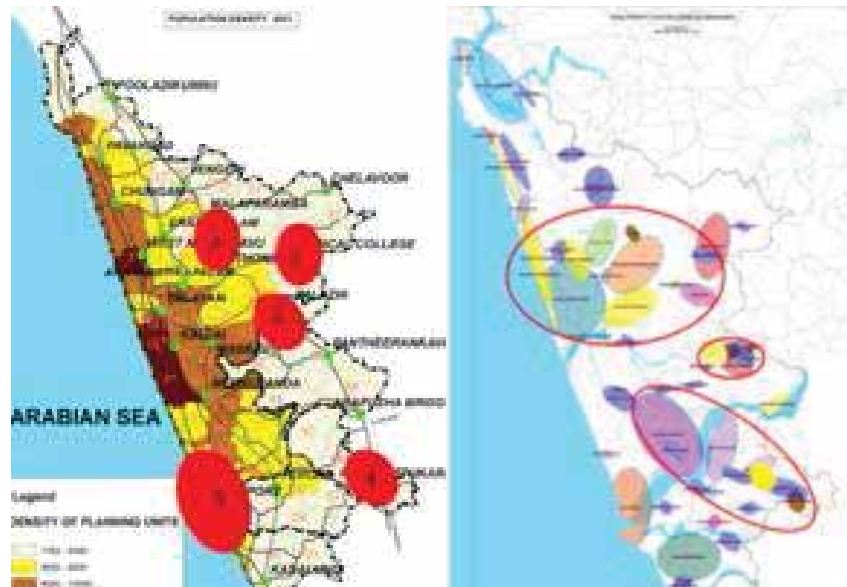


Figure 21-8 : Growth Centres and Direction of growth

Two major mass transit proposals are in the pipeline for the city, the light metro corridor and the high speed rail corridor. Of these, the light metro corridor, being a high quality public transit option, is expected to bring down the number of private vehicles plying in the route, and thus ease the city traffic congestion to a great extent.

Beypore Port and the associated road traffic is another subject addressed by the Masterplan. Beach road is envisaged to cater to the North – South traffic generated or attracted by the port. Beypore Cheruvannur Road is extended to NH By-pass, with dedicated truck lane in a total width of 24m, to cater to the East-West traffic, bypassing the city core, and this traffic is intended to be diverted outside the planning area from the Truck terminal planned at

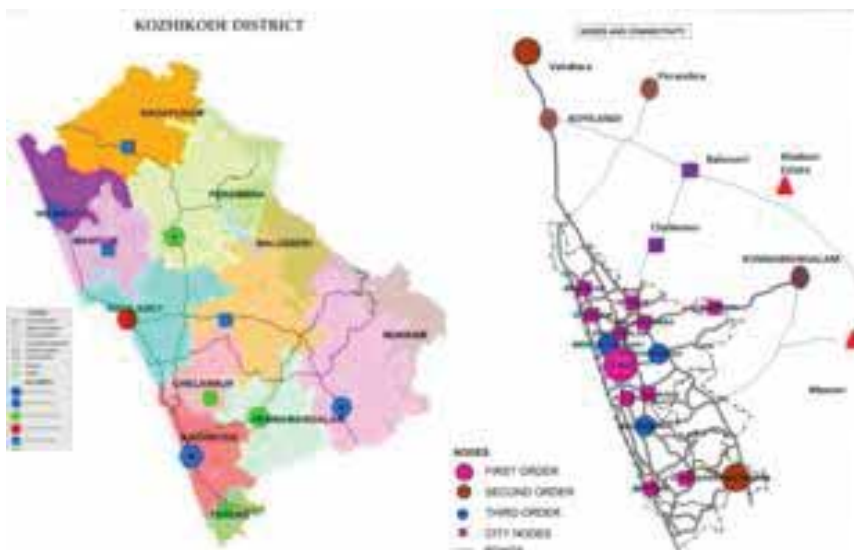


Figure 21-9: Connectivity of Nodes

Kolathara to Kunnamangalam on NH766 and Mavoor Road.

The suggested conceptual connectivity pattern overlaid on the proposed activity centres is presented in figure 21-10. A two tier road is envisaged along the NH By-pass from Thondayad to Vengeri, which will carry the through-traffic, while the existing by-pass will function as a city road. The water way network through EK Canal and BK Canal is proposed with water taxi circuit, which will also act as an emergency transit way from Malappuram district, Kadalundi area and Koyilandi to the city core. A mobility hub is envisaged at Malaparamba, which will act as an interchange hub connecting mono rail, water way and road transport and terminal for inter district buses. This will also help preventing the congestion at the city centre.

Dedicated High Speed Bus Routes are planned from the Hub connecting Airport and Railway Station, to Medical College, and to Kunnamangalam in the city periphery. Circular low floor AC bus routes are also planned from the hub in all directions. The Moffusil bus stand will function as the intra-city bus terminal. Seven bus terminals are also planned along the periphery of the city. Six parking plazas along with commercial complexes and Five Flyovers are also planned at various locations in the city core, to ease congestion. It is envisaged that all nodes are well connected with arterial roads and the major activity centres have road, mono rail and waterway connectivity.

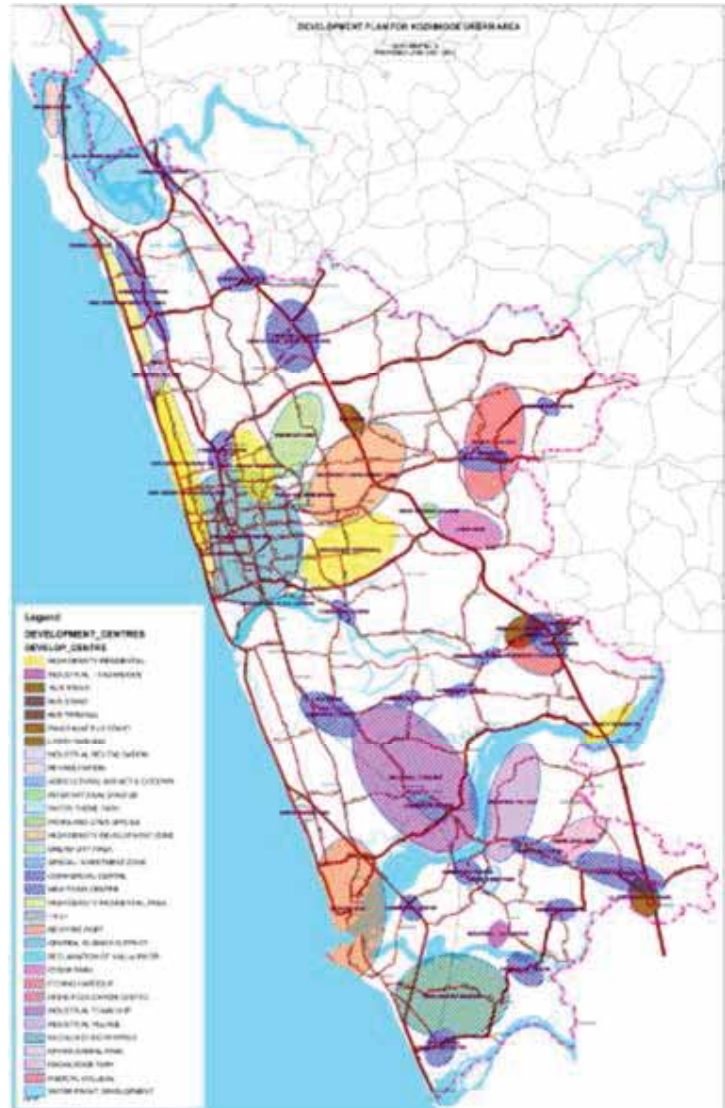


Figure 21-10: Development Concept – Suggested connectivity pattern and proposed activity centres

21.8 Primary Sector Development

Fisheries, the most important primary sector activity in the planning area, is planned to be enriched with fisheries oriented industrial zones for subsidiary, value addition and by-product processing industries along the coast and provision of physical and social infrastructure for the fishermen community. The upcoming Kinfra Marine Park in Beypore, once fully functional, is going to be a big boost to the fisheries sector, with facilities for seafood pre-processing units, value added marine products' production, fishing boat repairs and service, data and communication centre, training centre etc.



Three major fishing harbours in the planning area, Vellayil, Beypore and Puthiyappa are envisaged to be developed with quality Infrastructure. Aquaculture, especially Cage culture, is also proposed to be promoted using the ponds and streams in planning area.

Agriculture sector is proposed to be revived utilising the recent developments in urban agriculture, by promoting homestead cultivation, terrace farming, organic agriculture, horticulture and floriculture projects, agro-based value addition industries, and the KadalundiJaivaGramam – a village devoted for organic agricultural practices and products.

21.9 Waste Management

The plan proposes to promote reduce-reuse-recycle strategy as well as to create awareness, promote and enforce mandatory decentralised solid waste management while developing the Njeliyan Paramba Waste treatment plant to its full potential using latest technologies. The plan also locates a sewerage treatment plant and proposes speedy implementation of the KSUDP Comprehensive Sewerage and Drainage Master Plans.

21.10 Green and Sustainable Development

Driving the planning area towards sustainability is a major concern addressed by this Masterplan. The plan focuses on measures to reduce pollution, cut down fuel and energy

consumption, check conversion of productive land, promotion of non-conventional energy sources, increase green cover etc. The mixed use developments proposed will house public transportation, commercial, schools, offices, and entertainment in walkable distance, reducing the trip distances to work, education, shopping etc. and thus the fuel consumption. Promotion of high density developments with low coverage will reduce the productive land covered under concrete, diminishing the average shelter footprint multi-fold, when compared to low rise independent or group housing units accommodating similar numbers of population. Besides, such development reduces per capita land and infrastructure development cost reducing the per capita energy use exponentially with population density. The waste management concept centred on reduce-reuse – recycle principle, decentralised waste management, and the proposals for producing electricity and manure from the waste will reduce the waste footprint of the planning area.

The promotion of public transport and state of the art mass transit systems will cut down the carbon emissions from personal transport modes. Water way transport, when compared to other modes of transport is less polluting and energy consuming, which is promoted in the Masterplan. The development of walkable streets and promotion of pedestrianisation, designated cycle tracks and public transit corridors etc. also contribute significantly to lowering the foot print of urban transport. The proposed multilevel parking facilities will reduce the congestion on roads, again contributing towards reduction of air and noise pollution. The plan also envisages using the existing RoW to maximum potential and proposes no much of new roads or widening, reducing the tarred surface, a major contributor to formation of urban heat islands.

The plan also comes up with strict measures for environment conservation and increasing green cover and proposes conservation of wetlands, mangroves, sacred grooves and ponds along with river banks, beaches and other water fronts. The plan envisages promotion of urban agriculture, aquaculture etc and specifically organic agriculture, another step towards a sustainable future.

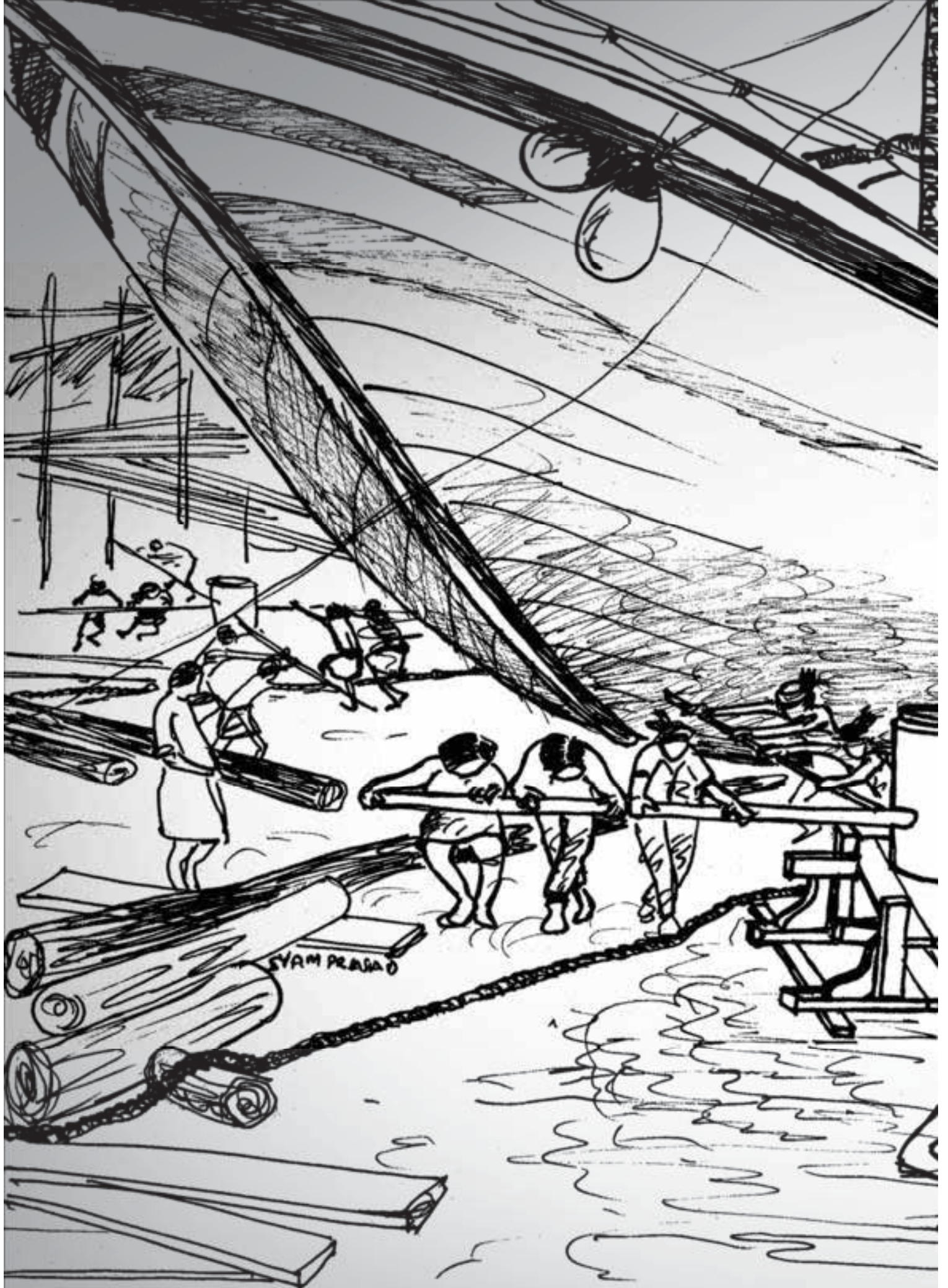
21.11 Development Concept of the Planning Area

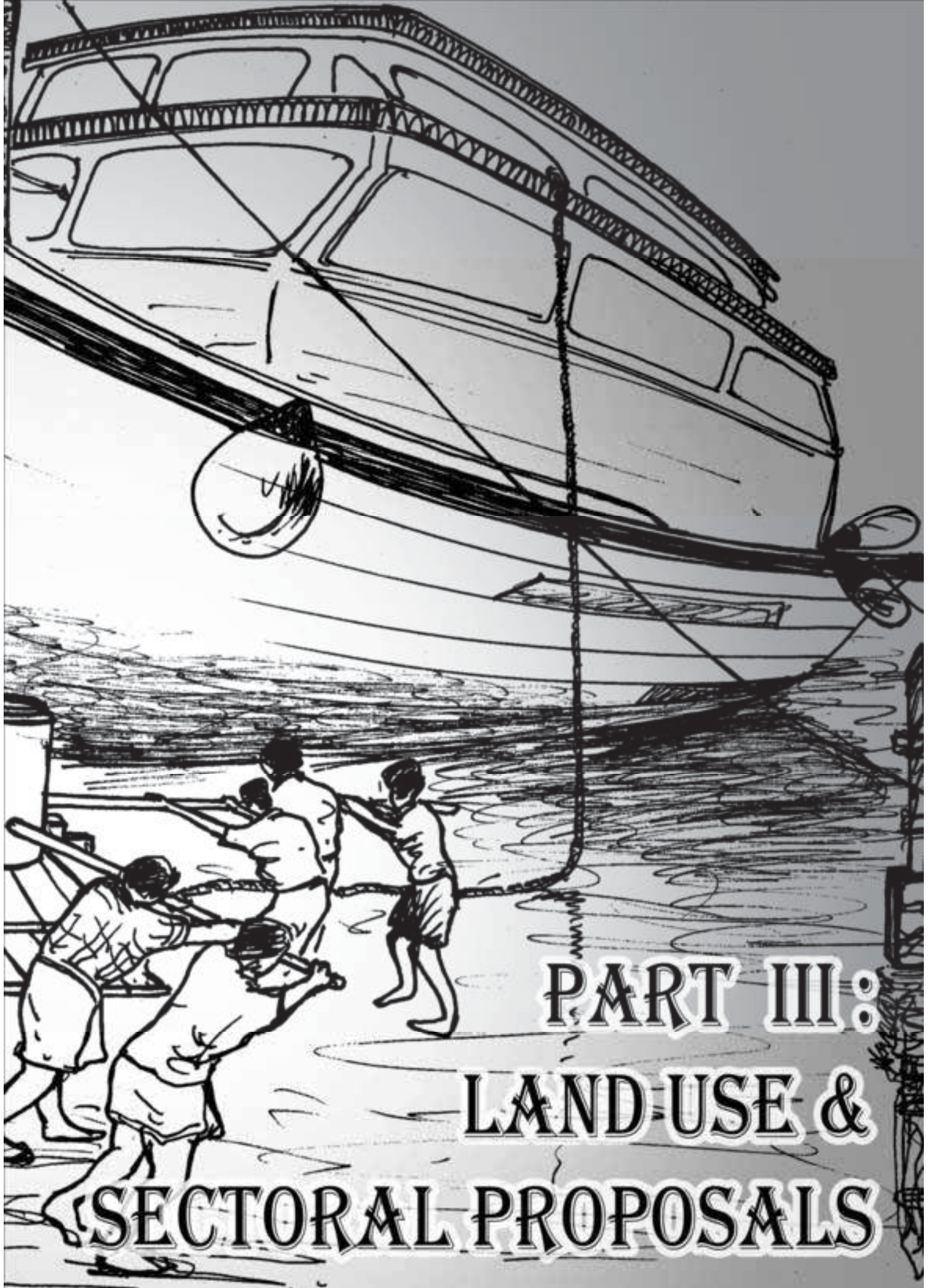
The development concept for the planning area is derived by combining the sectoral concepts presented above. Thus the planning area is envisioned as *the commercial capital and regional transport hub of Northern Kerala with a strong industrial base of high tech industries as well as traditional and small scale initiatives, a city which respects its heritage and environment and offers ample spaces for leisure and entertainments, an education and research hub in science and technology, literature and arts, health care, management as well as agriculture, and a tourism hub which promotes beach and eco-tourism, heritage and cultural tourism, health tourism, sports tourism as well as business tourism and offers high quality of living to its residents.*



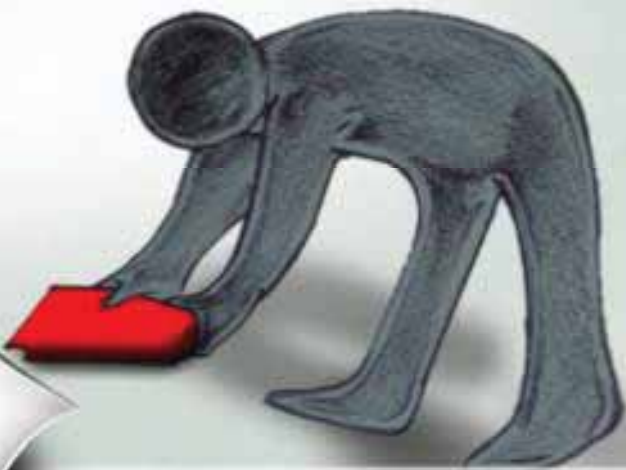
Figure 21-11: Development Concept for the Planning Area

The development concept thus encompasses a strong transportation network of integrated rail-road-water modes favouring public transport, supported by parking plazas, truck and bus terminals and the mobility hub; exclusive soft – core and hard-core industrial zones for creating a strong industrial base for the city; a well laid out hierarchical commercial development; high development promotion areas of mixed use; low density developments in environmental and heritage hot spots interwoven with eco-tourism activities; earmarked residential and commercial rehabilitation areas; comprehensive and customized projects for primary sector development in urban contexts; specific land allocation for housing the marginalised; and incentive based policies to pool land for public purposes.





PART III:
LAND-USE &
SECTORAL PROPOSALS



Land Use Plan



* Proposed Land Use Pattern

* Proposed Land Use Map

22.1 Proposed Land Use Pattern

Along the lines of the development concept, the general policy observed while designing the proposed land use is 'to prevent the decay of urban core by making the city more liveable as well as an attractive employment generator, while enhancing its services as the district headquarters, commercial capital and transit hub to remote areas of North Kerala'. Accordingly, the following zones are proposed for the planning area.

- Residential Zone (Residential Zone I)
- High Density Residential Zone (Residential Zone II)
- Low Density Residential Zone (Residential Zone III)
- Multi-Functional Zone
- Commercial Zone
- Mixed Zone (Residential/Commercial)
- Public and Semi Public Zone
- Tourism Promotion Zone
- Tourism Zone
- Small Industrial Zone
- Industrial Promotion Zone
- Dry Agricultural Zone
- Recreational Zone
- Water Body
- Transport Zone
- Park and Open Space
- Wet Agricultural Zone
- Cyber Park
- Environmentally Sensitive Area
- Green Belt
- Defence Land
- Port and Allied Developments
- Heritage Zone

The following special zones are also proposed, to attend to the specific needs of the planning area.

- Mobility Hub
- Parking Plaza
- Educational Complex
- Knowledge Park
- Nirdesh

- Garbage Treatment Plant
- Buffer zone
- Slaughter House
- Marine Park
- Truck terminal
- Water Theme Park

22.1.1 Residential Zones

The existing residential land use in the planning area is about 68%, and is sprawling around, swallowing the productive urban as well as rural land. Hence in lines with the concept of a compact settlement pattern, it is proposed that the residential area should be reduced in the planning area and high density low coverage residential growth should be promoted. Besides, encroachment of wetlands and agricultural areas resulting from the ever-growing demand for land in housing sector needs to be checked. Thus, three categories of residential uses are demarcated in the proposed land use for planning area as described below.

22.1.1.1 Residential Zone I

This zone allows for the normal residential developments as permissible by the KMBR/KPBR. The zone covers most of the planning area, 78.03Sq.km, about 44% of the planning area.

22.1.1.2 Residential Zone II

The high density residential zones are demarcated in such areas where there is good accessibility, existing major land use is residential and there is high economic potential for land, but is underutilised. It is also taken care that high density residential is proposed along the future work centres like IT parks, so as to promote better work home relationships. Four major areas, one between Eranhipalam and Arayidathupalam enclosed by the NH 66, NH 766 and Mavoor Road, another at Govindapuram between the Canoli Canal and NH 66 by-pass, the next in Pantheerankavu and the last in Ramanattukara are identified and demarcated. The total area under this zone comes to 7.94Sq.km, which is 4.45% of the planning area.

“Density is a key factor in both the growth of cities, the happiness of cities, and the wealth of nations. And cities and regions where density is more concentrated near their urban cores — appear to gain the biggest economic advantage.”

*Richard Florida
(<http://www.theatlanticcities.com/jobs-and-economy/2012/11/cities-denser-cores-do-better/3911/>)*

22.1.1.3 Residential Zone III

Low density residential developments are envisaged near paddy and agriculture stretches, to ensure low disturbance to the sensitive land use and also along the periphery of the planning area to create a virtual zone of transition from the urban to the rural as well as to ensure land availability for the middle and low income groups at a reasonable cost within the planning area. This constitutes 6.45 Sq.km, around 3.6% of the planning area. The height of buildings in this zone is envisaged to be regulated to 12m

Thus the pucca residential land use allocation in the planning area is reduced to about 52% from the 68% in existing land use. It is taken care that the disturbances due to other uses such as industrial and commercial is minimised in residential zones.

22.1.2 Commercial Zone

Being a commercial centre of regional importance, and commercial being one of the most productive land uses in the planning area, the concept in commercial development is to increase the land under commercial activities in a hierarchical commercial development pattern. Proposed share of commercial area in large towns as per URDPFI Guidelines is 4-5% of developed area. The existing commercial area is 2.11 % of developed area which results in a requirement of additional 4.6 Sq.km of commercial area to be met by 2035.

Hence the CBD being the major node and subsidiary nodes along the important junctions are to be retained as commercial, while trying to allocate more land in this use. The pucca commercial zone includes the CBD area as well as developed commercial centres around important nodes in the planning area. This constitutes 5.15 Sq.km, around 3% of the planning area.

22.1.3 Mixed Zone (Residential/Commercial)

Mixed use zones of commercial and residential is proposed adjacent to the pucca commercial use and at subsidiary nodes of lower hierarchy, which accounts to 12.37 Sq.km, around 6.9% of the planning area. These zones are proposed with the intention to explore maximum prospective of the land in areas of good connectivity and potential by promoting utilization of otherwise residential areas for non-nuisance commercial enterprises, professional establishments, banking and financial institutions, necessary social infrastructure etc, besides reducing the trip distances for such purposes in the locality.

22.1.4 Multi-Functional Zone

Real estate sector in the planning area has witnessed high activity due to increased demand in hospitality, residential, retail and office space, in the past decade. In future, the growth of IT/ITES sector, Port, health and business tourism, and other development projects are expected to add impetus to the demand for business hotels, in addition to the

increased demand from tourists to Wayanad and northern Kerala. The demand for office and commercial space in Kozhikode is also expected to grow at a fast pace owing to proposed IT initiatives, various state-of-the-art infrastructure projects, general business investments coming from the NRI groupsetc. To address this need for built space, Multifunctional zones are envisaged as high density development zones, and demarcated in areas of good accessibility and high economic potential for land. High end Residential, Commercial, Industries of non-nuisance nature, Public and Semi-public and Recreational uses are anticipated to be housed in this zone. The major areas identified and demarcated for this zone are the stretch between Arayidathupalam and Thondayad till Chevarambalam as well as Palazhi and Pantheerankavu, to tap the demand for commercial spaces arising due to developments in IT sector and Port. A few more pockets are identified at Beypore, near Kinfra Marine Park, Ramanattukara, Idimoozhikkal, Chaliyam, and Kadalundi. The area under this zone is 8.37 Sq.km, about 5% of the planning area.

22.1.5 Public and Semi Public Zone

The study of existing land use reveals that the Public and Semi Public Uses in the planning area don't sum up to even half of the requirement as per standards. Being the District and Taluk Headquarters and the most important service centre of North Kerala, it is imperative to save the existing land as well as to pool more land under this use to meet the future needs. Hence, the Public and Semi Public Zone is proposed so as to retain the existing public and semi-public uses, including religious uses. Only incidental uses to the main use are proposed to be additionally permitted in this zone except for construction in lands owned by public agencies. This zone constitutes 8.36 Sq.km, around 4.7% of the planning area.

22.1.6 Industrial Zones

22.1.6.1 Industrial Promotion Zone

To strengthen the industrial base of the planning area, major industrial zones are proposed in Cheruvannur Nallalam and Feroke, contiguous to the existing industrial developments and a new industrial area is marked in Olavanna, to house the storage, godowns and ancillary industrial uses arising by the development of port. All these areas are accessible either by rail or major roads or both, and water sources are available within reach, making them suitable for industrial purposes. The industrial promotion zone contributes to 2.69.km, around 1.5% of the planning area.

22.1.6.2 Small Industrial Zone

Small industrial zone is proposed as a contiguous belt in Cheruvannur Nallalam, Beypore, Ramanattukara and Feroke, extending the areas which already have industrial developments, spreading over 8.49 Sq.km, around 4.8% of the planning area. This zone is

dedicated for non-polluting medium and small scale enterprises. These areas are also accessible by rail and road and bordered by the river, suggesting its potential for industrial development.

22.1.7 Transport Zone

The land under various transport terminals like the railway station, bus terminals, truck terminals, lorry stands, parking, existing roads, etc and the land under ownership of railways are zoned as the transport zone. This contributes to about 9.9 Sq.km, around 5.5% of the planning area. Only incidental uses to the proposed transportation use is proposed in this zone.

22.1.8 Recreational Land uses

The existing land use analysis reveals that the recreational uses in the planning area falls gravely short of the requirement. The required recreational open spaces prescribed as per UDPFI guidelines for large cities is 1.2 to 1.4 Ha/1000 persons, which converts to 21.13 Sq.km in the planning area for the year 2031. The currently available parks and open spaces accounts to only 0.32 Sq.km. which leaves an unmet demand for 20.81 Sq.km of recreational open spaces for 2035. However, in the context of the planning area, reserving such an amount of land exclusively as open spaces is not feasible. Hence, recreational uses are zoned under three heads, as detailed below, to segregate buildable recreational zones from parks and open spaces.

22.1.8.1 Recreational Zone

The land between the NH 66 by-pass and Dream City is demarcated as recreational zone to facilitate recreational facilities such as fair grounds, open air theatres, exhibition centres and art galleries. Height of buildings is restricted to 10m in this zone. This accounts to 0.25 Sq.km, 0.14% of the planning area.

22.1.8.2 Tourism Promotion Zone

The part of Elathur rich in backwaters, areas adjacent to Dream City, a stretch of land along Chaliyar river in Olavanna and Ramanattukara panchayats and the areas adjacent to Kadalundi Kadavu near the mangroves reserve and bird sanctuary are envisaged as tourism promotion zone. Activities like industrial and commercial having polluting nature are not promoted in this zone. This zone contributes to 2.55% of the planning area, spreading over 4.54Sq.km.

22.1.8.3 Tourism Zone

There are few beautiful islands in Kallai river, Chaliyar and in Elathur back waters. These areas are envisaged as tourism zone. Activities like industrial and commercial having polluting nature are not promoted in this zone. Single storey buildings with less coverage

are only permitted in this area. This zone contributes to 0.33 % of the planning area, spreading over 0.59Sq.km.

22.1.8.4 Parks and Open Spaces

Existing Parks and Open Spaces are retained and new areas for parks are reserved in Beach, Arayidathupalam, Jawaharlal Nehru Housing Colony, Medical College, Beypore and Kadalundi. Many neighbourhood level parks are also proposed in the planning area. This land use constitutes 1.13Sqkm, 0.64% of the planning area. Only incidental uses to parks are proposed in this area.

These recreational uses together constitute around 6 Sq.km, about 3.5% of the planning area.

22.1.9 Agriculture zone

22.1.9.1 Dry Agricultural Zone

The dry agriculture areas, mainly coconut farms, in those localities of the planning area where environmental conservation is of importance, are proposed to be retained. Lower order residential, commercial, industrial, and public and semi-public uses are also proposed in this zone. The zone contributes to around quarter a percentage of the planning area.

22.1.9.2 Wet Agricultural Zone

The paddy fields in the planning area are proposed to be preserved as wet agricultural zone. No construction or land development activities are permitted in this zone. Around 2.0% of the planning area falls in this zone.

22.1.10 Water Body

Water bodies in the planning area are preserved under this zone. Fisheries and water sports related infrastructure as well as aquaculture activities are permitted in this zone, which covers approximately 7% of the planning area.

22.1.11 Cyber Park

Cyber Park, zone for the existing IT parks and future investments in IT sector is demarcated along the NH 66 by-pass in Palazhi.

22.1.12 Port and Allied Developments

It is identified that Beypore Port has the necessary potential to be developed into a full-fledged Cargo as well as Passenger handling port, and this would add tremendous impetus to the regional economic growth. Hence, around 0.7 Sq.km of land is identified for development of Beypore port and allied activities. Light and service industries, godowns,

ware houses, and residential uses incidental to the port are proposed to be housed in this zone additionally.

22.1.13 HeritageZone

For conserving the heritage areas/Structures identified in the plan area, heritage zones are proposed in Area around Mananchira Square, SM Street, Tali, Thiruvannur, Bilathikulam, Varakkal Temples, Kuttichira, Fort of Tippusulthan. The developmental activities in this zone shall be approved beforehand by the Art and Heritage Commission.

22.1.14 Environmentally Sensitive Area

Mangroves, waterlogged areas, riverfront, beach, islands, wetlands and paddy fields are demarcated as environmentally sensitive areas and assigned special developmental controls, in view of protecting the bio-diversity, natural drainage, and encroachment of river banks, beach and water bodies. Developmental and construction activities are not envisaged in this area other than those structures required for water supply and irrigation, embankment protection, activities for biodiversity and environment conservation, agriculture, horticulture, aquaculture, fisheries related infrastructure like Fish landing centres and boat jetties. These areas are also expected to serve as a recreational open space for the locality.

River banks having severe erosion problems shall be protected by constructing embankments. Stretches of Edakkandi Parambu, Chelappuram, Chittarikandi and Moozhikkal to kakkodi of Poonur Puzha and Ferok, BC road and Mullasserri of Chaliyar need urgent attention. Shore protection of Kallai River and Mampuzha shall be done throughout the length.

22.1.15 Green Strip

Other than CRZ regulations, no other regulations prevent the building constructions besides the river shores. Most of the major rivers will cover under the CRZ provisions, but some stretches are excluded from it. Hence a green strip of no construction zone is provided with a width of 10m for all major rivers in this plan area except for Poonur River. For Poonur River, this width is limited to 5m since the width of the river is less compared to the other major rivers.

22.1.16 Special Zones

22.1.16.1 Mobility Hub

A special zone for the mobility hub is demarcated at Malaparamba, which is envisaged as the regional transit centre where all modal interchanges can happen. 0.09 Sq.km, around 0.05% of the planning area is set aside for the mobility hub. Incidental uses of

the transit terminals of all modes as well as parking plazas are envisaged to be housed in this special zone.

22.1.16.2 Marine Park

Marine Park, a special zone for fisheries related industries is earmarked, near the existing Kinfra Marine Park in Beypore. An area of 9 Ha, additional to the Kinfrapark of 0.4 Ha, is set aside for industrial ventures like Fish Waste based Manure Plants, modern Fish Processing and Marketing Facilities, Fishing boat workshops, Net Repairing, Net Colouring Facilities, Net Factory, etc.

22.1.16.3 Nirdesh

The National Institute for Research and Development in Defence Shipbuilding (NIRDESH) at Chaliyam is marked as a special zone with a total of 18.79 Ha of land for the purpose including an additional 2.37 Ha zoned for the expansion of the project.

22.1.16.4 Knowledge Park

An area of 32 Ha is zoned for the proposed Knowledge Park at Ramanattukara. All incidental uses to the Knowledge Park are also proposed to be housed in this zone.

22.1.16.5 Parking Plaza

A Parking Plaza is identified at existing Bus Stand area at Palayam, having an extent of 2 Ha. 20% of the built-up area in this zone is proposed to be utilised for commercial purposes. Besides parking plazas are identified as component projects in various proposals, like, Multi-tier parking at Moffusil Bus Stand, existing DD office complex, Mobility Hub, SarovaramBiopark and in Beypore port allied developments zone.

22.1.16.6 Slaughter House

Provision of modern slaughter houses has been an unmet demand for long time, in the planning area. Therefore, three areas are demarcated for Slaughter houses, a major facility at Kothi, and minor facilities at Olavanna and Ramanattukara are proposed, amounting to a total area of 0.01 Ha set aside for this purpose.

22.1.16.7 Garbage Treatment Plant

9.8 Ha of land is set aside for the development of Solid Waste Treatment plant at Njeliyanparamba, and another Garbage treatment plant is proposed at Ramanattukara. Only buildings for incidental uses are proposed in this zone.

22.1.16.8 Buffer Zone

A buffer area of 6.2 Ha surrounding the Solid Waste Treatment Plant at Njeliyanparamba is proposed around the garbage treatment zone, to reduce further

introduction of human interferences and activities in this area. Only maintenance/reconstruction of existing buildings is proposed to be permitted in this zone.

22.1.16.9 Truck Terminal

Area zoned for truck terminal and related activities.

22.1.16.10 Water theme park

Existing two unused waterbodies are zoned as water theme parks.

22.2 Proposed Land Use Map

The proposed Land Use in the planning area is given in figure 22-1 and table 22-1.

Table 22-1: Proposed Land Use

Proposed Land Use	Area in Sq.km	Percentage of Total Planning Area
RESIDENTIAL ZONE I	78.04	43.76
RESIDENTIAL ZONE II	7.94	4.45
RESIDENTIAL ZONE III	6.45	3.61
MULTI FUNCTIONAL	8.37	4.69
COMMERCIAL ZONE	5.16	2.89
MIXED ZONE (RESIDENTIAL/COMMERCIAL)	12.37	6.94
PUBLIC AND SEMI PUBLIC ZONE	8.37	4.69
TOURISM PROMOTION ZONE	4.54	2.55
TOURISM ZONE	0.59	0.33
SMALL INDUSTRIAL ZONE	8.49	4.76
INDUSTRIAL PROMOTION ZONE	2.69	1.51
DRY AGRICULTURAL ZONE	0.81	0.45
RECREATIONAL ZONE	0.26	0.14
WATER BODY	11.85	6.64
TRANSPORT ZONE	9.69	5.43
PARK AND OPEN SPACE ZONE	1.13	0.64
WET AGRICULTURAL ZONE	3.70	2.07
CYBER PARK	0.30	0.17
ENVIORNMENTALLY SENSITIVE AREA	4.15	2.33
GREEN BELT AREA	0.75	0.42
DEFENCE LAND ZONE	0.19	0.11
PORT AND ALLIED DEVELOPMENTS ZONE	0.62	0.35
HERITAGE ZONE	0.03	0.01
SPECIAL ZONES		
MOBILITY HUB	0.09	0.05
PARKING PLAZA	0.01	0.001
EDUCATIONAL COMPLEX	0.37	0.21

KNOWLEDGE PARK	0.32	0.18
NIRDESH	0.19	0.11
GARBAGE TREATMENT PLANT	0.10	0.06
BUFFER ZONE	0.06	0.04
SLAUGHTER HOUSE	0.01	0.01
KINFRA MARINE PARK	0.09	0.05
TRUCK TERMINAL	0.05	0.03
WATER THEME PARK	0.58	0.33
Grand Total	178.32	100.0

* Total Planning Area as per census is 177.09 Sq.km. The total area including un-surveyed lands along the coast is estimated as 178.32 Sq.km from the land use map.

When the proposed land uses are classified along with the most resembling land uses, the category wise split-up as presented in table 22-2 is obtained. It can be seen that Residential use constitute about 50% of the proposed land uses for the planning area. Pucca Commercial land use constitutes about 3% and more commercial is envisaged under mixed use and multifunctional zones. Industrial uses constitute 5%, public – semi-public 5% and transportation around 6% of the planning area. Around 7% is water bodies, suggesting the possibilities for waterfront development, water based recreation , tourism and water ways development.

Table 22-2: Proposed Land Use – Categorised

Proposed Land Use Category	Area in Sq.km	Percentage of Total Planning Area
Residential	92.42	51.83
Commercial	5.16	2.89
Mixed Zone (Residential/Commercial)	12.37	6.94
Multifunctional Zone	8.37	4.69
Tourism Promotion Zone	5.13	2.88
Industrial	8.49	4.76
Hazardous	2.69	1.51
Public and Semipublic	8.37	4.69
Transportation	9.78	5.49
Port and Allied Developments	0.62	0.35
Recreation, Stadium Parks and Open Spaces	1.39	0.78
Dry Agriculture	0.81	0.45
Wet Agriculture	3.70	2.07
Environmentally Sensitive Areas	4.90	2.75
Water body	11.85	6.64
Others	2.28	1.28
Total	178.32	100.00

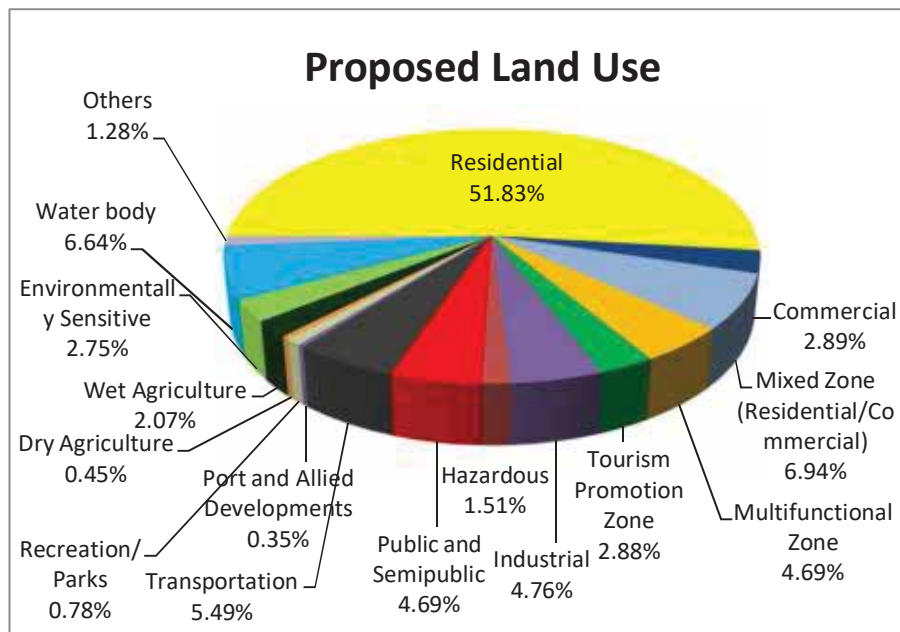
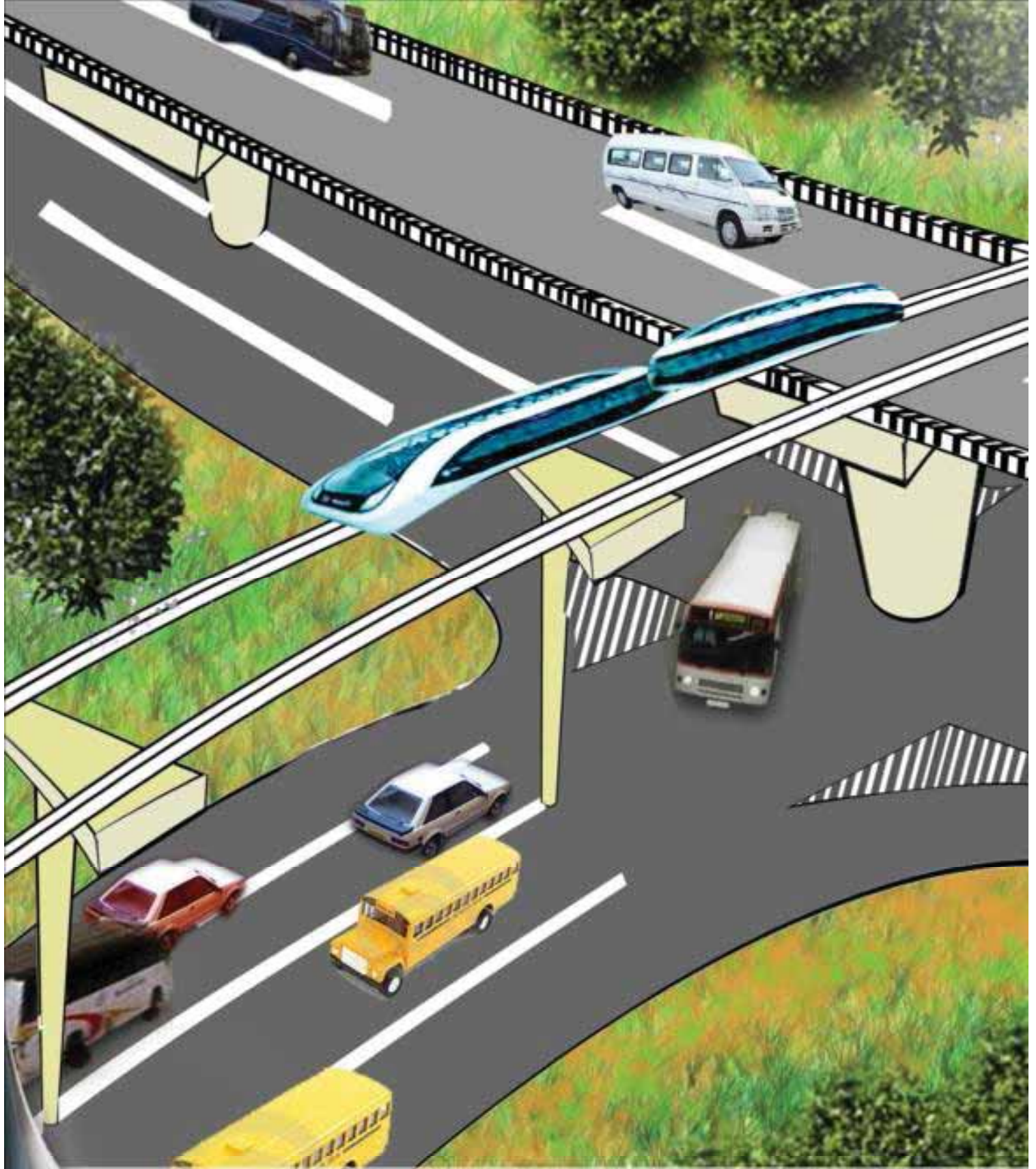


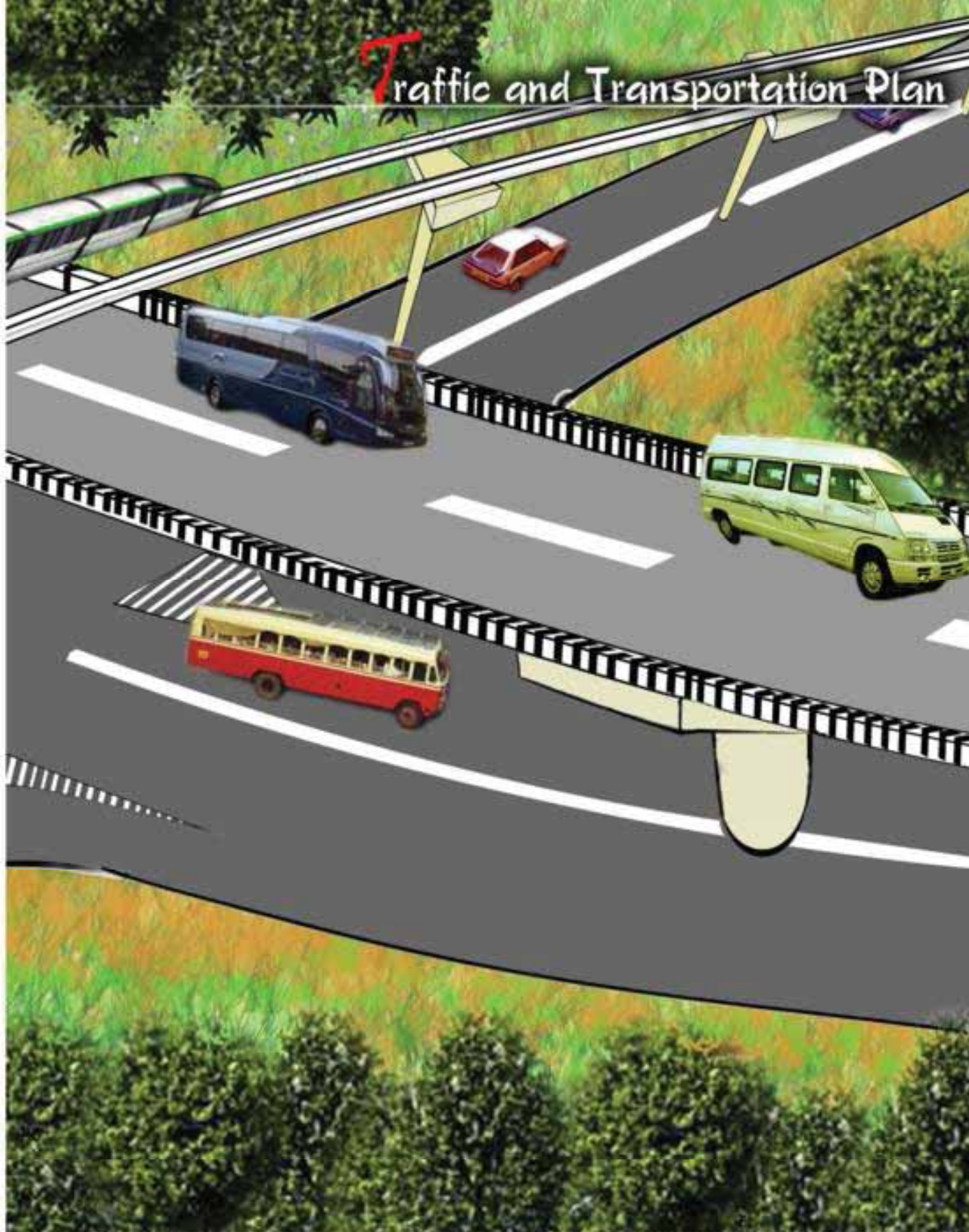
Figure 22-2: Proposed Land Use categories

Combining the envisaged commercial development in multifunctional zone and mixed use zone, the total share of land in planning area put to commercial uses is expected to be around 11Sqkm, about 7% of the developed area. Similarly the land expected to be under industrial uses , together in Multifunctional Zone , Industrial, Small industrial and Port and Allied Developments is around 14 Sq.km, around 9% of the developed area. In the same way, the land envisaged to be put to residential uses is about 96Sq.km, i.e., 61% of the developed area. This is expected to result in a densification of the residential areas to 135persons/Ha from the existing 64 persons/Ha, by 2035.Likewise, besides the allocated land under Recreation, Stadium and Parks and Open Spaces, the environmentally sensitive areas and water bodies are envisaged to be used for eco-friendly recreational purposes. The tourism promotion zone and tourism zone are also expected to cater to the recreational needs of the public. Thus the total land use expected to be used for recreational purposes account to 26 Sq.km, constituting 17% of the developed area. Public and semi-publiclanduses are expected to the extent of 9 Sq.km, around 5% of the developed area. The share under transportation uses is around 9%, combining the port, railways and the road. Thus, the total developable area proposed is 157 Sq.km., which would result in an increased developed area density of 83 persons/Ha compared to the existing 49 persons/Ha.



- * Road Widening, Traffic Segregation & Geometric Improvements
- * Loop Bus Services & Dedicated Bus Corridors for Public Transport
- * Mobility Hub with Road, Rail, Water and Air connectivity at Malaparamba
- * Inland Waterway Network with Connectivity to Hub
- * Evacuation Route * Proposed Rail Extension * Flyovers * Rail Over Bridges

Traffic and Transportation Plan



- * Two Tier Road for bypassing New City Core
- * Seven Bus Terminals at Periphery and Bus Routing.
- * Parking Plazas at Major Nodes
- * Truck Terminals & Dedicated Truck Lanes in N-S and E-W Directions
- * Evacuation Route

- * Proposed Rail Extension
- * Flyovers
- * Rail Over Bridges
- * Green Corridors
- * Development of a Walkable Community

It is identified from the study and analysis of existing transportation infrastructure that Kozhikode Study area has a very good circulation network, but with over utilised links, which connects almost all the major activity centers in the area. Masterplan area is blessed with main roads in both N-S and E-W direction at regular interval of about 2Km. Other than road, study area has railway stations and proximity of International airport. The un-utilised waterway network can be used as a major transit mode in near future. Air, water, rail and road mode of transport options are presently available in the study area, road network being the most preferred mode by users. The main problem in road connectivity is its insufficient links, with low carrying capacity and poor geometry.

Hence, the connectivity concept for Kozhikode urban area is “Strengthen the arterial and sub arterial roads in the plan area for efficient inter-zonal connectivity, improve the local and collector roads and construct missing links for intra-zonal accessibility, along with improved facilities in other modes of transport with state of the art technologies in connectivity sector”. The strategies proposed to be adopted include strengthening of the existing North –South, East – West linkages by maximum use of existing right of way and without significant widening; promoting public transport and providing access to public transportation corridor within walking distance; segregating intra-city traffic way from the city core by establishing a full-fledged multi- modal mobility hub along NH 66 by-pass near Malaparamba with Loop bus services connecting Airport, Railway Station, Inter City and Intra City Bus Terminals; enhancing organized parking facilities in urban core by constructing parking plazas; implementing Light metro / elevated road corridors in already congested corridors; providing Bus lanes/ cycle tracks/traffic segregation in accident prone areas; employing traffic management measures like Junction improvements, signage and signals; and development into a walkable and inclusive city with pedestrian friendly streets, physically challenged and elderly - friendly bus stops and streets, low floor buses, ladies only trips in all surface transport modes and the like. It is proposed that all the areas shall be ensured access to public transport either by a road having width 7m or above serving every 2km² areas or providing access to a road of minimum 7m width within walking distance (800 m) or establishing bus routes and bus stops having service area of 800 m.

The road network for Masterplan area is planned by sticking to these aspects. The main proposals in this plan are summarised below.

23.1 Road Widening, Traffic Segregation and Geometric Improvements

The immediate measure for reducing the congestion in study area is the widening of roads and geometric improvements. Most of the important roads in the plan area are proposed for widening. The important widening proposals, the proposed widths and the major nodes in the stretch are given in the table 23.1. Out of this, almost 75% of widening proposals are the un-implemented proposals in the existing Masterplan. As development

controls are being implemented in these areas, the required land for widening is still undeveloped.

Table 23-1: Proposed Road Details

Sl No:	Road Name	Right of Way (m)	Major Nodes
1	N H 66 By-pass	45	Ramanattukara - Pantheerankavu - Palazhi - Thodayadu - - Vengeri - Pooladikunnu
2	Mavoor Road	30	Arayidathupalam - medical college - Mavoor
3	Wayanad Road	30	Nadakkavu - Civil station - Moozhikal -
4	Beypore - Arappuzha	24	Beypore - Cheruvannur - Kolathara - NH 66 By-pass
5	N H 66	24	Ramanattukara - Feroke - Meenchanda.
6	N H 66	24	Meenchanda - Kallai - Mananchira - Nadakkavu - Pavangadu - Elathur
7	Kuttiadi Road	18	Pooladikunnu - Purakkattiri
8	Coastal Road	24	Calicut Beach - Vengali
9	Beypore Beach Road	24	Beypore - Naduvattom Beach
10	Mini By-pass	20	Mankavu - Meenchanda
11	Kuttiadi Road	18	Pavangadu - Eranjikkal - Pooladikunnu.
12	Medical College - Karanthoor Road	18	Medical College - Mundikkal Thazham - Karanthur
13	Balusseri Road	18	Karaparambu – Vengeri- Kakkodi
14	Mooriad- Methottu Thazham	18	Mooriad Bridge – Methottu Thazham
15	Kadalundi - Ferok	18	Kadalundi - Prabodhini - Mannur - Ferok
16	Mannur -Ramanattukara	12	Kallampara- Perumugham-Ramanattukara
17	Mooriad Bridge - Kunnathupalam	18	Mooriad Bridge - Kunnathupalam
18	Mini By-pass	18	Westhill - Eranjipalam - Arayidathupalam - Mankavu
19	Palazhi - Mathara Road	18	Palazhi - Iringallur - Mathara
20	Old Beypore Road	18	Beypore - Marad - Panniyankara
21	Christian College - Karimbanapalam Road	18	Christian College - Karimbana Palam
22	Palazhi - Perumanna Road	15	Palazhi - Perumanna.
23	Puthiyangadi - Kakkodi Road	15	Puthiyangadi - Kunduparamba - Thanneerpanthal - Kakkodi.
24	Francis Road- Mooriad	15	Francis Road - Pushpa Junction – Mooriad Bridge

Length of roads of different carriage way widths proposed in this Masterplan along with approximate project cost for construction including land acquisition and road furniture is given in Table 23-2 below.

Table 23-2: Approximate Project Costs for Road Infrastructure Development

Proposed Road Width (m)	Type	Length (Km)	Cost (in Crores)
12	Proposed New road	6.96	415.00
	Widening of Existing road	138.34	
15	Proposed New road	2.32	105.00
	Widening of Existing road	50.68	
16	Proposed New road	1.94	50.00
	Widening of Existing road	19.75	
18	Proposed New road	1.77	210.00
	Widening of Existing road	64.46	
20	Proposed New road	0.00	10.00
	Widening of Existing road	2.57	
24	Proposed New road	21.16	415.00
	Widening of Existing road	50.87	
30	Proposed New road	3.25	270.00
	Widening of Existing road	40.76	
45	Proposed New road	0.93	180.00
	Widening of Existing road	20.98	
Grand Total			1655.00

For segregating pedestrian and Vehicles, continuous unobstructed footpath of minimum 2m width shall be provided on either side of all streets with right of way 12m or more. Similarly, dedicated and physically segregated bicycle tracks with a width of 2.5m, one in each direction shall be provided on street with right of way 24m or more.

Cycle tracks and pedestrian routes shall be identified. The micro level detailing of these shall done as a separate study.

23.2 Mobility Hub with Road, Rail, Water and Air connectivity at Malaparamba

Widening of existing roads and introduction of few missing links will relieve the traffic problems inside the city to a great extent. But if the existing bus terminals (Palayam and Mofussil) continue to function as the mobility centres, all inter and intra zonal traffic will still get attracted to city core and would not help reduce congestion. Hence, a new

transportation terminal, which would also act as a state-of-the-art interchange hub - a Mobility Hub -, is proposed at Malaparamba along the NH 66 By-pass, an area where all the vehicles from North, East and South can easily approach without traversing the commercial core. The existing Moffusil bus stand is proposed to be reserved for city services.

The mobility hub is deemed as a transit centre of the city where all modal interchanges can happen. Besides the bus terminal for all intercity and long route buses it is proposed to house, a good connectivity to the proposed monorail station and water way connectivity to EK canal is also proposed from hub, so that once the proposed inland water transport through EK and BK canals start, the Hub can act as the city terminal for the same. Loop bus services are planned to operate from hub to connect the major activity centres in the urban area, namely railway station, Moffusil bus stand, medical college etc. Connectivity to monorail station at Malaparamba is planned with a dedicated connection through NH 66 by-pass. A helipad may also be provided at the hub, to improve airways linkage. These facilitate road, rail, air and waterway connectivity at Hub. Different modes of transport will be operated from different levels at hub. Besides, a parking plaza shall be provided at hub. Grade separated interchanges with minimum conflict points from NH by-pass shall be provided to the hub for reducing the mobility problems caused by the vehicles from and to the hub at NH By-pass.

Waterlogged area in the hub can be changed as water bodies and waterfront allied commercial developments shall be made available here. Besides, hotel, lodging, office and commercial spaces and tourist facilitation centres will be provided inside the hub, which would improve the work-home relationship, tourism infrastructure as well as economic viability of the project. Artist's impression of the Proposed Mobility Hub is given in figure 23.1. The estimated project cost for the implementation of Mobility Hub is and the proposed implementation time frame is approximately Rs. 400 Crores and the suggested implementation time frame is 2015-2025.

23.3 Loop Bus Services and Dedicated Bus Corridors for Public Transport

It is inferred from the mode split analysis that the share of public transport is about 75%. When compared to national average, it is very high. But in the case of Kozhikode, city's public transport sector still needs improvement. Congestion in buses at peak hour is very high. Average occupancy of buses at peak hour is about 100 persons. For making public transport more attractive, some dedicated bus lanes and circular bus routes are proposed in this Masterplan. These routes are shown in figure 23-2.

The proposed dedicated bus routes are

1. Hub – Malaparamba – Moozhikkal - Kunnamangalam
2. Hub – Thondayad – Medical College.
3. Hub – Thondayad - Ramanattukara – Airport.

4. Hub – Malaparamba – Eranhipalam – Nadakkavu – Palayam Railway Station.
5. Railway Station – Cherooty Road – Gandhi Road – Nadakkavu – Hub.

A typical cross section for 30m wide dedicated bus route is given in figure 23-4. In the case of Hub to railway station route, 30m wide road is not available for the whole length. Hence one directional dedicated route is planned here.

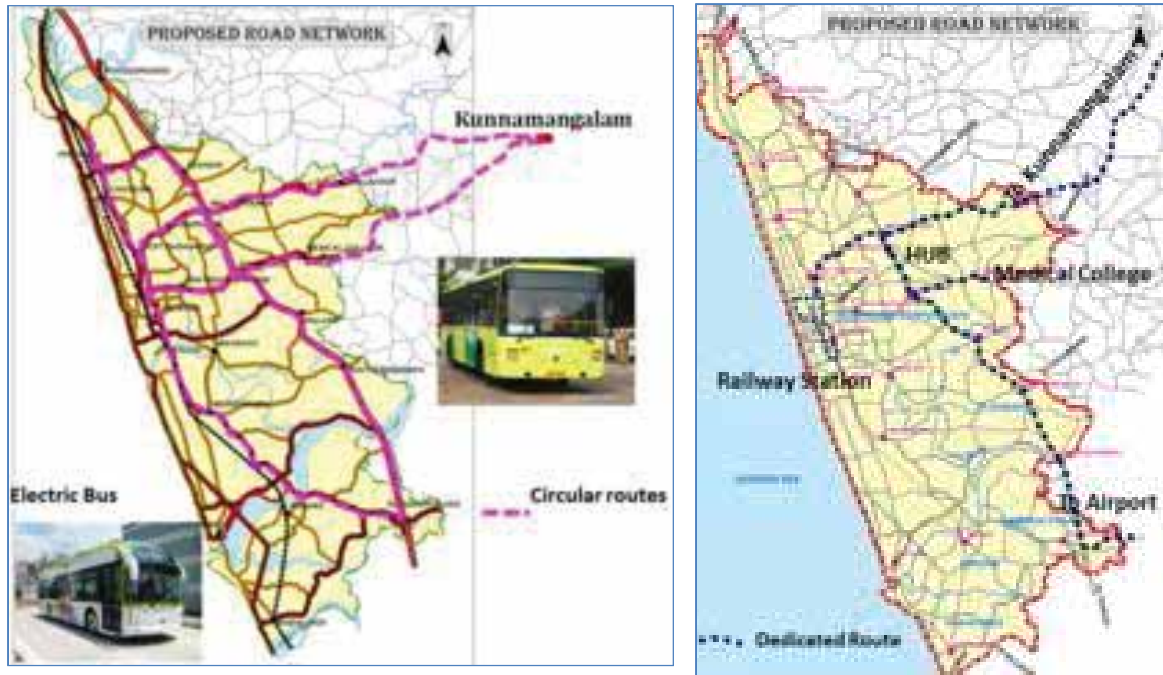


Figure 23-1: Loop Bus Services and Dedicated Bus Corridors

Three loop bus service routes are envisaged in this plan. Those are,

1. Hub – Malaparamba – Malikkadavu – Puthiyangadi – Elathur Terminal - Puthiyangadi – Nadakkavu – Kallai – Meenchanda – Ramanattukara Terminal – Pantheerankavu – Thondayad – Hub.
2. Hub – Malaparamba – Moozhikkal – Kunnamangalam - Medical College - Thondayad – Hub.
3. Hub – Malaparamba – Eranhipalam – Nadakkavu – IG road – Thondayad – Hub.



Figure 23-2: Shoulder Lane dedicated route

Low floor energy efficient buses or electric green buses can be used as circular buses. At some links, this route ties with dedicated routes. At this links, dedicated route can be used for plying of circular buses. At other links, a dedicated route may be provided for buses at shoulder lane as shown in figure 23-3.



Figure 23-3: An Artist's impression of the Proposed Mobility Hub

The estimated project cost is approximately Rs. 40 Crores and the proposed implementation time frame is 2015-2020.

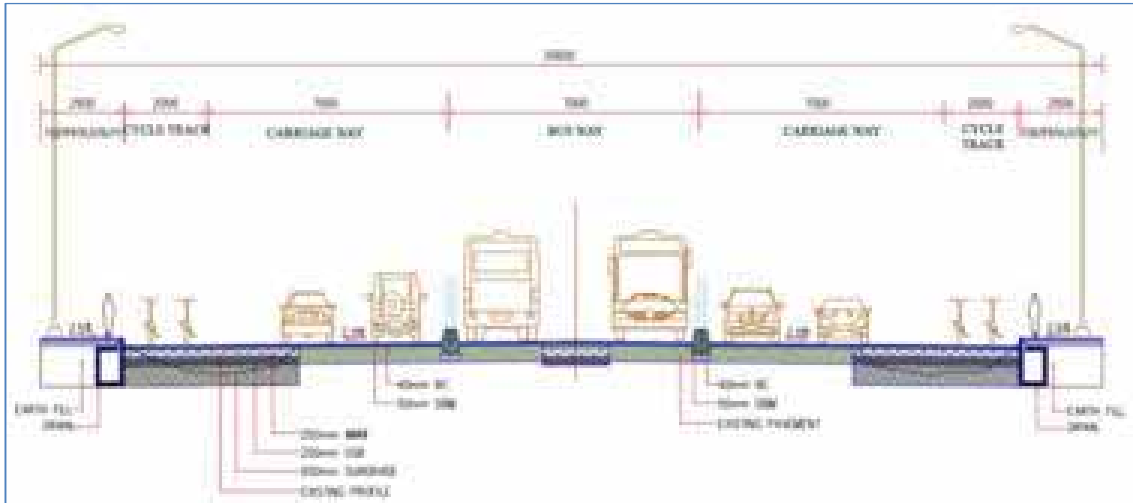


Figure 23-4: Dedicated Route

23.4 Inland Waterway Network with Connectivity to Hub

National Waterway No 3 is located in Kerala, and runs from Kollam to Kottapuram and was declared a National Waterway in 1993. Since Kerala have lots of inland water bodies and hence chances of extension of this national waterway is very high. A waterway, which runs for the entire length of planning area, can be constructed by developing EK and BK canals. The proposed waterway is shown in the figure 23-5. This can be easily connected to hub by developing a canal from Sarovaram area to hub through existing water logged area. This canal can also be used as a water ambulance route in the case of emergency. Minimum width of this



Figure 23-5: Waterway Network

canal shall be kept as 15m.

Few focus points of proposed waterway are,

- Cargo movement: Cheapest mode of transport through the city to suburbs with added scope due to port development and Vadakara – Mahe Canal in implementation
- Passenger traffic: Speedy passenger movement from Malappuram, Vadakara, Koyilandy to mobility hub and to Medical College. Passenger boats can ply economically from Feroke to Elathur.
- Flood Control: The waterway will act as a major drainage channel
- Tourism Circuit: Continuous water based network connecting Focal Points - Elathur water front development – dream city – Beypore – Kadalundi bird sanctuary

Besides, the feasibility of a by-pass for this inland waterway may be studied and steps taken accordingly, if developing the stretch passing through the city core to the required standards of the national waterway is not feasible. In this case, the waterway network passing through the city core can be used for exclusively for the city's needs and tourism circuits.

The estimated project cost is approximately Rs. 200 Crores and the proposed implementation time frame is 2015-2025.

23.5 Mass Transit Options: Light Metro and High Speed Rail



Figure 23-6: Light Metro Network

The ambitious venture of Kozhikode, the Light Metroproject is at the anvil. Another major mass transit proposal is the high speed rail corridor. Of these, the first phase of light metro-rail corridor, from Medical College to Meenchantha, which connects existing bus terminals and railway station, being a high quality public transit option, is expected to bring down the traffic congestion at the city core to a great extent. In second phase, it is proposed to be extended to Airport and Civil Station. But this phase will only start after considering implementation as well as financial success of first phase. Proposed alignment for light metros shown in figure 23-6. The estimated project cost is approximately Rs. 100 Crores for two phases and the proposed implementation time frame is 2015-2025.

High-speed rail may not reduce the congestion in the city and it will attract a marginal percentage of

rail and long route bus passengers to it. The High speed rail project is in its planning stage and the station is planned at Malaparamba opposite to proposed Mobility Hub.

23.6 Two Tier Road for by-passing New City Core



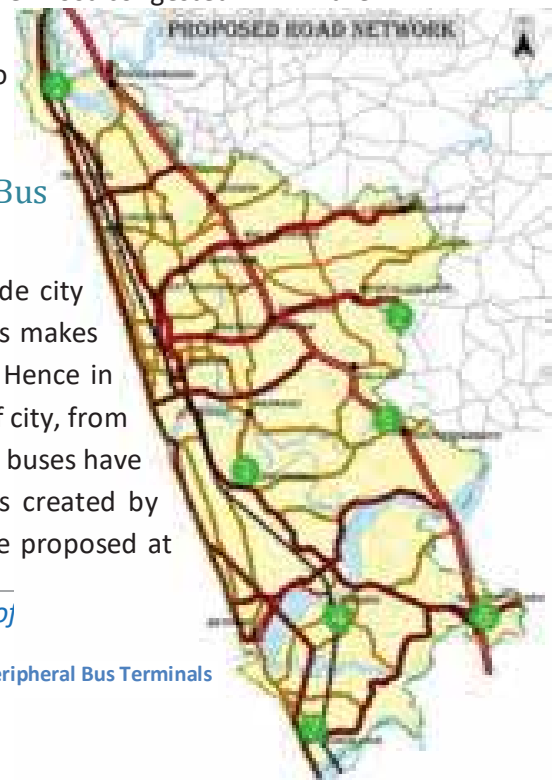
Higher order development and IT industries besides NH by-pass between Malaparamba and Thondayad will increase the traffic volume in this portion of NH. Moreover the newly proposed mobility hub will have its influence on this

road to a higher extent. Hence introduction of an elevated road by-passing this new city area is planned for catering the requirements of through traffic. This will reduce the accident rates as well as congestion in this future business corridor. This elevated road shall start prior to Thondayad junction and end after Vengeri Junction. This will help the through traffic to by-pass three major roads, Mavoor Road, Wayanad Road and Balusseri Road and 5 minor roads along the 3.5 Km stretch on NH By-pass. The elevated road is deemed as four lanes above the six lane divided carriage way of NH 66 By-pass. The estimated project cost is approximately Rs. 60 Crores and the proposed implementation time frame is 2018-2024.

Like Thondayad – Malaparambu another major traffic corridor of Kozhikode city is Kallai –Nadakkavu stretch of existing NH66. This is one of the most congested link in the Kozhikode Corporation. An elevated road is also proposed in this stretch. The elevated road shall start prior to Meenchantha Junction and end after Westhill Junction.

23.7 Seven Bus Terminals at Periphery and Bus Routing

Now all the city buses (City service buses, plying inside city and its periphery) halts at Mananchira and surroundings. This makes large interruption in the flow of other vehicles at city core. Hence in this plan, few bus terminals are proposed at peripheral area of city, from where all city buses should start and end their service. No city buses have halts at city core. This will remove the congestion problems created by long time halting of city buses in city core. Bus terminals are proposed at



Elathur, Medical College, Meenchantha, Feroke, Pantheerankavu, Ramanattukara and Kadalundi. The estimated project cost is approximately Rs. 400 Crores and the proposed implementation time frame is 2015-2020.

23.8 Parking Plazas at Major Nodes

Parking is one of the main problems faced by city in present days. The vehicle growth is very high in past decades, but the areas reserved for parking is very less. The identified parking plaza locations (Figure 23-8) are

1. Palayam Bus Stand and Vegetable Market area.
2. DD office complex area.
3. Multi-tier parking at Moffusil Bus Stand
4. Near Mobility Hub
5. Near Sarovaram Biopark
6. Near Beypore port

The estimated project cost is approximately Rs.200 Crores and the proposed implementation time frame is 2015-2020.



Figure 23-8: Parking Plazas

23.9 Truck Terminals and Dedicated Truck Lanes in N-S and E-W Directions

Intense port activities demands for a container/Truck terminal. A truck terminal is proposed at Kolathara. Once this terminal is established, Trucks to Wayanad side is to be diverted to Kunnamangalam without disrupting city traffic through Port - BC Road - NH By-pass–Pantheerankavu–Kunnamangalam. Trucks to N-S direction can ply through proposed coastal highway. The proposed truck lane is shown in the figure 23-9. Other than this main terminal, two more terminals/stands are proposed at Vengeri besides NH By-pass and Vengali near Railway Over Bridge. This terminal at vengeri is mainly meant for trucks coming to existing agricultural market at



Figure 23-9: Proposed Truck Terminals

Thadambattuthazham and towards the north east side of Kozhikode Corporation. The terminal at Vengali is proposed at the area comprising of the unused road up to railway line and the lower side of existing Railway Overbridge, and this area can be used by the trucks operating at Puthiyappa Harbour. The estimated project cost is approximately Rs.340 Crores and the proposed implementation time frame is 2020-2025.

23.10 Evacuation Route

Presently Calicut city lacks an evacuation route. The old city area situates between Calicut beach and railway line. Existing city core situates between railway line and Canoli canal. The barriers, Railway line and Canoli canal causes interruption to the traffic from city towards east side, especially to medical college. Similarly, these barriers cause problems in traffic when large passenger movements come to city core and beach at the time of exhibitions and conferences. Now roads are available in this direction but all are major city arteries. Hence these cannot be taken as a fixed evacuation route. In this plan an evacuation route is proposed in E-W direction from beach to medical college. This route will start from beach through existing Gandhi road. Then an elevated road shall be constructed from existing ROB in front of Providence School to Sarovaram area. This elevated road will bypass Kannur road at Christian College junction and its mini by-pass at Sarovaram. After Sarovaram the road will continue on Panathuthazham – Mundikalthazham Road till Kalandithazham junction at grade. From Kalandithazham this road will turn south and enter the Medical College Campus. The elevated road is shown (in orange dotted lines) in figure 23-10. The estimated project cost is approximately Rs.35 Crores and the proposed implementation time frame is 2015-2020.

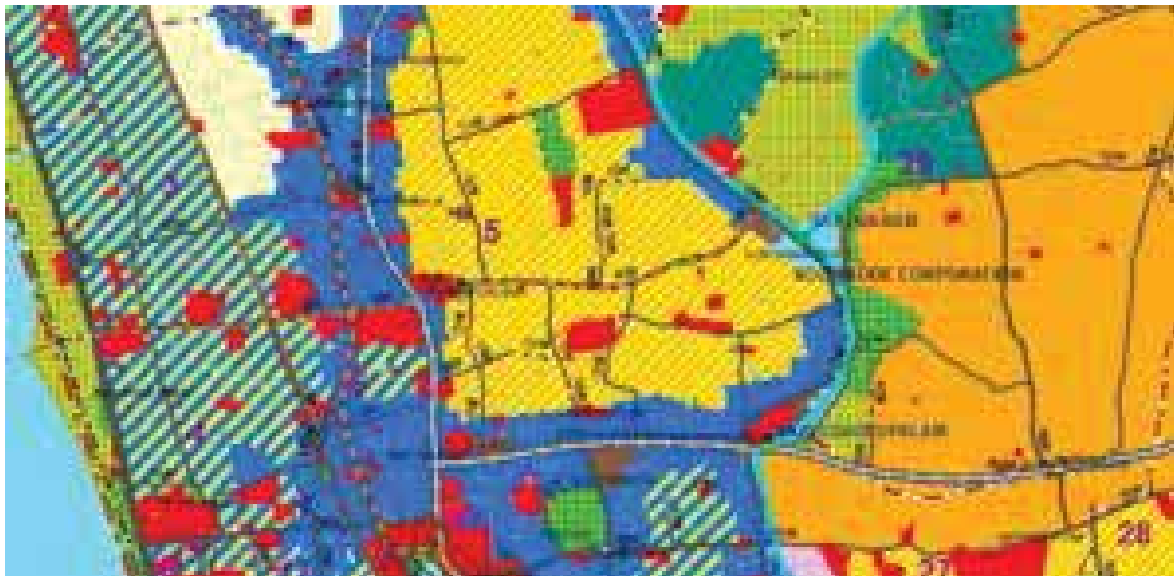


Figure 23-10: Evacuation Route

23.11 Proposed Rail Extension

The proposed development of Beypore Port is anticipated to create huge cargo movements in the planning area. Rail connectivity to the port will be mandatory in such case, to help the to and fro movement of goods related to the port and to reduce the cargo movements on road to manage-able limits. Hence, a rail extension of approximately 3.66 km is proposed at Feroke towards Beypore Port with the intention to facilitate goods traffic to and from the port, as shown in figure 23-11. The estimated cost for the project is Rs.55 crores and the proposed implementation time frame is 2018-2025.

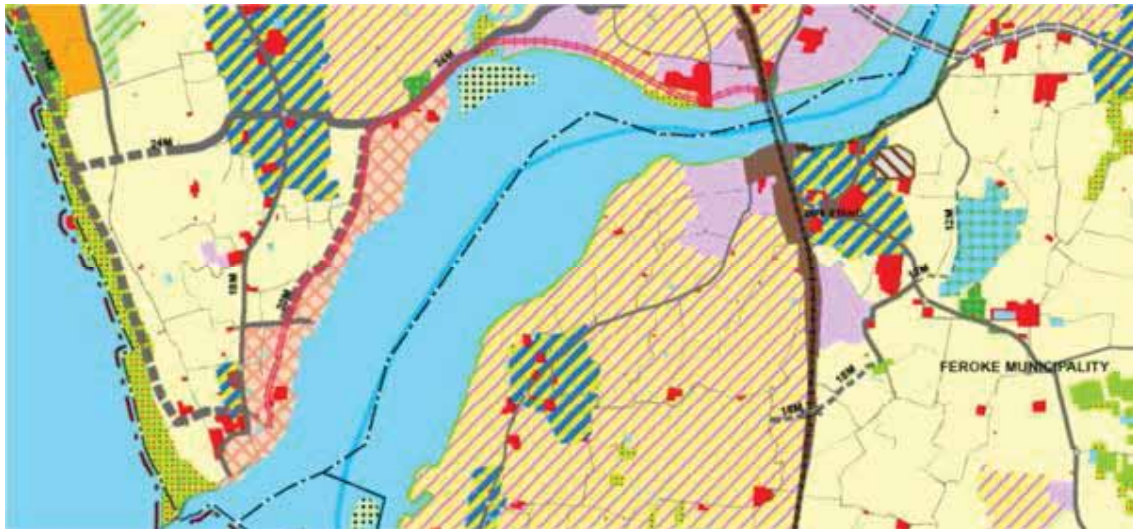


Figure 23-11: Proposed Rail Extension

23.12 Flyovers

The following flyovers are proposed at the following junctions, as they are necessary for reducing the congestion and accidents at junction and for improving the net speed of vehicles. Ramanattukara

- Pantheerankavu
- Pooladikkunnu
- Eranhipalam
- Cheruvannur
- Karaparambu
- Puthiyara- Stadium Junction
- Beypore
- Railway Station road to Oyitty Road

The estimated project cost is approximately Rs.150 Crores and the proposed implementation time frame is 2015-2025.

23.13 Rail Over Bridges

To increase the accessibility to western areas of Masterplan area, the following railway over bridges are proposed

- Westhill Chungam,
- P T Usha road
- Panniyankara
- Parappuram (Ward 51)
- Feroke near IOC
- Kadalundi near Panchayat Office
- Kadalundi Near Bus stand

The estimated project cost is approximately Rs.105 Crores and the proposed implementation time frame is 2015-2025.

23.14 Junction Improvement Plans.

The intersections are the areas where pedestrians, bicyclists and motor vehicles conflicts together. The intersections include not only the pavement area, but typically the adjacent sidewalks. Hence designed intersections are necessary to reduce the accidents to a great extent.

Major junctions in study area which require improvement measures are:

Bank Road Junction, Cheruvannur Junction, Chevayur Junction, Eranhipalam Junction, Feroke Town Junction, Karapparamba Junction, Malaparamba Junction, Mankavu Junction, MCC Junction, Medical College Junction, Meenchantha Junction, Palayam Junction, Pantheerankavu Junction, Pavangad Junction, Poonthanam Junction, Pottammal Junction, Pushpa Junction, Rajaji Junction, Ramanattukara, Rly Stn-Link road Junction, Thodayad Junction, Vattakinar Junction and Westhill Junction

Various measures can be adopted for the improvements of the junction are listed below.

- Reduction in the frequency of intersection conflicts can be achieved by separating through and turning movements.
- Restrict or eliminate some turns during peak period, or totally.
- Install pavement markings.
- Provide lane assignment signing or marking.
- Improve visibility of intersections by providing enhanced signing and delineation.
- Provide continuous sidewalks, pedestrian signs, signals and markings for the protection of pedestrian traffic.

Visibility at intersections is one of the major factors in safety at intersections. According to IRC 66-1976 there are two specific intersection conditions viz:

- Uncontrolled intersections where the intersecting roads are of more or less equal importance and there is no established priority.
- Priority intersections like minor road intersections where one road takes virtual precedence over the other. Traffic on minor road may be controlled by Stop or Give way signs / Road markings.

For priority intersections, *IRC SP 41, Guidelines for the Design of At-grade Intersections in Rural and Urban Areas*, recommends a minimum visibility of 15m along the minor road while for the major road; sight distance equal to 8 seconds travel at design speed is recommended. For a design speed of 50Kmph, the distance should be 110m. Adapting these values might have resulted in prohibition of construction at about 20 cents of land adjacent to intersection and the same might have create problems for commercial and residential developers in towns in Kerala, where mainly ribbon development and high road density is seen. Hence values slightly less than those recommended by IRC is adopted in this plan and the recommended distances to be kept free of construction is given in section 25.1 Zoning regulations.

The estimated project cost is approximately Rs.100 Crores and the proposed implementation time frame is 2015-2025.

23.15 Auto and Taxi Stands

Auto Rickshaws popularly known as Autos and taxi cars are an integral part of the urban and rural transportation system in the state. Autos are widely being used as a transit agent for relatively shorter distances, especially by the common public in order to transfer from one transit mode/ location to another, also to reach to specified destination from primary transit modes such as bus terminals, railway stations, airports and sea ports. Taxis are deployed when the distance to be travelled is relatively larger, and when it is required to save time. Autos and taxis act as feeder agents to the main public transport means by transporting passengers from distant areas to the public transport network.

Auto and Taxi stands are generally referred to be a queue area, where autos and taxis line up to wait for the passengers. Auto/ taxi stands are usually

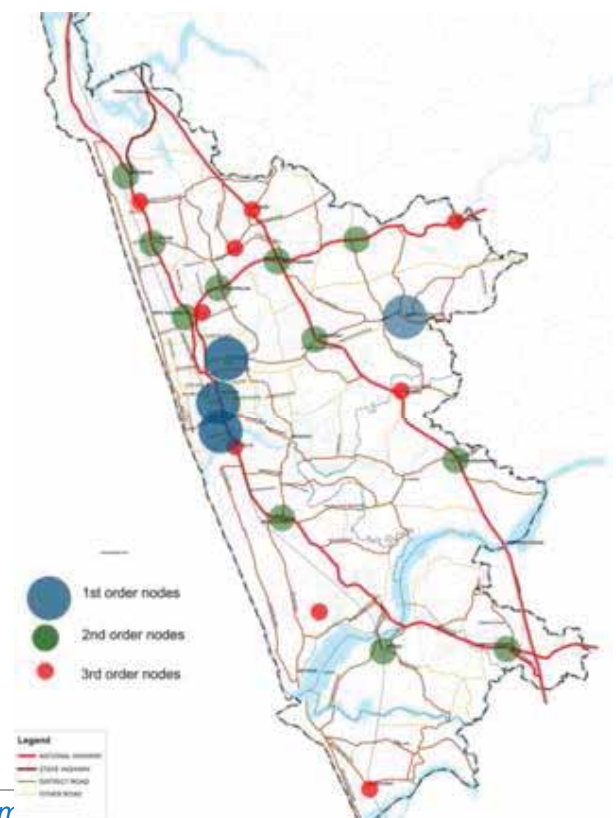


Figure 23-12: Major nodes of Plan area

located along the side of the main road, mainly on public land. Presently the queue extends up to the main roads, thereby causing inconvenience to the free flow of other traffic.

Presently the public transit nodes of the town can be classified in different types of nodes with respect to their volume of passengers being handled can be classified as given in fig 23.12. The Railway Station, Mofusil bus stand, palayam bus stand and the Medical College junction receives maximum number of commuters for auto and taxi usages hence fall in to 1st order nodes. Hence at these locations taxis and auto stations need to come up with keeping state of the art facilities. These to include various facilities like, digital prepaid booking kiosks, digital queue management systems, comfort stations, rest areas for the drivers, information centers, convenience shops and so on. The 2nd and third order nodes receives commuters less than that of the first order and at these places dedicated bays and facilities need to be provided, which allows the comfortable and safe commuting of passengers, keeping the main traffic flow hurdle free.

23.16 Bus Bays

Bus bays in general can be referred to be a space on the side of the main carriage way where in buses can be pulled over from the main route so that the passengers can get in and off the buses without hindering the flow of traffic behind. Bus bays can be attached with bus waiting shelters, but not necessarily. The main function of the bus bays are to ensure that no traffic in the route is affected while buses are stopped on their course of service.



Figure 23.13:– Typical layout of a bus bay (For illustrative purpose)

Currently, the buses stop right over the carriage way blocking one entire lane. This prompts the long trail of traffic behind to fall in queue behind the buses and the entire traffic movements in the lane are stopped until the buses start to move further. The scenario gets repeated at each and every bus stop, resulting in considerable delays and traffic deadlocks. When the scenario develops vehicles from behind tends to overtake the bus ahead, mostly in a desperate manner. This can result in fatal accidents and other unpleasant circumstances critically endangering the safety of the other road users. Also, the

bus operators get hardly enough time to stay at the bus stops for the passengers to safely board and de-board the buses.

Presently the city had limited number of stops where in designated bus bays are functioning, whereas have much scope for improvements making use of the available infrastructure. Location specific designs need to be adopted considering various aspects. Based on the availability of land the existing bus stops can be categorized to the following three types.

- a) Type A – Carriage way is wide enough that, land under public ownership is available by the side of the carriage way, for the construction of a detailed, designed bus bay. Typical layout of the type A bus bay is given in Fig23.14

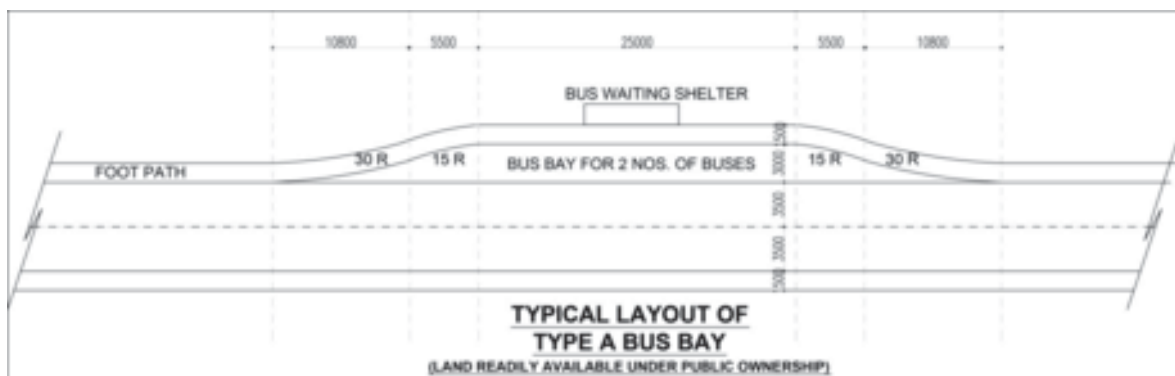


Figure 23.14: Typical layout of type A Bus Bay



- b) Type B – Carriage way is wide enough that, the land is available for the construction of an improvised bus bay, and the typical layout of the type B bus bay is given in Fig23.15

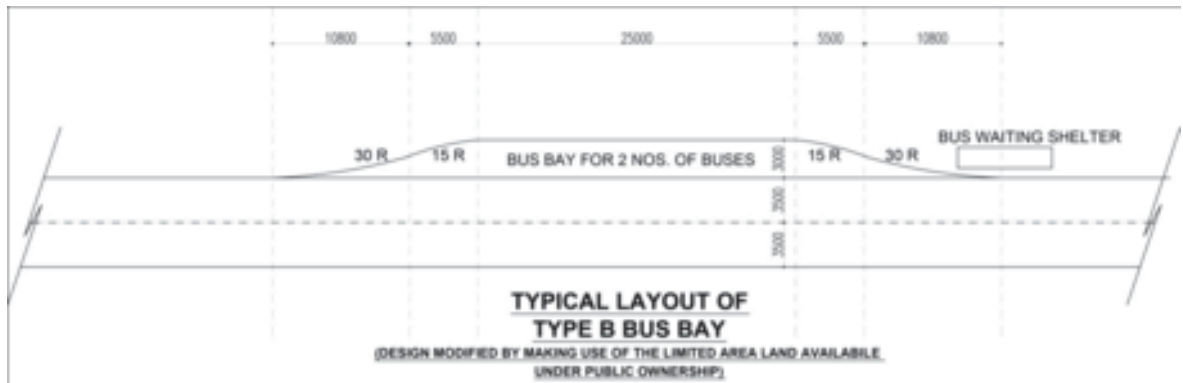


Figure23.15: Typical layout of a type B bus bay.



c) Type C – In this type of bus stops, the land available are not enough to provide any further improvements. Land to be arranged for in order to construct the bus stops by different means.

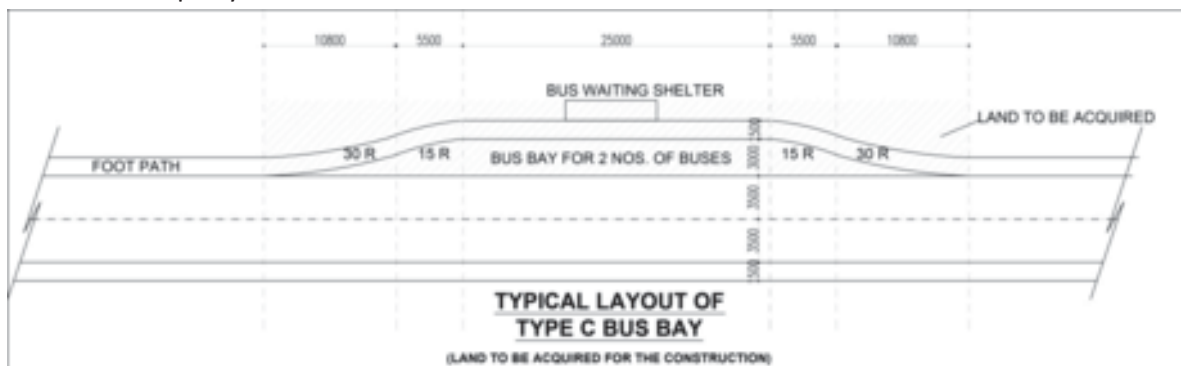


Figure 23.16: Typical layout of a type C bus bay.



The spatial distributions of the different types of bus stops in and around the planning area are shown in the figure 23.17.

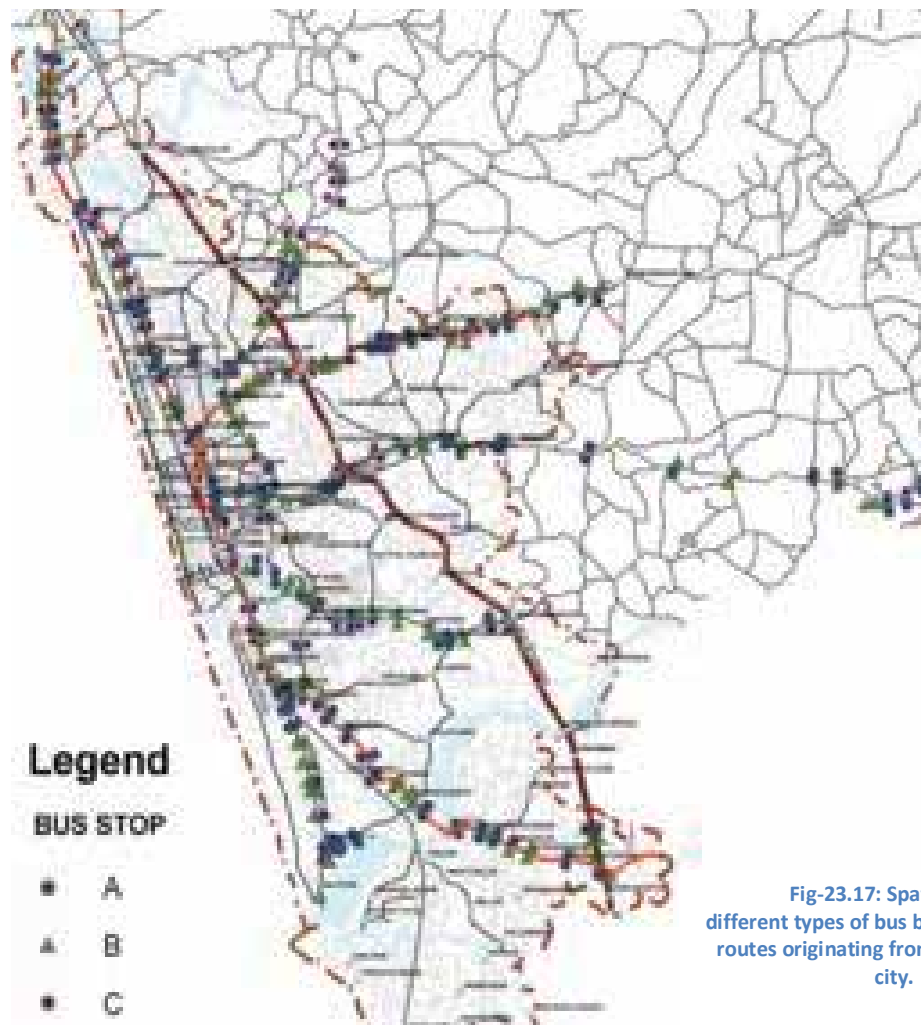


Fig-23.17: Spatial distribution of different types of bus bays on major bus routes originating from the Kozhikode city.

Study on availability of land on eight major routes as shown in figure 23.17 reveals that, either designated well designed bus bays, or improvised bus bays (type A or B) can be provided at almost 80% of the locations, making use of the characteristics of existing right of ways, without going for additional and acquisitions. Wherever land is not available at present, (Type C locations) land need to be acquired by various means, including

- a) Providing development right incentives.
- b) Association with commercial centers nearby and providing bus bays within their shopping precincts.
- c) Sponsorship through providing advertisement rights on the bus shelters at major centers, and
- d) Through traditional land acquisition processes.

23.17 Green Corridors and Heritage walk

Green corridors or GreenWalk Ways, connecting the green areas and water bodies in the city, are proposed to enhance the 'Green – Blue Network' in the planning area, the pilot stretch from Sarovaram to Beach and further in all possible stretches, with the purpose of increasing cycle and pedestrian friendliness of the urban centre and to promote health and environment friendly habits among its residents.

The project intends to make the city more pedestrian and cyclist friendly, attractive for tourists as well as to create a stress buster for the residents of the city core. The first phase of the proposed walk way is planned to connect Sarovaram Bio Park to Kozhikode Beach through Mananchira, connecting as many green patches and water bodies as possible. Building this walk way employing various resorts of landscaping will leave no space for monotony and will make the walk way more attractive. Even the neglected backyards of various buildings can be interlinked and landscaped to achieve continuity through heavily built areas. This will also help better utilisation of the otherwise neglected urban spaces and will ensure technical feasibility of the project.

Walkways besides Kallai River from Kothi Bridge to Kallai Railway Station and from Feroke to Arappuzha Bypass Junction are another two green – blue walk ways to be developed. Various methods to implement this walk way, even through heavily built areas and different terrains, is represented in figure 23-18 (Picture Courtesy: Public Domain). To enhance the economic feasibility, the project can be implemented with private participation in building the network as well as lifelong maintenance, linking it with the CSR activities of various establishments in the city.



Figure 23-18: Green Walk ways

Another walk way in Kadalundi is proposed, connecting bird watching centres and mangrove parks. Cycle tracks are proposed to be developed along with these walk ways in all feasible stretches. Considering the Sarovaram – Beach walk way as the pilot stretch, such walk ways can be extended to all parts of the planning area in later stages. The estimated project cost is approximately Rs.10 Crores and the proposed implementation time frame is 2015-2020.

Similar to this green walkway, Heritage walk corridors connecting heritage areas in the District are also proposed in this Plan. A heritage walk stretch can be developed between Varakkal Beach and Canoli Canal, connecting heritage places of Varakkal vavu bali tharppana (a ritual for the departed souls) beach, Varakkal Temple, Barracks Church, Freemason Building, V K Krishnamenon Museum and Canoli Canal.



Figure 23-19: Proposed Heritage Walk

23.18 Development of a Walkable Community³

Walking, the most primitive and basic transportation mode, have given way to automobile-oriented transportation, in the last few decades. This has already revealed its negative impacts and is increasingly affecting the public health, transportation infrastructure, economic development, and social equality. The Kozhikode City Police, with the help of schools in the planning area, is putting in laudable efforts in creating traffic awareness and pedestrian friendliness in the planning area.

The Masterplan sets the basic policy frame work to promote walkability through mixed use and multi-functional zones, and allocation of high-density development areas near major transit centres. Besides, a comprehensive project is proposed herewith, to build communities in the planning area where people are not only given the opportunity to reach their destinations on foot safely, but also ensured a 'quality time' spent on walking. Since the hindrances to pedestrian movement are of variety, the measures to overcome them should also be multi-dimensional. The project also intends to promote cycling, being a non-polluting, green and healthy mode of commuting, like walking. Walking and cycling can help reverse poor health trend, and is particularly important for the elderly, disabled, and lower-income people who have fewer opportunities to participate in sports or formal exercise programs, and cannot afford to drive owing to health/financial reasons. It is hoped that, if the trips about a kilometre in length – equivalent to less than 20 minute walk - can be reduced from the total traffic volume, the congestion problems can be reduced to a significant extent in the peak time. Improvement in walkability will benefit the elderly in specific, as they are mostly confined to the houses due to the absence of safely walkable premises, besides strengthening the social fabric, by creating ample opportunities for social interaction. The project components include

- Immediate traffic control measures including
 - Construction of raised, offset and high-visibility pedestrian crossings (zebra lines, as referred locally) and Pedestrian Islands at the existing crossings and other required places. The raised pedestrian crossing is a higher section of pavement with a pedestrian crossing (zebra line) marked on it, having sloped ramps for the driver leading and following the flat raised-crossing section. They should be raised to the standard height of a pedestrian foot path, or of the existing footpath, if any. They force the drivers to slow down, and chance of an accident and fatality decreases with decreasing speed. Such crossings thus ensure a safer crossing for the pedestrians,

³Source of images and concepts used in this section is 'Steps to a Walkable Community - A Guide for Citizens, Planners, and Engineers' by Sam Schwartz Engineering and America Walks – Making America a Great Place to Walk. The images are used purely for representation purposes.

besides making it easy for the elderly and physically challenged, when integrated with a network of pedestrian foot paths, guaranteeing a walk at the same level.



Figure 23-20: Examples of Raised Pedestrian Crossing



Figure 23-12: Example of an Offset Crosswalk and Pedestrian Island

An offset crosswalk is one with a center median that acts as both a pedestrian safety island and means of directing pedestrians to look toward oncoming traffic before crossing the second half of the street.

- Design and planning interventions to reclaim flood prone sidewalks which are not accessible/ safe during monsoons.
- Creation of Safe Routes to Schools/educational institutes—create a pedestrian sidewalk network towards educational institutes from important transit points, residential localities etc., prioritized based on the accident-proneness of the area, age group of the students of the institution etc..
- Installation of redlight cameras and speed cameras
- Installation of signalled intersections with leading pedestrian

interval/split phasing to accommodate conflict free pedestrian crossing phases, pedestrian exclusive crossing phases and turning/ pedestrian friendly modifications to existing signals systems / pedestrian detecting signals



Figure 23-22: An Accessible Pedestrian Signal

- Installation of accessible pedestrian signals to accommodate the needs of challenged / impaired pedestrians which provide audible signals and vibrating surfaces etc. to indicate the appropriate time for pedestrians crossing.
- Preparation and strict implementation of a Pedestrian Master plan which provides a comprehensive outline of the walking transportation network and identifies projects that will enhance and encourage walking throughout the community. The master plan should

- Prepare a 'street user hierarchy framework' for the planning area . A street user hierarchy defines the order of priority of various street users in a particular street, from a design and implementation perspective, and urges each user to do justice towards the more vulnerable street users. A street hierarchy that prioritizes pedestrians would rank street users in the following order: pedestrians, cyclists, transit users, freight transporters, taxi drivers, and private-vehicle drivers.



Figure 23-23: A Traffic Zone Specifying the Speed

- Delineate 'Traffic Zones'- Traffic zones specify and standardize expected travel behavior by clearly identified zones, such as 40 kmph, 30 kmph, and 20 kmph zones, pedestrian-priority zones with continuous and clear route for pedestrians with reduced mobility and dedicated pedestrian-only areas.

- Build a Comprehensive Sidewalk Network with Safe Routes to transit stations, hospitals, public places etc., and targeting special sections of population like the elderly, challenged, women etc..

- Redesign important roads to include Motorised Vehicles', Walking, and Bicycle lanes by adapting roadway geometry (including reducing or narrowing travel lanes), traffic-signal plans, and adjacent land uses.

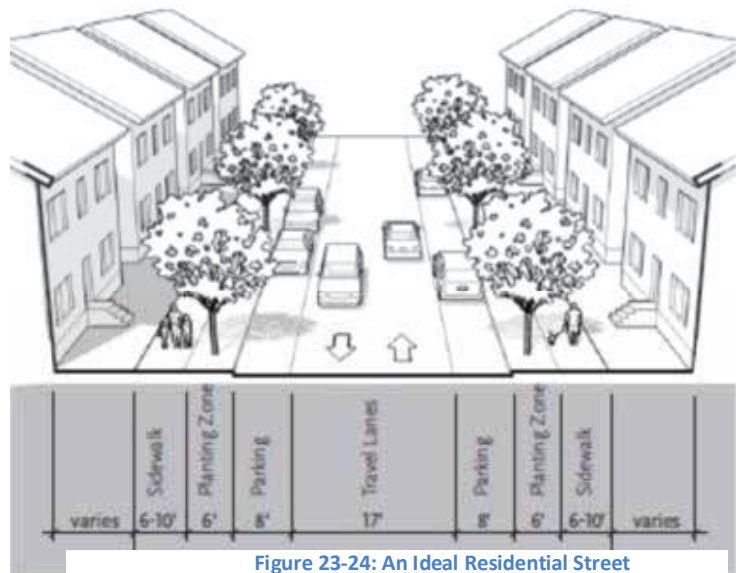


Figure 23-24: An Ideal Residential Street

- Locate parking lots/plazas in such a way to encourage walking
- Identification and temporary conversion of unused public/private land to organised parking lots.

- Build Pedestrian and Cyclist Bridges and Create a Pedestrian Way-finding System – signages and way finding maps/digital installations at all required places to facilitate seamless flow of pedestrians between various destinations.



Figure 23-25: A Pedestrian and Cyclist Over Bridge

- Formulate legal provisions ensuring higher penalties for drivers who harm more vulnerable roadway users, such as pedestrians and cyclists.
- Suggest and implement urban design and street improvement measures to transform walking to a pleasant experience.

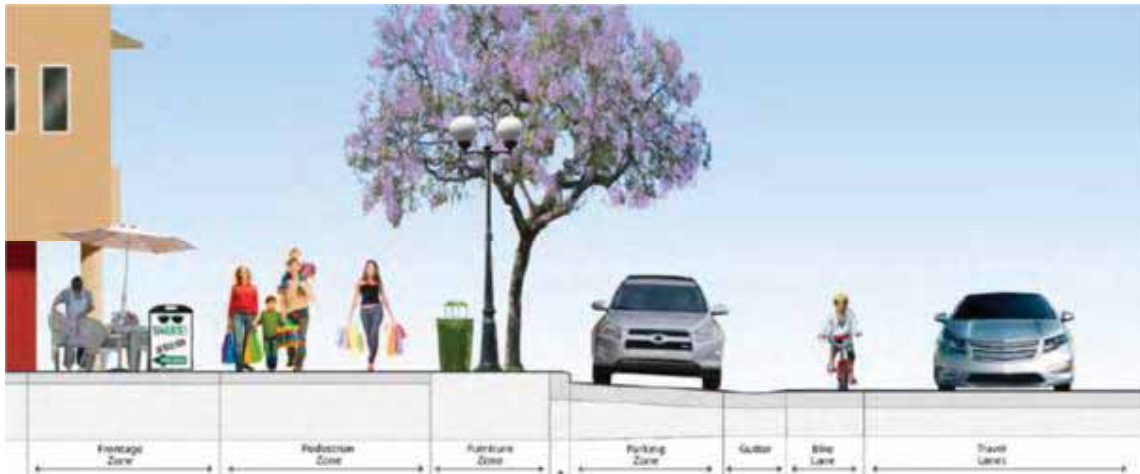
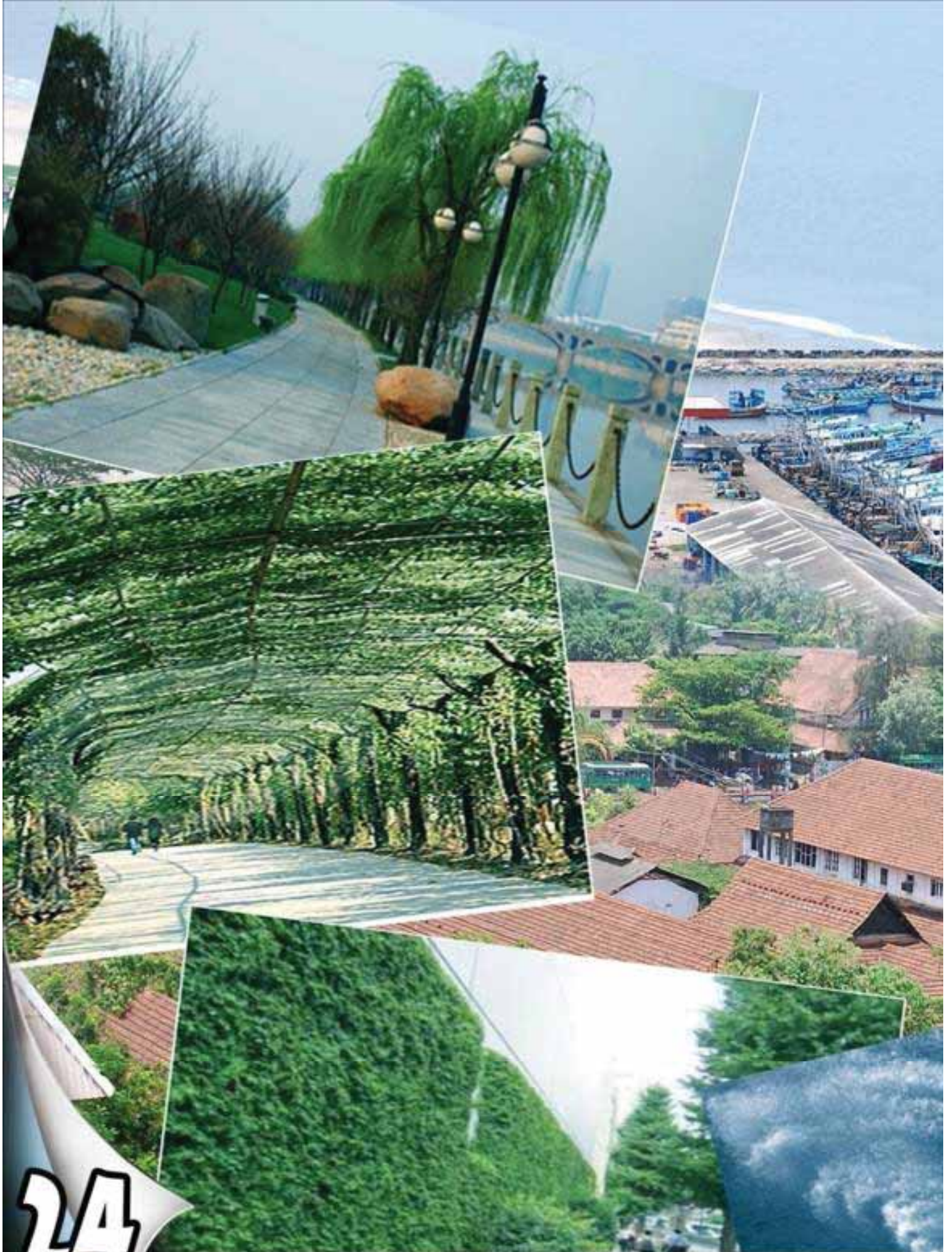


Figure 23-26: Cross Section of a 'Complete Street'

- Facilitate Phase wise transition of the streets in planning area to 'Complete Streets' – where the rights-of-way are designed for safe access for everyone on the street, regardless of age, ability, or mode of transportation. Such streets shall be designed to accommodate hawkers, pedestrians, street furniture and greens, parking, utilities, segregated lanes for cycles, motor cycles, public transit, personal vehicles etc., an example for which is presented in figure 23-26.

The estimated project cost is approximately Rs.5 Crores and the proposed implementation time frame is 2015-2031.



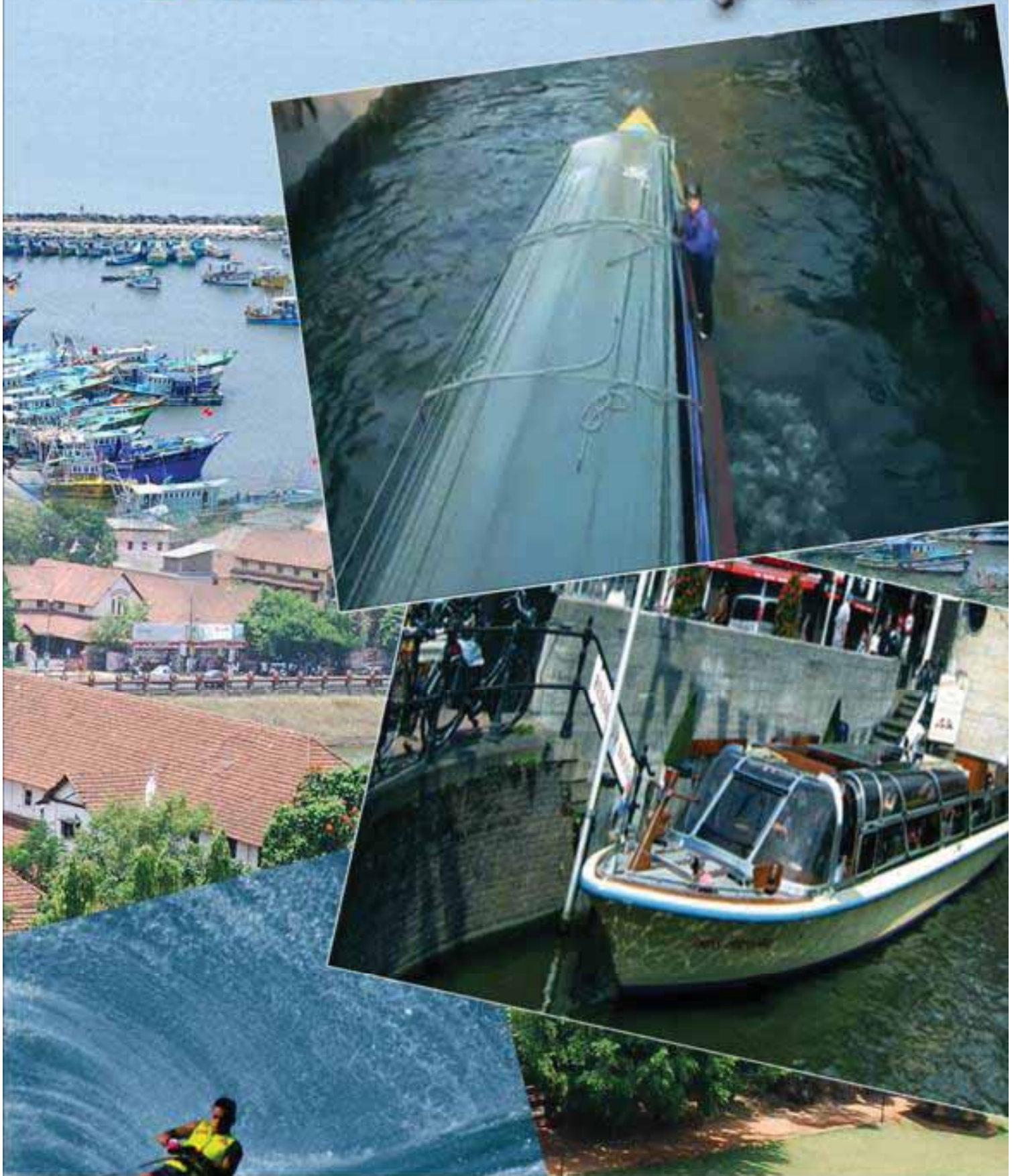
24

* Economy

* Industries

* Trade & Commerce

Sectoral Proposals



* Tourism

* Fisheries

* Agriculture

* Animal Husbandry

24.1 Economy

The study and analyses reveal that the planning area needs to strengthen its economic sector so as to create its own identity in the economic scenario of the state. The city is blessed with a highly enterprising business community, the potential of which is yet to be tapped optimally. The bloom of IT industries provides a new hope for the industrial sector of the planning area. Besides, the city has high potential in fisheries sector, which can be enhanced with proper infrastructure for harvest as well as export oriented processing. The promising potential in water based, health, educational and business and eco- tourism is untapped thus far. Hence, the general policy towards economy of the planning area is to “Provide a focus for the economic initiatives in the planning area, and create a vital position for the city in the economic scenario of the state”.

24.1.1 Industries

The policy in industrial sector is to “Attract focused investments in industrial sector through provision of land and infrastructure”. A two-pronged strategy of attracting New Age industries while supporting the traditional economy by infrastructure provisions has to be implemented. It is proposed that IT sector shall focus on product oriented initiatives, to create its unique position in the state’s IT initiatives. Besides, suitable land for large scale private sector/public sector/PPP mode MSME industrial estates has to be earmarked, to overcome the hurdle of unavailability of suitable industrial land. Simplifying rules and regulations pertaining to MSME sector and streamlining functions of Single Window Clearance Board is essential to promote the MSME sector. Also, common infrastructure like testing laboratories, marketing outlets, facility centre etc. has to be established through cluster initiatives to make this sector more cost effective. In this context, it is envisaged to develop Feroke as ‘Industry Friendly Panchayat’ with such common infrastructure. Strengthening of technical institutions like ITI, Polytechnic etc. is necessary to create more employable man power. Specific interventions for women oriented industries and increase in female work participation shall be in focus. Specific proposals in industrial sector are detailed below.

24.1.1.1 Proposal for Expansion of IT sector

Location: Kozhikode Municipal Corporation and Olavanna Grama Panchayat, near Palazhicontiguous to existing IT parks).

Project Rationale:IT sector in the study region is in infancy, but has good prospects, Kozhikode being a dream destination for high quality work and life, thanks to the serene environment and high quality life offered by the city. The low manpower costs bundled with high literacy and abundant talent pool, moderate real estate costs, reasonable cost of living etcare expected to make the planning area a preferred destination for IT companies and other knowledge based industries in the coming decades. The region is also strategically

placed with good accessibility to Bangalore, the most important IT destination of the country as well as other major IT hubs like Mangalore, Kochi and Thiruvananthapuram. The region also has many prestigious schools in the field of science, technology and management which ensure the availability of highly skilled human resources required for IT sector, as well as training personnel and aids. The existing IT initiatives in the city are product development oriented, which enhances the potential for Kozhikode in the IT map of Kerala, as a unique IT destination of the State with focus on Product Development, against the services-focused IT initiatives of Kochi and Thiruvananthapuram. Hence, it is proposed that the IT sector in the planning area may be enhanced and more land may be delineated and allocated for this purpose.

The proposed location for expansion of IT sector initiatives is at 15-minute drive from the city centre and railway station and 20-minute from the Karipur International Airport contiguous to the existing Uralungal and Government Cyber Parks, which already have SEZ status. Locating the future industries next to the existing ones will not only reduce the associated infrastructure costs, but also result in better sustainability by sharing of existing infrastructure and resources and lifetime reduction in operating cost and wastage of resources. Hence the expansion of IT sector is proposed at land contiguous to the existing Cyber Parks.

Implementation Time Frame 2015-2031

24.1.1.2 Proposal for Knowledge Park at Ramanattukara

Location : Ramanattukara Gramapanchayat, Resurvey No.s 201p, 202p of KarinkallaiDesam, 229p, 235p, 236p, 237p, 240p, 241, 242p, 243p, 244p, 247, 248p, 251p, 252, 253p of VelipramDesam

Project Rationale:The proposed Advanced Technology Park in Ramanattukara is a joint venture between Kerala Industrial Infrastructure Development Corporation (KINFRA) and INKEL Ltd. The Rs.9,000 crore project is projected to generate 25,000 direct employment opportunities and 30,000 indirect jobs. The foundation stone for the project is already laid and the acquisition of land for the 80-acre park is over and the project is expected to be completed in five years.



Figure 24-1: Proposed Knowledge Park, Ramanattukara

The park will have centres for industrial production and research oriented activities

in electronics, microelectronics, avionics, biotechnology, nanotechnology and pharmaceutical research and development, a field where Kerala lags behind. The proposal is to construct Knowledge Park with Financial Services, BPO, KPO, LPO, etc., Accommodation facilities, Open Air Auditorium, Multi Products and Services Park, Health and Wellness Zone, Green Zone With Water Body, Convention and Exhibition Centre.

The Masterplan delineates the area acquired for the Knowledge Park and facilitates its development.

Project Cost Rs. 500 Crores

Implementation Time Frame 2015-2019

24.1.1.3 Proposal for Bronze and Clay Cottage Industrial Cluster

Location: Resurvey No. 25p of Olavanna Desam, Olavanna Panchayat

Project Rationale: Olavanna Panchayat is a hub of artisans who craft clay and bronze products. It is important to recognise their traditional knowledge and skills and assure their progress and welfare, amidst the rush behind new age industries. To facilitate their development, an area of 0.3 Ha, currently under the stagnant Bell Industries, is delineated as a Bronze and Clay cottage



Figure 24-2: Bronze and Clay industrial cluster

industrial cluster. The land is owned by Olavanna Gramapanchayat. This project was proposed by the Gramapanchayat, during the 'People's aspirations' studies.

The roads adjacent to the proposed industrial cluster in N-S and E-W directions are proposed to be widened to 12m, to enhance the accessibility to the area. It is proposed that the industrial cluster's focus should be on the production of value added products like the earthen pots for composting biodegradable wastes, besides the traditional products.



Figure 24-3: Value added products suggested for production in the cluster

* Images from public domain used for representative purposes only.

Project Cost Rs. 0.5 Crores

Implementation Time Frame 2015-2017

24.1.1.4 Proposal for Women's Industrial Clusters

Location

1. Resurvey No.s 223p, 250p, 251, 252, 270p, 286p in Puttekkat, NalloorDesam, Feroke Panchayath
2. Abandoned clay mining areas in Resurvey No.s 170p, 171p, 173p, 174p, 175p, 180p, 182p, 183p of NalloorDesam, Feroke Gramapanchayat and Resurvey No.s 42p, 43p, 44p, 46p, 47p, 56p, 57p, 58p, 59, 60, 61p, 62, 63, 85p, 175p, 176p, 177p, 178, 179p, 180p of Cheruvannur Desam, Kozhikode Corporation
3. Kadalundi Gramapanchayat, resurvey nos. 145p, 146p, 147p, 149p, 150p of MannurDesam.

Project Rationale:The planning area lags behind in Female Work Participation. Hence, women oriented industrial clusters and skill development centres are promoted in the planning area.



Figure 24-4: Centre to Promote Women Entrepreneurship and Skills Development in Feroke Panchayath



Figure 24-5: Women's Industrial Cluster, Kadalundi

In Re Sy.No 250/4 and nearby plots in Puttekkat, Millath Colony, Feroke Panchayat, a Centre to Promote Women Entrepreneurship and

Skills Development to impart training to women in IT,

Management of Xerox, Lamination, Internet Café centres etc., Beauty Parlour and Cosmetology, Catering, Hospitality, Cookery and Food Products, fisheries products, Coir Products, Home nursing, Agriculture Nurseries, Textile Technology, Driving, Automobile Workshops, Medical technicians etc is proposed.

Women-oriented industrial projects are proposed in the abandoned clay mining areas in Feroke and Cheruvannur Nallalam, as well as Church Compound in Kadalundi Panchayat. These units are proposed to house women only units for tailoring/garment manufacturing, jewellery manufacturing, copra manufacturing, chapathi making, fish and sea food processing, catering and food processing, soda manufacturing, dairy/poultry farms and products, fully mechanized laundry, commercial production of sanitary napkins, hollow brick production, etc..It is proposed that widows, women who are sole breadwinners of their families, SC/ST women and women from BPL families must be given reservation in the skill development programmes as well as job opportunities in these initiatives.

Project Cost Rs.20 crores Implementation Time Frame 2015-2020

24.1.1.5 Proposal for Beypore Port Ancillary Industries

Location: Resurvey no.s 2, 3p, 4p, 6p, 7p, 8p, 10p, 11p, 12p, 13p, 14p, 15p, 24p, 25p, 26 of Kadalundi desam of Kadalundi Gramapanchayat, resurvey nos. 33p, 34p, 35, 36p, 53p, 54, 55p, 58p, 59p, 61p, 62p, 63p, 64p, 84p, 85p, 86p, 87p, 88p, 89p, 92p, 94p of Beypore Desam of Kozhikode Corporation

Project Rationale: The natural Port of Beypore, a prominent port of past and a major fishing harbour, has a history, dating back to many centuries of trade relations with the Arabs, the Chinese and the Europeans. Today, it's a minor port, but handles around 95% of the cargo dealt by the minor ports of Kerala. The proposed improvements at the Beypore port to develop the port to international standards, and to make it a major container terminal after Vizhinjam and Vallarpadam as well as an international passenger terminal with facilities for crew change and supply of fuel, lubricants, food, water and provisions for carriers plying in the Singapore-Fujairah shipping route, will certainly make it the focus of the regional economic development.



Figure 24-4: Beypore Port Ancillary Industries

These proposed developments brings forth immense opportunities for export oriented food processing industries, ship breaking units, material handling equipment's renting and maintenance services, bunkering, lubricants, food, water and provisions supply chain link services, manufacturing units for fenders, marine equipment and channel marker buoys, net manufacturing units, container manufacturing units, engineering industries, service stations etc.. Hence an area of 66 Ha adjacent to the port, along Chaliyar River, is set aside for promoting such developments, along with other residential developments, maritime schools and offices associated with the port. The area is also proposed to have rail and road connectivity.

Project Cost Rs. 800 crores

Implementation Time Frame 2015 - 2031

24.1.1.6 Proposal for Uru making Cluster

Location InPort and Allied Developments Zone

Project Rationale The ship building yards of Beypore is famous for the traditional Beypore Uruor Dhow, the



Figure 24-5: Proposed Uru Making Cluster

Arabian trading vessel. Besides, huge vessels called *Pathemari* were also constructed in the yards here. This industry is nearly 1500 years old and the craftsmanship of the workers, called *Khalasis*, is exceptional. A couple of boat-building yards can still be found near the Beypore port. These traditional boats are having much demand eventoday, and *Urus* are being manufactured and exported to Arab nations from Beypore, though the number has reduced. As part of the efforts to revive and restore the traditional *Uru* making industry to its past glory, an *Uru* making cluster is proposed in Beypore, in the Port and Allied Developments Zone. *Urus* can also be used to promote sea cruise tourism in the area.

A dry dock (a narrow basin that can be flooded to allow a load to be floated in, then drained to allow that load to come to rest on adry platform) for repair and maintenance of *Urus* shall be constructed at suitable locations. Dry docks are used for the construction, maintenance, and repair of ships, boats, and other water craft.

Project Cost Rs.30 crores

Implementation Time Frame 2015 - 2019

24.1.1.7 Proposal for Boat Making Cluster

Location Resurvey 250p , NalloorDesom , Feroke Panchayath

Project Rationale: An industrial cluster of boat making industries is proposed in 1.5 acres in resurvey no. 250p of NalloorDesom, Feroke panchayat. This project was proposed by the panchayat during people's aspiration studies.

Project Cost Rs.20 crores



Figure 24-6: Boat Making Industries Proposal in Feroke Panchayath

Implementation Time Frame 2015 - 2018

24.1.1.8 Proposal for Revitalisation of Kallai Industrial Area

Location: Kozhikode Corporation

Project Rationale: The wood industry of Kallai has a glorious past and played a pivotal role in defining the commercial nature of Kozhikode. In late 19th and early 20th centuries, Kallai was a world famous centre of timber trade. Till the 1970s, around 300 wood-



Figure 24-7: Revitalisation of Kallai Industrial Area

based industrial units operated on the Kallai banks, employing more than 20,000 workers in various capacities, and worked three-shift a day. Afterwards, the industry faced shortage of raw materials as tree felling was strictly discouraged to check deforestation and many industries have closed down. Besides, the demand for solid wood products also declined, owing to the replacement of wood furniture by artificial wood and metals.

However, a few timber mills still function in Kallai. But, the area is now characterised by abandoned industrial areas and paints a gloomy picture and the industrial potential of this area, having water resources aplenty and being accessible by rail, road and water, is underutilised. Besides, unscientific industrial development, encroachment of the river and the debris and pollution created by these industries is endangering the Kallai River. However, the proposed development of the Beypore port is expected to provide a fresh breath of life to this declining trade. The renovation of the port to meet international standards, which can accommodate larger imports of timber, will divert shipments from other major ports to Kallai. Hence the revitalisation of this industrial area, with unaltered focus on wood industry, with scientific land use allocation and infrastructure development including those to sufficiently abate the pollution, is proposed. The Project Components include Identification and elimination of encroached lands, Area Masterplan, Land Pooling and acquisition, if required, Development of Basic Infrastructure, approval of SEZ status and reallocation to owners and interested industrial entrepreneurs. Programmes for marketing and brand building of timber products, especially furniture shall be introduced.

Project Cost Rs.1.00 crore

Implementation Time Frame 2015-2019

24.1.1.9 Proposal for Medium and Small Scale Industrial Clusters

Location Resurvey no.s 2p, 3p, 4p, 5p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 13p, 16p, 20p, 21p, 22p, 23p, 24p, 25p, 26p, 27p, 28p, 30p, 31p, 32p, 33p, 34p, 35p, 36p, 38p, 40p, 41p, 42p, 43p, 44p, 45p, 46p, 47p, 48p, 49p, 50p, 51p, 52p, 53p, 54p, 55p, 56p, 57p, 58p, 59p, 60p, 61p, 62, 63p, 64p, 65p, 66p, 67p, 68p, 69p, 70p, 71, 77p, 78p, 79p, 81p, 82p, 83p, 84p, 85p, 86p, 87p, 88p, 89p, 90p, 91, 92p, 93p, 94p, 95p, 96p, 97p, 98p, 99p, 101p, 103p, 105p, 106p, 107p, 108, 109p, 110p, 111p, 112p, 113p, 114, 115p, 116p, 117p, 118p, 119p, 120p, 121p, 122p, 123p, 124p, 125p, 126p, 130p, 131p, 132, 133p, 134, 135p, 139p, 140p, 141p, 142p of Nallur Desamin Feroke Gramapanchayat, Small Industrial Zones in Ramanattukara Gramapanchayat and Cheruvannur- Nallalam area of Kozhikode Corporation



Figure 24-8: Feroke Industrial Village



Figure 24-9: Medium and Small Scale Industrial Zone in Cheruvannur Nallalam

Project Rationale: Unavailability of earmarked lands and infrastructure at reasonable rates is a major hurdle faced by the Medium and Small scale industries sector. Besides, absence of wholesale market for input resources, poor marketing and standardisation infrastructure, poor exposure to latest technology and lack of technical consultants have a high negative impact on the growth of MSMEs in the planning region. Hence, it is proposed that MSME clusters may be initiated at the

earmarked lands at Cheruvannur Nallalam,

Ramanattukara and Feroke in Private sector, PPP mode or in Government sector.

Besides Feroke is proposed to be developed as an Industrial village with the required infrastructure for MSME clusters like testing laboratories and other standardisation infrastructure, common marketing outlets, common facility centre for Clusters etc..

Figure 24-10: Medium and Small Scale Industrial Zone in Ramanattukara



Project Cost Rs.0.5 crores
Implementation Time Frame 2015-2020

24.1.1.10 Proposal for Industrial Estates

Location Resurvey no. 236p, 237p, 238p, 229p of VelipramDesam, near knowledge park, in Ramanattukara gramapanchayat
Resurvey no. 445p, 289p of VelipramDesam in Ramanattukara Gramapanchayat
Resurvey no.s 56/2, 57/2, in Nellikode Desam, Kozhikode Corporation
Project Rationale: Industrial estates are proposed, near knowledge park in Resurvey no. 236p, 237p, 238p, 229p and Resurvey no. 445p, 289p of VelipramDesam in Ramanattukara gramapanchayat as well as resurvey no.s 56/2, 57/2, in Nellikode Desam, Kozhikode Corporation for small and medium scale industries.

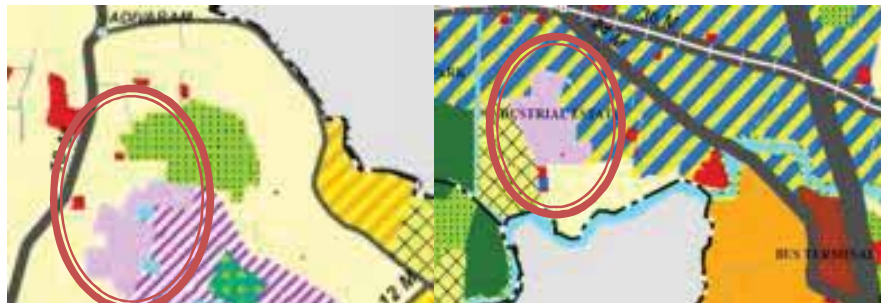


Figure 24-11: Industrial Estate Near Knowledge Park, Ramanattukara

Figure 24-12: Industrial Estate, Ramanattukara

Project Cost Rs.200 crores

Implementation Time Frame 2015 - 2020

24.1.2 Trade and Commerce

The policy in trade and commerce sector is to “Streamline the investment potential in commercial sector through hierarchical, organised and more attractive commercial development and opening up of old commercial core”. The proposed strategies include delineation of Special Development Zones (ex: High end commercial development along NH by-pass), decentralisation of commercial activities by development of new commercial nodes at important junctions and decongestion the crowded commercial core, revitalisation of Big Bazar area with better infrastructure and development of existing commercial areas with Walkable commercial streets, Parking plazas, etc.. Compact commercial developments shall be promoted to ensure maximum open spaces in the city.

24.1.2.1 Proposal for Revitalisation of Big Basar area

Project Rationale:The *Valiyangadior* Big Basarof Kozhikode has a very vibrant history of trade links with all over the world and has been referred to in the chronicles of travellers since 13th century. However, the centre of whole sale trade is now underutilised, owing to the narrow streets and dilapidating buildings. The Masterplan proposes to revitalise this area with due importance to its heritage value. A Land Pooling Scheme/ DTP scheme with special controls to retain the heritage value of the area, but to utilise the potential of this prime commercial locality of Kozhikode is proposed to be drawn up.

About 90 cents of land owned by Kozhikode Corporation is available at the Big Bazar area (Resurvey number 55, 56 and 57), where initially Passport Office was functioned. Now commercial buildings and few offices are functioning at this area, but the land is very much underutilized. A commercial complex can be constructed here, which, in future will become the major revenue generator of Corporation.

Project Cost Rs. 50 Crore

Implementation Time Frame 2015-2017

24.1.2.2 Proposal for Walkable Commercial Streets

Project Rationale: For a commercial area to be attractive, it should be safe for the customers. The current shift in the nature of shopping in the planning area, from small retail shops to shopping malls, plazas and promenades, reflect the change in taste and choice of the local customers and the demand for more safe and cosy shopping environments. However, many of the commercial areas in the planning area are often unattractive and unsafe for the general public, due to the congestion, created by vehicles passing criss-cross through the streets. Hence it is proposed that measures like exclusive pedestrianisation, scheduled pedestrianisation, curtailing the street space allocated for vehicles etc should be employed in the most congested commercial areas. Parking requirements of the individual

buildings could be waived off in the case of a designated pedestrian corridor. Parking Plazas/ Shared parking spaces can be provided at various corners of the commercial area, to facilitate parking.

- Exclusive pedestrianisation

It is proposed that SM Street, the most important retail hub in the planning area shall be pedestrianized. Similarly Customs Road, Mele Palayam Road and Palayam Thali Road shall also be pedestrianized. Since Customs road is mainly occupied by the people who visit beach at evenings, the restriction shall be limited for evening time only. Street vendors shall be permitted at evening time. Parking Plazas proposed at the existing DD Office Complex and Palayamshall cater to the parking requirements of the area. Customs

road is the road connecting Beach Road and P T Usha Road. When this road is exclusively pedestrianised, Red Cross Road can be used as an alternate

"The creation of safe and attractive walking and cycling environments in towns and cities is a necessary condition for success and is central to improving them for shoppers, visitors, workers, and residents alike. In other words, quite apart from pro-walking and pro-cycling arguments based on sustainability, the environment, health, community cohesion, or social inclusion, there is a strong business case for improving walking and cycling conditions."

— Dr. Rodney Tolley, Conference Director of Walk21

road for this. Similarly, Link Road can be used instead of Mele Palayam road.

Mavoor Road is another bustling commercial centre. Once the proposal for mobility hub is materialised, and the Moffusil Bus Stand will beconverted to the intra-city bus terminal, the number of vehicles plying in this road section from Arayidathupalam towards West will decrease. Hence it is proposed that space allotted to motor vehicles in the stretch of Mavoor Road up toArayidathupalam shall be reduced and 3-m wide pedestrian sidewalks shall be provided on either sides of the road.

Project Cost Rs. 1.5 crore

Implementation Time Frame2015-2020

24.1.2.3 Developing Geographical Indications for Indigenous Products

Project Rationale:Geographical Indication (GI) is a name or sign used on certain products which corresponds to a specific geographical location or origin, in the member countries of World Trade Organization (WTO).India enacted the Geographical Indications of Goods (Registration and Protection) Act, 1999 which has come into force with effect from 15 September 2003 and since then many indigenous products have achieved a GI tag.Under the Act, agricultural, natural or manufactured goods originating or manufactured in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristic of such goods is essentially attributable to its geographical origin and in cases where such goods are manufactured goods, one of the activities of either production or of processing or preparation of the goods concerned takes place in such

territory, region or locality, can be registered as Geographical Indications. The GI tag ensures that none other than those registered as authorised users (or at least those residing inside the geographic territory) are allowed to use the popular product name and is a very effective value addition and marketing tool. GI tagged products of Kerala include Aranmula Kannadi, Kuthampully Saree, Alleppey Coir, Navara rice, Palakkadan Matta Rice, Malabar Pepper, Pokkali Rice, Payyannur Pavithra Ring, etc.

The planning area and the district has an array of products such as the Beypore Uru, specialised Feroke roofing, ornamental and flooring tiles, Kallai furniture, Kozhikodan Halwa, Banana Chips, Kozhikodan Biriyanis, Kallummekkaya (Mussels) and various associated edible products, many special cuisines especially the Mappila Cuisines etc, which have markets beyond the State and Nation. Unfortunately none of them are GI tagged yet. It is proposed that Geographic Indications shall be obtained for these products at the earliest, along with strict quality control and standardization infrastructure and intensive market promotion activities, to increase the economic returns to the producers as well as to boost the overall economy of the planning area.

Project Cost Rs. 0.1 crores

Implementation Time Frame 2015-2019

24.1.2.4 Proposal for Hawkers Zones

Project Rationale : The national policy on urban street vendors 2009 observes that Street vending is not only a source of self-employment to the poor in cities and towns but also a means to provide 'affordable' as well as 'convenient' services to a majority of the urban population. To ensure free flow of traffic, smooth movement of pedestrians and maintenance of cleanliness and public hygiene while facilitating vendors/hawkers to sell goods/services at convenient locations frequented by the public, the policy also recognizes the need for regulation of street vending by way of designated 'Restriction-free Vending', 'Restricted Vending' and 'No Vending' zones based on certain objective principles. Accordingly, the Masterplan proposes to delineate Hawkers' Zones in Nadakkavu, Meenchantha, Malaparamba, Medical College and Mananchira - SM street areas. It is proposed that the delineation of these zones may be taken up immediately, as part of preparation/revision of DTP schemes in the area.

Project Cost Rs. 0.5 crores

Implementation Time Frame 2015-2020

24.1.2.5 Proposal for Indore market at Palayam

Main agricultural market of Kozhikode Corporation is Palayam market, where wholesale as well as retail agricultural sales are taking place. A state of the art Indore fruit and vegetable market is proposed at this area along with commercial complex and Parking plaza. The land of existing Palayam market, existing Bus Stand and land owned by

Corporation besides the Bus Stand can be utilised for this project. Proper drainage arrangements and waste management arrangements shall be done.

Project Cost of Market Rs. 25 crores

Implementation Time Frame 2018-2020

24.1.3 Tourism

The policy into tourism sector is “to create and implement tailor made tourism circuits catering to a variety of tourists with efficient supporting infrastructure, to utilize the tourism potential of the city to the maximum”. The strategies include development of special recreational zones in Elathur and Kadalundi, developing dream city area as a high tech recreation area, development of Canoli Canal into a full-fledged water based tourism circuit connecting the major tourist hot spots and a main tourism attraction, efficient use of the other water resources in planning area for water based tourism, creation and operation of theme based tourism circuits with efficient supporting infrastructure to promote cultural, ecological, educational, health tourism especially the traditional health care systems like kalari and marma, business and sports tourism, development of well-connected pedestrian/cyclist friendly green – blue networks in the city, development of Kadalundi as a Tourism Cluster, promotion of home stays and other tourism infrastructure, training for women in the area in running home stays and projects for conservation of built Heritage, including those under private ownership

24.1.3.1 Tourism Master Plan

With the recent stress on dispersing tourism to North Kerala and in the backdrop of the Rs.250-crore central grant for integrated tourism development programme for five northern districts, the ‘Northern Tourism Circuit’, the preparation of a Tourism Master Plan for the planning area becomes mandatory. The planning area, being the principal transportation hub to the region, shall not only house the world class infrastructure for the tourists, but also tap its own tourism potential in various segments like back water tourism, beach tourism, eco-tourism, culinary tourism, health tourism including traditional systems like kalari and marma treatments, religious and cultural tourism, educational tourism, business tourism, water sports etc..

However, the tourism sector in the planning area is in a nascent stage; currently the hotspots are not well-documented, and the tourism activities are unorganised. Hence, the first and foremost need of this sector is a Tourism Master Plan which identifies and documents the tourism hotspots, assess the infrastructural needs and shortcomings and identify linkages and supporting infrastructure that have to be created. Tourism circuits, optimally linking these hot spots, and organised tour operations have to be proposed. Besides, the tourism development in the area shall be tailored to ensure economic benefits

to the local people. Rigorous marketing activities also have to be taken up along with the infrastructural development to tap the tourism potential in an optimal way.

Project Cost Rs. 0.1 crores

Implementation Time Frame 2015-2017

24.1.3.2 Proposal for Integrated Water Taxi Tourism Circuit

The proposed Inland Waterway network from Elathur to Kadalundi can be efficiently utilised to improve inland water tourism. Water way network is proposed to connect tourism hot spots like Elathur tourism promotion zone, Sarovaram Biopark, Kadalundi bird sanctuary and Beypore port and is envisaged to be connected to the proposed mobility hub, which will help the tourists to connect other places of tourist interest. Hence, a water taxi tourism network having facilities in various affordability ranges, from common water taxis to cruise ships is proposed along this Inland water way network.

Project Cost Rs. 1 crore

Implementation Time Frame 2025-2030

24.1.3.3 Proposal for Elathur Back Water Tourism Zone

The back water tourism hot spots of Alappuzha - Ernakulum area are crowded and the state government has decided to decongest these hot spots, by way of attracting tourists to the unexplored back waters of North Kerala. The Elathur Back water is unexplored, serene back water, which has high potential for tourism activities. To utilise this potential, it is proposed that this area may be developed as a high end tourism zone with luxury house boats and other water based tourism activities. A tourism promotion zone is also demarcated around this back water, to facilitate low density and eco-friendly development in the vicinity.

Project Cost Rs. 1 crores

Implementation Time Frame 2015-2019

24.1.3.4 Proposal for Tourist Facilitation Centres

Location Resurvey no.s 41p, 42p of KarinkallaiDesam of Ramanattukara Gramapanchayat, resurvey no.s 137p, 140p, 141p 142p of MannurDesam of Kadalundi Gramapanchayat, Within proposed Mobility Hub

Project Rationale:The planning area lacks quality tourist infrastructure. Hence, in view of the proposed tourism developments in the planning area, international quality tourist facilitation centres are proposed in the planning area, at Kunnumalthadayi – Amminjathin Ramanattukara Gramapanchayat, along the banks of Chaliyar River and in Kadalundi Panchayat, near Prabodhini Junction. Besides, a tourist facilitation centre is proposed to be accommodated in the proposed mobility hub.



Figure 24-14: Tourist Facilitation Centre - Kadalundi



Figure 24-13: Tourist Facilitation Centre - Ramanattukara

Project Cost Rs. 1 Crores

Implementation Time Frame 2015-2017

24.1.3.5 Proposal for Hydrofoil Passenger Service from Beypore

Project Rationale: The developments proposed at Beypore Port brighten the prospects of improved connectivity between Kozhikode and Lakshadweep. Being the nearest sea port in Kerala, Beypore can be the prime link in trade, tourism and transportation between the mainland and the Lakshadweep islands.

To promote tourism in the planning area as well as North Kerala and to create a more attractive and diversified tourist circuit, Hydrofoil services connecting Lakshadweep to Kozhikode are proposed from Beypore port. The hydrofoils are seaborne vessels that lift itself on its 'wings' or 'foils' when moving at high speeds. These crafts are means of fast 'premium' travel over short distances. The cost of travel being higher than normal ships and lesser than flights, and the travel comfort higher than normal ships, the hydrofoil services are expected to attract economy class flight passengers as well, on regular basis. Services between tourist destinations like Kochi, Maldives etc can also be developed in later stages.



Project Cost Rs. 25 Crores.

Implementation Time Frame 2015-2017

24.1.3.6 Proposal for Water Sports

Location:Kozhikode Beach, Konnad Beach, Chaliyar River, Elathur Back Waters, Neelithodu (Ramanattukara Gramapanchayat South Boundary)



Figure 24-15: Proposed Water Sports in planning area

Project Rationale: Setting up aqua sporting facilities is an attractive economic opportunity in the planning area, having a very long coastline, abundant back waters and rivers, and witnessing an ever increasing flow of local, regional, national and international tourists. Jet Skis, Banana boating, Ski Tube, Parasailing, Water Skis, Sea Cruise etc..are proposed to be promoted in the planning area. Identification of beach, river and back water segments suitable for water sports, with the help of scientific studies has to be undertaken as the first step.

Project Cost 1.5 crores

Implementation Time Frame 2015-2020

24.1.3.7 Proposal for House Boats and Boating services

Location Feroke gramapanchayat

Project Rationale: It is identified that House boats trips and boating services can be conducted from Feroke to Vazhakkad along Chaliyar river. The project was proposed by the LSGI during People's Aspiration studies.

Project Cost Rs.0.5 Crores

Implementation Time Frame 2015-2020

24.1.3.8 Proposal for Development of Sarovaram Park and Kottuli Wetland Area

The Sarovaram BioPark and Dream City Area is proposed to be developed as a high end recreational area and a prime tourist destination with pollution free amusement parks, mangrove parks, jogging tracks and nature trail setc. The deepening and clearing of 'Nagarachira' is proposed to be taken up as a part of this project.

Project Cost Rs.1 Crores

Implementation Time Frame 2015-2017

24.1.3.9 Proposal for Island Tourism Project

Location: Island in Chaliyar River, Olavanna Gramapanchayat

Project Rationale: The island in Chaliyar river is a suitable location for ecotourism projects as it is easy to access and adjacent to existing and proposed tourism projects. The project was proposed by the LSGI during People's Aspiration studies.

Implementation Time Frame 2015-2025



Figure 24-16: Island Tourism Project

24.1.3.10 Proposal for Water Theme Park

Location 170p, 171p, 173p, 174p, 175p, 180p, 182p, 183p of NalloorDesam, Feroke Gramapanchayat

Project Rationale: The planning area and the region as such, lack a water theme park. Hence, a water theme park is proposed in Feroke, utilising the abandoned clay mines, which are rich in water even in peak summer. This can attract local tourists as well as tourists from the nearby districts of Wayanad and Malappuram, besides enhancing the tourism package presented by the planning area.

Project Cost Rs.1.5 Crores

Implementation Time Frame 2015-2017

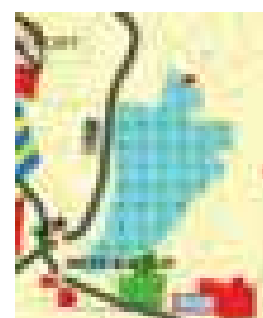


Figure 24-17: Proposed Water Theme Park at Feroke

24.1.3.11 Proposal for Development of Beaches

Location Unsurveyed lands in Kadalundi Gramapanchayat near NIRDESH Project, Resurvey no.s 16p, 17p, 434p, 435p, 436p, 437 p, 438 p, 439 p, 440 p, 441 p, 442 p, 443 p, 444 p, 445 p, 446 p of Ward 12, Resurvey no.s 1p, 2 p, 3 p, 4 p, 5 p, 6 p, 7 p, 8p, 47p, 48p, 49, 51p, 53 p, 55 p, 56 p, 211 p, 212 p, 213 p, 215 p, 216 p, 237 p, 238 p, 283 p, 285 p, 286 p, 288 p of Ward 15, Resurvey no.s 90 p of Ward 8 in Kozhikode Corporation

Project Rationale: Development of Beach with quality recreation infrastructure is proposed at two stretches in the planning area, one in the unsurveyed lands near Nirdesh Project in Chaliyam, Kadalundi and the other, extension to Kozhikode Beach towards south till Kallai River. Jogging/cycle tracks are also proposed to be developed in these beaches.

Project Cost Rs.1 Crore

24.1.3.12 Convention centre

To promote business and educational tourism in the planning area, a convention centre shall be materialised in the planning area. This may be located at a suitable space, near major roads and tourism attractions. It may be materialised at fringe areas of planning area like Elathur or Pantheerankaavu.

Implementation Time Frame 2015 - 2025

24.1.3.13 Promoting the Indigenous Cuisine

Kozhikode is famous for its indigenous Cuisines and Culinary. The Mappila Cuisines, Kozhikodan Halwa, Banana Chips etc are some of them. Besides, there are various food preparations associated with the Ayurveda, Kalari- Marma Health Care Traditions. It is high time that measures for authentication, promotion and value addition of indigenous cuisines be adopted so that the regional edge of these products are ascertained and used for the benefit of the local economy. It is proposed that Geographical Indications (refer 24.1.2.3) be developed for these products and measures to ensure only authentic products are served in the planning area, specifically in the tourist hot spots. Food festivals can be organised, in various seasons to promote seasonal indigenous dishes, and as part of various tourism, trade, investment promotional activities. Besides, export oriented production of these indigenous food products are proposed to be enhanced with strict quality control and marketing measures.

Project Cost Rs.0.5 Crores/year

Implementation Time Frame 2025 - 2030

24.1.3.14 Proposal for Kadalundi Eco Tourism Cluster

Project Rationale: Kadalundi gramapanchayat, surrounded by water on four sides, still preserves its environmental quality and serenity, away from the haste of urban Kozhikode. The famous estuarine wetlands of Kadalundi Panchayathouse a wide variety of mangroves and their faunal associates and is a declared bio-reserve, housing a Bird Sanctuary. There are three bird watching centres in the



Town and Country Planning Department, Government of Kerala

Figure 24-18: Kadalundi Eco Tourism Cluster

panchayat which also famous for a wide variety of fish, mussels and crabs. These points towards the potential of Kadalundi to be developed as eco-friendly tourism cluster.

Hence it is proposed that Kadalundi may be declared as a 'Jaiva Gramam' (Refer 24.5.1) where only eco-friendly agricultural pursuits are promoted, to prevent any danger to the migratory birds. The infrastructure at the bird's sanctuary and bird watching centres and facilities for boating through the river needs to be raised to international standards. Home stays should be promoted in Kadalundi, which would benefit the local economy to a great extent. Women in the area are proposed to be trained in hospitality and running of home stays. Tourism oriented initiatives in Ayurveda and Kalari / Marma systems of health care are also proposed to add to the tourism value of the area. Besides, local cuisine and sea food delicacies along with organic agricultural products should be marketed in the area. Establishment of and cycle rent shops targeting the tourists and creation of a pedestrian pathway cum cycling lane network for this area shall be taken up immediately. Promotion of environment friendly vehicle fuels like CNG, and phase wise transition to achieve full conversion to use of such fuels, is also aimed in this eco-tourism cluster.

Project Cost Rs. 1 crore/year

Implementation Time Frame 2015-2031

24.1.4 Fisheries

Not only the economics, but also the people associated with the fisheries sector demands special attention, the former owing to its significant contribution towards the regional economy and the latter being socially and economically marginalised. The policy adopted for fisheries is to "Explore the potential in fisheries sector optimally, with better infrastructure, ancillary industries and community development measures". The proposed strategies include development of fisheries oriented industrial zones in coastal area, infrastructure support to fisheries sector and fishermen community, increase in coastal security and surveillance facilities, and strengthening of coastal transportation.

24.1.4.1 Marine Park

Marine Park, for fisheries related industries is proposed adjacent to the existing Kinfra Marine Park in Beypore. An area of 9 Ha, additional to the Kinfra Park of 0.4 Ha, is set aside for industrial ventures like Fish Waste based Manure Plants, modern Fish Processing and Marketing Facilities, Fishing boat workshops, Net Repairing, Net Colouring Facilities, and Net Factory etc.

Project Cost Rs. 55 crore

Implementation Time Frame 2015-2020

24.1.4.2 Proposal for Malsya Gramam – Model Fishermen Village

Refer Section 24.2.6.5

24.1.4.3 Proposal for Comprehensive Development of Fisheries sector

The following projects are proposed to ensure comprehensive development of fisheries sector.

- Development of Mini Harbour at Vellayil - The Fishing Harbour is proposed as a second stage development of the existing fish Landing centre at Vellayil and is situated in Kozhikode Corporation. All statutory clearances like PCB consent, CRZ clearances etc are obtained for the project. The estimated project cost is Rs 3930.20 Lakhs, with 75% Central aid. The harbor is envisaged to handle 8980 tonnes of fish in European Union standards and is expected to provide 2275 jobs in fishing sector. Project completion period is 4 years. It will benefit the local fishermen in the location, by way of increase in fishing days, quality improvement of fish catch, and it also act as harbour of refuge in case of emergency. Major Project components are two Breakwaters, Quay, and Auction Hall.
- Development of Fish landing centres
 - Construction of fish landing centres near Azheekkal in Elathur, Koya Road, Mukhadar, Marad North
 - In Kadalundi near existing auditorium, adjacent to Chaliyam fish landing centre
- Development of Puthiyappa Harbour with
 - Renovation of buildings
 - Construction of an infrastructure complex for fishermen, especially migrants, with stay, refreshment, entertainment facilities
 - Extension of jetty at south of Puthiyappa Fishing Harbour to facilitate country boats
 - Boat jetty
 - Bus terminal
 - Breakwater near Pamban Kallu at Edakkal to prevent sedimentation at harbour
- Boat repairing workshops with Rail facilities for inland repairing of ice plant cold storage boat in the coastal area
- Net repairing workshops and net coloring facilities at all beaches and fish landing centers
- Ice plant/Cold Storage Facilities in all Fish landing Centres
- Sea wall along the coast with fishing gaps
- Modern facilities for Fish processing and marketing near Vellayil, Beypore, Puthiyappa
- Permanent facility for dredging at all breakwaters
- State-of-the-art Coastal Surveillance Hub at Beypore with exclusive boat jetty and modern boats
- Hybrid Solar and wind energy harvest at all harbours

- Installation of signal lights at Vellayil, Beach and Koya Road to benefit fishermen
- Sanitation infrastructure development at all fish landing centres
- Construction of breakwater at Butt road beach, Chakkumkadavu- Mukhadar
- Fisheries based industrial clusters at Beypore, Westhill
- Road improvement and provision of organized parking along the coast
- Extension of Beypore wharf
- Fisheries Information Centres in all fishing villages
- Enhance inland fishing
- Training Institute for fishermen population to provide training in modern technologies, competitive examinations, entrepreneurship etc..in Beypore Port area.
- Emergency/ Disaster Rehabilitation Centres in Bhatt road (Dhobighana), Mukhadar and Beypore Port

Project Cost Rs. 200 crore

Implementation Time Frame 2015-2035

24.1.4.4 Proposal for Fresh Water Aquaculture farms

Location

1. Resurvey 75p, 76p, 82, 83, 84, 85, 86, 87p, 104p, 107p, 109p, 112p, of KodalDesam, OlavannaGramapanchayat
2. Resurvey No.s 42p, 43p, 44p, 46p, 47p, 56p, 57p, 58p, 59, 60, 61p, 62, 63, 85p, 175p, 176p, 177p, 178, 179p, 180p of Cheruvannur Desam, Kozhikode Corporation

Project Rationale: Fresh water aquaculture used to contribute significantly to the economy of local governments like Olavanna in the past. With its abundant inland water resources, the planning area still has good scope for aquaculture, which needs to be potentially utilized with modern techniques like cage culture, export quality shrimp/prawn/ornamental fish hatcheries etc.. The planning area is famous for Mussel and Oyster farming using traditional techniques as well as indigenous dishes made of them, which can be enhanced with modern techniques for better produce and economic returns.

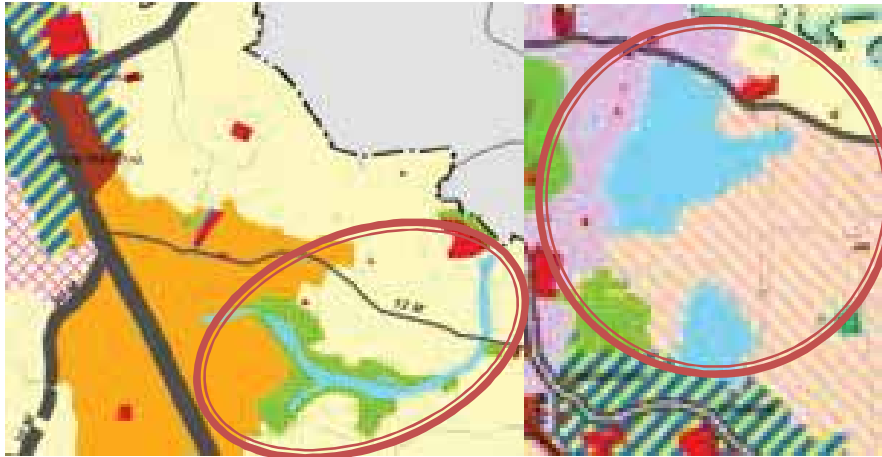


Figure 24-19: Aquaculture proposal in Olavanna

Figure 24-20: Aquaculture Proposal in Cheruvannur Nallalam

It is proposed that aquaculture may be revived in Olavanna, and started in Cheruvannur Nallalam using the abandoned clay mining areas. Aquaculture may be promoted in other unused tanks, ponds, water logged areas in the planning area as well. Project Cost Rs. 2 Crores

Implementation Time Frame 2015-2017

24.1.5 Agriculture

The policy in agriculture sector is to “Promote urban agriculture and enhance the opportunities for agriculturalists and agricultural labourers with infrastructure and value addition initiatives”. The strategies include promoting home stead cultivation, mixed cropping, green manures and organic farming, agricultural cooperatives, coconut development societies, industries for agro based value added product setc, and development of Kadalundi as a ‘ Jaiva Gramam’ . Utilising manpower of Kudumbasree, NREGS etc, horticulture projects are proposed to be initiated in vacant/uncultivated agricultural lands and puramboke lands. It is proposed that weekly markets are to be held at ward level so as to provide better benefits to the farmers in the region and hinterland, for which temporary arrangements shall be made at the nodes, utilising vacant lands, uncultivated land, open spaces, play grounds etc..

24.1.5.1 Proposal to Vitalise Thadambattuthazham Urban Agricultural Wholesale Market

Though the infrastructure and facilities at Urban Agricultural wholesale market at Thadambattuthazham has been constructed, it has not utilized fully. It is proposed that the vegetable market at Palayam may be shifted to this market at the earliest, making use of the existing infrastructure potential, and creating additional infrastructure, if required.

Project Cost Rs.0.5 Crores

Implementation Time Frame 2015-2017

24.1.5.2 Proposal for a Comprehensive Programme for Development of Agricultural Sector

Sl. No.	DETAILS OF PROJECT	COST (In Rs. Lakhs)																			
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
I COCONUT PLANTATION																					
1	ORGANIC/ CHEMICAL FERTILIZERS	13	14.3	15.73	17.3	19	20.9	23	25.3	27.8	30.61	33.61	37	40.7	44.7	49	54	59	65	71.5	79
2	PUMP SET/WELL/DRIP/SPRINKLER FOR IRRIGATION	1.6	1.76	1.95	2.13	2.35	2.58	2.84	3.12	3.43	3.78	4.15	4.57	5.03	5.53	6.08	6.69	7.36	8.1	8.9	9.8
3	COCONUT TREE CLIMBER MACHINE / TRAINING	0.5	0.55	0.61	0.67	0.73	0.81	0.89	0.98	1.14	1.18	1.3	1.43	1.57	1.73	1.9	2.1	2.3	2.5	2.9	3.1
4	OTHER AGRICULTURAL TOOLS and MACHINES	1	1.11	1.2	1.33	1.46	1.61	1.77	1.95	2.14	2.36	2.59	2.85	3.14	3.45	3.8	4.18	4.59	5.05	5.56	6.1
5	COCONUT SEEDLING DISTRIBUTION	0.08	0.09	0.22	0.24	0.26	0.29	0.32	0.35	0.38	0.44	0.46	0.51	0.56	0.62	0.68	0.75	0.82	0.9	1	1.08
6	DISEASE AFFECTED / LOW YIELDING COCONUT FELLING	2	2.2	2.22	2.24	2.47	2.72	2.99	3.29	3.62	3.98	4.38	4.82	5.3	5.83	6.41	7.05	7.76	8.52	9.39	10.3
II VEGITABLE CULTIVATION																					
1	SEED/FERTILIZER (FOR HOMESTEAD CULTIVATION)	0.72	0.79	0.87	0.96	1.05	1.16	1.28	1.4	1.54	1.7	1.87	2.05	2.26	2.49	2.73	3	3.3	3.63	3.99	4.39
2	AGRICULTURE IN SCHOOLS	2	2.2	2.22	2.24	2.47	2.72	2.99	3.24	3.62	3.98	4.38	4.82	5.3	5.83	6.41	7.05	7.76	8.52	9.39	10.3
3	RESIDENTIAL ASSOCIATION / VEGITABLE CULTIVATION BY KUDUMBASREE				15	16.5	18.15	20	22	24.2	26.6	29.3	31.6	34.75	38.2	42	46.2	50.9	56	61.6	67.7
4	PRECISION FARMING (HITECH)				15	16.5	18.15	20	22	24.2	26.6	29.3	31.6	34.35	38.2	42	46.2	50.9	56	61.6	67.7
5	TERRACE CULTIVATION / HOMESTEAD FARMING	1	1.11	1.2	1.33	1.46	1.61	1.77	1.95	2.14	2.36	2.54	2.85	3.14	3.45	3.8	4.18	4.59	5.05	5.56	6.1
III PLANTAIN CULTIVATION: IN STUDENTS' HOUSES		5	5.5	6.05	6.66	7.3	8	8.8	9.7	10.7	11.8	13	14.2	15.7	17.2	19	20.9	23	25.2	27.8	30.5
IV MIXED CROPPING IN COCONUT FARMS																					

1	DISTRIBUTION OF FRUIT BEARING TREES (GRAFTED MANGO SEEDLINGS)	0.4	0.44	0.48	0.53	0.59	0.64	0.71	0.78	0.86	0.94	1.04	1.14	1.26	1.38	1.52	1.67	1.84	2.02	2.22	2.45
2	MIXED CROPPING KIT(GINGER,TERMERIC)	0.75	0.83	0.91	1	1.1	1.21	1.33	1.46	1.61	1.77	1.95	2.1	2.31	2.54	2.8	3.1	3.39	3.72	4.1	4.5
3	GREEN MANURE PLANTS SEEDS	0.06	0.066	0.073	0.08	0.088	0.1	0.11	0.12	0.24	0.27	0.29	0.32	0.35	0.39	0.43	0.47	0.52	0.57	0.63	0.7
V SOLID WASTE DISPOSAL																					
1	VERMI COMPOST PLANT CONSTRUCTION	0.6	0.66	0.73	0.8	0.88	1	1.1	1.2	2.4	2.7	2.9	3.2	3.5	3.9	4.3	4.7	5.2	5.7	6.3	7
2	BIO GAS PLANT CONSTRUCTION	1.6	1.76	1.95	2.13	2.35	2.58	2.84	3.12	3.43	3.78	4.15	4.57	5.03	5.53	6.08	6.64	7.36	8.1	8.9	9.8
VI PADDY CULTIVATION																					
1	SEED,FERTILIZER, OTHER RESOURCES DISTRIBUTION	0.25	0.28	0.3	0.33	0.37	0.4	0.44	0.49	0.54	0.59	0.65	0.71	0.79	0.86	0.95	1.05	1.15	1.27	1.39	1.52
VII COMMON INFRASTRUCTURE																					
1	WEEKLY MARKETS FOR AGRICULTURAL PRODUCE				5	5.5	6.05	6.66	7.3	8	8.8	9.7	10.7	11.8	13	14.2	15.7	17.2	19	20.9	23
2	COLD STORAGE AND GODOWN										1600										

24.1.5.3 Proposal for Cold Storage and Godown

A cold storage and godown for agricultural produces is proposed at Thadambattuthazham Urban Agricultural Wholesale Market compound.

Project Cost Rs.16 Crores

Implementation Time Frame 2015-2019

24.1.5.4 Proposal for Floriculture Projects (Lotus Farms) at Olavanna, Cheruvannur Nallalam

Location

1. Resurvey 75p, 76p, 82, 83, 84, 85, 86, 87p, 104p, 107p, 109p, 112p, of KodalDesam, Olavanna Gramapanchayat
2. Resurvey No.s 42p, 43p, 44p, 46p, 47p, 56p, 57p, 58p, 59, 60, 61p, 62, 63, 85p, 175p, 176p, 177p, 178, 179p, 180p of Cheruvannur Desam, Kozhikode Corporation

Project Rationale: With its abundant inland water resources, the planning area still has good scope for lotus/water lily farms. It is proposed that lotus farms may be promoted in Olavanna, Cheruvannur Nallalam (in the abandoned clay mining areas) and in tanks, ponds, water logged areas etc in the planning area

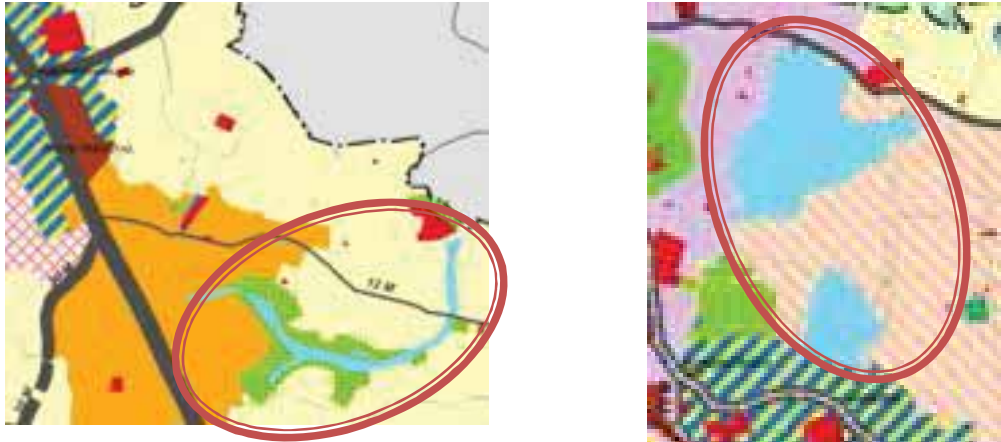


Figure 24-22: Lotus Farms proposal in Olavanna Figure 24-21: Lotus Farms proposal in Cheruvannur Nallalam

Project Cost Rs. 1 Crore

Implementation Time Frame 2015-2016

24.1.5.5 Ground Water Recharge and Management

As most of the planning area falls in Over Exploited / Critical Categories of ground water exploitation, a proper ground water management strategy need to be implemented in the planning area. The Ground Water Information Booklet of Kozhikode District, Kerala State prepared and published by the Central Ground Water Board, Ministry of Water Resources, 2009 states that Kozhikode block is notified by CGWA/SGWA, as the block is over exploited, and the further development of the ground water should be restricted. The study identifies that the artificial recharge structures suitable for Kozhikode district are percolation tanks, gully plug, check dams, sub-surface dykes and roof top rainwater harvesting. Percolation tanks will be suitable for most of the planning area, as they fit areas with valley fill, colluviums and highly weathered rocks. Check dams can be constructed across small streams with gentle slope with permeable beds. Sub-surface dyke along gently sloping wide valleys with narrow outlet can be effective groundwater conservation structures in some parts of the planning area. Dug well recharge can be practiced in most of the planning area. The existing dug-wells, ponds, tanks and streams should be cleaned, protected and conserved. Desiltation of tanks / ponds can augment the groundwater recharge to a great extent. Besides, in order to have a proper assessment of the groundwater resources at micro level, studies may be undertaken for the planning area which falls in the over-exploited and critical blocks. Groundwater development should be limited with conjunctive use of rainwater and surface water. More stress should be given for watershed development for better water management. The importance of conservation of water resources, rainwater harvesting and other water conservation and recharge structures can be popularised through mass awareness programmes and training programmes.

Project Cost Rs.0.5 Crore/Year

Implementation Time Frame 2015-2019

24.1.5.6 High tech precision farm

High-tech farming is an alternative to derive high incomes from small sized holdings due to the attractive crop productivity they offer. These practices involve farming under controlled conditions such as greenhouses, shade net houses, and plant protection nets. This can be promoted in city areas, where the land availability for conventional farming is less. Method such as Tunnel technology, Hydroponics Farming and Vertical farming shall be introduced and free training and subsidised supply of materials can be provided.

Project Cost Rs.0.5 Crore/Year

Implementation Time Frame 2015-2025

24.1.6 Animal Husbandry

The plot sizes in most of the planning area cannot support dairy and poultry activities in a profitable way. Hence, the planning area has to depend on the hinterland for dairy and poultry products. Therefore, the policy for this sector is to “Create better infrastructure and promote planning area as the district centre for value addition and marketing of dairy and poultry products while improving the city’s potential to meet its own demand”. The proposed strategies include introduction of high tech abattoirs and meat processing, cold storage and marketing facilities, equipping veterinary hospitals with modern facilities and manpower, and promote diary development as part of ‘Kadalundi Jaivagramam’. It is proposed that LSGIs in the periphery shall explore this opportunity, benefit from the funds of planning area in this sector and supply dairy and poultry products for the planning area.

24.1.6.1 Proposal for Scientific Slaughter Houses and Meat Processing, Cold Storage and Marketing Facilities

Location Resurvey No. 282p of Ward 15 at Kothi of Kozhikode Corporation, Resurvey no.19p 20p of Kodal Desam, Olavanna Gramapanchayat.

Project Rationale: Lack of modern infrastructure for production and marketing of hygienic meat and value added products is a major concern in the planning area. Another concern for small and medium sized slaughter houses is the waste generated during slaughter



operations. In the absence of proper infrastructure, the slaughter house wastes are increasingly dumped in a haphazard manner, enormously polluting our drinking water sources, the rivers and wetlands. It is high time that modern slaughter houses are established in the

Figure 24-23: Proposed Scientific Slaughter House at Olavanna



Figure 24-24: Proposed Scientific Slaughter House at Kothi

planning area, for clean and hygienic meat production. Scientific organization of these activities will generate more employment, both in animal husbandry as well as allied industries for processing of slaughter house by-products, and will ensure environment friendly disposal of the slaughter waste.

Hence, a hi-tech abattoirs/ modern slaughter houses are proposed at Kothi and Olavanna. Full-fledged infrastructure for Meat Processing, Cold Storage and Marketing Facilities shall be provided here. Besides, a plant for processing the slaughter waste is also proposed along with these slaughter houses. The plant may utilise a combination of bio-methanation, rendering and composting technologies for the treatment of the slaughter waste, and incineration for disposal of the residue. The by-products from the plant like tallow, grease and MBM (meat and bone meals) can be marketed profitably. The bio-gas produced from the plant can be used as fuel for production of by-products and value added products, while the compost can be marketed.

Project Cost Rs.60 crores

Implementation Time Frame 2015-2020

24.1.6.2 Proposal for Development of District Veterinary Hospital

The district veterinary hospital faces infrastructural as well as personnel shortage. Being the most important centre for veterinary facilities in the district and the region, the hospital demands better infrastructure and sufficient number of personnel, actions for which has to be taken on immediate basis.

Project Cost Rs.1 crores

Implementation Time Frame 2015-2019

24.2 Physical and Social Infrastructure

The planning policy adopted in the infrastructure sector is “To equip the city with superior quality infrastructure that would promote the city for investments in industrial, commercial and tourism sectors and enhance the quality of life of its residents”. The plan focuses on ensuring safe drinking water, sanitation, electricity, education, health and access to road, for all. The focus in education and health services shall be on quality and infrastructure improvement. Besides, the plan proposes to put in place an efficient disaster management infrastructure.

24.2.1 Water Supply

The total water demand in 2031 is estimated at 243 MLD (@ Per capita requirement for domestic purposes = 135 lpcd; Requirement for Public purposes = 35 lpcd, Requirement for fire fighting = 1% of total demand. Ref: UDPFI Guidelines). The current quantity of supply

is 147 MLD which results in an additional requirement of 96 MLD by 2031. The current capacity of water treatment plants is 157 MLD, which indicates a requirement of capacity enhancement / new water treatment plant of 86 MLD.

To meet the additional demand, the proposed strategies include protection of potential water sources like tanks/ponds and conception of water supply projects using them, ground water recharge measures, promoting rainwater harvesting projects and strict enforcement of mandatory rainwater harvesting requirements in large projects etc. A legal regulatory framework shall be established to ascertain availability of safe drinking water from public/private water supply system before granting building permits for large scale developments as huge water extraction using dug/bore wells by such projects are apparently resulting in regional water shortages. The specific proposals are listed below.

24.2.1.1 Extension of JICA assisted Water Supply Project

As a long term solution for drinking water supply in the planning area, the JICA project shall be extended to source water from Poonor Puzha, Chaliyar, Mampuzha Rivers.

Project Cost Rs.200 crores

Implementation Time Frame 2020-2031

24.2.1.2 Identification and Implementation of Small Scale Water Supply Projects

The Ground Water Information Booklet of Kozhikode District, Kerala State prepared and published by the Central Ground Water Board, Ministry of Water Resources, 2009 observes that the springs in Kozhikode district, which area perennial sources for drinking water, are not effectively utilised for drinking water supply and proposes that attention should be given for the proper rejuvenation of these springs, and a large number of springs (46 numbers) in the district can be developed for drinking water supply.

Olavanna Gramapanchayat provides good practice examples for the planning area in mini-water supply projects. It is proposed that mini water supply schemes, utilising springs/streams/tanks/ponds/wells and using rain water harvesting technologies, shall be identified and implemented by the LSGIs. Such water supply schemes may be utilised for ensuring cent per cent household water supply connection in salinity affected areas. Rainwater harvesting using storage tanks shall be compulsorily implemented in all buildings including residences. Rainwater harvesting for groundwater recharge as well as for drinking water purposes shall be promoted by popularizing the techniques on water harvesting.

Project Cost Rs.150 crores

Implementation Time Frame 2015-2025

24.2.2 Waste Management and Pollution Abatement

The estimated solid waste generation in 2035 @ 500g per capita (Ref: UDPI Guidelines) is 650 t/day. The quantity of solid waste currently collected is 150 t/day, which

points out requirement for enhancement of collection and treatment infrastructure for around 500 t/day by 2035. The policy adopted in this sector is to promote decentralized SWM and reduce-reuse-recycle strategy which will help reduce the quantity to be treated at the centralized facility and thus the burden on city managers.

Hospital waste disposal is a burning issue in the planning area. It is proposed that the private and public hospitals operational in the planning area should install their own solid and liquid waste treatment and disposal plants, and this shall strictly be enforced by the concerned LSGIs. The specific projects are detailed below.

24.2.2.1 Decentralised Solid Waste Management

Decentralised Solid Waste Management, the disposal of waste at the point of generation itself, needs to be highly promoted in the planning area. A requirement analysis (ward wise) and technology feasibility study along with a comprehensive implementation plan need to be charted out for the planning area and funds need to be earmarked to popularize bio-gas plants/ pipe composting/vermi composting and to provide subsidy to set up the units. Individual pipe/vermi composting or biogas plants has to be mandated in residential areas as well as hotels/restaurants etc., whereas collective plants of similar nature can be mandated ward-wise as well as for plotted developments, residential colonies, villa projects etc., as a criteria for their permit. Disincentives, in the form of heavy user charges, may be employed in cases where the party still depends on the centralised system even though a decentralised plant is feasible. Awareness programs for the waste generators are to be taken up to reduce the quantity of solid waste, segregation, self-help methods for disposal of bio degradable solid waste at source etc, through social workers, media etc. Decentralised solid waste disposal would not only help to bring down the volume of waste dumped/treated at Njeliyanparamba, but also increase the environment friendliness, besides complimenting the proposal to promote homestead cultivation in the planning area.

Project Cost Rs.0.1 crores

Implementation Time Frame 2015-2025

24.2.2.2 Proposal for Hi-tech Solid Waste Treatment Plant and Production and Marketing of Bio-fertilisers at Njeliyanparamba

Location Resurvey no.s of 7p, 8p, 9p, 12p, 13p, Cheruvannur Desam, Kozhikode Corporation
Buffer area: Resurvey no.s of 5p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 13p, 14p, 36p, 38p, 39p, 40p, Cheruvannur Desam, Kozhikode Corporation

Project Rationale: Though the decentralisation of solid waste disposal shall be of highest priority, a centralised facility at regional level is also a necessity, taking into consideration the enormous quantity of waste generated in crowded commercial centres and urban settlements.

The existing Solid Waste Treatment plant at Njeliyanparamba serves the whole of Kozhikode District, but has the capacity to treat only 60-65 tonnes of waste per day. Hence, a solid waste treatment plant with state-of-the-art facilities for composting, biogas generation, and incineration/gasification of rejects, and a scientific land fill is proposed to be built at the Njeliyanparamba yard. The proposed facilities are envisaged to handle around 200 tonnes of solid waste per day in the initial phase and the capacity shall be developed to 600 tonnes in two subsequent phases, within the plan period. A project for generation of electricity should also be taken up with the incineration/gasification component, the produce of which can in turn be used for the running of the plant. Also, the bio-fertilisers manufactured by the compost plant should be marketed, especially in areas like Kadalundi where a 'Jaivagramam' is proposed. Besides, the project necessarily requires comprehensive solid waste management plan and implementation strategies, detailing the collection, segregation and transportation plan, fleet requirements and specifications, treatment methods and technologies, as well as disposal procedures, for its successful implementation.

Besides, it is proposed that plastic waste recycling units, e-waste processing units, as well as industries manufacturing products from recycled materials, be established in the buffer area of the Njeliyanparamba yard.

Project Cost Rs.70 crore

Implementation Time Frame 2015-2030

24.2.2.3 Proposal for Full-fledged Service Centre for Sanitation Vehicles at Njeliyanparamba

Location NjeliyanParamba

Project Rationale: The proposed solid waste treatment facility at Njeliyanparamba would require a massive fleet of vehicles for transportation of waste from various locations to the plant. Cleaning and maintenance of these vehicles is practically impossible at the general service stations, due to the highly unsafe and unpleasant waste handled by them. Hence a full-fledged service station for such vehicles is proposed along with the proposed plant, which may function as a component project, in PPP mode.

Project Cost Rs.0.5 crores

Implementation Time Frame 2015-2019

24.2.2.4 Garbage Treatment Plant

Location Resurvey No. 235p, 314p of VelipramDesamin Ramanattukara Gramapanchayat, Project Rationale A Garbage Treatment Plant is proposed In Ramanattukara Panchayat for treatment of organic wastes. Biogas generation and Vermi-composting plants shall be installed for processing the solid wastes and the bio-fertilizers produced shall be marketed. Besides, facilities for recycling plastic waste and e-waste may also be provided in this unit.

Project Cost Rs.28 crores

Implementation Time Frame 2015-2019

24.2.2.5 Improvised KSUDP Drainage and Sewerage Plan

The drainage and sewerage master plan prepared and implemented by KSUDP addresses the requirements in old Kozhikode corporation area, which can rightly be incorporated into the Masterplan. Mitigation measures for the remaining planning area need to be dealt with as further phases of this project a comprehensive system for the planning area developed by the end of 2020.

Besides, recycling and reusing of waste water for secondary uses like gardening/irrigation/use in flushing cisterns etc., need to be mandatorily imposed in the proposed large scale constructions in the planning area. The good quality effluents from the proposed STPs as per KSUDP plan can also be used to replenish the water bodies where water sports are proposed, sold for construction purposes etc.. A reclaimed-water supply system with pumping main and reservoirs can be constructed for distributing this water for the secondary purposes, for the water scarce areas in the planning area, the feasibility of which need to be studied in detail.

24.2.2.6 Slaughter Waste Treatment Facility

Refer 24.1.6.1

24.2.2.7 Proposal for Fish Waste Fertilizer Plants

To attend to the fish waste generated at the fishing harbours, fish landing centres and fish markets in the planning area, fish waste processing facilities and fertilizer production plants along with marketing facilities are proposed at Beypore Port and Puthiyappa Harbour.

Project Cost Rs. 0.5 crores

Implementation Time Frame 2015-2019

24.2.2.8 e-waste Management Facility

Processing of e-waste is a major concern of the present, in an increasingly IT inclined society. An e-waste processing unit is proposed in the Beypore Port Allied Industrial Zone, to accommodate recycling, reuse and disposal facilities of e-waste, taking into consideration the proposed IT sector investments in the planning area as well.

Project Cost Rs. 0.5 crores

Implementation Time Frame 2015-2019

24.2.2.9 Expansion of Plastic Waste Recycling Plant at West Hill

The existing Plastic Waste Recycling Unit at Westhill Industrial estate has the capacity to recycle 800 to 1000 kilos of plastic per day, at present. The expansion of this unit to cater to the whole of planning area, along with power production at the plant, is proposed.

Project Cost Rs. 1 crores

Implementation Time Frame 2015-2019

24.2.2.10 Delineation of Silence Zones and Noise Pollution Management Plan

It is proposed that Silence Zones are to be delineated and Noise Pollution Management Plans are to be prepared for the planning area, as part of preparing detailed town planning schemes.

Implementation Time Frame 2015-2017

24.2.3 Health

The requirements in health infrastructure estimated for the year 2031 is presented in table 24-1, which has to be met by private and public sector together.

Table 24-1 : Health - Requirement 2031

Sl. No	Category of facility	Requirement in 2031	Existing	Gap
a	General Hospital of 500 beds, for 2.5 lakh	3250 beds	2810	440 beds (1 General Hospital)
b	Intermediate hospital of 200 beds, for 1 lakh	3250 beds	2360	890 beds (4 intermediate hospitals of 200 beds)
c	Intermediate hospital of 80 beds, for 1 lakh	1300 beds	595	805 beds (10 intermediate hospitals of 80 beds)
d	Polyclinic with observation beds , for 1 lakh	16	9	7 polyclinics
e	Nursing Home, child welfare and maternity centre of 30 beds 1 for 0.45 lakh	1083 beds	1050	66 beds (2 nursing homes)
f	Dispensary, for 0.15 lakh population	108	55	53 dispensaries

(Ref: UDPFI Guidelines)

24.2.3.1 International Centre of Excellence in Health at Kozhikode Medical College

Project Rationale Kozhikode Medical College Hospital is a premier centre of medical education in the state and serves as a referral centre to more than five districts of the state, which account to about 40% of the State's population, and mainly caters to the economically weaker sections who cannot afford the highly charged services at private hospitals. The Masterplan proposes the development of KMCH as a Centre of Excellence, which is a long-time need of the region.

Though many development activities are being undertaken, the infrastructure at the institute meets neither the demand not the expected quality at present. Currently, the commissioned number of total beds does not meet the patient load, and it is a common scene that the floors and corridors being occupied by patients. Other than the medical



infrastructure including state of the art building complexes, advanced laboratories and

equipment, the centre also needs quality residential infrastructure for the faculty and students.

Besides, a Research Institute on Life Style Diseases and a Cancer Research Centre is proposed at the medical college campus. Also, more courses on para-medical sciences are proposed to be established at the KMCH. The development of the Institute of Palliative Medicine and extension of the services of the pain and palliative care unit is also proposed during the plan period.

Project Cost Rs. 350 Crores

Implementation Time Frame 2015-2025

24.2.3.2 Regional Institute for Research and Services in Geriatric Care

Location Resurvey No.s 322p, 324p, 325p of Ward 33 (Chevayur), Govt. Leprosy Hospital Compound, Kozhikode Corporation.

Project Rationale: Specialised services and research in Geriatric care is identified as a need of the time in the planning area, as the elderly population is high and expected to rise further in the planning area, as well as the region, during the plan period. A specialised regional centre for the same is proposed in the existing campus of the Govt. Leprosy Hospital at Chevayur.

Project Cost Rs.5 Crores

Implementation Time Frame 2015-2020

24.2.3.3 Establishment of an Ayurveda Medical College in Govt. Sector

Keeping in mind the increasing prominence of Ayurveda in the medical and tourism scenario of the state, establishment of an Ayurveda Medical College in Govt. Sector, in the planning area or adjacent panchayats is proposed.

Project Cost Rs.100 Crores

Implementation Time Frame 2020-2025

24.2.3.4 Development of Homeo Medical College, Kozhikode

The Govt. Homeo Medical College and its campus are proposed to be developed with state-of-the-art infrastructure and facilities.

Project Cost Rs.50 Crores

Implementation Time Frame 2015-2020

24.2.3.5 Raising Beach Hospital and Kottaparamba Hospital to extension centres of Medical College

The govt. medical college, Kozhikode faces infrastructural and man power shortcomings as it serves population beyond its capacity, which in turn results in its inefficient functioning as a referral centre as well as higher education and research centre in medicine. It is proposed that General Hospital and Govt Women and Children Hospital

Kottaparamba shall be developed with sufficient infrastructure to serve as satellite centres of Medical College and functions other than referral, education and research may be handled by these centres.

Project Cost Rs.50 Crores

Implementation Time Frame 2015-2025

24.2.3.6 Relocation, Standardisation and Improvement of Public Health Laboratory

It is proposed to relocate the Regional Public Health Laboratory to the Regional Analytical Lab Compound, Malaparamba and develop world class laboratory and research infrastructure at this centre. A disease surveillance monitoring station is also proposed to be established here.

Project Cost Rs.10 Crores

Implementation Time Frame 2015-2019

24.2.3.7 Development of a Research Centre and Better Infrastructure for Leprosy Hospital

The Govt. Leprosy Hospital and Rehabilitation Centre at Chevayur is functioning in age old buildings and facilities. It is proposed that better treatment and rehabilitation facilities shall be developed at this centre with facilities for recreation, livelihood etc for the rehabilitated persons. It is also proposed that the whole campus needs to be re-planned in a compact manner to efficiently utilise the available land to other health sector projects proposed in this campus.

Project Cost Rs.10 Crores

Implementation Time Frame 2015-2025

24.2.3.8 Proposals for Public Health Sector Enhancement

The following projects are proposed to enhance the public health sector in the planning area.

- Upgradation of Olavanna Govt. Health Centre to CHC and expansion/upgradation of facilities with new block, lab facilities, 25 beds and 24 hrs service.
- New PHC at Chevayur (at Existing TB hospital), and at Florican Hills (Near Providence College)
- Infrastructural improvements at Homeo , Allopathic and Ayurveda health centres in the planning area
- Infrastructure and Facilities development at ESI hospital, Government Ayurveda hospital at Pantheeramkavu, District Ayurveda Hospital at Westhill and the Homeo hospital
- Geriatric care wards to be established in all govt. and private sector hospitals.
- Centre for Contagious Disease monitoring and prevention
- Establishment of a chest specialty clinic in coastal area

- Establishment of a new health centre in Payyanakkal area
- Inpatient wing to be started in Marad Health Centre

Project Cost Rs. 200 Crores

Implementation Time Frame 2015-2030

24.2.3.9 Make Kozhikode as a global health city

As envisaged in vision 2030, Kozhikode can be developed as a medical city of excellence with international-class facilities in education, training, health care services, support infrastructure, and encourage trade in services by promoting:

- Cross-Kerala border trade in medical services through the use of IT,
- Medical tourism,
- Inflows and outflows of foreign direct investment in this sector,
- generating new knowledge through R&D, training, and interactions,
- promoting the quality of health care by attracting international medical professionals and multinational companies, and
- Training and retaining skilled workers.

24.2.4 Education

24.2.4.1 Educational Infrastructure Improvement

The requirement of educational infrastructure at the end of plan period as per standards is given in table 24-2. However, since the gap up to Higher Secondary School is found taking into account the govt. schools only, this has to be updated with the information on private schools, and the infrastructure has to be enhanced accordingly.

Table 24-2 : Education - Requirement in 2031

Category	Standards	Existing No .of institutions		Requirement 2031	Gap
		Govt/Aided	Unaided		
Pre primary	1/2500 population	44	NA	650	606
LP School	1/2500 population	247	NA	650	620
UP School	1/7500 population		NA	217	
High School	1/13000 population	61	NA	125	64
Higher Secondary S	1/13000 population	52	NA	125	73
Arts and Science	1/80,000 population	6	7	20	7
Polytechnic	1/36,000 population	4	1	45	40
I.T.C/I.T.I	1/35,000 population	8	18	46	20
T.T.I	1/1,20,000 population	2	5	14	7
Professional College	1/2,50,000 population	9	7	7	Nil

(Ref: Greater Kollam Development Plan, UDPFI Guidelines)

Besides, it is identified that the physical infrastructure like playground, toilets, especially girl friendly toilets, computer and internet facilities etc at many schools is below the expected standards. It is proposed that comprehensive infrastructure improvement measures are to be taken up at all govt. and aided schools, especially in the fisheries schools and those in the coastal belt.

24.2.4.2 Educational Complex at Olavanna

Location Resurvey No.s 23p, 24p, 25p, 28p, 29p, of KodalDesam, 50p, 65p, 66p, of KailamattamDesam, 234p, 236p, 237p of Olavanna Desamin Olavanna GramaPanchayath

Project Rationale: The offices of the department of education face space and infrastructural shortcomings, which needs to be addressed by scientific planning and design interventions in the available land or relocating them to a more suitable location. An educational complex is identified in Olavanna, to house the offices of the Department of Education. Offices of Education Additional Director, DEO, City AEO, SSA District Office, URC, and Text book depot, a School of Management, a School of Economics and a B.Ed. College are proposed to be housed in this educational complex.



Figure 24-25: Educational Complex - Olavanna

Olavanna GLP School shall be raised to UP School level.

To increase the attractiveness of the city for highly educated workforce required by the IT sector and premier institutes like IIM and NIT, the education sector need to be enhanced to international standards. As part of this quality enhancement measures, an Institute for Teachers Training Courses and In-service Training Programs, in the model of IIM, is also proposed in this educational complex.

Project Cost Rs. 300 Crores

Implementation Time Frame 2015-2020

24.2.4.3 University Centre and Collegiate Education Centre

Project Rationale: A centre for housing sub-centres of the state, national and international universities is proposed to be located in suitable location. This aims to promote distance learning possibilities as well as establishing authentic centres of native and foreign universities to facilitate information and easy access to quality higher studies options.

Project Cost Rs. 13 Crores

Implementation Time Frame 2015-2025

24.2.4.4 Relocation of Govt. Engineering College, Kozhikode

Project Rationale: The government engineering college, Kozhikode, now functions in the Govt. Polytechnic Compound, West Hill. The college is cramped due to space and infrastructure shortage. Hence it is proposed to be relocated to a suitable location.

Project Cost Rs. 200 Crores

Implementation Time Frame 2015-2019

24.2.4.5 University for Folk and Fine Arts, Literature and Cultural Studies

Project Rationale: Though Malabar region is famous for many literary efforts, folk arts and the general enthusiasm of its folks towards literature and arts, it lacks an educational and training institute in this field. Hence, a university of international standards for Folk and Fine Arts, Literature and Cultural Studies is deemed essential for the region and is proposed to be located at a suitable location.

Project Cost Rs. 2 Crores

Implementation Time Frame 2015-2025

24.2.4.6 Centre for Integrated Development of Schooling Age Children

Location Resurvey no. 156p of Ward 33 (Chevayur) of Kozhikode Corporation

Project Rationale: To ensure the comprehensive development of school children, a Center for Integrated Development of Schooling Age Children is proposed at the Juvenile Home Compound, Vellimadukunnu. Studies and Research Centers on Folklore, Environment and Agriculture, Fine Arts and Performing Arts (in lines of Kalamandalam), a Sports Academy, Guidance centre for advanced studies, Student and Parent Counseling facilities, De-addiction and monitoring centres etc are proposed in this centre.

Project Cost Rs. 5 Crores

Implementation Time Frame 2015-2021

24.2.4.7 Centre for Integrated Development of Differently-abled Children

Refer 24.3.4

24.2.5 Energy

Though the planning area is fully electrified, many of the areas face low voltage issues. The power requirement as per UDPFI standards is 2KW/household including domestic, commercial, industrial and other requirements. Projected Electricity Consumption @ 2KW/HH assuming a HH size of 4 is 650 MW for the planning area in 2031. The requirement of 11 KV Substations is one per 15000 population (Ref: UDPFI Guidelines), which indicates a requirement of 87 numbers of 11KV substations in the planning area till 2031. The priority of energy sector shall be on identifying of local projects for addressing the

power shortage utilizing the potential in non-conventional energy sector, and increasing the efficiency of existing network with smart grids and better infrastructure. Extensive advocacy for green buildings which reduce power consumption for lighting and ventilation shall be undertaken and policies/regulations shall be framed for the areas and type of construction where green building measures can be mandated. The specific proposals are listed below.

24.2.5.1 Electricity Substations

22 KV Substations are proposed in Dream city – Mobility Hub, Cyber Park area and Nallur – Feroke area as well as capacity enhancement of Puthiyara, Chevayur and Kuttikkattur substations to 66 KV is proposed.

Project Cost Rs. 450 Crores

Implementation Time Frame 2015-2025

24.2.5.2 Energy Harvest from Renewable Energy Sources

The planning area has already started witnessing private initiatives in renewable energy harvest from hybrid power projects (Ref: wind-solar hybrid power project at St Joseph's Anglo-Indian Girls' Higher Secondary School, Kozhikode). The Masterplan proposes to study in detail, on urgent basis, the potential of power generation from renewable energy sources like wind, solar, biomass etc, in the planning area and the feasibility of various technologies. The study shall also focus on high potential areas where such systems can be mandated, promoted etc. Hybrid power generation apparently has good scope along the long coastline of planning area and projects can be conceived in this field by the LSGIs, and developed with the help of individuals, company, partnership firm, or a joint venture on a build-own-operate-transfer (BOOT) basis. Besides, harnessing solar energy shall be mandated in medium and large scale projects, including residential projects, in the planning area, the potential, feasibility and implementation tools for which need to be detailed by the proposed study.

Project Cost Rs. 0.05 Crores

Implementation Time Frame 2015-2019

24.2.5.3 Smart Grids

It is proposed that the power distribution network in the planning area may be converted to Smart Grids, which would increase the efficiency of both the delivery of services as well as the collection of service charges. GIS mapping of the power utility has to be taken up on emergency basis and SCADA based management has to be employed.

Project Cost Rs. 100 Crores

Implementation Time Frame 2015-2030

24.2.6 Housing

The basic policy in housing is to promote compact residential developments by careful review of prevailing FAR. Besides, measures to ensure inclusive development in housing sector are to be studied in detail and implemented. It is suggested that high end private housing projects must reserve and dispose at least 20-25 per cent of developed land for EWS housing in cross subsidization system.

24.2.6.1 Housing for Working Women

The housing for migrant working women in the planning area is catered mainly by the hostels run by private sector and to a small extent, by the working women's hostel run by government. It is proposed that the existing working women's hostel at Vellimadukunnu shall be renovated to a high rise building with boarding, recreation and fitness facilities as well as day care centres for children, such that they are affordable for working women from all classes and shall admit working women from government as well as private firms. Special facilities for physically challenged working women shall be ensured. Besides the proposal for a new hostel in Kovoov-Iringadanpally road shall be implemented in a fast pace. Besides Housing Board compound can be utilised for provision of accommodation for working women. Moreover, quality control measures shall be strictly enforced in all government and private hostels to ensure safe and comfortable stay for the working women.

Project Cost Rs. 2 Crores

Implementation Time Frame 2015-2025

24.2.6.2 Slum Improvement Projects

Urban poor are one of the important stakeholders of any urban plan. It is proposed that the LSGIs in the planning area shall ensure improvement of slums as well as sub-standard housing areas under various on-going projects for the same like RAY, IHSDP, and KSUDP- CIF etc, in a phased manner. Along with the construction of houses and provision of other infrastructures in slum areas, following programmes shall also be implemented.

- i) Development of data base on the Urban Poor in the entire masterplan area.
- ii) Development of an employment plan including training.
- iii) Study centres/library/Adult learning centres in slum and urban poor colonies.

Project Cost Rs. 2.5 lakhs/house

Implementation Time Frame 2015-2025

24.2.6.3 Rehabilitation of Dilapidated Colonies

For thousands of people in the developing world, the urban area were always been means for improving their quality of living, and environment besides getting better jobs and incomes. People find some sort of livelihood in the premises of the cities, and are forced to find accommodation nearby usually on illegally occupied lands. The case of Kozhikode city also traces a similar pattern although not extremely severe. Colonies were being developed without legal claims to the land and without permissions from the authorities to build.

Because of their illegal or semi legal nature, the infrastructure facilities won't be adequate enough to cater the needs. People, who were traditionally engaged in ill treated status jobs like that of scavenging, were settled in mainly three colonies.

- 1) Kaluthan Kadavu Colony
- 2) Colony near Nadakkavu Cross road
- 3) Colony near Stadium junction.

KALLUTHAN KADAVU COLONY

The colony belonging to Ward 60 of the Kozhikode Corporation spreads over an area of 1.5 acres accommodating over 300 families on the banks of the canal in extremely sub standard conditions. It's first settlement is dated back to around 45 years ago, before which it was an abandoned burial ground. Rainy season is a nightmare for the residents. Not a single household possesses individual toilets. During the heavy rains that lash Kerala in the monsoon, the canal water rises blocking the public toilets in the area and water from both flows into the colony. The filthy water enters even the houses and makes life even more difficult for the people who already live in cramped conditions. No single person owned a government job and houses lacked a steady income. Men are usually engaged in casual jobs, such as painting, cleaning etc. and women goes out to houses as maids or take up jobs such as garbage collection.

The rehabilitation project needs to aim in supplying standard housing conditions to around 300 families living in the colony. As the colony is spread over a considerable land extending up to 1.50 acres, good enough for the purpose. Considering an allowable FAR of 2.50, around 15,000 square meter of floor area can be constructed on the plot. Vertical development method can be adopted with lower floors allocated for commercial purpose and the higher ones for rehabilitation of the existing residents of the Colony.

COLONY NEAR NADAKKAVU CROSS ROAD

This colony is existing by the side of Nadakkavu cross road which connect East Nadakavu and west Nadakkavu areas, by connecting Kannur road and the Wayanadu roads. The over all developmet of the Nadakkavu area is hindered due to the presence of this colony, which currently accommodates nearly 40 households, at crucial area of Nadakkavu. The area of this settlement spread across 1.7 0 acres. Most of the residents in the colony are the sanitation workers employed by the Kozhikode corporation. The all 40 households share the existing five bath rooms and four latrines. An anganwadi within this area employs two instructors who take care of five kids. It is housed in a cramped room with just enough space for seven of them to sit.

The Colony and the area as a whole is having immense potential for further improvements. Being located in the heart of commercial area of the Town, sufficient area

can be allocated to rehabilitate all the households once properly developed. The area can be developed on BOT basis to a commercial center, with upper floors to be allocated for the residences of the existing dwellers.

COLONY IN FRONT OF STADIUM JUNCTION.

This informal settlement is located towards the eastern side of the stadium junction, and is spread across an area of 40 cents. It accommodates around 17 families and is in a dilapidated condition with no proper sanitation, water supply facilities available. People live in temporary type of shelters which often fails during heavy monsoon rains. The area is located right with in the central business district of the town. The colony can be developed with commercial areas on the lower floors, and reserving the upper floor for residential units, to be allocated for the existing dwellers. BOT system of implementation shall be proposed, as the commercial value of the location is considerably high, and this aspect makes the project financially viable.

24.2.6.4 SC Housing Schemes

There are around 70 SC housing colonies (with more than 10 SC families) in the planning area. It is proposed that to meet the housing demand, multi-storeyed housing projects has to be undertaken. An SC housing project is proposed in Chelavoore.sy 73/1A1 and another in resurvey no.250/4 in Puttekat, Feroke. Basic infrastructure facilities of adequate standard, like H/H water supply connections, overhead water tanks for each colony, sanitation, power connections, street lights, solid waste treatment facility etc..has to be ensured in these colonies. Livelihood opportunities shall be ensured for at least one member of these families.

Project Cost Rs. 40 Crores

Implementation Time Frame 2015-2025

24.2.6.5 Model Fishermen Village – ‘MalsyaGramam’

Model fishermen villages are proposed in the Elathur, Mukhadar, Puthiyappa and Chaliyam. The model fishermen village is envisaged to have good quality housing, electrification, water supply and sanitation, disaster information and rescue centres, hospitals, skill development, education and technical training facilities for fishermen population especially the women, anganwadis, elderly and palliative care centres, fish processing centre, fisheries related industries etc., in the delineated area.

The 13th Finance Commission has recommended Rs. 200 crores as grant in aid to the state for development of the Fisheries sector for the period 2011-15. The grant is meant for Construction of Model Fishing villages which include construction of houses, provision of drinking water, sanitation, provision for health facilities, setting up of fish marketing centers, construction of fisheries schools etc..The project is proposed to be implemented under the "Model Fishing Village" scheme under the 13th Finance Commission Award Projects.

Project Cost Rs.10 Crores

Implementation Time Frame 2015-2017

24.2.7 Sports and Recreation

The recreational land uses fall short gravely of requirements, as the study reveals. Hence the strategy is to create new open spaces/ parks/ stadiums/ play grounds and to develop the existing ones to the required standards. Besides, it is proposed that the waterfront areas and puramboke lands shall be developed to serve as neighbourhood parks.

Kozhikode is home to many eminent personalities in sports, honoured in international and national levels, and dubbed as 'Footballer's Mecca' for its famous love for the game of Football. However, the region lacks quality sports infrastructure and training facilities. Hence the policy in sports sector is to create international quality infrastructure and training facilities, as well as to promote sports tourism in the area.

24.2.7.1 International Stadium and Sports Complex

The existing stadium in the planning area is at the centre of the core business area which creates havoc at the conduct of any event and lacks sufficient space for events of national/international scale. Hence, a New International Sports Complex cum Commercial Complex shall be developed within the corporation area or at the surrounding panchayats, utilizing the commercial potential as well. The Complex is proposed to house a Cricket Stadium, Foot Ball Stadium, an Indoor Stadium, Parking Plaza, Commercial and Office Complex and residential and training facilities for sports persons. The existing stadium is proposed to be retained as an open space or a venue for conduct of regional events.

Project Cost Rs.500 Crores

Implementation Time Frame 2015-2030

24.2.7.2 Park and Recreational Complex- at Paroppadi

The project is envisaged on an area extending to 70 acres, at Paroppadi, near Malapparamba area, easily accessible from NH 766, (wayanad road). The land is being kept vacant without any agricultural activities for the past 15 years. The plot is a watershed area with availability of water throughout the year. It is a low lying area surrounded by residential buildings, and the site is comprised of survey numbers including 9,10,23,25,26,65,66,67,103 and 104 and portion of few other survey numbers. At the eastern side of the site, police head quarters are located and the Kanadikkal river flow on the western side at distance of 1 km and the site. The site is connected with the river through a canal. General location details are given in Fig 24.26.



Figure 24.26: Location details

The development pressure and the demand on residential units of Kozhikode city have started threatening the surveillance of this water body, as developers have already started illegal filling up of the area. The land has got an exclusive potential to be developed as an urban square while conserving the serene nature of the site and preserving the existing water body. As the Kozhikode city tends to grow outwards towards NH 17 bypass, urban square near to it makes the site more feasible due to the nearness towards the National Highways. The existing cross sectional details of the site are given in Figure 24.27.

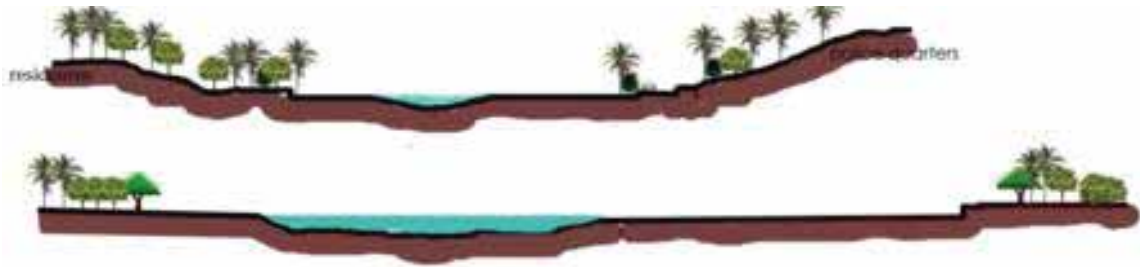


Fig 24.27: Cross sectional details of the site.

The objective of the project is to protect the serene environment of the area by protecting the natural water body in the form of a fresh water pond, at the same time to provide the facilities for income generation to the owners, by suitably developing the area into a recreational space in a sustainable manner. The various facilities to include fresh water pond, children's park, community park, meeting area, open air theatre, arts and crafts shop, curios shops, food courts, aquaculture, and allied amenities. A schematic site plan for the development is given in figure 24.28. The proposed cross section of the development is given in figure 24.29



Fig 24.28: Proposed cross section of the development.

The project can be implemented making use of various best aspects of Land Pooling and Public Private Partnership methods in general. Special purpose vehicle may be coined out for the implementation of the project. Land from various owners need to be combined and developed as per the requirements and guidelines of the project, and a specified developed portion of the land need to be handed over back to the original owners in proportion to the land they actually were in possession before.

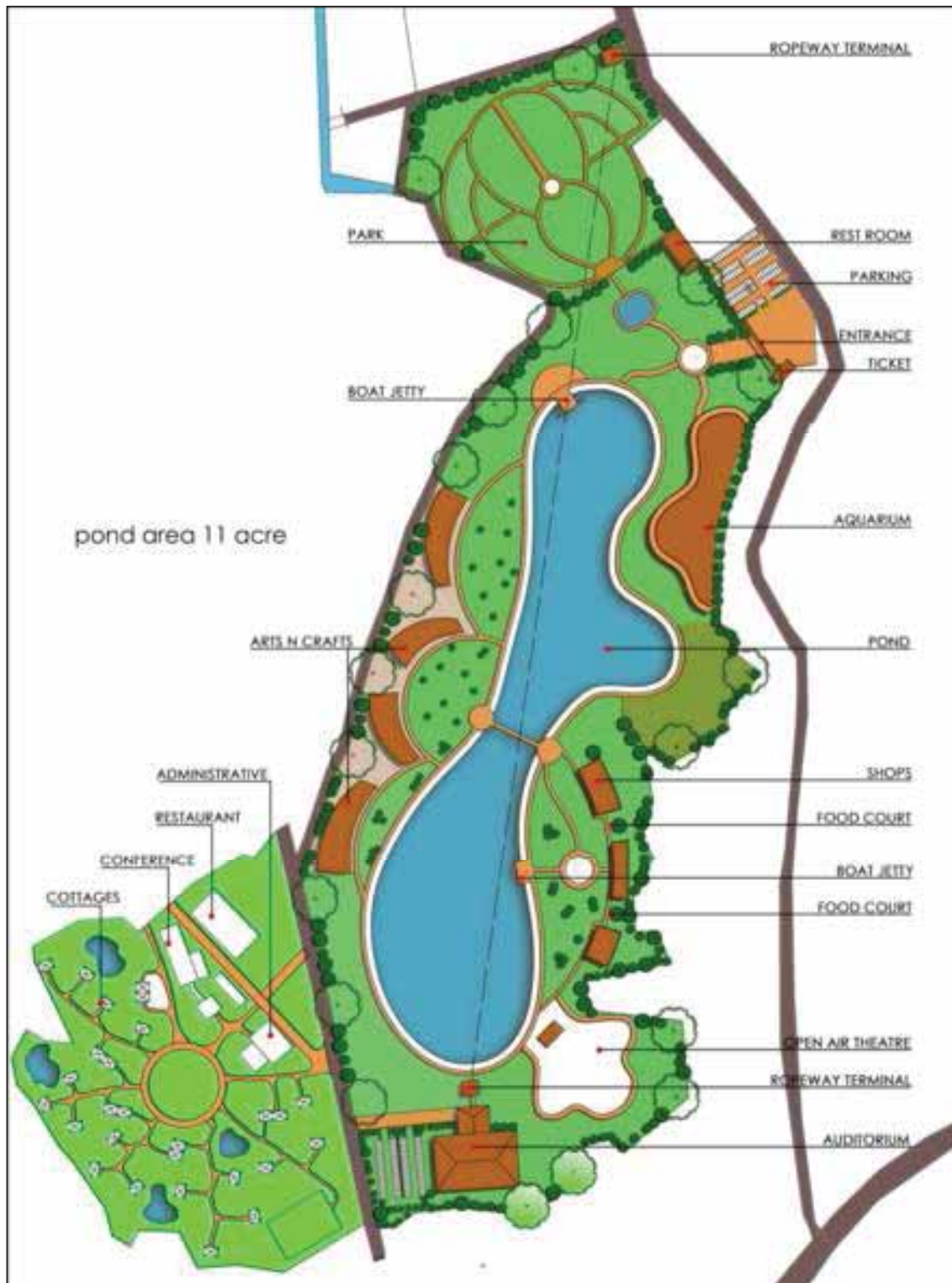


Fig 24.29: Schematic site plan for the development.

24.2.7.3 Sports Complex

A sports complex is proposed near Payyanakkal GHSS, which would facilitate the sports related activities of schools in the region. This project was proposed by the working group of JTPC as part of Peoples Aspiration Study.

Project Cost Rs.0.5 Crores

Implementation Time Frame 2015-2030

24.2.7.4 Indoor Stadium

New Indoor Stadium is proposed in Leprosy Hospital Compound, Chevayur.

Project Cost Rs.25 Crores

Implementation Time Frame 2015-2019

24.2.7.5 Swimming and Football Schools

Swimming is a lifesaving talent, which needs training at a young age. Swimming Schools is proposed at Kadalundi in the 82 cents of land in Resurvey No. 175p of MannurDesam, utilising the existing pond (This project was proposed by Kadalundi LSGI as part of Peoples Aspiration Study) and near Nadakkavu, in ward 3, T Sy.No 681 of Kozhikode Corporation. Related Infrastructure like access road, dressing room, landscaping, trainer's room etc..is also proposed to be built as part of the project. Mokavoor - Eranjikkal area of Kozhikode Corporation is an area with abundant water bodies. A swimming pool can be developed at this area, utilising existing ponds or water bodies. Besides, region-wise football schools are proposed to be conducted in all playgrounds and stadiums.

Project Cost Rs.1 Crores

Implementation Time Frame 2015-2020

24.2.7.6 New Parks, Play Grounds and Mini Stadiums and hierarchical development of open spaces

The following recreation facilities are proposed in the planning area. It is proposed that facilities for skill development in children shall be installed in all parks.

- Mini Stadium at Karinkaipadam, Ramanattukara – resurvey no. 31p, 32, 33p, 34p, 39p , 45p, KarinkallaiDesam
- Play Ground near Knowledge Park, Ramanattukara - resurvey no. 236p, VelipramDesam (Land owned by LSGI)
- Play ground at Puthiyappa Beach.
- Children's Park, Ramanattukara – resurvey no. 278p, VelipramDesam
- Park near Velliparamba, Medical College – resurvey no. 56p, 58p of Ward 30 (Kovoor) of Kozhikode Corporation
- Park at resurvey number 11p, Olavanna Desam, Olavanna Gramapanchayat.
- Chungam Poozhi pathar Bio Park

- Park in front of Jayanthi Nagar Colony, along the road.
- Park to the north of Santhi Nagar Colony, West hill in the vacant beach.

Other than these proposals, it is proposed to develop open spaces in a hierarchical manner throughout the planning area. A detailed study conducted for this purpose and the outcomes of the study are attached as Annex XIV of this report.

Project Cost Rs. 425 Crores

Implementation Time Frame 2015-2020

24.2.7.7 Development of Existing Parks/ Recreational Facilities

- Development of open air stage at Beach to national standards
- Development of VK Krishnamenon museum to national standards
- Development of Oceanarium and establishment of Centre for Training in Ornamental Fish Culture at Konnad Beach
- Renovation and revitalisation of Lions park aquarium
- Development of Butt road beach playground with better facilities
- Development of Play ground near Odumbra Bridge (resurvey numbers 732p, 734p Ward 24 , Kozhikode Corporation)
- Construction of mini stadiums at existing playgrounds at Mukachi Maidanam and Puthiyappa
- Development of existing mini stadium at Beypore
- Development of Gotheeswaram children's park

Project Cost Rs. 3 Crores

Implementation Time Frame 2015-2020

24.2.8 Other Civic Amenities

The requirement of socio-cultural facilities, distribution services and other facilities in the planning area is given in tables 24-3, 24-4 and 24-5. As the use of internet facility through mobile phone is increasing like anything and e-governance promotion activities are taking place in a wider perspective, provision for 100% wi-fi connectivity in the masterplan area shall be introduced.

Table 24-3 : Socio-cultural facilities - requirement 2031

Sl. No	Category and Standards	Requirement 2031	Existing	Gap
a	Community Room - one for 5,000 population	325	59	266
b	Community Hall and library - one for 15,000 population	108	61	47
c	Recreational Club - one for 1 lakh population	16	121	0
d	Music Dance and Drama centre - one for 1 lakh population	16	24	0
e	Meditation and spiritual centre- one for 1 lakh population	16	0	16
f	Socio-cultural centre - one for 10 lakh population	2	0	2

(Ref: UDPFI Guidelines)

Table 24-4 : Distribution Services – Requirement 2031

Sl. No	Category and Standards	Requirement 2031	Existing	Gap
a	Petrol pump			
	One for 150Ha of gross residential areas in residential use zone	63	24	106
	One for 40Ha of gross industrial area	30		
	Two petrol pumps in each freight complex	18		
	Two petrol pumps in each district centre	3		
	One petrol pump in each community centre	16		
b	Milk Distribution			
	One milk booth for 5000 population	325	17	308
c	LPG godowns			
	one gas godown for 50000 population	33	14	19

(Ref: UDPFI Guidelines)

Table 24-5 : Other facilities - requirement 2031

Sl. No	Category and Standards	Requirement 2031	Existing	Gap
1	POLICE			
a	Police Station , 1 for 90000 population	18	15	3
b	Police Post , 1 for 50000 population	33	1	32
c	District Office and Battalion, 1 for 10 lakh population	2	1	1
d	Police line, 1 for 20 lakh population	1	1	0
e	District Jail , 1 for 10 lakh population	2	1	1
f	Civil Defense and home guards, 1 for 10 lakh population	2	0	2
2	FIRE			
	1 fire station or sub-fire station within 1 to 3 km for 2 lakh population	8	3	5

(Ref: UDPFI Guidelines)

24.2.8.1 Fire Stations

The absence of adequate number of fire stations and their rational distribution is a major lacunain the planning area from risk mitigation and management point of view. It is proposed that more fire stations have to be established in the planning area at the following places.

- Mobility Hub – Sarovaram area
- Olavanna
- Ramanattukara
- Beypore Port

Project Cost Rs. 4 Crores

Implementation Time Frame 2015-2030

24.2.8.2 New Crematoria and Modernisation of Existing Crematoriums

A New Crematorium is proposed at VelipramDesam of Ramanattukara Gramapanchayat. Modernisation and infrastructure improvements are proposed at Kannamparambu, Gotheeswaram beach, Mathottam crematoriums. Besides, modernisation of all crematoriums with state of the art technologies and adoption of less land intensive ways shall be taken up in a phased manner. Mobile crematoriums are proposed to be acquired and promoted by the LSGIs.

Project Cost Rs. 26 Crores

Implementation Time Frame 2015 -2020

24.2.8.3 Community Halls

The following community facilities are proposed at various parts of the planning area.

- Community hall at Ramanattukara, to the North of existing busstand, in Resurvey Nos. 297p, 296p of VelipramDesam.
- Community Hall near Koya Road in Re.Sy No.98/7 part.
- A cultural centre at Marad

Project Cost Rs. 18 Crores

Implementation Time Frame 2015 -2020

24.2.8.4 Government Offices' Complex

It is proposed that the District Jail, Puthiyara, Kozhikode may be relocated outside the planning area, and a Government Offices' Complex may be established in this compound, to house the government offices which are presently accommodated in rented facilities.

Project Cost Rs. 20 Crores

Implementation Time Frame 2020 -2030

24.2.8.5 Night Shelter

A night shelter is proposed at the vacant land behind Apsara Theatre. This location is at walkable distance from Kozhikode Railway Station and is well connected with city bus as well as para transit services.

24.2.9 Disaster Management

24.2.9.1 Disaster Preparedness and Management Plan

As part of disaster preparedness, the Masterplan identifies and provides for evacuation routes from all directions to the main medical centre of the region, the Kozhikode Medical College. It also proposes new fire stations at four locations. However, preparation of a full-fledged disaster management plan is necessary which should identify all risk areas like hazardous industries, petrol pumpsetc, prepare a risk mitigation plan, identify and demarcate zones which are vulnerable to various kinds of disasters, propose prevention and mitigation measures, identify rescue centres, create necessary physical infrastructure and trained human resources for prevention of disasters as well as warning, mitigation and rescue during disasters. Student members of various social service initiatives in educational institutions shall be given compulsory training in providing first-aid, lifesaving skills, risk and disaster mitigation, etc. whose services will surely benefit the society in exigencies.

Project Cost Rs. 0.1 Crores

Implementation Time Frame 2015 -2020

24.3 Social Welfare and Empowerment

The policy in this sector is to “Facilitate empowerment of vulnerable sections (socially and economically backward, physically/mentally challenged, women, senior citizens) through planning and policy measures. Make the city safe for the most vulnerable; they will be safe for everyone”. The strategies include inclusive planning and design of streets, parks, public places, civic facilities, sanitation infrastructure and transport modes, starting women centered industrial projects, promoting women entrepreneurship and impart skills development training, creation of geriatric/specially skilled/physically challenged care infrastructure in govt. sector, and preferential housing of the marginalized.

24.3.1 Women’s Industrial Cluster

Refer 24.1.1.4

24.3.2 Women’s Entrepreneurship and Skill Development Centre

Refer 24.1.1.4

24.3.3 Friendly transportation and amenities for Women, Elderly and Differently-abled

It is proposed that ‘ladies only’ bus services may be conducted in the planning area, during odd hours and peak hours, to ensure safety and comfort of women. Besides, all

transport terminals shall have friendly infrastructure and amenities to ensure comfort and security for the elderly, women, feeding mothers, specially-skilled and the differently-abled.

Besides, women – friendly toilets, like the electronic toilets installed recently, are proposed to be installed in sufficient numbers in all schools, work centres, hospitals, office complexes etc.

Parks are proposed to be specially designed to suit the requirements of the elderly, specially-skilled and the differently-abled.

Project Cost Rs. 10 Crores

Implementation Time Frame 2015 -2030

24.3.4 Development of IMHANS – Centre of Excellence

Institute of Mental Health and Neurosciences (IMHANS), recently conferred 'centre-of-excellence' status by the central government, addresses the mental-health requirements of the northern districts of Kerala, and is developing community mental health programs for the region, aiming at treatment and rehabilitation of the psychologically ill within the community itself. It is proposed that this centre shall be developed with the necessary manpower and state-of-the-art infrastructure for mental health education, research and community services including treatment and rehabilitation.

Project Cost Rs. 100 Crores

Implementation Time Frame 2015 -2025

24.3.5 Centre for Integrated Development of Differently-abled Children

It is proposed that a Centre for Integrated Development of Differently-abled Children, to extent developmental care and support to the differently-abled and specially-skilled, right from their birth, as well as children with learning disabilities and psychological issues, be established in the Juvenile Home Compound.

Project Cost Rs. 5 Crores

Implementation Time Frame 2015 -2020

24.3.6 Special Schools in Government/aided Sector

Almost all Special Schools, attending to the educational needs of one of the most vulnerable sections of the society, are run by charitable organisations and religious initiatives. It is proposed that all such private initiatives may be given due recognition and support through govt.aids, to ensure better infrastructure and facilities as well as better remuneration for the staff. Besides, the adequacy and accessibility of these institutions needs to be studied in detail. It is also proposed that the state govt. shall start Special Schools, to meet the gap, if any. Infrastructure of uneconomical schools can be utilised for

new special schools. The education complex in Olavanna may also be considered for locating a new special school.

Project Cost Rs. 50 Crores

Implementation Time Frame 2015 -2022

24.3.7 'PakalVeedu'

It is proposed that 'PakalVeedu' or day care homes for the elderly may be started along with the Anganwadis. It is anticipated that this will have mutually beneficial effects on both the elderly as well as the children.

Project Cost Rs. 10 Crores

Implementation Time Frame 2015 -2022

24.3.8 Homes for Elderly in Government Sector

To meet the demand, it is proposed that two more homes for elderly shall be started in Govt Sector additional to the existing old age home, to ensure the welfare of the senior citizens. An old age home is proposed in Joseph Road in T.Sy no. 292p, ward no.4,(the corporation land opposite to Janayugam press)and another in Social Welfare Complex, Vellimadukunnu. Besides, it is proposed that holistic medical care facilities, legal assistance, recreation and exercise facilities, etc. shall be provided at these old age homes. Senior citizens willing to deliver services in their fields of experience and knowledge shall be given the opportunity for the same, which would help them to lead a more healthy and dignified life, and the monetary returns from this can be used to meet their expenses.

Project Cost Rs. 1.0 Crores

Implementation Time Frame 2015 -2020

24.3.9 Pain and Palliative, Geriatric Care Centres

It is proposed that a comprehensive study may be undertaken on the district/block/LSGI/ward level requirement of local/regional centres for palliative and geriatric care, as well as home care services in the planning area as well as region, and services may be extended as per the findings of the study. Student members of various social service initiatives in educational institutions shall be given compulsory training in geriatric and pain and palliative care, whose services can be utilised in emergency situations, besides creating better understanding and awareness in the citizens at a very young age.

Project Cost Rs. 0.5 Crores

Implementation Time Frame 2015 -2020

24.4 Culture and Heritage

The policy in culture and heritage sector is to conserve the built and natural heritage, preserve and show case the rich cultural heritage, and optimally utilise this potential to enhance the vibrancy and tourism potential of the area. The specific proposals are detailed below.

24.4.1 Cultural Square at Mananchira

The existing DD Office Complex Compound is proposed to be developed as a cultural hub of the region, considering the importance of Mananchira and surroundings in the heritage and culture of the region. A centre of national standards to promote theatre and drama is proposed in this compound. Auditoriums of international standards for performing arts, facilities for rehearsing and staging dramas and plays and a theatre complex for exhibition of world cinemas is proposed as part of this centre. Along with this, a museum showcasing the works of eminent writers of the region like Vaikom Muhammed Basheer, M.T. Vasudevan Nair, S.K.Pottekkat, Sanjayan, Thikkodiyar, Sukumar Azheekode, etc. is also proposed. Besides a cultural square to honour and reminisce cultural and social leaders is also proposed as part of this cultural hub.

Project Cost Rs. 30 Crores

Implementation Time Frame 2015 -2020

24.4.2 International Cultural Centre

The Kozhikode city had trade relations with number of countries in the Middle East and Europe due to being in the silk route and known for the honesty of its tradesmen. So it is proposed to set up an International Cultural Centre with the active participation of these countries in the city for promoting cultural exchange and showcasing the city's glorious past. The centre will have display on the trading history of the city in terms of photographs, relics and other exhibits. The centre will also have facilities for performing arts, conventions and exhibitions. The land lying vacant in Gandhi Road (former Kerala Soaps & Oils factory compound) is earmarked for the purpose.

Project Cost Rs. 10 Crores

Implementation Time Frame 2015 -2020

24.4.3 Conservation of Tippu's Fort

Location Resurvey no 166p of Nalloor desam, Feroke Gramapanchayat

It is proposed that landscaping and tourist facilities may be provided at the site, to attract tourists and researchers to the fort.

Project Cost Rs. 55 Crores

Implementation Time Frame 2015-2017

24.4.4 Establishment of an Archives of International Standards

The regional archives of Kozhikode, which houses over five lakh records, currently functions in the district collectorate premises and is constrained by the lack of space. It is proposed that a dedicated building to house archives of international standards be established in the existing Old Taluk Office and Jail Compound, having facilities for proper display and scientific conservation of documents.

Project Cost Rs. 1 Crores

Implementation Time Frame 2016 -2020

24.4.5 Conservation of Old Sea Bridges of Kozhikode

The two historic sea bridges of the erstwhile glorious Port City of Kozhikode were constructed in 1880 by the British and were in use up to the late 1960s. Only a few vertical members of the concrete framework of these one-time bridges, which were used for import/export of goods as well as for domestic services, are remaining today. The remnants of these bridges, reminiscent of the city's glorious past, are of high heritage value and are proposed to be conserved using state-of -the-art technologies. A watch tower and



refreshment facilities to attract tourists along with beach beautification programmes is also proposed which can be operated on BOT format, to make the whole project economically feasible. The responsible agencies include DTPC, Art and Heritage Commission, and Kozhikode Corporation.

Project Cost Rs. 0.5 Crores

Implementation Time Frame 2015 -2020

24.4.6 SM Street Heritage Project

The conservation of SM Street as a heritage is a long cherished dream of the city, the efforts for which did not materialise due to non-consensus among the various stakeholders. It is proposed that this centuries old commercial hub of Kozhikode shall be conserved without altering its traditional ambience and architecture. However, facilities like parking plazas, drainage network, street lighting etc are required to ensure the healthy survival of this retail hub of common man. Hence, a comprehensive project for the conservation of the street as a heritage, while ensuring it's functioning as the buzzing retail trade centre of Kozhikode, is proposed.

Project Cost Rs. 10 Crores

Implementation Time Frame 2015-2017

24.4.7 Revathi Pattathanam

Revathi Pattathanam, an annual assembly of scholars and competitions for the Bhattasthana (the seat of a bhatta), held for seven days from the 'Revathy' day of the month of 'Thulam' (October – November), since 14th century and hosted by the Samuthiri ruler and held at Tali Mahadeva Temple, was a major event for the scholars in south India during the medieval period. The assembly aimed at social-cultural enrichment and competitions were conducted in four fields of knowledge- Tarka, Vyakarana, Mimamsa and Vedanta. More subjects were added at later stages. Now-a -days, the festival is conducted for a single day. Scholars are felicitated, "Murajapa" – recitation of three Vedas, and cultural seminars are held, and awards for the best poet and temple artist are distributed as part of this cultural festival. It is proposed that the festival be revived to its glory and grandeur with government support, as an attempt to conserve the culture, traditions, ancient knowledge and arts.

Project Cost Rs. 0.5 Crores

Implementation Time Frame 2015-2017

24.5 Environment

The policy in environment sector is to “Designate zones for conservation, preservation and protection and utilize the potential for responsible tourism “. The strategies include declaration of Kadalundi as a Bio reserve, development of Community Mangroves Reserve in various locations in the planning area like that in Kadalundi, a comprehensive incentive based plan to conserve ponds and sacred groves, ban on plastic, afforestation programme, implementation of wetlands management plan, conservation of the natural and man-made heritage, promotion of low ecological foot print buildings and pollution-free fuels, enhancing urban green cover etc.. It is proposed that the planning area shall gradually achieve conversion to environmental friendly fuels like CNG for transportation. To counter the effects of climate change and urban heat islands, it is proposed that green cover in the urban area shall be enhanced by mandating minimum tree cover in large projects, increasing road side vegetation cover, etc with the help of Urban Forestry/ Social Forestry programmes. The specific projects are listed below.

24.5.1 Kadalundi 'Jaivagramam'

Project Rationale Kadalundi Gramapanchayat invites special attention among the LSGIs of the planning area, as it is an island, surrounded by rivers on three sides and the ocean on the fourth. The LSGIs famous for its bird's sanctuary and mangrove reserves. To conserve the rich biodiversity of this island, the development of this LSGI shall be regulated in such a way to guard against anything that can deteriorate the environmental quality. In such a fragile ecosystem, even human activities of rural nature like agriculture, if using pesticides, can deteriorate the air, water and soil environments and can endanger the migratory birds.

Hence, Kadalundi is proposed to be developed as a *Jaivagramam* – a village which promotes organic practices. The development into a full-fledged organic village will need many policy and project initiatives to be implemented on urgent basis, which are listed below.

- Ban on use of pesticides and chemical fertilisers in the LSGI and promotion of organic manures.
- Treatment of 100% organic wastes produced in the LSGI at source using vermin composting, pipe composting, biogas plants etc., with the help of Jilla Panchayath, Gramapanchayat and State Government funds through various agencies/missions.
- Promotion of Organic Farming, Export oriented production of organic agricultural produce, Branding/Certification and Marketing with the help of State and Central Government funds.
- Promotion of Organic Farming on roof tops, homesteads, public use compounds, uncultivated agricultural lands and cultivable vacant lands with the help of Jilla Panchayat, Gramapanchayat funds.
- Export oriented production of Sea food and aquaculture products.
- Promotion of renewable energy harvesting, mainly wind and solar energy with the help of Jilla Panchayat, Gramapanchayat, State and Central Government funds.
- Ensure proper sanitation facilities in all buildings using prefabricated septic tanks / sewerage network and sewage treatment plant and thus prevent water pollution
- Ban on use of Non-recyclable Plastic in the LSGI, promote reuse and recycle and establish recycling units
- Promotion of Animal Husbandry with the help of State and Central Government funds.
- Promotion of traditional industries and environment friendly practices in traditional industries (de-fibering machines instead of retting, artificial seasoning of wood etc)
- Restriction of high rise / high density development and polluting industries.
- Promotion of pedestrianisation and cycling - Establishment of and cycle rent shops targeting the tourists, creation of a pedestrian pathway cum cycling lane network for the whole panchayat.
- Promotion of environment friendly vehicle fuels like CNG, and phase wise transition to achieve conversion to use of such fuels.

Project Cost Rs. 15 Crores

Implementation Time Frame 2015 -2020

24.5.2 Comprehensive Plan for Development and Management of Community Mangroves Reserve at Kadalundi

Project Rationale: The first community reserve of India, the Kadalundi – Vallikkunnu community reserve, is under threat due to indiscriminate sand mining and dumping of waste in the river. Though declared as a community reserve in 2007, the efforts for comprehensive development of the reserve has not fully materialised yet. Hence a

comprehensive development and management plan is proposed to be made for developing Kadalundi as a mangroves hotspot and a major bird watching spot in the country. Projects for setting up a mangrove nursery, a research centre, bird watching towers, Butterfly Park, boat jetty, fishing points, stroll/jogging tracks, tourist facilities centre, tour packages, construction of seawalls and river embankments as well as development of the locality are to be addressed by the management plan. Policies for use of eco-friendly materials for construction, decentralised waste treatment, low density development etc are also to be formulated.

Project Cost Rs. 1 crores

Implementation Time Frame 2015-2019

24.5.3 Conservation of Ponds and Sacred Groves

Project Rationale 'Kavu'- the sacred groves and ponds are the habitat of indigenous flora and fauna and the preservation of Kavus and ponds is an immediate need of society. Majority of the Kavus and ponds in the planning area are under private ownership. It is proposed that a comprehensive incentive based plan to conserve ponds and sacred groves in the planning area, regardless of the type of ownership, shall be conceived and implemented at the earliest. In case of Kavus and ponds under private ownership, conservation could be done either by the owner, with or without aids from the local government; or the corresponding land could be surrendered to the respective local governments for conservation, in which case, the owner could utilize equivalent construction rights for the surrendered land, elsewhere in the planning area. Suitable Policy and legal environment and fund allocations shall be ensured by the respective local governments. The list of major Kavus along with their extent is appended in annexe XV. No construction activities other than those required for the protection of the structure / area shall be permitted in this areas.

Project Cost Rs.180 Crores

Implementation Time Frame 2015 -2025

24.5.4 Development of Botanical Garden

Location Resurvey No. 119p, Ward 26 (Kommeri) of Kozhikode Corporation, Resurvey No. 8p, 9p, 10p, 96p, 101p, 102p, 103p of Iringallur Desam of Olavanna Gramapanchayat

Project Rationale: The Calicut University Botanical Garden (CUBG) is the largest and most diverse botanical gardens in varsities across the country. The garden society has proposed to develop an aquatic bio park on 15 acres of paddy land, aimed at creating a national-level conservatory of aquatic plants and eco education, targeting tourists as well as students. It will be a wetland in its pristine form and one of the biggest collections of aquatic plants. The project involves the development of a 5.6 acre artificial lake with pockets of aquatic plants along the periphery, a mangrove zone, marshy land, landscaped grounds with expansive lawns and tree plantations and a demonstration area for exhibition of freshwater and saline algae. The aquatic bio park would also house model interpretation centres to educate

visitors on the importance of the wetland ecosystem, a tissue culture facility, a museum complex, medicinal plant garden and collection of terrestrial plants. Another proposed project is an arboretum (tree garden) in 20 acres to conserve around 200 most threatened tree species from the Western Ghats, a listed UNESCO World Heritage.

Besides establishment of a zoo in the botanical garden compound is also proposed by the Masterplan.

Project Cost 50 Crores

Implementation Time Frame 2020-2025

24.5.5 Development of HortusMalabaricusSasyaSaraswam

The 'Itty Achuthan Memorial HortusMalabaricusSasyaSaraswam', a park that attempts to preserve all herbs and plants that find a mention in the historic work 'HortusMalabaricus' by Hendrik Van Rheede, the Dutch Governor of Kochi during 1667-77, is an ambitious project conceived by the State Forest and Wildlife Department at Chaliyam. The project aims to rejuvenate the 742 plants listed in HortusMalabaricus. It is proposed that the park may further be developed as a centre for research on flora and fauna of the region, with facilities of international quality to attract tourists and scholars world over.

Project Cost Rs. 0.8 Crores

Implementation Time Frame 2015 -2017

24.5.6 KottuliWetlands Management Plan

Wet lands are invaluable components of the environment ecology and bio diversity. Wetlands are transitional zones that occupy an intermediate position between dry land and open water. Wetland ecosystems are dominated by the influence of water; they possess characteristics of both terrestrial and aquatic ecosystem and properties that are uniquely of their own. Kottuli wet land is listed as wet land of National. The wetland, as it is located adjacent major transportation links and development zone, is under threat. Preservation is planned to be achieved in such a way that the private land included would be fully surrendered by the owner to the corporation and will be given equivalent benefit to build elsewhere. The following are proposed as policy measures to preserve the wetland.

- The wet land is to be kept as pollution free and no waste outlets are allowed to be discharged
- Sediment trap or silt trap has to be installed at the point of treated effluent water entering the canal
- Ensuring full functions of sewage treatment plants located on the banks.
- Ensuring stringent action to those who discharge untreated water to wet land
- No constructions are permitted
- Exploring the possibility of converting Kottuli wet land as a Bio park without losing character and without compromising on ecological importance.

Besides, an area Masterplan incorporating the management plan prepared by CWRDM is proposed to be drawn up to facilitate specific spatial controls for the area.

Project Cost Rs. 220 Crores

Implementation Time Frame 2015-2020

24.5.7 Revitalisation of Streams and Water bodies

The following water bodies in the area are proposed to be revitalised.

- The abandoned clay mine to north of Chungam junction, Ramanattukara
- Kundamkulam – Kuniyil Thodu
- Chethupalam Thodu
- Kappakkal and Anamadu Thodu
- Aaviyil Thodu , Thoppayil beach
- Stream from Varakkal Temple to Kampuram Beach
- V.K. Canal and Maruthamoli Thodu
- Mampuzha
- Kallai River

Besides, a comprehensive project to identify and develop the missing links of streams and to re-establish the connections with the river / ocean is proposed.

Project Cost Rs. 1.1 Crores

Implementation Time Frame 2015 -2022

24.5.8 Integrated CRZ Implementation Plan for Kozhikode Urban Area

The CRZ regulations form a basic framework for both environmental conservation as well as development control along the coast. In a major portion of the planning area, the development is governed by the regulations prescribed by Coastal Zone Management Plan of Kerala, 1996. Three recently merged gramapanchayats of Elathur, Beypore and Cheruvannur-Nallalam still falls in CRZ III, rest of the corporation areas fall under CRZ II and the other panchayats of the planning area falls in CRZ III. However, ambiguity and discrepancies still exist in implementation of the CZMP. The CZMP map prepared at 1:12,500 scale can be used effectively for guidance, but not for implementing and monitoring the compliance to the CRZ provisions in the field. The regulation of dense development along the coast in the planning area needs cadastral level maps with survey plot level information, preferably in 1:1000 scale. The vagueness in CZMP at implementation level has resulted in wrong interpretations of the CRZ zones. Resolving these ambiguities is important from the perspectives of environmental conservation as well as optimal utilisation of the high potential urban land. Hence it is proposed that an Integrated CRZ Implementation Plan shall be prepared on urgent basis, with 1: 1000 scale cadastral level mapping of the CRZ zones, for the whole of the planning area. Besides, a plot level information system, to

help transparent and simple decision making on development permits in CRZ areas, shall be developed and implemented.

Project Cost Rs. 0.2 Crores

Implementation Time Frame 2015 -2017

24.6 Governance

The policy in governance is to “Facilitate a well-coordinated and efficient city management using state-of-art tools and technologies”. The strategies include introduction of e-payment of taxes and fees, online public service delivery and awareness creation among general public, unifying governance practices in all LSGIs in master plan area, improving internal coordination between different sections, implementation of GIS based property tax management for increased efficiency of tax assessment and collection, revision of tax assessment to create slabs based on nearness to transit corridors , coverage of the building etc., promote new formats and tools of land development and project implementation like PPP, land pooling, TDR, betterment levies etc. The specific projects are detailed below.

24.6.1 Comprehensive Improvement in Governance

The following measures are proposed to ensure good governance in the planning area.

- Vigilance and Monitoring Cell to enforce waste management, especially by the hospitals, slaughter houses and fish/meat market, hotels and other commercial centres. The cell will meet and report in every 3 months. All govt bodies like health, PCB, town planning etc shall be members of this cell.
- Standardise the service delivery to ensure consistency in quality and promptness across the various LSGIs in the planning area
- Ensure better co-ordination and communication between various sections of the LSGIs
- Implement ‘SUGAMA’ for project implementation
- Implement e-governance and online public services delivery
- Implement facilities for online remittal of taxes, fees etc.. for whole of planning area
- Creation of a comprehensive database and GIS Mapping of utility networks, Implementation of GIS and SCADA based utility management and online complaint redressal systems with the help of 24*7 consumers care/ call centres.
- Incentivise initiatives by households for waste disposal within their premises

Project Cost Rs. 25 Crores

Implementation Time Frame 2015 -2030

24.6.2 e - Governance

It is proposed to develop utility maps and plot level GIS for the entire planning area. By the introduction of Management Information system (MIS) and Web GIS various departments can deliver their services at the locations convenient to the public. It also aims to share data between departments and coordination of their strategy plans so as to avoid conflicting decisions. Each department spatially analyse the data within their jurisdiction and area of interest. With the help of plot level GIS and Utility maps Local bodies process building application, issue completion certificate, assess property tax etc without field visit, and other services using Web GIS and MIS. It is also to be used by other departments for providing various facilities like monitoring, metering and controlling of drinking water supply, metering and controlling of power of individual users etc. Also double entry accounting and online public service delivery system shall be introduced.

24.6.3 Urban Planning and Design

24.6.3.1 Detailed Alignments of Roads and Junction Improvement Plans

Project Rationale: The Masterplan identifies many roads, a few of which are new alignments, and many involve widening. The implementation of these proposals needs detailed alignment plans, which are proposed to be taken up immediately after the sanctioning of the master plan. It is proposed that the pedestrian/cyclist friendliness as discussed in sections 24.3.3 and 24.1.2.2 be incorporated while preparing the detailed alignment. Junction Improvement Plans are also to be prepared along with/independent of these detailed alignments for the various junctions in the planning area.

Implementation Time Frame 2015-2017

24.6.3.2 Detailed Town Planning Schemes

Project Rationale: The Masterplan is a general land use plan that set the broad policy framework for guiding development decisions in the planning area. Detailed Town Planning Schemes for specific areas of coherent nature and purpose detailing land-use and zoning regulations, as well as urban design, transportation, and open-space guidelines for each area, need to be prepared and implemented for effective control of the micro level land uses, which is proposed to be taken up as the next phase of this Masterplan. The Detailed Town Planning Schemes should address the concerns highlighted in sections 24.1.2.4, 24.2.2.10, 24.6.3.5, and 24.6.3.6. The proposed areas include

- Kottaparamba - Palayam Area
- Railway Station Area
- Eranjipalam – Arayidathupalam Area
- Arayidathupalam – Thondayad Area
- Beach Area

- Big Basar Area
- Civil Station Area
- Malaparamba Area
- Cheruvannur Industrial Belt
- Medical College Area
- West Hill Area
- Vellayil Area
- Chalappuram Area

Implementation Time Frame 2015-2017

24.6.3.3 Urban Renewal

Project Rationale An ancient city like Kozhikode will have number of pockets of decay with shift in economic activities. For example, the Big Bazar area once the centre of activity of the town lost its sheen with the shift in the economy and trade. Such pockets are in a dilapidated condition due to lack of maintenance and absence of economic impetus. These pockets contribute towards unhealthy conditions and squalor in the city. So, redeveloping such areas in an appropriate manner is in the interest of the city corporation as a whole. These redevelopments are proposed to be taken up using techniques like land pooling. Area specific DTP Schemes shall be prepared for these urban renewal projects with the active participation of the residents, land owners and other stake holders in these areas. Some of the areas identified for such urban renewal packages and their major thrust of development are as follows:-

- Big bazaar area (Commercial development retaining the past glory as a trade centre for plantation crops and spices).
- Kuttichira area (Residential development intended to up scale the housing conditions of the joint families still occupying dilapidated structures).
- SM Street (A commercial street of heritage value).
- Kottuli wetland and its environs (Intended to eke out land for the development of a new township while ensuring conservation of Kottuli wetland in all aspects and utilizing the environmental serenity of the area).
- Melepalayam (A commercial precinct).
- Palayam market area (Trade and commerce).
- Any other area proposed by the residents / ward councilors subject to environmental sustainability and financial viability.

Implementation Time Frame 2015-2020

24.6.3.4 Masterplans for Nearby Local Governments

For the successful implementation of the Masterplan for Kozhikode Urban Area and to establish fruitful give and take relationships with the LSGIs outside the planning area, it is imperative that at least the immediate neighbouring LSGIs shall have Masterplans. Many of the proposed projects like the dedicated truck lane to Kunnamangalam and further east, the Inland Water Way Network, Back Water Tourism at Elathur, Boating through Chaliyar etc require the cooperation of the neighbouring LSGIs for implementation. Besides, these can also boost the economy of these panchayats. Many projects, linked with the proposed projects in the planning area, can be conceived by these LSGIs, thus helping the wholesome economic development of the region. Hence it is proposed that Masterplans shall be prepared for these LSGIs. As pilot initiatives, Kunnamangalam and Kakkodi Panchayats are proposed to be taken up.

Implementation Time Frame 2015-2020

24.6.3.5 Heritage Zone and Buildings Management Plan

Project Rationale: A few heritage zones and buildings are identified in the Masterplan. Besides, a heritage listing is also done by the Department of Town and Country Planning, which identifies many a buildings/sites of heritage value. However, there can be buildings/sites in the planning area, under private ownership, which have heritage value, but are unidentified yet. Timely intervention is necessary for their identification, as well as for framing heritage control guidelines and measures. For protecting the monuments under private ownership, novel methods having a participatory nature are to be identified. Hence, a comprehensive project for identification and conservation of heritage, inclusive of the preparation of heritage area development control regulations, may be taken up on immediate basis, on sanction of this Masterplan. For identified heritage areas/structures, zoning regulations are provided in section 25.1 of this document.

Implementation Time Frame 2015 -2018

24.6.3.6 Planned Public Spaces and Streets

Project Rationale: Planned public spaces, street furniture etc enhance social interaction and improve liveliness of the city. Hence, a review of the city from an urban design perspective and an urban design guidelines is proposed be wrapped up for the city, which lists the locations which need urban design interventions and the projects to be implemented on short and long term basis.

Project Cost Rs. 0.25 Crores

Implementation Time Frame 2015-2024

24.6.4 Development Assistance Utility

To guide and facilitate a fast, fair and transparent dealing of developmental queries as well as complaints regarding service delivery, an online utility is proposed to be built for the planning area. The envisaged utility should have a comprehensive plot level/ building level database and shall be able to address the following.

- List out the development permits/ NOCs/ clearances required at a specific plot or for a specific construction like the clearances from railways, airport authority, KCZMA, Military, National Highways, KSEB, Pollution Control Board, Town and Country Planning Department, Local Body etc..
- Assess the outstanding taxes/fees to be paid for a property and facilitate online payment of the same
- Online registration and tracking of files submitted in various government offices
- Online complaint registration and tracking.

Project Cost Rs. 1 Crores

Implementation Time Frame 2015-2030

24.7 Towards Being Smart...

As economics move from agrarian to industrial and service the pace of urbanization accelerates. With steady increase in global population migration to cities also increases. The world's urban population is expected to double by 2050 and 90% of this growth will take place in developing countries, with India taking a significant share of that. In India, the share of GDP from urban areas is much more than rural areas, and is expected to reach 75% by 2031. The global experience is that a country's urbanization is relatively slow up to a level of 30% and it speeds up thereafter until it reaches 60-65%. With an urban population of 31%, India is at a point of transition where the pace of urbanization will speed up. It is the right time to plan a proper urbanization strategy by exploiting the advancements in technology so as to improve the quality of life.

The smart city movement tries to address the issues of this faster urbanization without compromising environmental sustainability, financial viability and maintaining a reasonable level of quality of life.

In Kerala there exists a rural-urban continuum. 47.72% of the total population of Kerala is urban. From 2001 to 2011 huge growth in urban population has occurred (92.72%). This could be attributed squarely to the manifold increase in the number of towns in the state between 2001 & 2011 from 159 to 520. Hence, in order to reduce the ill effects of urbanization and to curtail urban sprawl so as to improve quality of life, our cities need to become 'SMART'.

There are large numbers of definitions for a smart city. According to the Draft Concept Note on Smart Cities published by the Ministry of Urban Development, Government of India, smart cities are those which have smart (intelligent) physical, social, institutional and economic infrastructure.

A smart city is expected to create ample employment opportunities/ livelihood options for its entire people regardless of social status, age, income levels, gender etc. The three pillars on which a city rests are its institutional infrastructure (including speedy and ICT enabled service delivery, enforcement, security, taxation, institutional finance/ banking, transparency and accountability, skill development, environmental sustainability, people's participation in decision making, citizen advisory committee), physical infrastructure (power, water supply, solid waste management, sewerage, connectivity, multimodal transport, cyber connection, housing, disaster management) and social infrastructure (Education, health care, entertainment, inclusive planning). The instruments that facilitate the development of a smart city are use of clean technologies, use of ICT, participation of the private sector, citizen participation and smart governance.

Kozhikode is a regional node catering to almost half of the state. The city has state of the art facilities in health, education, water supply and many other sectors which makes it

Town and Country Planning Department, Government of Kerala

comparable to other bigger cities in the country. However, like Thiruvananthapuram and Kochi, Kozhikode also is an improperly developed city. The city core is saturated and presently the peri-urban areas are growing up taking momentum from the various institutions and IT sector developments coming up there. In order to keep up the level of service solutions are imminent. To ensure transparent governance and inclusiveness ICT enabled service delivery system is necessary.

The draft concept note on smart cities by the Government of India lays down certain benchmarks for smart cities. Considering these benchmarks as a reference the attempt to transform Kozhikode into a smart city through this master plan is examined as follows:-

24.7.1 Transport

- The traffic network is designed to minimize the travel time to any where in the planning area to be not more than 30 minutes.
- Continuous unobstructed footpath of minimum 2m width is proposed to be provided on either side of all streets with right of way 12m or more.
- Dedicated and physically segregated bicycle tracks with a width of 2m, one in each direction are proposed to be provided on street with RoW 24m or more.
- Access to para-transit ensured within 300m walking distance.

24.7.2 Spatial planning

- The land use zoning is done in such a way that 95% of the residences have daily needs and retail shops available within 400m walking distance.
- 95% of residences to have access to employment and public institutional services by public transport or bicycle or walk

24.7.3 Water supply

- 100% households to have direct water supply connections with the completion of JICA project and other mini water supply schemes proposed in the master plan
- 135 liters of per capita per day supply of water
- GIS based utility mapping and management to enable 100% metering of water connections and 100% efficiency in collection of water related charges.

24.7.4 Solid Waste Management

- To fill in the gap in centralized SWM system by promoting decentralized SWM system and reduce – reuse – recycle strategy.

24.7.5 Storm water Drainage

- 100% coverage of road network with storm water drainage network is proposed in the master plan

- Rain water harvesting made mandatory to most of the occupancy classes depending on the area of the building.
- Development of comprehensive data base on GIS platform on urgent basis proposed.

24.7.6 Electricity

- 100% households already have electricity connection
- 24x7 supply already achieved
- 100% metering of supply already achieved
- GIS mapping of power utility proposed to ensure – 100% recovery of cost and tariff slabs that work towards minimizing waste

24.7.7 Telephone connection

- Tele-density in the city is greater than 90% Expected to reach 100%

24.7.8 Wi-Fi connectivity

- 100% Wi-Fi connectivity proposed

24.7.9 Health care facilities

- Bench marks regarding availability of health care facilities already achieved.

24.7.10 Education

- Bench marks regarding availability of Educational facilities already achieved.

24.7.11 Fire fighting

- In addition to the existing four fire stations four more stations are proposed so that fire fighting facility is available within every 5-7km radius.

24.7.12 Others:

- The master plan propose to study in detail on urgent basis, the potential of power generation from renewable energy sources like wind, solar, biogas etc. and the feasibility of various technologies.
- Roof top solar panels on all Medical, Assembly and Residential buildings beyond a certain size is already made mandatory. Besides a detailed study is proposed to explore the possibility of extending this further.
- Proposal for developing green building norms included in the master plan
- Implementation of e-governance, double entry accounting and online public service delivery system proposed

- Creation of a comprehensive data base and GIS mapping of utility networks, Implementation of GIS & SCADA based utility management and on line complaint redressal system proposed.

24.8 Phasing and Costing.

In this section, the approximate expenditure for implementation of development proposals, the time period required for implementation and responsible agencies for implementation are detailed.

Sl. No	Proposal	Total in Crores	Implementation Framework	Responsible Agencies
Transportation				
1	Road widening and geometric improvement.	1655.00	2015-35	LSGI, PWD, NH
2	Segregation of traffic	100.00	2015-35	ISGI, PWD, NH, POLICE, RTO
3	Mobility (transit) hub along bypass	400.00	2015-25	LSGI
4	Designated lanes for Public Transport (Buses) with low floor and Green Buses and circular buses	40.00	2015-20	LSGI, PWD, NH
5	Inland Waterway network in N-S direction with connectivity to hub.	200.00	2015-25	IRRIGATION, LSGI
6	Light Metro	100.00	2015-25	LSGI, STATE GOVERNMENT
7	Elevated Highways	280.00	2015-26	LSGI, PWD, NH
8	Seven bus terminals at periphery and bus routing	35.00	2015-20	LSGI, PWD
9	Parking Plazas	55.00	2015-20	LSGI, PWD
10	Truck terminals	340.00	2020-25	LSGI, PWD

11	Evacuation Route	35.00	2015-20	LSGI, PWD
12	Rail Extension	55.00	2018-25	LSGI, RAILWAY, STATE GOVERNMENT
13	Flyovers	150.00	2015-25	LSGI, PWD, NH
14	Railway overbridges	105.00	2015-25	LSGI, RAILWAY, STATE GOVERNMENT
15	Junction Improvement	100.00	2015-25	LSGI, PWD, NH
16	Auto Taxi Stand	1.50	2015-18	LSGI, PWD, NH
17	Bus Bay	35.00	2015-20	LSGI, PWD, NH
18	Green Walkway	15.00	2015-20	LSGI, NGO
19	Walkable commercial streets	5.00	2015-31	LSGI, NGO
	Industrial			
20	Expansion of IT sector	500.00	2015-31	LSGI, STATE GOVERNMENT
21	Knowledge Park	500.00	2015-19	LSGI, STATE GOVERNMENT
22	Bronze and Clay Cottage Industrial Cluster	0.50	2015-17	LSGI, INDUSTRIES
23	Womens industrial cluster & Centre to Promote Women Entrepreneurship and Skills Development	20.00	2015-20	LSGI, INDUSTRIES
24	Beyapore Port development	800.00	2015-31	LSGI, INDUSTRIES
25	Uru making cluster	30.00	2015-19	LSGI, INDUSTRIES
26	Boat Making Cluster	20.00	2015-18	LSGI, INDUSTRIES
27	Revitalisation of Kallayi Industrial Area	1.00	2015-19	LSGI, INDUSTRIES

28	Medium and Small Scale Industrial Clusters	0.50	2015-20	LSGI, INDUSTRIES
29	Industrial Estates	200.00	2015-20	LSGI, INDUSTRIES
Commercial				
30	Revitalisation of Big Basar area	50.00	2015-17	LSGI, INDUSTRIES, CDA
31	Walkable commercial streets	1.50	2015-20	LSGI, CDA, PWD, NH
32	Developing Geographical Indications for Indigenous Products	0.10	2015-19	LSGI, NGO
33	Hawkers Zones	0.50	2015-20	LSGI, NGO
34	Indore Market	25.00	2018-20	LSGI, CDA
Tourism				
35	Tourism Master Plan	0.05	2015-17	LSGI, TOURISM DEPARTMENT
36	Integrated Water taxi tourism circuit	1.00	2025-30	LSGI, TOURISM DEPARTMENT, IRRIGATION DEPARTMENT
37	Elathur Backwater Tourism Zone	1.00	2015-19	LSGI, TOURISM DEPARTMENT, IRRIGATION DEPARTMENT
38	Tourist Facilitation Centres	1.00	2015-17	LSGI, TOURISM DEPARTMENT
39	Hydrofoil passenger service from Beypore	25.00	2015-17	LSGI, TOURISM DEPARTMENT, IRRIGATION DEPARTMENT

40	Water Sports	1.50	2015-20	LSGI, TOURISM DEPARTMENT, IRRIGATION DEPARTMENT
41	House Boats & Boating services	0.50	2015-20	LSGI, TOURISM DEPARTMENT
42	Development of Sarovaram BioPark & Kotooli Wetlands Area	1.00	2015-17	LSGI, TOURISM DEPARTMENT
43	Island Tourism Project	1.00	2015-25	LSGI, TOURISM DEPARTMENT
44	Water Theme Park	1.50	2015-17	LSGI, TOURISM DEPARTMENT
45	Beach Development	1.00	2015-20	LSGI, TOURISM DEPARTMENT, PORT AND HARBOUR
46	International Convention centre	100.00	2015-22	LSGI, TOURISM DEPARTMENT
47	indigenous cuisine promotion	0.50	2025-30	LSGI, TOURISM DEPARTMENT
48	Kadalundi Eco-tourism Cluster	1.00	2015-31	LSGI, TOURISM DEPARTMENT
Fisheries				
49	Marine Park	55.00	2015-20	LSGI, TOURISM DEPARTMENT, PORT AND HARBOUR
50	Model Fishermen Village	10.00	2015-17	LSGI, TOURISM DEPARTMENT, PORT AND HARBOUR

51	Comprehensive Development of Fisheries sector	200.00	2015-35	LSGI, TOURISM DEPARTMENT, PORT AND HARBOUR, FISHERIES DEPARTMENT
52	Fresh water Aquaculture farms	2.00	2015-17	LSGI, TOURISM DEPARTMENT, FISHERIES DEPARTMENT
Agriculture				
53	Vitalise Thadambattuthazham urban agricultural wholesale market.	0.50	2015-17	LSGI, AGRICULTURE DEPARTMENT
54	A comprehensive programme for strengthening the agricultural sector	30.00	2015-35	LSGI, AGRICULTURE DEPARTMENT
55	Godown (Cold Storage)	16.00	2015-19	LSGI, AGRICULTURE DEPARTMENT
56	Floriculture Projects	1.00	2015-16	LSGI, AGRICULTURE DEPARTMENT
57	Ground Water Recharge & Management	0.50	2015-19	LSGI, AGRICULTURE DEPARTMENT
58	Hightech Farm	0.50	2015-25	LSGI, AGRICULTURE DEPARTMENT
Animal Husbandry				
59	Scientific Slaughter Houses and Meat Processing, Cold Storage and Marketing Facilities	60.00	2015-20	LSGI, ANIMAL HUSBANDRY DEPARTMENT
60	Development of District Veterinary Hospital	1.00	2015-19	LSGI, ANIMAL HUSBANDRY

				DEPARTMENT
Water supply				
61	JICA Water Supply Project Extension	200.00	2020-31	LSGI, WATER AUTHORITY, IRRIGATION
62	Identification and Implementation of Small Scale Water Supply Projects	150.00	2015-25	LSGI, WATER AUTHORITY, IRRIGATION
Waste /Pollution Management				
63	Decentralised Solid Waste Management	0.10	2015-25	LSGI, NGO
64	Hi tech solid waste treatment plant	70.00	2015-30	LSGI, NGO
65	Full fedged service centre for sanitation vehicles	0.50	2015-19	LSGI, NGO
66	Garbage Treatment Plant	28.00	2015-19	LSGI, NGO
67	Fish waste fertilizer plants	0.50	2015-19	LSGI, NGO
68	e-waste management facility	0.50	2015-19	LSGI, NGO
69	Plastic Waste Recycling Plant at WestHill	1.00	2015-19	LSGI, NGO
70	Scilence zone	1.00	2015-17	LSGI, TOWN PLANNING
Health				
71	International Centre of Excellence in Health	350.00	2015-25	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
72	Regional Institute for Research and Services in Geriatric Care	5.00	2015-20	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT

73	Establishment of an Ayurveda Medical College in Govt Sector	100.00	2020-25	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
74	Development of Govt Homeo Medical College, Kozhikode	50.00	2015-20	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
75	Raising Beach Hospital & Kottaparamaba Hospital to satellite centres of Medical College	50.00	2015-25	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
76	Relocation, Standardisation and Improvement of Public Health Laboratory	10.00	2015-19	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
77	Development of a research centre and better infra for leprosy hospital	10.00	2015-25	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
78	Public Health sector enhancement	200.00	2015-2030	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
79	Global Health City	10.00	2015-30	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
Education				
80	Infrastructure Improvement	100.00	2015-25	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT

81	Educational Complex	300.00	2015-20	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
82	University Centre & Collegiate Education Centre	13.00	2015-20	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
83	Relocation of Govt. Engineering College, Kozhikode	200.00	2015-19	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
84	University for Folk & Fine Arts, Literature and Cultural Studies	2.00	2015-25	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
85	Centre for integrated development of Schooling Age Children	5.00	2015-21	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
Energy				
86	Electricity Substations	450.00	2015-25	LSGI, KSEB
87	Energy Harvest from Renewable Energy Sources	0.05	2015-19	LSGI, KSEB, STATE GOVERNMENT
88	Smart Grids	100.00	2015-30	LSGI, KSEB
Housing				
89	Housing for Working Women	2.00	2015-25	LSGI, CDA, KURDFC

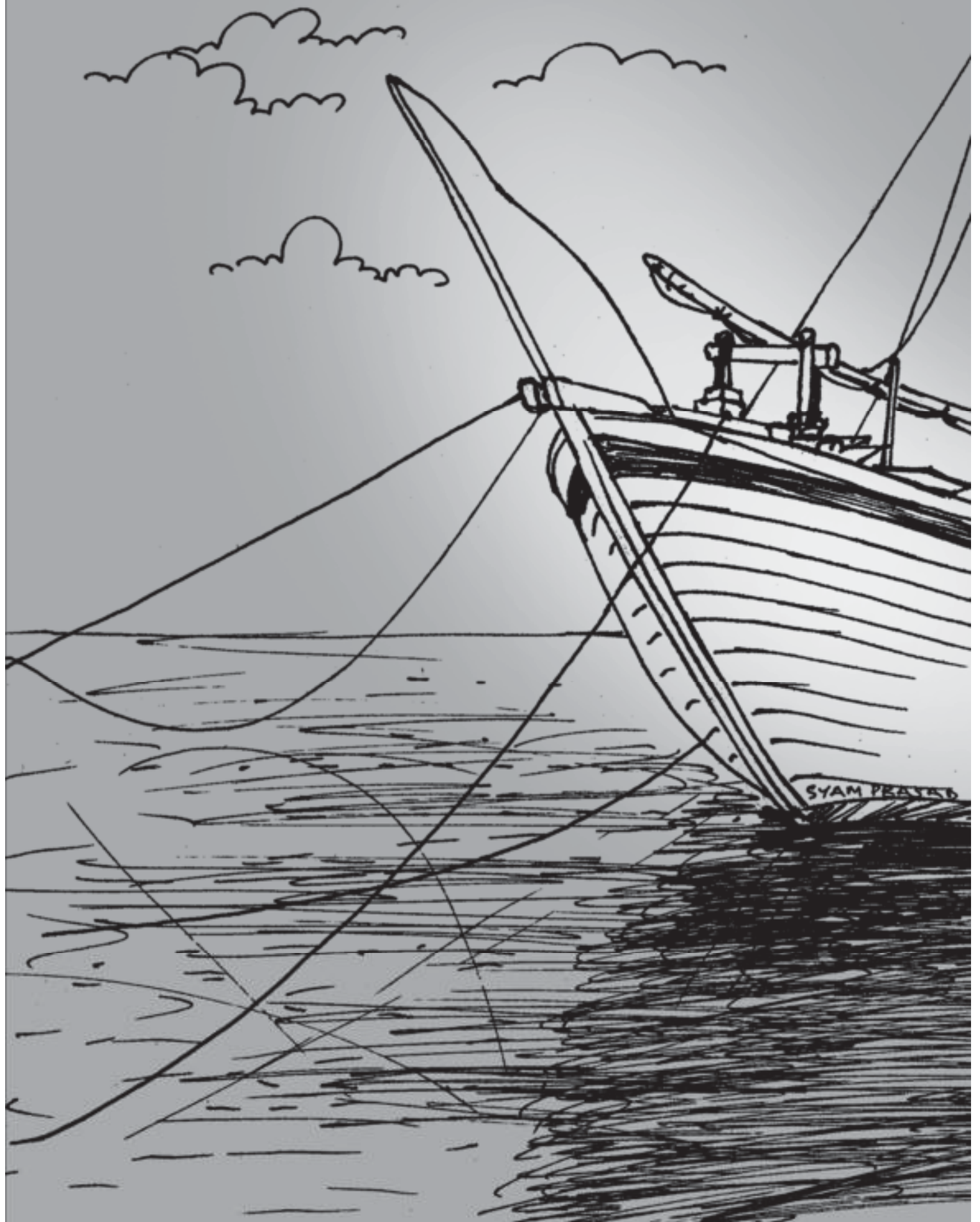
90	Slum Improvement Projects & Rehabilitation of colonies	250.00	2015-25	LSGI, CDA, KURDFC
91	SC Housing schemes	40.00	2015-25	LSGI, CDA, KURDFC
Sports				
92	International Sports Complex	500.00	2015-30	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
93	Recreation Complex Paroppadi	100.00	2015-30	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
94	Sports Complex	0.50	2015-30	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
95	Indoor stadium	25.00	2015-19	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
96	Swimming & Football Schools	1.00	2015-20	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
97	New parks/Recreation Facilities	425.00	2015-20	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
98	Development of Existing Parks / Recreation facilities	3.00	2015-20	LSGI, TOURISM DEPARTMENT, STATE GOVERNMENT
Other Civic Amenities				

99	Fire Stations	4.00	2015-30	LSGI, FIRE AND RESCUE DEPARTMENT
100	New Crematoriums and Modernisation of Existing Crematoriums	26.00	2015-20	LSGI
101	Community Halls	18.00	2015-20	LSGI
102	Government Offices' Complex	20.00	2020-30	LSGI, PWD
103	Night Shelter	5.00	2015-19	LSGI, PWD
104	Disaster management plan	0.10	2015-20	LSGI, PWD
Empowerment of Women and Socially Marginalised				
105	Friendly transportation & amenities for Women, Elderly and Differently-abled	10.00	2015-30	LSGI, PWD
106	Development of IMHANS - Centre of Excellence	100.00	2015-25	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
107	Centre for integrated development for differently abled children.	5.00	2015-20	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
108	Special Schools in Government Sector	50.00	2015-22	LSGI, EDUCATION DEPARTMENT, STATE GOVERNMENT
109	Day care homes for elderly - 'Pakal Veedu' along with anganwadis	10.00	2015-22	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
110	Homes for Elderly in Govt Sector	1.00	2015-20	LSGI, HEALTH DEPARTMENT, STATE

				GOVERNMENT
111	Pain & Palliative, Geriatric Care centres	0.50	2015-20	LSGI, HEALTH DEPARTMENT, STATE GOVERNMENT
Culture & Heritage				
112	Cultural Square at Mananchira	30.00	2015-20	LSGI
113	International Cultural centre	10.00	2015-20	LSGI, NGO
114	Conservation of Tippu's Fort	55.00	2015-17	LSGI, ARCHAEOLOGY DEPARTMENT
115	Archives of International Standards	1.00	2016-20	LSGI, ARCHIEVES DEPARTMENT
116	Conservation of Old Sea Bridges of Kozhikode	0.50	2015-20	LSGI, ARCHAEOLOGY DEPARTMENT
117	SM Street heritage project	10.00	2015-17	LSGI, ARCHAEOLOGY DEPARTMENT
118	Revival of Revathi Pattathanam	0.50	2015-17	LSGI, ARCHAEOLOGY DEPARTMENT
Environment & biodiversity conservation				
119	Kadalundy Jaiva Gramam	15.00	2015-20	LSGI, AGRICULTURE DEPARTMENT
120	Development and Management of Community Mangroves Reserve at Kadalundi	1.00	2015-19	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT

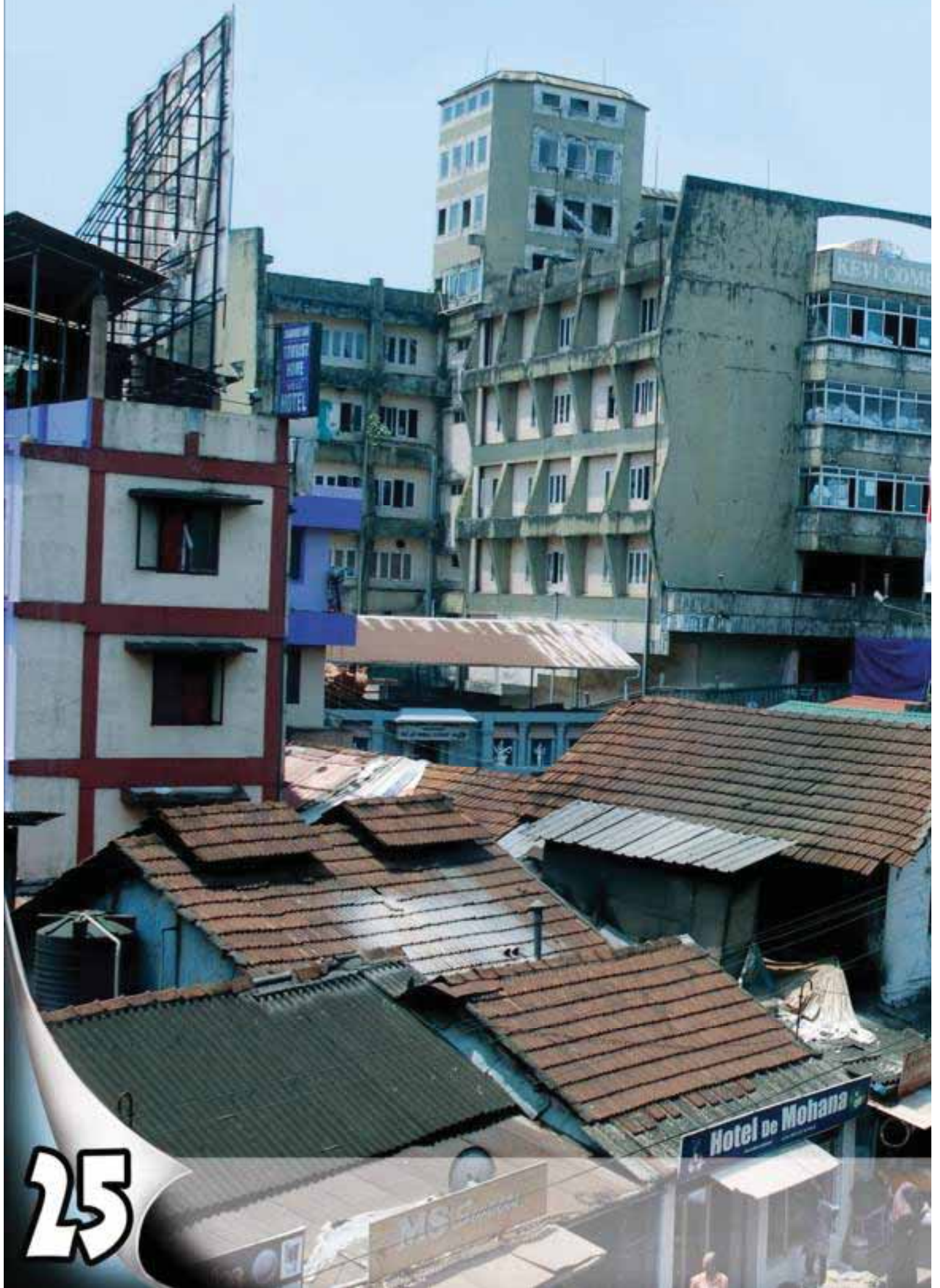
121	Pondu and Sacred groves conservation	180.00	2015-25	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
122	Development of Botanical garden	50.00	2020-25	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
123	Development of Hortus Malabaricus Sasya Sarvaswam	0.80	2015-17	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
124	Kottooli Wetlands Management Plan	220.00	2015-20	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
125	Revitalisation of Streams & Waterbodies	1.10	2015-22	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
126	Integrated CRZ Implementation Plan for Kozhikode Urban Area	0.20	2015-17	LSGI, AGRICULTURE DEPARTMENT, TOURISM DEPARTMENT
Governance				
127	Comprehensive Improvement in Governance	25.00	2015-30	LSGI
128	e-Governance	0.50	2015-25	LSGI
Urban Planning & Design				

129	Detailed Alignment of Roads	0.80	2015-17	TOWN PLANNING DEPARTMENT, CDA, LSGI
130	Area Development Plans	1.30	2015-20	TOWN PLANNING DEPARTMENT, CDA, LSGI
131	Urban Renewal	6.00	2015-20	TOWN PLANNING DEPARTMENT, CDA, LSGI
132	Area development plans for nearby development centres	0.20	2015-20	TOWN PLANNING DEPARTMENT, CDA, LSGI
133	Heritage Zone and Building Management Plan	0.10	2015-18	TOWN PLANNING DEPARTMENT, CDA, LSGI, ARCHEOLOGICAL DEPARTMENT
134	Planned public spaces and street furniture	0.25	2015-24	TOWN PLANNING DEPARTMENT, CDA, LSGI
135	Development Assistance Utility	1.00	2015-30	TOWN PLANNING DEPARTMENT, CDA, LSGI
Total		10981.15		





PART IV:
DEVELOPMENT
REGULATIONS



25

D^evelopment Controls



* Zoning and Zoning Regulations

* Special Rules for granting compensation for affected persons and contribution for betterment

All future developments shall be in conformity with the provisions of the 'Masterplan for Kozhikode Urban Area 2035' within the planning area comprising of Kozhikode Corporation and the Gramapanchayats of Kadalundi, Feroke, Ramanattukara and Olavanna. Development control has two parts

- I. Zoning Regulations
- II. Special Rules for granting compensation for affected persons and contribution for betterment

25.1 Zoning Regulations

1. For the implementation and enforcement of the proposals envisaged in this Masterplan, areas have been zoned under various categories such as Residential Zone I, Residential Zone II, Residential Zone III, Mixed Zone (Residential cum Commercial), Multi-functional Zone, Commercial Zone, Public and Semi-public Zone, Small Industrial Zone, Industrial Promotion Zone, Dry Agricultural Zone, Tourism Promotion Zone, Tourism zone, Recreational Zone, Water Body, Transport Zone, Park and Open Space Zone, Wet Agricultural Zone and Special Zones. Details regarding the nature of uses 'permitted', uses 'restricted' and uses 'prohibited' in each zone are presented in the Table 25.1. These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in this scheme.
2. 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 of the Local Self Government Institution concerned (hereinafter referred to as the Secretary), as the case may be, for their respective jurisdictions. In some cases it may be possible to permit some other uses also, which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually studied based on their performance characteristics and special locational factors. Such cases which come under this category are classified as "Uses Restricted". Restricted-1 category deals with the uses that shall be restricted by the Secretary with the concurrence of the Town Planner of the District office of the Department of Town and Country Planning, Restricted -2 category deals with the uses that shall be restricted by the Secretary with the concurrence of the Chief Town Planner of the Department of Town and Country Planning.
3. "Used prohibited" enlists the various objectionable uses in each zone which shall not be permitted under normal circumstances.
4. 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 scheme. All existing uses in every zone shall be permitted to continue. The addition/extension/alteration/Reconstruction of these existing buildings are permitted in all zones except *at Recreational zone, Wet agriculture zone, environmentally*

sensitive area, Heritage zone and special zones. The total builtup area shall not exceed 1.5 times the existing builtup area.

5. If any portion of a zone is put to a "Use prohibited" as stated in Para 2, before the sanctioning of the scheme, 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 with the concurrence of the Chief Town Planner concerned.
6. Existing areas and structures of archaeological importance, agricultural uses and religious uses may be retained in all the zones and shall not constitute non-conforming uses.
7. Regulation of constructions and / or land developments on the sides of new roads/roads proposed for widening as per the Masterplan shall be governed by the distance from the centre line of the road, unless otherwise specified in the Masterplan or Detailed Town Planning Schemes or any detailed road alignments approved by Chief Town Planner concerned.
8. Expansion of existing public and semi-public institutions to adjacent plots shall be permissible without any regard to the land use in which such adjacent plot is zoned and the development regulation imposed by such zoning subject to the provisions of Paddy Land and Wet Land act in force.
9. Constructions and / or land developments, if any, in paddy lands and in wet lands, shall be in conformity with the paddy land and wet land act in force in the state.
10. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required in any of the provisions of the scheme in consultation with the Chief Town Planner concerned.
11. Any use not specified either in the 'uses permitted' or 'uses restricted' category of a particular use zone, but which is of a similar nature to any use permitted or restricted in that particular use zone, can be considered by the Secretary, with the concurrence of the Chief Town Planner concerned.

GENERAL GUIDELINES

1. Silence Zone, as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986 and its subsequent amendments, shall be applicable to the area under this scheme.
2. Large Scale development proposals in an area not less than 2 hectares, exceeding an investment of Rs.50 crores, which provide direct employment (after commissioning of the project) to the tune of not less than 500 may be permitted in all zones other than

Special Zones, Environmentally sensitive area, Port and allied development zone and Park & Open space, subject to the recommendation of a committee to be constituted by the Government for this purpose, under the Chairmanship of the Secretary, Local Self Government Department, consisting of Chief Town Planner concerned of Kerala State Town and Country Planning Department and the Secretary of the LSGI concerned as members and the District Town Planner, Kozhikode District of the Town and Country Planning Department as convener and satisfying the following conditions

- a) The developer shall produce project cum feasibility report and environmental impact assessment report, if required, of the project to the convener of the committee, 15 days in advance of the committee meeting.
 - b) The developer shall produce before the committee, all required clearances from the State and Central Government agencies concerned.
 - c) Adequate provision shall be made for supporting infrastructure such as water supply, Sewerage, Solid Waste Management etc. Separate sewage treatment plant and solid waste management measures shall be provided and maintained by the developer at his /her cost.
 - d) Adequate Memorandum of Understanding between the developer and Secretary of Local body concerned shall be undertaken to bring this into effect.
 - e) Maximum floor area ratio shall be 2 and Minimum access width shall be 12 meter.
 - f) The project shall be completed within a period of 3 years if not specified otherwise
3. The areas specially demarcated for certain projects as Special zones (Proposed Mobility Hub, Parking Plaza, Educational Complex, Knowledge Park, Nirdesh, Garbage Treatment Plant, Slaughter House, Marine Park, Truck terminal and Water theme park) are to be acquired by LSGI within a period of 7 years from the sanctioning of the plan. If the acquisition proceedings has not been initiated within this stipulated period, freed land may be released and returned back to that land use zone which may be deemed appropriate based on the surrounding land uses and developments, with the concurrence of Chief Town Planner concerned
4. For all constructions in plot area exceeding 0.5 Hectare shall be supplemented with landscape plan ensuring 20% of green cover, and shall be left unpaved.
5. For every development, that happens and warrants trees to be cut, all the existing trees shall be shown in the building plan and atleast same number of trees shall be planted, maintained and brought up within the plot, in the immediate vicinity of the development.
6. 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.

Table 25.1 Zoning Regulations

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
1	Residential Zone I			
	All Residences including apartments, Night Shelters, Orphanages, Old Age Homes, Dharmasala, Residential Quarters.	Ashram/Mutt/Madr asa.	fuel filling stations	Any other use not specified
	Shops, professional offices, banks & other financial institutions, restaurants, hotels- Total Floor area of all such building use limited to 200sqm	Public utility areas and buildings other than those included in the permitted use		
	Cottage Industries, Service Industries of non-nuisance Nature (See Annexure-I), with number of workers limited to 6 without power or 3 workers with power limited to 5 HP			
	Educational institutions essentially serving the needs of residential community such as nursery schools, kindergartens and schools offering general education (up to high school level).			
	Health institutions essentially serving the needs of residential community such as dispensaries, clinics (OP), Diogonostic centres, etc. and having a floor area not more than 200 Sq.m.			
	Community facilities such as community halls, recreational clubs, gymnasium/yoga centers, libraries etc. all having a floor area not more than 300 Sq.m.			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Utility installations and civic amenities essentially serving the needs of residential community such as post office, police station, telephone exchange, electric substation, fire station.			
	Tot lots, parks, play grounds, water treatment plants below 5 MLD.			
	Transmission Towers, Telecommunication towers and wireless stations			
	Plant nurseries, Pump house, Wells and Irrigation Ponds incidental to community needs			
<i>Provided that the access road has a width of 5m minimum.</i>				
	Automobile workshops for two/ three wheelers – floor area up to 100 Sq.m			Any other use not specified
<i>Provided that the access road has a width of 8m minimum</i>				
	Hospitals , Higher secondary Schools, Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Exhibition Centers and Art Gallery-floor area all up to 750 Sq.m	LPG distribution centres (excluding bottling plants and bulk storage) limiting the floor area to 50 Sq.m.		Any other use not specified
	Poultry farm, Dairy and Kennel up to floor area of 200Sq.m			
	Shops, professional offices, banks & other financial institutions, restaurants, hotels- limiting floor area of all up to 300 Sq.m			
<i>Provided that the access road has a width of 12m minimum</i>				
	Auditorium / Wedding Halls / Community halls, floor area of all up to 1500 Sq.m, Shops,	Hospitals up to a floor area of 3000Sq.m		Any other use not specified

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	professional offices, banks & other financial institutions, floor area of all up to 1000 Sq.m			
	Poultry farm, Dairy and Kennel above a floor area of 200 Sq.m			
2	Residential Zone II			
	All Residences including apartments, Tourist resort, Guest house, lodge, Night Shelters, Orphanages, Old Age Homes, Dharmasala, Residential Quarters, Hostels and Boarding houses.	Ashram/Mutt /Madrassa.	Fuel Filling Stations	Any other use not specified
	Shops, professional offices, banks & other financial institutions, restaurants, hotels, limiting floor area up to 200 Sq.m	Public utility areas and buildings other than those included in the permitted use		
	Cottage Industries, Service Industries of non-nuisance Nature (See Annexure-I), with number of workers limited to 6 without power or 3 workers with power limited to 5 HP	Places of Worship, Higher Secondary schools		
	Educational institutions essentially serving the needs of residential community such as nursery schools, kindergartens and schools offering general education (up to higher secondary school level).			
	Health institutions essentially serving the needs of residential community such as dispensaries, clinics, nursing homes etc. and having a floor area not more than 200 Sq.m.			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Community facilities such as community halls, recreational clubs, gymnasium/yoga centers, libraries etc. having a floor area not more than 500 Sq.m.			
	Utility installations and civic amenities essentially serving the needs of residential community such as post office, police station, telephone exchange, electric substation, fire station.			
	Tot lots, parks, play grounds, water treatment plants below 5 MLD.			
	Transmission Towers, Telecommunication towers and wireless stations			
	Plant nurseries, Pump house, Wells and Irrigation Ponds incidental to community needs			
<i>Provided that the access road has a width of 5m minimum.</i>				
	Automobile workshops for two/ three wheelers – floor area up to 100 Sq.m			Any other use not specified
<i>Provided that the access road has a width of 8m minimum</i>				
	Shops/ Professional Offices/ Commercial Offices/ Banking and Financial institutions - floor area up to 300 Sq.m	LPG distribution centres(excluding bottling plants and bulk storage)limiting the floor area to 50 Sq.m		Any other use not specified
	Hospitals, Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Exhibition Centers and Art Gallery-floor area up to 750 Sq.m			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Poultry farm, Dairy and Kennel up to 200Sq.m			
<i>Provided that the access road has a width of 12m minimum</i>				
	Shops/ Professional Offices/ Commercial Offices/ Banking and Financial institutions - floor area up to 1500 Sq.m			Any other use not specified
	Hospitals up to 2000 Sq.m of Floor area.			
	Auditorium / Wedding Halls / Community halls- floor area up to 1500 Sq.m			
<i>Provided that the access road has a width of 18m minimum</i>				
	Hotels			
3	Residential Zone III			
	All residences, Residential Flats/Apartments, Orphanages/Old age homes/Dharmasala up to 12m height.	All government, quasi government or co-operative societies affordable housing projects	Fuel filling station	
	Following uses up to 100 Sq.m floor area. Shops, commercial offices, Restaurants and professional offices, Banking and financial institutions, Gymnasium, Yoga Centres, Clinics (Outpatient)	All types of industries (See Annexure - I) other than obnoxious and nuisance type industries up to 200 Sq.m of floor area		
	Service industries of non-nuisance nature (See Annexure I) and Cottage Industries including coir with power limited to 20 HP-floor area up to 100 Sq.m	Welding workshops up to 100 Sq.m of floor area.		
	Day care and crèche, Nursery/Kindergarten, Library and reading rooms, tot lots/Parks/Play grounds			
	Public utility areas and Buildings essentially serving the need of the local community			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Plant nursery, pump house, wells and Irrigation Ponds			
	Poultry farms, Dairy and kennel up to 200 Sq.m floor area			
	<i>In plots having access road width not less than 8 m</i>			
	All Educational institutions			
	Service industries of non-nuisance nature (See Annexure I) Up to 200 Sq.m Floor Area and power not exceeding 30 HP of power			
4	Multi-Functional Zone			
	<i>All uses permitted in Multi functional zone may also be permitted by the corresponding authorities in land to a depth of 200m on both side of 45m wide NH 66 Bypass except at Recreational zone, Wet agriculture zone, environmentally sensitive area, Heritage zone and special zones. There shall be 6m (Six meter) building line from this bypass for all the constructions, where plot abuts Bypass.</i>			
	All Residences including apartments, Tourist resort, Guest house, lodge, Night Shelters, Orphanages, Old Age Homes, Dharmasala, Residential Quarters, Hostels and Boarding houses.	Places of Worship, Gas godowns.	Fuel Filling Stations	Any other use not specified
	Tourist resort, All Shops, shopping Complexes, up to a floor area of 1000 Sq.m, Ashram/Mutt/Madrassa.		Following uses up to 200 Sq.m Floor area. storage, handling, manufacturing processing of highly combustible, explosive, poisonous, irritant, corrosive, toxic or noxious materials or products or any products or materials producing dust	
	Cottage Industries, Service Industries of non-nuisance			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Nature (See Annexure I , with number of workers limited to 10 with power limited to 10 HP or 20 workers without power.) Cold storage, weigh bridges, Printing Press, IT Hardware/Electronic industries, Automobile workshops for 2/3 Wheelers , Smoke house, Automobile service station, provided that the access road has a width of 5m minimum and also Godowns/ Warehouse/ Storage of non-hazardous materials, stacking yards, IT Software units			
	Clinics, Diagnostic Centers. Govt. or Public sector offices, Social Welfare centers, Museum/ Auditorium / Wedding Halls / Community halls, Convention Centers- all up to a floor area of 1000 Sq.m			
	All educational institutions up to Higher Secondary Level including Technical Institutions such as VHSC, ITI, ITC, etc.			
	Public Utility areas & buildings Transmission towers and Wireless Stations, Parking Plazas, Transport terminals, Plant Nursery, Fair Grounds, Markets, Parks & playgrounds, Open air Theatre,Pump House.			
	<i>Provided that the access road has a width of 12m minimum</i>			
	Shops/Shopping Complexes, Shopping malls, Multiplex, Hypermarkets ,Museum/ Auditorium / Wedding Halls /			Any other use not specified

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Community halls, Convention Centers, above a floor area of 1000 Sq.m and up to a floor area of 3000 Sq.m			
	Professional Offices/ Commercial Offices/ Banking and Financial institutions - floor area above 500 Sq.m			
	Hospitals & Health centres (up to 50 beds)			
	Automobile wash stalls, automobile service stations, service garages with repairing facilities – for light vehicle, welding workshops- floor area for all limited to 200 Sq.m			
<i>Provided that the access road has a width of 15m minimum</i>				
	Educational institutions of higher order		Bus Terminals/stand, lorry stand	Any other uses not specified
	Automobile workshops/ Automobile Service Stations for Heavy vehicles			
	Hospitals & Health Centres - (up to 100 beds)			
<i>Provided that the access road has a width of 18m minimum</i>				
	Hospitals & Health Centres- (up to 300 beds)			Any other uses not specified
	Shopping malls, hyper markets, Multiplex, Movie Halls/ Auditorium/Wedding Halls, Shopping Complexes, Hypermarkets, Museum/ Auditorium / Wedding Halls / Community halls, Convention Centers			
5	Commercial zone			
	All Shops including shopping Complexes, Shopping malls, Multiplex, Hypermarkets, Restaurants, Hotels, Professional offices,	Places of Worship.	Fuel Filling Stations	Any other use not specified

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Commercial Offices & Establishments, Banking and financial institutions, IT Software units			
	Cottage Industries, Automobile workshops, Automobile Service Stations, Cold storage, Service Industries of non- nuisance Nature (See Annexure I) with number of workers limited to 19 and power limited to 30 HP), weigh bridges, Printing Press, IT Hardware/Electronic industries.	Other public utility areas & buildings		
	Godowns/Warehouse/Storage of non-hazardous materials, stacking yards.	Dairy farm, Poultry farm		
	Residences floor area up to 300 Sq.m, Night shelters, orphanages, old age homes, Dharmasala, hostels and boarding houses, lodges and guest houses, ashram/mutts.			
	Residential apartments with at least two lower floors or 20% of builtup area whichever is less for commercial use (Requirements incidental to residential area such as lobby can be provided in the commercial floors)			
	Clinics, diagnostic centres and hospitals up to 50 beds.			
	Govt. or Public sector offices, Expansion of existing educational institutions, Day care and Creche, Nursery/Kindergarten, schools up to higher			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	secondary level,			
	Social Welfare centers, Museum/ Auditorium / Wedding Halls / Community halls and Convention Centers, up to 1000Sq.m.			
	Transmission towers and Wireless Stations			
	Public Utility areas & buildings such as Parking Plazas, Transport terminals, Plant Nursery, storage of agricultural produces and seeds, Fair Grounds, Markets, Parks & playgrounds, Open air Theatre			
<i>Provided that the access road has a width of 8m minimum</i>				
			Hospitals & health centers above 50 beds, Higher educational institutions	
6	Mixed Zone (Residential cum Commercial)			
	<p>i. Land up to a depth of 100m on either side for the following roads except at Recreational zone, Wet agriculture zone, environmentally sensitive area, Heritage zone and special zones will also be deemed as Mixed Zone.</p> <p>1.NH66, 2.NH 766 3. NH 966 and 4. Meenchanda – Arayidathu palam – Westhill chungam Mini Bypass road.</p> <p>ii. There shall be 6m Building line for Meenchanda – Arayidathu palam - Westhill chungam Mini Bypass road for all constructions where plot abuts Bypass.</p>			
	All uses permitted in Residential Zone II and Commercial Zone	All uses restricted-1 in Residential Zone II and Commercial Zone	All uses restricted-2 in Residential Zone II and Commercial Zone	Any other use not specified
7	Public & Semi Public Zone			
	Additions and alterations to the existing buildings and addition of new blocks without altering the use, Buildings for incidental uses		Cremation ground, crematorium, burial ground/common vault	Any other use not specified

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	Local/State/Central Government/Public Sector Buildings.		Any constructions in plots owned by public agency.	
	Public Buildings including hospitals, educational Institutions, Libraries and Parks.			
8	Tourism Promotion Zone			
	All residences, Residential Flats/Apartments, Hostels and Boarding Houses, Restaurants / Canteen/ Resorts/ Hotels, Orphanages / Old Age Homes / Dharmasala, Night Shelters, Guest Houses, Lodges	Bakeries and Confectionaries- floor area above 200 Sq.m.	Fuel Filling Stations	
	Retail Shops/Professional offices and other offices, -floor area up to 200 Sq.m, Travel and Tourism Institutions	Shops/Professional Offices/ Banking and Financial institutions - floor area up to 500 Sq.m		
	Movie Halls, Convention Centre Ashram / mutt, Museum, Exhibition Centres and Art Gallery, Open air Theatre, Amusement Parks, Stadium, Fair Ground, Gymnasium / Yoga Centers, Tot Lots/Parks/Play Grounds, Swimming Pools			
	Zoological and Botanical Gardens / Bird Sanctuary, Camping Site			
	Bakeries and Confectionaries, Commercial Offices/ Establishments, Banking and Financial Institutions - floor area up to 200 Sq.m			
	Cottage Industries for handicrafts			
	Day Care and Crèche, Nursery / Kindergarten, Primary/Upper Primary			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	School			
	Police Post/Police Station, Post and Telegraph office, Fire Post/Fire Station, Telephone Exchange, Library and Reading Rooms			
	Clinics (Outpatient) and Diagnostic centres - floor area up to 200 Sq.m ,Hospitals & Health Centers (up to 10 beds),Social Welfare centers, Public Utility Areas & Buildings			
	Automobile workshops for 2/3 Wheelers, Auto/Taxi / Jeep Stand			
	Transmission towers, Telecommunication towers and Wireless Station			
	Places of Worship			
9	Tourism Zone			
	Only Single storey buildings are permitted in this zone and the coverage of all buildings shall be limited to 25%			
	Pump House up to 20 Sq.m, wells and irrigation ponds, Paddy Cultivation, Tot Lots/Parks/Play Grounds, Fair Grounds, Open air Theatre, Zoological and Botanical Gardens/Bird Sanctuary, Camping Site, Swimming Pools, Exhibition Centers& Art Gallery up to 10m Height.	Uses incidental to the recreational uses namely Retail shops / Restaurants/ canteen up to a floor area of 100 Sq.m, ATMs		
	Repair of existing houses without increase in floor area and in coverage.			
	Cafeteria and residential cottages for tourism purposes.			
10	Small Industrial			
	Agro based industries	Ashram /mutt, places of worship	Fuel filling stations.	Any other use not

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited specified
	Cottage industries, service industries of non-nuisance nature (See Annexure –I), automobile workshops & automobile service stations, spray painting workshops, saw mills, ice factory, cold storage, printing press, water treatment plants, marble and granite storage / cutting centers, industrial estates & industrial parks of non-obnoxious and non-nuisance type industries	Public utility areas and buildings other than those included in the permitted use	Cremation ground, crematorium, burial ground/common vault	
	Storage of non-nuisance nature/ sale of goods/ commercial and business offices incidental to the manufacturing activity	Parking plazas, other parking areas		
	IT/ITES software units, Information technology/ITES buildings and information technology/ITES parks	LPG distribution centres, excluding bottling plants and bulk storage go down.		
	Residential buildings floor area up to 300 Sq.m, residences incidental to industrial use.			
	Shops, Professional Offices, Banking and Financial Institutions, Commercial Offices/ Establishments, Restaurants /Canteen/Hotels/–floor area of all up to 100 Sq.m			
	Nursery schools, kindergartens and schools offering general education (up to high school level).			
	Community facilities such as community halls, recreational clubs, gymnasium/yoga centers, libraries etc. having			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	floor area up to 100 Sq.m			
	Diagnostic centres, dispensaries, clinics, nursing homes etc. and having a floor area not more than 200 Sq.m.			
	Utility installations and civic amenities of minor nature such as post office, police station, telephone exchange, electric substation, fire station, water treatment plants below 5 MLD.			
	Plant nurseries			
	Transport terminals incidental to industrial use			
	Transmission towers and Wireless stations			
<i>Provided that the access road has a width of 8m minimum.</i>				
	Hospitals, Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Exhibition Centers and Art Gallery-floor area up to 500 Sq.m			
11	Industrial Promotion Zone			
	All industries other than obnoxious and nuisance type (Annexure –I), Storage and handling of non hazardous materials. Boat and Uru Making.	Automobile wash stalls, automobile service stations, service garages with repairing facilities, welding workshops.	Storage, handling, manufacturing processing of highly combustible, explosive, poisonous, irritant, corrosive, toxic or noxious materials or products or any products or materials producing dust, obnoxious and nuisance industries (Annexure –II)	Any other use not specified
	Industrial estates & industrial parks, IT/ITES software units		Cremation ground, crematorium, burial	

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
			ground/common vault	
	Residential uses incidental to the industrial use			
	Any other activity incidental to industrial use			
12	Dry Agricultural Zone			
	Agriculture, Horticulture, Pump House, Wells and Ponds, Storage of Agricultural Produces and Seeds, Plant Nursery	Places of Worship	Fuel Filling Stations	Any other use not specified
	Single Family Residential buildings- floor area up to 200 Sq.m	Stacking Yards	Storage of Explosives and Fire works, Gas godown	
	Shops, Clinics, Professional Offices, Commercial Offices / Establishments, Banking and Financial institutions, Social welfare institutions, Restaurants/ Canteens - floor area up to 50 Sq.m	Cremation Ground/ Crematorium, Burial Ground, Common vault, Slaughterhouse.		
	Public Utility buildings serving the local community, Library and Reading Rooms ,Tot Lots/Parks/Play Grounds			
	Local/State/central government offices like Police Post, Fire Post/Fire Station, Post office etc. serving the local community			
	Godowns / Warehouses / Storage - non-hazardous - floor area up to 200 Sq.m			
	Cottage Industries, Service Industries of non-nuisance Nature (See Annexure I), with number of workers limited to 6 without power or 3 workers with power limited to 5HP			
	Day Care and Crèche, Nursery / Kindergarten / Primary			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	&Upper primary schools			
	Plant nursery, pump house, wells and Irrigation Ponds			
	Poultry farms, Dairy and kennel			
	Clinics (OP) and diagnostic centres up to floor area 100Sq.m.			
	Transmission towers and Wireless stations			
13	Recreational Zone			
	Tot Lots/Parks/Play Grounds, Fair Grounds, Open air Theatre, Zoological and Botanical Gardens/Bird Sanctuary, Camping Site, Swimming Pools, Exhibition Centers& Art Gallery up to 10m Height.	Uses incidental to the recreational uses namely Retail shops / Restaurants/canteen up to a floor area of 100 Sq.m, ATMs	Amusement Parks, Uses incidental to the recreational uses	Any other use not specified
		Indore Stadium		
		Auto rickshaw /taxi/jeep stands.		
14	Water Body			
	Boat jetties, bridges, retaining walls, fish landing centres, Water sports, Fish farming.			Any other use not specified
15	Transport			
	Transport terminals such as bus terminals/stand, truck/lorry stand, boat jetty/harbors, airport, mobility hub etc., offices /storage buildings incidental to the main use, auto rickshaw stands, taxi/jeep stands, railway stations			Any other use not specified
	Any incidental use to the transport terminals Such as Retail Shops, Restaurants, Canteen, etc. Which are integral or essential part of a transport terminal with	Public Utility areas & buildings		

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	maximum percentage of coverage permissible for the project as a whole shall be limited to 30% and the floor area ratio shall be limited to 1.			
	Parking Plazas, Transmission Towers and Wireless Stations			
	<i>provided that the access has a width of 18m minimum</i>			
	Container terminals			
16	Parks and Open Spaces			
	Parks/Play Grounds, Fair Grounds, Open air Theatre, Zoological and Botanical Gardens/Bird Sanctuary, Tot Lots, Pump House up to 20 Sq.m, wells and irrigation ponds, ATM,	Incidental buildings such as Club, Swimming pool, Open Air Theatre, Reading Room, Cafeteria, etc., up to 100 Sq.m and Water Treatment Plant below 5 MLD		Any other use not specified
17	Wet Agriculture			
	Paddy Cultivation	Minor Public Utility areas & buildings which will not affect the character of the area		Any other use not specified
	Agriculture, Horticulture and fodder cultivation. Repair of existing houses			
	Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction.			
	Constructions/ land developments in conformity with the Conservation of Paddy Land and Wet Land Act in			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	force in lands Designated as paddyland or wetland under the said Act			
18	Cyber Park			
	Information technology buildings and Information technology parks, allied uses or as directed by the government.			Any other use not specified
19	Environmentally Sensitive Area			
	Pump House up to 20 Sq.m, wells and irrigation ponds, Paddy Cultivation			Any other use not specified
	Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction. Repair of existing houses			
20	Green Belt			
	Protection walls for water body, Pump House/ Wells and Irrigation Ponds			Any other use not specified
21	Defence Land			
	Any constructions by Defense departments			Any other use not specified
22	Port and allied Developments			
	All use related to the port and uses incidental to the main use, quarters of staff working in the port, light and service industries connected with port development other than obnoxious and nuisance type industries, godowns and warehouses, Boat and Uru Making or as directed by the government.	Retail shops, parks and play area, police and fire stations, Taxi stands, truck terminals		Any other use not specified

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
23	Heritage Zone			
	<p>Notwithstanding anything contained in the zoning regulations of the master plan and subject to modifications as prescribed hereunder, no development, redevelopment, construction including additions, alterations, repairs, renovations, replacement of special and architectural features, demolition of any part or whole thereof in respect of any objects or buildings in the area, coming under heritage zone (Area around Mananchira Square, SM Street, Tali, Thiruvannur, Bilathikulam, Varakkal Temples, Kuttichira, Fort of Tippu Sulthan) shall be allowed except with the prior written recommendation of the Art and Heritage Commission constituted by the Government under Rule 154 of the Kerala Municipality Building Rules, 1999 in order to conserve the heritage character.</p> <p>Provided that, no area or buildings or objects of the heritage zone will be allowed to be altered from the existing condition without prior written recommendations of the Commission:</p> <p>Provided also that new constructions and additions or alterations to existing buildings may be permitted in this area with the following additional regulations namely:-</p> <p>The Local Self Government Institution concerned shall insist on any such recommendations of the commission.</p> <p>The Art & Heritage Commission, if found necessary, may entrust the above regulatory aspects to a committee constituted for the purpose by the commission.</p> <p>A. Tali temple & its precincts (Re survey numbers 69, 70, 71, 72, 73, 74(p), 75, 76, 77, 78(p), 98(p), 115(p), 116, 117, 118(p), 119, 120, 123, 131, 132, 133, 134, 135, 153, 154, 155, 156(p), 157, 158(p), 159(p), 160(p), 163, 177, 178, 179, 181(p), 198, 199, 200, 203, 204, 205(p), 206(p), 210, 211, 212, 213(p) of revenue ward 18)</p> <ol style="list-style-type: none"> The total number of stories including the existing if any <i>shall not exceed two from the street level.</i> The overall height of the construction including the existing up to the topmost point of the proposed construction <i>shall not exceed 9 metres from the street level.</i> The architectural character of the facade of the proposed construction <i>shall be as per the advice of the Commission.</i> <p>B. Thiruvannur (Re survey numbers 273(p), 275(p), 278(p), 279, 280, 281(p), 282(p), 287, 302(p), 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331(p), 339(p), 340, 341, 342,</p>			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	<p>344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 360(p), 371(p), 378(p), 379, 380, 381, 382, 421(p), 437(p), 438, 439, 440(p), 441, 443, 444, 450(p), 451(p), 453, 454, 455, 456, 457, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470 of revenue ward 22) Bilathikulam (Re survey numbers 1242(p), 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1295, 1296, 1297, 1298, 1299, 1300, 1305, 1306, 1307(p), 1361, 1362(p), 1368, 1370, 1371, 1372, 1373, 1374, 1375, 1376) of revenue ward 1) Varakkal (Re survey numbers 16(P), 17(P), 18, 19(P), 21(p), 21(p), 22(P), 23, 24, 34, 35, 132(p), 133, 134, 135, 136(p), 137, 138, 139, 140, 141(p), 143, 144, 145, 146(p), 147, 148, 149, 174(p), 186(p) and 189(p)) of revenue ward 1)</p> <p>Temples and their premises</p> <p>a) The total number of stories including the existing if any shall not exceed two from the street level.</p> <p>b) The overall height of the construction including the existing up to the topmost point of the proposed construction shall not exceed 9 metres from the street level.</p> <p>c) The architectural character of the facade of the proposed construction shall be as per the advice of the Commission/ District Level Sub- Committee if any constituted by the Commission.</p> <p>C. Kuttichira Area (Re survey numbers 335, 384, 385, 386, 387, 388(p), 389, 400, 401, 402, 403, 404, 405, 406, 407, 408(p), 481(p), 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 499, 500, 501, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 518(p), 519 of revenue ward 12, and 5(p), 6, 7(p), 9, 10, 11, 12, 13, 14, 15, 16, 43, 44, 121, 122, 123, 124, 125, 126, 127, 128, 129 of revenue ward 16)</p> <p>a) The total number of stories including the existing if any shall not exceed three from the street level.</p> <p>b) The overall height of the construction including the existing up to the topmost point of the proposed construction shall not exceed 12 metres from the street level.</p> <p>c) The architectural character of the facade of the proposed construction, if any, shall be as per the advice of the Commission/ District Level Sub- Committee if any constituted by the Commission.</p> <p>D. SM Street</p> <p>a) The total number of stories including the existing if any shall not exceed</p>			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	<p><i>two from the street level.</i></p> <p>b) The overall height of the construction including the existing up to the topmost point of the proposed construction <i>shall not exceed 9 metres from the street level.</i></p> <p>c) No basement floor shall be allowed.</p> <p>d) Existing foot prints of the buildings shall be maintained as such and no part of the building including hoardings / signage's etc. shall be projected outside the plot boundary.</p> <p>e) The slope of roof in facades (Pitch) shall be at an angle within the range <i>35-40 degrees from the horizontal</i> and sloping towards the street.</p> <p>f) The roof in facade facing the street shall be finished with traditional Mangalore Pattern (M.P) terracotta tiles (natural terracotta colour).</p> <p>g) The sunshades in facades if any shall have the same slope and finish as that of the main roof.</p> <p>h) The exterior wall surfaces shall be finished in white or off-white colour. The exterior walls shall be given plain finish and no stucco/texture/or cover with facing material ornamentation be allowed.</p> <p>E. Mananchira Area</p> <p>a) The total number of stories including the existing if any <i>shall not exceed two from the street level.</i></p> <p>b) The overall height of the construction including the existing up to the topmost point of the proposed construction <i>shall not exceed 12 metres from the street level.</i></p> <p>c) The architectural character of the facades of the construction, if any, <i>shall be as per the advice of the Commission/ District Level Sub-Committee</i> if any constituted by the Commission.</p> <p>The survey numbers included in SM Street and Mananchira areas are 72(p), 73, 74(p), 75(p), 97, 98, 99(p), 100, 101, 102, 103, 104, 105 of revenue ward 17,</p> <p>1, 2, 3, 4, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42(p), 43, 44, 45(p), 46, 47(p), 48, 49, 50, 51, 53(p), 54(p), 55, 56, 57, 58(p), 59, 60, 61, 62, 63, 64, 65, 66, 67, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82(p), 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 103, 104, 105, 106, 107, 108, 109 of revenue ward 10,</p> <p>9(p), 20(p), 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 108, 109, 110, 111, 112(p), 113, 114(p), 116, 117, 118, 119, 120, 121, 122, 123, 124, 130(p), 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145,</p>			

Sl. No	Uses Permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
	<p>146, 147, 148, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165(p), 166, 167, 175(p), 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 257, 258, 259, 260, 261, 262, 263 of revenue ward 7</p> <p>F. Fort of Tippu Sultan (Re survey number 166 (p) Nallur desam of ferok municipality)</p> <p>a) The construction and architectural character of the facades of the construction <i>shall be as per the advice of the Commission.</i></p> <p>District Level Committee</p> <p>A district level sub committee shall be scrutinizing the applications for the constructions in the area zoned as heritage/ conservation zones in the master plans.</p> <p>Structure of the committee.</p> <p>Chairperson: The Mayor/ Chairperson/President of the local body</p> <p>Convener: The District Town planner concerned</p> <p>Members</p> <ol style="list-style-type: none"> 1. District level officer of the Archaeology Department 2. A representative from INTACH 3. An Architect having Master Degree in Architecture preferably in Urban design/Conservation. <p>The members other than ex-officio members of the above committee shall be nominated for a period of three years, with the concurrence of the Commission.</p> <p>Note: 1. Buildings of National/ Regional/ state level importance shall be scrutinised in the State level committee of the Art & Heritage Commission and the others shall be in the district level committee if any constituted by the Commission.</p> <p>Note: 2. In the case of Manachira area, regulations shall be insisted only for 25m depth of land from the street boundary surrounding mananchira.</p> <p>Note: 3. Existing natural vegetation such as trees and shrubs which added to the character of the area shall be protected and maintained to the extent possible.</p>			

24	Special Zones
Developments in this zone may be permitted by Secretary of LSGI concerned .For the projects proposed in paddy land , developments shall be subject to the provision of Paddy Land and Wet land Act in force in the State	
a)Mobility Hub	
Transit Terminal and Parking Plaza as main uses (Terminal for BRTS, Circular Buses and intercity and interstate buses, Mono rail/Light Metro connectivity, water way connectivity, Helipad, multi storied parking plazas) and uses incidental to it.	
b) Parking Plaza	
Area is proposed for construction of Multi Level parking Plaza and 20% of Floor area for Commercial/trading centre.	
c) Education Complex	
Higher educational institutions, labs and related facilities and incidental uses like residential quarters, canteen, and waiting rooms.	
d) Knowledge park	
All educational buildings and incidental uses like Offices and Quarters, Laboratories, Green house nurseries and study centres as directed by the government.	
e) Nirdesh	
Constructions by state/ Central Government	
f) Garbage Treatment Plant	
Solid waste treatment plant and Buildings/structures incidental to it.	
g) Buffer zone(50m depth)	
No new buildings / structures are permitted in this buffer and green vegetation cover shall be provided at this area. Repair/Reconstruction of existing buildings without increasing the floor area shall be permitted with the concurrence of District Town Planner.	
h) Slaughter house	
Slaughter house and uses incidental to it.	
i) Marine Park	
Area for development of Marine industries and related activities as directed by the government.	
j) Truck Terminal	
Truck Terminal and related activities	
k)Water Theme Park	
Water Theme park and allied activities	

GENERAL NOTES

1. Zoning Regulations will prevail over the provisions in KMBR/KPBR.
2. Kerala Conservation of Paddy Land and Wetland Act and Coastal Regulation Zone Notification will prevail over all the provisions in this Masterplan.
3. Subject to zoning regulations of the respective zones, more than one use may be combined in a building, provided that the total floor area of such a building shall not exceed the maximum floor area permitted for any of such use, in that zone. Also, the

floor area of individual uses shall be limited to that prescribed by the zoning regulations for the zone.

4. For the purpose of these regulations, floor area means the total built-up area of the building on all floors.
5. Irrespective of zoning regulations, public utility areas and building under government approved schemes can be implemented anywhere in the planning area except at special zones.
6. No person shall construct any building within 5m from any plot boundary abutting Poonur river, within 10m from Mampuzha, Kallai River, Chaliyar, Ferok River and Kadalundi River and 2m from any plot boundary abutting drains having minimum width of 2m to 5m and 3m from drains having width more than 5m.
7. Where ever the width of Canoli canal is less than 15m, the minimum distance between the centerline of Canoli Canal and any construction/building other than compound wall shall be 10.5m.
8. Fisheries related industries are permitted in areas within a distance of 500m from High Tide Line of Sea irrespective of other Zoning regulations and subject to satisfying the provisions of CRZ Notification.
9. For all proposed roads in masterplan, a construction free area shall be provided at every intersection. Minimum visibility distances to be provided at intersections for roads having different widths are given below. No constructions shall be carried out within the visibility triangle. This distance shall be measured from the edge line of the road and for this purpose the proposed width of road shall be considered as the width of the road.

Width up to 12m : 6m

Width more than 12m: 15m

(Detailed alignment plans, which shows building lines and visibility triangles, for roads, which will be sanction according to the proposals in this plan, will prevail over this provisions)

All sight distance obstructions like bushes, trees and hoardings in the visibility triangle should be removed or no obstructions shall be permitted from a height of 0.6m to 1.8m from road level to improve safety.

10. Uses permitted in commercial zone and public and semi public zone, may also be permitted by the executive authority in land to a depth of 150m in residential zone I, residential zone II, public and semi public zone and Small industrial zone on both sides of roads having an existing or proposed width of 18m or more (As per master plan for Kozhikode urban area 2035), if such uses are not permissible otherwise as per the zoning regulations mentioned earlier.

ANNEXURE I
LIST OF NON-OBNOXIOUS AND NON-NUISANCE TYPE OF SERVICE OR LIGHT INDUSTRIES
PERMISSIBLE IN VARIOUS ZONES.

1	Production of copra
2	Processing of arecanut
3	Rice and Flour Mills.
4	Production of rice, flour etc., by hand pounding.
5	Processing of Cardamom, ginger, pepper etc.
6	Production of Khandsri for sugar-cane
7	Carrying and preservation of fruits and production of jam, jelly etc.
8	Processing 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) appam.
15	Production of vinegar.
16	Manufacture of soda, water, lemonade etc.
17	Manufacture of Ice.
18	Manufacture of ice cream.
19	Processing, packing and distribution of tea.
20	Processing, grinding, packing and distribution of coffee.
21	Manufacture of syrup.
22	Manufacture of beedi.
23	Manufacture of Cigar.
24	Manufacture of tobacco snuff.
25	Manufacture of chewing tobacco.
26	Cotton ginning, clearing, pressing etc.
27	Cotton spinning other than in Mills
28	Cotton spinning and weaving in Mills.
29	Cotton weaving in handloom.
30	Cotton weaving in power looms.
31	Handloom weaving.
32	Khadi Weaving in Handloom.
33	Printing of cotton textiles.
34	Manufacture of Cotton thread, rope twine etc.
35	Jute spinning.
36	Manufacture of jute products including repairing of gunny bags.
37	Weaving of silk by Handloom.
38	Manufacture of hosiery goods.
39	Making of embroidery products
40	Tailoring
41	Manufacture of quilts and mattresses.

42	Manufacture of Coir and Coir Products.
43	Manufacture and assembling of umbrellas and production of spare parts of umbrellas.
44	Repairing of umbrellas.
45	Manufacture of wooden furniture and fixtures.
46	Manufacture of structural wooden goods such as doors, beams etc.
47	Manufacture of wooden industrial goods such as parts of handloom ambarcharka, bobbirs etc.
48	Manufacture of wooden utensils, 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 chap pals.
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-kerbs, tube, closets etc.
66	Manufacture of structural stone goods, stone crushing, stone carving, stone dressing, marble carving etc.
67	Manufacture of stone wares.
68	Manufacture of stone images.
69	Manufacture of chinaware's and crockery.
70	Manufacture of large containers and chinaware.
71	Manufacture of glass and glass products.
72	Manufacture of clay models
73	Manufacture of iron and steel furniture.
74	Manufacture and repairing of brass and bell metal products.
75	Manufacture of aluminum utensils and other products.
76	Manufacture of tin cars and copper vessels.
77	Electroplating, timplating, 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	Servicing and repairing of motor vehicle
90	Manufacture of cycles, parts and accessories.
91	Manufacture and repair of boats and barges.
92	Manufacture and repairing of animal drawn and hand drawn vehicles.
93	Repairing of photographic 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	All industries classified as "green/non hazardous" by state/central government

ANNEXURE II

LIST OF OBNOXIOUS OR NUISANCE INDUSTRIES SUBJECT TO OBJECTIONABLE ODOURS, FUMES EFFLUENTS OR PROCESSORS TO BE LOCATED IN VARIOUS ZONES. (Grouped under Indian Standard Industrial Classification)

I	Manufacture of Food Stuff :
1	Slaughtering, preservation of meat and fish and canning of fish.
II	Manufacture of Beverages:
2	Production of distilled spirits, wines, liquor etc., from alcoholic malt, fruits and malts in distillery and brewery.
3	Production of country liquor and indigenous liquor such as toddy, liquor form mahua, palm juice.
III	Manufacture of Textiles :
4	Dyeing and bleaching of cotton
IV	Manufacture of Wood and Wooden Products :
5	Sawing and planning of wood.
6	Wood seasoning and creosoting
7	Manufacture of veneer and plywood.
8	Paper, pulp and straw board.
V	Manufacture of Leather and Leather Products :
9	Currying, tanning and finishing of hides and 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 etc., acids) ammonia, and chlorine
16	Manufacture of dyes, paint, colours and varnishes, printing ink.
17	Manufacture of fertilizers (Specially from organic materials):
18	Manufacture of disinfectants and insecticides
29	Manufacture of ammuniton, explosive and
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 gelatin and glue.
30	Fat, tallow, grease or lard refining of manufacture.
31	Bone meal, bone grist and bone powder.
32	Manufacture of cashew nut shell oil.
33	Other similar types of nuisance industries.

25.2 Special Rules for granting compensation for affected persons and contribution for betterment

Government will issue detailed guidelines for granting compensation for affected persons and contribution for betterment. However a suggestive concept is described herewith.

25.2.1 Compensation for affected persons

Implementation of various projects as detailed out in the Masterplan requires acquisition of private properties. Each person who loses their property by virtue of the implementation of the scheme will be compensated appropriately. A person who is willing to surrender the land required for the formation or widening of streets, expansion of railways/waterways/ parks/ preservation of environmentally sensitive areas or for any other public purpose, shall be benefited by suitable compensations.

25.2.2 Betterment Levy

Every developer who enjoys the direct benefit due to the implementation of a specific proposal in the Masterplan, such as formation of new street or widening of existing street, shall pay a levy to the local body and the amount could be collected as development fund which could be utilized for rehabilitation, slum improvement and for affordable housing projects. For the formation of new roads, levy could be charged for the entire constructed floor area, where as for the widening of an existing street levy could be charged for the additional floor area which is permitted to be constructed for the proposed widening.

The implementation of projects mentioned in special zones would be realized by surrendering of land, collection of betterment levy or land pooling or a combination of these tools.