PATTAMBI

MASTER PLAN (DRAFT REPORT)



Pattambi Municipality

Local Self Government Department Planning

Govt. of Kerala

October 2023

MASTER PLAN

FOR

PATTAMBI TOWN

2036

(Draft Report)

Prepared by

PATTAMBI MUNICIPALITY

LOCAL SELF GOVERNMENT DEPARTMENT PLANNING, GOVERNMENT OF KERALA

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PATTAMBI MUNICIPALITY
LOCAL SELF GOVERNMENT DEPARTMENT PLANNING
GOVERNMENT OF KERALA

MASTER PLAN FOR PATTAMBI TOWN

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FOREWORD

In the last two decades our towns have been growing rapidly. The rapid growth of town brings prospers and concern over the future. This leads to the concern on planned growth of the town. A peek into the history of Pattambi does show its congruence with urban nature as well as socio-cultural history.

It is not unknown that a planned growth and a sustainable development requires the input of not only various stakeholders but experienced professionals. Pattambi is no less hungry in her growth ambitions and surely wishes to grow leap and bounds.

The Local Self Government Department (Planning) has done a fruitful job in assisting us with their expertise as per the mandate G.O. (Rt.) No. 2955/2015/LSGD dated 29.9.2015. The master plan for Pattambi has come out with a slew of innovative ways to solve the current problems especially in addressing the decongestion of central area of the town and spatial allocation for infrastructure facilities.

It is indeed a delight in having been a part of this comprehensive, taxing yet fruitful product. This wonderfully crafted document is an outcome of several iterations of extensive consultations between the Local Self Government Department (Planning) and various stakeholders including the Special committee that was formed within the Municipal council. The Special Committee were able to chip in the ground facts for a better understanding of the problems. The physical infrastructure sector, economic aspects and social infrastructure were scrutinised for its underlying problems and solutions to propel the growth momentum for the next twenty years were formed.

Every effort has been taken to tap the maximum potential that this municipality has to offer for the future development course. It is imperative to note that no development can happen in silos, and to realize this document into fruition we need the active participation of all stakeholders. A participative, proactive development of the maximum populace should be our motto. I am sure all the beneficiaries will pitch in to make this a reality.

Pattambi

25/10/2023

Lakshmikutty O.

Chairperson

Pattambi Municipality

OFFICE OF THE PATTAMBI MUNICIPALITY * PATTAMBI P.O * PALAKKAD DT-679303 Date:

LAKSHMIKUTTY. O
CHAIRPERSON
Pattambi Municipality

PREFACE

Urban areas have been the driving force in economic and social development of the nation. Cities emerged as focal point of transport, trade, business, education, religion and governance. Large resources are spent on the development of various urban settlements but the condition of these towns continues to deteriorate because of piecemeal nature of expenditure and lack of definitive development schemes. Ad-hoc efforts neither result in better environment nor strengthen the economic base. Hence, comprehensive master plans having long term perspective is need of the hour for our urban settlements.

74th Constitution Amendment Act envisages the empowerment of the Urban Local Bodies (ULBs) with planning functions, which is enshrined in the Twelfth Schedule to Article 243–W of the 74th Amendment. The powers, authority, and responsibilities entrusted on municipalities include urban planning, town planning, regulation of land-use and construction of buildings and planning for economic and social development related to spatial planning.

Master Plans are expected to give impetus to the planned development of towns. As per the Kerala Town and Country Planning Act 2016 in force in the state, not withstanding anything contained in the Kerala Municipality Act 1994, the Municipal Council is empowered to prepare or get prepared a Master Plan for the Local Planning area.

As per G.O. (Rt.) No. 2955/2015/LSGD dated 29.9.2015 Administrative Sanction and Financial Sanction was accorded for the implementation of the third phase of the Scheme of preparation of Development Plans and Detailed Town Planning Schemes which includes Pattambi Municipality. The Municipal Council has taken resolution to prepare Master Plan for the town as per resolution No. 2 dated 25.05.2016.

The studies carried out in connection with the preparation of Master Plan for Pattambi Town comprehensively covered the areas crucial to planning and sustainable development of the region. The master plan was prepared through a systematic process, comprising of extensive data collection and analysis, identification of development issues, setting up of goals and objectives, formulation of development concept and carving out policies & strategies followed by detailed sectoral proposals.

The development framework provided by draft Integrated District Development Plan for Palakkad District, became a major determinant in formulating the development concept of the Plan. The draft Master Plan is prepared through joint effort of the Pattambi Municipality and the Local Self Government Department Planning.

I would like to appreciate the leadership provided by the Pattambi Municipality for this endeavor under the Chairmanship of Smt. Lakshmikutty O. The leadership of the former chairmen Sri. K.S.B.A.Thangal and K.P.KunjuMuhammed (Vaputty), in the formulation of urban plan are also reckoned with gratitude. The contributions of the Special Committee constituted for the preparation of the Master Plan as well as the Working Groups were significant in the task. I take this opportunity to appreciate the officials of the Palakkad District office of the LSGD planning, especially Smt. Deepa V.P., District Town Planner, Sri Renjith K. S., former Deputy Town Planner, and the entire planning team for their sustained efforts in the time bound preparation of this Plan. I also appreciate the officials of the circle concerned in the office of the Chief Town Planner for their efforts in vetting and finalizing the Master plan for Pattambi town.

I hope, this Master Plan will provide the desired frame work for planned development of Pattambi town.

OFFICE OF THE CHIEF TOWN PLANNER
THIRUVANANTHAPURAM

Prasanth H.

Chief Town Planner (Planning).

Local Self Government Department Planning.
Government of Kerala

Thiruvananthapuram
08/11/2023

ACKNOWLEDGEMENTS

The master plan delivers a coordinated strategy to guide future development, transport and public space investments over the next 20 years to ensure our town to be safe, attractive and a continued source of pride. The preparation of the Master Plan for Pattambi town was started in May 2016, as per G.O.(Rt) No. 2955/2012/LSGD, dated 29.9.2015 under Phase III of the scheme of preparation of Master plan and Detailed Town Planning Schemes.

The process of preparation included extensive data collection, local level and spatial analysis of collected data, identification of problems and potentials, envisaging the future integrating the results of scientific analysis and the aspirations of people and finally transferring that vision into a Plan. Considering the intricacy of the details involved and multi-disciplinary 'technical knowhow' required, the plan preparation process would not have been realized without the dedicated leadership of the local government and the participation of various stake holders. In this regard, I am sincerely acknowledging the valuable guidance and involvement of Municipal chairperson **Smt. O. Lakshmikutty** and Vice chairman **T.P.Shaji.** The contributions and support put forth by Sri. K.S.B.A. Thangal and Sri. K.P. Kunju Muhammed Rasheed (Vapputty), who are the former municipal chairmen, during their tenures during the preparation of the Pattambi Master Plan are also to be acknowledged together. I gratefully acknowledge the contributions of all the councillors of the municipality and the former councillors and political leaders who offered their support for fulfilling this project.

Further, I am extremely grateful to the encouraging leadership, support and motivation extended by our Chief Town Planner, **Sri. Pramod Kumar C P** and **Sri Prasanth H**, Chief Town Planner (Planning) beyond which the plan would not have been realized in time. I would like to thank all those who have participated in the discussions and moulding the plan to the level we see today. In this connection, I am extremely thankful to **Sri. Giji George**, **Smt.K.S.Girija** (Former Chief Town Planners), **Sri. S Ajayakumar, Senior Town Planner**, **Smt. Isha P A, Town Planner and Sri Denzil Fernandez, Deputy Town Planner** for the immense support, creative guidance, valuable assistance and efforts taken for carving and vetting the plan. I also express my deepest gratitude for the creative and valuable advice extended by **Smt. Asha Ajoy Ghosh**, Town Planner and **Smt. Raji S. S.**, Deputy Town planner, Chief Town Planning Office.

Special thanks also go to officials of various line departments who shared data and gave their valuable support in this plan preparation exercise without which the compilation of this vital document would have been difficult to realize. The plan has been prepared in a participatory way having several consultations with stake holders at all stages. I offer special thanks to members of Special Committee, members of various Working Groups and other stake holders for offering their views, comments and rec-

ommendations to strengthen the plan. I would like to extend special thanks to the residents of Pattambi town who provided substantial input that helped to shape the Master plan.

The dedicated effort put by **Sri. V.A. Gopi** during his tenure in the capacity of District Town Planner for the successful timely completion of the plan need special acknowledgement. Preparation of Master Plan for Pattambi Town is the culmination of several months of dedicated work by the members of the planning team constituted for the purpose in this office. I sincerely appreciate the dedicated efforts of **Sri Renjith K S,** Former Deputy Town Planner who led the planning team on his tenure to shape this plan in the way what we see today. I extend my sincere gratitude to all members of planning team with special mention to **Sri. Sarath Sankar M**, **Sri. A. N. Subhash,** and **Smt. Jagadambika Devi K.V.**, Assistant Town planners who worked together to contribute to this plan along with **Smt. Radhika R** I[st] grade surveyor who lead and created the GIS part of the plan. Contributions of Planner Associates **Smt Greeshma S,** Planning Assistants **Smt. Jilsha K.S**, **Kum. Ally Paul** and **Kum. Keerthy M,** Planning Assistant (GIS) **Sri T.K Thaliz, Kum. Sachna A. S,** Computer Assistant (GIS) **Smt. Syamini. C,** and IInd Grade Statistical Assistant **Smt. Aswani A,** who were involved in the plan preparation are also acknowledged here. Special thanks to all other staff of district office who worked during the period of this plan preparation, for their tireless efforts without which this plan would not have been completed.

Deepa V.P.

Town Planner

Local Self Government Department Planning.

Palakkad

Palakkad

25/10/2023

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ABBREVIATIONS

AAY	-	Antyodaya Anna Yojana
ABC Programme	-	Animal Birth Control Programme
ACMA	-	Automotive Component Manufactures Association
AD	-	Anno Domini
ADS	-	Area Development Society
AHP	-	Affordable housing in partnership
AM	-	Ante Meridiem
AMRUT		Atal Mission for Rejuvenation and Urban Transformation
ANERT	-	Agency for Non-conventional Energy and Rural Technology
APCOS	-	Anand Pattern Co-op Societies
APL	-	Above Poverty Line
ATM	-	Automated Teller Machine
BC	-	Before Christ
B.Ed	-	Bachelor of Education
BLC	-	Beneficiary led consturction
BMC	-	Bulk Milk Cooler
BOD	-	Biological Oxygen Demand
BOT	-	Build, Operate and Transfer
BPL	-	Below Poverty Line
BRGF	-	Backward Regions Grant Fund
BSNL	-	Bharat Sanchar Nigam Limited
BSY	-	Balika Samridhi Yojana
CA	-	Chartered Accountant
CAA	-	Constitution Amendment Act
CAGR	-	Compounded Annual Growth Rate
CBD	-	Central Business District
CBSE		Central Board of Secondary Education
CBO	-	Community Based Organization
CCU	-	Coronary care unit
CC	-	Cement Concrete
CDP	-	City Development Plan
CDS	-	Community Development Supervisor
CEC	-	Cation Exchange Capacity
CESS	-	Centre for Earth Science Studies
CFL	-	Compact Fluorescent Lamp
CHC	-	Community Health Centre
CI	-	Concentration Index
CLS	-	Credit linked subsidy scheme

CNC	-	Computer Numerical Control
COPP	-	Committee on Plan Projects for Industrial Townships
CPHEEO	-	Central Public Health Environmental Engineering Organization
CREDAI	-	Confederation of Real Estate Developers' Associations of India
CT	-	Computerized Tomography
CWRDM	-	Centre for Water Resources Development and Management
DCA	-	Diploma in Computer Application
DCS	-	Dairy Co-operative Societies
DDMP	-	District Disaster Management Plan
DEM	-	Digital Elevation Model
DIC	-	District Integration Committee Organization
DMD	-	Disaster Management Department
D&O Trade	-	Dangerous and Offensive Trade
DPCs	-	District Planning Committees
DPR	-	Detailed Project Report
DRM	-	Digital Rights Management
DRW	-	Drought Relief Work
DTP	-	Detailed Town Planning
Dt.	-	District
DTPC	-	District Tourism Promotion Council
DWCUA	-	Development of Women and Children in Urban Areas
DWT	-	Depth of Water Table
DYSP	-	Deputy Superintendent of Police
ECG	-	Electro Cardio Gram
EEG	-	Electro Encephalon Gram
EIUS	-	Environmental Improvement in Urban Slums
EOC	-	Emergency Operation Centre
ENT	-	Otolaryngologist
ESA	-	Environmental Sensitive Areas
ESI	-	Employees State Insurance
ESS	-	Entrepreneur Support Scheme
ETP	-	Effluent Treatment Plant
EWS	-	Economically Weaker Section
FAR	-	Floor Area Ratio
FCI	-	Fixed Capital Investment

FHC	-	Family Health Centre
FHSC	-	Family Health Service Centre
FFDA	-	Fish Farmers Development Agency
FOP	-	Financial Operating Plan
FSI	-	Floor Space Index
FY	-	Financial Year
GLSR	-	Ground Level Storage Reservoir
gm	-	Grams
GO	-	Government Order
GOI	-	Govt. of India
Govt.	-	Government
GOI-UNDP	-	Govt. of India- United Nations Development Programme
GOK	-	Government of Kerala
gpcd	-	Grams per Capita per Day
GIS	-	Geographic Information System
GP	-	Grama Panchayath
GST	-	Goods and Services Tax
GPF	-	General Provident Fund
GPS	-	Global Positioning System
GWD	-	Ground Water Department
GWMW	-	Ground Water Monitoring Well
H_2S	-	Hydrogen Sulphide
Ha	-	Hectares
HH	-	Households
HHI	-	Households Industries
HIV		Human Immunodeficiency Virus
HP	-	Horse Power
HS	-	High School
HS	-	Health Supervisor
HSC	-	House Service Connection
HSS	-	Higher Secondary school
HUDCO	-	Housing and Urban Development Corporation
HWCs	-	Health and wellness centres
ICDP		Integrated Cattle Development Programme
ICDS	-	Integrated Child Development Scheme
IELTS	-	International English Language Testing system

ICSE	-	Indian Certificate of Secondary Education
ICT	-	Information and Communication Technology
ICTC		Integrated Counseling and Testing Centre
ICU	-	Intensive Care Unit
IDDP	-	Integrated District Development Plan
IDSMT	-	Integrated Development for Small and Medium town
IPT	-	Intermediate Public Transport
IGMSY	-	Indira Gandhi Mathruthva Sahayog Yogana
IHSDP	-	Integrated Housing and Slum Development Project
ILFS	-	Infrastructure Leasing & Financing Society
IMAGE	-	Indian Medical association Goes Eco friendly
IP	-	In Patient
IPM	-	Integrated Pest Management
IPSASB	-	International Public Sector Accounting Standards Board
IPT	-	Intermediate Public Transport
IRC	-	Indian Roads Congress
IIMS	-	Institute of Integrated Medical Science
IRCTC	-	Indian Railway Catering and Tourism Corporation
IRTC	-	Integrated Rural Technology Centre
ISM	-	Indian System of Medicine
ISP	-	Integrated Sanitation Program
IT	-	Information technology
ITC	-	Industrial Training Centre
Jn.	-	Junction
JNNURM	-	Jawaharlal Nehru National Urban Renewal Mission
JSSK	-	Janani-Shishu Suraksha Karyakram
JSY	-	Janani Suraksha Yojana
KELSA	-	Kerala State Legal Services Authority
KAS	-	Karnataka Administrative Service
kg	-	Kilograms
KILA	-	Kerala Institute of Local Administration
KIIFB	-	Kerala Infrastructure Investment Fund Board
km	-	Kilometer
KMBR	-	Kerala Municipal Building Rules
KSBC	-	Kerala State Bamboo Corporation
KSEB	-	Kerala State Electricity Board

KSE Ltd.	-	Kerala Solvent Extraction Limited
KSFE	-	Kerala State Financial Enterprises
KSPCB	-	Kerala State Pollution Control Board
KSRTC	-	Kerala State Road Transport Corporation
KSTP	-	Kerala State Transport Project
KSSDA	-	Kerala State Seed Development Authority
KSWDC	-	Kerala State Women's Development Corporation
KSY	-	Kishori Sakthi Yojana
KUDFC	-	Kerala Urban Development Finance Corporation
KUHS	-	Kerala University of Health Sciences
KVA	-	Kilo Volt Ampere
KWA	-	Kerala Water Authority
KWH	-	Kilo Watt Hour
LCS	-	Low Cost Sanitation
LDP	-	Local Development Plan
LED	-	Light-Emitting Diode
LHS	-	Left Hand Side
LIC	-	Life Insurance Corporation
LIFE	-	Livelihood Inclusion and Financial Empowerment
LIG	-	Low Income Group
Lit	-	Liters
LL	-	Lakh Liters
LP	-	Lower Primary
lpcd	-	Liters Per Capita Per Day
LPG	-	Liquefied Petroleum Gas
LSG	-	Local Self Government
LSGD	-	Local Self Government Department
LSGI	-	Local Self Government Institution
(M)	-	Municipality
m	-	Meters
mbgl	-	Meters Below ground level
MBA	-	Master of Business Administration
MCM	-	Million cubic Meters
MCW	-	Maternity and Child Welfare
MDR	-	Major District Road
METIND	-	Metal Industries Limited

MGNREGS	-	Mahatma Gandhi National Rural Employment Guarantee Scheme
mg/L	-	Milligrams per Litre
ML	-	Million Liters
MLA	-	Member of Legislative Assembly
MLD	-	Million Liters per Day
MILMA	-	Malabar Region Co-operative Milk Producers Union
mm	-	Milli Meters
MML	-	Margin Money Loan Scheme
MoUD	-	Ministry of Urban Development
MP	-	Member of Parliament
MSL	-	Mean Sea Level
MSME	-	Micro, Small & Medium Enterprises
MSMED	-	Small and Medium Eterprises Development
MSW	-	Municipal Solid Waste
MT	-	Metric Tonne
NABARD	-	National Bank for Agricultural and Rural Development
NATPAC	-	National Transportation Planning and Research Centre
NCD	-	Non Communicable Disease
NGO	-	Non-Governmental Organizations
NHAI	-	National Highway Authority of India
NHED	-	Nutrition and Health Education
NUIA	-	National Institute of Urban Affairs
NHG	-	Neighborhood Group
NMAM	-	Model National Municipal Accounting Manual
NNM	-	National Nutrition Mission
Nos.	-	Numbers
NPA	-	Nutrition Programme for Adolescent Girls
NRC	-	National Remote Censing
NREGA	-	National Rural Employment Guarantee Act
NMT	-	Non Motorized Transport
NRHM	-	National Rural Health Mission
NRSC		National Remote Sensing Centre
NRW	-	Non-Revenue water
NSDP	-	National Slum Development Program
NSS	-	National Service Scheme
NTU	-	Nephelometric Turbidity unit

NIOS	-	National Institute of open schooling
NUHM	-	National Urban Health Mission
OBC	-	Other Backward Class
ODR	-	Other District Roads
O&M	-	Operation & Maintenance
O-D	-	Origin & Destination
OG	-	Out Growth
OH	-	Over Head
OHSR	-	Overhead Service Reservoir
OHT	-	Overhead Tank
OP	-	Out Patient
PCU	-	Passenger Car Unit
PCO	-	Polycystic Ovary Syndrome
PGDCA	-	Post Graduate Diploma in Computer Applications
pH	-	Potential of Hydrogen
PHC	-	Primary Health Centre
PI	-	Pollution Index
PM	-	Post Meridiem
PMAY	-	Pradhan Mantri Awas Yojana
PMEGP	-	Prime Minister's Employment Generation Programme
PMRY	-	Prime Minister's Rozgar Yojana
PO	-	Post office
PPH	-	Persons Per Hectare
PPP	-	Private Public Participation
ppsqkm	-	Person Per Square kilometer
RGGVY	-	Rajiv Gandhi Grameen Vidyutikaran Yojana
RHS	-	Right Hand Side
RNCTP		Revised National Tuberculosis Control Program
ROB	-	Road Over Bridge
R.O Plant	-	Revenue Osmosis plat
SC	-	Scheduled Caste
SECC	-	Socio Economic and Caste Census
SFC	-	State Finance Commission
SH	-	State Highway
SHG	-	Self Help Group
SIC	-	Spatial Integration Committee

SIDCO	-	Small Industries Development Corporation
SIFL	-	Steel Industrial Forgings Ltd
SILK	-	Steel Industrials Limited Kerala
SIMCO	-	South India Metal Company
SIPC	-	Small Industries Promotion Centre
SISI	-	Small Industries Service Institute
SIS	-	Standard investment Subsidy Scheme
SJSRY	-	Swarna Jayanti Shahari Rozgar Yojana
SLC	-	Special Local Committee
SLBP	-	Special Livestock Breeding Program
SNP	-	Supplementary Nutrition Programme
SPAC	-	State Plan of Action for the Child
SPM	-	Suspended Particulate Matter
SPEM	-	State Poverty Eradication Mission
sq. ft	-	Square Feet
sq. km	-	Square Kilometers
SSA	-	Sarva Siksha Abhiyan
SSI	-	Supplemental Security Income
SSO	-	Soil Survey Organisation
ST	-	Scheduled Tribe
STP	-	Sewage Treatment Plant
SVL	-	Sodium Vapour Lamp
SWM	-	Solid Waste Management
TB	-	Tuberculosis
T&CS	-	Thrift & Credit Societies
TDS		Total Dissolved Solids
THRS	-	Take Home Ration Scheme
TPD	-	Tonnes per day
TOD	-	Transit Oriented Development
TTC	-	Teachers Training Centre
TTI	-	Teachers Training Institute
TV	-	Television
TWSS	-	Town Water Supply Scheme
UA	-	Urban Agglomeration
UPSC	-	Union Public Service Commission

URDPFI	-	Urban and Regional Development Plan Formulation and Implementation
USGS	-	United States Geological Survey
UGD	-	Underground Drainage
UK	-	United Kingdom
ULB	-	Urban Local Body
UNESCO	-	United Nations Educational, Scientific and Cultural
UP	-	Upper Primary
UPHCs	-	Urban Primary Health Centres
USEP	-	Urban Self Employment Program
USS		Ultra Sound Scan
UST	-	Urban Skill Training
UWEP	-	Urban Wage Employment Program
V/C	-	Volume to Capacity
VAMBAY	-	Valmiki Ambedkar Awas Yojana
VFPCK	-	Vegetable and Fruit Promotion Council Kerala
VHSS		Vocational Higher Secondary School
W	-	Watts
WBM	-	Water Bound Macadam
WFPR	-	Work Force Participation Rate
WHO		World Health Organization
Wi fi	-	Wireless networking technology
WPR	-	Work Participation Rate
w.r.to		With Respect To
WSS	-	Water Supply Scheme
W/S	-	Watershed
WTP	-	Water Treatment Plant

1

Introduction

1. INTRODUCTION

1.1 GENERAL

Urban Planning is a method of development that contributes to the organization, growth and evolution of urban areas and their urbanizing environs, based on economic, social, legal and aesthetic concepts and conditions in order to promote the welfare of public & quality of environment. It is to guide the development of a city or town so that it furthers the welfare of its current and future residents by creating convenient, equitable, healthy, efficient and attractive environment – "Sustainable development".

Master Plan is a blue print for the proposed development of towns for the next 20 -25 years. Master Plan involves estimation of future population, social economic conditions and infrastructural needs along with land use plan (present and proposed) and development control restrictions for ensuring that the necessary facilities are in place when the development takes place. Master plan is a statutory document that is approved, enforced and implemented for controlling, directing and promoting sound and rational development or redevelopment of an urban area with a view to achieving maximum economic, social and aesthetic benefits.

1.2 EARLIER PLANNING EFFORTS AND STUDIES

The earlier planning effort in this area can be addressed in two levels i.e. district level and town level.

1.2.1 District Level

The decentralized planning system was implemented in India through the 73rd, 74th constitutional Amendment of India on December 1992. Accordingly, the Kerala State legislative assembly enacted the Kerala Panchayath Raj Act 1994 and the Kerala Municipality Act 1994 repealing the previous Acts. The 74th Amendment Act of the constitution of India mandated District Planning Committee to prepare a Development plan for the district. As per the Article 243 ZD of the constitution; the District Planning Committee shall consolidate Panchayath/Municipality Plans in the district and prepare a Development Plan for the district as a whole.

By realizing the above fact, Government have accorded sanction to prepare an Integrated District Development Plan (IDDP) and Local Development Plan (LDP) for Palakkad district vide Order No.354/07/LSGD dated 01.02.2007. The District Planning Committee of Palakkad decided vide decision dated 26.05.2007 to prepare an Integrated District Development Plan (IDDP) Palakkad along with local development plan (LDP) for each and every local Governments in the district in an integrated manner. The District Planning Committee in its meeting held on 31.12.12 approved IDDP Palakkad. Ker-

ala Town and Country Planning Act 2016 gives a statutory backing to the preparation of Perspective Plan for District as per section 14.

1.2.2 Town Level

There was no spatial planning efforts done at Town level.

1.3 NEED FOR MASTER PLAN IN PATTAMBI TOWN

Palakkad or Palghat is the land of Palmyrahs and Paddy fields. Along with Kuttanadu, Palakkad is a major Paddy growing area of the state. It is often called as the "Gateway of Kerala". Palakkad district is situated in the central part of Kerala state. The district is bounded on the North by Malappuram District, in the East by Coimbatore district of Tamilnadu, in the south by Thrissur district and in the west by Thrissur and Malappuram districts.

There are six Taluks, 163 villages, 88 Panchayats and 7 municipalities namely Palakkad, Shoranur, Ottappalam, Chittur – Thathamangalam, Pattambi, Cherpulasseri and Mannarkkad. A twenty-miles-across gap in the Western Ghats is the most striking feature of Palakkad district. The geographical area of the district is 4480 km^2 which is 11.5% of the state's area. The district is one of the main granaries of Kerala and its economy is primarily agricultural. The proximity and easy approach to Tamil nadu have caused the blend of Malayalam and Tamil cultures here.

Pattambi, situated on the shores of Bharathapuzha, south western side of Palakkad District. Pattambi is a municipal town in Palakkad District which is the headquarters of Pattambi Taluk which is included in Ottappalam Sub Division. Pattambi is one of newly formed Municipalities and sixth in geographical area among municipalities in Palakkad District. A cultural combination of Malappuram, Thrissur and Palakkad obviously differentiating the area from other places of Palakkad. Pattambi is well known for its cultural importance.

Pattambi Municipality is one among the seven municipalities of Palakkad district and functioning as Taluk headquarter. Pattambi town is also a regional centre for people in the surrounding rural areas and thus provides facilities to support them. Pattambi is facing a set of urban problems including traffic congestion, lack of housing, other infrastructure facilities, amenities etc. The town centre is presently seen lacking appropriate and effective planning and urban design strategies to support and attract further growth and investment.

Pattambi Town does not have a Master Plan. There is a dire need for a comprehensive Master Plan that provides an overall vision to guide future development of town by wiping out the deficits in urban infrastructure, mining the problems and exploring the potentials of town. Master Plan would enable towns to exert a dynamic influence on attraction of investment and to bring about high standards of living and

working environment.

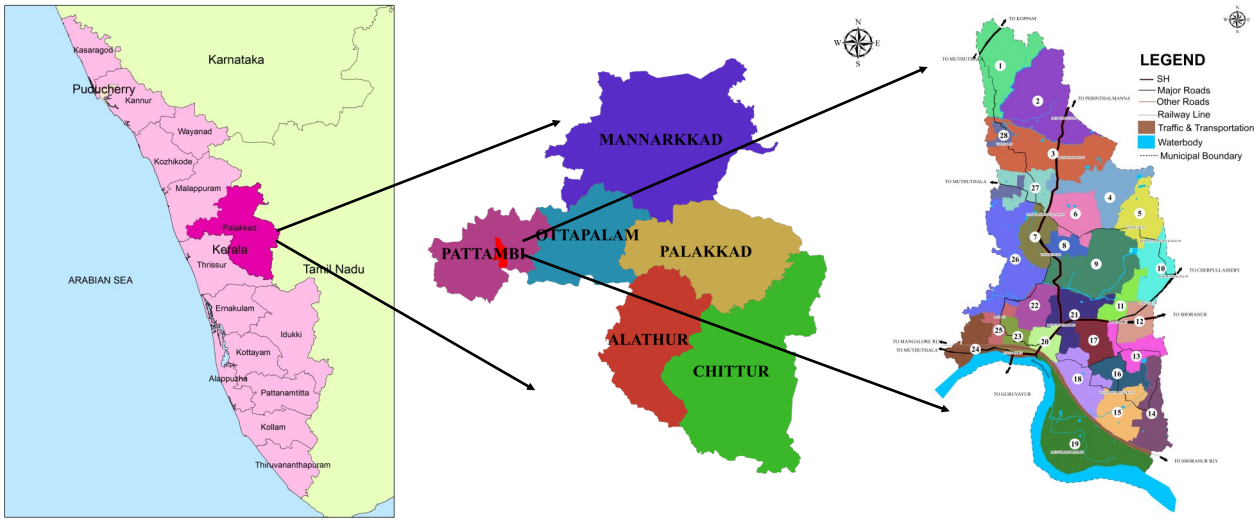


Fig. 1.1 Location of Pattambi Town

1.4 LEGAL FRAME WORK FOR MASTER PLAN

As per The Kerala Town and Country Planning Act 2016 in force in the state, not withstanding anything contained in the Kerala Municipality Act, 1994 or the Kerala Panchayath Raj Act 1994, the Municipal Corporation, Municipal Council, Town Panchayath or Village Panchayath shall have the following additional function "Prepare or get prepared a Master Plan for the Local Planning area". It contributes sufficient statutory backing to the preparation of Master Plan for town. As per G.O. (Rt.) No. 2955/2015/ LSGD dated 29.09.2015 Administrative Sanction and Financial Sanction was accorded for the implementation of the third phase of the Scheme of preparation of Development Plans and Detailed Town Planning Schemes which includes Pattambi Municipality. The Municipal Council has taken resolution to prepare Master Plan for the town as per resolution No. 2 dated 25.05.2016.

1.5 METHODOLOGY

With the help of guidelines issued by the government of Kerala in the title "Scheme of preparation of Development Plans" the master plan preparation process can be divided into many steps listed as follows:

As the first step, existing town planning schemes are to be evaluated to justify the need for a new master plan.

A seminar on development can help to analyze stakeholders context on the plan.

1.5.1 Preliminary Efforts

- Constitution of Special committee
- Delineation of planning area.
- Collection of cadastral maps.
- Global Position System (GPS) Survey.
- Preparation of Digitized maps.

1.5.2 Data collection and Compilation

Two types of data collection are involved.

- **Primary data:** Primary data collection involves land use survey, socio economic survey and traffic survey.
- **Secondary data**: Secondary data collection involves sectoral data collection by Special committee through working groups.
- **Data Compilation**: Collected data is compiled in specified format so as to make the analysis easy.

The responsibility of secondary data collection and compilation vest with the special committee. The process of data collection and compilation may be enriched and monitored by conducting a series of workshops. The District Town Planner shall ensure that the data collection and compilation are completed within the stipulated time frame even if the special committee fails to accomplish the task within the said time frame.

1.5.3 Analysis

Two types of analysis are done :

- **Local analysis** : The objective of Local Analysis is to analyze the development trend of each sector, its potential and development problems associated with each sector. It also includes a study on people's development aspirations from the earlier development reports. Special committee has the responsibility of local level analysis. The process of local analysis may be enriched and monitored by conducting series of workshops.
- **Spatial analysis**: The spatial analysis focuses upon regional setting of the settlement as well as the distribution pattern of activities & population, land use and infrastructure network within the local body.

The findings of both the analysis and findings from the urbanization study of the district are then integrated to facilitate the envisioning process.

1.5.4 Envisioning process

The outcome of the envisioning process is the integrated development vision of the planning area which comprises of setting up of goals and objectives, formulation of development concept and formulation of policies and strategies

Setting up of goals and objectives:

The major development problems and potentials of planning area will be clear from the consolidated findings of the analysis. Accordingly the development goals and objectives will be formulated.

Formulation of Development concept.

A Master Plan has to look in to the development perspective of the area for a future period. This is accomplished through the formulation of development concept of the area.

Formulation of policies and strategies

General Development Policy based on the development concept is formulated. Then sectoral policies and strategies are framed inconformity with the general policy. The development concept and sectoral policies are presented in the council which is then finalized by taking the feasible suggestions of the council into account.

1.5.5 Detailing

Projected Requirements

The future requirements in each sector are assessed in this step. Inter-sectoral integration is also ensured while assessing the future requirements in each development sector.

Sectoral Detailing, Land Use Planning

Sectoral development suggestions are formulated to achieve the projected requirements. Detailing is a joint activity of both Local Self Government Department Planning and special committee. A proposed land use plan is also prepared with zoning regulations.

Draft Plan and its legal processing

The following statutory steps have been enjoined in the Kerala Town and Country Planning Act 2016 with regards to the preparation, publication and regulation aspect of a Master Plan .

Section 36 (1) of the Kerala Town and Country Planning Act 2016 envisages that the Muncipal Council may, by a resolution decide to prepare a Master Plan in respect of the area under its jurisdiction or part there of. As per section 36 (2), the Municipal council should prepare or get prepared a draft Master Plan. Draft Master Plan has to be forwarded along with Council resolution to government. As per section 36 (3) Government on receipt of Master Plan in consultation with Chief Town Planner accord approval for publication within a period of 60 days from the date of receipt of draft Master Plan.

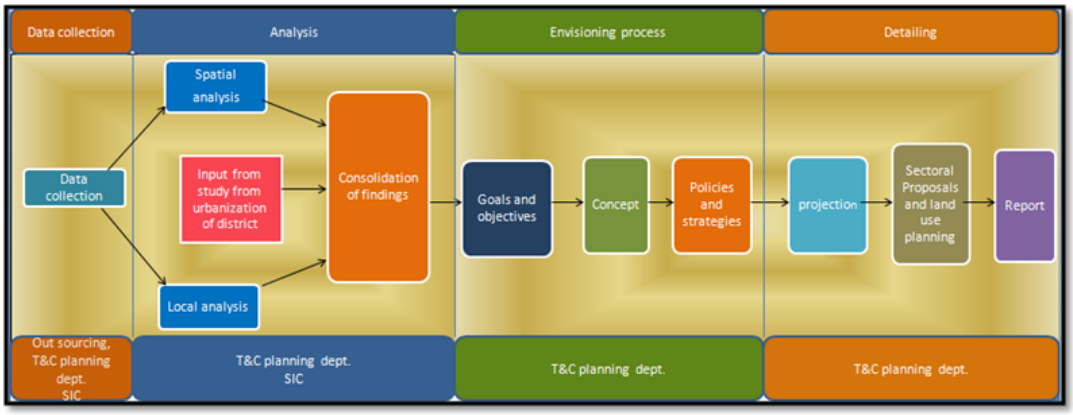


Fig. 1.2 Stages and responsibilities of Master Plan preparation.

As per section 36(4), Municipal Council within a period of 60 days from the date of receipt of approval for publication, publish the same in the website and a notice of publication in the official Gazette and in at least two newspapers having wide circulation within Municipality (one must be Malayalam newspaper) inviting objections and suggestions to be submitted within 60 days from the date of publication of notice specifying the place or places where a copy shall be available for inspection by the public.

Immediately after publication of the Master Plan, a copy of Master Plan should be forwarded to District Planning Committee for their remarks as per section 36(5). As per section 36(6), Municipal Council shall appoint a special committee formed under section 32. Special committee shall process the objections and suggestions and hear all such persons who have made request in writing or being so heard and submit report in prescribed format to Municipal Council.

As per section 36(7), Municipal Council within a period of 60 days from the date of receipt of report of Special Committee approve the Master Plan with or without modifications as may be considered necessary and shall forward master plan together

with objections and suggestions, report of special Committee and the recommendations to Government for Sanction.

As per section 36 (8) within a period of 60 days from the date of receipt of Master Plan, government may accord sanction to the plan after ensuring compliance with the provisions of perspective plans or any other plans prepared under the Act and publish a notice in the official Gazette intimating the fact of sanction of Master Plan.

Government may obtain technical remarks from Chief Town Planner to ensure compliance with plans under the Act. If the Master Plan is returned for incorporating modifications suggested by Government the same shall be resubmitted within 90 days to Government for sanction as if plan is submitted afresh.

As soon as Master Plan has been sanctioned by the Government, Municipal Council shall forward a copy to District Planning Committee and shall publish a notice regarding sanction of Master Plan by Government and in at least one newspaper specifying the place or places where a copy shall be available for reference or sale. Sanctioned Master Plan or its extract shall be published in the website of Municipality.

1.6 COMMUNITY INVOLVEMENT

There can be no meaningful development in any society, if the people themselves are kept out of the planning process. People's participation, therefore, is essential and must be introduced at relevant stages in the planning process. To "listen to the people" both to understand their needs and to assess how their lives are actually being affected by development projects and policies are important.

The suggested indirect participation of the people is ensured through elected representatives in the Legislative assembly, Municipal Council and Ward Committees (74th CAA). This kind of participation has appropriately been provided in the plan formulation process. The direct participation can be through individuals, citizen groups, neighborhood groups, business groups, consumer groups, and such other groups. NGOs and CBOs can also play a vital role as an intermediate link between the people and the government.

The method adopted for the preparation of master plan ensured community involvement at various stages of preparation of the plan. The first meeting was conducted as on 02-11-2017 at Municipal conference hall and on the same day a discussion with MLA also conducted at Pattambi.

It should be mandatory to present the salient features of a Masterplan in a public meeting, organized by the local authority just after the public notice inviting their comments and suggestion before its approval. All land pooling schemes should be formulated with direct active participation of the people.





The method adopted for the preparation of Master Plan ensured community involvement at various stages of preparation of the plan. In the meeting conducted on 29/11/2018, the Special Committee was formed with Municipal Chairman as the Chairman of the committee. Municipal Secretary was appointed as Convenor. Other members of the Committee were working group Chairman and District Town Planner. Sri. K. R. Narayanaswami was chosen as the subject expert of the Special Committee.

Separate planning team was created in the District Town and Country Planning Office under the leadership of Town Planner. As per the discussions conducted with the Special Committee, various surveys and data collection were carried out. Development seminar was conducted on 27/02/2019. Land use and socio - economic surveys were completed and traffic and transportation survey and study work was undertaken with the technical support of NATPAC, Thiruvananthapuram.

The Municipal Council made various suggestions to incorporate in the Master Plan of Pattambi town. The draft master plan was discussed with Municipal Chairman and Councilors prior to the submission to Chief Town Planner for vetting. Great efforts are thus put to reflect the needs, aspirations and problems of the community.

In the meeting conducted on 25/05/2022, the Special Committee was reconstituted with the Municipal Chairperson as the Chairman of the committee. The municipal Secretary was appointed Convenor. Other members of the committee were the working group chairman and District Town Planner.

The stakeholder consultation was conducted on 02-02-2022, and the suggestions from the stakeholders were evaluated by conducting a special committee meeting as on 22-07-2022. Annexure III contains the suggestions of various stakeholders in the town. The special committee was also conducted a site visit on 22-09-2022. On March 25,2023 a meeting was held with the MLA to explain the projects outlined in the master plan.

Various suggestions from the MLA and members of the Municipal Council are

also collected and incorporated in the master plan. Great efforts are thus made to ensure community participation to reflect the needs, aspirations, and problems of the community.





2

Profile Of Town

2. PROFILE OF TOWN

2.1 GENERAL

Pattambi Municipality is situated in Pattambi Taluk. It is located 59 km towards west from District head quarters Palakkad. Located at 10°49' 0" North, 76° 12' 0" East and at an altitude of 24 m above MSL. Pattambi is bounded by Koppam on North, Bharatha Puzha on South, Muthuthala and Thrithala on west and Ongallur on East. Other towns in the District, Shoranur, Ottappalam are located at 12 km, 22 km east and Mannarkkad and Cherpulassery at 50 km, 17 km north east, Chittur - Thathamangalam at 66 km south east of Pattambi Town.

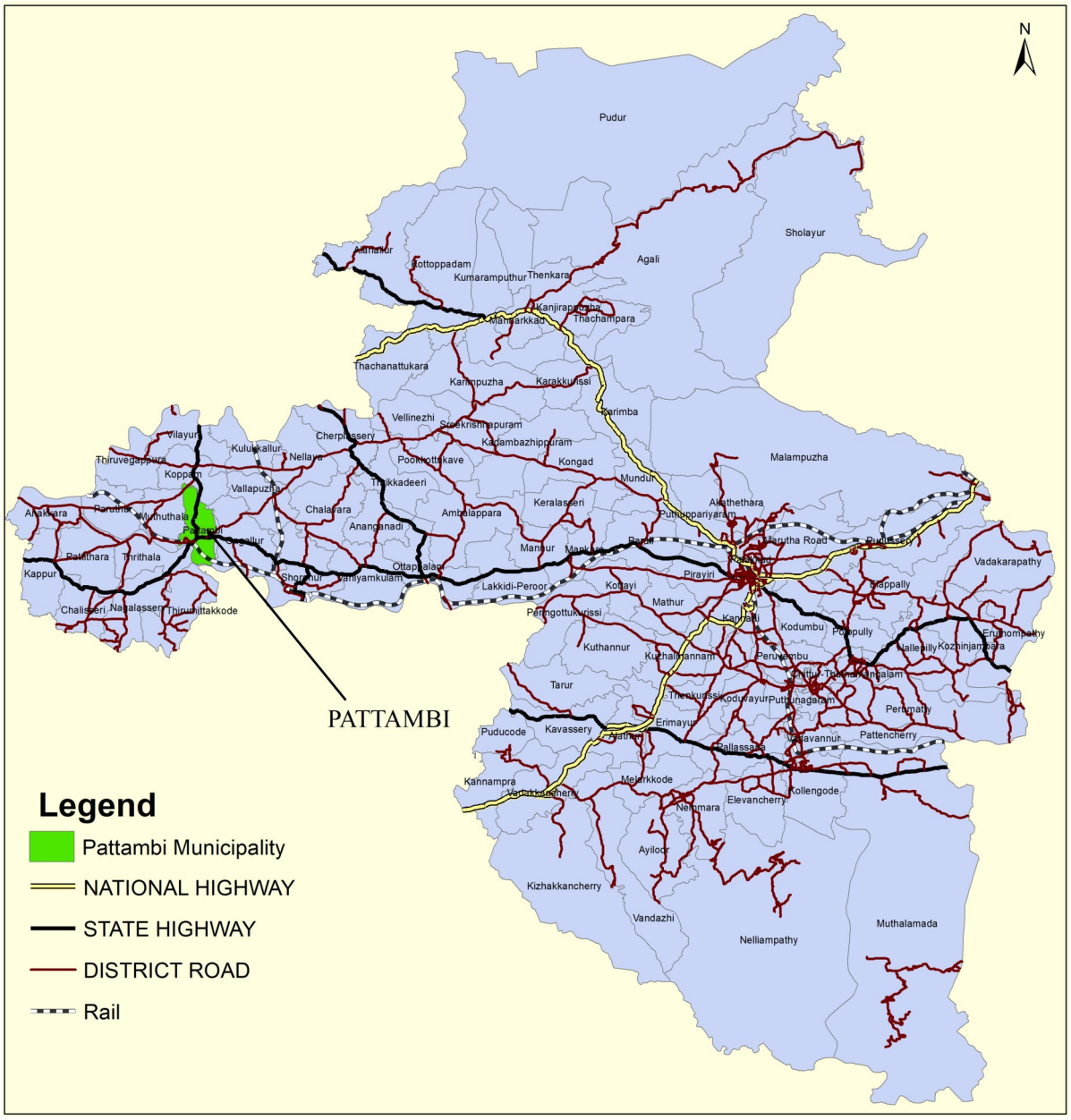


Fig. 2.1 Connectivity of Pattambi town with other towns in District

Source: IDDP, Palakkad

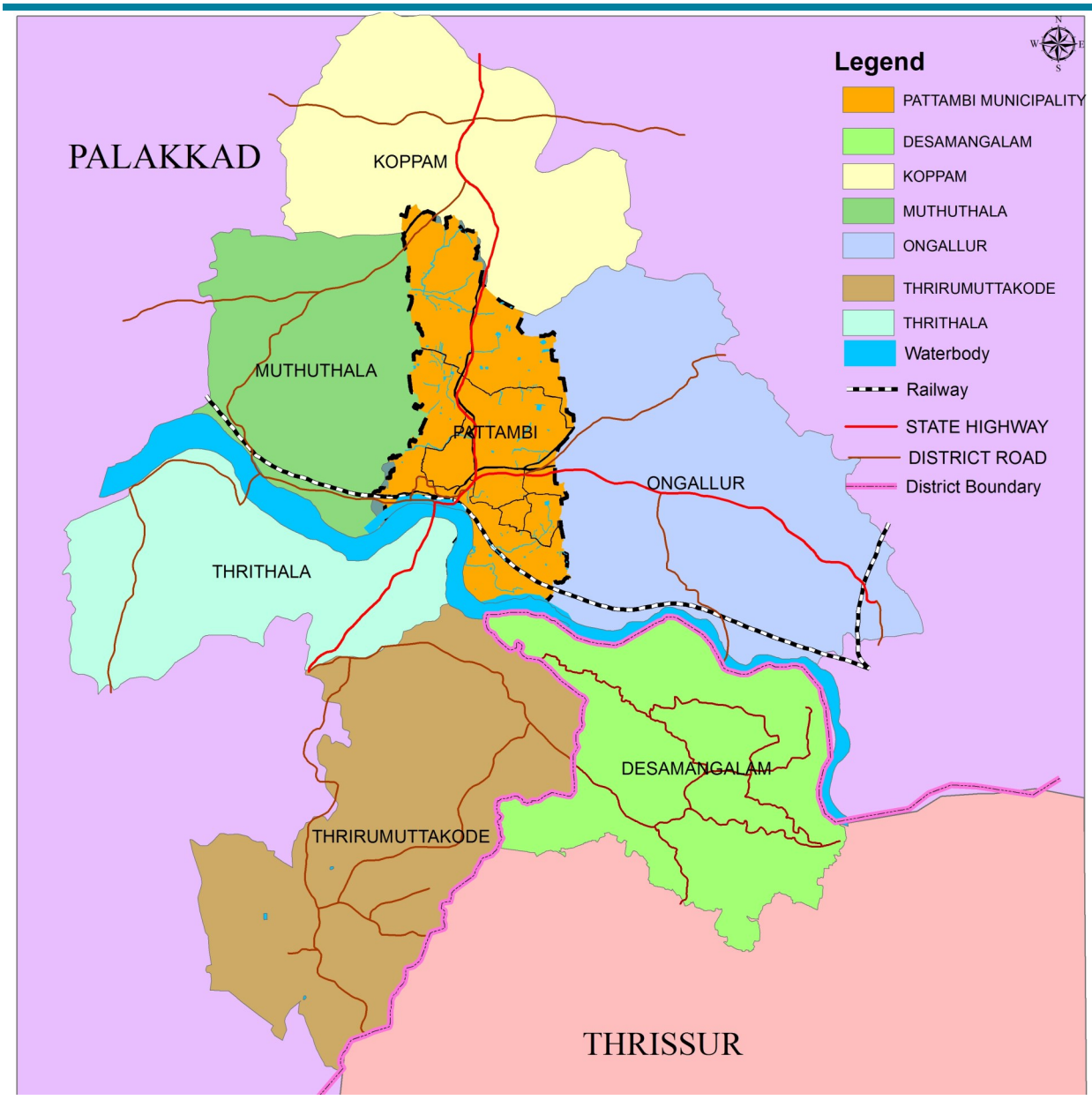


Fig 2.2 Boundaries of Pattambi Municipality

Source: Kerala State Land Use Board

2.2 AREA, ADMINISTRATIVE DIVISIONS

Area of the Pattambi municipality is 15.84 Km2 which is approximately 0.35% of the total area of the district. Pattambi municipality consist of 4 desoms i.e. Vallur, Nenthrimangalam, Kizhayur and Kodalur and is shown in Figure 2.3. As per the 2011 census report, the total population of Pattambi town was 28632 which was 1.02% of the total population of Palakkad District. It includes 14049 males and 14583 females. The population density of town is 1800/Km2. As per the 2011 census, there were 16 wards. Pattambi Municipality is formed in 2015 with 28 wards. Hence for the study and analysis, 28 wards as of now are considered. The spatial location of 28 wards of Pattambi Municipality is shown in Fig. 2.4. and number and names of wards are shown in Table 2.1.

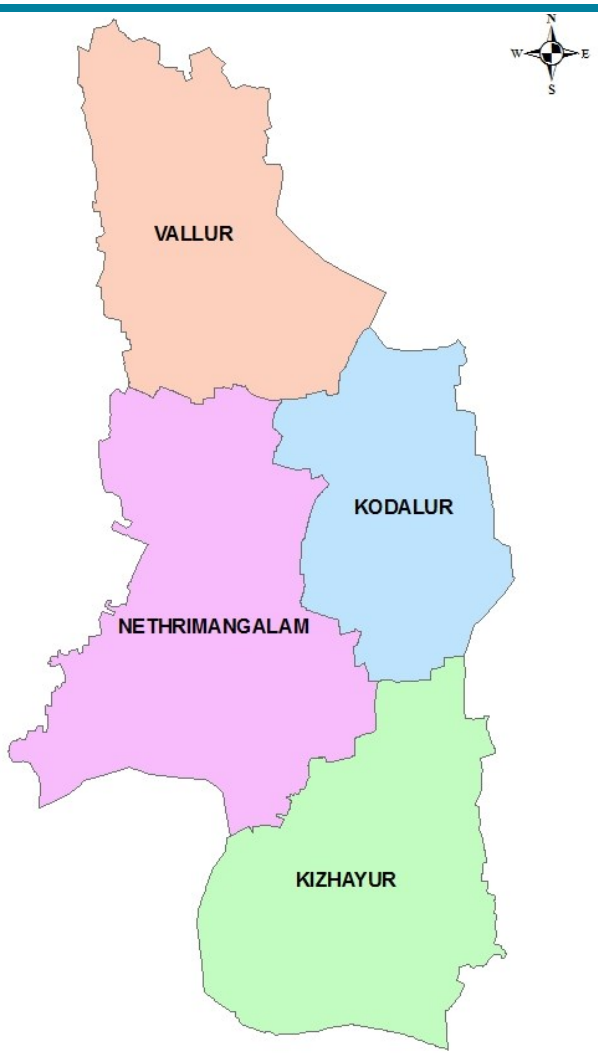


Fig 2.3 Desoms in Pattambi Municipality

Source: Survey and Land Records

Table 2.1 Number and name of wards in Pattambi Municipality

Ward No	Name of ward	Population	Ward No	Name of ward	Population
1	Vallur north	1080	15	Louly	936
2	Vallur east	1121	16	Kolorkunnu	1058
3	Randam mile	1031	17	Mele pattambi	1107
4	Kalappara	923	18	Umikunnu	1107
5	Kodalur centre	1121	19	Nambram	1089
6	Nediyam kunnu	1053	20	Pattambi town	1053
7	Sankaramangalam	1089	21	Kaithali	1121
8	Thekkumuri	1035	22	Nethirimangalam	1116
9	Chorakunnu	1121	23	Civil station	1076
10	College	1116	24	Paruvakkadavu	1076
11	Kizhakke angadi	1089	25	Kozhikunnu	1116
12	Hidayath nagar	1098	26	Vadakkumuri	1098
13	Cherulipparambu	1062	27	Tthottungal city	1076
14	Kizhayur	1080	28	Vallur centre	945

Source: Primary Health Centre,Pattambi

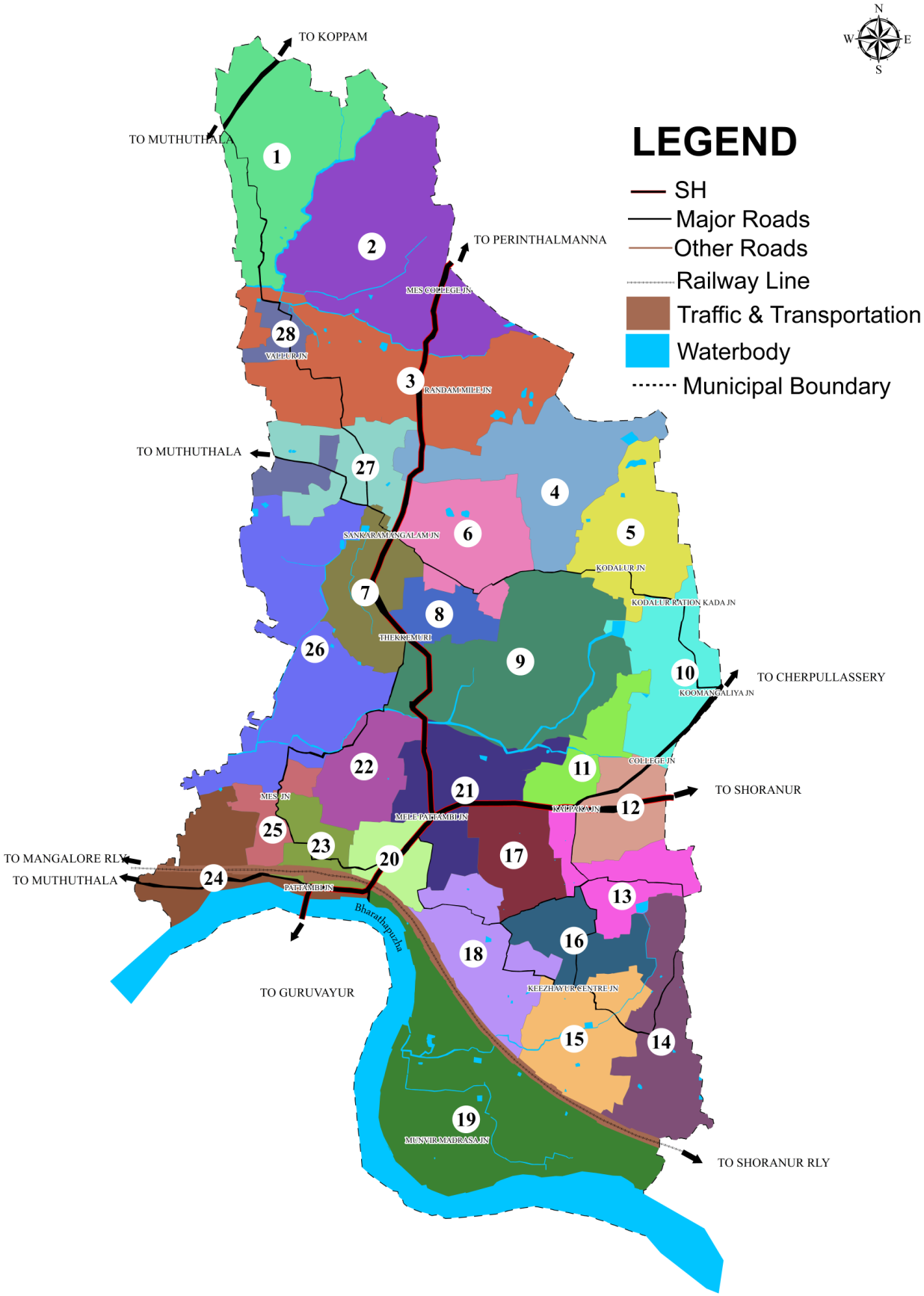


Fig 2.4 Ward map with 28 Wards

Source: Local Body

2.3 CLIMATE

Town receives on an average of 2348mm of rainfall annually. Major rainfall is received during June to September in the South West monsoon (71%). The North West monsoon contributes about 18%. The maximum temperature ranges from 28.1 to 39.5 whereas the minimum temperature ranges from 22.2 to 25.30. The average annual maximum temperature is 32.30 and the average annual minimum temperature is 23.40. The wind is predominantly from West and East during morning as well as in the evening hours. The wind speed is high is during August (13.6 km ph). The humidity is higher during the monsoon period i.e., from June to September. It is around 90% during this period. All through the year, the humidity is high during the morning.

2.4 PHYSIOGRAPHY AND RELIEF

Based on the physical features, the district is divided into two natural divisions – midland and high land. The midland consists of valleys and plains. The municipality comes within the midland region. Fig. 2.5 shows physiography of the district showing Pattambi town. Palakkad District falls in the Central Kerala Coast micro region as per

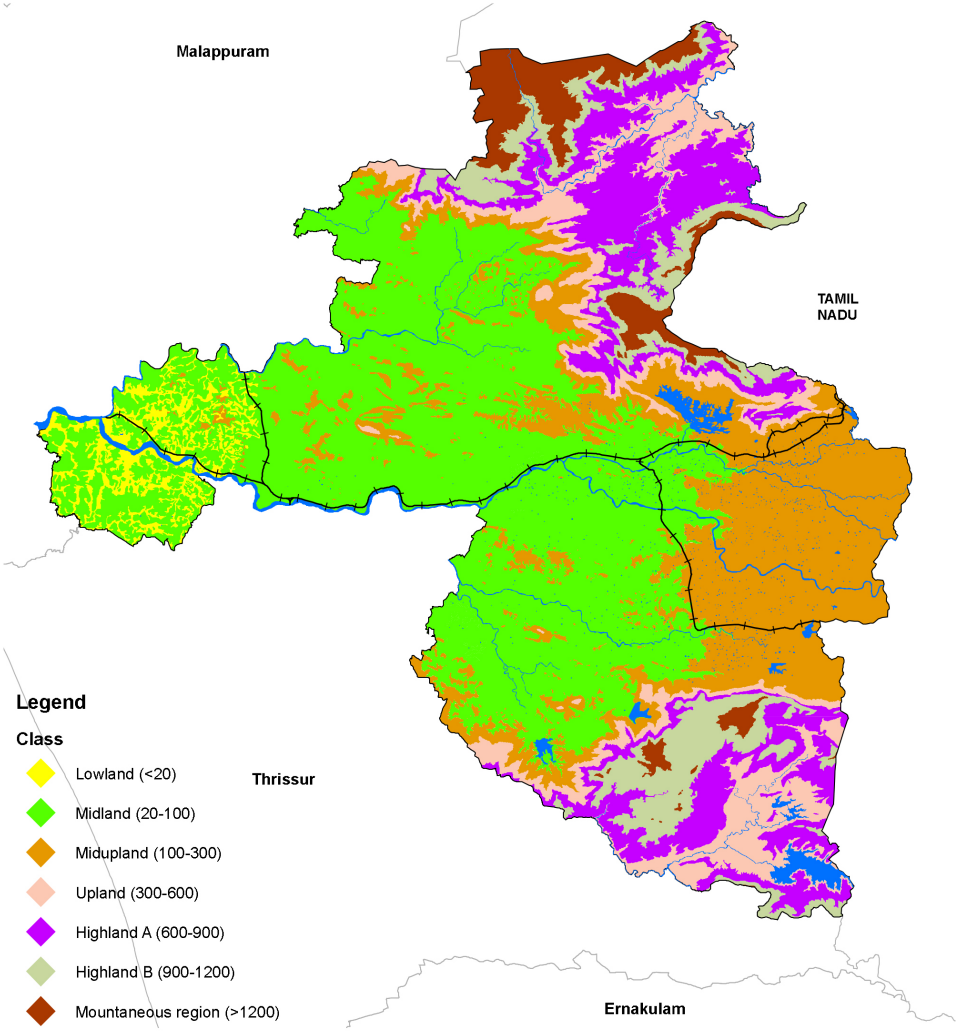


Fig. 2.5 Physiography of Palakkad district showing Pattambi town

Source: Soil Survey Office, Palakkad

regional classifications designed by the Census Organisation. Each Micro Region is further divided into Sub-Micro Regions on the basis of topography, geology, soils, climate and natural vegetation. Thus Palakkad consists of four such Sub-Micro Regions viz. (i) Pattambi Undulating Plain (ii) Mannarkad - Palakkad Forested Hills (iii) Palakkad Gap and (iv) Chittur Forested Hills.

Pattambi Undulating Plain region lies in the extreme Western portion of Ottappalam Taluk presently Pattambi Taluk. It makes its boundaries with Malappuram Undulating Plain in the North, Palakkad gap in the east, Trichur Plain in the South and Malappuram coast in the West. This region with knolls and isolated hills here and there slopes towards the West. The maximum height (191m.) is recorded in the Western portion of Vilayur Village in its Eastern end and the minimum height (78m.) in the Chalissery Village.

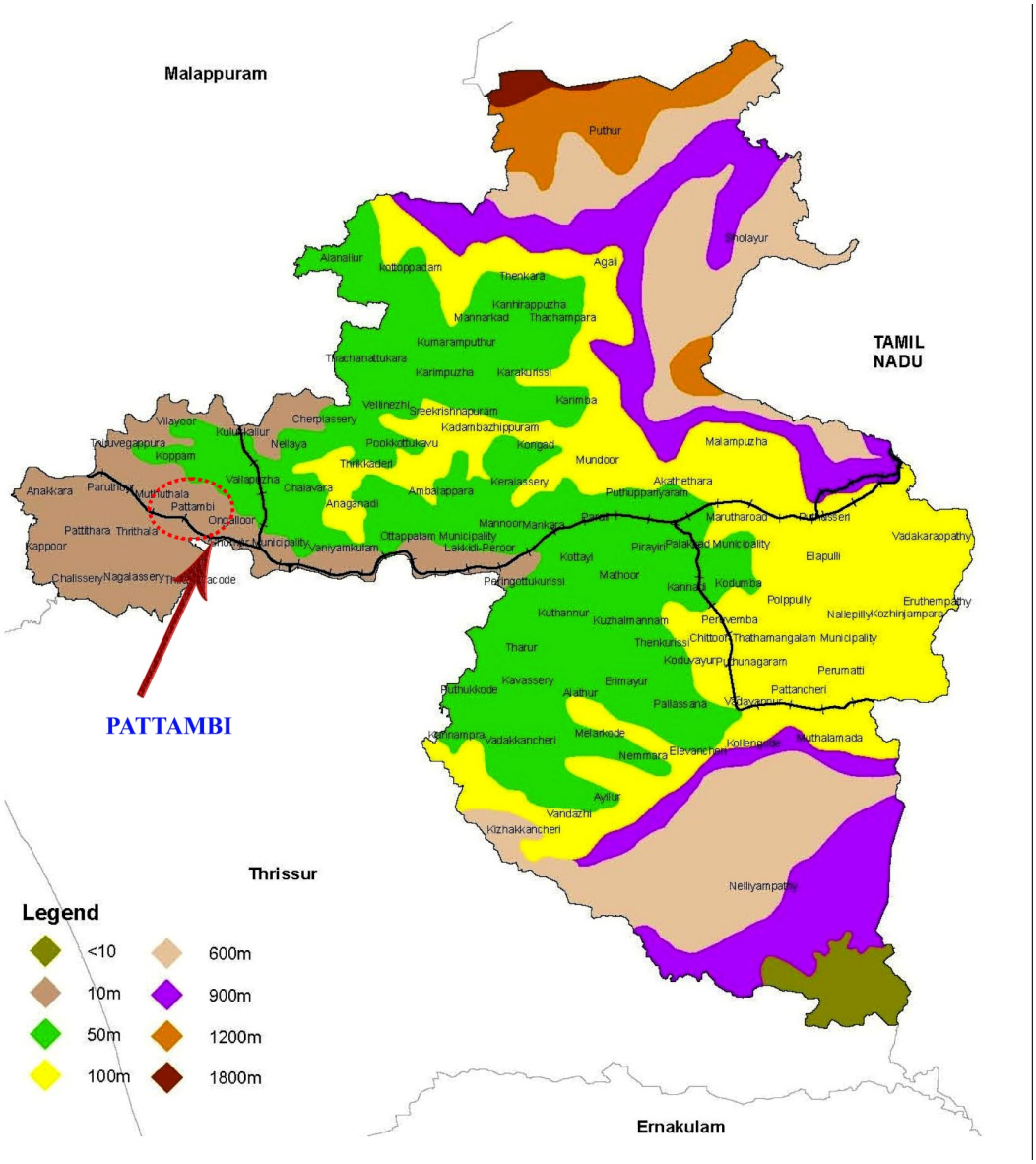


Fig. 2.6 Relief of District showing Pattambi Town

Source: Soil Survey Office, Palakkad

Pattambi Town is having less extensive valleys and slopes are having mild gradients. The peripheral areas of the town are agricultural lands and paddy. Bharathapuzha river flows along southern boundary of town. Pattambi Town have a relief with in 10m (Fig. 2.6). and comes under moderately sloping to steeply sloping areas.

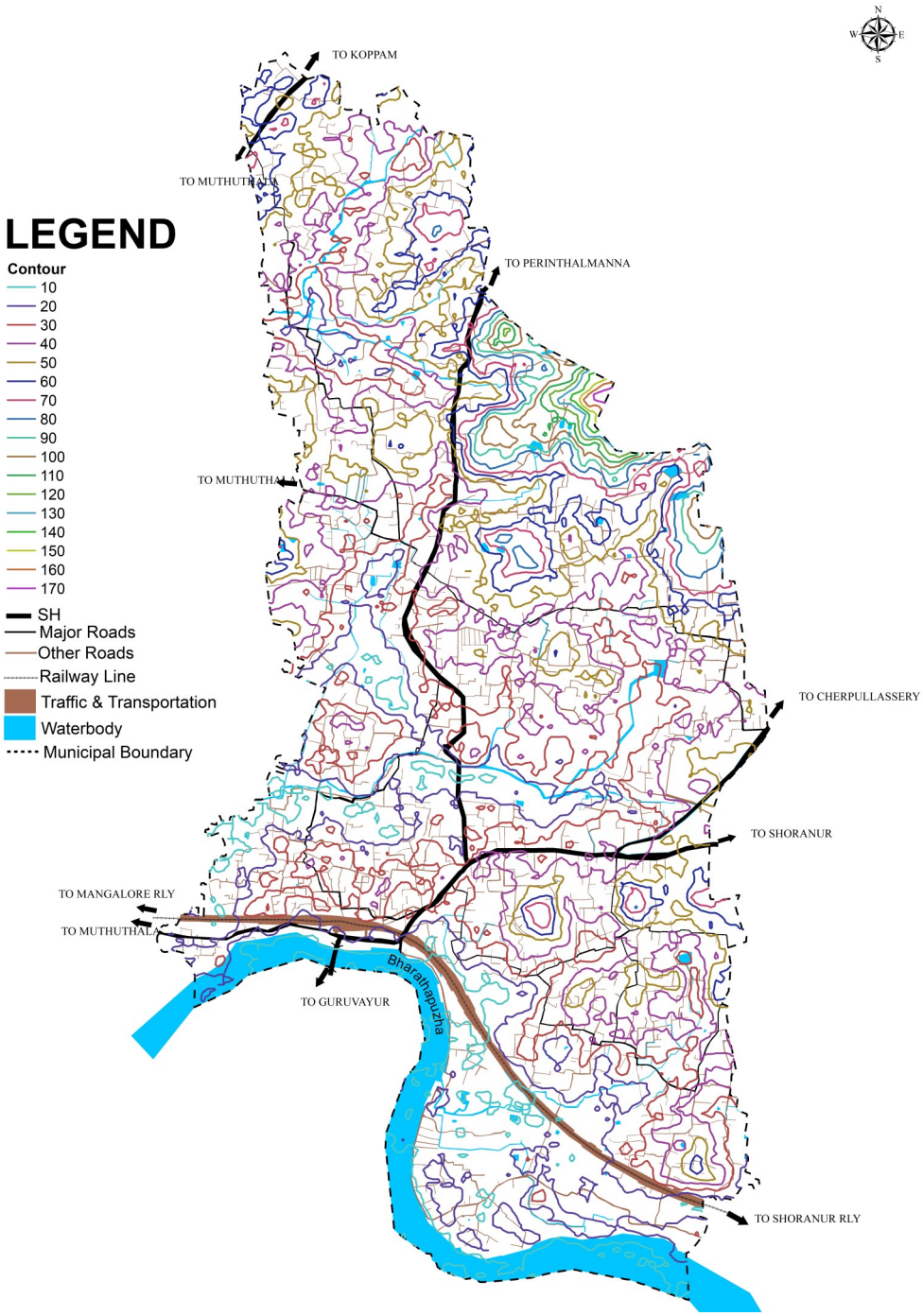


Fig. 2.7 Contour Map of Pattambi Town

Source: https://bhuvan.nrsc.gov.in

Contour map and Digital Elevation Mode (DEM) of Pattambi Town are shown in Fig 2.7 & Fig 2.8 respectively. Pattambi Town is having percentage of slope of 1 to 38% and comes under gently sloping to steep sloping areas (Fig 2.9).

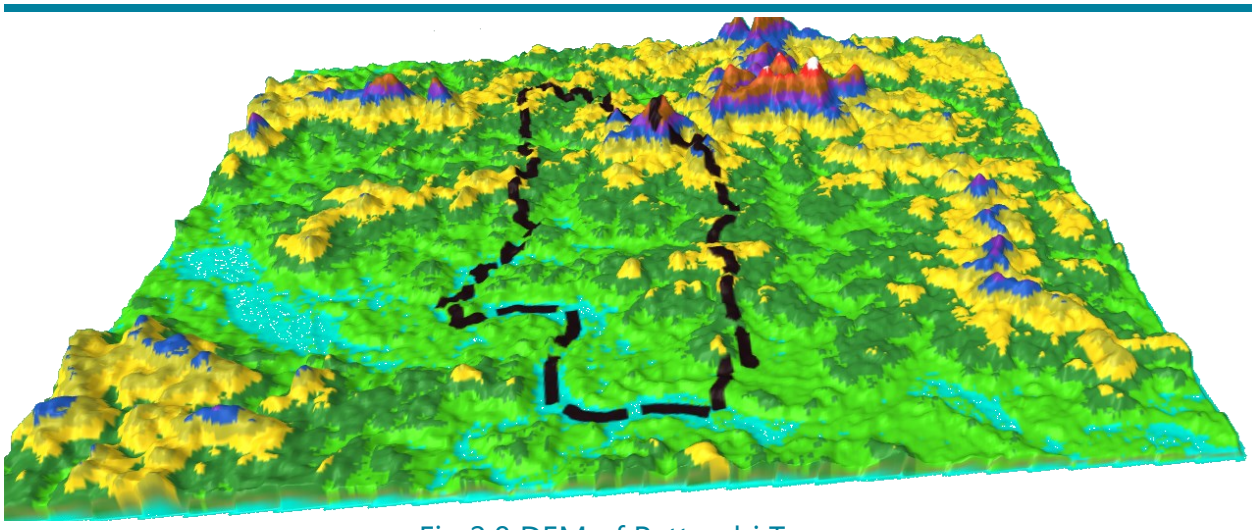


Fig 2.8 DEM of Pattambi Town

Source: https://bhuvan.nrsc.gov.in

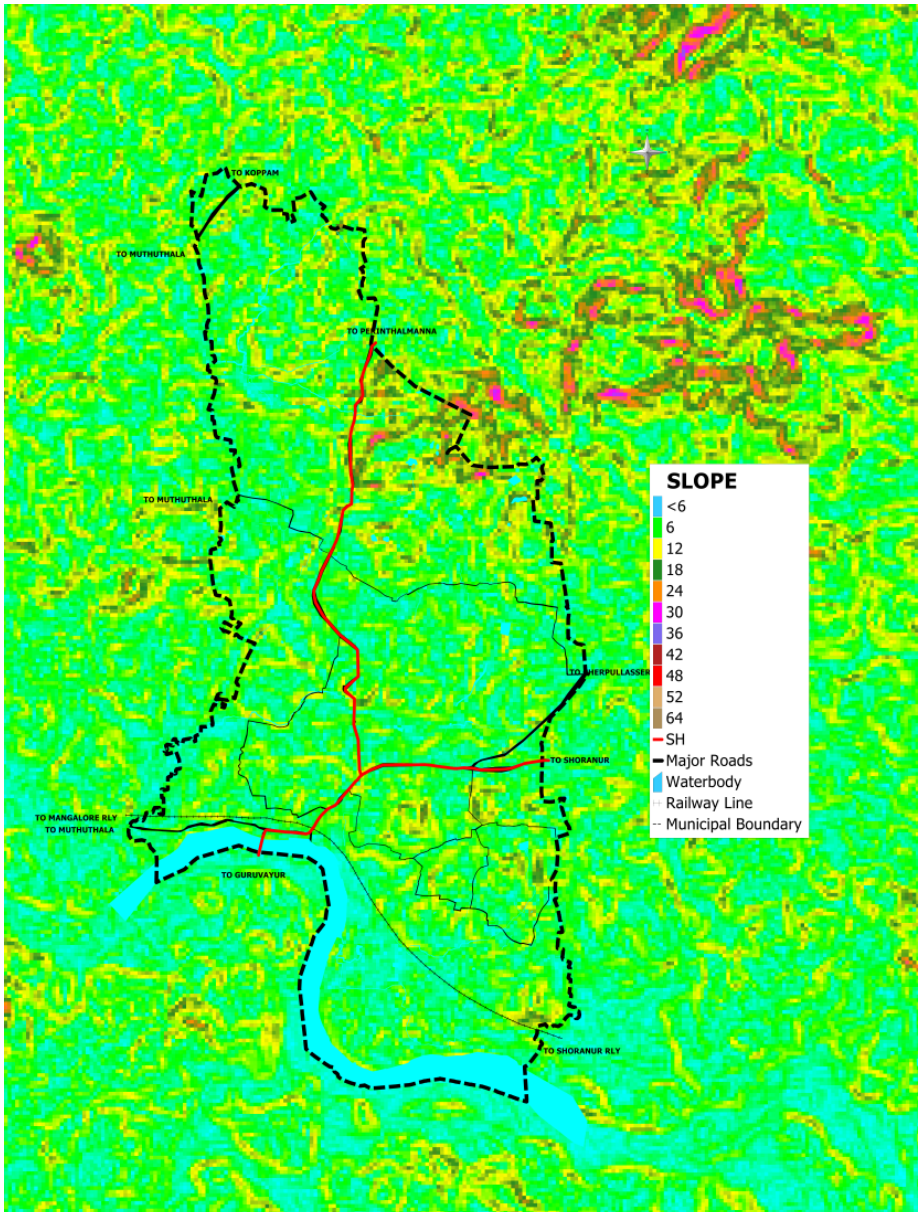


Fig. 2.9 Slope Map of Pattambi Town

Source: https://bhuvan.nrsc.gov.in

2.4.1 Soil

Soil series is the lowest category in soil classification system. Soil profiles similar in differentiating characteristics and arrangement of horizons are grouped and identified as Soil Series. The field study and supplementary soil analytical data are used for the establishment of soil series. The soil series is named after the place where it is identified first. According to Soil Survey Department study, there are 8 major soil series in the district (Fig. 2.10). Kanjikkulam series is the major soil series in the district spread over 35% of geographical area. These are distributed on the central and western parts of Palakkad District. Pattambi area is coming under Kanjikkulam series. These soils are formed from gneissic parent material over laterite. The Kanjikulam series consists of moderately deep to deep sandy clay loam to clay loam soils developed from laterite

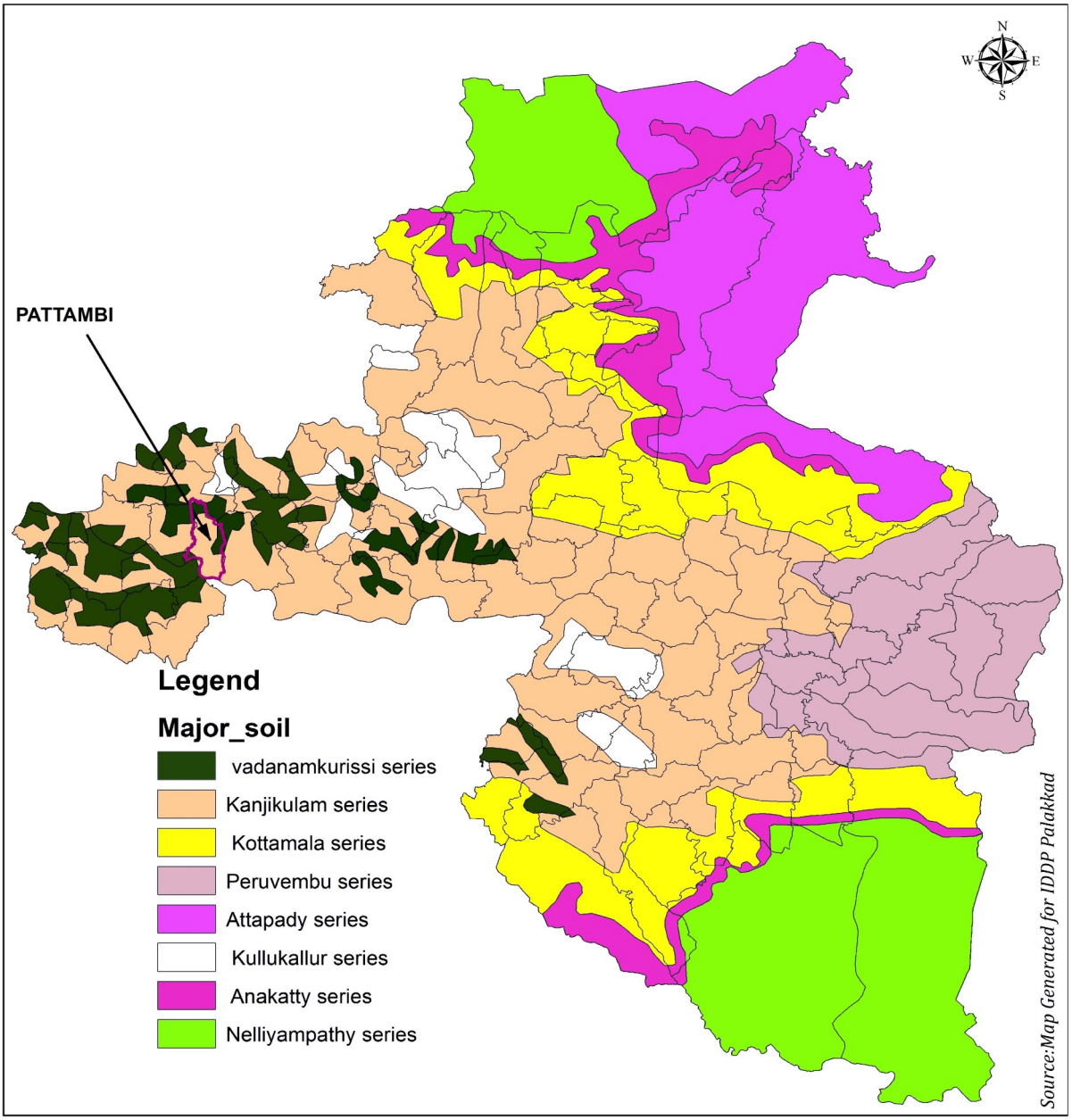


Fig. 2.10 Major Soil Series of Palakkad District

Source: Soil Survey Office, Palakkad

over gneissic parent material. The soils have gravels distributed throughout the profile. These occur on gently sloping to moderately steep sloping lands. They are well drained and having moderate permeability. The soils are excessively gravelly and have yellowish brown to dark reddish brown colour, sandy clay loam to clay loam surface soils and reddish yellow to dark reddish brown, clay loam to clay subsoil layers. Urgent soil conservation measures are to be adopted in Pattambi. All Kanjikulam soil series comprising Pattambi area belongs to the erosion class e2 to e3 having moderate to severe erosion status. The levels of potassium, nitrogen and phosphorus are low to moderate in this soil. As per Census 2011, in Pattambi Undulating Plain region, the soil of this region is

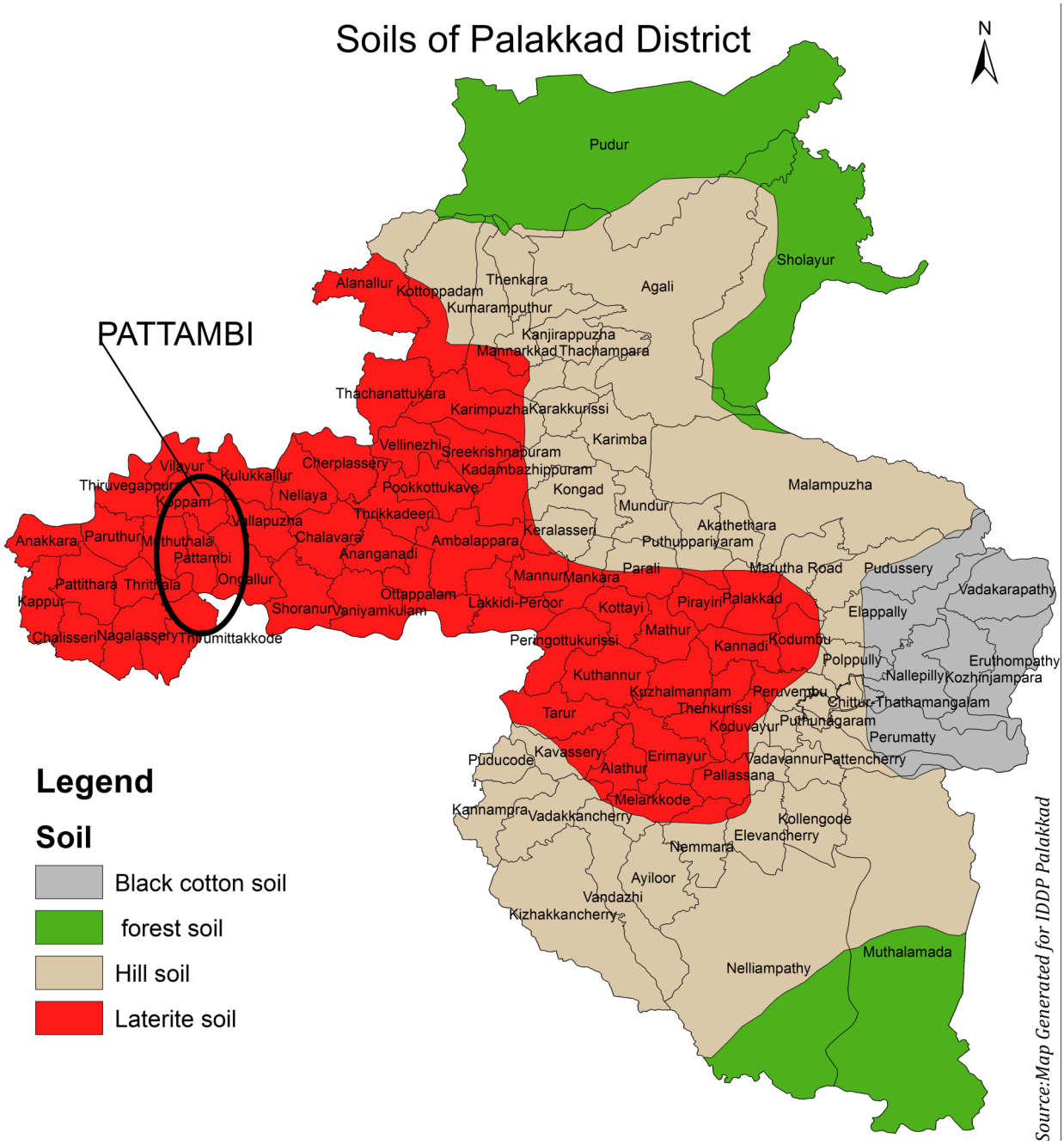


Fig. 2.11 Major Soil of Palakkad District
Source: Soil Survey Office, Palakkad

alluvium and laterite. The soils technically classified as fluvents - tropepts - orthents.

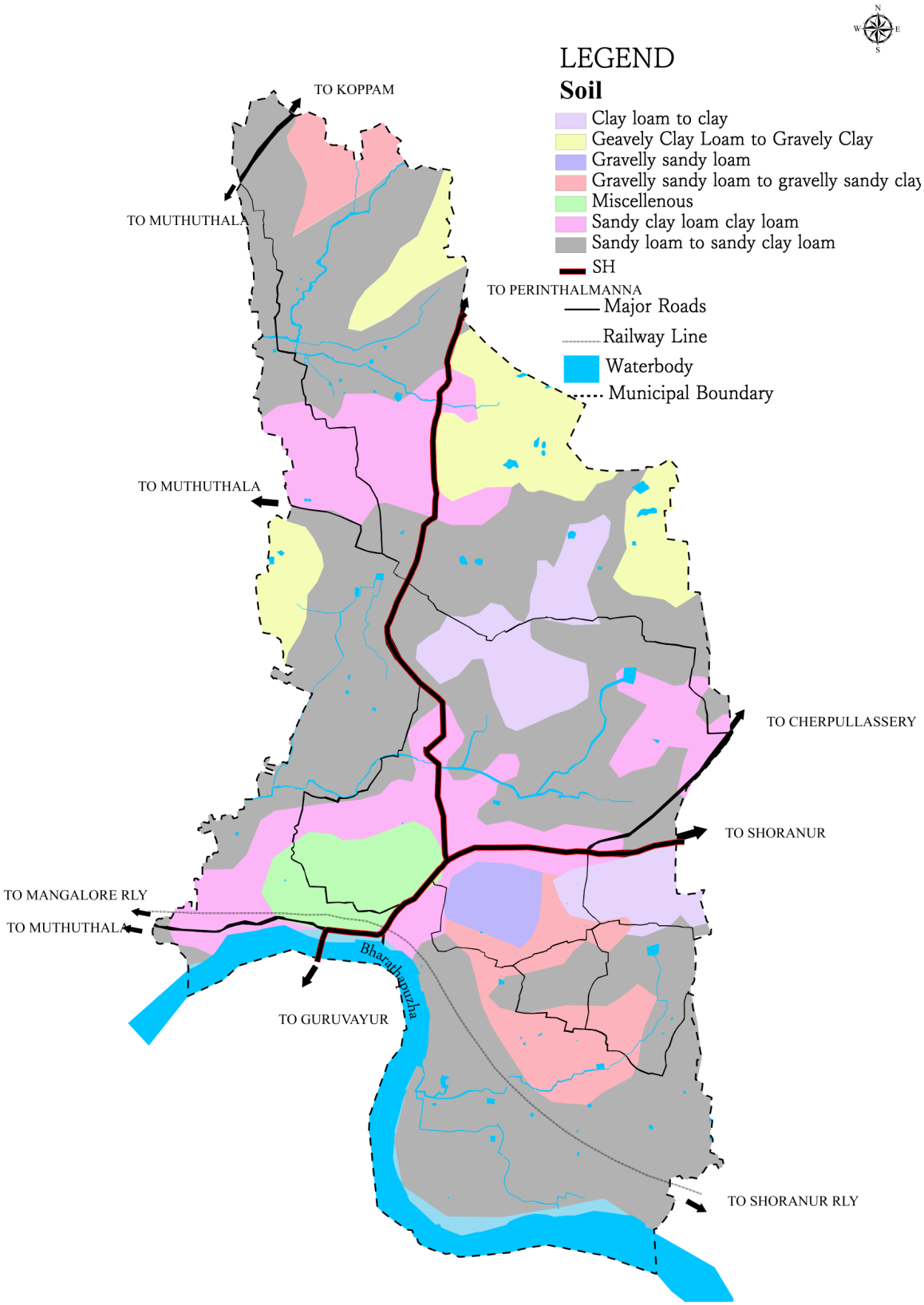


Fig. 2.12 Soil types of Pattambi Town

Source: Kerala State Land Use Board

2.4.2 Geomorphology

Geomorphology means a "discourse of earth landforms" and it is generally defined as a Science of Landforms" which are the products of various exogenetic and endogenetic forces. It is a systematic study of landforms in relation to the climatological, geological and structural aspects. Landforms play a vital role in land resource mapping, terrain evaluation and soil classification in addition to groundwater studies. Geomorphologically the area is classified as Pedi-plane, Plateau and Residual hill (Fig. 2.13). Plateau is the most prominent geomorphic unit occurring in the study area. The weathered thickness is less than 10m, and the topsoil thickness is also less.

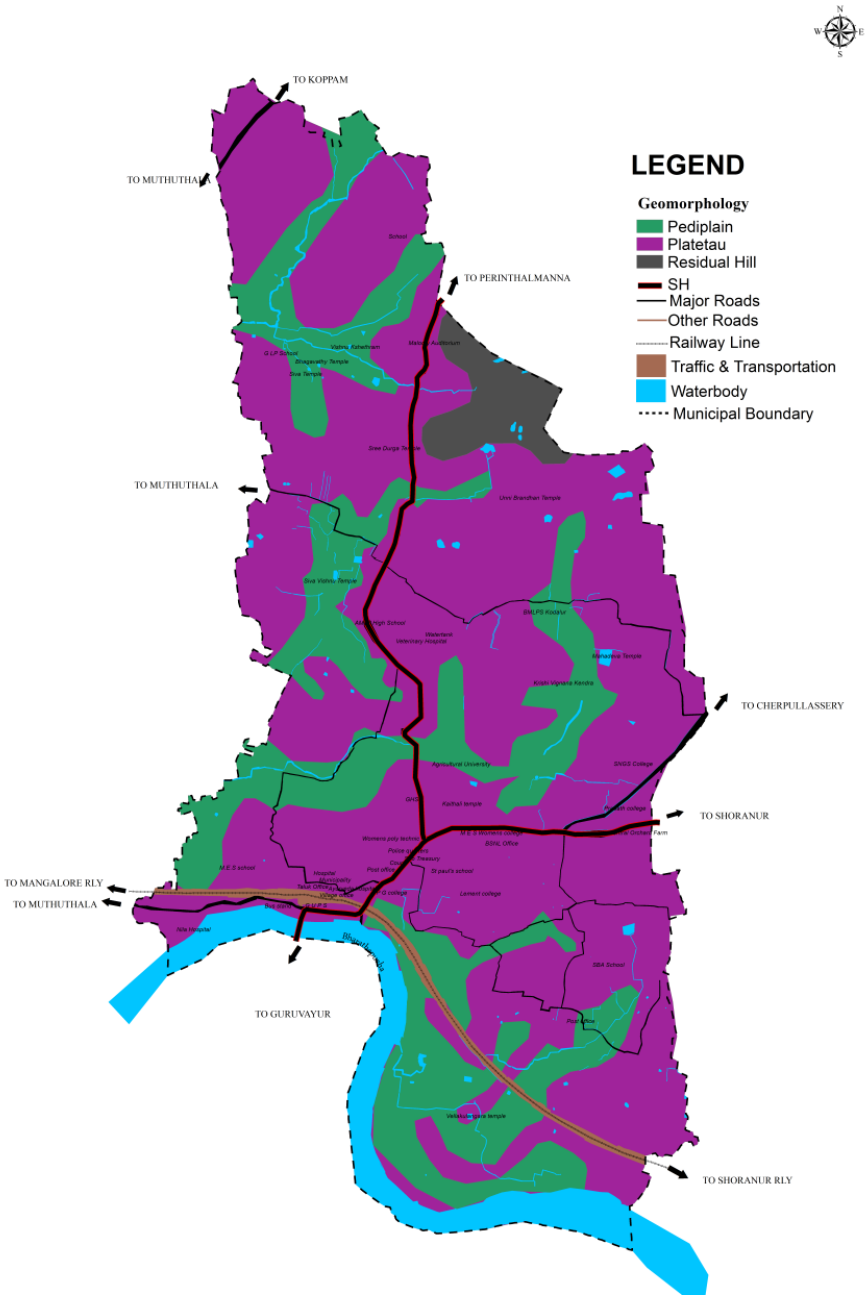


Fig. 2.13Geomorphology of Pattambi Town

Source: Kerala State Land Use Board

2.4.3 Lithology

The lithology of a rock unit is a description of its physical characteristics visible at outcrop, in hand or core. Considering Lithology of Pattambi Town(Fig.2.14), shows rocks having two properties ie. Charnakite and laterite.

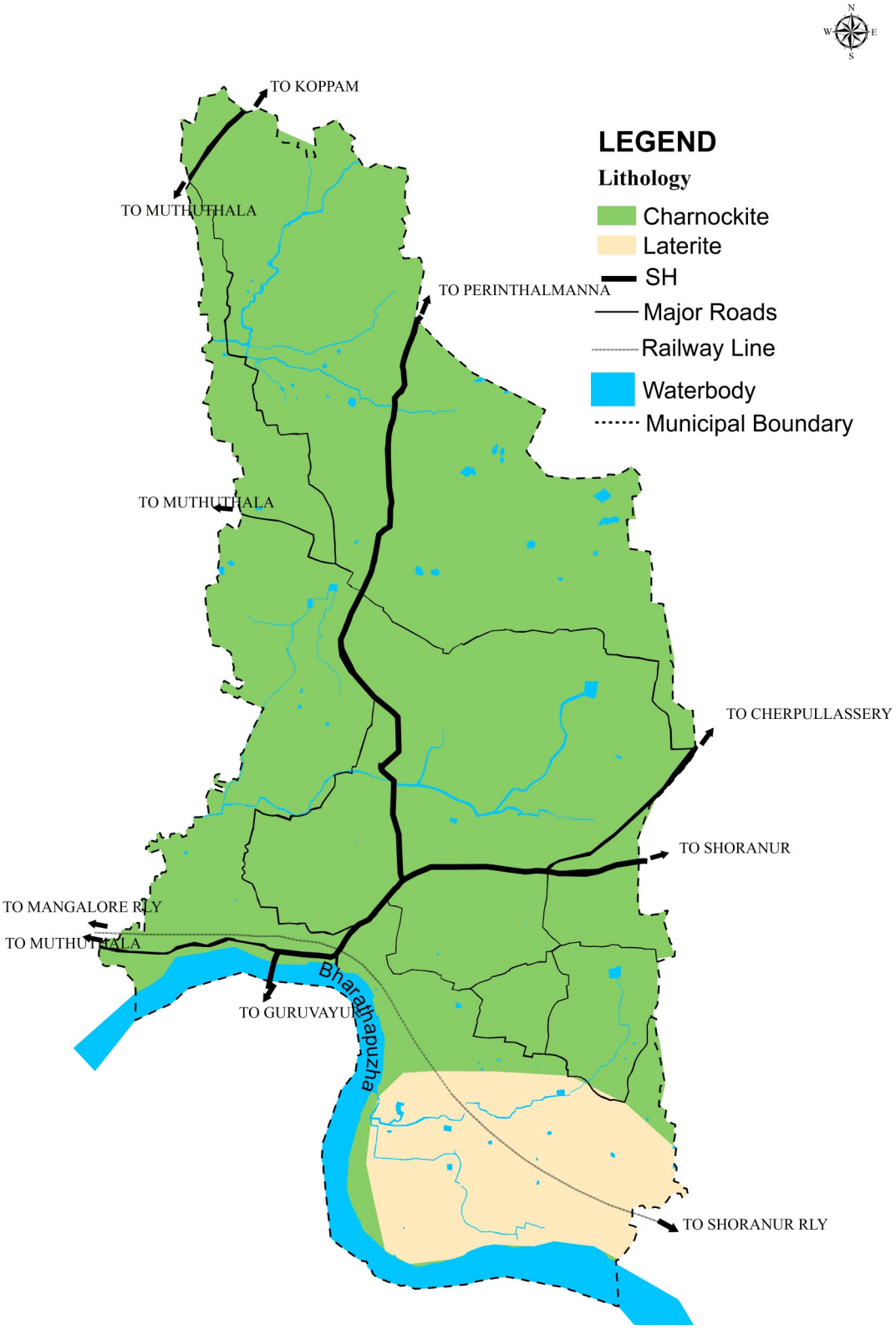


Fig. 2.14 Lithology of Pattambi Town

Source: Kerala State Land Use Board

2.4.4 Geology

The Municipal area is covered with Charnockite group of rocks and migmatite complex rocks. About 80% of the area is underlain by Charnockite group of rocks and remaining area is covered with the migmatite complex (Fig. 2.15)

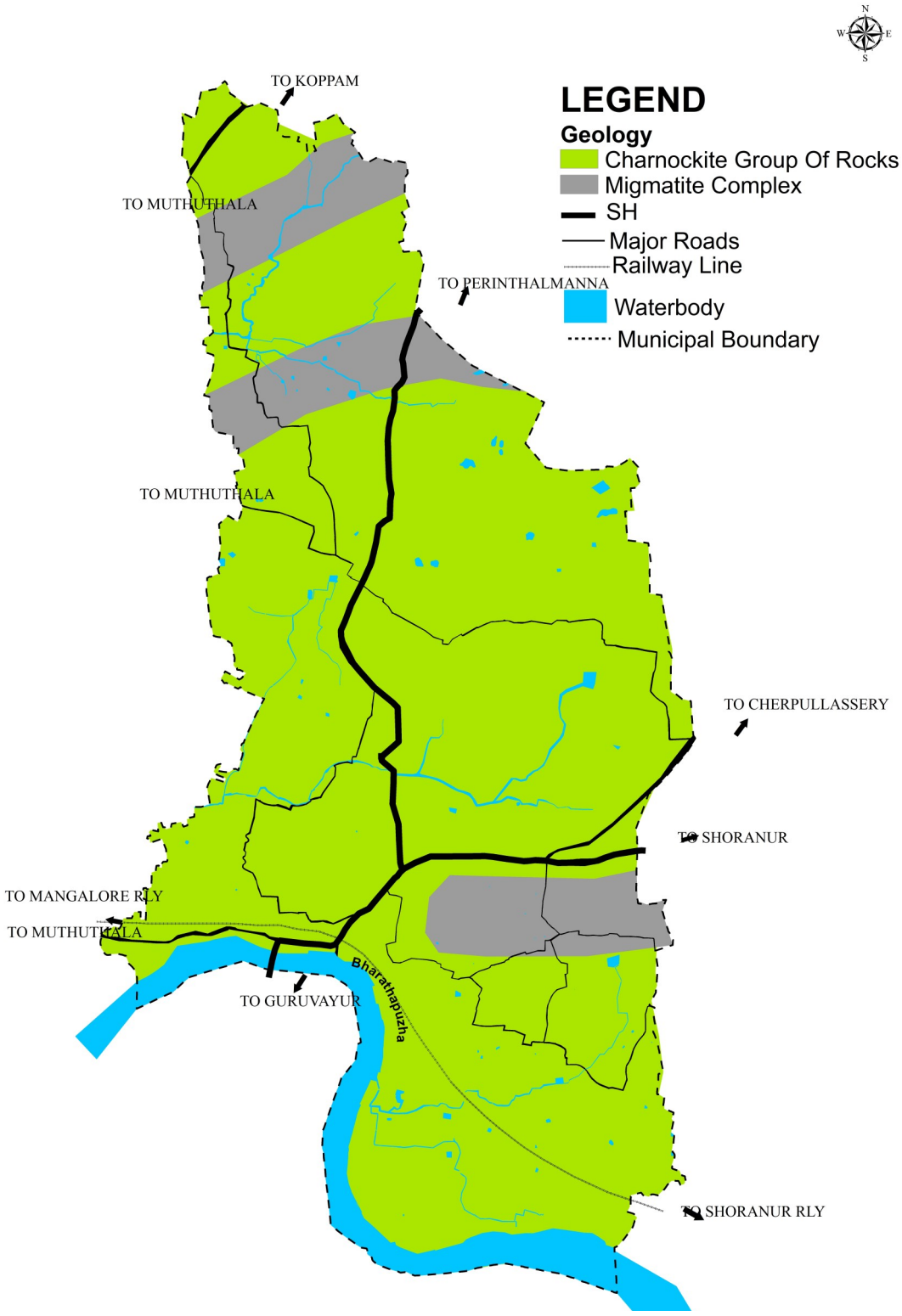


Fig. 2.15 Geology of Pattambi Town

Source: Kerala State Land Use Board

2.5 BIODIVERSITY

The flora of Pattambi is characteristically tropical, owing to the seasonal rainfall and moderate temperature. Some of the dominant trees in the region are Coconut Tree (Cocos Nucifera), Plaintain (Musa Paradisiaca), Mango Tree (Mangifera Indica), Jackfruit Tree (Artocarpus Heterophyllus) and Palm tree. Plain lands are utilised for Paddy cultivation. No animal can be mentioned peculiar to this area. Birds like Crows, Pigeons, Sparrows, Woodpeckers, Myna, Kingfishers, Parrots, etc. are seen in all areas. An exotic species of snail - *Achatina fulica* (African Snail) has become a very serious pest here and measures to control it has not succeeded yet.

2.6 HISTORY/EVOLUTION AND GROWTH

On 1st January 1957, Malabar District trifurcated into three districts viz. Kannur, Kozhikode and Palakkad. Palakkad District thus formed consisted of old Valluvanad Taluk, Palakkad taluk, portion of Ponnani taluk of Malabbar District and Chittur taluk of erstwhile Travancore Cochin state. This section tries to explore the history and evolution of Pattambi Town.

Pattambi was originally part of the Valluvanad Swaroopam dynasty. Valluvanad was an erstwhile late medieval feudal state in present state of Kerala in South India extending from the Bharathapuzha River in the south to the Pandalur Mala in the north during their zenith in the early Middle Ages. On the west, it was bounded by the Arabian Sea at the port Ponnani and on the east by Attappadi Hills. According to local legends, the last Chera ruler gave a vast extension of land in South Malabar to one of their governors, Valluvakkonithiri.

By the late 18th century, Vellatiri or Walluwanad proper was the sole remaining territory of the Walluvanad raja (Valluva Konatiri), who once exercised suzerain rights over a large portion of Southern Malabar. On the cessation of Malabar to the British by Tipu Sultan, Vellaattiri entered into an agreement with the British, and Pattambi became a part of British India. During British rule, the capital of Valluvanad was Perinthalmanna (3km from Angadipuram). Perinthalmanna's importance went up because the treasury, court, sub jail, etc were all located there. On the 21st May 1800, Malabar became a part of Madaras Presidency under the administration of Principal Collector at Calicut.

2.6.1 History of Governance

The history of Pattambi town begins with the formation of the erstwhile Pattambi Panchayath on 7/12/1934 vide GO No 38/36 under the administrative control of Malabar District Board. Consequent to the formation of the states on the linguistic basis under the State Reorganisation Act, 1956, Palakkad District was formed in 1–1–1957 and Pattambi came under the administrative jurisdiction Palakkad District.

From 1957 to 1990 the revenue division exist as a special panchayath. In 1960 Kerala Municipality Act came into effect. The Pattambi Panchayat was converted in to a Municipal town as per GO(P) No 152/2015/LSGD dt 30/4/2015. First electoral body took charge on 1.10.1995. In 1995, there were 10 wards and it was increased to 28 wards in 2015. Pattambi Taluk with Pattambi town as headquarter was formed in 2013 vide GO (P) No 283/2013/RD dt 27/6/2013 comprising 18 villages of erstwhile Ottappalam Taluk.

Different versions are given to the origin of the name of Pattambi. Old name of the region was Nethirimangalam. The name "Pattambi" is believed to be derived from "Batta Nambi" –a local legend who lived in the area. Another myth is that the name "Pattambi" came from the colloquial usage of the word silk by Tamil brahmins those came for silk trade in this area. Another version is related to the malayalam word "Patte Thottambi" referring to the defeat of Tippusultam's army in this area. Another argument is that the name "Pattambi" derived from the "Pattanis" who came for trade here.

2.6.2 History of Development

During the 18th century when Tippu Sultan led the Padayottam, a road was constructed from Palakkad to Ponnani through Pattambi. The first major railway line in Kerala (exceeding 100 km) was the 105 km Pattambi - Podanur stretch started on April 14, 1862 which has given boost to the development of this town. The Pattambi - Mangalore 296km-line was started only in 1907.

"Boards school" which started in the last decade of 19th Centaury was the first authorized educational institution in Pattambi. Another school named "Special School"



Fig 2.16 Malabar District Map

started functioning in 1905, now known as "Govt Mappila L.P. School". A L.P. School started at Maruthur in 1924. During the period of 1940-1955 primary educational institutions were established in Kodallur, Sankaramangalam and Kizhayur.

In 1940, First high school was started functioning by Sri C.P Nair and taken over by Government in 1957. MES School Pattambi had a humble beginning in 1978. The school saw phenomenal growth under the able leadership of Dr. K.P. Aboobacker and other like minded people.Other schools include St. Paul's English Medium High School, CGM English Medium High School, etc.

Neelakanta Sharma, a sanskrit scholar started a Sanskrit school called 'Sarasvatodyothini' here in 1889 and was later upgraded to College. The University of Madras granted affiliation in 1911, and the humble Sanskrit school became "Central Sanskrit College, Permudiyoor, South Malabar". In 1931 it was also approved as a research center. The college was renamed "Sree Neelakanta Central Sanskrit College, Pattambi, Perumudiyoor" in July 1943 by the Madras University in memory of its founder.

The Malabar District Board took over management in 1957. It was affiliated with Kerala University in 1958 as "Sree Neelakanta Government Sanskrit College, Pattambi". The college is presently affiliated with the Calicut University. An agriculture research institute was set up in Pattambi in 1927 and it is one among the earliest such institutes in Malabar region.



Fig. 2.17 Neelakanta Govt. Sanskrit College, Pattambi

First hospital was started in 1958 in a building donated by M E Abdulla haji and later transferred to building donated by E P Brothers in 1970 and the hospital now known as E. P. Achyuthan Nair Memorial Government hospital.

2.6.3 Socio Cultural History

Pattambi was a part of Valluvanad having a prestigious cultural tradition worth mentioning. The green foliage of nature and various art forms play a vital role in attracting thousands to know more about this land. Coming to art forms, Kathakali, Kaikottikali, Thiruvaathirakali, Thumbithullal, Tholppaavakuuthu, Carnatic Music, Melam and Thayambaka (classical percussions) are a part and parcel of every Valluvanadans life. People celebrate festivals in a great spirit and unity and certain arts forms are performed on such special occassion. Religious events like Pooram, Nercha, Vela, Ayyappan Vilakku and other festivals like Onam, Vishu, Id-ul-Fitr, Christmas, etc. are celebrated by all in great spirit and harmony.

Temples of valluvanad add beauty to the land. The paintings and sculptures

found incarnated in old temples can be mentioned as the greatest epitome of talents. People belonging to different communities and religions living in a great peace and harmony is a real beauty to watch. Population of the land is equally shared between the Hindus and the Muslims. Christians are minority in the area. The relation between communities are very good and there is an excellent communal harmony between them.

Pattambi has a rich history of its cultural heritage. Pattambi is the birth place of famous personalities like scholar Punnasseri Nambi Neelakanta Sharma, socialist leader E.P. Gopalan, and local leader Hajee K.P. Assainar Vaidyar. E.M.S. Namboodiripad was elected from Pattambi constituency and Kathakali artiste, Guru. Raghavan Teyunni Nair. Pattambi is also home town for legends of Malayalam Literature Kuttikrishna Marar, Poet P. Kunhiraman Nair, Dr K.N Ezhuthachan, Pulakkat Raveendran, Cherukad and also Great Sanskrit Scholars. - M.P. Sankunni Nair and K.P. Narayana Pisharody.

The town was once the seat of Sanskrit learning and produced many Sanskrit scholars who contributed to the language and literature. Punnasseri Nambi was one of them. Another Sanskrit scholar who tried to revive the Sanskrit education was Neelakanta Sarma. it can proudly boast of a stream of scholars it produced like Kuttikrishna Marar, and others. Malayalam film director Major Ravi and E. Sreedharan (metro rail) also hails from Pattambi.

Socio cultural Festivals

There are a number of places of worship in Pattambi. Some of the important temples are Kaithali Mahadeva temple, Perumudiyur Shiva temple, Panthakkal temple and siva temples at Kizhayur, Sankaramangalam, Vallur and Kodallur and Subramanya temples at Kizhayur, Samkaramangalm and Vallur, Bhagavathy Temple at Vallur etc.

Kaithali Sree Mahadeva Temple (ASI site) carved out in a single mammoth rectangular granite stone, has puzzled experts as the topography has no granite rocks. It is believed to have been built in the 8th century AD during the second Chera dynasty. Traces of Pallava style of architecture can be seen on the semi-finished sanctum sanctorum (Fig. 2.17 & 2.18).

The Padinjare Madham Guruvayoorappan Temple (also known as "Pattambi Guruvaayoor") is another famous temples (Fig. 2.20). The Panthakkal Bagavathy Temple (Fig. 2.19) annual festival is called Mandalathalappoli. In this festival more than 20 elephants are lined up. Sree Kadapparampathu Kavu Bagavathy Temple is one of the famous temples. In the Annual festival Kalavela, more than 50 bulls are lined up.

The most important festival - Pattambi Nercha (Fig. 2.21 & 2.22), is celebrated in February-March every year and people irrespective of caste and religion, take active participation, which is very famous in Valluvanad. Between 70 to 80 elephants are lined



Fig. 2.18 Kaithali Siva Temple, Pattambi



Fig. 2.19 Sivarathri celebration at Kaithali Siva Temple



Fig. 2.20 Panthakkal Bhagavathy Temple, Pattambi



Fig. 2.21 Sree Guruvayurappan Temple, Pattambi

up for the Pattambi Nercha festival which is held in memory of Aloor Valiya Pookunj Koya Thangal, a Muslim saint of South Malabar.

The town is illuminated, and a pageant replete with traditional musical ensembles like 'Panchavadyam' and 'Thayambaka' parades through the town at night. Various art forms of Kerala are then performed on the banks of the river Bharathappuzha. Even though the festival does not have any Islamic or religious significance, it is still celebrated by the society at large.

2.7 LOCAL, SUB REGIONAL AND REGIONAL SETTING

The regional setting of a Town can be arrived from the Regional Plan which spells out hierarchy of the town in the District Scenario, the activity of the town has to perform and its connectivity with different settlements. Local setting with adjacent local bodies is show in fig. 2.23. Sub regional and Regional linkage of the Pattambi town with surrounding district/state and its regional setting within the district are shown in Fig 2.24 and Fig. 2.25.



Fig. 2.22 Pattambi mosque



Fig. 2.23 Pattambi Nercha festival

2.7.1 Regional Connectivity

Pattambi Town is having a good road and rail connectivity to neighboring LSGIs, other parts of the state and to metro cities in India. Pattambi is connected to India's railway network by Pattambi- Podannur Railway line. The railway line link the town to southern parts of Kerala and northern parts of the country. Most of the main line trains operating in Kerala towards Mangalapuram side and Mangalapuram- Chennai pass through Pattambi Railway station.

The Palakkad – Ponnani State Highway No.23 passing through the town connecting 3 districts viz. Thrissur, Malappuram and Palakkad. Palakkad Ponnani road connect the town with District headquarters and Ponnani of Malappuram District.

Pattambi bridge connects Pattambi town to Thrissur District. Cherpulassery road and Perinthalmanna road gives access to Malappuram District and other areas of Palakkad District respectively. Government buses as well as private bus services operate between Pattambi and other major towns such as Thrissur, Palakkad, Guruvayoor,

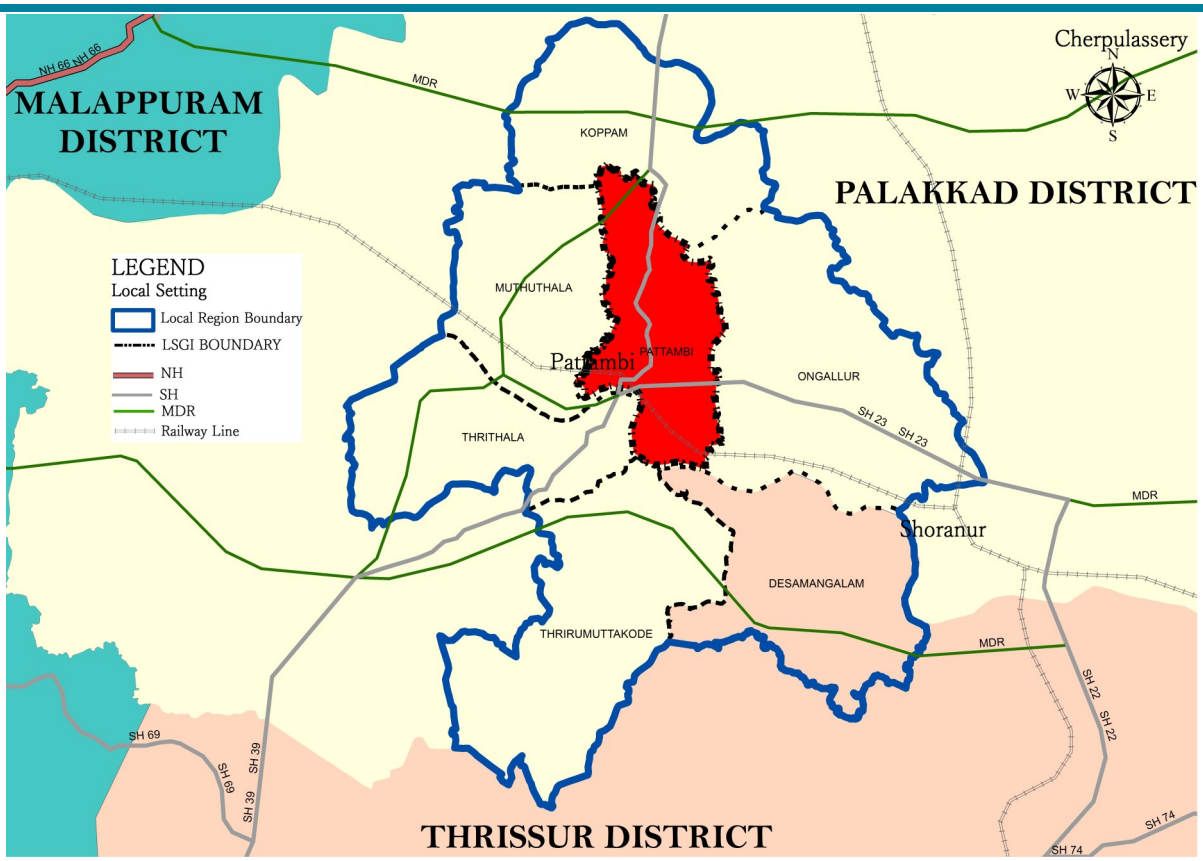


Fig. 2.24 Local Setting of Pattambi Town

Prepared by: LSGD Planning, Palakkad

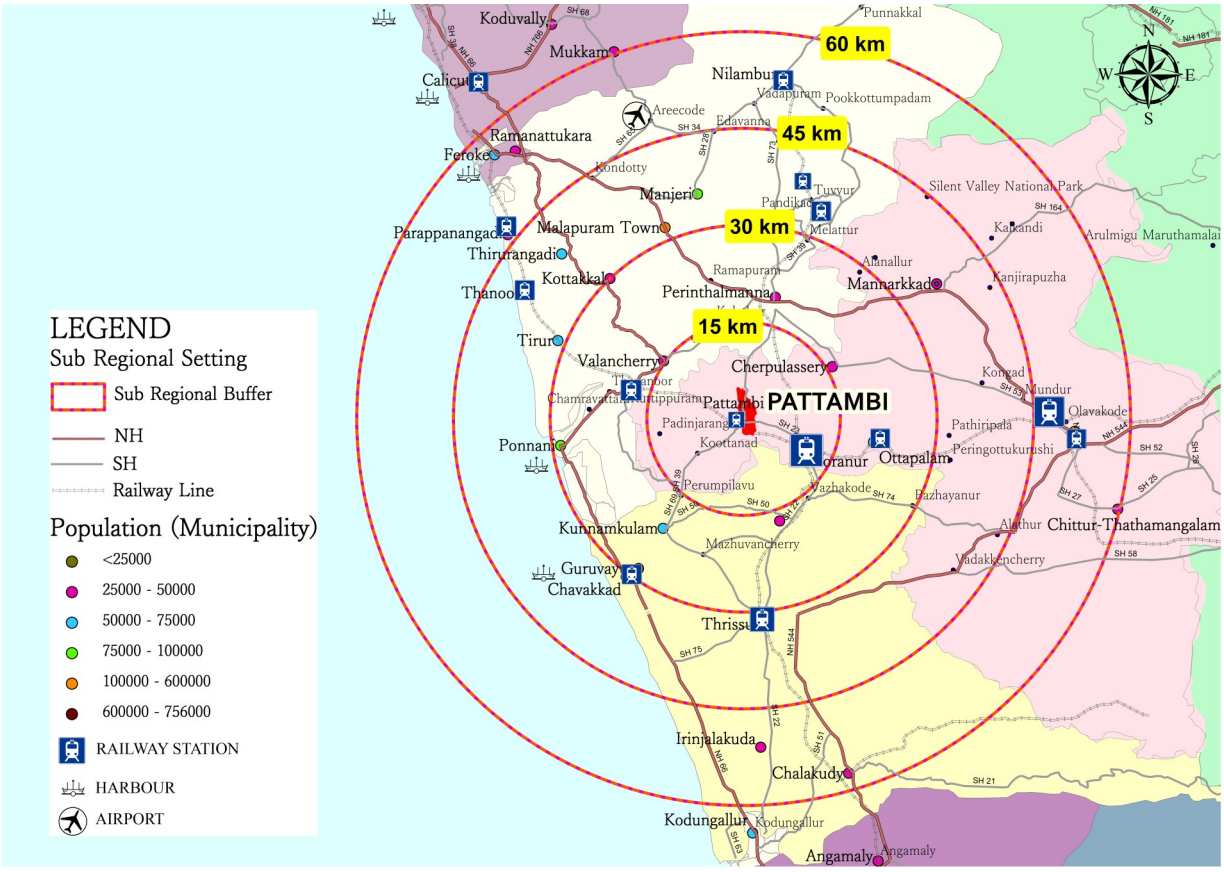


Fig. 2.25 Sub Regional Setting of Pattambi Town

Prepared by: LSGD Planning, Palakkad

Perinthalmanna.

Shornur is the nearest municipality which is situated 16 km south of the town. Thrissur is the nearest corporation situated 31 Km in the south direction. The port town Kozhikode and Kochi are 84 km and 116 km away from the Pattambi town. Coimbatore city the second largest city after Chennai in Tamilnadu located 109 km east of Pattambi.

Nearest airports are Kozhikode - 64 km, Kochi - 90 km, and Coimbatore -109 km. SH 23a Palakkad - Cherrpulasseri - Perinthalmanna road, SH 23b Shornur - Perinthalmanna road, SH 039 Perumbilav - Nilambur road passes through Pattambi Municipality.



Fig. 2.26 Regional Setting of Pattambi Town

Prepared by: LSGD Planning, Palakkad

2.7.2 Hierarchy of Settlements based on District Plan 2017

Hierarchy of settlements is based on the number and order of facilities. As per the settlement analysis of District Plan 2017, the settlements of the district are grouped in to four hierarchies. The Palakkad Municipality is the first order settlement. Alathur, Shoranur are the existing and Mannarkkad, Chittur Thathamangalam are proposed second order settlements. Pattambi is suggested as third order Settlement (Service centre) and supposed to provide third order facilities to the LSGIs in their respective service areas (Koppam, Vilayur, Thiruvegappuram, Anakkara, Kappur, Pattithara, Chalisseri, Thirumittakode). Fig. 2.26 shows hierarchy of settlements of Palakkad district.

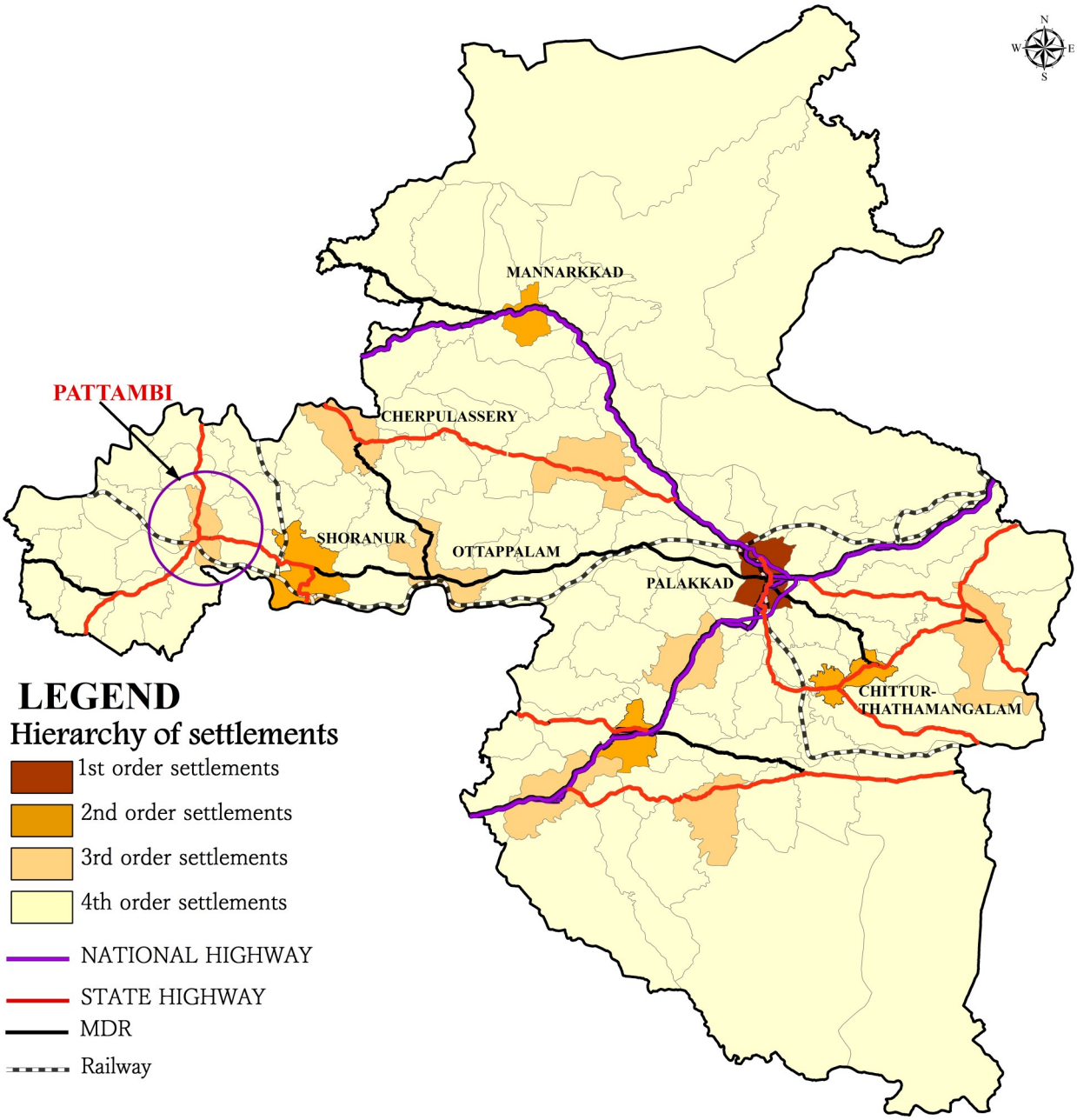


Fig. 2.27 Hierarchy of Settlements

Prepared by: LSGD Planning, Palakkad for IDDP

2.7.3 Hierarchy of nodes

A node is formed by the agglomeration of commercial activity around one or more adjacent road junctions. The hierarchy of node is identified by the extent of activity taking place in the node. As per District Plan 2017 Melepattambi junction in Pattambi Municipality is coming as second order node and service population is taken as approximately 1.5 - 2 lakhs. According to the suggested road network for the district, Pattambi - Palakkad road and Pattambi Muthuthala road are proposed to be widened. Since Pattambi town is one of the four prominent nodes in the region, it is proposed as second order node. It has to cater a population of 3 Lakhs. The hierarchy of nodes of Palakkad district is given in Fig. 2.27.

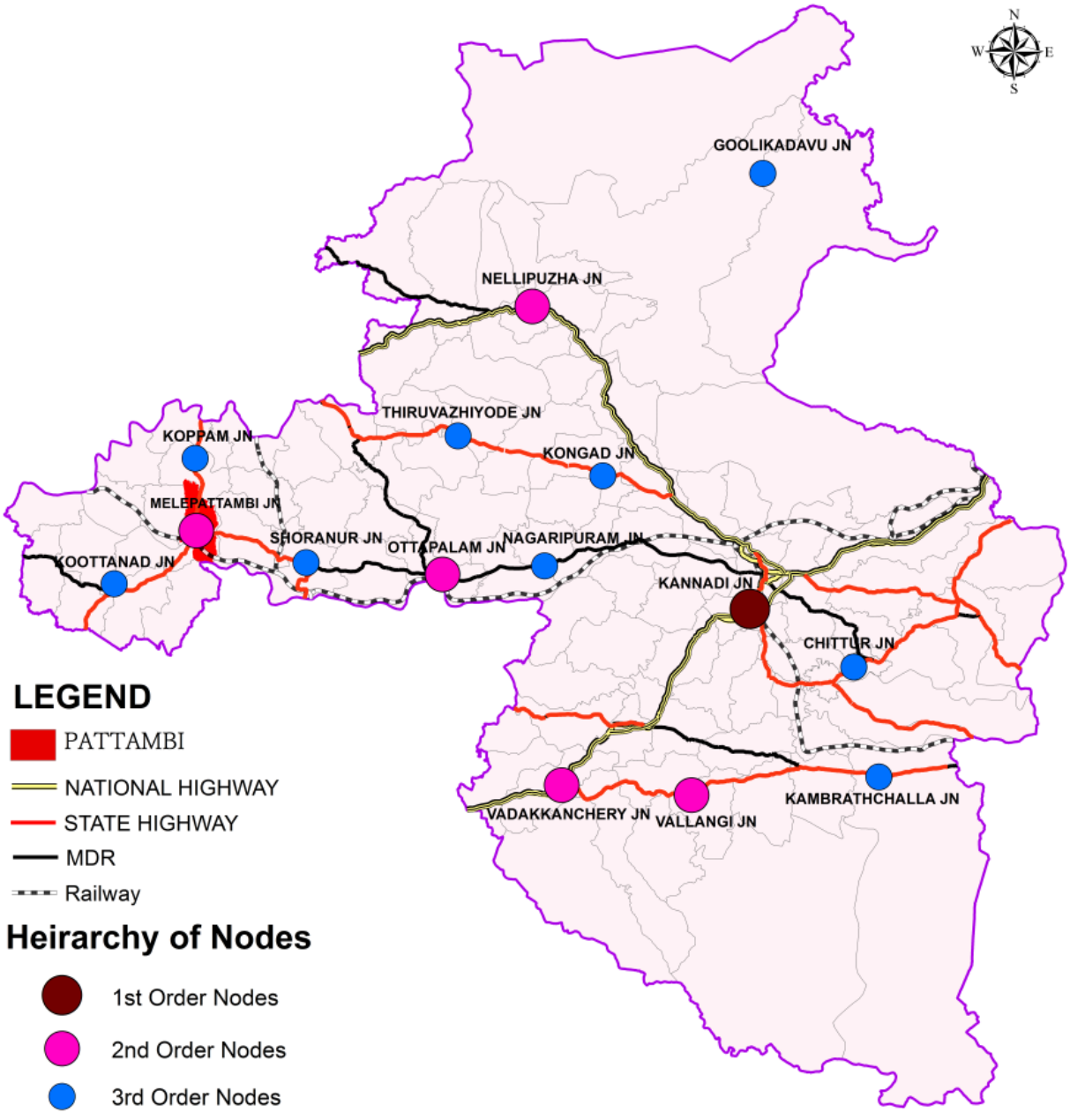


Fig. 2.28 Hierarchy of Nodes (Proposed)

Prepared by: LSGD Planning, Palakkad for IDDP

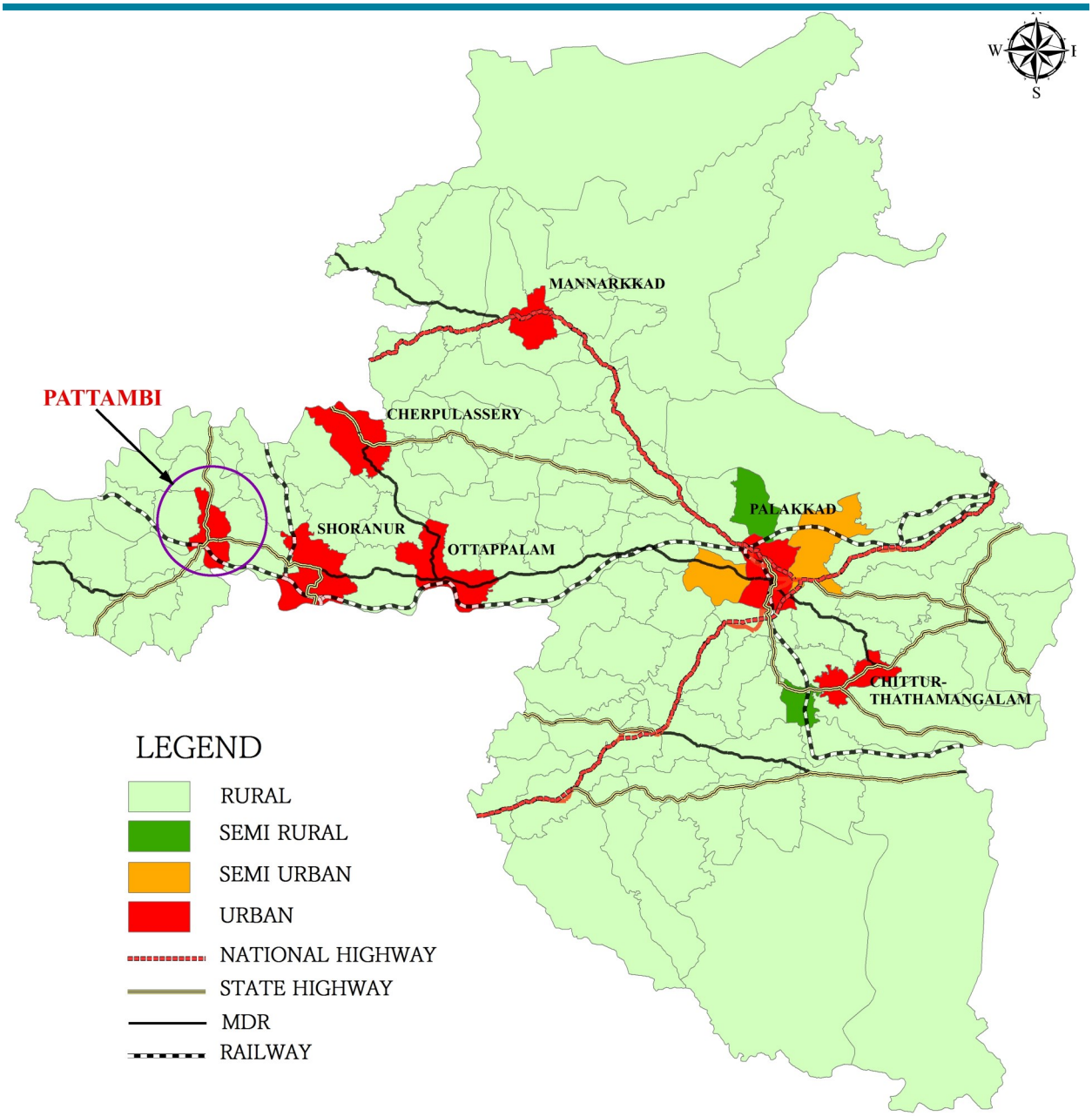


Fig. 2.29 Functional Character

Prepared by: LSGD Planning, Palakkad for IDDP

2.7.4 Functional character

The major activity within the settlement decides the functions of that settlement. Functional character is determined by studying the major function of land use and the average plot size within the settlement. The spatial distribution of the settlements based on its character shows a clear demarcation in the pattern of the settlements in into Urban, Semi Urban, Semi Rural and Rural. An area can be classified as semi-urban, if there exists (or likely to introduce) both urban and rural activities, but the predominant activity is urban. If the predominant activity is rural, it is classified as semi-rural area. Pattambi municipality shows urban character and is shown in Fig. 2.28.

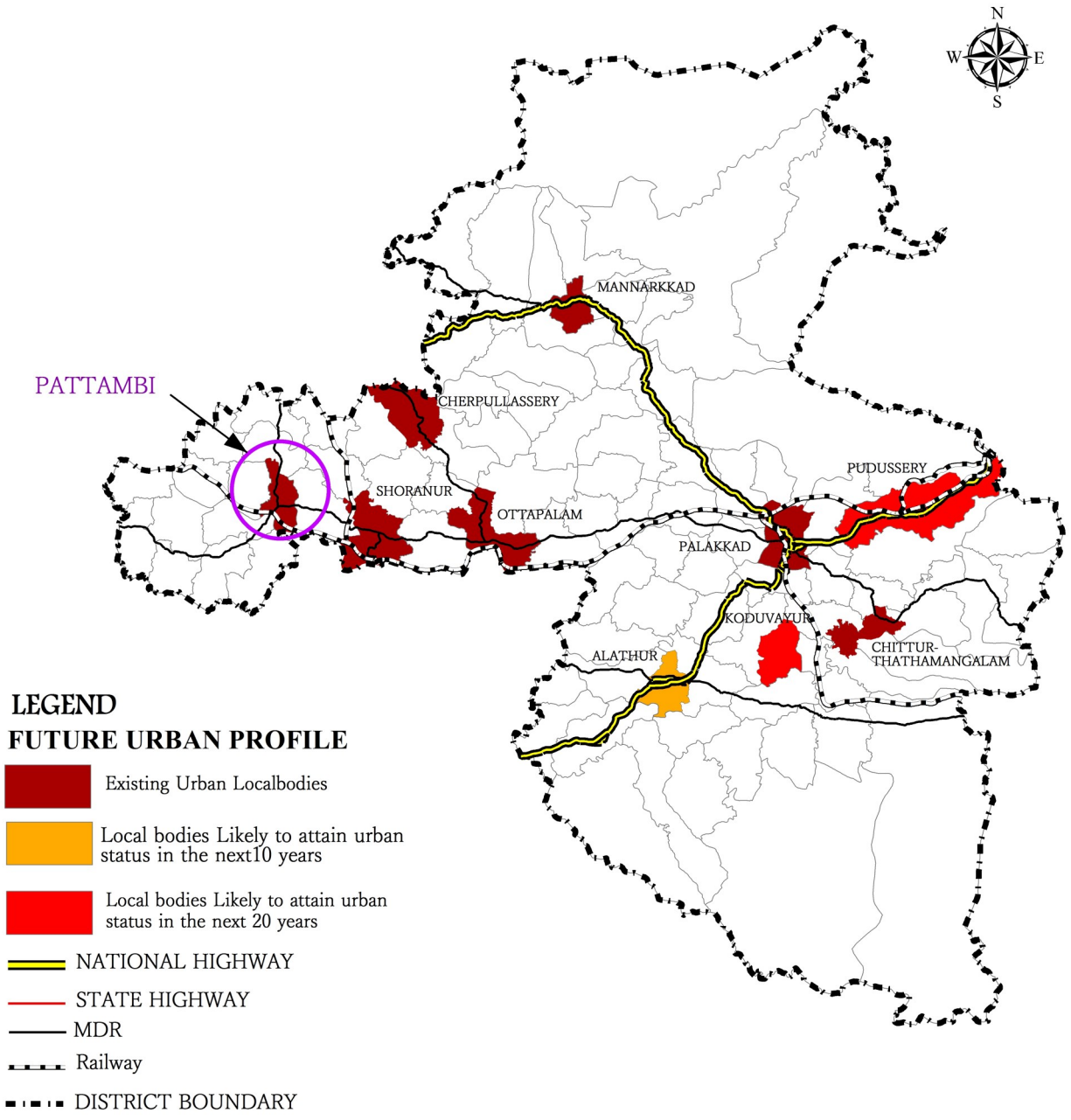


Fig. 2.30 Future Urban Profile

Prepared by: LSGD Planning, Palakkad for IDDP

2.7.5 Future Urban Profile as per District Plan 2017

The future urban profile of the district is derived through sequential analysis of four criteria viz. census data, existing physical and economic development, perspectives in urban development and finally proposed hierarchy of settlement. There are 7 existing urban local bodies (Municipalities) in the District. They are Palakkad, Shoranur, Ottappalam, Chittur - Thathamangalam, Pattambi, Cherpulasseri and, Mannarkkad. Based on the analysis, it is clear that Alathur Panchayath will attain urban character in the next decade. Pudussery and Koduvayur Panchayaths will attain urban status in 2031. The future urban profile of Palakkad district is shown in Fig. 2.29.

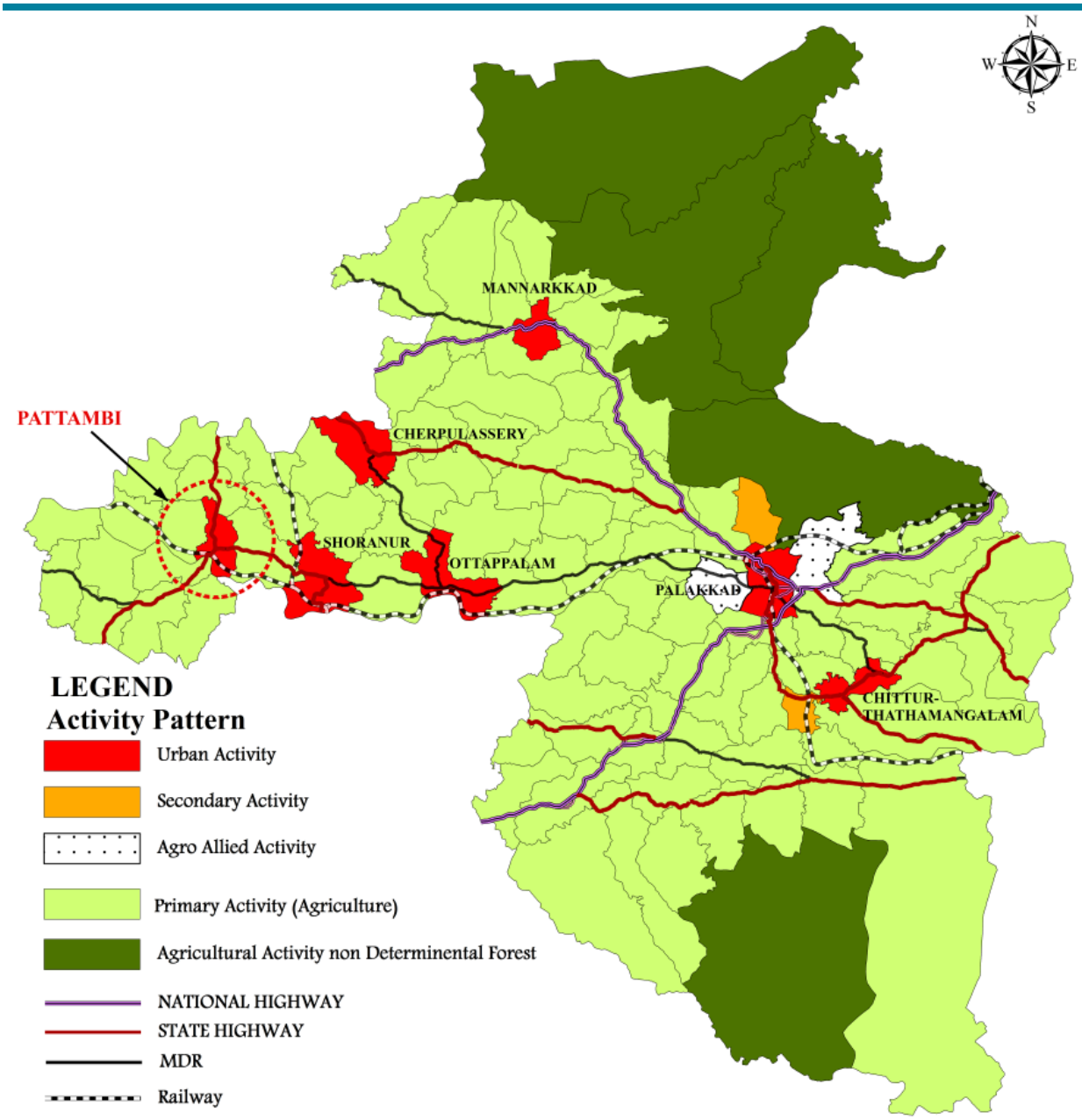


Fig. 2.31 Activity Pattern of District

Prepared by: LSGD Planning, Palakkad for IDDP

2.7.6. Activity pattern

The Activity Pattern of the district is analyzed based on the land use concentration pattern, functional character and future urban profile. The existing activity pattern within the district is derived based on the study of spatial distribution of the aspects covered in the settlement studies.

Accordingly the major activities of the settlements of the district are identified to be urban activity, primary activity, secondary activity, agriculture & allied activity and activity non detrimental to forest. The final activity pattern of the district emerging out by superimposing the activities is shown in fig. 2.30. Pattambi municipality shows the activity pattern as Tertiary.



Fig. 2.32 Development Concept of District as per District Plan

Prepared by: LSGD Planning, Palakkad for IDDP

2.7.7 Development Concept of the District

The spatial structure of the district is evolved by integrating the activity pattern, regional connectivity and hierarchy of settlements. The development goals and objectives of the district were derived based on findings of various studies. The development concept of the district is formulated by synthesis of findings of studies in the orbit of goals and objectives over the district platform. The development concept will provide the required frame work for integrated development of the district.

As per development concept of District Plan (Fig 2.31), Pattambi comes under Multi functional zone (IInd order).

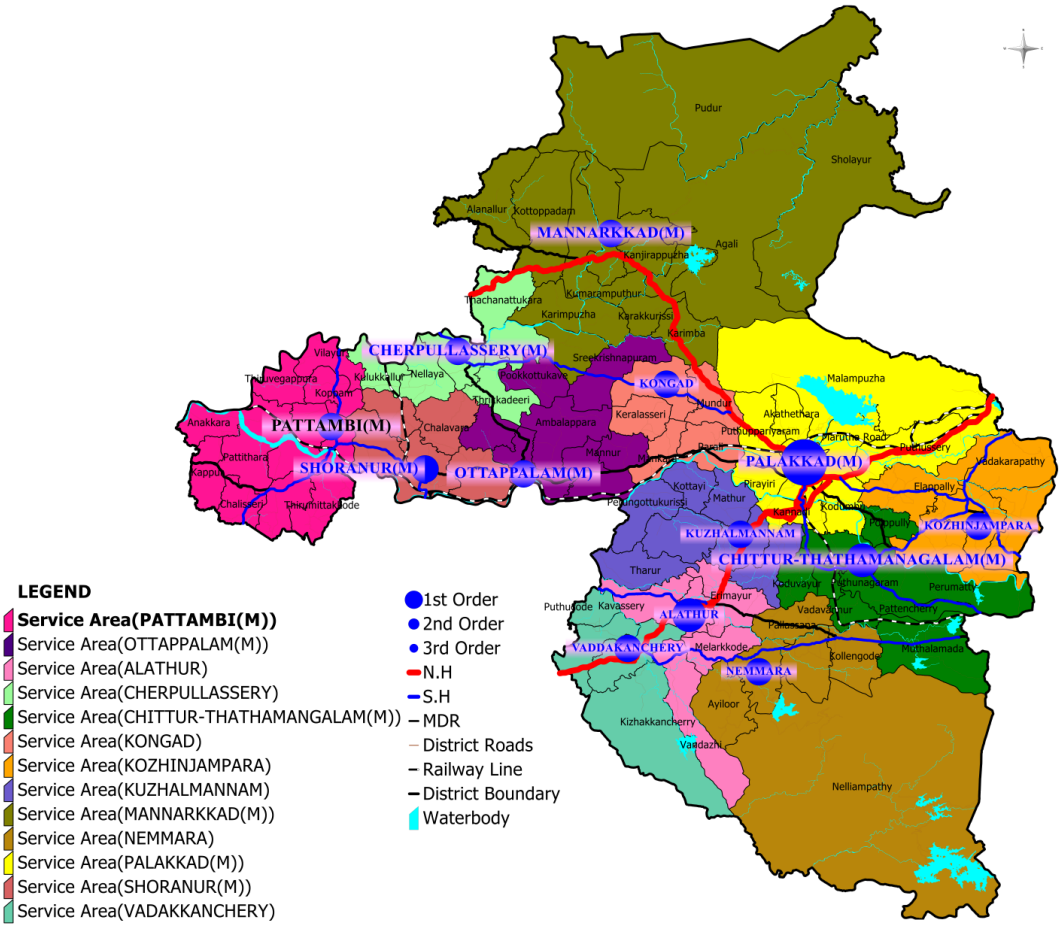


Fig. 2.33 Service area of third order settlements as per District Plan 2017

Prepared by: LSGD Planning, Palakkad for IDDP

Table 2.2 Area and population of LSGIs included in Service area of Pattambi Town.

Sl No	Name of LSGI	Area in Sq Km	Population (2011)	Sl No	Name of LSGI	Area in Sq Km	Population (2011)
1	Pattambi	15.84	28632	8	Parudur	20.71	26638
2	Koppam	25.85	30169	9	Nagalasseri	26.2	27606
3	Muthuthala	19.95	24861	10	Chalisseri	19.2	24238
4	Thrithala	22.78	27796	11	Pattithara	27.2	33157
5	Thirumittakode	32.31	31998	12	Anakkara	20.95	24699
6	Vilayur	17.73	23389	13	Kappur	23.52	31337
7	Thiruvegapura	20.46	33942				

Prepared by: LSGD Planning, Palakkad for IDDP

2.8 SERVICE AREA OF PATTAMBI TOWN

Based on the Hierarchy of Settlements derived out in the "District Plan" Pattambi Municipality comes as one of the eight third order settlements in the district. Service area of Pattambi Municipality includes the following LSG's and its area and population are shown in Table 2.2 and in Fig. 2.32 respectively. The service population of the Pattambi town being a third order settlement in the district is 3,68,462.

2.9 PATTAMBI TOWN AND ITS IMMEDIATE INFLUENCE ZONE

There are five panchayats which surround Pattambi town. The surrounding panchayats are Koppam, Muthuthala, Thrithala, Thirumittakode and Ongallur. Table 2.3. gives the demographic details of the immediate influence zone.

The population of Pattambi and its immediate influence region grew from 116924 persons from 1981 to 186727 persons in 2011 constituting a growth rate of 14.52% during the decade of 1991-2001 and 14.17% during 2001-2011.

Table 2.3 Demographic Details of Immediate Influence Zone

Sl No	Name of LSGI	Area in Sq Km	Population				Population Density				Growth rate		
			1981	1991	2001	2011	1981	1991	2001	2011	1981-1991	1991-2001	2001-2011
1	Pattambi	15.84	18368	22108	24168	28632	1160	1396	1526	1808	20.36	9.32	18.47
2	Koppam	25.85	17764	22286	26277	30169	687	862	1017	1167	25.46	17.91	14.81
3	Muthuthala	19.95	14954	18491	21496	24861	750	927	1077	1246	23.65	16.25	15.65
4	Thrithala	22.78	19296	22312	25537	27796	847	979	1121	1220	15.63	14.45	8.85
5	Thirumittakode	32.31	21431	25855	28510	31998	663	800	882	990	20.64	10.27	12.23
6	Ongallur	31.68	25111	31755	37555	43271	793	1002	185	1366	26.46	18.26	15.22

Source : Census 1981, 1991, 2001, 2011

Table 2.4 Activity pattern of Pattambi Town and surrounding LSGI's

S.l No.	Name of LSGI	Urban Profile	Functional Character	Land use Concentration	Activity Pattern
1	Pattambi	Urban	Urban	Urban	Tertiary Activity
2	Ongallur	Non Urban	Rural	Agri	Primary Activity (Agri)
3	Koppam	Non Urban	Rural	Agri	Primary Activity (Agri)
4	Muthuthala	Non Urban	Rural	Agri	Primary Activity (Agri)
5	Thrithala	Non Urban	Rural	Agri	Primary Activity (Agri)
6	Thirumittakode	Non Urban	Rural	Agri	Primary Activity (Agri)

Prepared by: LSGD Planning, Palakkad for IDDP

Fig. 2.33 shows a pictorial representation of Activity Pattern of Pattambi Town and surrounding local bodies. From these data, we get a clear view of the tertiary character of Pattambi Town. All the neighboring LSGI's fall under primary activity zone. It can be seen that the immediate surrounding settlements show rural nature. Hence the planning area for Master plan was confined to Pattambi Municipal area.

The analysis of Regional linkage of the town with surrounding District/State and Regional setting of the town within the district based on the "Integrated District Development plan" clearly points out the fact that the Pattambi municipality is well connected with surrounding District/State, Airport, Port, tourist spots, growth centers within the district by road and rail network. The analysis also reveals the fact that the Pattambi

Municipality has to function as Taluk head quarter and as a third order settlements, the town has to perform the function of an urban centre with due consideration to service sector activity.

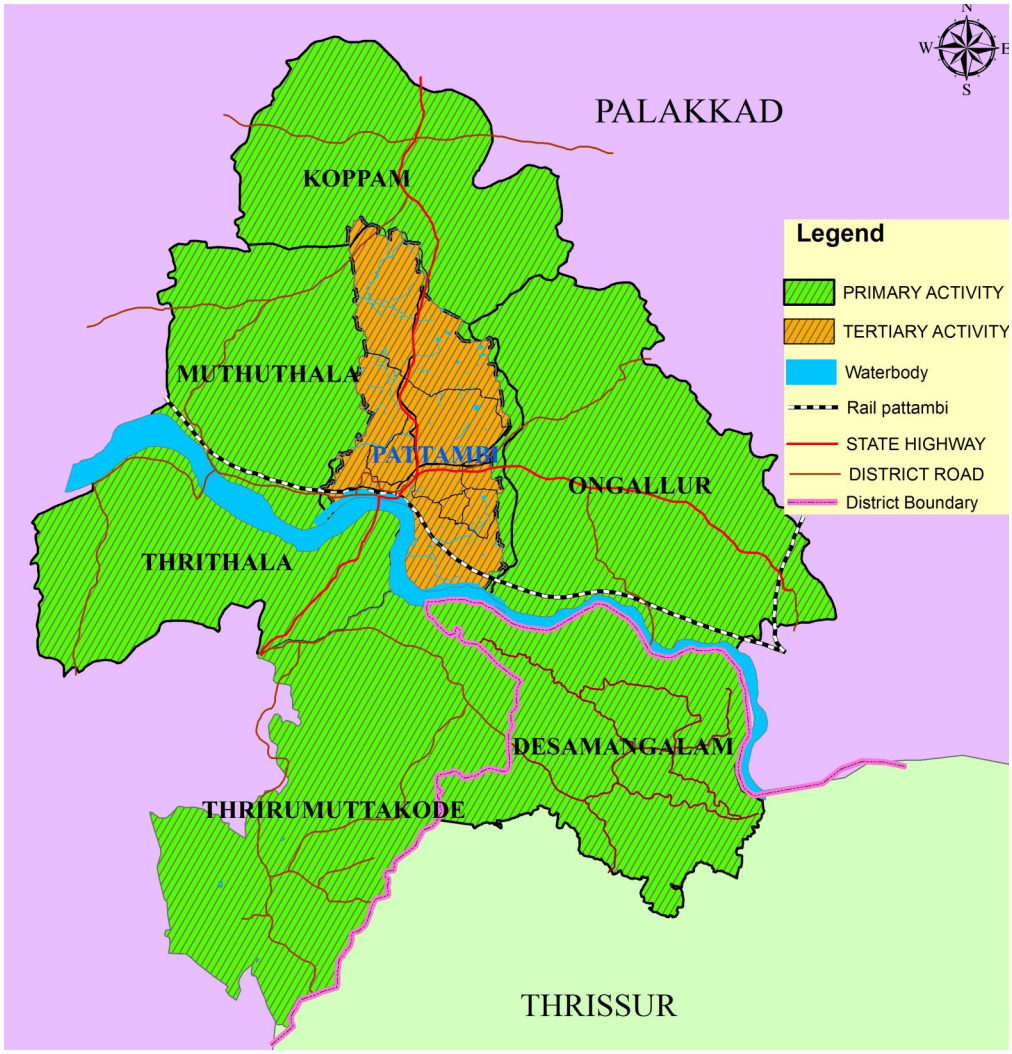


Fig. 2.34 Activity Pattern

Prepared by: LSGD Planning, Palakkad for IDDP

2.10 INFERENCE

Based on the Hierarchy of Settlements derived out in the District Plan 2017 for Palakkad, Pattambi Town is one of the third order settlements in the district. The service population of the town being a third order settlement in the district is 3,68,462. Hence development of Pattambi Municipal area with more improved infrastructural facilities and job opportunities are required to satisfy the needs of the increasing population. Since none of the neighbouring LSG's show urban character, the Master Plan area is delineated to be the Pattambi Municipal Area.

3

Demography

3. DEMOGRAPHY

Demography is the science of populations, seek to understand population dynamics by investigating three main demographic processes: birth, migration, and ageing (including death) which illustrate the changing structure of human populations.

3.1 POPULATION AND ITS GROWTH PATTERN

The Census of 2011 place Kerala's population at 3,34,06,061 persons which includes 1,60,27,412 males and 1,73,78,649 females. Although Kerala accounts for only about 1.2% of the total area of India, it contains about 2.76% of the country's total population. Among the States of India, Kerala stands at 12th position in terms of population.

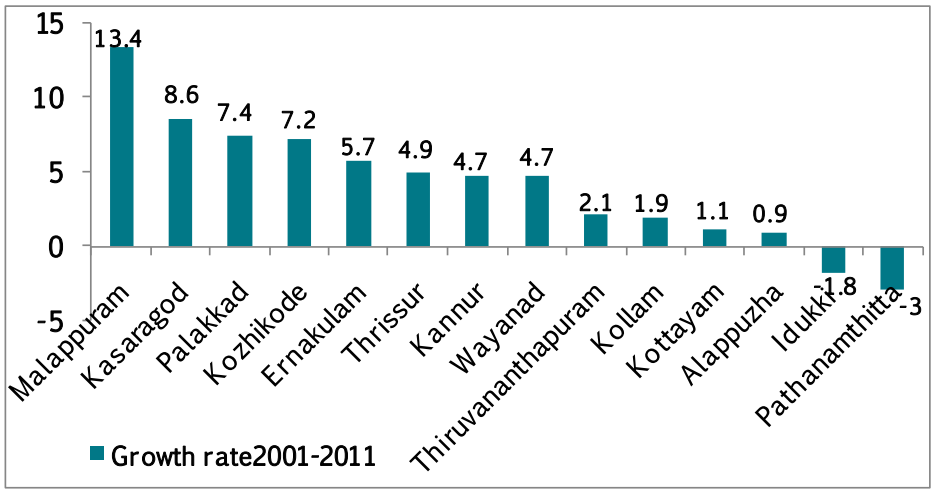


Fig. 3.1 Population growth rate 2001-2011 all Districts and Kerala state

Source: Census 2011

The population of Palakkad district as per Census 2011 is 28,09,934 persons consisting of 13,59,478 males and 14,50,456 females, which accounts for 8.41% of the total population of Kerala. In terms of area, the district with an area of 4,480 sq. km amounts to 11.53% of the area of the state and is the largest district of Kerala. Population growth rate of 2001-2011 of all districts and Kerala State is shown in Fig. 3.1 and Decadal variation of total population of Palakkad District is shown in Fig. 3.2.

The population of Pattambi Town is 28,632 as per Census 2011 which includes 14,049 males and 14,583 Female. It constitutes 1.02% of District population. The town has a total geographical area of 15.84 sq. km that shares 0.35% of total district area. Decadal total and gender wise population of Pattambi Town is shown in the Table 3.1. Temporal variation of total decadal and gender wise Population of Pattambi Town is shown in Fig. 3.3.

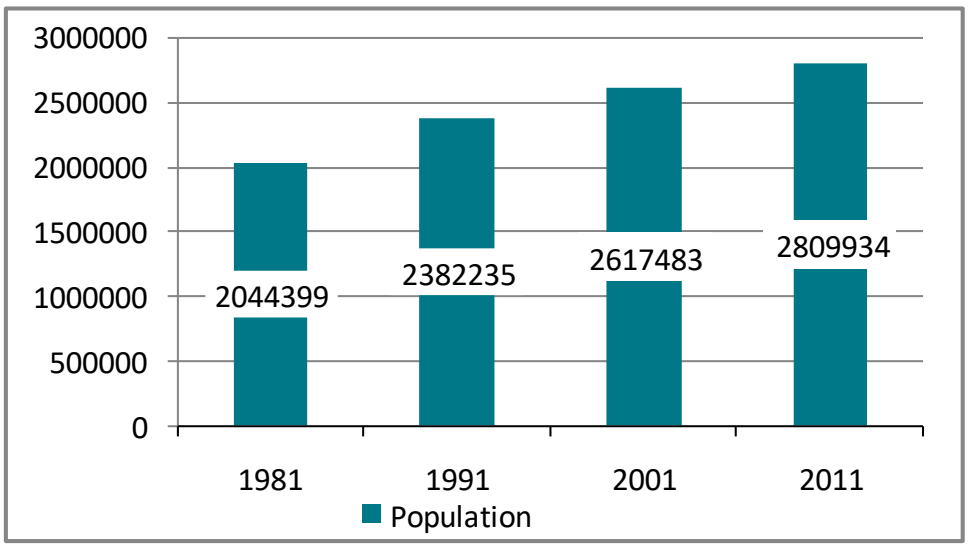


Fig. 3.2 Decadal variation of total population of Palakkad District

Source: Census 1981, 1991, 2001, 2011

Table 3.1 Decadal total and gender wise population of Pattambi Municipality

Year	Male	Female	Total
1971	7,035	7,336	14,371
1981	8,887	9,481	18,368
1991	10,641	11,467	22,108
2001	11,569	12,599	24,168
2011	14,049	14,583	28,632

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

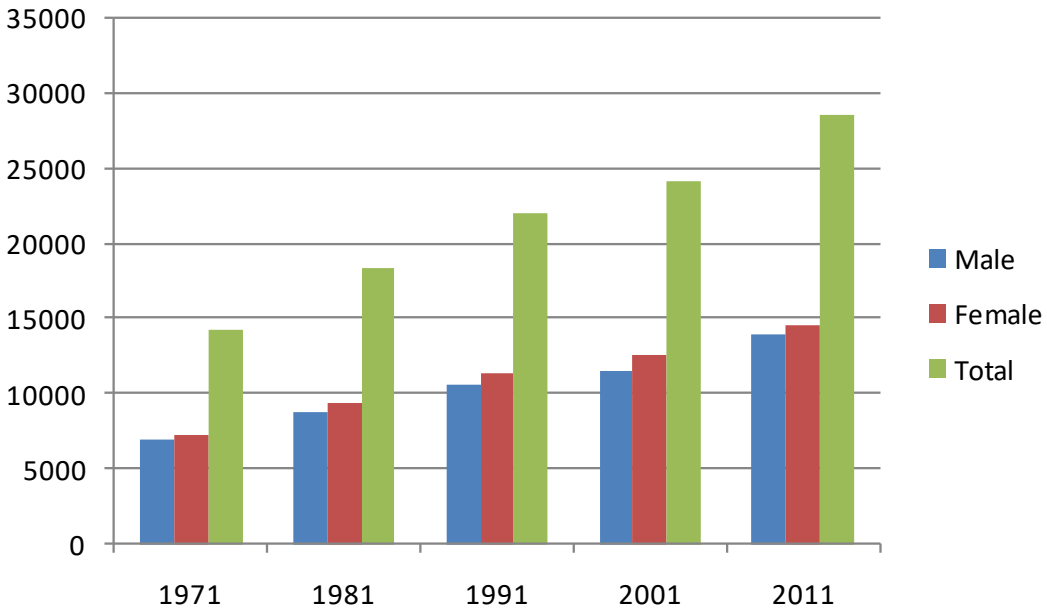


Fig. 3.3 Temporal variation of total decadal and gender wise Population of Pattambi (M)

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

Mannarkkad, Cherpulasseri & Pattambi are the three newly formed municipalities in the year 2015. Mannarkkad Municipality is formed comprising Mannarkkad Panchayat and ward nos 15, 16 of Thenkara Gramapanchayat and Cherpulasseri Municipality is formed comprising Cherpulasseri Panchayat and ward nos 14, 15, 16 of Thrikkadeeri Gramapanchayat and Pattambi Municipality is same as Pattambi Gramapanchayat.

Fig. 3.4 shows comparison of population of Pattambi Municipality with other municipalities (Census 2011). Population data of other two municipalities viz., Mannarkkad and Cherpulasseri were not available in census 2011 data as they were formed in 2015, their population were calculated adding population of newly included areas from nearby Panchayath. Palakkad municipality is having the highest population in the district with a population of 1,31,019 persons followed by Ottappalam and Shoranur Municipalities with 53,755 and 43,533 persons respectively. Pattambi is 5th in position in the district.

Table 3.2 Decadal total population of Urban LSGIs in Palakkad District

Sl. No.	Name of Municipality	Area in sq km	1991	2001	2011
1	Palakkad	26.6	1,23,289	1,30,767	1,31,019
2	Ottappalam	32.66	44,186	49,242	53,755
3	Shoranur	32.28	39,550	42,029	43,533
4	Chittur - Thathamangalam	14.71	32,048	31,886	32,298
5	Pattambi	15.84	22,108	24,168	28,632
6	Mannarkkad	14.09	24,973	28,592	31,738
7	Cherpulasseri	31.88	30,490	34,593	39,241

Source: Census 1991, 2001, 2011

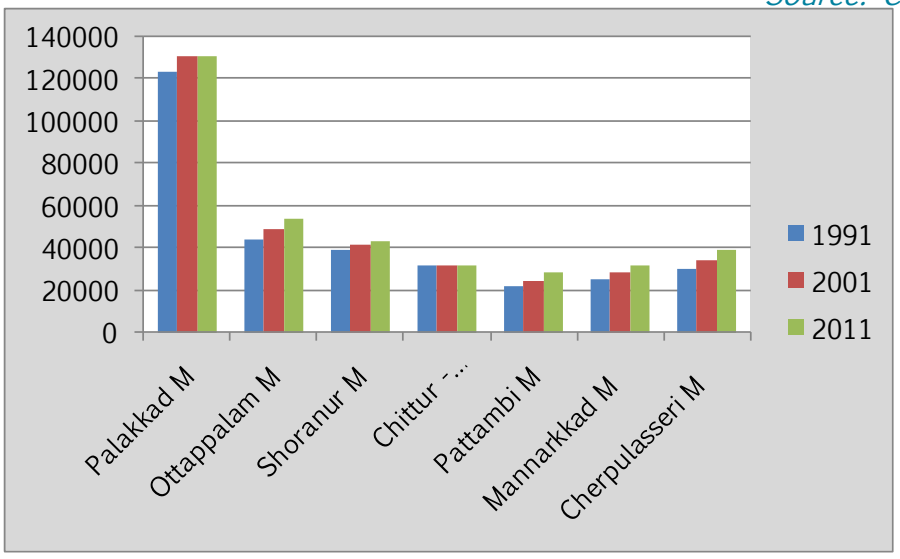
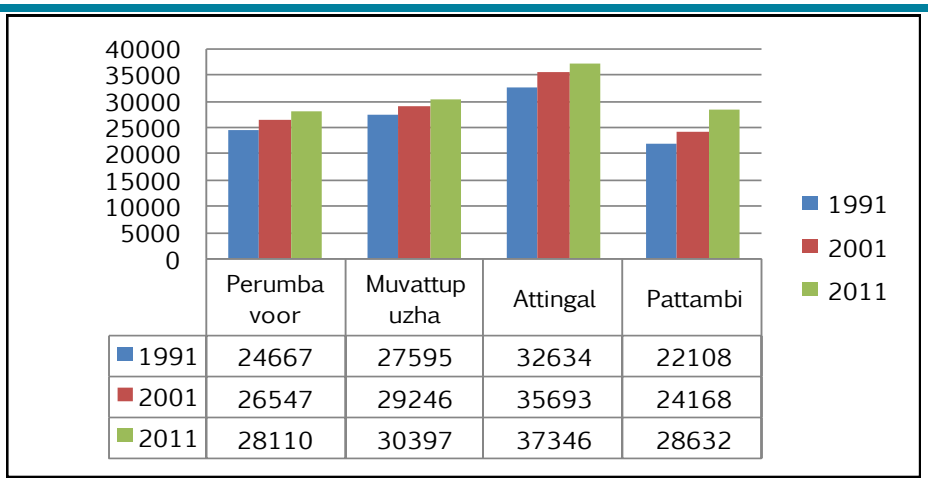


Fig. 3.4 Comparison of temporal variation of total decadal Population of Pattambi with other municipalities in District



	Perumbavoor	Muvattupuzha	Attingal	Pattambi
1991	24667	27595	32634	22108
2001	26547	29246	35693	24168
2011	28110	30397	37346	28632

Fig. 3.5 Population comparison with similar Towns

Fig. 3.5 shows comparison of population of town with towns having similar population growth pattern as of Pattambi Town. Population comparison with nearby local bodies is shown in fig. 3.6 while comparing population of nearby local bodies, Pattambi is having lesser population than Ongallur, Koppam, and Thirumittakode Panchayaths. The population of Muthuthala Grama panchayath is lowest and Ongallur Panchayath is highest.

Table 3.3 Comparison of temporal variation of total population of Pattambi

Name of LSGI	1971	1981	1991	2001	2011
Pattambi Municipality	14731	18368	22108	24168	28632
Ongallur GP	19825	25111	31755	37555	43271
Koppam GP	14546	17764	22289	26277	30169
Muthuthala GP	12119	14954	18491	21496	24861
Thrithala GP	14801	18476	22312	25537	27796
Thirumittakode GP	18059	21431	25855	28510	31998

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

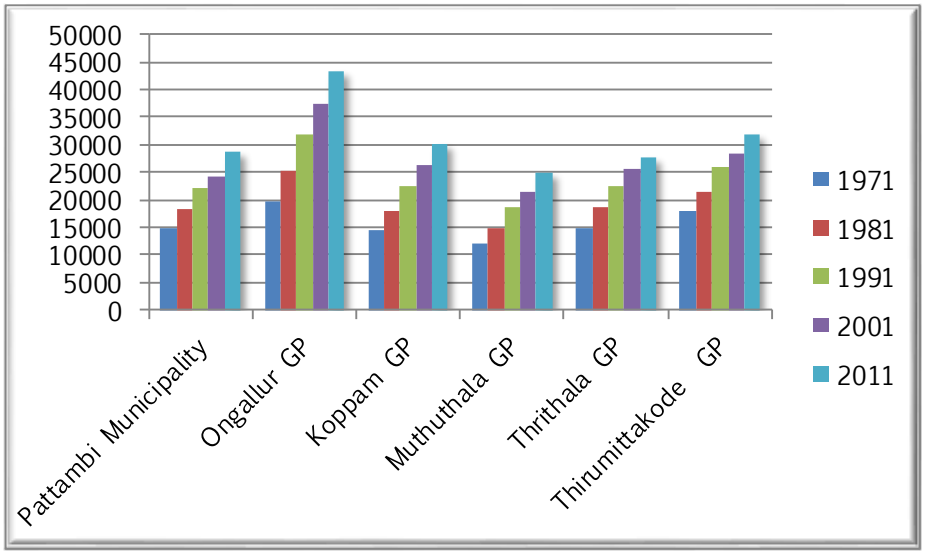


Fig. 3.6 Population comparison with nearby LSGIs

3.2 SPATIAL DISTRIBUTION OF POPULATION

The ward wise spatial distribution of population in Pattambi Municipality is shown in Fig. 3.7. From the table 3.4 we can see that the wards Vallur East (2), Kodalur Centre (5), Chorakunnu (9), Kaithali (21) which lies along the SH have higher population. Lower population is at wards Louly (15), Kalappara (4) and Vallur Centre (28) and in these wards where more lands are used for agricultural purpose. Table 3.4 shows ward wise population of Pattambi Municipality.

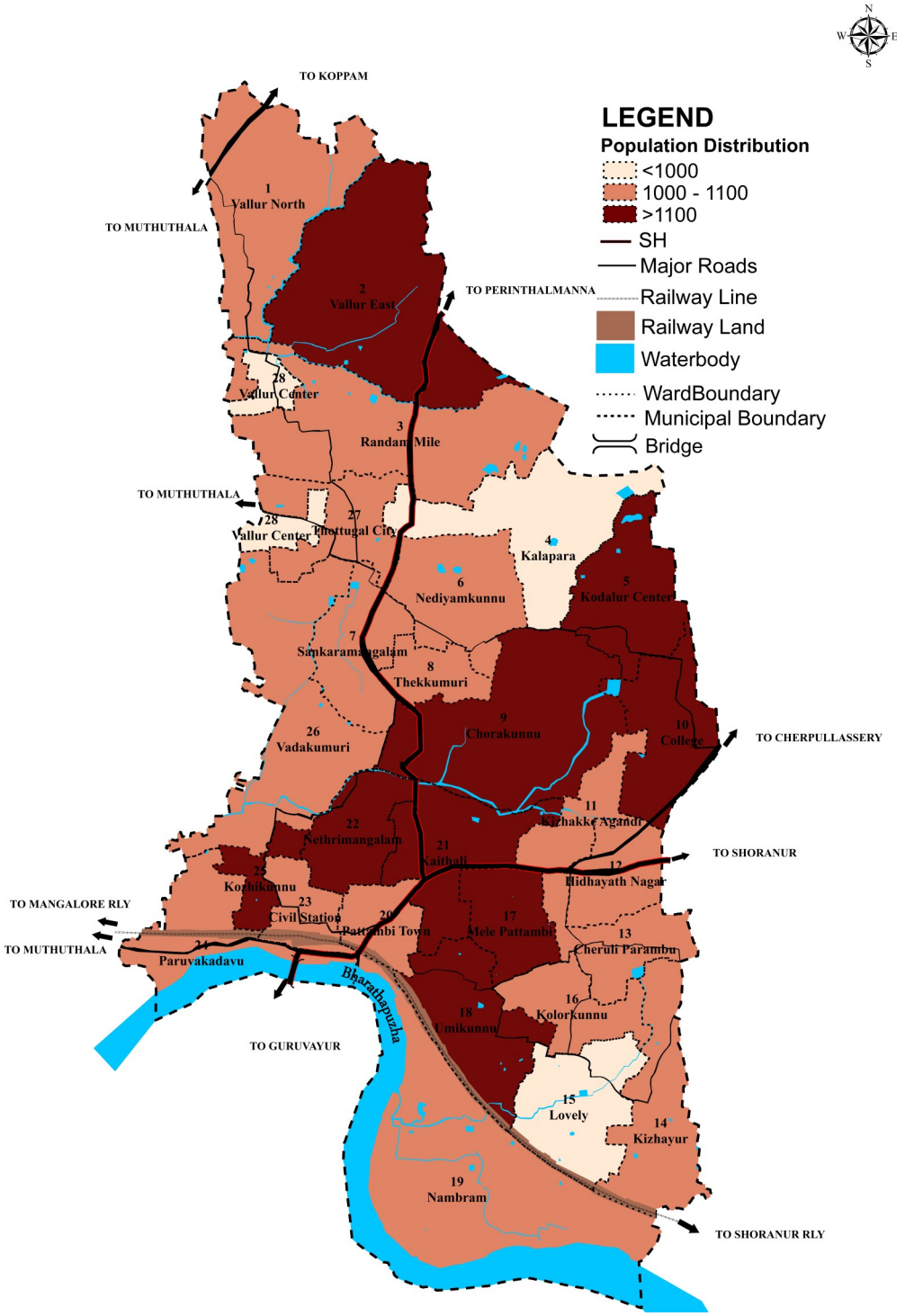


Fig. 3.7 Spatial distribution of population

Table 3.4 Ward wise Population of Pattambi Municipality 2016

Ward No	Name of ward	Population	Ward No	Name of ward	Population
1	Vallur north	1080	15	Louly	936
2	Vallur east	1121	16	Kolorkunnu	1058
3	Randam mile	1031	17	Mele pattambi	1107
4	Kalappara	923	18	Umikunnu	1107
5	Kodalur centre	1121	19	Nambram	1089
6	Nediyam kunnu	1053	20	Pattambi town	1053
7	Sankaramangalam	1089	21	Kaithali	1121
8	Thekkumuri	1035	22	Nethirimangalam	1116
9	Chorakunnu	1121	23	Civil station	1076
10	College	1116	24	Paruvakkadavu	1076
11	Kizhakke angadi	1089	25	Kozhikunnu	1116
12	Hidayath nagar	1098	26	Vadakkumuri	1098
13	Cherulipparambu	1062	27	Tthottungal city	1076
14	Kizhayur	1080	28	Vallur centre	945

Source: Pattambi Municipality

3.3 POPULATION DENSITY

The gross population density of the town is 1808 persons/sq.km much higher than the value of 627 persons/ sq.km of the district. The average population density of the state is 860 persons/sq.km which is 2.25 times the national average. It has been observed that the density is higher near to the CBD area of the municipality and on the wards along the main roads. The net area of the municipality is 7.36 sq. km and the net population density is 3890 persons/ sq.km.

The ward wise gross population density and net population density is shown in Table 3.5 The gross population density in the municipality ranges from 558 persons/sq.km in Nambram ward to 7,284 persons/sq.km in Kozhikunnu ward. The net population density ranges from 1,473 persons/sq.km in Chorakunnu ward to 8,156 persons/sq.km in Kozhikunnu ward.

Lowest gross population density is at Nabram is due to geographical feature of the ward. Nabram is surrounded by river and railway line so it has less connectivity with other parts of the town and major area of ward is Paddy. Lowest net population density is at Chorakunnu ward. Huge area in this ward is under Regional Agricultural Research Station, Pattambi. So the land available for residential occupancy is less.

Higher gross population density was observed in Kozhikunnu (25), Thekku-

Table 3.5 Ward wise gross and net population density

Ward No	Name of ward	Gross Population density	Ward No	Name of ward	Net Population density
25	Kozhikunnu	7284	25	Kozhikunnu	8156
8	Thekkumuri	5218	8	Thekkumuri	6994
23	Civil station	5070	17	Mele pattambi	6183
20	Pattambi town	4692	28	Vallur centre	6165
28	Vallur centre	4444	5	Kodalur centre	6120
11	Kizhakke angadi	4189	7	Sankaramangalam	6083
17	Mele pattambi	3604	27	Thottungal city	5700
12	Hidayath nagar	3554	6	Nediyam kunnu	5665
16	Kolorkunnu	3431	12	Hidayath nagar	5442
22	Nethirimangalam	3301	13	Cherulipparambu	5438
13	Cherulipparambu	3130	11	Kizhakke angadi	5301
27	Thottungal city	2813	22	Nethirimangalam	5247
7	Sankaramangalam	2696	23	Civil station	5172
10	College	2356	20	Pattambi town	4830
5	Kodalur centre	2211	16	Kolorkunnu	4577
21	Kaithali	2106	15	Louly	4354
6	Nediyam kunnu	2043	1	Vallur north	4192
18	Umikunnu	2012	24	Paruvakkadavu	4010
14	Kizhayur	1971	14	Kizhayur	3890
15	Louly	1828	4	Kalappara	3543
24	Paruvakkadavu	1790	18	Umikunnu	3485
4	Kalappara	1269	10	College	3422
1	Vallur north	1203	3	Randam mile	2768
26	Vadakkumuri	1099	26	Vadakkumuri	2590
9	Chorakunnu	1095	21	Kaithali	2303
3	Randam mile	930	2	Vallur east	2239
2	Vallur east	901	19	Nambram	1942
19	Nambram	558	9	Chorakunnu	1473

Source: Pattambi Municipality

muri (8) and Civil Station (23) wards near to the CBD areas. Higher Net Population Densities were observed in Kozhikunnu (25), Thekkumuri (8) and Melepattambi (17) wards.. The highest gross population density and net population density was at Kozhikunu and it is due to its proximity to Civil Station, MES International School etc. Ward wise gross and net population densities are shown in Fig. 3.8 and 3.9 respectively.

The gross population density of the municipality comes fourth while compared to densities of all other municipalities within district. For the past two decades the population density has remained nearly constant. The gross popu-

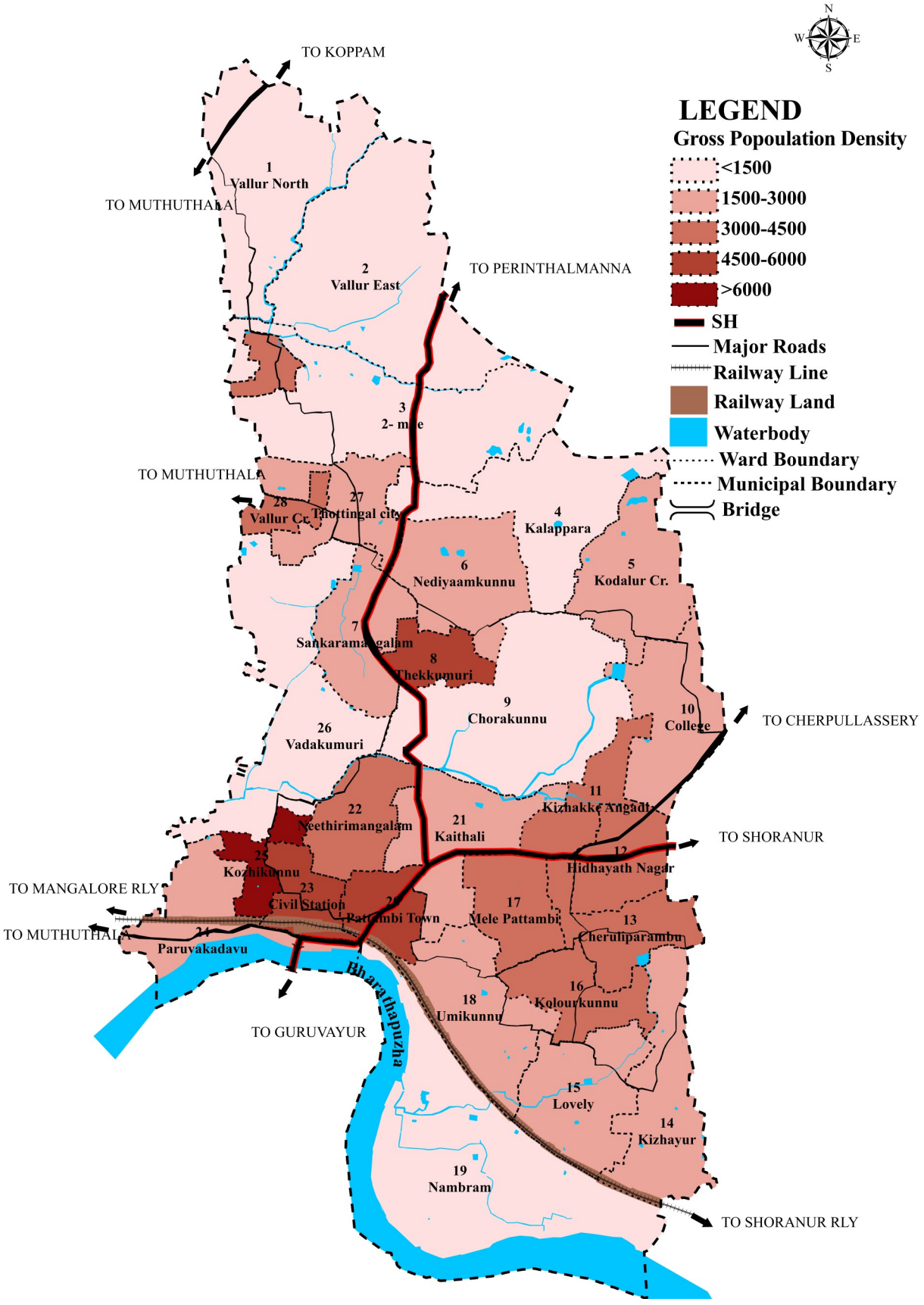


Fig. 3.8 Ward wise gross population density

lation density of the municipalities from 1991 to 2011 is shown in table 3.6 and Fig. 3.10.

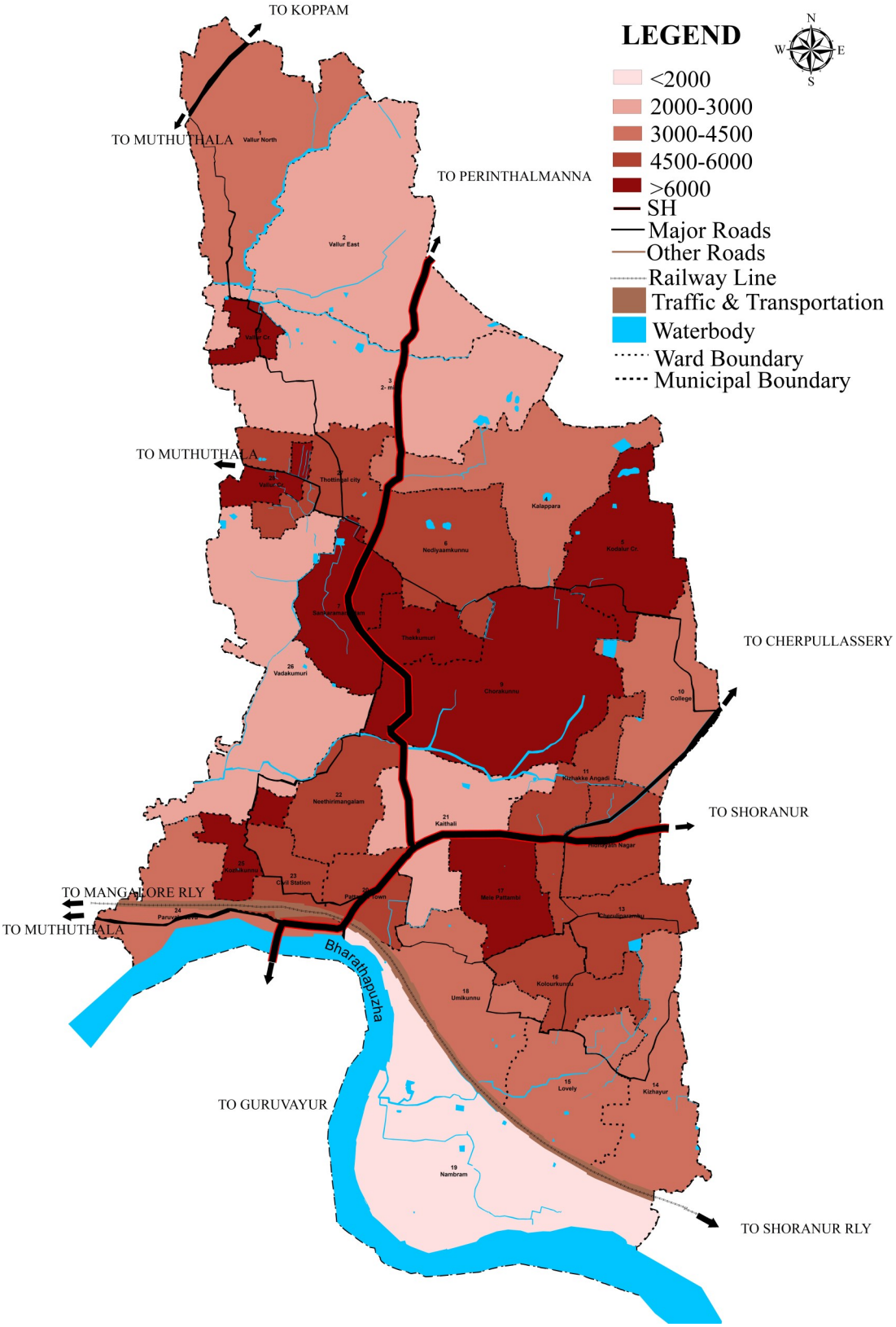


Fig. 3.9 Ward wise net population density

Table 3.6 Gross population density of Municipalities in Palakkad District

Sl. No.	Name of Administrative unit	Gross Population Density		
		1991	2001	2011
1	Kerala	749	819	860
2	Palakkad District	532	584	627
3	Palakkad M	4635	4916	4926
4	Ottappalam M	1353	1508	1646
5	Shoranur M	1225	1302	1349
6	Chittur - Thathamangalam M	2179	2168	2196
7	Pattambi M	1396	1526	1808
8	Mannarkkad M	1772	2029	2253
9	Cherpulasseri M	956	1085	1231

Source: Census 1991, 2001, 2011

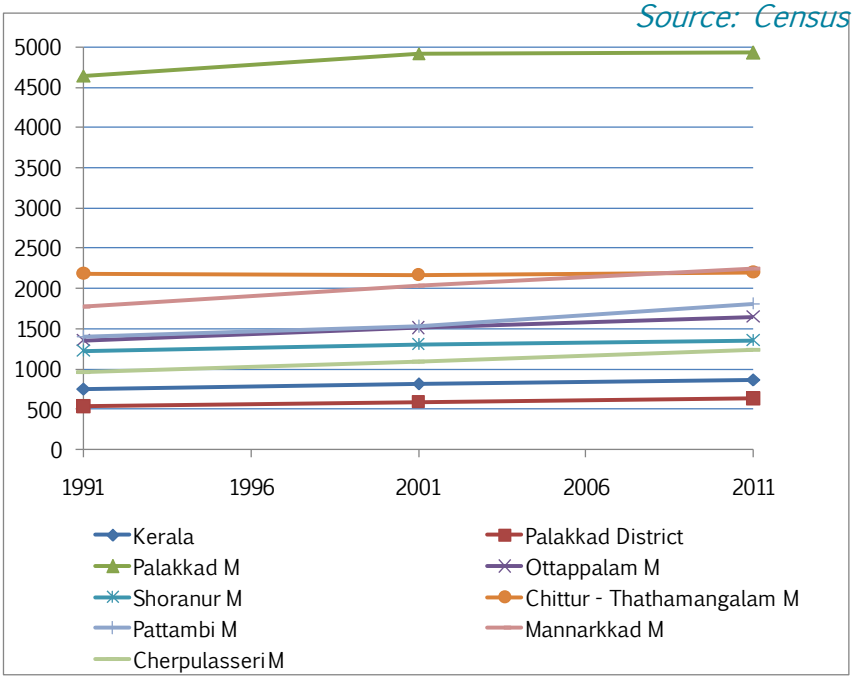


Fig 3.10 Comparison of gross population density with other towns in the district

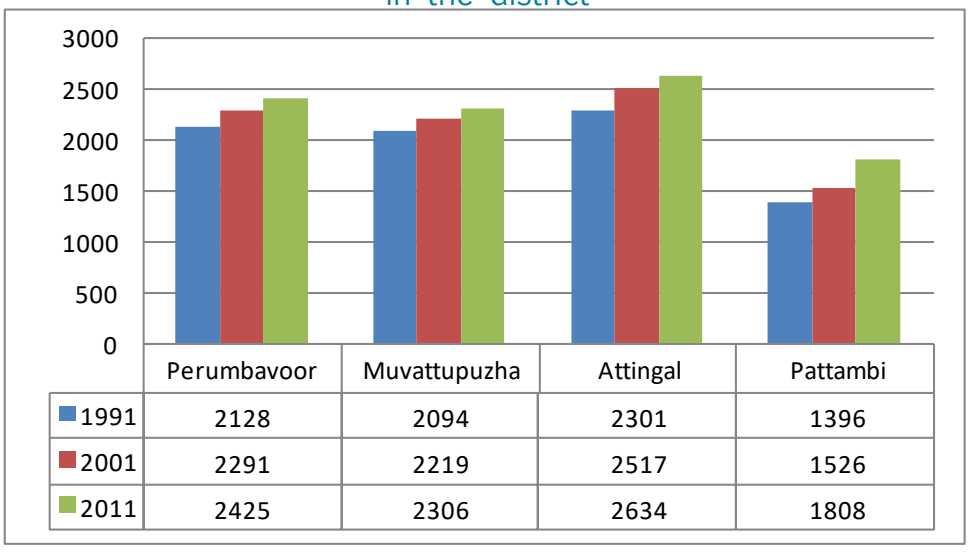
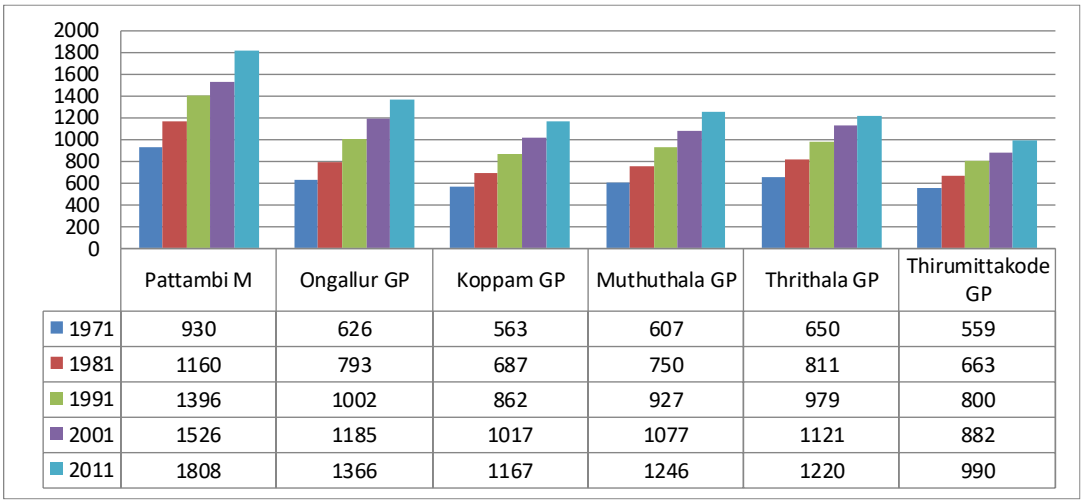


Fig. 3.11 Gross population density comparison with similar towns

The comparison of population density with nearby LSGI's as per 2011 census is shown in Fig. 3.12. Pattambi Town with a population density of 1,808 persons/sq.km has the higher population density than the neighbouring LSGI's.



	Pattambi M	Ongallur GP	Koppam GP	Muthuthala GP	Thrithala GP	Thirumittakode GP
1971	930	626	563	607	650	559
1981	1160	793	687	750	811	663
1991	1396	1002	862	927	979	800
2001	1526	1185	1017	1077	1121	882
2011	1808	1366	1167	1246	1220	990

Fig. 3.12 Gross population density comparison with nearby LSGI's

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

3.4 POPULATION GROWTH RATE

The Table 3.7 shows the population growth rate of State, District and Municipalities respectively for the last three decade. Fig. 3.13 shows a comparison of growth rate amongst municipalities as well as with district and state. The growth rate of the Pattambi municipality is higher than the other municipalities in the district, district average and state average. Growth rate shows an increasing trend only for Pattambi Town and all others shows decreasing trend.

From the Fig 3.14 tit is seen that the growth rate during the decade 1971-81 was 24.69. It was followed by 20.36, 9.31,and 18.47 in the following decades. It may be due to out migration of youth or familes. During the period 1991 -2001 showed a sharp decline. Pattambi also showed a decline trend in growth rate.

Table 3.7 Decadal variation of growth rate

Sl No	Name of Administrative unit	GR 1991-2001	GR 2001-2011
1	Kerala	9.43	4.91
2	Palakkad District	9.88	7.35
3	Palakkad M	6.07	0.19
4	Ottappalam M	11.44	9.16
5	Shoranur M	6.27	3.58
6	Chittur - Thathamangalam M	-0.51	1.29
7	Pattambi M	9.32	18.47
8	Mannarkkad M	14.49	11.00
9	Cherpulasseri M	13.46	13.44

Source: Census 1991, 2001, 2011

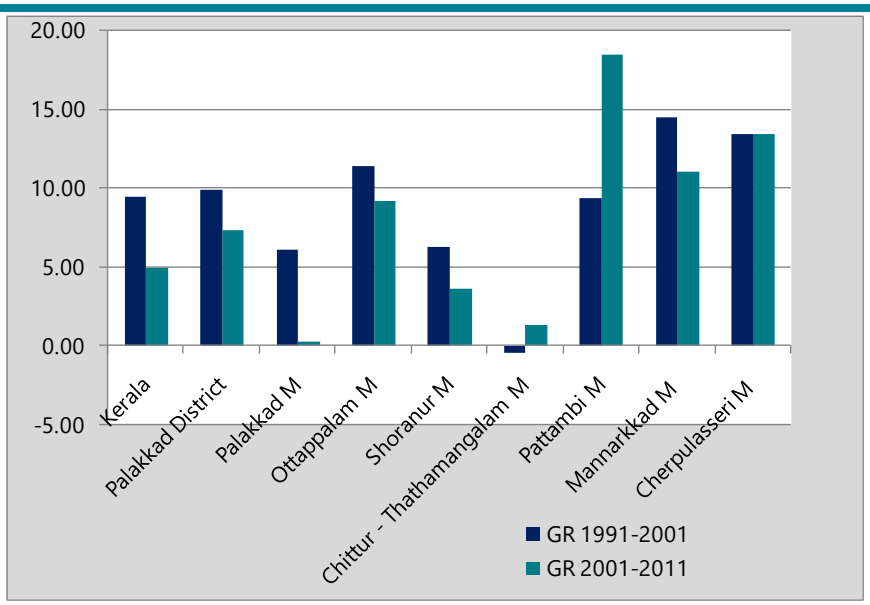
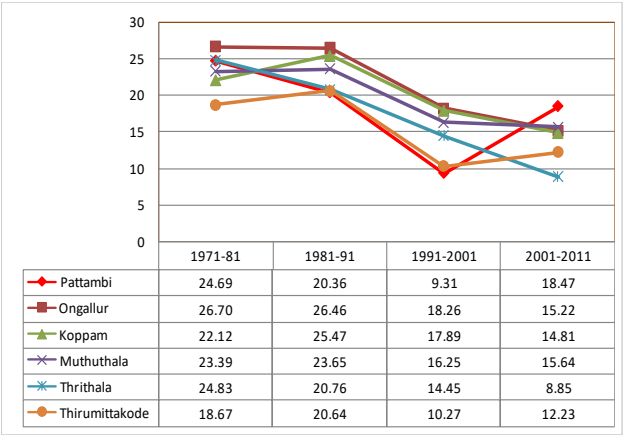


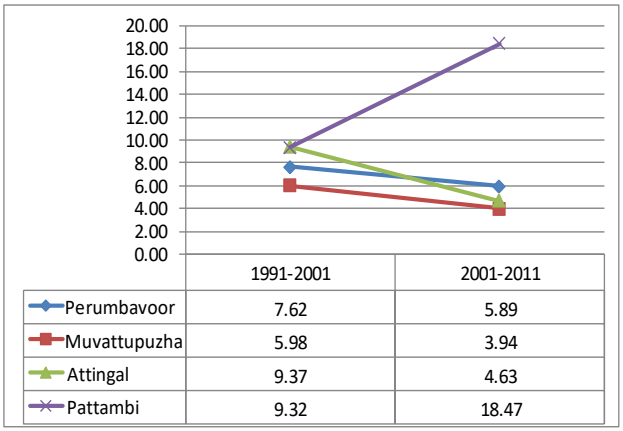
Fig. 3.13 Comparison of population growth rate of Pattambi town with other towns in the district.

Fig. 3.14 & 3.15 shows the comparison of growth rate of Pattambi town with nearby LSGI's and similar towns respectively. Compared to nearby LSGs, Pattambi municipality and Thirumittakode GP shows inclined growth rate during 2001-2011, all others having declining growth rate. Compared to similar towns, Pattambi alone is having increasing growth rate.



	1971-81	1981-91	1991-2001	2001-2011
Pattambi	24.69	20.36	9.31	18.47
Ongallur	26.70	26.46	18.26	15.22
Koppam	22.12	25.47	17.89	14.81
Muthuthala	23.39	23.65	16.25	15.64
Thrithala	24.83	20.76	14.45	8.85
Thirumittakode	18.67	20.64	10.27	12.23

Fig. 3.14 Comparison of population growth rate with nearby LSGI's



	1991-2001	2001-2011
Perumbavoor	7.62	5.89
Muvattupuzha	5.98	3.94
Attingal	9.37	4.63
Pattambi	9.32	18.47

Fig. 3.15 Comparison of population growth rate with similar towns

3.5 POPULATION CONCENTRATION

The population concentration of the municipality is shown in Fig 3.16 .One third of the population is distributed in the wards Vallur east (2), Chorakunnu (8), Kodallur centre (9), College(10), Umikunnu (17), Kaithali (21), Nethrimangalam (22), and half the population will be covered on adding Kizhakke Angadi(11), Hidayath Nagar (12), Melepattambi (16), Nambaram (18), Vadakkumuri (26). On adding the population of Vallur North (1), Sankaramangalam (6), Thottungal city (27), Kizhayur(14) Paruvakkadavu (24) two third population will be covered.

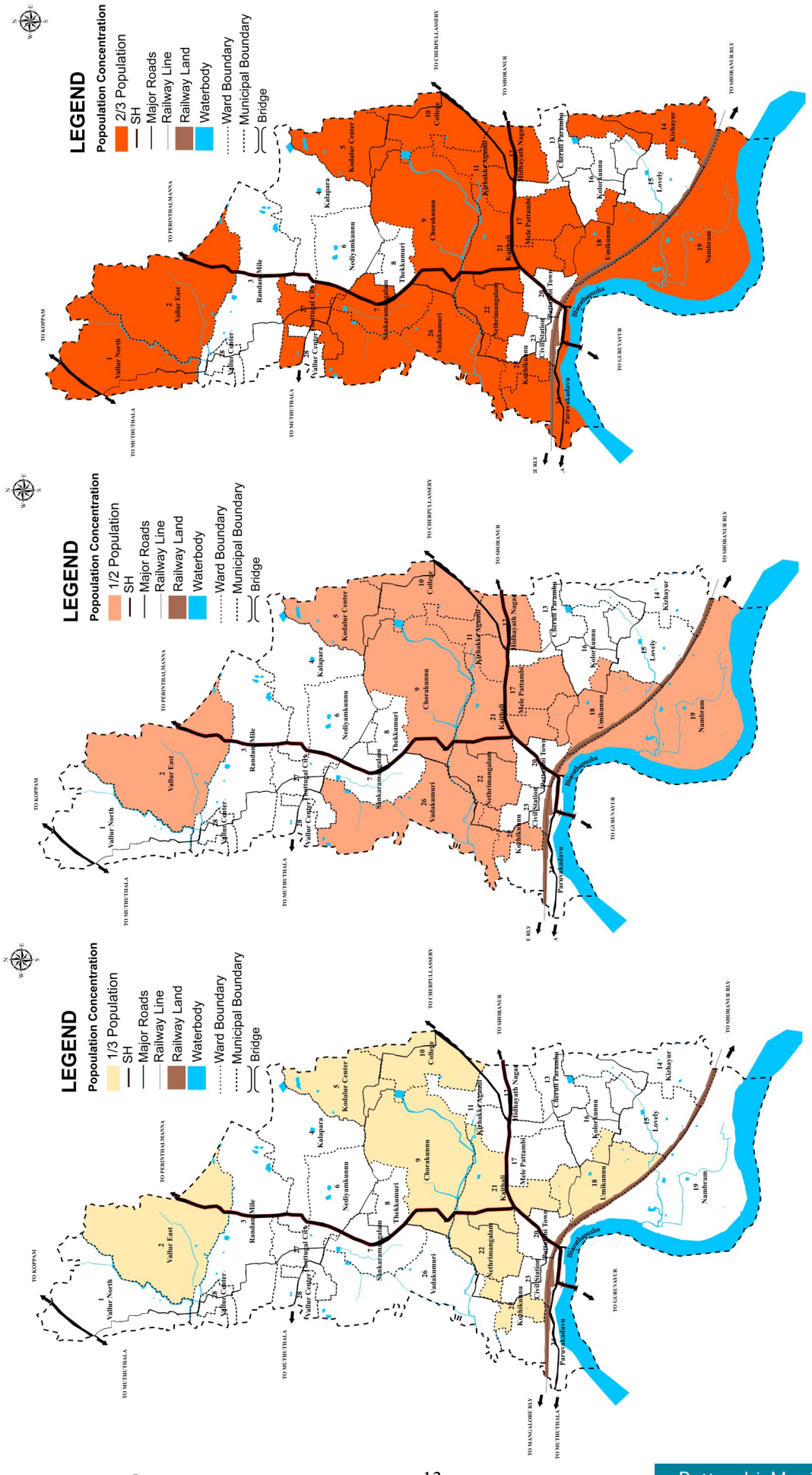
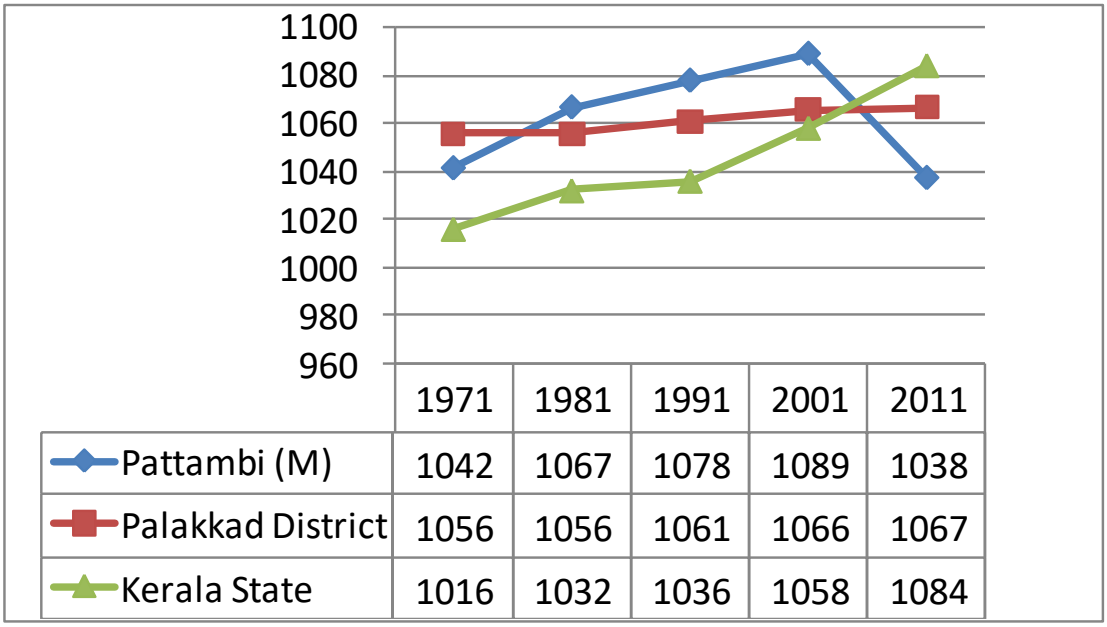


Fig 3.16 1/3rd, 1/2 & 2/3rd Population concentration of Pattambi Town

3.6 SEX RATIO

Sex composition of the human population is one of the basic demographic characteristics, which is extremely vital for any meaningful demographic analysis. It is defined as the number of females per 1000 males. Changes in sex composition largely reflect the underlying socio – economic and cultural patterns of the society. It is a measure of prevailing equity between males and females at a given point of time.

According to the 2011 Census, Pattambi Town is having a sex ratio of 1038, 51 points lesser than 2001 Census value of 1089. Except for the sex ratio of the municipality, which decreased in 2011 over the previous decade, both the state and the district figures have increased over the last three decades as can be seen from the Fig. 3.17.

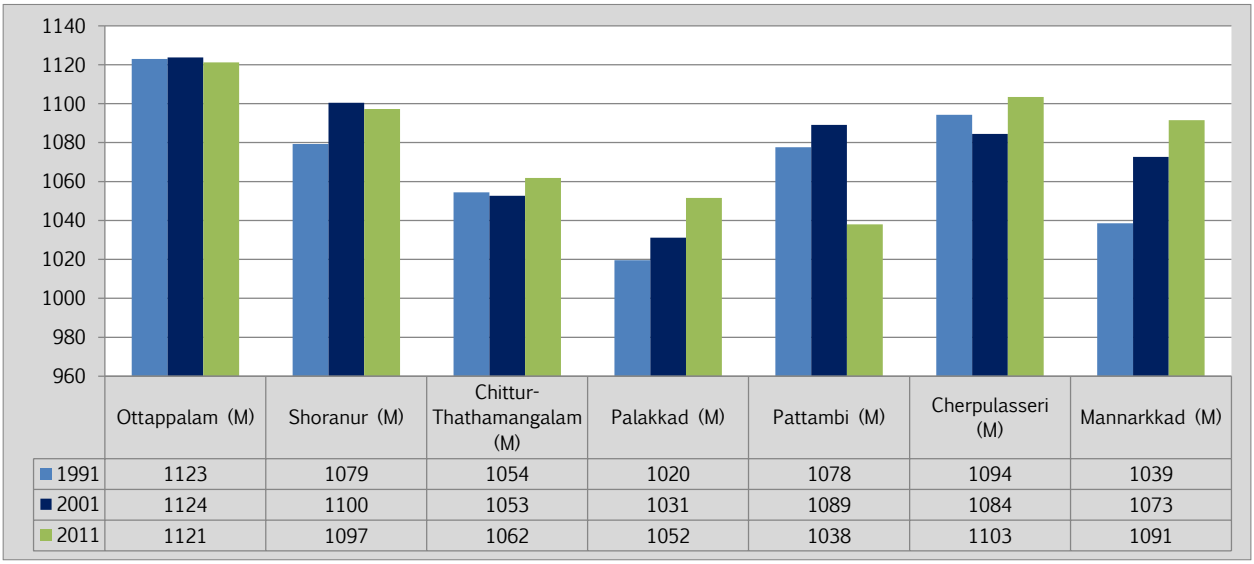


	1971	1981	1991	2001	2011
Pattambi (M)	1042	1067	1078	1089	1038
Palakkad District	1056	1056	1061	1066	1067
Kerala State	1016	1032	1036	1058	1084

Fig. 3.17 Temporal variation of sex ratio of Pattambi Town, Palakkad District and Kerala State.

Fig. 3.18 shows the comparison of sex ratio with other municipalities and that of the district. In the case of sex ratio, Kerala is unique, being the only state in India where females have predominance over males with a sex ratio of 1,084. As per 2011 Census, Palakkad district is having a sex ratio of 1,067, 1 point above the previous decade's value of 1,066.

However the sex ratio in the municipality is lower than that of the district. Ottappalam municipality is having the highest sex ratio followed by Cherpulasseri and Shoranur of 1,103 and 1,097 respectively. Pattambi Municipality is having the lowest sex ratio in the district. The sex ratio of Pattambi municipality in 1991 was 1078 which increased to 1089 in 2001 and a dip by 51 point in 2011.

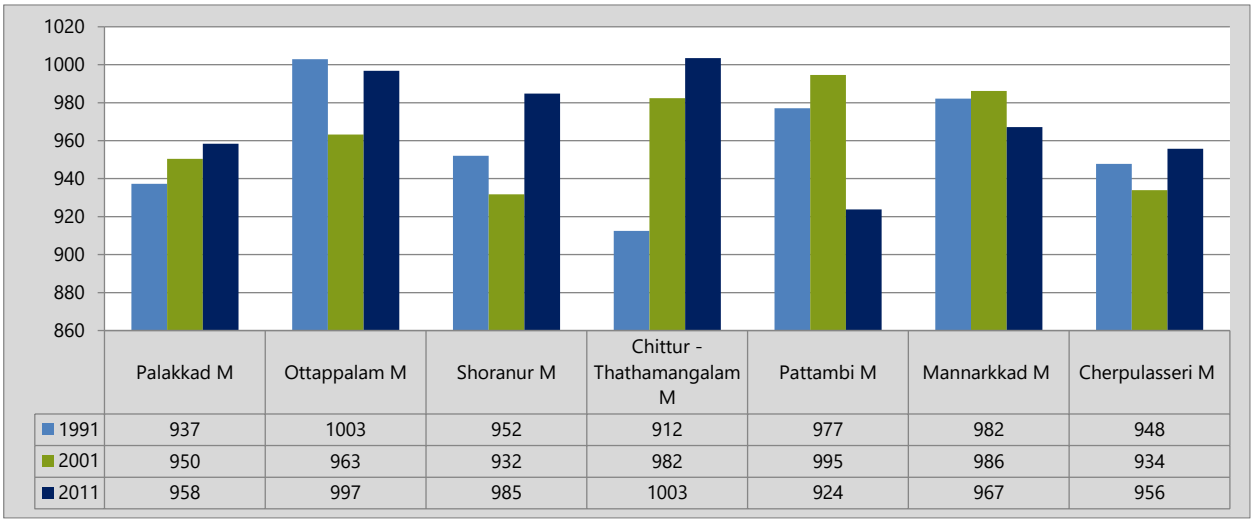


	Ottappalam (M)	Shoranur (M)	Chittur-Thathamangalam (M)	Palakkad (M)	Pattambi (M)	Cherpulasseri (M)	Mannarkkad (M)
1991	1123	1079	1054	1020	1078	1094	1039
2001	1124	1100	1053	1031	1089	1084	1073
2011	1121	1097	1062	1052	1038	1103	1091

Fig 3.18 Comparison of sex ratio as per 2011 census with other municipalities

As per census 2011, Pattambi municipality is having a sex ratio of 1,038 whereas the sex ratio for population in the age group 0 - 6 of the municipality is 924. Changes in Child Sex Ratio index reflects underlying socio - economic and cultural patterns of the society, especially its attitude towards the girl child. Gender ratio of town shows need of further study whether there is discrimination against girls, female infanticide, which is the killing of girls after birth, or of female foeticide, sex-selective abortion of the foetus.

The child sex ratio of the municipalities and that of the district as per 2011 census are shown in Fig. 3.19.

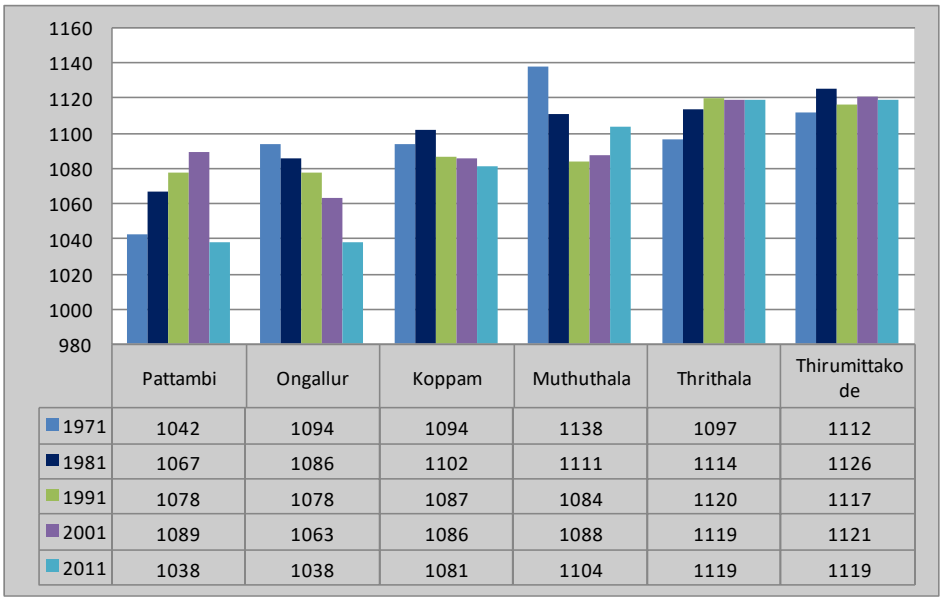


	Palakkad M	Ottappalam M	Shoranur M	Chittur - Thathamangalam M	Pattambi M	Mannarkkad M	Cherpulasseri M
1991	937	1003	952	912	977	982	948
2001	950	963	932	982	995	986	934
2011	958	997	985	1003	924	967	956

Fig. 3.19 Comparison of Child sex ratio with other municipalities in the district

However Chittur – Thathamangalam Municipality is having a much higher child sex ratio than that of other municipalities as well as of the district and it is the only municipality in the district having a positive sex ratio of 1003 i.e.; 1003 girls to 1000 boys. The child sex ratio of Pattambi increased from 977 in 1991 to 995 in 2001 and decreased to 924 in 2011.

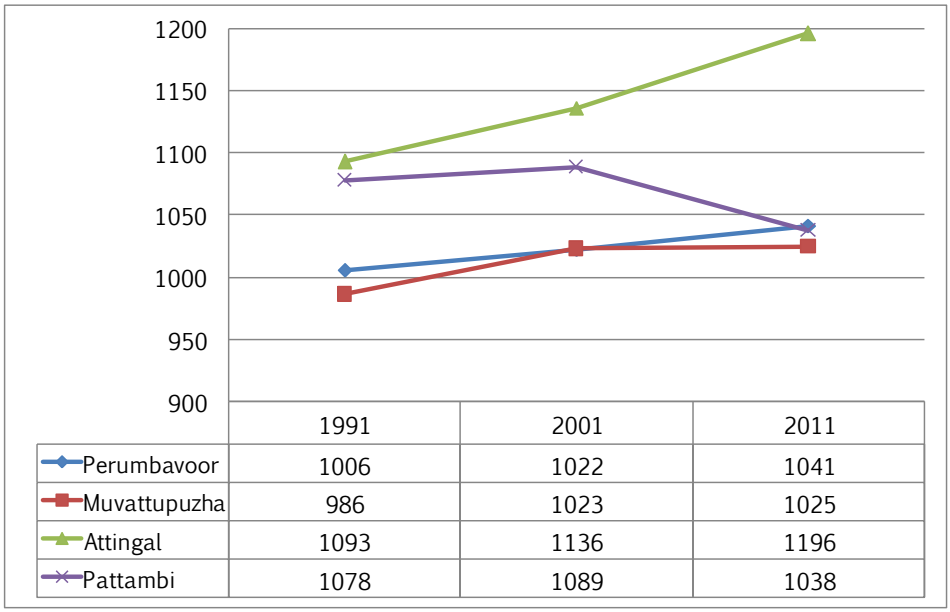
Pattambi municipality is having the lowest child sex ratio of 924 which is lower than that of the district's value of 967. Comparison of sex ratio with nearby LSGI's and similar towns are shown in Fig. 3.20 and Fig 3.21 respectively. Compared to sex ratio with nearby LSGs, Pattambi Town is having least sex ratio. Compare to sex ratio of similar towns, Pattambi Town is having higher sex ratio than Muvattupuzha, all other towns are having higher sex ratio than Pattambi Town. Being a muslim dominated society, girls are married at very young age in Pattambi Town. Young brides and their children are also more likely to suffer from the increased morbidity and mortality associated with early child birth.



	Pattambi	Ongallur	Koppam	Muthuthala	Thrithala	Thirumittakode
1971	1042	1094	1094	1138	1097	1112
1981	1067	1086	1102	1111	1114	1126
1991	1078	1078	1087	1084	1120	1117
2001	1089	1063	1086	1088	1119	1121
2011	1038	1038	1081	1104	1119	1119

Fig. 3.20 Comparison of sex ratio with nearby LSGI's

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



	1991	2001	2011
Perumbavoor	1006	1022	1041
Muvattupuzha	986	1023	1025
Attingal	1093	1136	1196
Pattambi	1078	1089	1038

Fig. 3.21 Comparison of sex ratio with similar towns

Source : Census 1991, 2001, 2011

3.7 AGE STRUCTURE

Age structure of population in a city plays a major role in urban planning as it gives an idea about the dependent population, working population, the jobs to be created, the present and future requirements of educational, health and other facilities and amenities. From socio-economic survey, the age structure of population (Fig. 3.22) is derived which shows that majority of the people among the males and females are within the age group 15-40 years. The municipality has 12.34% of the population in the age group 0 to 6 years as per census 2011.

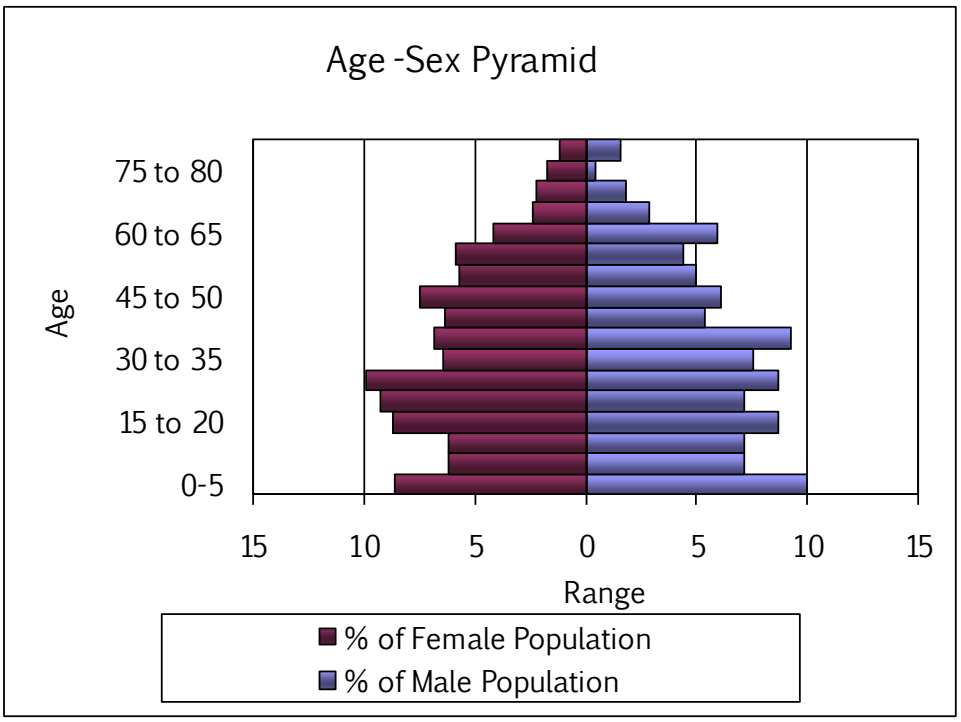


Fig. 3.22 Age Sex Pyramid

Source: Socio- economic survey, 2016

3.8 LITERACY

The literacy rate of the Pattambi has increased from 90.78% in 1991 to 95.18% in 2011 (Fig. 3.23). Shoranur Town has the highest literacy rate than all other municipalities in the district (Fig 3.24) and Pattambi Town is having nearly same literacy rate as that of Shoranur Town. Literacy rate of Pattambi Town is above the average literacy rate of 89.31% of the district.

Males literacy rate is more than female literacy rate. In the municipality, 97.08% of the males and 93.38% of the females are literates as per census 2011. The respective values as per 2001 census were 95.33% and 89.48%. The municipality has highest literacy rate when compared to the neighbouring LSGI's (Fig 3.26) and the lowest literacy rate when compared to similar towns (Fig. 3.27).

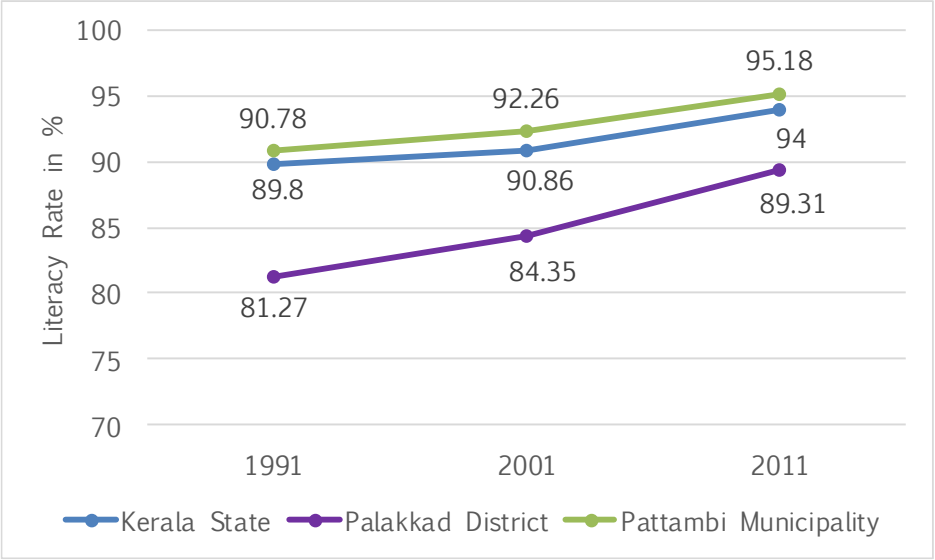


Fig. 3.23 Temporal variation of literacy rate in the municipality

Source: Census 1991,2001,2011.

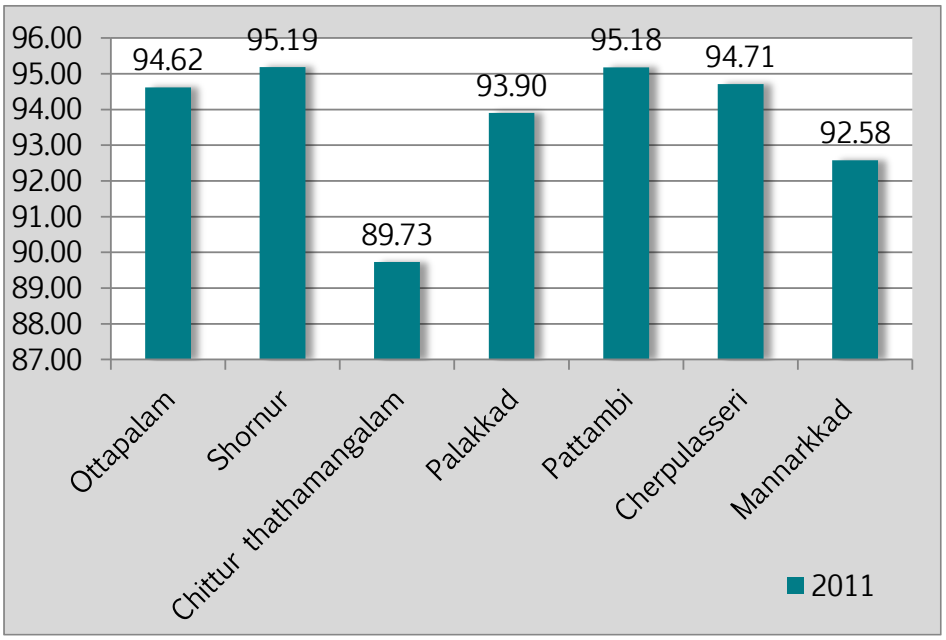


Fig. 3.24 Comparison of literacy rate with other municipalities

Source: Census 2011.

Table 3.8 Comparison of Literacy rate of Pattambi Town with District & State

	2001			2011		
	Total (%)	Male (%)	Female (%)	Total (%)	Male (%)	Female(%)
Pattambi	92.26	95.33	89.48	95.18	97.08	93.38
Palakkad District	84.35	89.52	79.56	89.31	93.1	85.8
Kerala State	90.86	94.24	87.72	94	96.11	92.07

Source: Census 2001,2011.

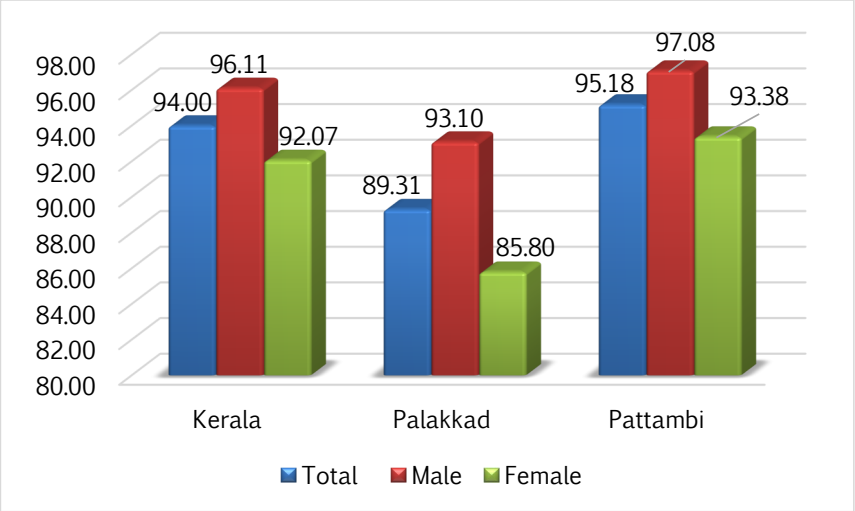


Fig. 3.25 Comparison of Literacy rate of Pattambi Town with District & State *Source: Census 2011.*

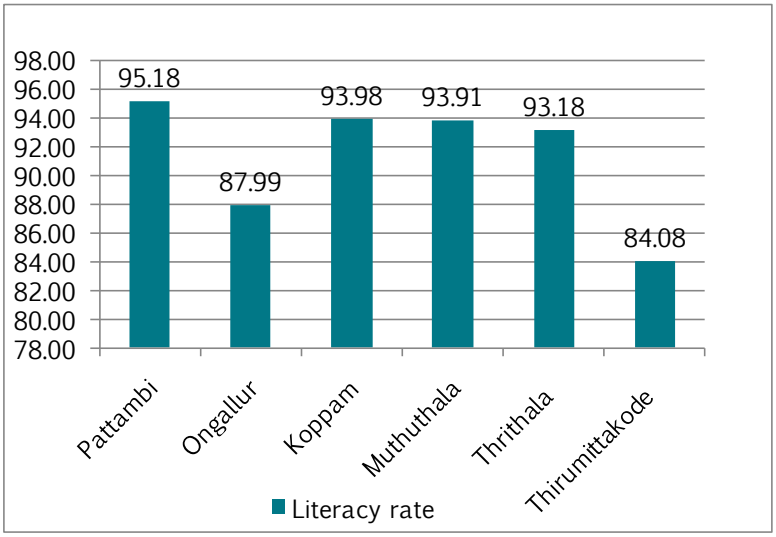


Fig. 3.26 Comparison of literacy rate with neighbouring *Source: Census 2011.*

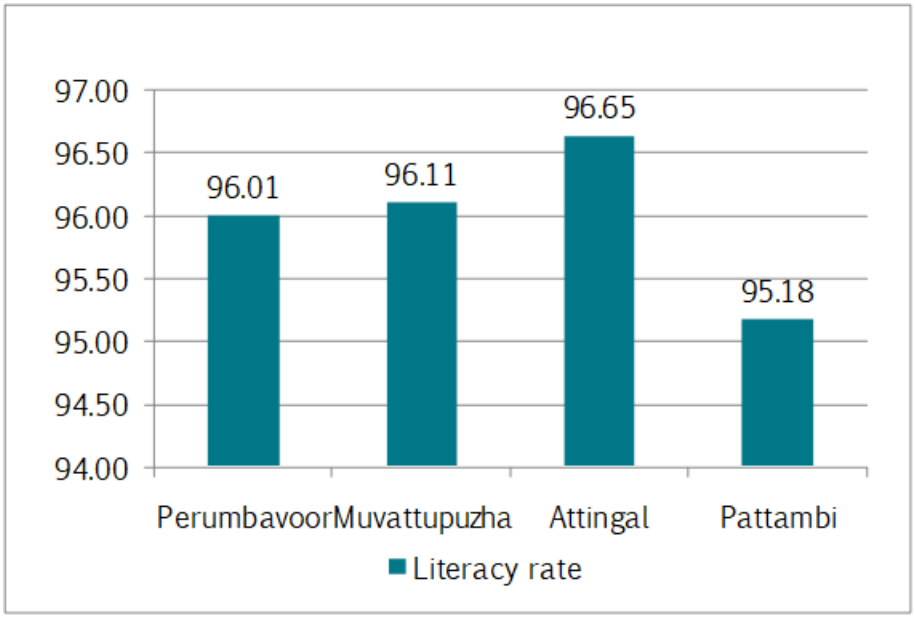


Fig. 3.27 Comparison of literacy rate with similar towns

Source :Census 2011

3.9 SIZE OF HOUSEHOLDS

The total number of households in the municipality as per Census 2011 is 5,897. The trend in household size has been steadily decreasing from 6.59 in 1971 to 4.86 in 2011 indicating the shifting of preference from joint families to nuclear households (Fig. 3.28).

When compared with the neighbouring LSGI's also, Ongallur Panchayat is having the highest household size followed by Koppam Panchayat and Pattambi Town (Fig. 3.29). The average household size of Pattambi Town is 4.86 which is higher than the district (4.41) and state (4.26) as well as other municipalities in the district (Fig. 3.30) and that of similar towns (Fig. 3.31).

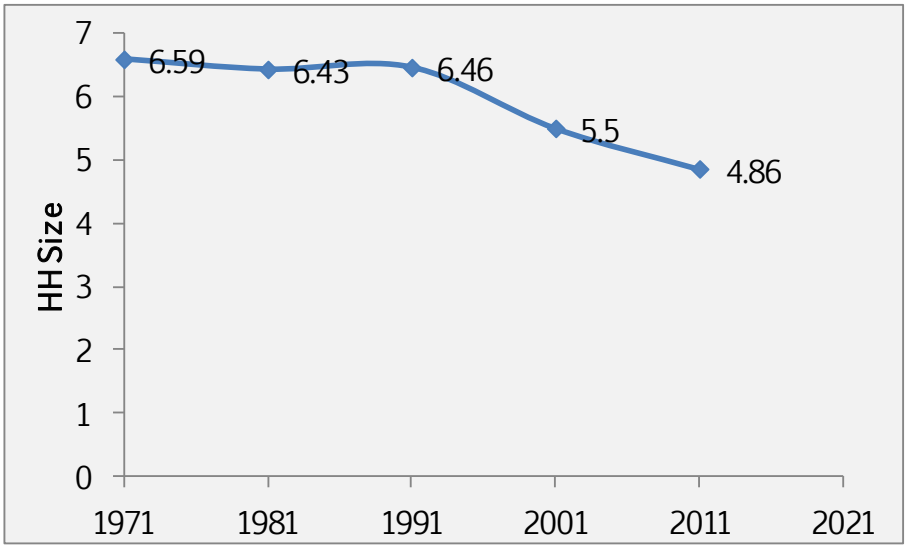


Fig. 3.28 Temporal variation of household size in Pattambi Town

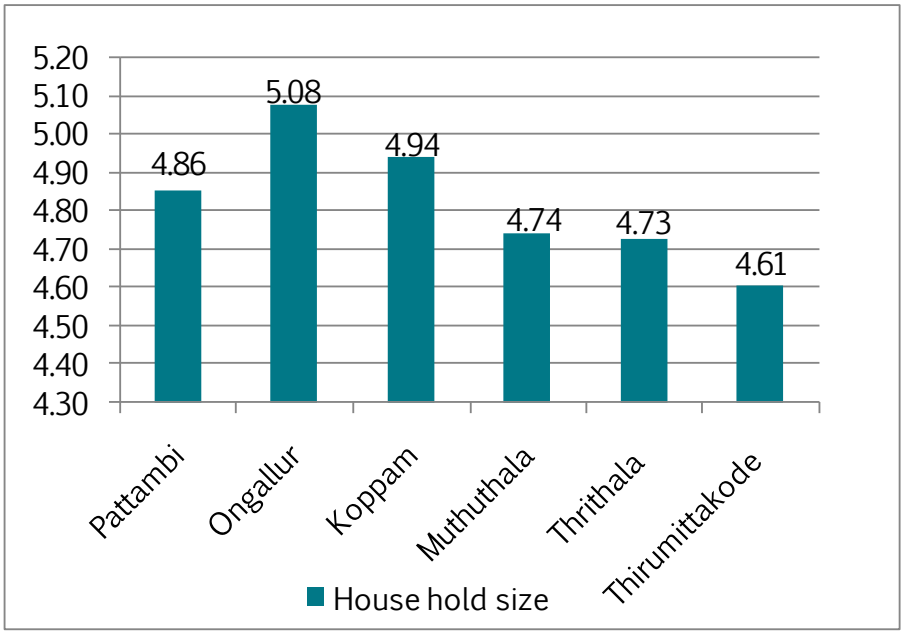


Fig. 3.29 Comparison of house hold size with nearby LSG's

Source :Census 2011

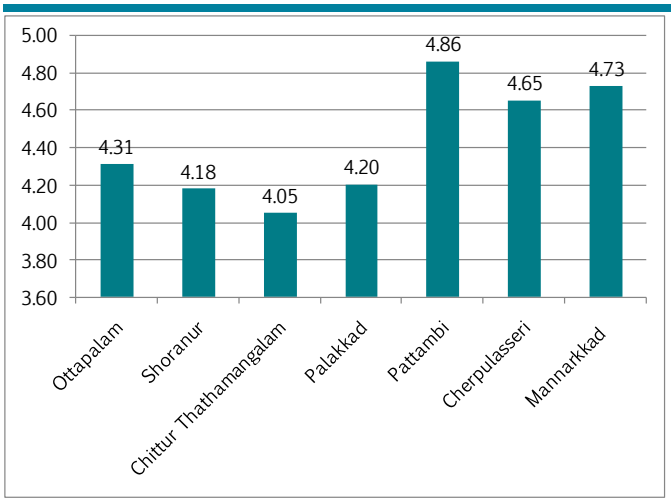


Fig. 3.30 Comparison of house hold size with other towns in District

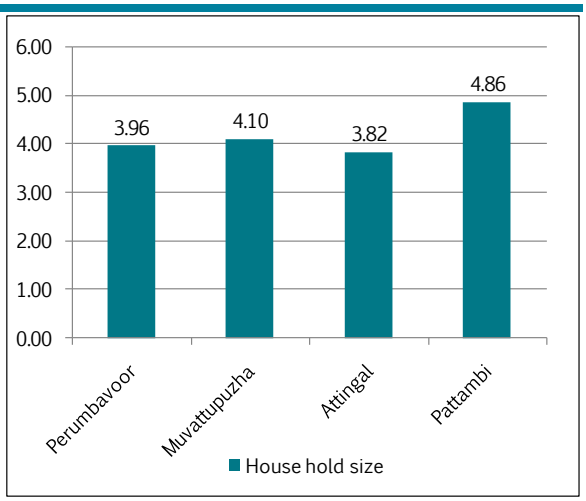


Fig. 3.31 Comparison of house hold size with similar towns (2011)

3.10 SOCIAL COMPOSITION

Social composition mainly represents the percentage of Scheduled Castes and Scheduled Tribes population in the municipality. Out of the total population in the municipality 12.12% are SC's and a negligible 0.13% is ST's (Fig. 3.32). The religion wise population shows that nearly 43.43% are Hindus, 55.34% Muslims and 0.86% Christians. (Fig. 3.33).

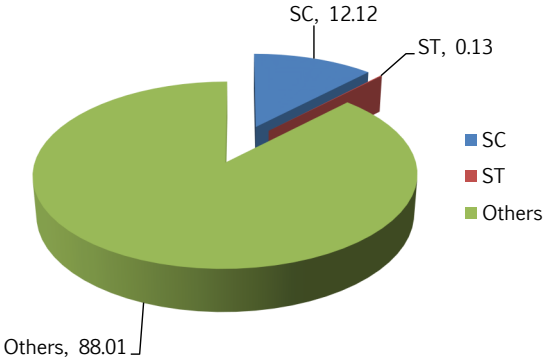


Fig. 3.32 SC/ST composition of Pattambi Town

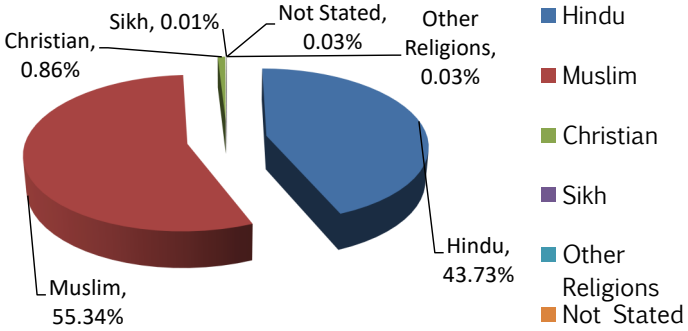


Fig. 3.33 Religion wise population break up

Source: Socio economic survey

3.11 MIGRATION

Human migration is the movement of people from one place to another with the intention of settling to a new location. It forms an important component of the process of urbanization and helps in understanding the dynamics of the society. Migration trend is a major factor in determining future population of the town. People who migrate into a territory are named as immigrants, whereas those who migrate from an area is treated as emigrants.

Census of India defines the migration in two ways viz migrants by place of birth and migrants by place of last residence. Migrants by place of birth are all those enumerated at a village/town at the time of census other than place of birth while a person is considered as migrant by place of the last residence, if the place in which he is enumerated during the census is other than his place immediate last residence. The low percentage of population growth rate and comparatively small household size shows that there is less immigration to the town.

Table 3.9 gives the percentage of families migrated within the last five years. Only 3.48% of total population migrated within the last five years. It can be seen that 1.16% of the people migrated within the local body while 1.16% migrated outside but within the district, 0.97% outside the district but within Kerala and 0.19 % to Tamilnadu. Table 3.10 shows that 1.55% of the migrants migrated for job, 0.19% migrated for educational purpose and 1.35% for social reasons.

Table 3.9 Percentage of families migrated within the last five years (Origin wise)

Migrated to	within the local body	Outside but within the district	Outside District but within Kerala	Tamilnadu
Average % for the LSGI in each category	1.16	1.16	0.97	0.19

Table 3.10 Percentage of families migrated within the last five years (Reason wise)

Purpose	Job	Educational Oppurtunity	Social Reason	Any others
Average % for the LSGI in each category	1.55	0.19	1.35	0.19

Source : Socio – economic survey, 2016

Migration status of Pattambi Town as per Pravasi Survey, 2013 shows that 986 persons gone abroad for job purpose, majority gone to Middle east. More than 50% (476 Nos.) of them are working as Labourers, following Drivers (193 Nos.), sales man (156 Nos) and Business (79 Nos.)

Table 3.11 No of Pravasis (destination wise)

Migrated to	Saudi	UAE	Kuwait	Oman	Quatar	Baharin	USA	Canada	Nigeria	Other african countries	Australia	Malasia	other Asian countries
	384	301	87	50	105	20	20	1	1	6	6	2	3

Source : Pravasi survey

Migrants in Pattambi Town from other states in India

Kerala is heading towards zero or negative population growth. The advanced demographic transition in the state had resulted in the emergence of nuclear families, which invested significantly on the education of their children. The universal enrolment and retention of children in schools irrespective of their gender resulted in the emergence of an educated youth population in Kerala and acute unemployment among them. This also resulted in a drastic shortage of native workforce in the unorganised sector, particularly to take up low-skilled jobs that required arduous physical labour. Emigration from Kerala is also cited as one of the reasons for the transformation of the labour market. Kerala ranked first among the migrant receiving states in southern India in 2000, considering internal migration.

According to the Economic Review 2018, there are 2,85,849 inter state migrant workers in the State. Palakkad district accounts for 5.33 per cent of the inter state migrant labour population in the State. Migrant workers are found in almost all the sectors in Palakkad district, including agriculture. The construction sector absorbs the largest proportion of the migrant workers. Footloose labourers, not attached to any particular employer, constitute a large proportion of the workers. Informal employees perhaps constitute the majority of the migrant labour.

Table 3.12 Details of migrants in Pattambi Town

Sl No	State	No of migrants
1	Andra Pradesh	31
2	Bihar	178
3	Delhi	1
4	Karnataka	3
5	Madhya pradesh	1
6	Maharashtra	2
7	Nepal	5
8	Odisha	5
9	Rajasthan	8
10	Tamilnadu	241
11	Telengana	1
12	Tripura	2
13	Uttar Pradesh	13
14	West Bengal	277
	Total	**768**

Source: Survey done by Municipality 2017

The stretch between private bus stand and Nila Hospital on Pallam Road in Pattambi has umpteen structures that have been rented out to migrant workers. One of the largest labour *nakas* in the district is at Pattambi private bus stand. The strategic connectivity to the *naka* and other towns in the district, easy access to the railway station and availability of

water in abundance (River Bharathapuzha) were the major reasons cited by migrants for choosing Pattambi as their place of residence. Immigrants from Tamil Nadu and West Bengal dominate the *nakas*. Workers from Assam and Uttar Pradesh can also be found. Workers from West Bengal, Bihar, Uttar Pradesh and Tamil Nadu were found at residential pockets. While majority were single men, the workforce from Tamil Nadu comprised women as well. Workers from Gudalur district in Tamil Nadu who service the septic tanks were also here.

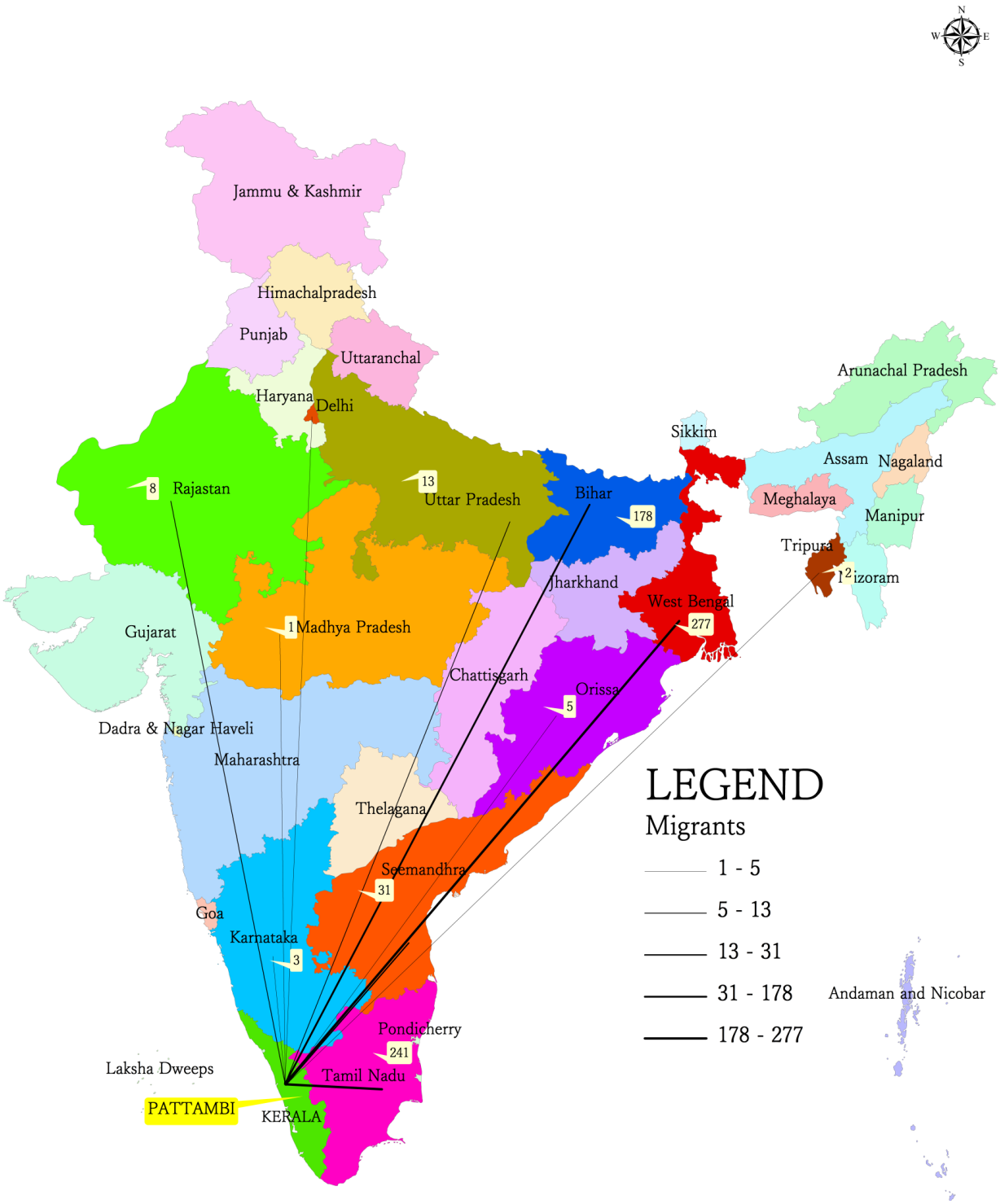


Fig. 3.34 Migrant details of Pattambi Town

Most of the migrants lives in congested camps in cramped rooms with limited lighting and ventilation. Water, Sanitation and Hygiene (WASH) facilities were generally poor. They are constrained to live in unhygienic conditions without proper shelter, sanitation and safe drinking water, which has led to the spread of communicable diseases and other social problems. Most rooms had no separate kitchen and people used diesel, which was easily available, as the cooking fuel. Kerosene or cooking gas was neither affordable nor available at convenience. A lot of people also depended on mess/canteens run by fellow migrants for food. Many in the migrant labour camps at Pattambi use the river as their toilet in the absence of one in their homes.

3.12 INFERENCE

Total population of the municipality is 28,632 consisting of 14,049 males and 14,583 females (according to Census 2011). Municipality accounts for 0.35% of the total area of the district and 1.02% of the total population. 5,897 households with an average household size of 4.85. Size of households is steadily decreasing due to the preference from joint families to nuclear households.

Population growth rate of the last decade was 18.47%. Growth rate was declining from 1991 - 2001 (20.36 - 9.31) and 2001 - 2011, then there was an sudden increase in the growth rate. Population is showing an increasing trend from 14,371 in 1971 to 28,632 in 2011. Population growth rate and household size is highest compared to other urban LSGIs in the town. Gross population density is 1,808 persons/sq. km. and net population density is 3860 persons/sq. km. The sex ratio is 1038.

Sex ratio was decreased by 51 points as per 2011 census. Sex ratio is lowest compared to other urban LSGIs in the town which is crucial in understanding the condition of women in the society. Child sex ratio (924) is lowest compared to the district and other urban LSGIs in town. 12.12% of the population is SC and merely 0.13% is ST. Literacy rate (95.18%) is highest compared to nearby LSGIs and lowest compared to similar towns.

Literacy affects fertility, mortality, birthrate, living standard, status of women and also sex ratio. One sixth of the families in Pattambi town are depending upon income from pravasi. There are 768 migrant workers in pattambi. Majority of Migrant workers are from West Bengal (277), Tamil nadu (241) and Bihar (178). The stretch between private bus stand and Nila Hospital on Pallam Road in Pattambi has lots of buildings that have been rented out to migrant workers. One of the largest labour camps in the district is at Pattambi Private bus stand.

4

Occupational Structure

4. OCCUPATIONAL STRUCTURE

Occupational structure is the distribution of occupations in society, classified according to skill level, economic function, or social status. Improving the economic function and skill development are crucial for poverty reduction and sustaining a healthy economic order and social development.

Occupational structure is shaped by multitude of factors ranging from structure of economy, technology, bureaucracy, labour-market segmentation etc. There is a close relationship between development of a region and occupational structure it hosts. This chapter aims to understand the occupation structure of Pattambi at a spatial & temporal level.

4.1 WORKERS

Work is defined as participation in an economically productive activity with or without compensation, wages or profit. Such participation may be physical or mental in nature. Work involves not only actual work, but also includes effective supervision and direction of work. It also includes part time help or unpaid work on farm, family enterprise or in any other economic activity. All persons engaged in 'work' as mentioned above are workers.

The total workers are classified into main workers and marginal workers. A person who has worked for 6 months or more in any economically productive activity is termed as a main worker and those who have worked for less than six months in the last one year preceding to the date of enumeration is termed as marginal worker. For the first time in Census 2011, the marginal workers have been sub divided into two categories, namely persons worked for less than 3 months and those worked 3 months or more but less than 6 months.

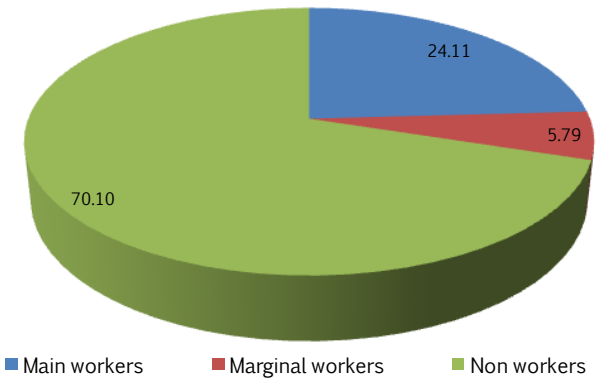


Fig. 4.1 Category of workers in Pattambi Town.

Source: 2011 Census

The total number of workers in Pattambi Town as per Census 2011 is 8,561 (29.90%) of the total population of the town. This is less than WPR of district 37.1%. The total workers include 6,904 (24.11%) of main workers and 1,657 (5.79%) of marginal workers. It is shown in Figure 4.1.

It can be seen from Table 4.1 which shows the decadal change in the percentage of workers and non workers. The percentage of non workers has been steadily decreasing during 1991-2011. The total number of workers have increased from 25.18% of the total population in 1981 to 29.9% in 2011. Decadal variation of total workers, marginal workers, main workers and non workers are given in Fig. 4.2.

Table 4.1 Decadal Variation in Percentage of Workers

Year	% Main workers	% Marginal workers	% Non-workers	% Total -workers
1981	24.22	0.95	74.185	25.18
1991	23.52	1.23	75.23	24.76
2001	20.39	5.13	74.47	25.52
2011	24.11	5.78	70.1	29.9

Source Census 1981, 1991, 2001, 2011

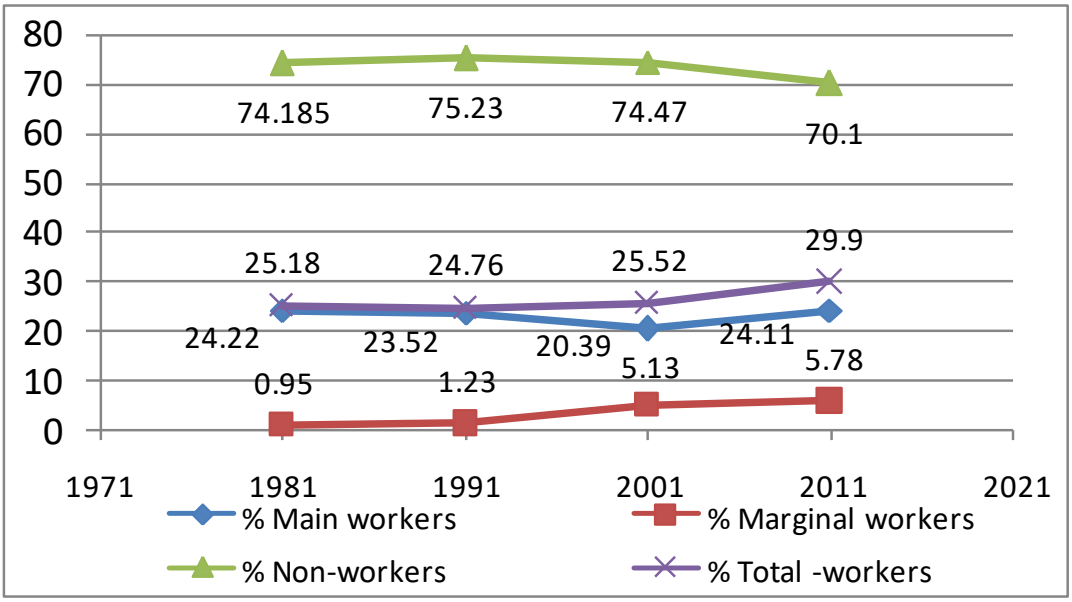


Fig. 4.2 Decadal variation of total workers, marginal workers, main workers and non workers

4.2 WORK PARTICIPATION RATE

Work Participation Rate (WPR) is defined as the percentage of total workers to the total population. WPR of Kerala according to 2011 Census is 34.78% and that of Palakkad district is 37.09%. District is having 7th rank in the State. Fig 4.3 shows the decadal variation of total, Male, Female WPR of 1981, 1991, 2001, 2011. In Pattambi town job opportunities are increasing and economic activities are gaining momentum. However the WPR among males is quite higher than that of the females, with males contributing to 25.22% and

females 4.68% of the total working population in the municipality as per Census 2011.

Pattambi Town has least WPR of 29.90% compared to other municipalities in the district (Fig.4.4), in fact it is lesser than the average value of the district (37.09) and the state (34.78). When compared with similar towns, it can be seen that the WPR of Pattambi Town is much below the value of WPR of similar Towns as per census 2011 (Fig 4.5).

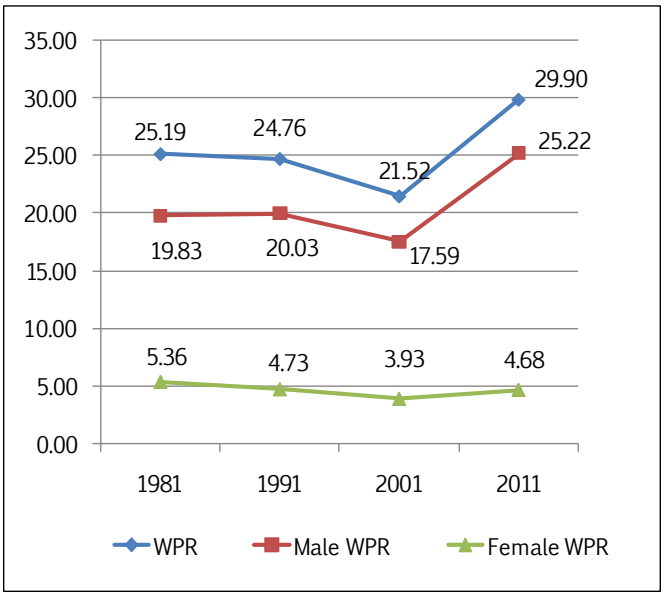


Fig. 4.3 Decadal variation of WPR across gender in Pattambi Town

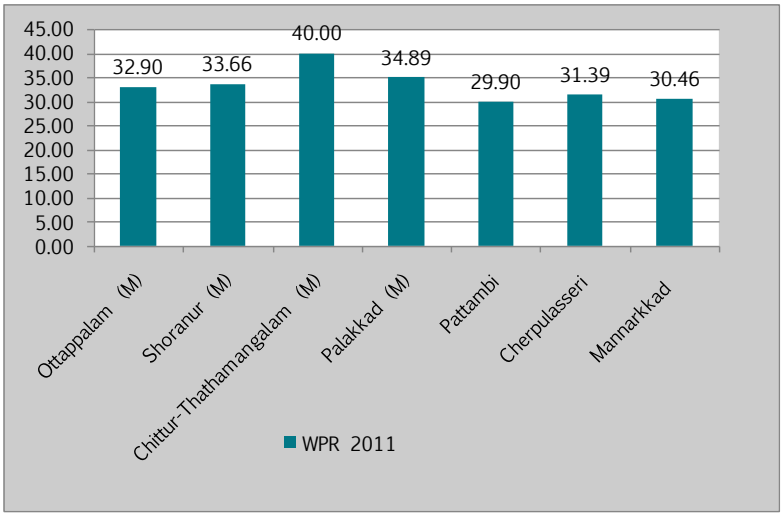
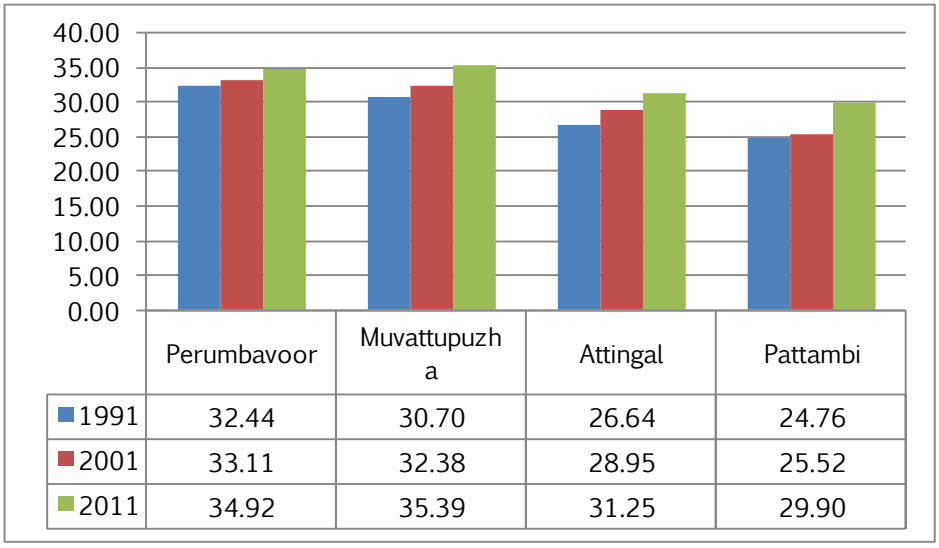


Fig. 4.4 Comparison of WPR with other urban local bodies within District



	Perumbavoor	Muvattupuzha	Attingal	Pattambi
1991	32.44	30.70	26.64	24.76
2001	33.11	32.38	28.95	25.52
2011	34.92	35.39	31.25	29.90

Fig. 4.5 WPR Comparison with similar towns

When compared with neighbouring LSGI's the picture is quite different. WPR of Pattambi Town and Thirumittakode is almost equal. WPR of all other adjacent local bodies are lesser than Pattambi Town. (Fig 4.6)

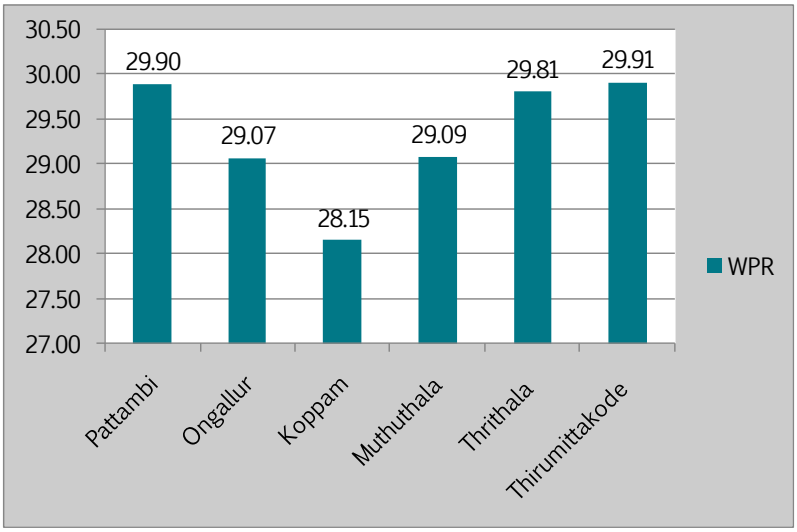


Fig. 4.6 Comparison of WPR with other towns in the district

4.3 OCCUPATIONAL STRUCTURE

A person is classified as cultivator if he or she is engaged in the cultivation on land owned or held from government or held from private persons or institutions for payment in money, kind or share. Cultivation includes effective supervision or direction in cultivation. A person working on another person's land for wages in cash or kind or combination of both is termed as agricultural labourer. Household workers include those working in the household industries engaged in manufacturing, processing, servicing and repair of goods. A person who has been engaged in some economic activity during the reference period but not as a cultivator, agricultural labourer or in household industry is termed as 'other worker'.

According to 2011 Census, 84.3% of the total workers of Pattambi Town are male workers. There is a clear dominance of male workers in all classes of workers. Female work participation is more in Agricultural labourers section and least in House hold industries section. Analysing the economic base of the development plan area in past decades will help to understand the direction of growth of area in terms of economy.

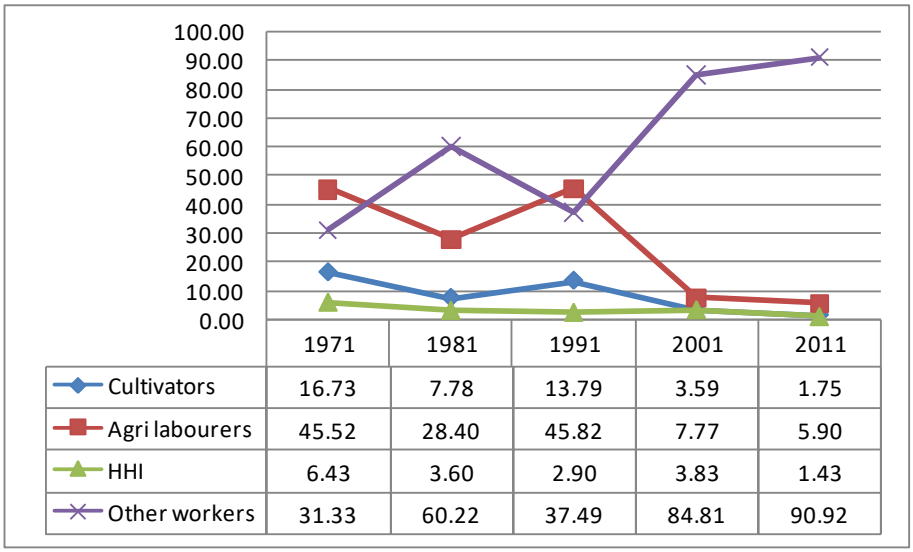
Percentage of workers in various categories in last 3 decades has been discussed in Table 4.2. It can be seen that except for other workers, the number of agricultural labourers, cultivators and household industrial workers have been constantly decreasing in the municipality (Fig.4.8). This clearly shows that there is a shift from traditional agricultural activities to other activities like trade and commerce, construction activities etc. The number of other workers

consisting mainly of all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport, banking, mining, construction, political or social work, priests, entertainment artists etc. and Percentage of other workers has increased by 41.54% over the last three decades. The number of household industrial labourers shows sharp decline from 3.83% to 0.94% during 2001- 2011.

Table 4.2 Occupational Structure of main workers

Year	Cultivators	Agri labourers	HHI	Other workers
1971	375	1020	144	702
1981	346	1264	160	2680
1991	366	1216	77	995
2001	177	383	189	4181
2011	121	407	99	6277

Source Census 1981, 1991, 2001, 2011



	1971	1981	1991	2001	2011
Cultivators	16.73	7.78	13.79	3.59	1.75
Agri labourers	45.52	28.40	45.82	7.77	5.90
HHI	6.43	3.60	2.90	3.83	1.43
Other workers	31.33	60.22	37.49	84.81	90.92

Fig. 4.7 Decadal variation of Four fold classification of main workers in percentage

Workers are also classified into primary, secondary and tertiary workers. The workers in other category can be considered as tertiary workers and therefore the increase in the total number of workers is due to an increase in the number of tertiary workers. From the socio economic survey analysis, it was found that the majority of workers are engaged in tertiary sector. The percentage of workers is shown in Fig.4.8 Primary workers amounts to 4.86%, secondary workers to 1.53% and tertiary workers amounts to 93.61% of the total workers in the municipality. Thus it can be seen that the economic growth of Pattambi Town would heavily depend on the service sector or tertiary sector.

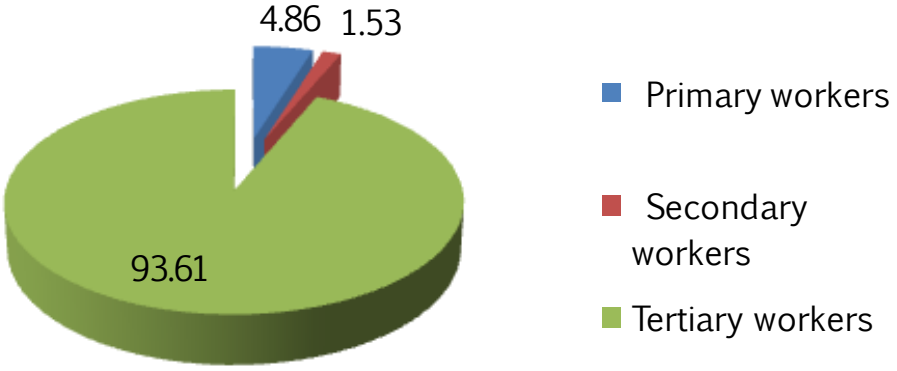


Fig. 4.8 Employment structure of Pattambi Town

Source: Socio economic survey, 2016

On analysing the employment pattern from the socio – economic survey (Fig.4.9), it can be seen that the private sector provides major employment opportunities in the municipality followed by self employment. It can also be seen that the percentage of unemployed population trying for employment (13.53%) is also significantly higher in the municipality. Only 1.92% among the population are employed in public sector.

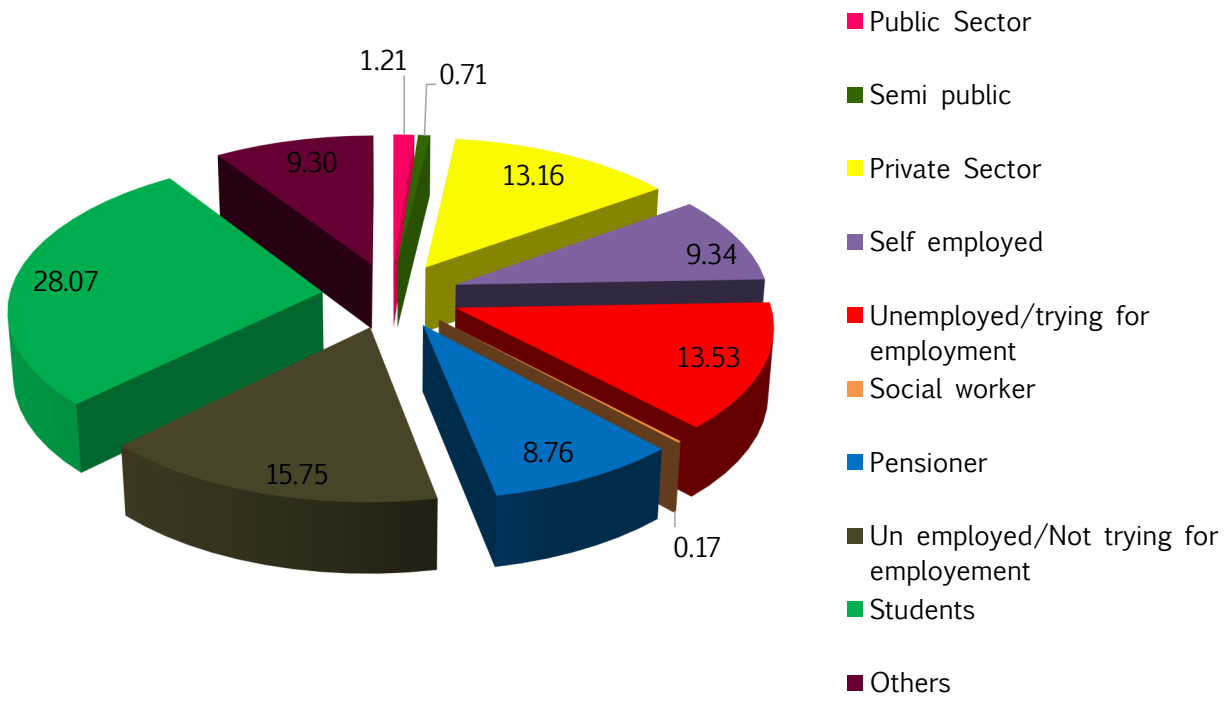


Fig. 4.9 Employment Pattern

Source: Socio economic survey, 2016

The status of employment as per Socio economic survey 2012 (Fig.4.10) shows 47.83% of the workers are other workers, 16.24% are migrant workers, 8.18% are drivers. The number of government employees, agricultural labourers, agriculture cultivators are very less.

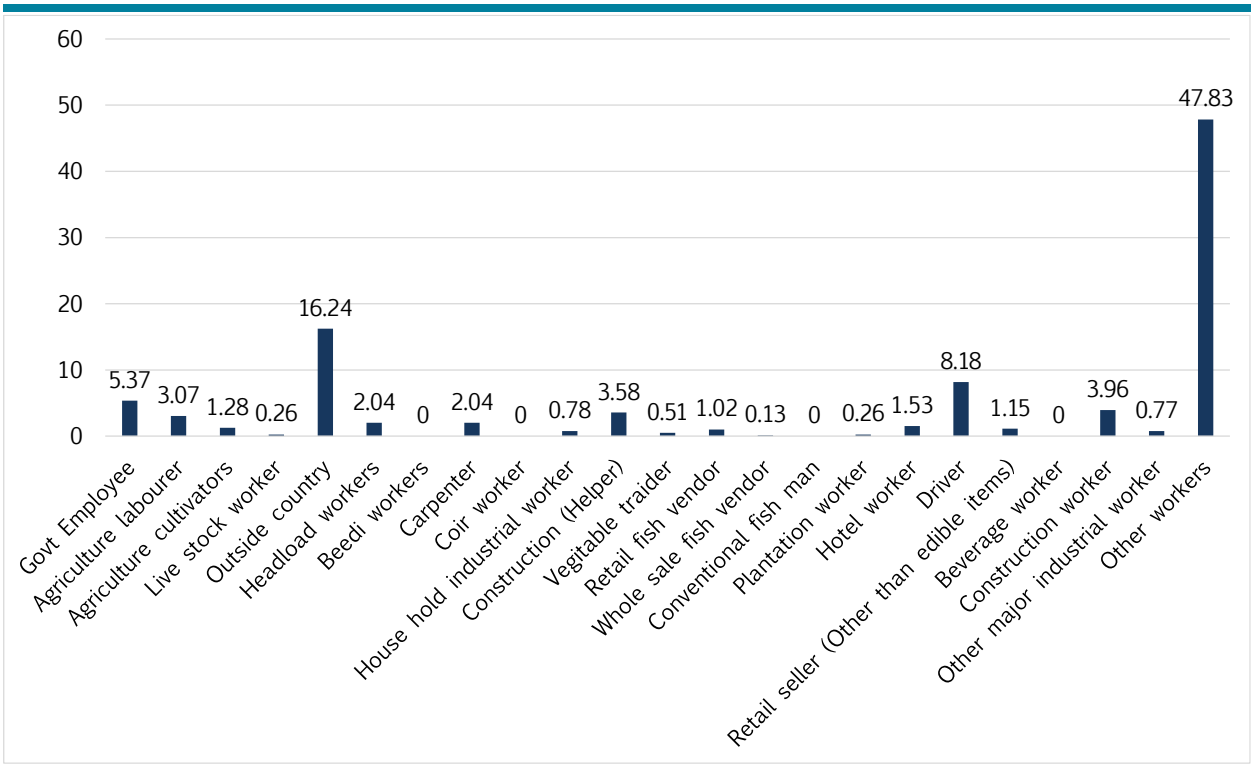


Fig. 4.10 Status of Employment in Pattambi Town

Source: Socio economic survey, 2016

4.4 SPATIAL DISTRIBUTION OF WORKERS

The concentration indices of cultivators, agricultural labourers, household industrial workers and other workers are shown in Fig. 4.11, 4.12, 4.13 and 4.14 respectively. It can be seen that the concentration of cultivators are maximum in Vallur (1), Thekkumuri (3), Kizhayur (9), Nethrimangalam (14), and Pallipad (15) wards on the northern and southern periphery of the municipality.

The concentration of agricultural labourers were found to be maximum Sankaramangalam (2), Thekkumuri (3), Kodalur East (5), Kizhayur (9), Kondoorkkara (8), Andoor Palliyal (10) Nethrimangalam (14), and Pallipad (15) wards. It can also be seen that higher concentration of agricultural labourers were seen in the same wards where the concentration of cultivators were higher which means that both the cultivators and agricultural labourers co-exist in the same wards. Agricultural land is concentrated on northern and south periphery of the municipality. From which it is seen that cultivators and agricultural labourers are well connected with agricultural land use.

High concentration of house hold industrial workers were found to be in College (6), Melepattambi (7), Kondoorkara (8), Kizhayur (9), Town west (12), and Nethrimangalam (14) wards. The concentration of other workers are distributed more or less uniformly in the municipality however the highest concentration of other workers are found in Vallur (1), Kodalur Centre (4), College (6), Mele Pattambi (7), Andoor Palliyal (10), Town East (11), Town West (12) and

Kozhikunnu (13) wards. House hold industrial works and commercials land use are concentrated on wards in the CBD area of the municipality. Other workers and public and semi public land use are concentrated on same wards along SH. Also Pattambi is a small geographic area having connectivity within the

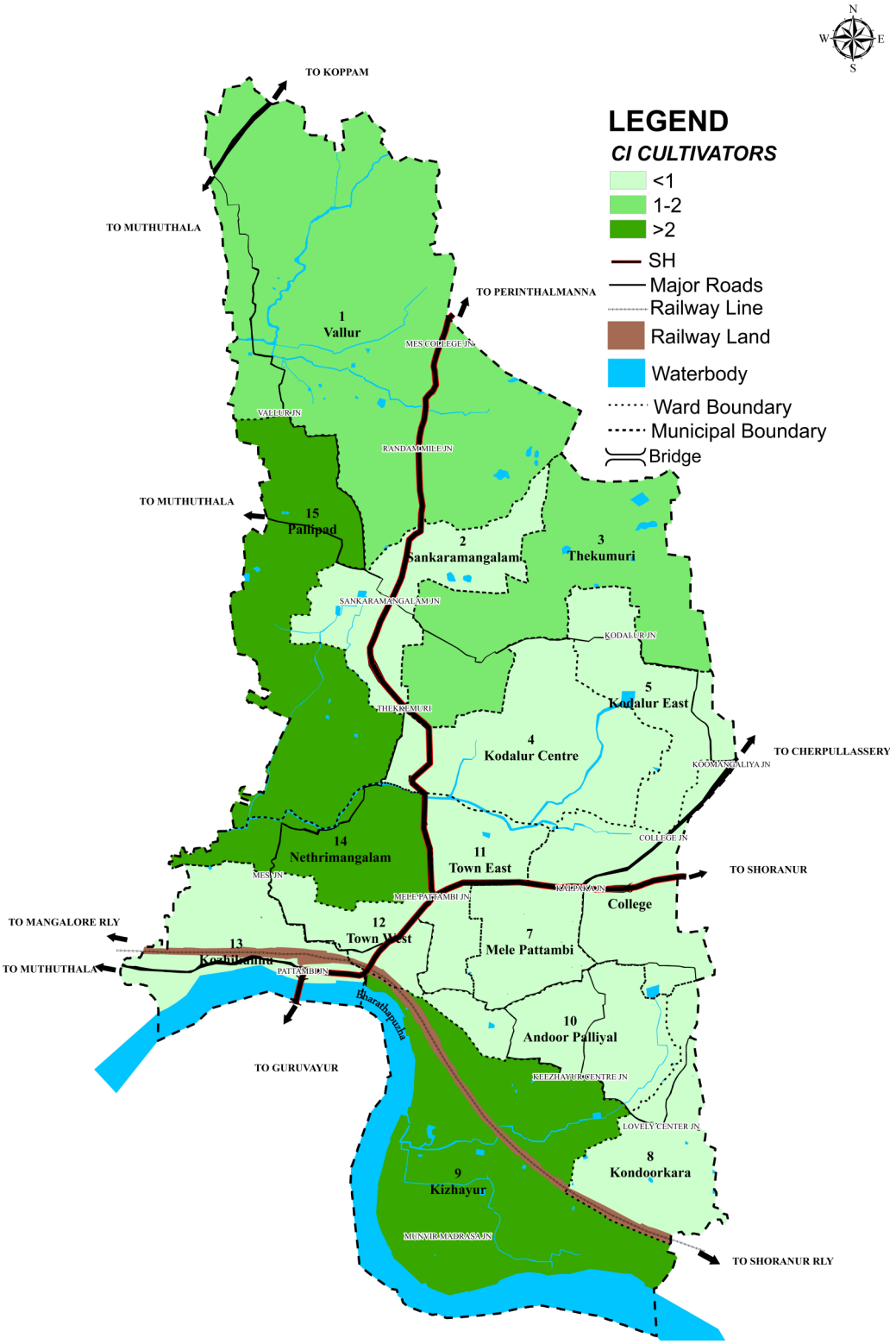


Fig. 4.11 Cultivators Concentration Index

(Source: 2011 Census)

district and near by districts. So distribution of house hold industries workers and other workers have less influence with land use.

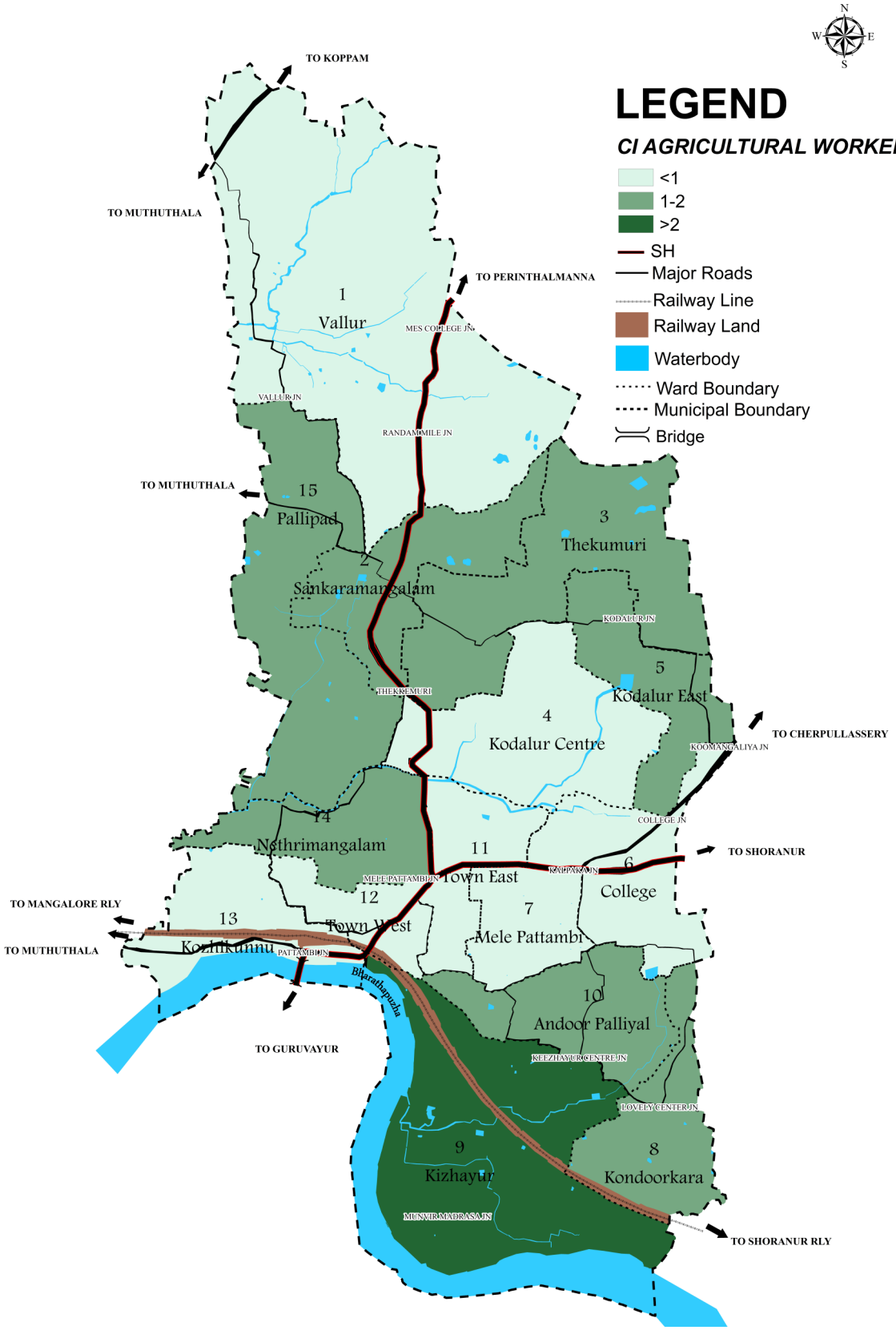


Fig. 4.12 Agricultural Workers Concentration Index (

Source: 2011 Census

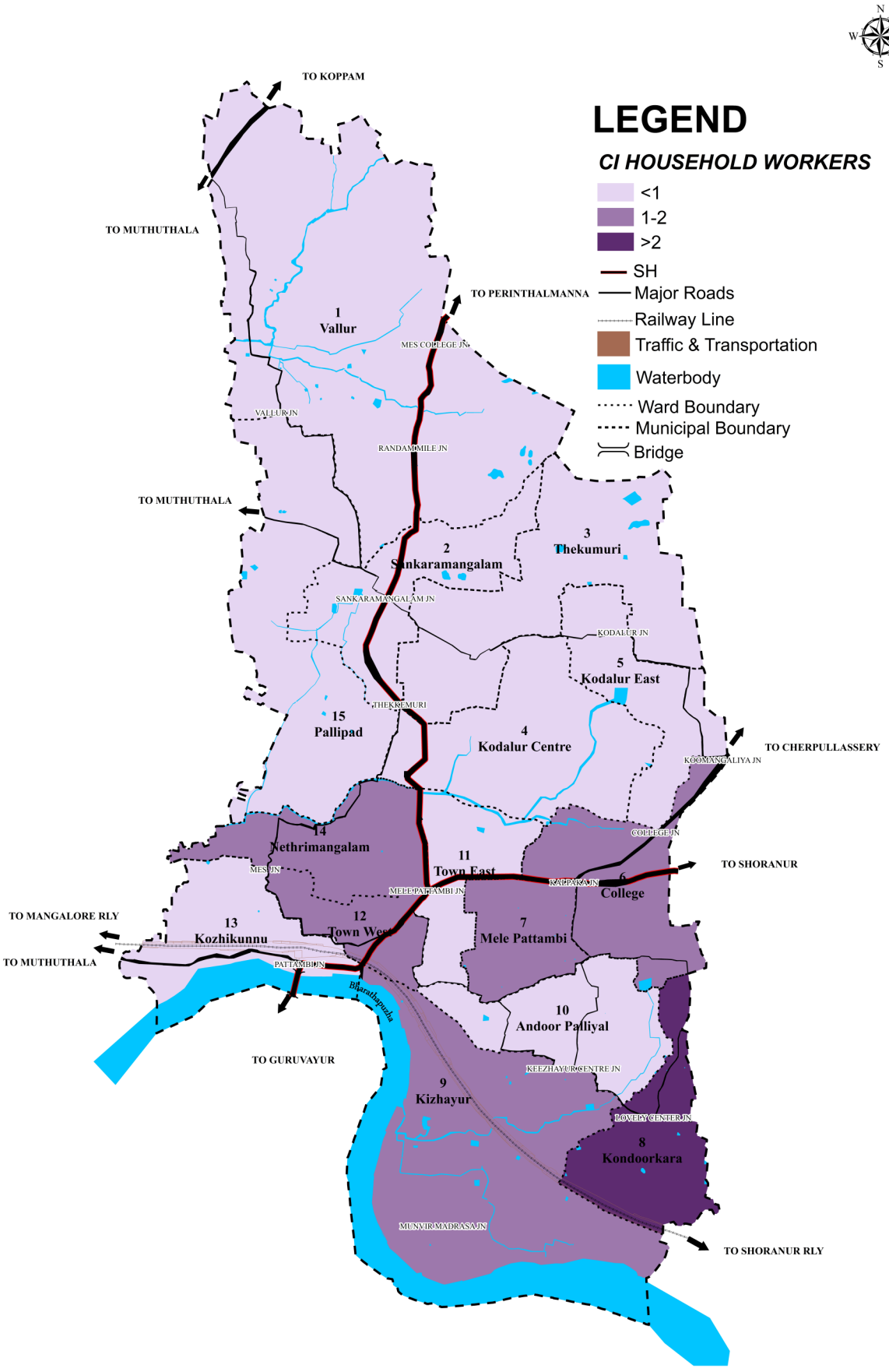


Fig. 4.13 Household Industrial Workers Concentration Index

Source: 2011 Census

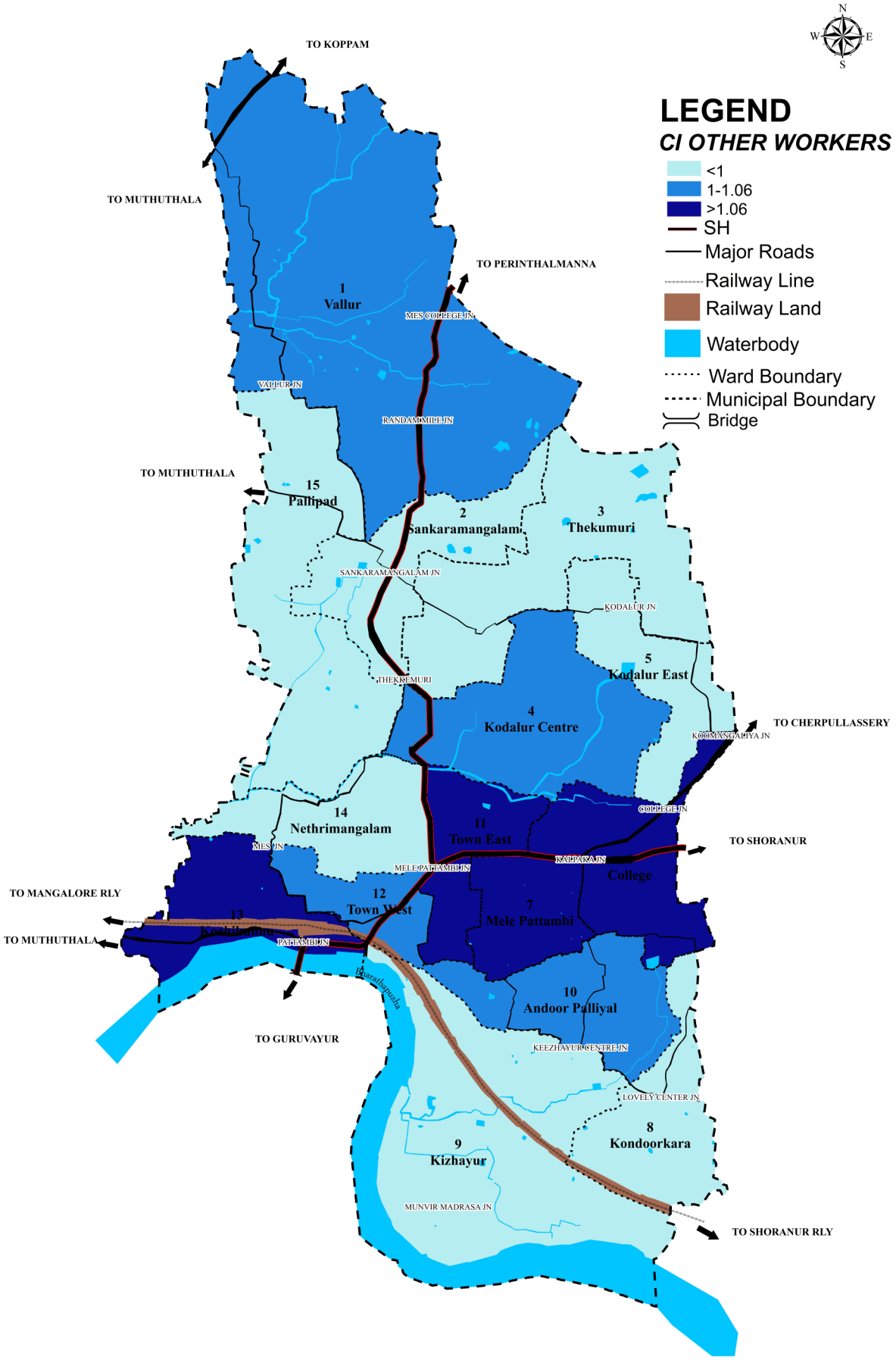


Fig. 4.14 Other Workers Concentration Index

Source: 2011 Census

4.5 DEPENDENCY RATIO

This indicator gives the ratio of non workers to the workers in the municipality. A high ratio means that the working people and the overall economy face a greater burden in supporting non-working population. Fig. 4.15 indicates the dependency ratio of the town in comparison with other municipalities in the district, the district and state average.

It can be seen that Pattambi municipality has the highest dependency ratio when compared with the state average of 1.88 and district average of 1.70. The municipality with a dependency ratio of 2.34 has also the highest value when compared with other municipalities in the district indicating higher burden of non-workers on the working population.

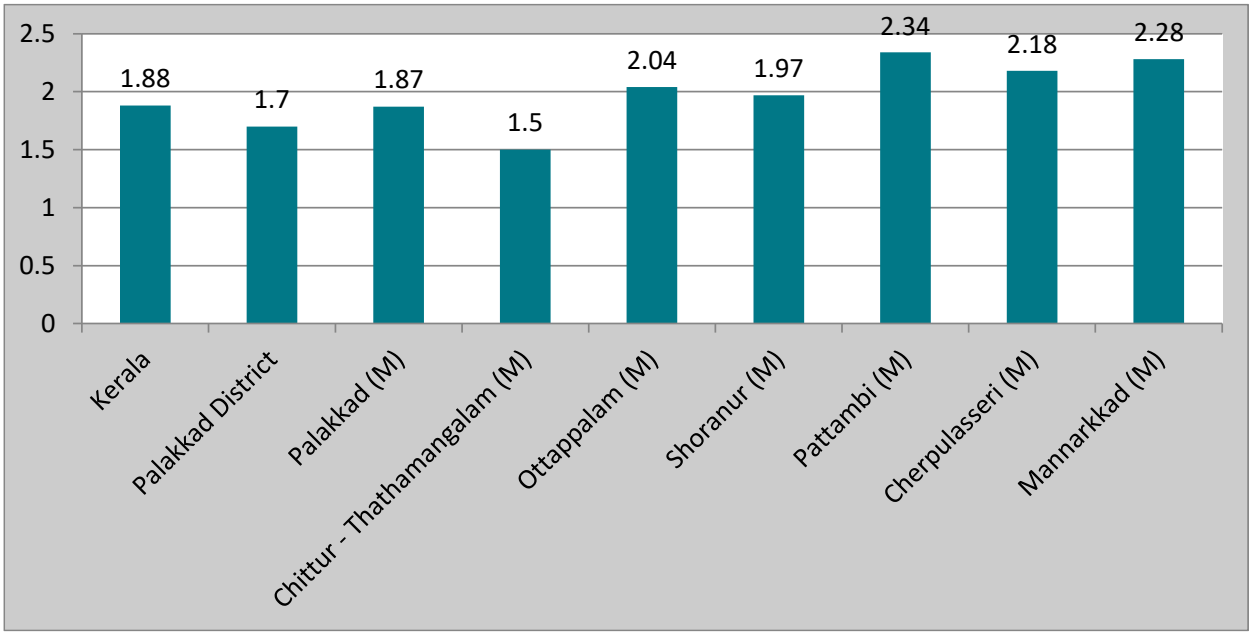


Fig 4.15 Dependency ratio of the town in comparison with other municipalities, with the district and the state.

Source Census 2011

4.6 INFERENCE

29.90% of population is working and among which 24.11% are main workers and 5.79% are marginal workers. Total number of workers are showing an uphill trend from 25.18% (1981) to 29.90% (2011) and the number of non workers are decreasing. Pattambi has the least WPR compared to Kerala, Palakkad, and other municipalities in the district.

While WPR is high when compared to nearby LSGDs, its relatively low when compared to similar town. However, WPR of males (25.22) is quite higher than females (4.68) indicating a strong potential for increased female WPR.

Major share of main workers are other workers (90.92%). The percentage of cultivators, agricultural labourers and household industries are decreasing. 93.61% of workers are tertiary workers. Socio economic survey reveals that only 1.92% of the total population work in public sector. Pattambi town has high dependency ratio of 2.34. Dependency ratio is higher compared to other municipalities and district average and state average.

Considering the overall occupational structure, tertiary sector seems to be predominantly favourable with worker populace, while the primary sector plummeting since last two decades offers evidence of increasing urbanization character.

The Concentration of cultivators and agricultural laborers are mainly concentrated in southern peripheral areas near the Bharathapzha and the railways. and North and north-west part also This is due to the availability of suitable land for cultivation.

5

Existing Land Use

5. EXISTING LAND USE

Land use analysis is done to broadly categorize how the land is used. Each type of use has its own characteristics that can determine compatibility, location and preference to other land uses in the town. The land use plan, brings together consideration for both the physical development as well as the social characteristics of the town.

Land use mapping and related information is used to analyze the current pattern of development, and serves as the framework for formulating how land will be used in the future. To arrive at an optimum plan that will be both effective and, the plan must account for past development activity as well as current market factors and conditions that shape where and how land will be developed.

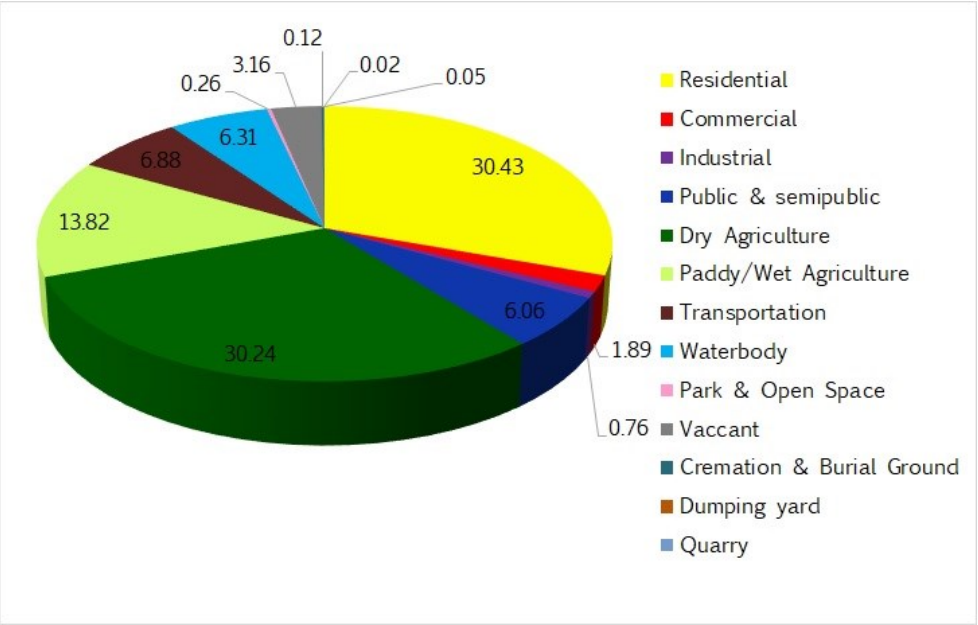
5.1 GENERAL ANALYSIS OF LAND USE

Pattambi Town spreads over an area of 15.84 km^2. A breakup of the urban area of Pattambi Town under various categories including residential, commercial, industrial, traffic and transportation, recreational utilities, public and semi public uses were done. Detailed analysis of the town have been done on the basis of existing land use pattern. Categorization of the existing land use, 2012 based on the manual survey is presented in table 5.1 and fig.5.1 shows the land use break up of existing land use.

Table 5.1 Land use break up 2016

SL No	Landuse	Area (In Sq.Km.)	% of total area
1	Residential	4.82	30.42
2	Commercial	0.30	1.89
3	Industrial	0.12	0.76
4	Public & Semi public	0.96	6.06
5	Dry Agriculture	4.79	30.23
6	Paddy / Wet Agriculture	2.19	13.82
7	Transportation	1.09	6.88
8	Water body	1.01	6.38
9	Park and Open Space	0.04	0.25
10	Cremation & Burial Ground	0.0218	0.14
11	Dumbing yard	0.0025	0.02
12	Quarry	0.0087	0.05
13	Vaccant	0.49	3.10
	Total	**15.84**	**100**

Source: Land use survey by LSGD Planning, Palakkad.



Source: Land use survey by LSGD Planning, Palakkad.

Fig. 5.1 Land Use Break up 2016

As per the existing land use plan 2016 shown in the Fig 5.2, it has been observed that 46.47% of the total municipal area is under non agricultural use while the remaining 53.53% of the area is under agriculture use, water bodies and vacant land at present. The prevailing predominant land use is agricultural (44.06%). Around 30.43% of the developed area is under residential land use. Nearly 15.85% of the municipal area have already been developed for various other uses such as Commercial, Industrial, Public and semi public, Parks and Transportation which have been discussed below.

5.2 LAND USE CONCENTRATION PATTERN

The concentration pattern of a land use gives an idea about where that particular land use is concentrated within the Municipality. The concentration pattern of land use can be ascertained by the concentration index of the land use which is calculated as follows.

The Concentration Index may be greater than one, equal to one or less than one. Wards with any particular land use concentration index greater than one indicates that the land use under consideration is highly concentrated in that area.

$$\text{Concentration index (C.I) of a particular land use in the municipality} = \frac{\text{(Area of that land use in a ward) / (Total area of the ward)}}{\text{(Area of that land use of the Municipality)/ (Total area of the Municipality)}}$$

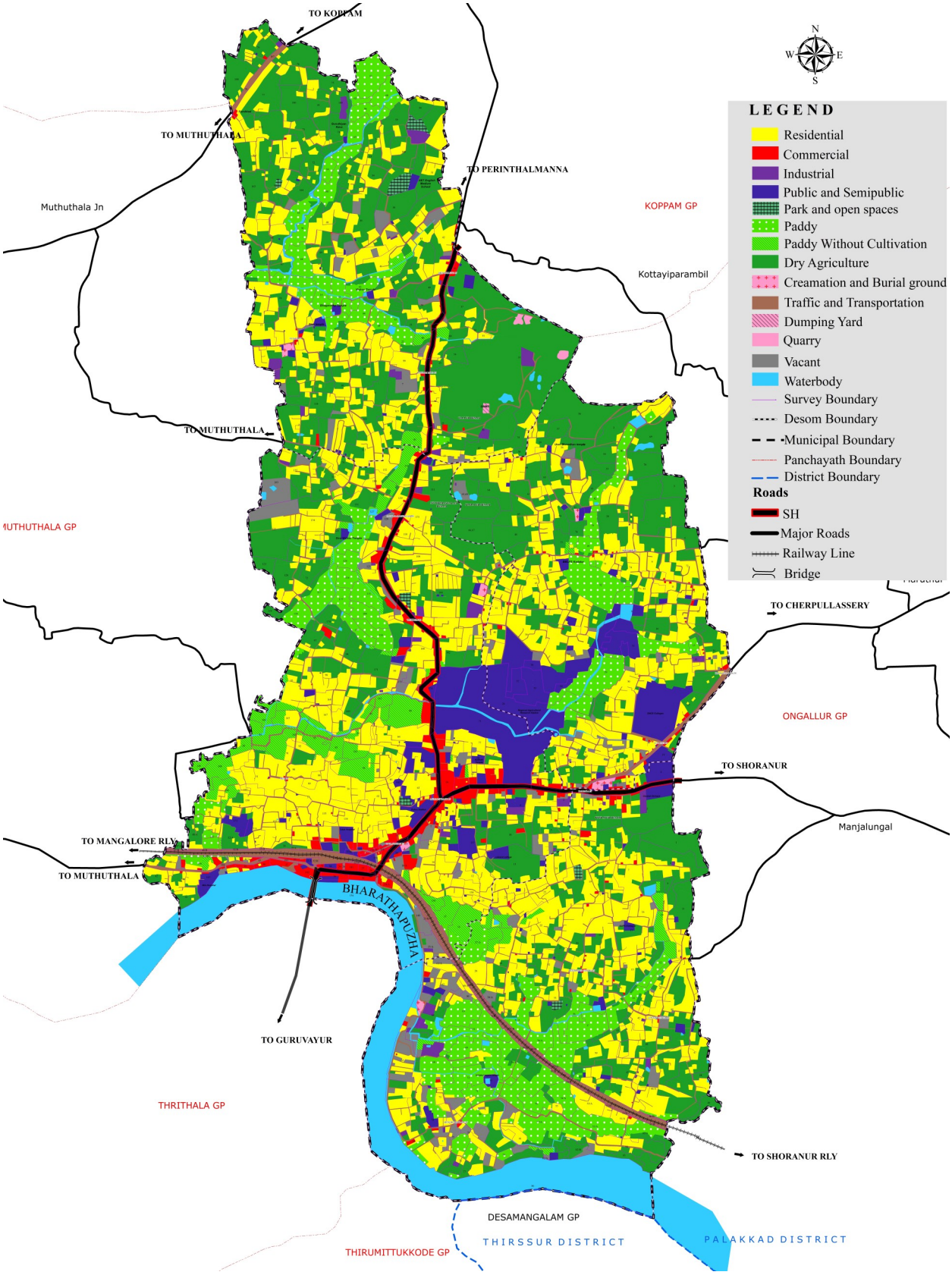


Fig. 5.2 Existing land use 2016

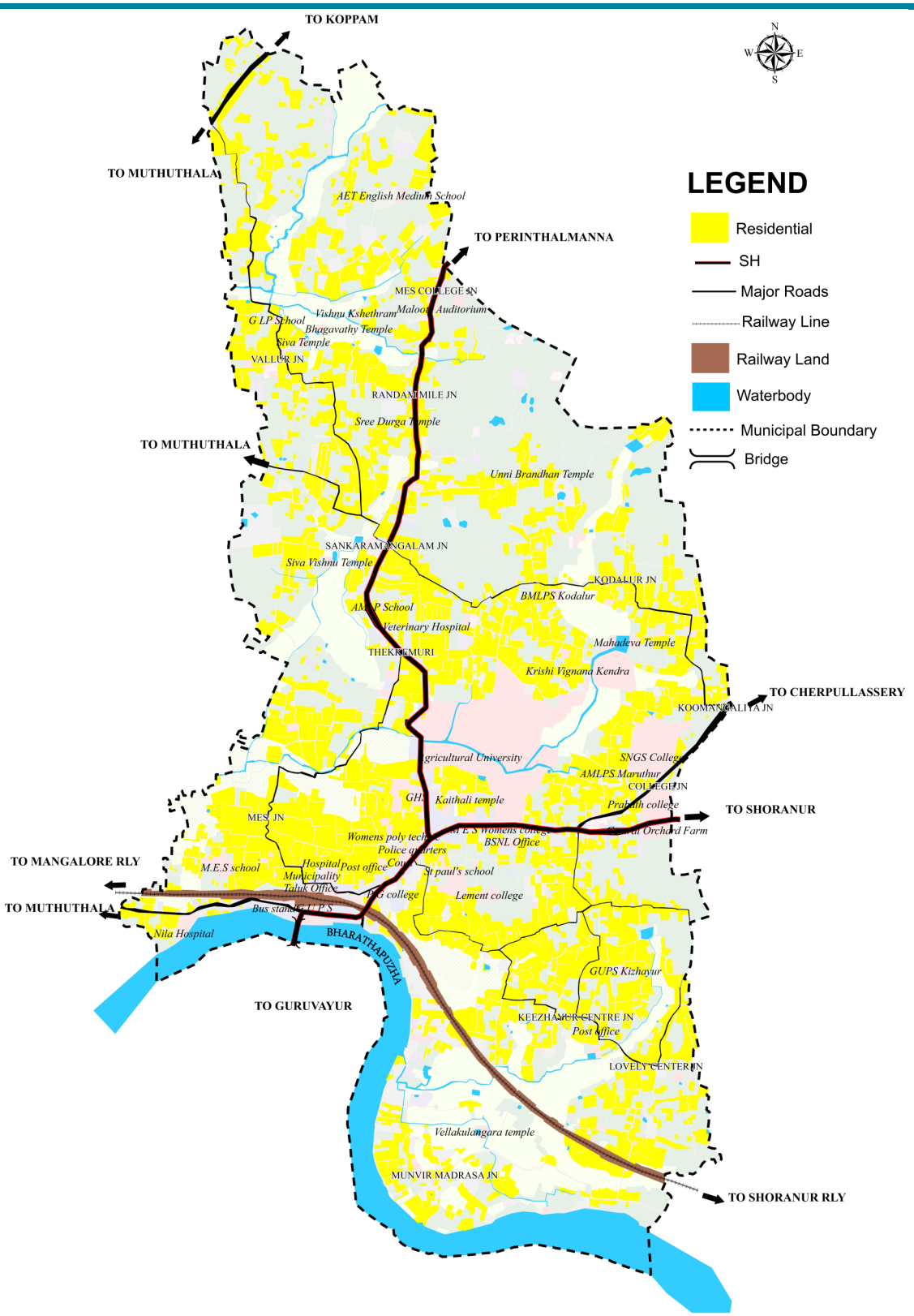


Fig. 5.3 Spatial distribution of Residential land use

.2.1 Residential Land use

As per the existing land use 2016, the major land use is residential. 30.43% of land in the municipality is under residential use. This include an area of 4.82 km^2. This shows that the town is characterized by dense develop-

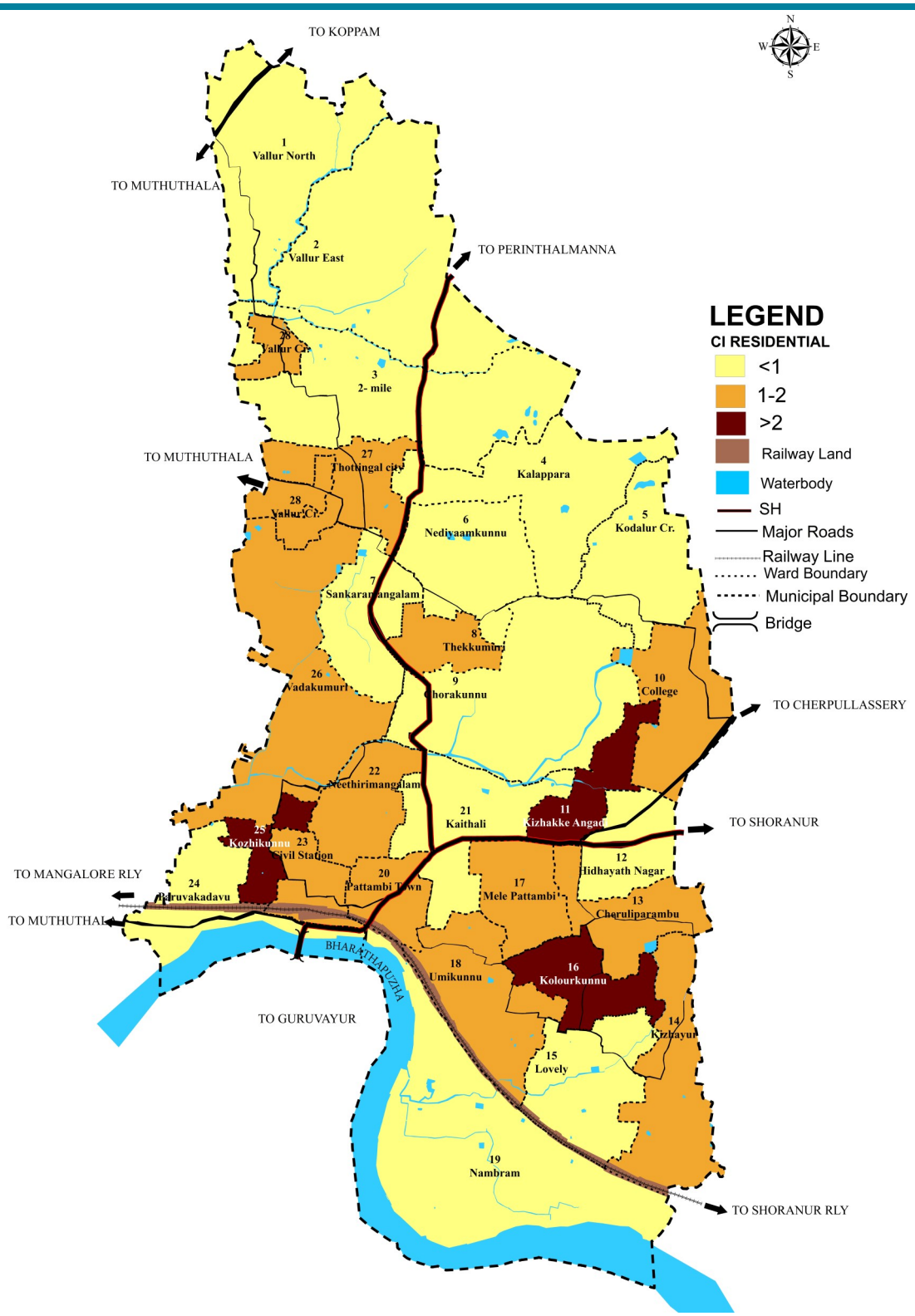


Fig. 5.4 Concentration index of Residential land use

ment with smaller size of the plots. Residential land use is distributed throughout the municipal area. Fig. 5.3 and Fig. 5.4 shows distribution of residential land use and ward wise residential concentration index of Pattambi Town respectively. Central areas and western half of town are highly concentrated with residences. On moving to the northern periphery residential dwellings gradually decreases. Easy access to the major roads makes these wards more attracted

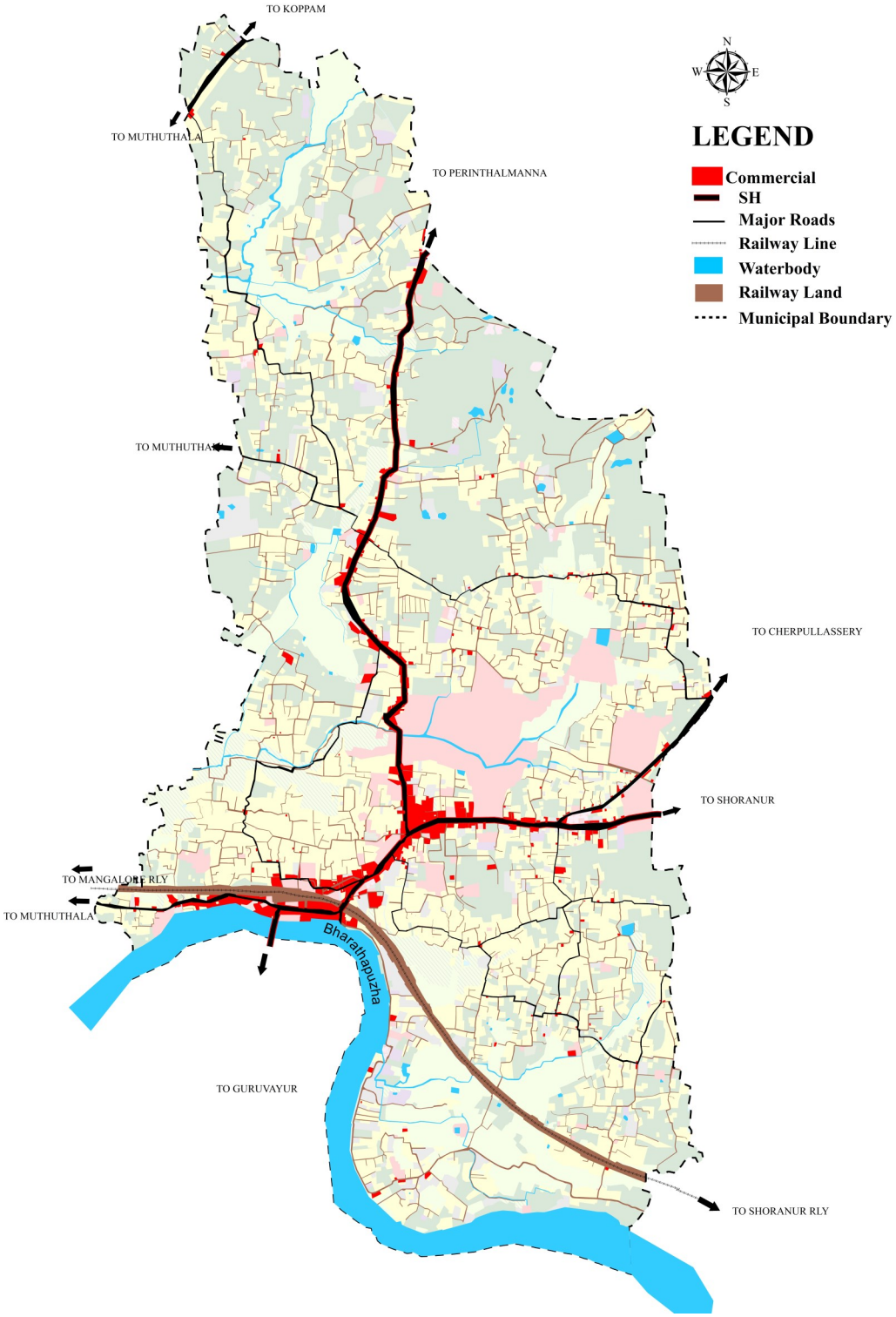


Fig. 5.5 Spatial distribution of Commercial land use

to residents.

5.2.2 Commercial Land use

In Pattambi Town, the commercial activities are mainly concentrated along the sides of Pattambi-Palakkad road and Pattambi-Perinthalmanna Road. 1.89%

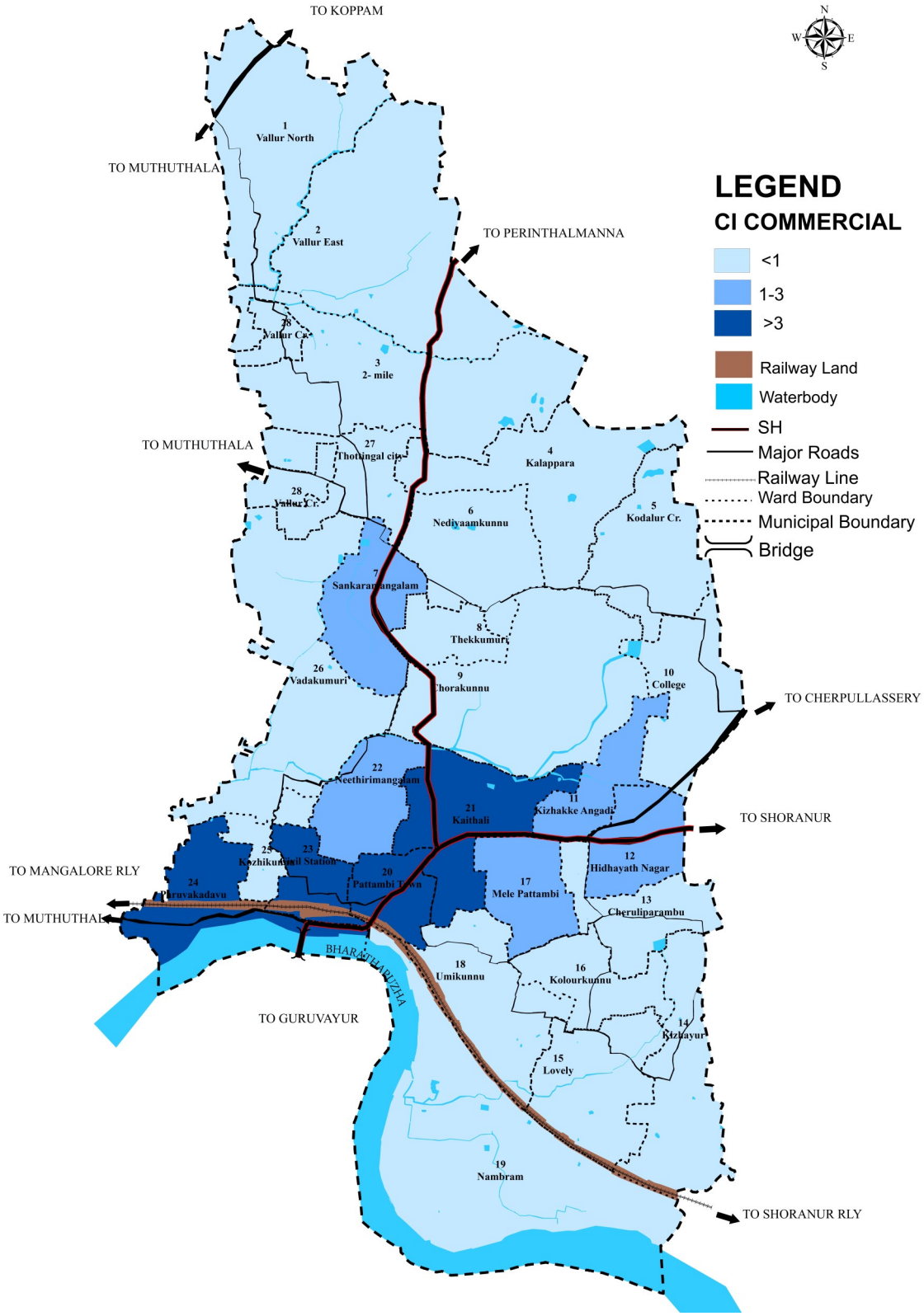


Fig. 5.6 Concentration index of commercial land use

of land in the municipality is under commercial use which constitutes 30 Hectares of the municipal area. Spatial Distribution of commercial land use is shown in Fig. 5.5. Commercial

activities are concentrated at the intersection of state highways and along

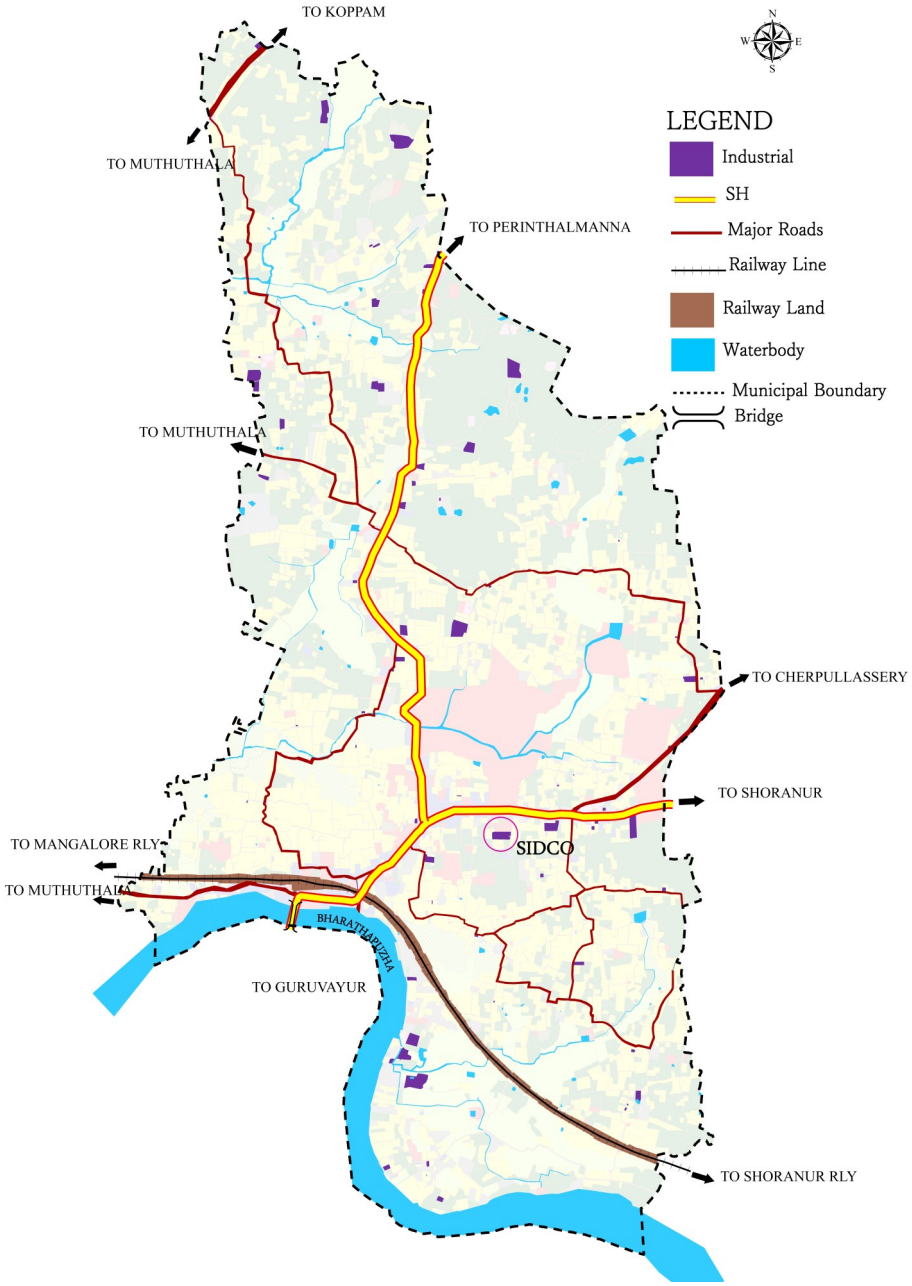


Fig. 5.7 Spatial distribution of Industrial land use

major traffic corridors. Spatial distribution of concentration index of commercial land use is shown in the Fig 5.6 Commercial land use is mainly concentrated in the wards Pattambi Town (20), Kaithali (21), Civil Station (23) and Paruvaka-davu(24).

5.2.3 Industrial Land use

At present, the area under industrial use is around 12 Ha, which is about 0.76% of the total area of town. Industrial use covers 1.62% of the total built up area. There are no medium and major scale industries in Pattambi town

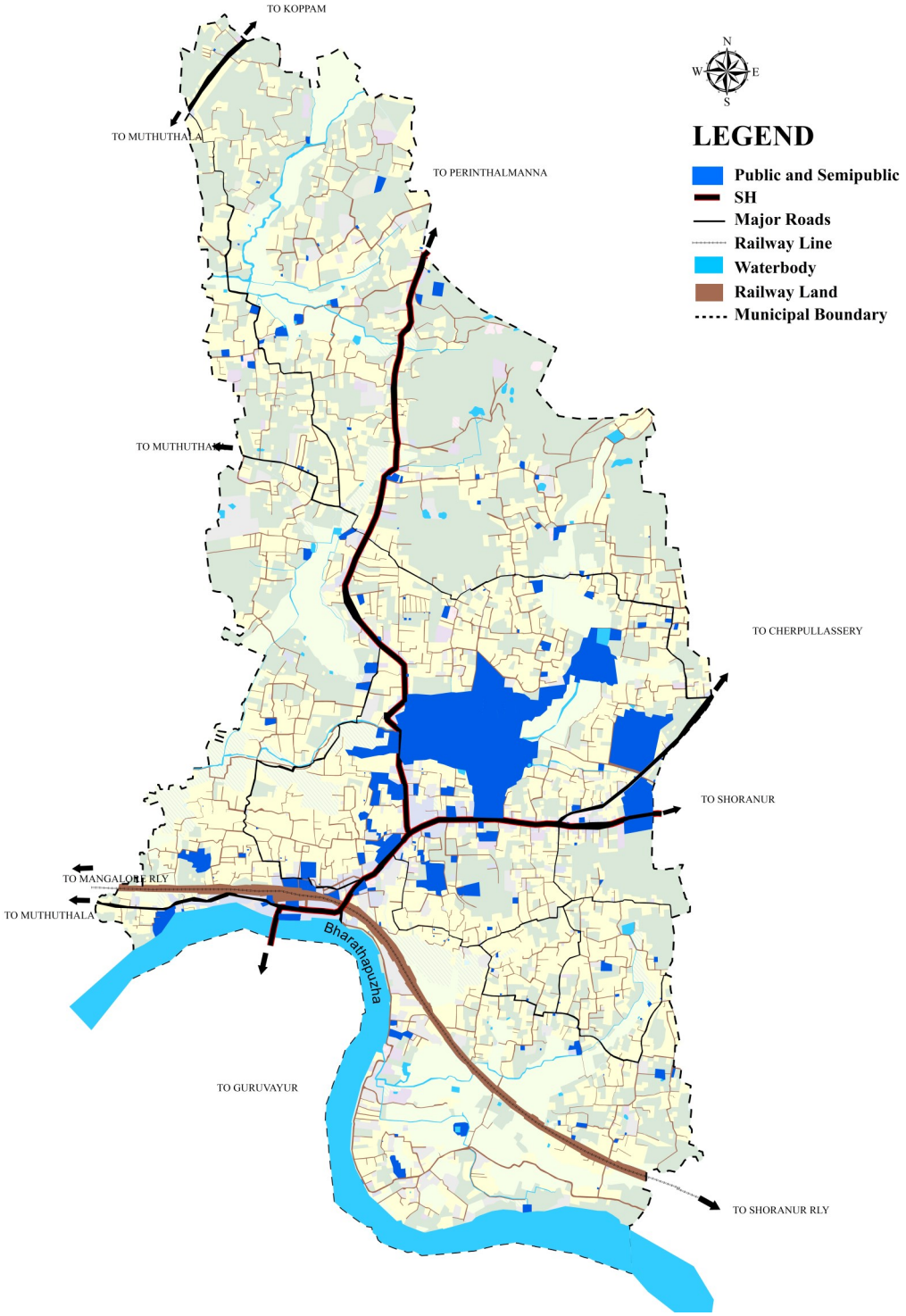


Fig. 5.8 Spatial distribution of Public and semi public land use

and the existing industries are of small scale type.

As per the spatial distribution the industrial land use is seen scattered through out the Town. There exists a mini industrial estate of one acre extent run by SIDCO in the Town. Spatial Distribution of Industrial land use is shown in Fig. 5.7.

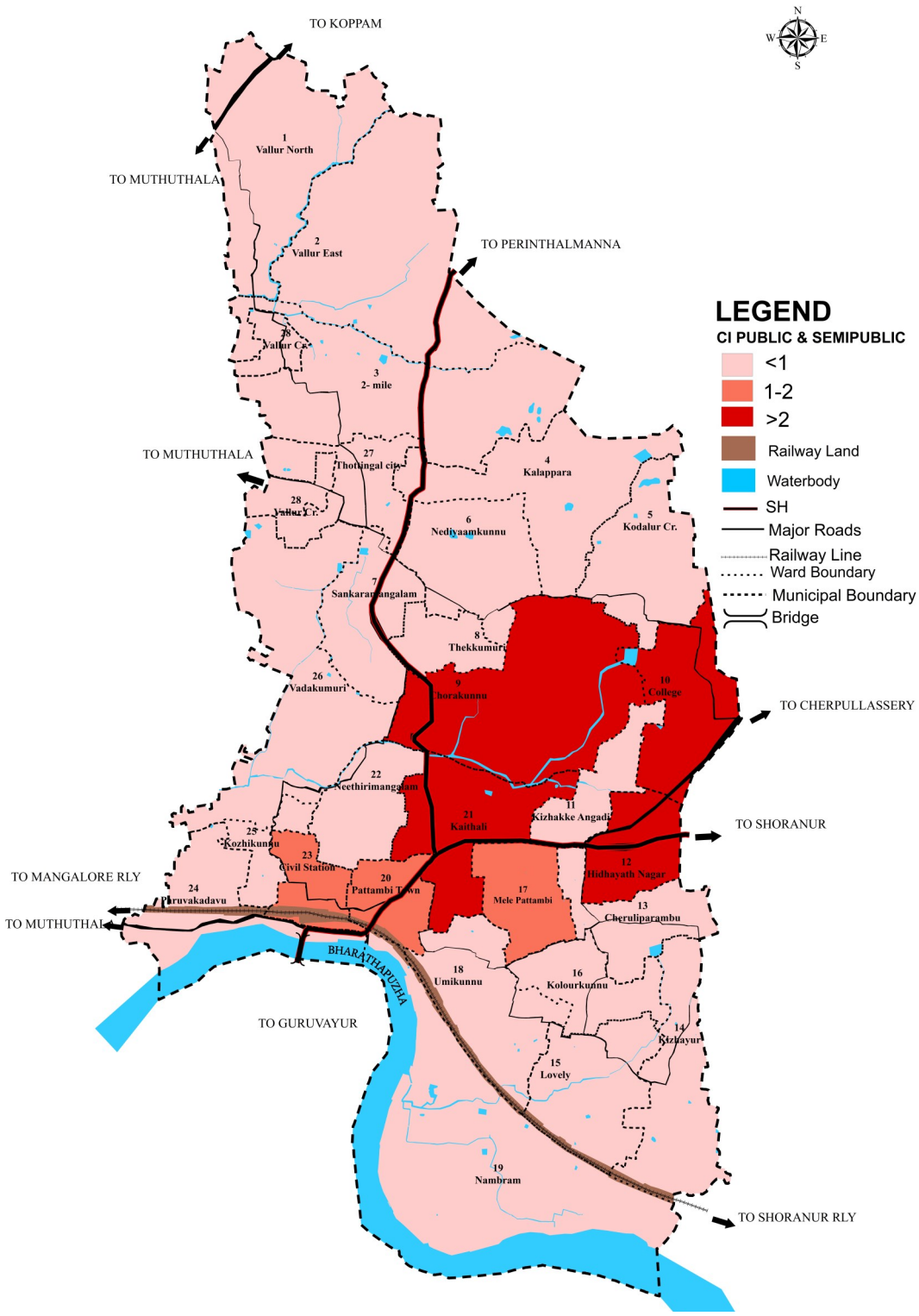


Fig. 5.9 Concentration index of Public and Semipublic land use

5.2.4 Public & Semi public Land use

Govt./Semi Govt. offices, educational and research institutions, medical and health institutions, social, cultural and religious institutions, Govt. lands etc. are grouped under this category. An area of 96 hectares which is 13 % of the total developed area and 6.06% of total municipal area of the city is under public and semi public use. Major Public land use is that of Regional Agricul-

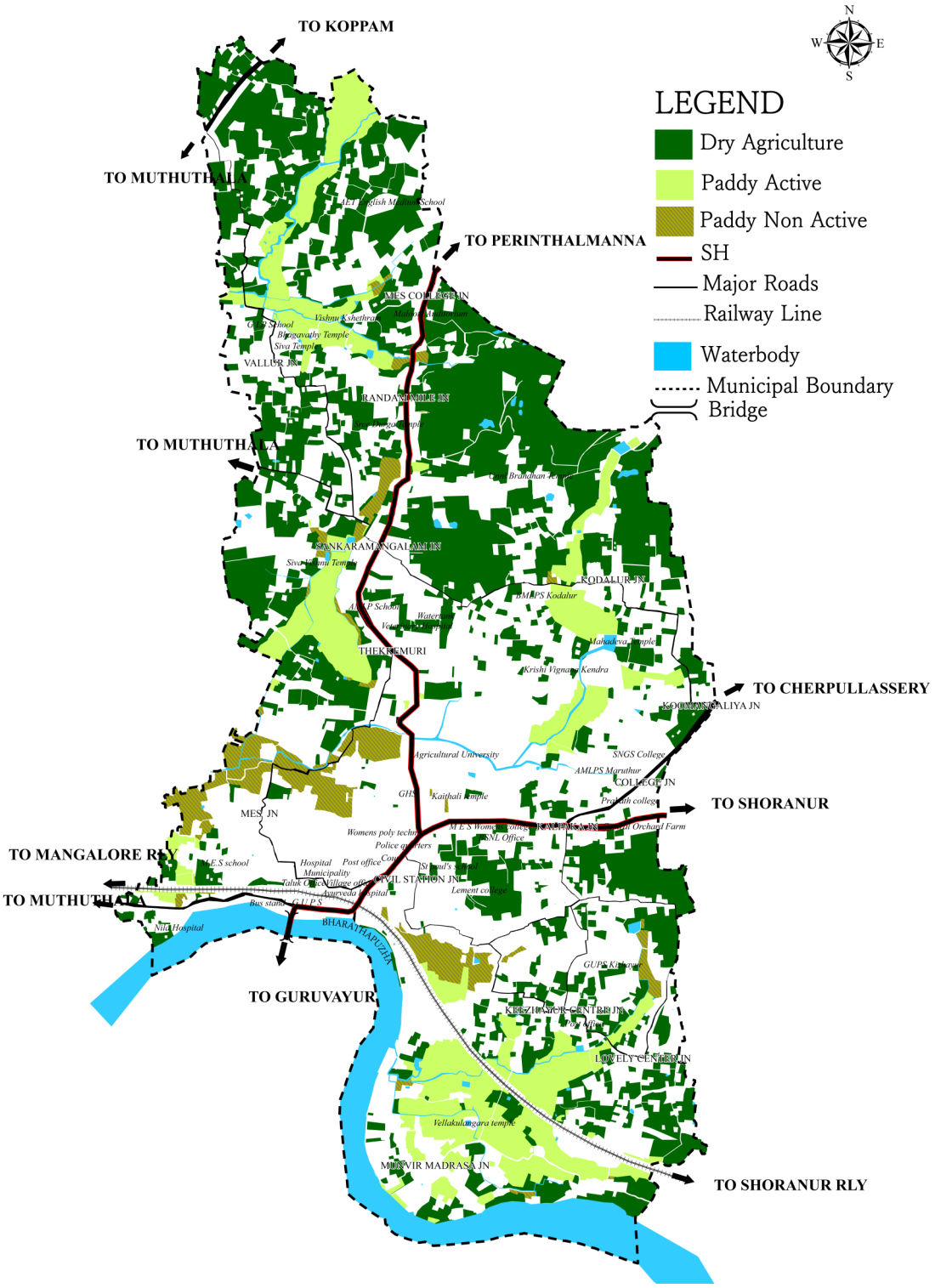


Fig. 5.10 Spatial distribution of Agricultural land use

tural Research Station which

includes paddy under research purpose. Spatial Distribution of Public and Semi Public land use is shown in Fig. 5.8. Fig. 5.9 shows distribution of concentration index of public and semipublic land use. Major Public land use is that of RARS, Pattambi, Others Public buildings like SNGS college, schools and other educational institutions, govt. offices etc are contributing for this concentration

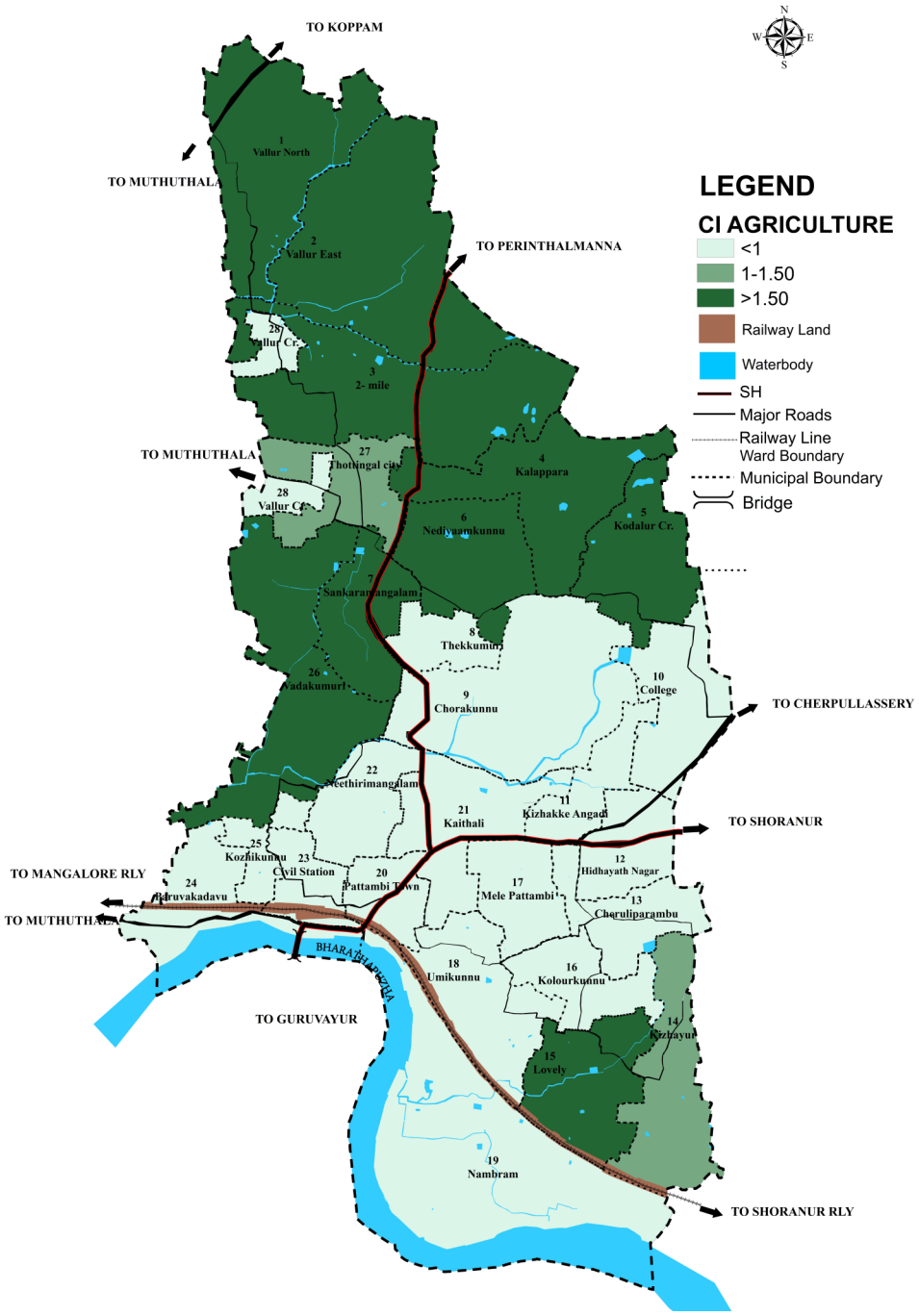


Fig. 5.11 Concentration index of Agricultural land use

of public uses in wards Chorakunnu (9), College (10), Hidayath Nagar (12), Kaithali (21).

5.2.5 Agriculture Land use

Agriculture as a whole constitute about 44.06% of the total municipal area. 30.24% of land in the municipality is used for dry agriculture (479 Ha) and 13.82% is used for wet agriculture (219 Ha). Dry agriculture includes mainly Rubber and Coconut cultivation areas. The major wetland crop is paddy which is spread through out the Municipal area. Agricultural use under paddy cultiva-

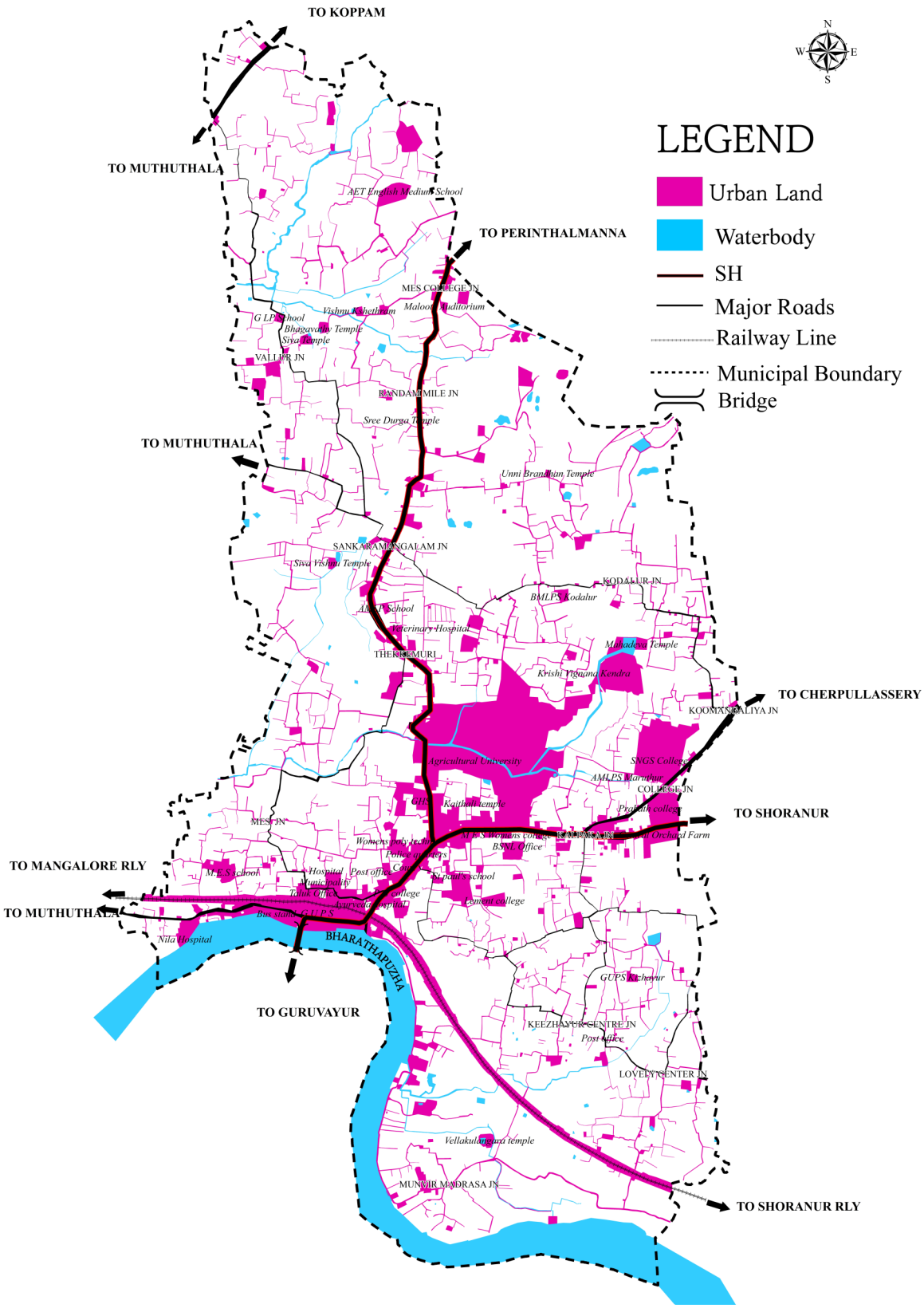


Fig. 5.12 Spatial distribution of Urban land use

tion includes cultivated paddy land

and uncultivated paddy fields (5. Ha) which are cultivable. Agriculture land use is distributed mainly in the northern and southern region of Town. Spatial Distribution of agricultural land use is shown in Fig. 5.10. Spatial distribution of

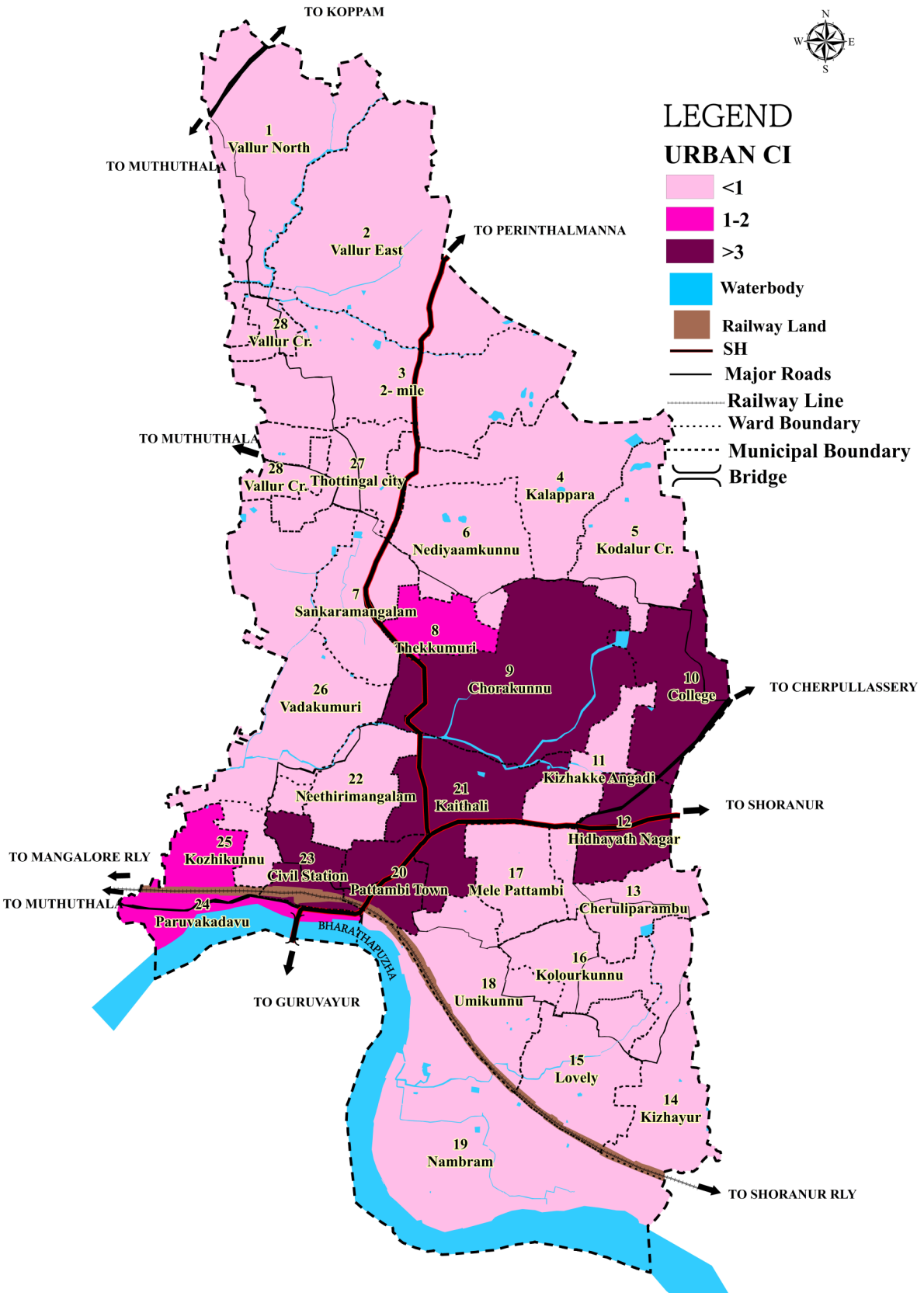


Fig. 5.13 Concentration index of Urban land use

concentration index of agricultural land use is shown in Fig 5.11. From the map it is clear that agricultural area is mostly concentrated along the northern half and south west periphery of the town.

From the map of previous chapter, such as fig. 4.11 and 4.12 it can be seen that the presence of cultivators and agricultural workers are in the same area, hence this area is suitable for cultivation.

5.2.6 Urban Land use

Urban land use was obtained by combining commercial, industrial, public & semi public, transportation, cemetery & open spaces. Spatial Distribution of Built-up land use is shown in Fig. 5.12.

Spatial distribution of concentration index of urban land use is shown in Fig 5.13. From the map it is clear that urban land use area is mostly concentrated along the major traffic corridors and CBD area of the town.

5.2.7 Transportation

System of transportation has evolved as a result of the intersection between various land use functions. Its requirement is the physical manifestation of the mobility requirement of people. The area covered by transportation comes to 6.88% of total Municipal area. The percentage of developed area under this use is 14.82%. Two state highways connecting to nearby districts are passing through the Town. Railway connects town to other important cities of India . All regions of the municipality are well connected by roads but their condition needs improvement.

5.2.8 Water bodies

An area of 100 hectares which is 6.31% of total municipal area is under water bodies use that includes Bharathapuzha river, ponds, thodu and canal network.

5.2.9 Park and Open Spaces

Recreational facilities like parks, play ground, stadium, club etc. are important for leading quality social life in any city. Pattambi town has play grounds and no parks. The total area under recreational use in the town comes out to be 0.26% of the total Municipal area.

5.2.10 Undeveloped Areas /Vacant Lands

Vacant land includes the area which is presently not being developed and is under no use. In municipality, at present 0.51sq.km of lands are seen vacant that is neither occupied by residents nor used for any other developmental purposes. It constitute 3.22% of the total municipal area.

5.2.11 Other uses - Cemetery/Cremation Ground/Quarry and Dumping yard

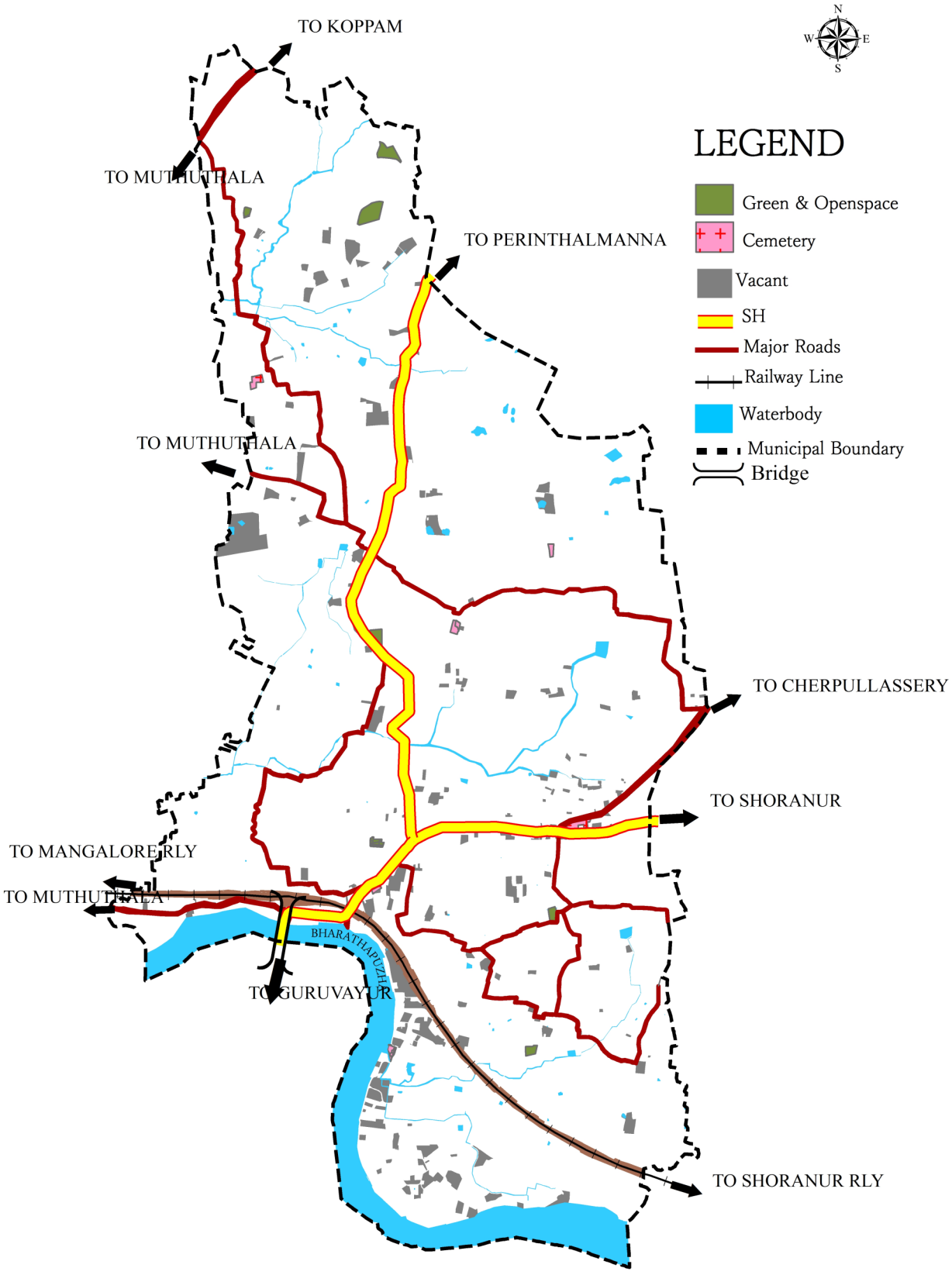


Fig. 5.14 Spatial distribution of Open spaces, Vacant lands & Cemeteries

Other uses like Cemetery/Cremation Ground/Quarry and Dumping yard coming under hazardous use constitutes nearly 0.02 sq. km. It constitutes 0.12% of the municipal area. Fig. 5.14 shows the spatial distribution of open spaces, vacant lands and other land uses.

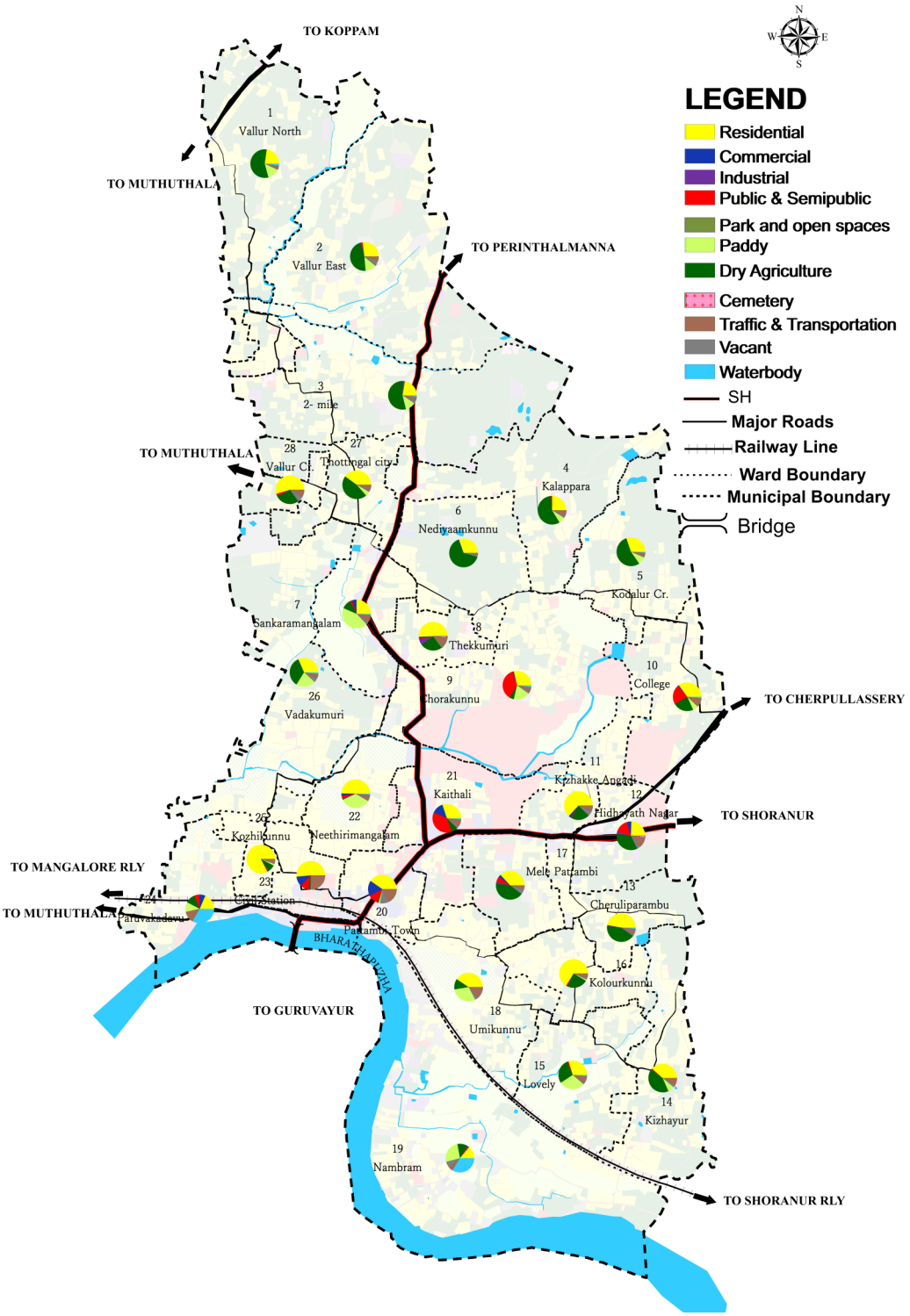


Fig. 5.15 Ward wise land use split up of Town

Table No. 5.2 Ward wise land use split up in Ha

Ward No	Ward Name	Residential	Commercial	Industrial	Public	Park & Openspace	Paddy	Dry Agriculture	Transport & Communication	Vacant	Water body	Cremation & burial ground	Dumping yard	Quarry
1	Vallur North	20.1	0.2	0.7	0.2	0.2	12.2	49.7	4.1	0.2	2.1	0.0	0.0	0.0
2	Vallur East	33.1	0.6	1.5	1.5	2.3	15.6	57.8	6.3	4.7	1.0	0.0	0.0	0.0
3	Randam mile	24.4	0.4	2.4	0.9	0.0	12.5	59.3	5.0	2.7	1.8	0.4	0.3	0.9
4	Kalappara	17.8	0.3	0.2	1.1	0.0	5.1	40.9	4.7	1.8	0.7	0.2	0.0	0.0
5	Kodalur Cr.	15.2	0.2	0.0	0.3	0.0	4.5	27.4	2.7	0.0	0.5	0.0	0.0	0.0
6	Nediyaamkunnu	15.4	0.6	0.3	0.1	0.0	0.0	32.6	1.3	1.0	0.4	0.0	0.0	0.0
7	Sankaraman-	10.1	2.0	0.0	1.0	0.0	17.6	4.4	3.3	1.4	0.5	0.0	0.0	0.0
8	Thekkumuri	10.0	0.4	1.1	0.4	0.5	0.0	5.0	2.0	0.0	0.0	0.4	0.0	0.0
9	Chorakunnu	29.2	1.2	0.2	37.5	0.0	19.0	5.0	5.3	2.7	2.3	0.0	0.0	0.0
10	College	16.4	0.6	0.3	10.3	0.0	2.9	11.0	4.7	0.3	0.8	0.0	0.0	0.0
11	Kizhakke Angadi	16.3	0.7	0.0	0.3	0.0	0.0	5.3	1.9	1.3	0.1	0.0	0.0	0.0
12	Hidhayath Nagar	7.6	1.6	0.7	4.9	0.0	0.0	10.7	3.6	1.2	0.0	0.7	0.0	0.0
13	Cheruliparambu	15.8	0.3	0.5	0.0	0.4	0.0	14.0	2.0	0.4	0.4	0.0	0.0	0.0
14	Kizhayur	20.8	0.1	0.2	0.7	0.0	4.0	22.7	4.7	1.3	0.3	0.0	0.0	0.0
15	Lovely	15.1	0.1	0.0	0.8	0.4	14.9	14.1	4.4	0.7	0.7	0.0	0.0	0.0
16	Kolourkunnu	20.2	0.1	0.1	0.4	0.0	0.4	7.3	1.7	0.5	0.0	0.0	0.0	0.0
17	Mele Pattambi	11.4	0.9	0.6	1.9	0.0	0.0	12.8	1.4	1.8	0.0	0.0	0.0	0.0
18	Umikunnu	22.1	0.0	0.0	0.1	0.0	16.4	6.6	7.6	1.9	0.3	0.0	0.0	0.0
19	Nambram	27.0	1.0	2.3	2.2	0.0	51.0	22.4	9.3	13.9	65.6	0.3	0.0	0.0
20	Pattambi Town	9.0	3.8	0.0	2.6	0.0	0.4	0.3	3.9	2.3	0.0	0.2	0.0	0.0
21	Kaithali	15.7	6.8	0.3	19.7	0.4	0.2	3.7	4.1	1.6	0.6	0.0	0.0	0.0
22	Neethi-	16.8	0.9	0.0	1.2	0.0	11.7	0.4	2.4	0.0	0.5	0.0	0.0	0.0
23	Civil Station	10.9	2.4	0.0	2.1	0.0	0.0	0.4	5.1	0.3	0.0	0.0	0.0	0.0
24	Paruvakadavu	11.1	3.9	0.0	3.6	0.0	6.6	6.7	7.7	0.5	20.0	0.0	0.0	0.0
25	Kozhikunnu	12.6	0.0	0.0	0.2	0.0	0.3	1.3	0.9	0.0	0.0	0.0	0.0	0.0
26	Vadakumuri	31.1	0.3	0.0	0.9	0.0	21.7	34.1	4.5	5.5	1.6	0.0	0.0	0.0
27	Thottingal city	15.1	0.4	0.2	0.1	0.0	1.9	17.4	2.7	0.5	0.1	0.0	0.0	0.0
28	Vallur Centre	11.4	0.1	0.1	0.6	0.0	0.1	5.8	1.8	1.4	0.1	0.0	0.0	0.0
Total		482	29.8	11.9	95.5	4.2	219	479	109	49.9	100	2.2	0.3	0.9

Source: Land use survey by LSGD Planning, Palakkad.

5.3 DIRECTION OF GROWTH

The facilities of transport or communication increase the population and such a tendency leads to the growth of towns. Pattambi Town is growing in the east west direction mainly because of the existence of traffic corridors. Population density is found highest around the core areas of the city. Central crowding occurs mainly due to easy access routes, commercial activity and presence of public institutions. Geographically, this main commercial centre is located at the heart of the most intensively built-up and populated area, accessible from major arterial roads to allure the most number of visitors.

5.4 WARD WISE LAND USE ANALYSIS

The analysis of land use in the 28 wards of municipality shows that majority of wards have higher residential percentage. Fig 5.15 shows ward wise land use split up of Pattambi Town, while its further details are presented in table 5.2.

5.5 INFERENCE

As per existing land use plan 2016, 46.47% of total municipal area is under non agricultural use and the remaining 53.53% is under agricultural use, water bodies and vacant lands. Predominant land use in the municipality is agriculture (44.06%) in which 30.24% of land in the municipality is used for dry agriculture & 13.82% is used for wet agriculture. Dry agriculture (4.79 Sq. Km) includes mainly rubber and coconut cultivation.

Major wetland crop is paddy (2.19 Sq. Km) in which 0.50 Sq. Km is paddy without cultivation. Agriculture land use is distributed mainly in the northern and southern periphery of Town. Vallur north, Vallur east, Randam mile, Kalappara, Kodalur centre, Nediyankunnu, Sankaramangalam, Kizhayur, Louly, Vadakkumuri, & Thottungal city are the wards with agriculture CI greater than 1.

About 30.37% municipal is used for residential purpose, amongst which Kizhake angadi, Kolorkunnu, & Kozhikunnu have residential CI greater than 2. Commercial activities are concentrated along Pattambi – PKD road and Pattambi - Perinthalmanna Road which comes to 1.89% of municipal area. Amongst these parcels, Pattambi town, Kaithali, Civil station & Paruvakadavu have residential CI greater than 3.

About 0.76% of total area of the town is industrial in nature. No

medium and major scale industries are in town. Existing industries are small scale type. 1 acre of mini industrial estate run by SIDCO exists. Randam mile, Thekkumuri, Hidayath nagar, & Melepattambi are the wards with industrial CI greater than 2.

When the concentration of household industrial workers and other workers is combined with the concentration of residential, commercial, and industrial land use, it is clear that these are the areas where they live. That is, it is suitable for both accommodation and transportation in the area where SH 23 is located.

96 hectares which is 6.06% of total municipal area is under public and semi public land use. Major public land use is that of Regional Agricultural Research Station. Wards with public and semi public CI greater than 2 are Chorakunnu, College, Hidayath nagar & Kaithali.

Transportation constitutes 6.88% of total Municipal area. Two state highways connecting to nearby districts - SH 23a Palakkad - Cherpulasseri - Perinthalmanna road, & SH 23b Shornur - Perinthalmanna road, SH 39 Perumbilav - Nilambur road passes through Pattambi. Railway connects town to other important cities of India - Pattambi- Podannur railway line.

100 hectares which is 6.31% of total municipal area are water bodies which includes Bharathapuzha river, ponds, rivulets and canal network. Pattambi town has 2 municipal play grounds and no parks which constitutes (0.26% of the total Municipal area) 3.22% of the total municipal area. 0.51 sq.km of lands in Pattambi are seen vacant, i.e. 3.66% of total municipal area. Cemetery/Cremation Ground/Quarry and Dumping yard coming under hazardous use constitutes nearly 0.02 sq. km. (0.12% of the municipal area).

6

Agriculture

6. AGRICULTURE

6.1 AREA UNDER CULTIVATION

Palakkad is one of the districts where the agriculture is having a major role in the economy and hence it is called the 'Granary of Kerala'. In Pattambi town agriculture constitute nearly 44.06% of the total Municipal area. The major agricultural crop is paddy which covers about 13.82% of the total land area. Other than paddy, coconut, plantain, pepper, rubber etc. are also cultivated. The agriculture use is the major land use.

6.2 IMPORTANT CROPS AND PRODUCTION

Important crops in Pattambi Town and its area of cultivation are given in Table 6.1. Paddy is the main agricultural crop in the municipality and serves as the livelihood for large number of people. It has got a lot of ecological significance in the municipality. It can also be seen from the table that the area under the paddy cultivation has increased lightly from 2011 - 12 to 2015 - 16 (Fig. 6.7). However, productivity has remained almost the same for paddy first crop.

Table 6.1 Area of cultivation and productivity of important crops

Type of crop	Area (Ha)					Production (Tonne /Nos)				
Year	2011-12	2012-13	2013-14	2014-15	2015-16	2011-12	2012-13	2013-14	2014-15	2015-16
Paddy 1st Cro	113	81.6	84	99.5	120	248.6	163.2	176.4	218.9	265.1
Paddy IInd Crop	113	117	118	106.4	111.5	259.9	245.7	253.7	244.72	262.025
Coconut (nos)	250	250	250	250	250	526.75	525	350	490	526.75
Rubber	40	40	40	40	42	44	44.8	36	44	46
Areca nut (nos)	18	18	16	17	17	123.3	110.97	49.32	69.87	98.64
Cashew nut (nos)	20	20	20	20	20	15	14	14	15	15.6
Pepper	18	18	10	12	14	5.04	4.68	2.5	3.36	4.2
Papaya	15	17	10	20	25	117.3	68.5	60.5	138	175
Banana	15	17	10	20	25	117.3	68.5	60.5	138	175
Tapioca	7	5	4	6	6	168	115	80	138	144
Ginger	6	4	5	6	8	873.2	49.2	55	72	98.4
Turmeric	5	5	6	3	7	10.5	11	12	6.15	15.4

Table 6.1 continued...

Type of crop	Productivity (MT/ha, Nos/Ha)				
Year	2011-12	2012-13	2013-14	2014-15	2015-16
Paddy 1st Crop	2.2	2	2.1	2.2	2.2
Paddy IInd Crop	2.3	2.1	2.15	2.3	2.35
Coconut (nos)	3010	3000	2000	2800	3010
Rubber	1.1	1.12	0.9	1.1	1.15
Areca nut (nos)	6850	6165	2740	4110	5802
Cashew nut (nos)	750	700	700	750	780
Pepper	0.28	0.26	0.25	0.28	0.3
Papaya	6.9	6.85	6.05	6.9	7
Banana	6.9	6.85	6.05	6.9	7
Tapioca	24	23	20	23	24
Ginger	12.2	12.3	11	12	12.3
Turmeric	2.1	2.2	2	2.05	2.2

Source : Krishi Bhavan, Pattambi

There are mainly two rice growing seasons for paddy, *Mundakan* or Winter Paddy and *Virippu*. The latter is the first crop grown in autumn season (From April/May – September/October) while the former is the second crop, *Mundakan* (September/October - December/January). The temporal variation of paddy production in both the seasons combined are given in Fig. 6.1. It can be seen from Table that that both the seasons yielded almost equally.

The cultivation of paddy is followed by the production of coconut. The productivity of coconut was same (3010 Nuts/Ha) in 2011-12 and in 2015-16 (Fig. 6.2). Average productivity of coconut in state is 7000 nuts/Ha, while in Pattambi town it is less than 50% of the state average. It may be due to lack of awareness of better management practices in plantations and due to fertiliser effect.

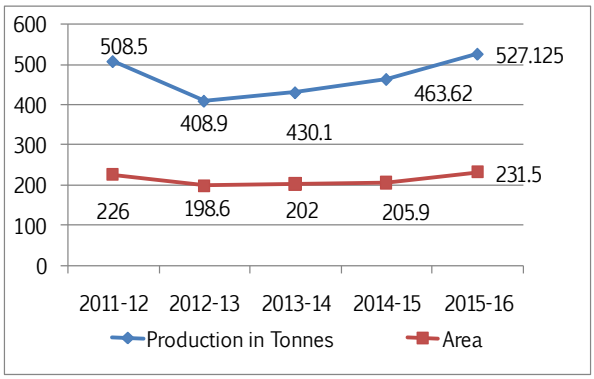


Fig. 6.1 Temporal variation of paddy production and area

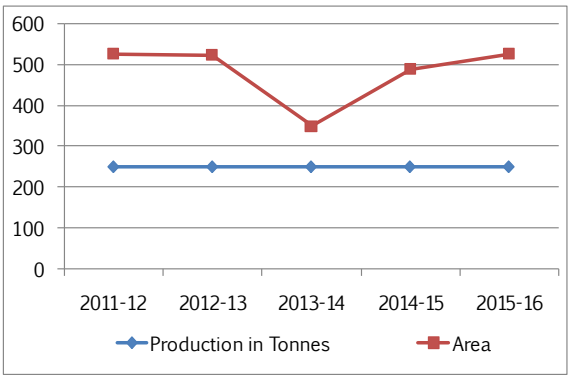


Fig. 6.2 Temporal variation of coconut production and area

6.3 SPATIAL DISTRIBUTION

From fig. 6.3 it can be seen that Concentration of agriculture (including Dry and wet Agriculture) is higher in wards vallur north (1), Vallur east (2), Randam mile (3), Kalappara (4), Kodalur centre (5), Nediyamkunnu (6), Sankaramangalam (7), Kizhayur (14), Louly (15), Vadakkumuri (26), Thottungal city (27), and Vallur centre (28). Fig. 6.4 and Fig. 6.5 shows that spatial distribution of paddy and Dry agriculture respectively.

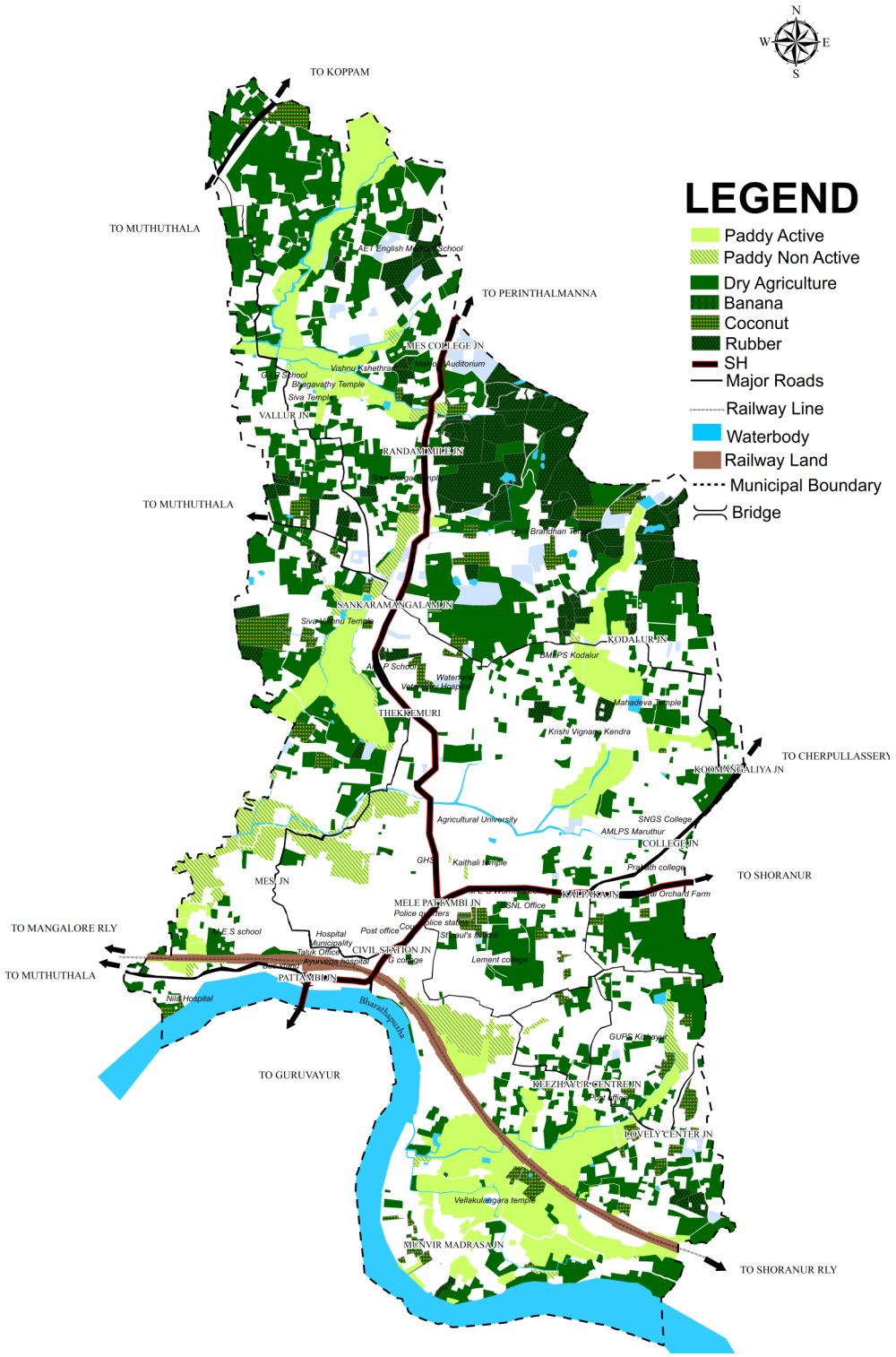


Fig. 6.3 Spatial distribution of Wet and Dry agriculture

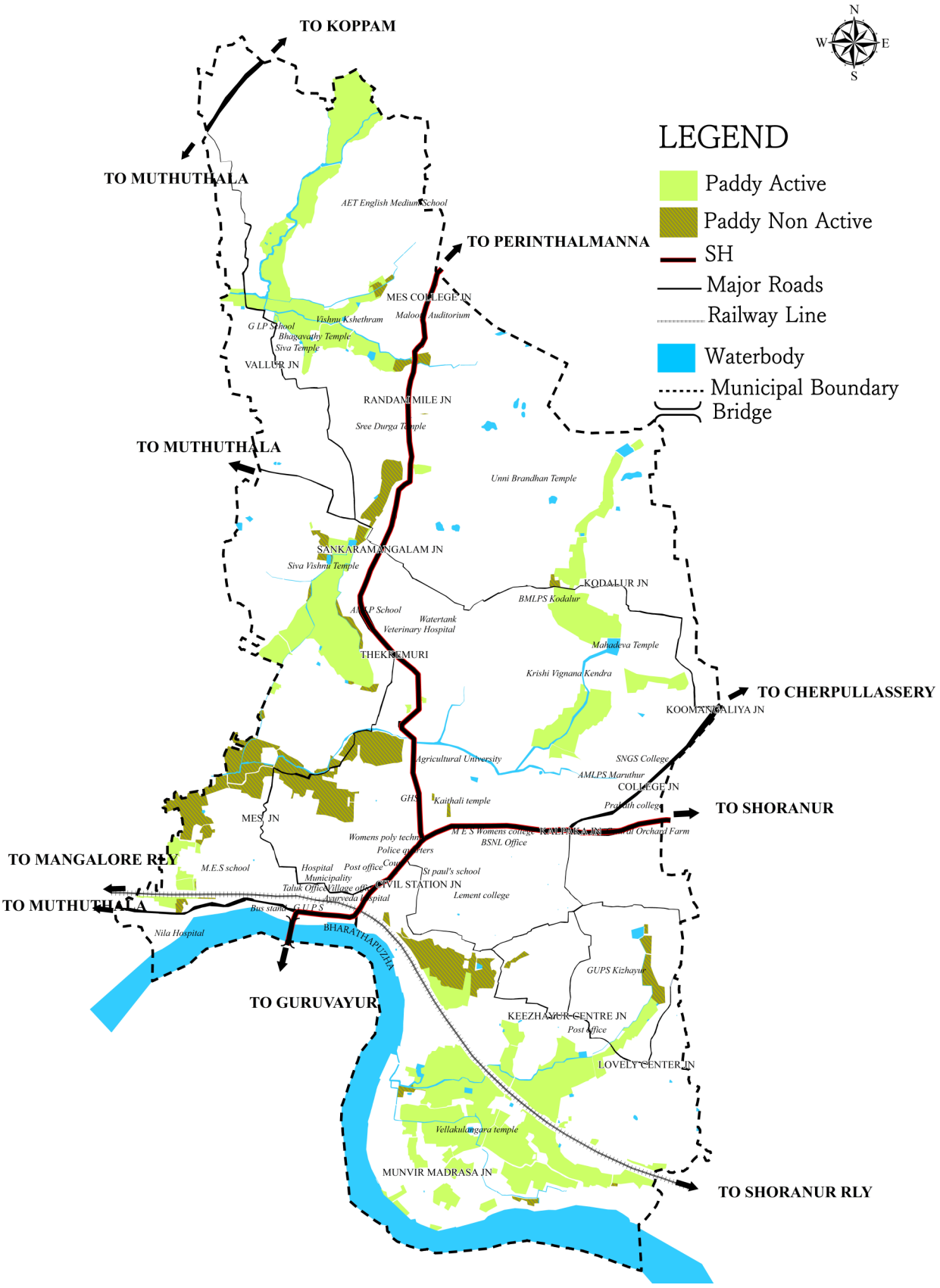


Fig. 6.4 Spatial distribution of Paddy active and Paddy non - active

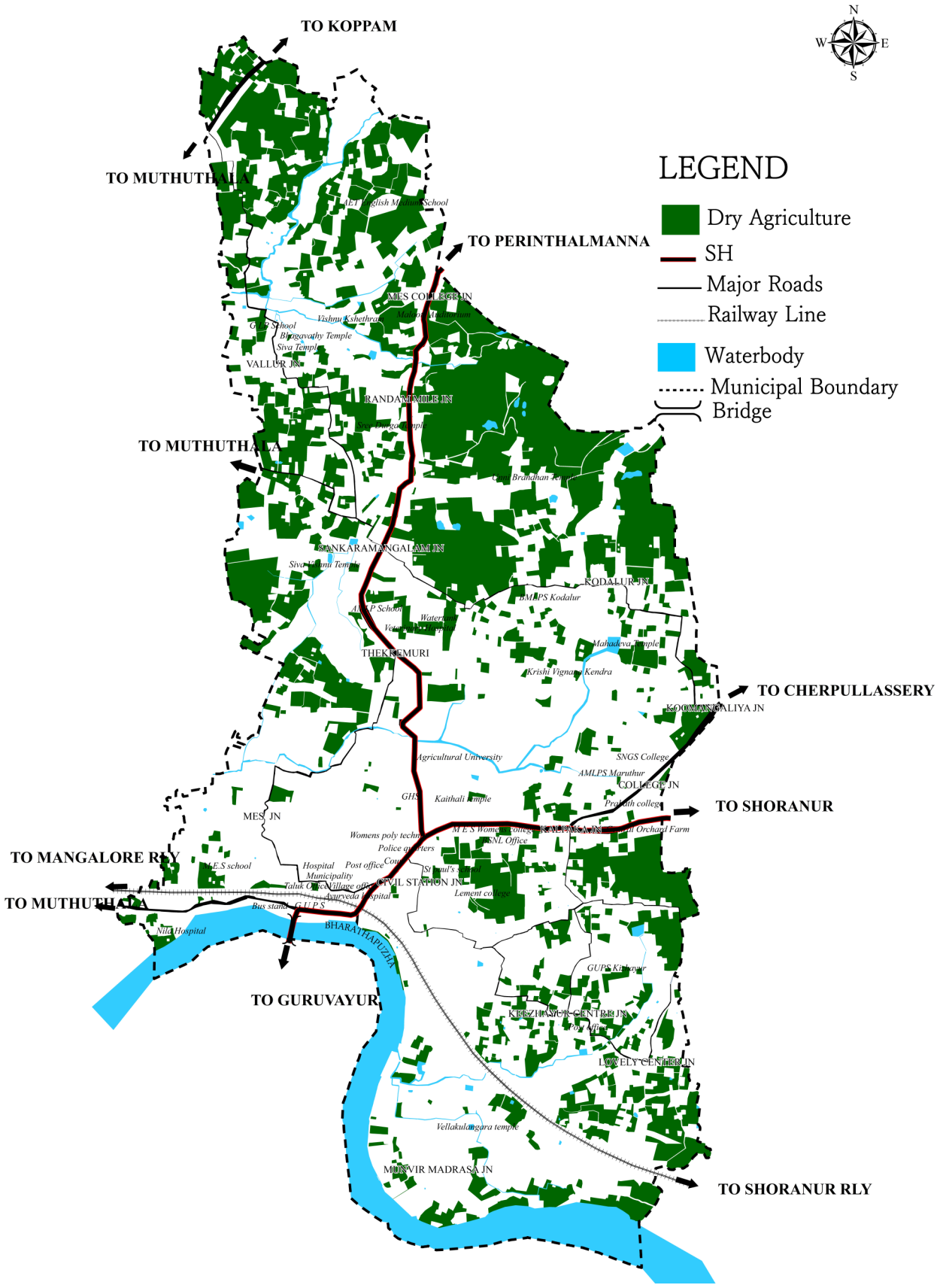


Fig. 6.5 Spatial distribution of Dry agriculture

6.4 AGRICULTURAL INPUTS AND MARKETING FACILITIES

Agricultural inputs include fertilizer shops, market, units supplying machineries, seed farms etc. In Pattambi Town, there is one Krishi bhavan office, FQCL (Fertilisers Quality Control Laboratory) and one daily market. The market mainly has fish, vegetable and fruits. For tackling the problem of labour shortage in agriculture sector, farm mechanisation is giving more importance nowadays. The availability of machineries under Pattambi Krishi bhavan is detailed in Table 6.2.

Table 6.2 Details of machineries in Pattambi town

Type of Machinery	Tractor	Power Tiller	Transplanter	Reaper	Power Weeder	Power Sprayer	Rocker sprayer	Thresher	Pump set	Knapsack Sprayer
Quantity (Nos)	4	5	1	2	1	6	15	6	432	47

Source : Krishi Bhavan, Pattambi

6.5 PADASEKHARA SAMITHIES

Organisation of farmers of a locality registered under any law for the time being in force, with the objective of promoting paddy cultivation called Padasekhara samithies which form the driving force for group farming activities. There are six active Padasekhara samithies in Pattambi Town and the details of them are shown in Fig. 6.6 and in Table 6.3.

Table 6.3 Details of Padasekhara samithies

Sl. no.	Name of Padasekhara samithies	Number of Farmers	Season	Total Area in hectare	Availability of seeds	No of machineries used
1	Vallur	98	I	36	Satisfactory	Tractor, Tiller, Transplantor, Harvester
			II	36		
2	Sankaramangalam	92	I	62	Satisfactory	
			II	60		
3	Kodallur	64	I	34	Satisfactory	
			II	32		
4	Aryanpadam	96	I	58	Satisfactory	
			II	56		
5	Kizhayur	126	I	96	Satisfactory	
			II	92		
6	Neravath	44	I	24	Satisfactory	
			II	24		

Source: Krishi Bhavan, Pattambi

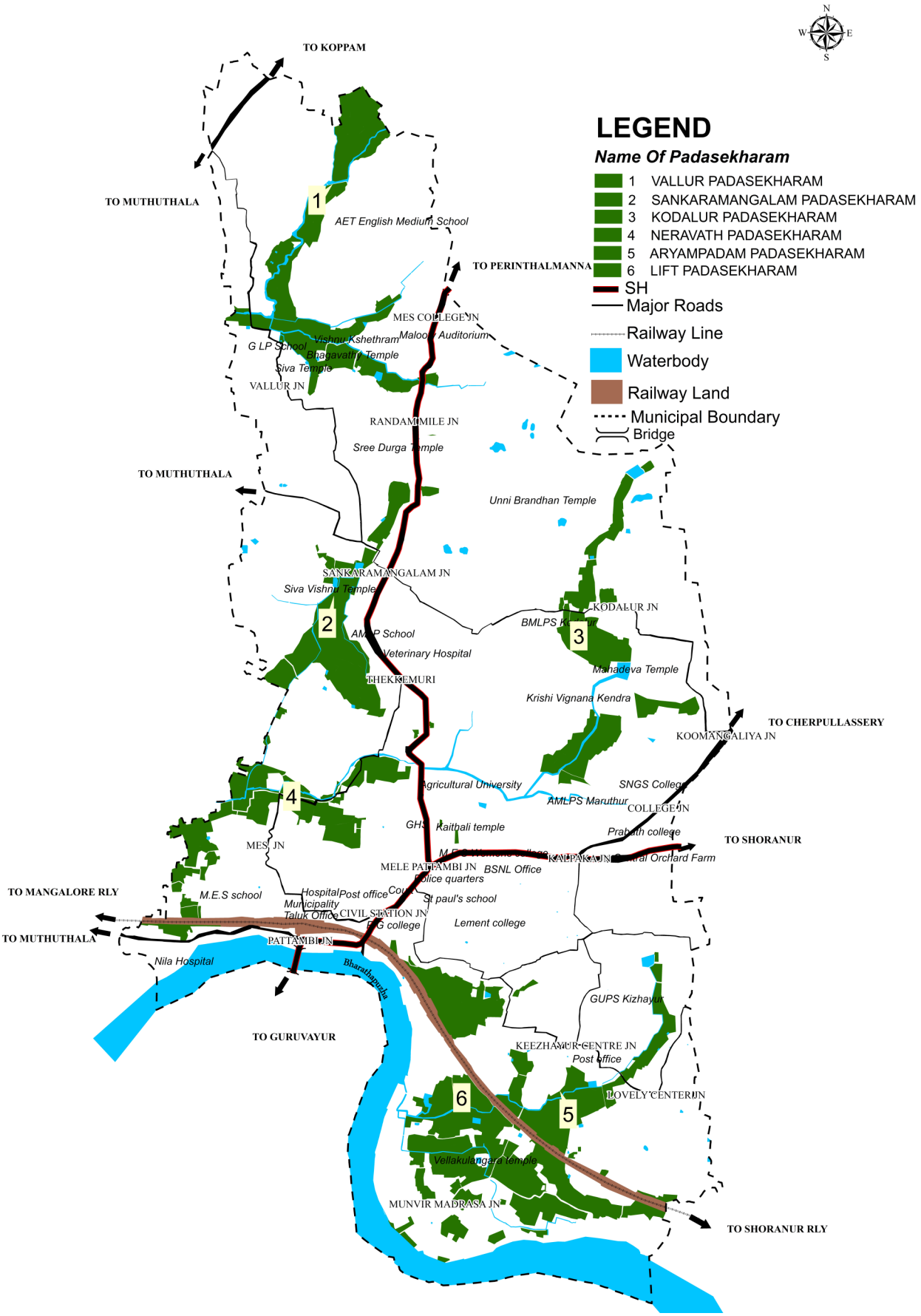


Fig. 6.6 Distribution of padasekhara samithies in Pattambi Town

6.6 IRRIGATION FACILITIES

Paddy is the major crop in the municipality. There is autumn (virippu) and winter (Mundakan) paddy cultivation but there is no third crop ie. summer (Puncha). Bharathapuzha is the main source of irrigation. There is one lift irrigation scheme at Kizhayur The major source of irrigation are the Bharathapuzha and ponds Fig. 6.7 shows the ayacut areas in the municipality. Kizhayur LIS ayacut serves the municipality primarily covering an area of 0.24 sq.km. Table 6.4 shows the details of irrigation facilities and 6.5 shows the details of Rivulets.

Table 6.4 Details of Irrigation facilities

Ayacut	Area in Hectares
Well/ Ponds/ Tanks	20
Canal/ River	15
Lift Irrigation	48
TOTAL	83

Table 6.5 Details of Rivulets (Thodu)

Sl. No.	Name of Thodu	Length in Km
1	Kandam Thodu	3
2	Poleela Thodu	5
3	Mucheeri Thodu	1
4	Pambadi Thodu	1
5	Vallur Thodu	2

Source: Irrigation office, Pattambi

6.7 WATERSHEDS

Watershed is an extent or an area of land where surface water from rain or ice converges to a single point in lower elevation. These water bodies supply drinking water, water for agriculture and manufacturing, offer opportunities for recreation and provide habitat to numerous plants and animals. Unfortunately various forms of pollution, including runoff and erosion, can interfere with the health of the watershed and hence its protection is important. The details of water sheds are given in Table 6.6 and their spatial location is given in Fig. 6.8.

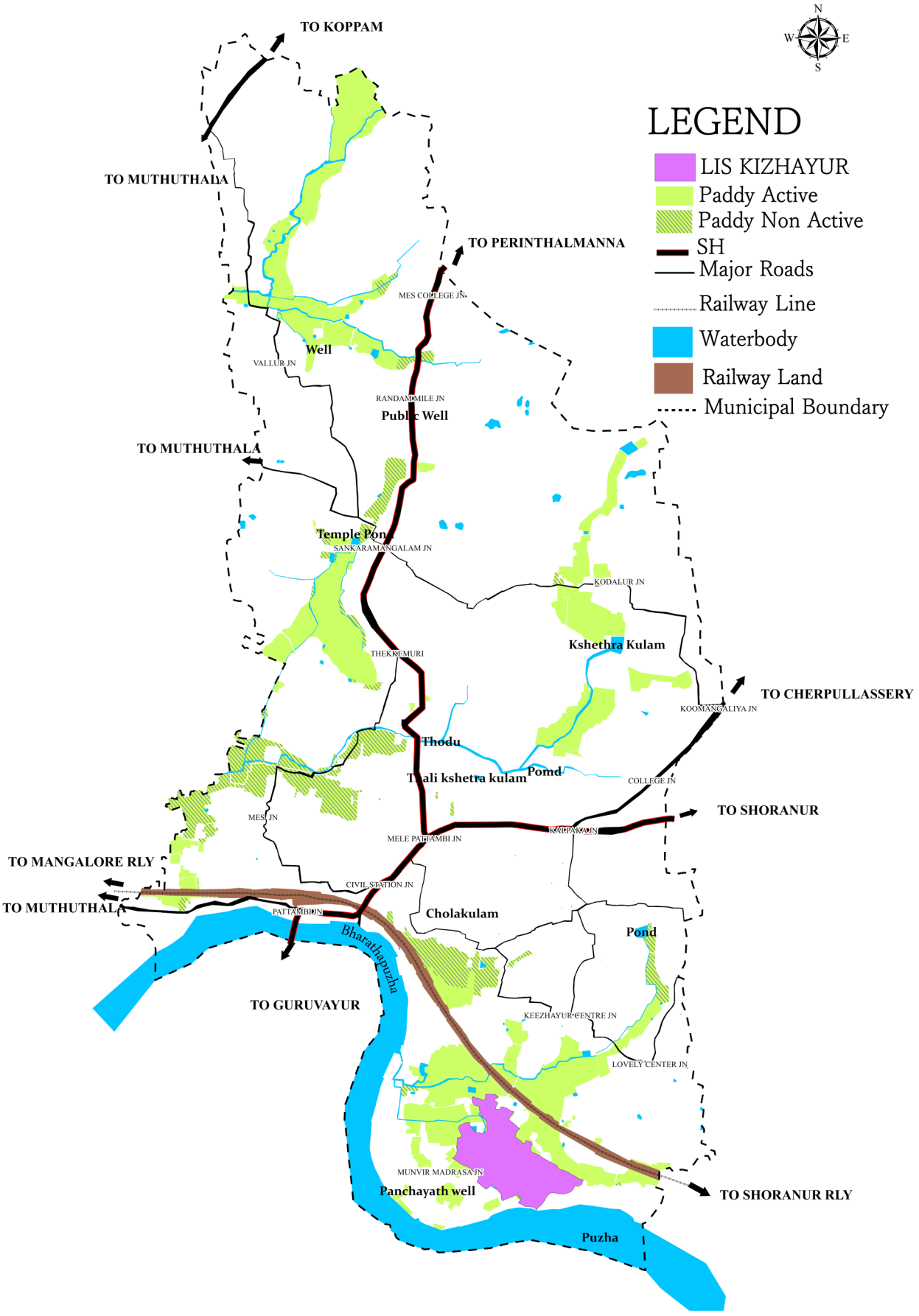


Fig. 6.7 Ayacut area

Source: Irrigation office, Pattambi

Table 6.6 Details of watersheds

Sl No	Name of W/S	Local bodies	Area in Ha	Priority
1	Kizhayur	Pattambi,Ongallur	354	Medium
2	Kolliparamb	Pattambi,Ongallur	356.8	Low
3	Maruthur	Pattambi,Ongallur	805.6	High
4	Maruthur - I	Pattambi,Ongallur	805.6	High
5	Muthuthala	Pattambi,Muthuthala , Koppam,Parathur,Thiruvegappuram , Vilayur,Vallappuzha	2602.5	High
6	Netrimangalam	Pattambi, Muthuthala	483	Medium
7	Pattambi	Pattambi, Muthuthala	596.6	Low
8	Poovakkad	Pattambi,Ongallur	399.8	Medium

Source: Soil Survey office, Palakkad.

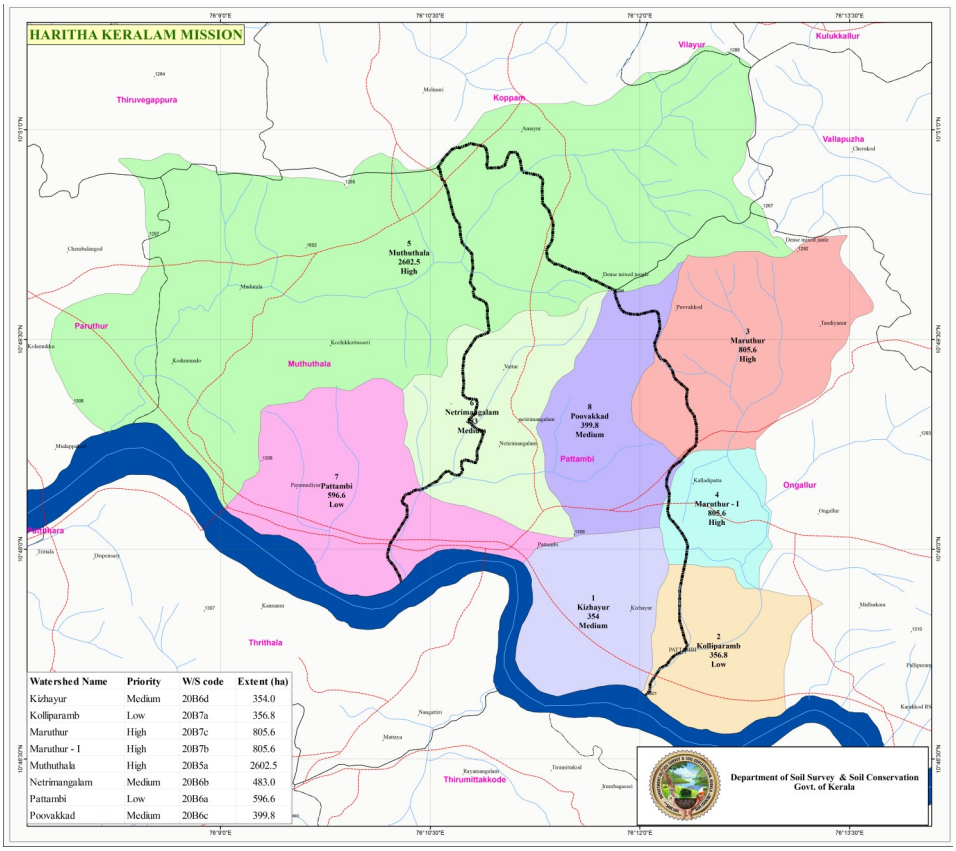


Fig. 6.8 Location of watersheds

Source: Soil Survey office, Palakkad.

6.8 PROBLEMS AND POTENTIALS

Area under agriculture is 44.06% in which 30.24% of land is used for Dry Agriculture (4.79 sq. km.) and 13.82% is used for Wet Agricultures (2.19 sq. km.) including 0.50 Sq. km. of uncultivated paddy). 3.16% of the municipal area is under uncultivated paddy. They are located close to the central region of the town. Agriculture Concentration is high in 11 wards which are located in the northern and south periphery of the town. Major crops cultivated in

Pattambi municipality are coconut, paddy, followed by rubber. Presence of arecanut, cashew nut, pepper, pappaya, banana, tapioca, ginger and turmeric are also there.

Productivity of coconut was decreased during 2011-2014 from 3010No/Ha to 2000 No/Ha and then again increased to 3010 No/Ha in 2015-2016. Productivity of coconut is showing an uphill trend. Production of paddy increased from 508.50 tonnes to 527.125 tonnes in 2011-2016 showing a positive growth whereas area of cultivation has registered slight increase while the Productivity has remained the same.

There are 6 Padasekhara samithis located at Vallur, Sankaramangalam, Kodallur, Aryanpadam, Kizhayur, and Neravath. Area of cultivation under coconut, rubber, cashew nut etc remained same. A decrease is noticed in the area under arecanut and pepper. Bharathapuzha and ponds are the main source of irrigation. There is one lift irrigation scheme at Kizhayur. Total ayacut area is 83 Hectares.

One Krishi bhavan office and FQCL (Fertilizer Quality Control Laboratory) is located at Pattambi Town. The number of cultivators decreased from 16.73% in 1971 to 1.75% in 2011 and agricultural labourers are also declining from 45.52% in 1971 to 5.90% in 2011. Majority of workers are entering into tertiary sector (93.61%).

7

Animal Husbandry

7. ANIMAL HUSBANDRY

Animal husbandry is concerned with animals that are raised for meat, fibre, milk, eggs, or other products. It includes day-to-day care, selective breeding, and the raising of livestock. A large number of farmers depend on animal husbandry for their livelihood. In addition to supplying milk, meat, eggs, wool and hides. Bullocks were the major source of power for farmers.

7.1 LIVESTOCK POPULATION

The main livestock are cattle, buffaloes, goat and fowls. According to the Livestock Census 2012, the livestock population in Pattambi Town was 15,020 where the poultry population constitutes the largest group numbering 13,770 followed by cattle population 691, goat 343 while the dog population is 148. Poultry population have witnessed increasing growth while Species like cattle, goat and dog have witnessed negative growth over the population of the census.



Fig. 7.1 Cattle Farm at Pattambi

The products obtained from livestock are mainly egg, meat and milk. Table 7.1 shown temporal variation in the number of livestock. From the figure we can see a decreasing trend in the number of cattle and goat. The main reasons is the decline of green pastures. Also, as mechanization was widely introduced, labour force has become scarce which has made animal rearing to be a burden for farmers. The variation in the number of livestock population over the past years is shown in Fig. 7.2.

Table 7.1 Temporal variation of live stock population

Live stock	1996	2003	2007	2012
Cattle	1980	879	774	691
Buffalo	82	48	51	68
Goat	1324	396	458	343
Dog	563	287	163	148
Poultry	9046	5685	4269	13770

Source : Live Stock Census 1996, 2003, 2007, 2012

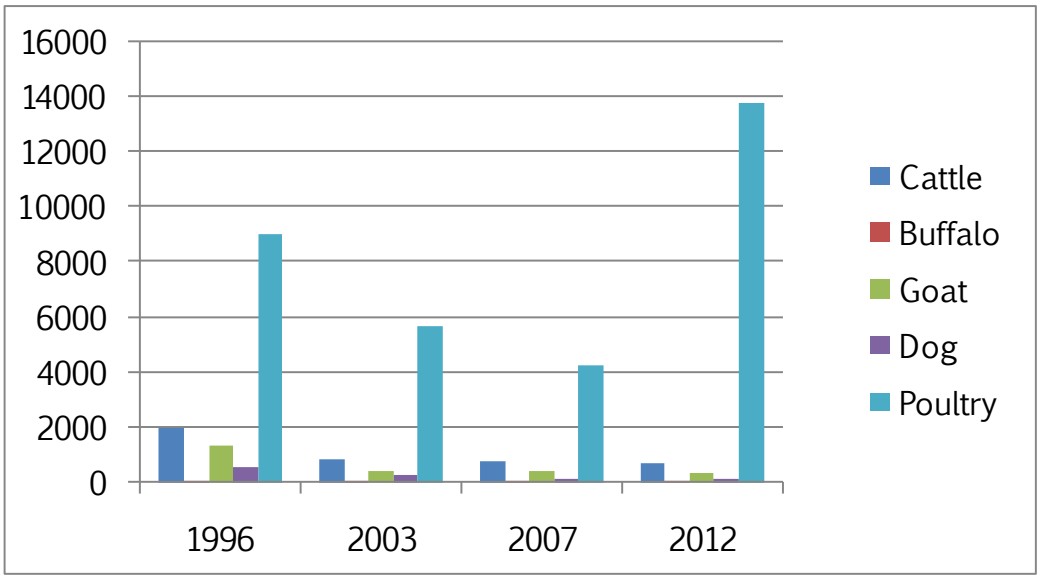


Fig. 7.2 Temporal variation in the number of livestock

Source : Live Stock Census 1996, 2003, 2007, 2012

7.2 PRODUCTION

Meat

There is only one poultry farm in the municipality in College Ward (10) with a production of 2500 kg of meat per month. There are six broiler farms. There is no authorized slaughter houses within town.

Milk

There are two dairy co operative societies. Kodalur Ksheera sangham covering ward 8, 9, & 10 collecting 2500 litres of milk per month and Pattambi vanitha Ksheera sangham covering ward 14, 15, 16, & 19 collecting 7800 litres of milk per month. There are 5 diary farms in Pattambi municipality with production of 381 litres per day.

Ongoing Projects

SLBP (Special Livestock Breeding Program) - The objectives of the scheme is to provide extension support, adequate health and Insurance coverage and good quality feed at subsidised price to the growing Cross Breed Female Calves of below poverty line farmers for a period of 28 months or till its first calving whichever is earlier. Under this scheme cattle feed is provided at half rate to selected 50 farmers for 6 months aged cattle in Pattambi town.

7.3 PHYSICAL INFRASTRUCTURE

Physical infrastructure in the municipality includes a Veterinary hospital, Integrated Cattle Development Programme (ICDP) centre. However there is no hatcheries in the municipality.

7.4 PROBLEMS AND POTENTIALS

Cattle population is decreasing for the past few years (1996 - 2012) from 1980 to 691. Poultry population was declining from 1996 - 2007 (9046 to 4269) and there was a sudden increase to 13,770 in 2012. All other live stock population (Buffalo, Goat & Dog) is found to be in declining trend.

There are 5 private dairy farms within the municipal area with average milk production of 11,430 per month out of which 10300 per month is collected from two co-operative societies in the municipality and the remaining quantity is directly distributed to houses.

One poultry farm is present in the municipality at College Ward (10) with a production of 2,500 kg of meat per month. There are no authorised slaughter houses within the municipality which means Unauthorised slaughter houses are functioning in the town. There is a veterinary dispensary in Pattambi town.

8

Fisheries

8. FISHERIES

8.1 EXISTING SCENARIO

In Pattambi, fishing activities are less, but fish market is functioning as a collection and disbursing centre. There are about 16 ponds in the Municipality having an area of 657 cents and most of them are with perennial water supply and constructed to support paddy cultivation. Inland fishing can be practiced in those ponds except the temple ponds. Bharathapuzha river passing through the southern boundary of municipality could also support natural fish population.

Paddy fields where water is available year round can also be utilized for fish culture without disturbing paddy cultivation. Altogether the area that can be brought under fish culture is estimated to be around 100 ha. Stocking of fish seed in open waters with fast growing varieties will increase the availability of fishes. This also ensures a source of income for the local people and availability of fishes in local market.

A sustainable system of fish farming is to be encouraged to reach more farmers. The area under pond aquaculture further increased with the introduction of new schemes like Matsyasamridhi, RVKY, Special Package etc. in the subsequent years. These schemes popularized various methods of fish culture among the farming community of the town. Training in fish farming and hatchery operations are conducted regularly by the Department of Fisheries in Fish Farmers Development Agency and National Fish Seed Farm at Malampuzha.

8.2 FISH MARKET

There is a fish market (Fig. 8.1) existing in along TB road having an extent of 48.92 cents with built uparea of 216 sq. m. (24 Stalls) in the municipality. From coastal areas of Managalapuram, Vypin, Beppur, nearly 30 tonnes of fish are brought to this market and distribute those to nearby local bodies i.e.. Cheruthuruthy, Shoranur, Ottappalam, Vallappuzha, Cherpulasseri, Nellaya, Kulukkallur, Pulamanthol, Koppam, Thiruvegappuarm, Vilayur, Muthuthala, Parathur, Ongallur, Arangottukara, Desamangalm, Koottanad, Thrithala, Anakkara, Pattithara, Chalisseri, Pallam through retail traders.



Fig. 8.1 Fish Market

The major share of fish comprises of marine catch. Fresh water fishes from out-

side sources are also available in the market. The price of fishes varies depending on availability as well as demand. Nearby fish markets of Pattambi are Kunnamkulam, Cheruthuruthy, Perinthalmanna and Valancherry. A private ice plant is also functioning in town which is not active.

Table 8.1 Details of fresh water fisheries

Sl. No	Year	Ward / Location	Qty of Production per month/ Year	No. of ponds/ water bodies	No. of Persons working in the related activity
1	2014	Pattambi	18.2 TONES	55	10
2	2015	Pattambi	20.5 TONES	47	8
3	2016	Pattambi	21.23 TONES	39	8

Source: Fisheries department

8.3 MODERN FISH MARKET

As part of the state government's initiative to build a chain of 41 hygienic fish market across the state, Kerala State Coastal Area Development Corporation (KSCADC) constructed a modernized fish market at Pattambi (Fig. 8.2). The two - storeyed market building constructed at a cost of Rs. 2.38 crore and having 1,101 square meters of built up space. Extent of land is 1 hectare and 21 cents. Market is situated along Pattambi Perinthalmanna road. The ground floor has 25 stalls, a chill room, a flake ice unit, and toilet facilities.

Another 25 stalls exclusively for the sale of dried fish, and two stalls for value-added products on the first floor. The building to be constructed in land owned by the Pattambi Municipality Market has Effluent Treatment Plant (ETP) within it. The ownership of the building will be transferred to the panchayath after completion. This market will serve as a stable source of income for the Municipality, besides greatly benefiting fishermen, sellers and consumers. Fish are brought mainly from Managalapuram, Vypin, Beppur, Ponnani. Business of 30 tonnes of fish is going on here daily.



Fig. 8.2 Modern Fish Market

8.4 PROBLEMS AND POTENTIALS

In Pattambi, fishing activities are less, but fish market is functioning as a collection and disbursing centre. There is a fish market existing along mini civil station road having an extent of 48.92 cents with built up area of 216sq. m. (24 Stalls) in the municipality. From coastal areas of Managalapuram, Vypin, Beypur, nearly 30 tonnes of fish are brought to this market daily and distribute those to nearby local bodies through retail traders. A private ice plant is also functioning in town which is not active.

As part of the state government's initiative to build a chain of 41 hygienic fish market across the state, Kerala State Coastal Area Development Corporation (KSCADC) constructed a modernized fish market at Pattambi at a cost of Rs. 2.38 crore and having 1,101 square meters of built up space is situated along Pattambi Perinthalmanna road.

Extent of land is 1 hectare 21 cents in which only 0.11 hectare is used and the remaining land is vacant. Ground floor has 25 stalls, a chill room, a flake ice unit, and toilet facilities. Another 25 stalls exclusively for the sale of dried fish, and two stalls for value-added products on the first floor. The Market has Effluent Treatment Plant (ETP) within it.

9

Industry

9. INDUSTRY

9.1 EXISTING INDUSTRIAL BASE

Pattambi town is backward in industrial base. The municipality has no major or medium scale industries however it has many Small Scale Industrial Units (SSI Units). The number of industrial units has increased over the past 2 decades. It has increased by 20% from 367 SSI units in 2000 to 441 SSI units in 2017 (Fig. 9.1).

Enterprises under MSMED Act 2006 are classified into two types such as enterprises engaged in the manufacture or production of goods and enterprises engaged in providing or rendering of services, both types are again classified on the basis of investments into three such as micro, small and medium.

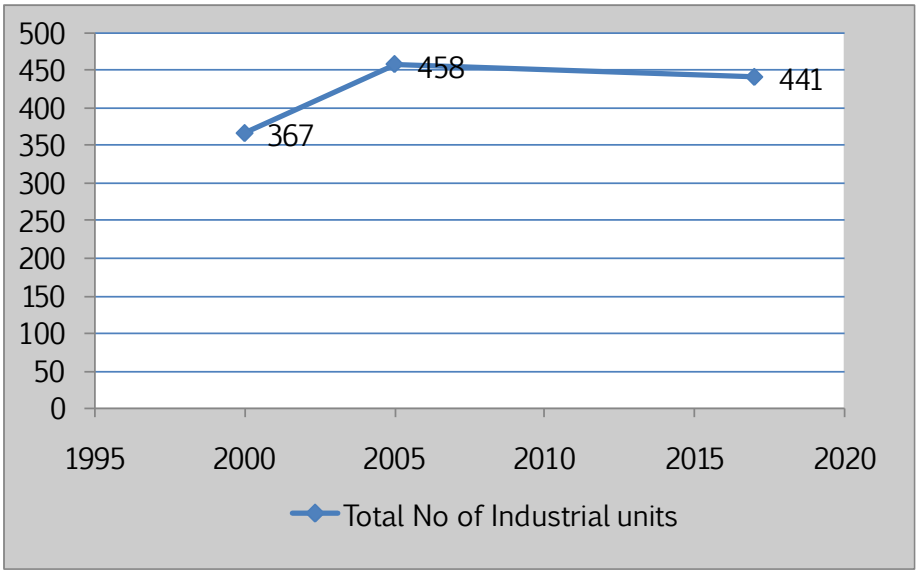


Fig 9.1 Variation in the No. of industries

9.2 MINI INDUSTRIAL ESTATE

A Mini Industrial Estates is functioning at Pattambi under the control of Small Industries Development Corporation (SIDCO). The sheds in these MIEs are allotted to micro enterprises to encourage the investment in these categories and thus to ensure the industrial development (Fig. 9.2).



Fig. 9.2 Mini Industrial Estate, Pattambi

Total area of the estate is 1 acre and 9 working sheds having a total built up area of 6100 sq. ft. and land area of 14 cents were allotted. The manufacturing units include Ayurvedic medicine, Plastic products, Wooden

furniture, Glass products, Engineering works, Readymade Garments, etc. Major industrial units functioning in MIE are M/s Surya Glass Creation and M/s Umalee engineering works.

Earlier, enterprises are broadly classified into agro based, rubber based, forest based, animal husbandry based, textile materials, chemical, engineering, electronics, minerals, plastic based, building materials and others. Fig. 9.3 shows Small scale industries registered up to 2017 in Pattambi town.

The number of SSI units registered up to 2000, 2005 and 2017 is given in Table 9.1. It can be seen that the textile based units are higher followed by engineering based. Fig. 9.4 shows the spatial distribution of Industrial units in Pattambi town.

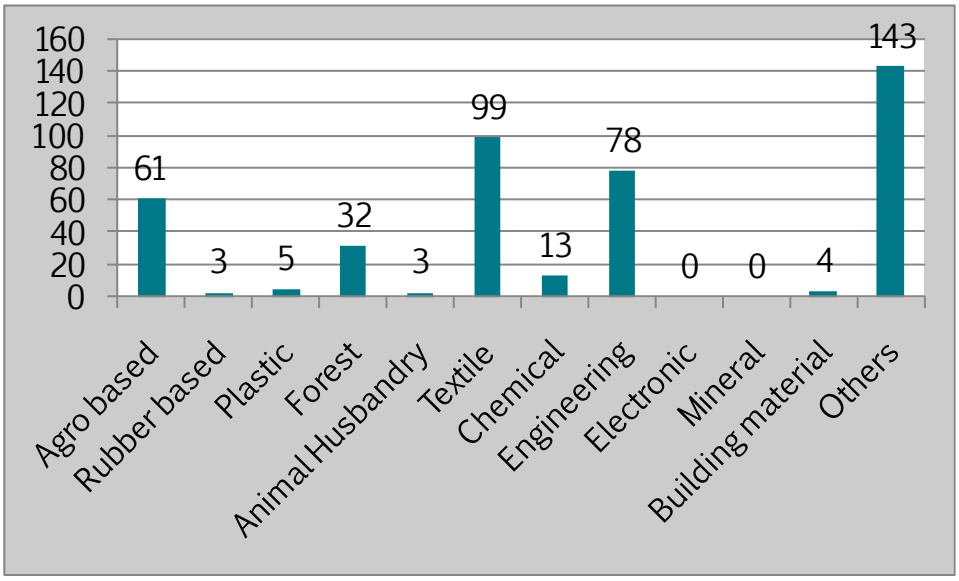


Fig. 9.3 SSI registered up to 2017

Table 9.1 Number of Small scale industries in town

Type of Industry	2000	2005	2017
Agro based	21	30	61
Rubber based	2	7	3
Plastic	5	5	5
Forest	30	31	32
Animal Husbandry	3	3	3
Textile	52	65	99
Chemical	10	13	13
Engineering	73	88	78
Electronic	14	30	0
Mineral	0	0	0
Building material	6	13	4
Others	151	173	143
Total	367	458	441

Source: Industries department

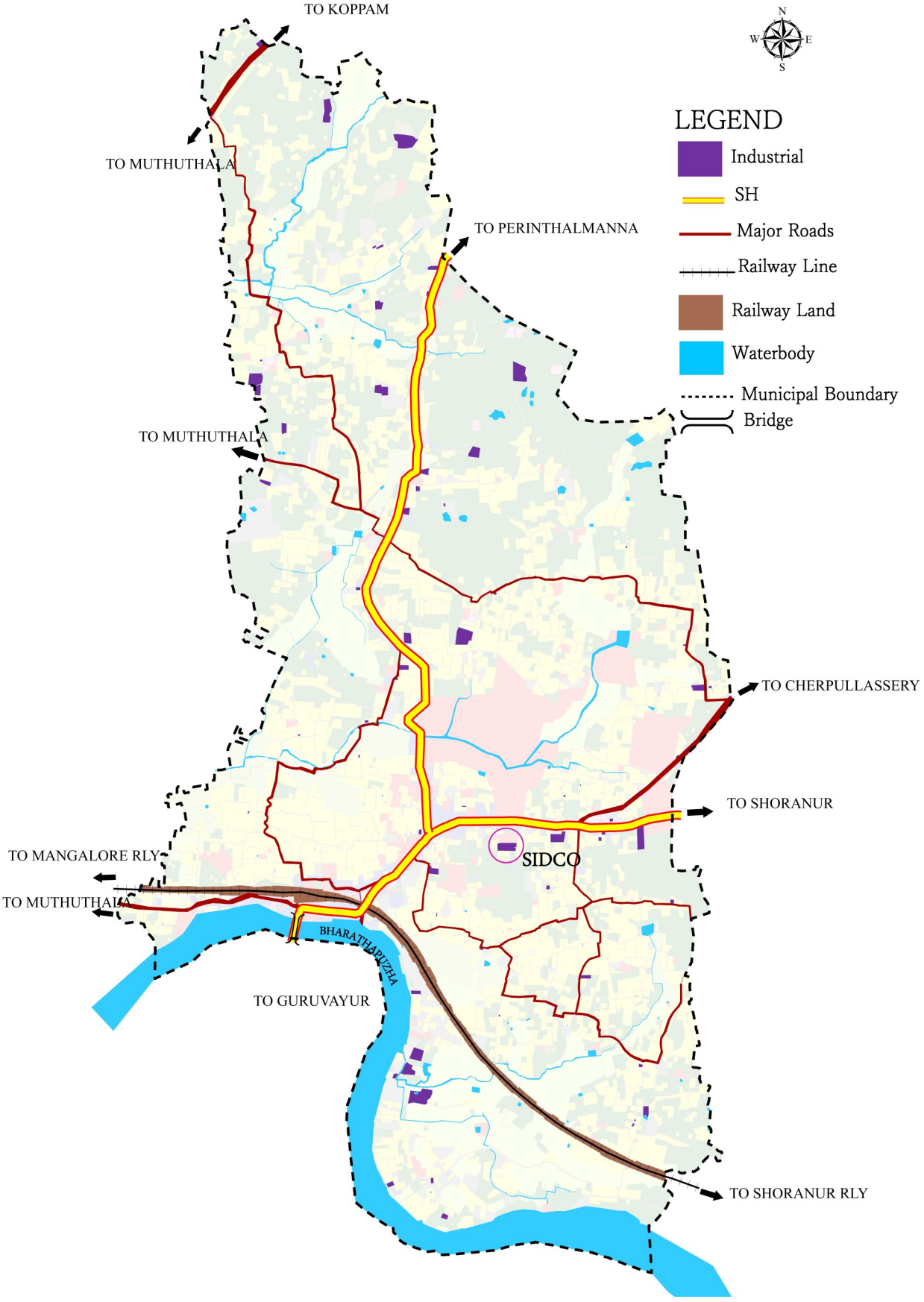


Fig. 9.4 Spatial distribution of industrial units

9.3 PROBLEMS AND POTENTIALS

The land area under industrial use is 12 Ha which constitutes only 0.76% of the total municipal area. Industrial establishments are concentrated mainly in four wards namely, Randam mile, Thekkumuri, Hidayath nagar and Melepattambi. Presently industries are seen scattered throughout town, not in a clustered manner. The municipality has no major or medium scale industries however it has many Small Scale Industrial Units (SSI Units).

The number of industrial units has increased over the past years. It has increased by 20 % from 367 SSI units in 2000 to 441 in 2017. A Mini Industrial Estate is functioning at Pattambi under the control of Small Industries Development Corporation (SIDCO). Total area of the estate is 1 acre. 9 working sheds having a total built up area of 567 sq. m and land area of 14 cents were allotted and the remaining land is vacant.

From Small scale industries registered up to 2017, it can be seen that the textile based units are higher followed by engineering based ones. There is an increase in the number of agro based industries from 2000 (21 units) to 2017 (61 units).

10

Trade and Commerce

10. TRADE AND COMMERCE

The economic base of Pattambi town is mainly trade and commerce, industries and agriculture. Real estate business, financial and banking services, other commercial establishments, etc. also contribute to the economy of the town to some extent. The transport corridors in the town have become the main channels of economic activity bolstering trade and commerce.

Pattambi is a service centre in the District, especially in trade and commerce. The inhabitants of surrounding LSGs like Ongallur, Koppam, Muthuthala, Thrithala, Thirumittakode depend on Pattambi Town for their trading and shopping needs. It also displays the functionalities of a third order node in the district, considering trade and commerce.

Hence Pattambi has the potential to fulfil the function of a community centre for commercial facilities and a capacity to serve a population of approximately 80,000.

10.1 EXISTING SCENARIO

Melepattambi junction is the important commercial centre of the Municipality area. It is a major centre of wholesale and retail trade. Other main commercial nodes of the municipality are Pattambi Town Jn. and Civil station junction.

On the other hand, around 1.89 % of the total municipal area is under commercial land use. Lack of space for efficient circulation is the main problem faced by town. Commercially developed wards comprises of Pattambi Town (20), Kaithali (21), Civil Station (23) and Paruvakadavu (24).

10.2 IMPORTANT CENTRES AND NODES

The agglomeration of activity area around one or more road junctions which act as a commercial centre is known as a node. Major commercial nodes include Mele Pattambi Jn, Pattambi Town Jn., Civil Station Jn., Kalpaka Jn, Sankaramangalam Jn. etc. The above nodes are characterized by high concentration of commercial units. The hierarchy of commercial centres in the municipality are given in Table 10.1.

They are determined by the extent of activity taking place there. The number and types of shops, the number of people using the node, the business turn over and extend of traffic, all determine the extent of activity and hence the hierarchy of nodes.

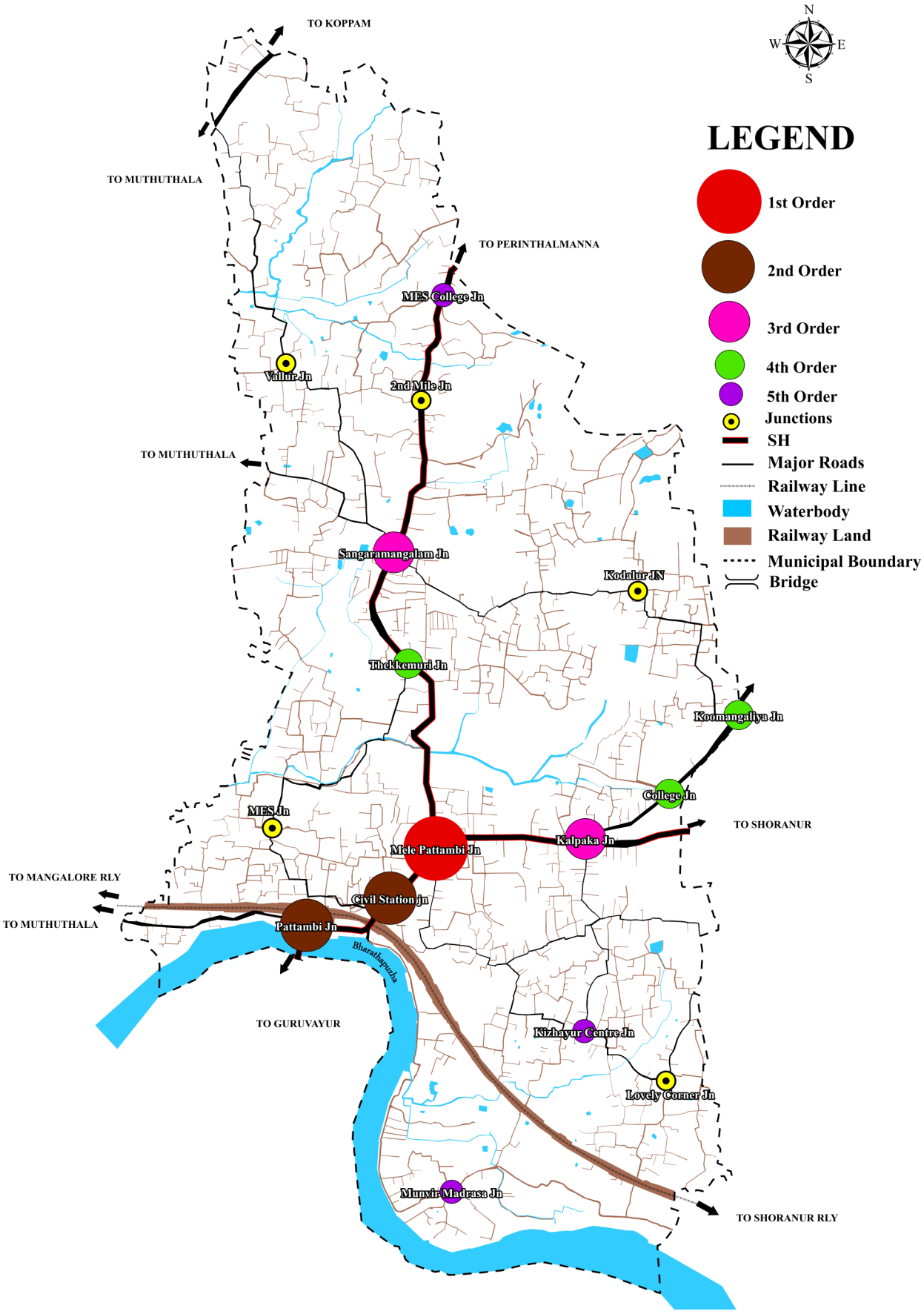


Fig. 10.1 Nodes and their hierarchy

Melepattambi junction which is at the intersection of SH 23 - Pattambi Perinthalmanna road and SH 39 - Palakkad Ponnani Road is of first order hierarchy followed by Pattambi Town Jn. and Civil Station Jn of second order. Fig. 10.1 shows the spatial distribution of commercial centres and nodes.

Table 10.1 Hierarchy of commercial centres

Sl No	Name of Node	Hierarchy
1	Melepattambi Jn	I
2	Pattambi Town Jn	II
3	Civil Station Jn	II
4	Kalpaka Jn	III
5	Sankaramangalam Jn	III
6	College Jn	IV
7	Koomangaliya Jn	IV
8	Thekkemuri Jn	IV
9	MES college jn	V
10	Munvir Madrassa Jn	V
11	Kizhayur Centre Jn	V

10.3 STREET VENDORS/INFORMAL SECTOR

Street vendors are an integral part of urban economies in India. It refers to those who sell goods and services in public space. They provide consumers with convenient and accessible retail options and form a vital part of the social and economic life of a city.

The National Policy on Urban Street Vendors, 2009 recognizes the positive role of street vendors being an integral and legitimate part of the urban retail trade and distribution system for daily necessities of the common man.



Fig. 10.2 Street Vendors

Street vendors are a common sight in many parts of the municipality. According to the municipal records, there are 72 licensed vendors operating within town (Fig. 10.2). Number of unauthorized vendors also can be seen within Town. The vendors deal with vegetables, fruits, egg, and other food items. Their tendency is to settle in areas where there is a constant movement of people, especially near the commercial nodes and bus terminals.

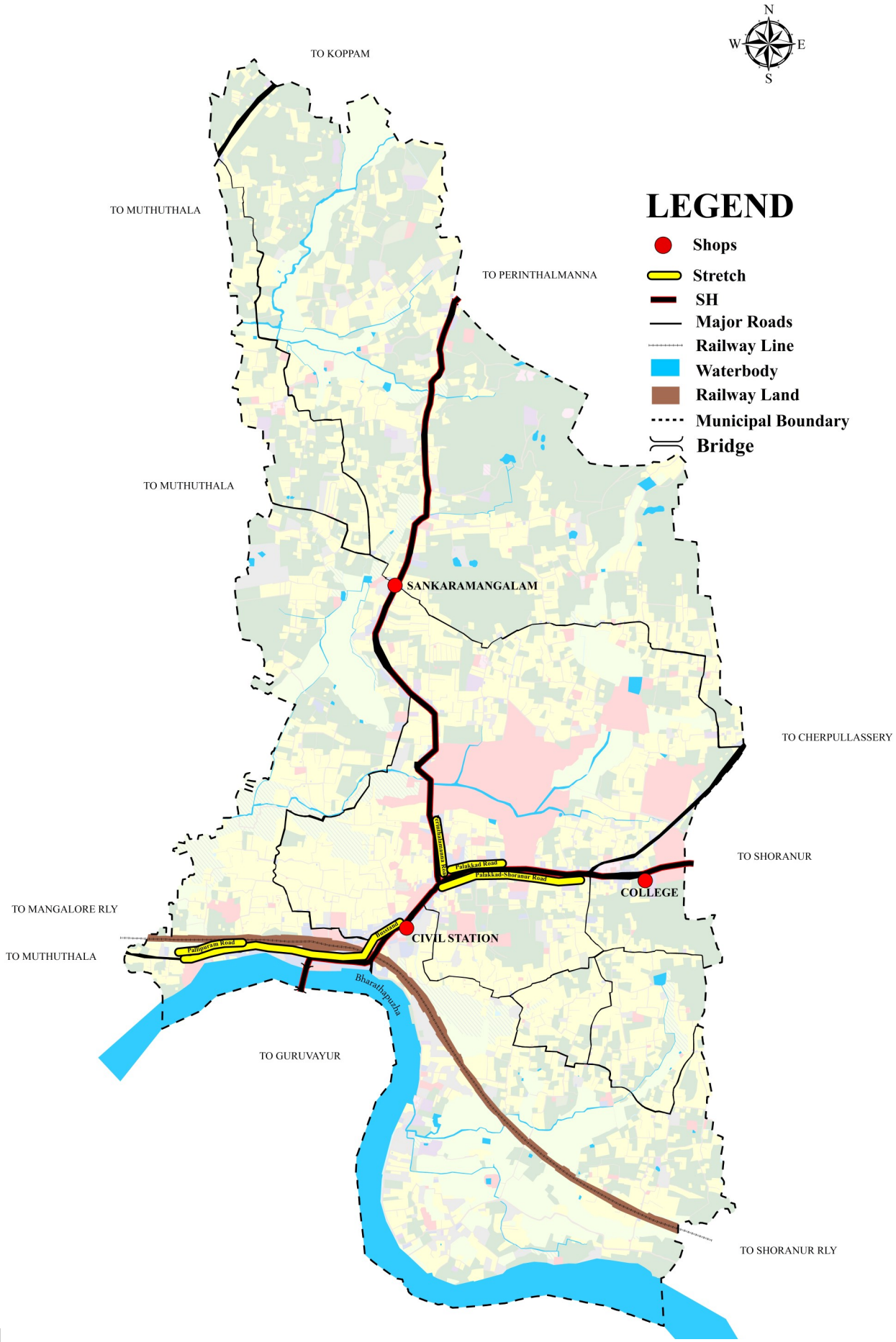


Fig. 10.3 Location of Street vendors

Majority of street vendors are concentrated along bus stand premises. Vendors uses road sides near bus stand during morning and evening hours for selling their goods. Table 10.2 shows the location of street vendors in Pattambi Town and table 10.3 shows the details of street vendors in Pattambi Town. Figure 10.3 shows the spatial location of street vendors in Pattambi.

Table 10.2 Location of street vendors in Pattambi Town

Sl No	Name of Place/Road	No of Vendors
1	Bus stand	23
2	Pallipuram Road	16
3	Palakkad Road	13
4	Old Bus Stand,Pattambi	7
5	Perinthalmanna Road	6
6	Shornur Road	3
7	Melepattambi	2
8	Palakkad Guruvayur Road	2
	Total	72

Source: Local body

10.4 WHOLE SALE AND RETAIL TRADE

The whole sale activities in the town is scattered along with the retail activities, and is mainly involved in the trading of rice and other grocery items (Fig. 10.4). Also, agricultural produce from the hinterland are traded in the town. These include mainly cashew, ginger, pepper, and rubber. MRF procures 30-35 tonnes of rubber per month from the town. 1.5 to 1.8 tonnes of cashew and pepper reach Cochin market in a week from this town. Around 2.5 tonnes of Areca nut is sent to Nagpur Market in a week. Coconut export from the town (mainly to Tamilnadu) comes to 20-25 tonnes per month. The active retail shopping include clothes, jewellery, building materials and food & grocery.



Fig. 10.4 Old Market, Pattambi

Table 10.3 Details of street vendors in Pattambi Town

Sl No	Name of Place/Road	Lankmark to identify location	Nature of Items being sold	No of Vendors
1	Palakkad Road	Womens College	Food Items	1
2	Palakkad Road	Krishi Bhavan	Fruits	1
3	Palakkad Road	Melco Building	Food Items	1
4	Pallipuram Road	Old Bus Stand	Food Items	1
5	Pallipuram Road	Town Jumamasjid	Fruits	1
6	Perinthalmanna Road	Petrol Pumb Opposite Side	Food Items	1
7	Bus Stand	Nila Hospital	Stationery	1
8	Perinthalmanna Road	Pannivel Motors Opposite Side	Helmets, Sunglass	1
9	Bus Stand	Bus Stand	Chappal	1
10	Bus Stand	Bus Stand	Lottery	1
11	Bus Stand	Bus Stand	Food Items	1
12	Bus Stand	Bus Stand	Lottery	1
13	Bus Stand	Bus Stand	Food Items	1
14	Bus Stand	Bus Stand	Books, News Paper	1
15	Pallipuram Road	Purple Wedding Area	Food Items	1
16	Pallipuram Road	Kulathingal Tower	Food Items	1
17	Palakkad Road	Near Beauty Silks	Food Items	1
18	Palakkad Guruvayur Road	Near Ahalya Foundation Opticals	Food Items	1
19	Stand Road	Near Railway Station	Food Items	1
20	Melepattambi	Near Bsnl Office	Fruits	1
21	Palakkad Road,Melepattambi	Opposite Canara Bank	Food Items	1
22	Palakkad Road	Alex Theatre	Food Items	1
23	Pallipuram Road	Pattambi Town Juma Masjid	Fruits	1
24	Pattambi, Old Bus	Bus Stand	Lottery	1
25	Palakkad Road, Melepattambi		Food Items	1
26	Pallipuram Road	Town Jumamasjid	Food Items	1
27	Near Bus Stand	Near Bus Stand	Footware	1

Table 10.3 Continued.....

28	Pattambi, Old Bus Stand	Bus Stand	Perfumes	1
29	Palakkad Road	Opposite G.L.P School	Seeds	1
30	Bus Stand	Bus Stand	Lottery	1
31	Bus Stand	Bus Stand	Toys	1
32	Bus Stand	Bus Stand	Lottery	1
33	Bus Stand	Bus Stand	Lottery	1
34	Shornur Road	Soil Testing Laboratory	Food Items	1
35	Shornur Road		Food Items	1
36	Pallipuram Road		Fruits	1
37	Pallipuram Road	Old Bus Stand Opposite Side	Food Items	1
38	Palakkad Road	Opposite T.H.Building	Fruits	1
39	Busstand	Bus Stand	Eucalyptus	1
40	Busstand	Bus Stand	Lottery	1
41	Busstand	Bus Stand	Food Items	1
42	Busstand	Bus Stand	Food Items	1
43	Busstand	Bus Stand	Books	1
44	Busstand	Bus Stand	Lottery	1
45	Busstand	Bus Stand	Lottery	1
46	Busstand	Bus Stand	Lottery	1
47	Busstand	Bus Stand	Food Items	1
48	Busstand	Bus Stand	Food Items	1
49	Pallipuram Road	Bus Stand	Food Items	1
50	Pattambi Old Busstand	Bus Stand	Toys	1
51	Pallipuram Road		Lottery	1
52	Palakkad Road	Krishi Bhavan Gate	Food Items	1
53	Palakkad Road	Pattambi Agricultural Research Centre	Food Items	1
54	Palakkad Guruvayur Road	Bsnl Office	Food Items	1
55	Melepattambi	Petrol Pumb	Fruits	1
56	Pallipuram Road		Food Items	1
57	Pallipuram Road		Food Items	1
58	Old Bus Stand,Pattambi	Old Busstand	Shoe Polishing	1

Table 10.3 Continued.....

59	Palakkad Road	Near Institute Of Agriculture Technology	Food Items	1
60	Palakkad Road		Food Items	1
61	Pattambi, Old Bus Stand	Old Busstand	Food Items	1
62	Pallipuram Road		Food Items	1
63	Pallipuram Road		Fruits	1
64	Pallipuram Road	Infront Of Market	Food Items	1
65	Pallipuram Road		Food Items	1
66	Bus Stand	Bus Stand	Food Items	1
67	Old Bus Stand Pattambi	Bus Stand	Chappal	1
68	Pattambi Old Bus Stand	Bus Stand	Food Items	1
69	Perinthalmanna Road	Mathilakam Complex,Melepattambi	Food Items	1
70	Perinthalmanna Road		Food Items	1
71	Perinthalmanna Road	Pattambi High School	Food Items	1
72	Perinthalmanna Road	Madeena Masjid,Melepattambi	Food Items	1

Source: Local body

10.5 FINANCIAL INSTITUTIONS

About 16 financial institutions are available in the municipality. Table 10.4 shows the details of existing financial institutions present in the municipal area. Two State Bank of India and its associate banks function in the town. It can also be seen that as per the data collected till 2011. There are no Scheduled tribe Societies and urban co-operative banks functioning in the municipality.

10.6 PROBLEMS AND POTENTIALS

The land area under commercial use is 30 Ha which constitutes only 1.89 % of the total municipal area. Commercial activities are mainly concentrated in 4 wards namely, Pattambi town, Kaithali, Civil station and Paruvakadavu. Commercial activities are concentrated along Pattambi – PKD road and Pattambi - Perinthalmanna Road. There are 72 licensed Street vendors and they are mainly concentrated along road sides near bus stand.

Commercial facilities are seen mainly as ribbon development along the

Table 10.4 Details of financial institutions

Financial Institutions	Numbers
State bank of India and Associates	2
Nationalized Commercial Bank	3
Scheduled and Commercial Banks	5
Harijan Service cooperative Banks	1
Scheduled tribe Societies	-
District co-operative bank branches	1
Service co operative banks	1
Urban co- operative banks	-
Employees credit societies	2
Kerala state agricultural and rural development banks	1

Source: Panchayth level statics -2011

major transport corridors along SH 23 and 39. There is a fish market existing along TB road having an extent of 48.92 cents with built up area of 216 sq. m. (24 Stalls) in the municipality. Modern fish Market is situated along Pattambi Perinthalmanna road which is not presently active.

Pattambi is well connected via road and rail to other towns within district and state NRIs are contributing a great to the economy of this Town and can play significant role in shaping monetary, social and economic conditions of Town.

11

Tourism and Heritage

11. TOURISM AND HERITAGE

Culture and tradition play an important role in the promotion of tourism. Tourism is an employment generator, a significant source of foreign exchange for the country and an economic activity that helps local and host communities. Rising income levels and changing lifestyles, development of diverse tourism offerings and policy and regulatory support by the government are playing a pivotal role in shaping the travel and tourism sector.

11.1 EXISTING SCENARIO

The potential for tourism is very low in the municipality. There are no tourist destinations in Pattambi. The 4.9 km Bharathapuzha banks has tourism potential, but remains underutilized. Pattambi Mosque, Vallur Guruvayurappan Temple, Kaithali Siva Temple, Unni Branthankavu, Panthakkal Bagavathy Temple etc are the religious places in Pattambi. Pattambi nercha at Pattambi mosque and Sivarathri celebration at Kaithali Siva temple are the two annual events celebrated in pattambi.

11.2 IMPORTANT HERITAGE SITES AND FESTIVALS

11.2.1 Kaithali Siva Temple

This ancient Tali, known also as Kaithali is located in a lane of the same name adjoining Alex theatre in the heart of Pattambi town, in Melepattambi, quite close to the junction of Pattambi - Palghat and Pattambi - Perintalmanna road (Fig. 11.1). The temple is a protected monument under the Archaeological Survey of India. It is carved out in a single mammoth rectangular granite stone, is located at a busy part of Pattambi town.

Historians say the temple might have been built in the 8th century AD



Fig. 11.1 Kaithali Siva Temple



Fig. 11.2 Sivarathri celebration at Kaithali Siva Temple

during the second Chera dynasty. Traces of Pallava style of architecture can be seen on the semi-finished sanctum sanctorum (Sreekovil) of the temple which is a monolithic structure. There remains a myth still woven around the construction of Kaithali temple. The myth holds that Pattambi Kaithali temple was built by goblins or Bhoothathans.

Kattilmadam was the roof of Kaithali temple at Pattambi. The goblins built the structure at a distant place and were brought the same to pattambi. The rectangular base of Kattilmadam is significant in the sense that Kattilmadam was the first archeological artifact that revealed the influence of earliest Pallava and Pandya styles in temple construction but it clearly reveals the Jain influence also.

Besides Mahadeva, the temple has five associated deities - Narasimha-moorthy, Lord Ganesha, Lord Sastha, Lord Subrahmanya, and Lord Anjaneya. It was only a few years ago that the ASI took over the conservation. Shivarathri in Kumbhom and Ardra asterism in Dhanu are celebrated with pomp. Other Siva Temples in Pattambi are Vallur, Sankaramangalam, Kodallur, Kizhayur.

11.2.2 Padinjare Guruvayurappan Temple

The Padinjare Madam Guruvayoorappan Temple (also known as "Pattambi Guruvaayoor") is one of the famous temples in Kerala. This temple is dedicated to the lord Krishna and the poojas are the same as they are being done Guruvayur Sri krishna temple. It is said that the lord Krishna decided to reside here due to the request of an old brahmin who could not go to Guruvayur due to his old age. He used to have darshan of Sri. Krishna at Guruvayur regularly. Because of his inability to go to that place, he requested Lord Krishna to come and reside in Pattambi and The Lord did so.

11.2.3 Panthakkal Bhagavathy Temple

Panthakkal Bagavathy Temple is one of the famous bhagavathy temples in Pattambi area (Fig. 11.4). Annual festival Mandala thalappoli, is celebrated here. In this festival more than 20 elephants are lined up. Other Bhagavathy kavus are Mullakkal and Kulathingal where Poorams are celebrated with Poothan ,Thira and Kala art forms. Pooram festival are celebrated at Subramanyan kovils of Kizhayur, Sankaramangalm and Vallur.

11.2.4 Unni Branthankavu

It is situated on the highest place of Pattambi Town, Kalapparakunnu. Very rare species of wood, plants of medicinal value are there.



Fig. 11.3 Sree Guruvayurappan Temple, Pattambi



Fig. 11.4 Panthakkal Bhagavathy Temple



Fig. 11.5 Vallur Guruthiyankavu Temple



Fig. 11.6 Pattambi mosque

11.2.5 Pattambi Nercha

Pattambi Nercha, the annual feast at Pattambi mosque (Fig. 11.6 and Fig. 11.7) is held in the memory of a Muslim saint from the Malabar region - Aloor Valiya Pookunjikoya Thangal. The town is illuminated brilliantly and a pageant with traditional musical ensembles like panchavadyam and thayambaka is taken out at night during the festival. About 70 - 80 tuskers are lined up for the festival. Various art forms are also performed on the banks of the River Bharathappuzha.



Fig. 11.7 Pattambi Nercha festival

11.3 PROXIMITY TO OTHER TOURISTS SPOTS

Other important tourist spots in the vicinity of Pattambi Town and its distance from town are shown in Table 11.1 below. Fig. 11.8, 11.9, & 11.10 shows the tourist destinations near Pattambi municipality.

Table 11.1 Tourist attracting places near Pattambi municipality

Sl. No	Tourist Place	Distance from Pattambi Town (km)	Name of Local body
1	Ramagiri kotta	5	Ongallur
2	Rayiranellur Mala	13	Thiruvegapuram
3	Muthassiyarkavu	7	Muthuthala
4	Thirumittakode temple	8	Thirumittakode
5	Njagattiri Temple	3	Thrithala
6	Andaladi Mana	5	Ongallur
7	Kattil Madom	7	Thrithala
8	Keraleeya Ayurveda Samajam	14	Shoranur Municipality
9	Vaidya madom	8	Thrithala
10	Punnasseri Illam	2	Muthuthala
11	Thiruvegapuram Mahadeva Temple	16	Thiruvegapuram

Source: DTPC Office Palakkad



Fig. 11.8 Rayiranellur Mala



Fig. 11.9 Ramagiri kotta



Fig. 11.10 Andaladi Mana

11.4 SCOPE FOR RIVER FRONT TOURISM

Rivers are the major spatial elements of the landscape and constitute a significant tourism resource. Bharathapuzha river (Fig. 11.11) is flowing along south western boundary of town has to explore opportunities for developing Bharatha Puzha river-front into a tourist destination. Facilities like parks, health resorts etc. have to be created on the river-front that would attract tourists. There needs an in-depth study on the project in order to develop the area into one of the most relaxing areas in town.



Fig. 11.11 Bharatapuzha

11.5 AVAILABILITY OF TOURISM INFRASTRUCTURE

The infrastructure for tourism includes basic infrastructure components like transport facilities, electricity, water supply, drainage, sewerage, solid waste disposal systems and services. Moreover, facilities like accommodation, restaurants, recreational facilities and shopping facilities also comes under the ambit of Tourism Infrastructure. Since the tourist flow is only seasonal, there are no major tourist infrastructural facilities in the town. However there is a Five star hotel named “Nakshathra Regency” near Alex junction. Kulathingal Tower, CKS Lode, Tourist Home, Melepattambi, Hotel Rajaprashtam etc are other economy hotels. There are no home stay facility within Town.

11.6 PROBLEMS AND POTENTIALS

There are no major tourism centres present in Pattambi. Pattambi Mosque, Vallur Guruvayurappan Temple, Kaithali Siva Temple, Unni Branthankavu Panthakkal Bagavathy Temple etc are the religious places in Pattambi. Pattambi nercha at Pattambi mosque and Sivarathri celebration at Kaithali Siva temple are the two annual events celebrated in Pattambi.

Pattambi Nercha, the annual feast at Pattambi mosque is held in the memory of a Muslim saint from the Malabar region - Aloor Valiya Pookunjikoya Thangal. Kaithali siva temple located in Mele Pattambi is a protected monument under the Archaeological Survey of India. There is no separate space for celebrating these events, so they are often celebrated on the road, disrupting traffic.

Tourist places near Pattambi includes Ramagiri kotta, Rayiranellur Mala, Muthassiyarkavu, Thirumittakode temple, Njagattiri Temple, Andaladi Mana, Kattil Madom, Vaidya madom, Punnasseri Illam, Thiruvegapuram Mahadeva Temple etc. within 20 KM. Bharathapuzha river flowing along south western boundary of town has to explore opportunities for developing Bharathapuzha riverfront into a tourist destination.

Source : Live Stock Census 1996,2003,2007,2012

12

Physical Infrastructure

12. PHYSICAL INFRASTRUCTURE

Physical infrastructure is the basic physical structures required for an economy to function and survive. The fast growing Population in recent years has placed an increasing stress on physical infrastructure such as urban and rural water supply and sanitation, drainage system, solid waste management and energy, which are the basic services that should be put in place to enable development to occur. The sustainability and quality of life in urban centers is closely linked to the quality and efficiency of Physical infrastructure.

12.1 WATER SUPPLY

The purpose of municipal water supply system is to transport potable water from a water treatment facility to residential consumers, for use as drinking water, water for cooking, water for sanitary conditions, and other water use in a domestic environment. Water supply is essential for business and industry to operate in a municipal environment. Supply of water is very essential to properly located fire hydrants to provide the public with an effective level of fire protection. Municipal water systems may also need to provide water for special services that include street cleaning, the selling of water to contractors for erecting buildings, parks and recreation, and miscellaneous uses.



12.1.1 Existing water supply system

The management of drinking water supply is very important, as the growing demand for water due to the high population density and changing water use habits. Kerala Water Authority is an autonomous authority established for the development and regulation of water supply, waste water collection and disposal and to fix the tariff and charges for water supply and sewerage services in the state of Kerala. At present all the water supply schemes in the Pattambi town undertaken by KWA has been handed over to the municipality.

Important sources of water

The important sources of water supply in Pattambi town are Bharathapuzha and bore wells at various parts of the town. According to socio economic survey 55.13 % of people depends on well water, followed by piped water supply of Municipality which constitute 35.78 %. About 1.93% depends on community well and 0.39% depends on public bore well. The sources of water in the Pattambi town are given in Fig.12.1 and Table 12.1.

Table 12.1 Details of water sources in Pattambi town.

Sl. No	Source	Location	Quality of water source wise	Challenges to the sources
1	River	Bharathapuzha	Potable water that can be used after chlorination	Scarcity of water on dry season.
2	Borewell	Various parts	Potable water that can be used after chlorination	

Source: Pattambi Municipality

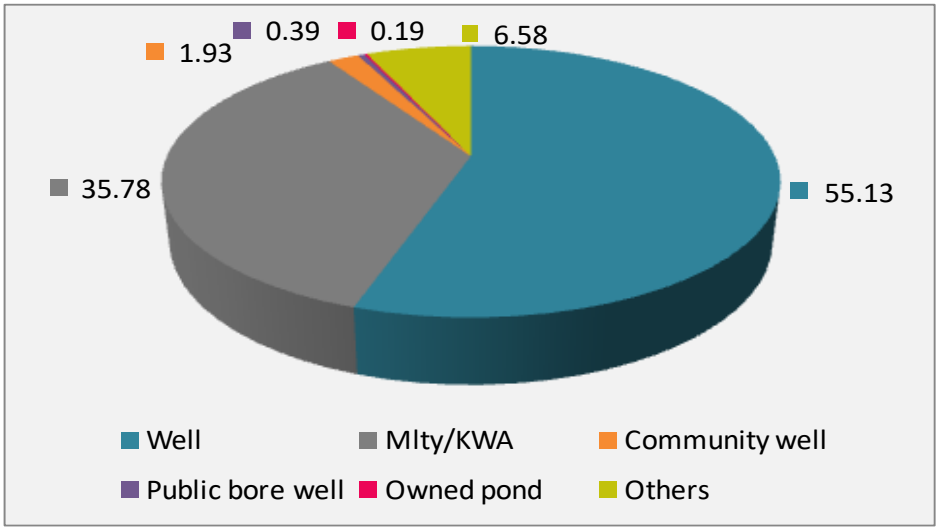


Fig 12.1 Sources of water.

Source : Socio economic survey

Existing transmission, distribution and storage capacities

The sources of water supply schemes in Pattambi town are Bharathapuzha and borewells. One major water supply scheme and 31 minor water supply shemes are functioning in Pattambi town. The major water supply scheme in the town is "Pattambi Thwaritha Grameena water supply scheme", which is commissioned in 2014. The scheme is designed at the rate of 40 lpcd.

The scheme consist of a Water treatment plant of 2.5 MLD and two OHSR of 3.5 LL and 1.55 LL at Unnibrandhankavu and Anthoor Palliyal repectively. Source of water is an intake well cum pump house situated near Nila hospital. Intake well is having of 6m diameter and 8 m depth and an infiltration gallery of 50m length with 2 arms. Water is pumped from intake well to the water treatment plant located near PWD guest house having a capacity of 2.5 MLD.

Aeration, Flocculation, Filtration and Chlorination are the methods practiced in the treatment Plant. A Flash mixer is also used to mix coagulant with water prior to flocculation and plant is good in working condition. The details of water treatment

plant are given in Table 12.2. An OHSR reserve tank of 2.5 LL is situated in the same PWD guest house compound for emergency situations, and one OHSR tank in the treatment plant compound, which is not in use at present. The water supply service area of the town is divided into 3 zones.

1. Zone 1- Direct supply.

2. Zone 2 - OHSR OF I.5 LL Capacity at Anthoor Palliyal

3. Zone 3 - OHSR of 3.5 LL Capacity near Unnibrandhan temple

In Zone II and III, water from the reservoir is distributed through various pipes. In Zone I direct pumping is carried out. The total length of distribution network extends over 70 km. The clear water pumping main of 200 mm PVC pipe is laid in Zone I, and III. 160 mm PVC clear pumping main is laid in Zone II it extends over 2530 m. Pumping main to Zone I and Zone III extends over a length of 2053 m and 4435 m respectively.

Table 12.2 Details of water treatment plant.

Sl.No	Location	Source of water (Rivers, fresh water lakes, streams, ponds ,Tube well, Bore well)etc	Capacity of the Plant(MLD)	Types of treatment	Working Condition
1	Near PWD Guest house	River	2.5	Clorination Only	Good

Source: Pattambi Municipality





Fig. 12.2 Water treatment plant and intake well

Some of the important minor water supply schemes are

- Pallippadi water supply scheme - 7.5HP Motor
- Collegepadam water supply scheme – 2-10 HP Motor, 2-5000 litre tank
- Puthukkulam water supply scheme – 7.5HP Motor
- Thekkumuri water supply scheme-10HP Motor
- Kallikkad water supply scheme-7.5HP Motor, 5000 litre tank
- Guruthiyan Kavu Water supply scheme– 5HP Motor.

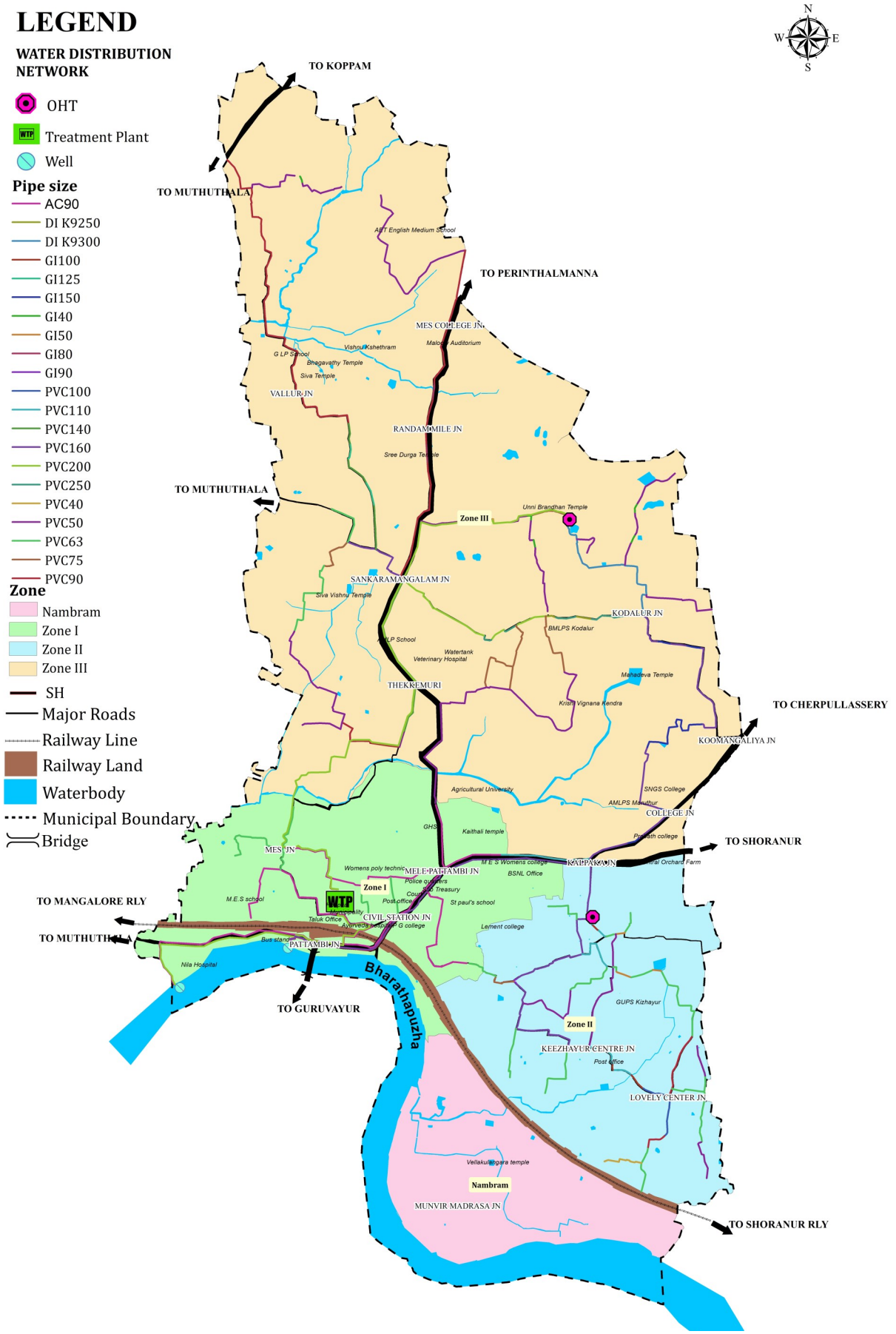


Fig. 12.3 Water supply distribution network in Pattambi town

Service coverage

The details of water supply distribution network are given Table 12.3. The population served by piped water includes house connections and street taps. There are 874 Public taps in the Pattambi town. The scheme covers all the 28 wards in the Pattambi town. There are 4539 house connection, 450 industrial connection and 17 public and semipublic connections.

Table 12.3 Details of water supply distribution Network.

Sl. No	Net work	Sources	Area of coverage (wards)	No. of houses covered/no. of connections	No. of Industrial connections	No. of public & semipublic institutions connections	Tariff structure
1	Water Supply Scheme	River & Borewell	1 to 28 wards	4539	450	17	Domestic-Rs65/- Non domestic Rs/-215

Source: Pattambi Municipality

Water availability in Pattambi town mainly depends on Velliyangal regulator cum bridge in Bharatapuzha. In summer velliyangal region dries up and water supply schemes in Pattambi town are forced to shut down. This is one of the major issue in Pattambi town. Pattambi witnessed acute water shortage in the last summer and despite the existence of a regulator at Velliyankkal, the river dried up in the recent past which indicates the gravity of water scarcity. Fig. 12.3. shows the water supply distribution network in Pattambi town.

12.1.2. Distance to water sources

According to the socio economic survey 2016 it is identified that about 96% of water sources are located within the compound and 1.74% located outside upto 50 m. Only 0.39% of water sources are located at a distance of 101-250m and a very few were located at a distance of 51-100m and 251 -500m. Fig. 12.4. shows the distance to water sources.

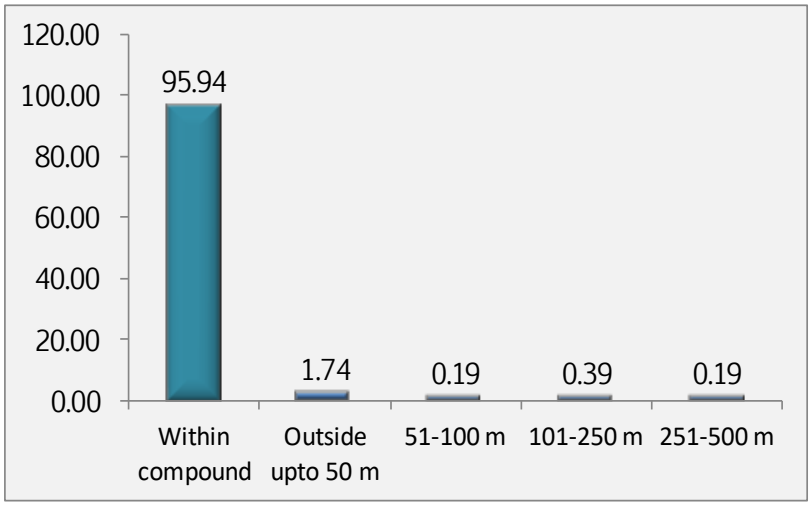


Fig. 12.4 Distance to water sources

Source : Socio economic survey

12.1.3. Duration of water availability

As per the socio economic survey it is observed that only 6.77% is having water supply for 24 hours. About 2% get water for 12-24 hrs, 0.97% has 6-12 hrs, 22.05% has 1-6 hrs, and 1.55% has only less than one hr water supply. Major portion of about 37% gets water once in 2 or more days. Fig. 12.5. shows the duration of water availability in Pattambi town.

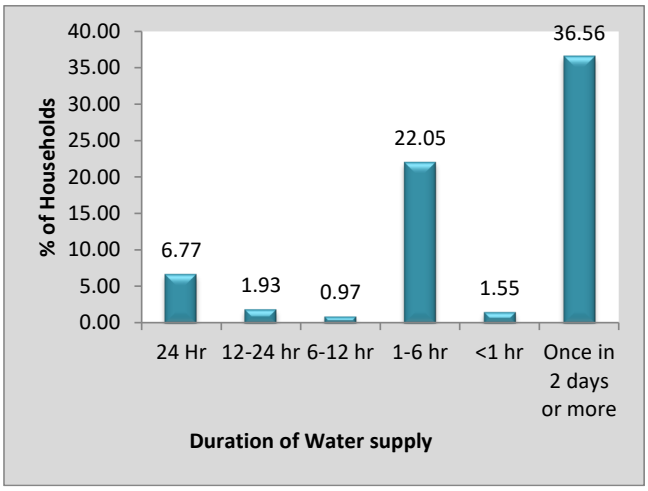


Fig. 12.5 Duration of water availability

Source : Socio economic survey

12.1.4. Ground water depth

Hydrograph of two observation well is given in Fig. 12.6 and Fig. 12.7. Depth of water table from ground level of observation well No. 115 is 7.64 m average of 10 years in peak summer, and that of observation well no. 136 is 10.86 m. Well no. 115 is an open well situated at Pattambi, and well No.136 is a bore well in Pattambi. Details of ground water table is shown in Table 12.4.

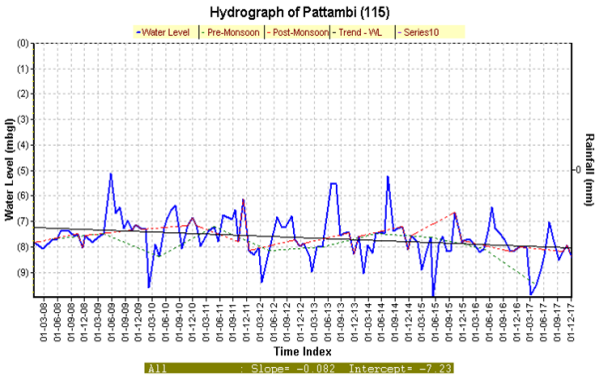


Fig. 12.6 Hydrograph of Observation well No:115

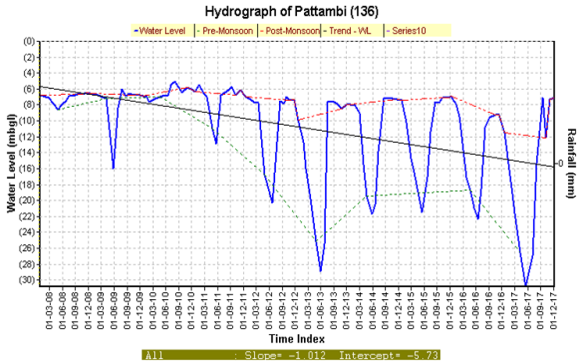


Fig. 12.7 Hydrograph of Observation well No:136

Source : Ground water department, Palakkad.

Table 12.4 Details of ground water table

Type of Well	Location	Well No	Jan-16	Jan-05	Jan-15	10 Years Mean [2006-2015]		Fluctuation Jan 16 with respect to		
						WL	Yrs	5-4	6-4	7-4
1	2	3	4	5	6	7	8	05-Apr	06-Apr	07-Apr
Open Well	Pattambi	115	7.69		7.83	8.14	8	-	0.14	0.45
Bore Well	Pattambi	136	7.9		10.21	7.936	9	-	2.31	0.036
Bore Well	Pattambi	160 PKD-2	14.46		15.64	15.763	9	-	1.18	1.303

Source : Ground water department, Palakkad.

12.1.5. Scarcity of water.

Encroachment on the river bank and river bed, and sand mining has reduced the water retaining capacity of the river and it leads to acute water shortage problems during summer season.

From the socio economic survey it is observed that about 42% Population are having no water scarcity problem. 31% having scarcity for a period of 1-2 months, 20.89% are having water scarcity for 2-3 months and 3.68% for 3-6 months. About 2% of population are facing scarcity for more than 6 months. Vallur North, Nediyamkunnu, Sankaramangalam, College, Kizhake angadi, Hidayath nagar, Cheruliparambu, Kizhayur, Lovely, Kolorkunnu, Nambram, Pattambi town & Nethirimanagalam has reported 1-2 months scarcity.

Randam mile, Kalappara, Kodalur centre, Thekkumuri, Melepattambi, Umikunnu, Kaithali, Vadakkumuri, Thottungal City and Vallur centre has reported 2-3 months scarcity. Vallur East has reported 3-6 months scarcity. Civil station, Paruvakadavu& Kozhikunnu has reported no scarcity. Water Scarcity is found to be more in areas where slope is higher (Vallur East, Randam mile, Kalappara etc) Fig. 12.8. shows the duration of water scarcity and Fig. 12.9 shows the spatial distribution of water scarcity areas in Pattambi town

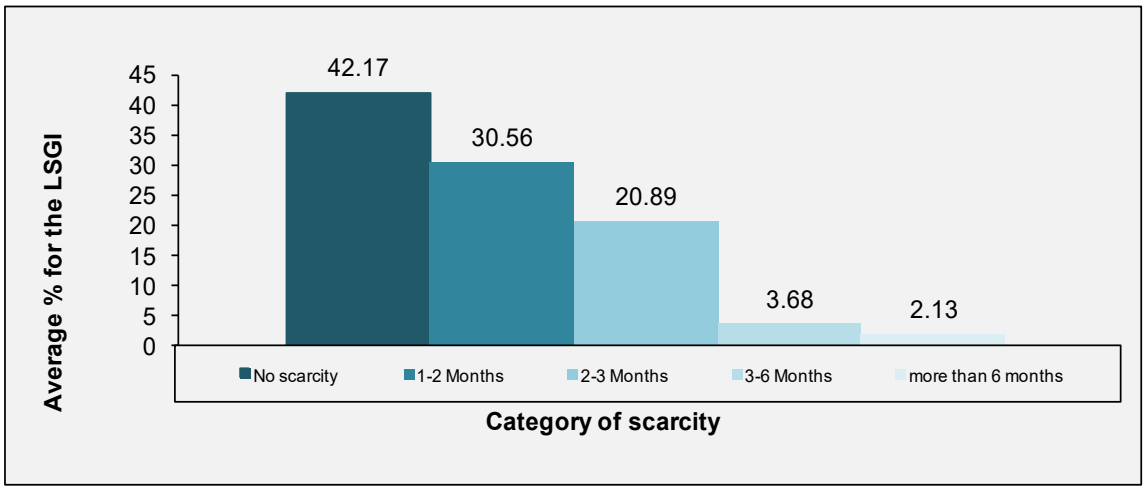


Fig. 12.8 Duration of water scarcity.

Source : Socio economic survey

12.1.6. Problems and potentials

At present, all the water supply schemes in the Pattambi town undertaken by KWA has been handed over to the municipality. The existing distribution network of KWA in Pattambi municipality covers all wards. Existing KWA schemes include one major water supply scheme (Pattambi Thwaritha Grameena water supply scheme-2014) and 31 minor water supply schemes. Pattambi Thwaritha Grameena water supply scheme-2014 is designed at the rate of 40 lpcd and consists of a water treatment plant

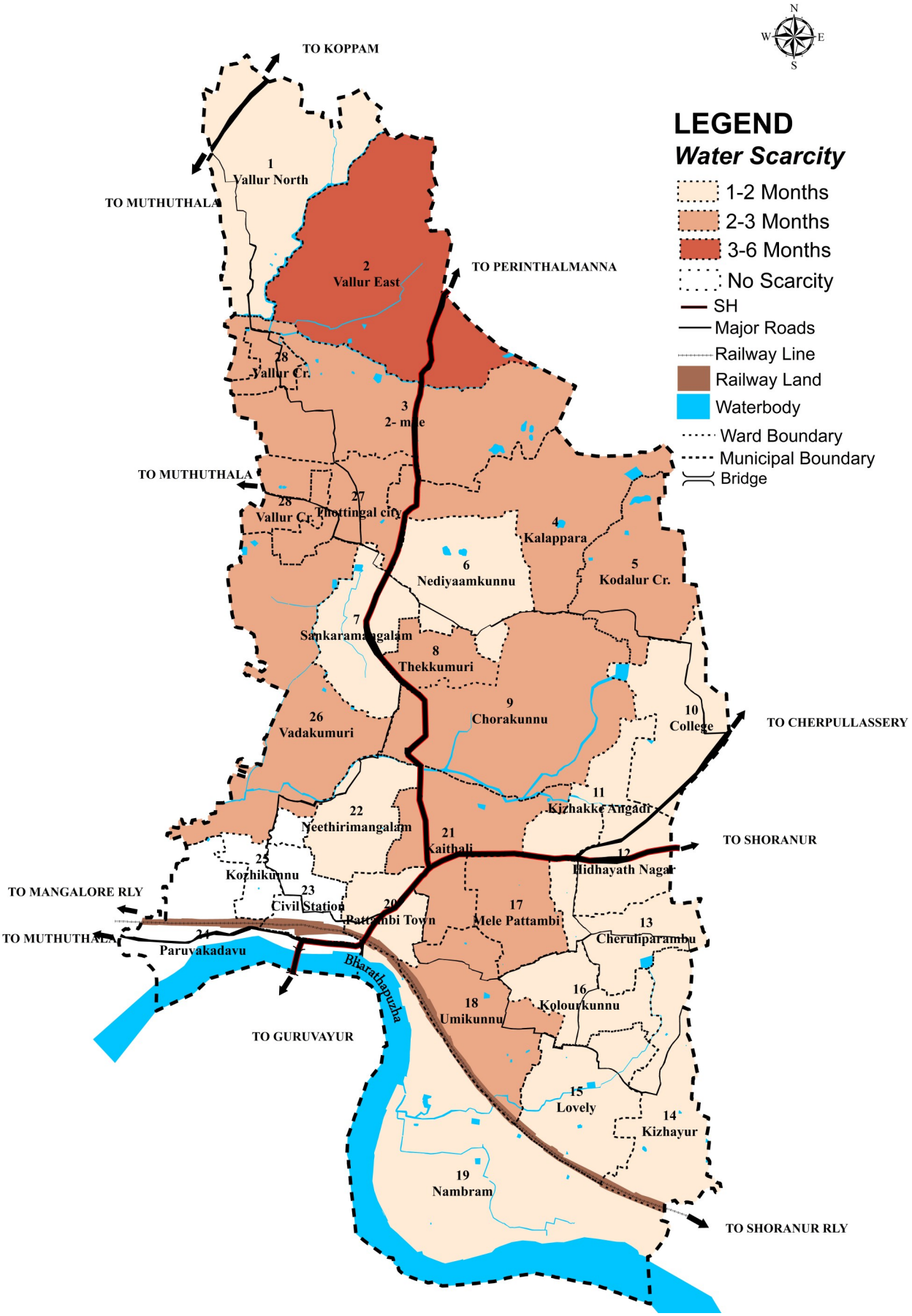


Fig. 12.9 Spatial distribution of water scarcity areas.

Source : Socio economic survey

of 2.5MLD with OHSR of 2.5 LL and two OHSR of 3.5 LL and 1.55LL at Unnibrandhan-kavu and Anthoor Palliyal respectively. The water Treatment Plant is located near PWD guest house and has a capacity of 2.5 MLD & Conventional type of treatment is done.

The water supply service area of the town is divided into 3 zones. 35.78% of population depends on KWA and their demand is around 1.5 MLD and this cannot be met from the Pattambi Thwaritha Grameena water supply scheme - 2014 having a total capacity of 0.75 MLD. Even though 55.13% of the households depends on open well, 35.78% depends on bore well and the remaining depends on KWA, owned pond, community well etc. the available water is not sufficient enough to meet the needs. The ground water table is showing a declining trend in the municipality.

Average Ground Water table depth in Open well (GHSS, Pattambi) is 8.14m and that of bore wells is 7.963 m & 15.76 m (10 years average in peak summer). From the socio economic survey it is observed that about 42% Population are having no water scarcity problem. 31% having scarcity for a period of 1-2 months, 20.89% are having water scarcity for 2-3 months and 3.68% for 3-6 months. About 2% of population are facing scarcity for more than 6 months.

12.2 DRAINAGE

Drainage systems are in place to remove the excess water in a development. This could be floodwater and rainwater and different kinds of runoff. Drainage is important to the successful function of a project site. Drainage helps guide water flow (from rain or irrigation) in order to remove it from the ground surface.

12.2.1 Existing drainage network

Pattambi Town receives on an average of 2348 mm of rainfall annually. A Planned drainage system is necessary for an urban area. The existing drainage systems consists of natural and artificial drains that ultimately discharge in to Bharathapuzha. According to the National Water Quality Monitoring Program's data on water quality, Bharathapuzha along Pattambi is one of the district's most polluted stretches.

According to KWA, the major reason for pollution of Bharathapuzha at Pattambi are as follows. *(Source : 'D.P.R. for sewerage and septic Management for Pattambi Municipality' Prepared by KWA)*

- Six drains from Pattambi town opening to the river which carries domestic waste water from the trade establishments located in the town area from Mele Patttam-bi to Nila Hospital
- Solid waste damping into the side of the river and solid waste reaching the river carried by the drain
- Possibility of open defecation and discharge of septage into the river by

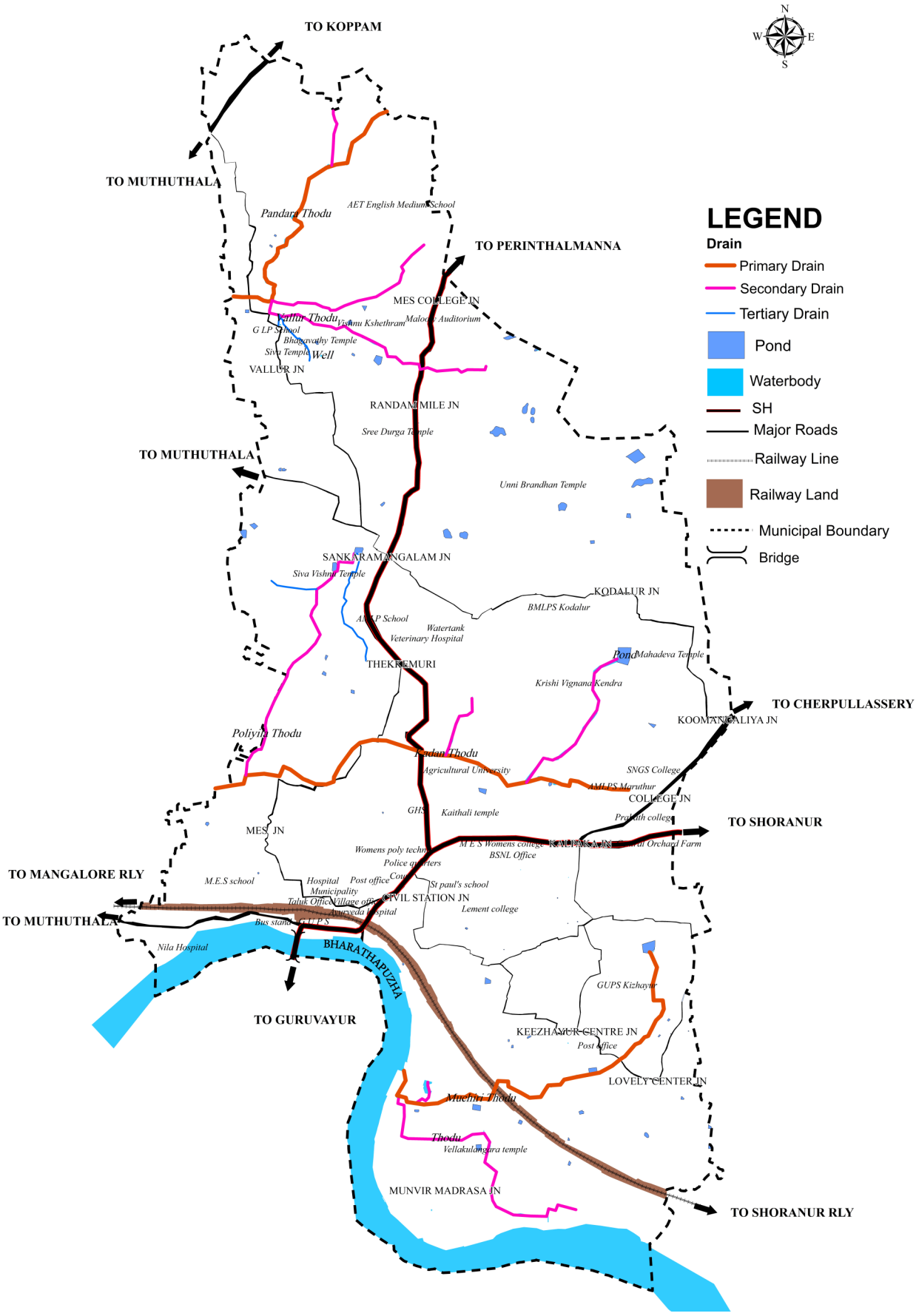


Fig. 12.10 Natural drains in Pattambi town.

Source: Land use survey by LSGD Planning, Palakkad.

persons who are engaged in cleaning septic tank periodic basis.

As the Pattambi town comes under midland region consists of valleys and plains the major drainage system is natural drainage systems.

Only very few of the drains along the roads in the core area are seen covered and others are uncovered. Many of the natural drains are blocked due to waste disposal.



Fig. 12.11 Drain at Harmony street



Fig. 12.12 Waste disposal along the sides of drain at Nambram road

Clogging of drains may leads to water logging which is the main reason to flooding. As per census 2011, 46.5% of waste water outlet in town are not connected to any drain. 23.5% of waste water outlets are discharged into covered drains and 30% are discharged into uncovered drainage system. Fig. 12.10 shows the natural drains in Pattambi town.

12.2.2 Problems and Potentials

Most places have natural drainage systems. Waste water is linked to drains in 53.5% of cases. The blocking of many natural drains is a result of human activities like trash dumping. Due to poor drainage systems, clogged drains can cause water logging, which is the main issue during rainy seasons.

12.3 SANITATION AND SEWERAGE SYSTEM

Sanitation is the hygienic means of preventing human contact from the hazards of wastes to promote health. Examples of waste that can cause health problems are feces, solid wastes, domestic wastewater and industrial wastes. Hygienic means of prevention can be done by using septic tanks, proper sewage systems or simply by personal hygiene practices.

In the month of September 2019, Friends of Bharathapuzha and Sreepathy Engineering College jointly conducted a study on river pollution in ward 19, 23 and 24 adjoining Bharathapuzha under leadership of the Pattambi Municipality. These wards

have 5 hospitals, 690 households and 428 other institutions. Observation and result of survey are as follows.

Out of 690 households, 450 households discharge sewage into septic tank and others into soak pit, 443 house holds discharge their other liquid waste into septic tank, 212 households discharge into soak pit and 35 house holds into open ground.

350 households discharges the black water to septic tank and others into open drains. The majority of homes bury the septic tank waste on their own property. The survey also revealed that the others discharge their untreated faecal waste to another location through private agencies.

The effluent from the water closet are disposed off to septic tank in all hospitals in the above specified three wards. The black water from the septic is connected with soak pit. The untreated fecal silt in the septic tank is disposed in site itself and none of the hospitals cleans the septic tank at regular intervals till the surveyed date.

In the case of 428 other institutions (table 12.5 shows list of various institution with in the above specified wards), 175 institutions discharges their liquid waste in the septic tank and 39 institutions in the soak pit. Most of the institution drains their black water from the septic tank to sock pit but 67 institutions drain off to open drains. The 80 institutions bury the sludge from the septic tank on their own land and 74 institutions discharge their sludge else where through private agencies. Among them 84 institutions discharge their grey water into soak pit, 62 institutions into public drain and 3 of them discharges into both soak pit and drain.

Table 12.6 shows the total water consumption of all the 3 wards and the amount of effluent from it.

Table 12.5 List of various institutions within the ward 19,23 and 24

SL. No.	Other Institutions consists	No.
1	Shops	355
2	Hotel	28
3	School	17
4	Market	10
5	Government Institutions	8
6	Bank	5
7	Mosque	3
8	Temple	1
9	Railway Station	1

Source : Study Friends of Bharathapuzha

Table 12.6 Consumption of water within the ward 19,23 and 24

Class of Occupants	Consumption of water	Total grey water (65 % of consumption)
Households	710800	462072
Hospitals	48000	31200
Other institutions	289700	188305
Total in liters	**1048500**	**681577**

Source : Study Friends of Bharathapuzha

The study of 3 wards adjoining Bharathapuzha concluded as follows. 78 % of the house holds and 43 % of institutions follows their own methods to dispose the solid waste. In the case of effluents from water closets 35% of households and 18% of institutions disposes it into soak pits. In the case of black water from the septic tank, 22 % of households and 38% of institutions directly drain out this into public drains. 78% of households and 46% of institutions dispose their untreated silt from septic tank in site itself. 36% of households and 44% of institutions depend public drain to dispose the grey water. The leachate of this may mix with sub surface water at the time of rainy seasons and finally enter into the river.

The situation is not much different when entire Pattambi Town is considered. There is no sewage system in Pattambi town. From the socio economic survey it is observed that majority of houses in the municipality uses pit latrine, it is about 73.31%. This is an indication of unhealthy practice of night soli disposal in the town. Fig. 12.13. shows the sanitary waste disposal methods in the town and ward wise sanitation system is shown in Fig. 12.14.

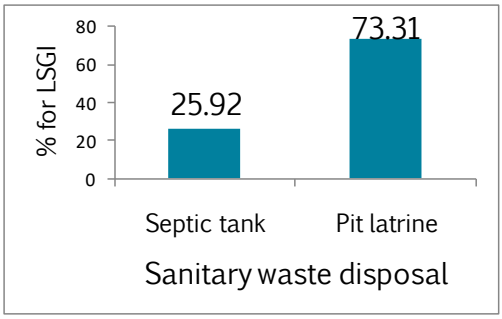


Fig. 12.13 Sanitary waste disposal

Source : Socio economic survey

Table 12.7 shows the quantity of grey water produced in Pattambi town in the year 2021. But in the town core area major built up area consist of industrial units, schools,

Table 12.7 Quantification of grey water in Pattambi town

Projected Population (2021)	34371 Nos
Total water consumption (Considering 70 lpcd for the town with piped water supply but without sewage system)	2.41 MLD
Total quantity of grey water (65 % of water consumed) w.r.to Population	1.56 MLD

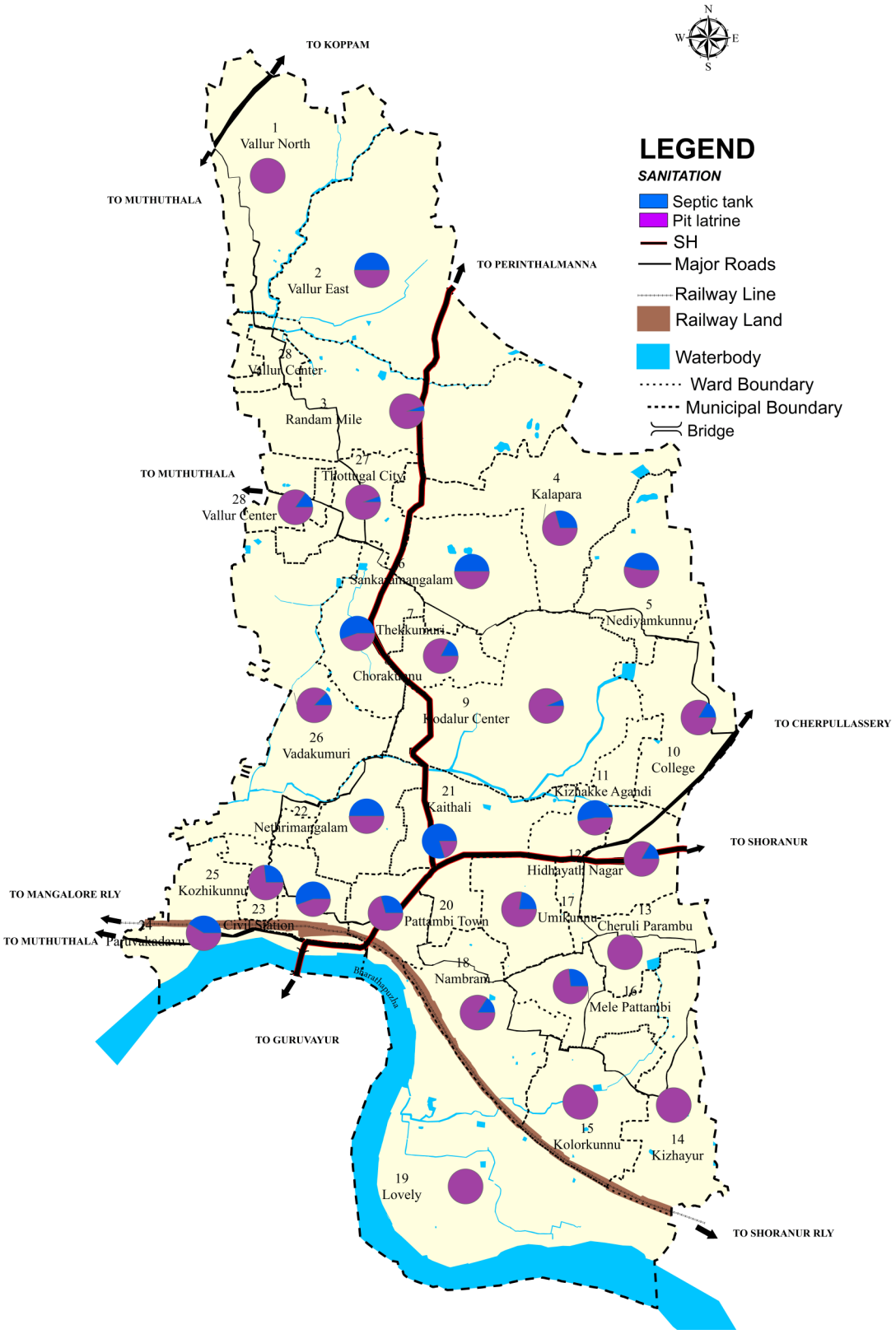


Fig.12.14 Ward wise sanitation system

Source : Socio economic survey

colleges, commercial establishment etc. as per table 12.5. The users of this facilities are mainly floating population. Table 12.8 shows the quantification of grey water in such areas.

Table 12.8 Quantification of grey water in Pattambi town considering other than residential

SL.No.	Type of establishment	No. of estab-lishment	lpcd	No. of seat /user	Water consump-tion/day	Quantity of waste water genra-tion/day
1	Hotels	9	180/bed	49	8820	5733
2	Restaurants	50	70/seat	1000	70000	45500
3	Hospitals with number of beds exceeding 100	0	450/bed	0	0	0
4	Hospitals with number of beds less than 100	4	340/bed	141	47940	31161
5	Nurse homes	0	135	0	0	0
6	Hostels	0	135	0	0	0
7	Boarding schools and col-leges	0	135	0	0	0
8	Day schools and colleges	43	45	12966	583470	379255.5
9	Offices	52	45	526	23670	15385.5
10	Factories	54	45	213	9585	6230.25
11	Cinema halls/concert halls / auditoriums	4	15	2350	35250	22912.5
	Total in litres / day				**778735**	**506177.**
	Total in MLD				**0.78**	**0.51**

From the table 12.7 and 12.8 it is seen that the total quantity of grey water per day is 2.06 MLD.

In the case of septage generation, the report "Human Excreta Management in Urban Kerala: Towards Sustainable Options State Wide-by World Bank" gives the quantity of septage generation in the 93 urban local bodies of the State. As per the study, in Pattambi Town quantity of septage generation assessed as 3 KLD.

Another method, IS code (CSE,2017) suggest a value of 120 liters / capita per year as septage generation rate in Indian conditions. Thus, Pattambi town with projected population of 34371, in the year 2021 will generate a septage of 4124520 liters per year. Daily septage generation of the town will be 11300 liters (11.3 KLD).

Assume 30 % of septage is collected. Hence the quantity of septage required to treated is 3.39 KLD.

Total quantity of liquid waste is the sum of quantity of grey water (2.06 MLD) and quantity of septage (3.39 KLD). Quantity of septage is very low when compare with grey water, but Pattambi also a taluk head quarter. Therefore Municipaity should provide facilities for the use of the adjoining LSGIs as well. From the table 2.2 population in service area of pattambi comes 411733, then the effluent should be 14.82 KLD. From the table 2.3 total immediate influence zone of Pattambi town is 186727, then the effluent should be 6.75 KLD.

12.3.1 Problems and Potentials.

There is no public sewerage system in town. From the socio economic survey it is observed that majority of houses uses pit latrine. It is an indication of unhealthy practice of sanitation in the town. As majority use pit latrines that lack a physical barrier to keep waste contained in the pit, microbial and chemical contaminants can emanate from them, threatening nearby groundwater sources such as open well. Lack of toilets in the commercial establishments and lack of public pay and use toilets in market places and shopping areas also create unhealthy situation in the town.

12.4 SOLID WASTE MANAGEMENT

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. Solid waste includes a wide variety of materials that have served or can no longer serve their original intended use that are discarded, intended to be discarded, or burned for energy recovery, which are generated from residential, industrial and commercial activities.



12.4.1 Existing solid waste management system.

Presently there is a solid waste collection system in the Pattambi town. The solid waste generated in the town area is collected by sweeping and handpicking method. Waste bin collection method is not adopted in the town. 13 workers are working from early morning to 12pm to collect the waste. The major source is from vegetable market and hotels. Collection of waste is done also by Harithakarmasena from door to door. Door step service for solid waste collection is only available in 18 wards of the Municipality.

The waste at its source is not segregated, as it contains both biodegradable and

plastic waste. The collected waste is transported by a tractor to the storage shed situated 3.5 acres at Sankaramangalam.

Since the land at Sankaramangalam where the storage sheds are situated 500m away from the nearest house, it does not create any adverse effect on the neighboring people. There is no health and aesthetic problems also. Decentralized waste management systems, like house hold level, neighborhood level, ward level or zonal level are absent in the town. The waste generated from the market area does not have any solid waste collection or disposal system.

According to the City Sanitary Plan prepared by Suchithwa Mission, The solid waste generated in Pattambi town is 9 TPD. Out of this 6.98 TPD Bio-waste and 1.63 TPD consist of Plastics and non-bio degradable waste. Table 12.9 provides item wise quantity of waste. Only 4 tones are collected and disposed of at present. Three tones capacity Windrow compost plant and a one tone capacity RRF are operating in Solid waste treatment plant at Sankaramangalam. A material collection facility (MCF) is also working in the same place. From the collected waste plastic wastes are separated by 5 workers. Bailing machine and Shredding machine are also functioning here.

Table 12.10 shows the income and expenditure for solid waste management in the municipality during the last 5 years. Approximate average cost of 6.87 Lakhs per annum for disposal of 4 tones of waste can be understood from the past figures. The Municipality should not have the expected income from the production of manure from the Windrow compost plant. but total of 6.25 Lakhs income in the last 5 years from plastic waste can be seen as an achievement.



Fig. 12.15 Solid waste storage shed at Sankaramangalam

Table 12.9 Details of waste generated in Pattambi Town

SL.No.	Type of waste	Generated solid waste in TPD	% of solid waste
1	Wet waste	6.98	77
2	Dry waste	1.63	18
3	Sanitary waste	0.05	0.55
4	Domestic Hazardous waste	0.14	1.54
5	Other waste (Drain silt and inert)	0.27	3
	Total	**9.07**	**100**

Source : Suchithwa Mission

Table 12.10 Income and expenditure statement for solid waste management

Year	Windrow Plant		MCF	
	Income	Expenditure	Income	Expenditure
2018	0	242500	80000	235000
2019	0	230000	85000	250000
2020	0	273500	130000	240000
2021	0	270000	150000	567000
2022	0	280000	180000	687000

Source : Suchithwa Mission

As per the socio economic survey conducted in 10 % of households, 96.52% of the generated wastes are disposed on their own compound. 1.93% are disposed on open ground and about 1% of wastes are disposed on street. Fig. 12.16 and Table 12.11 shows the details of solid waste disposal in Pattambi town.

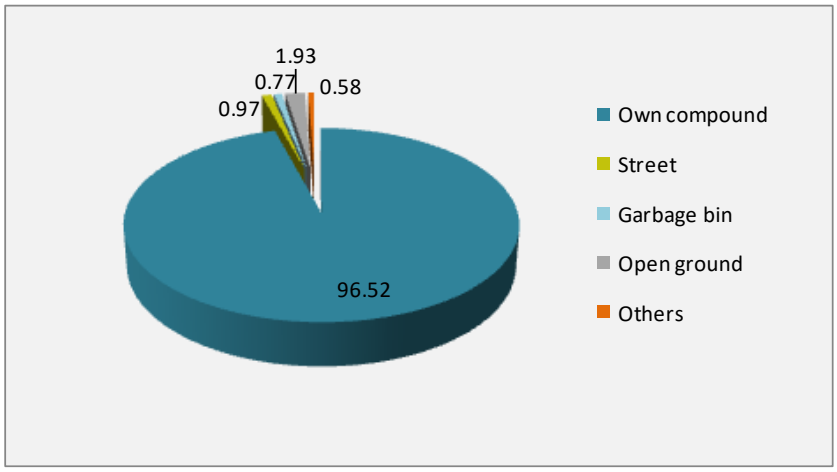


Fig. 12.16 Solid waste disposal

Table 12.11 Details of solid waste disposal

Category of place of waste disposal	Own compound	Street	Garbage bin	Open ground	Others
Average % for the Municipality in each category	96.52	0.97	0.77	1.93	0.58

Source : Socio economic survey

Biomedical waste.

The biomedical waste generated from the hospitals and clinics are collected through IMAGE, and biodegradable wastes are collected through municipal waste. Nila hospital is having their own waste disposal system in addition to the IMAGE. Paper wastes generated in the hospitals are disposed through incinerator and the food wastes are disposed using a biogas plant.

12.4.2 Problems and potentials.

Presently there is a solid waste collection system in the Pattambi town of 3.5 acres at Sankaramangalam. Solid waste collection system is a centralized but does not cover the whole municipal area. The waste at its source is not segregated, as it contains both biodegradable and plastic waste. Solid waste generated in Pattambi (M) is 9.07 Tonnes per day out of which 4 tonnes of waste is being disposed of in Sankaramangalam.

As per the socio economic survey 96.52% of the waste generated in the municipality are disposed on their own compound. They are not following proper methods of disposal. Waste are being dumped at Melepattambi, Civil station, Pattambi junction in an unhygienic manner. The biomedical waste generated from the hospitals and clinics are collected through IMAGE, and biodegradable wastes are collected through municipal waste

12.5 ENERGY

The process of economic growth is traceable in large part to the substitution of energy for the performance of every type of agricultural, industrial and domestic task. The availability of energy is an important determinant of the quality of life in human settlements. Energy growth is directly linked to well-being and prosperity across the globe. Meeting the growing demand for energy in a safe and environmentally responsible manner is a key challenge.

12.5.1 Existing condition.

The "110KV substation Pattambi" came into existence in August 2021. This substation serves the entire town of Pattambi, as well as Ongallur and Muthuthala grama panchyaths. Earlier, electricity in Pattambi was distributed from four substations (details are shown in table 12.12). Now the town is completely under a new substation. Older facilities can be used in emergency situations. Lovely, sevana, Mele-Pattambi, Pattambi

town and Bharathapuzha are the feeder in the town.

Table 12.12 Details of sub stations in Pattambi town.

Sl no	Sub station	Capacity in KV	Location	Serving area
1	Ongallur	33 KV	Koomankallu	Pattambi
2	Koottanad	110KV	Koottanad	ThazhePattambi
3	Arangottukara	110KV	Arangottukara	Kizhayur
4	Koppam	110KV	Koppam	Sankaramangalam

Source: KSEB Section, Pattambi

Total length of high tension (HT) line and low tension (LT) line are 72 Km and 298 Km respectively. There are 120 transformers in the town.

As per census 2011 the major source of energy consumption in the town is electrical energy which is about 98%. Consumption of kerosene is 1.7%. There is no non-conventional energy sources in the town. Fig. 12.17. shows the percentage of energy sources in Pattambi town. Details of distribution network of KSEB is shown in Fig. 12.19.

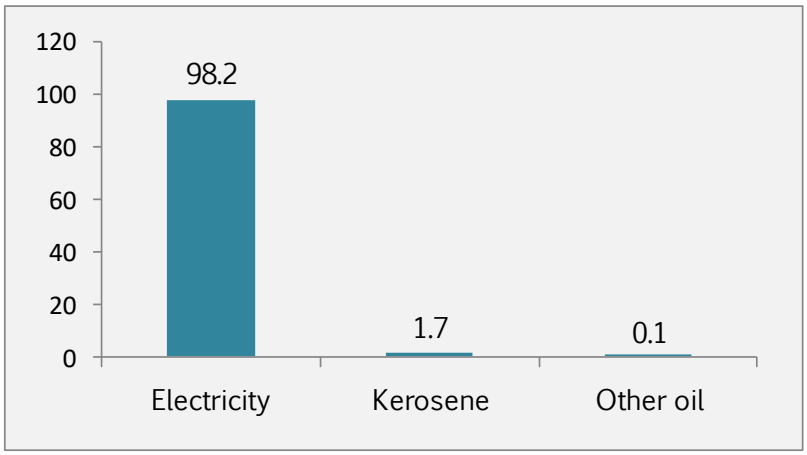


Fig. 12.17 Percentage use of energy sources in Pattambi town.

Source : Census 2011

Fig. 12.18 shows the type of fuel used for cooking purpose in Pattambi town. As per socio-economic survey 67.6% uses fire wood for cooking and 30.4% uses LPG.

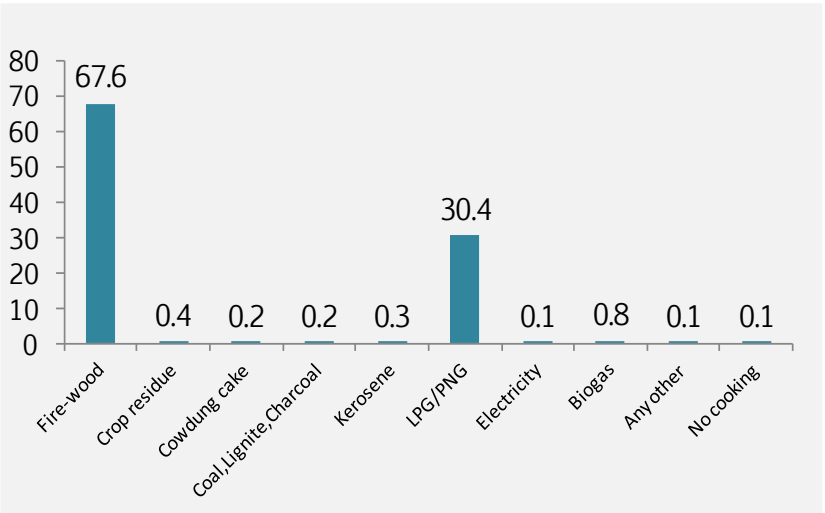


Fig 12.18 Type of fuel used for cooking.

Source : Socio economic survey

The category wise connections details in Pattambi town are given in Table 12.13. Fig 12.19 shows the category wise connection details in percentage during the year 2015-16. It shows that during the year 2015-2016, 68% of connection is for domestic purpose, 26% is for commercial purpose, 5% is for agriculture and rest 1% is for industrial.

Table. 12.13 Connection details in Pattambi town.

Year	Category wise break- No. of connections					
	Domestic	Industrial	Commercial	Agricultural	Others	Total
2013-14	9307	206	3581	723	11	13828
2014-15	6491	210	3849	685	11	14246
2015-16	9789	201	3827	674	11	14502

Source: KSEB Section, Pattambi

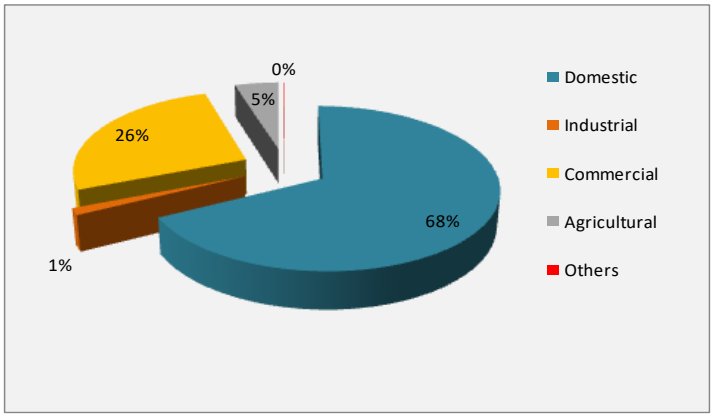


Fig 12.19 Category wise Connection details in percentage (2015-16)

Source: KSEB Section, Pattambi

The category wise consumptions details in Pattambi town are given in Table 12.14. Fig 12.20 shows the category wise consumption details in percentage during the year 2015-16. It shows that during the year 2015-2016, the major consumption is for domestic purpose (57%), followed by 31% for commercial activities. The consumption for industrial activities are 8% and 2% each for agriculture and other sectors. A total of 19618.48 KWH electricity is consumed during the year 2015-16.

Table 12.14 Category wise consumption details in Pattambi town.

Year	Total Consumption (MKWH)	Category wise break- No. of consumption(MKWH)				
		Domestic	Industrial	Commercial	Agricultural	Others
2013-14	17164.014	10220.67	1322.47	4779.172	381.718	460
2014-15	18968.002	10891.67	1974.84	5276.555	351.226	473.7
2015-16	19618.48	11190.96	1543.92	6069.177	317.014	497.4

Source: KSEB Section, Pattambi

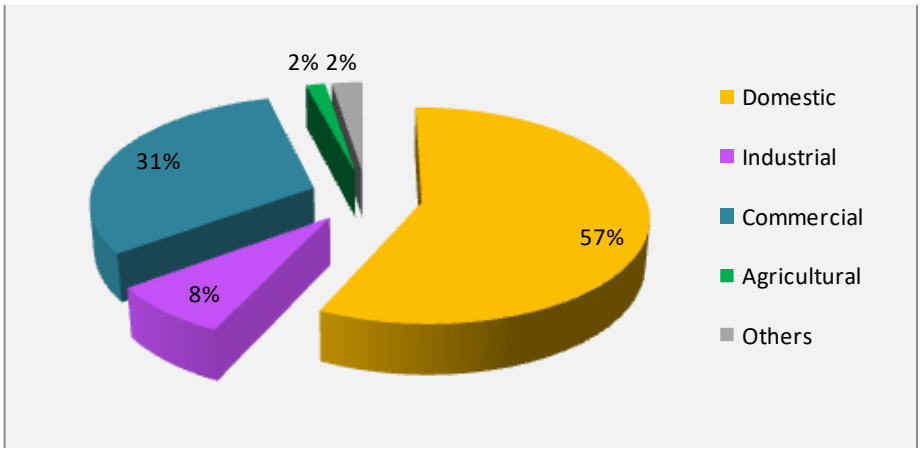


Fig. 12.20 Category wise consumption details in percentage (2015-16)

Source: KSEB Section, Pattambi

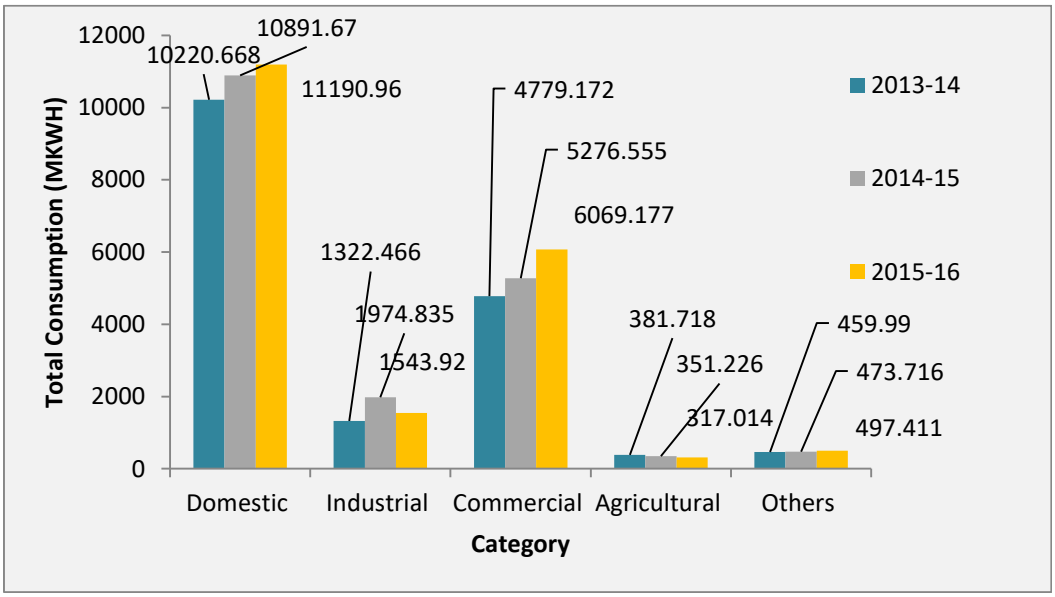


Fig 12.21 Category wise consumption details in the Pattambi town.

Source: KSEB Section, Pattambi

Fig. 12.21 shows the category wise consumption details in the Pattambi town for the past 3 years. There is an increase in the total consumption over the years. In industrial consumption, a decrease is seen in the year 2015-16, this may implies the reduction in industrial activities.

In addition to the electric energy supplies people also uses petroleum products like petrol, diesel, kerosene, LPG etc.

12.5.2 Street lighting

There are 1571 street lights in the municipality. The area without street lights are Kizhayur, Sankaramangalam, Valloor, Alikaparambu and Perumundiyur. The major type of street lights used within the municipality are CFL, SVL and double tube. The annual electricity charge for street lights is Rs 17,49,192. Details of street lights are given in Table. 12.15.

Table 12.15 Details of street light in Pattambi town.

Type	No. of Street Light	Hours	Watts	Annual Electricity ChargeRs	Any Area Without Street Light
Tube Light				17.,49,192	Kizhayur
SVL	194	12	250		Sankaramangalam
Solar					Valloor
Double Tube	352	12	40		Alikaparambu
CFL	1025	12	11X2		Perumundiyur

Source : Pattambi municipality

12.5.3 Problems and potentials

The power requirement of the town is being covered by KSEB. There is 33 KV sub-station located in Pattambi at Komankallu. Vallur, Kizhayoor and Chakkupadi are the areas facing low voltage problems. In Pattambi municipality, 68% of connection is for domestic purpose followed by 26% for commercial purpose. Pattambi town do not have any major energy problem.

13

Education

13. EDUCATION

Human resource development concern the quality of people that can be achieved through education. Education directly improves the quality of people by promoting efficiency and productivity. Pattambi town has the second highest literacy rate among the seven municipalities in the district, as per census 2011. Literacy rate of Pattambi town has increased from 92 to 95.17 during the period of 2001-2011.



13.1 EXISTING FACILITIES

Under article 21A of the Indian Constitution, free and compulsory education is provided as a fundamental right to children between the ages of 6 and 14. Education is provided by Public sector and private sector. In Pattambi town there are 12 schools in which 5 government schools, 3 aided and 4 unaided schools. Details of Govt., Aided and Unaided schools are given in figure 13.1. It is seen that, 42% of schools in the town are government schools.

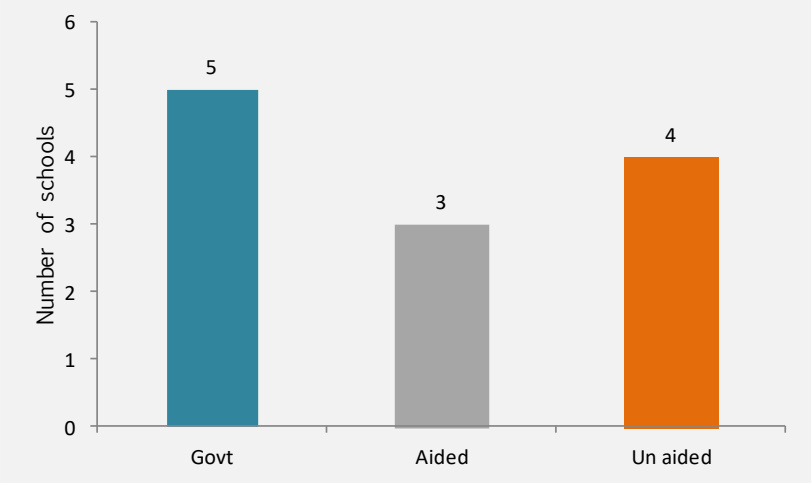


Fig. 13.1 Details of number of schools

Source: Local body, DDE

Table. 13.1 shows the details of schools in Pattambi town. There are 11 schools having primary schools facilities, 4 schools with high school facilities and 2 schools with higher secondary facilities. There is one Play school and day care centre. There is no vocational higher secondary schools in Pattambi.

Table 13.1 Details of schools in Pattambi town.

Sl. No	Name of school	Location/Ward	No of students				
			Pre Primary	Lower Primary	Upper primary	HS	HSS
GOVERNMENT							
1	GMLPS, Pattambi	Pattambi		61			
2	GLPS, Vallur	Vallur		74			
3	GUPS, Pattambi	Pattambi		470	578		
4	GUPS, Kizhayur	Kizhayur		204	295		
5	GHSS, Pattambi	Pattambi			379	1398	600
AIDED							
1	BKMLPS, Kodalur	Kodalur		188			
2	AMLPS, Maruthur	MelePattambi		74			
3	AMLPS, Sankaramangalam	Sankaramangalam		104			
UN AIDED							
1	MES International School	Pattambi	552	833	439	375	216
2	St. Pauls EMHS, Pattambi	Pattambi	412	349	782	345	
3	AET English medium School, Amayur	Pattambi	126	220	97	76	
4	Blossom Nurssery School		9				
Total			1099	2577	2570	2194	816

Source: Local body, DDE

Table 13.2 and figure 13.2 shows the percentage of students studying in each category of schools. It is observed that about 52% of students are studying in unaided schools followed by 44% of students in government schools. Only 4% of students are studying in aided schools. 68% of students are studying in state syllabus, and 32 % in CBSE syllabus. MES international school and AET English medium schools are the schools in which CBSE syllabus were followed.

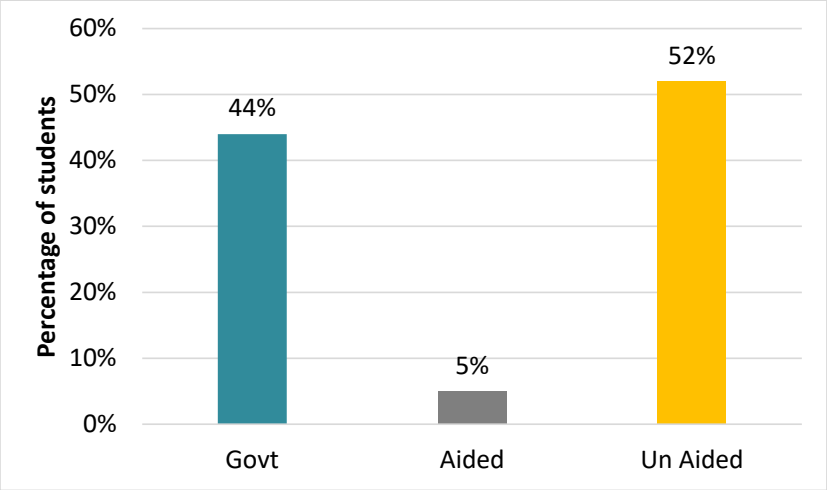


Fig. 13.2 Percentage of students in each sectors of school

Source: Local body, DDE

Table 13.2 Percentage of students in each sectors of school in the Pattambi town.

Category	Total no.of Schools	Percentage
Govt	4059	44
Aided	366	4
Un aided	4831	52

Source: Local body, DDE



Fig. 13.3 AMLPS Maruthur, Melepattambi



Fig. 13.4 MES International school, Pattambi



Fig. 13.5 Govt. Higher Secondary School, Pattambi



Fig. 13.6 Govt. UP School, Pattambi



Fig. 13.7 St. Paul's EM High School, Pattambi



Fig. 13.8 AET English medium school, Amayur

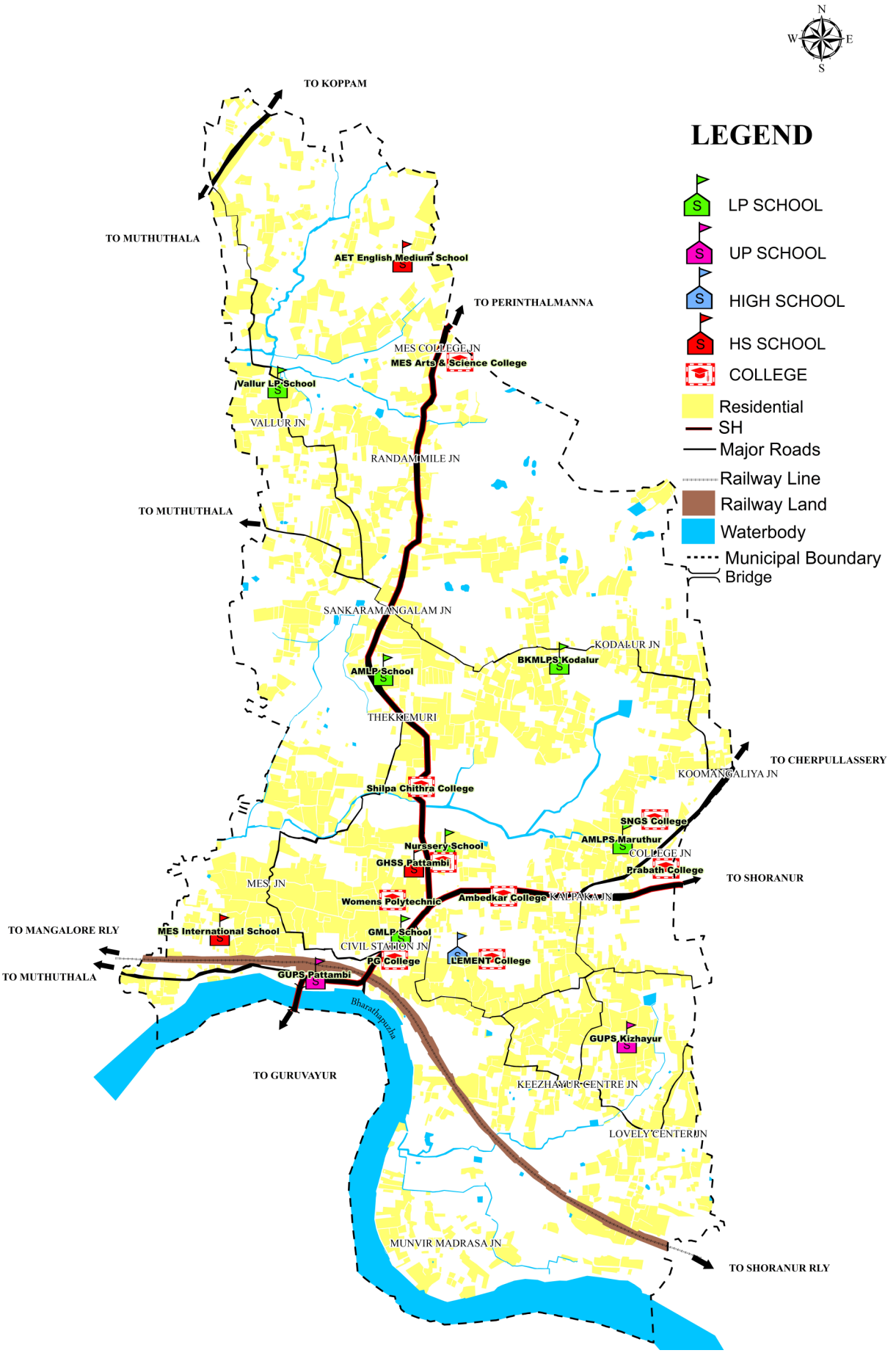


Fig. 13.9 Spatial distribution of educational facilities

Source: Land use survey by LSGD Planning, Palakkad.

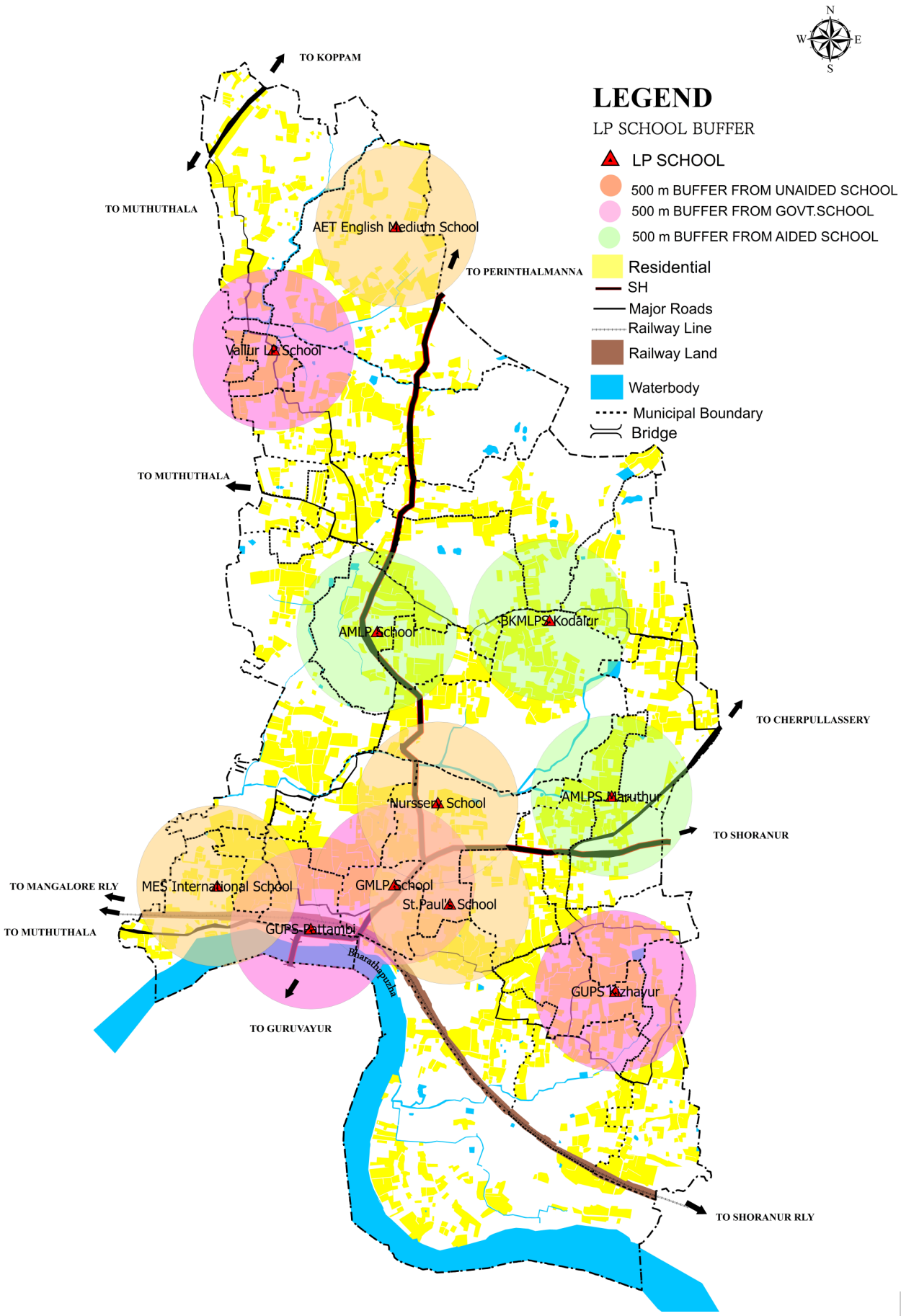


Fig. 13.10 Service area of primary school.

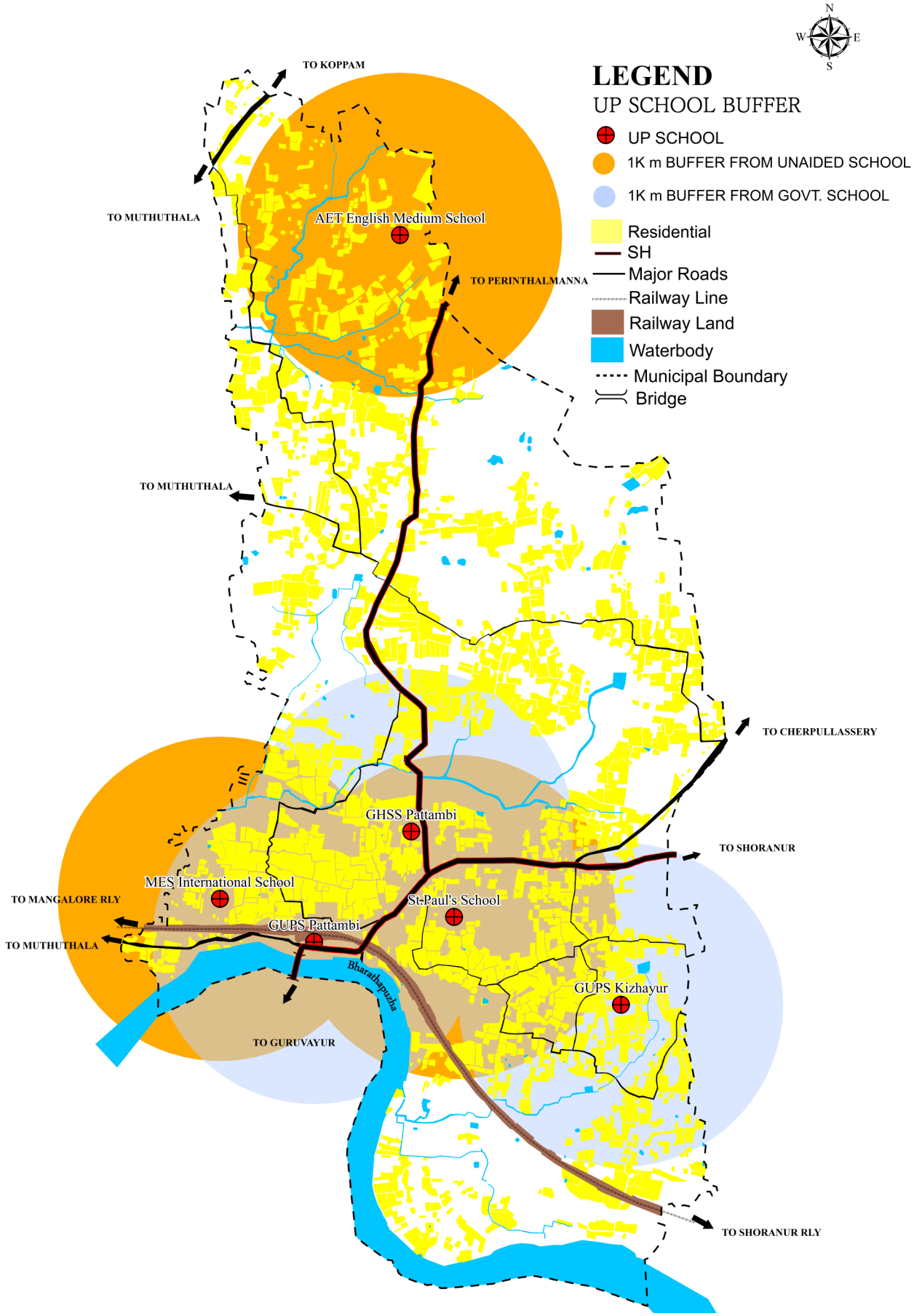


Fig. 13.11 Service area of UP school.

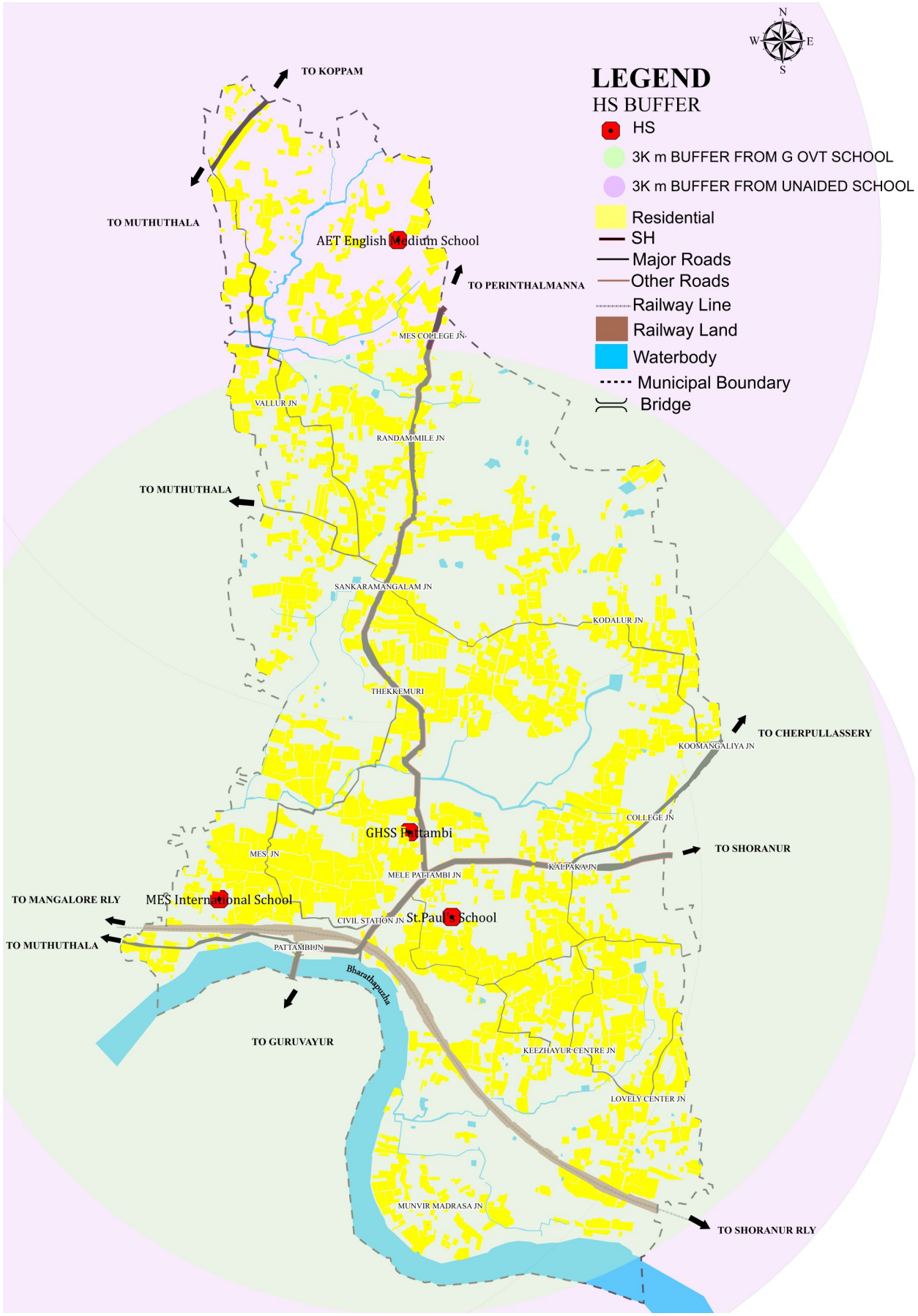


Fig. 13.12 Service area of High school.

Spatial analysis of schools with in the town shows that the service area of schools are covered almost all the municipal area. Schools are not located in areas where agricultural land use is predominant (Fig. 13.9, 13.10, 13.11 & 13.12).

Table. 13.3 Details of arts and science colleges in Pattambi town.

Sl. No	Name of College	Location	Number of students course wise							
			BA	B.Sc	B.Com	BBA	BAFE	MA	M.Sc	M.Com
1	Sri. Neelakanta Govt. Sanskrit College	Pattambi	570	304	221	30	0	90	68	40
2	MES Womens College	Pattambi	9	0	57	26	12	Nil	Nil	Nil
3	Lement College of Advanced Studies	Pattambi	0	13	76	28	0	Nil	Nil	Nil

Source: Local body, DDE

Table. 13.3 shows the details of arts and science colleges in Pattambi town. There are 3 arts snd science colleges functioning in Pattambi town, 2 private colleges (MES Women's college, Lement college of advanced studies) and 1 government college (Sree Neelakanta Govt. Sanskrit college). PG courses are available in Sri. Neelakanta sanskrit college.



Fig. 13.13 MES arts and science college, Pattambi.



Fig. 13.14 Sri. Neelakanta Govt Sanskrit college, Pattambi.

Table. 13.4 Details of technical institutions in Pattambi town.

Sl. No	Name of College	Details of owner-ship	Location	Specify the professional courses offered	Number of students course wise
1	MTC ITI & Technical Institute	Private	Mele Pattambi	KGCE,NCVT	
				1.Automobile	80
				2.Electrical	57
				3.CivilOil	10
				4.Refrigeration &AirConditioning	10
2	Womens Politechnic College	Private	Mele Pattambi	Fashion designing	100
				KGT Cources	30

Source: Local body, DDE

There is a MTC ITI & Technical institution, which offers 4 technical courses and a total of 157 students were attending the courses offered by them. There is one private women's polytechnic college in Pattambi town, which offer fashion designing and KGT courses.(Table 13.4)

13.2 OTHER EDUCATIONAL INSTITUTIONS

There are 2 computer education institutes and one decibel NDE inspection and training institute in the Pattambi town. Details of other educational institutes are given in table. 13.5.

Table. 13.5 Details of Other educational institutions in Pattambi town.

Sl.No	Name of College	Ownership	Location	Courses offered	No.of Students
1	Asset academy	Private	Pattambi	BA	3
				Spoken english	7
2	Dr.Ambedkar womens college	Private	Mele Pattambi	Plus one	60
				Plus two	31
3	PG Academy	Private	Pattambi	Plus one	212
				Plus two	142
				BBA	17
				MA	25
				M.com	9
4	Silpachitra College	Private	Mele Pattambi	KGCE	
				Pre primary teachers training	
				Drawing teachers training class	
				Dance teachers training	
				Musical Instrument class	
5	Prabath College	Private	Mele Pattambi	Plus one	100
				Plus two	100
				BA	50
				B.Com	50
6	Decibel NDE Inspections and Training Institute	Private	Sankaramangalam	Oil & Gas refining	30
7	G-Tech Computer Education	Private	Pattambi	DCA,C++,etc	93
8	Cyber College of Computers	Private	Pattambi	DCA,PGDCA	59

Source: Local body, DDE

There is a Regional Agricultural Research Station in Pattambi (Fig. 13.15), which offers 2 year Diploma in Agricultural Sciences (DASc). The objective of the institute is generation and transfer of technology related to rice and rice based cropping system, pulses, vegetables, organic farming and seed technology. The area of the station is 64 ha. Major units are Farm Unit, Agromet Unit, Information and Sales Counter, Research Workshop, Rice Museum, Dairy Unit, State Seed Testing Laboratory, Regional Horticultural Nursery, Regional Instrumentation Laboratory, Computer Centre & ARIS Cell, Station Library. Paddy

Seeds, Vegetable seeds, Fruit plant seedlings, Mango/Jack/Sapota grafts, Bio fertilizers, Bio control agents, Value added products, Booklet and publications are sold out.



Fig. 13.15 Regional agriculture research station, Pattambi

In addition there is a NDFC (National deaf family care) technical institute and college for the deaf at Sankaramangalam. It is affiliated to human resources development society. B.com and B.sc are the courses offered in this institute.

13.3 INFRASTRUCTURE DETAILS OF SCHOOLS

Considering the physical infrastructure all the 10 schools are having their own building, water availability and good road connectivity. Public tap connections are available and majority of schools depend on wells. All schools are having separate toilets for girls and boys. Computer and internet facilities are available in almost all schools but few LP schools lacks this facility. All the schools except the LP schools are having play ground facilities. Table 13.6. shows the student teacher ratio in Pattambi town.

Table. 13.6 Details of Student teachers ratio

STUDENT TEACHERS RATIO				
Sl.No:	Section	Number of teachers	Number of students	Students for a teacher
1	Preprimary	53	1099	21
2	Primary	228	5147	23
3	High School	98	2194	22
4	Higher Secondary	41	816	20

Source: Local body, DDE

13.4 COMPARISON WITH KERALA PLANNING STANDARDS

There are no professional college in the municipality and in the neighbouring LSGIs. The nearest Professional college is Sreepathy college of management and technology, Koottanad at a distance of 9 km and the nearest medical college is PK Das institute of medical sciences, Vaniyamkulam at a distance of 18.6 km. The nearest Polytechnic is IPTC Shoranur which is at a distance of 9 km from the town.

Table 13.7 Comparison with Kerala Planning standards.

Type	Existing (2011)	Required (2011)	Gap
Population	28,632	28,632	0
1. Nursery: 1 for every 2500	4	12	8
2. Primary: 1 for every 5000	11	6	0
3. HS: 1 for every13000	4	2	0
4. HSS: 1 for every 13000	2	2	0
5. Arts and Science College: 1 for every 80000	3	1	0
6. Polytechnic College :1 for every 36000	1	1	1
7. Professional college : 1 for every250000	0	1	1
8. ITI/ITC : 1 for every 35000	1	1	0
9. TTC : 1 for every 120000	0	1	1
10. School for handicapped: 1 for every 45000	1	1	0

13.5 PROBLEMS AND POTENTIALS

Literacy of Pattambi municipality is 95.18% which is highest compared to district and state. Male literacy (97.08%) is greater than female literacy (93.385). As per socio economic survey, majority of the population in Pattambi Municipality belong to High School educated group (39.95%).

In Pattambi town there are 12 schools which include 5 government schools, 3 aided and 4 unaided schools which includes 5 LP school, 2 UP school, 2 high school and 2 higher secondary school. 4 schools have pre - primary education.

Spatial analysis of schools within the town shows that the service areas of schools are covered almost all the municipal area. Considering the physical infrastructure, all schools have playground except for GMLPS and GLPS. Majority of schools depend on wells. Public water supply is available in very few schools. All schools are connected with motor able road.

All schools have separate toilets for girls and boys. Computer Lab and internet facilities are available in all High Schools, only a few LPS lacks this facility namely GMLPS pattambi, GLPS Vallur, AMLPS Maruthur, AMLPS Sankara-mangalam.

There are no professional college in the municipality and the neighboring LSGIs. Also there are no teachers training institute and government Polytechnic college in the town. The nearest Professional college is Sreepathy college of management and technology, Koottanad at a distance of 9 km. and the near-est medical college is PK das institute of medical sciences, Vaniyamkulam at a distance of 18.6 km. The nearest Polytechnic is IPTC Shoranur which is at a distance of 9 km from the town.

14

Health

14. HEALTH



Health is difficult to define but easier to understand. To many of us it may mean absence of diseases or infirmity and to many it may mean sound body and sound mind and sound function of the body. Health represents a state of physical and mental wellbeing. Without good health, we will not be able to enjoy the good things of life. If we have healthy people in our society, it will contribute greatly its efficiency and productivity. Information on epidemic diseases in Pattambi town during the last 10 years is available in table 14.1.

Table. 14.1 Epidemic during last 10 Years in Pattambi town.

Year	Epidemic Diseases	Location	No of patients
2010	DENGUE	Kizhayur	2
	ADD	Scattered cases	22
2011	LEPTO	Kodaloor	3
	ADD	Scattered cases	26
2012	DENGUE	Liberty street	1
	LEPTO	Paruvakkadav	1
2013	DENGUE	Scattered cases	4
	ADD	Scattered cases	16
2014	DENGUE	Sankaramangalam	1
	ADD	Scattered cases	18
2015	LEPTO	Panthakkal Paramb	1
	ADD	Scattered cases	13
2016	LEPTO	Thekkumuri	1
	LEPROSY	Thekkumuri	1
2017	HEPATITIS	All wards	319
	DENGUE	Scattered cases	2
	MALARIA	Sankaramangalam	1
2018	DENGUE	Vadakkumuri	1
	ADD	Scattered cases	15
2019	COVID 19	All wards	1118
	ADD	Scattered cases	27
2020	COVID 19	All wards	1800
	ADD	Scattered cases	19
2021	DENGUE	Kizhayur	2
	COVID 19	All wards	1412
2022	ADD	Scattered cases	34
	HFMD	Scattered cases	16
	COVID 19	All wards	29

Source: CHC Koppam

14.1 EXISTING FACILITIES

There is a Taluk hospital in Pattambi town. Nila hospital and Ahalia eye hospital are the private hospitals in the town under allopathic sector. One Ayush primary health centre and one Homeo clinic are functioning within the town limit.

Facilities in the taluk hospitals are General medicines, Ambulance service X-ray, ICTC, RNTCP, RSBY, RBSK, JSSK, JSY, USG, Lab, Palliative Clinic, NCD Clinic, Immunisation, Leprosy Clinic, Adolescent counseling, Mental Health, Nayanapatham etc. There are 7 doctors and 40 other staffs in the Taluk hospital. Disposal of biomedical waste generated in the hospital is through IMAGE. There are 76 beds are available in the hospital and an average patients per day is 477. Details of government allopathic hospitals are given in table 14.2.

The only one private multi specialty hospital in the Pattambi town is Nila hospital. There are 23 number of doctors/specialists working in the hospital. 60 number of beds are available. Other facilities in the hospitals are causality, computer lab, pharmacy, scan, mobile mortuary, NICU, ICU, ICCU, incubator etc.

Table. 14.2 Details of Gov. hospitals under allopathic sector in Pattambi town.

Sl. No	Name of Hospital	No of beds	Doctors/ Specialists	Other staff	Facilities	Govt/Private/ Co-operrative sector	Disposal of hospital waste
1	Taluk Hospital (THQH), Pattambi	76	7 Nos.	1. Nursing Superintendent -1 2.Head Nurse – 4 3.Staff Nurse – 14 4.Pharmacist – 1 5.Radiographer – 1 6.X-ray Attender -1 7.Senior Clerk – 1 8.Office Attendent -1 9.Nursing Assistant – 7 10.Hospital AttendentGr.I– 2 11.Hospital AttendentGr.II– 6 12. Part time Sweeper - 1	Ambulance, X-ray, ICTC, RNTCP, RSBY, RBSK, JSSK, JSY, USG, Lab, Palliative Clinic, NCD Clinic, Immunisation, Laprasy Clinic, Adolesentcounsiling, Mental Health, Nayanapatham	Government Sector	IMAGE
	Average number of Patients/ day =477						

Source: Taluk Hospital Pattambi

There is a water treatment plant for the liquid wastes generated in the hospital, an incinerator for paper wastes and bio gas plant for food wastes. The biomedical waste are disposed by IMAGE. Details of Nila hospitals and

Ahalya hospitals are given in Table. 14.3. One pain and palliative care unit is functioning in the Pattambi town. There is one sub - centre at kizhayur and two health centres in Pattambi town.

Table. 14.3 Details of Private hospital under allopathic in Pattambi town.

Sl. No	Name of Hospital	No of beds	Doctors/ Specialis	Facilities	Govt/Private	Disposal of hospital waste	Remarks
1	Nila Hospital , Pattambi	60	23	Casuality, computer lab,Pharmacy,scan, mobile mortuary,NICU,ICU&ICCU, Incubator etc.	Private Sector	IMAGE	
2	Ahalya Eye hospital	10	3	Scanning and surgery	Private Sector		Average 110 patients per day

Source: Nila hospital, Ahalya hospital

Ayush primary health centre is one government ayurvedic clinic in Pattambi town having general OP facility, and there is no bed facility in the clinic. In addition there is one private ayurvedic hospital "Shafi Ayurvedics" at Thekkemuri. There are 2 doctors and 4 supporting staffs working in the hospital. Bed facilities are available and the number of beds available is 5. There is one homeopathic dispensary in the Pattambi town. Details of ayurvedic clinic is given in table 14.4.

Table. 14.4 Details of ayurvedic system of medicine in Pattambi town.

Sl. No	Name of Hospital	Number of Doctors	Govt/Private/ Co-operative society	Workers	Facilities	Average number of Patients /day
1	Ayush Primary Health Centre(Ayurveda),Pattambi	1	Govt.	Attender 1	General OP	110
2	Shafi ayurvedics	2	private	4	General OP and bed facilities	

Source: Local body, DMO.

There is one homeopathic dispensary in the Pattambi town. Details of homeopathic dispensary are given in table 14.5. Spatial distribution of medical facilities is given in figure 14.4.

Table 14.5 Details of homeopathic system of medicine in Pattambi town.

Sl. No	Name of Hospital	Number of beds	Number of Doctors/Other staff	Facilities for trauma	Average number of Patients /day
1	Govt. Homeo Dispensary, Pattambi	Nil	1/3	General OP	70

Source: Local body, DMO.



Fig. 14.1 Taluk hospital, Pattambi



Fig. 14.2 Nila hospital, Pattambi



Fig. 14.3 Ayurvedic and homeopathic dispensary in Pattambi town.

The town mainly depends on Sevana Hospital and Research Centre which is located in the adjacent Panchayath Ongallur. Sevana hospital is a multi speciality hospital with 350 bed facilities. The other multi speciality hospital near to the Pattambi town are Moulana hospital Perinthalmanna, KIMS Al-Shifa hospital Perinthalmanna, Edapal Hospital Pvt Ltd, etc which is about 25 Km from Pattambi. The nearest community health centre is located at Koppam.

14.2 COMPARISON WITH PLANNING STANDARDS

The available bed strength in Taluk hospital is 76 and the total population in the Pattambi town is 28632. As per the planning standard 50 beds are required for 1 lakh population in Taluk hospital.

14.3 PROBLEMS AND POTENTIALS

There is a Taluk hospital in Pattambi town with 7 doctors and 40 other staffs. There are 76 beds available in the hospital and an average patient per day is 477. As per the planning standard bed strength available in Taluk hospital is enough to serve the population of Municipality. However it is not sufficient when consider as Taluk head quarter, hence extension of Taluk hospital is very essential in Pattambi town. There is no sufficient land in existing loca-

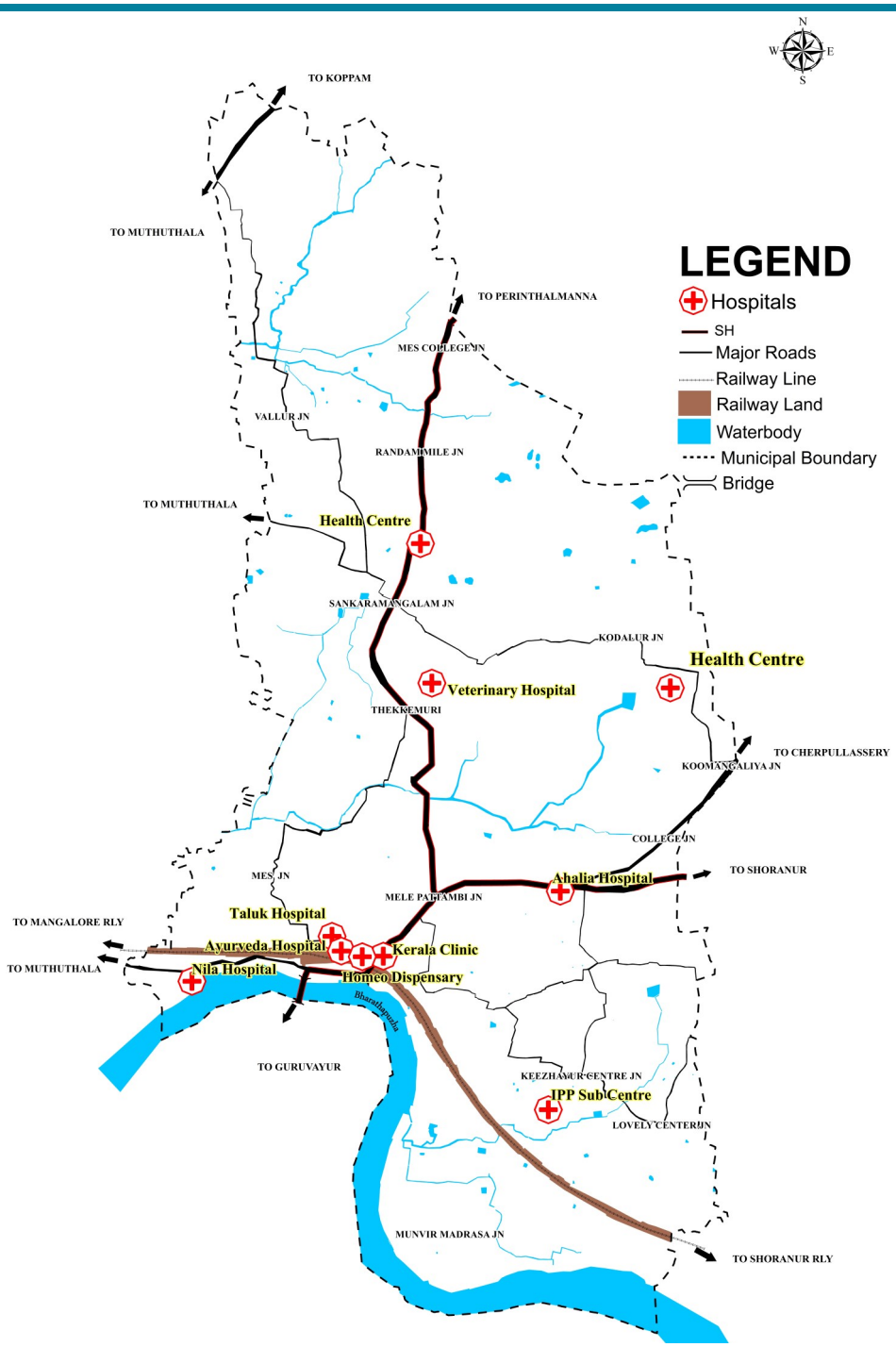


Fig. 14.4 Spatial distribution of medical facilities

Source: Land use survey by LSGD Planning, Palakkad.

tion, no possibility for further development at existing situation. Hence a new place has to be found for reforms.

Nila hospital and Ahalia eye hospital are the private hospitals in the town under allopathic sector. The town mainly depends on Sevana Hospital and Research Centre.

15

Housing

15. HOUSING



Living in satisfactory housing conditions is one of the most important aspects of people's lives. Housing is an essential need after food and clothing. Housing in the modern concept includes not only the physical structure providing shelter but also the immediate surroundings and the related community services and facilities. In Indian context residence is constructed for the family life where the person get physical and mental peace.

15.1 EXISTING HOUSEHOLD SIZE

As per Census 2011 (Fig. 15.1), there are 5897 households in Pattambi town and the average house hold size is 4.86 which higher than the district (4.41) and State (4.26). Table. 15.1 and Fig. 15.2 shows the decadal variation of Population and HH size in Pattambi town. The trend in household size has been steadily decreasing from 6.59 in 1971 to 4.86 in 2011 indicating the shifting of preference from joint families to nuclear families. As per census 2011 70.3% of the houses are pucca, 28.1% are moderate houses, 1.6% are kutcha houses.

According to the BPL survey, 2009, the number of households under BPL category is 2011 which is 34% of total households in the town.

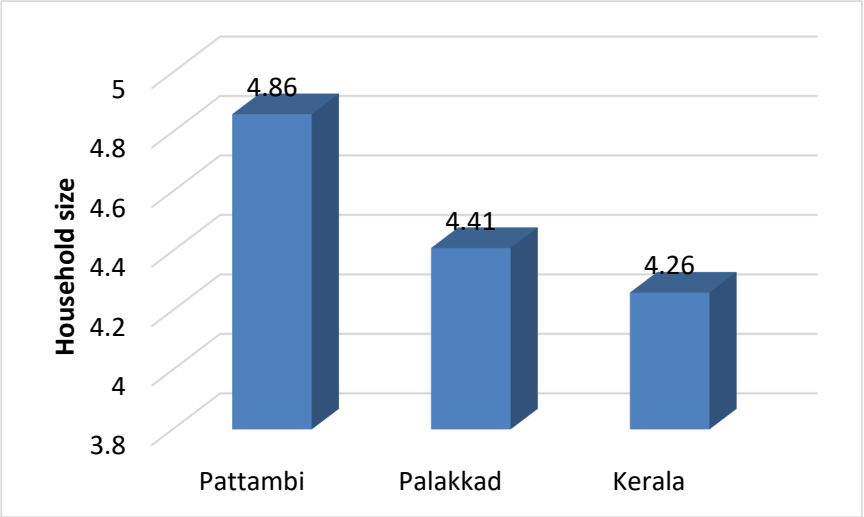


Fig. 15.1 Comparison of HH size in Pattambi town with district and state

Source: Census 2011

Table. 15.1 Decadal variation of Population and HH size in Pattambi town

Year	Population	No.Of House hold	HH Size
1971	14731	2235	6.59
1981	18368	2843	6.43
1991	22108	3521	6.46
2001	24168	4393	5.5
2011	28632	5897	4.86

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

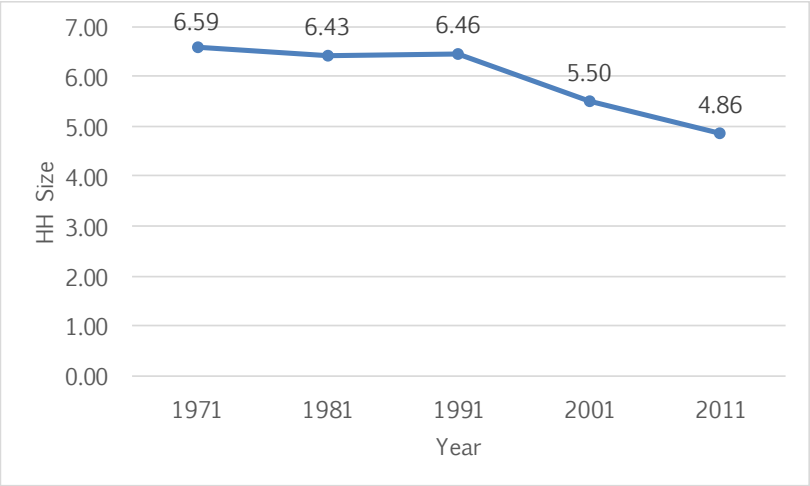


Fig. 15.2 Decadal variation of HH size in Pattambi town.

15.2 HOUSING SHORTAGE

By considering the total number of houses including those coming under kutcha houses and hut the housing shortage can be obtained. As per census 2011 there are 5897 house holds in Pattambi town. As per secondary data collected, the total number of houses in Pattambi town are 6463. The data shows that number of houses in the municipality is more than the households, hence it is assumed that there may be a chance of more than one houses owned by some of the high/middle income group population or NRI population.

According to the LIFE Mission survey, the total number of houseless households are 376 in which 148 families have land but 228 are landless. Pattambi has high housing gap comparing with the districts average which is almost half the housing gap of Pattambi. Urgent care has to be given to the housing sector of Pattambi.

Table. 15.2 Percentage variation of Plinth area of houses in Pattambi town.

Range of plinth area	< 20	20-50	50-75	75-150	150-250	>250
Average % for the LSGI	13.73	24.56	25.73	27.66	7.54	0.39

Source: Socio-economic survey

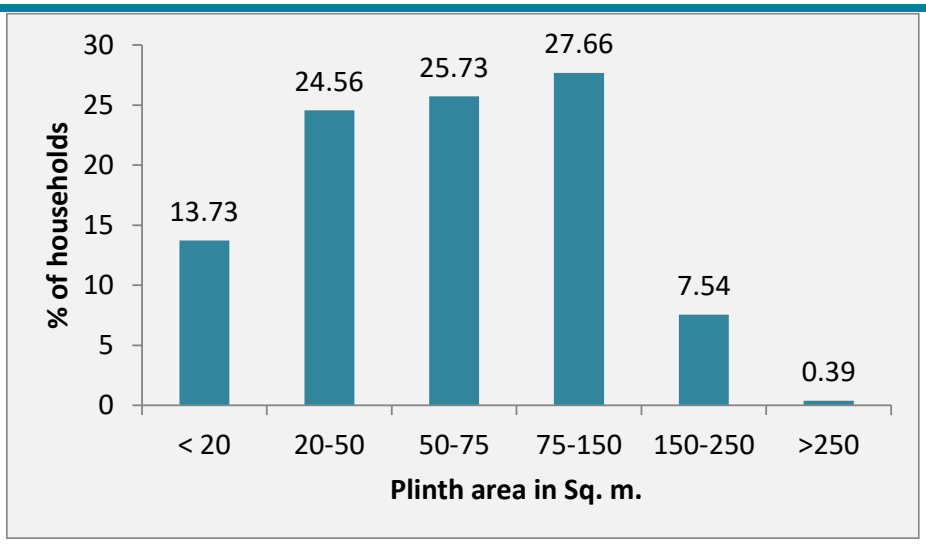


Fig. 15.3 Percentage variation of Plinth area of houses in Pattambi town.

Source: Socio-economic survey

Fig. 15.3 shows the variation of plinth area of houses in Pattambi town. it is noted that 24.56% of houses are having plinth area in the range 20-50 sq. m., 25.73% are having plinth area between 50-75 sq. m., 27.66% of houses are having Plinth area in the range 75-150 sq. m. A very few percentage are having plinth area more than 250 sq. m.

15.3 EXISTING HOUSING STRUCTURE

Fig. 15.4 shows the percentage variation of different type of houses in Pattambi town. it is noted that as per census 2011 percentage of kutcha houses in the town comes to 1.6% of the total number of houses. Therefore the total number of houses which require replacement is 1.6% of total houses (94 households) and 50% of moderate houses (829 households), which comes to 923. Fig. 15.5 shows the ward wise housing types in Pattambi town.

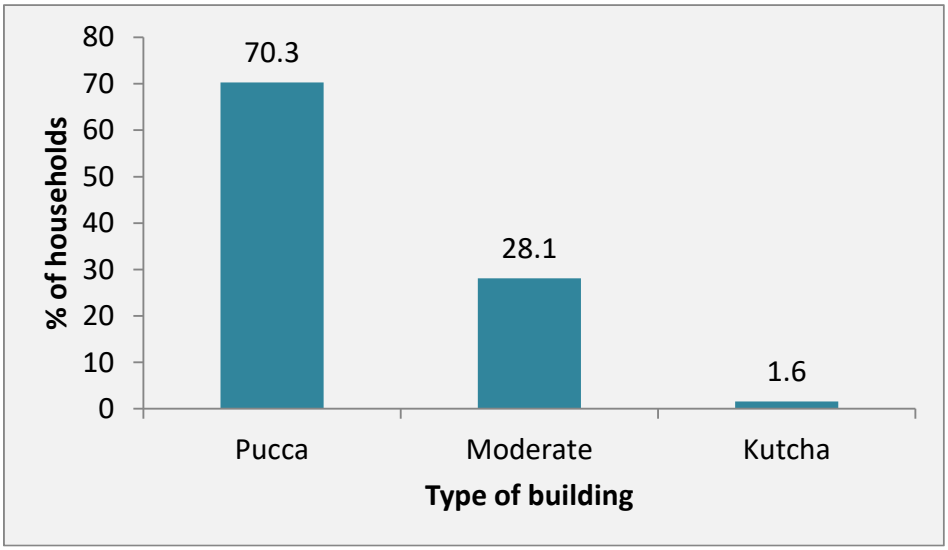


Fig. 15.4 Percentage variation of different types of houses

Source: Census 2011

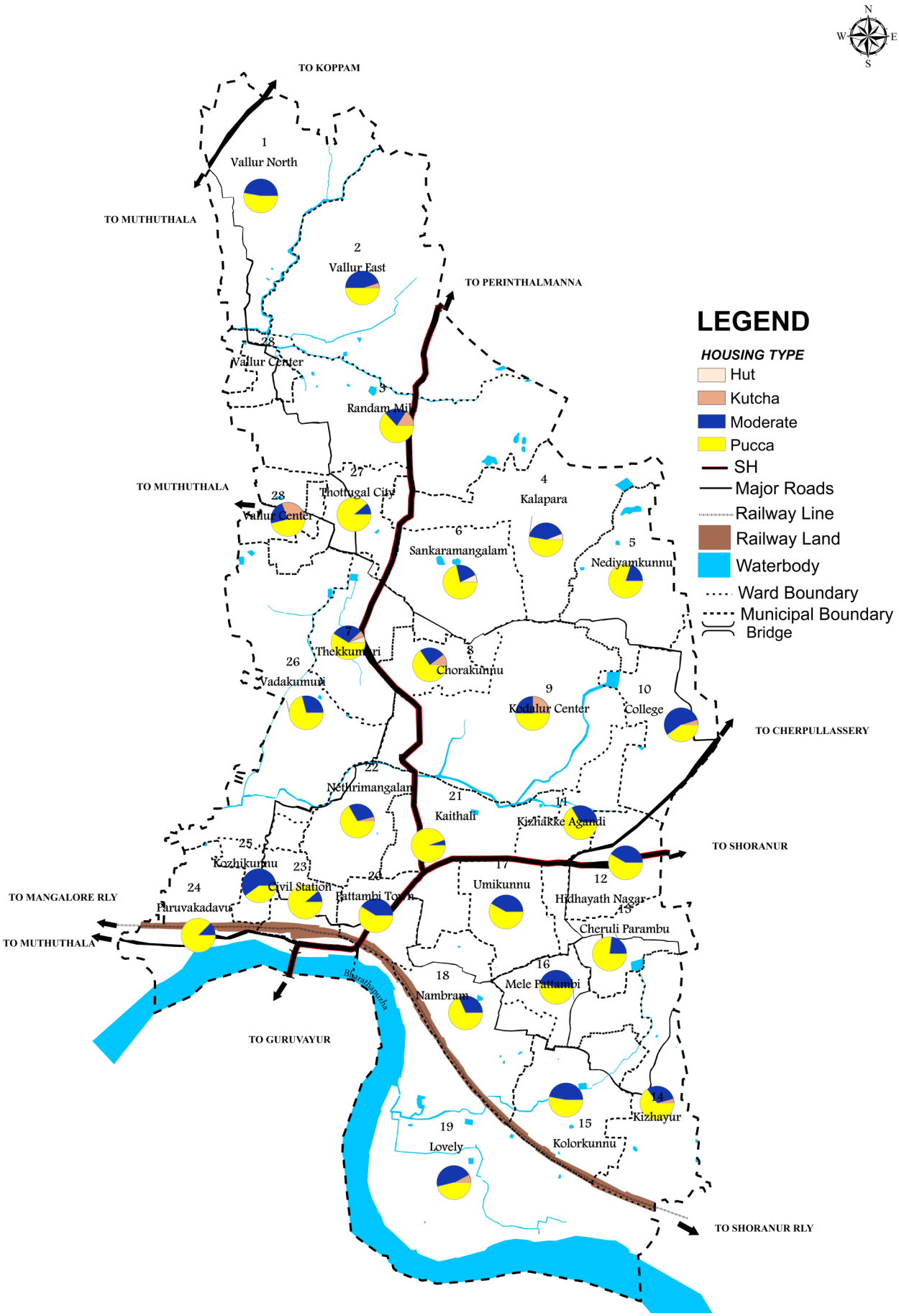


Fig. 15.5 Ward wise housing types in Pattambi town.

Source: Socio-economic survey

Fig. 15.6 shows the percentage variation of number of floors of houses in Pattambi town. As per socio economic survey 67.5% of houses are single storeyed and 33.85% are double storeyed.

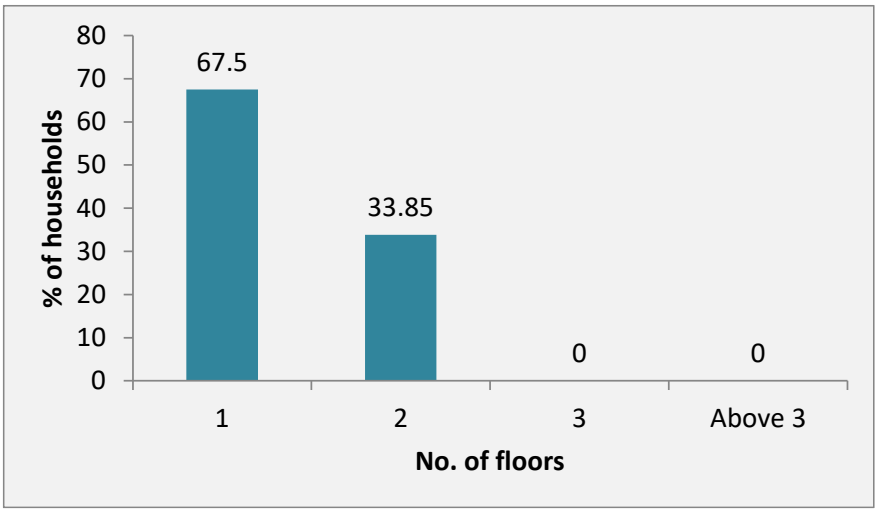


Fig. 15.6 Percentage variation of number of floors.

Source: Socio-economic survey

Fig. 15.7 and 15.8 shows the percentage variation of types of floors and types of walls in Pattambi town. As per census 2011 majority of the houses are having cement floors and stone packed with mortar wall.

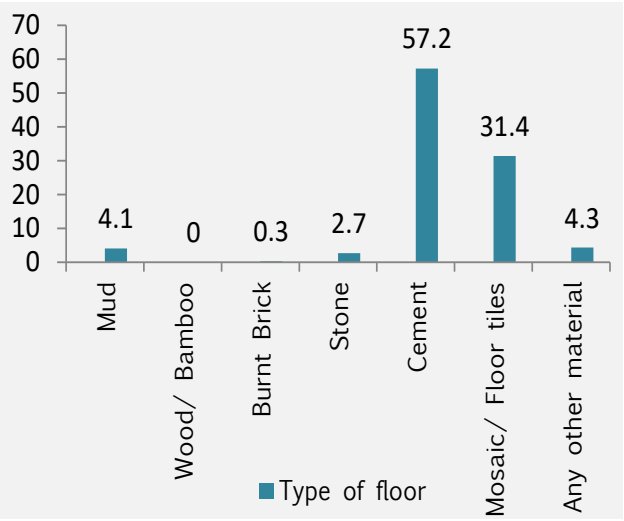


Fig. 15.7 Percentage variation of Type of floors.

Source: Socio-economic survey

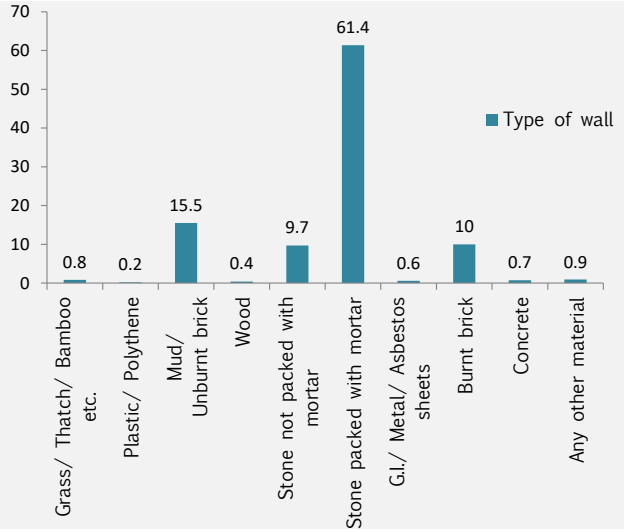


Fig. 15.8 Percentage variation of type of walls.

Source: Socio-economic survey

Fig. 15.9, 15.10 and 15.11 shows the percentage variation of types of roofs, number of dwelling rooms and owner ship of houses in Pattambi town. As per census 2011, 50% of houses are concrete houses. Majority of the houses are having three dwelling rooms and a very few percentage of houses are having five or six rooms. About 89% of the houses are occupied by owners and about 10% are rented houses.

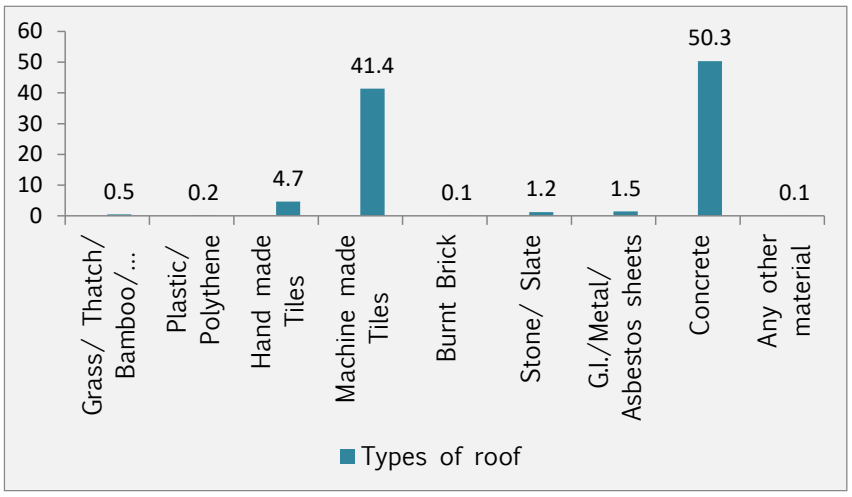


Fig. 15.9 Percentage variation of types of roof.

Source: Socio-economic survey

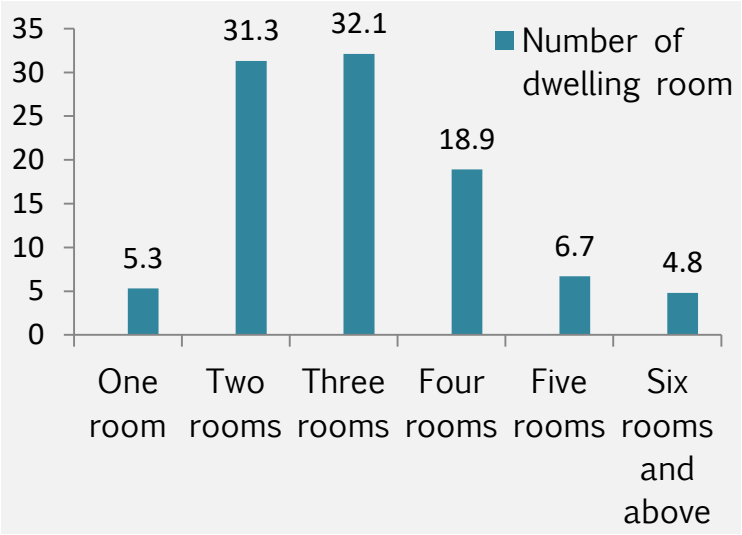


Fig. 15.10 Percentage variation of Number of dwelling rooms

Source: Socio-economic survey

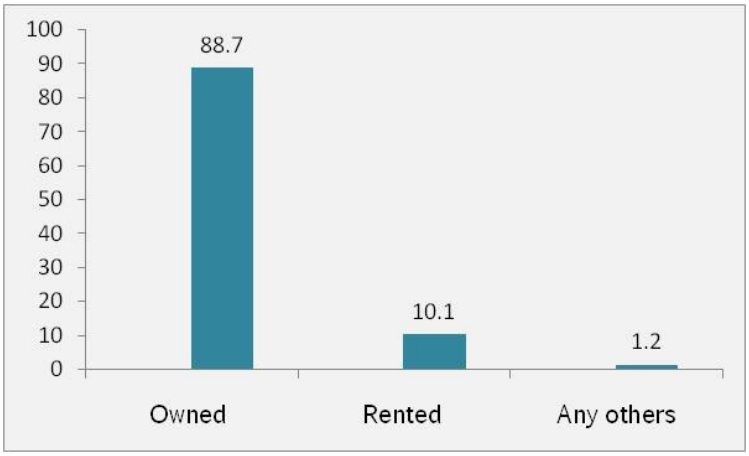


Fig. 15.11 Percentage variation of ownership of houses.

Source: Socio-economic survey

15.4 PROBLEMS AND POTENTIALS

30.37% of the total land in Pattambi municipality is under residential use. Household size in Pattambi (M) is higher than the district average .The trend in household size has been steadily decreasing indicating the shifting of preference from joint families to nuclear families.

As per BPL survey, 34% of the households are BPL. According to the LIFE Mission survey, the total numbers of landless houseless households, houseless households are more than district average. There is no notified slum in the town. Migrant workers are more in Pattambi. They are constrained to live in unhygienic conditions without proper shelter, sanitation and safe drinking water.

16

Recreational and Cultural Facilities

16. RECREATIONAL AND CULTURAL FACILITIES

Preserve and enhance parks and open spaces within the planning area to meet active and passive recreational needs, improve environmental quality, enhance the identity and character of neighborhoods and provide visual beauty in the town. Recreational facilities includes Park and open spaces, Playgrounds, beach, stadium open air theatre, Community hall, Art galleries, Zoo, Swimming pool etc.

16.1 EXISTING FACILITIES

16.1.1 Playgrounds

There are 2 Playground in Pattambi town, one municipal play ground at Sankaramangalam (ward - 7), and one at Cheruliparambu (ward - 13).

16.1.2 Theatres and Auditorium

There are 3 cinema halls in the Pattambi town. Babu Talkies (ward—0), Alex Cinema (ward - 21), Alex Movies (ward - 21). 4 Auditoriums are functioning within the town limit. Rajaprastham Auditorium (ward - 21), Vaishnava auditorium (ward - 15) Chithra Community hall (ward - 12) and Malooty auditorium (ward - 2).



Fig. 16.1 Playground at Cheruliparambu



Fig. 16.2 Rajaprastham auditorium



Fig 16.3 Alex theatre



Fig. 16.4 Malooty auditorium

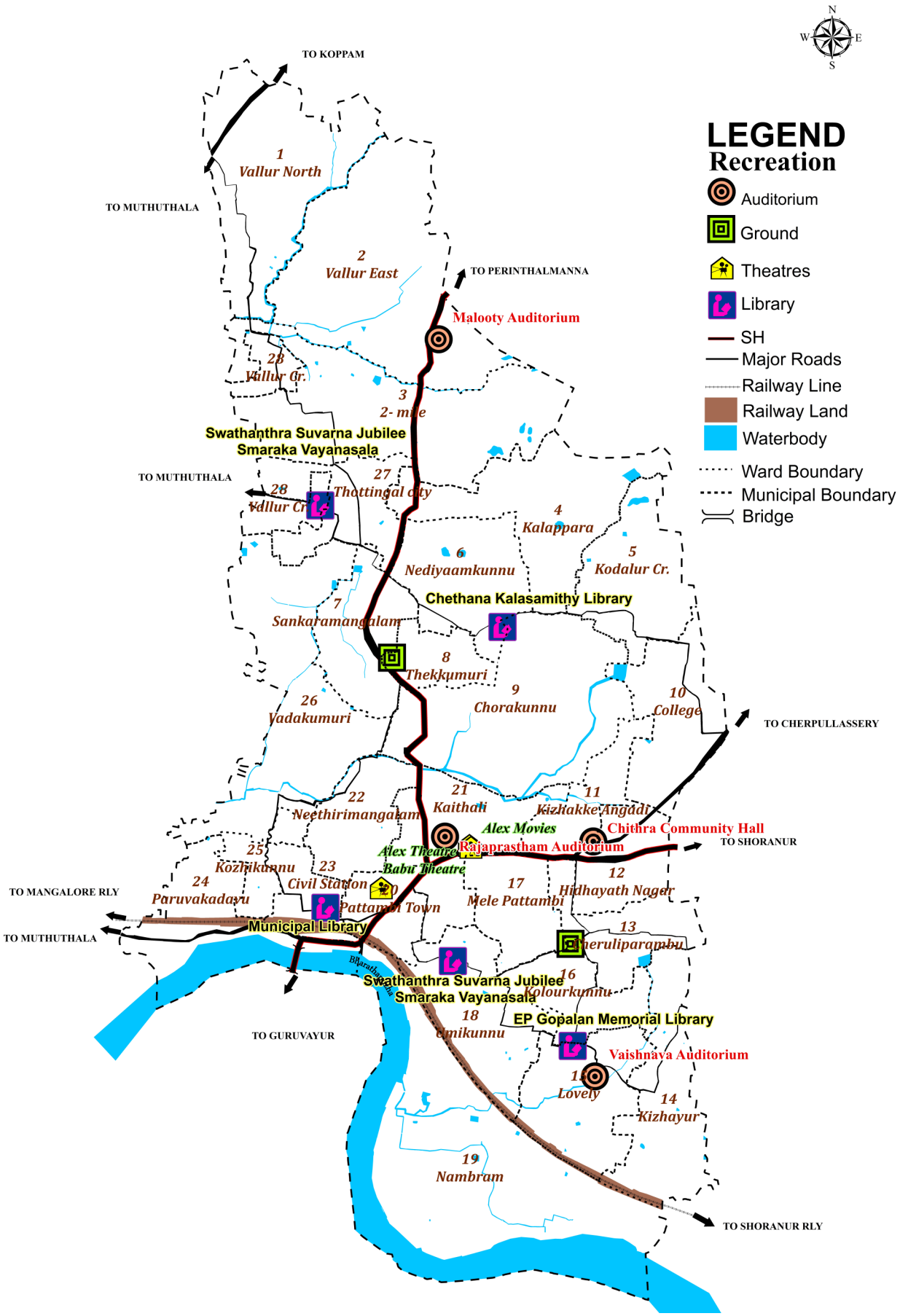


Fig. 16.5 Spatial distribution of Recreational facilities.

Source: Land use survey by LSGD Planning, Palakkad.

16.1.3 Libraries

There are 5 libraries in the Pattambi town in which two of them are only having reading room facility. There is a Municipality Public Library at Civil station (ward - 23), "E.R. Gopalamenon Smaraka vayanasala" at lovely (ward - 15) under Apsara arts and sports club Kizhayur and Chethana libarary at (ward - 6), and two reading rooms (Swathanthra suvarna jubilee smaraka vaya-nasala) at Vallur centre (ward - 28) and Umikkunnu (ward - 18).



Fig. 16.6Municipal library

Spatial distribution of recreational facilities in Pattambi town is shown in fig. 16.5

16.2 INFERENCE

There are 3 cinema halls and 4 Auditoriums functioning within the town limit. There are 5 libraries in the Pattambi town at Nediyamkunnu, Lovely, Umikunnu, Civil station and Vallur centre in which only two of them are having reading room facility. There is no park and stadium in the town. Proper plan-ning should be done to improve the recreational facilities in the town and there by creating a healthy living environment in the town.

17

Other Civic Amenities

17. OTHER CIVIC AMENITIES

17.1 EXISTING FACILITIES

17.1.1 Police station

Pattambi police station situated at Pattambi town (Ward 20). There are 35 staffs working in the police station, and the service area of the station extends to Pattambi, Koppam and Ongallur. Details of police station in Pattambi town is given in table 17.1 and spatial distribution of police station is shown in fig. 17.5.



Fig. 17.1 Police station, Pattambi

Table. 17.1 Details of police station in Pattambi town.

Sl.No	Name	Location	Ward	Extent	No.of Staffs	Service area
1	Police station,Pattambi	Pattambi	Ward-20	65.87	35	Ongallur, Pattambi,Koppam

Source: Police Station, Pattambi

17.1.2 Fuel station

There are 4 petrol pumps and one LPG godowns in the Pattambi town. Two petrol pumps are at Melepattambi (ward-21), one at Sankaramangalam (ward–6) and one at Amayur (ward-2). Sreenaraya gas godown situated at ward 14 having an area of 35 cents. The service area of this gas agency are Pattambi, Koppam, Muthuthala, Ongallur, Parathur and Nagalassery with a capacity of 12000 kg. Table 17.2 and 17.3 shows the details of petrol pump and LPG godowns respectively. Spatial distribution of fuel station is shown in fig. 17.5.

Table. 17.2 Details of petrol pump in Pattambi town.

Sl. No	Name/ numbers	Location	ward	Extent	capacity/service area		Remarks
					Petrol	Diesel	
1	Pattambi Filling Station	MelePattambi (Perinthalmanna Road)	Ward - 11	009.07 R	15000Lr	20000	BPCL
					10000Lr	10000	
2	N.V.S. Fuels	MelePattambi	Ward - 11	11.71 R	22000 Lr	22000	HPCL
					6000Lr	9000	
3	Indian Oil Corporation Petrol	Sankaramangalam	Ward - 2	05.41 R	20000Lr	25000	IOC
					12000Lr	12000	
4	HPC Amayur	Amayur	Ward - 1	03.27 R	22000Lr	22000	HPCL
					14000Lr	10000	

Source: Primary survey

Table. 17.3 Details of LPG godowns in Pattambi town.

Sl.No	Name/Number	Location/Ward	Extent	Capacity	Service Area
1	. SreeNarayana Gas Agency	Ward -14 (Indane)	35 Cent	12000Kg	Pattambi,Koppam,Muthuthala,Ongallur,Paruthur,Nagalassery

Source: Local body.

17.1.3 Crematorium and burial grounds

There is one crematorium situated at Nambram (ward-11) owned by Municipality, and 5 other burial grounds owned by religious institutions. Details of crematorium and burial ground are given in Table. 17.4 and the spatial distribution of crematorium and burial ground are shown in fig. 17.5. The Municipal owned land for cremation is not used due to lack of facilities

Table. 17.4 Details of Crematorium and burial ground in Pattambi town.

Sl.No	Name	Location	Ward	Extent (Cent)
1	Kabaristhan	Sankaramangalam	Thekkumuri 8	90
2	Kabaristhan	Kodalur	Kalappara-4	52
3	Kabaristhan	Melepattambi	Pattambi Town 20	53
4	Crematorium	Nambram	Ward - 19	78
5	Kabaristhan	kalpaka jn	Ward 12-Hidhayath Nagar	164
6	Kabaristhan	Vallur Jn	3- Randam Mile	103

Source: Local body.

17.1.4 Communication facilities

The communication facilities include post offices, telephone facilities, internet facilities and fax facilities. There are two post office in Pattambi town located at ward 15 and 20. One BSNL telephone exchange office is located at Melepattambi (ward-17). Spatial distribution of communication facilities are shown in fig. 17.5.



Fig. 17.2 BSNL Telephone exchange, Pattambi.

17.1.5 Public toilets and comfort station

Two public toilets are there in the Pattambi town, one E-Toilet near to Melepattambi bus waiting shed (Fig. 17.3) and one public toilet at bus stand



Fig. 17.3 E- toilet near Melepattambi bus waiting shed.



Fig. 17.4 Public toilet at Bus stand.

(Fig. 17.4). There is one public comfort station at Pattambi bus stand. Table 17.5 lists the facilities given in Pattambi Town. Pattambi town serves as a rest place for pilgrims travelling to Guruvayur and Sabarimala, it lacks sufficient facilities for pilgrims especially for disabled.

Table. 17.5 Availed and proposed facilities for basic needs of travelers

Sl No.	Location of Public Comfort station	No. of fecility provided / Proposed					
		Latrine			Urinals	Rest room	
		Male	Female	Disabled	Male	Male	Female
1	Near Bus stand (Existing)	4	3	Nil	6	Nil	Nil
2	Near fish market (Proposed)	2	2	1	Nil	Nil	Nil

Source: Local body.

17.1.6 Fire station

As per URDPFI guide lines, fire station is required for two lakhs population. The nearest fire station was situated in Shoranur Municipality, with a service area of 24 nearby LSGIs, including Pattambi town. The fire station has started functioning in the rented building at Pattambi as of February 2021. The Fire and Rescue Department has initiated steps to transfer 20 cents of land from the LSGD to construct its own building.

17.2 PROBLEMS AND POTENTIALS

There are 5 burial grounds in Pattambi town, all these belong to a particular community. The land owned by the Municipality cannot be used for some reasons, but this is an ideal place for public cremation.

Pattambi is a place where many people visit daily, but there are no specific facilities for relaxation and other personal needs. Moreover some facilities are available, but not specifically for the disabled. As a part of the annual plan, the Municipality is constructing a building next to the new market complex.

In Pattambi municipality, there is one Police station located at Pattambi town (Ward 20). Pattambi town has sufficient fuel filling stations and also has a good communication network.

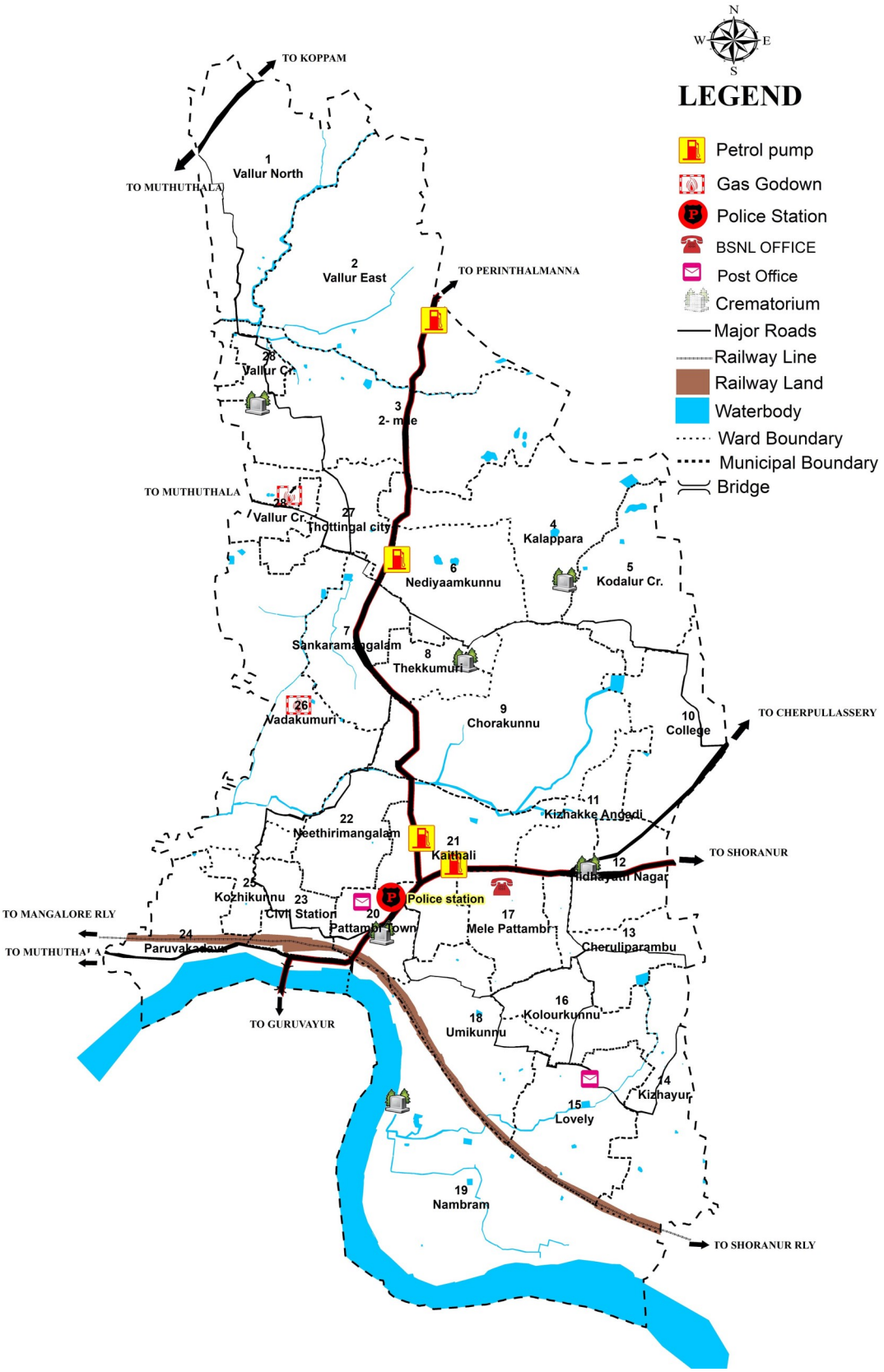


Fig. 17.5 Spatial distribution of civic amenities in Pattambi town.

18

Traffic and Transportation

18. TRAFFIC AND TRANSPORTATION

18.1 INTRODUCTION

Transportation planning is the process of defining future policies, goals, investments and designs to prepare for future needs to move people and goods to destinations. As urbanisation becomes more pronounced, traffic management becomes more challenging.

Good physical connectivity in the urban and rural areas is essential for economic growth of the country. Pattambi town has a transport network consisting of both roads and railways. As a part of the preparation of Master Plan, the Department of Town & Country Planning has entrusted National Transportation Planning and Research Centre (NATPAC) to carry out Traffic and Transportation Studies for Pattambi municipality.

This chapter include the traffic survey results, compilation of data, interpretation of data, estimation of traffic and transport demand in the plan period, identification of deficiencies in major travel corridors and preparation of long term traffic and transportaion improvement proposals for the Pattambi town.

18.1.1 An Overview of Transportation Network

Pattambi town has a transport network consisting of both roads and railways. The network of roads connect Pattambi to the neighboring towns like Shoranur, Guruvayoor, Thrithala, Perinthalmanna and Cherpulassery. The State Highway No 23 from Shoranur to Perinthalmanna passes and SH39 Perumbilavu to Nilambur (Pattambi Guruvayur border) Passes through the town.

Pattambi Town is connected by a broad gauge railway line from Shoranur to Mangalore and then to Panavel via Konkan railway. The railway station is located within the study area in Pattambi. A total of 34 services are operated through Pattambi station of which 10 services are passenger services and the remaining 24 are express services.

Although Bharathapuzha passes along the border of the town, there was no scope for inland water transport in the town. The nearest Port to the Pattambi is at Kochi. Pattambi Town is served by public transport system consisting of both State owned Kerala State Road Transport Corporation (KSRTC) and private buses and railways. The Bus stand is located near the Guruvayoor Road junction. Table 18.1 shows the category wise length of roads in Pattambi town.

Table 18.1 Category wise length of roads in Pattambi Municipality

Category		Length in Km	Description
State highway	SH-23	5.36	Shoranur-Perinthalmanna
	SH-39	1.2	Perumbilavu-Nilambur
PWD roads		5.35	MDR or ODR
Municipal roads		151.99	Municipality
Railways		4.27	Railways

18.2. VEHICLE POPULATION

The increase in the number of vehicles in many developing countries have led to increased traffic congestion in urban centers and increase in traffic accidents on road networks, which were never designed for the volumes and types of traffic, which they are now required to carry.

Table 18.2 Growth in Vehicle Population in Palakkad district.

Year	No.of vehicles	Growth index
2005	1,81,608	100.00
2006	2,17,724	119.89
2007	2,58,131	142.14
2008	2,83,308	156.00
2009	3,12,549	172.10
2010	3,48,248	191.76
2011	3,97,134	218.68
2012	4,45,703	245.42
2013	6,70,461	369.18
2014	5,88,140	323.85
2015	6,47,896	356.76
2016	6,75,991	372.23

Growth trend: The trend in vehicular growth has been phenomenal all over the State and Palakkad is no exception to this. The growth of motor vehicles in Palakkad district during the period from 2005 to 2015 is given in Table 18.2. and temporal variation of growth index of vehicle in Palakkad district is shown in Fig. 18.1. It can be seen that the vehicle population in Palakkad district has grown by more than 3.6 times during the last ten years.

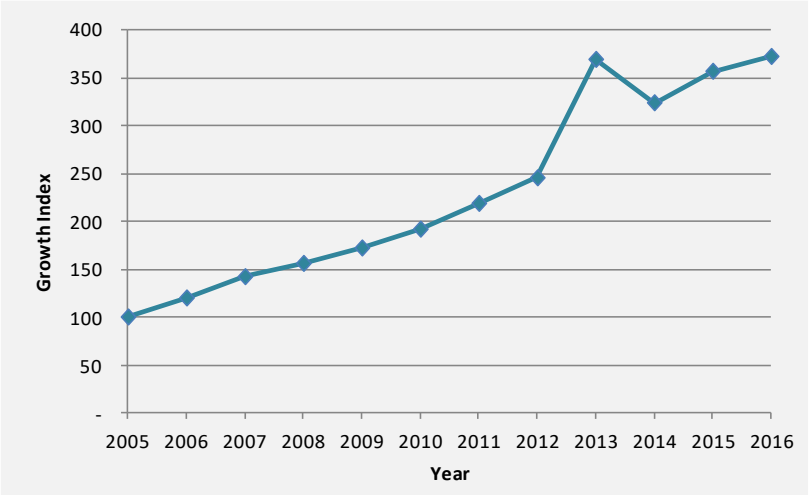


Fig. 18.1 Temporal Variation of growth index of vehicles in Palakkad district

During the period 2005-2013 the vehicle growth index showing an increasing trend, during 2013-14 the growth index suddenly decreases and then again it increase towards 2016. The number of motor vehicles having valid registration in Palakkad district in 2015 is given in Table 18.3.

Table 18.3 Number of vehicles having valid registration in Palakkad district

Sl. No.	Type of vehicle	Palakkadu district	Kerala State
1	Four wheelers & above	29,536	4,11,349
2	Three wheelers including Tempos	12,424	1,54,609
3	Stages carriages	1,290	31,286
4	Contract Carriages /Omni Buses	3,903	1,45,646
5	Cars	86,633	17,02,925
6	Taxis	9,103	2,14,216
7	Jeeps	3,210	73,700
8	Auto rickshaws	69,300	7,31,000
9	Scootor/Motor cycles	4,26,320	58,28,817
10	Tractors	3,000	15,293
11	Tillers	1,384	5,414
12	Trailors	276	2,411

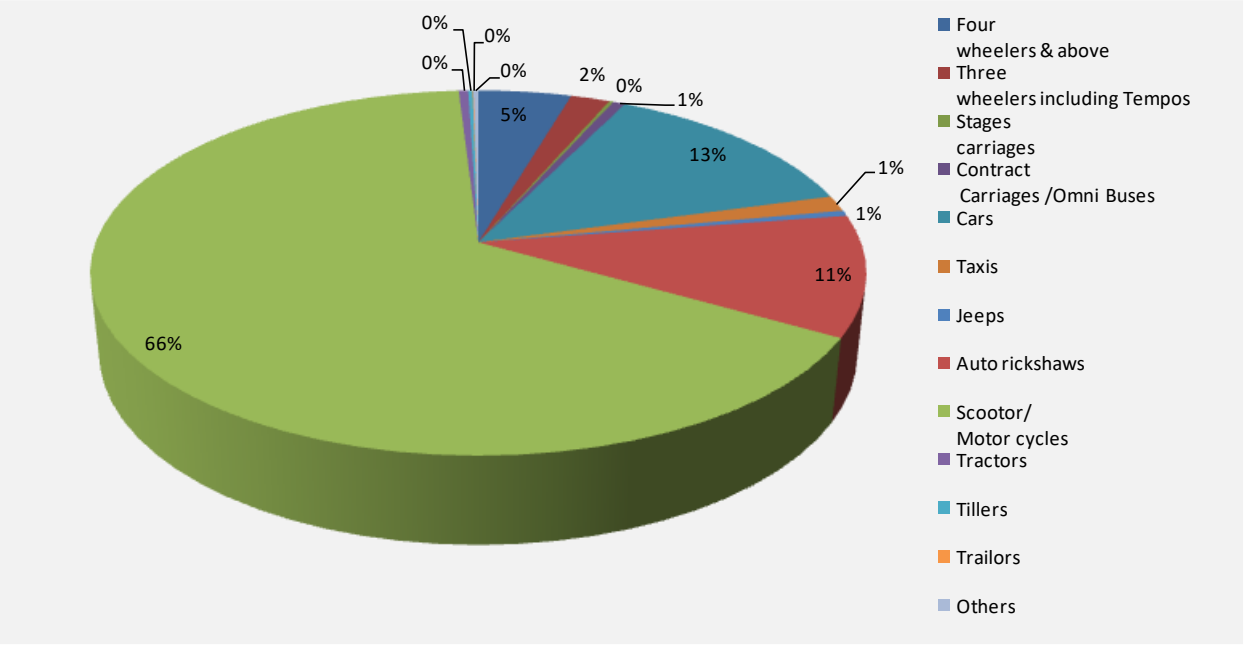


Fig. 18.2 Percentage of registered motor vehicle in Palakkad district in 2015

An analysis of the existing vehicle population shows that major share of nearly two third of the total vehicle population in the district continued to be two-wheelers, followed by 15 percent of cars.

18.3 ROADS

18.3.1 Existing Road Network

An efficient transportation network is the need of present urban scenario. Apart from being a major urban area in Palakkad District, Pattambi is the headquarters of Pattambi block Panchayat as well as Pattambi Taluk, it is essential to have a good road network connecting the length and breadth of the municipality.

The municipality is having a total road length of 163.9 Km connecting to the neighboring towns like Shoranur, Guruvayoor, Thrithala, Perinthalmanna and Cherpulassery. The State Highway No.23 from Shoranur to Perinthalmanna having a length of 5.26 km and SH 39 Perumbilavu-Nilambur road of length 1.2 Km (Pattambi to Guruvayur border) passes through the town, from where road to Guruvayoor of length 2 Km leads through the central part of the town.

Pattambi-Cherpulassery road having 1.2 Km length deviates from SH 23 at Kalpaka Jn. The road leading to Muthuthala is another major road in the town and it passes through the central part of the town connecting Pattambi Railway station and Pattambi bus station enroute.

A total of 31 bus stops were enumerated on various bus routes in Pattambi Town area on both sides of which 21 were found to have waiting sheds. They were of ordinary type without any modern facilities and also lack uniformity. Within the CBD area, segregated bus bays were not provided in any of the road. Fig. 18.4 shows the existing road network in Pattambi town.

I. Shoranur to Perinthalmanna road.

1 Shoranur Border - Kalpaka Jn

2 Kalpaka Jn - Mele Pattambi

3 Mele Pattambi - Thekkemuri

4 Thekkemuri - Sangaramangalam Jn

5 Sangaramangalam Jn - Perinthalmanna Border

II. Pattambi to Cherpulassery road.

6 Kalpaka Jn - College Jn

7 College Jn - Cherpulasserry Border

III. Pattambi to Guruvayoor road.

8 Mele Pattambi - Civil Station Jn




Fig. 18.3 Pattambi bus stand located near Bharathapuzha River

9 Civil Station Jn - Pattambi

10 Pattambi - Guruvayoor Border

IV. Pattambi to Muthuthala road.

11 Pattambi Jn - Bus Station

12 Bus Station - Muthuthala Border

V. Pattambi to Perumudiyoor.

13 Civil Station Jn - Perumudiyoor

VI. Sangaramangalam to Koomangaliya.

14 Sangaramangalam Jn - Koomangaliya

VII. Manjalangal - Keezhayur - Mele Pakeezhayoor

18 Keezhayoor - Pattambi.

15 Manjalangal - Kondoorkara

16 Kondoorkara - Lovely corner

17 Lovely Corner - Mele Pattambi

VIII. Other roads.

19 Sangaramangalam Jn - Muthuthala Panchayat

20 Sangaramangalam Jn - Mele Parakkadu

21 MES Jn - Thekkemuri

22 Koppam - Muthuthala Border

23 Njangattiri - V K Kadavu

24 Amayur - Kurumbully

25 Thekkemuri - Chorakkunnu

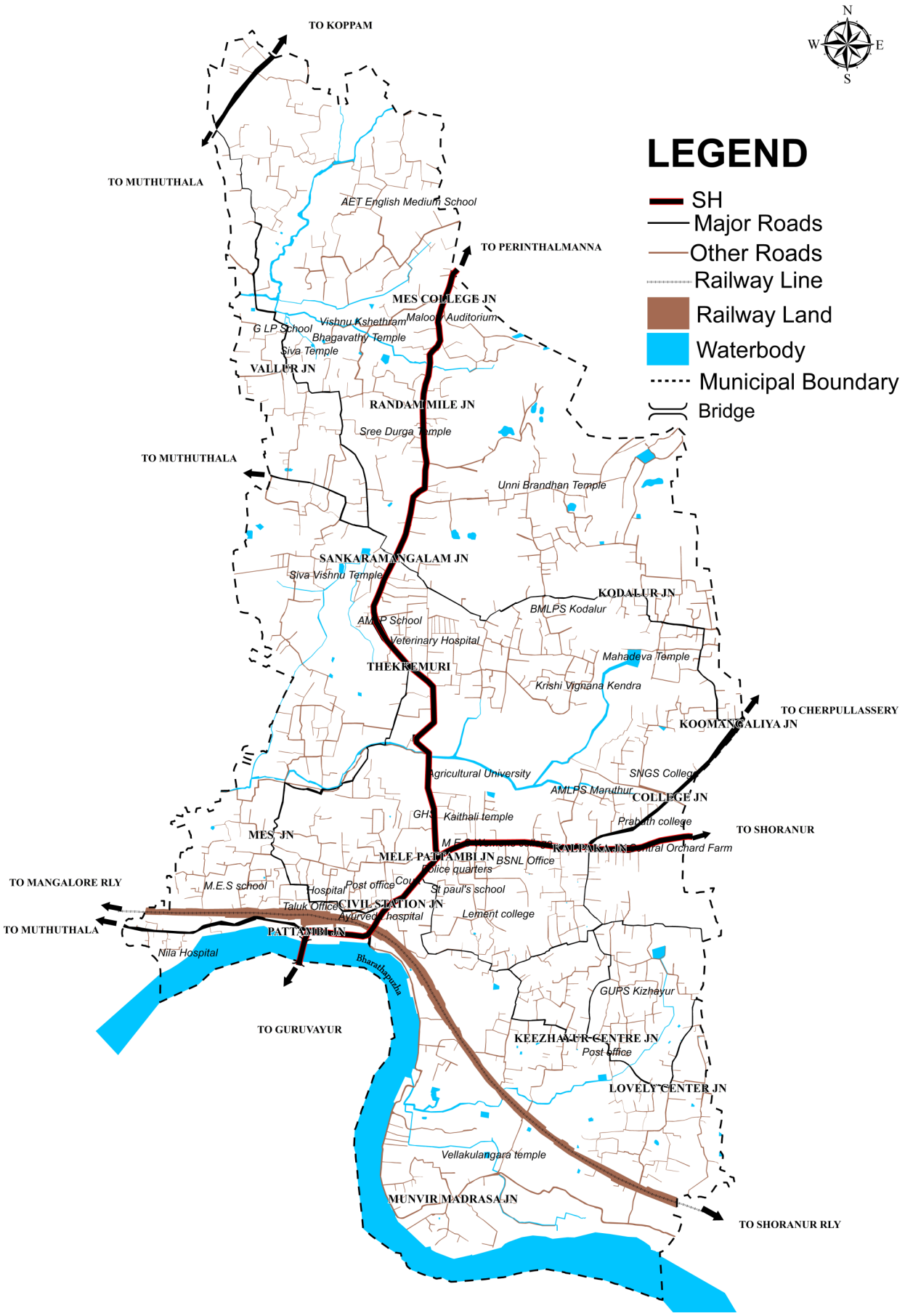


Fig. 18.4 Existing road network in Pattambi town.

18.3.2. Road Inventory Study

An understanding of the extent and quality of road network is very important to formulate plans for the future. The inventory details of major corridors within Pattambi Town are presented in this section. They included information on length of road, width of carriageway, road furniture and land use aspects.

It could be seen that all the 60 km of roads considered for detailed road inventory in the town were having only two lanes. Major road of Pattambi was the State Highway from Shoranur to Perinthalmanna with a length of about 5.26 km. Pattambi-Guruvayoor road has a length of 2 km and Pattambi-Cherpulassery road with just 1.2 km.

Regarding availability of footpath, only 1.5 km of road had footpath of on both sides of the road. Summarized road inventory profile of various homogeneous sections in Pattambi Town are given in Table 18.4. For the purpose of study the major corridors are divided in to eight homogeneous sections. Fig 18.5 shows the details of homogeneous section selected for the study in Pattambi town.

Table 18.4 Inventory of major roads in Pattambi Municipality.

1. Shoranur border to Kalpaka junction			
Length(km)	2.8		
Carriage way width in m (Avg)	7.5		
Right of way width in m (Avg)	15		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open spaces.	Commercial, Residential, Open spaces.	
Remarks			

2. Kalpaka junction to Mele Pattambi			
Length(km)	0.9		
Carriage way width in m (Avg)	7.5		
Right of way width in m (Avg)	15.5		
Adjacent land use	LHS	RHS	
	Commercial.	Commercial.	
Remarks	Land for widening of road is available		

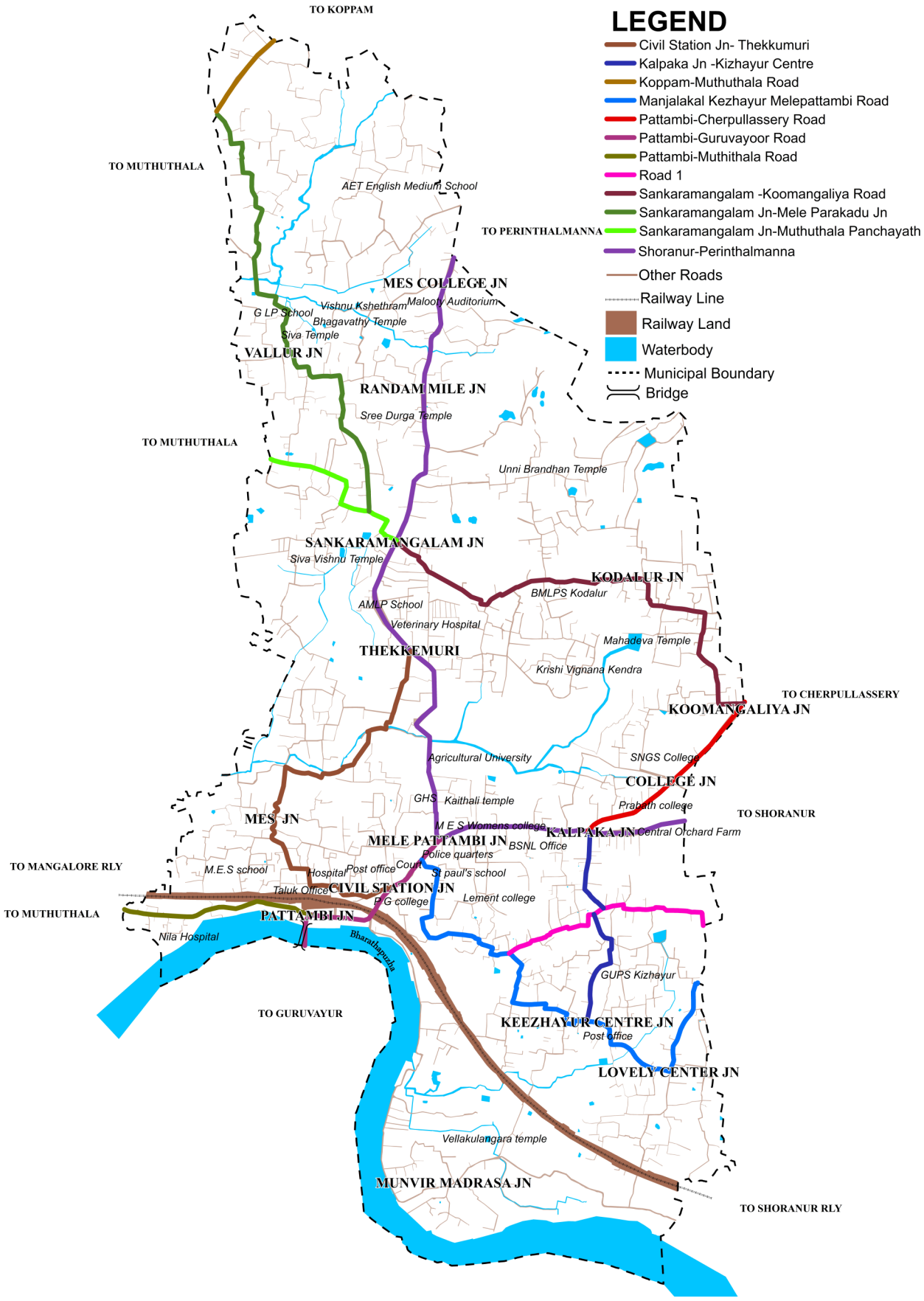


Fig. 18.5 Details of homogeneous sections selected for the study in Pattambi town.

3. Mele Pattambi to thekkemuri			
Length(km)	1.26		
Carriage way width in m (Avg)	8		
Right of way width in m (Avg)	16		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open space.	Commercial, Residential, Open space.	
Remarks			

4. Thekkemuri to Sankaramangalam junction			
Length(km)	0.84		
Carriage way width in m (Avg)	8		
Right of way width in m (Avg)	16		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open space.	Commercial, Residential, Open space.	
Remarks			

5. Sankaramangalam junction to Perinthalmanna border			
Length(km)	4.1		
Carriage way width in m (Avg)	7.25		
Right of way width in m (Avg)	17.25		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open space, Agriculture.	Commercial, Residential, Open space, Agriculture.	
Remarks	Land for widening of road is available		

6. Kalpaka junction to College junction			
Length(km)	0.6		
Carriage way width in m (Avg)	7.5		
Right of way width in m (Avg)	14.25		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open space.	Residential, Open space.	
Remarks			

7. College junction to Cherpulassery border			
Length (km)	0.6		
Carriage way width in m (Avg)	7.5		
Right of way width in m (Avg)	15		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open space.	Commercial, Residential, Open space.	
Remarks			

8. Mele Pattambi to Civilstatin junction			
Length (km)	0.4		
Carriage way width in m (Avg)	15.5		
Right of way width in m (Avg)	17		
Adjacent land use	LHS	RHS	
	Commercial	Commercial, Government.	
Remarks			

9. Civilstatin junction to Pattambi			
Length (km)	0.6		
Carriage way width in m (Avg)	15.5		
Right of way width in m (Avg)	15.5		
Adjacent land use	LHS	RHS	
	Commercial.	Commercial.	
Remarks			

10. Pattambi to Guruvayoor border			
Length (km)	1		
Carriage way width in m (Avg)	6.9		
Right of way width in m (Avg)	12.65		
Adjacent land use	LHS	RHS	
	Commercial, Residential	Commercial	
Remarks			

11. Pattambi junction to Bus station			
Length (km)	0.2		
Carriage way width in m (Avg)	9		
Right of way width in m (Avg)	10.5		
Adjacent land use	LHS	RHS	
	Commercial	Commercial	
Remarks			

12. Bus station to Muthuthala border		
Length (km)	0.9	
Carriage way width in m (Avg)	7.25	
Right of way width in m (Avg)	11	
Adjacent land use	LHS	RHS
	Commercial, Residential	Commercial
Remarks		

13. Civil station to Perumudiyoor		
Length (km)	5.5	
Carriage way width in m (Avg)	4.25	
Right of way width in m (Avg)	7.25	
Adjacent land use	LHS	RHS
	Commercial, Residential, Open spaces, Government, Agriculture.	Commercial, Residential, Open spaces, Government, Agriculture.
Remarks	Narrow road	

14. Sankaramangalam junction to Koomangalya		
Length (km)	3.3	
Carriage way width in m (Avg)	4.5	
Right of way width in m (Avg)	8.5	
Adjacent land use	LHS	RHS
	Residential, Open spaces, Agriculture.	Residential, Open spaces, Agriculture.
Remarks		

15. Manjangal to Kondoorkara			
Length (km)	1		
Carriage way width in m (Avg)	4.5		
Right of way width in m (Avg)	6		
Adjacent land use	LHS	RHS	
	Residential, Open spaces.	Residential, Open spaces.	
Remarks	Narrow road		

16. Kondoorkara to Lovely corner			
Length (km)	0.8		
Carriage way width in m (Avg)	4.5		
Right of way width in m (Avg)	6		
Adjacent land use	LHS	RHS	
	Residential, Open spaces.	Residential, Open spaces.	
Remarks	Narrow road		

17. Lovely corner to Kizhayur			
Length (km)	0.7		
Carriage way width in m (Avg)	5		
Right of way width in m (Avg)	6.5		
Adjacent land use	LHS	RHS	
	Residential, Open spaces.	Residential, Open spaces.	
Remarks			

18. Kizhayur to Mele Pattambi			
Length (km)	2.1		
Carriage way width in m (Avg)	5.5		
Right of way width in m (Avg)	7		
Adjacent land use	LHS	RHS	
	Residential, Open spaces, Agriculture.	Residential, Open spaces, Agriculture.	
Remarks			

19. Sankaramangala junction to Muthuthala Panchayath			
Length (km)	4.7		
Carriage way width in m (Avg)	4		
Right of way width in m (Avg)	7.3		
Adjacent land use	LHS	RHS	
	Commercial, Residential, Open spaces. Agriculture	Commercial, Residential, Open spaces. Agriculture	
Remarks			

20. Sankaramangala junction to Mele Parakkadu			
Length (km)	3		
Carriage way width in m (Avg)	3.75		
Right of way width in m (Avg)	7.25		
Adjacent land use	LHS	RHS	
	Residential, Open spaces, Agriculture	Residential, Open spaces, Agriculture	
Remarks			

21. MES junction to Thekkemuri			
Length(km)	1.8		
Carriage way width in m (Avg)	3.75		
Right of way width in m (Avg)	6.25		
Adjacent land use	LHS	RHS	
	Residential, Open spaces, Agriculture	Residential, Open spaces, Agriculture	
Remarks			

22. Koppam Muthuthala order			
Length(km)	11.3		
Carriage way width in m (Avg)	6		
Right of way width in m (Avg)	17		
Adjacent land use	LHS	RHS	
	Commercial,Residential, Open spaces, Agriculture	Commercial,Residential, Open spaces, Agriculture	
Remarks			

23. Njagattiri VK Kadavu			
Length (km)	4.3		
Carriage way width in m (Avg)	6.5		
Right of way width in m (Avg)	16		
Adjacent land use	LHS	RHS	
	Residential, Open spaces, Agriculture	Residential, Open spaces, Agriculture	
Remarks			

24. Amayur to Kurumbully			
Length (km)	5.5		
Carriage way width in m (Avg)	4.5		
Right of way width in m (Avg)	6		
Adjacent land use	LHS	RHS	
	Residential, Open spaces, Agriculture	Residential, Open spaces, Agriculture	
Remarks			

25. Thekkumuri to Chorakkunnu			
Length (km)	0.7		
Carriage way width in m (Avg)	3.25		
Right of way width in m (Avg)	6.75		
Adjacent land use	LHS	RHS	
	Residential, Open spaces,	Residential, Open spaces,	
Remarks			

18.3.3 Road Intersections

Intersection is an area shared by two or more roads. This area is designated for the vehicles to turn to different directions to reach their desired destinations. Its main function is to guide vehicles to their respective directions. In addition, the pedestrians also seek same space for crossing. Drivers have to make split second decision at an intersection by considering his route, intersection geometry, speed and direction of other vehicles etc. A small error in judgment can cause severe accidents. It also causes delay and it depends on type, geometry, and type of control. Overall traffic flow depends on the performance of the intersections. It also affects the capacity of the road. Therefore, both from the accident perspective and the capacity perspective,

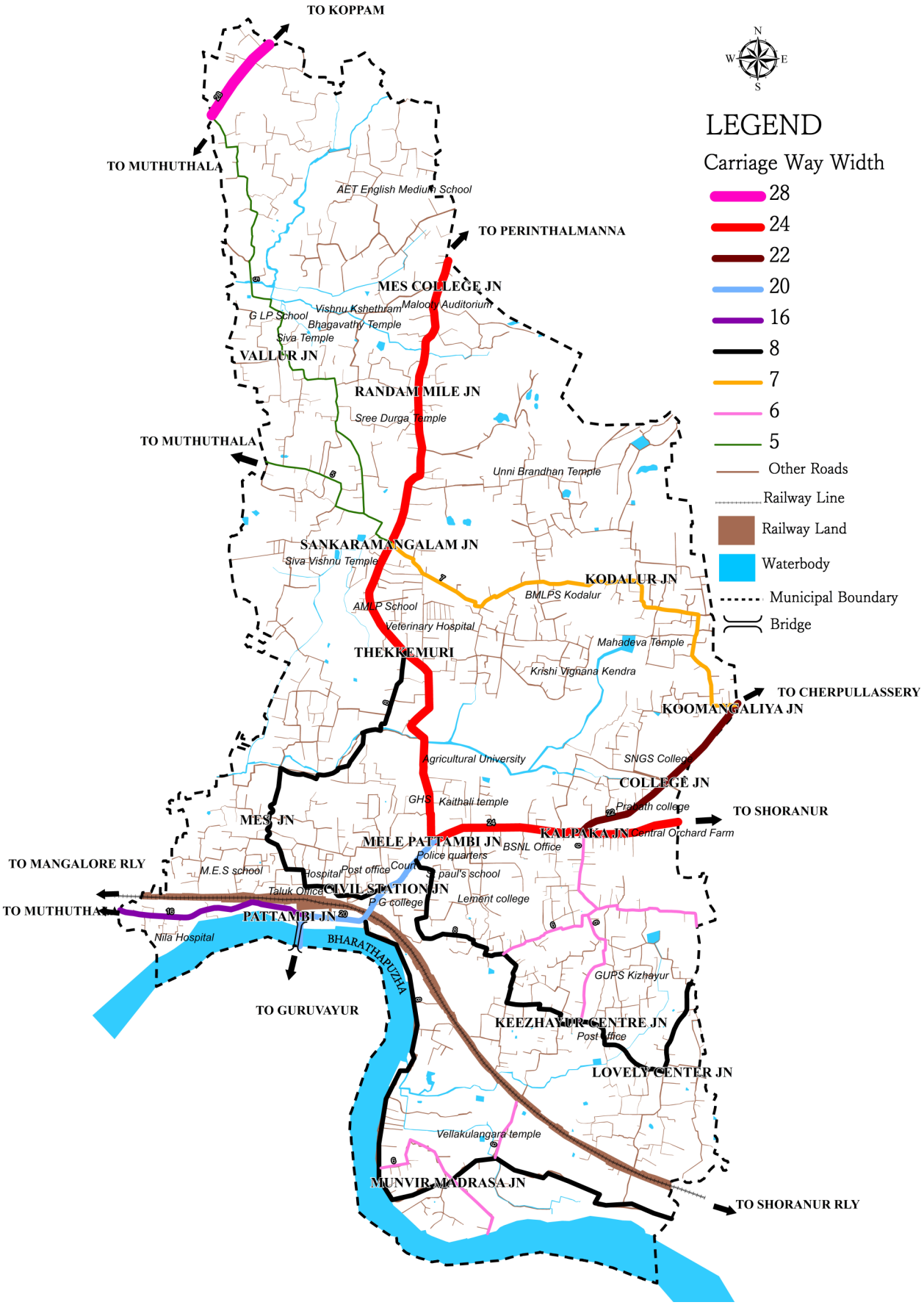


Fig. 18.6 Road network in Pattambi town based on carriage way width

the study of intersections are very important for the traffic engineers especially in the case of urban scenario. In Pattambi municipality there are 6 major road intersections are identified, Fig. 18.7 shows the major road intersections in Pattambi town and their details are given in Table 18.5.

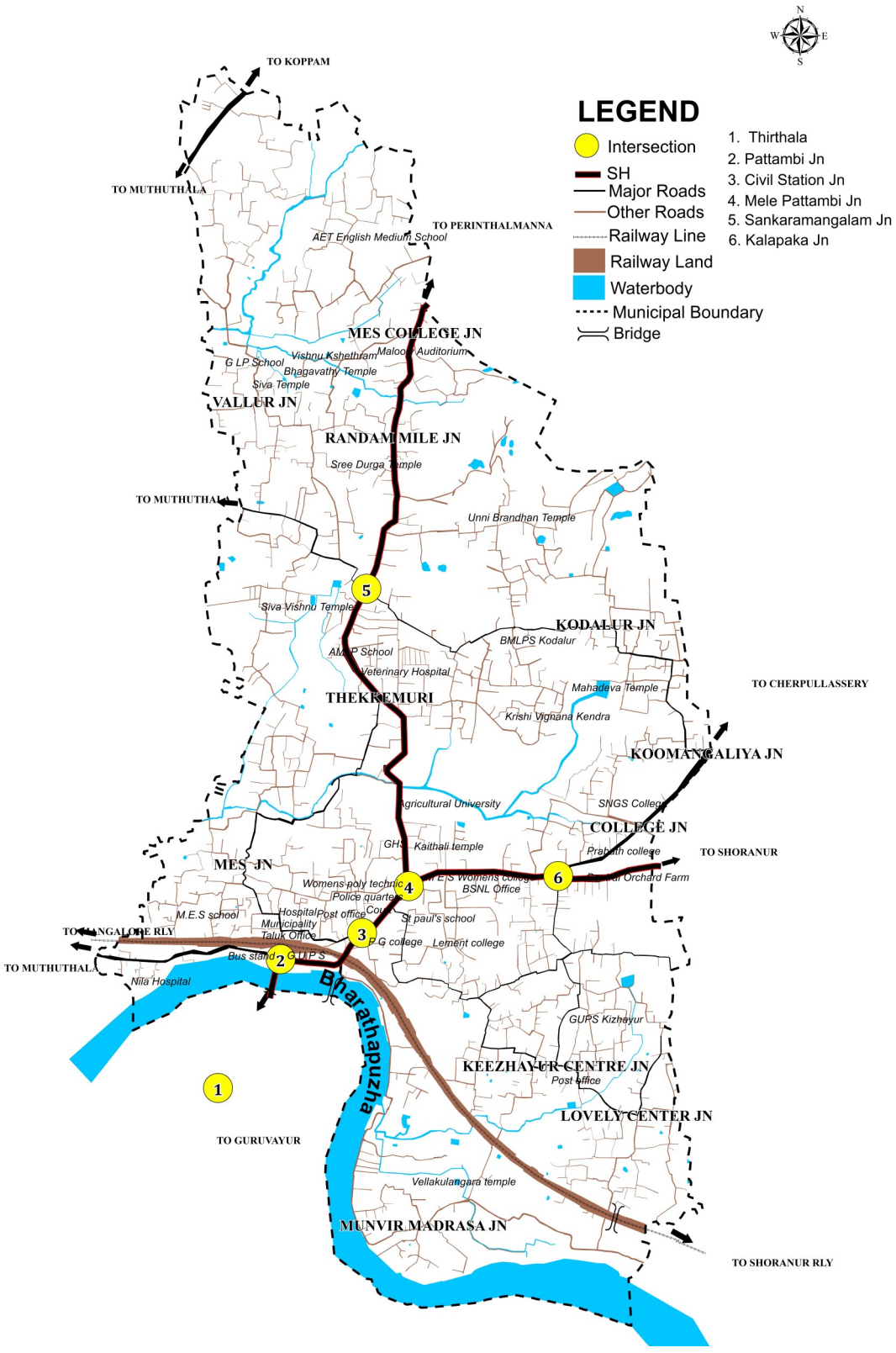


Fig. 18.7 Positions of major road intersections in Pattambi

Table 18.5 Details of Major intersections.

Sl. No.	Name of Junction	Type of junction
1	Thirthala	3 legged
2	Pattambi	3 legged
3	Civil Station	3 legged
4	Mele Pattambi	3 legged
5	Sangaramangalam	4 legged
6	Kalpaka	3 legged

18.3.3.1 Thrithala Road Junction

Thrithala road junction is located outside the municipal limit of Pattambi on Pattambi-Guruvayoor road from where the road to Thrithala leads. It is a three arm junction and all the three arms of the junction have two lane width. The junction is located at a horizontal curve leading to safety issues for vehicles approaching the junction from Guruvayoor arm. The junction handled a peak hour traffic volume of 1557 PCU with the major movements of 1,300 PCU along Pattambi-Guruvayoor direction. Traffic movements from Thrithala side were in the range of 100 to 140 PCU. Peak hour traffic flow at the junction is given in Fig. 18.9.



Fig. 18.8 Thrithala Road junction

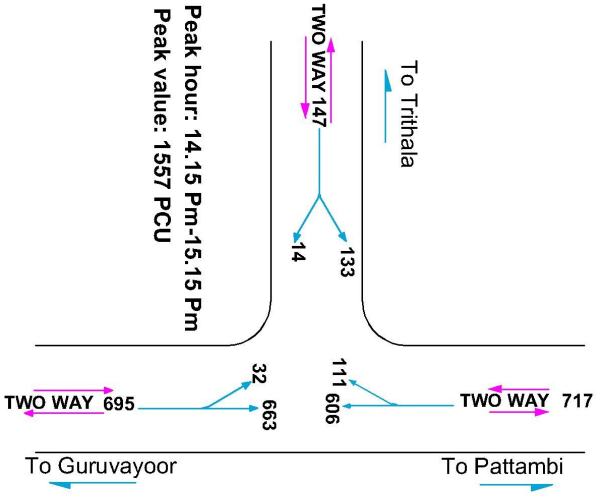


Fig. 18.9 Peak hour traffic flow at Thrithala Road junction

18.3.3.2 Pattambi Junction

Pattambi junction is located at the heart of Pattambi town on Mele Pattambi – Muthuthala road. The road to Guruvayoor leads from the junction making it a three arm intersection. All the areas surround the junction are full of commercial activities and the Pattambi bus station and Railway Station are located close to the junction, the first on the Muthuthala arm and the second on the Mele Pattambi arm. Only two lane width is available on the approaching arms of the junction. The bridge across Bharathapuzha on the Guruvayoor road is located close to the junction which is quite narrow.

Pattambi junction handled a peak hour volume of 2,713 PCU. The traffic movements between Guruvayoor and Melepattambi are found to be substantial (1,060 PCU) while it was 1,100 PCU between Mele Pattambi and Bus Station and 500 PCU between Guruvayoor and Muthuthala, mostly consisting of buses making multiple trips to the Bus station. Peak hour traffic flow at the junction is given in Fig. 18.11.

Due to the location of commercial establishments and public terminals, lot of pedestrian activities are generated in the junction area and in the absence of adequate walking and crossing facilities, they share the road space with vehicles putting themselves into accident risk. Severe traffic problems are witnessed at the junction due to inadequate road width on all the arms of the junction and absence of adequate turning radii for left turning as well as right turning vehicles at the junction.

Traffic problems are witnessed during peak hours due to large volume of vehicular movements and substantial pedestrian activities both across and along the arms of the junction. Inadequate width of the approaching arms cause traffic holdup during right turning of vehicles towards Civil Station side.



Fig. 18.10 Pattambi junction

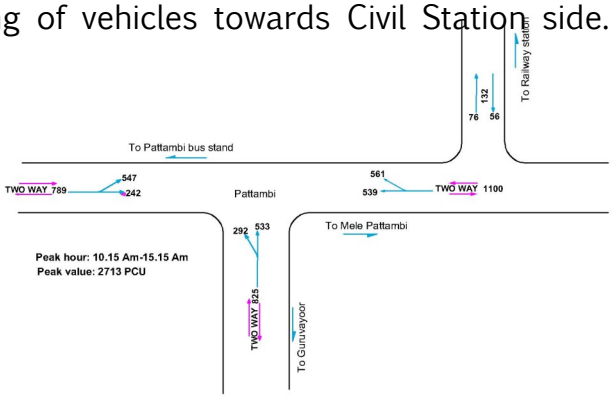


Fig. 18.11 Peak hour traffic flow at Pattambi junction

18.3.3.3 Civil Station Junction

Civil Station junction is located between Mele Pattambi and Pattambi junction on Pattambi – Muthuthala road. A minor road leads to the Civil Station/ Taluk Hospital on the north making it a three arm intersection. Commercial establishments are dotted on all the arms of the intersection. Only two lane road width is available on all the approaching arms and the junction area is found to be inadequate to accommodate large volume of vehicles passing through the junction in view of substantial turning movements.

The junction handled a peak hour traffic volume of 2,449 PCU and the major movements (1,800 PCU) were observed on the main road between Mele Pattambi and Pattambi junctions. Traffic movements towards Civil Station side were only 500 PCU. Peak hour traffic flow at the junction is given in Fig. 18.13.



Fig. 18.12 Civil station junction

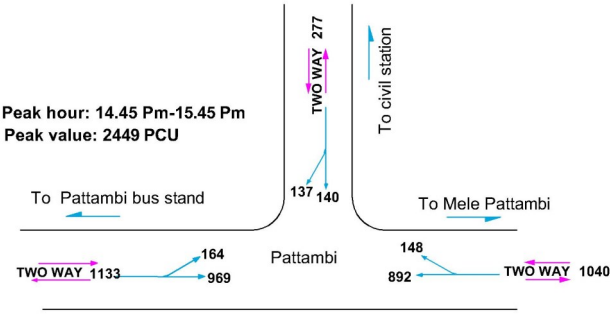


Fig. 18.13 Peak hour traffic flow at civil station junction

18.3.3.4 Melepattambi Junction

Mele Pattambi junction is the gateway to the CBD area of Pattambi town and located on State Highway connecting Shoranur with Perinthalmanna. The road to Pattambi town deviates from the junction and another minor road leads to residential areas within the town. Commercial establishments of large to medium size are dotting all the arms of the junction. The Shoranur arm of the junction has wide road of width about 10 m and while all other arms of the junction have two lane width.

The junction area is found to be inadequate to cater to the large volume of traffic passing through the junction and traffic movements through the junction are regulated by traffic signal. Temporary barricades are put up at the middle of the junction to facilitate segregation of traffic movements. Apart from vehicular movements, pedestrian and parking activities are also abundant in the junction.

Peak hour traffic flow at the junction was found to be 3,500 PCU and the highest movements were found to be between Kalpaka Junction and Pattambi with flow of 1,650 PCU. Traffic movements between Kalpaka and Sangaramangalam were also found to be substantial with around 900 PCU and between Sangaramangalam and Pattambi, it was 800 PCU. Peak hour traffic flow at the junction is given in Fig. 18.15.



Fig. 18.14 Mele Pattambi junction

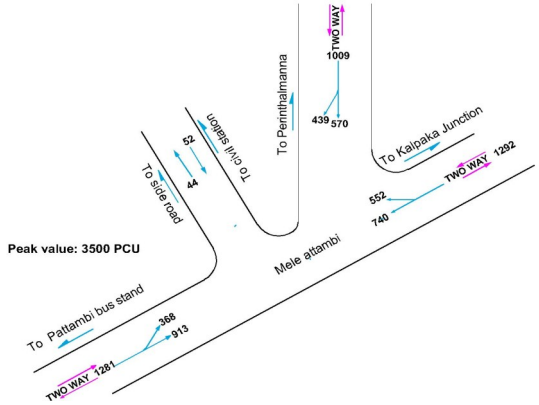


Fig. 18.15 Peak hour traffic flow at Melepattambi junction

18.3.3.5 Sankaramangalam Junction

Sangamamangalam junction Vallakkadavu is a four-arm intersection located on Shoranur - Perinthalmanna road. The road from Kozhikattiri to Kodalur cut across the main road to form a four arm intersection. While the main road has two lane road width, other arms have only single lane width. Only small to medium level commercial activities are found on the arms of the junction.

Peak hour traffic volume was found to be 1,700 PCU with more than 1,300 movements plying along the main road. Traffic towards Kozhikattiri and Kodalur were found to be quite minimal. Peak hour traffic flow at the junction is given in Fig. 18.17.



Fig. 18.16 Sangaramangalam junction

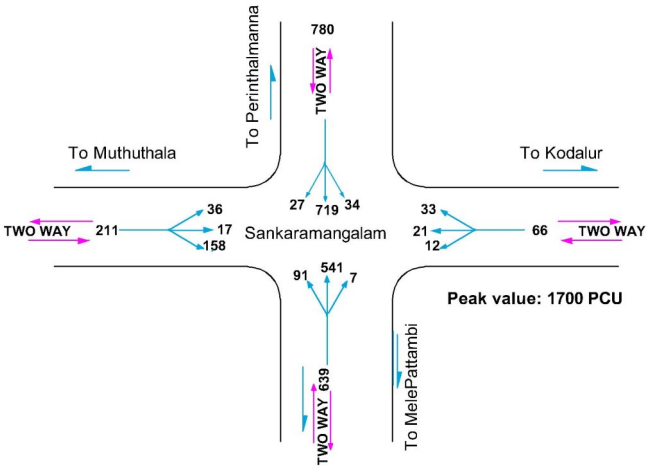


Fig. 18.17 Peak hour traffic flow at Sangaramangalam junction

18.3.3.6 Kalpaka junction

This is one of the major intersections in Pattambi Town and is the entry point of road to Cherpulasserry, another municipal town in Palakkad district. It is a Y arm intersection located on Shoranur - Perinthalmanna road from where road to Cherpulassery leads. Traffic movements at the junction are regulated by traffic signal. All the three arms of the junction have two lane width. Traffic regulatory measures like channelizes are absent in the junction



Fig. 18.18 Kalpaka junction

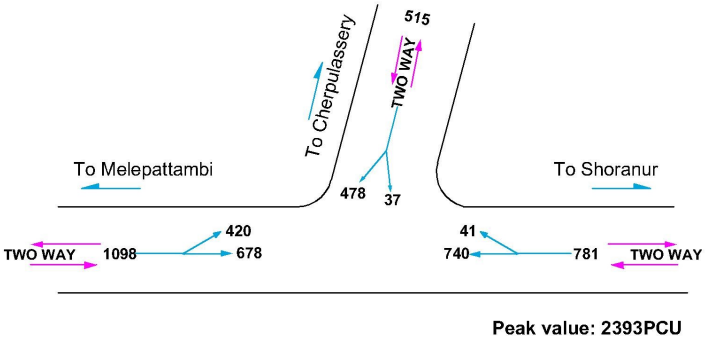


Fig. 18.19 Peak hour traffic flow at Kalpaka junction

except for traffic signal. Low level of commercial activities are observed in the junction area.

Peak hour volume at the junction was 2,300 PCU consisting of about 1,400 PCU movements between Pattambi and Shoranur, followed by 900 PCU of movements between Pattambi and Cherpulassery. Movements between Shoranur and Cherpulassery are relatively less. Peak hour traffic flow at the junction is given in Fig. 18.19.

18.4 CHARACTERISTICS STUDIES OF TRANSPORTATION NETWORK

The traffic and transportation improvement proposal for the Pattambi town require a detailed study on the existing transportation network characteristic and the future demand of transportation facilities for the planning period.

For estimating the future travel demand of the town a number of traffic surveys were carried out and the existing travel characteristics are identified. This includes traffic volume study at outer cordons and important intersections, speed and delay survey, parking survey, pedestrian survey, origin and destination (OD) survey, characteristics of intercity passenger traffic.

18.4.1 Traffic Volume Study

Traffic volume is an important input to understand the efficiency at which the system works and the general quality of service offered to road users. Classified traffic volume counts were carried out at (i) outer cordon points, (ii) mid-blocks on important road corridors, and (iii) major road intersections.

18.4.1.1 Traffic Volume Survey at Outer Cordon Points

Traffic flow through outer cordon locations are graphically shown in Figure 18.20. The maximum daily traffic volume of 23,000 PCU was observed on the Guruvayoor road, followed by about 19,000 PCU each at Amayur and Manappadi survey locations on Shoranur-Perinthalmanna SH. Cherpulassery road had 12,000 PCU of vehicular traffic interacting with Pattambi town while Muthuthala road had only about 10,000 PCU. Distribution of vehicles passing through the five outer cordon points in Pattambi town are given in Table 18.6.

18.4.1.2 Traffic Volume Survey at Midpoint of Homogeneous Section

Volume survey was conducted at the middle point of each of the homogeneous sections in Pattambi Town. Peak hour traffic volume estimated for various homogeneous sections in Pattambi Town is given in Table 18.7 and in Fig. 18.21. It could be seen that Shoranur - Perinthalmanna road carried the peak hour traffic volume ranging between 1,300 PCU on Sangaramangalam-Perinthalmanna Border section and 2,600 PCU on Kalpaka – Melepattambi

section.

Pattambi - Guruvayoor road had the highest peak hour volume of 2,500 PCU between Melepattambi and Civil Section and the least volume of 1,500 PCU between Pattambi and Guruvayoor road. On Pattambi - Muthuthala road, the highest peak hour volume of 1,600 PCU was observed between Pattambi

Table 18.6 Distribution of daily inbound and outbound traffic volume at outer cordon points in Pattambi town.

Type of vehicle	Guruvayoor road			Muthuthala road			Perinthalmanna road			Cherpulassery road			Shoranur road		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
KSRTC bus	90	106	**196**	-	-	**-**	45	38	**82**	12	6	**18**	86	104	**190**
prvt bus	250	376	**626**	92	83	**176**	195	193	**388**	132	131	**263**	220	234	**454**
Other buses	64	79	**143**	15	17	**32**	34	60	**94**	17	19	**35**	43	29	**72**
Mini bus/ tempo	25	22	**47**	23	20	**42**	48	3	**51**	8	1	**9**	52	49	**101**
Car	2,596	3,528	**6,124**	858	878	**1,736**	2,431	3,210	**5,641**	1,232	1,139	**2,371**	2,378	2,322	**4,700**
Pass auto	1,422	1,166	**2,587**	1,185	1,119	**2,303**	623	840	**1,463**	949	876	**1,826**	1,333	1,353	**2,686**
Two wheeler	4,691	4,883	**9,574**	2,982	2,290	**5,272**	2,925	3,475	**6,400**	3,192	2,754	**5,946**	3,760	3,238	**6,998**
MAT	143	180	**323**	8	204	**212**	244	182	**425**	56	22	**78**	207	151	**358**
Truck	524	582	**1,106**	101	81	**183**	506	596	**1,101**	402	409	**812**	578	555	**1,133**
Mini-truck/ tempo	227	418	**646**	68	62	**130**	417	315	**732**	215	203	**418**	235	396	**631**
auto	197	232	**429**	88	94	**181**	150	174	**324**	153	156	**309**	214	194	**409**
Bi-cycle	4	10	**14**	6	7	**13**	1	-	**1**	11	9	**20**	2	3	**5**
Others	-	6	**6**	6	6	**12**	3	-	**3**	-	-	**-**	3	6	**9**
Total (No)	**10,233**	**11,587**	**21,820**	**5,432**	**4,861**	**10,293**	**7,621**	**9,086**	**16,707**	**6,380**	**5,725**	**12,105**	**9,112**	**8,633**	**17,745**
Total (PCU)	**10,367**	**12,295**	**22,662**	**4,446**	**4,849**	**9,295**	**8,811**	**9,917**	**18,728**	**6,214**	**5,650**	**11,864**	**9,965**	**9,622**	**19,587**

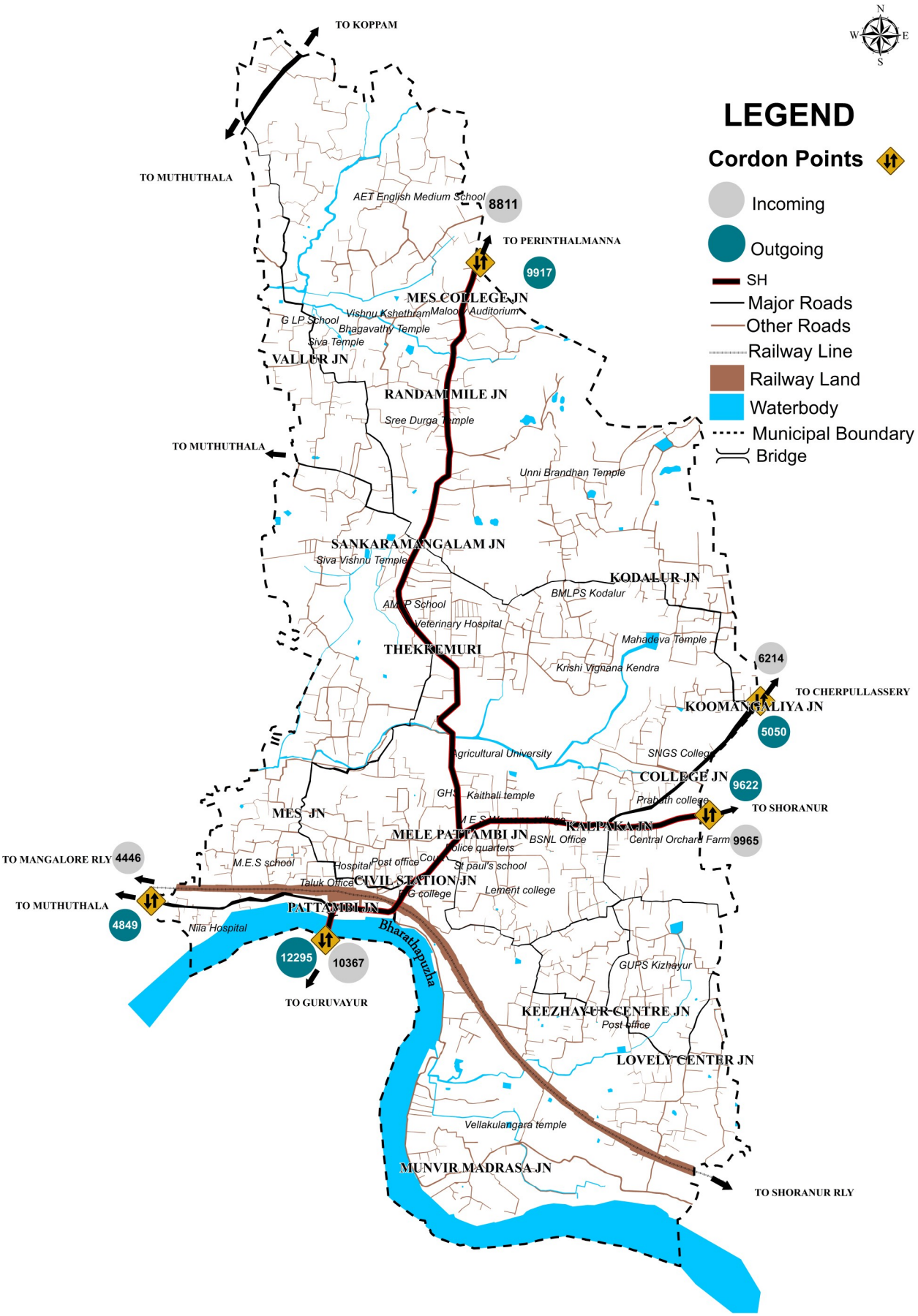


Fig. 18.20 Traffic flow through outer cordon points in Pattambi town.

and Bus Station and the lowest volume of 1,000 PCU on Bus Station and Muthuthala Border.

Pattambi had peak hour traffic volume in the range of 800 - 900 PCU only. All other roads in the town had traffic volume below 800 PCU. Within the CBD area of the town circumscribed by Pattambi bus station, Thrithala junction, Kalpaka junction, however, the traffic volume ranged between 1,500 and 2,600 PCU.

Table 18.7 Peak hour traffic volume on major road stretches in Pattambi town.

HS No.	Homogeneous section	KSRTC bus	prvt bus	Other buses	Mini bus/ tempo	Car	Pass auto	Two wheeler	MAT	Truck	Mini-truck/ tempo	Goods auto	Bi-cycle	Others	Total (No.)	Total (PCU)
	I. Shoranur to Perinthalmanna road															
1	Shoranur Border	9	39	10	10	366	173	768	11	38	97	69	2	1	**1,593**	**1,495**
2	Kalpaka Jn	11	53	2	16	817	512	1,092	33	61	73	62	1	1	**2,734**	**2,605**
3	Mele Pattambi	8	29	5	9	526	246	739	26	68	76	39	-	-	**1,771**	**1,755**
4	Thekkemuri	9	43	14	3	340	167	899	15	54	65	35	2	1	**1,647**	**1,526**
5	Sangaramangalam Jn	9	41	12	-	331	121	739	15	56	67	37	2	2	**1,432**	**1,390**
	II. Pattambi to Cherpulasserry road															
6	Kalpaka Jn	1	21	4	10	204	223	700	-	4	44	26	2	-	**1,239**	**975**
7	College Jn	2	18	2	-	196	134	612	3	12	30	21	10	-	**1,040**	**823**
	III. Pattambi to Guruvayoor road															
8	Mele Pattambi	19	80	5	7	753	518	1,061	17	31	69	57	1	1	**2,619**	**2,459**
9	Civil Station Jn	14	101	-	7	460	462	1,139	7	38	93	46	4	-	**2,371**	**2,180**
10	Pattambi	11	62	1	1	418	184	616	17	46	70	58	1	-	**1,485**	**1,512**
	IV. Pattambi to Muthuthala road															
11	Pattambi Jn	26	168	-	2	188	401	745	-	3	34	33	3	-	**1,603**	**1,641**
12	Bus Station	-	13	-	-	113	208	476	72	-	16	11	4	-	**913**	**959**
	V. Pattambi to Perumudiyoor															
13	Civil Station Jn	-	-	2	3	153	170	443	-	1	5	18	1	1	**797**	**588**
	VI. Sangaramangalam to Koomangaliya															
14	Sangaramangalam Jn	-	1	3	-	12	26	89	-	2	8	6	7	-	**154**	**122**
	VII. Manjalangal - Keezhayur - Mele Pattambi															
15	Manjalangal															
16	Kondoorkara															
17	Lovely Corner															
18	Keezhayoor															
	VIII. Other roadxs															
19	Sangaramangalam Jn	-	1	3	3	45	82	351	-	-	12	6	3	1	**507**	**349**
20	Sangaramangalam Jn															
21	MES Jn															
22	Koppam															
23	Njangattiri	-	13	-	-	95	28	162	-	1	24	6	1	-	**330**	**289**
24	Amayur															
25	thekkemuri															
	Mele Parakkadu															
	Thekkemuri															
	Muthuthala Border															
	V K Kadavu															
	Kurumbully															
	Chorakkunnu															

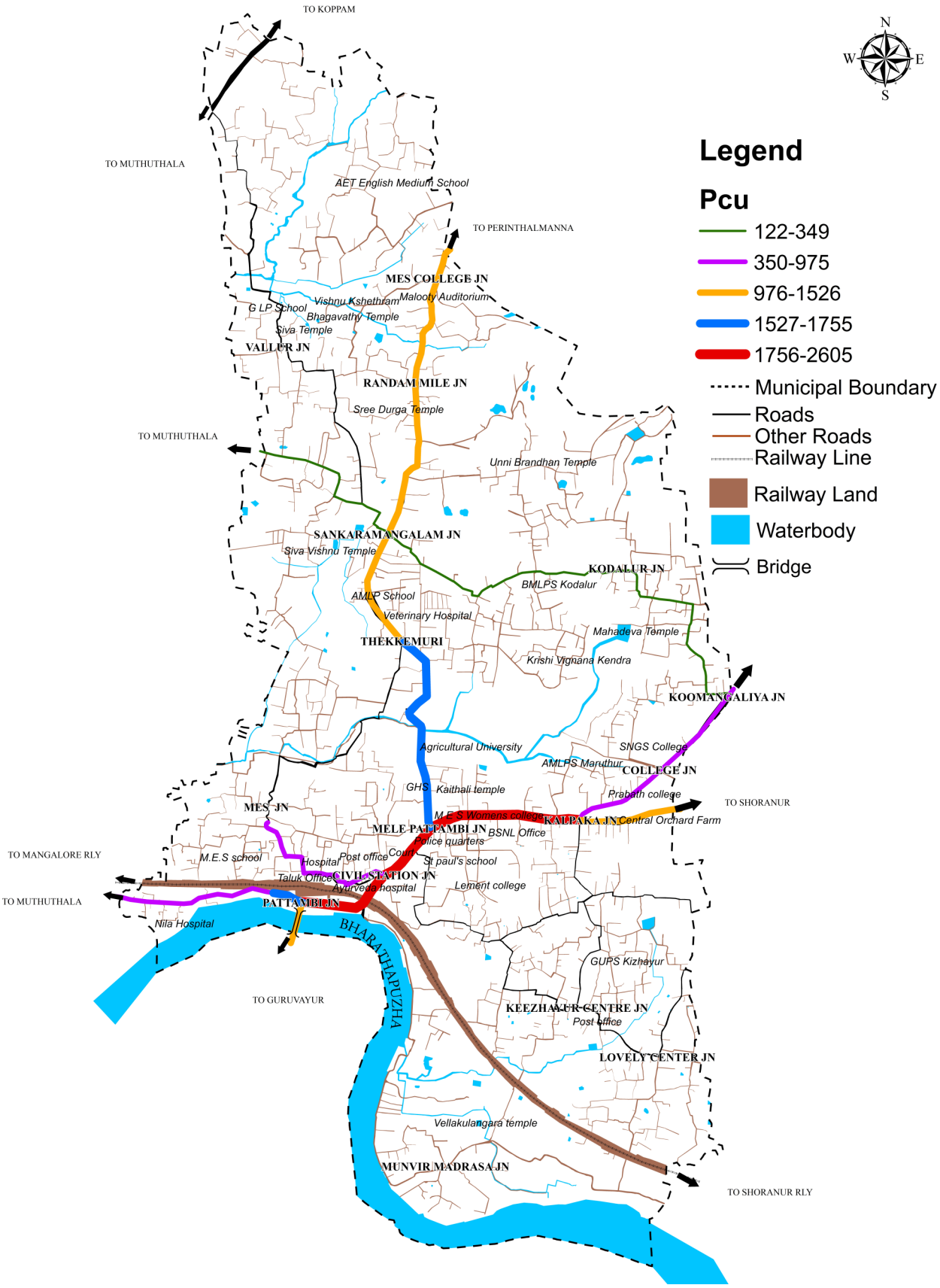


Fig. 18.21 Density of traffic on major road stretches in Pattambi town.

18.4.1.3 Traffic Volume Survey at Important Intersections

Based on the reconnaissance survey, turning movement surveys at six major intersections in the study area was conducted to ascertain the peak hour demands. Different categories of vehicles were converted in to a single unit called 'Passenger Car Unit' (PCU) using conversion factors suggested by Indian Roads congress (IRC). Summarized traffic flow through the selected intersections are given in Table 18.8.

It could be seen that Melepattambi junction recorded the highest peak hour traffic volume of 3,053 PCU, followed by 2,713 PCU at Pattambi junction, 2,449 PCU at Civil Station junction, 2,393 PCU at Kalpaka junction. Sankara-mangalam and Thrithala Road junction had the traffic volume between 1,500 PCU and 1,600 PCU.

Table 18.8 Peak hour traffic volume on major road intersections in Pattambi

Sl. No.	Name of intersection	Peak hour traffic (PCU)	Peak hour		
1	Thirthala	1,557	14.15	-	15.15
2	Pattambi	2,713	10.15	-	11.15
3	Civil Station	2,449	14.45	-	15.45
4	Mele Pattambi	3,053	14.45	-	15.45
5	Sangaramangalam	1,693	14.45	-	15.45
6	Kalpaka	2,393	8.30	-	9.30

18.4.2 Traffic Volume/Capacity Study

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

While working out the capacities due consideration was given to carriage way width, junctions, parking, lateral clearance, shoulder, surface condition etc. The traffic volume observed at different road stretches were compared with the capacity of road sections, to calculate the volume-capacity ratio (V/C ratio) of different road sections within the study area. The volume capacity ratio of major corridors within the Pattambi Town is given in Table 18.9.

It is seen that the entire State Highway stretch within Pattambi town had exceeded the capacity of the road with VCR exceeding at all the homogeneous sections. Apart from this, Guruvayoor road between Pattambi and border and the road between Pattambi and Bus station on Muthuthala road were found to have exceeded the base year traffic capacity (Fig. 18.22).

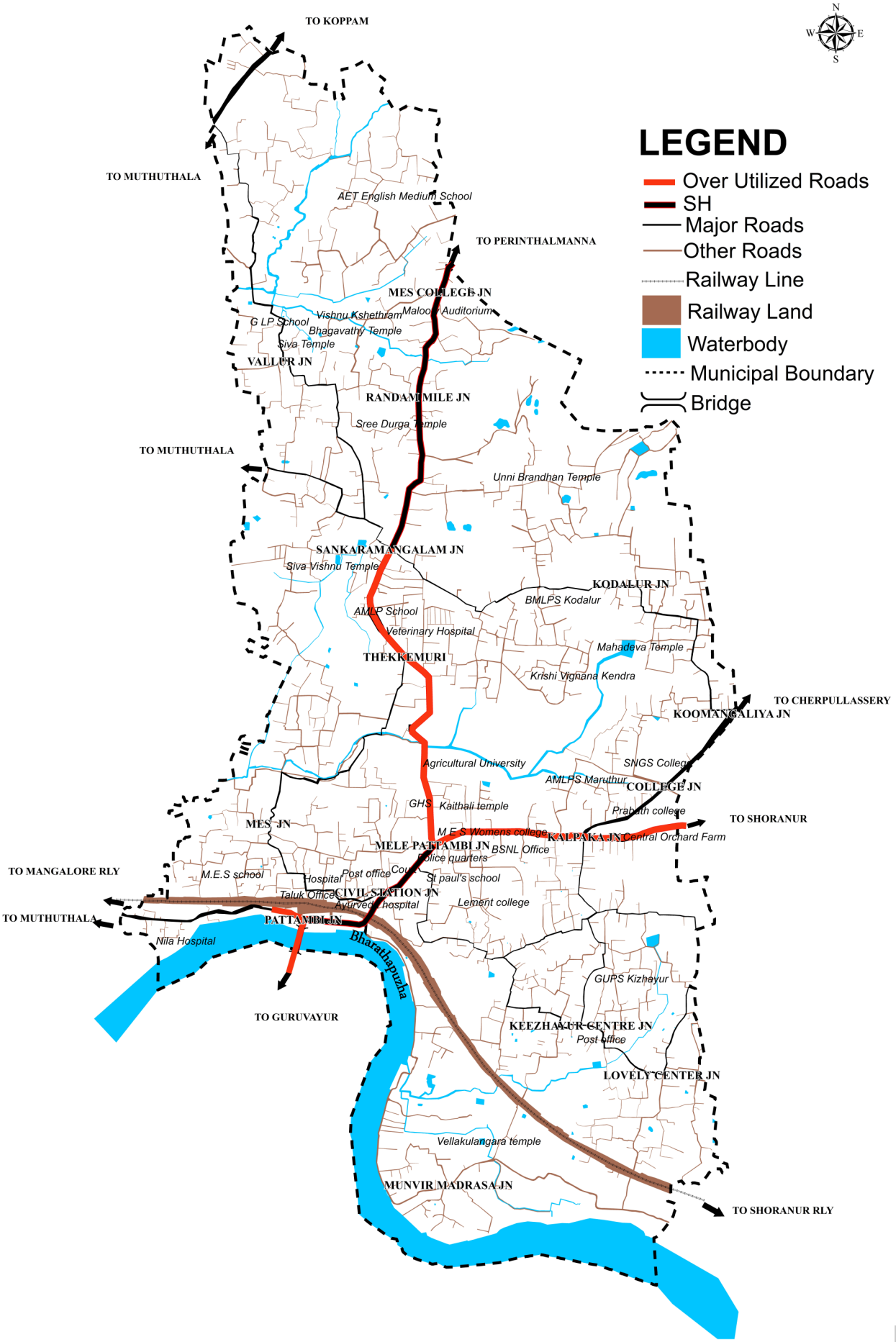


Fig. 18.22 Over utilized roads in Pattambi town.

Table. 18.9 Volume capacity ratio of major road stretches in Pattambi town.

SL No.	Homogeneous section		Peak hour volume (PCU)	Peak hour capacity (PCU)	Volume-capacity ratio
	I. Shoranur to Perinthalmanna road				
1	Shoranur Border	Kalpaka Jn	1,495	1,500	1.00
2	Kalpaka Jn	Mele Pattambi	2,605	1,500	1.74
3	Mele Pattambi	Thekkemuri	1,755	1,500	1.17
4	Thekkemuri	Sangaramangalam Jn	1,526	1,500	1.02
5	Sangaramangalam Jn	Perinthalmanna Border	1,390	1,500	0.93
	II. Pattambi to Cherpulasserry road				
6	Kalpaka Jn	College Jn	975	1,200	0.81
7	College Jn	Cherpulasserry Border	823	1,200	0.69
	III. Pattambi to Guruvayoor road				
8	Mele Pattambi	Civil Station Jn	2,459	3,000	0.82
9	Civil Station Jn	Pattambi	2,180	3,000	0.73
10	Pattambi	Guruvayoor Border	1,512	1,500	1.01
	IV. Pattambi to Muthuthala road				
11	Pattambi Jn	Bus Station	1,641	1,200	1.37
12	Bus Station	Muthuthala Border	959	1,200	0.80
	V. Pattambi to Perumudiyoor				
13	Civil Station Jn	Perumudiyoor	588	900	0.65
	VI. Sangaramangalam to Koomangaliya				
14	Sangaramangalam Jn	Koomangaliya	122	900	0.14
	VII. Manjalangal - Keezhayur - Mele Pattambi				
15	Manjalangal	Kondoorkara	-	900	-
16	Kondoorkara	Lovely corner	-	900	-
17	Lovely Corner	Keezhayoor	-	900	-
18	Keezhayoor	Mele Pattambi	-	900	-
	VIII. Other roadxs				
19	Sangaramangalam Jn	Muthuthala Panchayat	349	900	0.39
20	Sangaramangalam Jn	Mele Parakkadu	-	900	-
21	MES Jn	Thekkemuri	-	900	-
22	Koppam	Muthuthala Border	-	900	-
23	Njangattiri	V K Kadavu	289	900	0.32
24	Amayur	Kurumbully	-	900	-
25	thekkemuri	Chorakkunnu	-	900	-

18.4.3 Speed and Delay Study

To assess the average journey speed during peak hours, speed and delay survey was conducted along major roads in Pattambi Town. A summary of the observations regarding distance, journey time, delay time and speed is presented in Table 18.10.

The average travel speed within Pattambi town limits was found to be 31 kmph while the same within the CBD areas was around 21 kmph. The journey speed in Shoranur-Pattambi-Perinthalmanna road varied between 20 and

40 kmph and on Guruvayoor road, it was between 20 and 36 kmph. Cherpulasserry road witnessed a travel speed ranging between 33 and 43 kmph. The road to Muthuthala had travel speed of about 25 kmph.

The major delay to free flow of traffic was the conflicting movements at intersections on most of the road stretches, inadequate width of road and location of bus station at the CBD areas.

Table 18.10 Speed and delay characteristics on major roads in Pattambi Town.

	Homogeneous section		Length (km)	Average journey time (Sec)	Delay (Sec)	Average running time	Delay cause	Speed (km/ Hr)	
								With delay	Without delay
	I. Shoranur to Perinthalmanna road								
1	Shoranur Border	Kalpaka Jn	0.90	70.28	-	70.28		46.10	46.10
2	Kalpaka Jn	Mele Pattambi	0.90	159.07	14.57	144.51	Intersection	20.37	22.42
3	Mele Pattambi	Thekkemuri	1.26	162.12	23.15	138.97	Intersection	27.98	32.64
4	Thekkemuri	Sangaramangalam Jn	0.84	70.35	-	70.35		42.99	42.99
5	Sangaramangalam Jn	Perinthalmanna Border	1.80	158.11	-	158.11		40.98	40.98
	II. Pattambi to Cherpulasserry road								
6	Kalpaka Jn	College Jn	0.60	63.75	12.73	51.02	Intersection	33.88	42.34
7	College Jn	Cherpulasserry Border	0.60	49.12	-	49.12		43.97	43.97
	III. Pattambi to Guruvayoor road								
8	Mele Pattambi	Civil Station Jn	0.40	69.38	-	69.38		20.75	20.75
9	Civil Station Jn	Pattambi	0.60	108.04	10.27	97.77	Intersection	19.99	22.09
10	Pattambi	Guruvayoor Border	0.50	49.99	9.00	40.99	Intersection	36.01	43.91
	IV. Pattambi to Muthuthala road								
11	Pattambi Jn	Bus Station	0.20	29.14	-	29.14		24.71	24.71
12	Bus Station	Muthuthala Border	0.90	126.06	-	126.06		25.70	25.70
	All roads		**9.50**	**1,115.40**	**69.72**			**30.66**	**32.71**
	Roads in CBD areas		**2.10**	**365.63**	**24.84**			**20.68**	**22.18**

18.4.4 Parking survey

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 hours during the peak periods. Registration plate method was used to collect data on parking duration and accumulation of all categories of vehicles on major parking corridors. The locations of parking survey are marked in Figure 18.23.

Table 18.11 give the parking accumulation of vehicles observed at various locations in Pattambi Town. It could be seen that Pattambi town as a whole had peak parking accumulation of 380 vehicles at 05.30 PM in the evening. Bulk of them (84%) were found to be two wheelers. The road stretch between Pattambi junction and Bus station had the maximum accumulation of 173 vehicles consisting mostly of two wheelers.

A maximum of 66 vehicles were found to be parked on the road between Pattambi junction and Civil Station, followed by 52 vehicles between Melepattambi and Thekkumuri. 45 vehicles each were parked on the road between Melepattambi and Kalpaka and between Melepattambi and Civil Station.

Table. 18.11 Parking accumulation on major road stretches in Pattambi town.

Sl. NO.	Type of vehicle	Time of parking									
		14.00	14.30	15.00	15.30	16.00	16.30	17.00	17.30	18.00	18.30
1. Mele Pattambi to Kalpaka											
1	Bus	0	0	0	0	0	0	0	0	0	0
2	mini-bus/ tempo	0	0	0	0	0	0	0	0	0	0
3	Car	33	41	15	34	36	19	28	17	45	38
4	Autorickshaw	6	17	5	18	15	4	28	12	21	17
5	Two wheeler	40	34	12	40	35	12	20	32	42	27
6	MAT	0	0	0	0	0	0	0	0	1	0
7	Truck	0	0	0	1	0	0	0	0	0	0
8	Mini truck	0	0	0	0	0	0	0	0	2	3
9	Goods Auto	2	2	0	1	1	0	1	0	1	1
Total		48	53	17	60	51	16	49	44	67	48
2. Mele Pattambi to Thekkumuri											
1	Bus	0	2	2	2	1	1	4	2	2	2
2	mini-bus/ tempo	2	5	4	4	0	2	5	2	2	1
3	Car	4	7	10	8	5	19	22	15	8	10
4	Autorickshaw	6	2	4	9	2	8	7	12	5	12
5	Two wheeler	40	22	31	44	38	49	22	39	17	49
6	MAT	0	1	0	0	0	0	0	0	0	0
7	Truck	0	1	0	0	0	0	0	0	1	0
8	Mini truck	0	0	0	0	0	0	0	0	0	0
9	Goods Auto	1	1	0	0	0	0	1	1	0	2
Total		47	27	35	53	40	57	30	52	23	63
3. Mele Pattambi to Civil Station											
1	Bus	0	0	0	0	1	1	0	0	0	0
2	mini-bus/ tempo	1	0	0	0	0	0	0	0	0	0
3	Car	12	3	24	13	11	12	11	12	8	0
4	Autorickshaw	11	4	18	5	9	12	17	12	11	0
5	Two wheeler	14	5	34	29	25	26	27	33	37	0
6	MAT	0	0	0	0	0	0	0	0	0	0
7	Truck	0	0	0	1	0	0	0	0	0	0
8	Mini truck	1	0	1	0	0	0	0	0	0	0
9	Goods Auto	1	0	2	1	0	0	0	0	0	0
Total		**27**	**9**	**55**	**36**	**34**	**38**	**44**	**45**	**48**	**0**
4. Civil Station to Pattambi											
1	Bus	0	0	0	0	0	0	1	0	0	0
2	mini-bus/ tempo	0	1	0	0	0	0	1	2	0	0
3	Car	8	16	18	18	18	23	15	17	17	0
4	Autorickshaw	3	1	4	5	5	5	10	6	2	0
5	Two wheeler	28	48	56	70	61	77	62	54	48	0
6	MAT	0	0	1	1	1	0	0	0	0	0
7	Truck	0	0	1	1	2	2	1	3	0	0
8	Mini truck	1	1	3	1	2	0	2	3	1	0
9	Goods Auto	0	0	2	1	2	1	2	0	0	0
Total		32	50	67	79	73	85	77	66	51	0
5. Pattambi to Bus Station											
1	Bus	0	0	0	0	0	0	0	0	0	0
2	mini-bus/ tempo	0	0	0	0	0	0	0	0	0	0
3	Car	7	12	0	0	0	6	3	9	9	0
4	Autorickshaw	3	11	0	0	0	8	1	11	4	0

Table. 18.11 Continued..

5	Two wheeler	5	214	0	0	0	151	84	160	90	0
6	MAT	0	0	0	0	0	0	0	0	0	0
7	Truck	0	0	0	0	0	0	0	0	0	0
8	Mini truck	1	1	0	0	0	0	0	0	0	0
9	Goods Auto	0	1	0	0	0	2	1	2	2	0
Total		9	227	0	0	0	161	86	173	96	0
All locations											
1	Bus	0	2	2	2	2	2	5	2	2	2
2	mini-bus/ tempo	3	6	4	4	0	2	6	4	2	1
3	Car	64	79	67	73	70	79	79	70	87	48
4	Autorickshaw	29	35	31	37	31	37	63	53	43	29
5	Two wheeler	127	323	133	183	159	315	215	318	234	76
6	MAT	0	1	1	1	1	0	0	0	1	0
7	Truck	0	1	1	3	2	2	1	3	1	0
8	Mini truck	3	2	4	1	2	0	2	3	3	3
9	Goods Auto	4	4	4	3	3	3	5	3	3	3
	Total	163	366	174	228	198	357	286	380	285	111

The duration of parking of different type of vehicles at selected areas of the town are presented in Table 18.12. It could be seen that most of the vehicles (83%) parked in the major parking corridors parked for duration of less than 30 minutes. About 5% each of the vehicles were parked for duration of 30 to 60 minutes and 60-90 minutes. Only about 7% of the vehicles parked for more than one hour.

Table 18.12 Parking duration of vehicles on major road stretches in Pattambi town.

Sl. NO	Type of vehicle	Duration of parking (minutes)						Total
		<30	30-60	60-90	90-120	120-150	>150	
1. Mele Pattambi to Kalpaka								
1	Bus	0	0	0	0	0	0	**0**
2	mini-bus/ tempo	0	0	0	0	0	0	**0**
3	Car	135	21	14	5	2	3	**180**
4	Autorickshaw	91	6	8	4	0	0	**109**
5	Two wheeler	222	7	9	2	1	0	**241**
6	MAT	1	0	0	0	0	0	**1**
7	Truck	1	0	0	0	0	0	**1**
8	Mini truck	3	1	0	0	0	0	**4**
9	Goods Auto	4	1	1	0	0	0	**6**
Total		322	15	18	6	1	0	362
2. Mele Pattambi to Thekkumuri								
1	Bus	2	0	1	1	0	0	**4**
2	mini-bus/ tempo	9	1	4	1	0	0	**15**
3	Car	57	5	8	1	1	0	**72**

Table 18.12 Continued..

Sl. NO	Type of vehicle	Duration of parking (minutes)						Total
		<30	30-60	60-90	90-120	120-150	>150	
4	Autorickshaw	38	3	6	0	1	0	**48**
5	Two wheeler	205	29	14	4	2	1	**255**
6	MAT	1	0	0	0	0	0	**1**
7	Truck	2	0	0	0	0	0	**2**
8	Mini truck	0	0	0	0	0	0	**0**
9	Goods Auto	6	0	0	0	0	0	**6**
Total		252	32	20	4	3	1	312
3. Mele Pattambi to Civil Station								
1	Bus	0	1	0	0	0	0	**1**
2	mini-bus/ tempo	1	0	0	0	0	0	**1**
3	Car	61	3	2	1	0	2	**69**
4	Autorickshaw	47	5	10	3	0	0	**65**
5	Two wheeler	114	13	6	7	2	0	**142**
6	MAT	0	0	0	0	0	0	**0**
7	Truck	1	0	0	0	0	0	**1**
8	Mini truck	3	0	0	0	0	0	**3**
9	Goods Auto	4	0	0	0	0	0	**4**
Total		169	18	16	10	2	0	215
4. Civil Station to Pattambi								
1	Bus	1	0	0	0	0	0	**1**
2	mini-bus/ tempo	2	1	0	0	0	0	**3**
3	Car	57	2	7	3	2	3	**74**
4	Autorickshaw	35	3	1	0	0	0	**39**
5	Two wheeler	200	15	7	7	9	7	**245**
6	MAT	0	0	1	0	0	0	**1**
7	Truck	8	1	0	0	0	0	**9**
8	Mini truck	7	1	1	1	0	0	**10**
5. Pattambi to Bus Station								
1	Bus	0	0	0	0	0	0	**0**
2	mini-bus/ tempo	0	0	0	0	0	0	**0**
3	Car	19	4	6	0	3	0	**32**
4	Autorickshaw	32	1	3	0	1	0	**37**
5	Two wheeler	431	2	36	0	69	0	**538**
6	MAT	0	0	0	0	0	0	**0**
7	Truck	0	0	0	0	0	0	**0**
8	Mini truck	2	0	0	0	0	0	**2**
9	Goods Auto	2	0	1	0	1	0	**4**
Total		467	3	40	0	71	0	581
All locations								
1	Bus	3	1	1	1	0	0	**6**
2	mini-bus/ tempo	12	2	4	1	0	0	**19**
3	Car	329	35	37	10	8	8	**427**
4	Autorickshaw	243	18	28	7	2	0	**298**
5	Two wheeler	1172	66	72	20	83	8	**1421**
6	MAT	2	0	1	0	0	0	**3**

Table 18.12 Continued..

7	Truck	12	1	0	0	0	0	**13**
8	Mini truck	15	2	1	1	0	0	**19**
9	Goods Auto	24	1	2	0	1	0	**28**
	Total	**1468**	**88**	**104**	**28**	**86**	**8**	**1782**
	Percent	**82.38**	**4.94**	**5.84**	**1.57**	**4.83**	**0.45**	**100.00**

18.4.5 Pedestrian Survey

Pedestrian surveys were conducted at major locations where the pedestrian cross movements and lateral movements were found to be high. The surveys were carried out for a period of four hours during the period between 8.00 AM and 12.00 noon in the morning and/or between 4.00 PM and 8.00 PM in the evening.

Table 18.13 Peak hour pedestrian movements at Pattambi town

Sl. No.	Survey location	Peak hour			Pedestrian movements	Total (Area)
1	Pattambi Jn - Bus station side	17.15	-	18.15	287	632
	Pattambi Jn - Guruvayoor road	17.15	-	18.15	308	
	Pattambi Jn - Mele Pattambi road	17.15	-	18.15	37	
2	Civil Station Jn - Civil Station side	11.45	-	12.45	74	278
	Civil Station Jn - Mele Pattambi side	11.45	-	12.45	111	
	Civil Station Jn - Pattambi side	11.45	-	12.45	93	
3	Mele Pattambi Jn - Kalpaka side	17.00	-	18.00	230	715
	Mele Pattambi Jn - Pattambi side	17.00	-	18.00	265	
	Mele Pattambi Jn - Perinthalmanna side	17.00	-	18.00	220	
4	Kalapaka Jn - Cherupulasserry side	18.00	-	19.00	46	240
	Kalpaka Jn - Mele Pattambi side	18.00	-	19.00	182	
	Kalpaka Jn - Shoranoor side	18.00	-	19.00	12	
5	Sangaramangalam - Kodalur side	8.30	-	9.30	90	311
	Sangaramangalam - Mele Pattambi side	8.30	-	9.30	128	
	Sankaramangalam - Perinthalmanna side	8.30	-	9.30	60	
	Sasngaramangalam - Muthuthala side	8.30	-	9.30	33	
6	Thrithala road Jn - Guruvayoor side	16.30	-	17.30	53	108
	Thrithala road Jn - Pattambi side	16.30	-	17.30	29	
	Thrithala road Jn - Thrithala side	16.30	-	17.30	26	

Cross movements: Pedestrian cross movements observed at these locations are given in Table 18.13. It could be seen that Mele Pattambi junction area had the highest pedestrian cross movements of 715 during peak hour, closely followed by Pattambi junction area with 632 movements. Other important locations with considerable pedestrian movements are:

(i) Sangaramangalam area with 311

(ii) Civil Station area with 278

(iii) Kalpaka area with 240

Pedestrian vehicle conflicts: It reflects the intensity of pedestrian-vehicle conflicts on a link and is represented by PV^2 values where P is the number of pedestrians crossing a link during peak hour and V is the number of vehicles passing through the link during peak hour. For a road section with refuge, a value of PV^2 greater than $2x10^8$ and for a road section without refuge, PV^2 value greater than 10^8 indicates a higher level of conflicts and warrants grade-separated pedestrian facilities. It implies that a divided carriageway could be considered to have reduced impact of PV^2 value by 50%. Pedestrian vehicle conflicts observed at various locations in Pattambi town are presented in Table 18.14. It could be seen that all the arms of Melepattambi junction, one arm of Kalpaka junction, all the three arms of Pattambi junction, two arms of Civil Station junction, two arms of Sangaramangalam junction have high pedestrian vehicle conflicts which warrants suitable interferences.

Table 18.14 Pedestrian vehicle conflict at major road intersections

Sl. No.	Survey location	Pedestrian movements	Peak Traffic volume	PV^2	
1.1	Pattambi Jn - Bus station side	287	1,641	7.73	$x10^8$
1.2	Pattambi Jn - Guruvayoor road	308	1,512	7.04	$x10^8$
1.3	Pattambi Jn - Mele Pattambi road	37	2,180	1.76	$x10^8$
2.1	Civil Station Jn - Civil Station side	74	588	0.26	$x10^8$
2.2	Civil Station Jn - Mele Pattambi side	111	2,459	6.71	$x10^8$
2.3	Civil Station Jn - Pattambi side	93	2,180	4.42	$x10^8$
3.1	Mele Pattambi Jn - Kalpaka side	230	2,605	15.60	$x10^8$
3.2	Mele Pattambi Jn - Pattambi side	265	2,459	16.02	$x10^8$
3.3	Mele Pattambi Jn - Perinthalmanna side	220	1,755	6.78	$x10^8$
4.1	Kalapaka Jn - Cherupulasserry side	46	975	0.44	$x10^8$
4.2	Kalpaka Jn - Mele Pattambi side	182	2,605	12.35	$x10^8$
4.3	Kalpaka Jn - Shoranoor side	12	1,495	0.27	$x10^8$
5.1	Sangaramangalam - Kodalur side	90	122	0.01	$x10^8$
5.2	Sangaramangalam - Mele Pattambi side	128	1,526	2.98	$x10^8$
5.3	Sankaramangalam - Perinthalmanna side	60	1,390	1.16	$x10^8$
5.4	Sasngaramangalam - Muthuthala side	33	349	0.04	$x10^8$
6.1	Thrithala road Jn - Guruvayoor side	53	1,223	0.79	$x10^8$
6.2	Thrithala road Jn - Pattambi side	29	1,512	0.66	$x10^8$
6.3	Thrithala road Jn - Thrithala side	26	289	0.02	$x10^8$

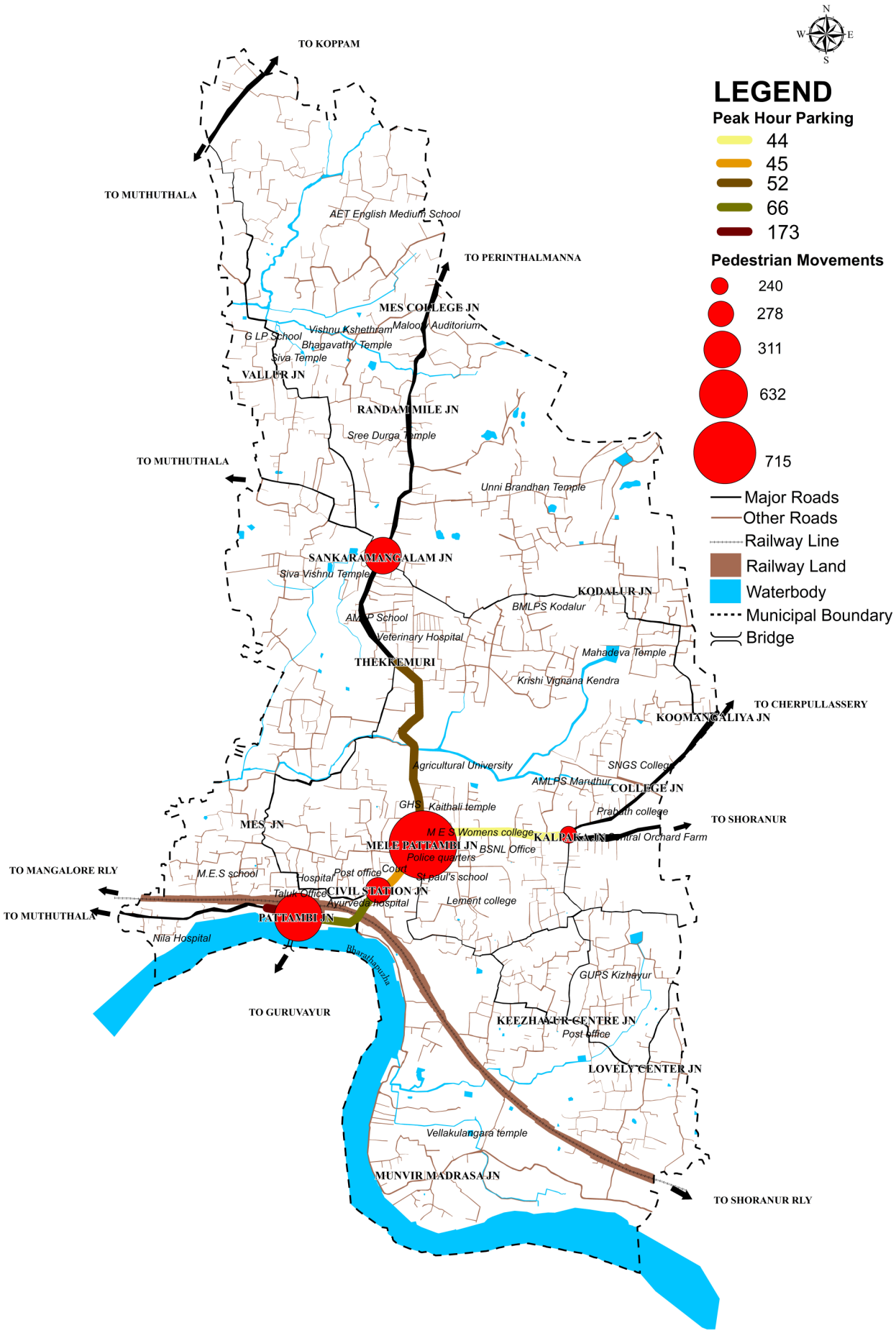


Fig. 18.23 Location of parking and pedestrian survey in Pattambi town

18.4.6 Public Tansport Operations

18.4.6.1 Bus Terminals

Public transport services are met by both KSRTC and private buses in Pattambi Town. These services are operated from Municipal bus stand located on Pattambi-Muthuthala road close to Pattambi junction.

18.4.6.2 Routes and Number of Trips Operated

Data compiled from KSRTC Depot and Private bus operators Association at Pattambi reveal that 434 buses are operated from/through the bus station in Pattambi town with about 813 trips per day. The highest number of bus trips are operated to Shoranur with 269 trips, followed by 255 trips to Guruvayoor, 237 trips to Perinthalmanna side, 78 trips towards Thrithala and 73 trips to Cherpulassery side. Table 18.15. shows the details of bus routes and services in Pattambi town. Bus transport routes in Pattambi town are marked in Fig. 18.24.

Table 18.15 Details of bus routes and services in Pattambi town.

Sl. No.	Name of bus route		No. of trips
1	Thirumittacode side	Pattambi Town	4
2	Guruvayoor side (Guruvayoor, Thrissur)	Perinthalmanna side	39
3		Cherpulasserry side	4
4		Shoranoor side	77
5		Pattambi Town	135
6	Thrithala side (Edappal, Ponnani)	Shoranoor side	3
7		Pattambi Town	75
8	Muthuthala side (Pallipuram)	Cherpulasserry side	0
9		Pattambi Town	26
10	Perinthalmanna side (Perinthalmanna, Valancherry)	Cherpulasserry side	1
11		Shoranoor side	5
12		Pattambi Town	192
13	Cherpulasserry side (Cherpulasserry, Mannarkkad)	Pattambi Town	68
14	Shoranoor side (Shoranur, Ottappalam, Palakkad)	Pattambi Town	184
Total			813

18.4.6.3 Access and Egress of Buses at bus Terminals

A count of buses entering/existing the Pattambi bus station were made during normal working day and it was observed that 639 entries and 823 exits were made during the period between 06.00 Hours and 22.00 Hours. The access-egress patterns of buses at the bus station are shown in Table 18.16.

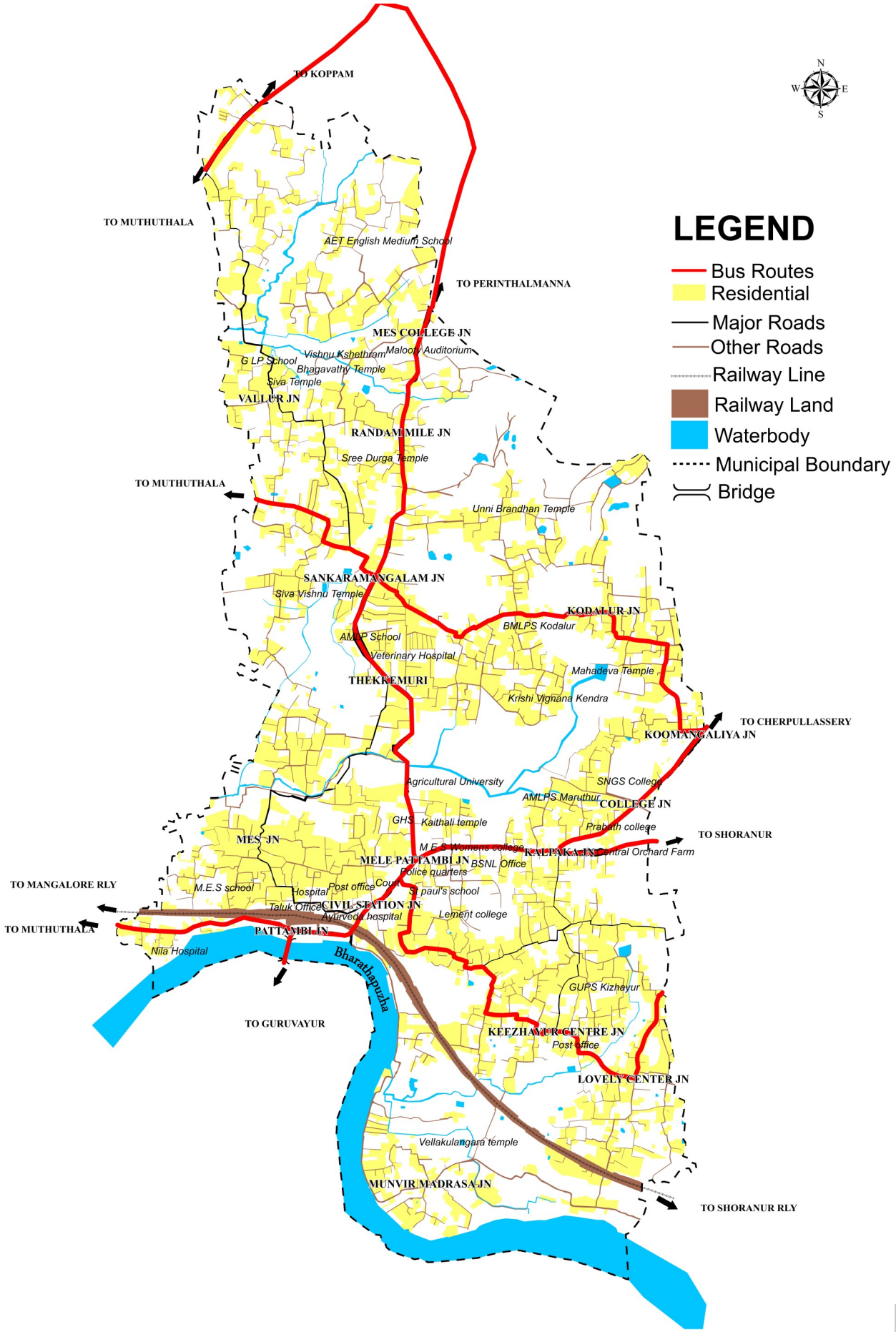


Fig. 18.24 Bus transport route in Pattambi town

18.4.6.4 Extent of Bus Passengers at Major Roads

Existing patronage for public transport buses on major travel corridors is shown in Table 18.17. Pattambi-Guruvayoor road passing through the CBD area of the town has the highest peak hour bus passengers in the town ranging between 3,000 and 4,000. On the SH corridor of Shoranur-Perinthalmanna, number of bus passengers varied between 1,500 and 2,700. Cherpulassery road had only less than 1,000 peak hour passengers in a day.

Table 18.16 Ingress and egress of buses at Pattambi bus station

Time		in	Out	Total
6.00	7:00	42	35	77
7.00	8:00	65	71	136
8.00	9:00	53	86	139
9.00	10:00	31	26	57
10.00	11:00	64	58	122
11.00	12:00	51	50	101
12.00	13:00	30	53	83
13.00	14:00	42	62	104
14.00	15:00	19	46	65
15.00	16:00	40	86	126
16.00	17:00	58	76	134
17.00	18:00	51	67	118
18.00	19:00	57	53	110
19.00	20:00	29	29	58
20.00	21:00	7	19	26
21.00	22:00	0	6	6
Total		**639**	**823**	**1462**

Table 18.17 Peak hour bus passengers on major road stretches in Pattambi

HS No.	Homogeneous section		KSRTC buses	Private buses	Total Buses	No. of bus passengers
I. Shoranur to Perinthalmanna road						
1	Shoranur Border	Kalpaka Jn	9	39	48	2016
2	Kalpaka Jn	Mele Pattambi	11	53	64	2688
3	Mele Pattambi	Thekkemuri	8	29	37	1554
4	Thekkemuri	Sangaramangalam Jn	9	43	52	2184
5	Sangaramangalam Jn	Perinthalmanna Border	9	41	50	2100
II. Pattambi to Cherpulasserry road						
6	Kalpaka Jn	College Jn	1	21	22	924
7	College Jn	Cherpulasserry Border	2	18	20	840
III. Pattambi to Guruvayoor road						
8	Mele Pattambi	Civil Station Jn	19	80	99	4158
9	Civil Station Jn	Pattambi	14	101	115	4830
10	Pattambi	Guruvayoor Border	11	62	73	3066
IV. Pattambi to Muthuthala road						
11	Pattambi Jn	Bus Station	26	168	194	8148
12	Bus Station	Muthuthala Border	0	13	13	546
V. Pattambi to Perumudiyoor						
13	Civil Station Jn	Perumudiyoor	0	0	0	0
VI. Sangaramangalam to Koomangaliya						
14	Sangaramangalam Jn	Koomangaliya	0	1	1	42
VII. Manjalangal - Keezhayur - Mele Pattambi						
15	Manjalangal	Kondoorkara	0	0	0	0
16	Kondoorkara	Lovely corner	0	0	0	0
17	Lovely Corner	Keezhayoor	0	0	0	0
18	Keezhayoor	Mele Pattambi	0	0	0	0
VIII. Other roadxs						
19	Sangaramangalam Jn	Muthuthala Panchayat	0	1	1	42
20	Sangaramangalam Jn	Mele Parakkadu	0	0	0	0
21	MES Jn	Thekkemuri	0	0	0	0
22	Koppam	Muthuthala Border	0	0	0	0
23	Njangattiri	V K Kadavu	0	13	13	546
24	Amayur	Kurumbully	0	0	0	0
25	thekkemuri	Chorakkunnu	0	0	0	0

18.4.7 Accident Prone Locations

Accident data for the last three years namely 2013, 2014 and 2015 were collected from State Crime Records Bureau, Thiruvananthapuram to assess the accident scenario in Pattambi town, locations of accidents, and accident severity. Details of accident reported according to accident severity during the last three years are given in Table 18.18. It could be seen that 42 accidents were reported in the year 2013, which increased to 49 in 2014 and then decreased to 41 in 2015. In the case of accident victims, the increase was from 65 to 67 and decrease to 45 during the same period. More than half of the total accidents were found to be grievous ones, followed by simple ones (26%) in the year 2015. Fatalities were reported in the case of eight per cent of accidents.

Table 18.18 Growth in accidents in Pattambi town

Year	No. of accidents				No. of casualities			
	Fatal	Grievous	Simple	Total	Fatal	Grievous	Simple	Total
2013	8	24	10	42	8	27	30	65
2014	3	35	11	49	3	36	28	67
2015	7	23	11	41	7	23	15	45

Major accident prone locations in Pattambi town are given in Table 18.19. It could be seen that the highest number of nine accidents were reported at the central area of Pattambi town, followed by seven accidents at Sangaramangalam and four accidents in Mele Pattambi and in that order. Accident prone locations are marked in Fig. 18.25.

Table. 18.19 Major accident prone locations in Pattambi town in 2015

Sl. No.	Accident prone location	No. of accidents in 2015
1	Pattambi	9
2	Sankaramangalam	7
3	Mele Pattambi	4
4	Thekkumuri	4
5	Kalpaka	2
6	Karimbulli	2
7	Peradiyur	2
8	Alex jn	1
9	Alikkaparambu	1
10	Asharipadi	1
11	Juma Masjid	1
12	Kairali	1
13	Kizhayur	1
14	Kozhikkattiri	1
15	Manjalungal	1
16	Onnamthipadi	1
17	Private Bus Station	1
18	Railway Station	1
19	Vallur	1

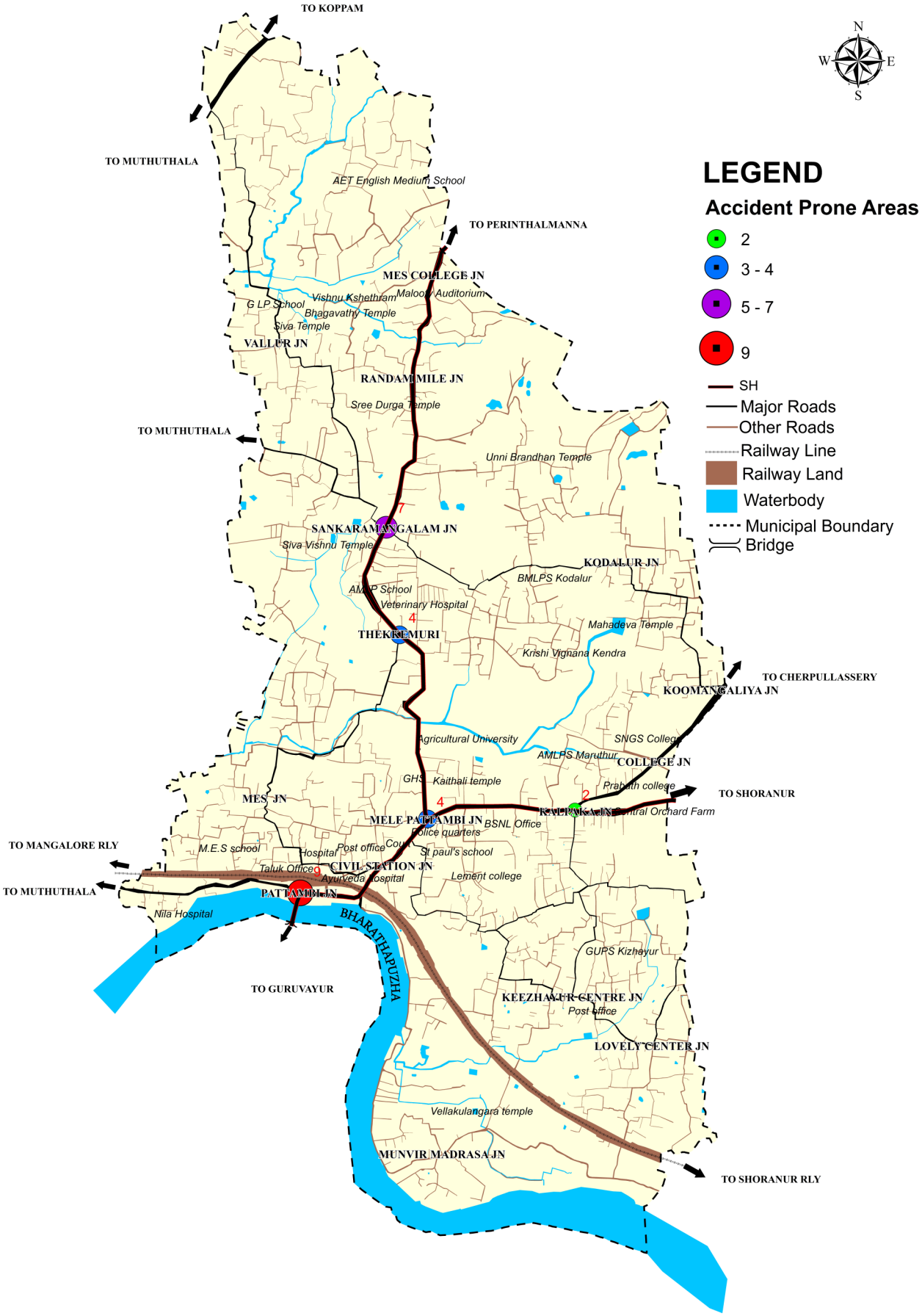


Fig. 18.25 Major accident prone locations in Pattambi town

18.4.8 Base Year Intercity Travel Characteristics

Base year inter-city travel characteristics of passenger and goods movements were obtained by conducting origin-destination survey on a sample basis at four outer cordon locations in Pattambi Town. During the OD survey, buses were not stopped due to practical difficulty and hence, OD pattern of buses were estimated from OD pattern of other vehicle types.

18.4.8.1 Sample Size of Vehicles Interviewed

A total of 5,459 vehicles of various categories were interviewed as part of OD survey which constituted 9.2 per cent of the total vehicles passing through the survey locations. Sample size of vehicles interviewed at various survey stations according to vehicle type are given in Table 18.20.

Table 18.20 Sample size of vehicle interviewed at outer cordon survey locations in Pattambi town

Sl.No	Type of vehicle	No. of total vehicles		No. of sample vehicles		Sample size	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
All locations							
1	Mini-bus/ Car	9651.73361	11170.8193	845	778	8.754904	6.964574181
2	Pass. Auto	5511.5738	5353.92571	190	123	3.447291	2.297379655
3	Two Wheeler	17549.5134	16640.8256	1352	978	7.703917	5.877112266
4	MAT/ Truck	2769.65715	2960.82709	174	307	6.282366	10.36872438
5	Mini-truck	1162.34541	1394.33751	275	215	23.65906	15.41950917
6	Goods auto	801.306647	850.266628	99	123	12.35482	14.46605052
	Total	37446.13	38371.0018	2935	2524	7.837926	6.577884025
1. Guruvayoor road							
1	Mini-bus/ Car	2621.6063	3549.13302	118	170	4.501057	4.789902178
2	Pass. Auto	1421.64284	1165.85483	18	22	1.266141	1.887027391
3	Two Wheeler	4690.8541	4882.91636	322	169	6.864422	3.461046379
4	MAT/ Truck	666.673365	761.810064	32	44	4.799952	5.775717871
5	Mini-truck	227.488909	418.326826	69	56	30.33115	13.38666241
6	Goods auto	196.565541	232.089434	37	17	18.82324	7.32476256
2. Muthuthala road							
1	Mini-bus/ Car	880.471082	897.950794	61	79	6.928109	8.797809472
2	Pass. Auto	1184.70237	1118.73599	50	35	4.220469	3.128530808
3	Two Wheeler	2982.30019	2290.07577	168	169	5.633236	7.379668489
4	MAT/ Truck	109.51433	285.545074	1	5	0.913123	1.751037036
5	Mini-truck	68.2466726	61.9275362	4	18	5.861092	29.06622982
6	Goods auto	87.6256028	93.5462516	5	13	5.706095	13.89686895
3. Perinthalmanna road							
1	Mini-bus/ Car	2478.72837	3213.12369	188	153	7.584534	4.761721446
2	Pass. Auto	623.330282	839.940435	48	6	7.700572	0.714336368
3	Two Wheeler	2924.7721	3475.22397	336	108	11.48807	3.107713373
4	MAT/ Truck	749.268172	777.615119	76	71	10.14323	9.130480916
5	Mini-truck	416.68732	315.02902	83	37	19.91901	11.74494973
6	Goods auto	150.035275	174.128531	32	24	21.32832	13.78292223
4. Cherpulasserry road							
1	Mini-bus/ Car	1240.57623	1139.81517	110	75	8.866847	6.580014209
2	Pass. Auto	949.108148	876.410502	39	37	4.109121	4.221765931
3	Two Wheeler	3191.70141	2754.22625	213	248	6.673557	9.004343789
4	MAT/ Truck	458.879612	430.681605	6	23	1.307532	5.340372035
5	Mini-truck	214.850636	203.47619	19	33	8.843353	16.21811374
6	Goods auto	152.75274	156.305129	9	29	5.891875	18.55345383
5. shoranur road							
1	Mini-bus/ Car	2430.35163	2370.79667	368	301	15.14184	12.69615417
2	Pass. Auto	1332.79016	1352.98395	35	23	2.62607	1.69994625
3	Two Wheeler	3759.88561	3238.38321	313	284	8.324721	8.769808316
4	MAT/ Truck	785.321671	705.175226	59	164	7.512845	23.25663098
5	Mini-truck	235.071872	395.577936	100	71	42.54018	17.94842271
6	Goods auto	214.327488	194.197282	16	40	7.465211	20.59761064

18.4.8.2 Zoning Pattern Adopted for the Study

For a meaningful analysis of O-D survey data, the study region was divided into 15 traffic zones, the boundaries of the zone corresponding to the boundary of one or more wards. In a similar way, outside study region was divided into 19 traffic zones, which include the immediate surrounding areas, adjoining Districts and neighboring States. The traffic-zoning pattern adopted for the study is given in Table 18.21. and geographically shown in Fig. 18.26.

Table 18.21 Zoning pattern adopted for the study in Pattambi town

Zone No.	Zone Name	Description			
1	Vallur area	Wards	1	2	3
2	Nediyamkunnu area	Wards	4	5	6
3	Thottungal city	Wards	27	28	
4	Sangaramangalam	Wards	7		
5	Thekkumuri	Wards	8		
6	Vadakkemuri	Wards	26		
7	Chorakunnu	Wards	9	22	
8	College	Wards	10	12	
9	Mele Pattambi	Wards	11	13	17
10	Kaithali	Wards	21		
11	Pattambi town	Wards	20		
12	Civil Station	Wards	23		
13	Kozhikunnu	Wards	24	25	
14	Nambram	Wards	18	19	
15	Keezhayoor	Wards	14	15	16
16	Towards Thirumittacode - Palakkad District	Arangottukkara			
17	Towards Guruvayoor - Palakkad District	Mezhathur, Vavanoor, Koottanad, Karukaputhur, chalisserry			
18	Towards Thrithala - Palakkad District	Thrithala, V K Kadavu, Kannur, Koodalur			
19	Towards Muthutuala - Palakkad District	Puthiya gate, Kodumunda, Pallipuram, Perumudiyur, Mammipadi, Muthuthala			
20	Towards Perinthalmanna - Palakkad District	Amayur, Koppam, thiruvegapuram, Puthiya road, Naduvattom			
21	Towards Cherupulasserry - Palakkad District	Cherpulasserry, Koomangalya, Vallappuzha, Choorakkode			
22	Towards Shoranoor - Palakkad District	Manjalingal, Ongallur, Ottappalam, Shoranur, Palakkad, Vadanamkurissi, Karakkad, Kondoorkara			
23	Towards Thirumittacode - Other District				
24	Towards Guruvayoor - Other District	Chavakkad, Kunnamkulam, Guruvayoor, Thrissur			
25	Towards Thrithala - Other District	Edappal, Ponnani			
26	Towards Muthutuala - Other Districts				
27	Towards Perinthalmanna - Other Districts	Pulamanthol, Perinthalmanna, Kozhikode, Valancherry			
28	Towards Cherupulasserry - Other Districts				
29	Towards Shoranoor - Other Districts	Cheruthuthy, Thrissur, Kochi			
30	Towards Guruvayoor - Other States				
31	Towards Muthutuala - Other States				
32	Towards Perinthalmanna - Other States				
33	Towards Cherupulasserry - Other States				
34	Towards Shoranoor - Other States	Koyamputhur, Pollachi			

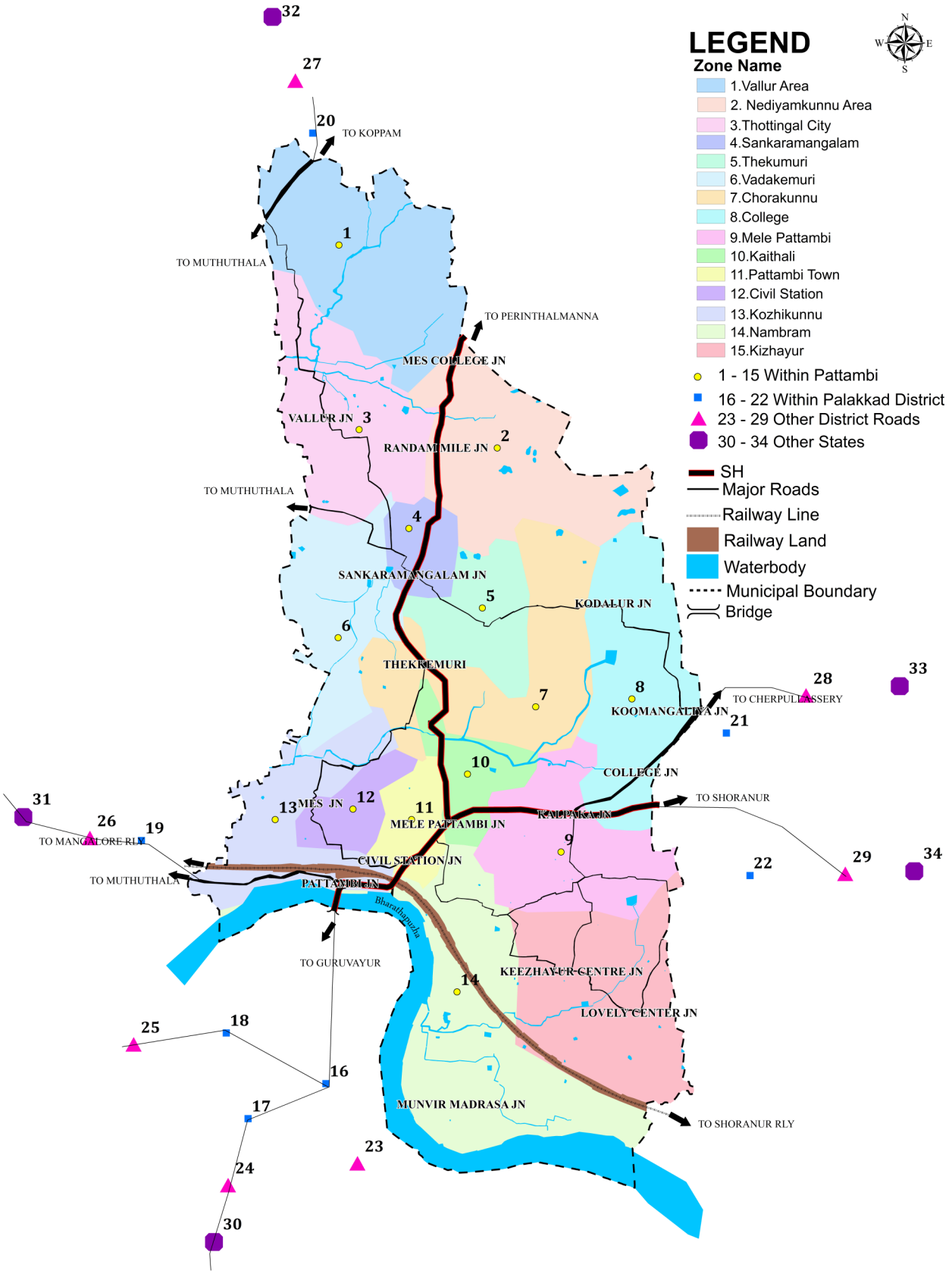


Fig. 18.26 Zoning pattern adopted for the Pattambi town.

18.4.8.3 Characteristics of Inter-city Passenger Traffic

18.4.8.3.1 Modal Split

The inter-city passenger transport in Pattambi town is predominantly met by road based KSRTC buses, private buses, mini-buses, and a host of personalized vehicles like four-wheelers, two-wheelers etc. An analysis of the O-D survey data collected from outer cordon survey locations revealed that an estimated two lakh inter-city passenger trips were performed in the study region on a reference day consisting of 1.1 lakh bus passenger trips (53%), 37,000 car trips (18%), 22,000 auto trips (11%), and 39,000 two-wheeler trips (19%). It could be inferred that public transport had a significant role in meeting the inter-city passenger demand. Table 18.22 gives the modal split of inter-city passenger traffic in Pattambi town.

Table 18.22 Modal split of inter-city daily passenger trips in Pattambi town

Sl. No.	Mode of travel	No. of passengers	% of passengers
1	Bus	110293.9406	52.8140353
2	Minibus/ Car	37217.77262	17.8216568
3	Autorikshaw	22283.00989	10.67017521
4	Two wheeler	39039.80353	18.6941327
	Total	**208834.5266**	**100**

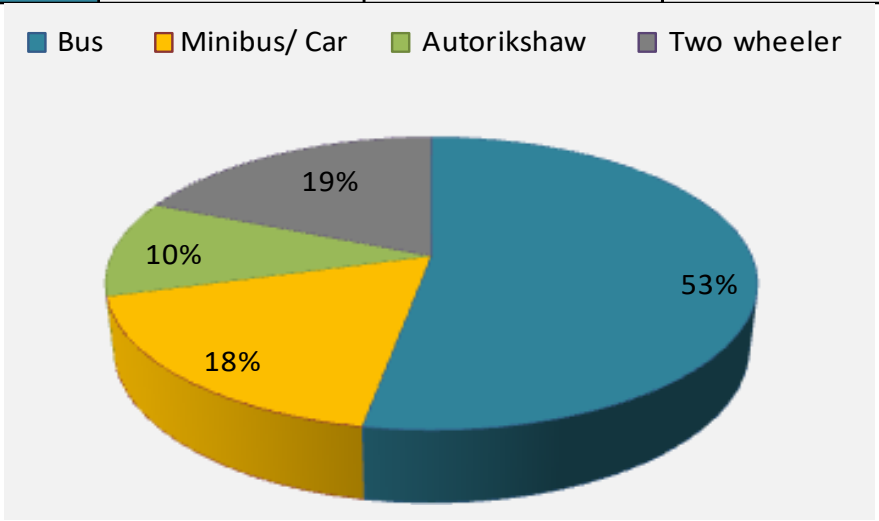


Fig. 18.27 Modal split of inter-city daily passenger trips in Pattambi town.

18.4.8.3.2 Purpose-wise Trips

Characteristics of passenger trips according to purpose of trips was analyzed and it was found out that highest number of the trips (40 per cent) were carried out for work related purposes, followed by 31% social purpose trips. Medical, Shopping and education trips were made by 9%, 6% and 5% of passengers respectively. Purpose wise trip distribution of inter-city passengers is given in Table 18.23.

Table. 18.23 Purpose split of inter-city daily passenger trips in Pattambi town.

Sl.No.	Purpose of trip	No. of passengers	Percent of passengers
1	Work	57399.49839	29.05563626
2	Business	22819.17504	10.92691683
3	Shopping	13026.12765	6.237535459
4	Medical	18853.26443	9.027848381
5	Social and recreation	65443.06537	31.3372824
6	Education	11674.83156	5.590469999
7	Others	19618.56421	9.394310664
	Total	**208834.5266**	**100**

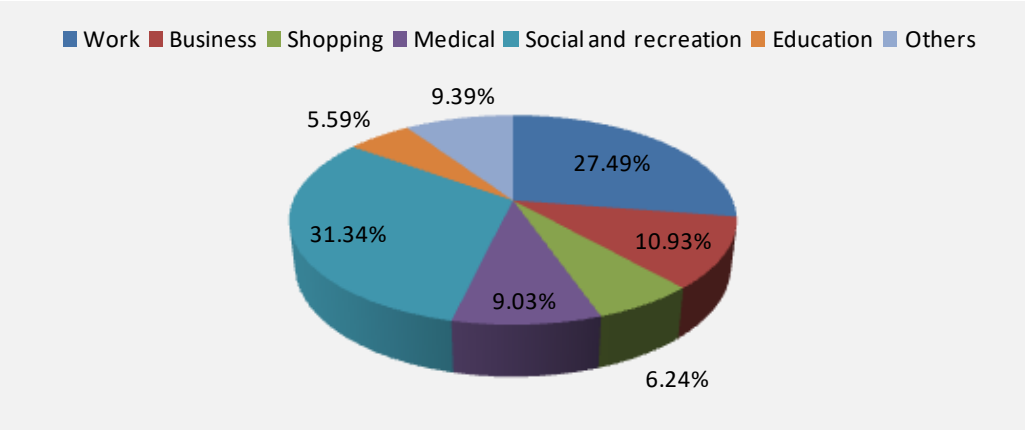


Fig. 18.28 Purpose split of inter-city daily passenger trips in Pattambi town

18.4.8.3.3 Occupation wise Trips

Characteristics of passenger trips according to occupation of trip maker was analyzed and it was found out 35% trip makers did not reveal their occupation and of the remaining trip makers, the highest number of the trips (58 per cent) were carried out by self employed people including cultivators, casual laborers etc, followed by 31% trip makers working in regular service. 11% of the people were found to be dependent people like retired, housewife, student, unemployed etc. Occupation wise trip distribution of inter-city passengers is given in Table 18.24.

Table. 18.24 Occupation wise trip distribution of passengers in Pattambi town.

Sl.No	Occupation	No. of passengers	Percent of passengers
1	Regular service	41976	20.11
2	Self employed	70830	33.93
3	Professional	1611	0.77
4	Cultivator	265	0.13
5	Casual labourers	5297	2.54
6	Retired	113	0.05
7	Unemployed	3817	1.83
8	Housewife	381	0.18
9	student	10653	5.10
10	Not reveal	73792	35.35
	Total	**208735**	**100**

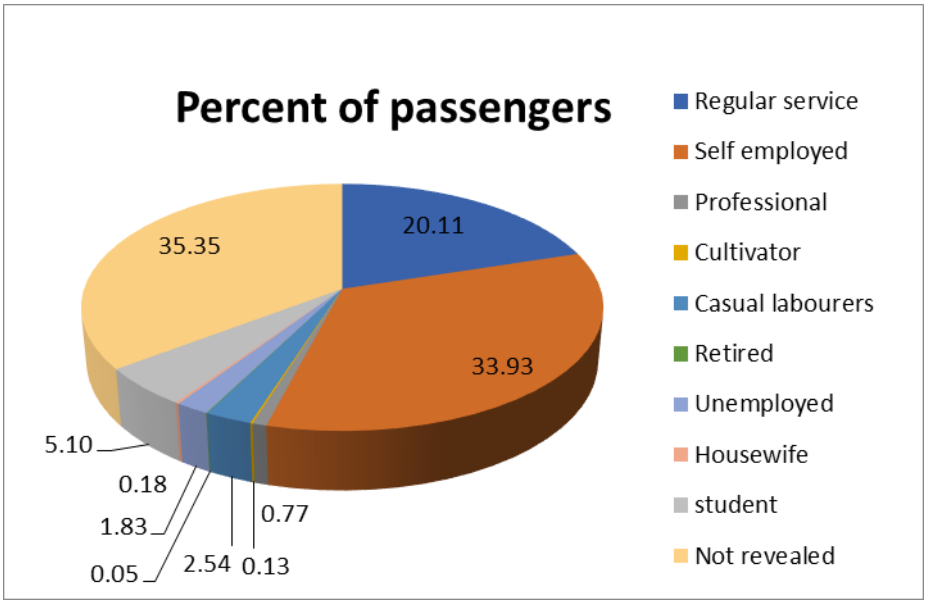


Fig. 18.29 Occupation wise distribution of trips in Pattambi town.

18.4.8.3.4 Origin-Destination of Passenger Trips

A total of 2.08 lakh passenger trips were performed as inter-city trips in the study region on a reference day. The major traffic generating zone within the study region was the town area with 44,000 trips, followed by Mele Pattambi area with 15,000 trips. In the case of external zones, Shoranur side of Palakkad district had the maximum generation of trips (30,000), followed by Cherpulassery side with 19,000 trips, Muthuthala side with 18,000 trips, Perinthalmanna side with 16,000 trips and Guruvayoor side with 14,000 trips.

Other districts and States together had a share of only 28,000 trips in the trip generation, of which Perinthalmanna side had the dominant share of 13,000 trips and Guruvayoor side with 8,000 trips. In the case of trip attraction also, Town zone had the maximum with about 68,000 trips. Mele Pattambi area had trip attraction of 12,000 trips and other zones had trips below 2,400.

Of the zones located outside Pattambi Town but within Palakkad district, Perinthalmanna side had the maximum attraction of 19,500 trips, followed by Guruvayoor side with 17,000 trips, Muthuthala, Shoranur and Cherpulasserry with 15,000 trips each. Other districts and States together had attracted more than 29,000 trips of which Perinthalmanna had the highest share of 13,500 trips, and Guruvayoor side with 7,600 trips.

The origin-destination matrix of inter-city passenger trips is shown in Table 18.25. Desire lines of inter-city passenger traffic is shown in Figure 18.30.

Table 18.25 Origin-destination matrix of inter-city passenger trips in Pattambi town.

O/D		1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	Vallur area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88	0	0	0	0	0	0	0	0
2	Nediyamkunnu area	0	0	0	0	0		0	0	0	0	0	0	0	0	32	0	103	57	3574	375	0	0	0	0	0	629	0	0
3	Thottungal city	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Sangaramangalam	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1136	0	41	0	0	0	0	89	0	0
5	Thekkumuri	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	0	0	0	0
6	Vadakkemuri	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	337	0	0	0	0
7	Chorakunnu	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	College	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	236	297	543	72	0	0	0	0	0	0	0
9	Mele Pattambi	0	0	0	0	0		0	0	0	0	0	0	0	0	282	1899	694	2697	2163	3460	1836	0	61	133	203	940	0	0
10	Kaithali	0	0	0	0	0		0	0	0	0	0	0	0	0	0	61	0	0	136	151	72	0	194	0	0	0	0	0
11	Pattambi town	0	0	0	0	0		0	0	0	0	0	0	0	0	211	9333	1756	8788	5672	8445	4286	184	1994	555	281	2250	0	254
12	Civil Station	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	328	0	0	0	0	0	0	0	0	0	0
13	Kozhikunnu	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Nambram	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Keezhayoor	0	0	0	0	0		0	0	0	0	0	0	0	0	0	272	0	0	136	0	245	0	0	0	0	890	0	0
16	Towards Thirumittacode - Palakkad District	0	0	0	0	0		0	0	434	0	1280	0	0	0	0	0	44	81	68	206	506	0	0	0	0	316	0	187
17	Towards Guruvayoor - Palakkad District	0	0	0	154	0		0	0	2558	31	7289	0	0	203	15	0	46	441	318	674	1207	0	0	0	0	764	0	45
18	Towards Thrithala - Palakkad District	0	0	0	123	31		0	0	869	0	8416	0	0	62	0	15	0	549	296	331	1077	0	44	0	0	191	0	48
19	Towards Muthutuala - Palakkad District	0	184	0	0	0		0	0	1268	0	12315	0	0	188	178	770	157	0	328	582	921	0	208	158	358	244	0	12
20	Towards Perinthalmanna - Palakkad District	1938	28	46	852	55		0	0	111	55	7384	0	18	18	74	575	143	91	0	370	1950	31	897	518	55	9	0	0
21	Towards Cherupulasserry - Palakkad District	0	175	0	31	0		0	1629	326	52	12226	0	0	558	134	1124	302	638	515	0	645	31	769	336	324	94	0	0
22	Towards Shoranoor - Palakkad District	0	51	0	331	70		0	51	5154	95	11584	53	0	0	359	1994	1379	825	1586	668	0	0	975	1597	101	2656	0	0
23	Towards Thirumittacode - Other District	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Towards Guruvayoor - Other District	0	0	0	0	0		0	0	283	0	2397	0	0	0	0	0	22	45	1110	664	500	0	0	0	12	3217	0	92
25	Towards Thrithala - Other District	0	0	0	0	0		0	0	31	0	468	0	0	0	0	0	0	72	45	269	769	0	0	0	14	205	0	33
26	Towards Muthutuala - Other Districts	0	0	0	0	0		0	0	151	0	464	0	0	0	0	31	0	0	34	19	0	0	76	0	0	34	0	0
27	Towards Perinthalmanna - Other Districts	295	0	0	463	0		37	0	0	0	3366	0	0	0	178	1708	248	164	1107	134	1761	0	2251	354	18	0	0	561
28	Towards Cherupulasserry - Other Districts	0	0	0	0	0		0	0	0	0	127	0	0	0	0	24	24	0	0	0	0	0	0	0	0	0	0	0
29	Towards Shoranoor - Other Districts	98	0	0	0	0		0	56	545	0	583	0	0	0	0	0	84	0	654	0	14	0	0	106	0	713	0	0
30	Towards Guruvayoor - Other States	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Towards Muthutuala - Other States	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Towards Perinthalmanna - Other States	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Towards Cherupulasserry - Other States	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158	0	0	0	0	0
34	Towards Shoranoor - Other States	0	0	0	0	0		0	0	56	0	28	0	0	0	0	58	7	0	45	0	0	0	0	0	0	190	0	0
Total		**2331**	**437**	**46**	**1955**	**156**		**37**	**1736**	**11786**	**233**	**67926**	**53**	**18**	**1029**	**1464**	**17864**	**5009**	**15014**	**19422**	**16979**	**15903**	**245**	**7628**	**4094**	**1367**	**13429**	0	**1233**

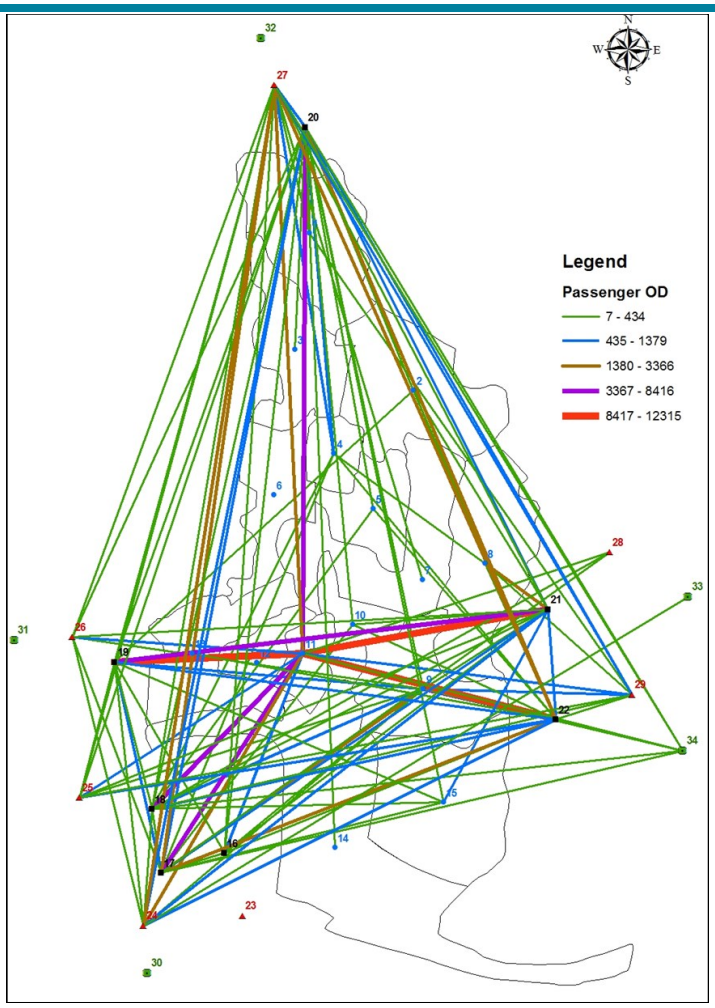


Fig. 18.30 Desire lines of inter-city passengers in Pattambi town

18.4.8.3.5 Pattern of Inter-City Passenger Trip

The O-D pattern of inter-city passenger traffic revealed that out of 2.08 lakh inter-city passenger trips, three fourth were external to internal and internal to external trips. External–external trips to the tune of 52,000 were performed through the study region and they constituted 25% per cent of the total trips. It could be inferred that Pattambi town being located at the middle of major travel corridors connecting Guruvayoor, Shoranur and Perinthalmanna, substantially higher share of external-external trips are performed through the Town. Pattern of inter-city passenger trips are given in Table 18.26.

Table. 18.26 Pattern of inter city passenger movements through in Pattambi.

Sl No	Pattern of movement	No. of passengers	Percent of passengers
1	Internal to Internal	1725.19065	0.83
2	Internal to External	86828.53017	41.58
3	External to Internal	68363.96958	32.74
4	External to External	51916.83624	24.86
	Total	**208834.5266**	**100**

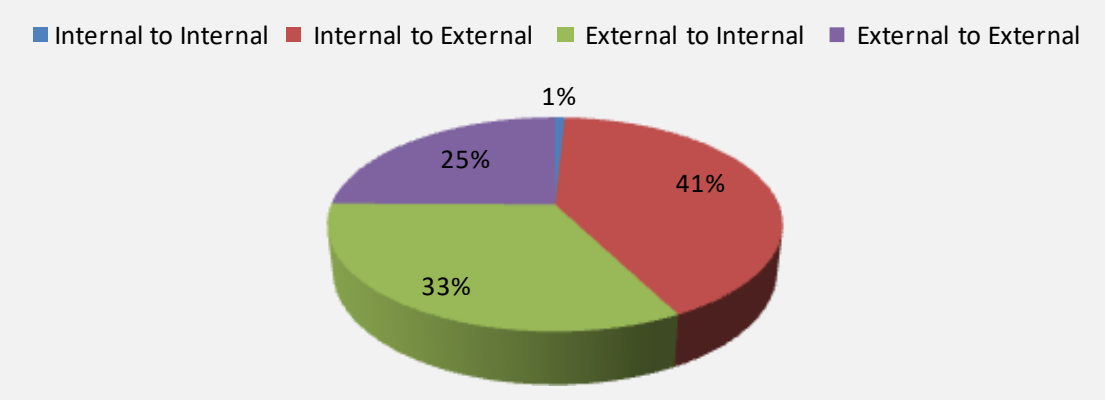


Fig. 18.31 Pattern of inter city passenger movements through in Pattambi.

18.4.8.4 Characteristics of Inter-city Goods Traffic

18.4.8.4.1 Volume of Goods Vehicles at Outer Cordon Points

Goods vehicles to the tune of about 2,500 each passed through the three outer cordon locations of Pattambi town namely Shoranur road, Perinthal-manna road and Guruvayoor road on a reference day. 1,500 goods vehicles passed through Cherpulassery road and only 706 through Muthuthala road (Table 18.29).

18.4.8.4.2 Modal Split of Goods Traffic

A total of 6,842 goods vehicles were found to be involved in carrying goods traffic to and from the study region, consisting of 3,719 trucks, 1,813 mini-trucks and 1,310 goods autos. The quantum of goods handled by these goods vehicles was 13,600 tonnes. Trucks carried the maximum volume of goods traffic (88%), followed by mini-trucks (10%). The remaining two per cent of goods traffic was handled by goods autos. Modal Split of inter-city goods traffic in Pattambi town is shown in Fig. 18.32. and Table 18.27.

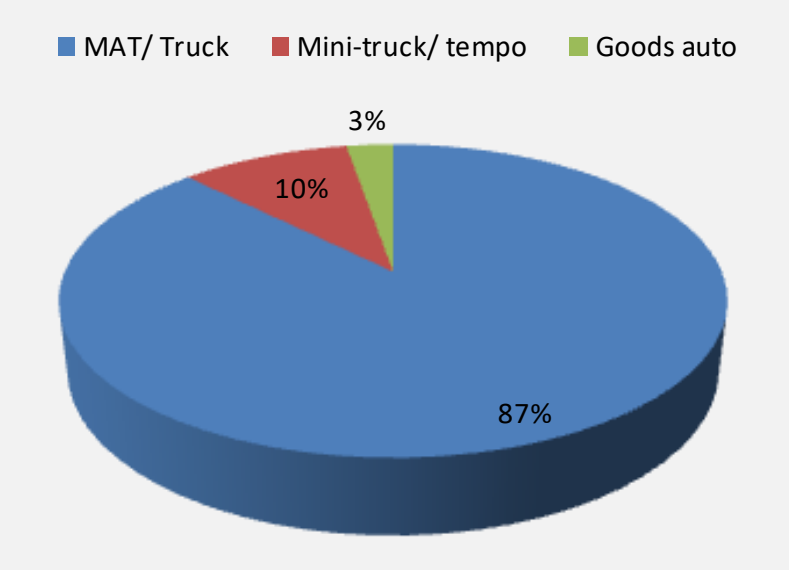


Fig. 18.32 Modal split of inter-city goods traffic in Pattambi.

Table 18.27 Modal split of inter-city goods traffic in Pattambi.

Sl. No.	Type of vehicle	No. of vehicles	Quantum of goods (Tons)	Share (%)
1	MAT/ Truck	3719.428182	11933.49599	88
2	Mini-truck/ tempo	1812.530475	1335.680393	10
3	Goods auto	1309.757755	368.9594293	3
	Total	**6841.716412**	**13638.13581**	**100**

18.4.8.4.3 Composition of Goods Carried

Out of the 13,638 MT of inter-city goods traffic observed through outer cordon survey stations, construction materials as a whole were carried in large quantities to the extent of 64% of total goods traffic in the region, followed by 15% of industrial goods, 12% of agricultural products, and five percent of food grains, three percent of petroleum products and five percent of other commodities. In the case of individual commodities, the maximum volume of goods movements were observed in the case of earth and gravel which amounted to 23 per cent., followed by cement (12%), and provision (12%). Commodity wise distribution of goods traffic in tonnes are given in Table 18.28.

Table. 18.28 Distribution of inter-city goods traffic in tonnes according to commodity carried in Pattambi.

No	Commodity		Vehicle type			Total	Share (%)
			Truck	Mini-truck	Auto		
1	**Food grains**	Wheat	-	14	-	14	0.07
2		Rice & paddy	677	21	-	698	3.74
5	**Agricultural products**	Fruits & vegetables	170	23	25	218	1.17
6		Milk & milk products	249	82	54	386	2.07
7		Coconut & copra	145	55	6	206	1.10
8		Meat	95	-	4	99	0.53
9		Fish	397	8	-	406	2.18
10		Eggs	94	5	1	100	0.54
13		Sugar	-	1	-	1	0.00
16		Soda & drinks	124	13	-	137	0.73
17		Provisions	54	41	17	113	0.60
18		Hay	-	9	6	16	0.08
20	**Construction materials**	Cement	57	-	2	59	0.32
22		Earth & gravel	-	55	0	56	0.30
24		Brick & tiles	164	-	-	164	0.88
25		Granite & rubbles	2,261	249	22	2,532	13.58
27		Asbestos sheets	1,410	110	48	1,569	8.41
28		Paints & varnish	3,180	51	53	3,284	17.61
29		Timber	288	26	2	316	1.69

Table 18.28 Continued..

No	Commodity		Vehicle type			Total	Share (%)
			Truck	Mini-truck	Auto		
30	Industrial goods	Firewood	256	35	-	291	1.56
31		Bamboo & wood	282	8	6	296	1.59
32		Furniture	115	47	3	165	0.89
33		Steel machinery	8	13	-	21	0.11
36		Electrical goods	437	110	29	576	3.09
37		Tyres & tubes	158	26	12	195	1.05
38		Spare parts	455	4	-	459	2.46
39		Chemicals & Drugs	19	29	0	49	0.26
40		Medicines	-	10	7	17	0.09
41		Fertilisers	36	27	-	63	0.34
42		Soap	-	1	4	5	0.03
44		Glass	24	16	-	39	0.21
46		Ready-made garments	59	19	-	78	0.42
47		Stationery & paper	484	39	32	554	2.97
49	Petroleum products	Motor spirit (Petrol)	16	153	12	180	0.96
51		LPG	219	20	20	260	1.39
53	Miscellaneous	Empty bags, tins & battles	-	16	-	16	0.08
54		Parcel	-	0	1	1	0.01
56		Miscellaneous	-	-	1	1	0.00
		Total	**11,933**	**1,336**	**369**	**13,638**	**73.12**

18.4.8.4.4 O-D of Goods Transportation

Inter-city movement of goods to the tune of 13,638 MT was carried out over the study region. The major traffic generator of goods traffic within the study region was the Town area with 1,527 tonnes most of them bound for other districts within the State. Among the zones outside the study region but within Palakkad district, traffic generation was high from Shoranur side with 3,820 tonnes, Cherpulasserry side (881 tonnes) and Perinthalmanna side with 712 tonnes each. Other districts and States together had generated 5,000 tonnes of goods traffic, of which other districts generated 2,700 MT and other States 2,300 MT.

Similarly in the case of goods traffic attraction, Town area had the dominant share with 3,000 tonnes. Among the external zones, while Perinthalmanna, Guruvayoor and Cherpulasserry sides of Palakkad district attracted about 1,100 tonnes each while Shoranur side attracted about 800 MT. All other districts and States together attracted only 5,000 tonnes and major share was held by Perinthalmanna side with 3,400 MT. The origin-destination matrix of inter-city goods traffic is shown in Table 18.29. Desire lines of inter-city goods traffic is shown in Fig. 18.33.

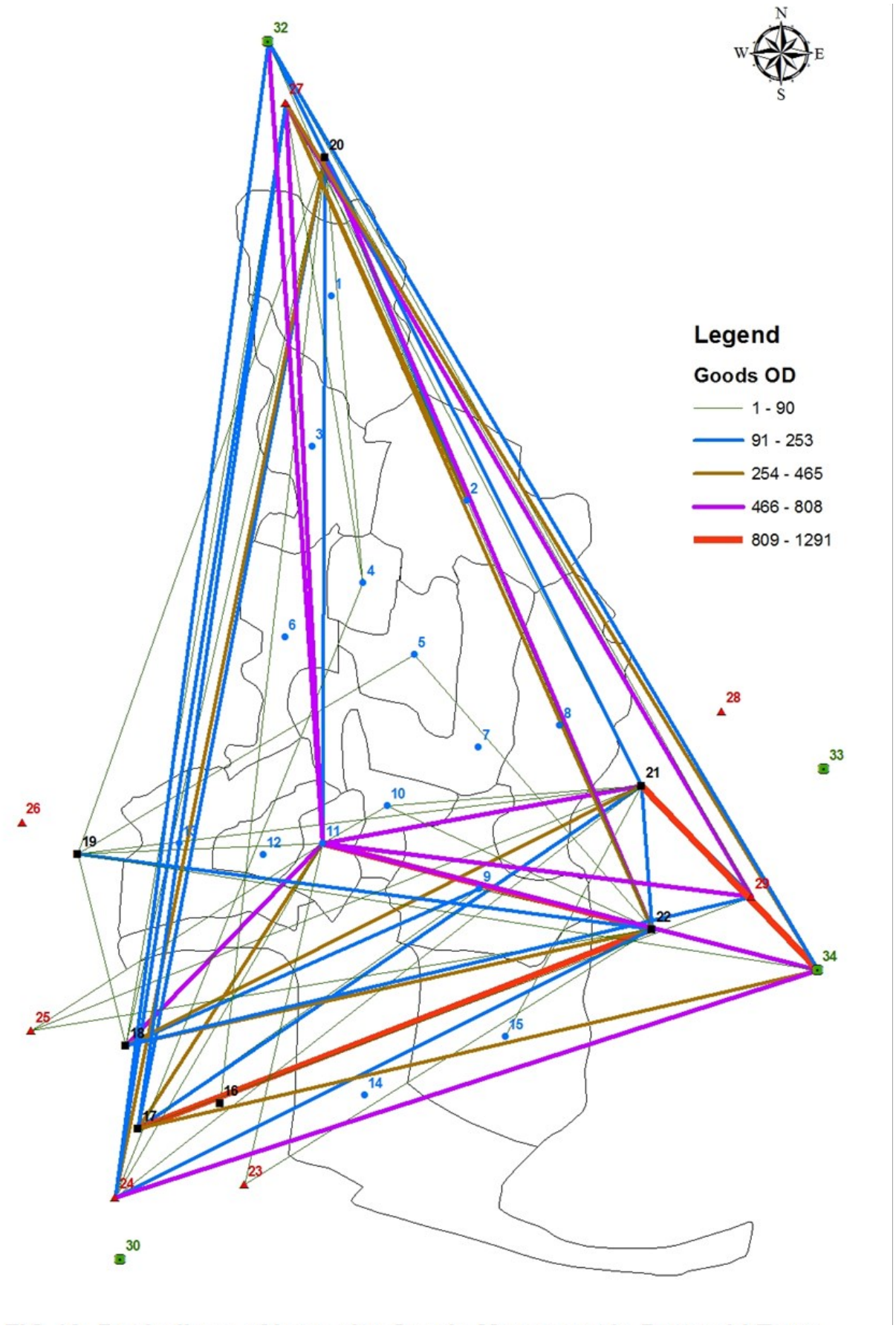


Fig. 18.33 Desire lines of inter-city goods movement in Pattambi town

Table 18.29 Origin-destination matrix of inter-city goods traffic carried in Pattambi.

O/D		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Total
1	Vallur area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2	Nediyamkunnu area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	10	0	0	0	0	0	165	0	0	0	0	0	0	0	**290**
3	Thottungal city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4	Sangaramangalam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	0	0	15	0	30	0	0	0	0	28	0	0	0	0	0	0	0	**142**
5	Thekkumuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6	Vadakkemuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7	Chorakunnu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8	College	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
9	Mele Pattambi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	22	0	0	173	0	0	0	0	0	0	0	0	0	**206**
10	Kaithali	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11	Pattambi town	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	132	30	19	352	357	82	0	0	7	0	346	1	1	0	0	0	131	57	**1527**
12	Civil Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
13	Kozhikunnu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
14	Nambram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
15	Keezhayoor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	15	0	0	0	0	0	0	0	0	0	0	**20**
16	Towards Thirumittacode - Palakkad District	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
17	Towards Guruvayoor - Palakkad District	0	0	0	0	0	0	0	0	1	0	181	0	0	0	0	0	0	0	0	65	1	23	0	0	0	0	1	0	2	0	0	0	0	0	**274**
18	Towards Thrithala - Palakkad District	0	0	0	0	0	0	0	0	104	0	299	0	0	0	0	0	0	0	0	5	5	20	0	0	0	0	0	0	0	0	0	0	0	6	**440**
19	Towards Muthutuala - Palakkad District	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	23	0	0	0	0	0	0	5	0	0	0	0	55	**89**
20	Towards Perinthalmanna - Palakkad District	0	50	0	18	0	0	0	0	0	0	127	0	0	0	0	10	55	6	22	0	0	200	0	166	0	0	3	0	13	0	0	0	0	41	**712**
21	Towards Cherupulasserry - Palakkad District	0	0	0	0	0	0	0	0	0	7	392	0	0	0	34	0	69	137	11	11	0	37	0	7	78	0	85	0	13	0	0	0	0	0	**881**
22	Towards Shoranoor - Palakkad District	0	0	0	0	2	0	0	0	1	16	645	0	0	0	0	0	539	174	106	303	57	0	3	60	159	1	1659	0	95	0	0	0	0	0	**3820**
23	Towards Thirumittacode - Other District	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	34	**43**
24	Towards Guruvayoor - Other District	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	232	11	115	0	0	0	0	655	0	0	0	0	47	0	0	**1095**
25	Towards Thrithala - Other District	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	41	0	0	0	0	5	0	0	0	0	0	0	0	**51**
26	Towards Muthutuala - Other Districts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
27	Towards Perinthalmanna - Other Districts	0	153	0	6	0	0	0	0	0	0	264	0	0	0	0	0	59	6	0	0	29	191	0	75	0	0	0	0	35	0	0	0	19	49	**886**
28	Towards Cherupulasserry - Other Districts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
29	Towards Shoranoor - Other Districts	0	0	0	0	0	0	0	0	0	0	272	0	0	0	0	0	1	80	0	5	80	0	0	0	0	0	292	0	0	0	0	63	0	0	**793**
30	Towards Guruvayoor - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
31	Towards Muthutuala - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
32	Towards Perinthalmanna - Other States	0	0	0	0	0	0	0	0	0	0	404	0	0	0	0	0	0	0	0	0	79	45	0	89	0	0	0	0	17	0	0	0	0	0	**634**
33	Towards Cherupulasserry - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
34	Towards Shoranoor - Other States	0	0	0	0	0	0	0	0	0	0	359	0	0	0	0	0	213	0	3	0	551	0	0	328	0	0	165	0	0	0	0	115	0	0	**1734**
Total		0	**204**	0	**24**	**5**	0	0	0	**106**	**34**	**2983**	0	0	0	**34**	**10**	**1138**	**433**	**160**	**1104**	**1196**	**839**	**3**	**741**	**417**	**1**	**3405**	**2**	**181**	0	0	**225**	**150**	**242**	**13638**

18.4.8.4.5 Pattern of Goods Traffic

A further study of the goods traffic pattern observed within the study region vis-a-vis the outside study region revealed that 3,400 tonnes of traffic originated from the study region and 2,200 tonnes of traffic terminated in the study region. More than 8,000 MT of traffic (59%) are of divertible nature, which are passing through the CBD area of the town due to non-availability of bypass. (Table 18.30.)

Table. 18.30 Pattern of goods movements in Pattambi.

Sl No	Pattern of move-ment	Quantum (MT)	Share (%)
1	Internal to Internal	11.43702539	0.08
2	Internal to External	3387.851838	24.84
3	External to Internal	2175.158382	15.95
4	External to External	8063.688563	59.13
	Total	13638.13581	100

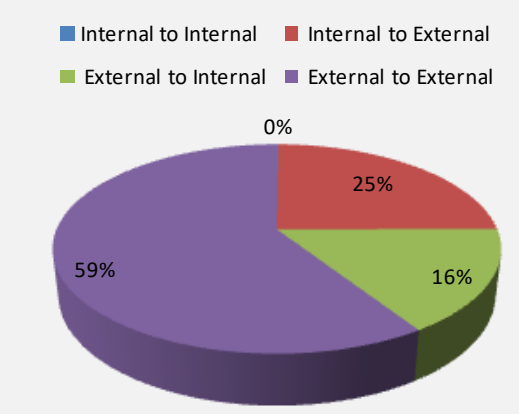


Fig. 18.34 Pattern of inter city goods movements in Pattambi.

18.4.8.5 Inter-city Vehicular Move-ments

Pattern of inter-city vehicular movements through Pattambi Town is obtained by analyzing the origin-destination movements of vehicular traffic at the outer cordon survey locations. It could be seen that 16,000 PCU of through vehicles passed along Pattambi Town, of which bulk of movements were be-tween Guruvayoor side and Perin-thalmanna side (3,148 PCU), Guruvayoor and Cherpulasserry (741 PCU), and Thrithala and Cherpu-lasserry (515 PCU). Movement pat-tern of inter-city vehicles through various exit points of Pattambi Town are presented in Table 18.31. and Fig. 18.35.

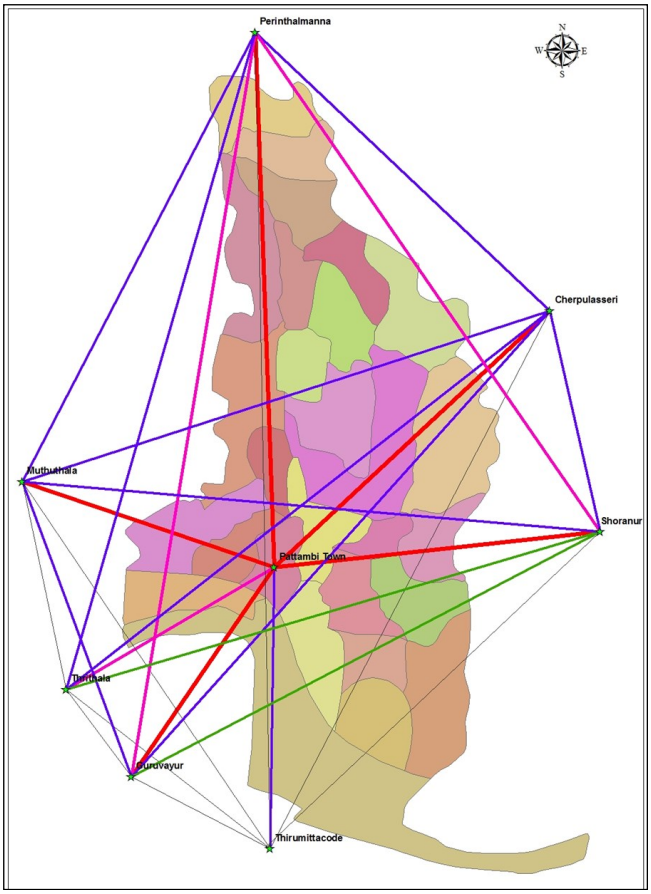


Fig. 18.35 Intercity vehicular move-ments PCU in Pattambi town.

Table. 18.31 Pattern of intercity vehicular movements in Pattambi town.

O/D		1	2	3	4	5	6	7	8	Total
		Pattambi Town	Thirumittacode side	Guruvayoor side	Thrithala side	Muthuthala side	Perinthalmanna side	Cherpulasserry side	Shoranur side	
1	Pattambi Town	24.8575	184.1110128	3369.71431	904.4366	2505.66789	4079.162	3703.140357	1998.229	16769
2	Thirumittacode side	337.1725	0	0	10.43863	20.3113394	71.50255439	36.63716426	160.1933	636.26
3	Guruvayoor side	2738.571	34.89228143	8.48094615	20.19527	161.285233	1610.246673	319.429441	786.4814	5679.6
4	Thrithala side	2400.742	0	45.330908	0	188.14437	174.7810448	177.9494693	621.7385	3608.7
5	Muthuthala side	2806.964	38.37851972	205.273447	81.39376	44.4169645	112.4151388	90.22131923	381.6825	3760.7
6	Perinthalmanna side	4054.353	94.21474235	1537.3064	279.5291	283.605165	96.64419432	248.7635419	1751.992	8346.4
7	Cherpulasserry side	3988.873	63.98716198	427.61308	336.9665	344.461092	189.8253606	11.27796574	232.2299	5595.2
8	Shoranur side	3984.825	74.89533112	1210.5387	695.3107	287.842681	2023.09415	317.2293834	31.48073	8625.2
Total		20336.36	490.4790494	6804.25779	2328.271	3835.73473	8357.671116	4904.648642	5964.028	53021

18.4.8.6 Intermediate Public Transport (IPT) Operations

IPT modes consist of autorikshaws and taxis. There are 11 auto stands and six taxi stands located within the municipal limit of Pattambi town. The share of IPT modes especially autorikshaws in the city road network comes around 16.44% and varies from 8.5% to 25% during peak hours (Table 18.32). Concentration of IPT modes is found to be as high as 19% in the CBD areas of Pattambi town. The share of IPT passengers in the inter-city passenger traffic was only 11% (Table 18.22).

Table 18.32 Extent of IPT operations in Pattambi.

HS No.	Homogeneous section		Total vehicles	No. of autos	%
	I. Shoranur to Perinthalmanna road				
1	Shoranur Border	Kalpaka Jn	1593	173	10.86
2	Kalpaka Jn	Mele Pattambi	2734	512	18.73
3	Mele Pattambi	Thekkemuri	1771	246	13.89
4	Thekkemuri	Sangaramangalam Jn	1647	167	10.14
5	Sangaramangalam Jn	Perinthalmanna Border	1432	121	8.45
	II. Pattambi to Cherpulasserry road				
6	Kalpaka Jn	College Jn	1239	223	18.00
7	College Jn	Cherpulasserry Border	1040	134	12.88
	III. Pattambi to Guruvayoor road				
8	Mele Pattambi	Civil Station Jn	2619	518	19.78
9	Civil Station Jn	Pattambi	2371	462	19.49
10	Pattambi	Guruvayoor Border	1485	184	12.39
	IV. Pattambi to Muthuthala road				
11	Pattambi Jn	Bus Station	1603	401	25.02
12	Bus Station	Muthuthala Border	913	208	22.78
	V. Pattambi to Perumudiyoor				
13	Civil Station Jn	Perumudiyoor	797	170	21.33
	VI. Sangaramangalam to Koomangaliya				
14	Sangaramangalam Jn	Koomangaliya	154	26	16.88
	VII. Manjalangal - Kizhayur - Mele Pattambi				
15	Manjalangal	Kondoorkara			
16	Kondoorkara	Lovely corner			
17	Lovely Corner	Keezhayoor			
18	Keezhayoor	Mele Pattambi			
	VIII. Other roadxs				
19	Sangaramangalam Jn	Muthuthala Panchayat	507	82	16.17
20	Sangaramangalam Jn	Mele Parakkadu			
21	MES Jn	Thekkemuri			
22	Koppam	Muthuthala Border			
23	Njangattiri	V K Kadavu	330	28	8.48
24	Amayur	Kurumbully			
25	thekkemuri	Chorakkunnu			

Table 18.33 Location of IPT stands in Pattambi town

Sl. No.	Road name	Auto Stand	Taxi Stand
1	Ongallooor to Ongalloor Karakkad Jn	LHS	RHS
2	Kalpaka to Melepattambi	LHS	LHS
3	Sangaramangalam to Mele pattambi	RHS	-
4	Mele Pattambi to Police station	LHS	RHS
5	Police Station to Civil Station	LHS	RHS
6	Civil station to Pattambi	-	RHS
7	Pattambi to Pattambi BS	RHS	-
8	Pattambi BS to Muthuthala Border	LHS	RHS
9	Mele Kodumunda to Muthuthala Pt	RHS	-
10	Muthuthala to Parakkode	LHS	-
11	Koottayiparambu to Kurumbully	RHS	
12	Thirumittacode to Koottupatha	RHS	

18.4.8.7 Characteristics of Rail Users

Pattambi railway station is located on the Mangalore-Shoranur rail line which traverses through the CBD of Pattambi town. The daily inbound and outbound passengers in these stations were surveyed as well as supported by secondary data on season tickets and information available at stations.

18.4.8.7.1 First mile/ last mile Connectivity of Rail Users

Table 18.34 shows travel mode used by rail commuters to access the railway stations and egress from the stations. Out of the daily rail passengers of 4,000, lion's share of about 35% opted bus as the mode for trips from first origin to origin as well as from destination to final destination located within the town. Walking was the mode of trip for a little below one fourth of rail passengers for the first mile connectivity and about 15% for the last mile connectivity.

Table 18.34 Distribution of rail passengers according to mode used by first mile/last mile connective to Pattambi station.

Sl. No.	Mode	Direction (%)	
		First Mile connectivity	Last Mile connectivity
1	Bus	37	34
2	Car	17	9
3	Auto	9	23
4	Two wheeler	12	18
5	Cycle	0	0
6	Walk	24	15
	Total	100	100

18.4.8.7.2 Origin Destination Matrix of Rail Users

An origin – destination matrix of sample rail passengers of Kannur is shown in Table 18.35. Places of Origin and destination refer to the first origin and final destination of the passenger, not necessarily the railway stations. It could be seen that out of 27% of the rail users originated from Pattambi Town area while 41% from other areas within Palakkad district and 29% from other districts and 3% from other States. Within Pattambi Town, bulk of the passengers were from Town area.

In the case of terminating rail passengers, 18% of the rail passengers had their destination in Pattambi Town while other places within Palakkad district surrounding had a share of 29%, other districts 45% and other States 8%.

Table. 18.35 Distribution of inter city passengers traffic according to its origin and destination in Pattambi town.

O/D		4	5	9	11	16	17	18	19	20	21	22	24	27	29	32
1	Vallur area	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2	Nediyamkunnu area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Thottungal city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Sangaramangalam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Thekkumuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Vadakkemuri	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7	Chorakunnu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	College	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Mele Pattambi	0	0	0	0	0	0	1	0	0	0	1	0	3	2	0
10	Kaithali	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
11	Pattambi town	0	0	0	0	2	1	4	3	0	0	7	1	56	8	0
12	Civil Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Kozhikunnu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Nambram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Keezhayoor	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0
16	Towards Thirumittacode - Palakkad District	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
17	Towards Guruvayoor - Palakkad District	0	0	0	2	0	0	1	0	0	0	2	0	8	1	0
18	Towards Thrithala - Palakkad District	0	0	0	0	1	0	0	0	0	0	2	0	15	1	1
19	Towards Muthutuala - Palakkad District	0	0	0	5	0	0	1	0	0	2	6	0	5	5	0
20	Towards Perinthalmanna - Palakkad District	0	0	0	0	0	0	1	0	0	0	2	0	7	5	0
21	Towards Cherupulasserry - Palakkad District	0	0	0	2	0	0	5	1	0	0	2	1	13	4	0
22	Towards Shoranoor - Palakkad District	0	0	1	8	0	3	0	8	4	1	0	0	11	4	0
23	Towards Thirumittacode - Other District	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
24	Towards Guruvayoor - Other District	0	0	0	1	0	0	0	0	0	0	0	0	2	2	0
25	Towards Thrithala - Other District	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
26	Towards Muthutuala - Other Districts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Towards Perinthalmanna - Other Districts	4	1	5	25	0	5	1	3	3	5	8	0	4	4	0
28	Towards Cherupulasserry - Other Districts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Towards Shoranoor - Other Districts	2	0	0	9	0	0	1	4	3	4	2	0	1	0	0
30	Towards Guruvayoor - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Towards Muthutuala - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Towards Perinthalmanna - Other States	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
33	Towards Cherupulasserry - Other States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Towards Shoranoor - Other States	0	0	0	1	0	1	0	0	1	1	0	1	1	0	0
Total		6	1	6	54	4	10	15	20	11	15	35	3	131	38	1

18.4.8.7.3 Trip Purpose of Rail Users

An analysis of rail passenger characteristics has revealed that 27% each of rail users in Pattambi Town had undertaken their trips for work and education purpose, closely followed by 19% of users for social and recreation purposes and 15% for business purposes 5% each of the rail users had shopping and medical as their purpose and hardly 1% of them had other purposes for their travel trip.

Table. 18.36 Distribution of rail passengers according to purpose of trip in Pattambi.

Sl. No.	Purpose	% of trips
1	Work	27.44
2	Business	15.57
3	Shopping	5.01
4	Social	19.00
5	Medical	4.75
6	Education	27.18
7	Others	1.06
	Total	100

18.5 TRAFFIC PROJECTION

The fundamental principle of urban transportation planning is to formulate a long-term transportation plan serving the community in the future. Thus it becomes necessary to forecast the future travel pattern for the horizon year. Traffic projection helps in evaluating the shortfall in the pattern of road network and accordingly plan the road network improvements, augment the facilities such as providing new roads, developing missing links, bypass road etc. This section gives an overview of various techniques available for traffic projections and the methodology adopted for this study.

18.5.1 Methods of Traffic Projection

For projecting the future demand, various methods of traffic projection including statistical, econometrical and mathematical models are available. These could be judiciously utilized depending upon the level of accuracy warranted and the extent of database available. Various methods of traffic projection employed in the transport planning include;

- Growth factor methods
- Regression method based on economic indicators like population, per - capita income growth rate and growth rate in industrial sector and land use parameter.
- Interpolation method based on past trend in traffic growth rates.

The relationship established between the various economic indicators for passenger and goods traffic movement can be used to estimate the future demand in an area. Also the growth rate of vehicular population in the area over the years will give a good estimate of the future trips. The traffic volume on links from the past years can be used to establish a growth rate for prediction of the future volume on links.

18.5.2 Techniques Adopted for Projection

Traffic projections were carried out according to the growth rates worked out on the following basis:

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

The growth rates estimated as per the above basis are:

Table 18.37 Growth rate estimated.

Methods	Annual growth rate (%)
Studies conducted by NATPAC in similar towns in Kerala in the past (Peak hour traffic growth)	3 to 6
Growth rate of Motor vehicles registration in Palakkad district during 2014-15	10
Biannual traffic count on major roads by PWD during 2007-08 (growth in AADT)	13.5

The impact of annual traffic growths on peak hour traffic were estimated based on the peak hour factors on daily traffic. On the basis of a critical evaluation of the above growth rates and also factors such as moderation in traffic growth over the years due to development in transportation sector, the following growth rates (Table 18.38) were adopted for the study area for different categories of roads viz. arterial, sub-arterial and collector roads.

Table 18.38 Growth rate adopted for traffic projection in Pattambi town

Sl. No.	Hierarchy of road	Traffic growth rate (%)	
		Up to 2026	Beyond 2026
1	Arterial	5	4
2	Sub-Arterial	4	3
3	Tertiary	3	2

18.5.3 Projected Link Volume on Existing Network

Table 29.13 presents the estimated daily traffic and Volume-capacity ratio for different horizon years on various road stretches in Pattambi Town.

It can be seen that all the major road corridors like Guruvayoor road, Muthuthala road, Perinthalmanna road, Cherpulasserry road and Shoranur road would be severely congested in the horizon year with the anticipated traffic more than the capacity of the roads under “do-nothing option” Fig. 29.2 .

The projected traffic on the existing road network implies that the existing road network would not be able to handle the traffic in the horizon years without upgradation of the transport infrastructure facilities. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, flyovers, bypasses and link roads is a must considering the dramatic increase in the traffic volume.

18.6 PROBLEMS AND POTENTIALS

Pattambi has a good network of roads connecting to the neighboring towns like Shoranur, Guruvayoor, Thrithala, Perinthalmanna and Cherpulassery. The State Highway No 23 from Shoranur to Perinthalmanna and SH 39 Perumbilavu-Nilambur passes through the town.

Like any urban centre in the State, with an unexpected growth of motor vehicles in Pattambi town the traffic problems are increased. The most important problem of Pattambi town is the traffic congestion at the central part of the town especially between Melepattambi Jn and Pattambi Jn and also between Pattambi Jn and Pattambi bus station.

It is caused by the inadequacy of road width which is not able to cater to the traffic generated by the large number of commercial establishments, public transport terminals-bus station and railway station and numerous public offices located in the close vicinity of the road stretch. The traffic problems get accentuated by conflicting movements of traffic at the major intersections like Melepattambi Jn, Civil Station Jn and Pattambi Jn as they are not having sufficient junction area to handle the conflicting movements.

Considerable parking and pedestrian activities are reported on the problematic road stretch which act as major external interference in the smooth operation of traffic flow in the town causing frequent traffic holdups. All the traffic have to pass through the congested CBD area of the town due to Inter-mixing of intra-city and inter-city traffic in the absence of adequate link roads and bypasses.

The location of bus stand within the central area of the city, results in movement of inter-city bus traffic on congested urban roads. Increase in personalized vehicles, encroachment of right-of-way, poor surface conditions, absence of proper traffic signs and markings are some other problems in the Pattambi town.

19

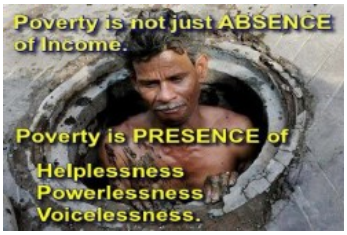
Special Concern Areas

19. SPECIAL CONCERN AREAS

Urbanization has some positive aspects including stimulation of economic activities, revitalization of social/cultural reform and contribution to economic/ social development, but these benefits will be unevenly distributed among certain groups rather than reaching all the people who live and work in the cities. This may result in social inequity, where the socially vulnerable (e.g. low-income groups) bears the most of the negative impacts of urbanization and rarely enjoys the benefits.

For successful and sustainable economic growth, a town needs inclusive development. The inclusive growth approach takes a longer-term perspective, as the focus is on productive employment as a means of increasing the incomes of poor and excluded groups and raising their standard of living. Hence it is essential to have an understanding of the urban poor and vulnerable section of the society.

19.1 SOCIAL BACKWARDNESS & POVERTY



Social backwardness is an issue when the people belonging to a certain group are considered inferior to other groups. This ultimately results in economic backwardness and because of this prejudice, the group is denied opportunities and face unequal treatment in all walks of life.

Social backwardness is the result of poverty to a large extent. Social backwardness which results from poverty is likely to be aggravated by considering their caste. This shows the relevance of both caste and poverty as determining factor of social backwardness of citizens. Poverty by itself is not the determining factor of social backwardness. Poverty is relevant in the context of social backwardness. Hence study of Social backwardness of Pattambi town is done based on BPL population and Scheduled caste and Scheduled tribe population.

19.1.1 BPL Index

Below Poverty Line (BPL) is an economic benchmark and poverty threshold used by Government of India to indicate the economic backwardness and to identify individuals and households in need of government assistance. Kerala is one of the states that had formulated its own criteria. In Kerala, there are nine parameters taken, and a family that lacks four or more parameters are classified as BPL (Table 19.1).

Table 19.1 List of parameters for classification of BPL

Sl. No	Parameters
1	No land or less than 5 cents of land
2	No house or dilapidated house
3	No sanitary latrine
4	Family without colour television
5	No regular employed person in the family
6	No access to safe drinking water
7	Women headed household or presence of widows or divorcee
8	SC and ST
9	Mentally retarded or disabled member in the family

Table 19.2 Ward wise number of BPL Households

SL.No.	Ward	SC	ST	General	Minority	Total No of BPL HHs
1	Vallur	94	0	62	45	201
2	Sangaramangalam	50	1	17	45	113
3	Thekkumuri	20	1	28	97	146
4	Kodallur center	37	0	91	30	158
5	Kodallur east	17	0	37	68	122
6	College	0	0	1	77	78
7	Mele Pattambi	35	0	7	50	92
8	Kondoorkkara	53	0	52	52	157
9	Kizhayoor	60	0	47	59	166
10	Aanthoorpalliyal	131	1	24	27	183
11	Town East	0	0	2	10	12
12	Town West	7	0	7	52	66
13	Kozhikunnu	42	0	3	79	124
14	Nethirimangalam	68	0	27	51	146
15	Pallipad	87	1	56	103	247
	Total	**701**	**4**	**461**	**845**	2011

Source: BPL survey, 2009

In Pattambi Town, 2011 families have been classified as BPL. Ward wise BPL households are shown in Table 19.2 and BPL population concentration is shown in Fig. 19.1. BPL index of wards 2, 4, 7, 8, 9, 10, 15 are equal to or greater than one in Pattambi municipality. The existing economic standard of people as obtained from the socio economic survey is an average monthly income of Rs 12,555 while the average monthly expenditure per house is Rs.

12,303. This gives an insight into the economic status of the people of Pattambi municipality. The earning capacity is very less. The BPL population is quite substantial and constitutes 34.11% of the total households in the municipality.

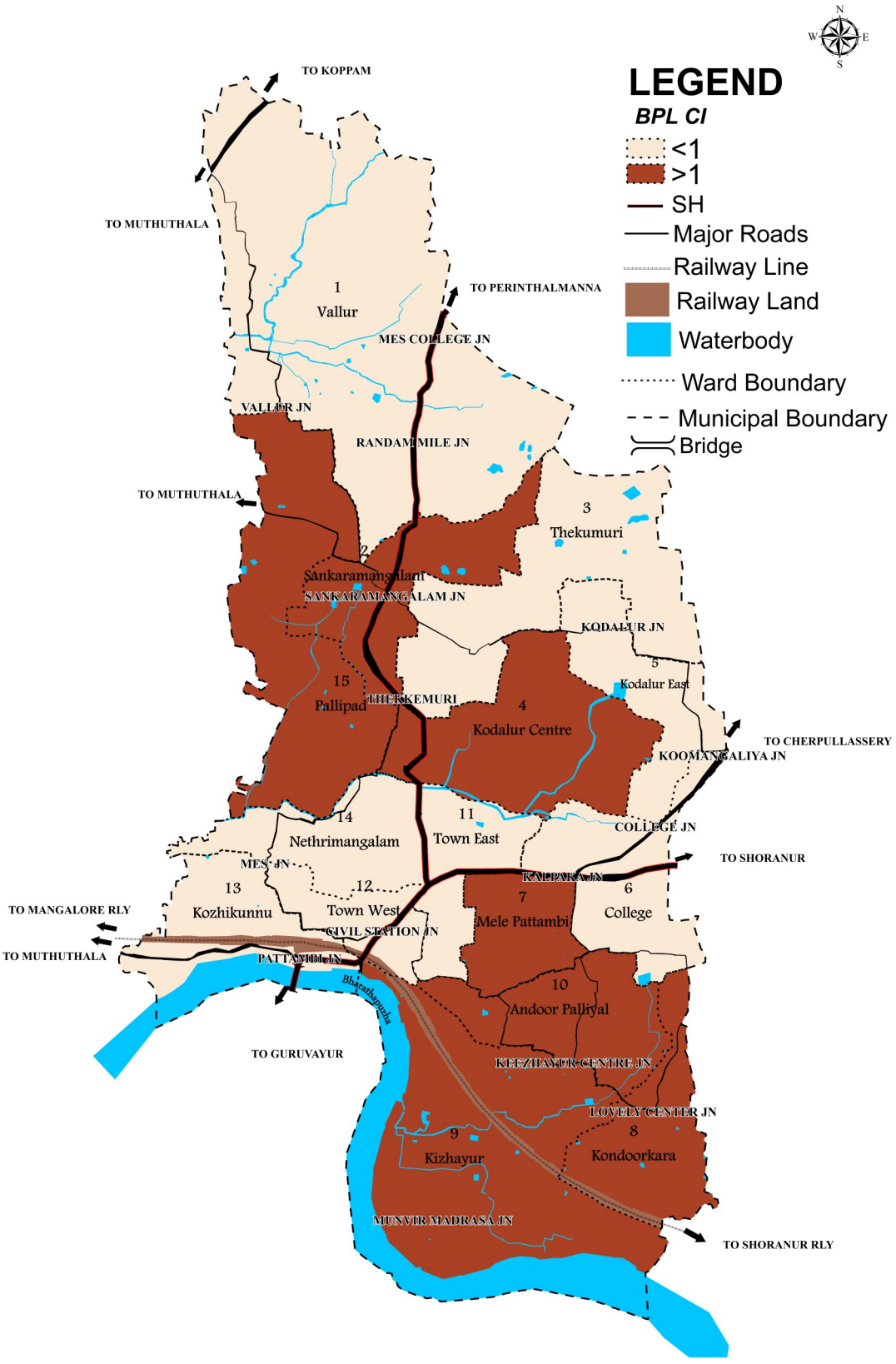


Fig 19.1 Ward wise BPL House holds concentration

Source: BPL survey, 2009

19.1.2 SC/ST Population Index

Palakkad is a socially backward district. According to the 2011 census, SC/ST population constitutes 16.11% of the total population in the district out of which 14.37% are SC's and the remaining 1.74% are ST's. SC population of Pattambi Town constitutes nearly 12.12% of the total population whereas ST population is very meagre and constitutes just 0.13% of the total population.

The temporal variation of SC/ST population from 1971 to 2011 is given in Fig. 19.2. The trends have shown that the SC population has increased over the years, but ST population has been fluctuating. The SC population has increased by 95.77% from 1971 to 2011. SC population growth rate was 44.56% in 1971-1981, 17.48% in 1981-1991, 11.22% in 1991-2001 and only 3.64% in 2001-2011. SC population growth rate is showing an inclining trend. But the ST population is far below the SC population.

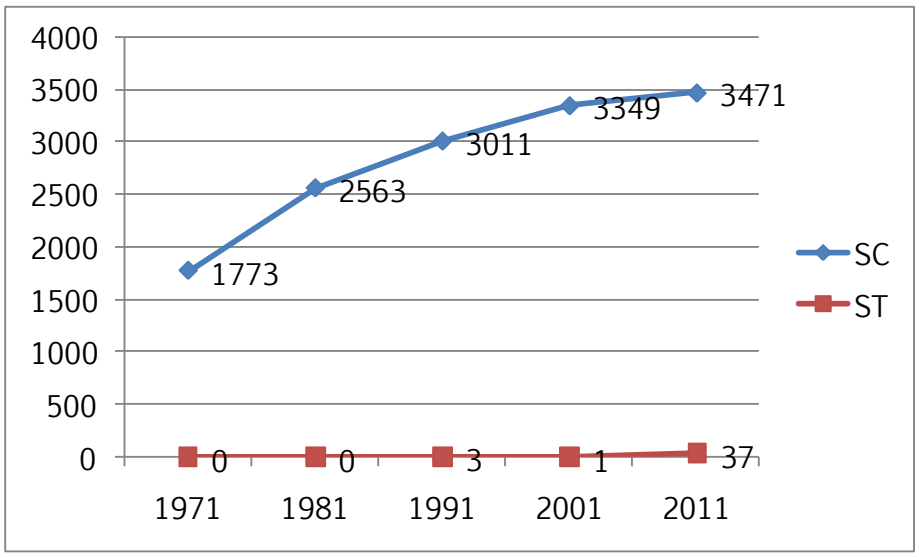


Fig 19.2 Temporal variation of SC/ST population *Source: Census 2011*

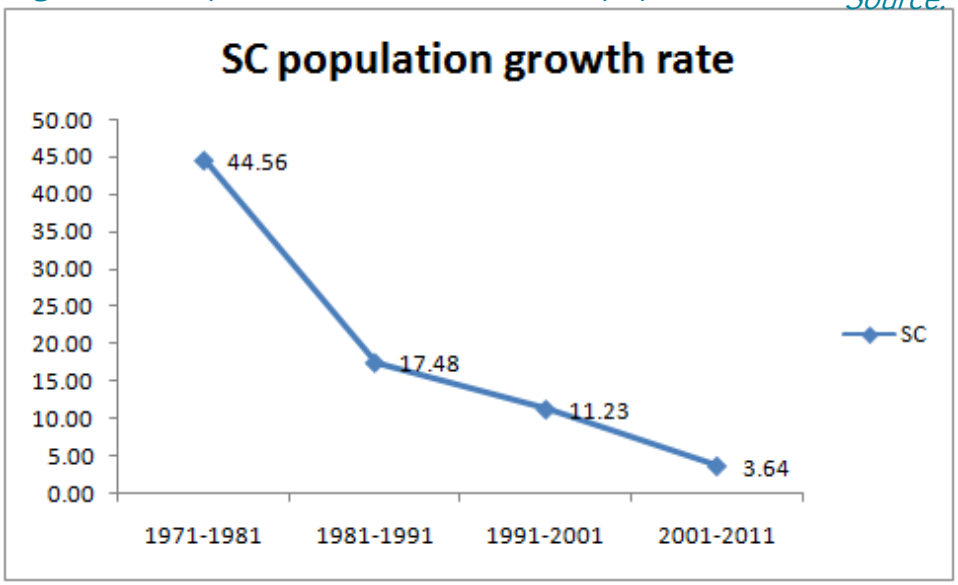


Fig 19.3 Temporal variation of increase in SC population *Source: Census 2011*

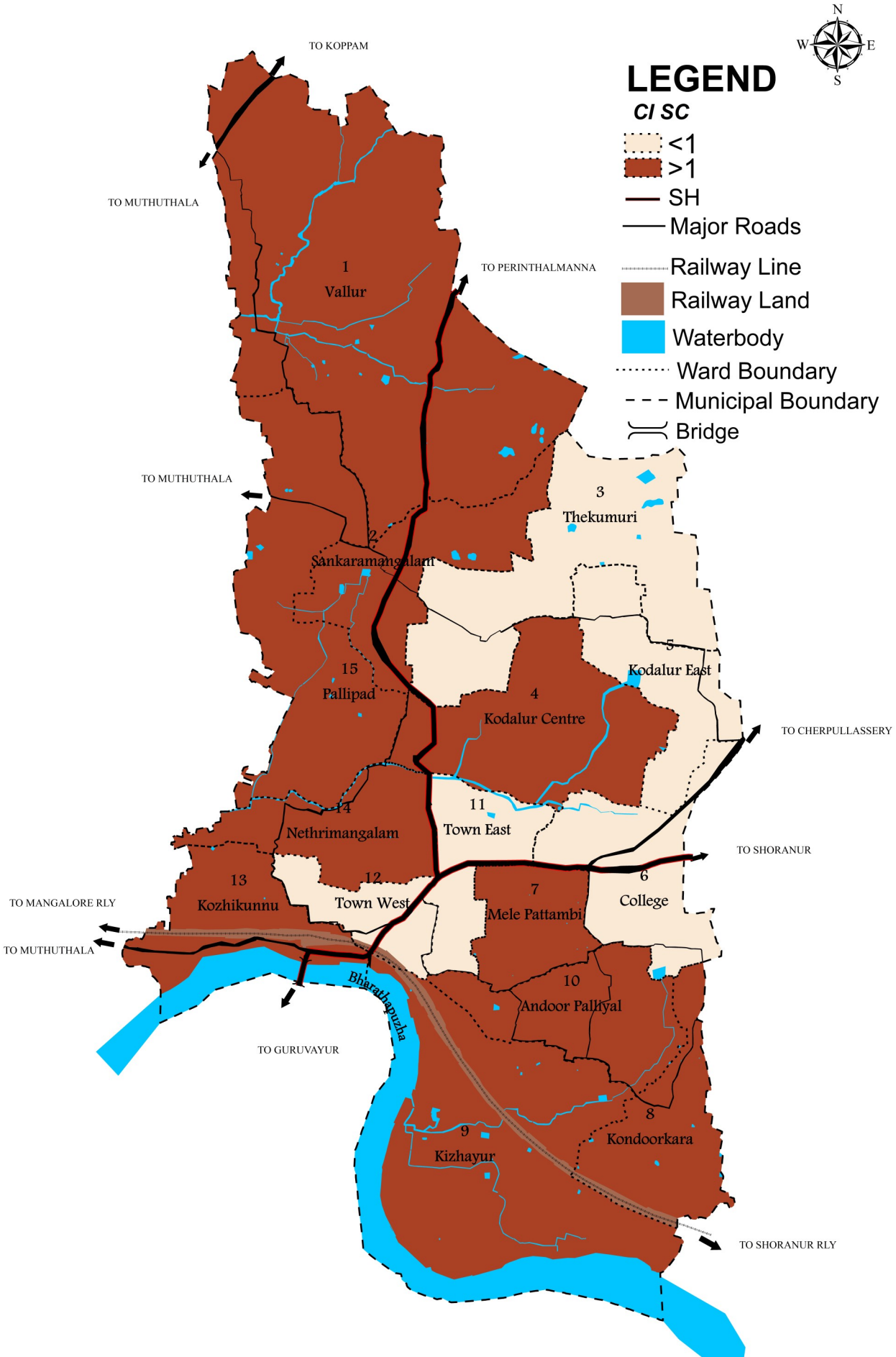


Fig 19.4 Concentration Index of Scheduled Caste population

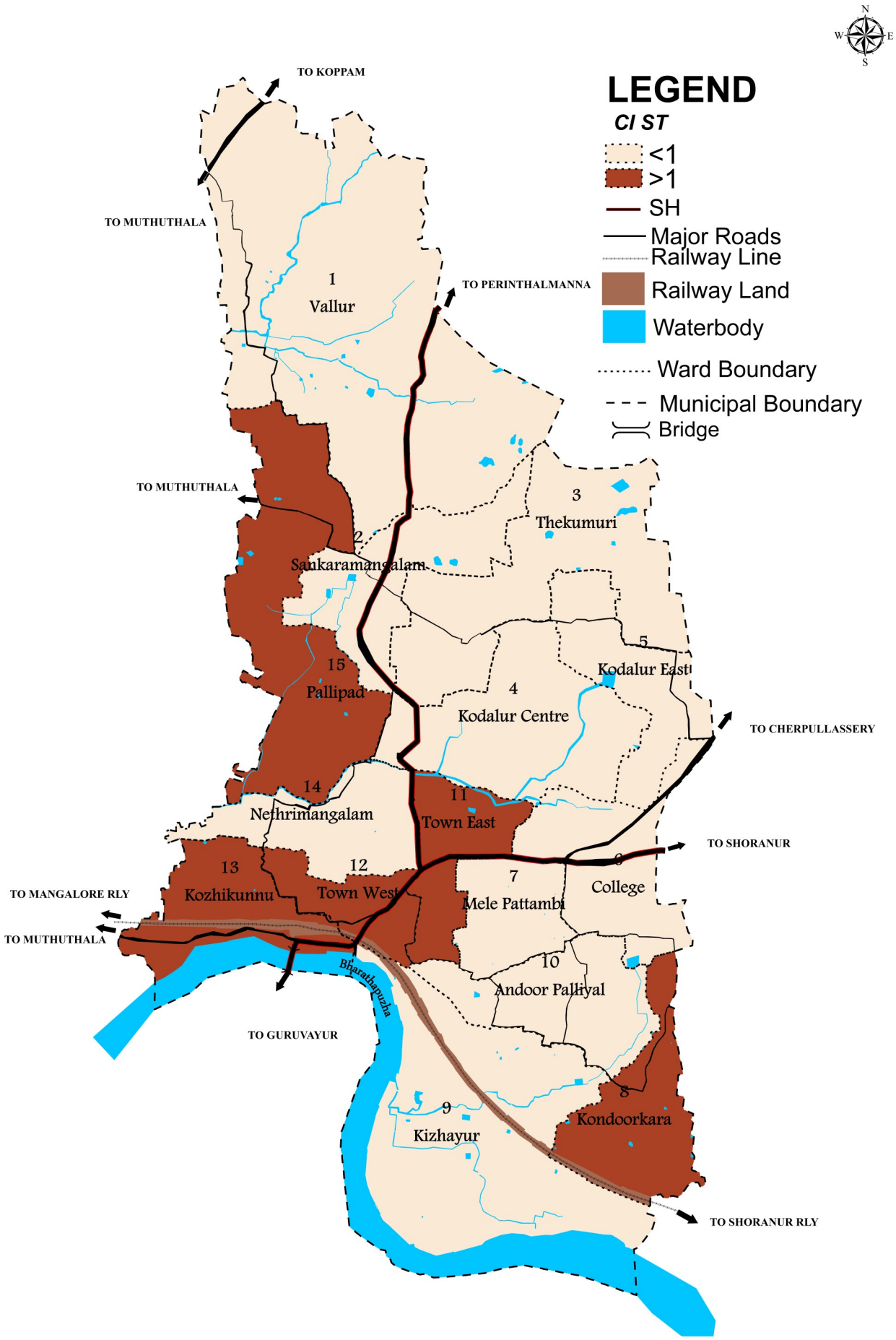


Fig 19.5 Concentration Index of Scheduled Tribe population

The SC population concentration and ST population concentration in the municipality are given in Fig 19.4, 19.5 respectively. The SC population is mainly concentrated in wards on the western side of Pattambi Perinthalmanna road and southern side of Shoranur Pattambi road.

Although the ST population is very less when compared with that of the SC, their population is mainly concentrated in Ward 8 (Kondoorkara), Ward 11 (Town East), Ward 12 (Town West), Ward 13 (Kozhikunnu), and Ward 15 (Pallipad). BPL concentration is observed in the wards having higher concentration of SC's and ST's indicating the social backwardness of the group.

19.1.3 General Condition of SC/ST Population

There are a total of 34 SC/ST colonies in the municipality comprising of 453 families and 61% of the total SC population in the municipality are residing in these areas. According to the socio-economic survey, 96.50% of the houses in these colonies are electrified. The toilet facility available is 95% and 99% of houses have accessibility to Potable Water.

Sex Ratio

Compared to the overall sex ratio of the municipality, the sex ratio of SC' are higher. The sex ratio among the SC's have shown a decline during 2001-2011. The variations of sex ratio for SC's over the last four decades are given in Fig 19.6.

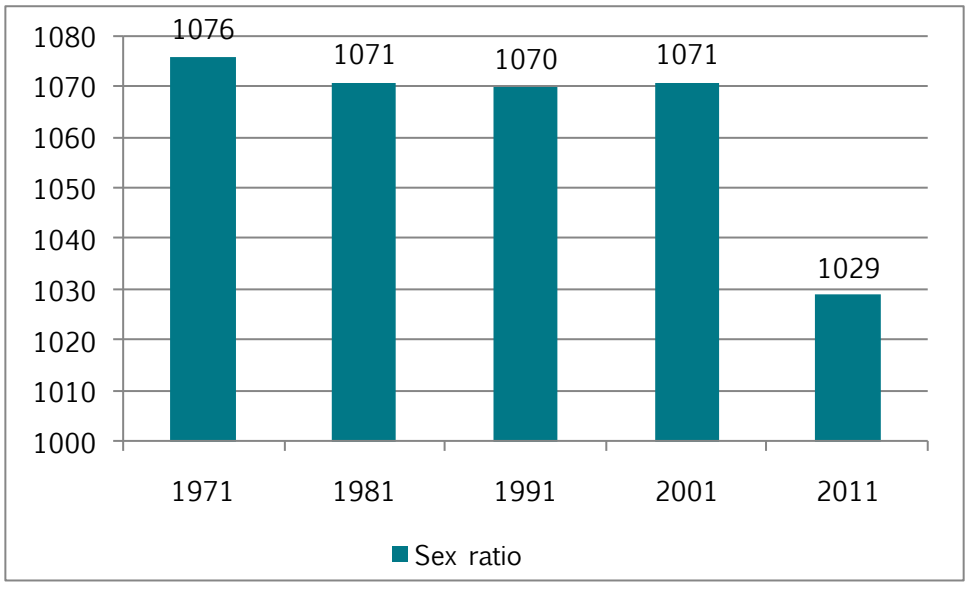


Fig. 19.6 Temporal variation of SC sex ratio *Source: Census 2011*

Literacy

Literacy rate of SC population in Pattambi Town according to the 2011 Census is 89.38%. This is low as compared to the overall literacy rate of municipality (95.18%).

19.1.4 Scheduled Caste Colonies

SC colonies are areas which require special attention as the living conditions are comparatively poor. The BPL distribution shows that most of them are concentrated away from the urban centres where agricultural laborers and cultivators are predominant. So there is a need to provide basic infrastructure facilities to each colony to upgrade the living condition.

The BPL population and SC/ST population are concentrated more or less in the same wards where there is high concentration of agricultural labourers and cultivators. There are 34 SC colonies in the municipality comprising of 453 families and 61% of the total SC population in the municipality are residing in these areas. According to the socio-economic survey, 96.50% of the houses in these colonies are electrified. The toilet facility available is 95% and 99% of houses have accessibility to Potable Water facilities. These areas lack street light facility and also face water scarcity during summer. Details of SC colonies are shown in table 19.3.

Table 19.3 Details of SC colonies

Sl No	Item		No.s
1	Total No of Sangethams		34
2	Total No of Families		453
3	Male population		1041
4	Female population		1082
5	Total population		2123
6	Toilet facility not available		23
7	Piped water connection available		440
	Own Well		8
8	Water scarcity	more than 6 months	
		3 to 6 months	448
		No scarcity	
9	Not electrified		16
10	No street light facility for		34

Source: Pattambi Municipality

19.1.5 Living Standards

Some measure of living standards was obtained by indirect means during the socio economic survey. Table 19.4 gives the share of people using appliances and utilities which are indicative of living standard.

Table 19.4 Living Standards

Sl. No.	Gadget	Share of households
1	Air conditioner	13.73
2	Refrigerator	63.05
3	Television	92.07
4	Washing machine	28.63
5	Telephone	18.96
6	Mobile phone	96.51
7	Computer	19.73
8	Internet connection	8.7
9	Gas connection	93.23

Source: Socio economic survey, 2015

The vehicle ownership is also an indicative of household prosperity. About 56.47% of the households own two wheelers and 17.4% own four wheelers. Three wheelers are possessed by 7.73% of the households. Since three wheelers are not used for personal transport in general, 7.73% of the households depend on three wheelers for their livelihood.

19.1.6 Inference

SC/ST population are mainly concentrated in wards having greater concentration of agricultural labourers and cultivators. Socially backward communities are mostly engaged in primary activities like agriculture. Government's financial assistance for education at all levels and reservations in educational institutions were found effective as their education status has also improved over the years. In spite of several initiatives taken towards poverty alleviation, there are several critical issues and challenges remaining unsolved.

19.2 POVERTY ALLEVIATION PROGRAMMES

Urban Poverty alleviation involves: (i) upgrading the physical environment in poor settlements by providing basic services such as water, sanitation, waste collection, storm drainage, access roads and street lighting; (ii) regularizing security of land tenure and housing; and (iii) instituting a social support programme focused on promoting sustainable livelihoods through the accumulation of natural, physical, human, social, financial as well as institutional and knowledge/information assets.

The State Poverty Eradication Mission (SPEM)- Kudumbasree, started in the year 1998, aims at eradicating absolute poverty within 10 years under the leadership of the Local Self Governments in Kerala. As per the Section 284 of the Kerala Municipality Act 1994, 2% of the income of each ULB is to be spent for Urban Poverty Alleviation Programme. The ULBs are transferring such amount to the CDS annually, as its share for UPA budget. The other sources of income to the CDS for UPA activities include the transfer from GOK under Kudumbasree centrally sponsored UPA programmes and institutional finance for Self Help Groups.

19.2.1 Major Poverty Alleviation Interventions

Deendayal Antyodaya Yojana - National Urban Livelihoods Mission

National Urban Livelihoods Mission (NULM), a centrally sponsored scheme has been launched in Kerala as a continuation to the erstwhile Swarna Jayanti Shahari Rozgar Yojana (SJSRY) to alleviate poverty and vulnerability of the urban poor. A family residing in an urban area with an annual income less than Rs 50,000 is considered as an urban poor in Kerala and is eligible for all benefits under DAY-NULM. Salient features of NULM are building strong grass root level institutions for the urban poor through social mobilization.

This programme enables the urban poor to access gainful self employment or skilled wage employment opportunities resulting in a significant improvement in their livelihood. The mission aims at providing shelters equipped with essential amenities to the urban homeless in a phased manner. NULM also addresses the livelihood concerns of the Urban Street Vendors by facilitating access to suitable spaces, institutional credit, social security and skills for accessing emerging market opportunities.

Though the project commenced at national level in the year 2013, implementation in the State started in May 2015. DAY- NULM was being implemented in the 14 Urban Local Bodies (ULB) of the state as a first phase. Government of India has consented to extend DAY-NULM implementation activities to the rest of the 79 ULBs and with the State government according sanction for the same, the scheme is currently being implemented in all the 93 ULBs of Kerala. Kudumbasree Mission is selected as the Nodal Agency for implementation of the project in the state.

Pradhan Manthri Awas Yojana (PMAY- Urban)

“Housing for All” Mission for Urban area will be implemented during 2015-2022. The mission will be implemented through four verticals giving option to beneficiaries, Urban Local Bodies (ULB) and State Governments, as under:-

i) “In Situ” slum Redevelopment ii) Affordable housing through Credit Linked Subsidy iii) Affordable Housing in Partnership iv) Subsidy for beneficiary-led individual house construction. Out of the above, Affordable Housing through Credit Linked Subsidy will be implemented through Banks/Financial Institutions, under the mission. The beneficiary can take advantage under only one component, from above. The Mission will be effective from 17.06.2015 to 31.03.2022.

LIFE Mission

Government of Kerala launched a mission named LIFE (Livelihood Inclusion and Financial Empowerment) as one of the component of Navakerala Mission envisages a comprehensive housing scheme for all the landless and homeless in the State. The mission is not just confined to providing housing alone but also financial empowerment ensuring livelihood means. The government has set a target of rehabilitating all landless and homeless within the next five years.

Swatch Bharat Mission

The overall objective of India's national urban sanitation programme "Swachh Bharat Mission (Urban)" is to provide complete sanitation solutions for all of India's 4,041 statutory towns. This includes the elimination of open defecation, use of insanitary toilets and manual scavenging by October 2019. Major components of the mission are household level latrines, Community latrines, Public latrines and urinals, and solid waste management. In Kerala, Suchitwa Mission is the nodal agency for implementing the scheme.

19.2.2 Urban Poor Programmes in Pattambi

Kudumbasree/UPA cell functions in Pattambi Municipality. Several programmes are undertaken by the Kudumbasree sub units for poverty alleviation through women’s empowerment. Number and distribution of women self help groups in Pattambi is shown in table 19.5. A Community Development Society (CDS) and, under that, 28 Area Development Societies (ADS) and 200 nos of neighbourhood groups/SHGs consisting of 2500 members are functioning in Pattambi. There are 7 group enterprises and 35 no.s of individual enterprises in the Municipality. Details of Kudumbasree Group enterprises are shown in table 19.6.

Table 19.5 Number and distribution of women self help groups in Pattambi(M)

Sl.No	Ward No	Name of ADS	No of SHGS	Sl.No	Ward No	Name of ADS	No of SHGS
1	1	Vallaur North	10	15	15	Lovely	3
2	2	Vallur East	8	16	16	Kolorkunnu	10
3	3	Randam Mile	9	17	17	Melepattambi	2
4	4	Kalappara	8	18	18	Umikkunnu	4
5	5	Kodalur	10	19	19	Nambram	9
6	6	Nediyamkunnu	9	20	20	Pattambi Town	3
7	7	Sankaramangalam	6	21	21	Kaithali	4
8	8	Thekkumuri	4	22	22	Nethirimangalam	10
9	9	Chorakkunnu	17	23	23	Civil Station	5
10	10	Collage	3	24	24	Paruvakkadav	3
11	11	Kizhakke Angadi	6	25	25	Kozhikkunnu	5
12	12	Hidhayath Nagar	4	26	26	Vadakkumuri	13
13	13	Cheruliparambu	8	27	27	Thottungal City	11
14	14	Keezhayur	10	28	28	Vallur Center	6

Source: Pattambi Municipality

Table No 19.6 Details of Kudumbasree Group enterprises

Sl. No	Ward No	Name of ADS	Activity
1	26	Vadakkumuri	Dtp Center Pattambi
2	13	Cheruliparambu	Tailoring Unit
3	14	Keezhayur	Floor Mill
4	1	Vallaur North	Adu Valarthal
5	1	Vallaur North	Backery Unit
6	27	Thottungal City	Tailoring Unit
7	13	Cheruliparambu	Tailoring Unit

Source: Pattambi Municipality

19.3 SOCIAL SECURITY & WELFARE, WOMEN AND CHILD DEVELOPMENT

Social security is primarily a social insurance programme providing social protection or protection against socially recognized conditions, including poverty, old age, disability, unemployment and others. Women, children, disabled, aged, transgender and persons with chronic illness are the most vulnerable sections of our society for historic and social reasons. Social welfare measures covers the needy sections of the population namely unsheltered, diseased, uncared, neglected and deviant people who do not have a place in the modern society.

Table 19.7 Details of the distribution of funds as on 31-12-2017

Sl No.	Name of Scheme		Allotment	Expenditure	No of Beneficiaries	Remarks
I	Pradhan Manthri Awas Yojana - PMAY (UNB)		4600000	4600000	276	(First Instalment Disbursed)
II	Swach Bharath Mission	Individual household latrine(IHHL)	799500	334066	21	(Latrine Constructed)
III	Life Mission	Not Yet Started				
IV	National Urban Livelyhood Mission (NULM)					
1	Socila Mobilization and Institution Development (SMID)					
a	Revolving Fund to NHGs			1050000/-	105 NHG's	
b	Revolving Fund to ADSs			600000/-	12 ADS	
2	Fund to Resource Organisation	(For MIS Entry)		36000/-		
3	ID Card Distribution to Street Vendors			13500/-	54 Persons	
4	Employment through Skills Training & placement			19150/-	13 Students	(Join Course)

Source: Pattambi Municipality

Accident and crime data of Pattambi Municipality for the year 2011, 2012, 2013, 2014 and 2015 are shown in table 19.8.

Table 19.8 Accidents & Crimes Data in Pattambi Municipality

Sl No.	Details of crime	No. of cases				
		2011	2012	2013	2014	2015
1	Theft	27	36	30	62	94
2	Robbery	0	1	1	0	5
3	Cheating	15	14	4	12	21
4	Violence against women	67	45	59	69	47
5	Accidents	118	99	127	134	125
6	Attempt to Murder	3	1	1	1	3
7	Murder	2	1	2	1	1
8	Petty cases	566	1186	1329	1003	911

Source : Police station, Pattambi

19.3.1 Social Welfare Programmes and Infrastructures

Social welfare schemes are introduced with the objective of benefiting various marginalised sections of the society. There are many schemes in place with central and state assistance. These schemes give ample support for aged, handicapped and orphan people, by way of pension provisions, insurance coverage and other benefits.

For securing the lives of the poorest of the poor families, the Government of Kerala has introduced the Social Security Pension Schemes. Currently, seven types of social security pensions are being distributed through local bodies. These are agricultural labour pension, Destitute pension, Widow pension, old age pension, disability pension etc. The details of pension schemes and number of beneficiaries in Pattambi Municipality are shown in Table 19.9.

Table 19.9 Pension schemes and no. of Pensioners

Sl. No.	Type of Pension	No. of Beneficieries			
		2013-14	2014-15	2015-16	2016-17
1	Unmarried Women above 50 years	12	4	108	224
2	Agricultural Labour Pension	4	2	222	399
3	Special Disabled Pension	47	8	562	1272
4	Old Age Pension	608	196	3239	6997
5	Widow Pension	189	72	2280	4804

Source: Pattambi Municipality

Social degradation of women is a primary concern in all societies. Even though many advances were made in economical and social aspects, children living in lower class families still suffer from mental and health problems. To reduce such problems among inhabitants, Pattambi municipality is doing supply of balanced diet. To ensure health of children, youngsters, pregnant women, lactating mothers etc. supply of such food items through anganwadis are helping a lot.

There are many socio - economic developmental activities conducted in the municipality which includes Pension schemes, Asraya schemes, helping schemes for physically and mentally challenged persons etc. The depth of these problems prompts continuation of these schemes in the twelfth five year plan also.

ICDS Projects

I.C.D.S. is an integrated approach for the development of women and children from disadvantaged sections across their life cycle. The grass root level service delivery points are anganwadi centers. ICDS projects provide supplementary nutrition, NHED, immunization and awareness on different subjects

etc. to women. Various welfare schemes of ICDS programmes are under SNP, the Supplementary Nutrition Programme for Children and SABLA scheme for Adolescent girls (11-18), for their empowerment, especially in the tribal areas. Under this Scheme training is accorded to the adolescent girls regarding Education, Personal hygiene and other skill development programmes.

There are 357No's of beneficiaries under the age group of 6 months to 3 years and 405 No's of beneficiaries under the age group of 3 to 6 years. Under SABLA scheme there are 700 No's of beneficiaries. IGMSY (Indira Gandhi Matritva Sahyog Yojana), is a conditional Maternity benefit scheme for pregnant and lactating women. A benefit of Rs. 6000/- was given under this scheme. This Scheme for promoting health & nutrition to pregnant and lactating women is being implemented only in Palakkad District. There are 70 No's of beneficiaries in Pregnant woman category and 69 No's in the lactating woman category.

19.3.2 Status of Anganwadi

Anganwadi is a type of rural mother and child care centre. They were started by the Indian government in 1975 as part of the Integrated Child Development Services programme to combat child hunger and malnutrition. Anganwadi means "courtyard shelter" in Indian languages. A typical Anganwadi centre provides basic health care in Indian villages. It is a part of the Indian public health care system. Basic health care activities include contraceptive counseling and supply, nutrition education and supplementation, as well as pre-school activities.



Fig. 19.7 Anganwadi at Guruthiyankavu

Anganwadi's are the grass root level service delivery point of social welfare activities. Anganwadi Center is the focal point for delivery of services which is managed by an Anganwadi Worker, assisted by a Helper. Both are honorary workers selected from local community. As per the criteria, there should be one anganwadi for 1000 population. There are a total of 22 anganwadis of which 21 are working in their own buildings. Although Anganwadis are having toilets, all toilets are not baby friendly. Spatial distribution of anganwadis in Pattambi Municipality is shown in Fig. 19.8. Details of Anganwadis are shown in Table 19.10.

Table 19.10 Details of Anganwadis

Sl. No.	C.No	Ward. No.	Name & Location	Extent in Cent	No. Of Children	No. Of Worker	Owned/ Rented	Compound Wall	Electricity	Drinking Water	Toilet	Kitchen
1	51	4	Pathyil Kodaloor	5	19	2	Owned	Yes	Yes	Yes	Yes	Yes
2	52	4	Kottapadi Sankaramangalam		13	2	Rented	Yes	Yes	Yes	Yes	Yes
3	53	8	Kallikadu Thekkummuri	5	20	2	Owned	Yes	Yes	Yes	Yes	Yes
4	54	28	Pallipadu Sankaramangalam	4.5	25	2	Owned	Yes	Yes	Yes	Yes	Yes
5	55	28	Valloor	2.5	15	2	Owned	Nil	Yes	Yes	Yes	Yes
6	56	1	Gurupathiyankavu	3	16	2	Owned	Nil	Yes	Yes	Yes	Yes
7	57	2	Mannathupuram	3	12	2	Owned	Yes	Yes	Yes	Yes	Yes
8	58	26	Vadakummuri	3	16	2	Owned	Yes	Yes	Yes	Yes	Yes
9	59	21	Panthakalparambu Pattambi	2.5	20	2	Owned	Yes	Yes	Yes	Yes	Yes
10	60	25	Kozhikunnu	3	12	2	Owned	Yes	Yes	Yes	Yes	Yes
11	61	23	Pattambi Municipality	3	15	2	Owned	Nil	Yes	Yes	Yes	Yes
12	62	24	Paruva kadavu	3.5	10	2	Owned	Yes	Yes	Yes	Yes	Yes
13	41	14	Muchirithodu,Kizhayoor	3	15	2	Owned	Yes	Yes	Yes	Yes	Yes
14	42	14	Thekencheri Kunnu,Kizhayoor	5	15	2	Owned	Nil	Yes	Yes	Yes	Yes
15	43	15	Kizhayoor	2.5	12	2	Owned	Nil	Yes	Yes	Yes	Yes
16	44	16	Cheruli Parambil Kizhayoor	1.5	15	2	Owned	Nil	Yes	Yes	Yes	Yes
17	45	17	MelePattambi(Thupil Colony)	3	15	2	Owned	Nil	Yes	Yes	Yes	Yes
18	46	18	Anthoor Palliyalil,Kizhayur	4.5	14	2	Owned	Nil	Yes	Yes	Yes	Yes
19	47	19	Nambram,Kizhayur	3	12	2	Owned	Yes	Yes	Yes	Yes	Yes
20	48	12	Pankuth,College Stop	1.5	15	2	Owned	Nil	Yes	Yes	Yes	Yes
21	49	10	Kodaloor	6	18	2	Owned	Nil	Yes	Yes	Yes	Yes
22	50	9	Chorakunnu, Kodaloor	2	14	2	Owned	Yes	Yes	Yes	Yes	Yes

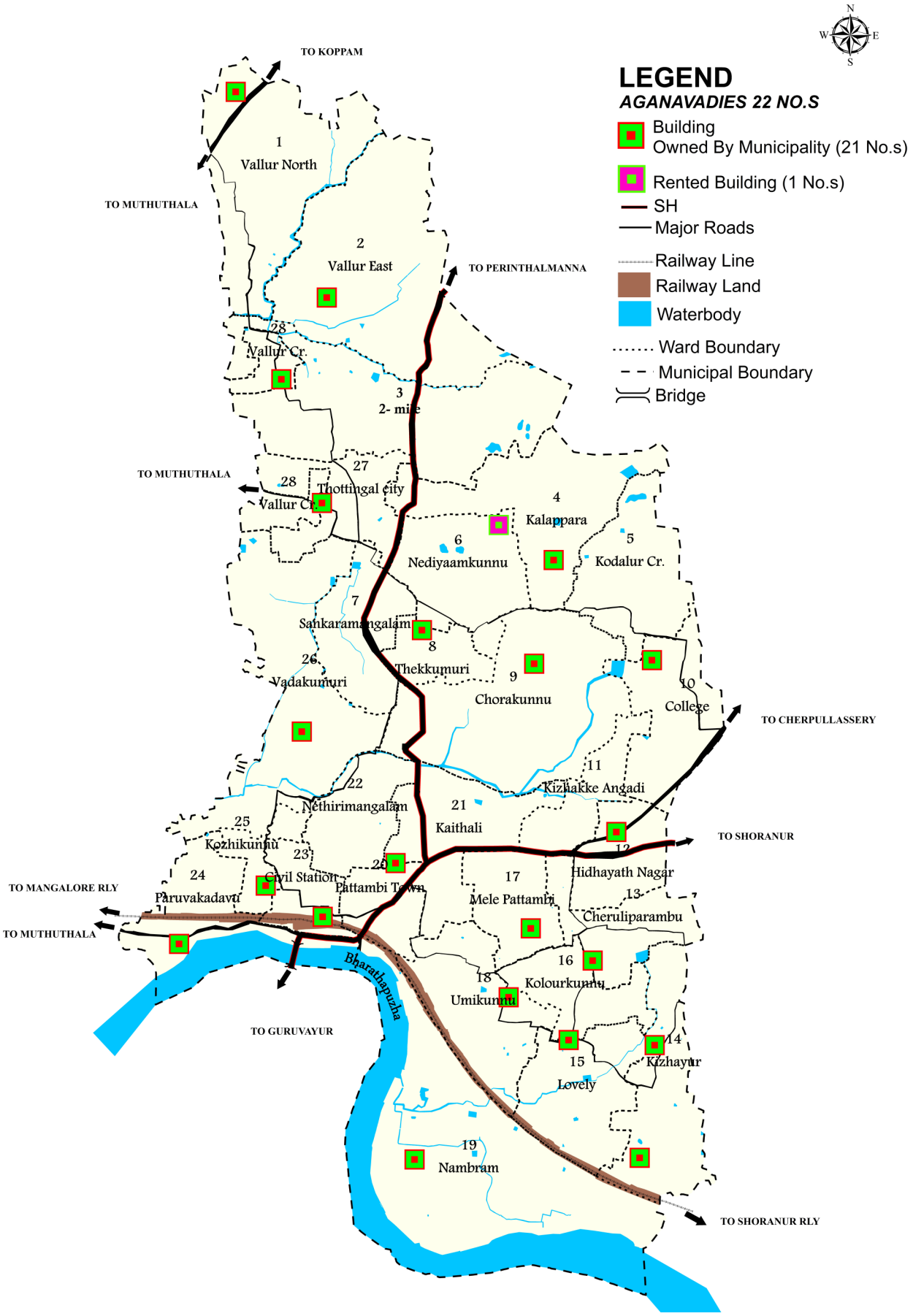


Fig 19.8 Spatial distribution of Anganwadis

Source: Land use survey by LSGD Planning, Palakkad.

19.4 INFERENCE

A Community Development Society (CDS) and, under that, 28 Area Development Societies (ADS) and 200 no.s of neighbourhood groups/SHGs consisting of 2500 members are functioning in Pattambi. There are 7 Kudumbasree group enterprises and 35 no.s of individual enterprises in the Municipality. In Pattambi Municipality, about 12.34% of the total population are children in the age group of 0-6 years (Census 2011).

Child Sex Ratio has decreased from 995 to 924 during 2001-2011. Child sex ratio is 924 lower than that of district value 927. There are 22 anganvadis in Pattambi town for the welfare of children. 21 of them are working in their own building. All of them have their own toilet facilities. These anganvadis are distributed in 19 wards. Kalappara, Kizhayoor and Vallur centre has two anganvadies. There are sufficient no of anganwadies in the Town and these need improvement of infrastructure.

Poverty alleviation programmes form the backbone in extending social assistance to the vulnerable sections of the population. Pattambi municipality does have a reasonable coverage of said programmes. However, the fall in ST population growth rate in the municipality can either indicate a migration or mortality rate among the communities. This needs to be addressed by providing better living conditions in their present locations. Increasing the density of Anganwadis in SC/ST colonies can augment the channelization of health and education efforts.

As regards women, the increase in number of pensioner beneficiaries amongst the widows and women aged 50 and above are deeply concerning. Community support groups can coalesce these scattered vulnerable sections under one umbrella. NHGs can tap into the talent/experience pool in strengthening the support groups. Combining day care centres with old age homes can result in a constructive environment.

20

Environment

20. ENVIRONMENT

As populations grow, the quality of the environment will play an increasingly important role in public health with respect to issues ranging from solid waste disposal, provision of safe water and sanitation and injury prevention to the interface between urban poverty, environment and health. Unsustainable patterns of transport and land use cause a number of significant, and interrelated environmental and health hazards.

The intensity of the pollution in terms of air, water and noise is evaluated in order to clearly understand the level and causes of pollution existing within the town so that appropriate strategies are put in place to tackle the problem . The Kerala State Pollution Control Board (KPCB) is responsible for monitoring water and air quality. It includes testing of both surface water and ground water and testing the ambient air quality under its purview.

In this chapter an attempt is made to describe the present scenario of the natural environment of the town, the pollution levels and the spatial location of environmentally sensitive areas. Though there is no scientific data collected by Pollution Control Board for air quality and sound pollution for Pattambi town, the present analysis of environment is based upon primary observations and residents view.

20.1 PRESENT SCENARIO

The town is having an undulating topography, height from Mean sea level varies from 20m to 75m. Land use of Town has 6.98 km^2 under agriculture use and 1 km^2 under water bodies use. Due to the high vegetation cover and lesser percentage of polluting industries the chances of industrial pollution are comparatively less in the peripheral areas. However the urban areas are witnessing the impacts of pollution in the form of degrading quality of air, water, natural resources and sound.

20.1.1 Water Pollution

The town has several surface water bodies like ponds, rivulets and also transversed by Bharathapuzha river along southern boundary. Water pollution is a major environmental issue. The discharge of untreated sewage is the single most important cause for the contamination of surface and ground water sources. Aquatic ecosystems are badly affected when pollutants are discharged directly or indirectly into water bodies without adequate treatment to remove harmful components.

In almost all the cases, the effect is damaging not only the individual species and populations, but also the natural biological communities. High levels of coliform in drinking water indicate contamination from surface or shallow sub-surface sources such as soil, septic or cesspool leakage, animal feedlot runoff and treatment failures.

Water quality of surface water sources

Bharathapuzha faces extreme pollution and contamination especially in town areas owing to dumping of garbage and discharging liquid waste directly to the river. Comfort stations of almost all the adjacent panchayaths and municipalities push wastes including human excreta to the river. Drainages of all these civic bodies and towns like Ottapalam and Pattambi are open to the river. Wastes from the general market, slaughter houses, etc also are removed to no where but to the river. Table 20.1 shows the water quality during 2009 to 2013. Table 20.2 and 20.3 shows the detailed observation in 2013 and 2017 respectively.

Table 20.1 Quality of water obtained from Pattambi sampling stations at Bharathapuzha river

Parameters	2009	2010	2011	2012	2013	Desirable limit
pH	7.63	7.3	7.5	8.1	8.5	6.5-8.5
DO(mg/l)	7.05	6.5	6.93	7.12	7	6
BOD(mg/l)	0.4	0.65	0.78	0.93	1.4	2
TC (no/100ml)	1675	1213	1725	992	900	50
FC (no/100ml)	710	653	1000	524	100	Nil

Table 20.2 Quality of water during 2013

2013	pH	Cond.	DO	BOD	Nitrate N	Amm - N	TC	FC
Unit		µmhos/cm	mg/l	mg/l	mg/l	mg/l	no/100ml	no/100ml
Max	8.5	248	7	1.4	0.58	0.1	900	500
Min	7.4	104	6.2	0.2	0	0	7	2
Mean	7.87	173.25	6.65	0.9	0.22	0.01	426	191
Standard Deviation	0.29	44.93	0.28	0.4	0.21	0.03	314	132
Desirable limit	6.5-8.5		4	3			5000	

Source: Water & Air Quality Directory-2013, State Pollution Control Board

Table 20.3 Monthly wise Water Quality data obtained from Pattambi sampling stations of Bharathapuzha river

Month	Date of sampling	Temp (°C)	pH	DO (mg/l)	BOD (mg/l)	Colour (Hazen)	Total Coliform (MPN/100ml)
January	06.01.2017	30	8.5	11.4	6.6	BDL	Nil
February	06.02.2017	29	7.6	6.8	3.6	BDL	Nil
March	13.03.2017	30	8.4	10.1	1	SOL	360
April	05.04.2017	30	8.1	7.5	4.8	SOL	420
May	12.05.2017	No Water Flow					
June	09.06.2017	33	7.6	7.3	2	BDL	100
July	13.07.2017	26	7.5	7.5	1.2	BDL	520
August	03.08.2017	30	8.1	7.4	1.4	BDL	60
September	15.09.2017	30	7.5	6.8	0.3	BDL	60
October	25.10.2017	29	6.2	8.8	3.4	BDL	980
November	15.11.2017	30	6.3	9	8	BDL	NIL
December	06.12.2017	29	7.2	8	2.4	BDL	420

Source: Pollution Control Board Office, Palakkad

All this contribute to contamination of Bharathapuzha. It has been observed that there has been a rise in the total coli form levels during the last six years. Due to incessant and unscrupulous sand-mining and encroachments, the river is dying slowly. Most parts of the river are covered with shrubs and weeds and look more like ground than a water body. During monsoon, the river gets filled up but soon it goes dry again due to the absence of sand bed.

Ground water quality

Groundwater quality comprises the physical, chemical and biological qualities of ground water. The quality of ground water obtained from well at GHSS Pattambi is given in table 20.4 The results show high contamination by E. Coli, a major cause of food borne and water borne diseases. Not a health threat in itself, it is used to indicate presence of potentially harmful bacteria. The presence of E. Coli bacteria in water is a strong indication of sewage or animal waste contamination.

Ground water table depletion

Ground water depletion is caused when the ground water is pumped out faster than it can be replenished. Some of the negative effects of ground water depletion are drying up of wells, reduction of water in streams and lakes, deterioration of water quality, increased pumping costs and land subsid-

ence. The ground water table is showing a decline in some of the areas in the municipality. Ground water level was declined by 2 meters in Bharathapuzha during the last 25 years.

Table 20.4 Quality of well water GHSS Pattambi

Sl No	Parameter	Limit	Well GHSS Pattambi
1	pH	6.5-8.5	7.6
2	Colour	5Hazen	Nil
3	SO4	150mg/l	20
4	Mg	30mg/l	4.1
5	Ca	75mg/l	63
6	COD	Nil	Nil
7	BOD	Nil	Nil
8	Ecoli	absent	360cFu/ml
9	Total hardness	300mgl	174m/L
10	TDS	500mg/L	250

Source: Pollution Control Board Office, Palakkad.

Table 20.5 Ground Water table details of monitoring wells in Pattambi

Type of Well	Location	Well No	Jan-16	Jan-05	Jan-15	10 Years Mean [2006-2015]		Fluctuation Jan 16 with respect to		
						WL	Yrs	Jan-05	Jan-15	Mean
1	2	3	4	5	6	7	8	05-Apr	06-Apr	07-Apr
Open Well	Pattambi	115	7.69		7.83	8.14	8	-	0.14	0.45
Bore Well	Pattambi	136	7.9		10.21	7.936	9	-	2.31	0.036
Bore Well	Pattambi	160 PKD 2	14.46		15.64	15.763	9	-	1.18	1.303

District Office of Ground Water Department, Palakkad.

Average Ground Water table depth in Open well is 8.14 m (10 years average in peak summer). This is due to conversion of paddy field for other development purposes and lack of proper ground water recharging measures. Average Ground Water table depth in Bore wells are 7.963 and 15.76 m (10 years average in peak summer). Hydrograph of wells are shown in Fig 20.1, 20.2, 20.3 respectively.





Bharathapuzha

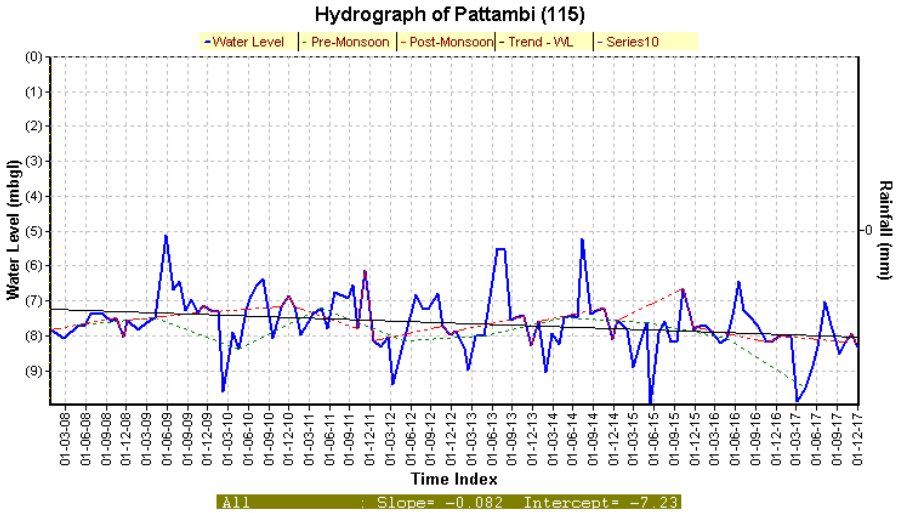


Fig. 20.1 Hydrograph of Open Well - Govt. UP School, Pattambi

District Office of Ground Water Department, Palakkad.

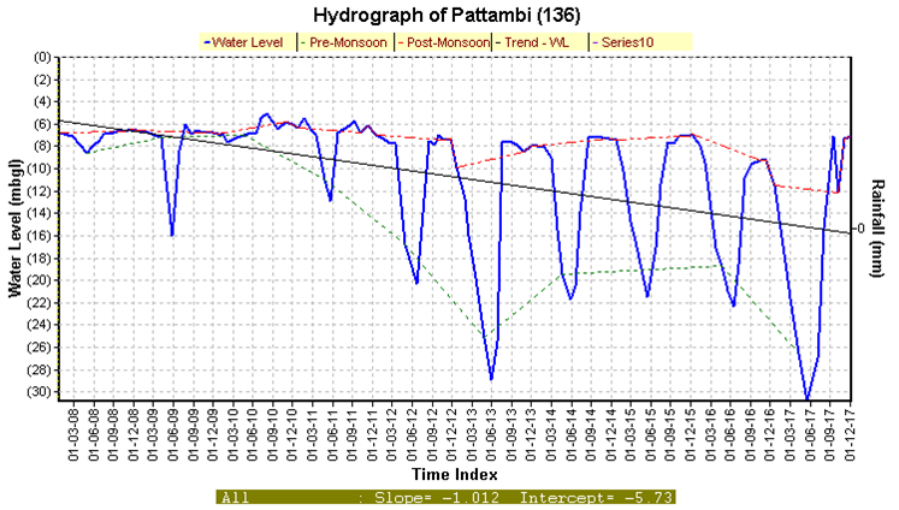


Fig. 20.2 Hydrograph of Bore Well – Family Welfare Centre, Nethrimangalam, Pattambi

District Office of Ground Water Department, Palakkad.

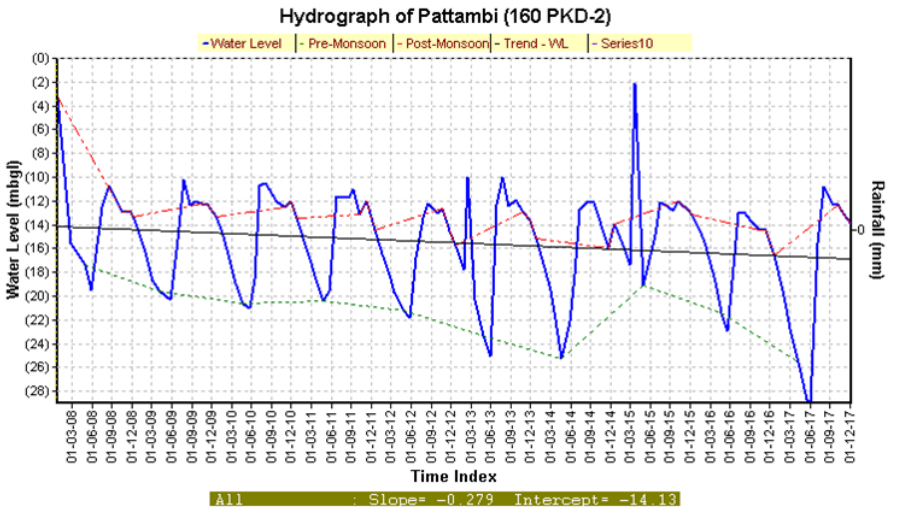


Fig. 20.3 Hydrograph of Bore Well – Village Office, Pattambi

District Office of Ground Water Department, Palakkad.

20.1.2 Land Pollution due to Solid Waste Dumping and Absence of Sewerage system

Land pollution is the deterioration (destruction) of the earth's land surfaces, often directly or indirectly as a result of human activities and misuse of land resources. Solid waste are usually thrown out on empty plots and on road side. The waste mounds pose health hazard for the residents, apart from being a visual sore eye. Although, waste dumping yard is earmarked for waste disposal, it is not sanitary and its leachate cause contamination of land and ground water. Absence of impermeable lining of septic tanks and absence of scientific soak pits for effluents is another reason of land pollution. Waste water is discharged directly to open drains from where it percolates into the ground water and pollutes land.



Waste dumped at Pattambi Railway Station Compound



Waste water and solid waste entering into Bharathapuzha river through Pazhaya kadavu

20.1.3 Air Pollution

Heavy vehicular traffic on State highways, railways and pollution due to industries in the town's vicinity are constant source of dust and other particulate matters which pollute environment of town and cause various kinds of respiratory problems to the citizens. There is no air quality monitoring station in the municipality.

20.1.4 Noise pollution

Noise pollution due to vehicular traffic is a general problem in the traffic corridors and commercial centres. Control measures are to be taken to regulate the noise pollution due to vehicular traffic near to public institutions like schools, colleges and hospitals. Noise level data of Pattambi town is not available with Kerala State Pollution Control Board.

20.2. ECOLOGICALLY SENSITIVE & FRAGILE AREAS

Ecologically Sensitive Areas (ESAs) are to be viewed as areas where human activities will continue, but be prudently regulated under the Environment (Protection) Act, 1986. ESAs are not at all meant to stop development in ways that would hurt local people, but to ensure that development is environment friendly and people oriented, as well as serve to preserve the ecological heritage on a long term basis. Ecologically Sensitive areas of the Pattambi Town include surface water sources (river, rivulets, ponds), paddy fields and heritage areas.

20.2.1. Paddy field

219 Ha of paddy fields (Fig. 20.4) are remaining in Pattambi Town that accounts to 13.82% of the total land area in the town. These low lying areas have to be conserved for food security and ground water recharge also. There are padasekharams named Vallur, Kizhayur, Neravath, Sankaramangalam, Aryampadam, Kodallur, etc.

20.2.2. Surface Water Sources

There is an ever increasing need for the protection and preservation of surface water sources as they are part of an interrelated system that is paramount when the demand for water exceeds the available supply. They also help in sustaining the water table since major ground water recharge areas are diminishing drastically. Bharathapuzha flowing along southern boundary of the town, has to be protected by restricting discharge of sewage and dumping of solid wastes into it. Natural drainage like rivulets have to be side protected and made free from encroachment.

There are a total of 68 ponds within Pattambi Town. Among them, 4 ponds are having an area greater than 1.00 acre and more. There are only 3 ponds owned by the Municipality and others are privately owned. Details of Major ponds are shown in Table 20.6. These ponds have to be conserved for ground water recharging and for irrigation purposes.

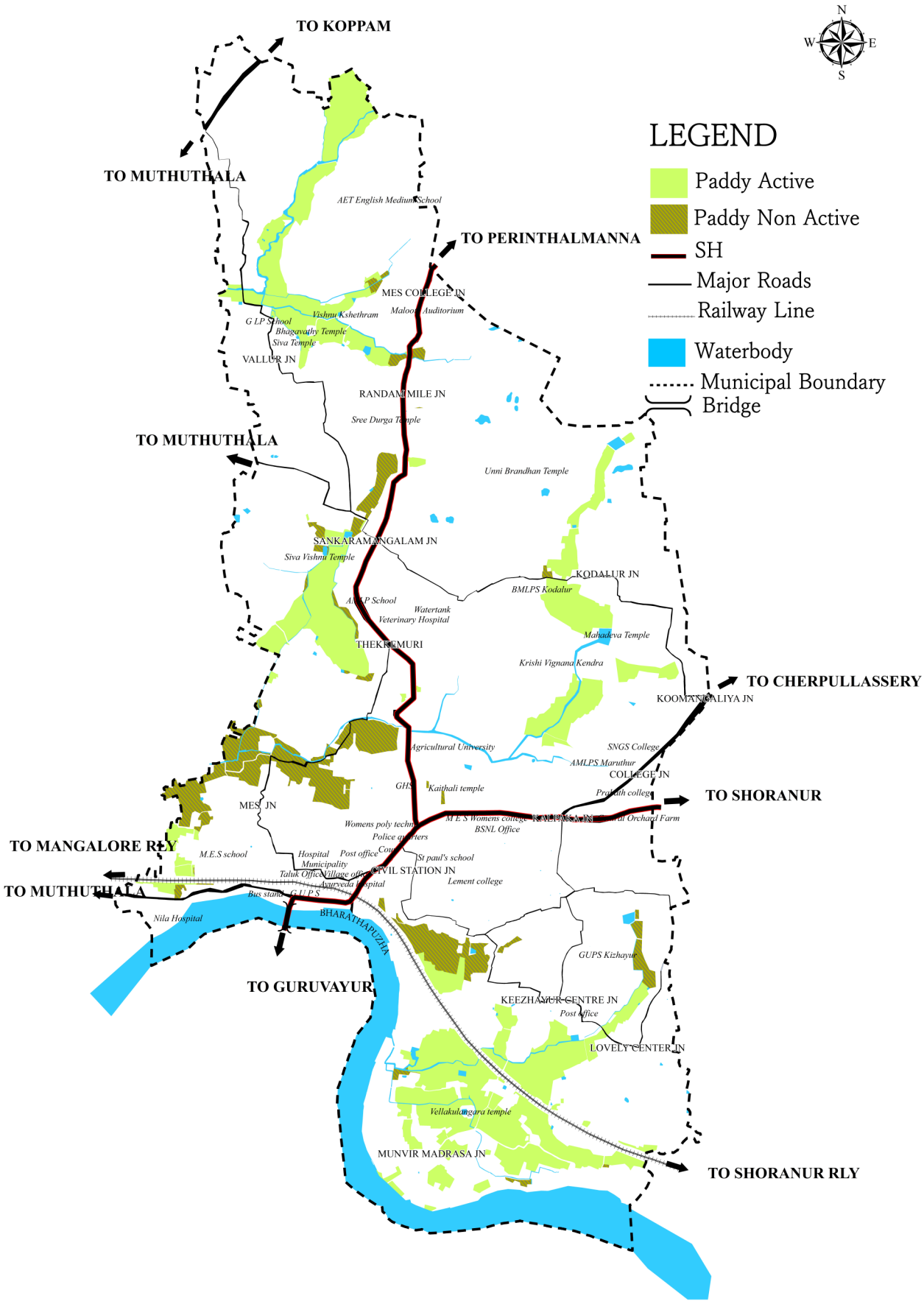


Fig. 20.4 Environmentally Sensitive Areas - Paddy

Source: Land use survey by LSGD Planning, Palakkad.

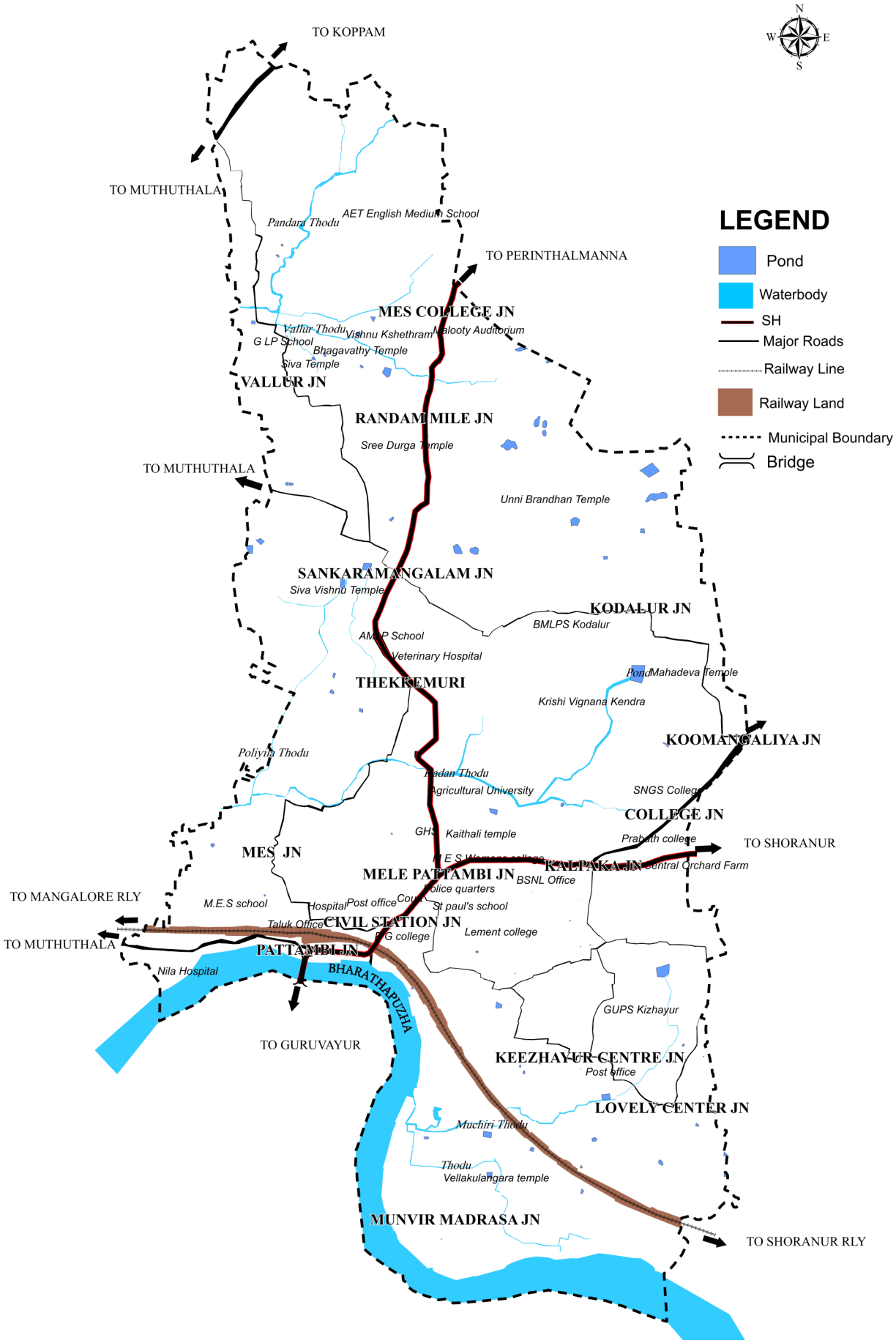


Fig 20.5 Environmentally Sensitive Areas - Water bodies (Ponds, rivulets, River)

Source: Land use survey by LSGD Planning, Palakkad.

Table 20.6 Details of Major ponds in Pattambi

Sl No.	Name	Area in cents
1	Kshethra Kulam	184.24
2	Perikakodu Kulam	124.45
3	Pond	109.55
4	Pond	104.25
5	Pond	52.35
6	Kula Valli Kulam	51.27
7	Pond	50.81
8	Temple Pond, Erattakulam	50.18
9	Pond	40.15
10	Pond	39.48
11	Pond	39.00
12	Sankaramangalam Pond	36.65
13	Pond	36.62
14	Pond	30.49
15	Pond	29.51
16	Thali kshetra kulam	28.31
17	Pond	27.04
18	Pond	24.53
19	Pond	23.16
20	Pond	23.04

Source: Pattambi Municipality

20.3 CONSERVATION EFFORTS

20.3.1 Bharathapuzha

The Bharatapuzha basin is the lone source of drinking water for 175 villages in Palakkad, Thrissur and Malappuram districts. The basin is the chief source of water for a large number of drinking water and minor irrigation schemes. The river has an annual water discharge of 7,478 million cubic metres. The river passes through Palakkad, Thrissur and Malappuram districts before emptying itself into the Arabian Sea at Ponnani.

Indiscriminate and illegal sand-mining affects the drinking water supply schemes and threatens the very existence of the river. The first biodiversity study on the Bharathapuzha conducted by the University Grants Commission in 2001 had found indiscriminate sand-mining as the main reason for the degradation of the river. Indiscriminate sand-mining is a dominant environmental

issue throughout the river basin. The State government has carried out a project to protect and conserve the Bharathapuzha using the River Management Funds (RMF). The government is planning to divert construction of more check-dams at sites identified as part of the Rajiv Gandhi National Drinking Water Mission. As many as 14 check-dam sites have been identified along the 209 km stretch of the Bharathapuzha some of which have been completed. Master plan for Sustainable Tourism Development of NILA was also prepared to elevate tourism as an instrument for promoting overall socio-economic development of the region giving due consideration to river conservation.

20.3.2 Paddy fields

Paddy fields give far more benefits than merely that of rice cultivation like ground water recharge, water purification, flood control, soil erosion control, air cooling effect, aesthetics of landscape and green lungs . Paddy fields become part of a new environment with ecological processes that reflect the influences of both human and nature. The paddy fields act as artificial wetlands, where certain type of aquatic ecosystem suitable for plant and animal forms, such as aquatic birds, insects and animals, including fishes are maintained.

Paddy fields are usually filled with water to a depth of 100 to 150mm and this standing water is maintained until prior to harvesting. Some water percolates through the heavy soils and moves into the ground as ground water recharge. Most of the percolated water flows back into the rivers and drains and are an important source of water for irrigation reuse or recycling. An estimated 7 percent goes towards recharging the underground aquifers and this will be an important source of groundwater recharge when dependence on groundwater supply is expected to increase in the future. Hence existing paddy fields have to be conserved. If all the sections of people are made aware of the serious consequences of the conversion of paddy lands, it would make implementation of the law easier and more effective. In order to conserve paddy land and restrict the conversion/reclamation of it, the Government has enacted “The Kerala Conservation of Paddy and Wetland Act, 2008”.

20.3.3 Heritage Areas

Kaithali Siva Temple

Kaithali Siva Temple due to its historical and architectural value, was declared a heritage monument protected under the Archaeological Survey of India. Temple has some of the most intricate laterite sculptures in Kerala. It is believed that the temple might have been built in the 8th century AD during

the second Chera dynasty. Traces of Pallava style of architecture is also seen on the semi-finished sanctum sanctorum.



Kaithali Siva Temple

Traditional Kerala houses - Nalukettu

There were nearly twenty nos of Manas/illams in Pattambi most of them are replaced by new RCC houses. Presently only three traditional Kerala architecture styled houses are existing. One among them is Karathazhathu Mana which is a nalukettu, traditional courtyard house.



Kizhayur Mana

Sacred Groves

Sacred Groves are a traditional socio cultural mechanism aiming at nature conservation involving many taboos, rituals, and other religious practices. Sacred groves known as “Kavu” a garden or consortium of trees. These are like mini forest. Food chain and food web inside these kept population of wild life under control.



Pullanikulangara Pampin kavu

Pullanikulangara Pampin kavu is a sacred grove handed over to the forest department. It has an area of 2592.91 sq. m. Groves are shrunk to just where deities are kept thus reducing the groves to just the sacraments without vegetation.

20.4 INFERENCE

Ecologically Sensitive areas of the Pattambi Town include surface water-sources (river, rivulets, ponds), paddy fields & sacred grooves. Land use of Town has 6.98 sq. km. under agriculture use and 1 sq. km. of water bodies. 219 Ha of paddy field is present in Pattambi Town that accounts to 13.83% of the total land area in the town. There are 68 ponds out of which 4 have an area more than 1 acre. 3 ponds are municipality owned and remaining are private. Total area of ponds is 5.71 Hectares.

Existing paddy fields, water bodies, and sacred groves need to be conserved. Existing water bodies has to be protected by preventing discharge of sewage and dumping of solid waste into it. Waste dumped at Pattambi Railway Station Compound, solid waste and waste water are entering Bharathapuzha river through Pazhaya kadavu causes land pollution.

From Water quality data obtained from Pattambi sampling station at Bharathapuzha, it has been observed that the total coli form levels is higher than the desirable limit. High levels of coliform in water indicate contamination from sewage, dumping of garbage and discharging liquid waste directly to the river. Ground water quality detail from well at GHSS Pattambi shows presence of E coli bacteria which is a strong indication of sewage or animal waste contamination.

Man is a part of the environment and its protection is very important for a healthy living. Hence air, water and land have to be properly conserved and its pollution should be prevented by all means. Proper control on pollutants from industries, automobiles and other sources has to be made with the enforcement of strict laws from the government and awareness campaigns.

21

Disaster Management

21. DISASTER MANAGEMENT

21.1 INTRODUCTION

Mankind's relationship with nature has gone through numerous stages beginning with survival issues in ancient times and through the span of the rise of mastery over nature since the industrial age. However, the quick massive intensive growth patterns of humans adversely affected nature as well as making them more vulnerable to disasters. A disaster can cause a huge impact on the broad-scale destruction of physical infrastructure, and livestock, loss of life, population displacement, and disruption of economic activity. Thus it can change the whole people's life structure by taking all commodities and cutting them off from other food supplies leading to loss of lives and livelihood. It reveals and challenges the power structure of an affected society, disrupting livelihood strategies and deconstructing social arrangements. The most common hazards across the world are landslides, earthquakes, cyclones, tsunamis, floods, forest fires etc. However, India is prone to various severe disasters every year. Geographical characters play a major role in every face of disasters over the years. In recent years, several parts of India have experienced devastating disaster events. Alike Uttarakhand was affected by massive floods and landslides that lead to unparalleled damage to life and property. Kerala encountered numerous amount of landslides cause a great impact on livelihood. The cost of our blind exploitation of natural resources without showing reverence for the delicate balance of nature has severely harmed us and is ongoing relentlessly.

In August 2018, Kerala experienced its worst flooding since 1924. The state of Kerala received 164% more rainfall than the normal monsoon. Triggered by abnormally heavy rainfall, the devastating flood and associated landslides affected 5.4 million people and in the loss of 488 lives. The deluge has created unprecedented damage to eight districts in Kerala.

The extent of destruction to the houses were excessive forcing 14.51 lakh people from 3.91 lakh families to leave their houses and enter relief camp offered by the state government. The terrible flood entirely or partially destroyed thousands of houses, shops, commercial buildings and public buildings.

All disasters are not natural. Natural disasters are often made severe because of human behavior. Now we accept that these human actions themselves have created conditions for disaster events. Each disaster gives an opportunity to learn from it. In light of devastating experience we had gone through in 2018, the present report focuses on disaster management plans for Pattambi municipality region, emphasizing flood and landslide mitigation measures.

21.2 NATURAL HAZARD PROFILE OF PALAKKAD DISTRICT

The district has been vulnerable, in varying degrees, to a large number of natural disasters on account of its unique geo-climatic conditions (Tropical Savanna Climate (Köppen Climate Classification Aw)). The region falls under multiple hazard zone and is highly vulnerable to floods, droughts, earthquakes, landslides, lightning and forest fires. The following Table 21.1 shows the hazard seasonality of various disasters based on past occurrences. Table 21.2 shows a matrix of past disasters that occurred in Palakkad district. The data befits to a period of 2010 - 2014 as sourced from District disaster management plan 2015.

Table 21.1 Hazard Seasonality of Palakkad District (*Source: DDMA, 2015)*

Disaster	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Drought												
Forest Fire												
Lightning												
Flood												
Earthquake												

Table 21.2 Matrix of Past Disasters in Palakkad District (*Source: DDMA, 2015*

Sl no	Disaster	Flood	Earthquake	Landslide	Drought	Lightning
1	No. of affected villages	135	3	2	6 taluks	1
2	Population affect-ed	6980	0	0	0	0
3	Cultivated area affected (Ha)	8073.29	0	0	11313	0
4	Estimated area of crop loss	766,822,220	0	0	976,337,500	0
5	No. of houses damaged	6734	0	0	0	0
6	Estimate cost of houses	221 lakh	0	0	0	0
7	No. of casualties	19	0	0	0	0

21.2.1 Flood

A flood is an overflow of water from water bodies, such as a river, lake, or ocean, in which the water overtops or breaks levees, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an aerial flood .

A study by the National Centre for Earth science studies (NCESS) in 2010 revealed that 12.66% of the area under Palakkad district is prone to the risk of flooding which would be 567 sq.km. In 2018 the district received 2378 mm of rainfall, far exceeding the annual average which is around 2110 mm, which raised the benchmark of runoff water resulting in floods along with localized landslides aggravating the condition. As per the study report of Central Water Commission (CWC) on Kerala Floods 2018, 08th and 09th of August 2018 witnessed a sharp rise in inflow of water to the Malampuzha Reservoir. Despite absorbing nearly 50% of the inflow, the impounding structure had to shell out 48 million cubic meters of water resulting in the inundation of low-lying areas and aggravating the situation in floodplains of Palakkad. Another instance of similar nature with lesser inflow occurred during 15th to 17th of August 2018 sustaining the flood conditions. Taluk-wise details of past flood events of Palakkad are mentioned in Table 21.3

Table 21.3 Taluk wise details of past flood events in Palakkad district (*Source: DDMA, 2015)*

Taluk	Details	Flood				
	Year	2010	2011	2012	2013	2014
Chittur	No of affected villages	20	22	0	21	23
	Population Affected	648	740	1820	1128	20
	No. Of Houses Damaged	162	185	455	282	5
	Estimated cost of house damages in Rs.	525190	778445	1084180	769750	0
	No. Of casualty	0	0	0	1	0
Pattambi	No of affected villages	0	0	0	0	16
	Population Affected	0	0	0	0	0
	No. Of Houses Damaged	0	0	0	0	84
	Estimated cost of house damages in Rs.	0	0	0	0	612272
	No. Of casualty	0	0	0	0	0
Mannarkad	No of affected villages	25	25	25	25	19
	Population Affected	598	611	536	557	322
	No. Of Houses Damaged	275	295`	202	289	88
	Estimated cost of house damages in Rs.	589300	463700	430000	678200	115400
	No. Of casualty	4	1	0	0	0

Table 21.3 continued...

Palakkad	No of affected villages	30	0	0	0	0
	Population Affected	0	0	0	0	0
	No. Of Houses Damaged	390	310	168	335	20
	Estimated cost of house damages in Rs.	2533600	970180	380400	1937480	122100
	No. Of casualty	0	0	0	0	0
Ottapalam	No of affected villages	41	41	41	41	23
	Population Affected	0	0	0	0	0
	No. Of Houses Damaged	181	561	163	379	67
	Estimated cost of house damages in Rs	375000	1585000	799290	3365350	329930
	No. Of casualty	1	3	0	0	0
Alathur	No of affected villages	0	0	0	0	0
	Population Affected	0	0	0	0	0
	No. Of Houses Damaged	656	224	274	202	482
	Estimated cost of house damages in Rs.	10 Lakh	7 Lakh	15 Lakh	8 Lakh	25 Lakh
	No. Of casualty	3	0	1	0	5

The map (Fig. 21.1) representing the Flood-affected area of Palakkad generated from Kerala state Disaster Management Authority inputs is given below.

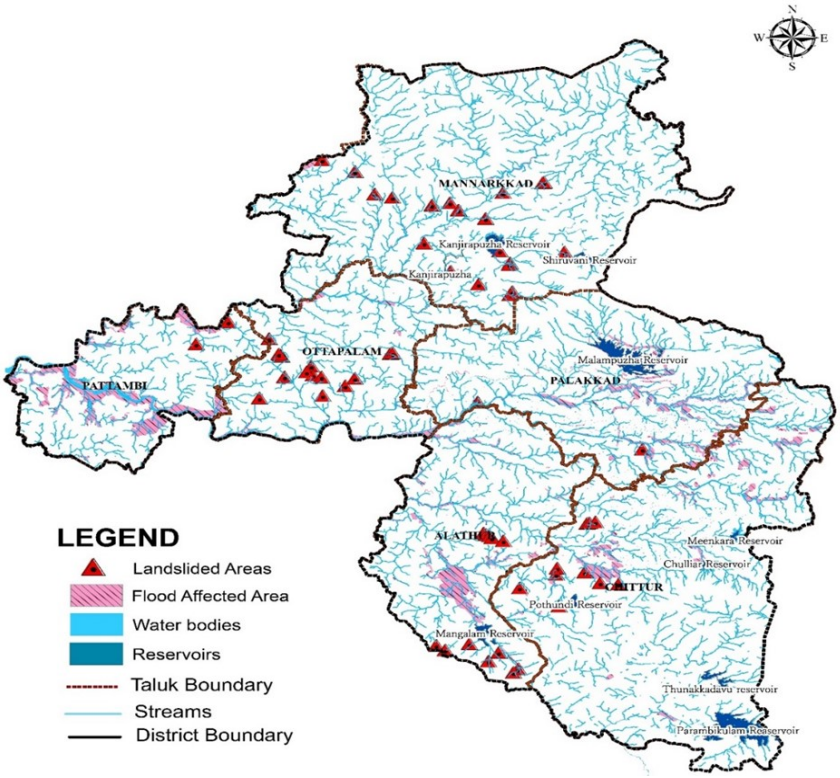


Fig. 21.1 Flood-affected areas of Palakkad

Spatial representations of other disasters and their likelihood locations are shown below. Further analysis is limited as the scope of this report is mainly regarding Floods and Landslides.

21.2.2 Drought

Drought is a recurrent phenomenon in Palakkad. Even though Palakkad has the maximum number of rivers, rivulets, dams and canals in the State, the district experiences severe drought every summer. As per JSA report, Despite getting more than 2,300 mm rain annually, the district has little progress in reusing and recharging infrastructure, developing watersheds, or catching rainwater and intensive afforestation. Thus district is ranked 219th rank in terms of water conservation. According to SEOC, a large portion of Chittur taluk and portions of Palakkad and Alathur taluks are severely drought-prone and the worst-hit sector is agriculture with an estimated economic loss of 97 crores. Apart from depleting potable water sources, many regions particularly the eastern part of the district are exposed to serious groundwater contamination, which intensifies the drinking water scarcity. The state of Kerala experiences seasonal drought conditions every year during summer months. The seasonal drought of Palakkad district every year bring about water scarcity mainly reflected in rivers and lowering of the water table. This adversely affects the rural and urban drinking water supply. The drought susceptibility map of Palakkad district is shown in Fig. 21.2. The figure shows the Palakkad district primarily covered with moderate area, especially in the Pattambi Municipality. Hence the macro level of study is constrained.

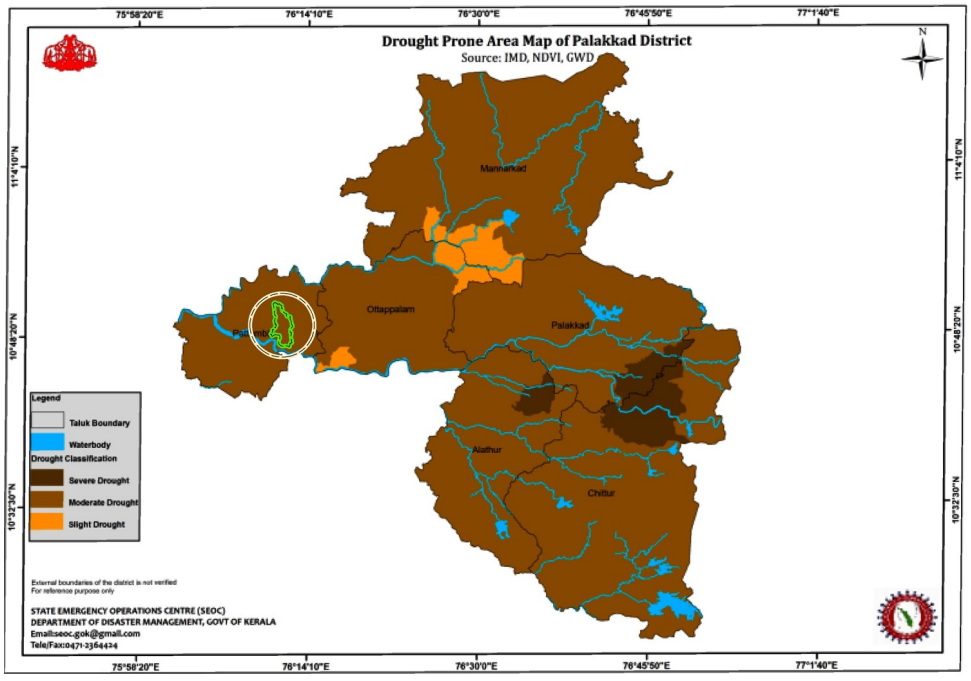


Fig. 21.2. Drought prone areas of Palakkad

21.2.3 Landslide

Landslides are frequent in the localized regions of the Western Ghats where the slope is steep, and soil is oversaturated as a result of prolonged rainfall. The impact of these events varies from small parcels to large tracts with the large ones involving loss of life and property getting highlighted and investigated in detail. Studies by NCESS

show that most of the events are of debris flow type triggered by excess rainfall and are influenced by terrain factors like slope, overburden thickness, land use, relative relief, disposition of streams etc. The recent events of Landslide in Palakkad (Table 21.4) indicate consistency with the past trends in spatial location. The spatial representation showing landslide susceptible zones is given in Fig. 21.3

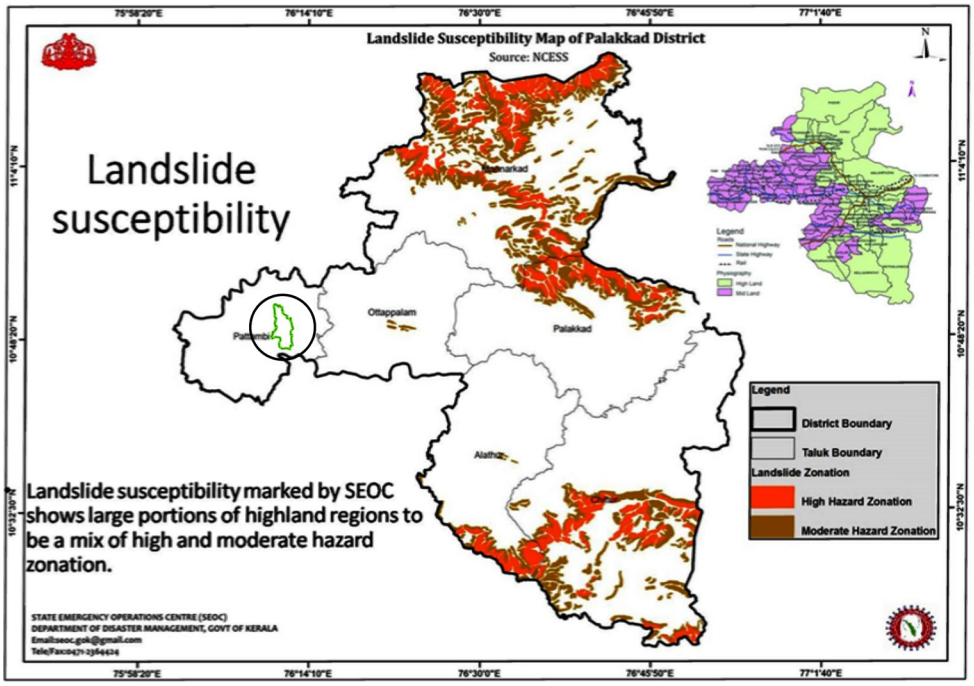


Fig. 21.3. Landslide Susceptibility map of Palakkad

Table 21.4 Review of recent landslides in Palakkad on the 12th,13th of June 2018 (Mannarkkad , Alathur Taluks)

Parameters	Event 1	Event 2	Event 3	Event 4
Name of the Land	Paypullu	Kun-dampotti-Vattapara	Mannannaka-yam	Kadappara
Village	Palakayam village	Palakayam village	Kizhekkencher-ry Village	Kizhekkencher-ry Village
Land use	High Height plantation	High Height plantation in runout area, Rubber plantation, Forest at source	High Height Plantation	High Height Plantation
Hydrological condition	Dry at source re-gion and flowing at	Flowing	Flowing	Flowing
Triggering factor	Rainfall	Rainfall	Rainfall	Rainfall

Table 21.4 continued...

People affect-	One single storeyed house fully damaged, one partially damaged.	Nil	Nil	Nil
Geo-scientific causes	Natural slope had been benched for cash crops thereby blocking natural drainage. Heavy antecedent rainfall for 3days preceding the event resulted in building up excess pore water pressure and reduction of strength on saturation. Landslide was initiated as planar failure along rock-overburden.	Initiated as rockslide dislodging huge boulders that size up to 3m×3m×2m. It further graded into a debris flow collecting more debris and soil, following a natural stream path.	Incessant rainfall for 3 days resulted in built up of cleft water pressure initiating rock slide. It further graded into a debris flow collecting more debris and soil, following a natural stream path and joined a higher order stream.	Initiated as shallow rotational failure due to super saturation of slope debris following incessant rain for 3 days. It further graded into a debris flow collecting more debris and soil, following a natural stream path and joined a higher order stream.

(Source : NLSM , GSI)

21.2.4 Earthquake

Palakkad district falls in seismic zone III and has experienced minor tremors in the past. The seismic data of Palakkad district for a period of 20 years (1989-2008) is presented in Table 21.5. A spatial representation showing earthquake susceptible areas based on past occurrences is given in Fig. 21.4.

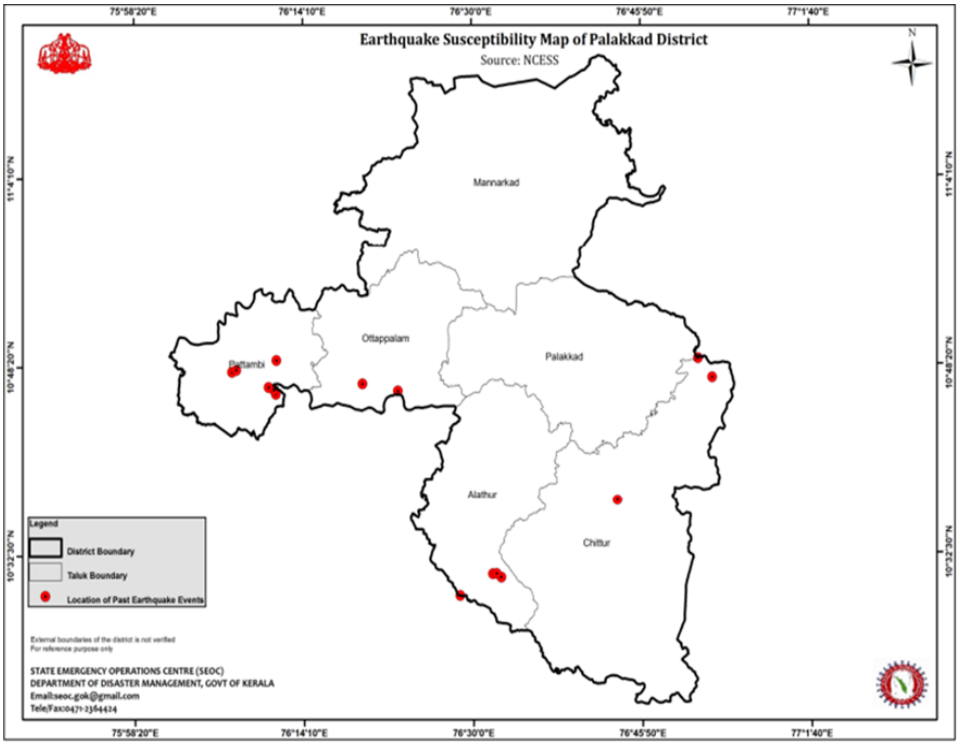


Fig. 21.4. Earthquake-prone areas of Palakkad

Table 21.5. Historical Earthquakes reported from Palakkad

Sl.no	Date	Location		Magnitude
		N°	E°	
1	02/12/1994	10.75	76.25	4.3
2	25/08/2001	10.76	76.25	2.8
3.	17/04/2004	10.81	76.13	1.6
4.	18/04/2004	10.69	76.66	1.5
5.	27/02/2006	10.80	76.57	1.0
6	01/03/2006	10.86	76.32	2.0
7.	25/03/2006	10.76	76.34	1.6
8.	03/06/2006	10.79	76.38	1.6
9.	07/09/2006	10.46	76.57	1.2
10.	30/04/2007	10.83	76.47	0.9
11.	04/05/2007	10.83	76.47	<1
12.	01/12/2008	10.69	76.52	2.3

(Source : NCESS & GSI)

21.2.5 Lightning

Lightning being a random event, it is impossible to map its spatial probability of occurrence to an aerial extent. Accidents induced by ground conduction from trees and lack of awareness aggravate the condition, intensifying the number of fatalities and property losses. The months of October, November and December have the highest lightning rates, according to data. The most likely time for lightning to strike during the day is between 15:00 and 19:00. The lightning susceptible regions based on past experiences is shown in Fig. 21.5.

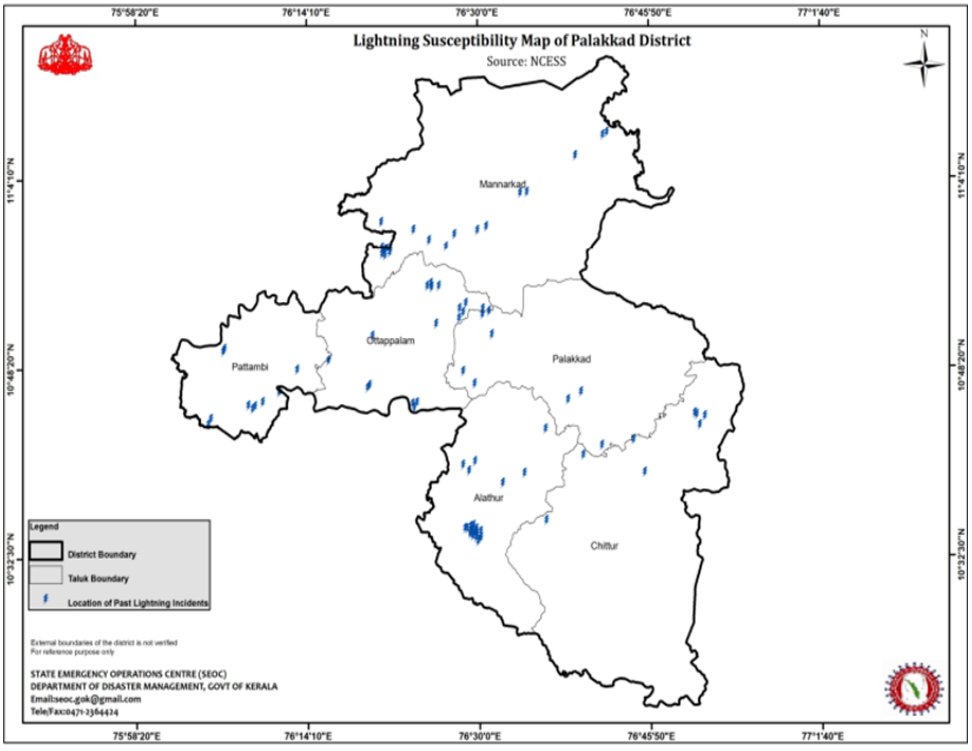


Fig. 21.5. Lightning-prone areas of Palakkad

21.3 INPUTS FROM THE REPORT OF "MODIFICATION STRATEGY OF SETTLEMENT PATTERN IN THE CONTEXT OF FLOOD 2018: PALAKKAD DISTRICT

The Palakkad district has received remarkable spells of rain during the southwest monsoon period. Landslips in the highlands added to the woes of the affected populace. In light of this, The Town & Country Planning Department, Palakkad Office, carried out research and created a report - "Modification strategy of settlement pattern in the context of flood 2018: Palakkad district" with a deep intention of reducing flood and landslide-related disaster damages. Following are the some of the findings of the study's extracts for the Pattambi area's premises: During the floods, Pattambi and Palakkad Taluks were severely damaged, while other taluks namely Mannarkkad, Alathur, Chittur and Ottappalam took the major hit by landslides. On a whole , floods alone affected an area of 180 sq. km. Plantation and agriculture took the major hit. Residential areas were affected both by floods and landslides. Transport infrastructure viz, Roads and bridges were partially and fully damaged in various parts of the district. A summary of damages in figures are listed below.

1. Rainfall - 2412.31 mm (last year - 1521.15 mm)
2. Total No. of Relief Camps established – 165 , Total Inmates - 16684 (5241 Family)
3. Total Death due to flood - 23 (Drowning - 10, Landslide - 13)
4. Missing Cases - 1 (Palakkad Taluk - 1)
5. No. of people rescued from flood - 1962
6. Fully Damaged Houses - 1276 (loss Rs. 51.04 crore)
7. Partial Damaged Houses - 4878 (loss Rs. 24.39 crore)
8. Agriculture crop loss - 8535.68 Ha (Rs. 61.52 crore loss)
9. Declared flood affected Villages - 86 out of 157
10. Main landslide affected areas - Vallangi , Kottoppadam, Karadiyodu, Nelliyampathy, Kizhakkancheri , Palakkayam, Kadambazhippuram ,Anakkal , Kattusseri

The Disastrous flood and landslides affected the maximum number of families living in Pattambi and Alathur taluks. Chittur and Palakkad taluks are not far away from the dreadful impact. This is corroborated by the proportional number of camps opened in the respective taluks. Nearly 41% of the affected populace are female, 21% are children against 38% of males. Thus 62% of the affected people fall under the vulnerable section.

From a geographic perspective, the majority of Chittur and Alathur taluks are in the highland zone, whereas Pattambi is in the midland region. Thus it is highly likely that Pattambi being a midland region has been vastly affected by floods while Chittur and Alathur taluks being the high zone were affected more by landslides than floods. Fig. 21.6 depicts the flood and landslide affected areas of Pattambi taluk.

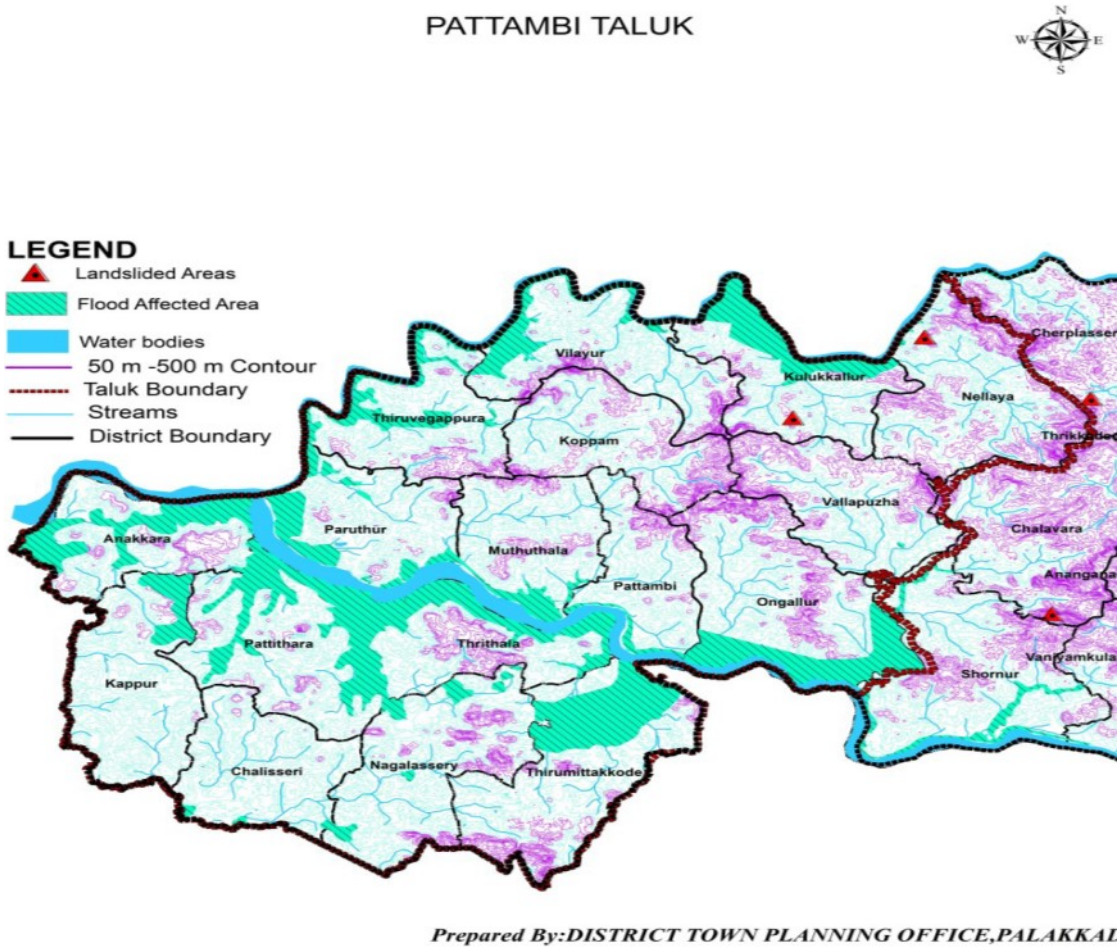


Fig. 21.6 Spatial Depiction of the flood and landslide affected areas of Pattambi taluk.

21.4 NATURAL HAZARDS HISTORY OF PATTAMBI

The historic accounts regarding the spatial extent of natural hazards become critical in disaster management and post-disaster response. In the past, Pattambi Municipality has primarily experienced flooding. Areas bordering the Bharathapuzha river near the southern boundary of Pattambi municipality are prone to flooding during the rainy season every year. The mega flood in 2018 and 2019 severely affected the Pattambi municipal area.

One of the main transportation corridors through the Pattambi Bridge was blocked for more than 10 days and some parts were damaged during such floods. This is the first time since 2006 that water has risen above the bridge. Some of the agricultural areas were also flooded and badly affected the economic base of the municipal

area. The infrastructures such as roads, houses, bridges, electricity and drainage facilities were also damaged during such floods.

21.4.1 Impact Analysis of Mega Flood 2018 in Pattambi Municipality

Pattambi municipality took a major hit during mega flood 2018. Southern region of the municipality was affected by the flood since it is bounded by Bharathpuzha. Water level raised up to 1.50 m above ground level along the banks of the river covering a width of 150m.



Out of 28, 11 wards were affected by flood. Table 21.6 gives the details of flood affected areas in Pattambi town during 2018 flood. Vallur north (ward 1), Randam mile (ward 3), Chorakunnu (ward 9), Umikunnu (ward 18), Nambram (ward 19), Pattambi town (ward 20), Nethrimangalam (ward 22), Civil station (ward 23), Paruvakkadavu (ward 24), Kozhikunnu (ward 25) and Vadakkumuri (ward 26) were affected.

The total population affected was 1081 which includes 357 families. Nambram was severely affected with 150 families and a population of 450, followed by Nethrimanagalam (80 families) and Paruvakkadavu (55 families). Fig. 21.7 depicts the flood affected areas of Pattambi Municipality(2018).

Table 21.6 Details of flood affected wards in Pattambi municipality

Ward no.	Ward name	No. of families	Population affected
1	Vallur north	5	20
3	Randam mile	1	3
9	Chorakunnu	12	36
18	Umikunnu	8	24
19	Nambram	150	450
20	Pattambi town	25	60
22	Nethrimangalam	80	200
23	Civil station	5	16
24	Paruvakkadavu	55	140
25	Kozhikunnu	5	12
26	Vadakkumuri	11	120
	Total	357	1081

Source : Pattambi Municipality

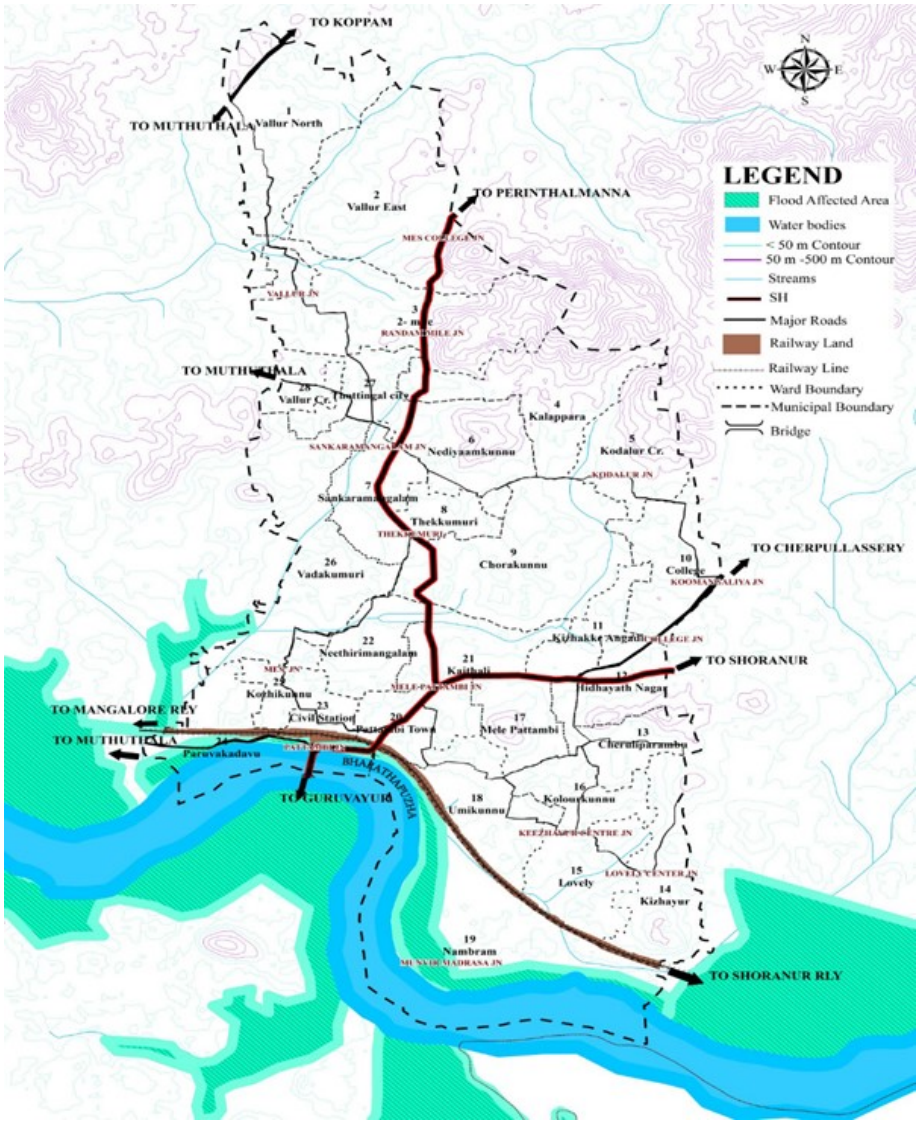


Fig.. 21.7 Spatial depiction of the flood affected areas of Pattambi Municipality.

In the figure, Flood affected areas were located near the river banks of Bharathapuzha in the southern region of Pattambi municipality.

21.4.2 Impact Analysis of Flood on Critical Infrastructure Facilities

This analysis aims at identifying the critical facilities in the Municipality like educational institutions, police stations, hospitals, fire and rescue stations, etc. These facilities play a central role in disaster response and recovery and hence, it is important to protect these critical facilities to ensure that disruption of public service is minimized during the disaster. The list of the critical facilities includes,

- Schools, Colleges and University
- Hospitals
- Police Stations
- Shelter Homes
- Telecom Offices
- Key Government Offices
- Community Centres
- Fire Stations

21.4.2.1 Relief Camp Location

Relief shelters and Rehabilitation camps shall be set up in order to accommodate people affected by a disaster. The camp shall be temporary or permanent in nature with basic necessities. People in the camp shall be encouraged to return to their respective accommodations once normalcy has returned.

Fig. 21.8 shows the locations of relief camps during flood. Table 21.7 gives the details of relief camps in Pattambi.

Table 21.7 Details of relief camps in Pattambi municipality

Sl No.	Location	Camps opened	Split up of inmates			Total
			Male	Female	Children	
1	GHS School	16-08-2018	54	180	100	334
2	MES International School	15-08-2018	20	38	32	90
3	NSS Hall	15-08-2018	3	3	2	8
4	Panthakkal	15-08-2018	5	7	3	15

Source : Pattambi Municipality

21.4.2.2 Safe Routes

Damages to the transportation routes not only cause immediate problems but also endanger the general development of any region. So it is very crucial to plan safe

routes. Safe routes and alternate routes have to mapped and communicated to the citizens through effective media to help the rescue operations. In the Pattambi Master plan all the future rescue shelters and the safe routes are marked. The proposed road network shall ensure reaching of every nook and corner of the Planning area in case of a calamity.

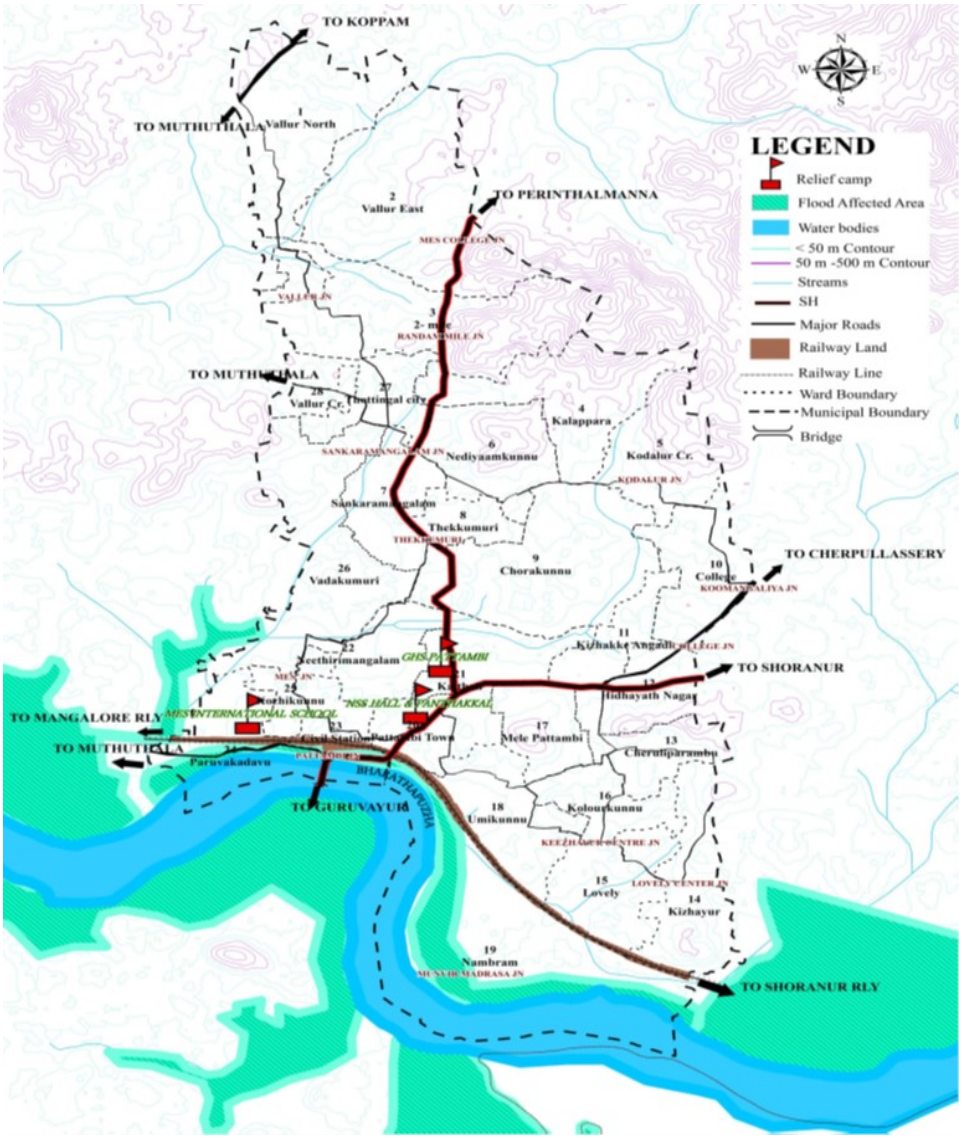


Fig.. 21.8 Spatial locations of the relief camps of Pattambi Municipality.

Due to the terrain of the town, apart from the riverside, normally flooding will not occur during monsoon. However, the proper drainage network shall be prepared and implemented especially along the arterial roads.

21.4.2.3 Housing

In Pattambi, the housing sector is not likely to be affected by flood-like circumstances. Ordinary brick buildings are usually quite susceptible to flood damage. The consequences of exceptionally heavy rain, gushing waters and inundation, all con-

spired to have an impact on the housing sector. 357 families were affected due to the flood in 2018. Nambram was severely affected with 150 families and population of 450. Followed by Nethrimanagalam (80 families) and Paruvakkadavu (55 families).

21.4.2.4 Connectivity Sector

About 127.58 m of roads in Pattambi town were damaged by the flood. Based on the collected Information, we could make out from the map that roads located in the southern part of town have reported the maximum damages. The following images shows the effect of damages across the Pattambi bridge which is the major entry of Pattambi-Guruvayoor road. Due to the terrain of the town, apart from the riverside, normally flooding will not occur during monsoon. However, the proper drainage network shall be prepared and implemented especially along the arterial roads. In many areas, electricity was shutdown to avoid further hazards. Table 21.8 shows the details of damaged roads in Pattambi town. Table 21.9 shows the details of damaged buildings in Pattambi town.



Effect of 2018 flood across Pattambi bridge

21.4.2.5 Electricity

Damages in the transmission subsector were caused by the collapse of electric towers, Transformers and poles as a result of erosion of their foundations. In many areas electricity was shutdown to avoid further hazards. Damages and losses in the distribution subsector were mainly caused by faults, collapsed poles in distribution lines, and power cut offs in the flooded areas.

Table 21.8 Details of Damaged roads in Pattambi Municipality

Sl. No.	Name of work	Actual length	Damaged road (M)	Amount in lakhs
1	Perinthalmanna bypass road	0.5	0.5	14 , 65,000
2	Green park Muthuthala thara road	3.5	3.5	8 , 00,000
3	Green park colony road	4	4	4 , 00,000
4	Kizhayur Onnamkatti road	1.2	1.2	6 , 40,000
5	Mele kulam road	0.9	0.9	80,000
6	Poovakkode road	4	4	2 , 40,000
7	Kottapadi road	0.8	0.8	2 , 00,000
8	Poovakkode Kodalur road	2.3	2.3	1 , 60,000
9	Kalpaka Street road	4.5	4.5	2 , 40,000
10	College Kalpaka road	0.6	0.6	2 , 00,000
11	Sekkeena Colony road	1.2	1.2	2 , 04,000
12	Kizhayur Cheruli parambu road	2.5	2.5	3 , 60,000
13	Mullakkal Alambali road	0.9	0.9	2 , 20,000
14	Kumari Kayattam Akunnu road	0.85	0.85	3 , 60,000
15	Kumari Kayattam Anganavadi VPM centre road	1.5	1.5	3 , 44,000
16	Ummikunnu Cholakulam	1.2	1.2	4 , 80,000
17	Police station Kizhayur	2.6	2.6	4 , 00,000
18	Saith Haji Nagar road	0.95	0.95	80,000
19	Kizhayur road drainage	1.2	1.2	6 , 00,000
20	Harmony street padam road	1	1	4 , 40,000
21	Murkkatt parambu padam road	2.2	2.2	6 , 40,000
22	M E S liberty road	2.6	2.6	5 , 60,000
23	Green park drainage	4.2	4.2	4 , 00,000
24	Pallippuram road bharathapuzha road	2.2	2.2	80,000
25	Sreesailam main road	1.5	1.5	4 , 00,000
26	Liberty street padinjare kamanam	1.3	1.3	80,000
27	Harmony pandhal road	2.5	2.5	4 , 00,000
28	Harmony liberty road	2.5	2.5	2 , 40,000
29	Vallur water tank- Sankaramangalam	1.1	1.1	80,000
30	Chettiyarpadi cherurnipadi road	0.85	0.85	1 , 20,000
31	Sankaramngalam parakkad road	2.25	2.25	1 , 40,000
32	Randam mile pulinchode road	1.1	1.1	1 , 56,000
33	Parvathy Holibricks padam road	1.9	1.9	1 , 20,000
34	Pathiyil road	1	1	1 , 80,000
35	Cholayil road	2.5	2.5	1 , 20,000

Table 21.8 continued...

36	Nediyankunnu kottapadi road	2.6	2.6	2 , 52,000
37	Madathil kulam road	1	1	2 , 20,000
38	Variath padi road	0.85	0.85	1 , 96,000
39	CKM colony road	1.68	1.68	2 , 00,000
40	School padi panchayath ground road	2.8	2.8	1 , 84,000
41	Thekkumuri madrasa road	3	3	1 , 68,000
42	Gopalan padi panamkutty Sankaramangalam road	2.5	2.5	1 , 80,000
43	Puthukulam palli road	2.4	2.4	2 , 52,000
44	Hidhayath nagar road	1	1	2 , 20,000
45	Kalpaka punnassery road	1.5	1.5	2 , 28,000
46	Kalpaka cheruliparambu road	1.5	1.5	1 , 80,000
47	Vadakkummuri centre ammukkunnu	1.2	1.2	2 , 12,000
48	Liberty vadakkummuri kulappuram	1.3	1.3	2 , 00,000
49	From Devikripa to puthanpadi road	2.5	2.5	1 , 88,000
50	Vishnu temple road	2.4	2.4	1 , 88,000
51	Kizhayur road	1	1	1 , 40,000
52	Kizhakkepurakkal kooriyatt road	1.5	1.5	1 , 00,000
53	Kolarkkunnu variath parambu road	1.5	1.5	1 , 96,000
54	Anthurpalliyal madrasa akunnu road	0.85	0.85	1 , 80,000
55	Thekkumuri puthukulam road	1.2	1.2	1 , 64,000
56	Kothakunnu road	1.3	1.3	1 , 20,000
57	Thottingal city parakkad road	3.5	3.5	80,000
58	Manoharan road	3.2	3.2	1 , 88,000
59	Thekkumuri Vadakkumuri road	1.85	1.85	1 , 48,000
60	Rationshop Ongallur Panchayath	1.25	1.25	1 , 40,000
61	Chandaramathi padi road	3.2	3.2	1 , 28,000
62	Koothathodi padi gopalan padi bondary road	1.9	1.9	1 , 68,000
63	Hithayath basheer padi road	2.2	2.2	1 , 56,000
64	Vallur Ariyath padi centre Kozhikkottiri road	2	2	1 , 72,000
65	Vallur school road	1.5	1.5	2 , 00,000
66	Kashav kunnu road	1.5	1.5	2 , 52,000
67	Pallippadu colony road	2.5	2.5	2 , 36,000
68	Paruvakadavu Anganwadi	1.5	1.5	10 , 00,000
	Total	127.58	127.58	1 ,84, 65,000

Table 21.9 Details of Damaged buildings in Pattambi Municipality

Sl. No.	Name of damaged building	Amount in lakhs
1	Comfort Station	8 ,00,000
2	Nambram Anganwadi	5 ,00,000
	Total	13,00,000

Source : Pattambi Municipality

21.4.2.6 Other Sectors

21.4.2.6.1 Agriculture

Major loss has happened in the agriculture sector where Paddy, Banana etc. are mostly affected. It is also important to note that while crop loss in an immediate visible effect of the flooding, larger issues related to loss of top soil, degradation of fertile land, silt formation in paddy etc. that make restoration of agricultural activities become a difficult task. Paddy lands in Nambram (ward 19) were damaged by the flood.

Damages to ecosystems are identified as riverbank erosion (Bharathapuzha River), destructions to wetlands, soil erosion and accumulation of silt in low and agricultural lands, and loss of forest and agricultural lands. Landslides degrade landscapes by causing offsite damages such as siltation of agricultural lands and water bodies. Floods too contribute to land degradation, causing severe soil erosion and depositing silt in low-lying areas, wetland and agricultural lands. Additional costs incurred for the disposal of waste generated during emergency and early recovery included in losses.

21.4.2.6.2 Animal Husbandry

The intense rainfall and wind have caused severe damages to animal husbandry sector of Pattambi municipality. The unprecedented rainfall which trigged flooding in the state has resulted in the death of large number of cattle, buffaloes, goats and poultry. Further, destruction of cattle sheds, shortage of fodder, veterinary medicines and vaccines added to the plight.

21.4.2.6.3 Trade and Commerce

Commercial establishments in Pattambi town (ward 20), Nethrimangalam (ward 22), Civil station (ward 23), Paruvakkadavu (ward 24), Kozhikunnu (ward 25) and Vadakkumuri (ward 26) were damaged during flood 2018.

21.5 DISASTER MANAGEMENT

It is observed that the more we develop in science and technology, the less we care about protecting and maintaining our environment. Indiscriminate, improper, injudicious use of the environment will result in nature deviating from its original path and cause hazards to all living beings that we cannot defend. In order to keep it in control, proper action plans must be encouraged. Disaster management is a process of effectively preparing for and responding to such disasters. It involves strategically organizing resources to lessen the harm that disasters cause.

The four key stages of activities that are taken up within disaster management are depicted in Fig. 21.9 The four disaster management phases illustrated here do not always occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster. The cyclical nature of disaster management involving Mitigation, Management, Response and Recovery processes focuses on the ongoing and continual actions to prevent and manage disasters.

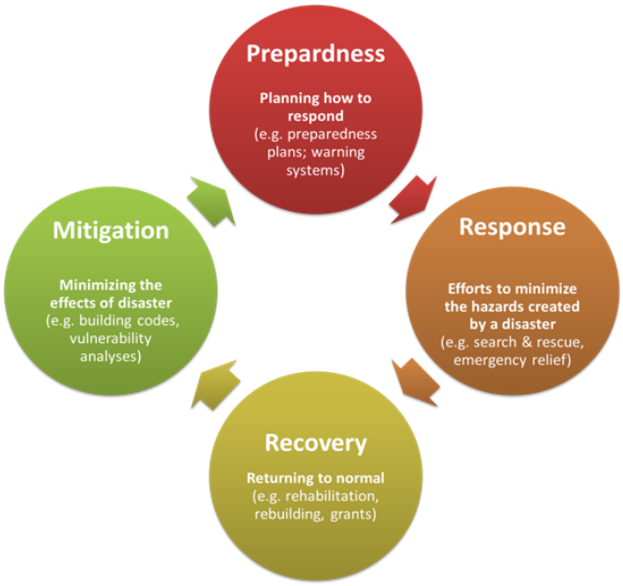


Fig 21.9 Disaster Management Cycle

21.5.1 Disaster Mitigation

Disasters wipe away what was written on the slate earlier. They give us the opportunity to write back on a clean slate in such a way that it facilitates the building of more resilient communities. This is what mitigation is meant for. Mitigation efforts attempt to prevent hazards from developing into disasters altogether, or to reduce the effects of disasters when they occur. Mitigation specifically refers to actions taken that can lessen the severity of a disaster's impact. The mitigation phase differs from the other phases because it focuses on long-term measures for reducing or eliminating risk. This includes proper planning and implementing what we need in a more

eco-friendly way. Our cities are becoming increasingly impervious to water, not just because of increasing built-up but also because of the nature of materials used (hard, non-porous construction material that makes the soil impervious). To improve the city's capacity to absorb water, new porous materials and technologies must be encouraged or mandated across scales. This can be envisaged by making the cities permeable by promoting the concept of sponge city.

In view of the hazard profile of Pattambi Municipality, mitigation measures addressing frequent floods is discussed below in detail.

21.5.1.1 Flood

The present report focuses to map the susceptible areas of the flood as a mitigation measure incorporating various flood conditioning factors and previous flood experience in a GIS environment.

21.5.1.1.1 Flood Susceptibility Mapping

Floods, which are a natural hazard, need not become a disaster, if we are prepared and are aware of how to deal with them. The first step to this goal is to find the probable areas of the flood. Flood susceptibility is defined as the relative likelihood of a dangerous flood event based on the propensity of a locale or site without considering the temporal probability of the occurrence event. The main purpose of the flood susceptibility mapping technique is to identify areas that are susceptible to flooding using geographic information system (GIS) and available topographical data. As natural hazards are multi-dimensional and multi-disciplinary phenomena that have a strong spatial component, GIS can be effectively applied in the context of flood damage analysis and risk assessment. The use of flood susceptibility mapping is a prerequisite for sustainable risk management, as it can predict the probability of flood occurrence and provide useful information on suitable measures for mitigating future floods.

To assess flood susceptibility, the flood conditioning factors were determined and their mutual interaction ratios were calculated. For the present study, a total of 9 conditional factors were created for susceptibility mapping including Rainfall, Slope, Elevation, Flow Accumulation, Drainage Density, Soil, Land use, Geology and Geomorphology using Arc Map.

Base datasets used:

1. Alos DEM data with 12.5m resolution
2. Geomorphology map from NRSC
3. 2018 Existing Land use
4. Rainfall data of stations (Pattambi ,Vadakkanchery ,Kunnamkulam , Mundayam , Perinthalmanna).

21.5.1.1.2 Flood Conditioning Factors

i. Rainfall

The rainfall input is one of the main factors influencing the magnitude of the runoff response during a flood event. Flooding is influenced by a combination of rainfall including amount, intensity, duration and spatial distribution. Therefore floods may be produced by high intensity, short-duration storms, or longer duration, low-intensity rainfall. Entire Kerala witnessed unprecedented spells of rain in 2018 which was the worst to hit the state in a century. A graphical representation showing rainfall details of the 2018 southwest monsoon for Palakkad is given in Fig 21.10.

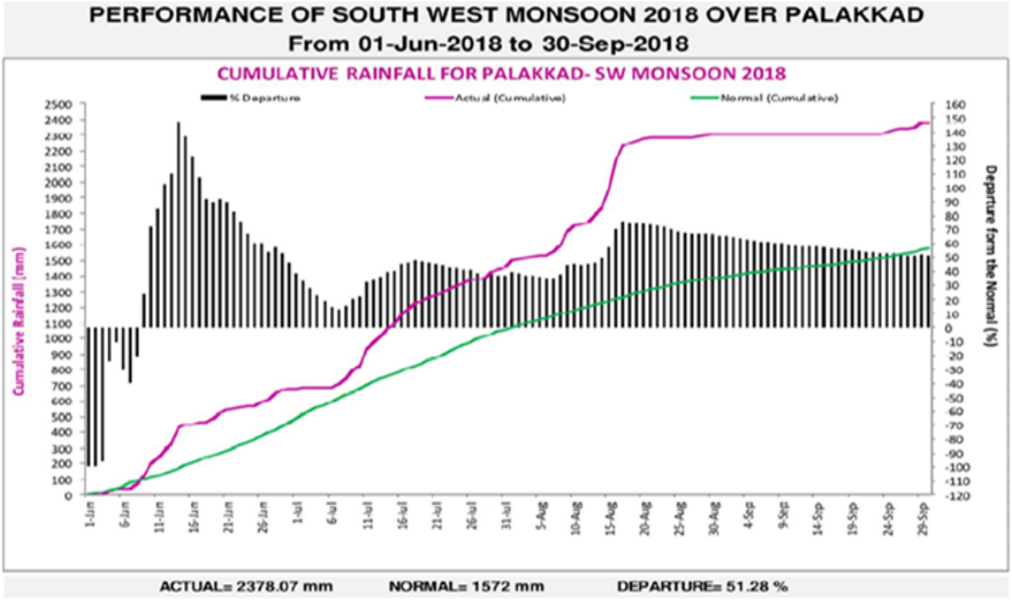


Fig 21.10. Details of the 2018 southwest monsoon for Palakkad District

The peak rainfall data was used for susceptibility mapping to predict the regions that may get the worst hit by flood. Annual average rainfall data for the year 2018 were collected from 6 stations surrounding the Pattambi town area and were mapped by Inverse Distance Weightage (IDW) method (Fig 21.11). Annual rainfall for Pattambi Municipality ranges from 256-246 mm. The weightage details for rainfall classes are given the Table 21.11.

ii. Slope

Slope controls the velocity of water on the ground surface, which affects infiltration and runoff. Generally, the areas with steep slopes generate more velocity hence conveying the water to nearby basins more rapidly without giving scope to further accumulation. Whereas gentler slope areas dispose the excess water gradually resulting in floods and water-logging. The slope map (Fig 21.11) for Pattambi Municipality was generated from ALOS Dem of the same area utilizing the surface tool of ArcMap

software. From the map, it is evident that the majority of the area falls under 7º (flat-Gentler) slope category hence more susceptible to flooding. The weightage details for slope classes is specified in Table 21.11.

iii. Elevation

Elevation has a reverse correlation with flooding. It is commonly observed that low elevated areas are more susceptible to flooding. The elevation map (Fig 21.11) was prepared using ALOS DEM data. The altitude values were sub-divided into five classes ranging from 28-126 m using the natural breaks method which was later re-classified by assigning weights (Table 21.11) in accordance with their ability to contribute to flooding.

iv. Flow Accumulation

Flow accumulation is an indirect way of measuring drainage areas. It is a pixelated representation of actual flow accumulation that occurs in the ground. The accumulated flow depends on the number of cells flowing into each cell in the output raster. An increase in flow accumulation should reflect an increase in flood susceptibility. Flow Accumulation map (Fig 21.12) was derived from ALOS DEM data on a watershed basis using the Hydrology tool in Arc Map environment which was later clipped to the areal extent of the town. The blue lines act as source regions for water, which adds up to form the next higher channel (green lines), and finally to a stream network inundating the pathways. The weightage details for flow accumulation classes are given in Table 21.11.

v. Drainage Density

Drainage density, defined as channel length per unit watershed area (km km^{-2}), reveals the amount (or density) of channels in a watershed. Drainage density depends upon both climate and physical characteristics of the drainage basin. Areas with high drainage density hold high probability of flooding and vice versa. The Fig 21.12 shows the drainage density map of Pattambi Municipality. The weightage details for Drainage Density classes are given in Table 21.11.

vii Soil

Soil permeability plays a much larger role in flooding. The higher the permeability of a soil layer, the faster water can infiltrate through and avoid flooding. Soil permeability affects not only how quickly and how much an area can flood, but also the recovery time of an area after a flood event. 7 types of soil are identified in Pattambi Municipality. The Fig. 21.12 shows the soil map of Pattambi Municipality. The major covered soils such as sandy loam, sandy clay and gravelly sandy clay , gravels are

more permeable least resistance to flooding. The weightage details for soil classes are specified in Table 21.11

vii. Geology

Geology is the study of the Earth, the materials of which it is made, the structure of those materials and the processes acting upon them. The Pattambi municipal area is mainly categorized into 3 geomorphic classes: Charnockite, Migmatite and Fluvial sediments. Charnockite covers the major part of the town followed by Fluvial sediments and Migmatite. The Fig 21.13 shows the geology map of Pattambi Municipality. Majorly covered charnockite and Migmatite are less porous preventing water from passing through pores and fissures and making it low resistant to flooding. The weightage details for geologic classes are specified in Table 21.11

viii. Geomorphology

As identified from the NRSC geomorphology map, the Pattambi municipal area is mainly categorized into 3 geomorphic classes; water body, Active flood plain and Pediment-Pediplain complex (Fig 21.13). Flood plain can be observed adjoining the river area and represents the land created by the lateral shifting of river channels and by the deposition of overbank flood deposits during 'present-day' environmental and climatic conditions. Pediment-Pediplain complex covers a major part of the town and represents a gently sloping landform made of weathered sediments. All three features represent areas with low slope and elevation hence are likely to be inundated during flood. The weightage details for geomorphic classes are specified in Table 21.11

ix. Land use

Land use is the only manmade parameter among flood conditioning factors. Anthropogenic interventions, such as urban area growth, disrupt the natural slope of the land and increase the impervious surface area of the city continuously, while the storage facilities such as large paddy fields and fishponds decrease, causing an increased runoff coefficient leading to localized flow accumulations and flooding. The Land use map of Pattambi Municipality (Fig 21.13) was rasterized and weightage is shown in (Table 21.11) for each land-use class was given according to their potential in contributing flood.

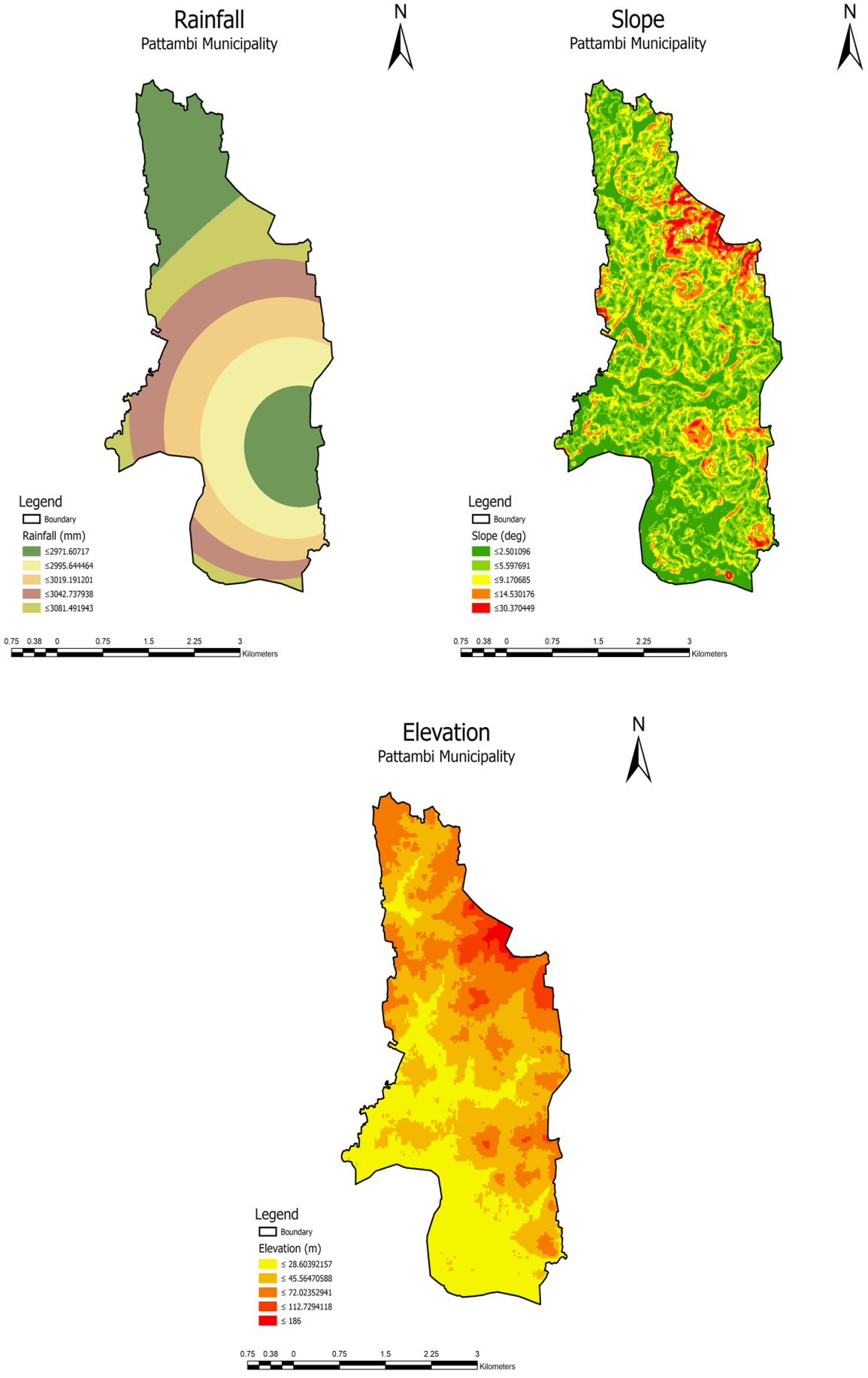


Fig 21.11 Rainfall , Slope , Elevation maps of Pattambi Municipality

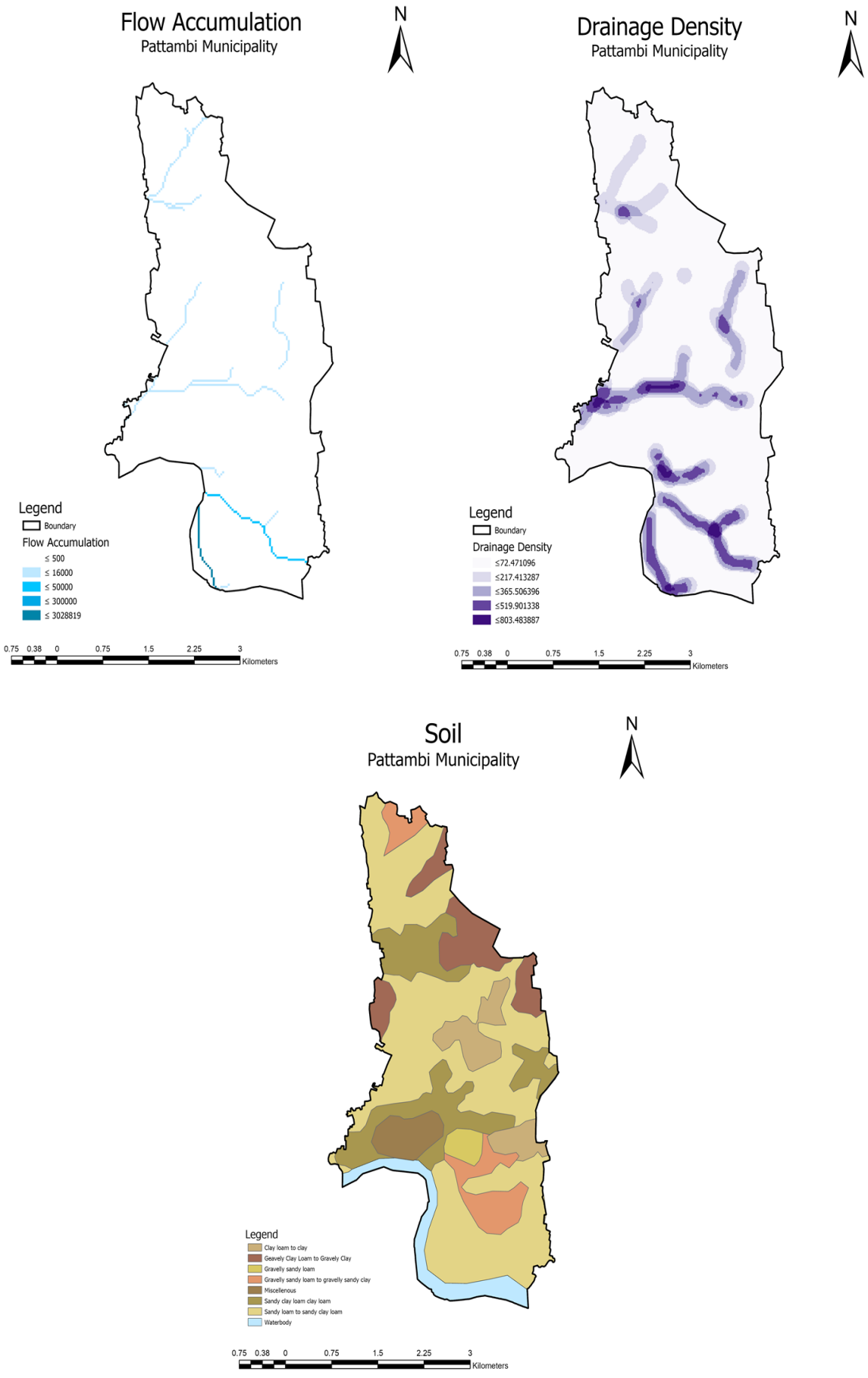


Fig 21.12 Flow Accumulation , Drainage density ,Soil maps of Pattambi Municipality

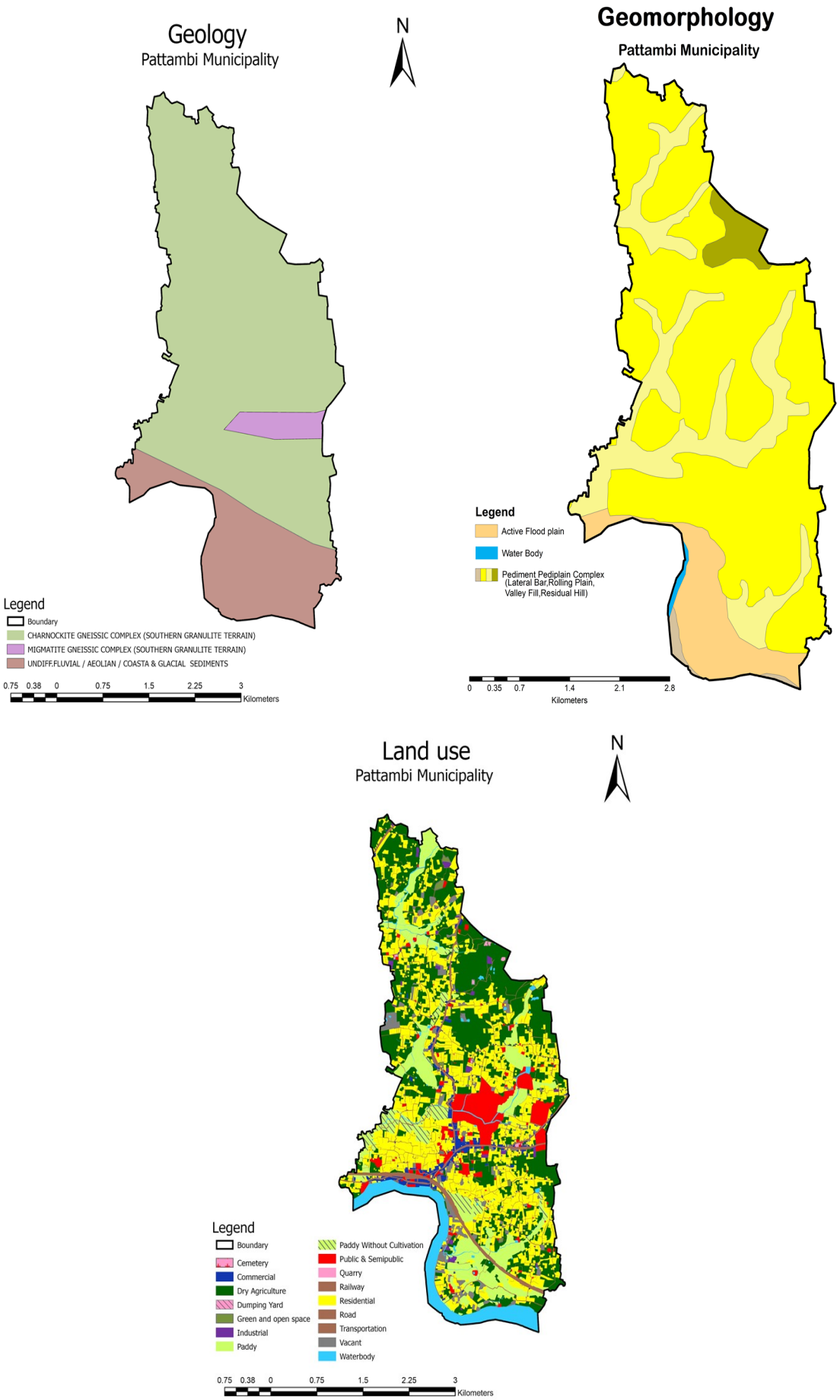


Fig 21.13 Geology ,Geomorphology ,Land Use maps of Pattambi Municipality

The hazardous areas cannot be estimated by considering the effect of each factor separately. The integration of all factors is necessary in order to obtain the overall map of flood-hazard areas. Since not all factors have the same degree of influence on the hazardous areas, a weighting approach, in which a different weight is assigned to each factor, was applied. The factor weights were assigned considering the effect of each factor on all other factors. The interactions between the factors are depicted in Fig.(21.14) A solid line between two factors indicates that one factor has a main effect on the other pointed to by the arrow; that is, a change of the first factor has a direct effect on the other. A dashed line between two factors indicates that one factor has a secondary effect on the factor pointed to by the arrow; that is, a change of the first factor has an indirect effect on the other. For example, flow accumulation has the main effect on land use and a secondary effect on the slope. In order to quantify the two different types of effects, one (1) point is assigned to the main effect and half a point (1/2) to the secondary effect. Then, the rate for a factor was computed as the summation of the points corresponding to the effects emanating from the factor .

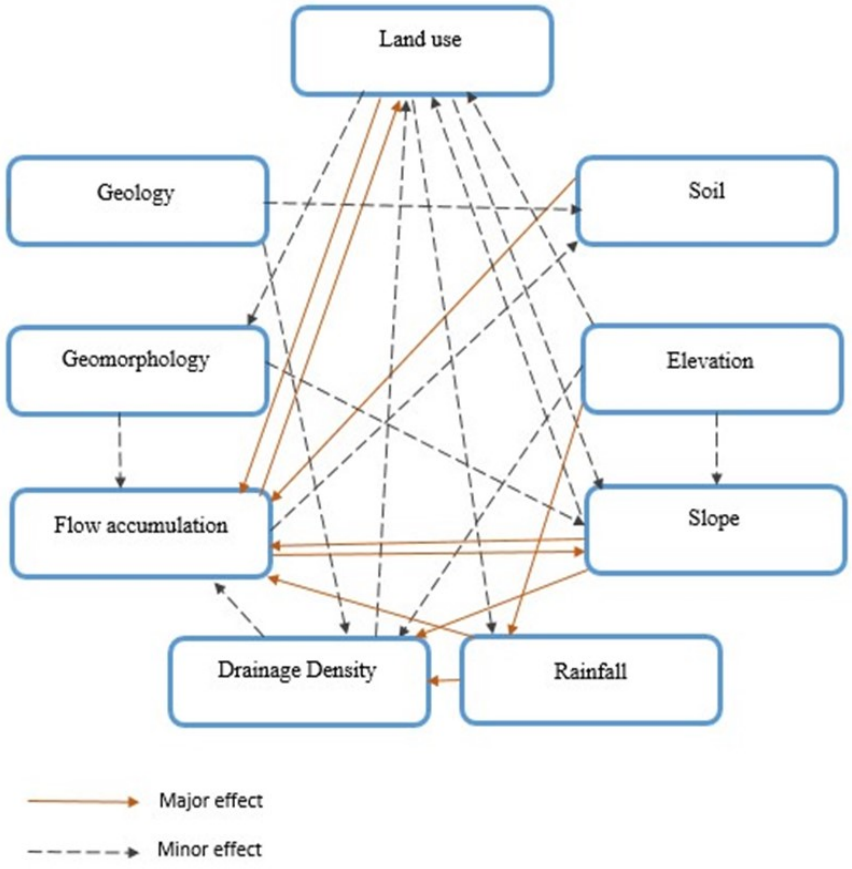


Fig.21.14 A schematic depiction of the interaction between factors that influence the flood hazard.

The rates for the factors depicted in Fig.21.14 are as follows in Table 21.10

Table 21.10 Mutual Interaction effects of factors

Factors	Interaction between factors	Rates	Rate weights
Flow Accumulation	2 Major + 1 Minor	(2x1) + (1x0.5)	2.5
Drainage density	2 Minor	(2x0.5)	1
Rainfall	2 Major	(2x1)	2
Slope	2 Major + 1 Minor	(2x1) + (1x0.5)	2.5
Elevation	1 Major + 3 Minor	(1x1)+(3x0.5)	2.5
Geology	2 Minor	(2x0.5)	1
Geomorphology	2 Minor	(2x0.5)	1
Soil	1 Major	(1x1)	1
Land use	1 Major + 3 Minor	(1x1)+(3x0.5)	2.5

From the table it is evident that the rate weights of Flow Accumulation, Slope, Elevation and Land use are slightly higher than all other factors. For a comprehensive evaluation of each factor related to hazardous areas, the rates and weights must be combined. This is achieved by multiplying the proposed weight by the rate of effect, which yields the total weight of each factor. The summation of all the factor weights yields the grand total weight (Table 21.11). The contribution of each factor to the hazardous areas, expressed as a percentage, is shown in the last column of Table 21.11. The percentage of each factor was computed as the ratio of the total factor weight to the grand total.

Table 21.11 Classification and weighting of factors

Factor	Classes	Hazard	Proposed weight of class (a)	Rate (b) (x_i)	Weighted rating (a x b)	Total Weight	Weight in % (w_i)
Flow Accumulation (pixels)	0-500	Very Low	1	2.5	2.5	62.5	16.0%
	500-16000	Low	3		7.5		
	16000-50000	Medium	5		12.5		
	50000-300000	High	7		17.5		
	300000-3028819	Very High	9		22.5		
Drainage density	0-72	Very Low	1	1	1	25	6.4%
	72-217	Low	3		3		
	217-365	Medium	5		5		
	365-519	High	7		7		
	519-803	Very High	9		9		

Rainfall (mm)	0-2971	Very Low	1	2	2	48	12.4%
	2971-2995	Low	3		6		
	2995-3019	Medium	4		8		
	3019-3042	High	7		14		
	3042-3081	Very High	9		18		
Slope (°)	0-2.73	Very High	9	2.5	22.5	62.5	16.0%
	2.73-5.97	High	7		17.5		
	5.97-10.07	Medium	5		12.5		
	10.07-16.30	Low	3		7.5		
	16.30-31.73	Very Low	1		2.5		
Elevation (m)	0-28	Very High	9	2.5	22.5	62.5	16.0%
	28-45	High	7		17.5		
	45-72	Medium	5		7.5		
	72-112	Low	3		5		
	112-186	Very Low	1		2.5		
Geology	Char-nockite	Low	3	1	3	17	4.4%
	Migma-tite	Medium	5		5		
	Fluvial sedi-ments	High	9		9		
Geomorphology	Water Body	Very High	9	1	9	35	9.0%
	Lateral Bar	Very High	8		8		
	Flood Plain	High	7		7		
	Valley fill	Medium	6		6		
	Rolling Plain	Low	4		4		
	Residu-al Hill	Very Low	1		1		

Soil	Gravely sandy loam / Miscel-leneous	Very low	2	1	2	29	7.4%
	Sandy loam to sandy clay loam	Low	4		4		
	Sandy clay loam to clay loam / Gravelly sandy loam to gravelly sandy	Medium	6		6		
	Gravelly clay loam to gravelly clay / Clay loam to clay	High	8		8		
	Water-body	Very High	9		9		
Land use	Water Bodies	Very High	9	2.5	22.5	48	12.4%
	Built-up/ Trans-portatio n	High	8		5.5		
	Open spaces	Medium	5		12.5		
	Vacant Land	Low	2		5		
	Active, Non-active paddy/ Dry Cul-tivation	Very Low	1		2.5		
Total						389.5	100.00 %

The maps corresponding to each conditional factor were overlayed following the weighted linear combination approach. According to this technique, each factor is multiplied by its percentage weight (numeric overlay) and the summation of all factors yields the final map of hazardous areas:

$S = \sum w_i x_i$

where S is the final map of hazardous areas, w_i is the weight of factor (percentage) i and x_i *is* the rate of factor i. The factors (thematic layers) were reclassified and combined according to equation (3) in the Model Builder (GIS) environment (Fig 21.15).



Fig 21.15 Flood Susceptibility Mapping Procedure as displayed in ArcMap Model Builder

The Flood susceptibility Map for Pattambi municipal region obtained after overlay analysis is given in Fig 21.16. As a verification procedure, the 2018-flooded regions were overlaid over the flood susceptibility map of Pattambi municipality.

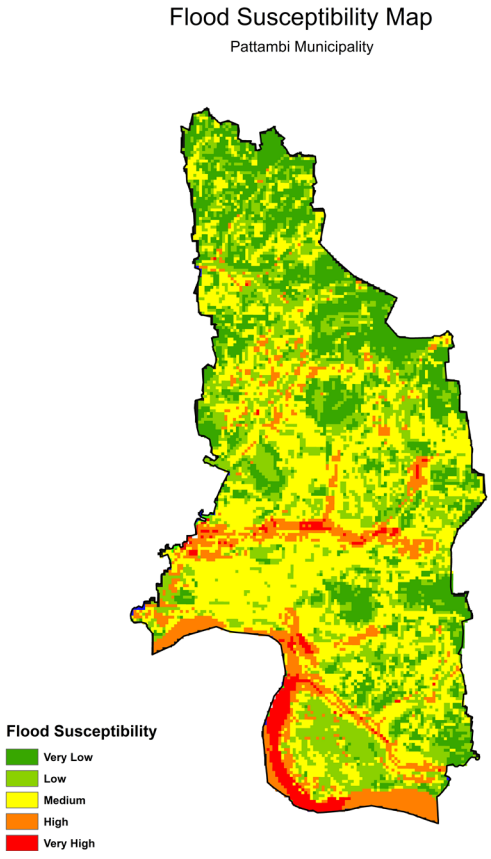


Fig 21.16. Flood Susceptibility map of Pattambi Municipality

The corresponding image is shown in Fig 21.17. The spatial locations of 2018 flood affected regions exactly match the very high risk and high-risk zones marked in the flood susceptibility map indicating the credibility of mapping results, which can be utilized for planning flood management measures in future. The Table 21.12 gives the areal coverage of flood Susceptibility in percentage from the maps of Pattambi Municipality.

Table 21.12 Details of the areal coverage of Flood Susceptibility

Sl. No.	Category	Area. Sq.km	Area %
1	Very Low	2.8	16.953
2	Low	5.40	32.711
3	Medium	6.28	38.034
4	High	1.64	9.937
5	Very High	0.391	2.372

The 2018-flooded regions were overlained over the existing land Use map of Pattambi municipality. The corresponding image is shown in Fig 21.18.

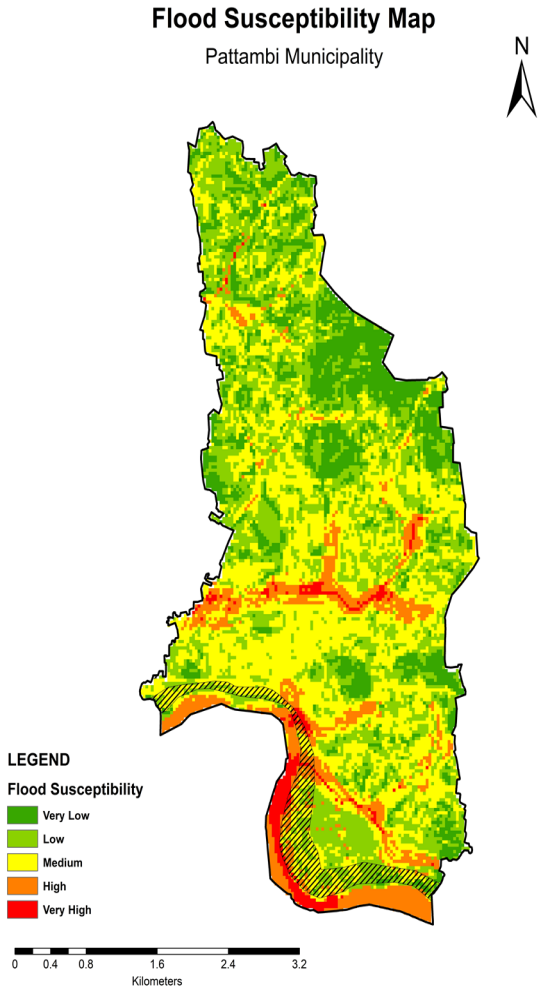


Fig 21.17 Flood regions overlained over flood susceptibility map

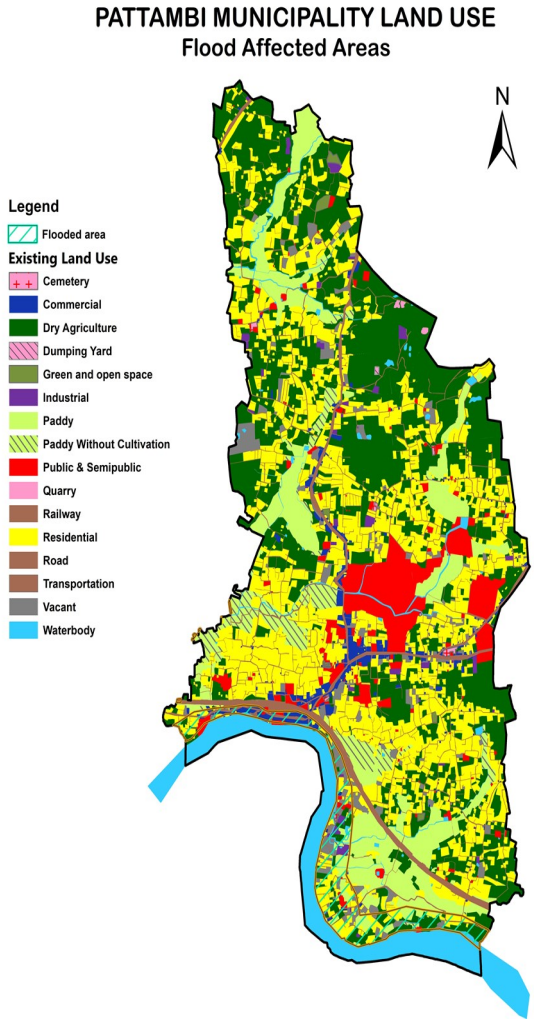


Fig 21.18 Flooded regions overlained over Existing land use map

Fig. 21.19 shows the 2018 google earth image of flooded regions near along the banks of the Nila River



Fig 21.19 Google Earth image of flooded regions of Pattambi Municipality.

Why did Pattambi Experience flooding in 2018?

The disastrous flood took prominent damage to the Pattambi municipality region. The predicted evident reason that caused the great flood could be the rainfall. As a natural phenomenon, monitoring long-term rainfall could be unpredictable and fractious. Moreover, independent rainfall cannot contribute to flooding alone. Rainwater that causes floods is made possible by the effect of other causal factors. The outcome of land use change leads to the unsettled terrain slope where any excess water flows to the low-lying water bodies. Floods/Water-logging occur when this natural slope is disrupted. The construction of new structures results in the cutting of slopes and the deportation of soil. Thus, urban flooding is caused by such an alteration because it changes the natural drainage pattern and creates new water pathways.

21.5.1.2 Landslide

Landslides are natural disasters that can cause severe damage to human lives and physical Infrastructures. The present report focuses to map the susceptible areas of the landslides as a mitigation measure incorporating various landslides conditioning factors and previous landslides experienced in a GIS environment.

Every year, particularly in the rainy season, the state of Kerala endures Landslides preceded by floods. As the landslides have been triggered in the regions of highly unstable. The District Palakkad encountered a few landslides in recent past years. Even in years of normal rainfall, landslide issues could exist in the midland and highland regions. Physiographically, Pattambi municipality has been categorized under the low lying undulating midland region. There could be a possibility of landslides. It is a fact that Pattambi has no records of previous extremely serious landslides and the resulting damages. It is necessary to show some attention to the Landslides condition of Pattambi municipality. The most common causes of Landslides are recognized to be the instability of mid high land regions and intense frequent rainfall.

21.5.1.2.1 Landslide Susceptibility Mapping

Landslides are calamitous events, that's has huge impacts on life and property. Landslide susceptibility is the possibility of spatial occurrence of landslides based on past geo-environmental conditions for a particular area. Landslides are more prone to occur under similar geological conditions and the geomorphologic factors that led to previous slope instability. Finding the probable locations for landslides is very crucial thus, Landslides susceptibility mapping techniques help to identify the susceptible areas where landslides are likely to occur using geographic information systems (GIS) and available topographic data. The use of landslide susceptibility mapping is a prerequisite for sustainable risk management. As natural hazards are multi-dimensional and multi-disciplinary phenomena that have a strong spatial component, GIS can be effectively applied in the context of flood damage analysis and risk assessment. Detailed knowledge of the frequency, character and magnitude of landslides is essential for carrying out successful quicker and safer mitigation programs along with future strategic planning of the area.

To assess landslide susceptibility, the landslide conditioning factors were determined and their mutual interaction ratios were calculated. For the present study, a total of 10 conditional factors were created for susceptibility mapping including Slope, Aspect, Rainfall, Land use, Elevation, Geology, Ndvi, Distance to road network , Soil , Geomorphology.

Base datasets used :

- Alos Dem data with 12.5m resolution

- Geomorphology map from NRSC
- 2018 Existing Land use
- Rainfall data.

21.5.1.2.2 Landslide Conditioning Factors

i. Rainfall

Rainfall is the primary inducing factor for landslides. As persistent rainfall and heavy precipitation storms can cause landslides, especially in the region with loosened soil where rainwater infiltrates the slopes. Landslides are influenced by accompany of rainfall characteristics such as amount, Intensity, duration, and spatial distribution. Therefore the landslides may be triggered by low stable region with high intensity, short-duration storms, or longer duration , low intensity rainfall. Entire Kerala witnessed unprecedented spells of rain in 2018 which was the worst to hit the state in a century.

A graphical representation showing rainfall details of the 2018 southwest monsoon for Pattambi is given in Fig 21.10. This peak rainfall data was used for susceptibility mapping to predict the regions that may get the worst hit by Landslides. Annual average rainfall data were collected from the surrounding 5 stations of Pattambi municipality for the year 2018 and were mapped by Inverse Distance Weightage (IDW) method ranges from 256-246 mm. The Fig. 21.11 shows the rainfall map of Pattambi municipality. The weightage details for rainfall classes are given the Table 21.13.

ii. Elevation

The elevation is another important element that can cause landslides which have a direct correlation. The landslide is more likely to occur as the rises in relative elevation of the area. In a gentle terrain of lower altitude, landslides happen quite often. The areas with higher water levels there might be a great chance for slope collapse. Thus, In higher elevated areas landslides are more probable to occur than in lower ones. The Elevation map for the study is prepared from the Alos DEM data is shown in Fig 21.11. The highest elevation areas are mainly seen towards the north-eastern part of the study area. The elevation values were sub-divided into five classes ranging from 28.6-186 m using the natural breaks method which was later reclassified by assigning weights (Table 21.13) in accordance with their ability to contribute to Landslides

iii. Slope

The slope constitutes a relevant parameter in landslide susceptibility studies. Since the magnitude and frequency of the landslides are based on slope stability,in a hilly area, higher slopes have a larger possibility of experiencing landslide threats. Slope regulates the speed of water on the ground, which has an effect on infiltration

and runoff. Generally, the gentle slope land area has a higher absorption rate due to the slow surface runoff. The steeper slope areas facilitate high water surface runoff to nearby basins without giving scope to further accumulation making the land mass vulnerable to landslides. The slope map (Fig 21.11) for Pattambi Municipality was generated from ALOS Dem of the same area utilizing the surface tool of Arc Map software. From the map, it is evident that the majority of the area falls under 7º (flat-Gentler) slope category. The weightage details for slope classes are specified in Table 21.13. The highest slopes are mostly confined to the northeastern, of the Pattambi Municipality.

iv. Soil

Soil is an important parameter that influences landslides. The features of the soil are dramatically altered by rainfall and infiltration. The intense rainfall alters some soil properties, including its water content, matrix suction and pore water press. Higher permeability of soil layers allows water to pass quickly and easily infiltrated. The water content of soil increases during rainfall and reduces the shear strength of soil which leads to the instability of natural slopes. In Pattambi Municipality, 7 different types of soil have been recognized The soil map of Pattambi Municipality is shown in Fig. 21.12 The weightage details for soil classes are specified in Table 21.13.

v. Geology

Geology is the fundamental instability character in landslide analysis. Most often, loose, poorly consolidated soil and debris covering bedrock are where landslides occur. The Pattambi municipal area is mainly categorized into 3 geomorphic classes; Charnockite, Migmatite and Fluvial sediments. Charnockite covers the major part of the town followed by Fluvial sediments and Migmatite. As igneous and metamorphic rocks are often hard and large, showing greater resistance to erosion. The charnockite are least susceptible to the landslide. A thematic map of geology is generated as shown in below Fig 21.13. The weightage details for geology classes are specified in Table 21.13.

vi. Aspect

Aspect is the orientation or direction of slope that is measured clockwise in degrees from 0° to 360°. History of landslides ascertain that landslides have always occurred in a particular direction; thus the aspect is considered as a causative factor. Though the aspect of the slope does not directly affect the slope stability, it affects the hydrologic processes such as the direction of precipitation and the amount of sunshine thereby determining the weathering process of the landforms. Usually, the aspect is accounted for all eight direction with addition of flat areas such as flat, north, north– east, east, south-east, south, south-west, west and north-west. The infor-

mation about the slope aspect was directly taken from DEM. The slope aspect map of the study area was prepared using spatial analysis tools (surface) in ArcGIS environment is shown in Fig 21.20. The weightage details for aspect classes are specified in Table 21.13.

vii. Land Use

Land use is the sole manmade parameter that causes landslides. Land Use frequently denotes changes in both natural and social systems. The anthropogenic interventions such as changes in vegetation cover, undercutting of natural slopes, expansion of the impervious surface area, changes of the drainage system and surface sealing lead to promote the propensity for landslide occurrence, and can significantly affect the activity of landslides. The initiation and reactivation of landslides are extensively contributed by human induced land use. Thus it is utmost importance to link the land use during the analysis. The Land use map of 2018 (Fig 21.20) was rasterized and weightage (Table 21.13) for each land-use class was given according to their potential in contributing flood.

viii. NDVI

The Normalized Difference Vegetation Index (NDVI) is a standardized index that allows generating an image displaying greenness (relative biomass). NDVI map was prepared from Landsat 9 OLI (operational land imager) satellite data using ArcGIS software tools. The NDVI was calculated using the formula of NDVI = (IR-R) / (IR+R), where, IR is the infrared portion and R is the red portion of the electromagnetic spectrum. The values of NDVI range from -1 to +1. Positive NDVI value shows healthy vegetation which covers slope surface and reduces soil erosion and slope failure. Negative NDVI values depict no vegetation cover where slope is exposed to atmosphere, soil erosion and slope failure. The Ndvi map of Pattambi Municipality is shown in Fig 21.20. The weightage details for Ndvi classes are specified in Table 21.13.

ix. Distance to Road

Urbanization involves the construction of the utilities and enhancement of infrastructure. Constructing roads in hilly regions can vitally reduce the stability of the slope causing damage to the toe support. The stability of a slope may change from stable to unstable during road constructions and vehicle movements. These slope activities may occur because of cracks that lead to high water absorption of the soil and these negative influences, such as water saturation, can trigger landslides. distance map was prepared using ‘Euclidean Distance’ technique in ArcGIS which gives the distance from each cell in the raster to the closest source. The Distance to road network of Pattambi Municipality is shown in Fig 21.20. The weightage details for distance to road classes are specified in Table 21.13.

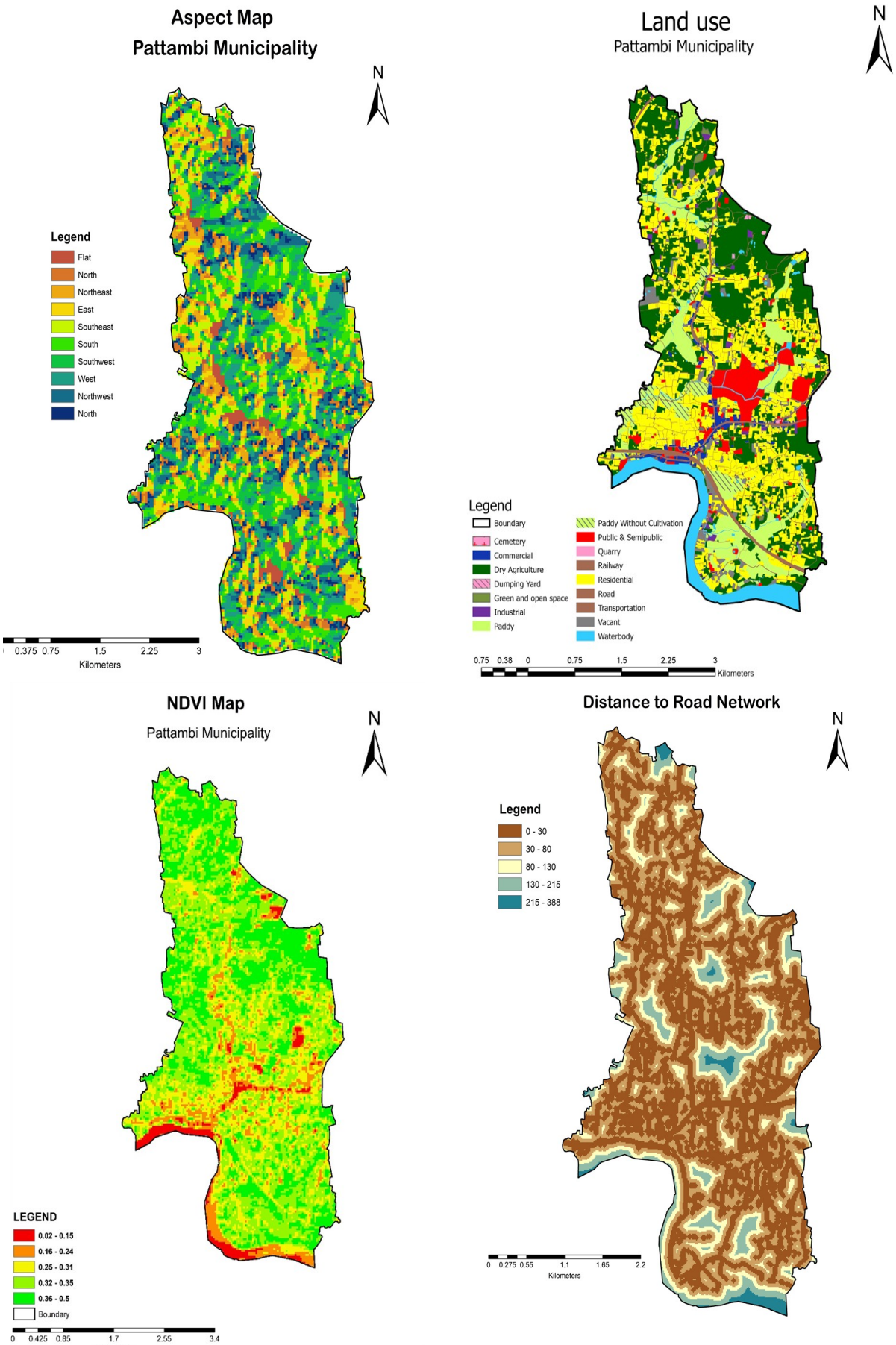


Fig 21.20 Aspect, Land Use , Ndvi , Distance to Road network maps of Pattambi Municipality.

x. Geomorphology

Geomorphology represents the relationship between the landslides and the geomorphology of the area. The geomorphic features such as denudation hills, escarpments, and interjunctions have higher landslide probabilities. As identified from the NRSC geomorphology map, the Pattambi municipal area is mainly categorized into 3 geomorphic classes such as waterbody, Active flood plain and Pediment-Pediplain complex. Pediment-pediplain complex covers a major part of the town and represents a gently sloping landform made of weathered sediments. Knowing the geomorphological characteristics is very important to identify the estimated massive landslide potential in an area. The Geomorphology of Pattambi Municipality is shown in Fig 21.13. The weightage details for distance to road classes are specified in Table 21.13..

21.5.1.2.3 Approach for landslide susceptibility mapping

A frequency ratio method is a statistical approach of identifying the relationship between past landslide locations and each influencing factor. From the connection between unaffected landslide regions and the causal factor, the relationship between the landslide occurred area and the causal factor could be determined. Thus the frequency ratio model is more promising for ranking the causal factors. Statistical relationships can be used to calculate the probability of landslides between past landslide areas and specified data sets. In general, landslides will occur more frequently in factor classes with a frequency ratio value of >1. The causative factors influencing landslides must be arranged according to their relative relevance in order to identify probable landslide sites. A proper rating scheme could be adopted for successful susceptibility mapping. The thematic layers generated were reclassified into 5 classes and the causative factors and their classes were assigned numerical values. All the weight-assigned causative factors were put together to develop a rating scheme for landslides based on knowledge and experience. The weightage assigned to each parameter indicates the level of influence in the occurrence of landslides, whereas higher weightage and ranks indicate greater influence for landslide occurrence. All the causative factors and past occurred landslides spatial data sites are resampled on the same cell size for the frequency ratio model. The number of the landslide pixel value represented as the count is calculated for each class of every factor using ArcGIS software. The higher the count value greater will be the probability of landslide/ flood in a specific factor class. The Frequency ratio (FR) for the every factors classes are calculated based on following equation.

FR = $\frac{N_i^p / N}{N_i^{lp} / N^l}$

Where N_l^p is the number of pixels in each landslide conditioning factor class, “N” is the number of pixels in the total area. N_i^{lp} is the number of landslide pixels in each land-

slide conditioning factor. N^l is the number of all landslide pixels in the total studyarea. The Relative Frequency (RF) is determined by calculating the total Frequency Ratio of a factor and dividing it by the Frequency ratio values of each factor class. ie,

RF= $\frac{\mathbf{FRi}}{\sum_{i=0}^{n} FR}$

Where FR_i is the frequency ratio of each class of a factor, $\sum_{i=0}^{n} FR$ is the summation of the Frequency ratio of each class.

The percentage of Relative Frequency (RF) is calculated by multiplying each relative frequency value with 100 to get the relative frequency integer and this RF integer is used as new weightage for reclassifying the causative factors of landslides.

The Minimum RF integer and Maximum RF Integer are computed to obtain the Mean Maximum – Minimum RF integer. The probability ratio of a landslide is calculated by dividing Maximum–Minimum RF values by a mean maximum-minimum RF integer.

The Probability ratio is calculated as

PR = $\frac{(\mathbf{MaxRF})-(\mathbf{MinRF})}{((Max)-(Min))\mathbf{MeanRF}}$

Where = Max_{RF} is the Maximum relative frequency, Min_{RF} is the minimum relative frequency and $(Max\text{-}Min)_{Mean\ RF}$ is the Mean Relative Frequency of subtraction of Min_{RF} from Max_{RF}

The obtained Probability Ratio (PR) is used as weightage for weighted Overlay analysis in ArcGIS. The resulted weightage and calculations are shown in the Fig 21.21

The weighted overlay analysis is a quick, accurate, and competent method for assessing probable landslide areas. In this study 10 environmental factor maps were used for assessment of landslide hazard susceptibility mapping. In order to combine these in performing the analysis, each cell from each map layer must be reclassified into a common preference scale, such as 1-5. All thematic maps were integrated using Weighted Overlay Model (WOM) (Eq.1). The maps corresponding to each conditional factor were overlaid following the weighted linear combination approach. According to this technique, each factor is multiplied by its percentage weight (numeric overlay) and the summation of all factors yields the final map of hazardous areas:

$S=\Sigma w_i\ x_i$

Where, S is the final map of hazardous areas, w_i is the weight of factor and x_i is the rate of factor. These weighted factor maps were integrated into GIS platform using WOM analysis to prepare a susceptibility landslide hazard zonation (LHZ) map. The Table 21.13 shows the ranked weightage assigned for different influencing factors. Further the area were calculated for the susceptibility zone and is shown in Table 21.14.

Table 21.13 Weightage of Landslide factors

Sl No.	Factor	Classes	Weightage
1	Slope	0-4	1
		4-7	2
		7-10	3
		10-15	4
		>15	5
2	Aspect	Flat	1
		North	2
		South	3
		East	3
		West	4
		North East	1
		North West	2
		South West	5
		South East	4
3	Elevation	3-23	1
		23-40	2
		40-60	3
		60-90	4
		90-176	5
4	NDVI	0.02 - 0.15	5
		0.15 - 0.24	4
		0.24 - 0.31	3
		0.31 - 0.35	2
		0.35 - 0.5	1
5	Land Use	Paddy Without Cultivation/Paddy	1
		Vacant/Waterbody	2
		Residential/Public & Semipublic/Commercial	3
		Dry Agriculture	4
		Quarry	5
6	Rainfall	246-250	1
		250-253	2
		253-256	3
		256-261	4
		261-267	5
7	Geomorphology	Lateral Bar	1
		Valley Fill	2
		Fluvial Origin-Active flood plain	1
		Rolling Plain	4
		Waterbody	3
		Residual hill	6
8	Geology	Migmatite	1
		Fluvial sediments	1
		Charnockite	2
9	Soil	Gravielly sandy loam to Gravelly sandy clay	4
		Gravelly sandy loam	4
		Sandy loam to sandy clay loam	2
		Graviely clay loam to gravely clay	4
		Sandy clay loam clay loam	3
		Clay to Loamy	3
		Miscellaneous	2
10	Distance to Road Network	0-30	5
		30-80	4
		80-130	3
		130-215	2
		215-388	1

Aspect					Landslide pixels in each class			Count	Frequency Rati	Relative Frequency	RF(non%)	RF (INT)	Minimum RF	Maximum RF	Max-Min RF	Mean Max-Min	Probability Ratio
OBJECTID	Class	Count			OBJECTID	VALUE	ID_1										
1	1	17685			1	3	5637.962	54	0.001430729	0.228969752	22.89697518	22					
2	2	36153			2	4	7204.062	69	0.001782393	0.28524908	28.524908	28					
3	3	37743			3	5	7308.469	70	0.003035428	0.485781168	48.57811682	48	0.228969752	0.485781168	0.256811416	0.665569375	0.385852213
4	4	38712															
5	5	23061															
	Total	153354					Total	193	0.00624855								
Elevation																	
OBJECTID	Value	Count			OBJECTID	VALUE	VALUE_1	count	FR								
1	1	46803			1	4	17853.55	171	0.015067407	0.698019964	69.80199636	69	0.301980036	0.698019964	0.396039927	0.665569375	0.595039288
2	2	53331			2	5	2296.947	22	0.006518519	0.301980036	30.19800364	30					
3	3	38496															
4	4	11349															
5	5	3375					Total	193	0.021585925								
	Total	153354															
Slope					Landslide pixels in each class												
OBJECTID	Value	Count			OBJECTID	VALUE	VALUE_1	count	FR								
1	1	43782			1	1	1879.321	18	0.000411128	0.024363414	2.4363414	2					
2	2	47613			2	3	3445.421	33	0.000868261	0.051453105	5.145310474	5					
3	3	38007			3	4	8770.163	84	0.004484305	0.265739659	26.57396591	26	0.024363414	0.658443822	0.634080408	0.665569375	0.952688678
4	4	18732			4	5	6055.589	58	0.011111111	0.658443822	65.84438221	65					
5	5	5220															
	Total	153354					Total	193	0.016874805								
Ndvi																	
OBJECTID	Value	Count			OBJECTID	VALUE	VALUE_1	count	FR								
1	1	15166			1	1	18271.17	28	0.001846235	0.384438925	38.44389246	38					
2	2	57244			2	2	11275.92	108	0.001886661	0.392856693	39.2856693	39					
3	3	53295			3	3	5951.182	57	0.001069519	0.222704382	22.27043824	22	0.222704382	0.392856693	0.170152311	0.665569375	0.255649249
4	4	25634															
5	5	2855															
	Total	154194					Total	193	0.004802414								
Landuse					Landslide pixels in each class												
OBJECTID	Value	Count			OBJECTID	VALUE	VALUE_1	count	FR								
1	1	21677	Paddy Without Cultivatio		1	3	2088.134	20	0.000281623	0.071288722	7.128872197	7	0.071288722	0.928711278	0.857422556	0.665569375	1.28825422
2	2	14588	Vacant/Waterbody		2	4	18062.36	173	0.00366883	0.928711278	92.8711278	92					
3	3	71017	Residential/Public & Semipublic/Commercial						0	0	0						
4	4	47154	Dry Agriculture				Total	193	0.003950453								
5	5	69	Quarry														
	Total	154505															
Distance to road																	
OBJECTID	Value	Count			OBJECTID	VALUE	VALUE_1	counts	FR								
1	1	2322			1	3	313.2201	3	0.000158078	0.002910317	0.291031691	0					
2	2	9468			2	4	7099.656	68	0.001617353	0.029776548	2.977654844	2	0.002910317	0.967313135	0.964402818	0.665569375	1.448989172
3	3	18978			3	5	12737.62	122	0.052540913	0.967313135	96.73131347	96					
4	4	42044					Total	193	0.054316344								
5	5	2322															
	Total	75134															
Soil																	
OBJECTID	Value	Count	Ex_Landuse		OBJECTID	VALUE	VALUE_1	counts	FR								
1	2	93144	Sandy loam to sandy clay		1	4	20150.49	193	0.007097676	1	100	100	0	1	1	0.665569375	1.502472976
2	3	34122	Sandy clay loam clay loam/Clay to Loamy														
3	4	27192	Gravielly sandy loam to Gravelly sandy clay				Total	193	0.007097676								
	Total	154458	/Graviely clay loam to gravely clay/Gravelly sandy loam														
Rainfall																	
OID	Value	Count			OBJECTID	VALUE	VALUE_1	count									
1	1	38550			1	3	6830.842	66	0.001765792	0.216355719	21.63557185	21	0.216355719	0.783644281	0.567288563	0.665569375	0.852335736
2	2	42644			2	4	13259.65	127	0.006395729	0.783644281	78.36442815	78					
3	3	37377															
4	4	19857					Total	193	0.008161521								
5	5	15570															
	Total	153998															
Geomorphology																	
OBJECTID	Value	Count	GEOMORPHOL		OBJECTID	VALUE	VALUE_1	count	FR								
1	1	16654	Lateral Bar/FluDri - Activ		1	4	14303.72	137	0.001350366	0.095252124	9.525212411	9	0.095252124	0.904747876	0.809495752	0.665569375	1.216245492
2	2	31425	Valley Fill		2	6	5846.775	56	0.012826386	0.904747876	90.47478759	90					
3	3	555	WatBod - River														
4	4	101454	Rolling Plain				Total	193	0.014176751								
5	6	4366	residual hill														
	Total	154454															
Geology																	
OBJECTID	Value	Count	INDEX_		OBJECTID	VALUE	VALUE_1	count	FR								
1	1	36295	MIGMATITE/FLUVIAL SE		1	2	20150.49	193	0.001633392	1	100	100	0	1	1	0.665569375	1.502472976
2	2	118159	CHARNOCKITE														
	Total	154454					Total	193	0.001633392								

Fig 21.21 Weightage of the factors through Frequency Ratio Model.

The factors (thematic layers) were reclassified and combined according to weightage obtained through frequency ratio model. The general representation of procedure for Landslide Susceptibility processed in the model builder (GIS) is shown in Fig 21.22. The Landslide Susceptibility Map for Pattambi municipal region obtained after overlay analysis is given in Fig 21.23.

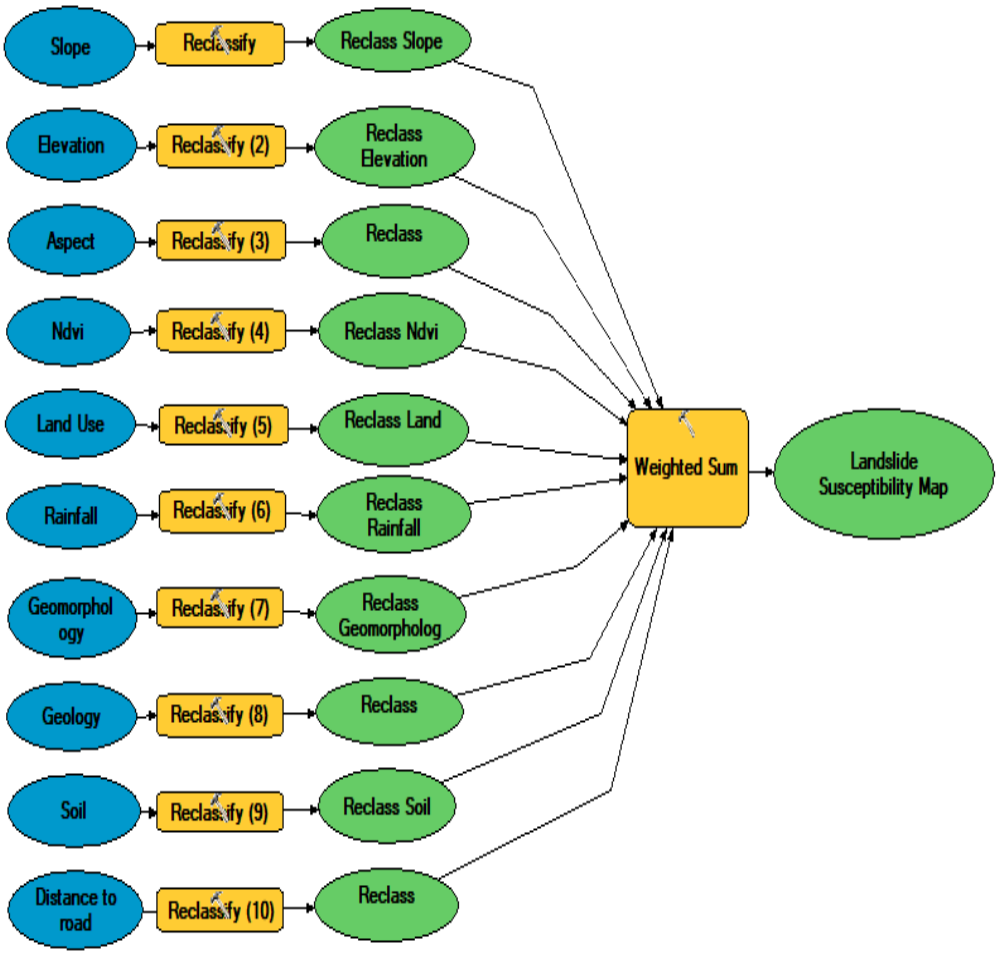


Fig 21.22 Landslide Susceptibility Mapping Procedure as displayed in Arc Map Model Builder

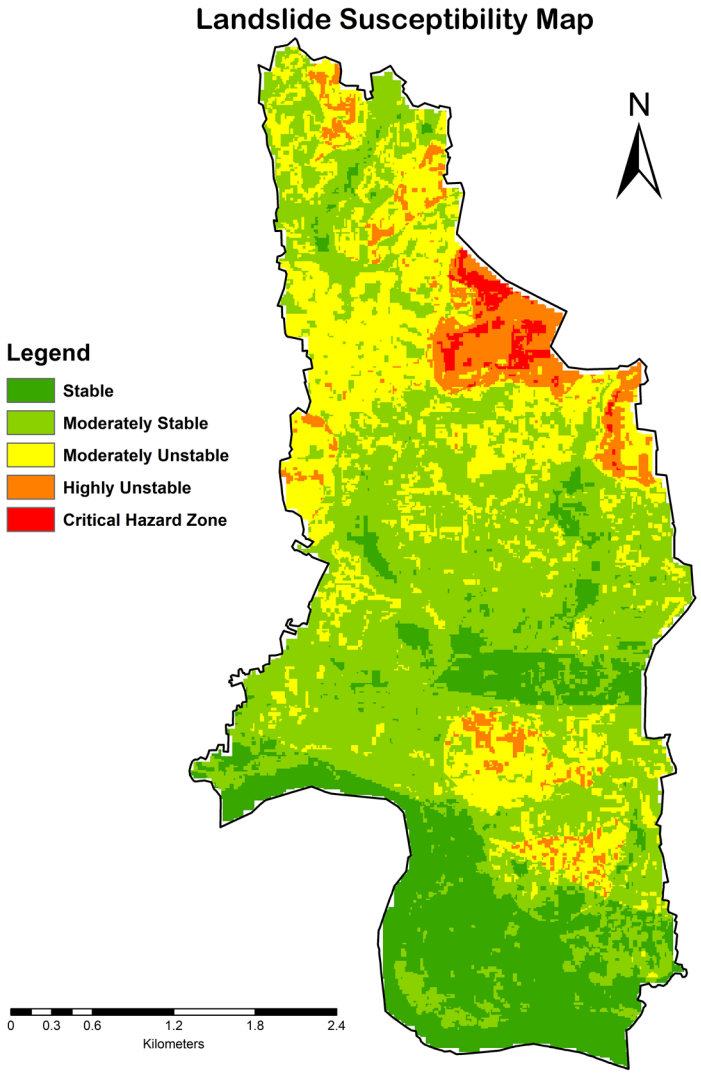


Fig 21.23. Landslide Susceptibility areas of Pattambi Municipality

Table 21.14 Details of the areal coverage of Landslide Susceptibility

Sl. No.	Category	Area. Sq.km	Area %
1	Stable	3.12	20.39%
2	Moderately Stable	7.323	46.71%
3	Moderately Unstable	4.0065	25.55%
4	High Risk Zone	0.966	6.168%
5	Critical Zone	0.181	1.160%

21.6 DISASTER MANAGEMENT

Coordinated action is essential when preparing for a disaster. This includes the development of plans or arrangements based on risk assessments done by Local governments, districts and the state through a continuous cycle of risk management, planning, coordinating, training, equipping, exercising, evaluating and taking corrective action to ensure the effective coordination and response during disasters. Effective disaster management planning for all hazards is a key element of being prepared. Disaster management planning establishes community networks and arrangements to reduce risks related to disaster preparation, response and recovery. State and district management authorities are the statutory bodies constituted under the Disaster Management Act, 2005 (Central Act 53 of 2005). The institutional structure of the District Disaster Management Authority (DDMA) is given in Fig 21.24.

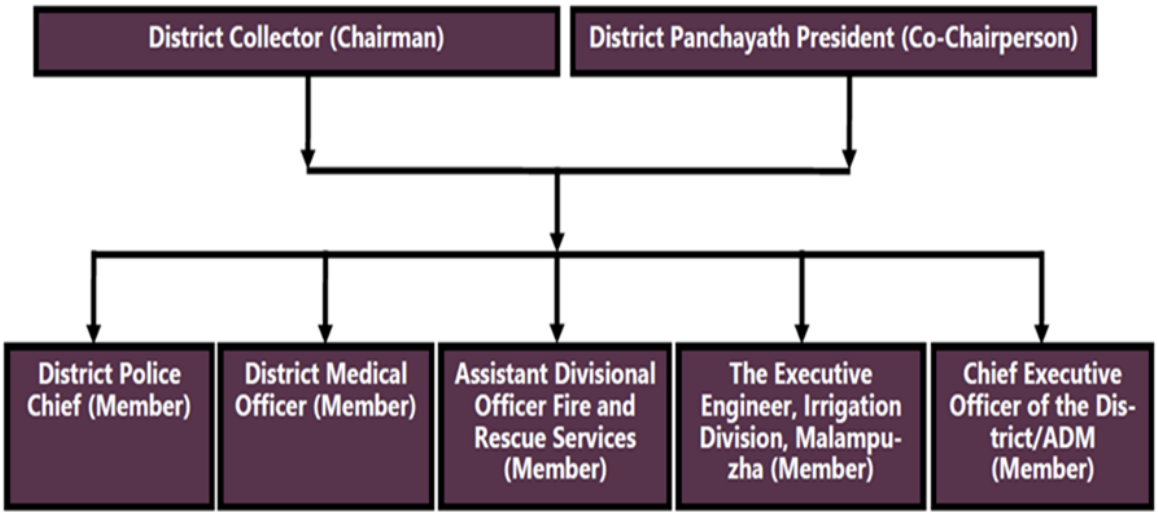


Fig.21.24. Institutional structure of DDMA

State Disaster Management Authority

The first KSDMA was constituted vide S.R.O No. 395/2007 dated 4th May 2007. Present Composition of KSDMA is notified vide S.R.O No. 583/2013 dated 17th July 2013. Vide Section 3 of the Kerala State Disaster Management rules (KSDMR), 2007 the authority is composed of ten (10) members, chaired by Chief Minister and convened by Additional Chief Secretary, Revenue and Disaster Management. The Chief Secretary (inter alia Chairperson of the State Executive Committee) is the Chief Executive Officer of KSDMA vide Section 14(4) of the DM Act, 2005.

District Disaster Management authority

The Palakkad disaster management authority is functioning under the chairmanship of the District Collector. District disaster management authority Palakkad prepared district disaster management plan and Kerala state disaster management policy, 2010 vide G.O(MS) No. 240/2010/DMO dated 19-06-2010 has laid down the guiding principles for the District disaster management plan of Palakkad.

21.6.1 Strategies

21.6.1.1 State Interventions

- Regulations & compliance monitoring mechanisms to check overutilization of natural resources.
- Support and guidance for conducting scientific studies to identify the optional distance between quarry locations to ameliorate the disaster effects.
- Preparation of spatial plans at the district level in the context of disaster.
- Adopt policies to incentivize vertical growth in safe zones.
- Frame and implement policies to regulate developmental activities along risk zones.

21.6.1.2 District Interventions

- Revise draft integrated District Development Plan (IDDP), 2013 include the context of disaster and legalize the same by District Planning Committee (DPC).
- Ensure that local bodies prepare projects in the context of present disaster effects and implement them.
- Formulation of evacuation routes connecting to safe zones in the event of disasters and dissemination of the same to the public.
- Consolidate the high-risk zones of the district on a spatial platform. Place regulatory measures.
- Stronger monitoring & corrective actions – on unauthorized development along flood plains, natural drains & landslip hazard zones.
- Action plan for de-siltation of dams, deepening of rivers.

21.6.1.3 Local Interventions

- Every local body to have a Local development plan on a spatial platform and submission of projects including the disaster context.
- Compulsory buffer zones in high-risk regions of the floodway.
- Riverfronts in high-density habitations

- Agricultural tracts/wetlands in medium to low-density habitations
- Flood proofing of residential/commercial complexes in flood fringe regions.
- Sensitizing the local populace regarding the importance of buffer zones and floodproofing.
- Only the local Interventions strategies above mentioned have been proposed to resolve through masterplan.

21.6.2 Activity plan for Landslide

Table 21.15. Activity Plan for Landslide

Activity Plan for Landslide		
1	Structural	Non-Structural
2	Clearance of water ways	Public awareness campaigns
3	Removal of encroachments	Monitoring & updating landslide related parameters, Flood warning system
5	Cleaning of Sewerage	Map the landslide prone areas
6	Check dams,gully bench-ing	Display boards for the public the areas prone for the landslides to avoid accidents
6	Re-grading of slope, Benching of slopes	Update Resource Inventories
7	Plant barren and sloppy areas in hill with suitable trees	-
8	-	Collect details of earth movers, cutters, JCB's and other related machineries in the District , Generators, Storage of Medicine, Mobilize the search and Rescue Equip-ments

21.6.3 Activity Plan for flood

Table 21.16: Activity plan for Flood

Activity Plan for flood	
1	Identification of flood prone areas and marking on maps
2	Documenting previous floods
3	Monitoring of landslides causing blockages in rivers
4	Assessment of area suffering drainage congestion
5	Assessment area prone to river erosion
6	Identify new safe areas and maintain existing shelters, making sure they have sanitary and other basic necessities
7	Implement public awareness activities to create a pro-active and prepared society, which can cope effectively with hazards and their aftermath
8	Educate the public on what to do and what not to do to prevent harmful activities in the floodplain
9	Inspect flood mitigation infrastructure

21.7 DISASTER RESPONSE

The aim of emergency response is to provide immediate assistance to maintain life, improve health and support the morale of the affected population. Such assistance may range from providing specific but limited aid such as assisting refugees with transport, temporary shelter, and food, to establishing a semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found.

The disaster response activities are organized through Incident Response Systems (IRS). The Incident Response System (IRS) is an effective mechanism for reducing ad-hoc measures in response. It envisages a composite team with various Sections to attend to all the possible response requirements. The IRS designates officers to perform various duties and get them trained in their respective roles. It also emphasizes the need for proper documentation of various activities for better planning, accountability and analysis. This will greatly help in reducing chaos and confusion during the response phase. Everyone will know what needs to be done, who will do it and who is in command. The institutional framework of IRS for Palakkad is given in fig Responsible Officers (ROs) have been designated at the State and District level as overall in charge of the incident response management. The Responsible Officer may delegate responsibilities to the Incident Commander (IC). Flow chart showing the institutional structure of IRS is depicted in fig 21.25 The Incident Response Team (IRT) is managed under IRS which will function at State, District, Sub-Division and Tehsil / Block levels. The IRTs will be pre-designated at these levels and on receipt of early warning, the corresponding Responsible Officer will activate them. In case a disaster occurs without any warning, the local IRT will respond and contact the Responsible Officer for further support, if required.

21.7.1 Operation Section

The Operations Section helps to prepare and execute different tactical operations required in response to the disaster. The duties include;

- Monitoring field level rescue and evacuation operations
- Monitoring salvage operations
- Requisition of accommodation, transport and other necessary equipment for relief groups
- Maintain law and order
- Regular updates to the EOC regarding relief operations

21.7.2 Planning Section

The Planning Section is responsible for the collection, evaluation, and display of incident information, maintaining the status of resources, and preparing the Incident Action Plan and incident-related documentation.

21.7.3 Logistics Section

The Logistics Section is responsible for providing adequate services and support to meet all incident or event needs. The duties include:

- Assess the need in terms of manpower and resources and ensure regular supply
- Ensure proper storage and transport facilities for relief materials
- Maintain adequate supply of necessary transport and equipment. Coordinate with private transport associations and boat associations for emergency requirements
- Organize transportation for rescue party, evacuated people and injured or sick people

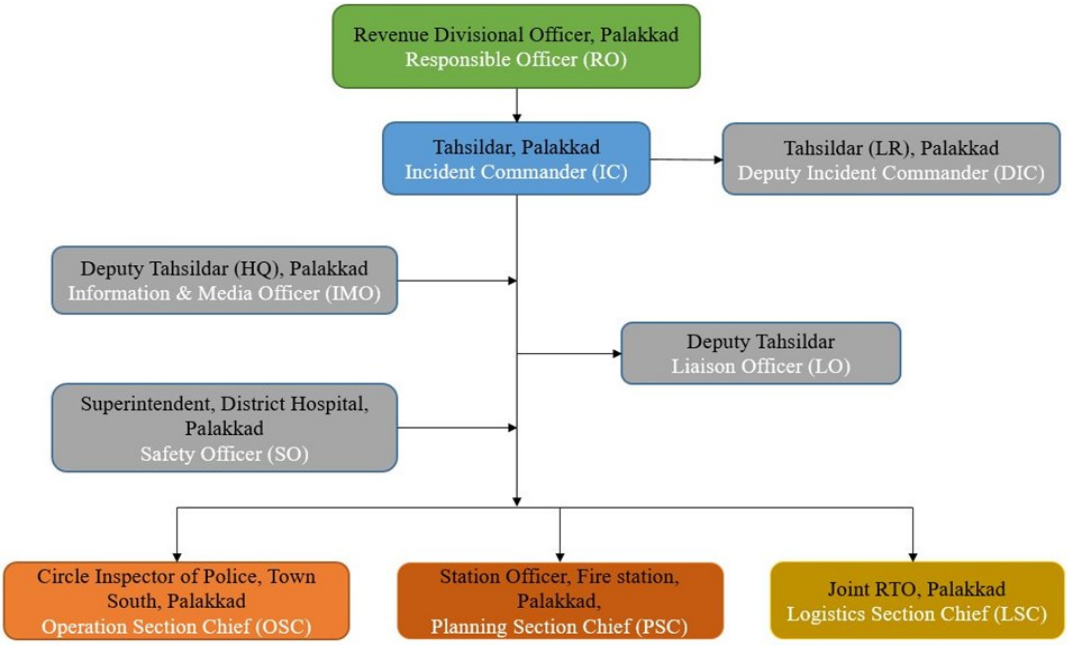


Fig 21.25 Incident Response System of Palakkad (Source: SDMA)

21.8 RECOVERY

This post-disaster phase aims in establishing the 3R's; Recovery, Rehabilitation and Reconstruction thus providing the opportunity to 'Build Back Better' (BBB) integrating disaster risk reduction into development measures, and making communities resilient to disasters. Recovery measures, both short and long term is a set of orderly actions triggered by the impact of a disaster upon a community taken by the integra-

tion of central, state and local level departments and NGOs. It will consist of several related activities such as the following:

- Damage assessments
- Debris clearance, removal and its environmentally safe disposal
- Restoration and even upgrading utilities including communication networksRe-establishment of major transport linkages
- Temporary housing
- Detailed building inspections
- Redevelopment planning
- Environmental assessments
- Demolition
- Reconstruction
- Integrating DRR (Disaster Risk Reduction) into various development initiatives
- Financial management
- Economic impact analyses

The major steps/ processes of the recovery process and the processes involved are summarized in Table 21.17

Table 21.17 Major steps of the recovery process and the key processes involved

Sl No.	Major Steps	Process
1	Post-Disaster Needs Assessment (PDNA) and Credible Damage Assessment	Preliminary assessment reports, Compilation and transmittal of damage and loss data Disaster damage assessments led by government and assisted by humanitarian response agencies, and the initial damage surveys leading to a comprehensive assessment Quantitative and qualitative baseline for damage, loss, and needs across sectors, blocks (taluk) and districts Results monitoring and evaluation plan for the recovery program, Select the most appropriate and achievable processes and methodology for conducting early and credible damage and needs assessments
2	Developing a vision for Build-Back Better (BBB)	• High-level meetings as well as broad-based, wider consultations with experts, civil society, and key stakeholder • Build consensus among the range of stakeholders within and outside government

Table 21.17 Continued....

3	Ensure coherence of BBB with the development programs and goals	• Discussions at top level to align the recovery vision with the government's broader, longer-term development goals and growth and poverty reduction strategies
4	Incorporating resilience and BBB in recovery vision	• Consultations and background studies on: • Disaster resistant physical recovery • Options for fast economic recovery • Gender and equity concerns • Vulnerability reduction • Natural resource conservation and environmental protection
5	Balancing recovery across sectors	• Balance public and private sectors BBB programs • Promote norms for non-discriminatory and equitable asset disbursement among individuals and communities • Prioritize infrastructure reconstruction • Address the recovery of the lives and livelihoods of disaster-affected communities • Show sensitivity to the needs of the affected population with regard to public expectations from recovery
6	Prioritizing sectors for recovery	• Determine the relative importance of various sectors such as housing, water and sanitation, governance, transport, power, communications, infrastructure, environment, livelihoods, tourism, social protection, health, and education

21.9 INFERENCE

In 2018 Pattambi municipality had unprecedented spells of rain that resulted in flooding of 0.8263 sq.km of land. Increase in the water level of Bharathapuzha river that flows through southern boundary of Pattambi municipality caused the Pattambi bridge to overflow. 11 out of 28 wards were inundated by flood. Nambram, Nethrimangalam, Paruvakadavu were most affected wards. The powerful rain spell had cost numerous amounts of damage to the houses and people surrounding the municipality region. The extremity of the disaster has prompted us to investigate their plausible explanations. Due to severe rainfall, the likelihood of a flood in the near future may not be minimal. Pattambi hasn't quite suffered from landslides in the past decade. High floods in Pattambi may be attributed to the midland geographical aspect of the region. More priority should be given to sustainable development plans where the developments, as well as nature, would go hand in hand.

22

Development Administration and Finance

22. DEVELOPMENT ADMINISTRATION AND FINANCE

Governance plays an important role in the implementation and execution of development activities. Hence good municipal governance is an indicator of how the development activities are actually implemented in the local body. In this chapter an attempt is made to describe the development administration and finance of Pattambi Municipality within the limited available data by taking a look at municipal revenue and expenditure in Pattambi town.

22.1 DEVELOPMENT ADMINISTRATION

Municipalities are local governments formed for the purpose of providing services to local residents and to provide local guidance over the development and enhancement of the community. Administration includes, budgeting and financial reporting, the payment of bills, the maintenance of both an office and the records of the municipality, the organization of Council meetings, the implementation of municipal programmes and policies and other related tasks.

The development activities under taken by the municipalities are

1. Construction and Maintenance of municipal roads, gardens, public well, drains etc.
2. Keeping and equipping of open spaces.
3. Water supply
4. Sewage disposal
5. Public health
6. Providing economic help for the Construction and maintenance of houses to economically backward communities.
7. Street light
8. Administration of Institutions owned by the municipality like Schools, Hospitals etc.
9. Construction and maintenance of municipal markets and slaughter houses.
10. Implementation of the planning in the municipal area as a part of the district plans.

Besides municipal level activities, functions in the various development departments are being controlled by the municipality and state plan schemes of these departments are channeled through the municipality.

22.2 MUNICIPAL FINANCE

Most of the urban local self governments, especially the smaller ones like Pattambi Municipality are not financially self sustaining. These municipalities often depend on grants from Central and State governments for funding their day to day affairs and fulfilling their constitutional obligations. The major source of income for urban local self governments is the property tax levied on the buildings in the municipality. This source has immense potential, but is not being tapped to the full extent at present.

Irrational rates, reductions given due to various non financial reasons, tax avoidable and evasion, leakages in collection system and improper records keeping and monitoring are some of the problems faced by revenue generation through property taxes. Another source of own revenue for the municipality is entertainment tax. Receipts from municipal properties also could be a major source. The financial status of the Municipality has been reviewed for the past 2 years, commencing from the financial year 2015-16 and is shown in table 22.1.

Table 22.1 Detailed annual financial statement

Head of Account	2015-2016	2016-2017
Opening Balance		
Bank/ Treasury	16247901	10117384
Cash	105548	1957345
	16353449	**12074729**
Income		
Revenue Account /Operating Receipts		
Tax Revenue	6762265	17599962
Assigned revenue		941880
Rental Income from Miunicipal Properties	4654741	6385009
Fees & user Charges	1599265	4294440
Sale & Hire Charges	6265	82549
Revenue Grants, Contributions and Subsidies	2997371	9185301
Interest Earned	1672	1330583
Sundry Debtors (Receivables)	2474172	6006554
Total	**18495751**	**45826278**
Capital income Receipts		
Grants Contributions for Specific purposes	19942245	27574850
Loans, Advances and Deposits	34000	117730
	19976245	**27692580**
Debt head		
Earmarked Fund		300000
Deposits Received	426178	1712816

Table 22.1 Continued

Other Liabilities	2340932	3224526
Total	2767110	5237342
Grand Total	41239106	78756200
Grand total including opening Balance	57592555	90830929
Expenditure		
Revenue Operating Payments		
Establishment Expenses	2340414	9245838
Administrative Expenses	831170	2059610
Operations & Maintenance	3245109	7650447
Interest & Finance Charges	28413	107591
Programme Expenses	990633	9038867
Revenue Grants, Contributions and Subsidies	20000	82599
Other Liabilities	2099281	5367752
Stock in hand	1147194	
Decentralised Plan Programme - Service Sector	4189419	8625168
Decentralised Plan Programme - Infrastructure Sector	14087730	12348508
Decentralised Plan Programme -Projects not included in Sector Division	734910	1882536
Prior period item	2000	2241
Revenue Expenditure Total	29716273	56411157
Capital expenditure		
Grants Contributions for Specific purposes	7276239	500000
Capital Work in Progress	1251490	1118586
Fixed Assets	4267250	5218219
Loans, Advances and Deposits		523204
Capital Expenditure Total	12794979	7360009
Debt Head Expenditure		
Deposits Received	586298	773145
Other Liabilities	2420276	3500577
Debt Expenditure Total	3006574	4273722
Expenditure total	45517826	68044888
Closing Balance		
Bank/ Treasury	10117384	22478990
Cash	1957345	307051
Total	12074729	22786041
Grand Total including closing balance	57592555	90830929

Source: Pattambi Municipality

Table 22.2 Summary of Finance

Item	2015-16	2016-17
Opening balance	1,63,53,449.00	12074729
REVENUE ACCOUNT		
Revenue income	18495751	45826278
Revenue expenditure	29716273	56411157
Surplus/Deficit	-11220522	-10584879
CAPITAL ACCOUNT		
Capital income	19976245	27692580
Capital expenditure	12794979	7360009
Surplus/Deficit	7181266	20332571
DEBT HEAD ACCOUNT		
Income	2767110	5237342
Expenditure	3006574	4273722
Surplus/Deficit	-239464	963620
Closing balance	12074729	22786041
Total Income	5,75,92,555.00	90830929
Total Expenditure	45517826	68044888

Source: Pattambi Municipality

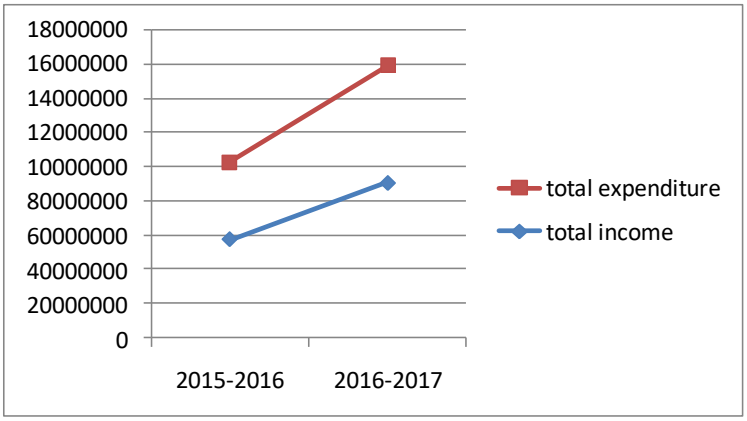


Fig. 22.1 Temporal variation of total income and total expenditure

Source: Pattambi Municipality

22.3 PROBLEMS AND POTENTIALS

The major problems faced by the municipality in the finance sector are the leakage in taxes and paucity of funds for developmental activities. The municipality has to prepare a number of financially viable projects and to be implemented in the town which can be developed (through PPP mode or other-wise) for enhancing the income of the municipality. Municipality has to identify new sources for resource mobilization. Most of the municipal revenue assets are undervalued and their regular maintenance and repairs are necessary to increase the revenue.

22.4 ASSET MANAGEMENT PLAN

Asset management is the systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organizational strategic plan.

While the need for Asset Management is clearly felt, it is equally important to have appropriate management information on asset condition, infrastructure costs and performance, and the consolidated requirements for repairs and maintenance, as well as appropriate maintenance standards. This section will deal with the elements that are essential in an asset management program for movable and immovable infrastructure.

22.4.1 Municipal Assets

Water Supply

Water supply in the town is operated and maintained by Kerala water Authority. 24 Public open wells and 51 public borewells are constructed and maintained by Municipality. Also, Municipality is paying the water charges for 874 Nos of public taps.

Irrigation

There are 68 ponds in the municipality. Out of which 3 ponds are owned by Municipality and used for irrigation purposes.

Sewerage and sanitation

There is no specific sewerage system for the town and the population is dependent on septic tanks and low cost sanitation units. The role of the municipality in this sector is limited to provision of public comfort station/latrines and giving financial aids through schemes. Two public toilets are there in the Pattambi town, one E-Toilet near Mele Pattambi bus waiting shed and one public toilet at bus stand. There is one public comfort station at Pattambi bus stand.

Roads

151.99 km of road was constructed and maintained by Municipality and the entire road stretch is bitumen surfaced.

Lands and Buildings

Municipality owns 77 number of plots having an extent of 2.98 acres in

the town. Total built up area of all Municipal owned buildings is 21116.11 sq. m. of which 2280.08 sq. m. area (10.80%) is income generating ones. Others are non remunerative buildings.

Non remunerative assets of the Municipality are the office buildings, assets which are either acquired or purchased or transferred by state government as per 74th CAA on which the municipality incurs considerable expenditure for operation and maintenance. They are maintained by the municipality under the general, water supply & drainage and elementary education funds separately. The municipality has vehicles which are used for service delivery and for administration purposes. The details of Municipal assets - land and buildings are presented in Tables 22.3 and 22.4 respectively.

Table 22.3 Municipal Assets - Lands

Sl No.	Name of Asset (Land)	Sq.M	Extent in Cents
1	Puthiya Chantha	80.00	1.98
2	Pazhaya Chantha	80.00	1.98
3	Bus stand (old)	74.00	1.83
4	New bus stand	40.00	0.99
5	Kizhayur cremation ground	37.00	0.91
6	Muchirithodu	162.00	4.00
7	thekkencherikunnu	202.00	4.99
8	Kizhayur	162.00	4.00
9	Cheruliparambu	162.00	4.00
10	Melepattambi	162.00	4.00
11	Anthoor Palliyal	202.00	4.99
12	Nambram 47	202.00	4.99
13	Pakkooth 48	162.00	4.00
14	Kodalur	162.00	4.00
15	Chorakunnu 50	202.00	4.99
16	Pathiyil 51	202.00	4.99
17	Kottapadi 52	162.00	4.00
18	Kallikad 53	162.00	4.00
19	Pallipad 54	5.00	0.12
20	Vallur 55	202.00	4.99
21	Guruthiyankavu 56	162.00	4.00
22	Mannathpuram 57	202.00	4.99
23	Vadakkumuri 58	162.00	4.00
24	Pathankal parambu 59	162.00	4.00
25	Kozhikunnu 60	162.00	4.00

Table 22.3 Continued.

Sl No.	Name of Asset (Land)	Sq.M	Extent in Cents
26	Panchayathpadi 61	162.00	4.00
27	Paruvakadavu 62	202.00	4.99
28	K P Thangal smaraka Bus stan	300.00	7.41
29	Old KSRTC	250.00	6.18
30	Old Market	200.00	4.94
31	New Market	500.00	12.35
32	Ayuveda Homeo Hospital	241.00	5.96
33	Veterinary Hospital	182.00	4.50
34	Kizhayur Subcentre	243.00	6.00
35	Nambram crematorium	1092.00	26.98
36	Golden jubilee vayashala	202.00	4.99
37	Solid waste management plant	300.00	7.41
38	Sankaramangalam Ground	200.00	4.94
39	Cheruliparambu Ground	100.00	2.47
40	Kallikad	100.00	2.47
41	Koombankallu	1618.00	39.98
42	Vallur	607.00	15.00
43	Pattambi RWSS	202.00	4.99
44	Nila Pumphouse	202.00	4.99
45	Pattambi Thwaritha Grameena water supply scheme	243.00	6.00
46	Playground Sankaramangalam	50.00	1.24
47	Playground Cheruliparambu	50.00	1.24
48	Pattambi Panchayath Anganvac	91.00	2.25
49	Anthoor Palliyal Anganvadi	62.00	1.53
50	Kallikat Anganvadi	21.00	0.52
51	Paruvakadavu Anganvadi	91.00	2.25
52	Kozhikunnu Anganvadi	21.00	0.52
53	Nambram Anganvadi	21.00	0.52
54	Melepattambi Anganvadi	91.00	2.25
55	Chorakunnu Anganvadi	91.00	2.25
56	Pankuth Anganvadi	1.00	0.02
57	Guruthiyankavu Anganvadi	21.00	0.52
58	Muchirithodu Anganvadi	21.00	0.52
59	Kodalur Anganvadi	1.00	0.02
60	Cheruliparambu Anganvadi	1.00	0.02

Table 22.3 Continued.

Sl No.	Name of Asset (Land)	Sq.M	Extent in Cents
61	Vadakkumari Anganvadi	21.00	0.52
62	Mannathpuram Anganvadi	21.00	0.52
63	PanthakalParambu Anganvadi	1.00	0.02
64	Kizhayur Anganvadi	21.00	0.52
65	Vallur Anganvadi	1.00	0.02
66	Pallipad Anganvadi	82.00	2.03
67	Thekkencherikunnu Anganvadi	21.00	0.52
68	Pathiyil Anganvadi	2.00	0.05
69	GLP School Vallur	99.00	2.45
70	GLP School Pattambi	64.00	1.58
71	GUP School Kizhayur	55.00	1.36
72	LP School Sankaramangalam	8.00	0.20
73	GUP School Pattambi	58.00	1.43
74	Sub centre Kodalur	58.00	1.43
75	Sub centre Sankaramangalam	16.00	0.40
76	Sub centre Kizhayur	90.00	2.22
77	Veterinary Hospital	1.00	0.02

Source: Assets Register, Pattambi Municipality

Table 22.4 Municipal Assets - Buildings

Sl. No.	Building Name	Total Floor Area (Sq.M)
1	Puthiya Chantha (Perinthalmanna)	1.00
2	Pazhaya Chantha	214.00
3	Old Market	276.00
4	New Market	732.00
5	Bus stand Building Waiting Shed	138.00
6	Bus stand Building Shoping Complex	299.72
7	Bus stand Building Shoping Complex	874.50
8	Bus stand Bunk	410.78
9	K P Thangal Bus Stand	630.00
10	K P Thangal Bus waiting shed	8.00
11	Pattambi Panchayath Anganvadi	45.37
12	Anthallur Palliyalil Anganvadi	45.36
13	Kallikatt Anganvadi	1.00
14	Paruvakadavu Anganvadi	35.25
15	Kozhikunnu Anganvadi	53.28

Table 22.4 Continued.

Sl. No.	Building Name	Total Floor Area (Sq.M)
16	Nambram Anganvadi	45.00
17	Mele Pattambi Anganvadi	50.59
18	Chorakunnu Anganvadi	28.00
19	Pakkooth Anganvadi	50.59
20	Guruthiyankavu Anganvadi	33.16
21	Muchirithodu Anganvadi	46.82
22	Kodallur Anganvadi	55.00
23	Cheruliparambu Anganvadi	46.82
24	Vadakkumuri Anganvadi	45.81
25	Mannathupuram Anganvadi	57.39
26	Kizhayur Anganvadi	47.34
27	Vallur Anganvadi	27.88
28	Pallipad Anganvadi	56.00
29	Thekkacherikunnu Anganvadi	42.39
30	Pathiyil Anganvadi	50.59
31	G.L.P School Vallur	523.00
32	G.M.L.P School Pattambi	675.89
33	G.U.P School	1244.00
34	L.P School Sankaramangalam	379.00
35	G.U.P School Pattambi	708.37
36	Sub Center Sangaramangalam	78.00
37	sub Center Kizhayoor	63.00
38	veterinary hospital	108.00
39	Panchayath Office	350.00
40	Ayurvedic Hospital Building	54.07
41	Women Rest house Kizhayoor	37.08
42	veterinary hospital Building	90.00
43	Kizhayur Subcentre	24.00
44	Melepattambi E toilet	20.00
45	Kallikad anganadi compound wall	4.64
46	Crematorium	110.00
47	LP Toilets	150.00
48	Muchirithodu	36.00
49	Thekkencheri kunnu	36.00
50	Kizhayur 43	36.00
51	Cheruliparambu	36.00
52	Melepattambi	36.00

Table 22.4 Continued.

Sl. No.	Building Name	Total Floor Area (Sq.M)
53	Anthoor Palliyil	60.00
54	Nambram	48.00
55	Pakkooth 48	90.00
56	Kodalur 49	36.00
57	Chorakunnu 50	36.00
58	Pathiyil 51	60.00
59	Kallikad	60.00
60	Pallipad 54	60.00
61	Vallur Anganvadi	60.00
62	Mannathpuram	36.00
63	Guruthiyankavu	36.00
64	Vadakkumuri	120.00
65	Panthakalparambu 59	36.00
66	Kozhikunnu	60.00
67	Panchayathpadi 61	36.00
68	Paruvakadavu 62	36.00
69	UP school improvement work	119.48
70	Municipality new building	324.00
71	Seva Grama Construction	60.00
72	Govt. Hospital	152.00
73	Comfort station	600.00
74	market shopping complex	400.00
75	Material recovery facility centre	92.80
76	GMLPS Pattami	150.00
77	Municipality Flooring	32.00
78	Municipality 3 Krishi Bhavan	120.00
79	K P Thangal bus stand frontage 2	400.00
80	K P Thangal bus waiting shed	105.00
81	Bus atand toilet block 4	21.00
82	GUP School block 1	90.00
83	GUP School block 2	140.00
84	GUP School block 3	448.00
85	GUP School block 4	224.00
86	GUP School block 5	264.00
87	GUP School block 6	40.00
88	GUP School block 7	140.00
89	GUP School block 8	180.00

Table 22.4 Continued.

Sl. No.	Building Name	Total Floor Area (Sq.M)
90	GUP School BRC	120.00
91	GLP School Block 1	198.00
92	GLP School Block 2	210.00
93	GLP School Block 3	150.00
94	Govt Hospital Block 1	204.00
95	Govt Hospital Block 2	426.00
96	Govt Hospital Block 3	28.00
97	Govt Hospital Block 4	136.00
98	Govt Hospital Block 5	42.00
99	Govt Hospital Toilet Block	21.00
100	GUP Boys toilet	3.00
101	GUP School Toilet block	6.00
102	GUP School Kitchen	25.00
103	GMLPS Kitchen	12.00
104	GMLPS Toilet block	8.00
105	GHSS Main block	1578.00
106	GHSS right side	756.00
107	GHSS PTA block	273.00
108	GHSS Behind main block	952.00
109	GHSS left side 1	252.00
110	GHSS left side 2	210.00
111	GHSS boys toilet block 1	21.00
112	GHSS boys toilet block 2	21.00
113	GHSS Girls toilet 1	34.00
114	GHSS sheet roof	33.00
115	GHSS Kitchen	20.00
116	GHSS Canteen	8.00
117	GHSS girls toilet 2	19.63
118	GHSS rainwater harvesting	12.57
119	GHSS HSE block	350.00
120	GHSS HSE staff room lab	105.00
121	GHSS HSE Toilet	18.00
122	GHSS Counsel room	18.00
123	GHSS Drinking water scheme	1.44
124	GHSS interlock	250.00
125	GHSS New building	56.00

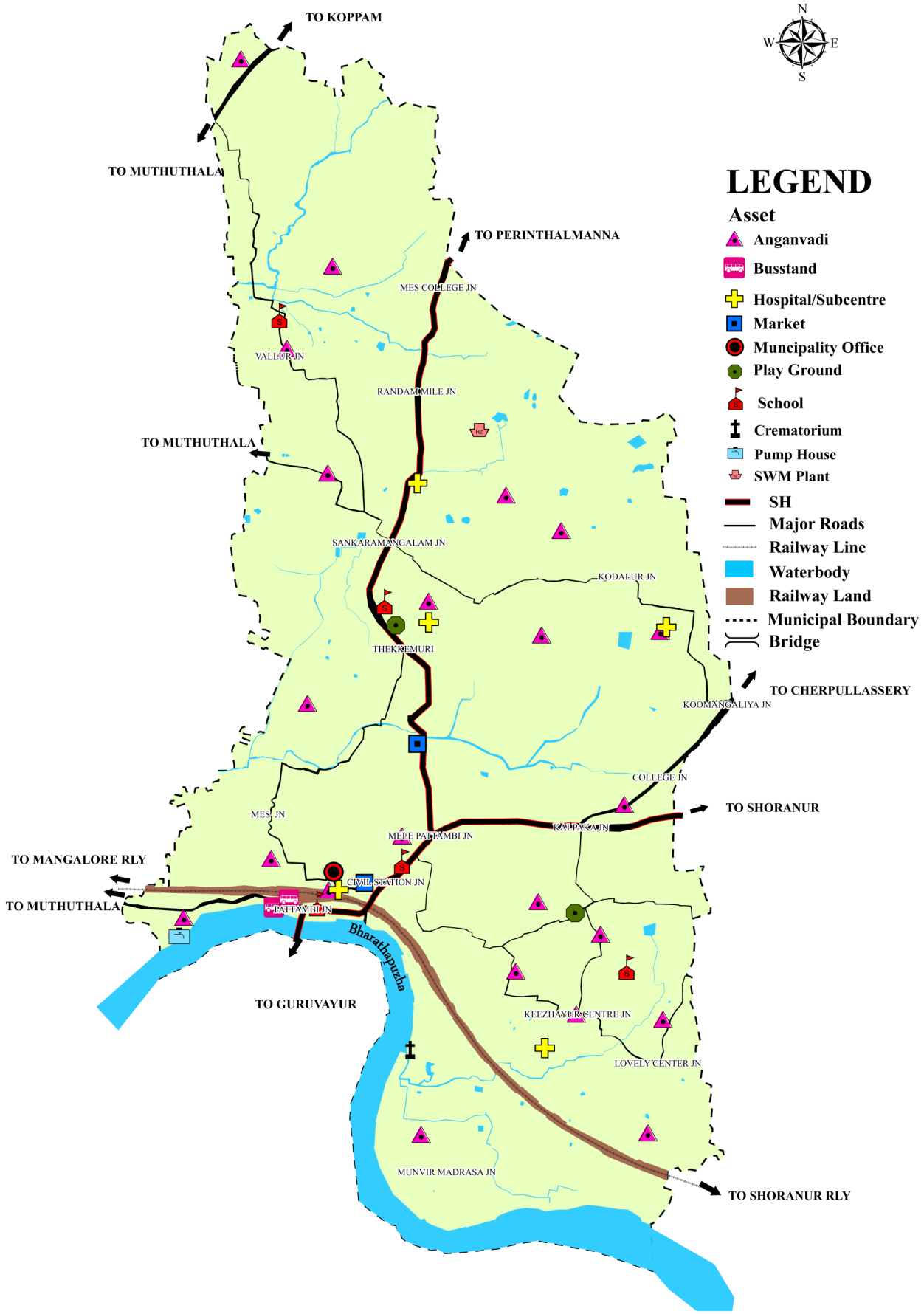


Fig. 22.2 Municipal Assets

Source: Land use survey by LSGD Planning, Palakkad.

Table 22.4 Continued.

Sl. No.	Building Name	Total Floor Area (Sq.M)
126	Swathanthra jubilee smaraka vayanasala pallipad	10.00
127	Vallur mahila samajam vayasala	17.50
128	Vijnanvadi Building	60.00
129	Kodalur healthcentre ward 1	42.00
130	Kizhayur subcentre	40.00
131	Bus waiting shed police station	30.00
132	Bus waiting shed Melepattambi	30.00
133	Bus waiting shed College	30.00
134	Bus waiting shed Thekkumuri	30.00
135	Bus waiting shed Sankaramangalam	30.00
	Total	21116.11

Source: Assets Register, Pattambi Municipality

22.4.2 Key Issues in Asset Management

Municipality assets needs to be maintained. Municipal roads are also seen poorly maintained.

22.5 INFERENCE

Resource mobilization: The revenue income receipts in 2016-17 was Rs.4,58,26,278 whereas the figure stood at Rs.1,84,95,751 in 2015-16, which is a 148% increase from the previous year, while the revenue expenditure registered a 90% increase during the same period.

However, the ratio of Revenue expenditure to revenue income in 2015-16 was 1.6 compared to 1.23 in 2016-17. Even though this is a healthy decline, more efforts should be directed to improve the revenue income receipts.

Whereas the ratio of capital expenditure to capital income receipts is on the decline. It has fell from 0.64 to 0.27 during the FY 2015-16 to 2016-17, which is not encouraging as it implies that rate of investment in fixed assets and capital works in progress are decelerating.

This drop in fixed investments can weaken the administration from gaining financial independence on a long term perspective. It also implies that there is a huge scope in augmenting the revenues by focusing on capital receipts. Value capture finance framework may be envisaged to boost the revenues in this regard.

23

Linkages

23. LINKAGES

Economic aspects of the town are to be analysed, so as to realize full potential of various sectors of economy as drivers of economic development, and of wealth and employment creation. Based on that, urban strategies and policies are to be formulated and implemented so as to promote and boost the participation of people, enhance municipal finance and contribute to the creation of decent urban jobs and livelihoods that increase economic empowerment. The inter-sectoral linkages are to be studied to identify development issues. Hence the cross sectional relation and impacts between environment, land, people, service activity, and production activity are analysed in this chapter.

23.1 INTERSECTORAL LINKAGES

In order to carry out detailed study of the plan area under consideration following sectoral linkages must be studied thoroughly.

- Primary sector- Agriculture, Animal husbandry & Fisheries
- Industries
- Transportation
- Tourism
- Commerce
- Environment
- Special concern areas

23.1.1 Primary Sector - Effect on Industries, Commerce, Transportation, Tourism, Environment and Special Concern Areas

The primary sectors in the town include agriculture, animal husbandry and fisheries. In Pattambi Town, agriculture constitutes nearly 44.06% of the total Municipal area in which 13.82% is paddy and 30.24% is dry agriculture. Agriculture sector plays the role of most important source of resources like food, fibre and raw materials that are required for the development of industrial and other non-agricultural sectors. Agriculture's productivity and institutional links with the rest of economy produce demand incentives and supply incentives fostering industrial expansion.

Agriculture influences industry in many ways. It generates demand for industrial products used in farming such as fertilizer, tools and machinery. Agriculture tools like spade, plough, etc are produced in the industries. Presently, Pattambi Municipality has more industries functioning in the textile sector followed by engineering. There is

shortage of functioning agro based industries. So the agricultural industry should be strengthened more to enhance development growth. Industries based on the primary sector can boost the industrial sector.

There is high demand for fish in the town. Fish marketing strengthened after the functioning of new fish market on the side of Pattambi - Perinthalmanna road. Fish kiosks with modern amenities at vantage positions are needed to provide quality fish at profitable rate. Fish based industrial units offer employment opportunities.

An efficient transport system is critically important for efficient agricultural marketing. If transport service is infrequent, or of poor quality or expensive, then farmers will not get any advantage when they attempt to sell their crops. Pattern of agricultural marketing is strongly influenced by nature of transport service. The State Highway No 23 from Shoranur to Perinthalmanna and SH 39 Perumbilavu - Nilambur road (Pattambi to Guruvayoor border) passes through the town, from where road to Guruvayoor leads through the central part of the town. Pattambi - Cherpulassery road deviates from SH 23 at Kalpaka Jn. The road leading to Muthuthala is another major road in the town. Well connected transport network and affordable transportation cost is necessary for development of primary sector.

Agricultural activities can create environment that attract tourists to enjoy our traditional methods of farming in its natural atmosphere. Regional Agricultural Research station, Pattambi attracts a considerable number of tourists. Exhibition centre for all types of seed, fertilizers, agro machineries and equipments can not only create space for tourism but will also help different padasekhara samithies to make use of these equipment without spending much money.

Also, paddy lands create a vibrant beauty which can also be used for farm tourism. Increase in tourism can boost agriculture as demand of food materials will also increase to greater extent. Establishing linkage between tourism demand for food and local agricultural production is critical in maximising the town benefits. Milk and Milk produces also have demand in tourism sector.

Agriculture and environment have an unbreakable relationship with each other. Drastic change in one will cause destruction of the other. Paddy fields are considered to be an important ecosystem in the nature. These land masses act as a system which balances environmental mechanisms and support growth of biological species. Improper use of chemical pesticides and fertilizers are causing imbalances in environment cycles. Economically backward population mainly work in agricultural sector. Hence changes in agricultural sector are likely to affect population in the weaker sector of economy.

23.1.2 Industries and Commerce - Effect on Transportation, Tourism, Environment and Special Concern Areas

Manufactured products need outlets from where it can reach consumers. These outlets constitute a main portion of commercial activities. Not only the final products but also the raw materials required for the production of commodities are obtained from commercial centres. Industry and commerce cannot exist without each other. Producers and consumers cannot be connected without a proper transportation network. In all areas transportation network plays a vital role in joining all sectors of development. Implementation of new agro based industries will provide job opportunities for economically backward classes and women. Industrial centres will give employment to women so that they will become earning members of the family.

Increase in tourism activities is likely to promote commercial activities also. In tourism sector the town has not developed much. Development of commercial sector will definitely encourage the tourism sector since large number of tourists with more purchasing power will be attracted to the area. Well organized markets and marketing of handicrafts and value added agriculture produce are the emerging needs in this sector.

23.1.3 Transportation - Effect on Tourism, Environment

Transportation facilities act as the nervous system of a town. All activities depend in one way or the other on transportation networks. Construction of a well defined network of transport has to be set up in such a way that it will not damage environmental balance beyond its tolerance limit.

Transportation activities support increasing mobility demands for passengers and freight, notably in urban areas. But transport activities have resulted in growing levels of motorization and congestion. As a result, the transportation sector is becoming increasingly linked to environmental problems. The most important impacts of transport on the environment relate to climate change, air quality, noise, water quality, soil quality, biodiversity and land take.

Transportation activities are a dominant factor behind the emission of most pollutants and thus they have heavy impacts on the environment. Conversion of paddy fields for developmental activities will heavily affect the existing water table level. Hence care should be taken in selecting the routes of newly proposed road network. If future traffic demand can be achieved by widening of existing road network, new proposals can be avoided.

23.1.4 Tourism - Effect on Environment and Special Concern Areas

Tourism can significantly contribute to environmental protection, conservation and restoration of biological diversity and sustainable use of natural resources. Because of their attractiveness and natural areas are identified as valuable. Development in

tourism sector has to be environmentally sustainable basis. Develop a culture of public hygiene and cleanliness is must for this sector development which enhances environment quality also. Bharathapuzha river flowing along the southern boundary of town and other water bodies within the town offer opportunity for the development of waterfront tourism.

Waterfront parks or Gardens by the rivers are envisaged to bring a refreshing garden ambience and promises more entertainment, leisure and recreation activities. Project may include suggestions on ecological restoration of Bharathapuzha, conservation and reuse of properties in vicinity, required landscaping, development of surrounding areas for integrated tourist development and recreational facilities, provision of required tourist infrastructure facilities especially solid waste and waste water disposal.

Tourism and environment have a dual relationship. Certain level of environmental quality is meant for healthy development of tourism sector. But, unbridled development in farming sector can adversely affect the environment. There is potential for tourism in municipality like river front tourism, farm tourism, health tourism. Strengthening of tourism sector will provide employment opportunities for local people.

23.2 LINKAGE BETWEEN SETTLEMENT CHARACTERISTICS AND SECTORAL DEVELOPMENTS

In early settlements, the development pattern was based on agricultural activities alone while in modern era; settlement characteristics were derived out of complex activity pattern of an area. Hence following linkages need to be analysed for understanding the existing spatial structure and also to visualize the most suitable spatial structure.

23.2.1 Effect of Population Growth on Various Development Sectors

The growth in population require an expanded or enhanced infrastructure and service to deliver basic infrastructure and services such as housing, water supply, security, education, health and waste management mechanisms to address the needs of the increased population. Rapid and often unplanned population growth is often associated with population demands that outstrip infrastructure and service capacity and leading to environmental degradation. The exponential growth in population will put insurmountable strain on basic infrastructure. This require an expanded or enhanced infrastructure and services to be able to effectively and efficiently deliver them such as housing, water supply, security, education, health and waste management mechanisms to address the needs of the increased population.

Even though population size of Pattambi Municipality is increasing, population

growth rate is decreasing and there was a sudden increase from 1991-2001 and 2001-2011. Temporal analysis of population for the last forty years (1971-2011) demonstrates that population growth of Municipality shows increasing trend. Primary sector was predominant in early 70's, it gradually gave way to tertiary sector. Secondary sector is also not showing much improvement. The rural/semi-rural character of town has changed over to urban character.

More than 90% of people are now involved in service sector activities. The proportion of the workers in non agricultural sector is an indicator of economic development. Compared to other urban local bodies within district, volume of paddy fields conversion to non agricultural purposes is less. Due to the lag between population growth and labour supply, people have migrated to other countries. There are nearly 16% households having at least one migrant for employment purpose to Middle East and European countries which shows the absence of employment opportunities having better remuneration within town.

Immigrants from other states are attracted to this town due to better wages in our state. Population growth may cause more migration in search of job, if proportionate increase in employment opportunities is not happened in future. Population growth may exert pressure in growth of industrial sector. Labour intensive manufacturing industries such as food processing, wood manufacturers and furniture etc. are needed to create more jobs.

23.2.2 Effect of Population Growth on Land use Changes and Environment

Population growth directly links with land use changes and environment and they are closely related in a complex and dynamic manner and this relationship is mediated by number of socio economic, cultural, political, and developmental aspects whose role varies considerably from one context to other. Population growth often cause to resource exhaustion or depletion but also equally to its under-use, over-use, and often even its misuse. Population growth caused paddy field conversion to other development activities. Since paddy fields function of ground water recharge basins and urban open spaces get affected and caused ground water storage depletion and drainage problems.

Land use change to residential and commercial purpose make more waste generation. In the absence of scientific waste management system, it pollutes both water bodies and land. It become more important to understand the relationship between population pressure, changes in land use and environmental degradation since 34% of population of town are still living below poverty line, non sustainable agricultural and industrial practices, and relatively small scope for further expansion of agricultural land. It is contended that resource depletion risks are also higher due to supply of large quantities of food, water and fuel into town and sewage and other wastes management

are a resource-consuming exercise at present. In the absence of integrated land use planning, automobile dependency is more, hence air pollution is also.

23.2.3 Industrial Sector - Effect on Environment, Land Use and Employment

Pattambi Town has varied types of the Industrial Establishments which have been developed over the period of time on the major transportation networks. Majority of industries are micro and small scale distributed spatially in a scattered manner. Most of them are non polluting industries. There is a Mini Industrial Estate of 1 acres in which 9 Small Scale Industrial Units have been functioning. Labour intensive furniture and wood related industries can be promoted which otherwise provide more employment opportunities also. Non polluting small scale industries can be allowed anywhere and all polluting industries should be located and segregated from the residential areas by creating appropriate green buffer so as to maintain the healthy living environment.

23.2.4 Effect of Various Sectors on Employment

Shopping and commercial areas reflect the economy and the image of the Town. Trade and commerce is an important employment sector in Pattambi Town, both direct and indirect. It is expected that the number of enterprises in retail trade are likely to increase and the corresponding employment is likely to increase in future. In addition to these, large number of enterprises in sectors such as restaurants and hotels, finance & insurance, real estate & business operate from commercial centres. Retail and allied service activities will play a predominant role in provision of employment and will play a significant role in the economic structure of the Town. Increased efficiency of urban mobility (more efficient public transport, city logistics) increases commercial productivity on the one hand, thus promoting employment and reducing

poverty.

The number of cultivators and agricultural labourers are on the decline in Pattambi. A large proportion of labourers engaged in agriculture and allied activities are without continuous employment. Increase in income from agricultural activity due to increase in productivity with technology advancement, adopting better measures for soil conservation and the utilisation of irrigation facilities will attract new entrants to this sector. A broadly accessible market information system had to be established and an effective risk management system has to be developed and operationalised. There needs to be a process of empowerment in all sectors of the agro-food sector and targeted investment to enhance competitiveness.

Animal Husbandry sector can also play a crucial role in the socio-economic development of the town and apart from offering nutritional food at affordable cost; the sector is widely helpful in generating gainful employment opportunities specifically to

marginal and small farmers, landless labourers and women by supplementing their family income. Livestock act as the best insurance against the unpredictable changes taking place in the nature like famine, drought and other natural calamities.

In Pattambi, fishing activities are less, but fish market is functioning as a collection and disbursing centre. Water bodies and paddy fields can be used for fish cultivation. Ornamental fish culture is another attractive sector for provision of employment in Pattambi due to the availability of higher women work force. The major attractions of Ornamental fish culture has low production cost and higher returns with in a very short time, growing demand for fishes both from domestic and international market.

Higher rate of unemployment in the towns is itself a reflection of the lack of adequate work opportunities in rural areas. In the urban areas, employment is linked with fluctuations in the state of business, transport and industry. Any change in conditions is reflected in an increase or decrease in employment figures. In industry, increase in investment and capacity does not lead to a proportionate growth of employment, but based on productivity techniques. The choice of techniques becomes, thus, a matter of crucial importance for employment policy. In areas in which there is considerable pressure of population, special care must be taken to make the maximum use of the available manpower resources. As far as Pattambi is concerned, there is potential for industrial development due to high degree of connectivity by road and rail to major industrial nodes in state and neighbouring state.

It is very likely that the demand for healthcare workers will continue to increase, hence employment opportunities also. Other factors including healthcare finance, technology, and the supply of healthcare professionals will also affect the growth of healthcare employment in future. More human resource and higher percentage of population in the age group of 0-14 years is likely to see a considerable increase in expansion of education infrastructure sector that provide employment also. Skill development and smart campuses are the need of hour.

Infrastructure development will definitely lead to significant employment generation, though a majority of it is still in the unorganised sector. Hence Trade and commerce, industry, education, health care and other service sectors are the thrust areas for employment generation in the town.

23.2.5 Changes in Traffic and Transportation Needs due to Growth in Various Sectors

The means of efficient transportation are an indispensable component for economic development of a town. Industrial and commercial activities can be carried on efficiently only if the communication system is highly modernized. In Industries sector, raw materials come from distant places, production takes place at different location

and the commodities produced required to be distributed to different places. Thus, industrial and transport developments have to go side by side. The dependence is mutual and not one-sided. It is with the help of these modern rapid means of communication and transportation that cities can grow in size and economy. In Pattambi industrial sector is not that much developed. There are no medium and large scale industries in the town. There is potential for development for non polluting industries. Presently industries are seen scattered throughout town, not in a clustered manner. The newly located industries are to be encouraged to use the existing network to the extent possible.

Development of Trade and commerce sector not only need connectivity, but also parking facilities, Freight transport facilities etc. Decentralization of commercial activities will help to reduce transport cost and decongest Town centre. Transport plays a significant role in the structure of food production and marketing. Wide-spread transport network is needed to take agricultural produce from farm to market and to processing centres for value addition. Improved transportation will encourage farmers to work harder for increased production, add value to their products, reduce spoilage and wastage and have positive impact on the productivity, income, employment level and reduce poverty level. In Pattambi Town, agricultural production areas are having road access and connectivity to market areas. Quality of interior roads is poor.

The development of transportation, transportation vehicles, infrastructure and using new technologies speed up the development of tourism. Presently Pattambi Town does not have much attractive tourist spots. Due to better connectivity by rail and road it can function as an intermediary destination to nearby tourist spots. Location of higher order facilities in educational and health sector need noise free zones, hence should be very well connected to arterial/sub arterial roads, and located sufficiently away from them also. Accessibility through public transport is much essential for those facilities.

Recreational facilities have to be located close to work and home in order to facilitate physical activity and social networking. It should be publicly accessible and should have parking facilities also. This will increase intercity traffic and in the case of higher order facilities like indoor/outdoor stadiums create inter city traffic also.

23.2.6 Changes in Traffic and Transportation Needs Due to Changes in Land Use

Land use and transportation are two sides of the same coin. Transportation affects land use and land use affects transportation. Decisions that affect one also affect the other. As a result, it is important to coordinate transportation and land use planning decisions so they are complementary rather than contradictory. The rapid and extended spatial developments exert great pressure on existing transport systems whereby the transport demand by far exceeds the supply of transport infrastructures. This situation result to traffic jams, congestions, road accidents, limited accessibility

and mobility to some of activity locations which led to reduced city's productivity (Nachmias, 2010)

Land use management strategies can be implemented at various geographic scales. Locating housing, shops and offices together in a neighborhood improves access for residents and employees. Clustering numerous residential and commercial buildings near a transit centre can reduce the need to own and use an automobile. Concentrating housing and employment within existing urban areas tends to increase efficiency of transit system. Increased land use mix tends to reduce the distances that residents must travel for errands and allows more use of walking and cycling for such trips. Certain combinations of land use are particularly effective at reducing travel, such as incorporating schools, stores, parks and other commonly-used services within residential neighbourhoods and employment centres. This creates urban villages, which are walkable centres, and small neighbourhoods which contain the services and activities that people most often need.

The rising income, the changing life style and the widespread of car ownership all affect how people utilize a given physical pattern of land use. This is a social dimension of transportation-land use connections. In the process of spatial decentralization that accommodates the demand for space and housing and strong regulation should be in place to make sure that the spatial constraint is strong enough to curtail sprawling development to survive a strong public transit system. High-density can potentially reduce trip distance and make NMT more viable. The provision of local personal service centers (shopping, government services, education, and recreation) should keep up with the pace of housing activities.

In Pattambi Town, growth is mainly radically outwards from central area and like ribbon development on the sides of roads. Cheaper land in the outskirts of town is converted from agricultural uses. Most of the new housing was in the form of single-family houses. Automobiles were easily able to serve such residential areas, while walking became more difficult, given the longer distances involved. The allocation of land for transportation infrastructure and service has to be improved considerately.

23.2.7 Spatial Distribution of Trade & Commerce - Effect on Real Property Values and Equitable Housing Policies

Land use patterns affect economic productivity and development. All else being equal, greater accessible and lower transport costs increase economic productivity (Litman 2010b). More accessible land use that reduces consumers' vehicle and fuel expenditures tends to increase regional employment and business activity. Land along the road becomes more accessible. This increased accessibility makes the land more valuable and attractive to developers.

As land along the road is developed, traffic volumes and the number of driveways increase. This results in more congestion and a deterioration of the road's capacity to efficiently move people and goods. The reduced efficiency of the road eventually necessitates roadway capacity improvements that may encourage additional development. Proximity to high traffic roads reduces residential property values due to noise and air pollution effects, but increased non-residential/commercial property values. Both residential non-residential properties within 500 meter of good conditioned accessible roads were generally of higher property value.

23.2.8 Inclusive growth in various sectors

An inclusive growth means growth with equity where everyone, regardless of their economic means, gender, race, ethnicity or religion, is enabled and empowered to fully participate in the social, economic and political opportunities that cities have to offer. The development process must be geared to include the excluded viz., the urban poor, slum dwellers, street vendors, construction sector workers, migrants, economically weaker sections, women and children, etc. Private sector should be involved in providing quality construction and affordable housing with quick delivery system for the urban poor and role of Government should be a facilitator. National Housing and Habitat Policy, likely to be released soon, should reflect this. For Inclusive Infrastructure development, an aggressive effort in promoting public-private partnership will be needed.

The convergence of programmes of urban development and poverty alleviation with those of education, health, social protection/security, women empowerment, and child welfare, social justice sectoral and departmental programmes needs a strategy of inclusiveness, with state level sectoral and departmental programmes. Microfinance, an important instrument in reaching credit to the poor and tiny enterprises, must reach the poor, building their capacity to absorb higher credit and also ensure greater availability of credit for small enterprises. Capacity Building and good governance also plays an important role in inclusive development.

23.2.9 Energy Efficiency and Land Use

Land use has impact on travel demand thereby consumption of energy (fuel). Walking, cycling and public transit can reduce travel needs to some extent thereby saving energy, at the same time liveable, walkable communities can promote a healthier lifestyle. Regardless of population density, transportation system design features such as greater street connectivity, a more pedestrian-friendly environment, shorter route options, and more extensive transit service tend to reduce per-capita vehicle travel, pollution emissions, congestion delays and traffic accidents. The energy consumption in urban transport largely depends on the modal split as well as the speed of the vehicle. On average, energy consumption for passenger per km is the least by bus

and the highest by car among different modes of road-based passenger transport. At present Pattambi Town is having a transportation problem in the form of congestion, delay, accidents, energy wastage, and pollution. Hence there is a need to have technology upgrades and introduction of a high speed, high capacity public transport system particularly along high-density traffic corridors. Use of electric traction should be encouraged as far as possible.

Pattambi town lies in Bharathapuzha river basin. Studies show that temperature in Bharathapuzha river basin has been on the rise over 36 year period from 1969 to 2005 causing ambient summer temperatures to rise 2-8° F, which increases energy demand also. Moreover, rainfall data shows that Nila watershed gets less rainfall than state average. In this situation, promotion of urban agriculture helps for energy savings and also for improving urban environment.

24

Spatial Structure

24. SPATIAL STRUCTURE

24.1 EXISTING SPATIAL STRUCTURE

The existing spatial structure of town is derived taken into account of activity pattern based on land use concentration and functional character, existing connectivity pattern and existing hierarchy of nodes.

24.1.1 Geography of the area

The contour map of town shows that the highest point is 170 m above MSL and lowest point is 10 m above MSL. The slope of the town varies from 30 and 50. According to physiography, It is coming under mid land and suitable for human settlements. The slope is from east to west direction. As per the slope analysis, Pattambi Town comes under gently to moderate sloping. Bharathapuzha and its nearby areas are having the lowest elevation which is less than 20 m from MSL. Fig. 24.1 shows the digital elevation map of Pattambi town.

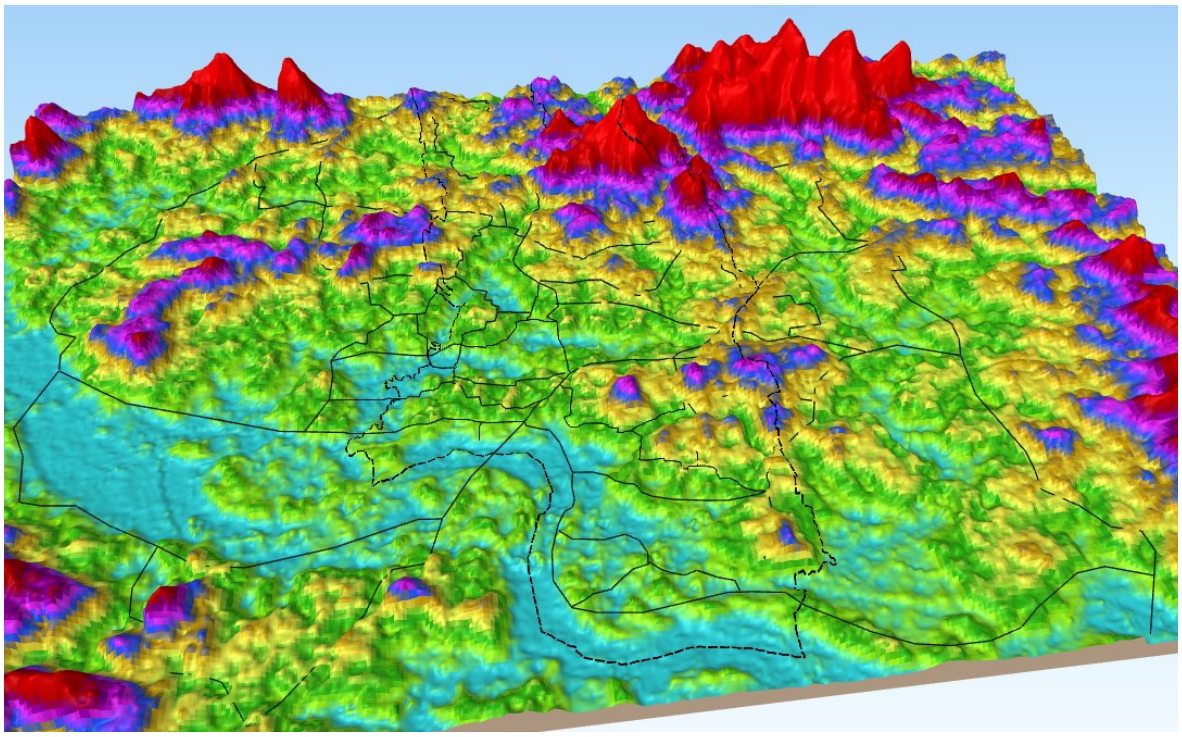


Fig. 24.1 Digital Elevation Map of Pattambi town

24.1.2 Functional Character

Settlements can be classified into urban, semi-urban, semi-rural and rural based on the land use, population distribution and average plot size in the town area. Analysis based on land use and plot size shows that there exists semi urban and semi-rural character of settlement in addition to urban and rural character. An area can be classified as Semi urban, if there exists both

urban and rural character, but predominant activity is urban. If the predominant activity is rural, it is classified as semi rural area. Existing functional character of town shows that nearly half of the wards show urban character. Wards located in the CBD area and immediate surroundings show urban character. Figure 24.2 shows the Functional Character of Pattambi Town.

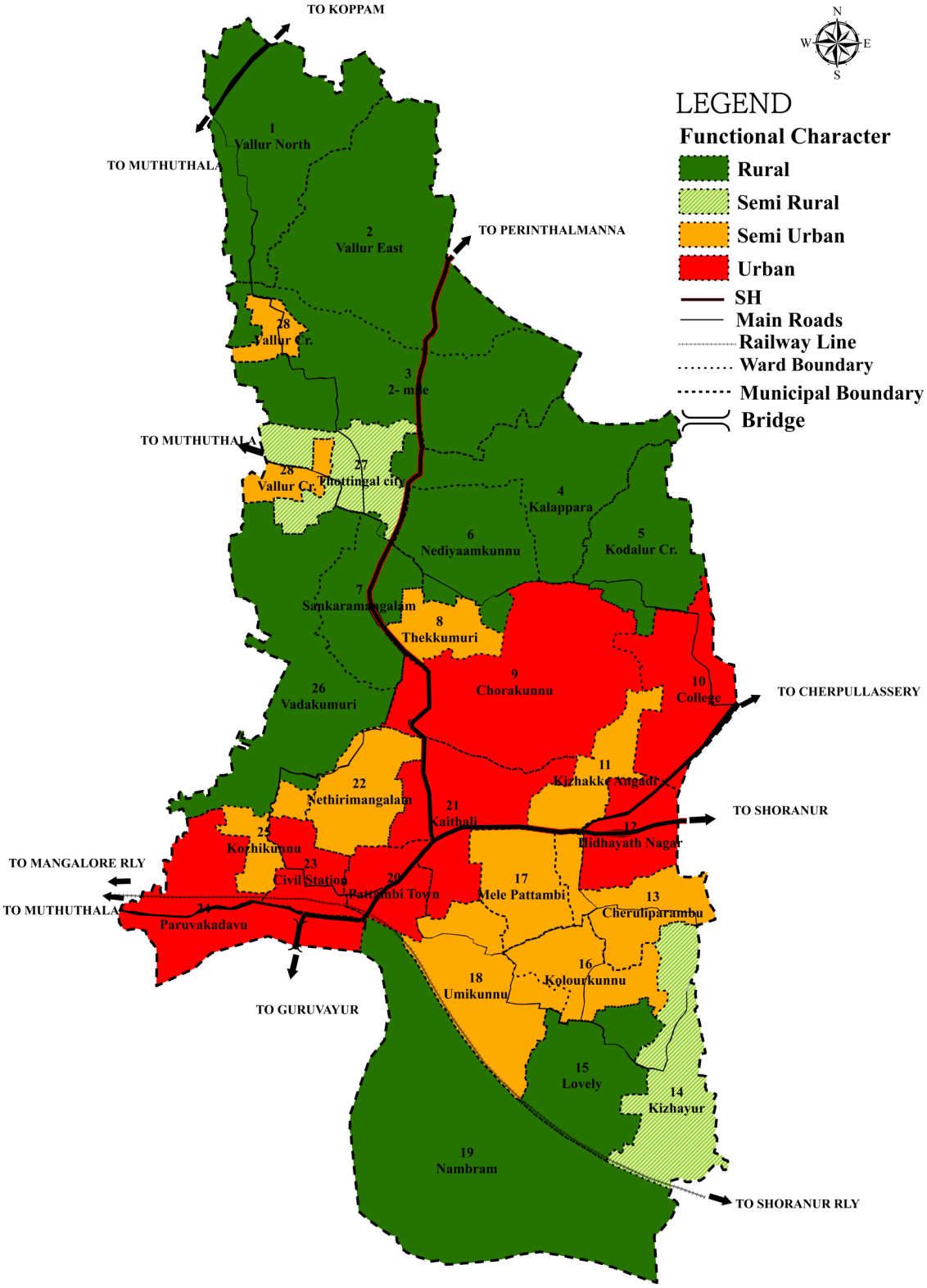


Fig. 24.2 Functional Character

Prepared by LSGD Planning, Palakkad.

24.1.3 Activity Pattern

The term activity pattern is used to indicate the major economic activity of a place or that can be brought there in future. The activity pattern can be derived through the integration of the land use concentration pattern and functional character of the Town. The determination of activity pattern at ward level is attempted here. Figure 24.3 shows the land use concentration of the wards in the Municipality. From the study of the land use concentration pattern of the town it is seen that commercial activities are concentrated in those wards near the town centre and those along important roads.

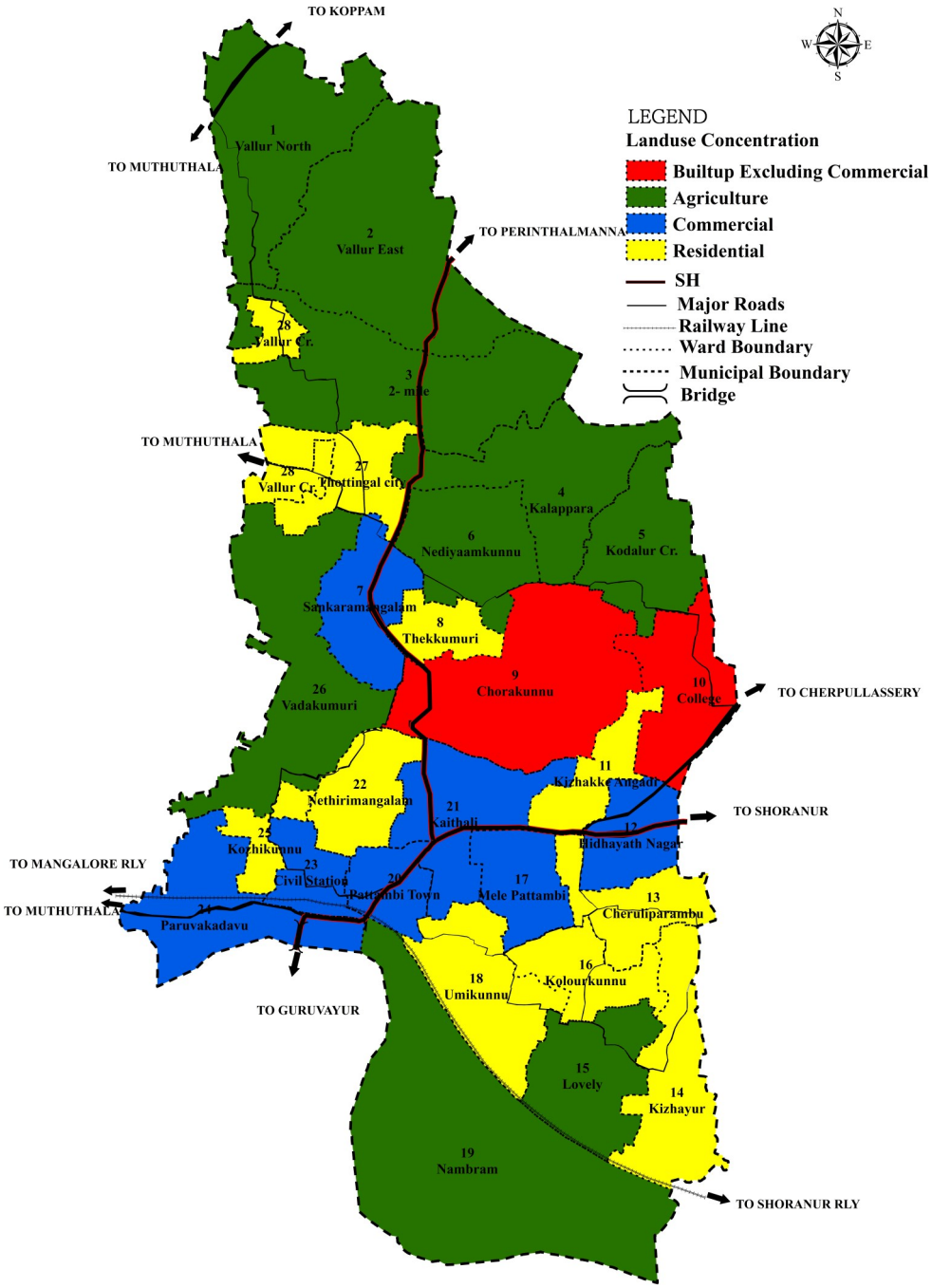


Fig. 24.3 Land use concentration

Prepared by LSGD Planning, Palakkad.

Figure 24.4 shows the activity pattern of the wards within the municipality. The activity pattern of the town shows the areas of agriculture activity, mixed residential activity, residential activity, Public & Semi public activity and commercial activity. Commercial, Public & Semi Public, Industrial activities are concentrated along major traffic corridors. Agricultural activity is concentrated along town periphery.

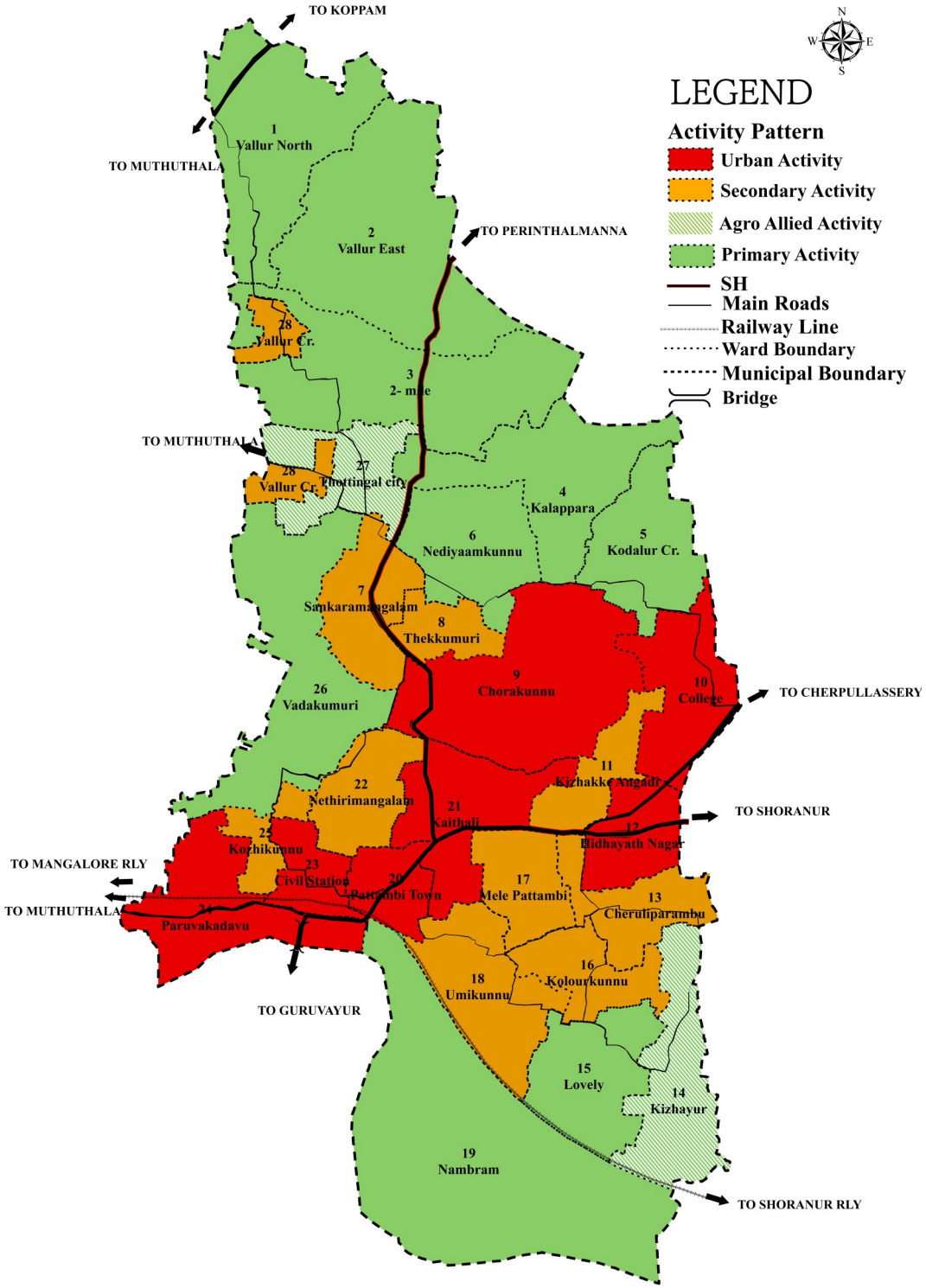


Fig. 24.4 Activity Pattern

Prepared by LSGD Planning, Palakkad.

24.1.4 Connectivity Pattern

Pattambi municipal area is connected only by road and rail in which the existing road network is of radial type. Shoranur-Pattambi-Muthuthala road stretch passes through the centre of the town connecting its two ends together. Roads to Perinthalmanna, Guruvayur, and Cherpulassery create wider road connectivity.

24.1.5 Existing Hierarchy of Nodes

Commercial nodes are identified on all important intersections of roads where there is a concentration of commercial activities and in the case of linear development, where there is commercial activity or physical development for a distance of 250 m is considered. Many of the educational, health, civic and other facilities are located in these places. The Connectivity pattern and existing hierarchy of nodes is shown in Fig. 24.5.

Following are the existing commercial nodes in the Pattambi town area.

Ist order Junctions

1. Melepattambi Junction

2nd order Junctions

1. Pattambi Town Junction
2. Civil Station Junction

3rd order Junctions

1. Kalpaka Junction
2. Sankaramangalam Junction

4th order Junctions

1. College Junction
2. Koomangaliya Junction
3. Thekkemuri Junction

5th order Junctions

1. MES College Junction
2. Munvir Islam Madrassa Junction
3. Kizhayoor Junction

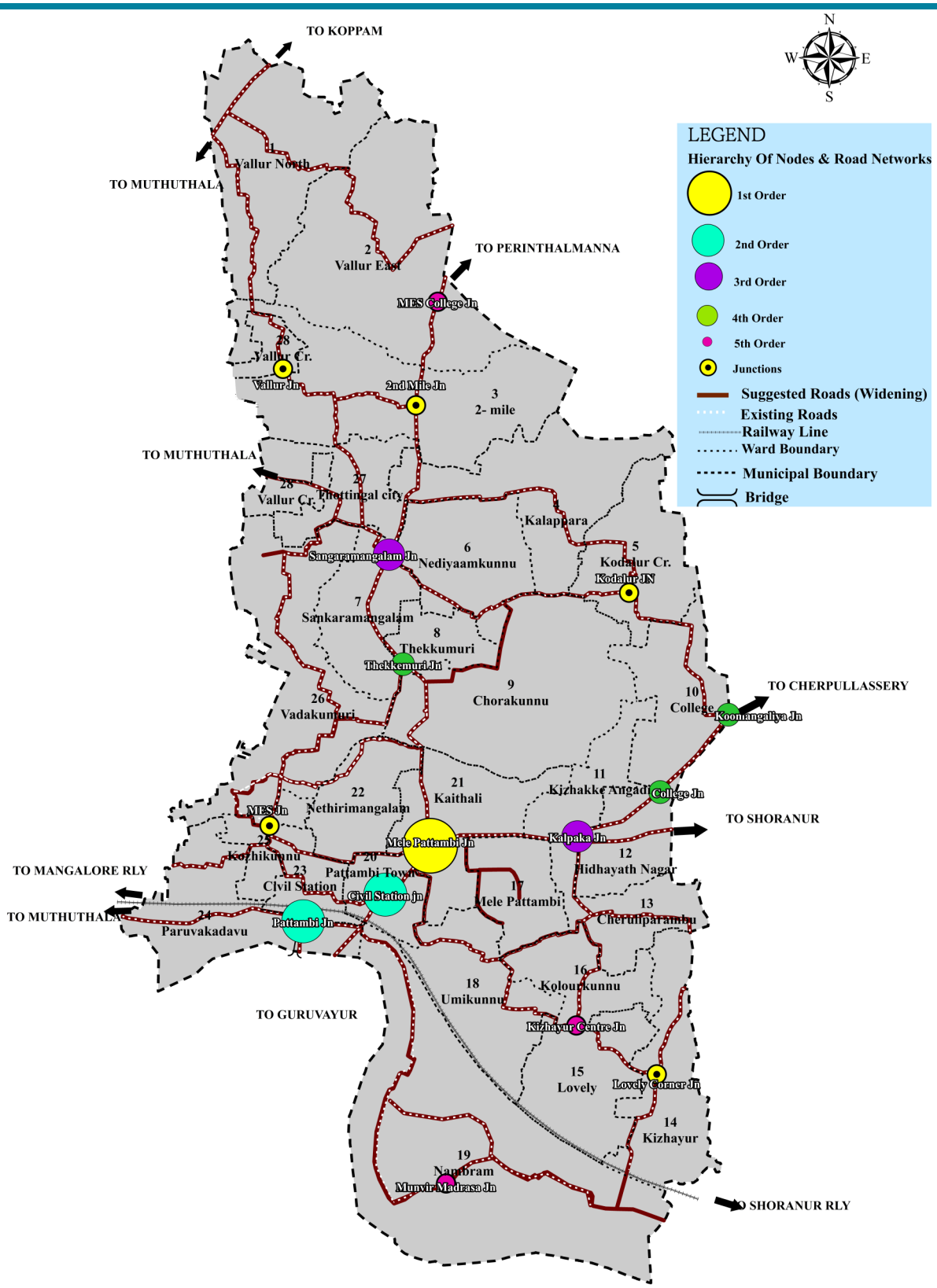


Fig. 24.5 Connectivity Pattern and Existing hierarchy of nodes

Prepared by LSGD Planning, Palakkad.

24.1.6 Existing Spatial Structure

Spatial structure of the municipal area is formulated from the activity pattern, connectivity pattern and hierarchy of nodes. Fig. 24.6 shows the

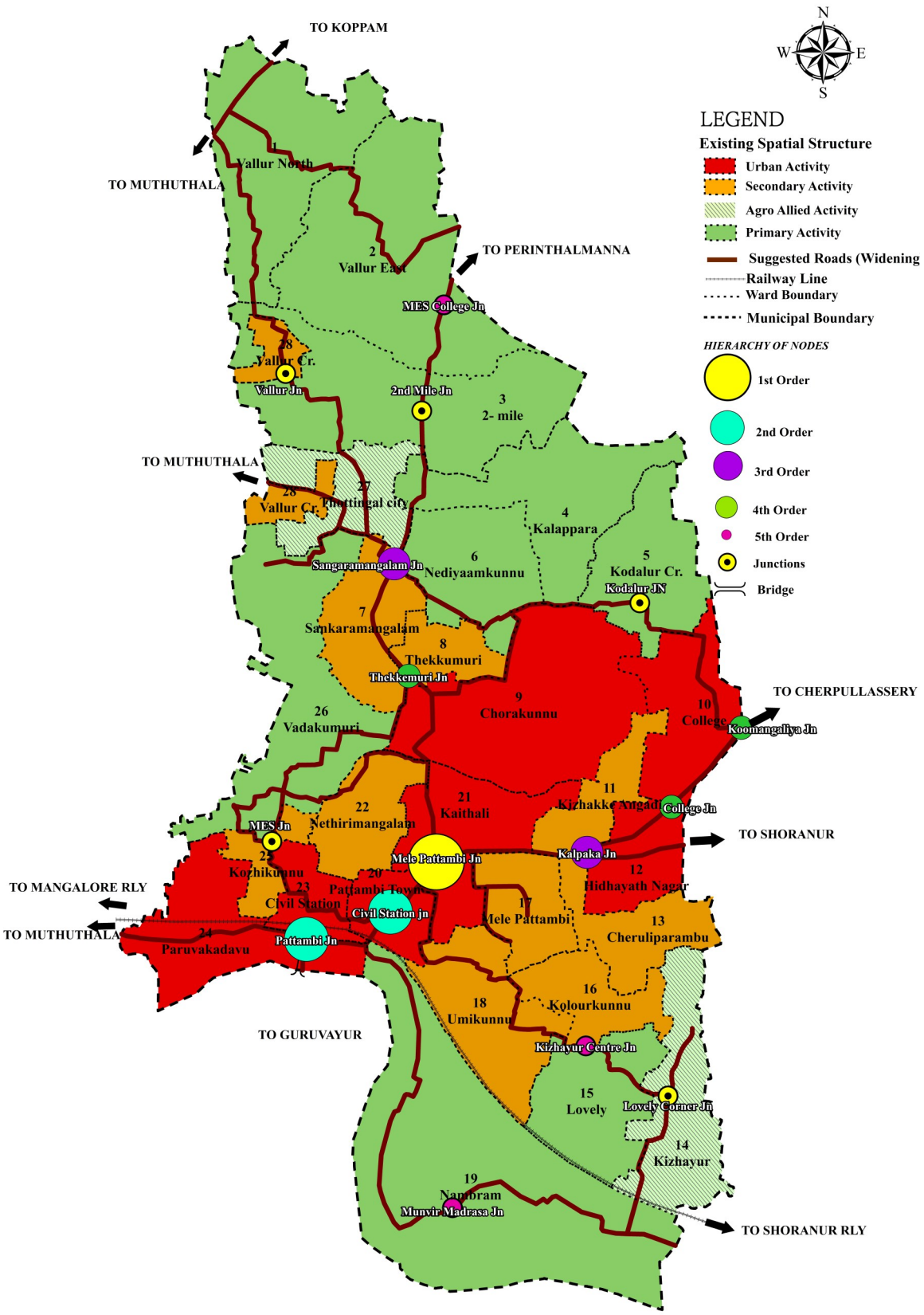


Fig. 24.6 Existing Spatial Structure

Prepared by LSGD Planning, Palakkad.

existing spatial structure of the Pattambi town. Middle portion of the town is predominant with urban and secondary activity. Primary and agro allied activities are concentrated in northern and southern peripheral wards.

25

Summary of Findings

25. SUMMARY OF FINDINGS

25.1 FINDINGS AS PER DISTRICT PLAN FOR PALAKKAD

- As per District Plan for Palakkad, Pattambi Municipal area is identified to have urban character and suggested as third order Settlement (Service centre). The town provides third order facilities to the LSGIs in their respective service areas (Koppam, Vilayur, Thiruvegappura, Anakkara, Kappur, Pattithara, Chalisseri, Thirumittakode).
- As per development concept of District Plan, Pattambi comes under multifunctional zone (IInd Order) of Palakkad district and act as a service centre for the hinter land and this zone is suitable for industries utilizing agricultural products of hinter land.
- Pattambi town junction is coming as second order node and service population is taken as approximately 1.5-2 lakhs.
- According to the suggested road network for the district, Pattambi-Palakkad road and Pattambi-Muthuthala road are proposed to be widened.

25.2 REGIONAL SETTING

- Pattambi town lies at 59 km west of district head quarters.
- Nearest airports and port town are Kozhikode - 64 km, Kochi - 90 km, and Coimbatore - 109 km.
- SH 23 Shornur Perinthalmanna road, SH 39 Perumbilav - Nilambur road passes through Pattambi Town. Shoranur-Podnnur railway line link Pattambi town to sothern part of Kerala and northern part of the country.

25.3 POPULATION

- Municipality accounts for 0.35% of the total area of the district and 1.02% of the total population.
- 5,897 households with an average household size of 4.85. Size of households is steadily decreasing due to the preference from joint families to nuclear households.
- Gross population density is 1,808 persons/sq. km which is higher than State & District and Net population density is 3,890 persons/sq. km. Gross population density is higher than near by LSGI's. One of the

reasons in the desire of the people to find accommodation close to the town as there are not enough facilities available in the hinter lands.

- The sex ratio is 1,038. Sex ratio was decreased by 51 points as per 2011 census. Sex ratio is lowest compared to other urban LSGIs. But seeing a decrease in the sex ratio of children is also likely to do harm in the future. The reason for this is not clear. The plan and awareness programs for the upliftment of women and children should be carried out.
- 12.12% of the population is SC and merely 0.13% is ST.
- One sixth of the families in Pattambi town are depending upon income from Non-Resident Keralites and NRIs (Prvavasis 986 nos.). The people leave the town mainly for good job, depending on their educational qualification. This is a state wide problem.
- There are 768 migrant workers in Pattambi. Majority of immigrant workers are from West Bengal (277), Tamil nadu (241) and Bihar (178).

25.4 OCCUPATIONAL STRUCTURE

- Total no. of workers are showing a rising trend from 25.18% (1981) to 29.90% (2011).
- 29.90% of population is working and among which 24.12% are main workers and 5.79% are marginal workers. In which WPR of male is 25.22 and female is 4.68.
- Contribution of women to WPR is limited, resulting in higher dependency ratio of 2.34
- Pattambi has least WPR compared to Kerala, Palakkad, and other municipalities in the district. A large number of the people in Pattambi are working abroad. Therefore they are not taken into account in census. Also the expatriates returning from overseas are business entrepreneurs, these part also excluded in the calculation of WPR.
- The percentage of cultivators, agricultural labourers and household industries are decreasing.
- About 93.61% of workers are tertiary workers.
- Availability of travel facilities, makes the town is a destination for migrant workers from other states.

25.5 LAND USE

- As per existing land use map 2016, 46.34% of total municipal area is under non agricultural use and the remaining 53.66% is under agricultural use, water bodies and vacant lands.
- Predominant land use is agriculture in which 30.24% of land in the municipality is used for dry agriculture & 13.82% is used for wet agriculture.
- Agriculture land use is distributed mainly in the northern and southern periphery of Town.
- Commercial activities are concentrated along Pattambi – PKD road and Pattambi - Perinthalmanna Road. 0.76% of total area of the town is industrial.
- 96 hectares which is 6.06% of total municipal area is under Public and semi public land use. Major public land use is that of Regional Agricultural Research Station.
- 100 hectares of total municipal area is water bodies which includes Bharathapuzha river, ponds and canal network.
- Pattambi town has two municipal play grounds which constitutes 0.26% of the total Municipal area.

25.6 ECONOMIC SECTORS

25.6.1 Agriculture

- 30.24% of total land is used for Dry Agriculture (4.79 sq. km.) and 13.82% is used for Wet Agricultures (2.19 sq. km.) including 0.50 Sq. km. of uncultivated paddy). Uncultivated paddy are located at very near to town core.
- Agriculture Concentration is high in 11 wards which are located in the northern and south periphery of the town.
- Major crops cultivated in Pattambi municipality are coconut, paddy, followed by rubber. Presence of arecanut, cashew nut, pepper, pappaya, banana, tapioca, ginger and turmeric are also there.
- There are 6 Padasekhara samithis located at Vallur, Sankaramangalam, Kodallur, Aryanpadam, Kizhayur, and Neravath.
- Bharathapuzha and ponds are the main source of irrigation. There is one lift irrigation scheme at Kizhayur.

- Fertilizer Quality Control Laboratory(FQCL), Regional Agricultural research station, Central Orchard farm and Krishibhavan are located at Pattambi Town.
- The number of cultivators decreased from 16.73% in 1971 to 1.75% in 2011 and agricultural labourers are also declining from 45.52% in 1971 to 5.90% in 2011.

25.6.2 Animal Husbandry

- Cattle population has been decreasing for the past few years.
- Poultry population has also declined from 9,046 to 4,269 during the period 1996 - 2007. Due to high demand in market and involvement of authorities, increase the poultry population to 13,770 in 2012.
- There are 5 private dairy farms within the municipal area with average milk production of 11,430 per month out of which 10,300 per month is collected by two co-operative societies in the municipality and the remaining quantity is directly distributed to houses.
- There are no authorised slaughter houses within the municipality, yet the fact that there is ample consumption of meat amongst the population, that means unauthorized slaughtering in the town.
- There is a veterinary dispensary and Milma Milk chilling plant under Malabar Regional Co-operative Milk producers Union (Ltd) located at Pattambi town.

25.6.3 Fisheries

- In Pattambi, fishing activities are less, but there is an existing wholesale and retail fish market along the Pattambi Perinthalmanna road. Kerala State Coastal Area Development Corporation (KSCADC) have been constructed this modernized fish market at Pattambi. 1,101 square meters of built up space is available at this location.
- From coastal areas of Mangalapuram, Vypin, Beypur, nearly 30 tonnes of fish are brought to this market daily and distribute those to nearby local bodies through retail traders.
- The Market has Effluent Treatment Plant (ETP), 25 stalls, a chill room, a flake ice unit, 25 stalls exclusively for the sale of dried fish, and two stalls for value-added products.

25.6.4 Industry

- The land area under industrial use is 12 Ha which constitutes only 0.76% of the total municipal area.
- Presently industries are seen scattered throughout town, not in a clustered manner. But a Mini Industrial Estate is functioning at Pattambi under the control of Small Industries Development Corporation (SIDCO). Total area of the estate is 1 acre. 13 working sheds having a total built up area of 567 sq. m. The existing building have only one floor. Considering access space to the buildings, there is no space for new projects.
- The municipality has no major or medium scale industries however it has many Small Scale Industrial Units (SSI Units).
- The number of industrial units has increased i.e. 20 % from 367 SSI units in 2000 to 441 in 2017.
- It can be seen that the textile based units are higher followed by engineering based. Raw materials are available at Coimbathure and Thirupur. These textile units consist of small ready made clothing units and tailoring units which have SSI registration.
- There are 7 Kudumbasree group enterprises and 35 numbers of individual enterprises in the Municipality.

25.6.5 Trade & Commerce

- The trade is centered around the Railway station and bus stand. Due to the space constrains between the railway line and Bharathapuzha the commercial activities extended to Mele-Pattambi.
- Commercial facilities are seen mainly as ribbon development along the major transport corridors along SH 23 and SH 39.
- The land area under commercial use is 30 Ha which constitutes only 1.89% of the total municipal area.
- There are 72 licensed Street vendors and they are mainly concentrated along road sides near bus stand.

25.6.6 Tourism and Heritage

- Pattambi Nercha, the annual feast at Pattambi mosque is held in the memory of a Muslim saint from the Malabar region - Aloor Valiya Pookunjikoya Thangal. There is no separate space for celebrating these

events.

- Kaithali Siva temple located in Melepattambi is a protected monument under the Archaeological Survey of India. It is carved out in a single mammoth rectangular granite stone, is located at a busy part of Pattambi town. Sivarathri celebration is the annual event celebrated in this temple.
- Pattambi Guruvayurappan Temple, Unni Branthankavu and Panthakkal Bagavathy Temple etc. are the religious places in pattambi town.
- Tourist places near Pattambi includes Ramagiri kotta, Rayiranellur Mala, Muthassiyarkavu, Thirumittakode temple, Njagattiri Temple, Andaladi Mana, Kattil Madom, Vaidya madom, Punnasseri Illam, Thiruvegapuram Mahadeva Temple etc. within 20 km.
- The 4.9 km Bharathapuzha banks has tourism potential, but remains under utilized.
- There are no tourism centers present in Pattambi but can make possible by proposing a tourism circuit by connecting Kaithali temple, Pattambi Mosque, Bharathapuzhayoram and near by places specified above.
- Pattambi town also a rest place for Sabarimala and Guruvayur Pilgrims.

25.7 PHYSICAL INFRASTRUCTURE

25.7.1 Water Supply

- All the water supply schemes, include one major water supply scheme (Pattambi Thwaritha Grameena water supply scheme - 2014) and 31 minor water supply schemes undertaken by KWA has been handed over to the municipality.
- Pattambi Thwaritha Grameena water supply scheme - 2014 is designed at the rate of 40 lpcd and consists of a water treatment plant of 2.5 MLD with OHSR of 2.5 LL and two OHSR of 3.5 LL and 1.55LL at Unnibrandhankavu and Anthoor Palliyal respectively.
- The water treatment plant is located near PWD guest house where conventional type of treatment is done. The water supply service area of the town is divided into 4 zones.
- Even though 55.13% of the households depends on own open well, 35.78% depends on own bore well and the remaining depends on piped water, community well etc.

- The ground water table is showing a declining trend in the municipality. Average Ground Water table depth in Open well (GHSS, Pattambi) is 8.14m and that of bore wells is 7.963 m & 15.76 m (10 years average in peak summer).
- From the socio economic survey it is observed that about 42% Population are having no water scarcity problem. 31% having scarcity for a period of 1-2 months, 20.89% are having water scarcity for 2-3 months and 3.68% for 3-6 months. About 2% of population are facing scarcity for more than 6 months.
- Water Scarcity is found to be more in high altitude areas (Vallur East, Randam mile, Kalappara etc).
- Nambram is the division in between the railway line and Bharathapuzha. Geographically, it is very difficult to get water through the main drinking water scheme in this place.

25.7.2 Drainage

- There is no planned drainage system in the town and existing drainage systems consists of natural and artificial drains that ultimately discharge in to Bharathapuzha flowing through the southern territory of the town.

25.7.3 Sewarage and Sanitation

- There is no public sewerage system in the Pattambi town
- From the socio economic survey it is observed that majority of houses uses pit latrine. It is an indication of unhealthy practice of sanitation in the town.
- Lack of toilets in the commercial establishments and lack of sufficient public toilets in shopping areas, public places such as railway and bus station etc. also create unhealthy situation in the town.

25.7.4 Solid Waste Management

- The solid waste generated in Pattambi town is 9 TPD. Out of this 6.98 TPD Bio-waste and 1.63 TPD consist of Plastics and non-bio degradable waste. But the solid waste treatment plant has only 4 tonne capacity for collection and disposal.
- Three tonne capacity windrow compost plant and a one tonne capacity RRF are operating in Solid waste treatment plant at Sankaramangalam. Bailing machine and Shredding machine are also present there.

- Solid waste collection system is a centralized but does not cover the whole municipal area.
- As per the socio economic survey, 96.52% of the waste generated in the municipality are disposed on their own compound. They are not following proper methods of disposal.
- The biomedical waste generated from the hospitals and clinics are collected through IMAGE and biodegradable wastes are collected through municipality.

25.7.5 Energy

- The power requirement of the Pattambi town is being covered by KSEB. There is 110 KV substation located in Pattambi at Kizhayur.
- In Pattambi municipality, 68% of connection is for domestic purpose followed by 26% for commercial purpose.
- Pattambi municipality do not have any major energy problem.
- The town has good fuel supply system in existence.

25.8 SOCIAL INFRASTRUCTURE

25.8.1 Education

- Literacy of Pattambi municipality is 95.18% which is higher compared to district and Kerala state. Male literacy (97.08%) is greater than female literacy (93.385%).
- As per socio economic survey, majority of the population in Pattambi Municipality belong to High School educated group (39.95%).
- Spatial analysis of schools within the town shows that the service area of the schools covers almost all the municipal area.
- Considering the physical infrastructure, all schools have playground except for GMLPS and GLPS.
- All institutions are connected with motor able road and sufficient sanitation facilities
- There is a NDFC (National Deaf Family Care) technical institute and a college for the deaf at Sankaramangalam. It is affiliated to human resources development society under Govt. of India. B.com and B.sc are the courses offered in this institute.

25.8.2 Health

- There is a Taluk hospital in Pattambi town with 76 beds. (an average patient per day is 477). As per the planning standard 50 beds are required for 1 lakh population in a Taluk hospital. Hence the bed strength available in the hospital is enough to serve the population of Municipality. However it is not sufficient when considering Taluk Head quarter.
- Taluk hospital has limited land, no possibility for further development at existing situation. Hence a new place has to be found for reforms.
- There is a Govt. Homoeo dispensary and Govt. Ayurvedic dispensary at Pattambi.
- Nila hospital and Ahalia eye hospital are the private hospitals in the town under Allopathic sector.
- The town mainly depends on Sevana Hospital and Research Centre which is located in the adjacent Panchayath Ongallur. The other multi specialty hospitals near to the Pattambi town are Moulana hospital Perinthalmanna, KIMS Al-Shifa hospital Perinthalmanna, Edapal Hospital Pvt Ltd Edapal, etc which are about 25 km from Pattambi.

25.8.3 Recreational and Other Civic Amenities

- There are 2 open play grounds in Pattambi town, one play ground at Sankaramangalam and one at Cheruliparambu owned by the municipality. Also there are 6 school playgrounds. But no space for walk ways for morning riding and open space for exercise with in the town.
- There are 3 cinema halls and 4 Auditoriums functioning within the town limit.
- There are 5 libraries in the Pattambi town at Nediyamkunnu, Lovely, Umikunnu, Civil station and Vallur centre in which only two of them are having reading room facility. All these are sufficient for Municipal population, however when consider Pattambi as Taluk head quarter, absence of Taluk referral library is seen.
- There is one Police station and a Fire station located at Pattambi town.
- Pattambi town has 4 fuel stations and 2 LPG godowns.
- There is one public crematorium / burial situated at Nambram which is not in use. There are 5 burial grounds owned by religious institutions.

- There are two post offices and one BSNL telephone exchange office.
- Two public toilets are present in the Pattambi town, one E-Toilet near Melepattambi bus waiting shed and one public comfort station at Pattambi bus stand.

25.8.4 Housing

- Approximately 30.43% of the total land in Pattambi municipality is of residential use.
- Total no. of households is 5,897 (census 2011). Household size in Pattambi (M) is 4.86.
- At present, there are 6,463 houses in Pattambi town.
- As per census 2011, 70.3% of the houses are Pucca, 28.1% are moderate houses, 1.6% are kutcha houses.
- According to the LIFE Mission survey, the total number of houseless households are 376.
- The stretch between private bus stand and Nila Hospital on Pallam Road in Pattambi has lots of buildings that have been rented out to migrant workers. They are constrained to live in unhygienic conditions without proper shelter, sanitation and safe drinking water.
- Ensuring proper toilets, septic tanks and modern STP are found necessary to avoid contamination of ground and surface water.

25.9 TRAFFIC AND TRANSPORTATION

- Pattambi town has good network of roads connecting neighboring towns (Shoranur, Perinthalmanna, Guruvayoor, and Cherpulassery).
- The State Highway no. 23 Shoranur - Perinthalmanna road, Pattambi - Guruvayoor road and Pattambi - bus station road are found over utilized with V/C ratio more than 1. This indicates severe congestion.
- From traffic volume survey, It was observed that Melepattambi junction has the highest peak hour traffic volume - 3,053 PCU followed by Pattambi Junction – 2,713 PCU.
- From speed and delay studies, minimum speed was observed between Civil Station Jn. to Pattambi stretch with a total delay of 10.27 seconds (Average speed is 22.09 km/hour) and maximum speed was observed in the Shoranur Border to Kalpaka Jn. road stretch and no delays were observed there (Average speed is 46.10 km/hr).

- Maximum delay was observed at Melepattambi jn having 14.57 seconds between Melepattambi - Kalpaka jn road stretch and 23.15 seconds between Melepattambi – Thekkumuri road stretch.
- From Parking survey, Maximum parking accumulation observed at Pattambi to Bus station road stretch between 2.00 - 6.30PM.
- Maximum pedestrian volume is observed in Melepattambi junction (715) followed by Pattambi junction (632) from pedestrian survey. Pedestrians are walking on the road space due to lack of footpath.
- Public transport services are met by both KSRTC and private buses in Pattambi Town. These services are operated from Municipal bus stand located on Pattambi - Muthuthala road close to Pattambi junction.
- The highest number of bus trips is operated to Shoranur, followed by Guruvayoor and Perinthalmanna.
- A count of buses entering the Pattambi bus station were made during normal working days and it was observed that 639 entries and 823 exits were made during the period between 06.00 Hrs and 22.00 Hrs.
- The existing bus terminal is located at the heart of the town. The buses to and from the bus station has to make multiple trips between Pattambi Jn and Bus Station creating a bottleneck situation.
- The O-D pattern of inter-city passenger traffic revealed that out of 2.08 lakh inter-city passenger trips, 24.92 % were external to external trips. It could be inferred that Pattambi town being located at the middle of major travel corridors connecting Guruvayoor, Shoranur and Perinthalmanna, substantially higher share of external-external trips are performed through the Town.
- Study of the goods traffic pattern observed within the study region with regard to the outside study region revealed that 3,400 tonnes of traffic originated from the study region and 2,200 tonnes of traffic terminated in the study region. More than 8,000 MT of traffic (59%) are of divertible nature, which are passing through the CBD area of the town due to non-availability of bypass.
- Major delay to free flow of traffic was due to conflicting movements at intersections on most of the road stretches, inadequate width of road and location of bus station at the CBD areas.
- Pattambi railway station is located on the Mangalore - Shoranur rail line which traverses through the CBD of Pattambi town. It is category

D, NSG 5 railway station.

- IPT modes consist of autorikshaws and taxis. There are 11 auto stands and six taxi stands located within the municipal limit of Pattambi Town.
- The share of IPT modes especially autorikshaws in the city road network comes around 16.44% and varies from 8.5% to 25% during peak hours

25.10 SOCIAL BACKWARDNESS

- There are 34 SC colonies in the municipality comprising of 453 families
- As per BPL survey, 2011 households in the municipaliy are BPL.
- There are 7 Kudumbasree group enterprises and 35 numbers of individual enterprises in the Municipality.
- There are 22 anganvadis in Pattambi town for the welfare of children. 21 of them are working in their own building. All of them have their own toilet facilities.
- According to the LIFE Mission survey, the total number of houseless households are 376, out of which 228 families are landless.

25.11 ENVIRONMENT

- Ecologically Sensitive areas of the Pattambi Town include surface water sources (river, ponds), paddy fields & sacred grooves.
- 219 Ha of paddy field is present in Pattambi Town that accounts to 13.82% of the total land area in the town.
- There are 68 ponds out of which four have an area more than 1 acre while three ponds are municipality owned and the remaining are private. Total area of ponds pegs to 5.71 Hectares.
- From Water quality data obtained from Pattambi sampling station at Bharathapuzha, it has been observed that BOD and total coliform level for Bharathapuzha River is higher than the standards prescribed by BIS for tolerant limit of surface water.
- High levels of coliform in water indicate contamination from sewage, dumping of garbage and discharging liquid waste directly to the river. KWA was prepared a Detailed Project Report for sewage and Septic management plan for Pattambi Town. This problem can be eliminated by implementation of the project.
- Sand-mining and encroachment upon the riverbed and its banks had

reduced the water retaining capacity of Bharathapuzha river. Scientific study approach has to be taken to improve the retaining capacity of river.

- Ground water quality detail from well at GHSS Pattambi shows presence of E coli bacteria which is a strong indication of sewage or animal waste contamination. Water supply distribution to be ensured to this area.
- Huge volume of traffic, frequent jams, absence of efficient public transport, leads to air pollution. The major part of pollution is by vehicles. The usage of electric vehicles may reduce this in future to an extent.

25.12 DEVELOPMENT ADMINISTRATION AND FINANCE

- Resource mobilization: The revenue income receipts in 2016 - 17 was Rs. 4,58,26,278 whereas the figure stood at Rs. 1,84,95,751 in 2015 - 16, which is a 148% increase from the previous year, while the revenue expenditure registered a 90% increase during the same period.
- However, the ratio of Revenue expenditure to revenue income in 2015 - 16 was 1.6 compared to 1.23 in 2016 - 17. Even though this is a healthy decline, more efforts should be directed to improve the revenue income receipts.
- Whereas the ratio of capital expenditure to capital income receipts is on the decline. It has fell from 0.64 to 0.27 during the FY 2015 - 16 to 2016 - 17, which is not very encouraging as it implies that rate of investment in fixed assets and capital works in progress are decelerating.
- This drop in fixed investments can weaken the Administration from gaining financial independence on a long term perspective. It also implies that there is a huge scope in augmenting the revenues by focusing on capital receipts.
- E-governance, online tax etc may boost the revenue of the municipality.

25.13 SWOT ANALYSIS

The findings summarized which is evolved from settlement analysis and sector analysis is now attempted to SWOT analysis with the involvement of people representatives, stake holders and professional families with Pattambi town. The following are the summary of results of the analysis.

25.13.1 Strength

- Regional connectivity by SH 23a Palakkad - Cherrpulasseri - Perinthalmanna road, SH 23b shornur Perinthalmanna road, and SH 039 Perumbilav - Nilambur road.
- Pattambi- Podannur railway line link the town to southern parts of Kerala and northern parts of the country.
- Pattambi is one of the Taluk head quarters in Palakkad district. Regional Agricultural Research Station, Central Orchard farm and Fertilizer Quality control Laboratory also host at Pattambi.
- Milk chilling Plant under Malabar Regional Co-operative Milk Producers Union situated at Pattambi.
- Melepattambi junction is coming as second order node and service population is taken as approximately 1.5 - 2 lakhs.
- Active modern fish market for retail and wholesale.
- SIDCO have 1 acre land where 13 units are in working.
- High literacy rate (95.18%).
- Good base in high school and higher secondary school education.
- 30.43 % Municipal area is used for residential purpose. A large number of NRK and NRI become the back bond of economy of the town. Town also act as a host of migrant labours. There are no slums in the town.
- Presence of spatially located five libraries make the town as reading friendly.
- Amble space for play ground one at Sankaramangalam and another at Cheruliparambu.
- ASI heritage monument situated at the core of the town.
- Police station and Fire & Rescue service within the town.
- A well established solid waste management plant situated at Sankaramangalam, where the MCF are situated 500m away from the nearest residential settlement. There also windrow compost plant and RRF having three and one tonnes capacity respectively.
- KWA prepared a DPR for sewage and septic waste management and suitable location for treatment plant already identified.

25.13.2 Weakness

- The town situated 59 km from District head quarter.
- SH-39 crosses the railway line through Under pass, which have only limited width, hence bottle neck cannot be removed in the core town. Here minimum speed was observed in speed and delay studies.
- Bridge across Bharathapuzha is structurally very old.
- Railway line divides the core town in two pieces and the narrow strip of land in between railway and Bharathapuzha consist of Pattambi Bus stand, Railway station and trade centre, so this is very busy place.
- Expansion of the existing bus stand is very difficult, because Bharathapuzha flows through the rear side of the stand.
- Commercial facilities are seen mainly as ribbon development along the major transport corridors along SH 23 and 39.
- Even though the municipality lies near the Kochi corridor, industrial clusters are absent in the municipality.
- Lack of parking facilities and encroachment of road for parking.
- Inadequate drainage system.
- Lack of higher order social infrastructure facilities including professional education, higher grade hospital facilities.

25.13.3 Opportunities

- Taluk administrative headquarters.
- Presence of active Modern fish market within the town.
- High potential for agro based industries. Suitable land for industrial zone available at Sankaramangalam near to the existing solid waste management plant.
- Heritage /pilgrimage tourism and riverfront tourism potentials. The bank of Bharathapuzha can be developed in such a way that the town faces the river, Providing the necessary facilities for Sabarimala and Guruvayur pilgrims will boost trade and commerce.
- A large number of residence are not in use due to the investment of NRIs, this can be used as Home stays for foreign tourists.
- The town have favorable condition for migrant workers.

25.13.4 Threats

- Unhygienic conditions in migrant workers camp.
- Unhealthy practise of sanitation disposal.
- Drainage and sewerage discharges directly into river from nearby commercial institutions.
- High levels of coliform in water indicate contamination from sewage, dumping of garbage and discharging liquid waste directly to the river.
- Huge volume of traffic, frequent jams, absence of efficient public transport, leads to air pollution.
- Decreased ground water quality in certain area of municipality.
- Incomplete coverage of solid waste collection system.
- Nambram is an area which is separated by railway land from Pattambi town. The development is possible only after the completion of the "Theeradesa road".
- Location of existing Taluk hospital is very close to the railway line which leads to inconvenience due to noise.

26

Goals and Objectives

26. GOALS AND OBJECTIVES

The vision principles that the town should follow in future are described as goals. In other terms Goals are the general target to be reached through completing a series of tasks. These tasks are called "objectives" which are designed to meet the goal.

Unlike goals, objectives are specific, measurable, and have a defined completion date. They are more specific and outline the "who, what, when, where, and how" of reaching the goals. Plans and actions based on clear goals and objectives are more likely to succeed in meeting the community's needs.

26.1 DEVELOPMENT GOALS AND OBJECTIVES

Based on the detailed study and analysis carried out, Goals and Objectives for Pattambi Town can be summarized as follows.

Goal : I

Develop Pattambi town as a eco-friendly and economically vibrant urban centre for trade and commerce.

Objectives:

- Provide adequate physical infrastructure facilities to meet the current and anticipated demands of all areas.
- Provide higher order health facilities to serve the nearby local bodies.
- Provide access and support for health services to all citizens with an emphasis on weaker sections of community
- Provision of an efficient traffic and transportation network within town.
- Improve better transportation network with regional connectivity.
- Provide adequate parking facilities in the town.
- Develop a system of permanent open spaces that link - recreational and institutional uses
- Encourage provision of recreational activities.
- Provide the dedicated zone for trade and commerce in the municipality.

- Encouraging clean, non - polluting industrial uses.
- Develop decentralized modern markets, cold storage facilities. Promote more retail and whole sale trade and commercial activities.
- Provide high quality infrastructure and services that support local business.
- Promote agriculture activities by providing sufficient infrastructures and marketing facilities.
- Decongest the core area of the town by dispersal of commercial activities by neglecting other commercial nodes within the town.
- Optimum utilisation of available potentials can boost economic growth.
- Increasing production and productivity of major crops like paddy, rubber, vegetables etc.
- Promotion of Homestead agricultural activities & bio organic farming.

Goal : II

Ensure safe and easy access and circulation to, from and within the town

Objectives:

- Increase the width of existing roads to avoid congestion in the CBD areas.
- Providing sufficient parking facilities.
- Upgrading existing transport infrastructure.
- Ensuring safe pedestrian and vehicular movements with an emphasis on Non-motorised transport like bicycles, provision of proper foot-paths.
- Develop a sidewalk plan prioritizing needed links between public facilities, schools, and other centres of activity and neighbourhoods.
- Improve traffic flow by improving signage, enforcing traffic laws and introducing traffic calming measures.
- To minimize travel outside the town by creating self contained and self sufficient communities.

Goal : III

Protect natural features and agricultural land that retains its prominence within the town

Objectives:

- Enabling sustainable development of agriculture minimising conflict with other land uses and minimising the conversion of agricultural land use for other development purposes.
- Create a green buffer strip around environmentally sensitive areas like water bodies, and around hazardous solid waste dumping land to e nsure proper encroachment and pollution protection.
- Implement zoning regulations for paddy fields with strict order.
- All environmental sensitive areas are home land of wide variety of flora and fauna, hence their conservation should be considered with utmost importance.
- Make the city green, secure, hygienic and elegant for living.

Goal : IV

Enhancement and protection of natural and cultural resources within the community to reinforce its rural past and history.

Objectives:

- Framing policies to protect the heritage sites and festivals.
- Preserving and promoting the rich cultural traditions of the region.
- Enforcement of the existing rules to protect the environment.
- Designing an effective development control regulation.
- Providing green infrastructure (network providing the “ingredients” for solving urban and climatic challenges by building with nature) that is important to the health, welfare and the quality of life of residents and tourists.

Goal : V

Protect existing open space and increase recreational facilities and develop the town as pilgrim tourist spot.

Objectives:

- Developing new open and green spaces to make Pattambi a green city.

- Protecting the formal and informal open space from inappropriate development.
- Ensuring the distribution of open spaces and recreational settings matching the current and future population characteristics.
- Promote religious and cultural tourism activities.

Goal : VI

To enhance the quality of life of the people, especially economically and socially weaker section in the town with quality social and physical infrastructure in an equitable manner.

Objectives

- Provide adequate physical infrastructure facilities to meet the current and anticipated demands of all areas.
- Prioritise educational facilities and services.
- Provide access and support for health services to all citizens with an emphasis on weaker sections of community.
- Develop a system of permanent open spaces that provide recreational uses with residential neighbourhoods.
- Envisage an accessible friendly infrastructure based on built environment and transport.
- Encourage provision of recreational activities.
- Increase public awareness about the protection of environment.

Goal : VII

Optimum utilization of resources for diversification and strengthening the economy of the town.

Objectives

- Promote value addition of products under agriculture.
- Promote small scale industries based on the resources of theregion.
- Develop tourism activities utilizing existing potentials and develop the town as a tourist transit centre.
- Develop the agriculture and animal husbandry sector.

- Increase the economic growth by enhancing job opportunities and better socio - economic environment.

Vision statement is derived after stakeholder consultations and taking into aspirations of people

Finally the Development Vision can be summarized as follows:

To develop Pattambi town as a regional growth centre with a thriving sustainable economy ensuring basic/enhanced physical and social infrastructure facilities, thereby extending a vibrant healthy life for its residents in an inclusive and environmental friendly manner giving due emphasis to the needs of its rural hinterland promoting constructive backward and forward linkages.

27

Development Concept

27. DEVELOPMENT CONCEPT

Development Concept is a guidance document which aims to lay the foundation for medium and short-term detailed development programmes that will attribute specific measures and processes for the objectives to be achieved. The key development aspects of planning area identified through detailed analysis are population density pattern, environment, transportation, agriculture and allied activities, industry, tourism and commercial activities. The suggested form and structure of the town is influenced by its regional setting, geographical features and evolved through an extensive process of social, physical and economic sectoral analysis. Development objectives when spatially located, taking into account the existing spatial structure, provides the development concept of town. The development concept will clearly indicate how the plan area will develop in future and also will give an overall idea of the location of determinant development proposals.

27.1 FORMULATION OF DEVELOPMENT CONCEPT

Based on detailed study and analysis of the existing development and growth mechanism, it has been observed that Pattambi is an administrative and service centre town and has enormous potential for rapid economic growth. Town has also potential to emerge as an industrial and tourist town, apart from having agriculture and allied sector potentials in and around it, provided required level of support systems, quality infrastructure, user friendly policy options, state of art developmental and institutional mechanisms are put in place. The town shows flourishing tertiary sector without having proper backward and forward linkage with primary and secondary sectors. More over the town and region is bestowed with natural resources, tourism and socio – cultural resources. At the same time there are areas of environmental concern.

The resource base of the town and integration of core sectors plays a crucial role in the planned development of the town. The existing transportation network read together with envisaged traffic and transportation concept and proposed transportation plan has profound impact in the formulation of development concept.

Obviously the impulses of ongoing / committed/ proposed projects within the municipality and surrounding region has to be given due consideration while formulating the development concept. The factors to be synthesized to formulate the development concept are described in Fig 27.1.

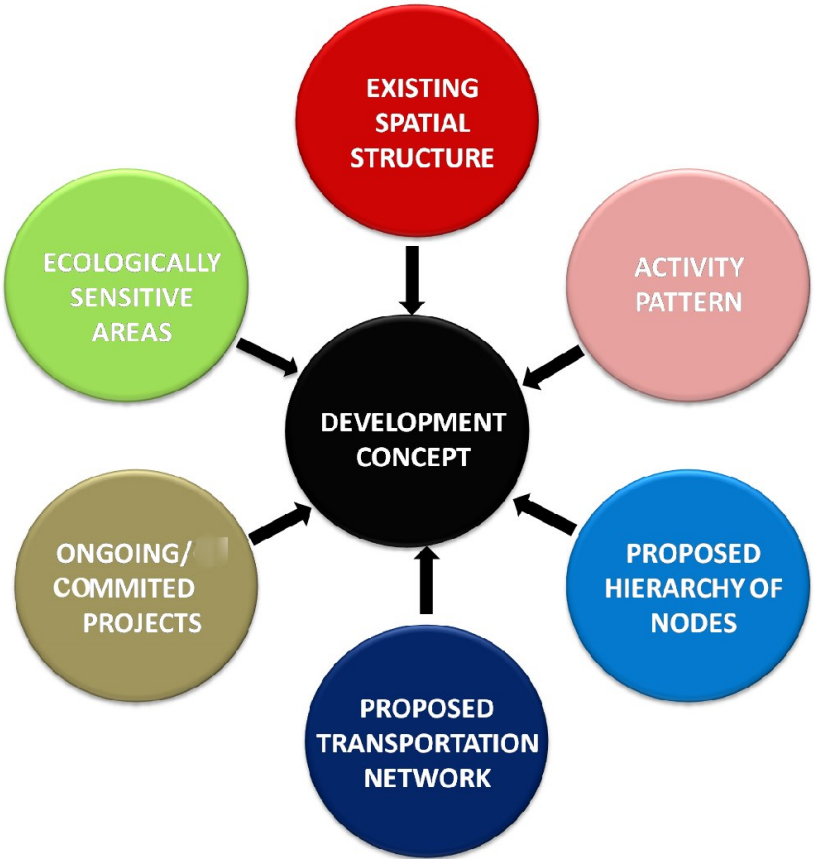


Fig. 27.1 Guiding factors to formulate Development Concept

Development of Town in Regional Context

At present Town acts as a major economic and employment node within its surrounding context. Development of any Town is inseparable from its regional environment. As per development concept of integrated district development plan for Palakkad District (IDDP), Pattambi Municipality comes under Agro allied Economic zone suitable for agro allied activities and agro allied industries and act as a third order settlement (Service centre) for the hinter land. Pattambi town junction is coming as second order node and service population is taken as approximately 1.5- 2 lakhs. According to the suggested road network for the district, Pattambi-Palakkad road and Pattambi Muthuthala road are proposed to be widened. Hence it is proposed to promote the development of Pattambi town in such a way as to function as Sub Regional Centre as defined in the IDDP for Palakkad District 2031. Growth and development within Pattambi shall both support and propagate growth in neighboring villages.

Development Constraints and Opportunities

The key objective of identifying the development constraints and opportunities are to understand the site constraints that are required to be respected as given site conditions and to optimize the potentials offered by the site which shall be considered for the future development.

27.2 ENVIRONMENT AND TOPOGRAPHY

There is a total of 320 Hectare of land to be conserved due to environment sensitiveness (Fig 27.2). Land under wet agriculture (13.83%) and water bodies (6.34%) uses has to be conserved. New infrastructure, especially roads, increases development pressures on agricultural land. However, planning and management of acceptable sites coupled with control, where necessary is required so as to avoid damaging pressure on environmentally sensitive sites. The construction of roads through paddy field will cause hike in land price and farmers feel farming as uneconomical and there is a tendency of selling lands to real estate developers.

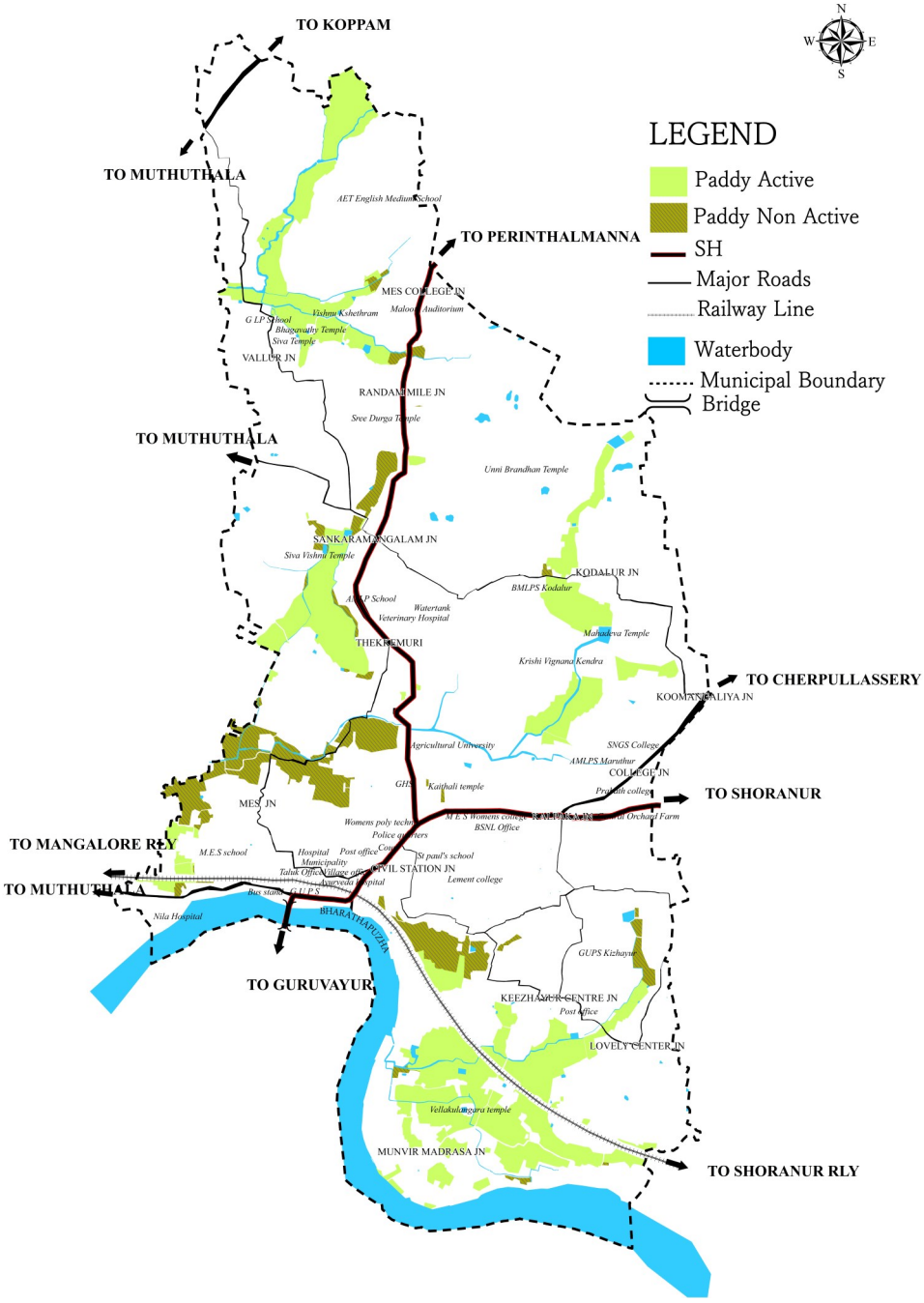


Fig. 27.2 Spatial distribution of Paddy fields and Water bodies

As per the slope analysis, Pattambi Town comes under gently to moderate sloping and average elevation of 10 to 170 m. (Fig 27.3). Bharathapuzha and its nearby areas are having the lowest elevation which is less than 20m from MSL. Hence chances of accumulation of drainage waste are high in this area. Proper care should be taken to protect Bharathapuzha river from pollution.

Nearly 50% of the Pattambi Town are occupied by agricultural land and water bodies especially paddy fields. Around 31% of Town's land falls under the "Steep Slope" Category, which is the land with a slope of more than 20%. This further leaves just about one-third of land available for development. These steep slope areas are environmentally sensitive and needs to be restrained from urban development.

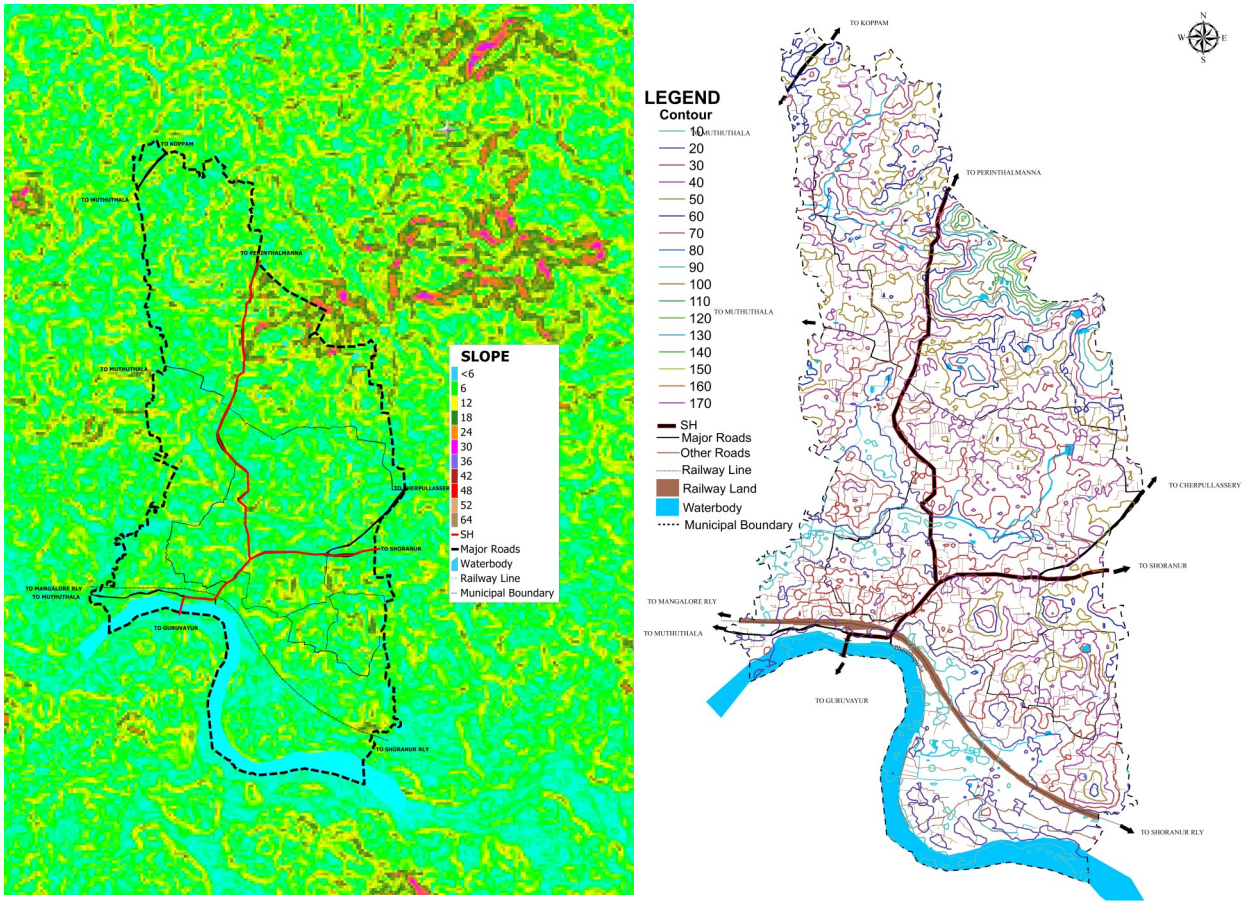


Fig. 27.3 Slope Map and Contour Map of Pattambi Town

27.3 POPULATION DISTRIBUTION

So as to accommodate future increase in population, spatial structure has to be designed keeping the environmental hindrances in mind. Steep sloped areas present in the north east side end of municipality and Bharathapuzha river in the south side prevents further expansion and development in that direction. Presence of high yielding paddy fields is another concern in the municipality. Future Distribution of Population Density is shown in Fig 27.4.

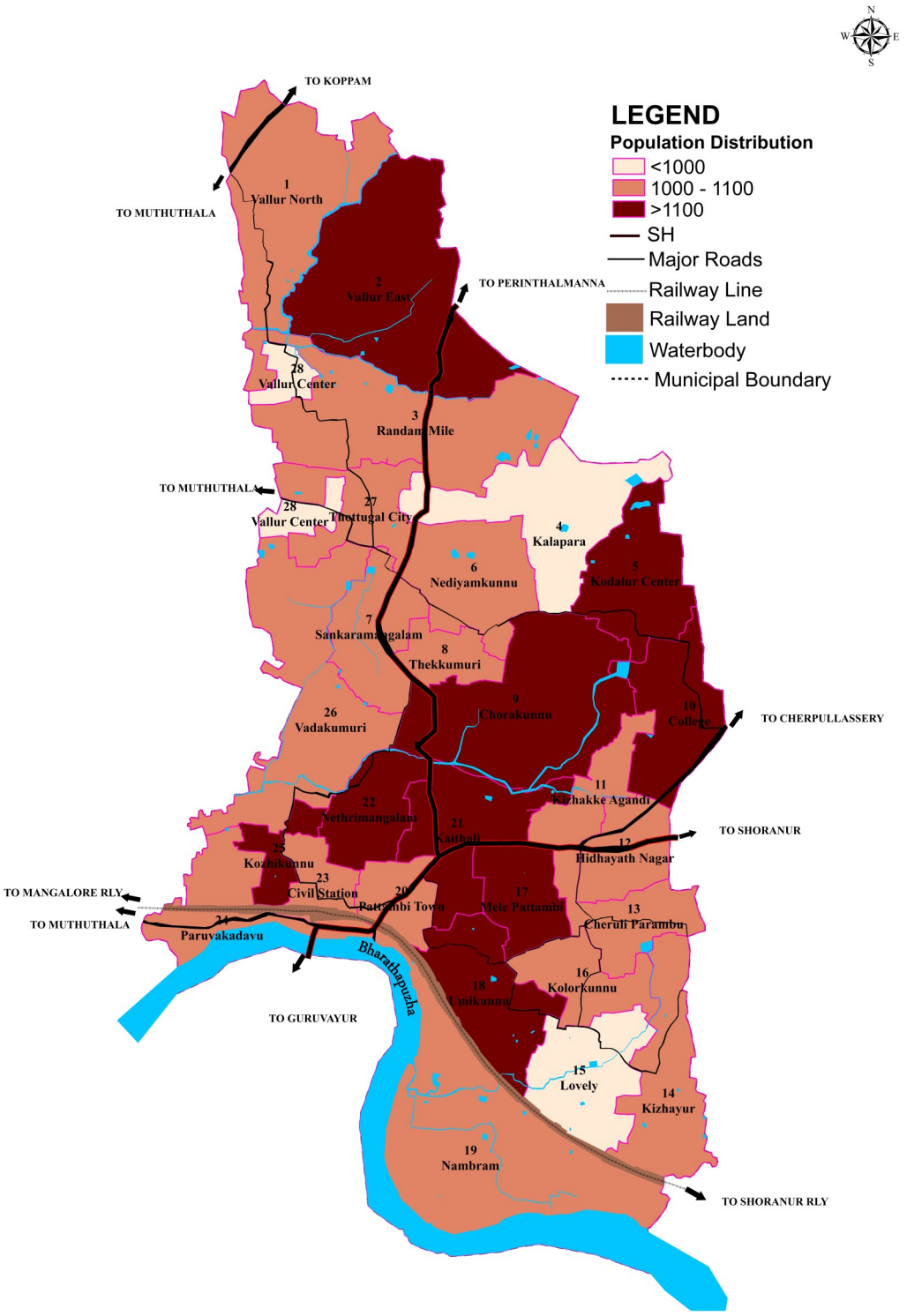


Fig. 27.4 Spatial distribution of Population

27.4 TRAFFIC AND TRANSPORTATION

In order to provide relief to the core area of town and keeping in view the increased volume of traffic in future, Radial city structure is proposed linking transportation corridors radiating out from the CBD connecting various areas of town to Town Centre. In this system, the main radial roads radiating from central business area are connected together with concentric roads. Ring radial are designed in such a way that with focal point as Melepattambi junction. Various ring roads will emanate from the central area and will be interconnected by two ring roads and a bypass. In addition, there will be regional connectivity to neighborhood settlements.

The radial roads would provide the regional connectivity to the neighboring settlements with ease. The proposed ring roads would, however, interlink existing major residential and activity centres within the town without causing multiple movements through the CBD area. The development of the inner ring road in conjunction with the outer ring roads and bypass would

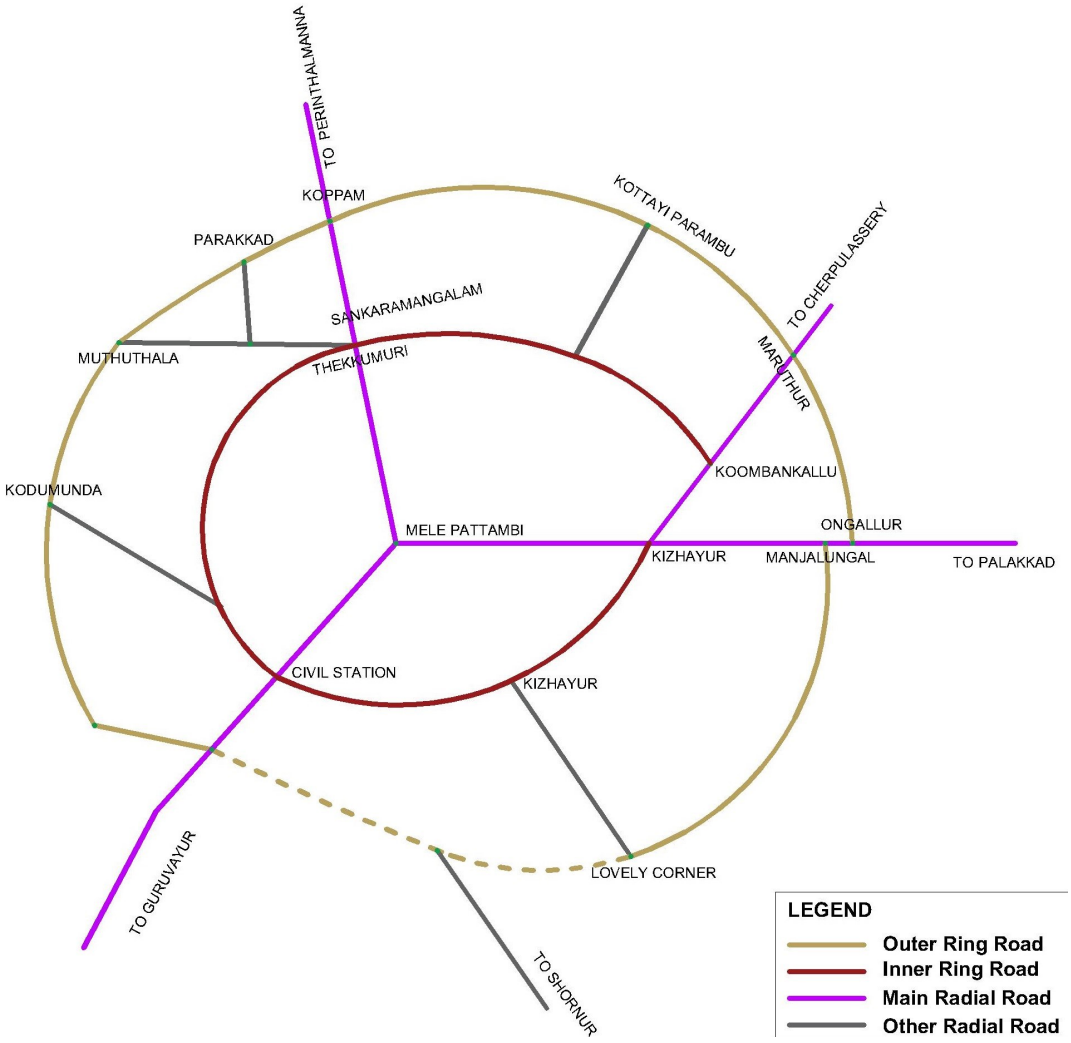


Fig. 27.5 Conceptual Road Development Plan

provide proper access to the inter-city and intra-urban traffic generated within the city. These ring roads would also feed traffic from arterial network to lower order roads. The main function of these ring roads will be to facilitate safe and relatively unhindered movement of traffic within the city. To facilitate this, appropriate restrictions on frontage access and on-street parking restrictions should be strictly enforced. For completing ideal ring road concept, practical difficulty arises from the construction of railway overbridge and bridges crossing Bharathapuzha river. Hence southern portion of inner ring road is omitted. The proposed road pattern will provide high degree of connectivity to the nearby settlements. Conceptual road development plan for Pattambi town is shown in Fig 27.5 and Fig 27.6 shows the concept and proposed transportation network respectively.

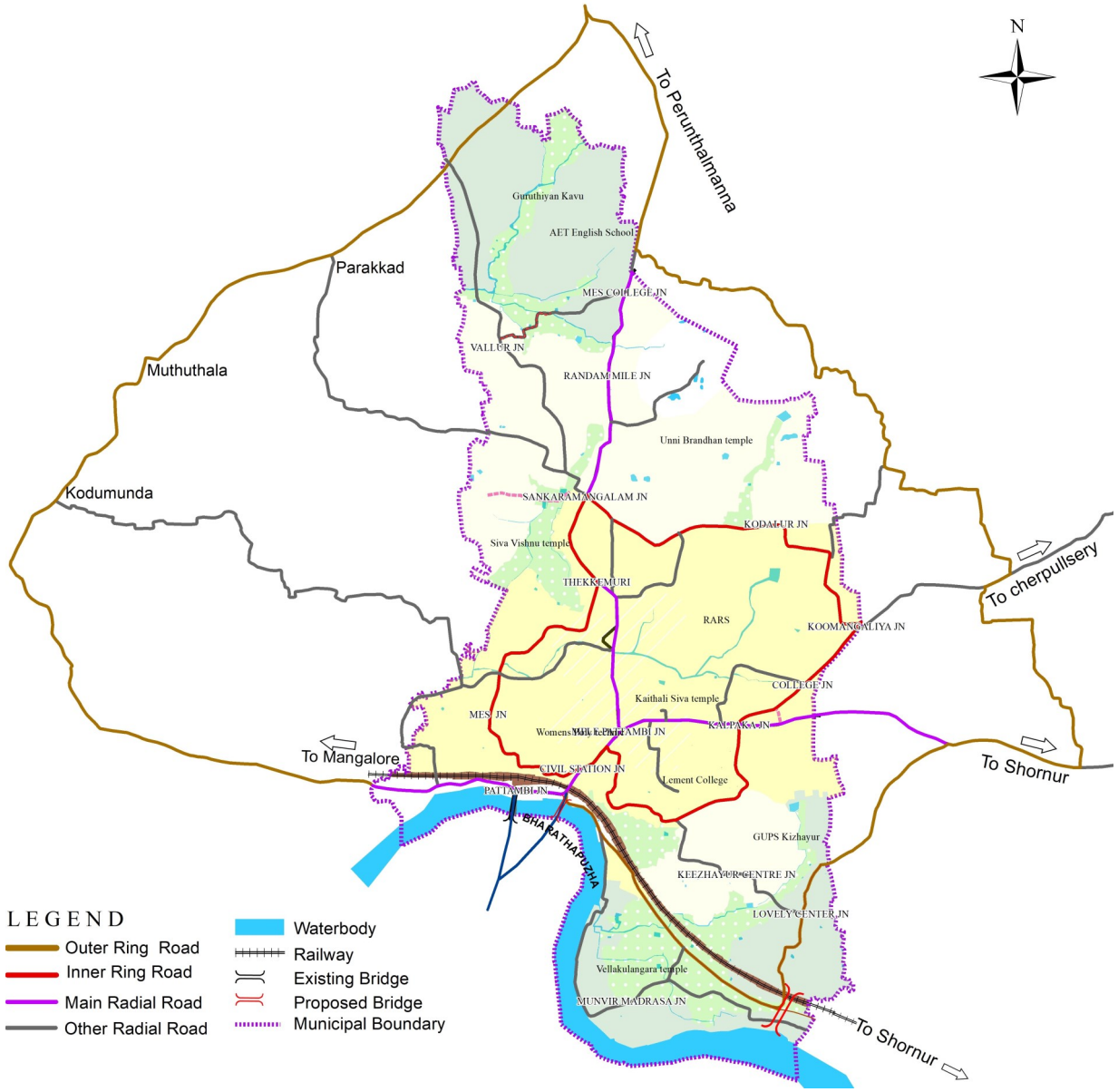


Fig. 27.6 Proposed Transportation network

27.5 HIERARCHY OF NODES

Commercial activities are centered around break even points, i.e. bus terminal and railway station area and as ribbon development along major traffic corridor. As most of the commercial activities of town are based on ribbon development along the prime movement corridors, future concept on commercial development is to decentralize commercial activities with a well defined hierarchy of commercial nodes. It is proposed to intensifying developments in inner area of town surrounding the CBD. These transportation corridors will connect key features of the town as well as proposed new activity nodes. Nodes formed as part of the intersection of transportation corridors will be developed as commercial nodes/regional service centres which will cater to a immediate catchment area and other regional facilities. Radial road network with well spaced state high ways cater to smooth city travel and also fast connections within town and better linkage to nearby hinterlands.

The existing uses in the CBD area comprise of mixed-use developments. Further intensification of existing commercial activities within CBD area should not worse the crowded pedestrian and vehicular traffic conditions there. However, it is recognized that commercial activities are needed to serve the needs of the community and residents living in the area. This is addressed through providing a commercial core area surrounded by the mixed use zones. A set of criteria will be imposed to guide and control commercial developments within core area , as well as areas intended for residential use.

In the residential areas, there will be provisions for small scale commercial facilities at the local level. These are intended to serve the needs of local residents only and will not be shown separately in the master plan as they will be subsumed under the predominant land use.

Strengthening of existing major commercial nodes is planned incorporating all infrastructure facilities to serve a population of 20,000 of its service area. First order node is proposed at Pattambi town and Melepattambi. Second order nodes acting as zonal centers are proposed at Sankaramangalam jn. There are four third order nodes proposed as local centers, they are Kudalur centre jn., and Lovely corner Jn., Vallur jn, Munvir Madrassa Jn. Nambram. The concept on future commercial development i.e. the proposed hierarchy of nodes is depicted in Fig 27.7

27.6 FUTURE TOWN STRUCTURE

Keeping in view the present growth trend and factors like existing residential pockets, topography, land suitability, proposed road net work etc, following spatial structure is envisaged for the future of Pattambi town. On the basis of studies, it is observed that most of the development activities are

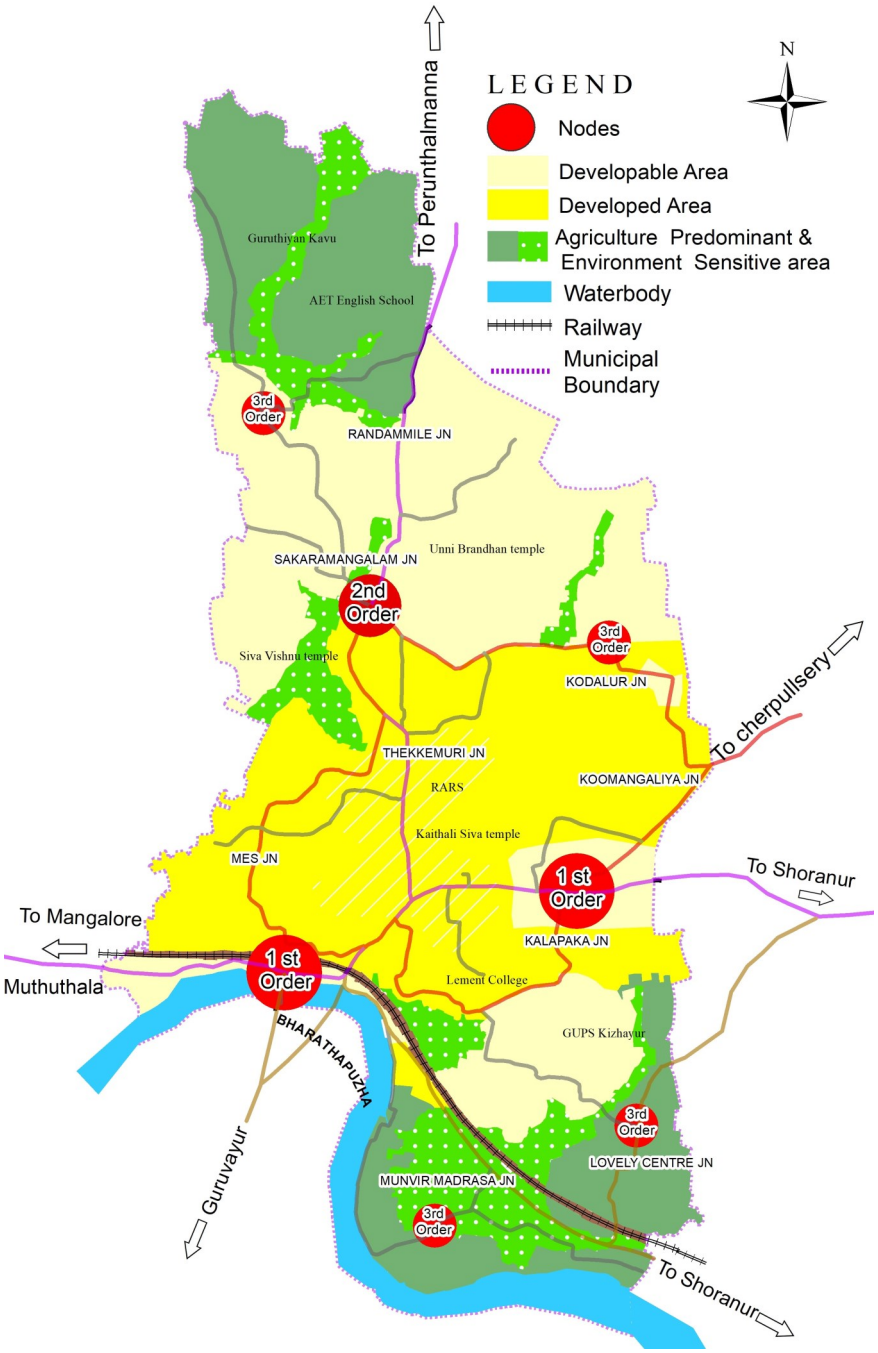


Fig. 27.7 Proposed hierarchy of nodes

concentrated in the areas falling in the vicinity of existing developed areas of the city and development along the main roads.

Keeping in view, the present growth trend and present as well as future size of the town, the following spatial structure has been envisaged for the development of future Pattambi town. Therefore different activities which are currently in operation in town, needs to be regulated and decentralized elsewhere within the planning area. More intensive urban activity is proposed adjoining major transportation corridors and also concentrating in the core area. The residential development is proposed in the immediate surrounding area. The remaining area occupied by low density residential activity

conserving environmentally sensitive areas like paddy fields, water bodies etc.

Maximize the potential of limited developable land of town, specific land utilization strategy has to be devolved. Immediate vicinity of core area should remain prime area for residential uses in order to support thriving town centre. Developments in these intermediate areas are supported with sufficient public facilities and utilities. Light industries are also allowed throughout the town area. Town peripheral areas with agriculture predominant are proposed to be retained as low dense development areas. Expand and strengthen the core area by allowing high density commercial developments and vibrant mixed use developments. Heritage areas are conserved and natural areas and steep slopes are to be protected using afforestation measures. Developing walkable neighborhoods well served by pedestrian friendly local streets, well served by basic amenities such as neighborhood shops, kindergarten, parks, primary schools at walkable distance of 400m. Sector level park is to be developed along the river taking advantage of river front. Understanding of existing spatial structure of town is a prerequisite to visualize future spatial structure for accommodating the projected growth. The structure of the town can be appreciated by noting the relationship between living and working areas in terms of their connectivity with each other. Physical constraint due to presence of Bharathapuzha River flowing along southern boundary of town and railway line almost parallel to Bharathapuzha river leaving a narrow stretch of land in between further guided the development concept of town.

TOWN CENTRE

Town areas has developed along the radiating routes all merging in the Mele Pattambi Junction. So there is a need to think upon the concept of ring road development to deviate the traffic which is mainly concentrated in the core. Somehow the proposed ring road passes through Kizhyur, Sankaramagalam and Koobankallu. While studying the existing road network, town and some proposed linkages, it is found that certain very important road junctions are coming up, which may prove to be potential nodal centers of development within town. Besides the potentiality due to future road intersections, all these nodal centers are having their own justification and reasons to grow. Commercial nodes are developed along major road intersections. The Paddy fields and water bodies are taken into account considering their environment sensitiveness. More densification of the area around immediate surroundings of CBD area by means of land use zoning and its regulations is envisaged. Dense development is not recommended along the north eastern and southern

periphery areas of the town where the agriculture is more predominant. A road network with ring and radial pattern with few inter connection roads is proposed for the town. In addition to the CBD area, commercial nodes are proposed at different part of the town considering the future distribution of population and proposed road network. It is expected the expansion of present CBD towards radial roads. Mixed activities ie. Commercial, Public & Semi-public and residential area are seen around CBD. Residential activities are seen dominating around the central core area. Small scale industrial development in proposed in residential area throughout the proposed developed area of town. Tourism facilities to be developed on the banks of river and linking heritage buildings. The concept of town centre is shown in Fig 27.9.

27.7 RESIDENTIAL ACTIVITY ZONING

Central areas of the municipality are highly concentrated with mixed activities where a town centre is proposed . North ,eastern and south eastern peripheral area of municipality where agriculture activities are predominant are suggested as agriculture predominant areas. More open spaces and paddy lands will promote calm and comfortable life in these areas. All other areas are separated out as intensive residential zones. These residential activity zones mainly consists of already developed residential lands.

Within residential areas in general, social facilities have to be provided to meet the residents need for public services. These include schools, libraries, health facilities, police and fire posts, government offices/departments etc. These facilities serve complementary roles and can be clustered or co-located to optimize land use and create synergy. The provision for social facilities at regional level has to be reasonably planned and sited for the needs of the town and its growing residential population in the new housing areas and its surrounding hinterland. Apart from residential areas, residential mixed area is proposed along major transport corridors.

27.8 ENVIRONMENT SENSITIVE AREAS

With the intention of preserving Environment sensitive areas ,the existing waterbodies and cultivating paddy fields are kept as such.

27.9 RECREATION, HERITAGE & TOURISM CONCEPT

Bank of Bharathapuzha is proposed to be developed for recreation purpose by creating parks, waterside promenades, cultural and recreational facilities. Recreational facilities are unavoidable in a town growth as it influences mental health of inhabitants to a greater extent. Present recreational facilities

in town are extremely poor. To enhance this sector some parks and open spaces are suggested in the town. In addition, walkways are proposed to be planned connecting religious institutions .Kaithali Temple in Pattambi is an ASI site.There are so many religious institutions and festivals in connection to these.

Understanding of existing spatial structure of the town is a prerequisite to visualize future spatial structure for accommodating projected growth. The structure of the town can be appreciated by noting the relationship between

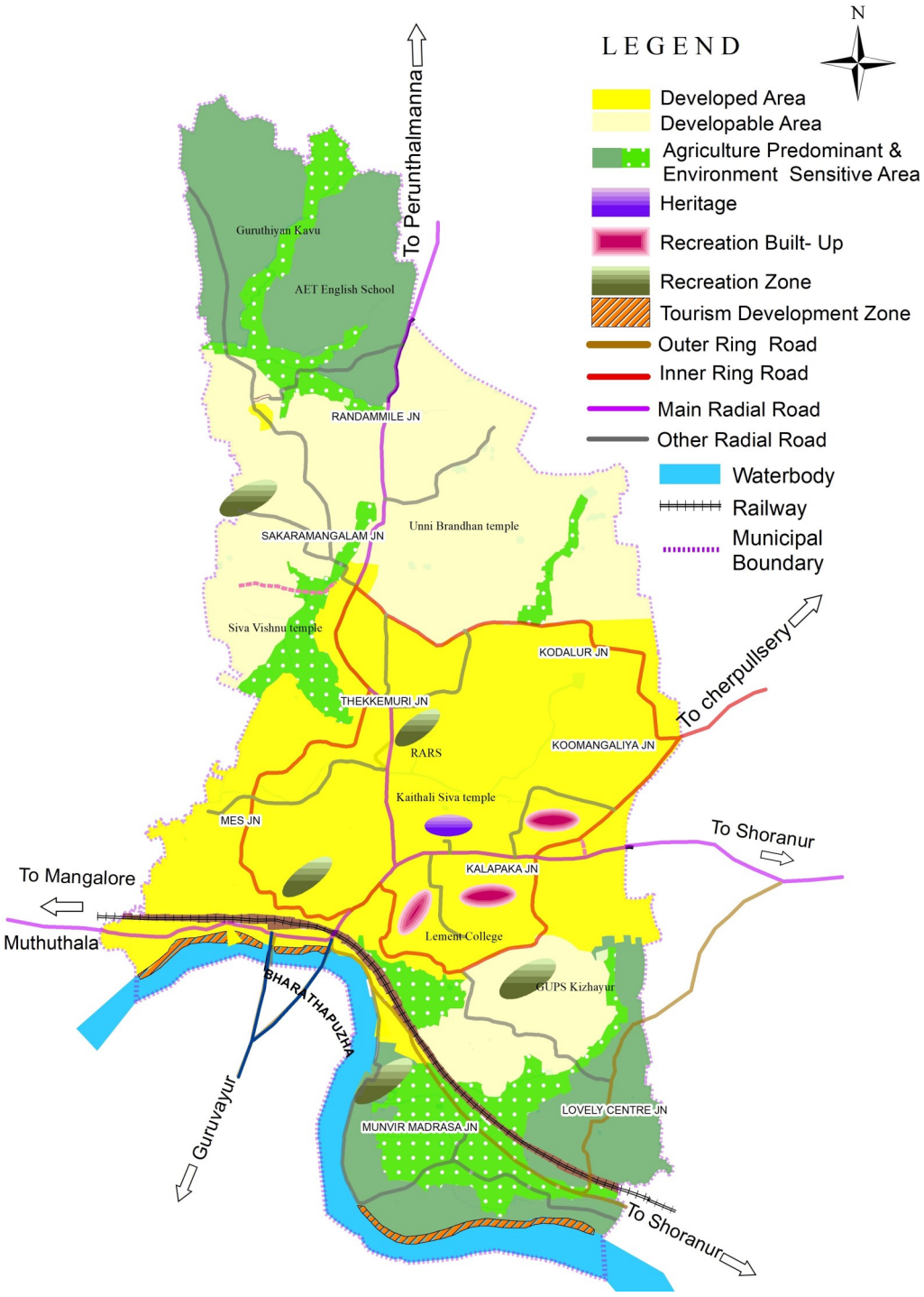


Fig. 27.8 Concept of Residential Activity zone

living and working areas in terms of their connectivity with each other. Pattambi town has been fragmented into two segments by Railway line, only one underbridge connects two parts. The CBD area near Town bus stand, railway station, Melepattambi Junction are major work areas of the town where major commercial activities are also concentrated. The other work areas are mainly along major transport routes and areas where other public institutional buildings are located. It is observed that the development activities are concentrated along main roads passing through the town besides the area falling in the vicinity of existing developed areas of the town. The concept of residential activity zone with recreation and tourism potential area are shown in Fig 27.8.

The cities grow organically depending upon the availability of land, easy accessibility and growth potential. On the basis of various sector studies and noticeable development activities have been detected prominently on Shoranur Pattambi road, Cherpulasseri road, Perinthalmanna road, Muthuthala road and Guruvayur road. Keeping in view the past as well as present trends along with the vision 2036 for this town, basic town structure envisaged for future is "A Compact Core envisaged as Town Centre with expansion on all sides as well as along major transport arteries."

The predominant land use of the town is residential and doesn't have a strong economic base for its self sustainability. It is evident from existing land use that the residential use has a larger share of developed area. After acquiring the status of the Taluk headquarter, the town has witnessed tremendous spurt as far as educational institutes and other multifarious activities are concerned. Although it has been observed from the studies that there is a tendency of growth along transport corridors, considering areas of potential development, wider areas of development have been considered. As the proposed roads would open up new areas for development, the scope of potential areas may touch the potential nodes of development also.

27.10 FUTURE ECONOMIC DEVELOPMENT ZONES

The Town will provide a broader range of retail services that serve both its residents and those in surrounding region. The town will also seek opportunities to promote its historic and recreational resources as a means of generating tourism revenue and attracting new employers to the community. The town will strive to approach economic development activities using a collaborative and innovative approach that encourages cooperation between the public and private sector, and with other jurisdictions as appropriate to achieve the objectives of this Master Plan.

Economic development of town mainly depends upon the primary and service sector activities. Commercial activity is mainly concentrated along Cherpulasseri ,Perinthalmanna and Shoranur road .Hence it is suggested to create a commercial activity core surrounded with mixed residential activity as shown in fig 27.9. Junctions are categorized based on the nodal hierarchy of commercial usage. The study reveals that the existing Central Business District (C.B.D) or the main commercial centre of the town is very congested where there is lack of parking facilities and inadequate road width etc. are the major problems. Therefore to serve the additional population of the town, more

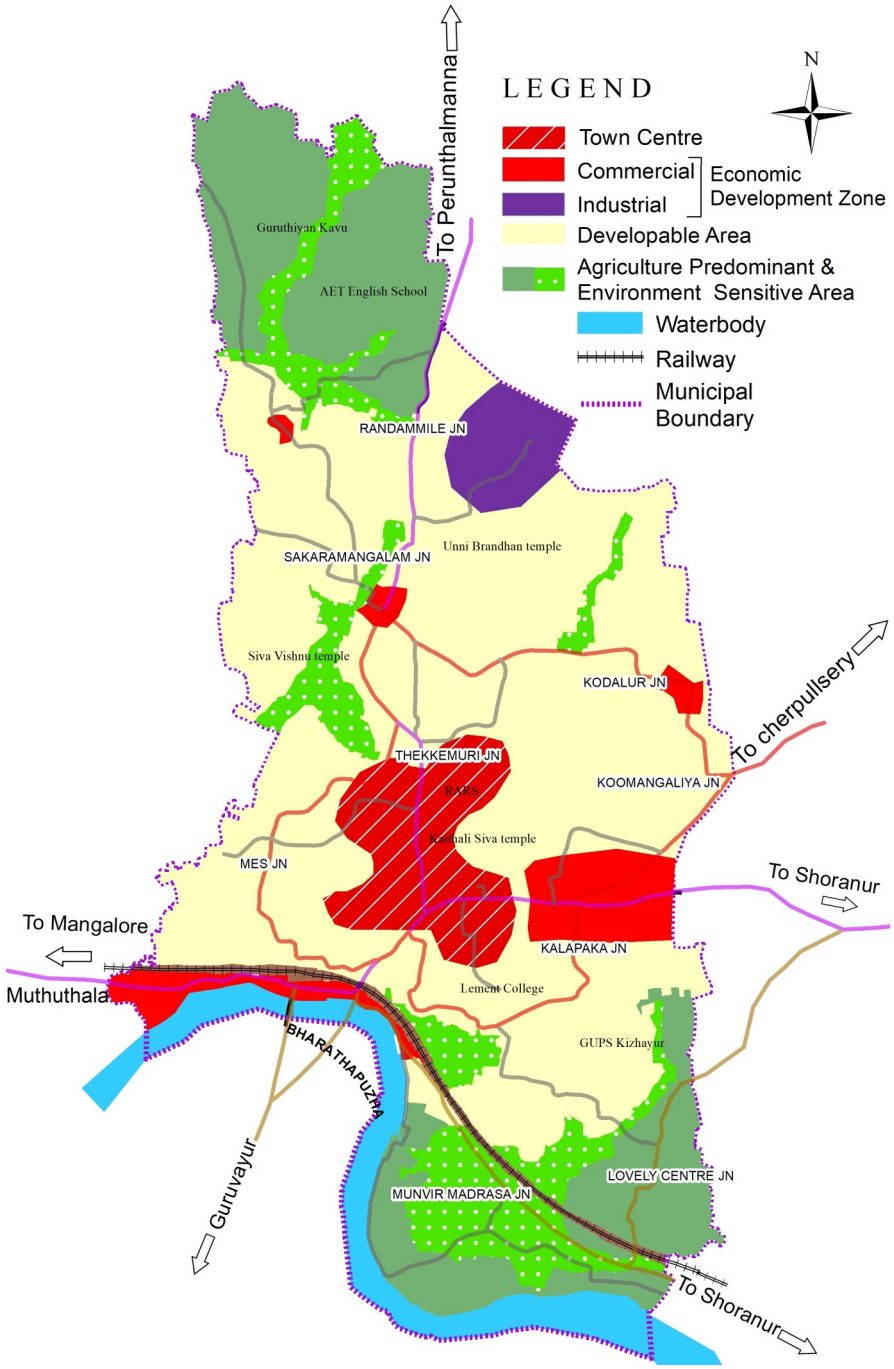


Fig. 27.9 Concept of economic developmet zone

new commercial areas are proposed to be developed in the new expansions. It has also been kept in mind that this town will continue to function as a regional centre and will serve the larger area than its planning area. More commercial centers will be required in new residential areas. The existing commercial areas shall remain the part of proposed Commercial Land Use Zone. Existing commercial activities will be allowed to continue operating there. To further reduce congestion, commercial activities are decentralised. Further intensification of existing commercial activities within the town centre area must also be contained so as not to worsen the crowded pedestrian and vehicular traffic conditions there. However, it is recognized that commercial activities are needed to serve the needs of the community and residents living in the area. In the residential areas, there will be provisions for small scale commercial facilities at the local level. These are intended to serve the needs of local residents. In addition to trade and commerce, another supplementary driver of economic growth and creation of employment opportunities will come from industrial uses. This includes existing industrial uses, as well as proposed agro based industries and engineering industries.

27.11 MIXED ACTIVITY AREAS

It is proposed to permit commercial and public activities up to a depth of 100 m on either side of roads of existing or proposed width of 15 m or more in residential and dry agricultural use areas.

27.12 FINAL DEVELOPMENT CONCEPT

Fig 27.9 portrays formation of development concept of Pattambi Town. The town grows through a path avoiding natural and manmade barriers. As per the study, analysis and results, keeping the present growth trend and future population of the town in mind, following proposed spatial structure is obtained. The structure thus obtained depicts clear combination of uses such as commercial, industrial, tourism, recreational, transportation, public-semi public and mixed land use. However taking note of the unique characteristics of the surrounding region of the town and the constraints in terms of land form and linkages, it is desirable that the future developments are accommodated broadly as Fig 27.10. which is the final development concept of Pattambi town and its derivation is shown in Fig 27.11.

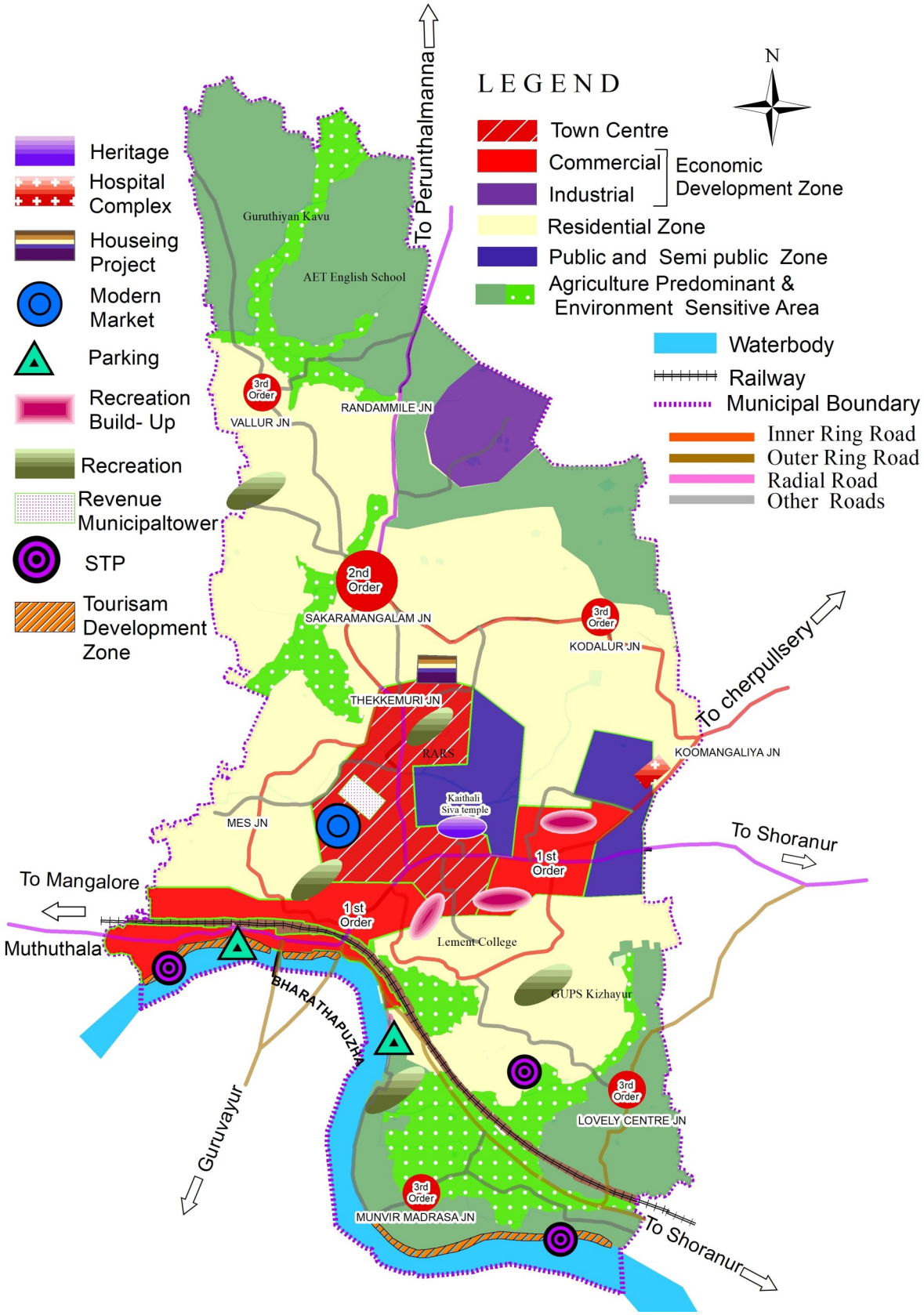


Fig. 27.10 Final development Concept

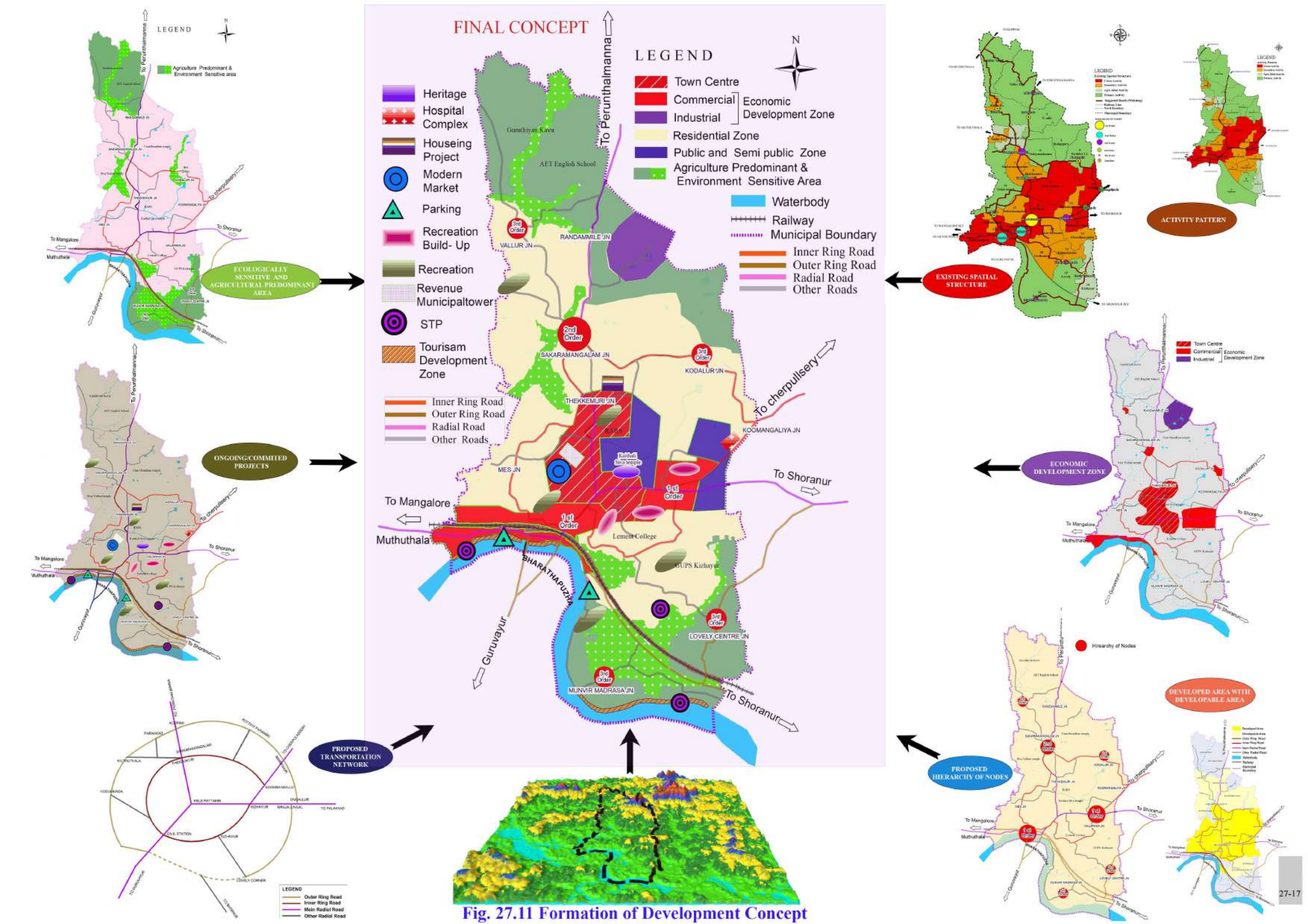


Fig. 27.11 Formation of Development Concept

28

Policies and Strategies

28. POLICIES AND STRATEGIES

28.1 TRADE AND COMMERCE

Policy

- ♣ To develop viable, attractive, commercial activity areas in the order of hierarchy throughout the planning area.
- ♣ To develop the town as a major collection and distribution centres for goods and commodities.

Strategies

- ♣ Provide adequate infrastructure in the newly developed commercial areas and filling the gaps of existing commercial areas.
- ♣ Develop truck terminals.
- ♣ Provide modern wholesale markets, weekly/night market, cold storage facilities, etc. for vegetables and fruits.
- ♣ Enhance access to commercial areas for pedestrians and public modes of transport.
- ♣ Provide sufficient parking facilities, waste management system etc.
- ♣ Storage, service, maintenance, and loading areas must be constructed at suitable locations.

28.2 INDUSTRY

Policy

- ♣ To develop small scale industrial development in the town with environment friendly ventures and investor friendly guidelines.

Strategies

- ♣ Promoting the textile and other household industrial units.
- ♣ Strengthening and modernization of traditional industries by diversification of products.
- ♣ Modernization, diversification or changing of manufacturing process.
- ♣ Develop skilled labour force and increase the technological and management capabilities of units.
- ♣ Provision of marketing facilities and equipment information, the adoption

of quality standards, productivity management and quality control measures.

- ♣ Provide modern, reliable and adequate physical infrastructure such as electricity, roads, telecommunication and water supply in viable industrial zones.
- ♣ High quality infrastructural facilities like good connectivity, power, water supply should be ensured.
- ♣ Develop processing units especially giving value addition to agricultural products.

28.3 TOURISM AND HERITAGE

Policy

- ♣ To develop Pattambi town as a heritage based tourism destination.

Strategies

- ♣ Explore tourism potentials of nearby places in the vicinity by developing Connectivity.
- ♣ Develop infrastructure for tourism promotion by providing economy class lodging facilities including home stays.
- ♣ Tourism promotion involving cultural bodies, NGOs, CBOs, Educational Institutions and experts in the process of heritage conservation.
- ♣ Conserving heritage sites and buildings through proper control measures.
- ♣ Potential for River front development tourism can be explored.

28.4 AGRICULTURE AND ALLIED SECTORS

Policy

- ♣ To promote agriculture sector as a support to the economic activities of town.

Strategies

- ♣ Conservation of existing paddy cultivation areas.
- ♣ Mechanisation to compensate the labour shortage problem.
- ♣ Providing sufficient storage and marketing facilities.
- ♣ The existing potential of canal, water courses and ponds may be utilised fully for formulating viable irrigation projects.

- ♣ Integration of homestead cultivation and animal husbandry sector.
- ♣ Utilising the water sources, inland fishing may be improved.
- ♣ Solid and liquid waste management of houses can be integrated with "kitchen garden".

28.5 PHYSICAL INFRASTRUCTURE

Policy

- ♣ Providing everyone access to basic amenities of life.

Strategies

- ♣ Ensuring safe, equitable, reliable, adequate and quality water supply.
- ♣ Improving operational efficiency of water supply system by minimizing wastage and leakage.
- ♣ Minimizing ground water consumption by promoting water conservation.
- ♣ Promoting rain water harvesting and recycling of water.
- ♣ Provide drainage system in order to prevent water logging.
- ♣ Provide eco-friendly decentralized sewerage treatment system and recycling of sewage.
- ♣ Promote safe and hygienic collection, transportation and disposal of solid waste.

28.6 SOCIAL INFRASTRUCTURE

Policy

- ♣ Maintain the high standards of health, educational, recreational, institutional, religious facilities and ensuring accessibility to all people to quality social infrastructure.

Strategies

- ♣ Providing adequate sites based on norms for creating/developing various social infrastructures.
- ♣ Involving private and corporate sectors for providing, developing and maintenance of social infrastructure.
- ♣ Develop adequate and quality infrastructure.
- ♣ Promoting community participation in maintenance and upkeep of social infrastructure.

28.7 TRAFFIC AND TRANSPORTATION

Policy

- ♣ Improving safety, mobility and efficiency of traffic within and outside the city.

Strategies

- ♣ Widening and strengthening of existing main roads and developing missing links.
- ♣ Establishing a hierarchical order in the road network .
- ♣ Provide opportunities for safe and effective non-vehicular transportation.
- ♣ Including pedestrian access ways, cycle tracks wherever appropriate.
- ♣ Providing adequate parking spaces to remove traffic bottlenecks.
- ♣ Promoting and understanding the needs of the pedestrians within the core area.
- ♣ Improving the road geometry of existing roads.
- ♣ Improvement of road junctions and providing proper signs and signals.

28.8 SPECIAL CONCERN AREAS

Policy

- ♣ To make urban poor an integral part of the city planning, growth and development process.

Strategies

- ♣ Improving accessibility to basic services for the urban poor.
- ♣ Providing urban poor with better living environment.
- ♣ Creating enough employment opportunities especially in agriculture sector for improving financial status of poor.
- ♣ Providing adequate opportunities for creating affordable shelter duly supported by basic services.
- ♣ Empowering poor to be integral part of city development process.
- ♣ All poverty alleviation programmes to be made more focused and poor centric.

28.9 ENVIRONMENT

Policy

- To sustain environmentally sensitive areas and ensure clean, green and hygienic living environment.

Strategies

- Renovate & conserve water bodies and paddy fields.
- Increase green cover in town.
- Develop river front parks to promote tourism.
- Ensure proper waste disposal and effective waste management system.
- Creating awareness among local people about the importance of environmental conservation.

28.10 DEVELOPMENT ADMINISTRATION AND MUNICIPAL FINANCE

Policy

- Promote better service Delivery.
- To improve financial base for the town through broad, diversified and inflation protected revenue base.

Strategies

- Promoting optimization of available municipal land for generating resources for municipality development.
- Making use of good practices in urban development for resource generation.
- Improving revenue base for the town through GIS based property tax system.
- Rationalizing the pricing of urban services on the principal of “USER MUST PAY”.
- Optimizing use of available resources through better prioritization of projects and improved management.
- Improving financial management through adoption of standard accounting policies.
- Achieving continuous reduction in service delivery and overhead costs through better financial management.

29

Visualising the Future

29. VISUALIZING THE FUTURE



Modeling urban future in urban planning is very important. Growing awareness for sustainability amplifies the demand for planning support systems that analyze and visualize future populations, workforce, water supply, traffic volumes, energy intensity, and other indicators. Visualizing critical information about how cities and urban environments might develop in the next one or two decades is an effective tool for analyzing impacts of today's planning decisions on future environments.

29.1 POPULATION PROJECTION

Population projections are calculations of future population based on their past and present conditions. They are neither predictions, nor forecasts, nor estimates. Rather, they are in between predictions and forecasts. Projections are merely intelligent exercise as to what would happen to current population under specified assumptions in future years. Urban Planning requires a fair idea of future for which planning needs to be done. For this purpose we use various methods for “predicting” the future which generally involves population data and population projection as people are the ones who need to be kept in mind and they are the ones for whom planning is done. Following are the five methods used for population projection.

1. Arithmetic mean method.
2. Geometric increase method.
3. Decreasing rate of growth method.
4. Exponential method.
5. Incremental increase method.

Table 29.1. Projected population of Pattambi town.

Sl. No.	Method	Population 2011	Projected Population				
			2016	2021	2026	2031	2036
1	Arithmetic mean method	28632	30415	32197	33980	35763	37545
2	Geometric increase method	28632	31233	34069	37164	40539	44222
3	Decreasing rate of growth method	28632	33475	38615	43944	49324	54594
4	Exponential method	28632	31484	34620	38068	41860	46030
5	incremental increase method	28632	30473	32353	34272	36230	38226
	Average Population	28632	31416	34371	37486	40743	44124

Average of the five methods is considered as the projected population for planning purpose, so that the variation in population projection by various methods can be eliminated. Table 29.1 shows the projected population for the year 2016, 2021, 2026, 2031 and 2036. Projections have been done to implement the proposal in short term and long term basis.

29.2 WORK FORCE PROJECTION

Pattambi town is expected to have projected workers of 16,767 in the horizon year 2036. As per the projection of workforce shown in Table 29.2, the average WPR targeted for the town by 2036 is 38%. With the introduction of new development projects, economic base will be increased, which will further result in the increase of job opportunities in the Town.

Table 29.2 Projected Work force and WPR for Pattambi town.

Year	1971	1981	1991	2001	2011	2021	2031	2036
Population	14371	18368	22108	24168	28632	34371	40743	44124
Workers	3738	4626	5475	6170	8561	10999	14667	16767
WPR	26.01	25.2	25	26	30	32	36	38

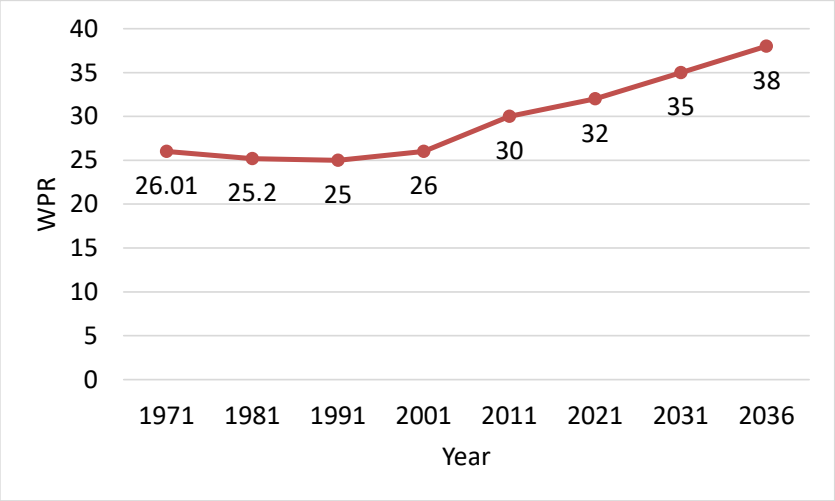


Fig. 29.1 Projected WPR in Pattambi town.

Table 29.3. shows the projected main workers in Pattambi town. The ratio of main workers to the total workers in the planning area as per 2011 census is 81% and for 2001 it was 80%. By creating more employment opportunities, it is expected that the share of main workers will be increased to 90% in 2021 and 98% in 2036. Table 29.4. shows the category wise projected work force for Pattambi town.

Table 29.3 Projected Main workers for Pattambi town.

Year	1971	1981	1991	2001	2011	2021	2031	2036
Total workers	3738	4626	5475	6170	8561	10999	14667	16767
Main workers	2241	4450	5201	4930	6904	9927	14046	16363
%Main workers	60	96	95	80	81	90	96	98

Table 29.4 Category wise Projection of main workers in Pattambi town.

Year	1971	1981	1991	2001	2011	2021	2031	2036
Cultivators	375	346	366	177	121	199	281	335
%Cultivators	17	8	7	4	2	2	2	2
Agri labourers	1020	1264	1216	383	407	596	843	1006
% Agri labourers	46	28	23	8	6	6	6	6
HHI	144	160	77	189	99	99	140	168
% HHI	6	4	1	4	1	1	1	1
Other workers	702	2680	3542	4181	6277	9034	12782	15258
%Other workers	31	60	68	85	91	91	91	91
Mian	2241	4450	5201	4930	6904	9927	14046	16767

As per the occupation structure of the town in 2011, 91% of the workers are in other workers category. Since Pattambi being an agricultural area, and due to the promotion of agricultural activities and animal husbandry at suitable locations, it is expected that the number of cultivators and agricultural labourers will remain the same. So the number of cultivators and agricultural labourers is projected to be same as that in 2011. As the development plan, household industries should be promoted and it is expected to remain same as that in 2011.

29.3 INFRASTRUCTURE PROJECTION

The importance of infrastructure for sustained economic development is well recognized. High transaction costs arising from inadequate and inefficient infrastructure can prevent the economy from realizing its full growth potential regardless of the progress on other fronts. Modern, efficient infrastructure underpins the economic health of all nations, supporting the economy, improving productivity, and providing access to opportunities to build stronger communities. As economy grows and population expand, so does the scale of demand on the infrastructure that supports daily life.

29.3.1 Physical Infrastructure

Physical infrastructure is the combination of basic facilities which is helpful in economic development of an economy. It includes facilities of water supply, drainage, sewerage system, telecommunication, electricity, transportation, energy etc. The infrastructure backlogs and demand has been calculated on the basis of projected population and standards given in URDPFI guidelines.

29.3.1.1 Water Supply

The quantity of water required for municipal uses, for which the water supply scheme has to be designed requires water consumption rate (Per Capita Demand in litres per day per head) and population to be served. It is very difficult to precisely assess the quantity of water demanded by the public, since there are many variable factors affecting water consumption. The various types of water demands which a town

may have, are domestic consumption, non domestic consumption and public uses such as fire demand. The reduction of unaccounted-for-water (UFW) due to leakage from pipes and commercial losses from illegal connections and poorly managed water meters, could increase available water supply significantly.

As per URDPFI guidelines desirable standard of water for domestic use for a medium size town is 135-450 lpcd. As per Central Public Health and Environmental Engineering Organization (CPHEEO) manual, the domestic water requirement is 135 lpcd, and this value is taken for assessing the future domestic water requirement of the town. 20.8% of domestic water demand is taken as non domestic demand such as commercial, industrial and institutional uses. An additional provision of 1% of domestic and non-domestic demand is given as fire demand. As per CPHEEO a maximum provision of 15% of total demand shall be made as unaccounted water loss. 33% allowance has to be given for elevated storage capacity. Table 29.5 shows the estimated water demand for Pattambi town. The total water requirement for the town in 2036 is 8.36 MLD and storage capacity required is 11.12 MLD.

Table 29.5 Estimated water demand for Pattambi town.

Year	Unit	2021	2026	2031	2036
Population		34371	37486	40743	44124
1. Domestic water demand @ 135 l/h/d	MLD	4.64	5.06	5.5	5.96
2. Non-domestic water demand @ 20.8% of (1)	MLD	0.97	1.05	1.14	1.24
3. Fire demand 1% of (1)+(2)	MLD	0.06	0.06	0.07	0.07
4. UFW @ 15% of (1) + (2) + (3)	MLD	0.85	0.93	1.01	1.09
5. Total water demand @ (1)+(2)+(3)+(4)	MLD	6.51	7.10	7.72	8.36
6. Storage capacity required @ 33% of supply	MLD	2.15	2.34	2.55	2.76
7. Total storage capacity required @ (6) + (5)	MLD	8.66	9.44	10.26	11.12

29.3.1.2 Sewerage

Sewerage system in urban areas is an important priority in Indian setting because of rapid urbanization, industrialization, and population growth. Treatment of wastewater is one of the important steps to prevent contamination of urban underground water. Because of unpredictable growth and regional shortage of water, urban areas may be monitored with semi-centralized supply and treatment system of wastewater.

As per CPHEEO manual 80% of water supply may be expected to reach the sewers. A peak factor should be considered for the total discharge to be generated for the STP. Peak factor depends upon the density of population, topography of the area, and hours of water supply for the design based on contributory population recommended by CPHEEO manual. Population of Pattambi town comes under the range of 20,000 to 50,000 and the peak factor is taken as 2.5. Requirement of sewerage system is shown in Table 29.6.

Table 29.6 Requirement of sewerage system for Pattambi town.

Year	Unit	2021	2026	2031	2036
Population		34371	37486	40743	44124
Per capita demand	MLD	4.640	5.061	5.500	5.957
1. Waste water @ 80% of per capita demand (**Capacity of Plant**)	litres/day	3.712	4.048	4.400	**4.765**
2. Peak factor		2.5	2.5	2.5	2.5
3. Capacity of sewer	MLD	9.280	10.121	11.001	**11.913**

In Pattambi town there is no public sewerage system. It is estimated that total waste water generated will be increased from 3.712 MLD in 2021 to 4.765 MLD in 2036. By 2036 a treatment plant of 4.77 MLD capacity is required. The flow in sewer varies from hour to hour and seasonally. However, for the purpose of hydraulic design estimated peak flow is 11.913

29.3.1.3 Storm Water Drainage System

Existing drainage system consists of natural and artificial drains that ultimately discharge into Bharathapuzha. Very few roads in the core areas are having covered drains and others are uncovered. All the roads require drains on both sides, and the road length will be considered the required drain length in the future. Table 29.7 shows the estimated length of the drain in the future.

Table 29.7 Projected requirement of storm water drainage in Pattambi town.

	Unit	2021	2026	2031	2036
Projected Population	Nos	34371	37486	40743	44124
Road length	Km	33	36	39	42
Drain length	Km	66	72	78	84
Pucca closed	Km	66	72	78	84

29.3.1.4 Solid Waste Management System

As per URDPFI guidelines the waste generation varies from one quarter of kilogram per capita for small towns to half a kilogram per capita for large and metro cities. As the Pattambi town has a population below 50,000 it is considered as a small town and the solid waste generated is taken as 320 g/h/d. An additional 30% provision is made for waste from other institutions. The requirement of solid waste treatment system for the town in the horizon year is shown in Table 29.8. It is estimated that about 18.36 tonnes of solid wastes will be produced in 2036. Area requirement for solid waste composting is calculated 400sq.m/t and it is expected that 1.81 acres of area will be required in the year 2036 for the solid waste composting.

Table 29.8 Requirement of solid waste treatment system for Pattambi town.

Year	Unit	2021	2026	2031	2036
Population		34371	37486	40743	44124
1. Solid waste generation @ 320 g/h/d	tonnes/day	11.00	12.00	13.04	14.12
2. Including 30% extra for other institutions	tonnes/day	14.30	15.59	16.95	18.36
4. Area required for Composting plant @400 sq.m/t	Acres	1.41	1.54	1.67	1.81

29.3.1.5 Traffic and Transportation and Street light

The fundamental principle of urban transportation planning is to formulate a long-term transportation plan serving the community in the future. Thus it becomes necessary to forecast the future travel pattern for the horizon year. Traffic projection helps in evaluating the shortfall in the pattern of road network and accordingly plan the road network improvements, augment the facilities such as providing new roads, developing missing links, bypass road etc. This section gives an overview of various techniques available for traffic projections and the methodology adopted for this study. Table 29.9. shows the requirement of traffic and transportation and street light facilities in Pattambi town.

The total road length in Pattambi town comes to 163.9 Km, with per capita availability of 5.15 m against URDPFI standard of 0.96 m per capita. The road length available in Pattambi town is sufficient as per standard. Projection are made taking the view point that only two types of roads should be built with major share of 85% to bituminous roads and the rest 15% to concrete roads. Earthen road and WBM roads are proposed to be converted to bituminous or cement concrete roads. Among various categories of street lights priority is given to power lamps (70%), followed by tube light and high mast lamps (30%). There are areas without street lights.

Table 29.9 Projection of Traffic & transportation and street lights in Pattambi

Year		Unit	2021	2026	2031	2036
Population			34371	37486	40743	44124
1. Road length @ 0.96 m per capita		km	33	36	39	42
Road Surface	Concrete (km) @ 15% of total road length	km	5	5	6	6
	Bituminous (km) @ 85% of total road length	km	28	31	33	36
2. Lamp poles @ 30 m c/c			1100	1200	1304	1412
Street Lights	Tube Light/CFL /Ordinary bulb @ 30% of lamp poles	Nos	330	360	391	424
	High power lamps @ 70% of lamp poles	Nos	770	840	913	988
	High Mast Lamps @ 0.1% of lamp poles	Nos	1	1	1	1
4. Parking facilities @ 0.4 Ha of land per 10000		Ha	1.37	1.50	1.63	1.76

29.3.1.6 Methods of Traffic Projection

For projecting the future demand, various methods of traffic projection including statistical, econometrical and mathematical models are available. These could be judiciously utilized depending upon the level of accuracy warranted and the extent of database available. Various methods of traffic projection employed in the transport planning include:

- Growth factor methods
- Regression method based on economic indicators like population, per-capita income growth rate and growth rate in industrial sector and land use parameter.
- Interpolation method based on past trend in traffic growth rates.

The relationship established between the various economic indicators for passenger and goods traffic movement can be used to estimate the future demand in an area. Also the growth rate of vehicular population in the area over the years will give a good estimate of the future trips. The traffic volume on links from the past years can be used to establish a growth rate for prediction of the future volume on links.

Techniques adopted for projection

Traffic projections were carried out according to the growth rates worked out on the following basis:

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

The growth rates estimated as per the above basis are given below in table 29.10 and the table 29.11 shows the growth rate adapted in Pattambi town.

Table 29.10 Growth rate estimated.

Methods	Annual growth rate (%)
Studies conducted by NATPAC in similar towns in Kerala in the past (Peak hour traffic growth)	3 to 6
Growth rate of Motor vehicles registration in Palakkad district during 2014-15	10
Biannual traffic count on major roads by PWD during 2007-08 (growth in AADT)	13.5

Table 29.11 Growth rate adopted for traffic projection in Pattambi town.

Sl. No.	Hierarchy of road	Traffic growth rate (%)	
		Up to 2026	Beyond 2026
1	Arterial	5	4
2	Sub-Arterial	4	3
3	Tertiary	3	2

Projected link volume on existing network

Table. 29.13 presents the estimated daily traffic and Volume-capacity ratio for different horizon years on various road stretches in Pattambi Town. It can be seen that all the major road corridors like Guruvayoor road, Muthuthala road, Perinthalmanna road, Cherpulassery road and Shoranur road would be severely congested in the horizon year with the anticipated traffic more than the capacity of the roads under "do-nothing option" Fig. 29.2 shows the over utilized roads in Pattambi town. The projected traffic on the existing road network implies that the existing road network would not be able to handle the traffic in the horizon years without up-gradation of the transport infrastructure facilities. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, flyovers, bypasses and link roads is a must considering the dramatic increase in the traffic volume.

29.3.1.7 Power

As per URDPFI guidelines the power consumptions works out to be 2KW per house hold. The average household size as per the census data is 4.86. The power requirement of pattambi town is shown in Table 29.12. As per URDPFI guidelines one substation of 11KV is required for every 15,000 population. At present there is one 33KV substation at Ongallur, and three 110KV substations at Koottanadu, Arangottukara and Koppam. These 4 substations serve the areas of Pattambi, Thazhe Pattambi, Kizhayur and Sankaramangalam.

Table 29.12. Power

Years	2017	2011	**2017**	2021	2026	2031	2036
Population	(Existing)	28632	31794	34371	37486	40743	44124
1. **Sub-stations**: One 11 kV sub-station for every 15000 population	0	2	2	2	2	3	3

Table 29.13 Projected volume capacity ratio of major road stretches in Pattambi town.

HS No.	Homogeneous section		Capacity (PCU)	2016		2026		2036	
				Traffic Volume (PCU)	Volume/ Capacity Ratio	Traffic Volume (PCU)	Volume/ Capacity Ratio	Traffic Volume (PCU)	Volume/ Capacity Ratio
I. Shoranur to Perinthalmanna road									
1	Shoranur Border	Kalpaka Jn	1500	1495	1.00	2435	1.62	3605	2.40
2	Kalpaka Jn	Mele Pattambi	1500	2605	1.74	4242	2.83	6280	4.19
3	Mele Pattambi	Thekkemuri	1500	1755	1.17	2859	1.91	4232	2.82
4	Thekkemuri	Sangaramangalam Jn	1500	1526	1.02	2486	1.66	3679	2.45
5	Sangaramangalam Jn	Perinthalmanna Border	1500	1390	0.93	2263	1.51	3350	2.23
II. Pattambi to Cherpulasserry road									
6	Kalpaka Jn	College Jn	1200	975	0.81	1443	1.20	1940	1.62
7	College Jn	Cherpulasserry Border	1200	823	0.69	1218	1.01	1636	1.36
III. Pattambi to Guruvayoor road									
8	Mele Pattambi	Civil Station Jn	3000	2459	0.82	4005	1.33	5928	1.98
9	Civil Station Jn	Pattambi	3000	2180	0.73	3551	1.18	5256	1.75
10	Pattambi	Guruvayoor Border	1500	1512	1.01	2462	1.64	3644	2.43
IV. Pattambi to Muthuthala road									
11	Pattambi Jn	Bus Station	1200	1641	1.37	2429	2.02	3264	2.72
12	Bus Station	Muthuthala Border	1200	959	0.80	1420	1.18	1908	1.59
V. Pattambi to Perumudiyoor									
13	Civil Station Jn	Perumudiyoor	900	588	0.65	790	0.88	963	1.07
VI. Sangaramangalam to Koomangaliya									
14	Sangaramangalam Jn	Koomangaliya	900	122	0.14	164	0.18	200	0.22
VII. Manjalangal - Keezhayur - Mele Pattambi									
15	Manjalangal	Kondoorkara	900						
16	Kondoorkara	Lovely corner	900						
17	Lovely Corner	Keezhayoor	900						
18	Keezhayoor	Mele Pattambi	900						
VIII. Other roadxs									
19	Sangaramangalam Jn	Muthuthala Panchayat	900	349	0.39	468	0.52	571	0.63
20	Sangaramangalam Jn	Mele Parakkadu	900						
21	MES Jn	Thekkemuri	900						
22	Koppam	Muthuthala Border	900						
23	Njangattiri	V K Kadavu	900	289	0.32	388	0.43	473	0.53
24	Amayur	Kurumbully	900						
25	thekkemuri	Chorakkunnu	900						

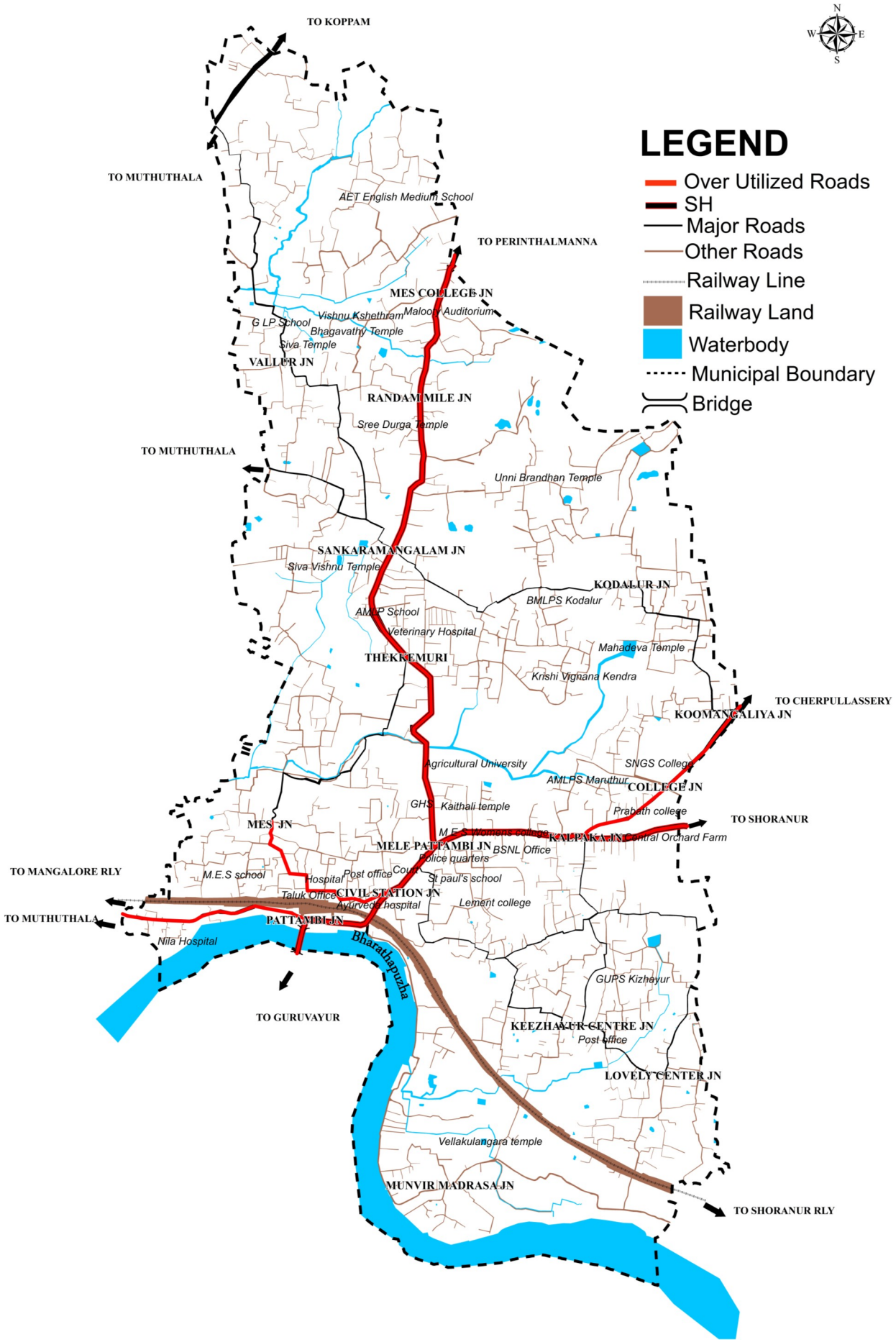


Fig. 29.2 Over utilized roads in Pattambi town (2036).

29.3.2 Social Infrastructure

Social infrastructure is the interdependent mix of facilities or services like education, health, housing and other civic amenities that maintain and improve the standard of living and quality of life in a community. The failure to make adequate provision for social infrastructure in the past has exacerbated the problems. This section gives the present status and future requirement of social infrastructure in Pattambi town.

29.3.2.1 Education

Educational planning is more than a technical exercise. It is also an organized social process involving a variety of actions. Education is for people and its development is ultimately aimed at maximizing the capacity for achieving full welfare of the population. Pattambi has a good educational background. Future educational requirement for Pattambi town is projected based on the URDPFI guidelines. Projected requirement of educational facilities for Pattambi is shown in Table. 29.14.

For the horizon year 2036, 14 pre primary schools, 1 higher secondary school are needed to meet the requirement. The number of primary and high schools are satisfactory. There are no professional colleges in the town. One private Women's polytechnic and one MTC ITI are functioning in the town. At present there is no TTC. There is a demand for one TTC for the horizon year 2036.

Table 29.14 Requirement of educational facilities for Pattambi town.

Type	Existing (2017)	Required (2017)	2021	2026	2031	2036
Population	31,794	31,794	34371	37486	40743	44124
1. Nursery: 1 for every 2500	4	13	14	15	16	18
2. Primary: 1 for every 5000	11	6	7	7	8	9
3. HS: 1 for every13000	4	2	3	3	3	3
4. HSS: 1 for every 13000	2	2	3	3	3	3
5. Arts and Science College: 1 for every 80000	3	1	1	1	1	1
6.Polytechnic College :1 for every 36000	1	1	1	1	1	1
9. Professional college: 1 for every 250000	0	1	1	1	1	1
7. ITI/ ITC : 1 for every 35000	1	1	1	1	1	1
8. TTC : 1 for every 120000	0	1	1	1	1	1
10. School for handicapped: 1 for every 45000	1	1	1	1	1	1

29.3.2.2 Health

Better health is central to human happiness and well-being. The importance of health care in modern day society can be gauged from the fact that good health is recognized as one of the fundamental rights of an individual. Future health requirements are projected based on the URDPFI guidelines and is shown in table 29.15.

Table 29.15 Requirement of health facilities for Pattambi town.

SL No	Health facilities	avail-able facilities	Required facilities				
			2021	2026	2031	2036	Year
			34371	37486	40743	44124	Population
1	Nursing home, 1 for every 45000-100000 of 25-30 beds	Nil	1	1	1	1	1 shortage
2	Dispensary, 1 for every 15000	2	2	2	2	3	1 shortage
3	Sub centers, 1 for every 5000	4	7	7	8	9	4 shortage
Taluk Head quarters facilities							
SL No	Health facilities	avail-able facilities	Required facilities				
			2021	2026	2031	2036	Year
			531897	564891	598201	636784	Population
4	Taluk Hospital,1 for every Taluk,	1	1	1	1	1	No shortage
5	Bed in Taluk Hospital,1 bed for every 2000 (50 beds for 100000 population)	76	266	282	300	320	244 shortage
6	Super speciality Hospital	Nil	1	1	1	1	No facility
7	Multi speciality Hospitals	Nil	1	1	1	1	No facility

At present there is no nursing home in the Pattambi town and one is required for the horizon year 2036. At present there is only two dispensary hence one is required for the horizon year. As per standards, 9 subcentres are needed for the year 2036, but only 4 are available. The bed facilities in the taluk hospitals are not in a satisfactory condition. 244 number of beds are needed for the year 2036. At present there is no super specialty hospital in the town.

29.3.2.3 Recreational facilities

According to the URDPFI standards one community room is required for every 5,000 population and one community centre per 15,000 populations. 9 community rooms will be required by the planning year 2036. 3 community halls and libraries are needed till the end of the planning period. However there is no need of additional religious places as the existing ones outnumber the required ones. URDPFI guidelines suggest providing 1 recreational club for 15,000 persons. The open spaces are to be developed with the other socio cultural and commercial facilities so that they can serve multiple purposes. The town has 4.17 Ha of parks and open spaces presently which should be improved. Projection of recreational facilities for the horizon years is shown in Table 29.16.

Table 29.16 Requirement of recreational facilities for Pattambi town.

Year	2021	2026	2031	2036
Population	34371	37486	40743	44124
1. Community room: 1 for every 5000	7	7	8	9
2. Community hall & Library: 1 for every 15000,2000sqm	2	2	3	3
3. Recreation club: 1 for 15000 population ,2000 sqm	2	2	3	3
4. Music, dance & drama centre: 1 for every 50000	1	1	1	1
5.Meditation and Spiritual centre one for 50,000 population	1	1	1	1

29.3.2.4 Other Civic Amenities

As per the URDPFI guidelines one petrol pump is required for 15,000 population. 3 petrol pumps are required for the horizon year 2036, at present there are 4 petrol pump in the town. URDPFI guidelines implies that one LPG godown is required to serve 40,000 population. Presently there are 2 LPG godown at ward 26 and ward 27. The number of LPG gowdowns in the town is sufficient to serve the future population. 1 Milk booth is required for every 5,000 population. As per the projected population 9 milk booths are required in the horizon year. As per the URDPFI guidelines 1 police station is required to serve 90,000 population.

In Pattambi town there is one police station at Ward 20 which serve Pattambi and 2 near by Panchayats Ongallur and Koppam. As per URDPFI standard, one fire station is required to serve 2 lakh population. There is one fire station in the Pattambi town. URDPFI standard says that one post office is required to serve about 10,000-15,000 population and one telephone exchange is required to serve 40,000 population. At present there are 2 post office at ward 15 and 20 and one BSNL telephone exchange located at Melepattambi (ward 17). As per the projected population 1 additional post office is required to serve the future population for the horizon year 2036.

Table 29.17 Requirement of other civic amenities for Pattambi town.

Year	2021	2026	2031	2036
Population	34371	37486	40743	44124
1. Petrol pump: 1 for every 15000	2	2	3	3
2. Milk booth: 1 for every 5000	7	7	8	9
3. LPG Godown: 1 for every 40000	1	1	1	1
4. Police station: 1 for every 90000	1	1	1	1
5. Fire station: 1 for every 200000	0	0	0	0
6. Post Office: 1 for every 10000 - 15000	2	2	3	3
7. Telephone exchange: 1 for every 40000	1	1	1	1

29.3.2.5 Housing

Safe, affordable housing is a basic necessity for every family. Without a decent place to live, people cannot be productive members of society, children cannot learn and families cannot thrive. Table 29.18 shows the projected number of house hold for the town.

Pattambi town has a projected house hold size of 3.77 for the horizon year. The number of house hold needed for the year 2036 was 11704. From the secondary data 6463 house holds are in the town presently. So there is a need of extra 5241 houses for the horizon year.

Table 29.18 Projected Number of House Hold of Pattambi town.

	2011	Projected Population and House Hold Size				
		2016	2021	2026	2031	2036
Population	28632	31416	34371	37486	40743	44124
HH size	4.86	4.64	4.43	4.21	3.99	3.77
No. of House Hold	5897	6771	7759	8904	10211	11704

30

Proposed Land Use

30. PROPOSED LAND USE

In order to accommodate the projected requirements based on the Development concept for the horizon period, requirement of land for various uses is to be determined and located spatially. The land use plan is prepared considering the existing development scenario, development trend, future requirements in the horizon period and the need to uplift Pattambi as a sub regional centre. The existing spatial structure, linkages of the town, trip generation characteristics of various land uses etc. were also considered.

30.1 PROPOSED LAND USE

Although it has been observed from the studies that there is a tendency of growth along transport corridors, considering areas with great potential for development, wider areas of development have been considered. Existing Pattambi town has predominantly developed along SH 23 - Pattambi Perinthalmanna road and SH 39 - Palakkad Ponnani Road.

The proposed land use plan for the Pattambi town has been prepared for the year 2036. The Category of land use proposed in line with the development concept is listed as follows and the spatial distribution of various land uses is shown in Fig 30.1. The proposed land use break up (in terms of area and percentage of composition) is shown in Table 30.1.

Table 30.1 Proposed Land Use Split up

SL No	Landuse	Proposed Area (In Sq.Km.)	Percentage of developable area
1	Residential zone	5.80997	46.11
2	Commercial zone	0.6208	4.93
3	Industrial zone	0.464074	3.68
4	Public & Semi public zone	0.8482	6.73
5	Town Centre zone	0.71032	5.64
6	Dry Agriculture zone	2.8455	22.58
7	Wet Agriculture zone	2.147	
8	Water body	1.0147	
9	Traffic & Transportation zone	0.558	4.43
10	Recreation zone	0.0426	0.34
11	Cremation & Burial Ground	0.021892	
12	Green belt	0.0459	

Table 30.1 Continued...

SL No	Landuse	Proposed Area (In Sq.Km.)	Percentage of developable area
13	Solid waste management plant	0.012609	
14	Land reserved for road	0.6010	4.77
15	Special zone	0.099463	0.78
16	Heritage zone	**0.004097**	
	Total	**15.843003**	
	Developable area	**12.599927**	100.00

30.1.1 Residential Zone

As per the proposed land use, Pattambi municipality is designed to have total residential land area of around 581 hectares which is about 36.67% of total municipal area and 46.13 % of developable area. It has been said earlier that the nearby areas of the town are mixed with residential, dry agriculture and other land uses. In this circumstance, densely populated area are envisaged as residential zone and other are under Dry agriculture zone. Accessible roads and availability of commercial establishments for immediate purchase are ensured in these areas. Also, the zone has been designed by ensuring the presence of play grounds in this zone that can be reached without crossing the State Highways and Railways.

It was earlier said that the net population density of Pattambi Town is 38.9 PPH and at the ward level it is as high as 81.56 PPH. So it is necessary to bring this town to 65 PPH. See the table 30.2 below, 678.83 Ha of land required for residential purpose, but only 580.90 Ha area is included as residential zone. It is sufficient for holding the projected population by 2036, because the zoning regulations are so designed to allow residential units in all other developable zones. Fig. 30.2. shows the residential zone with immediate

Table 30.2 Land area required for residential zone for Pattambi Town w.r.to Projected Population

Projected Population	Proposed population density in PPH	Required Area (In Ha.)	Proposed Area (In Ha.)	Deficiency (in Ha.)
44124	65	678.83	580.90	97.93

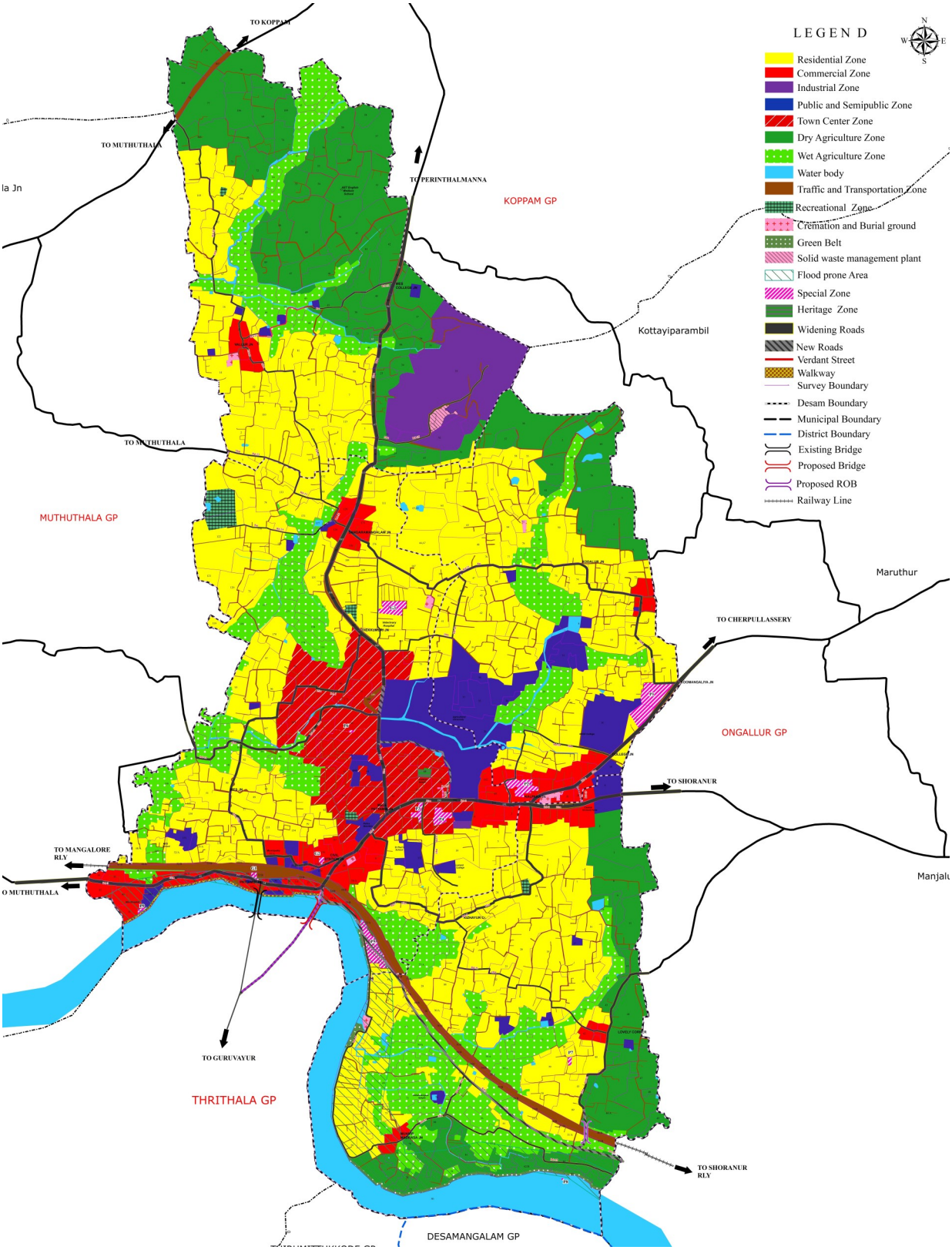


Fig. 30.1 Proposed Land Use

commercial centers and recreation facilities.

30.1.2 Commercial Zone

Most of the commercial activities are concentrated in the core area of the town and along the State Highway passing through the town as ribbon development. In order to meet the demand and fill the gap of major commercial centres, higher order commercial activities are proposed to be developed in core area. The proposed first order commercial zone is 24.94 Ha including the existing establishments around the bus stand and Railway station. Another location is at MelePattambi having 21.374 Ha including the existing commercial establishments on the both side of the State High way.

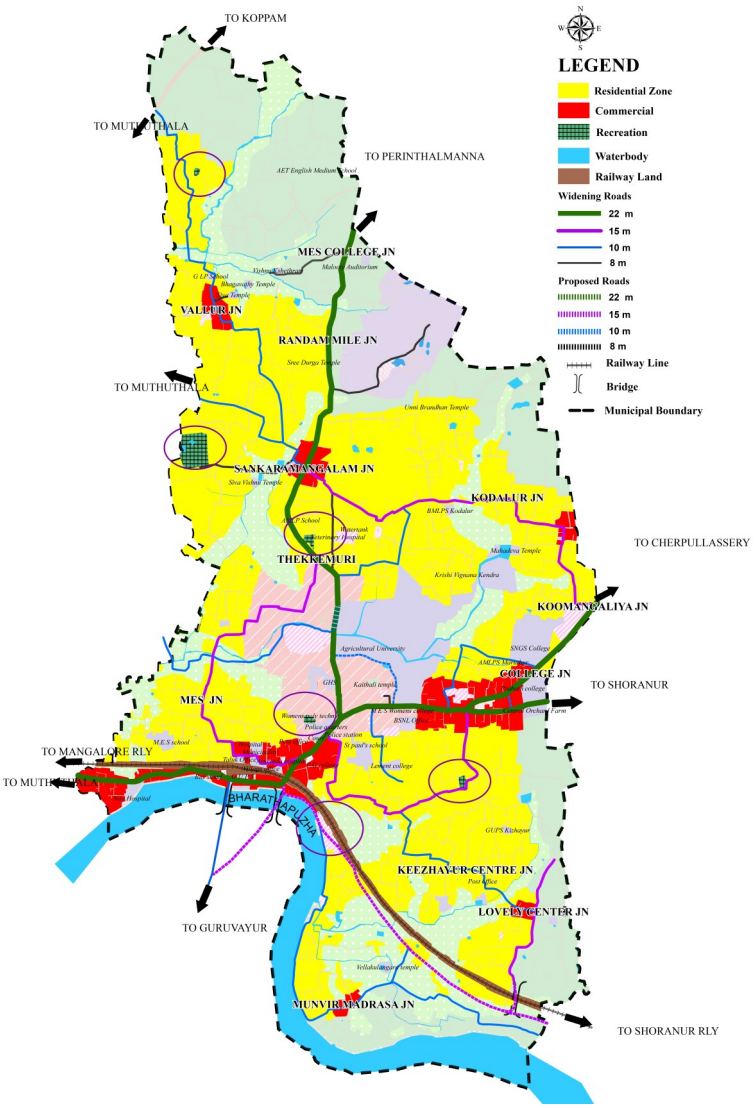


Fig. 30.2 Location of Residential zone,Commercial zone, Recreation zone

In order to make all residential areas self contained and self sufficient in terms of basic day to day needs of commercial uses five small commercial zones also proposed at Sankaramangalam, Vallur, Kodalur, Lovely corner, and Nambram. The location details of commercial zones are obtained from the fig 30.2.

30.1.3 Industrial zone

As per the spatial distribution the industrial land use is seen scattered through out the Town. As per the development concept the existing non nuisance type of small scale industries are permissible in all urban land use zones. Hence, separate industrial zones are not envisaged in the core of the town. The land owned by SIDCO is earmarked as an industrial zone in the

town.

Another 45.51 Ha land with access within 200m from State Highway in the northern part of the town is envisaged as an industrial zone to bring Pattambi to the goal of being an industrial friendly town. The proposed industrial zone is located near to the existing solid waste treatment site and Quarries. The zoning regulations of this zone is suggested in such a way that construction of residential buildings other than incidental use to main occupancy is restricted, quarrying is permitted in this zone. Fig. 30.3 shows the spatial distribution of industrial zone in Pattambi town.

30.1.4 Public & Semi Public Zone

Public and semi public land use accommodate Government offices, education institutions and health related and religious institutions. Public and semi public activities in Pattambi town are mainly spatially distributed along major transport corridors and at CBD area.

In Pattambi town Public and semi public land use is present in 96 Ha of land which are scattered all over the town. In Proposed land use accommodation of public and semipublic uses in residential, commercial and town centre zones are excluded.

The land owned by RARS is considered as Public and Semi Public zone including Paddy, therefore 7.05% (88,84 Ha) of the developable land of the town comes under Public and semi public zone. Public places like Proposed Town Hall, and Hospital complex are included in the Special zone. Therefore, there is no need to include more public places in Public and semi Public zone. Fig. 30.3 shows Public and Semi public zone in Pattambi town.

30.1.5 Town Centre

It was stated earlier that the dense development occurred in the area between the railway line and Bharathapuzha, the main reason for this is the presence of transit stations like Bus stand and Railway station. Later development started moving towards Mele Pattambi where land availability was limited and ribbon development was seen along State Highways. For shifting development towards the area where land availability is more, an office complex (revenue-Municipal towers) and related facilities are proposed at Sankaramangalam. Along with this, the Town centre zone is proposed as a liberal economic development zone with bypass and ring roads on the both side to give a new face to the town. The Town Centre zone also cover Mele-Pattambi junction and environs. Fig 30.3 shows the Town centre zone.

Here the zoning regulations have been prepared in such a way that multi storied residential flats are also allowed along with constructions suitable for economic development and public engagements.

30.1.6 Dry Agriculture Zone

In Pattambi town, 479 Ha of dry agriculture land is located near to peripheral area. But the proposed dry agriculture zone is only having an extend of 284.55 Ha. This zone Is very significant one since large tracts of developable land is available in this zone (22.59 % of Developable area of town). Low density residential development as well as housing for low income group are more likely allowed in this zone due to comparative low price of land . The industrial and institutional land use also shall be permitted in this zone with certain regulatory measures.

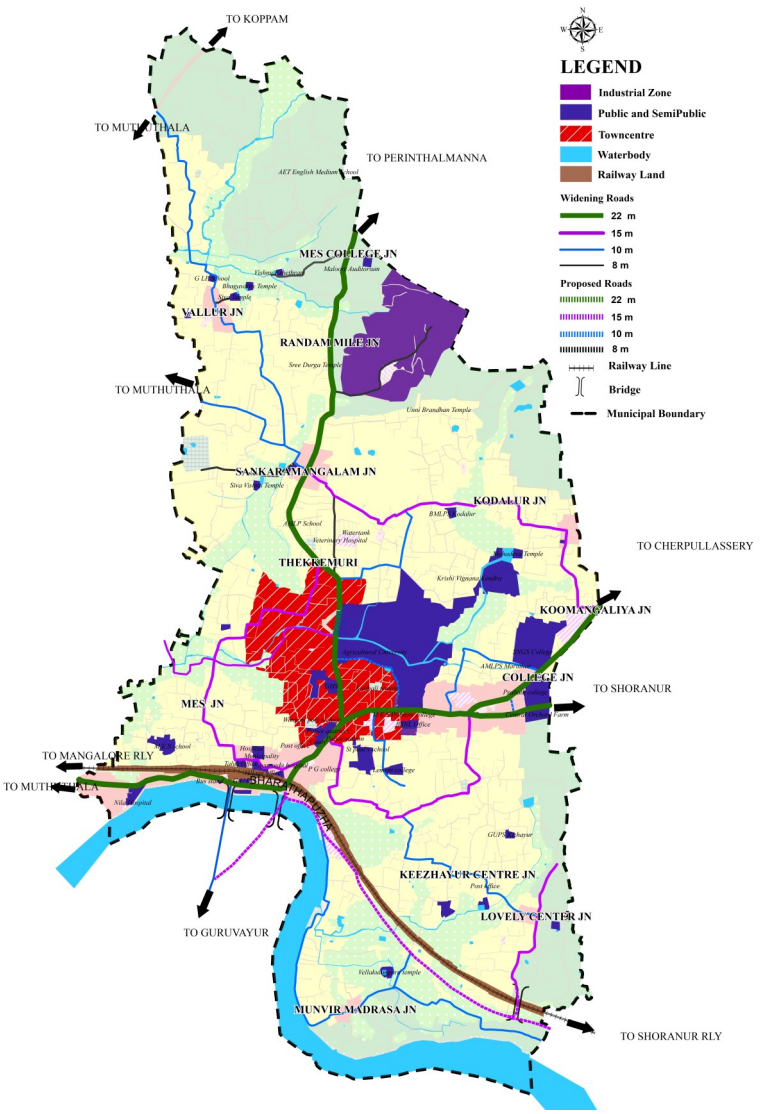


Fig. 30.3 Location of Industrial zone, Public and semi public zone and Town centre zone

30.1.7 Wet Agriculture Zone

Conservation of Paddy fields has environmental significance. Paddy field works as a water recharging area. Conservation of paddy is proposed wherever it is essential to maintain environmental quality and the land use in these areas are to be strictly regulated. According to the existing land use map, 219 Ha of land is suitable for paddy cultivation. But due to the requirement of some uncultivated paddy land for road and other infrastructure development, the area zoned as wet agriculture has decreased to an extent of 214.7 Ha.

30.1.8 Water bodies

Land use under water bodies constitutes about 99.64 Hectares which is 6.29% of the total municipal area. This zone includes ponds, rivers, 'Thodu' and canals.

30.1.9 Traffic & transportation zone

The major share of this zone is area covered by roads. The municipal road network has good coverage. Widening of existing roads and providing a few missing links only are attempted. The land under this zone also covers existing bus stands, bus bays, taxi stands and other parking etc. An extend of 110.4 Hectares (8.77 % of developable area of town) is coming under the traffic and transportation zone.

30.1.10 Recreation zone

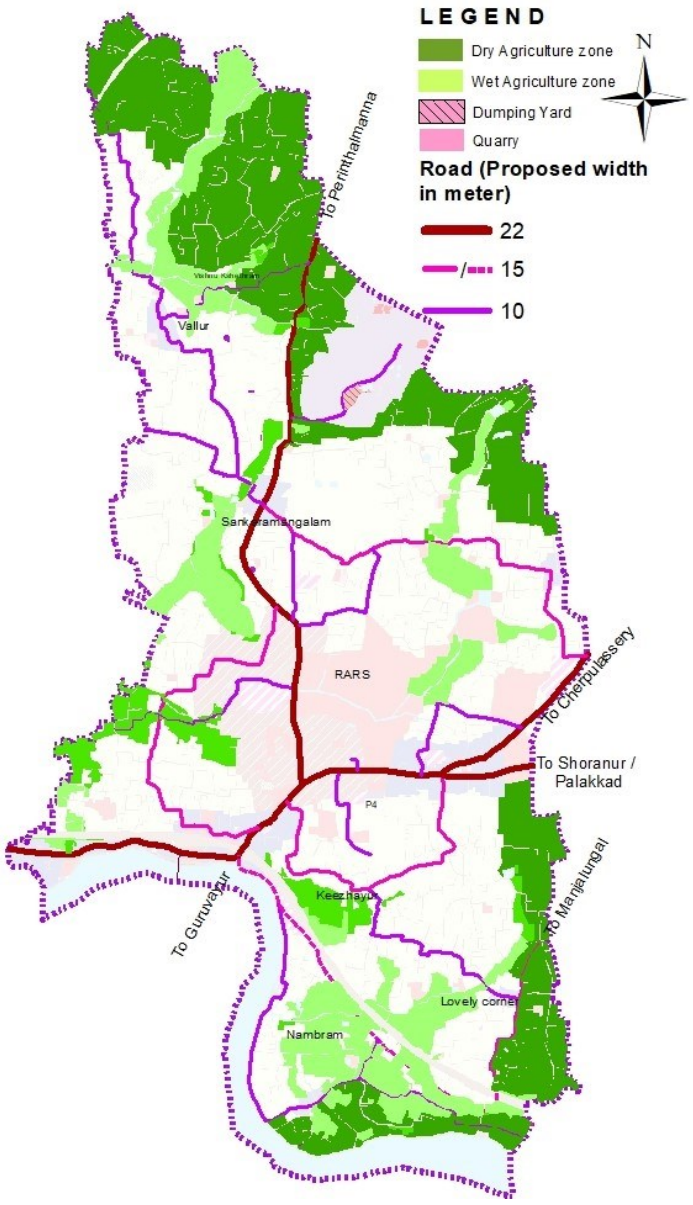


Fig. 30.4 Dry agriculture zone, Wet Agriculture zone Quarry and Solid waste management plant

Town suffers from lack of recreational areas. But due to the presence of paddy fields, water bodies and other vacant lands, the shortage of open spaces are not felt much. At present there are two municipal playgrounds, One open space near Panthakaparambu temple, They are comes under Recreational zone.

There is a quarry near Mundenad Colony in Pattambi town which has been closed for years. There is a possibility of converting it into an amusement park. The play ground near Sankaramangalam-Parakkad road is also seen to be developed in private partnership. Hence these two places are also brought under recreation zone. The total area of proposed playgrounds and open

spaces is 4.26 hectare (0.34% of developable area of town). Fig 30.2 shows the location of recreation zones.

30.1.11 Cremation and burial grounds

This zone includes existing Cremation and burial grounds in Pattambi Town which includes 2.19 Ha. Municipally owned cremation grounds are also included in this zone for conversion into Gas crematoriums.

30.1.12 Green belt

Bharathapuzha river is flowing through the southern boundary of Pattambi Town. The municipality has 4.86 km of river frontage. The shore line is environmentally sensitive and any polluting activity in this area will directly pollute river which is the major source of drinking water not only to Pattambi Town but also to nearby panchayats and the steep slopes pose threat to stability.

Green strip is proposed to a depth of 12 m along the boundary of Bharathapuzha River.

30.1.13 Solid waste management plant

This zone includes existing solid waste treatment plant, which is detailed in Chapter 32.

30.1.14 Land reserved for road

All existing roads, proposed roads, and widening roads are in this zone.

30.1.15 Special zone

Special zones include the areas specifically demarcated for certain projects details of which are given in sectoral proposals. No other activity other than the specific project and its incidental uses shall be permitted in such zones. Each project detailed are included in Chapter 32 named as Sectoral proposals.

30.1.16 Heritage zone

This zone includes the land situated Kaithali Siva temple (ASI Protected Monument).

31

Traffic and Transportation Plan

31. TRAFFIC AND TRANSPORTATION PLAN

31.1 TRAFFIC AND TRANSPORTATION PLAN

Transportation planning involves long range planning for future target year. In order to meet the base year and projected demand for various horizon years, a long term traffic and transportation plan has been formulated for the town. This covers planning for future transport development and network improvements such as parallel road links, bypasses for inter city arterial roads, grade separated pedestrian facilities across busy road, over bridges and development of integrated bus terminals and public transportation system. Transportation development scheme cover all the available modes of travel and are formulated so as to reduce the severe strain put on the existing road net work. All committed development schemes were taken into account while formulating the transportation plan. Three categories of roads are formulated in this plan which are as follows.

- Primary distributor roads
- Secondary distributor roads
- Tertiary distributor roads

31.1.1 Primary Distributor Roads (R1)

These roads provide connectivity to district head quarters, hence these roads are designed with ROW as 22 m. Typical cross section of these roads is shown in fig 31.1. Considering Pattambi town these roads are of radial pattern and developed as four lane to ensure smooth traffic of heavy vehicles. Continuous kerb, footpath cum drain protected with barricades on both sides are also proposed.

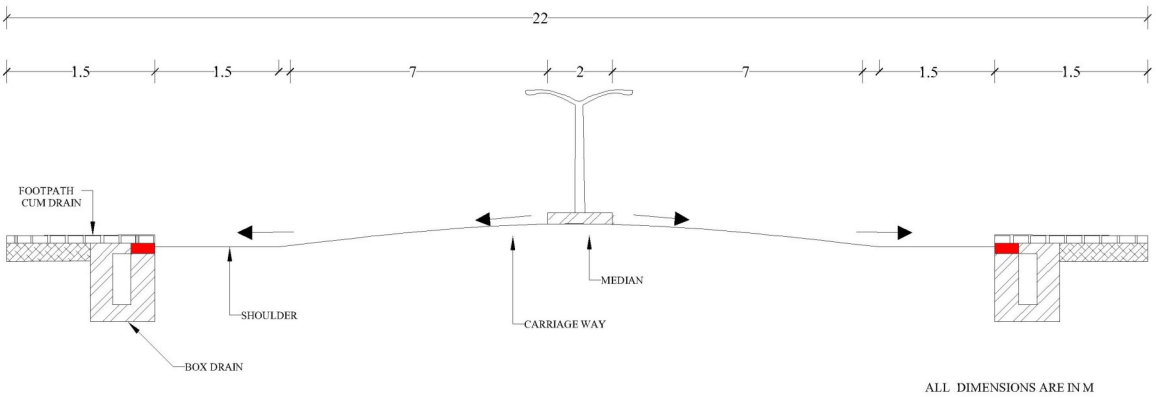


Fig. 31.1 Cross section of 22m wide four lane road with divided carriage way

31.1.2 Secondary Distributor Roads (R2)

These roads act as an intermediate roads which connects primary distributor roads with in the town and some roads provide connectivity to nearby towns and Taluk headquarters. Considering Pattambi town these roads act as ring roads in order to restrict the entry of vehicle into core town. It is proposed to be developed into two line roads with 15 m wide ROW with footpath cum drain. Fig 31.2 shows the cross section of such road.

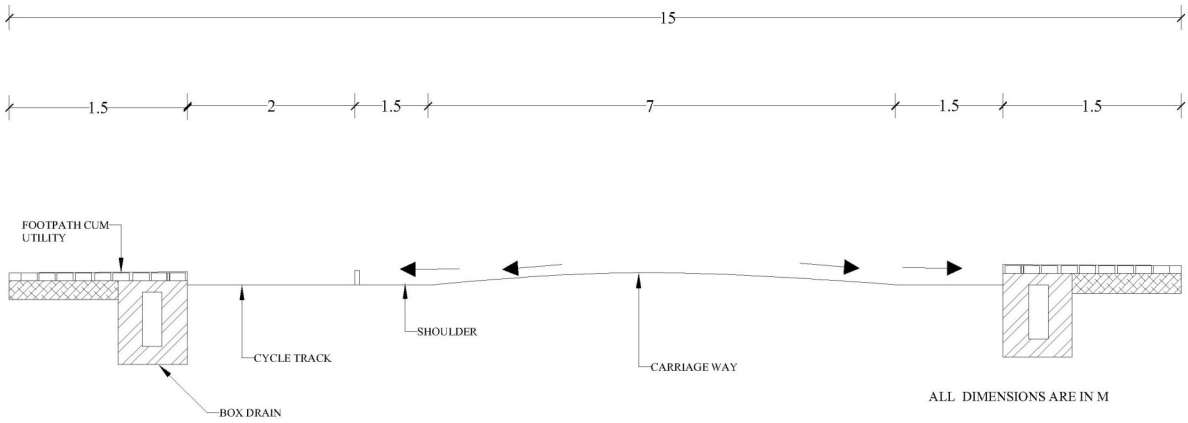


Fig. 31.2 Cross section of 15 m road two lane (R2)

31.1.3 Tertiary Distributor Roads (R3)

These radial roads provide connectivity to Pattambi town with hinterland and also connect inner ring road to outer ring road beyond municipal limit. It is proposed to be developed into two line roads with 10 m and 8 m wide ROW with footpath cum drain. Typical cross section of these roads is shown in fig. 31.3 and 31.4 respectively.

The above three classes of roads are again subdivided into 24 stretches which are tabulated in table 31.1 and the specification of each roads are as follows and Fig 31.5 shows the map of proposed road network.

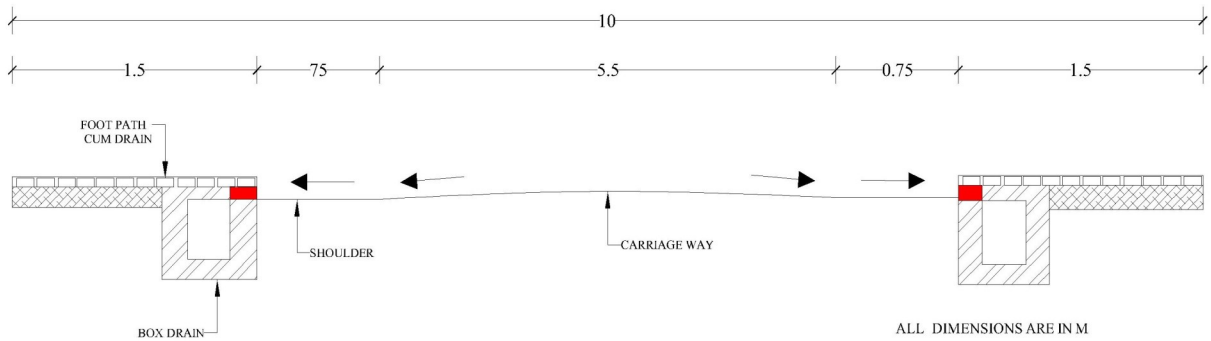


Fig. 31.3 Cross section of 10 m road two lane (R3)

Table 31.1 Road details of proposed road network

SL No.	Road No.	Length in Km	Existing width	Status	Proposed width ROW	Road Name
	R1 - 22m Roads					
1	Rd-1	3.66	12m - 24m	Widening	22 m	MelePattambi-Perinthalmanna Road
		0.2	Nil	Proposed	22 m	MelePattambi-Perinthalmanna Road
2	Rd-2	1.5	12m - 24m	Widening	22 m	MelePattambi-Shoranur Road
3	Rd-3	2.15	10m - 16m	Widening	22 m	MelePattambi-Muthuthala road
4	Rd-4	1.25	12m - 18m	Widening	22 m	Pattambi-Cherpulassery road
	R2 - 15m Roads					
5	Rd-5	2.95	6m - 8m	Widening	15 m	Sankaramangalam - koomangallya Road
6	Rd-6	2.8	5m - 8m	Widening	15 m	Civil station Jn- Thekumuri Jn road
7	Rd-7	1.2	4m - 5.5m	Widening	15 m	MelePattambi - Keezhayur Road
8	Rd-8	1.2	4m - 5.5m	Widening	15 m	Keezhayur - Kalpaka Road
9	Rd-9	0.45	4.45	Widening	15 m	Kuttipuram -Shoranur Road
		2.26	Nil	Proposed	15 m	Kuttipuram -Shoranur Road
10	Rd-10	1.4	5m - 8m	Widening	15 m	Manjalungal - Lovely corner - Nam-bram Road
11	Rd-11	1.43	5m - 9m	Widening	15 m	ByPass Road
	R3 - 10m Roads					
12	Rd-12	1.57	4m - 8m	Widening	10 m	Keezhayur - Lovely corner Road
13	Rd-13	3.4	4m - 8m	Widening	10 m	Sankaramangalam - MeleParakad Road
14	Rd-14	0.8	4m - 8m	Widening	10 m	Sankaramangalam - Kozhikottiri - Mu-thuthala Road
15	Rd-15	3.46	6m - 8m	Widening	10 m	Pattambi-Chenganakunnu road
16	Rd-16	2.7	4m	Widening	10 m	Link Road Connecting Nambram Roads
17	Rd-17	0.7	4m - 6m	Widening	10 m	Lement College Road
18	Rd-18	0.92	4m - 6m	Widening	10 m	Ice Plant Road
19	Rd-19	0.11	Nil	Proposed	10 m	link road MelePattambi- Shranur road and Pattambi-cherpulassery raod
20	Rd-20	1.11	5.5 m - 8m	Widening	10 m	Kalpaka-SNGS College road
21	Rd-21	0.73	Nil	Proposed	10 m	Bypass road through RARS

Table 31.1 Continued.....

SL No.	Road No.	Length in Km	Existing width	Status	Proposed width ROW	Road Name
	R4 - 8m Roads					
22	Rd-22	0.575	4m	Widening	8 m	Thekkumuri-Veterinary Hospital road
23	Rd-23	0.64	4m	Widening	8 m	MES College - Vallur Vishnu temple road
24	Rd-24	0.11	4m	Widening	8 m	Vallur Jn.- Shiva temple Road
25	Rd-25	0.42	4m	Widening	8 m	Sankarmangalam- Mundenad colony road
		0.25		Proposed	8 m	Sankarmangalam- Mundenad colony road
26	Rd-26	1.0	6m - 8m	Widening	8m	SWMP road

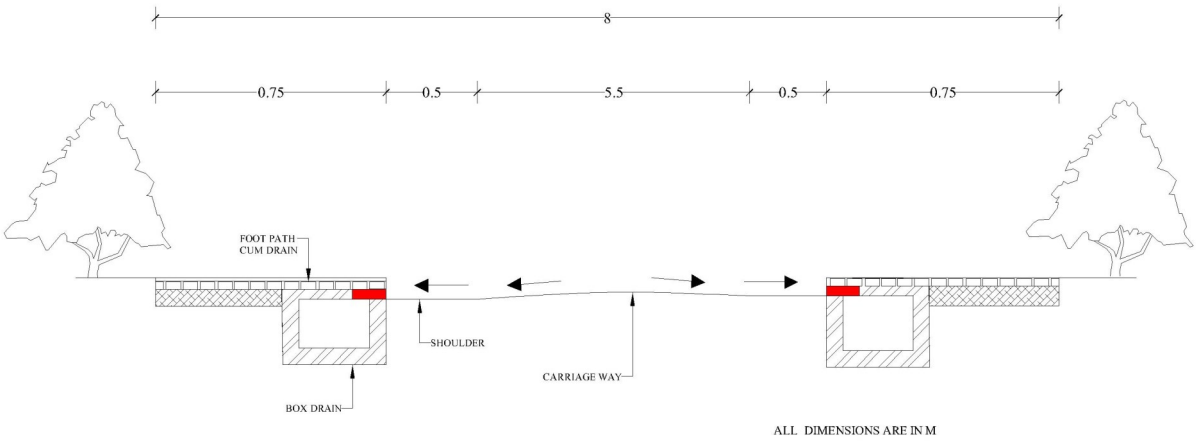


Fig. 31.4 Cross section of 8 m road two lane (R3)

31.2 ROAD HIERARCHY

R1 - 22 m Width Roads

Rd-1 Widening of Mele Pattambi - Perinthalmanna Road (3.66 Km)

Pattambi – Perinthalmanna road, forming part of SH 23 from Shoranur to Perinthalmanna, passes through Mele Pattambi Jn, the central area of Pattambi Town and traverses for a length of about 10km through Pattambi Town. The road carries substantial volume of traffic ranging between 1,300 and 1,800 PCU and is found to be over-utilized in the base year itself. Considering the traffic potential as well as the status of road as a major State Highway, the road needs to be widened to a four lane standard road in a width of 22m ROW with the status of arterial road. It is also envisaging to construct a new 200 m for overcome the horizontal curve in this road before Thekkumuri

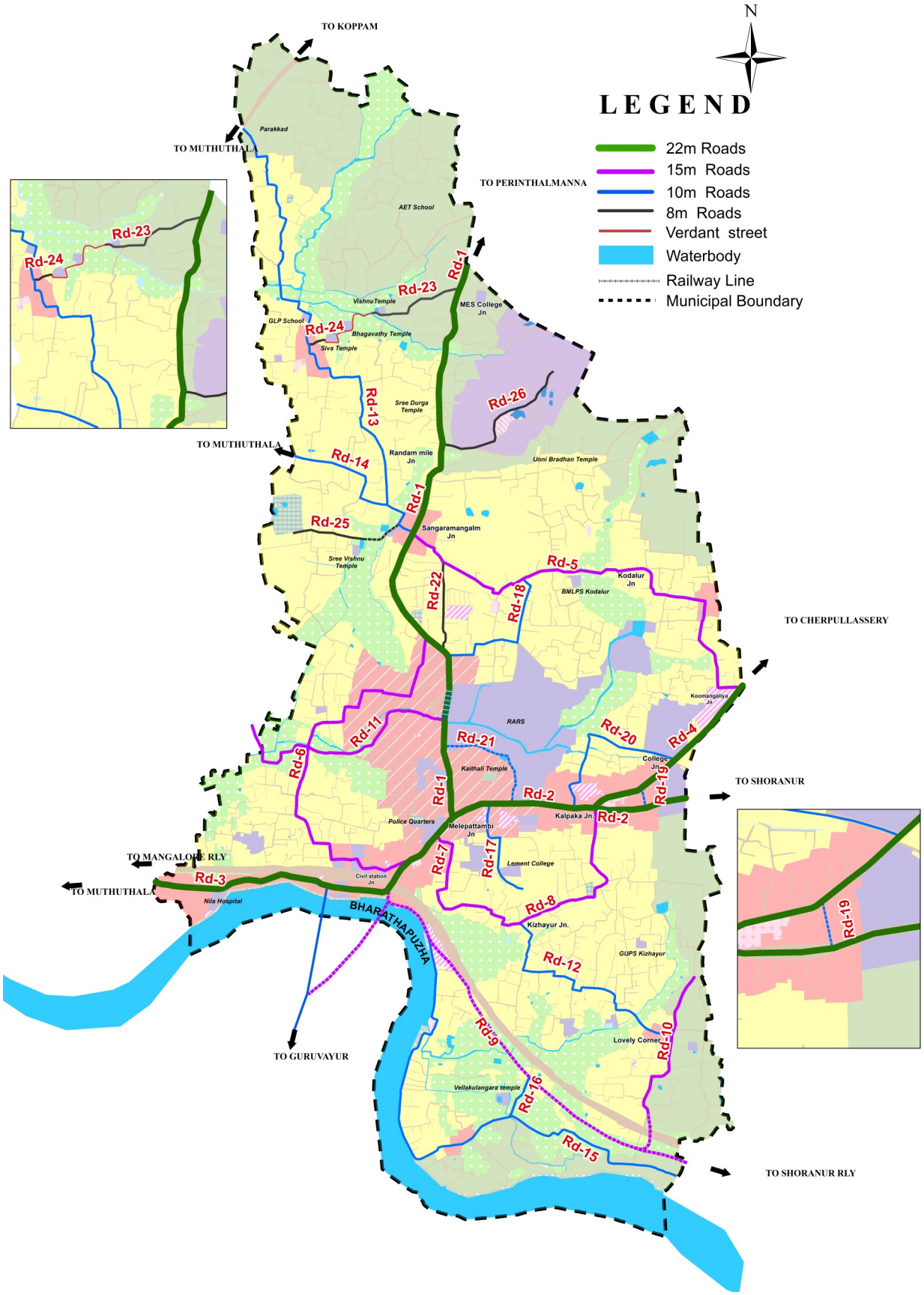


Fig. 31.5 Proposed road network

junction. The radial road passes through moderately built up Mele Pattambi Jn – Thekkumuri stretch which is expected to increase in density of built-up areas over the years. Hence, link roads bypassing the stretch may be needed for meeting the future traffic needs.

Rd-2 Widening of Mele Pattambi — Shoranur Road (1.5 Km)

Pattambi – Shoranur road forms part of SH 23 from Shoranur to Perinthalmanna. The road connects places like Ongalloor, Vadanamkurissi, Shoranur and proceed further to major urban centres like Palakkad and Thrissur, the district headquarters, and Coimbatore in Tamil Nadu. Being a major highway, the road carries traffic volume excess of it carrying capacity and would be severely congested by the year 2026. The road stretch between Mele Pattambi and Kalpaka houses many commercial establishments and hence lot of parking and pedestrian activities. Considering the factors like present traffic volume and future growth potential, the road is proposed for a four lane standard road in a width of 22m ROW with the status of arterial road.

Rd-3 Widening of Mele Pattambi — Muthuthala Road (2.15 Km)

The road originates from Pattambi Jn, the central node of Pattambi Town on Guruvayoor road and connects important places like Kodumunda, Pallippuram, Muthuthala and Koppam in neighboring Panchayats apart from Pattambi Bus Station. Part of the road between Pattambi Jn and bus station is over-utilized in the base year itself due to multiple movements of buses to and from the bus station which warrants four lane capacity. Although the location of railway line on the one side and Bharatha Puzha on the other side along with intense commercial establishments put question mark on widening the road to four lane, it is highly desirable that the road is widened to four lane with minimum ROW of 23m. Apart from this, some of the buses presently using the existing bus station needs to shifted to a new bus station which could be located somewhere near the Pattambi Bypass. Above measures could address the recurring traffic problems at the bus station area comprehensively for the various horizon years.

The remaining portion of Muthuthala road between Pattambi Bus Station and the Town border although currently underutilized is poised for overutilization by the year 2026 warranting four lane capacity. It is proposed to be widened to 22m. A small stretch between Railway Under pass to Nambram road also comes under this road stretch.

Rd-4 Widening of Pattambi — Cherpulassery Road (1.25 Km)

Cherpulasserry road originates from Kalpaka Jn on Shoranur-Perinthalmanna SH 23 and covers settlements like Maruthur, Vallappuzha, Pengattiri, Nellaya. The current traffic level was found to be less than its carrying capacity and expected to exceed the capacity by the year 2036. Accordingly, the road is proposed for four lane 22m wide road with divided carriageway with the status of arterial road.

R2 - 15m Width Roads

Rd-5 Widening of Sankaramangalam - Koomangallya Road (2.95 Km)

Sankaramangalam junction to Koomangiliya road passes through the Kodalur junction. This road is expected to decongest the CBD area of the town by providing alternate links to the by passable traffic through Pattambi Town. It is proposed to be widened to 15 m.

Rd-6 Civil Station Jn. - Thekumuri Jn. Road (2.8 Km)

The road from Civil Station junction to Thekkumuri via Municipal Office and Taluk Hospital is currently 5 to 8 m wide. It is proposed to be widened to 15.

Now the roads Rd-5, Rd-6 and the part of Rd-1 has been proposed as Northern Inner ring road, which can help to divert the vehicle from busy Mele-Pattambi junction.

Rd-7 MelePattambi - Keezhayur Road (1.2 Km)

The road originating from Pattambi Police Station on Pattambi-Mele Pattambi road connects Keezhayur and proceeds further to Manjalugnal on Shoranur road. The road at present carries relatively less volume of traffic. Considering the future potential of traffic the road starting from near Police Station to Keezhayur is currently 4 to 5.5 m wide. It is proposed to be widened to 15m.

Rd-8 Keezhayur - Kalpaka Road (1.2 Km)

The road starting from Keezhayur junction to near Kalpaka bus stop is currently 4 to 5.5 m wide. It is proposed to be widened to 15m. When the road is to be improved, a four legged junction should be developed in Pattambi– Shoranur Road.

Now the roads Rd-5 and Rd-6 has been proposed as Northern portion of Inner ring road. This will help divert vehicles without reaching the busy Mele-

Pattambi junction.

Rd-9 Kuttipuram - Shoranur Road (1.Km)

KRFB envisages construction of new bridge across Bharathapuzha and Kuttipuram - Shoranur road through Pattambi town. Without entering Pattambi town, vehicle can reach Shoranur via this road. It is intended to construct a road with a width of 15 m.

Rd-10 Manjalungal - Lovely corner - Nambram Road (1.4 Km)

The road originating from Pattambi Police Station on Pattambi-Mele Pattambi road connects Keezhayoor and proceeds further to Manjalugnal on Shoranur road. The road at present carries relatively less volume of traffic. Considering the future potential of traffic with the development of a ring road proposed as part of road network plan in this report.

Another road is included in the same standard to cross the railway through a new over bridge from Manjalungal on the Pattambi - Shoranur road via Lovely junction and reach the Rd-9. Now the roads Rd-9 and Rd-10 has been proposed as Southern outer ring road. This will help divert vehicles towards Palakkad bypassing the busy Mele-Pattambi junction.

Rd-11 Bypass Road (1.43 Km)

This road starts form Pattambi - Perinthalmanna road which easily connects Perumudiyur and Kodumunda. Only 1.43 Km pass through Pattambi Town, hence it is proposed to be widened to 15 m which is currently 5 to 9 m width.

R3 - 10 m Width Roads

Rd-12 Keezhayur - Lovely corner road (1.57 Km)

This Link road connecting road Rd-7 and Rd-8 towards the Manjalungal - Lovely corner - Nambram road. It is proposed to be widened to 10 m which is currently 4 to 8 m width.

Rd-13 Sankaramangalam - Mele Parakkad (3.4 Km)

This Link road will connecting road Sankaramangalam towards MelePara-kad. It is proposed to be widened to 10 m which is currently 4 to 8 m width.

Rd-14 Sankaramangalam - Kozhikottiri - Muthuthala Road (0.8 Km)

The road in effect lead from Sangaramangalam and lead to Muthuthala via Kozhikattiri. This road passes only for a distance of 800 m in Pattambi

Town. It is an easy road from Sankaramangalam to Muthuthala, hence it is proposed to be widened to 10 m which is currently having 4 to 8 m width.

Rd-15 Pattambi - Chengankunnu Road (3.46 Km)

This road connects Nambram area in Pattambi town with Ongallur and ends at Chenganakunnu temple premises. Out of 6 km of the full stretch 3.46 km is in Pattambi. It is proposed to be widened to 10 m.

Rd-16 Link road connecting Nambram Roads (0.27 Km)

This road stretch connects Rd-9 with Rd-15. This road having only 270m length which is proposed to widened to 10m.

Rd-17 Lement College Road (0.70 Km)

This road stretch connects Rd-2 with Lement college premises. This road having only 700m length which is proposed to widened to 10m.

Rd-18 Ice Plant Road (0.92 Km)

This is a link road connecting Rd-1 to Rd-5. This road having only 920m length which is proposed to widened to 10m

Rd-19 Link road connecting MelePattambi-Shoranur road and Pattambi Cherpulassery road (0.200 Km)

A 200 m road can be built above the existing canal to connect the Pattambi-Cherpulassery road and the Pattambi-Shoranur road. This road is proposed to widened to 10m.

Rd-20 Kalpaka - SNGS College road (1.11 Km)

This road starts from Mele Pattambi -Shoranur road and ends with Pattambi—Cherpulassery road through SNGS college. This road has a length of only 1.11 Km and passes through Kalpaka junction, which connects the proposed town hall site, hence it is proposed to be widened to 10 m from its current 5.5 to 8 m width.

Rd-21 Bypass road through RARS (0.73 Km)

This road starts from Mele Pattambi -Shoranur road and ends with Pattambi—Perinthalmanna road and proposed along the boundary of RARS as elevated road without disturbing natural flow of water. This road has a length of 730m and it is proposed to develop a width of 10 m.

R4 - 8 m Width Roads

Rd-22 Thekkumuri - Veterinary hospital road (0.575 Km)

This road starts from MelePattambi -Perinthalmanna Road and ends with Sankaramangalam -Koomankallya Road. This road passes along the veterinary hospital and proposed housing project site. Hence it is proposed to be widened to 8 m, which is currently 4 to 5 m wide.

Rd-23 MES College –Vallur Vishnu temple road (0.64 Km)

This road starts from MelePattambi -Perinthalmanna Road and ends at Vallur Vishnu Temple through the paddy field. It has a footpath through the paddy fields, through which one can walk to the Bhagavathi temple and then the Siva temple. The view of this place, with the temple pond, paddy fields, and banyan trees, is breathtaking. Chapter 32 explains the green pathway to avoid harming this beauty.

Rd-24 Vallur Jn. - Siva temple road (0.11 Km)

This road starts from Sankaramangalam-MeleParakkad Road and ends at Vallur Siva Temple and at the paddy field. This road will connect the green path way specified in paragraph Rd-23.

Rd- 25 Sankaramangalam - Mundenad colony road (0.11 Km)

A new road is proposed to be constructed from Sankaramangalam-Parakkad road to the Siva-Vishnu temple crossing the paddy field near the boundary of Siva temple. In order to avoid breaking of natural flow, a fly over is proposed to cross the Paddy field. The later road is also proposed to be extended to Mundanadu colony with a width of 10m.

Rd–26 SWMP Road (0.97 Km)

This road starts form Pattambi — Perinthalmanna road which connects Solid waste management plant. It is proposed to be widened to 8 m which is currently 6 to 8 m width.

31.3 JUNCTION IMPROVEMENT & REDESIGN

Intersections are the vehicle conflict points and are prone to accident risk. Therefore there is a need to properly design the intersections for streamlining traffic flow and minimizing conflicts points. Based on traffic studies and inventory survey, conceptual improvement proposals are made for some of the complicated intersections in Pattambi Town are as follows.

31.3.1. Jn-1 Mele Pattambi Junction

Located on the Shoranur – Perinthalmanna State Highway, the junction handles large volume of traffic and lacks adequate junction space for traffic movements. In order to address the issues comprehensively, a conceptual improvement proposal for the junction with adequate junction space is prepared and enclosed at fig 31.6. As per the proposals, three arms of the junction are proposed for four lane divided carriageway. Approximate 100m length of each road considered in such development. A fourth road also joins from this junction, but entry from left is allowed from this road, hence this road has not been considered for junction improvement proposal. In addition, a channelizing island is proposed on the bell mouth of the junction between Sangaramangalam and Kalpaka arms. Detailed study need to be carried out before finalysing the proposal.

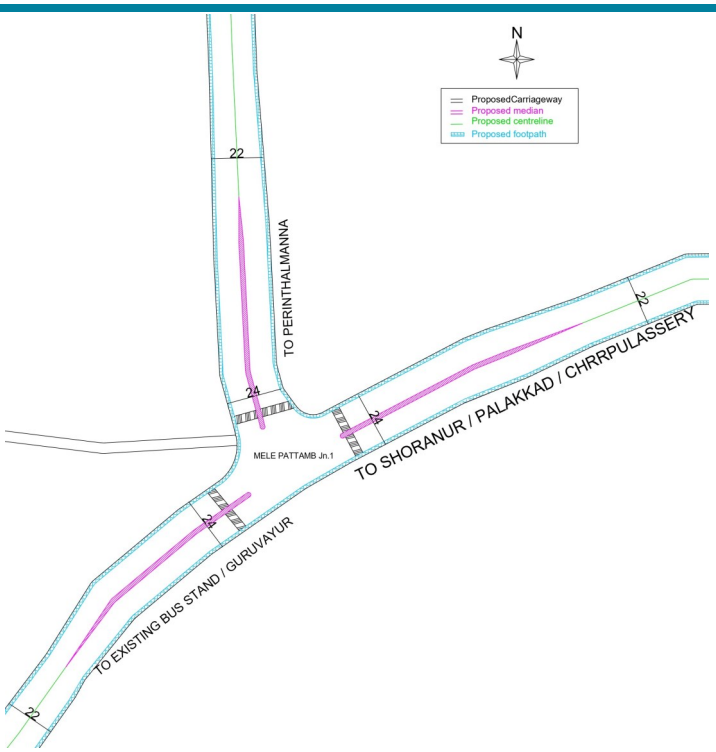


Fig. 31.6 Junction improvement Mele Pattambi

31.3.2. Jn-2 Junction near Under Pass

The new three armed junction will be formed after the construction of the proposed new bridge across Bharathapuzha. One road towards Existing bus stand, second towards Mele Pattambi and third towards approach road to new bridge. On the road towards Mele Pattambi, this road is very close to the under pass across the railway line, Therefore a detailed topographical survey need to be done before starting the construction work. Conceptual improvement proposal for this junction is as shown in fig 31.7.

31.3.3. Jn-3 Junction near Proposed New bridge

One more three armed junction will create when the new bridge across Bharathapuzha. One road from it leads to new bridge, another to Jn-2 and next to Nambram side. Conceptual improvement proposal for this junction is as shown in fig 31.7.

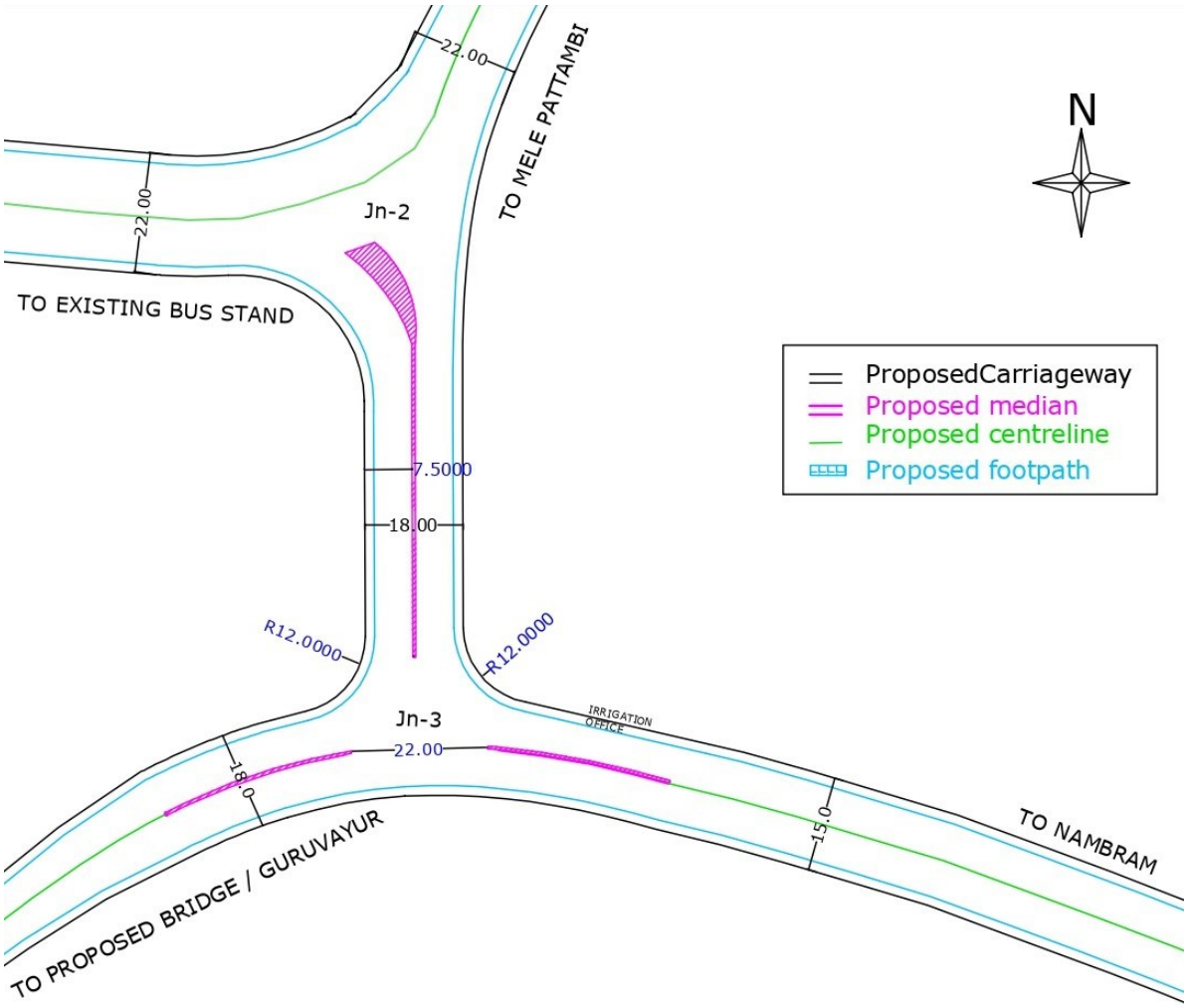


Fig. 31.7 Junction improvement Near Underpass and near Proposed new

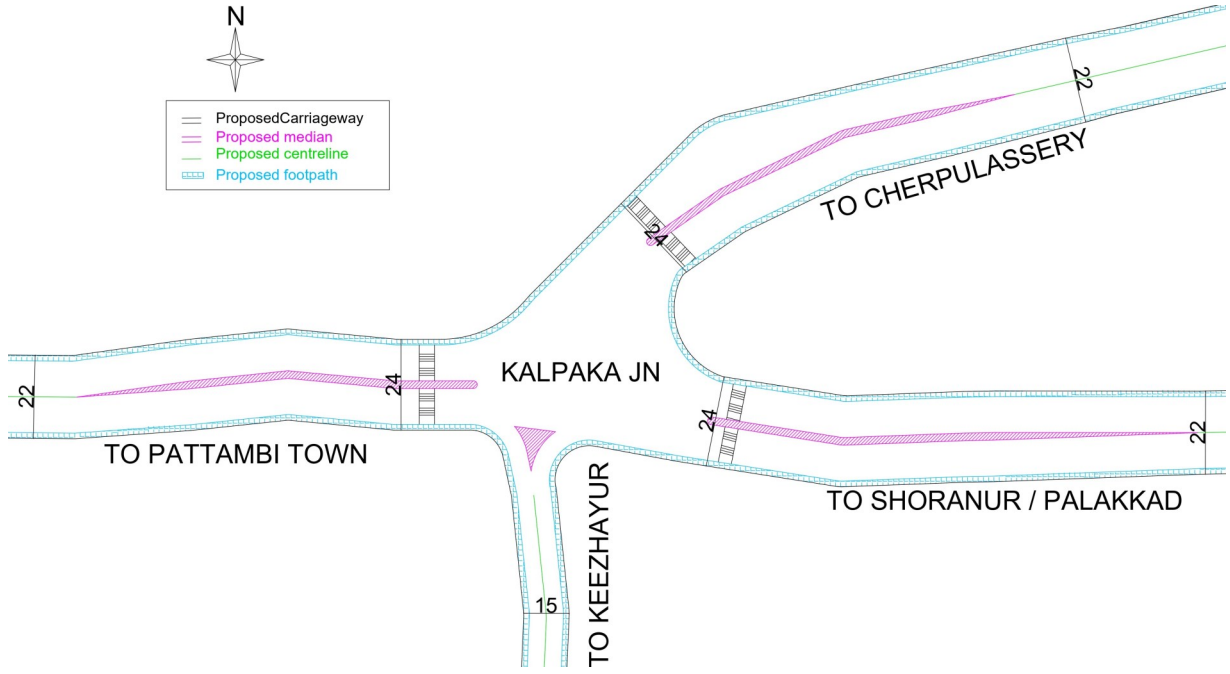


Fig. 31.8 Junction improvement, Kalpaka

31.3.4. Jn-4 Kalpaka Junction

This junction is located on Shoranur –Perinthalmanna road from where road to Cherpulassery deviates. There are no channelizers to segregate traffic movements at present and traffic signal is at place for the same. Considering the same and also the magnitude of problems observed at the junction, all the arms of the junction are proposed for four lane divided carriageway except the road towards Keezhayur. A proper design of junction is essential which may involve substantial land acquisition for which detailed topographic survey need to be carried out. Only a distance of 100m from the junction is included in the junction design.

When the new bridge is in place, access to the existing bridge will not be required, and hence the Pattambi junction near to the existing bridge, upgrade can not be included.

31.4.PUBLIC TRANSPORT SYSTEM

31.4.1 Proposed Bus Routes

Major travel corridors of Pattambi are found to have adequate bus services. As per the road network development proposed for Pattambi town, a concentric pattern of road network is visualized for the town. Some portions of the ring road as well as the radial roads corridors lack adequate public transport services in view of limitation of road width. With increased road width as proposed, some of the corridors lacking bus transport services could be provided with public transport services which are listed below;

Pattambi to Kozhikattiri

Pattambi to Poovakkode via Kodalur

Pattambi to Puthiya Gate to Kozhikattiri

Pattambi Bypass

With the introduction of bus routes in the above corridors, every nook and corner of Pattambi town will have public transport coverage.

31.4.2 Proposed Public Transport Infrastructure

Public transport infrastructure consists of facilities like bus stops, terminals, depots parking, IPT modes, pedestrian walkways and their individual facilities. The bus terminals, bus depots and bus stops are the contact points between the public transport user and the bus system. The following

development measures will be required to augment public transport infrastructure in Pattambi town.

31.4.3 Bus Stand and Bus bay

Due to the land constraints of existing bus stand and its very limited scope for further expansion, a new bus stand is necessary to cater the future service population of the town.

The siting criteria for a new bus stand suits to the land located along the Shoranur-Perinthalmanna road. The available vacant space near to the existing fish market at Sankaramangalam is most suggested for this.



Fig. 31.9 Suggested layout of proposed Bus stand

Municipality may take initiation to accomplish this project through suitable means in the coming years. The existing bus stand may be allowed to continue for handle buses to Pallipuram, Thrithala, Arangotukara, Pallam, and Muthuthala. The suggested layout of proposed bus stand ancillary uses is shown in Fig. 31.9.

31.4.4 Parking facilities

There is no planned parking space available within town. Most of the parking activities of Pattambi town are concentrated around the area between Pattambi bus stand and Railway station.

A Multi level parking is suggested on 0.1559 Ha of land in survey No 32/B1B opposite to the Existing Bus stand. The location is very near to the Railway station, hence the location is very ideal for Railway Passengers also.

Off street parking is suggested on 1.06072 Hectares of land in Survey No. 23/A3,A4,A5,A6,A8,A9, 140/2,3,4,5,6,7,11 in between proposed road (Rd-9) and Railway line. Land is situated at Nambram (Ward 19). With the limitation of on street parking hampering the free flow of traffic, it is proposed to develop off street parking facilities at the open space below the railway line near the Bus station. It could also accommodate taxis and autos also. With the development of parking facilities, parking on the road need to be banned or heavily priced.

If the bus stand at Sankaramangalam is implemented as suggested in the image below (Fig. 31.9), spacious parking facility will also be available for the public. The open auditorium proposed to be constructed near Lement College road has been designed in such a way that the parking facility can be conveniently converted. Details of the above projects are available in the following chapters. Pay and park facilities are also to be encouraged utilizing available vacant lands owned by Private persons with their participation

Rental Parking Space

The municipality have a plan to provide a convenient parking under the town center zone and commercial with private partnership. The municipality invite application from the plot owners who wish to facilitate their plot to parking yard. Site suitability ensured by municipality. A mobile app will be developed with the help of K-Disc, which connect the parking lots with vehicle owner.

The app would provide available parking space, location, other facilities such as clock room etc. and Online payment. The parking should be developed by the owner at his own expense. The owner of the lot should ensure the responsibility of the vehicle and the safety of the place during the parking time. The parking time should be allowed based on the beginning and ending of parking time. There would be only a maximal duration of one week allocated for vehicles on parking yard by accepting advance payment.

31.4.5 IPT modes

IPT modes consist of auto-rickshaws and taxis. There are 11 auto stands and six taxi stands located with in the Pattambi town. Some of these auto stands especially near Bus Station and Mele Pattambi have numerous vehicles parked on it without making any trips for a longer duration. Hence, it is suggested that the number of parking spaces be limited to five in the auto stands and other vehicles shall be parked elsewhere and make it to the stand on demand. Prepaid counters can be operated in the stands close to the Bus Station, with the advantages of minimum number of vehicles parked

and better fare rate for the users. With the reduction in number of parked vehicles, more space would be available for vehicle movement as well as pedestrians. The allotted parking spaces like Parking yard near Nambram road and space for Open Auditorium near to Lement College road may be used for this purpose. If the bus stand at Sankaramangalam comes true, parking facilies may also be provided for autorickshaws and taxis, apart from this and in the additional places of the existing bus stand.

31.4.6 Non-motorized traffic and pedestrian infrastructure

As soon as the proposed new bridge comes into existence, the old bridge and the road leading to it will be opened for non-motorized traffic. A 12m wide disabled friendly walkway has been proposed from junction near to proposed bridge (Jn-3) to the existing bus stand. Considering the heavy volume of pedestrians from railway station to bus stand a sky walk facility is also proposed to connect the bus stand, proposed multi level parking plaza and railway platform and Taluk Hospital premises. All these facilities are designed as disabled friendly.

31.5. BRIDGES

Two bridges and the approach roads are proposed. One being new bridge across the Bharathapuzha of which its initial steps were taken by KRFB. Another is a Railway Over Bridge from the proposed road namely Kuttipuram-Shoranur (Outer ring) road (Rd-9) to the road namely Manjalungal-Lovely corner-Nambram road (Rd-10).

32

Sectoral Proposals

32. SECTORAL PROPOSALS

Based on the primary and secondary data collected, local level analysis, spatial analysis of the data and suggestions from stakeholder consultations the following projects and proposals are made in various sectors. Details of all projects and proposals including activities and agencies to be involved, proposals and prioritization of projects are given in the subsequent tables in this chapter. The Municipality can include these proposals in its annual plan or five year plan for implementation.

32.1 TRADE AND COMMERCE

Pattambi has high potential for commercial developments and enhancements. The proposals for trade and commerce are intended for satisfying increasing needs of inhabitants of the municipality. Commercial developments can not only support residents of the municipality but also attract neighbouring population.

Melepattambi junction is the important commercial centre of the Municipality area. It is a major centre of wholesale and retail trade. Other main commercial nodes of the municipality are Pattambi Town Junction and Civil station junction. In Pattambi town, 1.89% of the total municipal area is under commercial land use which comprises 30 Hectares.

Commercial activities are mainly seen as ribbon development along the sides of Pattambi - Palakkad road and Pattambi - Perinthalmanna Road. Lack of space for efficient circulation is the main problem faced by town.

Development of wholesale market

The existing market does not have sufficient land to meet the needs of the town. A suitable vacant land to develop such a new market with private participation is located adjacent to the modern fish market in the Town Center zone. A weekly market and truck terminal can also be developed here similarly.

Development of Commercial Nodes with Modern Marketing Facilities,

CBD area is highly congested especially due to the presence of public and commercial establishments. Since People's day-to-day needs are met with trips to the local, neighborhood level shopping centers, five commercial nodes are proposed at Sankaramangalam, Vallur, Kodalur, Lovely corner and Nambram. These nodes are intended to be developed with private investment (Refer Fig.27.7 and Fig.30.2).

Development of efficient circulation space

Traffic congestion is a very big problem that causes not only jammed streets and delays but also pollution in the major commercial nodes. Strict law enforcement and

zoning can reduce this congestion to some extent. Introduction of well paved foot paths provide undisturbed walking ways for pedestrians. On street parking on congested roads should be strictly prohibited.

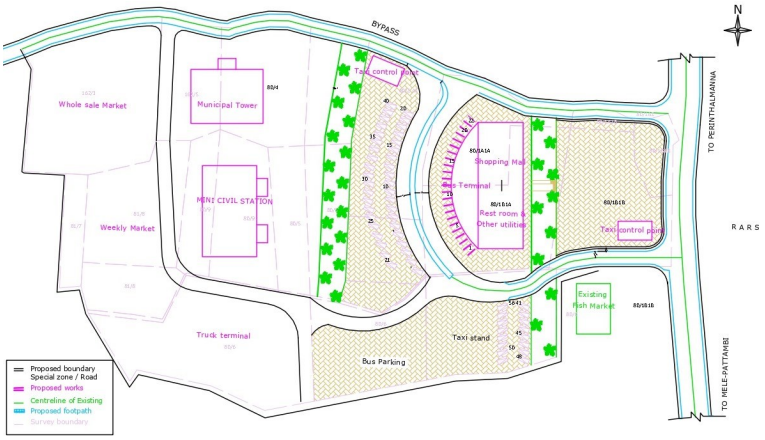


Fig.32.1 An example Layout for Wholesale, weekly market, and truck terminal

Street vendors/ informal sectors

Street vending as an occupation has existed for hundreds of years and is considered a cornerstone of many towns historical and cultural heritage. Street vendors may have fixed stalls such as kiosks, semi-fixed stalls like folding tables. They may operate from crates, collapsible stands, or wheeled pushcarts that are moved and stored overnight.

When the new bridge is completed across the Bharathapuzha, the old bridge and the approach road can be opened for street vendors. Similarly, in the 'Proposed road network plan' envisages to construct a new stretch in the SH to avoid the horizontal curve near fish market. When the new road stretch comes into existence, a part of the old road can be converted into street vending zone. This area will be quite busy once the new bus stand is operational, thus it has the potential to develop into a successful commercial street in the future. Fig. 32.2 and 32.3 shows the proposed vending space as such respectively.

Street vending will be prohibited within the periphery of 250 meters from the junctions which are proposed to be improved and in the commercial zones. But is allowable with restrictions in Town center zone.

Vendors should have access to facilities like solid waste disposal, clean public restrooms, aesthetically designed attractive mobile stalls and push carts, access to electricity and drinking water and protective covers to shield themselves and their goods from the sun, rain, dust, and other elements.

32.2 INDUSTRY

Pattambi town is backward in industrial base. The municipality contains a lot of small scale industrial units but no major or medium scaled industries . 45.51 Ha of land in the wards of Randam Mile and Kalapara have been designated as an industrial zone in order to make Pattambi an industrial friendly town. Industrialists can then be invited after the DIC has built all the necessary infrastructure on 10 acres of land that belongs



Fig.32.2 Old bridge proposed for Street vending

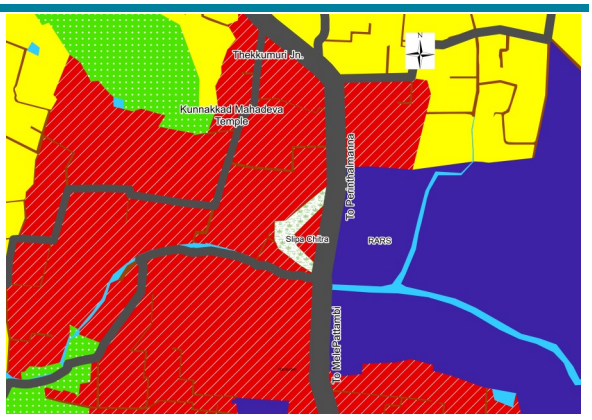


Fig.32.3 Existing road stretch for Street vending

to this zone. The remaining land can be developed later as a potential economic zone with involvement from the private sector. The location of the land is shown in Fig. 32.4.

A Mini Industrial Estate is functioning at Pattambi under the control of the Small Industries Development Corporation (SIDCO). The sheds in these MIEs are allotted to micro enterprises to promote investment in these categories and thus to ensure the industrial development.

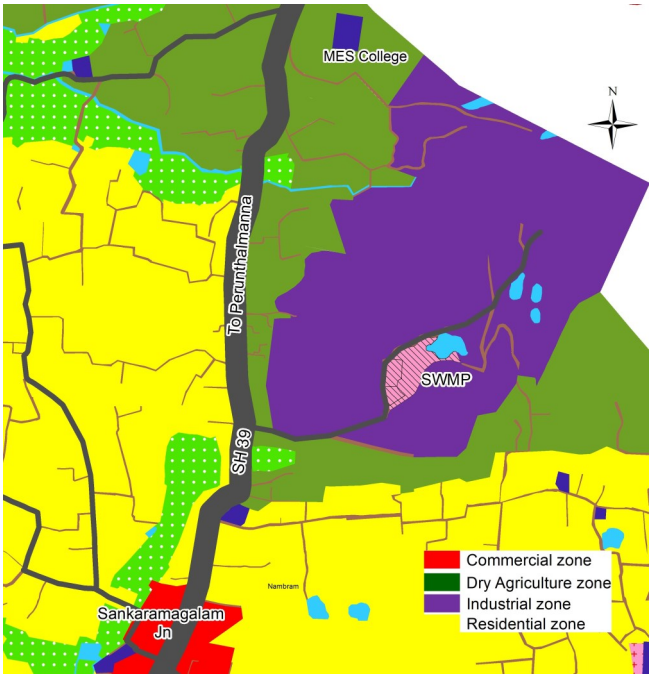


Fig. 32.4 Location of Industrial zone

Small Scale Industrial Units Promotion

The small-scale industrial sector plays vital role in the growth of the country. SSI Sector in India creates largest employment opportunities for the Indian populace, next only to agriculture. Hence, growth of SSI is essential in Pattambi. Master plan is intended to ensure women's empowerment and presence in this sector. When the infrastructure facility development and shifting of Taluk hospital is completed, then one or two existing buildings can be converted into a Working women hostel and community kitchen. This facility can serve as a training center for women interested in various forms of entrepreneurship. The creation of small-scale manufacturing units by women can help increase the involvement rate of women in the workforce while also preventing increased unemployment to some extent. By its less capital intensive and high labour absorption nature, SSI sector has made significant contributions to employment generation.

32.3 TOURISM AND HERITAGE

In the municipality, there is relatively little potential for tourism. The two annual festivities in Pattambi are Pattambi nercha at the Pattambi mosque and Sivarathri celebration at the Kaithali Siva Temple.

Kaithali Siva Temple

This ancient Thali, known also as Kaithali is located in a lane of the same name adjoining Alex theatre in the heart of Pattambi town, in Mele Pattambi, quite close to the junction of Pattambi - Palghat and Pattambi - Perinthalmanna road. The temple is a protected monument under the Archaeological Survey of India. It is carved out in a single mammoth rectangular granite stone and is situated in a busy area of Pattambi town.

River front tourism

River front tourism development along the banks of Bharathapuzha is proposed which includes setting up of walk ways and cycle tracks. This also includes setting up of conference center and flexible space accommodating gatherings, eat street, shops, entertainment establishments and other uses that encourage pedestrian activity. Beautification works will attract more tourists towards the river. During festival season, the sand bed of the river and the footpaths developed along the river can be used as exhibition venues. Therefore, it is proposed to construct a new NMT (1st phase) with a width of 12 m to reach the existing bridge, starting from Nambram road and going behind Guruvayur Temple (Refer Fig. 32.2 and 32.5). A separate fee can be charged for providing access to commercial establishments from this Lane. All other infrastructure facilities for beautification can be done with Private Participation.



Kaithali Siva Temple

Presently, there is no cohesive pedestrian network within the town, and there are many barriers to pedestrian movement. Paths often end abruptly, and entry points are not clear. Direct pedestrian access from the town centre to the riverfront with clear signage is also necessary. It has to improve both visual and physical connections between the town centre and the riverfront and upgrade of the riverfront to improve visitor experiences. Hence, to make the situa-



Bharathapuzha

tion better, It is proposed to construct another NMT (2nd Phase) from the existing bridge to the bus stand along the river bank (Refer Fig. 32.2 and 32.5). An escalator is also proposed at current bus stand towards the Sky walk where users can cross the adjacent road to access the proposed Multilevel Parking. As soon as Railways approves, the projected skyway can be extended up to Taluk Hospital. By constructing this facility, Pattambi's central town, which is prone to stagnation due to space limitations, can be given a fresh start. Fig. 32.6 shows its layout.



Fig. 32.5 Location of Proposed NMT

Tourism (Pilgrimage) Circuit

It can be relied upon Pilgrimage and health tourism for the growth of domestic tourism of Pattambi town. With the help of KSRTC, pilgrimage centres can be connected in order to take advantage of the potential for tourism in the area. List of potential tourism destinations is given in table 32.1 below. The "Grama Vandi" programme of KSRTC can be combined with locations close to Pattambi Town, and the tour operation can be conducted there. All infrastructure facilities, such as restrooms and refreshment will be provided by the municipality.

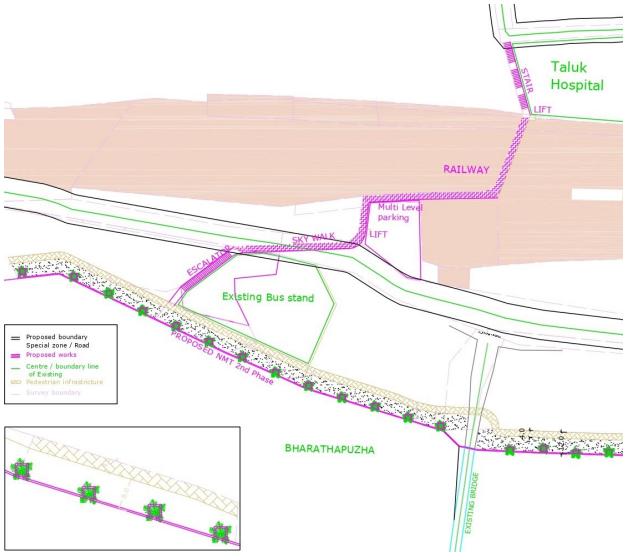


Fig. 32.6 Layout for Proposed NMT

Develop infrastructure for tourism promotion by providing economy class

lodging facilities including home stays using private partnership. So that they can spent one day in the town and visit tourism spots around the town and also ensure economic growth of service providers.

Table 32.1 List of tourism spots near Pattambi town

Sl No	Tourist Place	Distance from Pattambi Town (km)	Name of Local Body
1	Ramagiri Kotta	5	Ongallur
2	Rayiranellur Mala	13	Thiruvegapuram
3	Muthassiyarkavu	7	Muthuthala
4	Thirumittakkode Temple	8	Thirumittakode
5	Njagattiri Temple	3	Thrithala
6	Andaladi Mana	5	Ongallur
7	Kattil Madom	7	Thrithala
8	Keraleeya Ayurveda Samajam	14	Shoranur Municipality
9	Vaidya Madam	8	Thrithala
10	Punnasseri Illam	2	Muthuthala
11	Thiruvegapuram Mahadeva Temple	16	Thiruvegapuram

Verdant street

By protecting paddy fields and temple ponds, this project aims to boost tourism. It is heartwarming to see the rice fields, banyan trees, temple ponds, and temples. Hence it is proposed to construct green walkway, taking care to preserve the surrounding landscape with scenery. A 4.5 m wide, lush street is planned to be built to link the Vallur Siva, Bhagavathi, and Vishnu temples. For morning walks and exercise, there is no other option in the northern part of the town. So, it will be a relief in this area if this project is implemented. Two-wheelers may also be allowed in an emergency situation.

32.4 AGRICULTURE AND ALLIED SECTORS

In Pattambi Town agriculture constitute nearly 44.06% of the total Municipal area. The major agricultural crop is paddy which covers about 13.82% of the total land area. Other than paddy, coconut, plantain, pepper, rubber etc. are also cultivated. The agriculture use is the second major land use. Agriculture and allied industries, including

animal husbandry and fisheries, are vital to the town's development.

32.4.1 Agriculture

Proposals for Paddy cultivation

Paddy cultivation needs to be promoted for maintaining the environmental balance. Active paddy cultivation is to be brought back to all paddy fields which are now kept uncultivated.



Vallur temple premises

Shortage of labourers is also a major problem in paddy cultivation. Fragmentation of land, small scale farming etc. result in less profit and methods like group farming and collective farming are the remedial measures for it. Cultivation of rice varieties like Basmati rice, Njavara rice etc. can be experimented with arrangement for sufficient processing and marketing facilities.

For the benefit of people's health and the environment, organic farming and farmhouse growing methods should be promoted as a matter of policy.

Proposals for Vegetable cultivation

Presence of Regional agriculture Research Station and Central Orchard Farm in Pattambi town are aimed at the development of agriculture sector. Under the leadership of the municipality, it is proposed to organise an exhibition and marketing centre for agricultural crops, seeds, flowers, and ornamental plants every year.

Aquaponics system

Aquaponics system combines conventional aquaculture (raising aquatic animals in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment. Here water from aquaculture system is fed to hydroponic system where the by-products are broken down by nitrogen fixing bacteria into nitrates and nitrites, which are utilized by the plants as nutrients.

In a commercial aquaponics system, an electric pump moves effluent rich water from the fish tank through a solid filter to remove the particles, plants above cannot absorb. The water then provides nutrients for the plants and is cleansed before returning to the fish tank, below where the process repeats.

Poly house cultivation

New farming technologies like poly house farming provides better income in a short–period of time with less labourers. Poly house farming is an alternative new technique in agriculture in India. Poly houses are the green houses, which are using ultraviolet stabilized film. They are much suitable for the cultivation of exotic vegetables. It reduces dependency on rainfall and makes optimum use of land and water resources. Poly house farming can help the farmer generate income around the year growing multiple crops.



Poly house Farming

Precision Farming

Precision farming uses fertigation, an improved method of supplying nutrients through drip system with water soluble fertilizers. Fertigation refers to the application of plant nutrients by dissolving them in irrigation water, particularly with the drip system. The cultivation is done within the poly house so as to prevent the attack of pests. This system ensures higher water and nutrient use efficiency, resource saving and labour time and higher productivity and product quality.

Organic Terrace Farming

Terrace farming can function well in areas where concrete structures over rule natural ground. Bags or pots can be planted with food crops so that common man's daily needs are satisfied with ease. It not only gives some space back to agriculture, but it also helps the grower to get chemical-free fresh vegetables. This will not only save money, but also time and energy spent on several trips to the vegetable market. Then it cools the house, it is also good exercise while tending and watering plants.



Terrace Farming

32.4.2 Irrigation

The major proposals for irrigation sector are listed below

- Proposals for augmenting irrigation facilities include renovation of major ponds side, protection and desilting works of rivulets, proper maintenance of lift irrigation schemes and by provision of standby motors for existing lift irrigation schemes.

- Propose to construct Mini check dams/VCB at feasible locations
- Efficient and cost effective methods like sprinkler irrigation and drip irrigation should be encouraged.

32.4.3 Animal Husbandry

Lack of appropriate slaughtering facilities and unsatisfactory slaughtering techniques may cause unnecessary losses in meat as well as in valuable by-products and may be a major constraint in increasing animal production. Animals are frequently slaughtered in places which are frequently polluted with blood, intestinal contents and dirty effluents, which are not protected against insects, rodents and dogs.

Meat produced in such conditions will quickly deteriorate due to bacterial load and cause food poisoning. Further more, meat quality is adversely affected by careless handling under unsanitary conditions in the meat market and shops. In addition the by-products are not utilized and instead of being an asset they are considered as a nuisance.

The 45.51 Ha land envisaged as aim industrial zone was earlier mentioned, this land is very suitable for a modern slaughterhouse (Refer Fig.32.4). Either Private entrepreneurs can be encouraged or Municipality can be started with private partner ship. Slaughter house are allowed to be constructed with most modern facilities.

The proposed slaughter house must carry most hygienic working procedures, storage and waste disposal. Care should also be taken to ensure proper disposal slaughter wastes. In order to protect the river from slaughter house wastes, a green buffer of 10 m width is provided inside the boundary of proposed site for the slaughter house.

Male calf fattening scheme

Male calf fattening programs are to be taken up by the municipality for assuring nutrition to the male calves and for assuring wholesome meat to the consumers and thereby assuring better returns to the farmers. The scheme aims to increase beef production by providing good quality calf feed at 50% subsidized rate to the male calves of the age 4-6 months for a period of 6 months. The feed for the same has to be sourced locally and the farmers must be assured of getting quality cattle feeds and also for other classes of livestock.

Mini dairy units

Schemes for mini dairy units should be encouraged which will provide milch cattles for selected families in the municipality. Also, the assistance is given for procuring medical kits and good quality fodder. Milking Machines are extensively in demand by various dairy farms across the state.

Portable milking machine systems are provided with single milking machine & double bucket milking machines. Small and Medium Dairy Farms can avail these machines in different patterns and specifications to cater to the varied needs of dairy Industry. These milking machines help in extraction of milk more effectively.

Goat rearing and mini goat breeding units

The domestic goat alternates as a good source of milk, meat, fiber and skin. Goats contribute to the agrarian economy by offering livelihood security to the marginal farmers, including women. The project aims at providing two no's of Malabari goats at subsidized rates to selected families.

Poultry production units

It is proposed to increase the egg production by encouraging poultry farms. Also the egg marketing outlets are to be integrated with agricultural/ vegetable marketing outlets.

Fodder production units

Fodder cultivation should be promoted in a mission mode on a commercial scale to ensure availability to the farmers at affordable cost. Utilization of unutilized land under municipality can be used for fodder production.

Rear yard poultry farming

The backyard poultry project aims at providing units of 8 backyard poultry birds of 2 months of age to farmers. A sale counter for the sale of eggs should also be established. Women entrepreneurs belonging to self – help/ Kudumbasree units can be utilized for rearing of birds and marketing.



Rear yard poultry farming

32.4.4 Fisheries

Ornamental fish culture

Ornamental fish culture is fast emerging as a major branch of aquaculture globally. This sector assumes special significance due to its huge potential in providing employment to the people and as a foreign exchange earner. The low production cost and higher returns with in a very short time, growing demand for fishes both from domestic and international market are the major attractions of this sector when compared to any other sector.

Ornamental fish culture can be started in small scale units where there is availability of quality water. This gives opportunity for women folk for income generation utilizing their spare time. Training in ornamental fish production is given by various central

and state Government agencies.

Inland fish culture

The ponds which are suitable for inland fishing activity need to be renovated and protected. Inland fish production provides significant contribution to animal protein supplies in rural areas of state. Most of the inland production is consumed locally and marketed domestically. The site for a fish farm should be selected with great circum-spection and care, since the site and general arrangement will control the economics of operation.

32.5 WATER SUPPLY

In order to tackle the existing water shortage, it is also proposed to encourage the rain water harvesting arrangements in the municipality. The existing Water treatment plant has a capacity of 2.5 MLD and the two OHSR has 3.5 LL and 1.55 LL located at Unnibrandhankavu and Anthoor Palliyal respectively. An intake well cum pump house is situated near Nila hospital. The infrastructure facilities of the treatment plant is to be upgraded to meet the future water demand of 11.12 MLD. The location of the existing plant can be utilised to upgrade the treatment facility. The Municipality has already identified two sites for the overhead tank at Madhavan Kunnu and at Kizhayur. Fig.32.7 shows the location of OHSR.

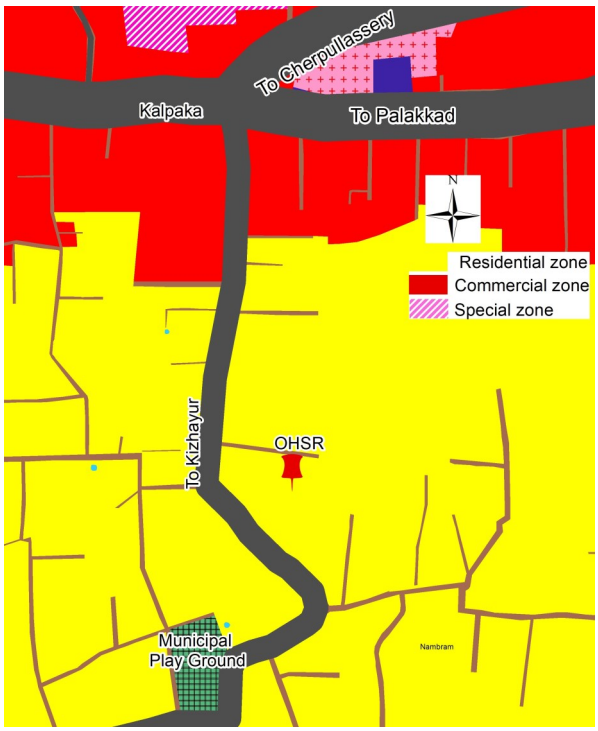


Fig. 32.7 OHSR at Madhavankunnu, Kizhayur

32.6 SANITATION AND SEWERAGE

Development of appropriate and efficient sewage treatment is vital to facilitate balanced and harmonized development. There is no planned sewerage system in Pattambi town. Sewerage network is proposed for the entire town, but it is suggested to cover the CBD area of Municipality in the first phase.

KWA has prepared detailed project report forecasting the population for the year 2052 for liquid waste management for Pattambi Town. A brief description about sewage management plan made by KWA are as follows.

- The report is designed to treat 5.4 MLD of waste water which includes 4.16 KLD of septage.
- Desludging of septage from sources are performed annually using special equipment and septage is carried to the STP for co-treatment after desirable dilution.
- The core area of Pattambi town are divided into 3 zones and the sewerage system consist of pipe and concrete chambers to the nearest manholes. From there it is transported through a network of pipes towards collection wells. Three collection wells are proposed, one in each zones.
- Proposed to lay sewers for about 73km with piped size ranging from 180mm to 600mm inside diameter.
- Manholes are proposed at every 30 m intervals and in every bend and road junctions.
- STP consists of pretreatment for both sewage and septage, biological treatment using MBBR, clarifier, filter, sludge handling units Chlorination etc.

As per the detailed design, approximately one acre of land is required for locating STP components and septage unit and two other plots for collection wells. KWA has identified three suitable sites and the same have been earmarked in this Master Plan also. The locations are shown in Fig. 32.8 and 32.9

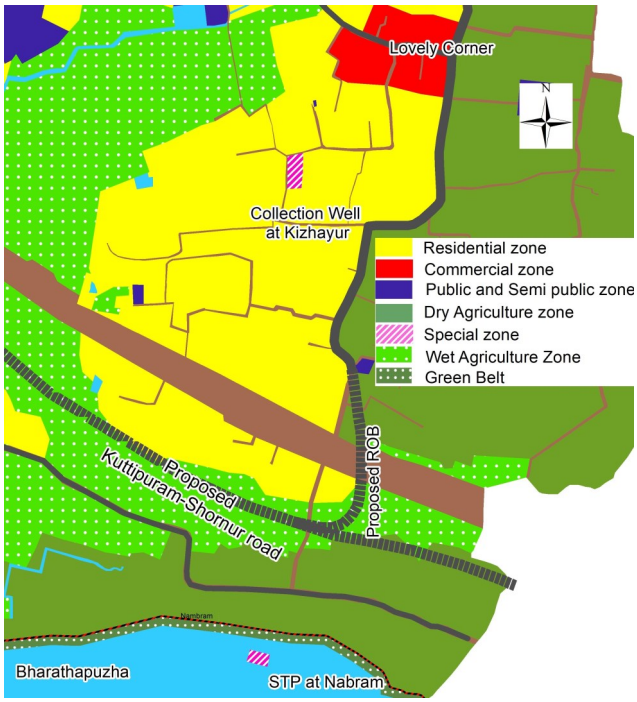


Fig. 32.8 Location of STP at Nambram and collection well at Keezhayur

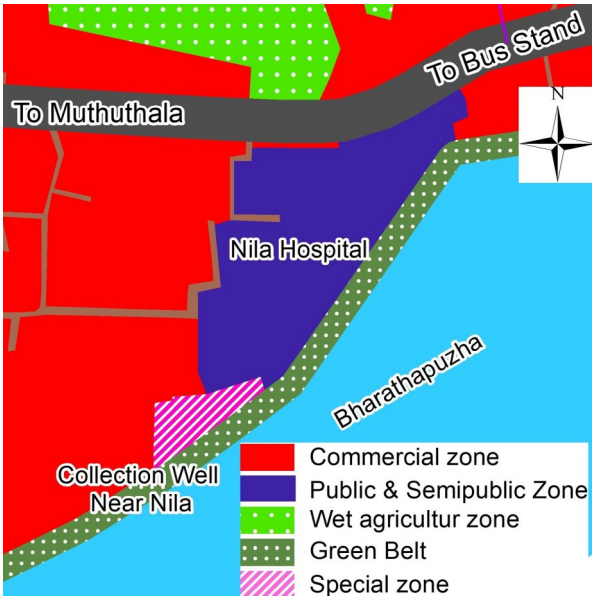


Fig. 32.9 Location of Collection well near Nila Hospital

32.7 DRAINAGE

There is no planned drainage system in Pattambi town. Most of the existing drains needs repair and maintenance. De-silting operation and side protection works must be carried out with immediate effect. The DPR for sewer system was prepared by conducting DGPS survey by KWA. DGPS is an improved autonomous Global Positioning which reduces the effect of correlated errors from two or more receivers only if they are all observing the same satellites. The DGPS data was retrieved in a computer system and subsequently used for hydraulic simulation through existing road network and find out expected routing plan for easy carriage of sewer load towards a common collection point. This data might also be utilized in designing a proper drainage system. At the location where the sewage is supposed to be transported, drainage might also be built at the same level. This safeguards the sewage line and makes it easier for future maintenance because the trenches meet the retaining wall on both sides.

Pervious drainage bed is ideal for ground water recharging. In the case of Kerala, which experiences light summer rains before to the start of the monsoon, pervious beds decrease runoff and the soil receives an instant recharge. In other words, different storm sizes produce varied amounts of runoff, i.e., heavier rain causes greater runoff. In this scenario, rainwater is channeled into collection wells next to the Bharathapuzha, with the overflow flowing into a "Dry Well" that can be diverted to the Bharathapuzha. The pavement of drains, which are intended to treat and delay the water flow in an urban environment, is likewise made of permeable porous blocks.

Dry wells for storm water management is used to drain storm water and recharge ground water supplies. Surface water is transmitted underground through this well, while excess water is discharged to natural drains. The negative effects of storm water runoff on streams and rivers can be lessened by using dry wells. Urban storm water collection keeps runoff out of streams and lakes, where pollution-causing contaminants and habitat-damaging erosion could occur. A dry well that would be built next to the sewage collection well was suggested. Working drawings of Dry well are shown in Fig. 32.10. (for location of such refer 32.7 and 32.8)

The main problem of Pattambi town is that sewage gets mixed with rain water and reaches Bharathapuzha. Implementation of a proper sewage system will solve this problem. The issue of overflow and pluvial floods during the monsoon can be resolved if a drainage system is put in place concurrently.

32.8 SOLID WASTE MANAGEMENT

Existing Solid waste management plant is functioning in Pattambi Town at Sankaramangalam. It is proposed construct a Bio-methanation plant also in the same site having 1.5 TPD. The mixed wastes consisting of market wastes and slaughterhouse

wastes can be fed into this plant. Fig. 32.4 shows the location of solid waste management plant.

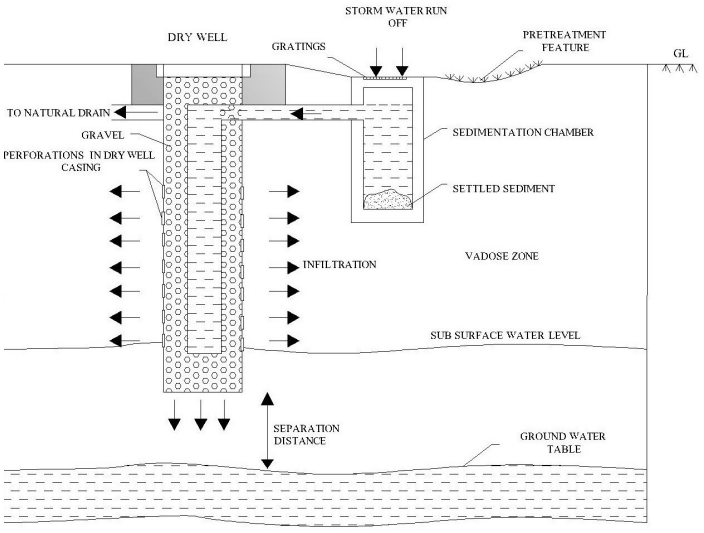


Fig. 32.10 Dry well

Recycling units

Recycling can reduce the consumption of fresh raw materials and prevent the waste of potentially valuable materials, which reduces energy use, air pollution (from incineration), and water pollution (from land filling). As part of the expansion of the industrial sector, recycling facilities for paper, glass, and plastic are being considered.

Decentralized Waste Management Scheme

For the treatment of waste at source itself, decentralized waste management schemes like biogas plants, pipe compost, vermi compost etc. are proposed to treat 0.7 tonne of waste produced in each ward. In the coming years, the Municipality is proposed to construct 10 Thumburmuzhi model bio-waste plant having capacity of 0.15 tones in different locations of the town. The proposed locations are shown in table 32.2. If this is implemented 1.5 TPD of bio-waste treatment will be possible. Also the Municipality intends to increase the capacity of the existing RRF by 1 TPD. If this also implemented the Municipality will be able to treat 7.5 TPD solid waste.

Table 32.2 Location of proposed solid waste management units

SL No.	Location of airobic compost 1 unit of 0.15 TPD	Cost of Construction	Operation and Maintanance cost for 5 years
1	Civil Station, Pattambi	39000	103500
2	Taluk Hospital	39000	103500
3	GMPL School	39000	103500
4	Police station	39000	103500
5	Police station Quarters	39000	103500
6	Sanskrit College	39000	103500
7	GHSS	39000	103500
8	GHS	39000	103500
9	GUPS Keezhayur	39000	103500
10	GLP School Valloor	39000	103500
	Total	**390000**	**1035000**

32.9 ENERGY

Within the municipal town, there are no places without electricity. The need for power will increase due to the growing population, current and planned industrial

facilities, etc., hence the power distribution system must be enlarged to meet this demand. The importance of unconventional energy sources must also be highlighted. Public buildings could have solar panels installed above them, starting a new movement toward energy efficiency. Beautification of street lights is also required for the town.

32.10 EDUCATION

Smart classrooms

We should design adaptable learning environments, or "smart classrooms," to meet the unique requirements of each student, motivated by new methods in teaching and learning that expand on the understanding of the significant influence that school architecture has on how well kids perform in the classroom. Every school if possible should have flexible learning and teaching spaces for groups of various sizes including a resource area, wet area, individual class rooms, a presentation space and an outdoor learning area.

Students benefit from the idea of a "smart classroom" in that it is always simple to comprehend and remember what is visually presented rather to having us read through pages and pages of text.

Incinerators for Girls toilets

Waste disposal is growing to be a major issue as institutions like schools, anganwadis, health centres, etc. proliferate. If adequate comprehensive disposal is not performed, both non-degradable and bio-degradable wastes may prove detrimental to health. In schools specifically, dumping of sanitary cloth and sanitary napkins in girls' toilets is a huge problem. When disposed of in toilets, it interferes with the normal operation of the toilets, and when disposed of in open areas or in rubbish dumps, it poses major health risks. Therefore, it is urgent to address this issue of proper sanitary waste disposal, particularly in terms of developing simple, affordable technology for composite waste disposal in schools.

32.11 HEALTH

Strengthening of Taluk Hospital

According to secondary information gathered, Taluk Hospital currently has 76 beds, 19 nursing staff, and 7 doctors. The Taluk Hospital's staffing levels meet the requirements for serving the Municipality's population. However, it is insufficient when seen as the Taluk headquarters, hence an expansion of this hospital in Pattambi town is very necessary. However, there is no room for additional building at the current site. Consequently, a new location is suggested at a land area of 3.1823 Ha for the hospital

complex at survey no 14/4,16/18A,16/18B,16/9, 17/1, 17/2 and 17/3 of Kodalur desam at Koombankallu. Fig. 32.11 shows the location of site.

32.12 RECREATIONAL FACILITIES

At present there are two municipal playgrounds, Its renovation work is under the consideration of the Municipal council. Near the Panthakaparambu Temple, there is an open area that is primarily used for Temple festivals. These areas are maintained as recreation zones in the master plan because they are frequently used as a play area and gathering spot.

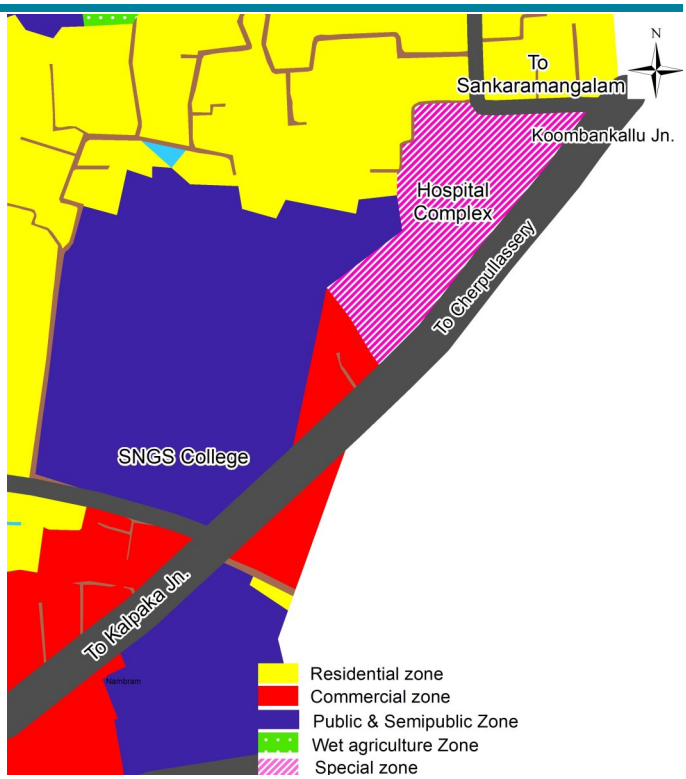


Fig. 32.11 Location of Hospital complex

There is a quarry near Mundanad Colony in Pattambi town which has been abandoned for years. There is a possibility of converting it into an amusement park. Fig 32.12 shows the recreation zone near Mundenad colony. The play ground near Sankaramangalam-Parakkad road is also seen to be developed in private partnership. Hence these two places are also brought under recreation zone.

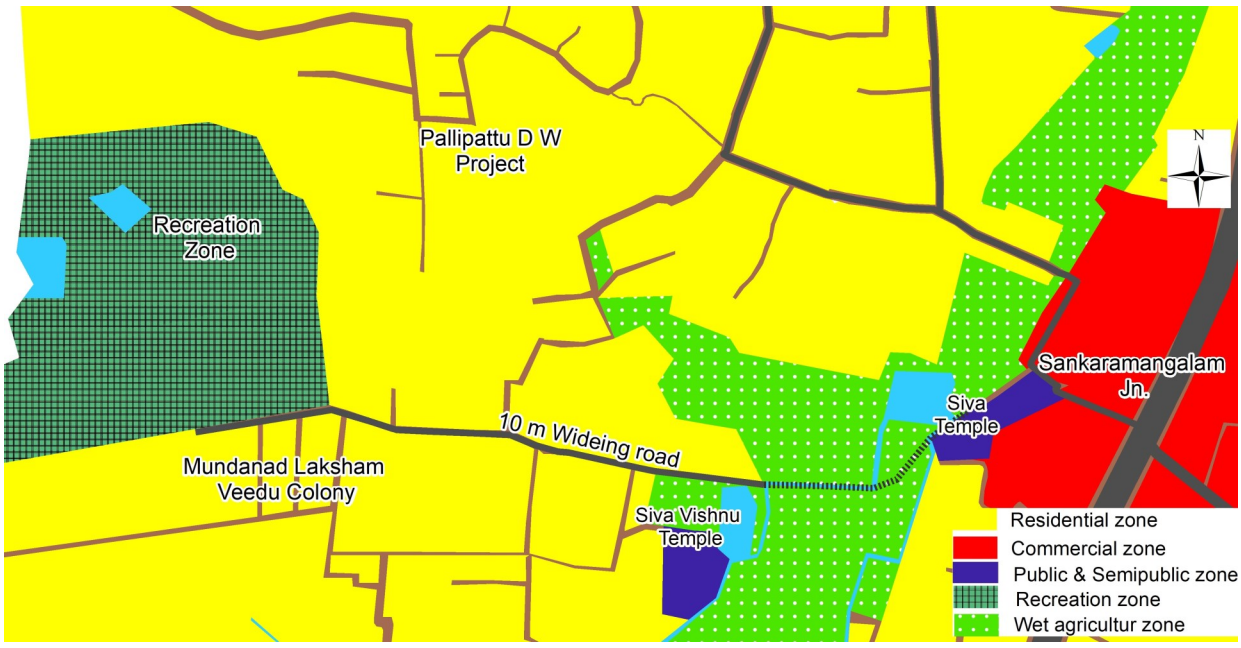


Fig. 32.12 Location of where the quarry is intended to be reclaimed for recreation

River front Pedestrian Path and Bicycle Tracks for Recreation

In order for locals and visitors to enjoy the river, a 3 m wide road must be constructed adjacent to the green belt. It is suggested that a winding route follow as closely as possible to the banks of the river. While getting their daily workout, evening and morning walkers can enjoy the picturesque grandeur of the river. It is proposed to provide bike lanes and footpaths.

Aquatic Complex

There is no athletic or sports training center in Pattambi Taluk. Therefore it is proposed to construct a modern Aquatic complex in Pattambi town. Fig. 32.13 shows the location of 0.8622 ha of land in Nethirimangalam desam in survey no. 5/6, 5/7B, 5/8.

Open Auditorium

There is no public platform in the town for social gathering, venue for arts and cultural fest and speeches of political parties. To over come this situation, a plan is being proposed as an open auditorium on a land of 0.4902 Ha in Nethirimangalam desam under survey no 5/3, 5/4, 5/7A. Fig. 32.13 shows the location of proposed open auditorium.

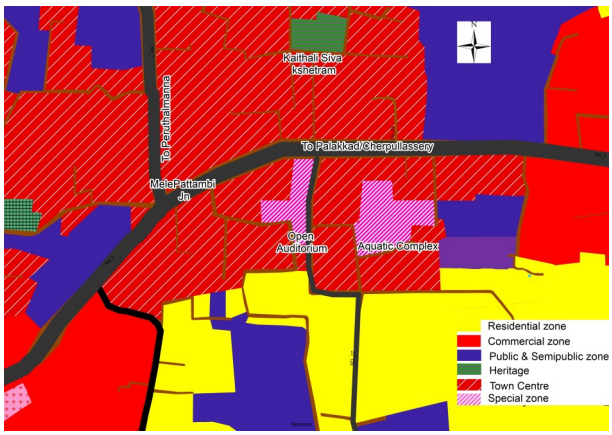


Fig. 32.13 Open Auditorium and Aquatic complex

Proposed Park and open space

There is no organized park for children, to address this issue, 2.0781 Ha of land between Nambram road and railway line is proposed as park and open space. The said place is situated at the following survey numbers in Nethirimangalam desam 23/A1, 23/A2, 23/A3, 23/A4A, 23/A4B, 23/A5, 23/A6, 23/A7, 23/A8, 23/A9, 23/A11, 140/2, 140/3, 140/4, 140/5, 140/6, 140/7, 140/11. When the new road proposed to be constructed by KRFB comes into existence, the said land will be divided into two. One part of the said land intended for parking of visitor's vehicles coming to the recreation place. Location of this special zone shown in Fig. 32.14.

Pilgrims from Tamil Nadu, Karnataka and other states are passing through Pattambi town to visit Guruvayoor and Sabarimala temples. Pattambi town can act as intermediate resting center for pilgrims from north Kerala also. The Municipal council also intends to provide refreshment facilities like inn for pilgrims at this place.

Pilgrim-Tourism Circuit

Pattambi have a unique pilgrim-tourism circuit connecting temples in and around the town. Therefore the scheme like 'Grama Vandi' of KSRTC can be combined with tourism potential places near Pattambi town. The pilgrim-tourism circuit connecting temples in and around the town which are listed in table 32.1.

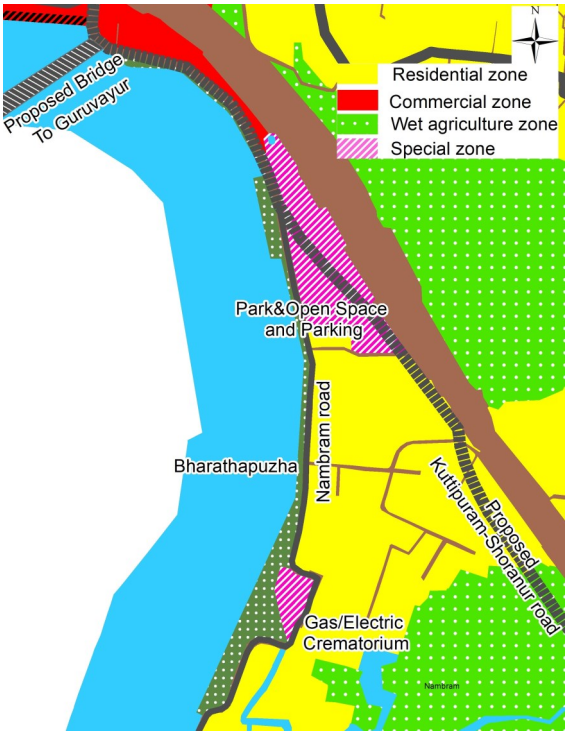


Fig. 32.14 Location of Park & open space, Parking and Gas / Electrical crematorium

32.13 OTHER CIVIC AMENITIES

The essential necessities of public life had traditionally been provided by municipal organisations. They carried out a number of regulatory tasks pertaining to building construction, public health areas including dining establishments, slaughterhouses, and tanneries, etc.

Revenue Tower and Municipal Tower

In order to bring all public services under one roof, municipal tower and revenue tower are proposed in land owned by the municipality adjacent to the existing fish market along Shoranur- Perinthalmanna road that comes under the town center zone. Adjacent privately owned lands can also become part of this land in the future, hence an integrated development is possible in this area. The layout is shown in Fig. 32.1.

Bus terminal, Market complex and Truck Parking

Up coming public facilities and availability of land in this area will create more development potential demanding for better transportation facilities. Locational constraints in the existing core area due to river and railway line and the location of existing bus stand adjacent to the river which hinders its further expansion also adds on to this demand. This situation necessitates siting of a new bus terminal with sufficient parking facilities. If this is proposed in a portion of the aforementioned land, it will also enhance the accessibility to envisaged public offices in this locality. Space for providing facilities for a weekly market and managing freight services may also be accommodated here. A model layout and location of the property are shown in Fig. 32.1 and 32.3, respectively.

Town Hall

Town hall is also proposed which can be used for major functions, social gather-

ings, and small scale cultural activities. A food court and amphitheatre for cultural events can be arranged in the permanent exhibition centre that can be implemented here. In survey nos. 23/1A and 25/22 of Kodalur desam in Melepattambi ward, a total of 1.4303 Hectares are planned to be covered. Fig. 32.15 shows the location of Town hall. An ample parking and a well planned open space are also proposed here.

Gas/Electrical Crematorium

It is proposed to construct a gas/electrical crematorium in survey number 64/14,4C,5B,5C and 65/1 of Kizhayur desam at Nambram (Ward - 19)with an extent of 0.3162 Hectare in existing cremation ground owned by Municipality. Fig. 32.14 shows the location of proposed gas / electrical Crematorium.

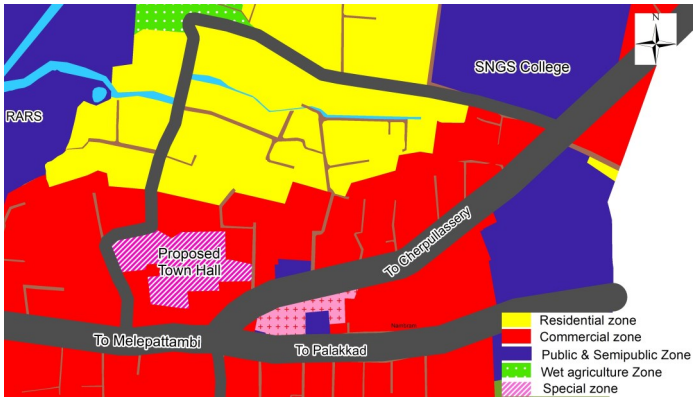


Fig. 32.15 Location of proposed Town hall

Fire station

At present, the fire station is functioning in a rented building. Steps are being taken to transfer over 20 cents of land owned by the municipality to the fire and rescue department. But this land is not sufficient for accommodating the office, rest rooms for employees, a parade ground, and parking for the department vehicles. In this situation, a portion of land (50 cents) set aside for the Taluk hospital may be used for the development of fire station as soon as it becomes available. Fig. 32.16 shows the location of proposed Fire station.

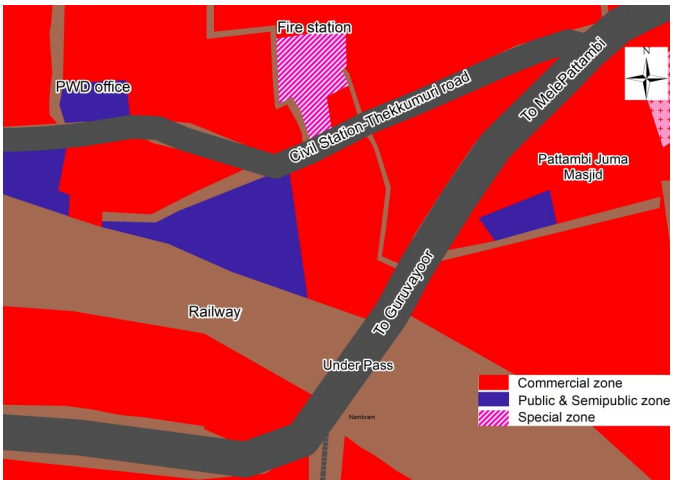


Fig. 32.16 Location of Fire station

Taluk Referral Library

Although there are five libraries in the town, it lacks a referral library as a Taluk head quarter. When the proposed Municipal tower is completed, then the existing municipal office can be converted into a Taluk referral library.

32.14 ENVIRONMENT AND DISASTER PREPAREDNESS

Environment can be the most peaceful and calm place and at the same time it can be the most deadly. Natural disasters occur when the Mother Nature can no longer bear the pressure that we are putting on her. Environment protection has be-

come imperative and an urgent requirement as against the over-exploitation of national resources in the name of development and as a result of desired replenishment of all the natural resources.

A proper legislative and institutional framework must be evolved for the protection of such areas which are endangered. Consistent with the emphasis on conservation of bio-diversity, a time-bound program of the flora and fauna of the regions of our town must be formulated. The various environmental regulatory agencies must be re-organized to make them self-supportive.

The various environmental programs such as river cleaning projects must also be so designed as to become inherently viable. There is a great need to motivate the industries through incentives to be responsive to environmental protection measures and thereby cooperate with the regulatory agencies in their endeavor to implement environmental safe-guards.

Environment education and awareness must be accorded top priority. The local institutions and the community must be involved in implementing environmental protection programs and bringing about environmental awareness. The following proposals are suggested to save the Bharathapuzha river and other water bodies.

1. Bank protection works.
2. Greening with plantation of evergreen trees to form a green strip of 10 m width.
3. Imposing restriction on illegal Sand mining.
4. Banning of discharge of untreated sewage and solid waste into them.
5. Take measure to check encroachment of its rivulets/canals.
6. De-silting should be carried out periodically.
7. Preparation of action plans for control of water and air pollution.
8. Option of renewable energy sources to be explored for transport.
9. Effective monitoring of water bodies and quality control.
10. Afforestation of catchment area of river.
11. Control of quarry activities in the river basin.
12. Adopt massive in-situ soil and water conservation measures through contour bunds, contour trenches, terracing, etc. in the catchment and check dams and subsurface dams in the river/main tributaries, prevention of conversion/ reclamation of wetlands/agricultural lands.

32.14.1 Suggested Mitigation Measures for Disaster

From the flood experiences of the year 2018 and 2019, and the flood susceptibility maps, show that precaution should be taken in the areas between Bharathapuzha and the railway line. Here, the main zones/uses envisaged are residential, commercial, special zones, Green belt, wet agriculture, and dry agriculture. In each zone, specific disaster management methods are detailed as follows

Residential zone

Nambram area of Pattambi town has experienced flooding in residential areas and there is a possibility of recurrence in this area in future. But it is not possible to say that this region is completely uninhabitable. Flooding lasts for only three to four days in this area . Nambram is an agricultural predominant area, as well as good residential area. Therefore, 15.58 Ha of flood prone land is designated for residential use. As per the planned population density, the maximum population that can be accommodated in this place is 1020 persons. As a precautionary measure, proposed town hall, is planned to rehabilitate the affected population (a maximum of 3,000) for four to five days.

Along with that, buildings are to be constructed according to disaster prevention guidelines .Type of buildings as shown in Fig. 32.17 can be adopted. Built form regulations are also detailed in Chapter 33, 'Zoning Regulation'.

Commercial zone

As per study, the area between Nila Hospital, Railway and underpass is understood to be flood prone. In its history till date, this area has been affected by floods only for a maximum of four days. Hence, commercial use may be allowed to continue on this land, but new construction in this area need to follow disaster mitigation measures.

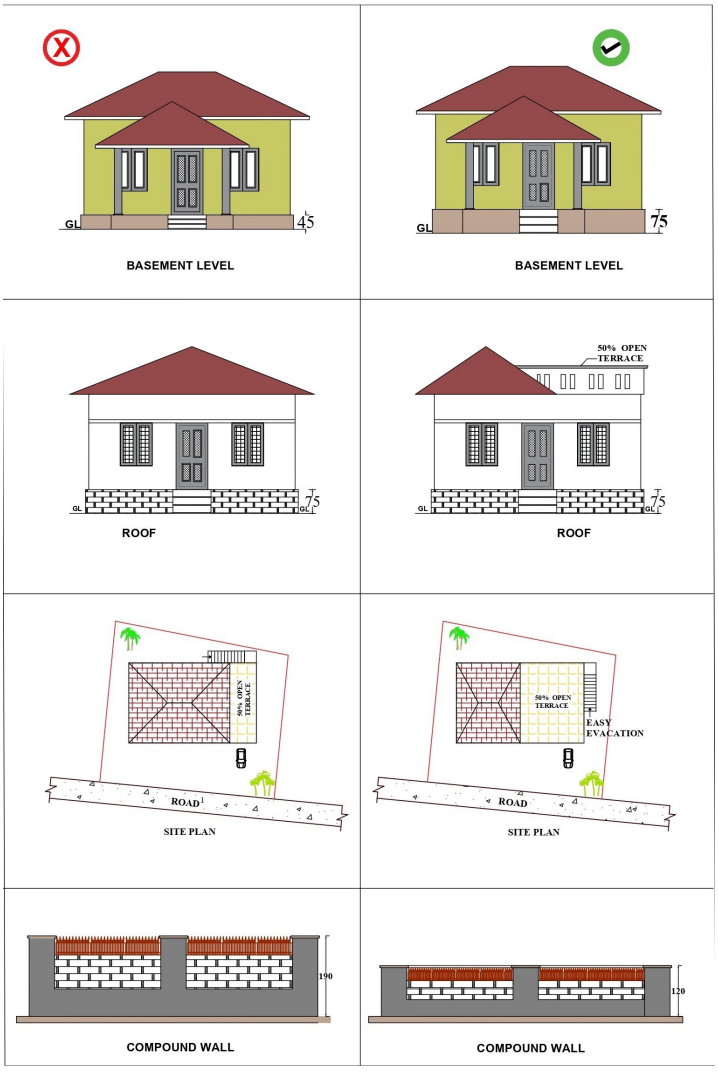


Fig. 32.17 Suggested construction models in Flood prone region

In this area, where commercial establishments are located, goods have been damaged thereby financial losses occurred during flood. To solve this issue , the municipality aims to ensure sufficient storage facilities with private participation. Making people aware of available public/ private storage spaces, the municipality will come up with a plan in future for making a secure storage place for goods and merchandise.

The municipality is developing a mobile app with the help of K-Disc. The app will provide correct information about availability of storage space its area and location, the items that can be stored .The customer can avail this facility on rented basis through the app. The service provider shall ensure the security of goods and premises. This would be highly beneficial to the entrepreneurs. This scheme would also assist in safeguarding commodities during floods in future, customers can give ratings and reviews for the rental space through the mobile app . Fig. 30.18 shows the commercial and residential zones coming in the flood prone area of Pattambi Town .

Special zones in Flood prone region

The proposed land use is designed to be more compatible with flooding. Roads play an important role in flood disaster response. In developing roads, one priority must be the roads that connect to designated emergency shelters. In making a road development plan , the road network should be designed in such a way that it is possible for humans (especially women, children, and disabled people) and livestock to reach the safe place in a short distance. Road development should be part of Disaster Risk Management planning. Hence a safe evacuation route is proposed and shown in Fig. 32.19. Low-lying roads are at risk of flooding which blocks possible escape routes. In Pattambi, bridge crossing Bharathapuzha and approach road to bridge are presently low lying. The proposed new bridge and approach roads by KRFB are designed to be elevated above flood level. The new bridge and the approach road leads to Mele-Pattambi through the under pass, from where people can move to all directions.

Special zones (STPs, Collection tanks, Crematorium, Park and Parking space, NMT) in flood-prone areas need to take precautionary measures during its design and preliminary elements area discussed below.

STPs and collection wells

The proposed collection wells and STPs are located within the flooded region adjacent to the river. Those were proposed by KWA after conducting scientific study. Design of those are to be done providing sufficient side protection works with height above high flood level .

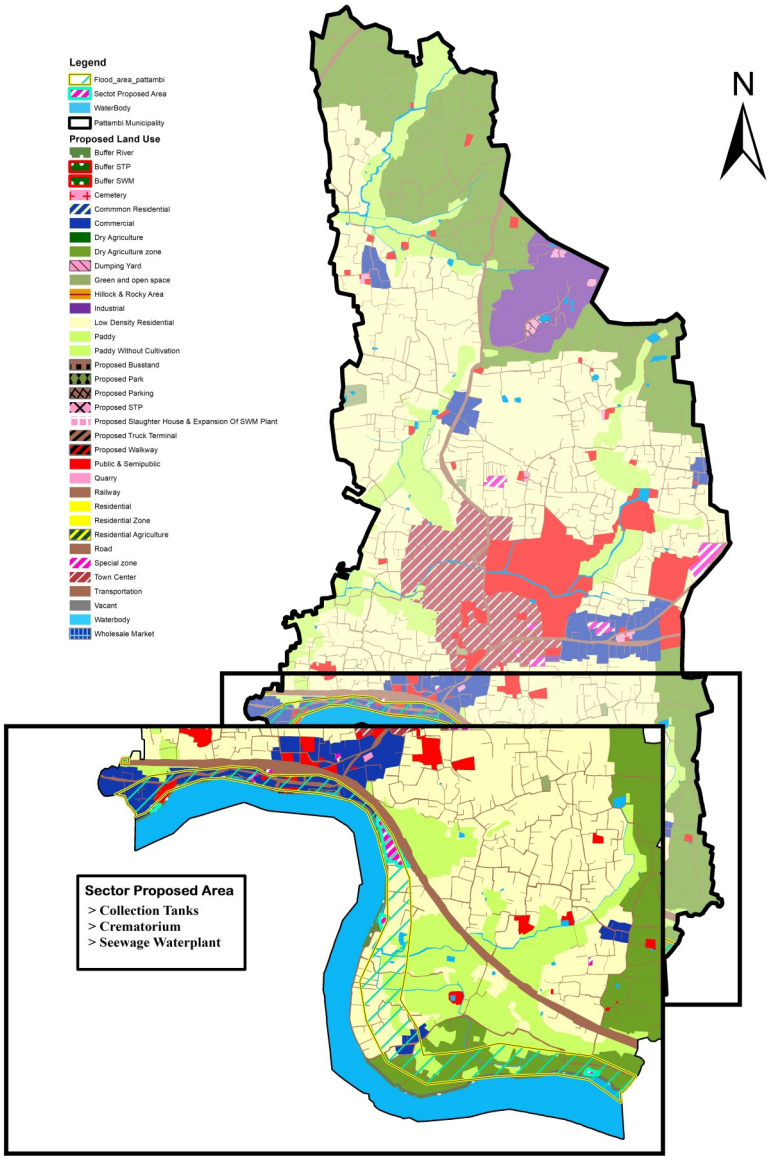


Fig. 32.18 Proposed zones in flood prone region

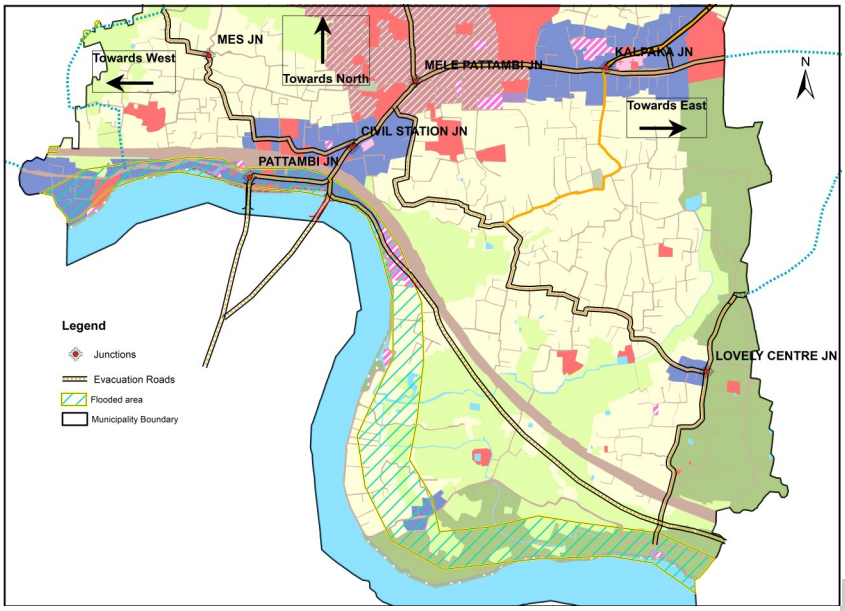


Fig. 32.19 Evacuation route for the forthcoming flood

Cremation

The Crematorium is positioned along the river bank and is prone to flooding. The proposed crematorium can be protected by making appropriate river bank protection work.

Park and Parking space

The proposed land use has allocated space for a park and parking area between the railway line and the river bank. The park and the parking space also associated with the crematorium could be susceptible to flooding. Here, no new construction is being done, which means there will no loss due to flooding.

NMT

NMT proposed along the bank of river, which is situated in flood prone. The elevation of the paving, should be designed above the maximum flood level.

32.15 HOUSING

According to the LIFE Mission survey, the total numbers of landless houseless households are 288 and the total numbers of houseless households are 148 who have own land. Local body should ensure availability and access of the houseless population to permanent shelters including the basic infrastructure facilities like water supply, sanitation, safety and security through varies schemes like LIFE mission, EMS Housing Scheme, Indira Awaas Yojana (IAY), Pradhan Mantri Awas Yojana – Gramin (PMAY-G), Rajiv Awas Yojana (RAY), etc.

Life Towers

For the rehabilitation of landless / houseless, multi storied apartment complexes (Life Towers) may be constructed. 1.269 Ha of land at Nethirimangalam in survey number 104/6,104/7 is suitable for housing projects. Hence it is proposed to use a portion of this land for constructing residential flats for the landless. Fig.32.4 shows the location of LIFE tower

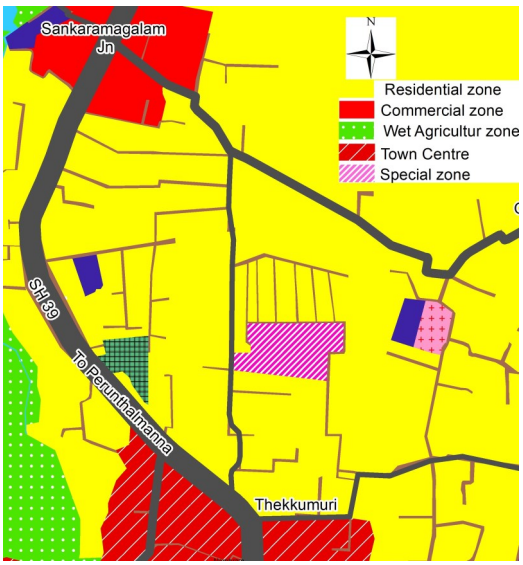


Fig. 32.20 Location map of Proposed Life tower.

Apna Ghar

Better habitation for migrant workers are a concern today. They are constrained to live in unhygienic conditions without proper shelter, sanitation and safe drinking water. Hence, the land measuring not less than 0.20 Ha in the industrial zone is proposed for the Apna Ghar Project. Here, the project

can be developed through suitable means. Fig.32.4 shows the location of Industrial zone suitable for these projects. Following proposals are also suggested.

- Construction of Community night shelters with water supply and sanitary facilities associate with Apna Ghar.
- Ensure proper functioning of labour camps.

She lodge and She working Place

It was mentioned in paragraph 32.2 that when the infrastructure facility development and shifting of Taluk hospital is completed, then one or two existing buildings can be converted into a Working women space and community kitchen. One of this building is also proposed for 'She lodge", Short stay facilities for women. This institution will benefit women who live and work in the city. POCSO Court exists in Pattambi and this institution can also be considered as a short stay for victims who come there. Also food supply to Apna Ghar and food distribution in emergency situation can be done through this institution.

32.16 GOVERNANCE

Municipal e-Governance is a web based application for covering services like Basic citizen services, Revenue earning services, Development services, Efficiency improvement services, Back office improvements and Monitoring. In this modern world, tedious procedure of registration, application and issuing has to be rectified. Major proposals are:

1. Application in e-governance through GIS support in Eight functional service areas of ULBs-registration and issue of birth & death certificate, payment of property tax & utility bills, management of utilities that come under the ULBs, Citizen grievances & suggestions, Building plan approvals, procurement and monitoring of projects, health, accounting system and personal information system.
2. Service Koisks can be provided in each zone.

G3

LIFE Tower
Desam: Netirimangalam
Extent : 1.267 Ha

P1

Hospital Complex,
Desam: Kodalur
Extent :3.194 Ha

P2

Town Hall
Desam: Kodalur
Extent :1.430 Ha

P3

Open Auditorium
Desam:Netirimangalam,
Extent: 0.4902Ha

P4

Aquatic Complex,
Desam: Netirimangalam
Extent : 0.8622Ha

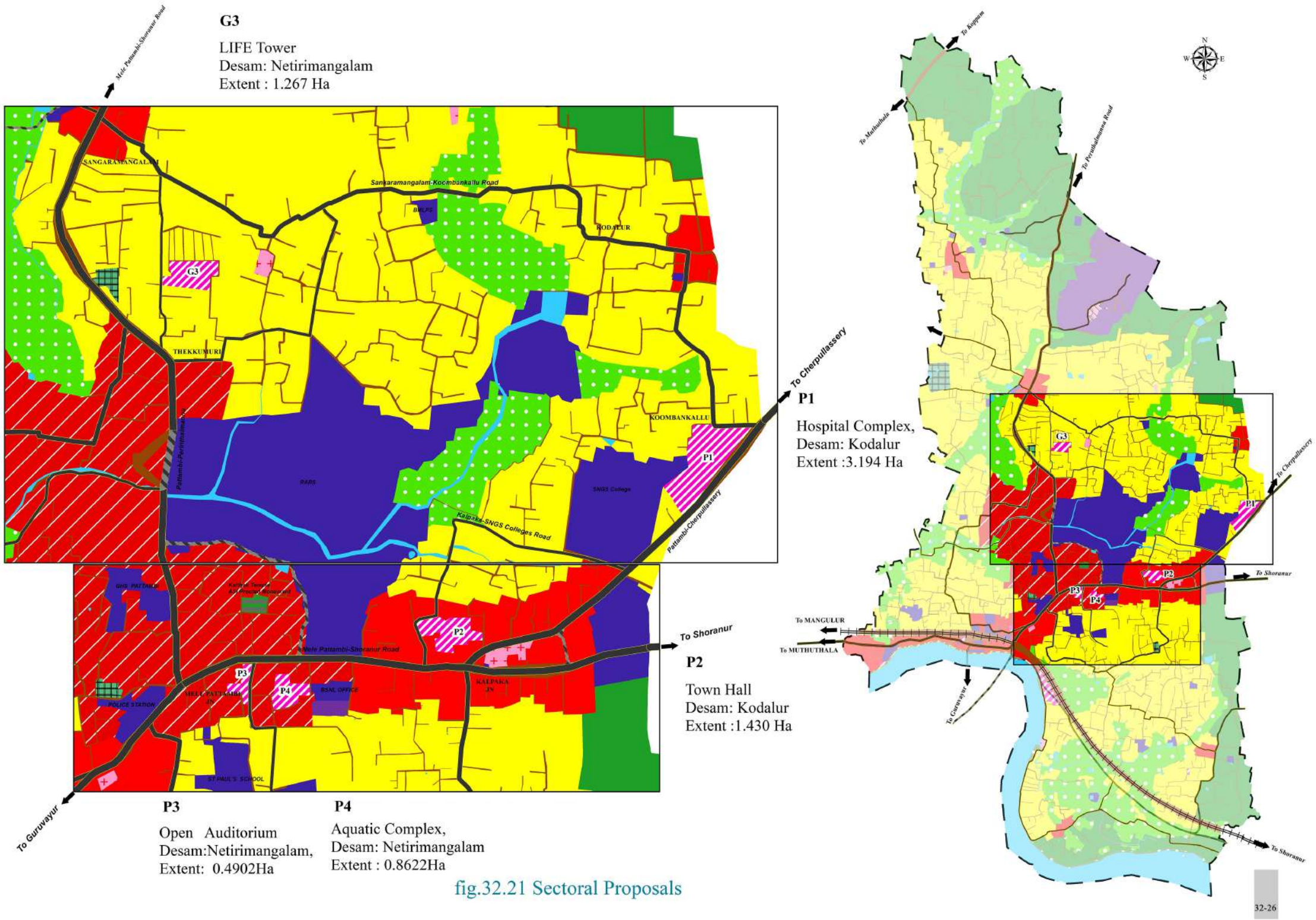


fig.32.21 Sectoral Proposals

G1

Multi level Parking
Desam: Netirimangalam
Extent : 0.155 Ha

G2

Fire Station
Desam :Netirimangalam
Extent : 0.110 Ha

P8

Collection Well,
Desam: Netirimangalam
Extent : 0.118Ha

P5

Park & Open Space and Parking
Desam:Netirimangalam
Extent : 2.075 Ha

Collection Well,
Desam: Kizhayur
Extent : 0.117 Ha

P6

P7

STP at Nambram
Desam: Kizhayur

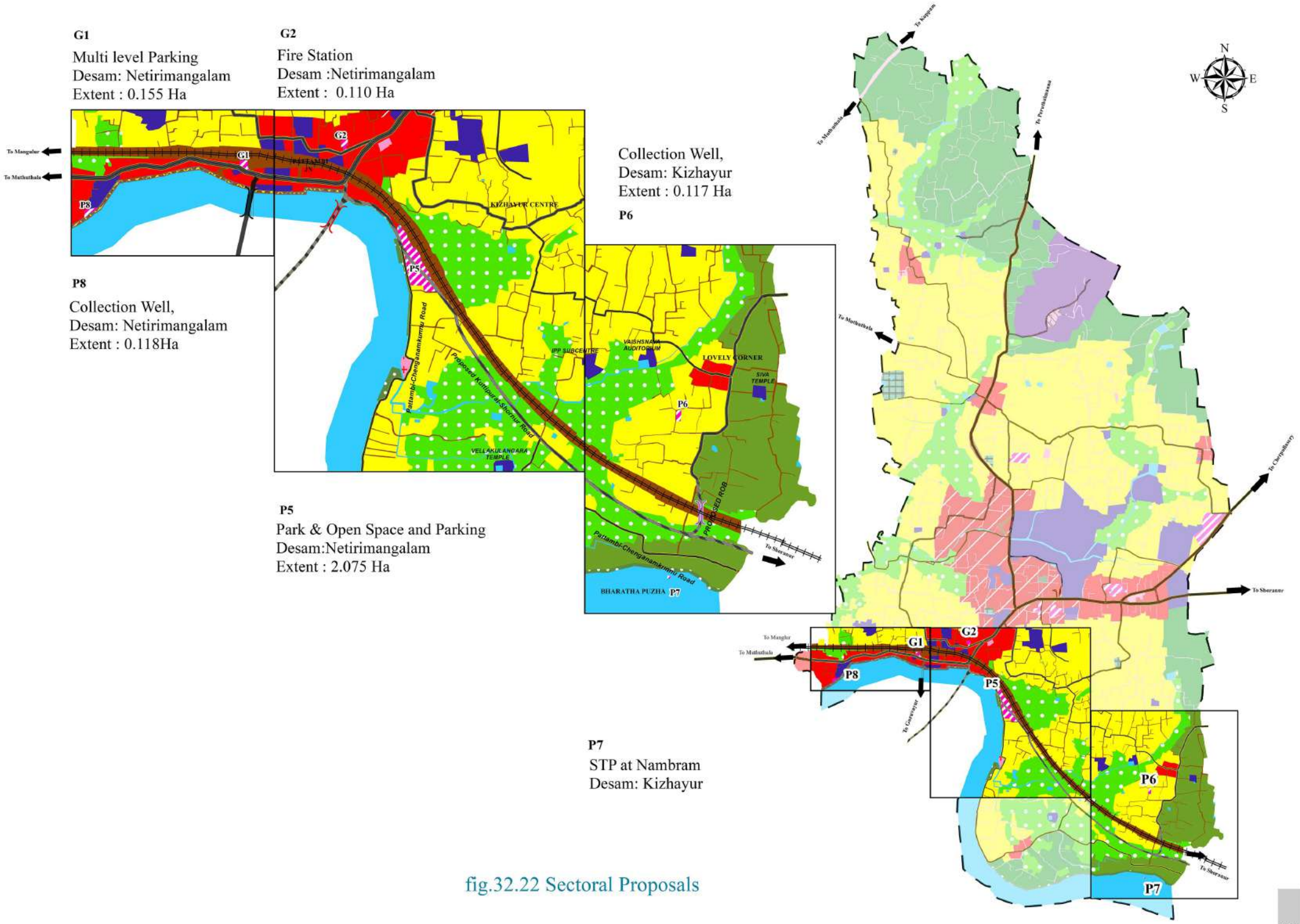


fig.32.22 Sectoral Proposals

33

Priority Action plan

33. PRIORITY PROJECTS, ACTIONPLAN & PHASING

In this chapter the projects proposed in various development areas are prioritized based on their importance and the methods of implementation of the projects are described here step by step. Project components, Financial requirement and resource mobilization methods for each of the projects are mentioned in Table 33.16, which will serve as a reference for the implementation process. A detailed DPR and funding needs to be secured for each project.

33.1 IMPLEMENTATION OF PROJECTS THROUGH SPECIAL PURPOSE VEHICLE (SPV) AND PUBLIC PRIVATE PARTNERSHIP (PPP)

Some of the projects mentioned here under which are proposed to be implemented by the Municipality may be done through the formulation of a Special Purpose Vehicle. Due to the financial difficulty for implementation and lack of availability of land, the municipality may not able to implement such projects. Through the formulation of SPV, this situation can be avoided. Such SPV can be utilized in asset securitization, joint ventures, property deals, etc with its own assets and liabilities, as well as its own legal status with minimal financial or operational risks to the LSGI. SPVs may be created as a company of which the major share holder can be the Municipality. It may also be operated in cooperative sector as a society that deals with infrastructure development and could also receive grants and aids from both central government, state government or local body or other supportive institutions to implement projects.

Creating an SPV is likely to ease out the PPP projects to get implemented. It will also attract more and more partners to get involved in these projects , which will help the municipality to get them materialised as soon as possible, without creating additional financial burden over them.

33.2 GAS / ELECTRICAL CREMATION

There are five burial grounds in Pattambi town, but all of them are owned by different communities. There is a common cremation ground but is in disuse due to lack of facilities. Due to rapid urbanization, land availability is reducing and hence preference of cremation is increasing over burial and burning in open place in town. It is a common sight in most traditional open crematoriums where cloud of black smoke covers the blue sky.

33.2.1 Location and Ownership

A gas / electrical crematorium is proposed in 0.3162 Hectres of land owned by municipality, comprising in survey numbers 64/14,4C,5B,4C and 65/1 of Kizhayur desam at Nambram (Ward 19). Fig. 32.13 shows its location.

33.2.2 Project Brief and Need of the Project

The residents of Pattambi town and the nearby area are using Santhitheeram at Shoranur and Punyatheeram at Cheruthuruthy. These locations are, respectively, 18 and 20 kilometres from Pattambi town, which creates hardship for the people of the Town.

The two main drawbacks of the traditional method of cremation are air pollution and deforestation. Also, cremation in open grounds generate large amounts of ashes, which are later thrown into rivers and water bodies, thereby polluting the water. Burning using electric/gas crematorium is environment friendly and also does not requires woods. Hence an Electric/Gas crematorium is proposed for the municipality. Cremation ground used in past is suggested. A gas or electric crematorium with modern facilities is one of the dire needs of local residents for years.

33.2.3 Responsible Agencies and Implementing Mechanism

The Municipality may develop a modern crematorium with necessary infrastructural facilities as well as landscaping with the aid of SPV. A willing trust or civic society or the municipality itself may undertake its upkeep and operation. Table 33.1 shows responsible agencies and their role in the modern crematorium.

Table 33.1 Agencies responsible for the development of gas /Electrical cremation

Responsible agencies	Role
Municipality / SPV	Project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
Financial agencies	Demand assessment, Funding.
Consultant	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report.
Selected trust or Civil society	Operation and maintenance.

33.2.4 Project Periods and Priority

Approximate project period is five years. The project shall be implemented with high priority. The approximate cost of the project is given in Table 33.16.

33.3 FIRE STATION

The nearest fire station was situated in Shoranur Municipality, with a service area of 24 nearby LSGIs, including Pattambi town. A new fire station has started functioning in the rented building at Pattambi as of February 2021. The Fire and Rescue

Department has initiated steps to obtain 20 cents of land owned by Pattambi Municipality to construct own building.

33.3.1 Project Brief ,Location and Ownership

The old fish market having an extent of 0.1188 Ha in survey numbers: 156/6A, 156/6B, 158/6,158/7,158/8,60/6, in Nethirimangalam desam is set aside for proposed fire station.

33.3.2 Responsible Agencies and Implementing Mechanism

20 cents of land are to be transferred to the Fire and Rescue Department. Office buildings and related facilities shall be developed by the Fire and Rescue Department.

33.4 OFF STREET PARKING FACILITIES

Following the rapid incense of private vehicle ownership, towns are suffering from lacking of parking areas with imbalance between parking supply and demand which can be considered the initial reason for parking problems. This imbalance is partially due to lack of land use planning. Shortage of parking spaces and accompanied traffic congestions are a common scenario. Hence provision of adequate parking facilities is an important aspect to be considered in urban planning.

33.4.1 Project Brief

The project includes the development of land, construction of pavement, provision of other infrastructure facilities like comfort stations etc., and any other components to facilitate value capture, like a clock room, restaurant, cafeteria, etc. In the future, after implementing parking, vending kiosks may be provided by the municipality on a monthly rental basis, which may help generate revenue.

Two parking lots are proposed to be developed in the town in three phases. The first priority is in the municipality's own land near the existing bus stand. The Municipality has begun the preliminary stages of implementation of this multi level parking. The second priority is to set up a parking lot in the area between Numbram Road and the Railway line. This parking area facility will be arranged only after commissioning of Kuttipuram-Shoranur theeradesa road.

33.4.2 Location and Ownership

Fig. 32.2, and 32.14 shows the location and Table 33.2 shows Location and Ownership details and priority of parking projects.

33.4.3 Responsible Agencies and Implementing Mechanism

The land for parking under 2nd priority is to be procured and development activities are to be carried out by the municipality and may be managed through Self-help groups. Table 33.3 shows the detailed implementation mechanism.

Table 33.2 Proposed Location and extent of parking and ownership of land

Priori-ty	Parking	Location		Extent in Ha.	Owner ship
		Desam	Sy. No		
1st	Multi-Level Parking near existing Bus stand	Nethrimangalam	32/B1B	0.1559	Municipal own land
2nd	Between Nambram road and Railway line	Nethrimangalam	23/A1, 23/A2, 23/A3, 23/A4A, 23/A4B, 23/A5, 23/A6, 23/A7, 23/A8, 23/A9, 23/A11, 140/2, 140/3, 140/4, 140/5, 140/6, 140/7, 140/11	2.0782	Private land

Table 33.3 Agencies responsible for the development of Parking

Responsible agencies	Role
Municipality	Project formulation, Getting necessary approvals and clearances, awarding of works, Quality management,
GoK / SPV	Funding
Consultant	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Selected civil society	Operation and maintenance

33.4.4 Need of the project

Even as the number of vehicles has expanded, parking space in town has remained constant or reduced due to a growing population. Especially when land is limited and expensive. rising parking demand spaces puts immense pressure on it. There is no planned parking space available within Pattambi town. Most of the parking activities of Pattambi town are concentrated around the area between Pattambi Railway station and Bus Station consisting mostly of two wheelers. Currently, the LSG and the city traffic police allow on street parking. It results in reduction in street space leading to lowering of the road capacity. This will reduce journey speed, journey time, increase delay and may cause accidents. The provision of adequate parking spaces in suitable locations can help free up valuable public space, making our cities more attractive; support local economy; reduce vehicle traffic; reduce operational cost of vehicles, reduce congestion and air pollution and enhance road safety. Hence off street parking facilities are proposed in the above mentioned locations to meet the upcoming parking demands of Pattambi town.

According to traffic studies, it is clear that there is high level of on-street parking in Pattambi town. The main demand that emerged from the Stakeholders meeting is regarding vehicle parking.

33.4.5 Project Periods and Priority

Project is proposed to be completed in two phases. Priority of each parking is shown in Table 33.2 and the approximate cost of the project is given in Table 33.16.

33.5 ECO MOBILITY CORRIDOR

It includes NMT and eco friendly transportation modes. It is intended to be built in such a way that those coming to the town can do shopping while enjoying the natural beauty of Bharathapuzha. This will be very beneficial for pilgrims and tourists, and can give a new impetus to the commercial sector of the town. The operation and maintenance may be awarded to self-help groups or any cooperative bodies through tendering process. Facilitating events like exhibitions will help to capture the capital cost of the project. After implementing NMT, suitable vending kiosks may be provided by the municipality on a monthly rental basis, which may help generate revenue.

33.5.1 Project Brief, Location and Ownership

The project is planned to be completed in two phases. The first phase will consist of a 12 m pedestrian walkway starting from Nambram Road and passing along the southern side of Guruvayurappan Temple to reach to the existing bridge. The second phase starts from the existing bridge to the bus stand along the river bank (Refer Fig.32.2).

33.5.2 Responsible Agencies

Various department and agencies may be entrusted with project implementation and management. Its details are shown in Table 33.4.

33.5.3 Need of the Project and Implementing Mechanism

Presently, there is no cohesive pedestrian network within the town, and there are many barriers to pedestrian movement. Paths often end abruptly, and entry points are not clear. A direct pedestrian access from the town centre to the riverfront with clear signage is also necessary. It has to improve both visual and physical connections between the town centre and the riverfront and upgrade of the riverfront to improve visitor experiences.

The project can be implemented by DTPC. They can implement the project directly or in PPP mode. Municipality may procure the land or with the consent of willing land owners. Municipality directly implement the project with the help of DTPC or direct interested corporate body to develop the park as a part of their corporate social

responsibility. The maintenance of the park can be assigned to resident association, clubs or educational institutions.

Table 33.4 Agencies responsible for the development of Eco Mobility corridor

Responsible agencies	Role
Municipality / SPV	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoK, Tourism Department, DTPC	Funding
Consultant	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Interested corporate bodies	Operation and maintenance, facilitator for the implementation of the project.

33.5.4 Project Periods and Priority

The project is planned to be completed in two stages. The project "NMT 1st phase" shall be implemented with high priority, that is, within five years, and "NMT 2nd Phase" shall be completed within next five years. The approximate cost of the projects are given in Table 33.16.

33.6 HOSPITAL COMPLEX

Pattambi Taluk has been declared as the sixth taluk in Palakkad District. The List of LSGIs in Pattambi taluk are Anakkara, Chalissery, Kappur, Koppam, Kulukkallur, Muthuthala, Nagalassery, Ongallur Parudur, Pattithara, Thirumittacode, Thiruvegappura, Thrithala, Vallappuzha and Vilayur. The existing taluk hospital facilities is inadequate for its serving population. Further development is not possible due to space constraints. This calls for proposing a new location.

33.6.1 Project Brief , Location and Ownership

An area of 3.1823 Ha is proposed for the hospital complex at Koombankallu. This privately owned land falls under survey numbers 14/4, 16/18A, 16/18B, 16/9, 17/1, 17/2, 17/3 in Kodalur Desam. It is intended to acquire this land by the revenue department and hand it over to the health department.

33.6.2 Need of the Project and Implementing Mechanism

The master plan has been prepared for the year 2036; hence, it is required to facilitate the hospital for a population of 636784. That means the shortfall of 244 beds needs to be filled as per URDPFI guidelines.

PWD should develop infrastructure under the supervision of health department and management shall be entrusted with the Municipal council.

33.6.3 Responsible Agencies

Various department and agencies may be entrusted with project implementation and management. Its details are available in Table 33.5

Table 33.5 Agencies responsible for the development of Hospital Complex

Responsible agencies	Role
Municipality / SPV and Revenue department	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
Gok, HealthDepartment	Funding
Consultant	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Municipality	Operation and maintenance

33.6.4 Project Periods and Priority

The project shall be implemented with high priority and intended to be completed within 5 to 10 years. The approximate cost of the project is given in Table 33.16.

33.7 PARK AND OPEN SPACE

Urban greenery is one of the ways to bridge the gap between people and nature. Parks provide environmental, aesthetic and recreational benefits to the town. They are also a source of positive economic benefits. They enhance property values, increase municipal revenue, bring in homebuyers and workers, and attract retirees. The operation and maintenance by suitable means, may be awarded to self-help groups or any cooperative bodies on a tender basis. They may conduct events like marriages and other gatherings in this place, but the responsibility should be taken by these self-help groups, and a certain percentage of the amount collected from the public may accumulate for the capital cost of the project. In the future, after implementing parking, vending kiosks may be provided by the municipality on a monthly rental basis, which may help generate revenue.

33.7.1 Project Brief ,Location and Ownership

The proposed park will provide leisure outdoor spaces for the residents. There should be different spaces for walking and leisure activities. The following components are required to be provided in the park:

- Walkways, Jogging track
- Leisure areas for residents to sit
- Dedicated play area for children with proper sitting for parents which may have interesting rides like Merry-Go-Round, Sea-Saw, and Slides etc for different age groups.



- Amphitheater
- Sports Area
- Planting : A planter in between the park with flowery beds will add beauty to the park.
- Fountain
- Recreational space for the aged and Challenged.



- Exercise area / Open Gym for youth and middle age group
- Sitting space for old and youth
- Drainage arrangements
- Wi-Fi on Nominal charges/free
- Entrance Gate (for vehicle & pedestrian)
- Parking space
- Food court
- General amenities such as toilet, drinking water etc.
- and any other components to facilitate value capture for the project.

An area of 2.0782 Ha in Nethirimangalam desam falls under the following survey numbers: 23/A1, 23/A2, 23/A3, 23/A4A, 23/A4B, 23/A5, 23/A6, 23/A7, 23/A8, 23/A9, 23/A11, 140/2, 140/3, 140/4, 140/5, 140/6, 140/7, 140/11, is proposed for Park and open space with parking. When the new road proposed to be constructed by KRFB comes into existence, the said land will be divided into two. One part of the said land intended for parking of visitor's vehicles coming to the recreation place. Refer Fig. 32.14.

33.7.2 Responsible Agencies

The project can be implemented by Municipality with the help of DTPC, other wise may try to be implemented through CSR fund available at that time. Municipality can procure the land or get it sponsored. Municipality directly implement the project with the help of DTPC or can select and direct interested corporate to develop the park as a part of their corporate social responsibility. The maintenance of the park can be assigned to resident association, clubs or educational institutions. Table 33.6 shows the responsible agencies for the development of park and open space.

Table 33.6 Agencies responsible for the development of Park and open space

Responsible agencies	Role
Municipality / SPV	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoK and DTPC	Funding
DTPC	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Selected self help groups	Operation and maintenance

33.7.3 Need of the Project and Implementing Mechanism

Park and open spaces has an important role in creating healthier and more livable communities by providing environmental, social and economic benefits. This is a place to meet and greet people, relax after work, exercise, walk, jog, spend time with family and for children to play. It provide active and passive recreational opportunities and contribute to the health and wellness of the community. Pattambi municipality lacks organized park and open spaces. Implementation mechanism is detailed in table 33.6

33.7.4 Project Periods and Priority

Approximate project period is five years. The project shall be implemented with high priority and intended to be completed within 5 to 10 years. The approximate cost of the project is given in Table 33.16.

33.8 OPEN AUDITORIUM

An open auditorium is proposed to accommodate large gatherings and to facilitate MICE tourism. At present, political parties hold demonstrations and public gatherings on the streets in the absence of such designated public spaces. This sometimes creates difficulties for the public and passengers. An Open auditorium can also be used as a venue for functions like Yuvajanotsavam, Keralotsavam, the College Art festival, etc.



Nishagandhi Open Auditorium, Thiruvanathapuram

33.8.1 Project Brief ,Location and Ownership

The proposed project includes the construction of Stage and yard for conducting public gatherings, seminars and entertainments etc in Pattambi municipality incorporating facilities for physically challenged people and parking.

It is planned to cover an area of 0.4902 Hectares over survey no. 5/3, 5/7A, 5/4, in Nethirimangalam desam. Fig. 32.13 shows the location of Open auditorium. The suggested location is owned by private parties.

33.8.2 Responsible Agencies

Various department and agencies may be entrusted with project implementation and management. Its details are available in table 33.7.

Table 33.7 Agencies responsible for the development of Open auditorium

Responsible agencies	Role
Municipality / SPV	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoK and DTPC	Funding
DTPC	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Selected self help groups	Operation and maintenance

The operation and maintenance by suitable means, may be awarded to self-help groups or any cooperative bodies on a tender basis. They may conduct events like marriages and other gatherings in this place, but the responsibility should be taken by these self-help groups, and a certain percentage of the amount collected from the public may accumulate for the capital cost of the project. In the future, after

implementing parking, vending kiosks may be provided by the municipality on a monthly rental basis, which may help generate revenue.

33.8.3 Need of the Project and Implementing Mechanism

Currently there are no place available for public gatherings in the municipality. Hence an open auditorium is proposed with all the infrastructure facilities. Municipality may procure the land and implement the project in next 10 years.

33.8.4 Project Period and Priority

Approximate project period is five years. The project shall be implemented with high priority and intended to be completed within 5 - 10 years. The approximate cost of the project is given in Table 33.16.

33.9 AQUATIC COMPLEX

Construction of aquatic complex will not only help in the development of sports but also will help generate significant gains in the regional economy by providing more employment opportunities and causes the development around its surrounding areas.

33.9.1 Project Brief ,Location and Ownership

The project involves the construction of multi storied building for swimming pool, diving pool, Wading Pool etc. With all amenities for practice and conducting of aquatic events and its associated facilities. 0.8622ha of land in Nethirimangalam desam in survey no. 5/6, 5/7B, 5/8 is earmarked for proposed aquatic complex. The land identified for this purpose is under private ownership. The project may include

- Players facilities like medical room, warm up area, separate fitness room, changing room and toilets for men and women
- It should also contain other facilities like lounges, Gymnasium, Office Room, Rooms for coaches & Referees., Acoustic Insulation for all walls & roof, Pantries, Public Toilet, clock room and Dormitories
- Parking facilities for two wheeler and 4 wheeler, cafeteria, solar panels for lighting and other uses, rain water harvesting system etc.
- and any other components to facilitate value capture for the project.

33.9.2 Responsible Agencies

Various department and agencies may be entrusted with project implementation and management. Its details are available in Table 33.8.

Table 33.8 Agencies responsible for the development of Aquatic complex

Responsible agencies	Role
Municipality / SPV / Owner / private Developer	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoK, Sports council Kerala / Owner / Private Developer	Funding
Sports Kerala Foundation / Private Developer	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
Municipality / Private Devel-	Operation and maintenance

If any private developer / owner(s) wishes to develop such a sports complex, he may do such so with the concurrence of the municipal council.

33.9.3 Need of the Project and Implementing Mechanism

Swimming is one of the best forms of exercise that has many physical and mental health benefits and is also one of most popular sport in the world with varied distance-events in butterfly, backstroke, breaststroke, freestyle, and individual medley.

Presently there are no public swimming pools in the municipality or in its vicinity. Once constructed the aquatic complex can be used by the public for recreational purposes, swimming lessons, for water sports like swimming, aqua jogging, water polo, water basket ball, water aerobics etc.





Swimming pool, Pinarayi, Kannur

By the implementation of this project the municipality can provide high quality training for aspiring swimming talents and hosting events. This will greatly contribute in development of sports sector by attracting more and more youth towards sports and identifying sports talents and may bring more medals in the field.

Women friendly facilities provided in the complex will bring more women to sports field. By training children to swim, they can be prepared for self-defense and rescue from accidental deaths.

33.9.4 Project Periods and Priority

Approximate project period is five years. The project shall be implemented with high priority and intended to be completed within 5 to 10 years. The approximate cost of the project is given in Table 33.16.

33.10 TOWN HALL

A modern town hall is proposed to accommodate government/private functions, community activities, meetings and conferences, performance and music events, dinners, dances, weddings and parties large and small.

33.10.1 Project Brief ,Location and Ownership

The proposed project includes the construction of town hall building for conducting public meetings, seminars and entertainments etc. in Pattambi municipality. It should have main function hall for meetings and gatherings, Conference rooms, Kitchen, office rooms, sufficient bathrooms, drinking water facilities, circulation area, Facilities for physically challenged people, parking and landscaping. It can be used as relief camps during the time of natural calamities. A life line store shall also be set up in the plot for the rescue operation. It should be equipped with all lifesaving tools and equipment's necessary for rescue and evacuation operations.

It is proposed to develop in 1.4303 Hectares of land owned by private parties. in survey no. 23/1A and 25/22 in Kodalur desam. Fig. 32.15 shows the location of proposed Civil station and Town hall. .

33.10.2 Need of the Project and Implementing Mechanism

Currently there are no town halls available in the municipality. Hence a town hall is proposed with all the infrastructure facilities needed for the gathering of peoples for public functions. Also during flood in 2018 and 2019 schools were used for relief camps, which adversely affected their functioning. The town hall can also function as a relief camp during natural disasters. Municipality can procure the land and implement the project

33.10.3. Project Periods and Priority

Approximate project period is five years. This project shall be implemented with high priority and intended to be completed within 10 years. The approximate cost of the project is given in Table 33.16.

Table 33.9 Agencies responsible for the development of Town Hall

Responsible agencies	Role
Municipality / SPV / Owner / Developer	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoK / SPV / Owner / Developer	Funding
Consultant	Preliminary estimate, Functional design, Engineering design, Detailed estimate, Detailed project report,
SPV	Operation and maintenance

33.10.4. Responsible Agencies

Various departments and agencies may be entrusted with project implementation and management. Its details are available in Table 33.9. This land is in private ownership. If the owner or any other developer wishes to develop the land as such, it can be done after getting concurrence from the municipal council. Service and facilities are to be provided along with the main use shall be as per this applicable plan.

33.11. SHE LODGE, SHE WORKING SPACE, COMMUNITY KITCHEN, SHORT STAY

When the Taluk hospital is relocated as per the master plan proposals, the existing property can be reused suitably for She lodge, She working space, community kitchen and short stays. She Lodge aims to provide lodging for women employees in the town and, their children and whereas short stay aims to provide shelter to the victims of sexual abuse and human trafficking.

A Start-up incubator for women has also been proposed to nurture start-ups and provide an array of resources and support in the most critical and vulnerable growth periods for early-stage companies.

33.11.1 Project Brief ,Location and Ownership

When the infrastructure facility development and shifting of Taluk hospital is completed, then one or two existing buildings can be converted into a Working women space and community kitchen. One of this building is also proposed for "She lodge", Short stay facilities for women. Any one of the floor can be used as Nirbhaya shelter homes and one stop crisis centre.

Co-working spaces are becoming increasingly popular in technology sectors. A co-working space is an open office space that's designed to foster a sense of community. This is done when workers from many businesses are able to complete their work under one roof. Since these spaces are shared, costs are kept very low for any business that decides to become a part of the co-working space. Even though

co-working spaces are similar to standard office spaces, they are notable for being more vibrant and energetic, which is why these spaces are considered to be highly beneficial for small teams, freelancers, entrepreneurs, and start-ups.

33.11.2 Need of the Project and Implementing Mechanism

For women travellers and employees, the first priority is to look for a safe place to stay. Currently there are no such facilities available for accommodating exclusively women in the Municipality. She Lodge is part of a 'women's empowerment' project by the state which aims to provide safe and affordable accommodation for travelling women and their children. The facility can be booked through online booking service.

Short stay are part of the project for the protection rehabilitation and reintegration of victims of sexual violence and trafficking. The shelter provide a safe and secure accommodation along with counselling and other therapeutic support for the empowerment of the victims.

Community kitchen also the part of the project. On normal days, food can be prepared and delivered to the offices in the town, She Lodge and Apna Ghar. We already know that systems like these are essential to surviving situations like floods.

Table.33.10 Responsible agencies for the construction of She lodge, She working space, community kitchen and short stay

Responsible Agencies	Role
Municipality	Procurement of land, project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Mon-
Women and child development/ Social welfare department (GoI & GoK)	Funding
Municipality by the help of Self help group like Kudumbashree	Operation and maintenance

The department of women and child development/ Social welfare department is the implementing agency. The project is funded central and state government in 60:40 ratio. The land redevelopment and alteration of building can be done by PWD. Table 33.16. shows approximate project cost for the project. The task of maintenance and management can be entrusted to self help groups like Kudumbashree.

33.11.3. Project Periods and Priority

Approximate project period is five years. The project shall be implemented in with high priority and intended to be completed within 10 years.

33.11.4. Responsible Agencies

Various department and agencies may be entrusted with project implementation and management. Its details are available in Table 33.10

33.12. LIFE TOWER

According to the Life Mission survey, in Pattambi town, 228 families are landless. Being destitute, they are likely to be exposed to various forms of exploitation. The aim of this project is to rehabilitate them.

33.12.1 Project Brief ,Location and Ownership

This project is planned to build a multi-storied building to accommodate 48 families. A house of 600 square meter is prepared for a family, which includes a bed-room, kitchen, toilet, bathroom, and living room. A separate drinking water supply system to be developed. The maintenance costs are to be bear by the residents. The project is planned on the land owned by the municipality in survey number 104/6,7 of Nethirimangalam desam.

33.12.2 Need of the Project and Implementing Mechanism

A significant issue, that must be resolved in order to improve living circumstances is housing for the needy. People's emotional and physical health are impacted by their living circumstances . The vulnerable in the society can be given a life confidence that they will not be evicted unexpectedly if they are provided with permanent housing facility. Also, it has a significant impact on molding future citizen.

Bhavanam foundation Kerala is implementing the project through civil contractors selected through an open tender. GoK is funding the project as per the detailed project report of BFK. The life tower may be handed over to the municipality after completion. The municipality will select the beneficiaries for the life survey seniority list and allot the accommodations. Maintenance, operation costs and rent for the land are met by the beneficiary on a monthly basis.

33.12.3. Project Periods and Priority

Approximate project period is five years. The project shall be implemented in with high priority and intended to be completed within 10 years.

33.12.4. Responsible agencies

Various department and agencies may be entrusted with project implementation and management. Its details are available in Table 33.11.

Table.33.11 Responsible agencies for the construction of Life Tower

Responsible Agencies	Role
Municipality	Project formulation, Getting necessary approvals and clearances, awarding of works, Quality management, Monitoring etc.
GoI & GoK	Funding
Bhavanam Foundation Kerala, Municipality	Infrastructure Development
Municipality by the help of Self help group like Kudumbashree	Operation and maintenance

33.13 STP, COLLECTION WELL AND SEWER SYSTEMS

KWA has prepared detailed project report forecasting the population for the year 2052 for liquid waste management on behalf of Pattambi Municipality.

33.13.1 Project Brief

It is proposed to provide 225mm to 450mm OD HDPE pipes of pressure rating PN 8 along the branch roads and of pressure rating PN 10 along the main roads. For pressurized lines below railway crossing 300 and 350mm diameter DI pipes are proposed.

In the sewer system, the manholes are first constructed in identified reaches before the sewers are laid. The structural design of the manholes is preformed to withstand traffic load also with controlled cracking under severe exposure conditions. 2601 number of manholes are proposed in the three zones which are already mentioned. Lifting manholes operated by submersible pump and a lockable control panel are also proposed in some locations.

There are three collection wells as per the detailed project report and the details are available in Table 33.12. For the location of collection well refer Fig. 32.8 and 32.9. Each collection well is designed to have adequate storage during peak hours of flow. Two submersible centrifugal pumps are provided to work in parallel during peak hour of flow.

Table 33.12 Details of collection well

Sl. No.	Description	Location	Peak flow in LPS from network
1	Collection well-3	Near Nila hospital	46.03
2	Collection well-2	Near Kizhayur Post office	92.49
3	Collection well-1	Nambram	164.87

Treatment involves three unit operations, namely Physical, chemical and biological unit operation. In Physical unit operation the row sewage goes through screening, mixing, sedimentation, gas transfer, filtration and adsorption. In Chemical unit processes includes disinfection, oxidation and precipitation. In Biological unit process is used to remove the biodegradable organic constituents and nutrients in waste water. Refer Fig. 32.8 for the location of land earmarked for STP.

Raw sewage includes septage (feacal sludge) which has an offensive odor and appearance. The collected septage transported in closed truck to the STP and is diluted in the tank by adding recycled water.

After the physical unit process of row sewage, it will go through biological process, used technology is Moving Bed Bio-Reactor. The two major reactions that take place in the organic carbon cycle are biological oxidation of waste organic matter and photosynthesis, which is the process by which green plants produce organic matter from carbon dioxide and water in reaction that are catalyzed by sunlight and the Chlorophyll in the green plant. Clarified water is passed through the pressure sand filter. Clear water can be collected from the outlet of the pressure sand filter. Frequent backwashing of the media is also required. Activated carbon filter process basically absorb unwanted contaminants from waste water, it removes residual contaminants such as chlorine, methane, organic compounds and even the taste and odour from water.

In the proposed project, the treated water will be suitable for the following purposes. That is, agricultural irrigation, crop irrigation, commercial nurseries, land scape irrigation, industrial recycling and reuse. Ground water recharging, salt water intrusion control, recreation / environmental uses and non-potable urban uses. The dewatered sludge can be used as a manure for cultivation.

33.13.2 Location and Ownership

The town was divided into three sectors for the liquid waste management plan, each with its own collection well. The location of collection wells has been determined so that waste water can be brought here by gravitation force. Septic tank waste

generated in the entire town can be treated at Nambram. Locations and ownership details are shown in Table 33.13

Table.33.13 Location of Liquid waste management plant

Technology	Scotor	Location details	Area in Ha.	Ownership
Collection well-3	III	40/8, 41/1 and 143/1 at Nethirimangalam	0.1181	Private land
Collection well-2	II	45/ 1A at Kizhayur desam	0.1178	Private land
Collection well-1 and STP	I	86 at Kizhayur desam	0.2155	Government land

33.13.3 Need of the Project and Implementing Mechanism

Currently there are no sewage treatment plant facility in the town. The sewage generated in households and various establishments are disposed into on-site sanitation systems where they are partially treated and leaching out under the ground polluting the ground water and posing severe risk to public health. The grey water from the households directly flows into the road side open drains and the waste water finds its way Bharathapuzha without any treatment. This leads to wastewater stagnation, ground and surface water pollution, odour nuisance, insanitary conditions mosquito breeding, and the spread of water borne & vector borne diseases.

The power and responsibilities of constructing sanitation facilities rests with Local self government bodies. Sewerage systems, including sewage treatment plants and network of sewers, trunk mains, pumping stations, etc. come under the purview of the Kerala Water Authority (KWA) . Municipality can purchase the land or get it sponsored or acquire with the help of Revenue department. The local governments can be supported by GoK and Central government funds and funding agencies. The construction of Sewerage systems, including sewage treatment plants and network of sewers, trunk mains, pumping stations, etc. can be executed by selecting a suitable contractor through open tendering process by inviting competitive bids at national level. SPV's can provide technical assistance and supervise the project. The operation and maintenance of the treatment plant can be done by the municipality. Municipality can collect a fee from the sources for the plant's maintenance.

33.13.4 Project Periods and Priority

The land where the sewage treatment plant is proposed to be constructed is a public land. So this land does not need to be acquired. It is proposed to take the sewer line to the treatment plant through the sides of the existing roads, so there is no need to acquire land. As a result, zone I can be completed first. In the case of the other two zones, the land for the collection row needs to be acquired. Hence, implementation of

the other two zones can be completed in the second phase. It is planned to complete the work within the next 10 years, as it needs to be implemented as soon as possible to make Bharathapuzha free of garbage. The approximate cost of the project is given in Table 33.16.

33.14 DRY WELL AND DRAINAGE SYSTEM

Pattambi Town receives on an average of 2348 mm of rainfall annually. A Planned system of drainage is a necessary ingredient of an urban area. The current situation is that during the monsoons, sewage and rainwater mix and reach Bharathapuzha. Six drains from Pattambi town open to the river, which carries domestic waste and water from the trade establishments located in the town.

33.14.1 Project Brief

The DPR for the sewer system was prepared by a DGPS survey conducted by KWA. This DGPS result may also be used in drainage networks. Drainage is also planned to be constructed in the level itself, which is intended to carry the waste water. By doing this, the trenches get the retaining wall on both sides, which protects the sewer line and facilitates future repair, and it is possible to bring the rainwater comfortably to the dry well.

33.14.2 Location and Ownership

Three dry wells are proposed to be constructed. The location of the proposed dry well is close to the reservoir where the sewage is to be collected. See paragraph 33.6.2 for details.

33.14.3 Responsible Agencies and Suggested Implementing Mechanism

KWA will be the implementing agency. Its construction is also planned along with the construction of the sewage treatment plant. Therefore, all the resources for the construction of STP can be used for this project. The Municipality will act as a facilitator for getting the project implemented. Suitable methodology for maintenance shall also be explored by the municipality.

33.15. NEW BRIDGE ACROSS BHARATHAPUZHA

Bridges have a special place in transportation infrastructure as it brings connectivity with other places. These structures connects people and places by helping to cross obstacles like rivers and act as an integral link in the transportation network.

33.15.1 Project Brief ,Location and Ownership

This project aims to construct a new bridge across Bharathapuzha at Pazhayakadavu to decommission the existing Pattambi bridge. The proposed Bridge has a length

of 327 m and a width of 11 m with carriage way of width 7.5 m. The bridge should be constructed in such a way that the Height of the bridge should be 1.5m above maximum flood level. It need a approach road of length 80m and width of 12 m. the bridge shall be provided with foot paths of adequate width, crash barriers, hand rails of minimum height 1.1 m, public utility provisions, drainage spouts, protection works etc.

33.15.2 Need of the Project and Implementing Mechanism

The Pattambi bridge across the Bharathapuzha river connects the town to western end of Palakkad district and parts of Thrissur district like Kunnamkulam and Guruvayur. It is one of the main transportation corridor to southern parts of the state. The existing bridge was commissioned in 1966. The width of the bridge is only 6 m and hence road gets blocked when two large vehicles enter the bridge at he same time in opposite directions. The bridge does not have foot path, crash barrier etc. this makes crossing of bridge difficult for pedestrians. There are no public utility provisions provided in the bridge to carry cables hence cables crossing the river are laid over the road and is visible. . There was an incident of concrete cover falling from the under side of bridge in 2012 June this indicate the weak condition of the bridge.

This bridge was overflowed in 2006, 2018 and 2019. During 2018 flood the bridge was overflowed and the traffic was blocked for around 5 days. And also some parts were damaged and the handrails were completely destroyed during the floods. Hence taking into consideration the increased traffic requirements, pedestrian requirements, strength of bridge and the disaster management aspects there is an urgent need to construct a new bridge with sufficient carriage way with and height above maximum flood level.

The project is implemented by Public Works Department through civil contractors selected through open tendering. The project is funded by KRFB and the Detailed project report is near to final stage.





Pattambi bridge during flood

33.16. RAILWAY OVER BRIDGE

KRFB is preparing a detailed project report for bridge across Bharathapuzha and the Kuttipuram-Shoranur road. With the completion of this road, the Shoranur side will be easily accessible. The Manjalungal junction can be easily reached if a flyover is built across the railway line from this road to RandamKatti. After the implementation of this project, vehicles can divert to Palakkad, Cherpulassery and Perinthalmanna without entering the town. This road can also be used effectively in flood situations.

33.16.1 Project Brief and Location and Ownership

One side of the railway is being set aside for the proposed Kuttipuram Shoranur road, and the other side is the Manjalingal-Lovelrycorner-Randamkatty road. This road, Manjalingal-Lovelycorner-Nambram road (Rd_10), is proposed to be widened to 15 m in width. The Proposal is to construct an approach road on both side of the rallil-way and connect it to the flyover. The flyover is possible only after getting permission from the Indian Railway.

33.16.2 Need of the Project and Implementing Mechanism

Even if the new bridge comes into existence, the vehicles coming from Guruvayur, Kuttipuram, and Thrithala will be able to go to Perinthalmanna, Cherpu-lassery, and Palakkad only through the narrow Underpass. This is likely to add to the congestion in the town.

There are no obstacles to the construction of Kuttipuram-Shoranur road and the development of Manjalungal-Lovely Corner-Nambram road, but the over bridge across the railway line is possible only after getting permission from the Indian Rail-ways. Once approval is obtained, the required land will be purchased and handed over to PWD for the construction of the approach road and the Overbridged will be constructed by Indian Railway. Funds should be raised through the agencies like KRFB.

Table 33.16 Phasing, Fiscal requirement and resource mobilization

Sl No	Name of project	Priority	Phasing	Fiscal re-quirement in (crores)	Implementation mechanism	Resource mobilisation
1	Gas / Electrical cremation	High	0-5 Years	1.35	Muniipality	Land is under Municipal ownership and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
2	Civil station Jn.-Thekkumuri Jn. Road (Rd-6)	Top	0-5 Years	10.5	Municipality / Other line departments along with funding agencies	Land to be procured by Local Body and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
3	Bypass road (Rd-14)	Top	0-5 Years	5.36	Muniipality / Other line departments along with funding agencies	Land to be procured by Local Body and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
4	Fire station	Top	0-5 Years	3	Fire and rescue De-partment	Transfer the available land to Fire and res-cue Department and Infrastructure will de-veloped by line department.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal re-quirement in (crores)	Implementation mechanism	Resource mobilisation
5	Multi-level parking	Top	0-5 Years	5	Muniipality	Land is under Municipal ownership and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
6	Pattambi-Chenganakunnu (Rd_15)	Top	0-5 Years	10.8	Muniipality	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
7	Eco Mobility corridor 1st phase starts from Pattambi-Chenganakunnu road and behind Guruvayur temble.	Top	0-5 Years	12	Municipality with the help of Tourism Dept. and MLA fund	Land to be procured by LSGs and may implement the project with government funding agencies such as Kerala tourism Department or other external funding agencies or in coordination with other line departments.
8	Eco Mobility corridor 2nd phase starts from Pattambi bridge and reach behind Bus stand.	High	5-10 Years	22	Municipality with the help of Tourism Dept. and MLA fund	Land to be procured by LSGs and may implement the project with government funding agencies such as Kerala tourism Department or other external funding agencies or in coordination with other line departments.
9	MelePattambi-Muthuthala Road (Rd_3)	Top	0-5 Years	16	PWD/ Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal requirement in (crores)	Implementation mechanism	Resource mobilisation
10	Hospital complex	High	5-10 Years	32	PWD should be developed the infrastrucure with the initiative of the Helath department.	Land to be procured by LSGs and the project may implemented by Health Department through other line department with plan fund.
11	MelePattambi-Shoranur Road (Rd_2)	Top	0-5 Years	11.2	PWD/ Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
12	MelePattambi-Printhalmanna Road (Rd_1)	Top	0-5 Years	35	PWD/ Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
13	Open Auditorium	Medium	5-10 Years	1.5	Municipality with the help of Tourism Dept.	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
14	Aquatic complex	High	5-10 Years	10.5	Sports foundation Kerala	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal requirement in (crores)	Implementation mechanism	Resource mobilisation
15	Pattambi-Cherpulassery road (Rd_4)	Top	0-5 Years	9.3	PWD/ Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
16	Town Hall	Medium	5-10 Years	32		Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
17	STP, Collection Wells and Sewerage systems	Top	0-5 Years	186	Municipality to implement the project with the help of mission KWA	Land to be procured by Local Body. Project cost to be met from Central government assistance and Gok fund pooled from various missions
18	Dry wells and drainage system	Top	0-5 Years	32	Municipality to implement the project with the help of KWA	Land to be procured by Local Body. Project cost to be met from Central government assistance and Gok fund pooled from various missions

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal requirement in (crores)	Implementation mechanism	Resource mobilisation
19	Parking	High	5-10 Years	0.5	Muniipality	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
20	Kuttipuram-Shoranur Outer ring raod with new bridge across Bharathapuzha	High	5-10 Years	85	KRFB	Government funding agencies or other external funding agencies or in coordination with other line departments.
21	Street vending zone	High	5-10 Years	0.1	Muniipality	Once the new road and bridge are in place, the Municipality is taking initiative to get the existing road and bridge from the PWD. Rehablitation of street venders may be implemented through PPP.
22	Park and open space	High	5-10 Years	1	Muniipality	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
23	Sankaramangalam-Kumbankallu road (Rd_5)	High	5-10 Years	11	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal requirement in (crores)	Implementation mechanism	Resource mobilisation
24	MelePattambi-Kizhayur road (Rd_7)	High	5-10 Years	4.5	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
25	Kizhayur-Kalpaka Road (Rd_8)	High	5-10 Years	4.5	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
26	Lement college road (Rd_17)	Medium	5-10 Years	2.5	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
27	She lodge, She working space, community kitchen, short stay	High	5-10 Years	8.5	Municipality, Bhavanam foundation Kerala.	When the infrastructure facility development and shifting of Taluk hospital is completed, then one or two existing buildings can be converted into a Working women space and community kitchen.
28	Life tower	High	5-10 Years	25	Municipality, Bhavanam foundation Kerala.	Land is available under municipality. and may implement the project with Plan fund or Government funding agencies or other external funding agencies and in coordination with other line departments.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal requirement in (crores)	Implementation mechanism	Resource mobilisation
29	Kalpaka-SNGS college road (Rd_20)	Medium	5-10 Years	4.25	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
30	Manjalungal-Lovely corner-Nambram road with ROB (Rd_16)	High	5-10 Years	35	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments. ROB can be constructed only with the con-
31	Ice plant road (Rd_18)	Medium	10-15 Years	3.45	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.
32	Thekkumuri-Vetinary Hospital road (Rd_21)	Medium	10-15 Years	2.15	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may implement the project with plan fund, own fund, government funding agencies or other external funding agencies or in coordination with other line departments.

Table 33.16 continued....

Sl No	Name of project	Priority	Phasing	Fiscal re-quirement in (crores)	Implementation mechanism	Resource mobilisation
33	Kizhayur-Lovely corner Road (Rd_11)	Medium	10-15 Years	5.1	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may im-plement the project with plan fund, own fund, government funding agencies or other external funding agencies or in co-ordination with other line departments.
34	Snakaramangalam-MeleParakkad road (Rd_12)	Low	15-20 Years	6.2	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may im-plement the project with plan fund, own fund, government funding agencies or other external funding agencies or in co-ordination with other line departments.
35	Sankaramangalam-Kozhikottiri-Muthuthala Road (Rd_13)	Low	15-20 Years	2.75	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may im-plement the project with plan fund, own fund, government funding agencies or other external funding agencies or in co-ordination with other line departments.
36	Link road connecting Shor-anur Road and Cherpulass-ery road (Rd_19)	Low	15-20 Years	1	Muniipality / Other line departments along with funding agencies	Land to be procured by LSGs and may im-plement the project with plan fund, own fund, government funding agencies or other external funding agencies or in co-ordination with other line departments.

34

Zoning Regulations

34. ZONING REGULATIONS

34.1 ZONING REGULATIONS

1. All future developments in the area covered under this plan shall be in conformity with the provisions of Master Plan for Pattambi Town.

2. For the implementation and enforcement of the proposal envisaged in the Master Plan for the town, areas have been zoned under various uses such as Residential zone, Commercial zone, Industrial zone, public and semi-public zone, Town centre, Dry agriculture zone, Wet agriculture zone, Traffic and transportation zone, Recreational zone, etc. Details regarding the nature of uses 'permitted' & uses 'restricted' in each zone are given in table 34.1. These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the Master Plan.

3. Uses **'Permitted'** in a zone cover the uses that can be normally accommodated in the relevant zone. Such uses may be permitted by the Secretary of Pattambi Municipality (herein after referred to as Secretary) if in accordance with other relevant rules/ orders concerned in force. In some cases it may be possible to permit some other uses also which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually studied based on their performance characteristics and special location factors. Such cases which come under this category are classified as "**Uses Restricted 1 & Uses restricted 2 "**.

   a. "**Uses Restricted 1**" category deals with the uses that shall be permitted by the Secretary, Pattambi municipality with the concurrence of the Town Planner of the District office of the Local Self Government Department (Planning), Palakkad. (hereinafter referred to as Town Planner)

   b. "**Uses Restricted 2**" category deals with the uses that shall be permitted by the Secretary, Pattambi Municipality with the concurrence of the Chief Town Planner concerned of the Local Self Government Department (Planning). (hereinafter referred to as Chief Town Planner)

4. "Uses prohibited" enlists the various objectionable uses in each zone which shall not be permitted under normal circumstances. All uses which does not come under 'Uses Permitted' or 'Uses Restricted 1 / Uses Restricted 2' will be considered as 'Uses *prohibited*'

5. Any use which is not specified either in the 'Uses Permitted', 'Uses Restricted 1' & 'Uses Restricted 2' of a particular use zone, but is of similar or ancillary nature to the uses permitted or uses restricted in a zone, may be permitted in such zone with the concurrence of the Town Planner.

6. Zoning regulations are not intended to prohibit existing uses that have been lawfully established prior to the enforcement of these regulations, unless otherwise specifically mentioned in this Master Plan. Zoning Regulations are essentially intended to help the competent authority in taking decisions regarding granting or refusal of permits for land development and construction of buildings/ structures.

7. If any portion of a zone is put to a *"Use Prohibited"* as stated in Para 4, before coming into operation of this Master Plan, such use shall be termed as *non-conforming use*. A non-conforming use may be allowed to continue in its existing location and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary with the concurrence of the Town Planner. The total built up area of such non-conforming use shall not exceed 1.5 times the existing built up area.

8. Existing areas and structures of archaeological importance, agricultural uses and religious uses may be permitted to continue in all zones and shall not constitute non -conforming uses.

9. Subject to the zoning regulations of the respective use zones, more than one uses may be combined in a building, or as a group of building, provided that the built up area of any such use in the plot shall not exceed the maximum built up area permitted in that particular use zone for such use. For the purpose of these regulations, built up area means the total built up area of the building on all floors.

10. All future developments shall also be in conformity with the provisions of Kerala Municipality Building Rules, unless otherwise specified in these regulations or in any Detailed Town Planning Scheme in force.

11. Any construction/ land development shall be in conformity with the provisions in Disaster Management Act, Archaeological Sites and Remains Act, Environment Protection Act 1986 and other applicable statutes.

12. Provisions under the Kerala Conservation of Paddy Land and Wetland Act 2008, and its amendments from time to time, will prevail over the respective provisions of this master plan, but shall conform to widening of roads or new road alignments and special zones envisaged in this plan.

13. 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 Master Plan.

14. Regulation of constructions and land developments on the sides of new roads /

roads proposed for widening as per the scheme shall be governed by the distance from the centreline of the road.

15. In the event of change in alignment of **New Road Proposals** in the Master Plan, after the commencement of land acquisition of the new alignment, the land parcels in stretches excluded from the original alignment may be changed to adjacent suitable land use zone with the concurrence of the Town Planner. This provision is applicable only to new road development proposals and not to widening proposal.

16. Operational constructions as defined in the Kerala Town and Country Planning Act, 2016 shall be treated as permitted use in the scheme area.

17. Expansion of existing Public and Semi Public Institutions and existing Industrial units including their incidental uses to adjacent plots shall be treated as permitted use irrespective of the zone in which such adjacent plot lies, except in recreation zone, traffic and transportation zone, Heritage zone, wet agriculture and water bodies and the development regulations imposed by such zoning, subject to the provisions of Paddy land and Wetland act in force, if applicable, or other applicable statutes.

18. Disaster mitigation projects by competent authorities shall be permitted in all zones.

19. Transmission / telecommunication towers, wireless station, ATMs, water tanks, waste management units and public utility buildings/structures shall be treated as permitted uses in all zones except in water bodies.

20. Projects of Central/ State Government, Local Self Government Institutions, Public Sector Undertakings and other Government Institutions may be permitted with concurrence of the Town Planner in all zones, even if such uses are not included in the permitted uses or restricted uses as per the zoning regulations applicable but shall conform to widening of roads or new road alignments envisaged in the scheme.

21. In case of uncertainty in identifying the alignment and boundary or a change in alignment or shift in plotting of thodu, canal, river, existing roads or railway line due to the absence of survey boundaries of the same in the Proposed Land Use Maps, it shall be referred to the actual position on ground as well as revenue records and decision taken by the Secretary in this regard shall be final.

22. The areas specially demarcated for certain projects as Special Zones are to be procured as per the provisions of the Kerala Town & Country Planning Act 2016, by Pattambi Municipality or other agencies concerned. If the proceedings to procure such land have not been initiated within 7 years from the date of sanctioning of this Master Plan, the areas so specifically demarcated may be released and assigned adaptable zone as mentioned in column (5) of clause 47, special zones in table 34.1, and on receipt of application for building permit on such lands after the above

stipulated period, the same shall be considered as per the zoning regulations of such assigned adaptable zone.

23. If different land use zones falls within a single plot, all uses permitted as per zoning regulations of such land use zones may be permitted by the Secretary in the plot. If application submitted includes any of the restricted uses and not included in such permitted uses, the Secretary shall issue permit with the concurrence of the Town Planner/Chief Town Planner, as the case may be. However, for the part of the plot which comes under water body zone, special zones, Recreational zone, and wet agriculture zone, this provision shall not be applicable.

24. Electric charging stations for vehicles may be permitted in all zones except in wet agriculture zone and water bodies

25. Large Scale development projects in an area of 1 hectare or more, exceeding an investment of Rs.100 Crores, which provide direct employment (after commissioning of the project) to the tune of not less than 200 may be permitted in all zones other than water body zone, if not included in the permitted uses or restricted uses as per zoning regulation applicable. In such cases, the recommendation of a committee with constitution as below shall be obtained, subject to satisfying the procedures laid out hereunder and the Secretary shall comply the same while issuing permit. Also, adequate provision shall be made for supporting infrastructure such as water supply, sewerage, solid waste management, power supply etc. Separate systems for management of solid waste and sewage shall be provided and maintained by the developer at his cost. The project shall be completed within a period of 5 years or as suggested by the Committee.

Procedure to be followed:

(a) The developer shall submit the project report, detailing the demand, feasibility and Environmental Impact Assessment aspects of the project, together with the approval, if necessary, obtained from the Ministry of Environment and Forests, Government of India to the Convener of the committee and the Convener shall make all arrangements for convening meeting of the committee at the earliest and the committee shall consider and dispose off the project report within a period of one month from the date of receipt of the same.

(b) The Convener shall fix the venue, date and time of the meeting in consultation with chairperson and shall be responsible for safe custody of records and communications thereof.

(c) The meeting shall be presided over by the Chairperson or in his absence by a member to be authorised by him.

Principal Secretary/Secretary to Government, Local Self Government Department	Chairperson
The Director, Local Self Government Department (Urban)	Member
The Chief Town Planner, Local Self Government Department (Planning)	Convenor
The District officer of the LSGD (Planning) having jurisdiction over the district concerned	Member
Secretary(s) of Local Self Government(s) concerned	Member(s)

(d) The quorum of the meeting shall be majority of the total number of members of the committee for the project.

(e) The developer shall also produce before the committee, all required clearances from the State and Central Government agencies concerned.

26. Any plot which falls in Industrial zone or Public & Semi Public zone or Crematorium and Burial grounds as per this master plan, and if the land use / building occupancy is changed/ proposed to be changed from its original use, then the Secretary may permit change in use or occupancy with the concurrence of the Town Planner by considering the uses permitted and restricted in the surrounding land use zones.

27. (a) Uses permitted in Residential zone, Town center and public and semi public zone shall also be permitted by the secretary , if not allowable otherwise as per the zoning regulations applicable, on both side of roads having proposed width of 10 m or more in Residential zone, Commercial zone, Town Centre, Public and Semi Public zone and Dry agriculture zone, in land up to a depth of 100m on both sides of such roads, provided the proposed width is already available.

(b) Uses restricted in Residential zone, Town center and public and semi public zone shall also be permitted by the secretary , if not allowable otherwise as per the zoning regulations applicable, on both side of roads having proposed width of 10 m in Residential zone, Commercial zone, Town Centre, Public and Semi Public zone and Dry agriculture zone, in land up to a depth of 100m on both sides of such roads, provided the proposed width is already available but with the concurrence of the Town Planner or The Chief Town Planner as the case may be.

(c) For roads which are not developed to such proposed width, the municipality may at any time levy development charges from the applicant for availing the above benefit for such roads. Such development charges shall be levied after due notification of the same, published in the official Gazette, subject to the provisions of Kerala Town & Country Planning Act 2016 and rules made there under, and with the previous sanction of the government.

28. An excess coverage of 10% over and above the respective KMBR provisions may be allowed by the secretary for Group F uses as per KMBR in commercial zone and Town centre zone by levying development charges by the municipality from the applicant. Such development charges shall be levied after due notification of the same, published in the official Gazette, subject to the provisions of Kerala Town & Country Planning Act 2016 and rules made there under, and with the previous sanction of the government. Post the levy of development charges and availing of 10% excess coverage as above, side yards may be exempted for such buildings uses in commercial zone and Town centre zone if the owner (s) of the plot (s) abutting the property under construction voluntarily agrees for the same in writing. This provisions is not applicable to high rise buildings.

29. If an access width of minimum 10m is available for a plot, all occupancies other than those under hazardous occupancy (as defined under KMBR in force) may be permitted in all zones, if not otherwise included as permitted/ restricted use in such zones , except in the case of Industrial zone, water body, and special zones with the concurrence of Town Planner. However such buildings/developments shall conform to road widening and new road proposals. In such cases, extra provision for 20% additional off street parking shall also be provided.

30. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required on any of the provisions of the Master Plan in consultation with the Chief Town Planner concerned of the Local Self Government Department (Planning).

31. For lands which are classified as a water body or similar use as per the revenue records or as per data bank, but is not included in water body zone in the proposed land use, zoning regulations of water body zone will be applicable to such lands.

Table 34.1 Zoning Regulations

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	1	2	3	4
32	**Residential Zone**			
32.1	All Residential Buildings including flats/ apartments, Boarding houses, Night Shelter/ dormitories, seminaries/ convents/ Orphanages/ Old age homes/ Dharma Sala, Guest houses / Lodges /rooming houses/ Home stays/resorts (or whatever name called), hostels, hotels with or without conference halls, dining halls or assembly rooms.			
32.2	All educational institutions and research centers, day care, libraries incidental to educational buildings, religious educational building such as madrassa, Sunday schools & the like and appurtenant assembly buildings — All having total built-up area up to 1500 sq. m.	Building(s) with total built-up area exceeding 1500 sq. meters and up to 3000 Sq. metres		
32.3	Hospitals or Medical or other treatment or care of persons suffering from physical or mental illness, clinics, homes for the infirm convalescent homes — All having total built-up area up to 1500 sq. m.	Building (s) with total built-up area exceeding 1500 sq. meters and up to 3000 Sq. metres.		
32.4	Auditoriums, conventional centers, wedding hall, community halls, art galleries, museums, libraries, skating rings, gymnasiums, congregation, dance halls, club rooms, recreation piers, amusement park, Foot ball turf, Swimming pool, Indoor Courts, Yoga center, Health club, and where people gather for recreation/ social/ religious/ patriotic/ political/ civil/ travel and similar purposes, — All having total built-up area up to 1500 sq. m. Recreational parks/Fair grounds, Open Air theatre, open grounds, walk ways, cycling tracks, Tot lots, park and play grounds.	Building (s) with total built-up area exceeding 1500 sq.metres and upto 3000 Sq.metres.	Multiplex	

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	1	2	3	4
32	Residential Zone (contd...)			
32.5	Local, State and Central Government Offices, Public Sector Offices, Government owned / approved private IT parks and all uses for accommodating offices of public and private agencies or for keeping of records.			
32.6	All commercial establishments, Banking and Financial institutions, Parking building, parking plaza — All having total built up area upto 2000 sq.m.	Building (s) with total built up area exceeding 2000 sq. metres and up to 3000 Sq. metres.		
32.7	Cottage Industries, Automobile workshops and service stations, Service industries of non-nuisance nature (See Annexure-I) , Water and sewage treatment plants below 5MLD, IT hardware/Electronic Industries, Total built-up area of building limited to 500 sq. m.			
	Poultry farms [4000 birds], Live stock [20 cows and 50 goats]			
32.8	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, ware houses, freight deposits, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds — All with total built-up area of building limited to **300 sq. m**.			
32.9	Plant nursery, Pump House, Wells and Irrigation Ponds			
32.10	Taxi/Jeep/Auto rickshaw stands.			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	-1	-2	-3	
33	**Commercial Zone**			
33.1	All commercial establishments and shops, Parking building, parking plaza, Automobile showrooms, Weigh bridges, Banking and Financial Institutions, Offices and Office Complexes		Multiplex	
33.2	All Residential Buildings including flats/ apartments, Boarding houses , Night Shelter/ dormitories, seminaries/ convents/ Orphanages/ Old age homes/ Dharma Sala, Guest houses / Lodges / rooming houses/ Home stays/resorts (or whatever name called), hostels, hotels with or without conference halls, dining halls or assembly rooms — All with total built up area of building limited to **1000 sq. metres**.	Building(s) with total built up area exceeding **1000 sq. metres**		
33.3	All educational institutions and research centers, day care purposes, libraries,religious educational building such as madrassa, Sunday schools & the like and appurtenant assembly buildings — All with total built up area up to 1500 sq. m.	Building(s) with total built up area exceeding **1500 sq. metres**		
33.4	Hospitals or Medical or other treatment or care of persons suffering from physical or mental illness, clinics, homes for the infirm convalescent home — All with total built up area up to 1500 sq. m.	Building(s) with total built up area exceeding **1500 sq. metres**		
33.5	All assembly buildings, recreation buildings and facilities, Religious uses, places of worship			
33.6	Local, State and Central Government Offices, Public Sector Offices, Government owned / approved private IT parks			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	-1	-2	-3	
33	Commercial Zone (contd...)			
33.7	Cottage Industries, Automobile workshops, Automobile service stations, Automobile wash stall, Electroplating works, service garages with repairing facilities, furniture making units with sawing and planing of wood, Dry cleaning, dyeing and laundry units, manure and fertilizer work, Service industries of non-nuisance nature (See Annexure-I). Spray painting workshops, IT hardware/Electronic Industries -— All with total built-up area up to 1000 sq. m.			
33.8	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, warehouses, freight deposits, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds.	Fuel filling stations		
33.9	Plant nursery, Pump House, Wells and Irrigation Ponds			
33.10	Taxi/Jeep/Auto rickshaw stands.		Transport terminals	

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses re-stricted -2	Condi-tions
	-1	-2	-3	
34	Industrial Zone			
34.1	All industries other than obnoxious and nuisance type industries as per annexure I, Automobile Workshops & Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Fish and Meat Processing Units, Water Treatment Plants, Slaughter house, Quarry, Marble and Granite crusher / Cutting Centres and Storage, Hardware/Electronic Industries, Industrial Estates & Industrial Parks.	Obnoxious/ nuisance type industries as per annexure II.		
34.2	Residential use for industrial labour			
34.3	Commercial establishments, Restaurants, Canteen. Parking building, parking plaza. Automobile work shops. Weigh bridge All with total built up area of building limited to **500 sq. metres**.	Building (s) with total built up area exceeding 500 sq. metres and up to 1500 Sq. metres.		
34.4	Art galleries, museums, libraries, skating rinks, gymnasiums, congregation, club rooms, recreation piers, amusement park, Foot ball turf, Swimming pool, Indoor Courts, Yoga centre, Health club. Recreational parks/Fair grounds, Open Air theatre, open grounds, walk ways, cycling tracks, Tot lots.			
34.5	Local, State and Central Government Offices, Public Sector Offices, Government owned / approved private IT parks and all uses for accommodating offices of public and private agencies or for keeping of records. Clinics (Out patient), Public utility buildings.	Hospitals or Medical or other treatment or care of persons suffering from physical illness, clinics, - IP up to **50 beds**.		
34.6	Storage of materials or shelter for goods, vehicles and the like, warehouses, fright deposits, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds.	Fuel filling stations		
34.7	Solid waste treatment, Sewage treatment plants.			
34.8	Poultry & Live stock farms, , Smoke House			
34.9	Taxi/Jeep/Auto rickshaw stands.		Transport terminals	

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses re-stricted -2	Condi-tions
	-1	-2	-3	
35	**Public & Semi Public Zone**			
35.1	All offices and assembly buildings,	Cremation ground/ Crematorium, Buri-al ground, com-mon vault		
35.2	All educational institutions, Religious institu-tions, Places of worship	Indoor / out door stadium		
35.3	Hospitals or Medical or other treatment or care of persons suffering from physical or mental illness, clinics, homes for the infirm, convalescent home, Diagnostic Centers, Geriatric & Palliative care centers.			
35.4	Residential use incidental to Public & Semi public use, hostels and boarding houses, night shelters, Orphanages/old age homes/ guest houses /lodges,	Fuel filling stations		
35.5	Commercial establishments, Banking and Financial institutions - All with total built area limited to 200 sq. m.	Building (s) with total built up area exceeding 200 sq. metres and up to 500 Sq. metres.		
35.6	Cottage Industries associated with public utility, Service industries of non - nuisance nature (See Annexure- I) Spray painting, Automobile work shops & service station, IT hardware and electronic industries, Water treatment plants			
35.7	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, ware houses, freight depots, transit sheds, garag-es, hangars, grain elevators, Storage of agri-cultural produces and seeds - All with total built up area limited to **300 sq. m**.	Building (s) with total built up area exceeding 300 sq. metres and up to 500 Sq. metres.		
35.8	Tot lots/Parks/Play grounds			
35.9	Taxi/Jeep/Auto rickshaw stands, Parking Pla-za,		Bus/Truck Terminals	
35.10	Plant nursery, Green houses, Agriculture and Horticulture, Pastures and Grazing Grounds, Fodder Cultivation, Pump Houses, Wells and Irrigation Ponds, Fish farms, Seed Farms, Storage of Agricultural produces and seeds			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	-1	-2	-3	
36	**Town centre Zone**			
36.1	All commercial establishments and shops, Parking building, parking plaza, Automobile showrooms. Weigh bridges, Banking and Financial Institutions, Offices and Office Complexes			
36.2	All Residential Buildings including flats/apartments, Boarding houses , Night Shelter/ dormitories, seminaries/ convents/ Orphanages/ Old age homes/ Dharma Sala, Guest houses / Lodges /rooming houses/ Home stays/resorts (or whatever name called), hostels, hotels with or without conference halls, dining halls or assembly rooms.			
36.3	All educational institutions and research centres, day care purposes, libraries, religious educational building such as madrassa, Sunday schools & the like and appurtenant assembly buildings.			
36.4	Hospitals or Medical or other treatment or care of persons suffering from physical or mental illness, clinics, homes for the infirm convalescent home.			
36.5	All assembly buildings and all recreation buildings and facilities		Multiplex.	
36.6	Local, State and Central Government Offices, Public Sector Offices, Government owned / approved private IT parks and all uses for accommodating offices of public and private agencies or for keeping of records.			
36.7	Cottage Industries, Automobile workshops, Automobile service stations, Automobile wash stall, Electroplating works, service garages with repairing facilities, furniture making units with sawing and planing of wood, Dry cleaning, dyeing and laundry units, manure and fertilizer work, Service industries of non-nuisance nature (See Annexure-I). Spray painting workshops, IT hardware/Electronic Industries			
36.8	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, warehouses, fright deposits, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds.	Fuel filling stations **Transport terminals**		
36.9	Plant nursery, Pump House, Wells and Irrigation Ponds			
36.10	Taxi/Jeep/Auto rickshaw stands.			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses re-stricted -2	Condi-tions
	-1	-2	-3	
37	**Dry agriculture Zone**			
37.1	Agriculture, horticulture and fodder cultivation, pas-tures, grazing ground, fish farm, seed farm and other types of cultivation including social forestry.			
37.2	Poultry & Live stock farms			
37.3	Single family residential building with total built up area of building limited to **300 sq. metres**.	Building (s) with total built up area exceeding 300 sq. metres and up to 500 Sq. metres.		
37.4	Night Shelter/ dormitories, seminaries/ convents/ Orphanages/ Old age homes/ Dharmasala, Guest houses / Lodges /rooming houses/ Home stays/ resorts (or whatever name called), hostels, hotels with or without conference halls, dining halls or assembly buildings.			
37.5	All Educational Institutions including Primary, Upper primary, high school, higher secondary school and other higher educational institutions including pro-fessional colleges, day care and creche, libraries , religious educational building such as madrassa, Sun-day schools & the like and appurtenant assembly buildings — All having built-up area upto 1500 sq.m..	Building (s) with total built up area exceeding 1500 sq. metres.		
37.6	Clinic (Out patients) and diognostic centres - built up area limited to **100 sq. metres**	Building (s) with total built up area exceeding 100 sq. metres and up to 300 Sq. metres.		
37.7	Libraries, club rooms, recreation piers, Foot ball turf, Swimming pool, Indoor Courts, Yoga centre, Health club, and where people gather for recreation/ social activities. Recreational parks/Fair grounds, Open Air theatre, walk ways, cycling tracks, Tot lots and play grounds. Religious uses , places of worship, Movie Halls with total built up area up to 1500 sq. meters.	Building (s) with total built up area exceeding 1500 sq. metres.	**Multiplex**	
37.8	Local, State and Central Government Offices, Public Sector Offices, Government owned / approved pri-vate IT parks and all uses for accomodating offices of public and private agencies or for keeping of records.			
37.9	Commercial establishments, Banking and Financial institutions, Automobile work shops. Weigh bridge, - All with total built up area of building limited to 100 sq. m. Parking building, Parking plaza.	Building (s) with total built up area exceeding 100 sq. metres and up to 300 Sq. metres.		

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted - 2	Conditions
	-1	-2	-3	
37	**Dry agriculture Zone (contd...)**			
37.10	Cottage Industries, Automobile workshops and service stations, furniture making units with sawing and planning of wood, Dry cleaning, dyeing and laundry units, manure and fertilizer work, Service industries of non-nuisance nature (See Annexure-I) ,	Spray painting workshops, IT hardware/ Electronic Industries above **1000 sq. metres**		
37.11	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, ware houses, freight depots, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds All with total built up area of building limited to **300 sq. m**.			
37.12	Pump House, Wells and Irrigation Ponds			
37.13	All places of worships & religious study center and residential uses incidental to main use			
37.14	Taxi/Jeep/Auto rickshaw stands.			
	Provided that the access road has a width of 8.00 m minimum			
37.15	All educational institutions and research centers, day care purposes, libraries incidental to educational buildings, religious educational building such as madrassa, Sunday schools & the like and appurtenant assembly buildings — All having total built up area up to 2000 Sq. m.	Building (s) with total built-up area exceeding **2000 sq.metres.**		
37.16	Hospitals or Medical or other treatment or care of persons suffering from physical or mental illness, clinics, homes for the infirm convalesant home.			
37.17	Auditoriums, conventional centers, wedding hall, community halls, art galleries, museums, libraries, skating rinks, gymnasiums, congregation, dance halls, club rooms, recreation piers, amusement park, Foot ball turf, Swimming pool, Indoor Courts, Yoga center, Health club, and where people gather for recreation/ social/ religious/ patriotic/ political/ civil/ travel and similar purposes. Recreational parks/Fair grounds, Open Air theatre, open grounds, walk ways, cycling tracks, Tot lots and play grounds.			
37.18	Cottage Industries, Automobile workshops and service stations, furniture making units with sawing and planing of wood, Dry cleaning, dyeing and laundry units, manure and fertilizer work, Service industries of non-nuisance nature (See Annexure-I) ,			
37.19	Storage of Non-hazardous materials or shelter for goods, vehicles and the like, ware houses, freight depots, transit sheds, garages, hangars, grain elevators, Storage of agricultural produces and seeds — All with total built up area of building limited to **500 sq. m**.			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses re-stricted -2	Condi-tions
	-1	-2	-3	
38	**Wet agriculture zone**			
38.1	Paddy fields, All kind of Agriculture and Horticulture, Pastures and Grazing Grounds, Fodder Cultivation, Fish and Seed farm, Well and irrigation ponds, Drying yard with out roof, Pump houses up to 20 sq. m. Plant nursery, Green houses	Dairy & Poultry Farms. Minor Public Utility areas & Public utility buildings incidental to main use - Area up to 100 sq. m.		
38.2	Constructions/ land developments in conformity with the Kerala Conservation of Paddy Land and Wet Land Act 2008 and its amendments in force in the State. For land which are legally converted to dry land by order of the competent authority, developments / constructions shall be permitted for the uses for which it was converted.	In the case of land which are dry as per revenue records, the secretary may, with the concurrence of the District Town Planner concerned considering the zoning regulations of surrounding land, permit constructions and land developments.		
39	**Water body**			
	All existing water bodies shall be conserved. Bridges, Side protection walls, Walk ways and cycling tracks around the water body, Bathing Ghats, Floating jetty, boat docking facilities, Sewage treatment Plant etc. may be permitted based on community level requirement.			
40	**Traffic and transportation zone**			
40.1	Roads, walkways, cycling tracks, flyovers, over bridges and under passes, All buildings and uses connected with Transport and communication such as Bus /Lorry Terminal, auto taxi Stand, Railway Station, essential repair and service shops related to the transportation & communication use, Parking grounds, Parking plaza, Traffic park.	Police post/ Station, Fire Post/Station, Post & Telegram office, Telephone Exchange, Electric sub-station, Clinics (Out Patient), Offices, Commercial, public & semi public uses and storage — All incidental to main use.		

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses re-stricted -1	Uses re-stricted -2	Conditions
	-1	-2	-3	
40	**Traffic and transportation zone**			
40.2	Any use incidental to the uses permitted such as retail shops/ Restaurants/ Canteen, Night Shelters, Guest houses, lodging facilities, Tot lots, Parks which form an integral part of transportation use	Social Welfare centre, Public utility areas and public utility buildings, Movie Halls.		
40.3	ATMs, Weigh bridges, Water& Sewage treatment plant	Fuel filling stations	Multiplex complex	
41	**Recreational zone**			
41.1	Open Air Stadium, Open Air Theatre, Any construction/land development essential for the development/ improvement of open air recreational facilities.			
41.2	Amusement parks, Tot Lots, Park, Play Grounds, bath houses, Swimming Pools, Zoological & Botanical Garden, Bird Sanctuary, Indoor games and stadiums, Gymnasium, Pavilions and grandstands, radio & television station, Watch Towers, Eco Walk Ways, road, Cycling tracks, Water Sports Facilities, Fair Grounds, parking grounds , Parking plaza, etc.			
41.3	Public utility areas and public utility buildings and its Incidental uses like restaurants, canteen, curio shops, retails shops etc. which will not affect the character of the area — All with total built up area limited to 100 sq. m.			
42	**Cremation and burial ground**			
	Cremation grounds, Burial grounds. Modern crematoriums, Buildings/ Structures incidental to the main use of the Zone.			
43	**Green belt**			
	No construction shall be permitted in this zone except: Sewage treatment plant, well, ponds and bicycle track maximum of 3.00 metres width			
44	**Solid waste management Plant**			
	Solid waste treatment plant and uses incidental to the permitted use of the zone			

Table 34.1 Continued.....

Sl. No.	Uses permitted	Uses restricted -1	Uses restricted -2	Conditions
	-1	-2	-3	
45	**Land reserved for Road**			
	Roads, walkways, cycling tracks, flyovers, over bridges, under passes and other uses which forms an integral part of the right of way. The existing roads, new roads, and widening roads are shown separately on the Proposed land use map for easy identification.			
46	**Flood prone area Overlay (based on Flood Hazard Probability of Kerala based on RCP8.5 Climate Change Scenario (100 years), Hazard Map published by KSDMA)**			
a.	**Land use regulations**			
46.1	All uses permitted in accordance with the Zoning Regulation of the respective Land Use Zone			All uses other than specified.
46.2	Buildings for public purposes/ Public amenities & services/ Disaster mitigation projects/ measures.			
46.3	Bridges, Side protection walls, Bathing Ghats, Constructions for drinking water and Irrigation schemes, Floating jetty, Pump house, Fish landings, Boat Jetties, Guided Boat rides, Watch Tower, Eco Walk ways, Water Sports Facilities, Fairground, park and open spaces, cycling track etc.			
46.4	Social forestry activities like bamboo cultivation, agriculture and horticulture, wells, ponds, ticket counter, Bird sanctuaries etc.			
46.5	The flood prone area is applicable to the complete area under the survey number over which it falls.			
b.	**Built form regulations**			
46.6	Plinth levels of all new constructions should be at a height of minimum 0.75 meter above the existing ground level or on stilts of height minimum 0.75 meter from existing ground level without obstructing the natural flow of water.			
46.7	New constructions shall have at least a balcony or an open verandah or an open terrace in the upper floor (s) or an open stair connecting the upper floor (s) to the ground. Such balcony or open verandah or open terrace or open stair shall face the yard abutting the adjoining street to facilitate easy evacuation.			
46.8	In the case of new buildings or constructions involving addition / extension of upper floor (s), at least 50 % of roof terrace area so constructed, shall be kept open to the sky and made accessible to facilitate easy evacuation.			
46.9	Height of any newly constructed compound wall shall not exceed 1.20 m and no sharp edged projections shall be fixed on the compound walls or gates.			

Table 34.1 Continued.....

Sl. No.		Uses permitted	Location and extent	Adaptable zone(s)
1	2	3	4	5
47	Zone name	**SPECIAL ZONES: Developments in this zone may be permitted by The Secretary. For the Projects proposed in paddy land, developments shall be subject to the provision of Kerala Conservation of Paddy Land and Wet land Act in force in the state. The proposals which are marked as G1, G2, G3 are proposed in land owned by Government/ LSG/ other Government institutions. Municipality shall act as a facilitator and take initiative to get the project implemented by the respective agencies/ departments through proper intervention. If required, the Municipality may take necessary steps for transferring the ownership of such lands to the LSG or concerned department/ agency implementing the project. Proposals which are marked as P1, P2, P3etc... are proposed in privately owned lands and shall be implemented by the municipality through land procurement by suitable means. For proposals P2, P3 and P4, municipality may take initiation to get the project implemented by the land owner or by any other private agencies or developer also, but with the concurrence of the municipal council. Initiation of land procurement for special zones shall be started within a period of 7 years from the date of sanctioning of this plan, otherwise the land use of that particular land may be returned to an adaptable zone as specified in column 5. If more than one adaptable zones are included in column 5 of any special zone, then all uses included as permitted and restricted in all such zones shall apply.**		
47.1	G1	**Multi Level Parking:** Parking plaza, parking grounds and other incidental uses. All commercial establishments, offices, assembly occupancies limited to ground floor.	Nethirimangalam Desam, Sy No: 32/B1B.	Public and semi public zone
47.2	G2	**Fire station:** Fire and rescue station, offices, parking ground and other incidental uses.	Nethirimangalam Desam, Sy No: 156/6A, 156/6B,158/6, 158/7, 158/8, 60/6.	Public and semi public zone
47.3	G3	**Life Tower:** Residential facilities, apartments, health care facilities, park and play grounds and other entertainment activities incidental to main use.	Nethirimangalam Desam, Sy No: 104/6, 104/7.	Residential zone, Public and semi public zone
47.4	P1	**Hospital complex:** Government hospital, offices, fire and rescue station, park and open spaces, incidental to main use.	Kodalur Desam, Sy No:14/4, 16/18A, 16/18B, 16/9, 17/1, 17/2, 17/3.	Residential zone, Commercial zone
47.5	P2	**Town hall:** Assembly / auditorium hall, rehabilitation centre, comfort station, clock room, community kitchen, and such other incidental uses to the main use.	Kcdalur Desam, Sy No: 23/1A, 25/22.	Commercial zone
47.6	P3	**Open Auditorium:** Assembly halls , auditoriums, out door sports and games, parking and other incidental uses to the main use.	Nethirimangalam Desam, Sy No: 5/3, 5/7A, 5/4.	Town centre
47.7	P4	**Aquatic complex:** Indoor and out door sports and games infrastructure facilities, swimming pool,gyms, including hostels, dormitories and all other such incidental use.	Nethirimangalam Desam, Sy No: 5/5.	Town centre

Table 34.1 Continued.....

Sl. No.		Uses permitted	Location and extend	Adaptable zone
1	2	3	4	5
47.8	P5	**Park & open space and Parking:** Parking of all vehicles, parking lots, multi-level parking, play ground, recreation infrastructure, open gyms.	Nethirimangalam Desam, Sy No: 23/A1, 23/A2, 23/A3, 23/A4A, 23/A4B, 23/A5, 23/A6, 23/A7, 23/A8, 23/A9, 23/A11, 140/2, 140/3, 140/4, 140/5, 140/6, 140/7, 140/11.	Public and semi public zone
47.9	P6	**Collection well:** Plant nursery, Pump House, Wells and Irrigation Pond, office, staff rest room, incidental parking.	Kizhayur desam, Sy No: 45/1A	Residential zone
47.10	P7	**STP at Nambram:** Sewage treatment plant, Plant nursery, Pump House, Wells and Irrigation Pond, office, staff rest room, godowns and other uses incidental to the main use.	Kizhayur desam, Sy No: 86	Water body
47.11	P8	**Collection well:** Plant nursery, Pump House, Wells and Irrigation Pond, office, staff rest room, incidental parking.	Nethirimangalam Desam, Sy No: 40/8, 41/1, 143/1	Public and semi public zone
48	**Heritage zone**			
	Construction/land developments around the Kaithali Temple (ASI Protected Monument) shall be as per regulations under the provision of AMASR Act 2010 and its amendments in force.			

ANNEXURE I

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

1. Aerated waters and fruit beverages
2. Apparel making
3. Assembly of air coolers and conditioners
4. Assembly of bicycles, baby carriage & other small non motorized vehicles.
5. Atta - Chakkies
6. Ayurvedic medicinal formulations, Ayurvedic health club
7. Bakery products ,biscuits ,confectionaries
8. Bamboo and cane products (only dry operations)
9. Block making for printing
10. Card-board box and corrugated paper and paper products
11. Carpet weaving
12. Cement and concrete products
13. Chilling plants and Cold storage
14. Coir (without bleaching /dyeing)
15. Concrete batching plants
16. Copper, brass and metal utensils
17. Cotton and woolen hosiery/Cotton and silk printing
18. Domestic electrical appliances
19. Electronics and electrical goods
20. Electroplating
21. Embroidery and Lace manufacturing
22. Engineering workshop and general fabrication works
23. Flour mills
24. Foam beds, Latex thread
25. Footwear (PVC and rubber)

26. Fountain pen
27. Furniture making
28. Garment stitching, tailoring
29. Gold and silver smithy
30. Gold and silver thread saree work
31. Ice cream or ice making
32. Insulation and other coated papers (Paper and pulp manufacturing excluded)
33. Jobbing and machining
34. Laundry, dry cleaning and dying
35. Light engineering
36. Manufacture and repair of musical instruments
37. Manufacture of soaps involving process without generation of trade effluents (Saponification of fats and fatty acids only
38. Manufacture of tobacco products
39. Manufacturing of formulated synthetic detergent products
40. Mineralized water
41. Oil ginning /expelling
42. Optical frames
43. Padlock
44. Paint (by mixing process only)
45. Paper pins and U- clips
46. Photo and picture framing
47. Power looms /hand looms (without dyeing &bleaching)
48. Pressure testing units
49. Printing press
50. Radio servicing and repairing
51. Rice mullors
52. Rope (Cotton and Plastic)

53. Rubber gloves other than that for surgical and medicinal purpose
54. Rubberized coir mattresses
55. Sanitary fittings and other similar industries
56. Scientific and mathematical instruments
57. Small foundries
58. Sports goods
59. Steeping and processing of grains
60. Tissue culturing
61. Toy making
62. Watch, pen and Spectacle repairing
63. Water softening and demineralization plants
64. Wooden and electrical accessories

ANNEXURE II

List of obnoxious or nuisance industries subject to objectionable odours, fumes, effluents or processes, located in hazardous 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 from malwa, palm juice.

III. Manufacture of wood and wooden products:

4. Sawing and planning of wood
5. Wood seasoning and creosoting
6. Manufacture of veneer and plywood
7. Paper, pulp and straw board

IV. Manufacture of leather and leather products:

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

V. Manufacture of rubber, petroleum and coal products:

9. Manufacture of tyres and tubes
10. Manufacture of industries and synthetic rubber
11. Reclamation of rubber
12. Production of petroleum, kerosene and other petroleum products in refineries
13. Production of coal tar and coke in coke oven

VI. Manufacture chemicals and chemical produces

14. Manufacture of basic industrial chemicals such as acids, alkali and their salts not elsewhere specified (especially sulphurous, sulphuric,

nitric, hydrochloric etc., acids) ammonia, chlorine and bleaching powder manufactures.

15. Manufacture of dyes, paints, colours and varnishes, printing ink
16. Manufacture of fertilizers (specially from organic materials)
17. Manufacture of disinfectants and insecticides
18. Manufacture of ammunition; explosive and fire works
19. Manufacture of matches

VII. Manufacture of non-metallic mineral products other than petroleum and coal:

20. Manufacture of cement and cement products
21. Manufacture of lime
22. Manufacture of plaster of Paris

VIII. Manufacture of basic metals and their products.

23. Manufacture of iron and steel including smelting, refining rolling and conversion into basic forms
24. Manufacture including smelting, refining etc., or nonferrous metals and alloys in basic forms
25. Manufacture of armaments

IX. Manufacture of machinery (other than transport) and electrical equipments

26. Manufacture of all kinds of battery

X. Miscellaneous items not covered above:

27. Incineration, reduction or dumping of offal, dead animal's garbage or refuse
28. Manufacture of gelatin and glue
29. Fat, tallow, grease or lard refining of manufacture
30. Bone meal, bone grist and bone powder and other similar types of nuisance industries.

ANNEXURE III

As part of the master plan preparation, a stakeholder meeting was held on February 02, 2022 at the Pattambi Municipal Council Hall. The meeting was attended by 25 representatives from various organisations.

Lakshmikutty -Chairperson Suggested and encouraged everyone to make remarkable points and bring valuable suggestions in the meeting. **Vice Chairman Sri. TP Shaji** has welcomed all participants in the meeting and urged to have fruitful discussions and put forward valuable suggestions. Below are the comments and suggestions of those who participated in the meeting.

TP Shaji - Vice Chairman

He spoke about various requirements like, open air auditorium, a municipality-owned separate council hall, a crematorium, a comprehensive drinking water scheme, an abattoir, a municipal tower etc.

Vinayan

He made suggestions for the expansion of the Pattambi Taluk Hospital and the development of the hospital. He said that if the road is constructed with a width of 30 meters, there will be no town in the municipality. It was also pointed out that, the river and rail are the main hindrances of the development of Pattambi. It was also suggested to evict the encroached land. He has made the following proposals: Construct parking and a food path from Guruvayur temple to Keezhayur, establish an open gym, Set up a sewage water treatment system, Find a solution to sewage water draining into the open canals . Maintaining the court complex properly and providing accommodations to judges, Adapt biogas systems, For the benefit of the farmers and to promote the crops, set up an industry by procuring goods directly from farmers that will benefit the public as well.

KP Muhammad Kutty (Doctor)

He suggested that, the hospital set up 10 cents of land for the benefit of the elderlyerly. The land near to the SNGS college is suitable for the Taluk hospital renovation. Set up, a sewage treatment plant, make proper use of parking facilities to improve traffic flow and improve transportation facilities.

K.P.Kamal (Chamber of Commerce)

Take a step to relocate street vendors. Take action to lay tiles on the food path. Relocate the bike parking near the bus stand to some other convenient locations during

6.00 am to 7.00 am. Instructed to remove the unauthorized 'No Parking boards'. Provide facilities for vehicle parking and an open auditorium on the bank of Bharatapuzha. The shops that violated the rule by extending it to the roads need to be fined with legal notice. Maintain the roadside drainage systems properly and improve the transportation system by introducing a bypass facility. It has been suggested that the existing water filtration system in front of the burial yard is insufficient. Prepare and maintain the canals so as to reach the water in the surrounding areas.

Balakrishnan (Vyapari Vyvasaya Samithi)

Instructions were given to protect the trade sector.

Siddique (Vyapari Ekopana Samithi)

Take measures against illegal parking. Find a good place and relocate the street vendors from Pattambi to Kalpaka area. Take initiative to ensure the pedestrians do not experience any inconvenience due to the vehicle parking .

TP Usman (Indian Union Muslim League)

Provide bus bay facilities in the existing bus stand.

Sreedharan (Kerala Building Owners Association)

Expressed gratitude for providing street lights in the various locations in the municipality. It is suggested to implement an Architectural Plan for Structural buildings. Set up a pay parking facility in the town. Appoint a cardiologist in the Govt. hospital. Set up a facility to treat the sewage before it reaches the river.

Shabeer K P (Liment College)

Refrain from the road widening to 30 meter project.

Ajayan K P (Pattambi Service Co op Bank) (Plan Coordinator)

It is suggested to construct the bus stand next to the market.

Vijayan (Convener Pattambi Municipality).

He observed that, the Industrial Park and Techno Park shall be great successes once they are established. Establishing a family court will be an advantage to the community in Pattambi.

Vinayan CPIM.

It will be great to have an auditorium in Kalpaka and a new hospital to be constructed in Kumbankallu area.

Rajan Master :

He disagreed with the development that is threatening the agriculture sector and suggested protecting wet lands and ponds.

Mohandas (environmental activist)

He appreciated the master plan for the Pattambi municipality. Suggested for toilets in Mele Pattambi, river conservation, accommodation for the migrant labours, renovation of cremation, giving priority to nature conservation, preserving the kandam thodu Canal, and turning the town green.

Muralidharan (environmental activist).

Welcomed the decision to make comfort stations at 5 locations. It is suggested for renovation of fish market, Revenue Tower, modern crematorium, new crematorium, playground for children, steps to get clean drinking water, construction of a new bus stand on Perinthalmanna Road, Parking facility at the premises of the railway station and on Nambram Road.

Pattambi unit and Pattambi Youth Wing Committee of Kerala Vyapari Vyavasayi Ekopana Samithi have made some suggestions.

Make the parking facility which is currently starting in the town and also in Melepattambi. While renovating the town, reorganize the existing auto and taxi stands and eliminate unnecessary vacant taxi stands. Create an appealing environment for street vendors and only allow vendors who are registered with the municipality to do business. Suggested to complete the proposed Town Park as soon as possible and in addition to it extend the park towards Nambam. Take an immediate step for improvement of the road from over bridge to the bus stand, in particular rebuilt the drain and cover it with slabs, and ensure passengers feel at ease. Provide roadside areas in Mele Pattambi into parking facilities. Repair road flaws on a regular basis. Build bus bays at all bus stops to alleviate traffic congestion. Improve the waste management system in order to boost urban tourism. Set up comfort stations throughout the city for the convenience of visitors. The electric posts along the road in Pattambi city, particularly near the over bridge, should be moved to the side. Steps should be taken to ensure that the drinking water supplied within Pattambi Municipality is completely purified.

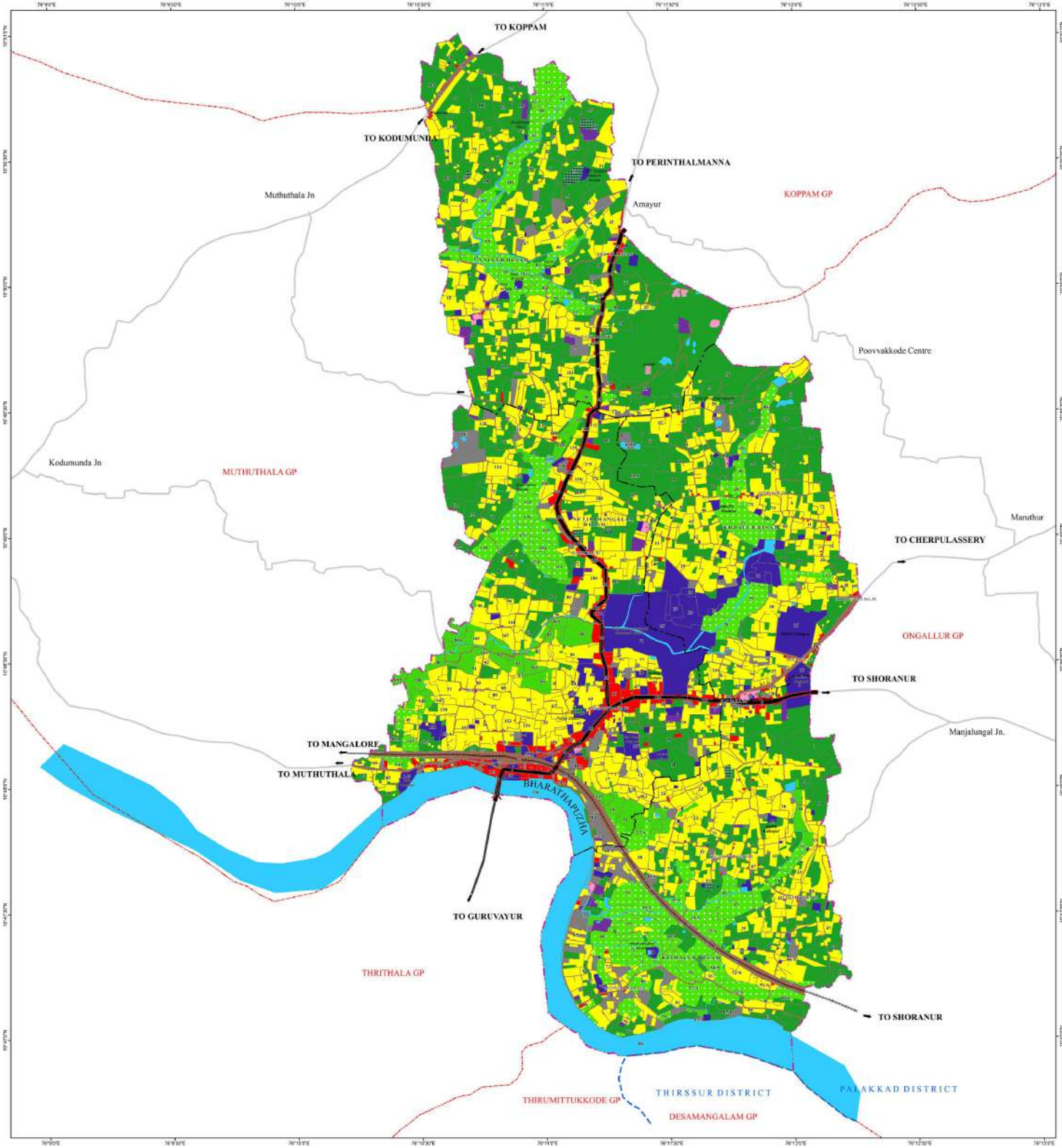
MASTER PLAN FOR PATTAMBI TOWN
EXISTING LANDUSE MAP -- MP/01











LEGEND

- Residential
- Commercial
- Industrial
- Public and Semipublic
- Park and open spaces
- Paddy
- Paddy Without Cultivation
- Dry Agriculture
- Cremation and Burial ground
- Traffic and Transportation
- Dumping Yard
- Quarry
- Vacant
- Waterbody
- Survey Boundary
- Desam Boundary
- Nearest LSG Boundary
- Municipal / Village Boundary
- District Boundary

Roads

- SH
- Railway Line
- Bridge

0 125 250 500 750 1,000 Meters

SCALE 1:10000

N W E S

PATTAMBI MUNICIPALITY	OFFICE OF THE CHIEF TOWN PLANNER (PLANNING) LSGD PLANNING THIRUVANANTHAPURAM
Chairperson	Assistant Town Planner
Secretary	Deputy Town Planner
OFFICE OF THE TOWN PLANNER LSGD PLANNING, PALAKKAD	Town Planner
Draftsman	
Assistant Town Planner	Senior Town Planner
Deputy Town Planner	
TOWN PLANNER	**CHIEF TOWN PLANNER (Planning)**

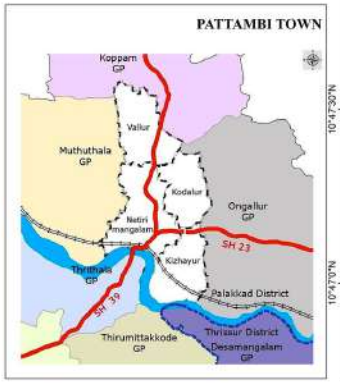
LOCAL SELF GOVERNMENT DEPARTMENT

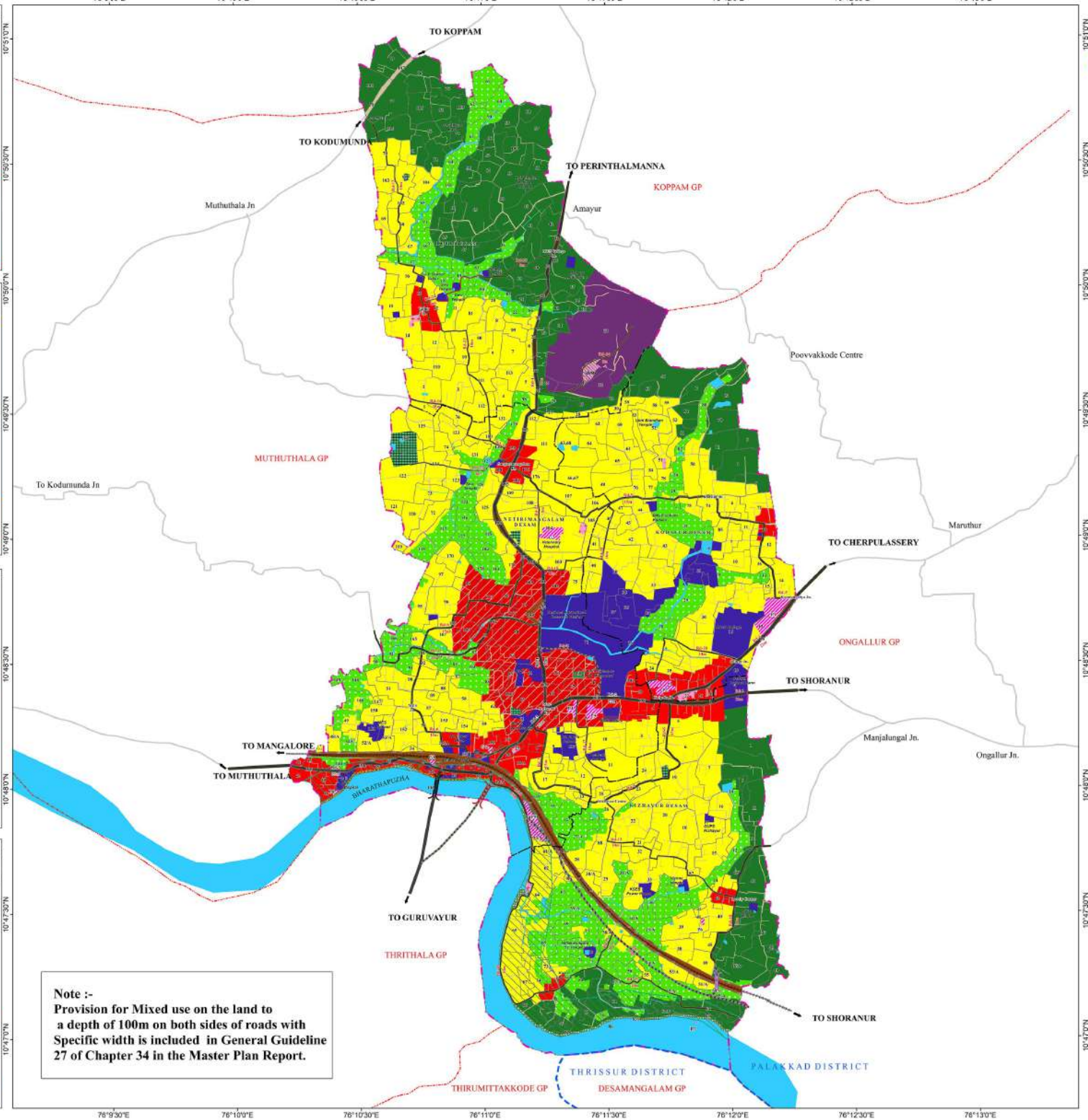
Additional Chief Secretary to Government











Note :-
Provision for Mixed use on the land to a depth of 100m on both sides of roads with Specific width is included in General Guideline 27 of Chapter 34 in the Master Plan Report.

MASTER PLAN FOR PATTAMBI TOWN
PROPOSED LAND USE MAP-2036-MP/02/I

LEGEND

Proposed Land use

- Residential Zone
- Commercial Zone
- Industrial Zone
- Public and Semipublic Zone
- Town Centre Zone
- Dry Agriculture Zone
- Wet Agriculture Zone
- Water body
- Traffic and Transportation Zone
- Recreational Zone
- Cremation and Burial ground
- Green Belt
- Solid waste management plant
- Land Reserved for Road
- Existing Road
- Road Widening
- New Roads
- Flood prone Area
- Special Zone
- Heritage Zone
- Verdant Street
- Eco Mobility Corridor
- Survey Boundary
- Desam Boundary
- Nearest LSGI Boundary
- Municipal / Village Boundary
- District Boundary
- Existing Bridge
- Proposed Bridge
- Proposed ROB
- Railway Line

0 125 250 500 750 1,000 Meters

SCALE 1:10000

N S E W

PATTAMBI MUNICIPALITY	OFFICE OF THE CHIEF TOWN PLANNER (PLANNING) LSGD PLANNING THIRUVANANTHAPURAM
Chairperson	Assistant Town Planner
Secretary	Deputy Town Planner
OFFICE OF THE TOWN PLANNER LSGD PLANNING, PALAKKAD	Town Planner
Draftsman	
Assistant Town planner	Senior Town Planner
Deputy Town planner	
TOWN PLANNER	CHIEF TOWN PLANNER (Planning)

LOCAL SELF GOVERNMENT DEPARTMENT

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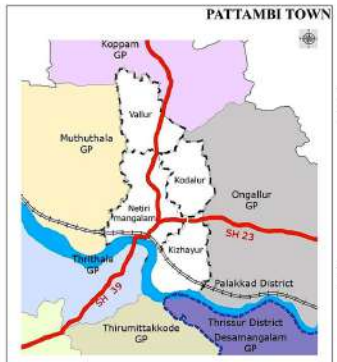

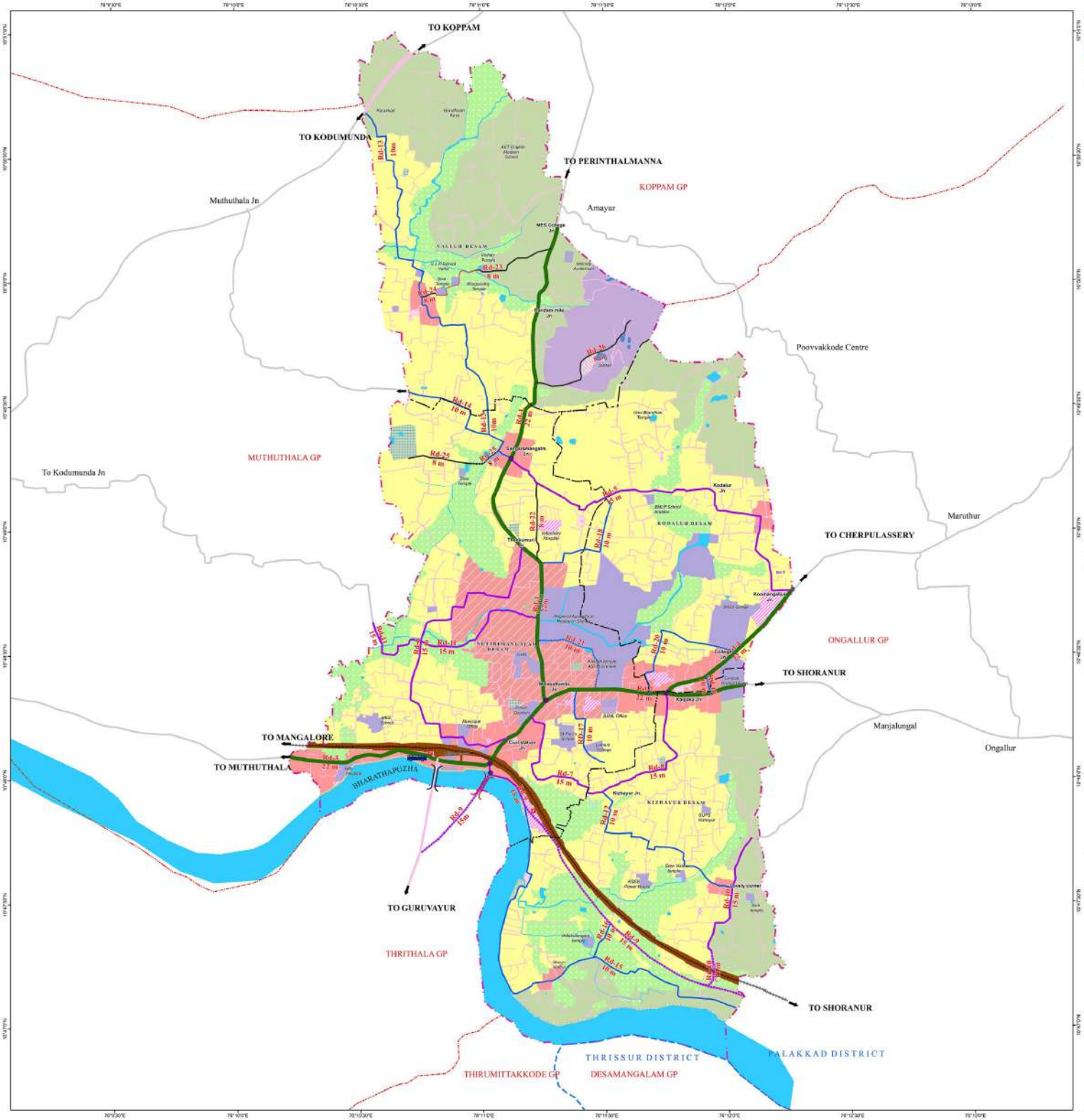

MASTER PLAN FOR PATTAMBI TOWN
PROPOSED ROAD NETWORK MAP- 2036--MP/02/11

LEGEND

Widening Roads
- 22 m
- 15 m
- 10 m
- 8 m

Proposed Roads
- 22 m
- 15 m
- 10 m
- 8m

- Verdant Street
- Proposed Junctions
- Proposed Parking
- Existing Bridge
- Proposed Bridge
- Proposed ROB
- Existing Bus Stand
- Railway Land
- Water body
- Other Roads
- Railway Line
- Desam Boundary
- Nearest LSG Boundary
- Municipal / Village Boundary
- District Boundary

0 125 250 500 750 1,000 Meters

SCALE 1:10000

N W E S

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Modernist Architecture and Town Planning is inimical to human beings..... based on Darwinian concept that evolution is open ended, that there must always be something new and better.

Leon Krier

October 2023