# TIRUCHIRAPPALLI

## Master Plan - 2045

### GIS BASED PLAN

Volume 1/2

Directorate of Town and Country Planning
Government of Tamil Nadu

# TIRUCHIRAPPALLI MASTER PLAN - 2045

## TIRUCHIRAPPALLI
## LOCAL PLANNING AUTHORITY

## VOLUME – 1

**DIRECTORATE OF TOWN AND COUNTRY PLANNING**
**GOVERNMENT OF TAMIL NADU**

# MASTER PLAN - 2045
# FOR
# TIRUCHIRAPPALLI LOCAL PLANNING AUTHORITY

| | | |
|---|---|---|
| Name of the Local Planning Authority | : | Tiruchirappalli Local Planning Authority |
| Tiruchirappalli Local Planning Authority Reference No | : | Roc No.246/2011/TD-3 |
| Directorate of Town and Country Planning Reference No | : | Roc No.30302/2005/MP3 and 30304/2005/TCP2 |
| Consent | : | Consented in G.O. (Ms). No. 13, Housing & Urban Development [UD4(2)] Department, Dated: 13.01.2024. |

Approved Under Section 28 of Tamil Nadu Town and Country Planning Act, 1971 in G.O.(Ms)No: 66 Housing and Urban Development [UD4(2)] Department, dated: 04.03.2026

**Joint Director (FAC) /**
**Member Secretary / Assistant Director,**
Tiruchirappalli Local Planning Authority
District Town and Country Planning Office,
Tiruchirappalli

**Assistant Director,**
Directorate of Town and Country Planning,
Chennai

**Joint Director**
Directorate of Town and Country Planning
Chennai

**Director**
Directorate of Town and Country Planning
Chennai

**ADDITIONAL CHIEF SECRETARY TO THE GOVERNMENT**
Housing and Urban Development Department
Government of Tamil Nadu

# PERFORMA

| | | | |
|---|---|---|---|
| Name of the Office | | : | District Town and Country Planning Office, Tiruchirappalli District |
| Name of the LPA | | : | Tiruchirappalli Local Planning Authority |
| **I.** | **PROPOSAL** | | |
| 1. | Letter No. and date of DTCP in which proposals submitted to Government | : | Letter No.246/2011/TD-3, Dt: 11.12.2024. |
| **II.** | **NOTIFICATION** | | |
| 2. | The G.O details of Notification Under Section 10(1) | : | G.O(Ms)No.936, RD&LA Department, Dt: 05.04.1974. |
| 3. | The G.O. details which confirmation was ordered under section 10(4) | : | G.O(Ms)No.1669, RD&LA Department, Dt: 16.07.1974. |
| 4. | The G.O. details of Notification Under section 10(1)(b) | : | G.O(Ms)No.240, H&UD (UD4(2)] Department, Dt: 24.09.2013. |
| 5. | The G.O. details which confirmation was ordered under section 10(4) &10(6) | : | G.O(Ms)No.88, H&UD (UD4(2)] Department, Dt: 30.06.2021. |
| 6. | The G.O. details which declaration was ordered under TUDA section 2(48) | : | G.O(Ms)No.207, H&UD (UD4(2)] Department, Dt: 23.11.2022. |
| **III.** | **CONSTITUTION** | | |
| 7. | The G.O details in which Tiruchirappalli appointment of Members | : | G.O(Ms)No.100, H&UD (UD4(2)] Department, Dt: 14.08.2023. |
| **IV.** | **CONSENT** | | |
| 8. | The G.O details in which the Government Accorded consent Under Section 24(2) | : | G.O(Ms)No.13, H&UD (UD4(2)] Department, Dt: 13.01.2024. |
| **V.** | **PUBLICATION** | | |
| 9. | Notification in form No.1 in the Tamil Nadu Government Gazette Under Section 26 | : | Tamil Nadu Government Gazette No.6, Part-VI, Section-1, Page No.238, 239, dt: 07.02.2024. |
| 10. | Resolution No. and date in which the Tiruchirappalli approved the Draft Master Plan | : | Tiruchirappalli Local Planning Authority Resolution No. 03, Dt: 12.09.2024 |

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## VI. APPROVAL

| | | | |
|---|---|---|---|
| 11. | Submission of Master Plan to Government for final approval Under Section 28 | : | Letter no. 246/2011/TD 3 Dt 18.02.2026. |
| 12. | The G.O. details in which Government accorded its Approval under Section 28 | : | G.O(Ms)No.66, H&UD (UD4(2)] Department, Dt: 04.03.2026. |

## VII. PUBLICATION DETAILS OF APPROVAL IN

| | | | |
|---|---|---|---|
| 13. | The Tamil Nadu Government Gazette under Section 30 | : | Tamil Nadu Government Gazette No.144, Part-II, Section-2, dt: 04.03.2026. |
| 14. | The notice board of the Local Body | : | |
| 15. | One or more leading daily Newspaper Circulation in the Tiruchirappalli Local Planning Area | | |

**Joint Director (FAC)/**
**Member Secretary/ Assistant Director,**
Tiruchirappalli Local Planning Authority

# TIRUCHIRAPPALLI MASTER PLAN - 2045

## CERTIFICATE

It is certified that,

- All the procedures prescribed in the Master Plan are prepared, published and sanctioned.
- The boundary of Tiruchirappalli Local Planning Area is reframed.
- Reports with the master plan are annexed and authenticated.
- The categorization in zoning map and the categorization in zoning regulation are tallied and found correct.

**Joint Director (FAC)/**

**Member Secretary/ Assistant Director,**

Tiruchirappalli Local Planning Authority

# ACKNOWLEDGEMENT

The Tiruchirappalli Local Planning Authority expresses its deep sense of gratitude to all individuals and institutions whose guidance, support, and collaboration have been instrumental in the preparation of the "GIS-Based Master Plan for Tiruchirappalli Local Planning Area - 2045". The successful completion of this comprehensive planning document has been made possible through the collective efforts of numerous stakeholders.

We convey our sincere thanks to Tmt. Kakarla Usha, I.A.S., Additional Chief Secretary to Government, Housing and Urban Development Department (HUDD), Tamil Nadu, for her invaluable guidance and direction throughout the planning process.

We express our gratitude to Thiru B. Ganesan, I.A.S., Director, DTCP, for his strategic recommendations, leadership and continued mentorship, which greatly contributed to the successful completion of the Master Plan.

We also acknowledge the dedicated support of Thiru V. Saravanan, I.A.S., District Collector, Tiruchirappalli and Thiru M. Pradeep Kumar, I.A.S., Former District Collector, Tiruchirappalli for their assistance in facilitating stakeholder consultations and community engagement activities, critical to the development of this Master Plan.

Our sincere regards are also extended to Thiru Murugan C.S., Advisor, HUDD, and Dr. Kanchanamala S., Additional Secretary (Technical), HUDD, Government of Tamil Nadu, for their expert guidance and continuous support in shaping the document.

We gratefully acknowledge the significant contributions of the Chennai Unified Metropolitan Transport Authority (CUMTA) and the IC Centre for Governance Coimbatore (ICCfG), for their valuable inputs in the Mobility and Economic Development components of the Master Plan.

We place on record our appreciation for the expert insights and constructive participation of the Chamber of Commerce; Confederation of Indian Industry (CII); Confederation of Real Estate Developers' Associations of India (CREDAI); Guidance Tamil Nadu and Tiruchirappalli District Tiny & Small-Scale Industries Association.

We acknowledge the dedicated contribution of Thiru Rama Krishna Rao, Team Leader – Project Monitoring Unit, DTCP, Tmt. Vaidehi E P Deputy Team Leader – Master Plan Unit, DTCP, Thiru Sreevatsa G R, Chief Executive – Tapasya Design Studio, Auroville, CARE School of Architecture, Tiruchirappalli and Tmt. Shanthakumari P, Assistant Director, DTCP for their technical guidance, consistent review and coordination throughout the project period.

We express our appreciation to all stakeholders, Urban Local Bodies, and participating government departments for their cooperation and commitment to this collaborative effort.

Finally, we extend our sincere thanks to all officers and staff of the District Town and Country Planning Office, whose commitment, hard work, and consistent support ensured the timely completion of the Master Plan.

**CORE TEAM:**

Mr Akil R | Ms Aruna J | Ms Ashmi A | Mr Balaji J | Ms Bavithra K | Ms Chandavi C N | Ms Gayathri Venkatraman | Mr Guru Prasath A | Dr. Kathiravan R | Ms Khalida Sultana | Mr Kirti Chandra D | Ms Kokilavani S P | Ms Madhumitha B | Mr Manoj Kumar S | Ms Mithilaa Shri | | Ms Monisha P | Ms Monisha R | Ms Nandhini P | Ms Nikki Yadav | Ms Nivetha M | Mr Prabhu R | Mr Shanmuga Priyan R | Ms Renjitha R N | Mr Sesha Bharathy M | Ms Vaasli T | Mr Vallarasu K | Mr Venkat Ramanan A

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**Joint Director (FAC)/**

**Member Secretary/ Assistant Director,**

Tiruchirappalli Local Planning Authority

**ABSTRACT**

Urban Development – Master Plan 2045 for Tiruchirappalli Local Planning Area – Approval under section 28 of the Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972) - Accorded – Orders – Issued.

==========

**HOUSING AND URBAN DEVELOPMENT [UD4(2)] DEPARTMENT**

**G.O.(Ms).No.66** **Dated:04.03.2026**

விசுவாவசு வருடம், மாசி 20

திருவள்ளுவர் ஆண்டு 2057.

**Read:**

1. G.O.(Ms).No.240, Housing and Urban Development (UD4(2)) Department, dated 24.09.2013.
2. G.O.(Ms).No.88, Housing and Urban Development (UD4(2))Department, dated 30.06.2021.
3. G.O.(Ms).No.13, Housing and Urban Development (UD4(2))Department, dated 13.01.2024.
4. From the Director of Town and Country Planning, letter Na.Ka.No.30302/2024/TCP2, dated 19.12.2024 and 18.02.2026.

======

**ORDER:**

In the Government order second read above, orders were issued for declaring the revenue villages specified therein to be a local planning area, namely, Tiruchirappalli local planning area under sub-section (4) of section 10 of the Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972).

2. In the Government order third read above, orders have been issued giving consent under sub-section (2) of section 24 of the said Act to the Tiruchirappalli local planning authority for the publication of a notice under section 26 of the said Act for inviting objections and suggestions in the preparation of the Master Plan for Tiruchirappalli local planning area.

3. The Director of Town and Country Planning, in his letter fourth read above, has forwarded the draft Master Plan 2045 for the Tiruchirappalli local planning area as approved by the Tiruchirappalli local planning authority, and requested the Government to accord approval under section 28 of the said Act.

..2..

4. The Government, after careful consideration, have decided to accept the draft Master Plan 2045 for Tiruchirappalli local planning area, as approved by the Tiruchirappalli local planning authority submitted through the Director of Town and Country Planning in para 3 above.

5. Accordingly, in exercise of the powers conferred by section 28 of the Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972), the Governor of Tamil Nadu, after consultation with the Director of Town and Country Planning, hereby approves the draft Master Plan 2045 for the Tiruchirappalli local planning area submitted by the Tiruchirappalli local planning authority.

6. The copies of the said Master Plan 2045 for the Tiruchirappalli local planning area as approved by the Government are communicated to the Director of Town and Country Planning, subject to condition that the master plan shall be reviewed every five years as per clause (b) of sub-section (2) of section 32 of the said Act.

7. The following Notification shall be published in the Tamil Nadu Government Gazette. Tiruchirappalli local planning authority is directed to ensure that the Notification is republished in the manner as prescribed in rules 12 and 15 of the Master Plan (Preparation, Publication and Sanction) Rules.

**NOTIFICATION**

In exercise of the powers conferred by sub-section (1) of section 30 of the Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972), the Governor of Tamil Nadu hereby publishes the approval of the Government under section 28 of the said Act for the Master Plan 2045 for the Tiruchirappalli local planning area submitted by the Tiruchirappalli local planning authority.

2. The approved Master Plan 2045 for the Tiruchirappalli local planning area with all its enclosures shall be kept open for the inspection of the public during working days in the office of the Tiruchirappalli Municipal Corporation during office hours.

**(BY ORDER OF THE GOVERNOR)**

**KAKARLA USHA**
**ADDITIONAL CHIEF SECRETARY TO GOVERNMENT**

To
The Works Manager,
Government Central Press,
Chennai – 600 001. (for publication of notification in the
Extra-ordinary issue of Tamil Nadu Government Gazette)
The Director of Town and Country Planning,
Chennai-600107.

..3..

The Collector, Tiruchirappalli District.
The Deputy Director / Member Secretary of Town and Country Planning, Tiruchirappalli. (Through Director of Town and Country Planning, Chennai-600 107).

Copy to

The Special Personal Assistant to Hon'ble Minister, (Housing and Prohibition & Excise), Chennai-600009.
The Private Secretary to Additional Chief Secretary to Government, Housing and Urban Development Department, Chennai-600009.
The Law (Hg&UD)Department, Chennai-600009.
The Housing and Urban Development (OP-1) Department, Chennai-600 009.
Stock File/Spare Copy.

**//FORWARDED BY ORDER//**

04/03/26

**SECTION OFFICER.**

04/03/2026

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GOVERNMENT OF TAMIL NADU
2026

[Regd. No. TN/CCN/467/2012-14.
[R. Dis. No. 197/2009.
[Price: Re. 0.80 Paise.

# TAMIL NADU GOVERNMENT GAZETTE

**EXTRAORDINARY** PUBLISHED BY AUTHORITY

No. 144] CHENNAI, WEDNESDAY, MARCH 4, 2026
Maasi 20, Visuvaavasu, Thiruvalluvar Aandu–2057

## Part II—Section 2

**Notifications or Orders of interest to a Section of the public issued by Secretariat Departments.**

### NOTIFICATIONS BY GOVERNMENT

### HOUSING AND URBAN DEVELOPMENT DEPARTMENT

APPROVAL OF MASTER PLAN 2045 FOR TIRUCHIRAPPALLI LOCAL PLANNING AREA UNDER THE TAMIL NADU TOWN AND COUNTRY PLANNING ACT, 1971.

*[G.O.Ms. No.66, Housing and Urban Development [UD4 (2)], 4th March 2026, மாசி 20, விசுவாவசு, திருவள்ளுவர் ஆண்டு–2057.]*

**No. II(2)/HOU/166(b)/2026.**

In exercise of the powers conferred by sub-section (1) of section 30 of the Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972), the Governor of Tamil Nadu hereby publishes the approval of the Government under section 28 of the said Act for the Master Plan 2045 for the Tiruchirappalli local planning area submitted by the Tiruchirappalli local planning authority.

2. The approved Master Plan 2045 for the Tiruchirappalli local planning area with all its enclosures shall be kept open for the inspection of the public during working days in the office of the Tiruchirappalli Municipal Corporation during office hours.

KAKARLA USHA,
*Additional Chief Secretary to Government.*

PRINTED AND PUBLISHED BY THE COMMISSIONER OF STATIONERY AND PRINTING, CHENNAI
ON BEHALF OF THE GOVERNMENT OF TAMIL NADU

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# List of Acronyms and Abbreviations

| | | |
|---|---|---|
| ADB | - | Asian Development Bank |
| ADS | - | Area Development schemes |
| AHP | - | Affordable Housing in Partnership |
| AIS | - | Automotive Industry Standards |
| AMASR-Act | - | The Ancient Monuments and Archaeological Site and Remains Act 1958 (Amendment & Validation) 2010 |
| AMC | - | Ahmedabad Municipal Corporation |
| AMRF | - | Automated Material Recovery Facility |
| AQI | - | Air Quality Index |
| ARHC | - | Affordable Rental Housing Complex |
| ASHRAE | - | American Society of Heating, Refrigerating and Air-Conditioning Engineers |
| ASI | - | Archaeological Survey of India |
| ATCC | - | Automatic Traffic Counter & Classifier |
| ATIS | - | Advanced Traveller Information System |
| ATM | - | Automated teller machine |
| AV | - | Audio Visual |
| BESS | - | Battery Energy Storage Systems |
| BHEL | - | Bharat Heavy Electricals Limited |
| BHELSIA | - | BHEL Small Industries Association |
| BIT | - | Bharathidasan Institute of Technology |
| BMTPC | - | Building Materials & Technology Promotion Council |
| BOD | - | Bio-chemical Oxygen Demand |
| BRTS | - | Bus Rapid Transit System |
| CA | - | Competent Authority |
| CAGR | - | Compound Annual Growth Rate |
| CBD | - | Central Business District |
| CBG | - | Compressed Bio Gas |
| CBO | - | Community-Based Organizations |
| CCTV | - | Closed-Circuit Television |
| CDZ | - | Cauvery Delta Zone |
| CE | - | Common Era |
| CETPs | - | Common Effluent Treatment Plants |
| CHC | - | Community Health Centre |
| CII | - | Confederation of Indian Industry |

| | | |
|---|---|---|
| CKIC | - | Chennai–Kanyakumari Industrial Corridor |
| CMP | - | Comprehensive Mobility Plan |
| CPHEEO | - | Central Public Health and Environmental Engineering Organization |
| CREDAI | - | Confederation of Real Estate Developers' Associations of India |
| CSI | - | Church of South India |
| CSR | - | Corporate Social Responsibility |
| CT | - | Census town |
| CT | - | Census Town |
| CWSN | - | Children With Special Needs |
| CWSS | - | Combined Water Supply Schemes |
| DAY-NULM | - | Deendayal Antyodaya Yojana- National Urban Livelihoods Mission |
| dB | - | Decibels |
| DCC | - | District Development Committee |
| DCR | - | Development Control Regulation |
| DCS | - | District Cooling Systems |
| DDMA | - | District Disaster Management Authority |
| DDMC | - | District Disaster Management Committee |
| DDP | - | Detail Development Plan |
| DEWATS | - | Decentralised Wastewater Treatment System |
| DGPS | - | Differential Global Positioning System |
| DH | - | District Hospital |
| DIC | - | District Industrial Center |
| DPC | - | District Planning Committee |
| DTCP | - | Directorate of Town and Country Planning |
| Eco-Park | - | Ecological Park |
| ECS | - | Equivalent Car Space |
| EE | - | External - External |
| EI | - | External - Internal |
| ELCOT | - | Electronics Corporation of Tamil Nadu Limited |
| ESI | - | Employees' State Insurance |
| EV | - | Electric Vehicle |
| E-Waste | - | Electronic Waste |
| EWS | - | Economically Weaker Section |
| FMCG | - | Fast Moving Consumer Goods |
| FP | - | Footpath |
| FSI | - | Floor Space Index |

| | | |
|---|---|---|
| FSTP | - | Faecal Sludge Treatment Plant |
| FY | - | Financial Year |
| G.O. | - | Government Order |
| GCC | - | Global Capability Centre |
| GDDP | - | Gross District Domestic Product |
| GH | - | Government Hospital |
| GI | - | Geographical identification |
| GII | - | Gender Inequality Index |
| GIIP | - | Good International Industry Practices |
| GIS | - | Geographic Information System |
| GNI | - | Gross National Income |
| GoTN | - | Government of Tamil Nadu |
| GSDP | - | Gross State Domestic Product |
| GSVA | - | Gross State Value Added |
| GTM | - | Green Tamilnadu Mission |
| GVA | - | Gross Value Added |
| H&UD | - | Housing and Urban Development Department |
| Ha | - | Hectares |
| HAPP | - | Heavy Alloy Penetrator Plant |
| HCC | - | Heritage Conservation Committee |
| HDI | - | Human Development Index |
| HDR | - | Human Development Report |
| HFA | - | Housing for all |
| HG | - | Halting Group |
| HH | - | Households |
| HIG | - | Higher Income Group |
| HSC | - | Health Sub-Centre |
| HT | - | High Tension |
| HUDCO | - | Housing and Urban Development Corporation |
| IBT | - | Integrated Bus Terminus |
| ICCC | - | Integrated Control and Command Centre |
| ICCFG | - | IC Center for Governance |
| ICD | - | Inland Container Depot |
| ICH | - | Intangible Cultural Heritage |
| ICOMOS | - | International Council for Monuments and Sites |
| ICU | - | Intensive Care Unit |

| | | |
|---|---|---|
| IE | - | Internal - External |
| IHSDP | - | Integrated Housing and Slum Development Programme |
| II | - | Internal - Internal |
| IIA | - | Indian Institute of Architects |
| IIIT | - | Indian Institute of Information Technology |
| IIM | - | Indian Institute of Management |
| IMD | - | Indian Meteorological Department |
| INTACH | - | Indian National Trust for Art & Cultural Heritage |
| IPD | - | Inpatient Department |
| IPHS | - | Indian Public Health Standards |
| IPT | - | Intermediate Public Transport |
| IRC | - | Indian Road Congress |
| ISO | - | International Organization for Standardization |
| IT | - | Information Technology |
| ITES | - | Information Technology Enabled Services |
| IUCN | - | International Union for Conservation of Nature |
| IWM | - | Integrated Water Management |
| IWMF | - | Integrated Waste Management Facility |
| JJM | - | Jal Jeevan Mission |
| KG | - | Kindergarten |
| KL | - | Kilo Litres |
| km | - | Kilometre |
| KPIs | - | Key Performance Indicators |
| KV | - | Kilovolts |
| kWh | - | Kilo Watts Hour |
| LID | - | Low Impact Developments |
| LIG | - | Lower Income Group |
| LL | - | Lakh Litres |
| LPA | - | Local Planning Area |
| LPCD | - | Liters per capita per day |
| LST | - | Land Surface Temperature |
| LT | - | Low Tension |
| M | - | Municipality |
| MAWS | - | Municipal Administration and Water Supply Department |
| MB | - | Mid Block |
| mbgl | - | Meters Below Ground Level |

| | | |
|---|---|---|
| MCC | - | Micro composting Center |
| MGNREGS | - | Mahatma Gandhi National Rural Employment Guarantee Act |
| MIG | - | Middle Income Group |
| MLCP | - | Multi Level Car Parking |
| MLD | - | Million Litres per Day |
| MMR-HCS | - | Mumbai Metropolitan Region – Heritage Conservation Society |
| MoHUA | - | Ministry of Housing and Urban Affairs |
| MPI | - | Multidimensional Poverty Index |
| MSME | - | Micro, Small, and Medium Enterprises |
| MT | - | Metric Tonnes |
| MU | - | Million Units |
| MVA | - | Mega Volt Ampere |
| MW | - | Mega Watts |
| NBC | - | National Building Code |
| NCC | - | National Cadet Corps |
| NCD | - | Non-Communicable Disease |
| NDMA | - | National Disaster Management Authority |
| NDMI | - | Normalized Difference Moisture Index |
| NDVI | - | Normalized Difference Vegetation Index |
| NDWI | - | Normalized Difference Water Index |
| NFHS | - | National Family Health Survey |
| NGO | - | Non-Government organization |
| NH | - | National Highway |
| NHAI | - | National Highways Authority of India |
| NIT | - | National Institute of Technology |
| NKHLC | - | New Kattalai High-Level Channel |
| NMT | - | Non Motorized Transport |
| NRCB | - | National Research Centre for Banana |
| NRSC | - | National Remote Sensing Centre |
| NRW | - | Non-Revenue Water |
| NSG | - | Non Suburan Group |
| NSS | - | National Service Scheme |
| NTDA | - | New Town Development Area |
| NTDP | - | New Town Development Plan |
| NULM | - | National Mission Management Unit |
| OC | - | Outer Cordon |

| | | |
|---|---|---|
| OD | - | Origin - Destination |
| OFT | - | Ordnance Factory Tiruchirappalli |
| OH | - | Overhead |
| OHTs | - | Over Head Tanks |
| OPD | - | Outpatient Department |
| ORR | - | Outer Ring Road |
| OSR | - | Open Space Reservation |
| OUV | - | Outstanding Universal Value |
| PBS | - | Public Bicycle System |
| PCU | - | Passenger Car Unit |
| PHC | - | Primary Health Centre |
| PIS | - | Passenger Information System |
| PLFS | - | Periodic Labour Force Survey |
| PM 10 | - | Particulate Matter size 10 |
| PM 2.5 | - | Particulate Matter size 2.5 |
| PMAY | - | Pradhan Mantri Awas Yojana |
| POI | - | Points of Interest |
| PPH | - | Persons per Hectare |
| PPP | - | Public-Private Partnership |
| PSTP | - | Packaged Sewage Treatment Plants |
| PSU | - | Public Sector Undertaking |
| PWD | - | Public Works Department |
| R.m | - | Running Metre |
| RAY | - | Rajiv Awas Yojana |
| RC | - | Roman Catholic |
| RCC | - | Resource Recovery Center |
| RD & LA | - | Rural Developpment & Local Administration |
| RKVY | - | Rashtriya Krishi Vikas Yojana |
| RMSA | - | Rashtriya Madhyamik Shiksha Abhiyan |
| ROW | - | Right of Way |
| RS | - | Railway Station |
| RSC | - | Residual Sodium Carbonate |
| RTE | - | Right to Education Act, 2009 |
| RTO | - | Regional Transport Office |
| S&S | - | Site and Services Scheme |
| SAR | - | Sodium Absorption Ratio |

| | | |
|---|---|---|
| SBR | - | Sequential Batch Reactor |
| SC | - | Scheduled Caste |
| SCADA | - | Supervisory Control and Data Acquisition |
| Scr CVC | - | Screen Line - Classified Volume Count |
| SDGs | - | Sustainable Development Goals |
| SDH | - | Sub-District Hospital |
| SETC | - | State Express Transport Corporation |
| SEZ | - | Special Economic Zone |
| SFCPoA | - | Slum Free City Plan of Action |
| SH | - | State Highway |
| SHG | - | Self Help Group |
| SIDCO | - | Small Industries Development Corporation |
| SIPCOT | - | State Industries Promotion Corporation of Tamil Nadu |
| SLB | - | Service Level Benchmarks |
| SMT | - | Small-Medium town |
| SPG | - | Society for the Propagation of the Gospel |
| Sq.km | - | Square Kilometre |
| sq.m | - | Square metre |
| SSP | - | Shared Socioeconomic Pathway |
| ST | - | Scheduled Tribe |
| STP | - | Sewage Treatment Plant |
| STR | - | Student–Teacher Ratio |
| SuDS | - | Sustainable [Urban] Drainage Systems |
| SUH | - | Shelter for Urban Homeless |
| SWD | - | Storm Water Drains |
| SWOT | - | Strengths, Weaknesses, Opportunities and Threats |
| TANGEDCO | - | Tamil Nadu Generation and Distribution Corporation Limited |
| TANSTIA | - | Tamil Nadu Small and Tiny Industries Association |
| TANTRANSCO | - | Tamil Nadu Transmission Corporation Limited |
| TCC | - | Tiruchirappalli City Corporation |
| TDS | - | Total Dissolved Solids |
| TES | - | Thermal Energy Storage |
| TH | - | Total Hardness |
| TIC | - | Tourism Information Centres |
| TIDITSSIA | - | Tiruchirappalli District Tiny and Small Scale Industries Association |
| TIIC | - | Tamil Nadu Industrial Investment Corporation Limited |

| | | |
|---|---|---|
| TIMEA | - | Tiruchirappalli Industrial Manufacturers and Entrepreneurs Association |
| TN | - | Tamil Nadu |
| TNCDBR | - | Tamil Nadu Combined Development and Building Rules, 2019 |
| TNEB | - | Tamil Nadu Electricity Board |
| TNGECL | - | Tamil Nadu Green Energy Corporation Limited |
| TNGRHS | - | Tamil Nadu Government Rental Housing Scheme |
| TNHB | - | Tamil Nadu housing board |
| TN-HR&CE | - | Tamil Nadu Hindu Religious & Cultural Endowments Department |
| TNIBF | - | Tamil Nadu International Balloon Festivals |
| TNITPP | - | Tamil Nadu Integrated Tourism Promotion Project |
| TNPCB | - | Tamil Nadu Pollution Control Board |
| TNPDCL | - | Tamil Nadu Power Distribution Corporation Limited |
| TNPGCL | - | Tamil Nadu Power Generation Corporation Limited |
| TNPHC | - | Tamil Nadu Police Housing Corporation |
| TNSAD | - | Tamil Nadu State Archaeology Department |
| TNSTC | - | Tamil Nadu State Transport Corporation |
| TNUDP | - | Tamil Nadu Urban Development Programme |
| TNUHDB | - | Tamil Nadu Urban Habitat Development Board |
| TNULM | - | Tamil Nadu Urban Livelihood Mission |
| TNWWHCL | - | Tamil Nadu Working Women Hostels Corporation Limited |
| TOD | - | Transit Oriented Development |
| TP | - | Town Panchayats |
| TPJ | - | Tiruchirappalli Junction |
| TREAT | - | Tiruchirappalli Engineering and Technology Cluster |
| TRZ | - | Tiruchirappalli International Airport |
| TTDC | - | Tamil Nadu Tourism Development Corporation |
| TVC | - | Traffic Volume Count |
| TWAD | - | Tamil Nadu Water Supply and Drainage Board |
| UCHC | - | Urban Community Health Centre |
| UDA | - | Urban Development Authority |
| UG | - | Underground |
| UGD | - | Under Ground Drainage |
| UGSS | - | Under Ground Sewerage Scheme |
| UKG | - | Upper Kindergarten |
| ULB | - | Urban Local Body |
| UNDP | - | United Nations Development Programme |

| | | |
|---|---|---|
| UNESCO | - | United Nations Educational, Scientific and Cultural Organization |
| UPHC | - | Urban Primary Health Centre |
| URDPFI | - | Urban and Regional Development Plans Formulation and Implementation |
| VMS | - | Variable Message Signs |
| W | - | Watts |
| WHC | - | World Heritage Convention |
| WHO | - | World Health Organization |
| WPR | - | Workforce Participation Rate |
| WRD | - | Water Resource Department |
| WTP | - | Water Treatment Plant |

# 1 PREAMBLE

## 1.1 Background

The Master Plan is a statutory long-term planning document that outlines a comprehensive spatial and policy framework for regulating and guiding the future growth and development of the planning areas. It serves as a foundational tool for city planning and policy vision document, integrating diverse components such as the built environment, socio-economic dynamics, ecological systems, infrastructure, and cultural assets. By doing so, it aims to promote organized, inclusive, and sustainable urban expansion.

In the context of Tiruchirappalli local planning area, Tiruchirappalli possesses significant heritage and tourism importance, with renowned religious and historic landmarks such as Srirangam Temple, Rockfort Temple, and the Cauvery riverine cultural landscape. These heritage precincts attract a substantial floating population and contribute to the city's economy, while necessitating controlled and sensitive development within the core areas. In recent decades, the city has experienced steady urbanisation driven by population growth, expansion of major industrial establishments including BHEL and the Ordnance Factory, growth of educational and health institutions, and improved regional connectivity. City's economy is diverse, comprising manufacturing, services, trade, defence-related activities, tourism, and informal sectors, supporting employment across a wide regional hinterland.

Rapid urban growth has increased demand for housing, leading to expansion towards peripheral and peri-urban areas and placing pressure on urban mobility systems, particularly in the core city. Environmentally, the city is influenced by its semi-arid climate and dependence on the Cauvery River system, with vulnerabilities to heat stress, water scarcity, and flooding in low-lying areas, alongside growing pressure on water bodies, open spaces, and agricultural lands. Simultaneously, rising population and development have increased demand for physical and social infrastructure, while ageing systems and limited land availability in core areas pose significant challenges.

### 1.1.1 Key Areas Addressed

The following are the key areas, which has been addressed by the Master Plan 2045.

**Land Use Planning:** Land Use Planning involves ensuring the optimal allocation of land for residential, commercial, industrial, and green spaces by proposing an effective zoning strategy.

**Promote balanced industrial growth:** Ensuring integration with urban development and land-use planning, while encouraging investment in diverse industrial sectors to create employment opportunities and strengthen the local economy.

**Transportation and Mobility:** Strengthen connectivity through the proposed development of highways and a ring road, while promoting public and non-motorized transport.

**Infrastructure and Utilities:** Upgrading water supply, sanitation, power, and waste management systems through smart integrated management system.

**Housing and Livelihoods:** Promoting inclusive housing, slum redevelopment and supporting economic development.

**Environmental Sustainability:** Protecting natural assets and promoting climate-responsive development.

**Social Sector:** Identifying key bench marks and parameters, and to ensure the LPA achieves its goals for community support, inclusion, and sustainable development.

**Heritage and Tourism:** Establishing a Heritage Cell to conserve historic buildings, strengthen local character, prepare for Heritage City nomination, enhance key destinations, eco-tourism, and promote tourism as a driver of economic growth and investment

**Phasing and Implementation:** Ensure systematic execution of projects and recommendations through well-defined stages, supported by abstract costing to guide financial planning and resource allocation.

## 1.2 Purpose of the Master Plan

The Tamil Nadu Town and Country Planning Act, 1971 provides a comprehensive framework for the systematic development and utilization of both rural and urban land across the state. This legislative framework facilitates the preparation and implementation of Master Plans to ensure planned growth and sustainable development.

The Master Plan encompasses various aspects of land use planning, infrastructure development, environmental conservation, socio-economic and mobility advancement. The Master Plan will provide the following requirements:

- To determine how land in the planning area is used.
- To allocate or reserve land for residential, commercial, industrial, and agricultural purposes, as well as for parks, playgrounds, and open spaces.
- To allocate and reserve land for public buildings, institutions, and civic amenities.
- To make provisions for national highways, arterial roads, ring roads, major streets, railways, airports, canals, and other transportation links.
- To outline traffic and transportation patterns, including road improvements and circulation systems.
- To reserve for future development, expansion, and new housing projects.

In addition to the measures outlined above, the Master Plan will ensure the implementation of relevant acts, regulations, and guidelines, including URDPFI, while adhering to statutory norms to achieve comprehensive and sustainable urban development to ensure the provision of essential amenities, services, and utilities as mentioned below.

- To make detailed development plans for specific zones, including housing, shopping centres, industries, civic facilities, and educational and cultural institutions.
- To establish clear stages for the implementation of the Master Plan and to address any additional matters deemed necessary for inclusion.
- To incorporate provisions for disaster management, including flood mitigation, cyclone-resistant infrastructure, earthquake-prone zone regulations, and emergency evacuation routes.
- To allocate and protect water resources, including rivers, lakes, groundwater recharge zones, and watershed areas, ensuring sustainable usage and prevent pollution.
- To include provisions for critical social infrastructure such as hospitals, community centres, and welfare institutions to cater to the needs of the population.
- To address the development and maintenance of physical infrastructure, including water supply and sewage systems, storm water drainage, solid waste management, and power supply networks.

Urban and Regional Development Plans Formulation & Implementation (URDPFI) 2015 guidelines, formulated by the Town & Country Planning Organisation, Government of India, provide guidelines for preparation of Master Plan indicate:

- The Master Plan will aim to provide detailed strategies and recommendations to implement policies from the Perspective Plan and Regional Plan, based on economic and social needs, public aspirations, available resources, and priorities.
- To ensure affordable housing provisions and slum rehabilitation, as equitable access to shelter ensures inclusive urban growth.
- The Master Plan also identifies areas that need preservation, conservation, and development, particularly those with heritage importance, ecological value, natural scenery, and significant landscapes.
- It includes the protection of historical, architectural, and scientifically important structures, as well as environmentally sensitive areas.

The Master Plan is been prepared using Geographic Information System (GIS)-based mapping and spatial analysis to ensure accurate land-use planning, infrastructure management, and data-driven decision-making. The typical timeframe for this plan is 20-30 years, with phased planning in 5-year intervals for periodic reviews.

## 1.3 Need for the Master Plan

**Context and Need for the Second Master Plan – Tiruchirappalli LPA**

The First Master Plan for Tiruchirappalli, prepared under the Tamil Nadu Town and Country Planning Act, 1971, in year 1996 has largely completed its planning horizon and is no longer adequate to address the present scale and complexity of urban growth. Over the years, Tiruchirappalli has emerged as a major regional centre for administration, education, healthcare, transport, and industry, resulting in rapid population growth, spatial expansion beyond municipal limits, and increased pressure on land, infrastructure, housing, and environmental resources. Significant changes in land use patterns, unplanned peripheral development, traffic congestion, and infrastructure deficits have necessitated a comprehensive review of existing planning provisions.

In this context, the Second Master Plan for Tiruchirappalli has been prepared in line with the policy framework and planning initiatives of the Government of Tamil Nadu to guide development up to a long-term horizon. The Plan responds to recent government proposals and investments in infrastructure, transport corridors, industrial and economic clusters, integrated bus terminals, and urban services. It also provides for the expansion of the planning area to include surrounding municipalities, town panchayats, and rural areas, enabling coordinated and balanced regional development. The Plan seeks to align local planning with State-level programmes and sectoral policies for urban development, housing, mobility, water supply, sanitation, and environmental protection.

The Second Master Plan aims to provide a structured spatial framework for orderly and sustainable growth of the Tiruchirappalli LPA. It focuses on rational land use zoning, identification of growth centres and development corridors, strengthening of transport and infrastructure networks, protection of water bodies and environmentally sensitive areas, and promotion of economic development while improving the quality of life. By addressing emerging challenges and future development needs in an integrated manner, the Plan serves as a statutory instrument to regulate development, optimize resource utilization, and ensure planned urban expansion in accordance with the vision and priorities of the Government of Tamil Nadu.

## 1.4 Master Plan for Tiruchirappalli LPA

The First Master Plan for Tiruchirappalli was prepared under Section 10(1) of the Tamil Nadu Town and Country Planning Act, 1971. The Tiruchirappalli Local Planning Area was declared vide G.O. Ms. No. 936, Rural Development & Local Administration Department, dated 05.04.1974, and notified under Section

10(4) vide G.O. Ms. No. 1669 Rural Development & Local Administration Department, dated 16.07.1974. The Plan covered an extent of 281.14 sq. km, comprising the Municipalities of Tiruchirappalli, Srirangam and Golden Rock, five Town Panchayats, and 40 Revenue Villages in Tiruchirappalli, Lalgudi and Thanjavur Taluks, were approved under Section 28 vide G.O. Ms. No. 374, RD & LA Department, dated 29.08.1996, with a planning horizon up to 2011.

The Navalpattu New Town Development Plan was prepared under Section 10(1) of the Act and declared vide G.O. Ms. No. 259, Housing & Urban Development Department, dated 15.04.1981 and notified under Section 10(4) vide G.O. Ms. No. 1044, Housing & Urban Development Department, dated 24.11.1982. The Plan covered an extent of 208.14 sq. km, comprising three Town Panchayats namely Tiruverambur, Kuttapar and Thuvakudi, and 15 Revenue Villages in Thiruverambur Panchayat Union, and was approved under Section 28 vide G.O. Ms. No. 180, Housing &Urban Development (UD4-2) Department, dated 19.07.2006, with a planning horizon up to 2021.

The Second Master Plan for Tiruchirappalli was prepared under Section 10(4) of the Act vide G.O. (Ms) No. 88, Housing and Urban Development Department, dated 30.06.2021. The Plan comprises the First Master Plan area, the Navalpattu New Town Development Planning Area, and additional areas notified for the Second Master Plan, resulting in a total planning extent of 804.53 sq. km. The administrative details of the Tiruchirappalli Planning Area are presented in the table below.

*Table 1.1: Administrative Summary of Tiruchirappalli LPA*

| S.No. | Administrative Category | No. of Local Bodies | Area (in sq.km) |
|---|---|---|---|
| 1. | Corporation<br>(Additional Villages – Pappakurichi, Thiruverumbur, Agaram, Ellagudi, Alathur & Keelakalkandarkottai) | 1 | 167.23 |
| 2. | Municipalities<br>Thuvakudi<br>Lalgudi | 2 | 24.40 |
| 3. | Town Panchayats<br>Koothappar<br>Puvalur<br>Manachanallur<br>S. Kananoor | 4 | 21.53 |
| 4. | Village Panchayats | 91 | 591.37 |
| **Overall LPA** | | | **804.53** |

## 1.5 Urban Development Authority (UDA)

The Tiruchirappalli (Trichy) Urban Development Authority (UDA) was constituted with the jurisdiction of current LPA boundary as per G.O.(Ms). No. 207, Housing and Urban Development Department, dated 23.11.2022, with the inclusion of Olaiyur Village in Srirangam Taluk of Tiruchirappalli District and the exclusion of Thogur Village from Budalur Taluk of Thanjavur District. The UDA is expected to utilize Master Plan as its primary tool for guiding sustainable urban growth, optimizing land utilization, and implementing strategic infrastructure development while addressing critical aspects such as transportation networks, environmental sustainability, and equitable distribution of civic amenities across the entire UDA area.

## 1.6 Master Plan Preparation 2021 – 2045

The preparation of Second Master Plan for Tiruchirappalli LPA - 2045 follows a systematic, multi-stage planning process that combines technical analysis, comprehensive baseline studies, appropriate feedback mechanisms, comparisons with national and international benchmarks and GIS-enabled spatial mapping, the process progresses through rigorous gap analysis, vision formulation, and extensive stakeholder consultations. The methodology integrates urban planning tools with ground level insights to create a balanced development framework are explained below.

### 1.6.1 Baseline Study for Tiruchirappalli Master Plan 2045

As part of the Tiruchirappalli Master Plan preparation, a comprehensive baseline study was undertaken to establish a clear and accurate understanding of the planning area's demographics, socio-economic profile, environmental conditions, and physical characteristics. This involved the formulation of a detailed methodology, work plan, and schedule of action with defined timelines and milestones. The process encompassed strategies for secondary data collection, identification of survey locations and the design of an effective stakeholder engagement framework.

The study included a review of existing Master Plans, development plans, and other relevant studies within the planning area to identify gaps and ensure that the new Master Plan is robust and forward-looking. The available data was assessed for quantity, quality and adequacy, ensuring its suitability for the intended planning objectives.

A stakeholder engagement and citizen participation strategy were developed as part of a broader Communication Plan, outlining the methods and timelines for involving stakeholders throughout the planning process.

This ensured inclusive and transparent participation from relevant government agencies, institutions, and the public.

It is important to note that the Census, which forms a critical component of the baseline data, dates back to 2011. Many subsequent records, including the District Handbook and other databases, rely on the Census as a benchmark. Therefore, this Master Plan will require a review and update of the baseline data once the latest Census figures are released

For spatial accuracy and up-to-date mapping, an action plan is implemented. Additionally, Good International Industry Practices (GIIP) were reviewed across relevant domains such as regional economic development, industrial policy, State SEZ policy, tourism and heritage conservation, and the management of environmental resources, solid waste, wastewater, and drinking water focusing on case studies with similar development challenges to Tiruchirappalli.

### 1.6.2 Base Map Preparation

The Existing Land Use Map was prepared to understand the current development scenario, identify growth trends, and analyse how land is being utilized across different sectors. It serves as a crucial reference for planning future infrastructure, regulating development, and preserving environmental resources.

The base map was prepared by integrating multiple layers of spatial and attribute data. The cadastral framework was digitized from geo-referenced village maps, with boundaries and survey numbers clearly marked. Government lands, water bodies, and approved layouts were mapped using official datasets and verified through field surveys. Additional thematic layers such as transport networks, public facilities, and environmental zones were incorporated to ensure a comprehensive database.

Layers integrated into the base map include:

- Cadastral maps with survey numbers
- Government lands
- Water bodies (rivers, lakes, tanks, and canals)
- Land approval data provided by government agencies
- Transport and road networks
- Public and community facilities
- Existing land use classification based on the usage and classified as per Tamil Nadu Master Plan rules
- Environmental and ecological features

The Existing Land Use Map was prepared by DTCP using high-resolution satellite imagery from the National Remote Sensing Centre (NRSC). Cadastral frameworks were developed using village maps with survey numbers from the Survey and Land Records department. DGPS surveys collected GCPs for geo referencing scanned paper maps, and survey boundaries were digitized as GIS polygons with village names and survey numbers. The process included the following.

**Process of Base Map Preparation**

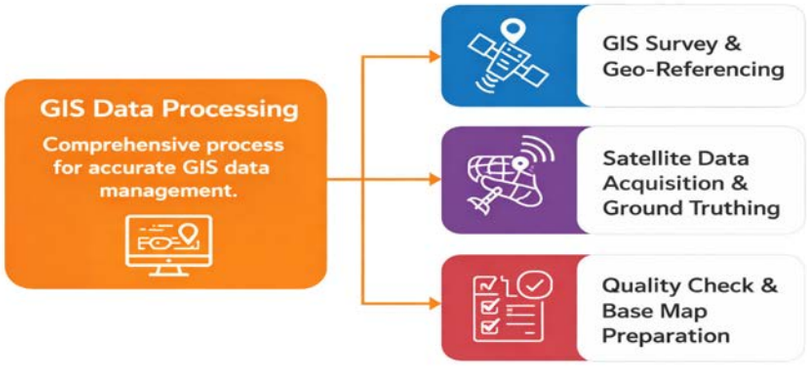



*Figure 1.1: Process of Base Map Preparation*

1. **GIS Survey & Geo-Referencing –** Cadastral maps were generated from village survey records, with DGPS-derived GCPs enabling precise geo-referencing. Boundaries were digitized as GIS polygons, while ward maps of Tiruchirappalli LPA were aligned and linked with town survey numbers in the database.
2. **Satellite data acquisition & Ground truthing –** The land use mapping process was carried out using high-resolution satellite imagery obtained from the National Remote Sensing Centre (NRSC), ISRO. Based on this data the preliminary Existing Land Use (ELU) classification for the Tiruchirappalli Local Planning Area (LPA) has prepared.
    a. To ensure the highest level of accuracy, the Directorate of Town and Country Planning (DTCP) implemented a multi-stage verification process:

- **Ground Truthing -** Field surveys were conducted to physically verify land use categories across the LPA.
- **Cadastral & Municipal Data Cross-Checking -** The classification was validated against updated cadastral maps and local government records.
- **Latest Satellite Imagery Verification -** The final land use map was cross-verified with Google Satellite Imagery (2025) to confirm recent changes and ensure temporal accuracy.

3. **Quality Check & Base Map Preparation –** To ensure accuracy, the existing land use classification was validated by overlaying Tamil Nadu Electricity Board electricity connection data provided geospatial data onto the GIS map. This cross-verification process helped confirm occupancy patterns and align recorded land use with ground realities before finalizing the base map.

### 1.6.3 Analysis

#### Identification of Gaps and Demands

Identifying gaps and assessing demand is a critical component in the preparation of a Master Plan, ensuring that urban development strategies respond effectively to both current requirements and future growth. This phase involves a thorough evaluation of existing infrastructure, land use patterns, economic activities, environmental settings, and social amenities to understand shortcomings in urban services and functionality. Core focus areas include housing deficits, transport bottlenecks, inadequate public spaces, industrial expansion needs, and gaps in healthcare and educational infrastructure.

By analysing these issues in relation to projected population growth, economic trends, and strategic policy objectives, the plan identifies priority interventions ranging from infrastructure upgrades to targeted development initiatives.

This analytical process was firmly anchored in key state and national policy frameworks to maintain coherence with long-term developmental visions. Notable among these are the Vision for a 1 Trillion Economy, the Tamil Nadu State Tourism Policy, the Tamil Nadu Housing and Habitat Development Policy, the National Framework for Safe Use of Treated Water (2022), the Solid Waste Management Rules (2016), and the Green Tamil Nadu Mission, to name a few. These policies provided the strategic direction necessary to frame regionally grounded and future-ready solutions.

In addition, the analysis drew upon nationally recognized methodologies and standards, incorporating guidelines from the Urban and Regional Development Plans Formulation and Implementation (URDPFI), Ministry of Housing and Urban Affairs(MOHUA), Indian Public Health Standards (IPHS), National Disaster Management Authority (NDMA), National Environmental Engineering Research Institute, National Mission Management Unit (NULM), E-Waste Management rules 2016, National Electricity Policy, National Energy Policy, Bureau of Indian Standards, Demographic and infrastructure projections were developed using the Compound Annual Growth Rate (CAGR) and benchmarks from the Central Public Health and Environmental Engineering Organization (CPHEEO). This approach enabled robust scenario modelling and informed the development of evidence-based, actionable recommendations for sustainable urban growth.

The insights derived from the gap and demand analysis ensure that the plan promotes urban efficiency, sustainability and resilience while addressing critical service deficiencies. Extensive stakeholder consultations with industry bodies, civic organizations and urban planning experts further refine the strategies, promoting balanced and inclusive development.

**SWOT analysis:**

SWOT Analysis is a systematic planning tool used to identify the Strengths, Weaknesses, Opportunities, and Threats/Challenges. For Tiruchirappalli, it serves as a strategic framework to evaluate its inherent cultural and environmental assets, existing urban limitations, potential growth avenues, and external pressures that influence its path toward sustainable development.

**Use of SWOT Analysis in Tiruchirappalli LPA:**

- Provides a clear, structured understanding of Tiruchirappalli's current urban, economic, and environmental situation.
- Helps align development strategies with the city's heritage strengths while addressing infrastructure and governance gaps.
- Identifies growth opportunities in tourism, economy, and infrastructure that can enhance Tiruchirappalli's regional significance.
- Highlights critical challenges such as urban sprawl, environmental degradation, and service delivery gaps, guiding targeted interventions.
- Forms the foundation for vision setting, goal formulation, and strategic action planning in the Tiruchirappalli Master Plan.

**Methodology – How the SWOT for Tiruchirappalli was derived**

The SWOT analysis for Tiruchirappalli was developed using a LPA specific, evidence-based and sector wise approach.

- Field observations to evaluate on-ground conditions of roads, public spaces, heritage zones, and environmental assets such as temple tanks and the Cauvery River.
- Review of secondary data from Tiruchirappalli City Municipal Corporation records, tourism statistics, planning reports, and socio-economic profiles.
- Stakeholder consultations with district officials, heritage conservationists, local business owners, transport authorities, and other respective departments.
- Spatial analysis of GIS data, land use patterns, heritage buffer zones, and areas experiencing rapid urban expansion.

This approach ensured that the identified strengths, weaknesses, opportunities, and challenges reflect Tiruchirappalli's actual conditions and provide a realistic basis for integrated and sustainable urban planning.

### 1.6.4 Stakeholder Engagement

Stakeholders' meetings for the preparation of the Tiruchirappalli Local Planning Area Master Plan were conducted at various stages under the chairmanship of the Chairman / District Collector, Tiruchirappalli District, with participation from all concerned line Government Departments.

*Figure 1.2: Series of Stake Holder Meeting*

**Summary of Stakeholder Meeting for Data Collection I, II & III:**

Meetings held on 30.07.2021 and 12.11.2021 were convened to initiate the Master Plan preparation process, during which line departments were instructed to furnish baseline and sector-wise data. The District Collector emphasized need to facilitate preparation of the Master Plan for obtaining Government approval under the Tamil Nadu Town and Country Planning Act, 1971.

The meeting held on 17.11.2023 was organised to collect updated departmental data for Tiruchirappalli second Master Plan. Representatives from 55 Government Departments participated, and all departments were directed to submit the required data.

**Summary of Meeting for Presentation of Consent Master Plan and To Invite Objection and Suggestions:**

Following the consent accorded vide G.O.(Ms) No.13, Housing and Urban Development [UD4(2)] Department, dated 13.01.2024, a stakeholders' meeting was held on 06.03.2024 to present consent master plan and invite objections

& suggestions from the public. The objectives of the Master Plan, including sustainable land use planning, infrastructure development, environmental protection, and balanced urban growth for a long-term planning horizon, were discussed.

*Figure 1.3: Stakeholder Meeting on 12.11.2023*

*Figure 1.4: Presentation of Consent Master Plan and To Invite Objection and Suggestions Meeting on 06.03.2024*

**Summary of Stakeholder Meeting with Line Departments:**

The meeting held on 16.12.2025 focused on validation of previous collected and updated data till 2025 for Tiruchirappalli Master Plan.

**Summary of Stakeholder Meeting for Validation of Comprehensive Master Plan Proposal and Recommendation:**

A stakeholder consultation meeting on the preparation of the Tiruchirappalli Master Plan was held on 19.01.2026 at the Collectorate, Tiruchirappalli, under the chairmanship of the District Collector. Representatives from academic institutions such as Bharathidasan University, Indian Institute of Management, National Institute of Technology Trichy, CARE School of Architecture, from governmental department like NHAI, Trichy City Police, Public Work Department, Water Resource Department Corporation, non- government bodies such IIA, CII, CREDAI, ICCFG, TIDITSSIA other stakeholders participated.

*Figure 1.5: Stakeholder Meeting with Line Departments in discussion with proposals on 19.01.2026*

**Key Takeaways from Stakeholder Consultations**

Key proposals included strengthening manufacturing and MSMEs, development of economic corridors, improvement of regional and urban mobility through ring roads, BRTS corridors, freight terminals, and bus terminals, environmental measures such as groundwater conservation and blue–green infrastructure, enhancement of social and park infrastructure, housing for various income groups and institutional needs, and conservation-led tourism and heritage development.

Stakeholders contributed valuable inputs on a range of topics including increase in residential area, industrial land allocation, logistics and dry port facilities, mixed-use zoning, parking management facility, integration of blue–green infrastructure, decentralized sewage treatment, affordable housing, the EV ecosystem, waste management, heritage linkages, and safety measures. They also requested the incorporation of national policies, regulation of land value impacts, and Stakeholders were asked to submit their suggestions in writing via shared online Google link.

## 1.6.5 Vision

The formulation of a shared Vision through an inclusive, participatory, and consultative process is a cornerstone of the Master Plan. This collaborative approach ensures that the plan embodies the collective aspirations of stakeholders, respects the intrinsic character of the landscape, and remains aligned with the institutional and regulatory frameworks governing the Local Planning Area (LPA).

The outcome of these deliberations is a strategic vision to reposition Tiruchirappalli as a “central growth accelerator”—a vital economic and geographical nexus. By leveraging its strategic location, we seek to evolve the city into an economically vibrant, globally competitive, and clean-energy-oriented hub by 2045. Stakeholders emphasized the necessity of driving urban

transformation through sustainable development, smart infrastructure, and the integration of blue–green ecological networks, all while safeguarding the city's unique historical and cultural identity.

Accordingly, the vision seeks to support the dynamic dichotomy of Tiruchirappalli city that simultaneously celebrates its rich cultural legacy and advances as a contemporary, inclusive capital for South Tamil Nadu. As a growth accelerator, the city will integrate sustainable urbanism and smart infrastructure with tradition-led innovation. A pivotal component of this strategy is establishing Tiruchirappalli as a leading economic, cultural, and knowledge hub within the Chennai–Kanyakumari Industrial Corridor (CKIC), reinforcing its regional and national significance.

**The 2045 Vision Statement:**

**"By 2045, Tiruchirappalli is envisioned as a heritage city that is established as a vibrant knowledge and economic regional centre that merges its cultural strength and industrial prowess to ensure a radiant quality of life for every resident through balanced spatial growth, seamless mobility and environmental sustainability."**

Core Strategic Objectives

**By 2045, Tiruchirappalli aims to achieve the following:**

1. To retain skilled population by developing a balanced settlement system supported by adequate housing, robust social infrastructure and equitable access to services.
2. To strengthen regional standing by promoting diversified economic development facilitated by efficient transportation, advanced logistics, and seamless connectivity.
3. To guide spatial growth through climate-resilient planning that conserves ecological systems, agricultural lands, and water resources while reducing disaster risks.
4. To leverage cultural and heritage assets for sustainable, tourism-driven economic development while ensuring active community participation and conservation.

Key Pillars of the Vision:

**1. Industrial and Economic Vision: A Diversified, High-Value Industrial Powerhouse**

- Establishing India's leading heavy-engineering innovation hub.
- Promoting a premier centre for advanced manufacturing.

- Fostering a vibrant MSME ecosystem.
- Nurturing an emerging IT/ITES and knowledge-based economy.
- Developing robust logistics gateways integrated with the Chennai-Kanyakumari Industrial Corridor.

**2. Agriculture and Rural Vision: Smart, Sustainable, and Profitable Agriculture**

- Transitioning to water-efficient Cauvery Delta agriculture.
- Catalysing value-added agro-industries and agro-export clusters.
- Designating specialized horticulture zones.
- Empowering farmers through digital marketplaces and cold-chain networks.
- Implementing climate-resilient cropping methodologies.

**3. Urban Infrastructure and Mobility Vision: A Smart, Connected, Clean, and Inclusive City**

- Evolving into an inclusive city powered by smart utilities and digital governance.
- Transitioning to a public transport-driven city featuring BRTS and ring roads.
- Serving as a model city for zero-waste management.
- Expanding green, walkable urban spaces.
- Developing affordable housing communities for all income groups.

**4. Environment and Sustainability Vision: A Green, Water-Secure, and Climate-Resilient City**

- Prioritizing Cauvery river rejuvenation.
- Accelerating the renewable energy transition.
- Creating urban forests and green belts.
- Deploying methodical storm water management to mitigate flood risks.
- Maintaining the Air Quality Index in the Good category year round.

**5. Cultural, Tourism and Heritage Vision: A Global Heritage Destination**

- Formulating a comprehensive heritage circuit.
- Strengthening status as a spiritual tourism capital.
- Developing a leisure riverfront and ecological corridor.
- Establish as a centre for traditional arts, crafts, and cuisine.

**6. Human Capital and Education Vision: A Leading Education and R&D Hub**

- Strengthening the National level Knowledge hubs.
- Establishing Centres of Excellence in collaboration with academic institutions.
- Enhancing student retention through local opportunity manifestation.

**7. Social and Quality-of-Life Vision: A Safe, Inclusive, and Thriving City for All**

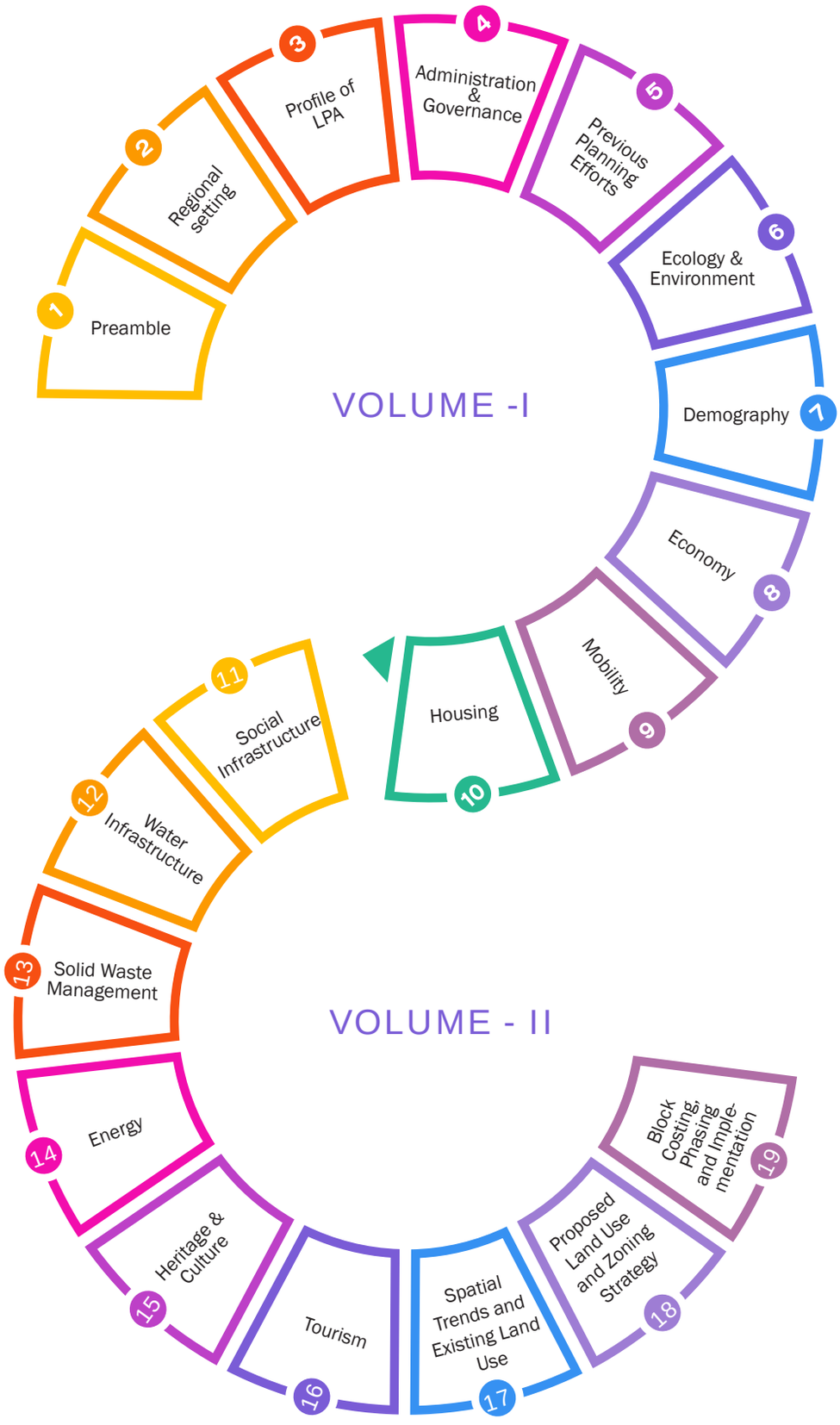
- Stimulating high employment and entrepreneurship.
- Boosting the healthcare ecosystem and medical tourism.
- Achieving total digital inclusion.
- Provisioning safe public spaces.
- Fortifying climate resilience across all urban systems.

### 1.6.6 Planning Recommendations

The Master Plan recommendations aim to address existing gaps and support sustainable urban growth. First, it studies current issues like land use, infrastructure, transport, Heritage and environment to find what's shortcomings. Then, it suggests recommendations: better zoning, more housing and commercial spaces, improved transport, including eco-friendly initiatives on renewable energy and waste management.

## 1.7 Report Structure

The Tiruchirappalli Master Plan 2045 is presented in five volumes, along with a set of existing and proposed land use plans. Volumes I and II comprise the main planning report, while Volume III, IV and V contains the detailed schedule specifying the proposed land use for each survey number within the LPA.


1 Preamble
2 Regional setting
3 Profile of LPA
4 Administration & Governance
5 Previous Planning Efforts
6 Ecology & Environment
7 Demography
8 Economy
9 Mobility
10 Housing
11 Social Infrastructure
12 Water Infrastructure
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VOLUME -I
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SUMANGALA

# 2 REGIONAL SETTING

## 2.1 Overview

Tiruchirappalli Local Planning Area (LPA) constitutes a significant portion of Tiruchirappalli District and accommodates the majority of the District's population. It serves as the primary centre for economic activities, cultural heritage, and critical infrastructure within the District. Tiruchirappalli District, a historic and economic hub in southern Tamil Nadu, spans approximately 4,403.83 sq. km and is geographically positioned at 10.7905° N latitude and 78.7047° E longitude. Administratively, the District is bounded by Ariyalur District to the east, Karur District to the west, Salem district to the north and Pudukkottai District to the south.

Geographically, Tiruchirappalli's landscape is defined by the perennial River Cauvery, which has sustained agriculture, trade and settlements since ancient times. The river's fertile alluvial plains supported early civilizations and contributed to the city's historical prosperity. Prominent rocky hillocks, especially the Rockfort hill, hold immense historical significance as sites of ancient forts, temples, and strategic defences. These elevated landforms played a crucial role during the Chola, Nayak, and later periods. Together, the Cauvery and the hillocks form a landscape deeply interwoven with Tiruchirappalli's cultural and historical legacy.

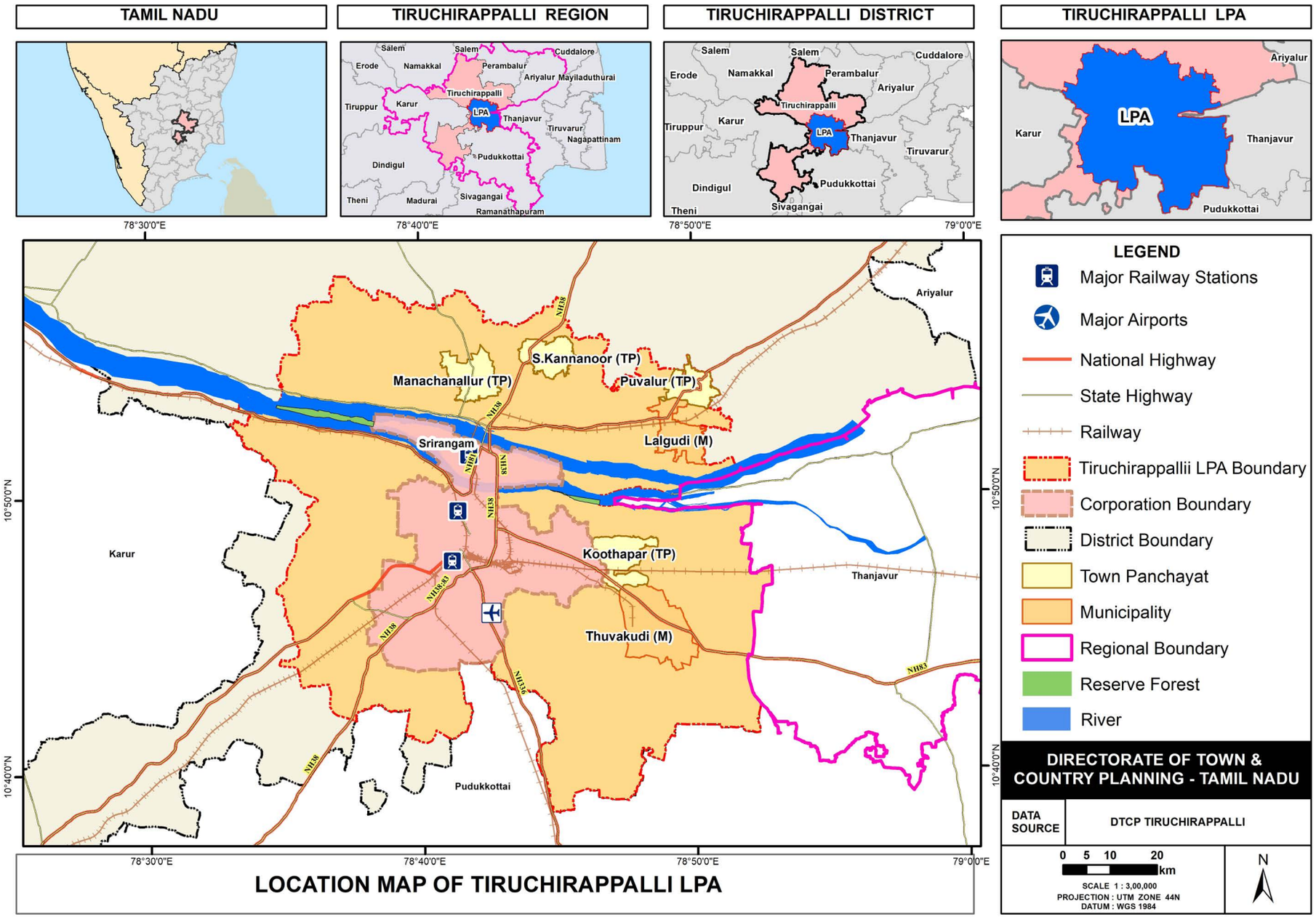
Tiruchirappalli City is one of the historically significant and continuously inhabited cities of Tamil Nadu, renowned for its rich cultural and architectural heritage. Known for iconic landmarks such as the Rockfort Temple, Srirangam Ranganatha Swamy Temple, and the Cauvery River, Tiruchirappalli is a major Tier-II urban centre supporting growth in education, manufacturing, engineering, healthcare, and trade. The city's long-standing reputation as a centre of religion and learning harmoniously coexists with its contemporary role as an important industrial, educational, and service hub for central Tamil Nadu.

The District's urban fabric extends to important satellite towns and town panchayats such as Srirangam, Thuvakudi, Manachanallur, Musiri and Thuraiyur supported by the Tiruchirappalli LPA's structured network of Municipalities, Town Panchayats, and rural settlements. This blend of geographical advantage, cultural significance, economic activity and planned urban development reinforces Tiruchirappalli's role as a vital regional hub, linking heritage, industries, and communities across central Tamil Nadu.

The Tiruchirappalli urban area expanded significantly following municipal reorganization. Since 2011, the Tiruchirappalli City Corporation jurisdiction has extended to approximately 167 square kilometres. The city is located at approximately 10.79° North latitude and 78.70° East longitude, while another reference places it at around 10.81° North and 78.69° East.

## 2.2 Tiruchirappalli Zone of Influence

Tiruchirappalli Local Planning Area (LPA) functions as a pivotal urban centre in central Tamil Nadu with its growth and sustainability intrinsically linked to a wide network of natural, economic and infrastructure systems that extend well beyond its administrative limits. The city's regional significance is strengthened by its historic role as an educational, and cultural hub by its well-connected location along major trade, industrial, tourism and transport corridors connecting the Cauvery delta with the nearby districts.




*Map 2.1 Geographical location of Tiruchirappalli*

From an environmental planning perspective, Tiruchirappalli LPA benefits significantly from the Cauvery River system, which serves as the main source of drinking water, irrigation and agricultural support in the region. Supporting this system, the Kolli Hills and Pachamalai Hills located to the north and northeast act as important watershed areas, with their slopes directing seasonal runoff into tributaries such as the Ayyar and Koraiyar Rivers. Within the district, the Cauvery River continues to influence settlement patterns, fertile floodplains, green corridors and Tiruchirappalli's long-standing cultural and heritage relationship with water, while supporting overall environmental balance and ecological sustainability.

Economically, Tiruchirappalli's position within a broader trade and transport network strengthens its regional competitiveness. To the southeast, Thoothukudi Port facilitates the movement of export commodities and imported goods, strengthening manufacturing, agro-processing, and logistics sectors in and around the city and Thanjavur hinterland facilitate the movement of agricultural produce, manufactured goods and industrial inputs, supporting local manufacturing, agro-processing and logistics sectors. To the south, Tiruchirappalli International Airport enhances connectivity to domestic and international markets, promoting tourism, business travel and high-value cargo operations. The district is also well-connected via major highways including NH-38, NH-36 and NH-83 providing seamless overland access to Chennai, Bengaluru, Thanjavur and other key urban centres, further integrating it into regional economic flows.

Socially and culturally, Tiruchirappalli's zone influences across multiple adjoining districts, attracting pilgrims, students and tourists to its historic temples, educational institutions, and cultural landmarks. The steady inflow of people, goods and knowledge reinforces the district's role as a hub for services, education and healthcare for the central and southern Tamil Nadu region.

These interdependencies linking Tiruchirappalli to vital rivers, ecological systems, ports, airports, highways and cultural circuits form the backbone of its sustainability. Together, they position Tiruchirappalli LPA as a resilient, well-connected and regionally significant urban and economic node capable of sustaining long-term growth while maintaining strong environmental and cultural ties.

## 2.3 Administrative Evolution and Governance Chronology

Tiruchirappalli district was trifurcated in 1995 to improve administrative efficiency resulting in the formation of Tiruchirappalli, Karur and Perambalur districts. The trifurcation redefined administrative boundaries, service delivery zones and development priorities. Tiruchirappalli retained its role as a regional administrative and transport hub.

Post-trifurcation, Tiruchirappalli district is bounded by Perambalur and Ariyalur districts to the north, Pudukkottai district to the south, Thanjavur district to the east and Karur district to the west.

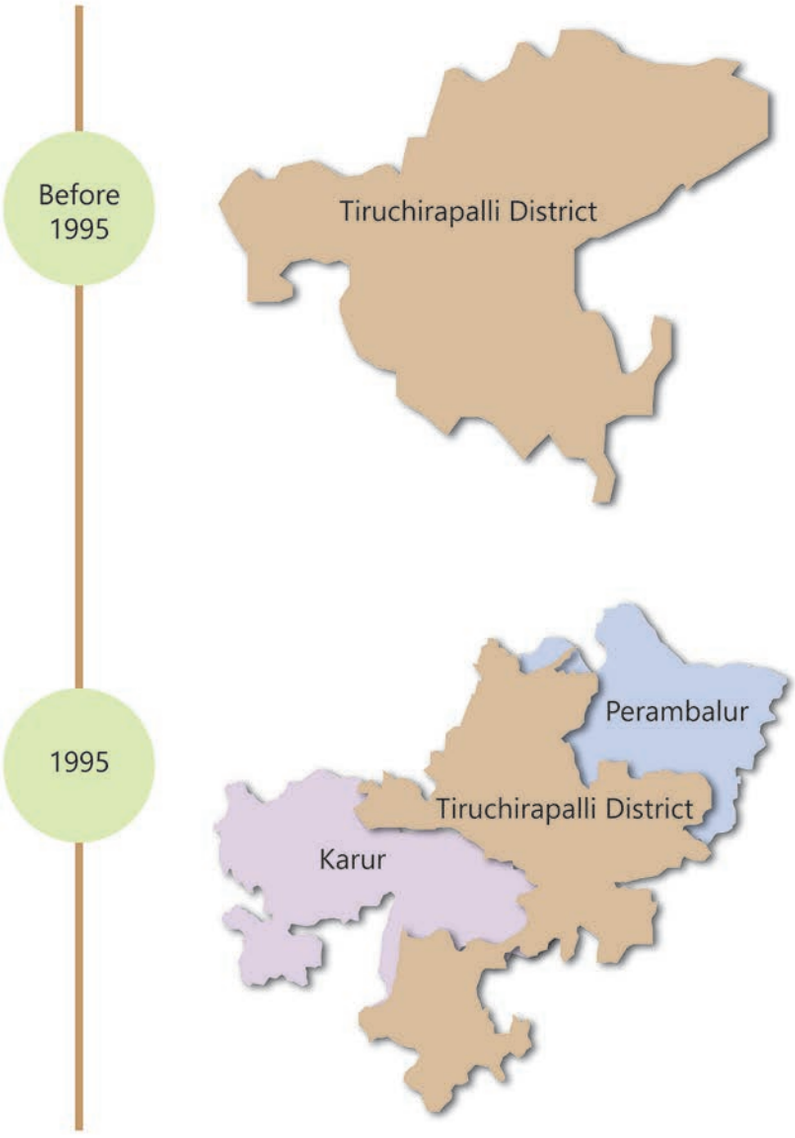



*Figure 2.1 Tiruchirappalli Trifurcation*

Tiruchirappalli District is organized into various administrative units which comprises revenue divisions, taluks, blocks and village panchayats, while urban areas are administered through a corporation, municipalities, and town panchayats.

The table below summarizes the district's administrative structure according to the latest official data.

*Table 2.1 Administrative Structure of Tiruchirappalli District*

| Administrative Unit | Number |
|---|---|
| Revenue Divisions | 4 |
| Taluks | 11 |
| Blocks / Panchayat Unions | 14 |
| Village Panchayats | 404 |
| Urban Local Bodies | |
| Corporation | 1 |
| Municipalities | 5 |
| Town Panchayats | 14 |

*Source: https://tiruchirappalli.nic.in/*

Tiruchirappalli District consists of a wide range of urban local bodies including a City Corporation one Grade I Municipality and four Grade II Municipalities. The table below summarises their classification, approximate area, and population as per the 2011 Census, providing an overview of the district's urban structure.

*Table 2.2 Municipalities Area and Population by grade*

| Sl. No | Classification of Municipal bodies | Name of the Municipal bodies | Area (in sq.km – approx.) | Population 2011 Census (in lakhs) |
|---|---|---|---|---|
| 1 | Corporation | Tiruchirappalli City Corporation | 167.2 | 8,47,387 |
| 2 | Grade I | Manapparai Municipality | 20.85 | 40,510 |
| 3 | Grade II Municipalities | Thuvakudi Municipality | 14.37 | 38,887 |
| | | Thuraiyur Municipality | 15 | 32,439 |
| | | Musiri Municipality | 18.80 | 27,941 |
| | | Lalgudi Municipality | 10.03 | 23,740 |

*Source: https://www.tnurbantree.tn.gov.in/*

## 2.4 District Profile

Tiruchirappalli is the fourth largest city in Tamil Nadu and serves as the district headquarters of Tiruchirappalli District, which comprises eleven taluks and fourteen Community Development Blocks. The district covers an area of 4,500.22 sq. km and has a population of 2,722,290 as per the Census of India, 2011, with a sex ratio of 1,013 females per 1,000 males. Geographically, the district lies between Latitudes 10°00' and 11°30' North and Longitudes 77°45' and 78°50' East.

The Tiruchirappalli Local Planning Area (LPA) constitutes about **804.53 sq. km** which is located approximately at the geographical centre of the district and the state, giving the city significant strategic importance as a major intra-state transportation and logistics node. The city is situated at an average altitude of 78 metres above mean sea level and is located about 130 km approximately from the primary order cities of Madurai and Thanjavur.

Tiruchirappalli is the fourth largest city in Tamil Nadu which serves as one of the key districts of the state with a population of 2,713,858 as per the 2011 Census and a sex ratio of 1,013 females for every 1,000 males. The city situated on the banks of the River Cauvery serves as the District headquarters and is widely known for its historic and religious significance. The most notable Rockfort Temple and the internationally renowned Sri Ranganatha Swamy Temple at Srirangam functions as one of the largest temple complexes in the world.

Historically, Tiruchirappalli was a vast composite District that included the present-day Districts of Perambalur, Karur and Ariyalur. To improve administrative efficiency, Perambalur and Karur District was separated in 1995, followed by the formation of Ariyalur District in 2001, leading to the present administrative structure.

The District also includes prominent towns such as Srirangam, Lalgudi, Thuraiyur, Musiri, and Manachanallur. Srirangam is a major pilgrimage destination within the LPA and Tiruchirappalli continues to function as an important centre for education, industries, transportation and heritage hub. Uraiyur region was one of the early capitals of the Cholas and has gradually evolved into a major cultural, historical and economic centre of Tamil Nadu.

### 2.4.1 Evolution of Tiruchirappalli Region

Tiruchirappalli region is deeply intertwined with its local terrain, geographical features and water systems situated on banks of a major River Cauvery.

The River Cauvery originates in the Brahmagiri Hills of the Western Ghats in Karnataka and traverses through the southern peninsula before entering Tamil

Nadu. Along its upper course, it flows past Mysuru, forming significant riverine islands such as Srirangapatna and Shivanasamudra, and creating the notable Shivanasamudra Falls.Upon entering Tamil Nadu through Dharmapuri district, the river continues southeastward, supporting extensive agricultural landscapes and settlement systems. Near Tiruchirappalli, at the Upper Anaicut (Mukkombu), the Cauvery bifurcates into two primary channels: the northern distributary known as the Kollidam River and the southern channel which continues as the Cauvery. The interstitial landmass formed between these two branches constitutes the riverine island of Srirangam. This bifurcation system has historically influenced the spatial structure, settlement morphology, irrigation networks, and cultural landscape of the Tiruchirappalli region, reinforcing its ecological and socio-economic.

#### 2.4.2.1 Historic Core

The major historic settlements of Tiruchirappalli are Srirangam, Rockfort, Thiruvanaikoil and Uraiyur were geographically located on elevated terrain near the river taking the advantage of natural defences and access to water. These elevated terrains allowed the settlements to be easily defended while overseeing the surrounding agrarian landscapes.

Each of these settlements functioned as fortified centres surrounded by fertile agricultural lands which supported their sustenance and economic activities. Most of them were situated along the northern banks of the Uyyakondan canal providing easy access to water for both domestic and agricultural purposes.

Despite being distinct settlements, they were well-connected through an organized network of roads, facilitating trade, communication and administrative control. This connectivity not only strengthened regional cohesion but also played a key role in the socio-economic and cultural development of the region over centuries.

#### 2.4.2.2 Colonial Era

During the colonial period, major British-era settlements in Tiruchirappalli were established along the southern banks of the Uyyakondan Canal primarily on elevated lands. These locations were chosen to avoid flooding ensure better drainage and maintain proximity to water sources without disrupting agricultural areas.

At the same time, settlements expanded beyond the Rockfort area, particularly around Pallikarai forming new residential and administrative zones. Urban growth during this period largely followed the natural topography, concentrating development on higher ground.

As a result, elevated lands became the preferred areas for settlement, while the fertile agrarian valleys below were left largely untouched, allowing traditional agricultural practices to continue alongside urban expansion.

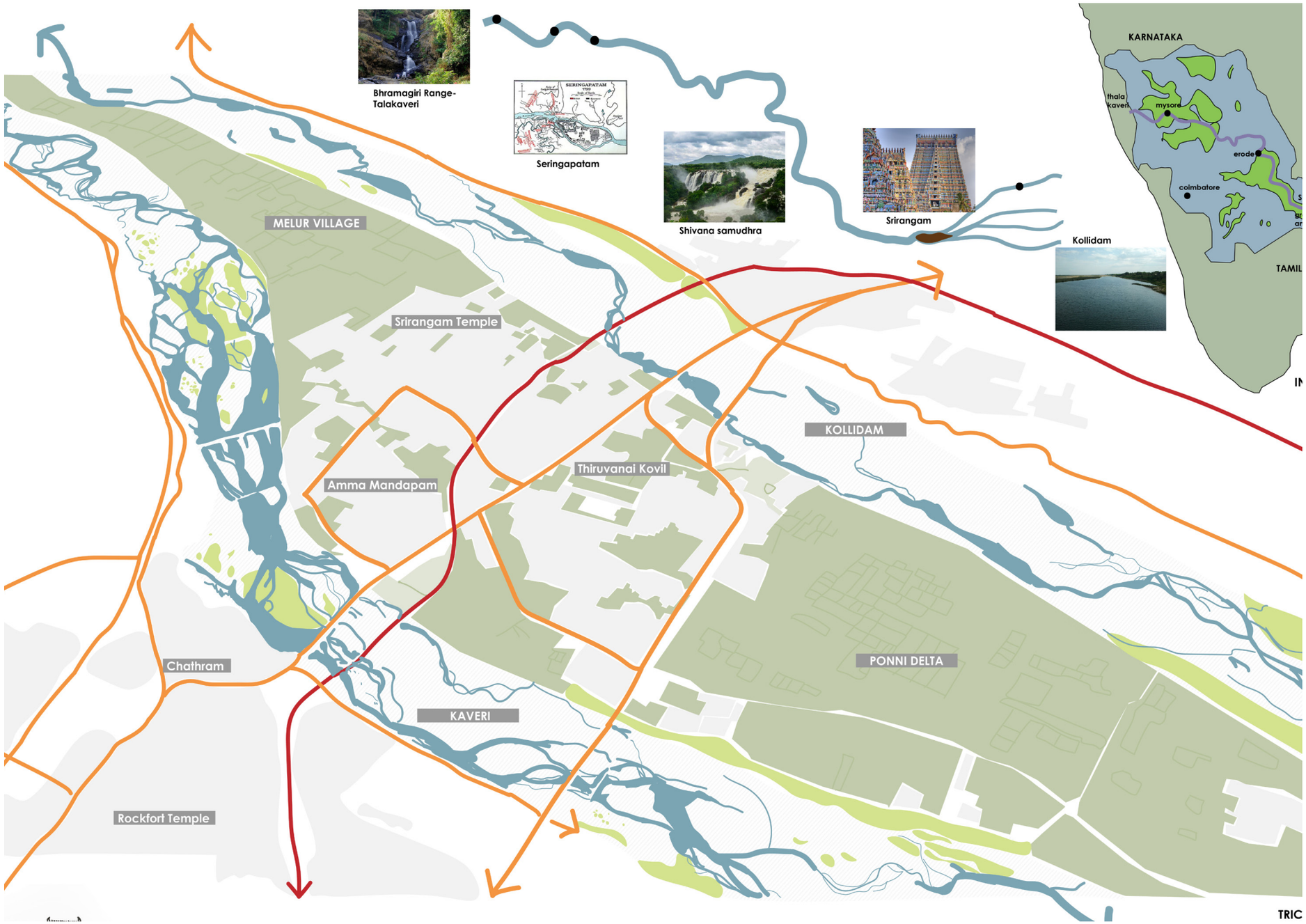



*Figure 2.2 Impact of River Cauvery Evolution in Tiruchirappalli Region*

### 2.4.2.3 Tiruchirappalli – 1980's – Early 90's

During the 1980s and early 1990s, Tiruchirappalli witnessed rapid urban expansion. New residential areas such as Thillainagar emerged between Uraiyur and Rockfort largely occupying former agricultural lands. This phase marked a shift from agrarian land use to urban development.

As urbanization intensified, existing irrigation channels were incorporated into the expanding city fabric. Over time, many of these channels lost their original function and gradually turned into sewage drains due to increased domestic discharge and lack of maintenance.

Development during this period also became more compact, with densification occurring around established settlements. This pattern reinforced urban growth along existing infrastructure while further reducing open and agricultural spaces.

### 2.4.2.4 Tiruchirappalli – At Present

The Urban development in Tiruchirappalli respected the natural terrain and slope with settlements located on elevated lands while low-lying areas were preserved for agriculture and water flow. However, in recent years rapid urban expansion has led to new developments encroaching into low-lying areas and former agrarian fields.

These developments are highly vulnerable to flooding due to poor drainage and disruption of natural water channels. Additionally, the conversion of agricultural lands into residential and commercial uses has placed immense pressure on existing water infrastructure. The Uyyakondan Canal and associated irrigation channels once vital for agriculture have increasingly become conduits for sewage creating serious environmental, health and water management challenges for the city

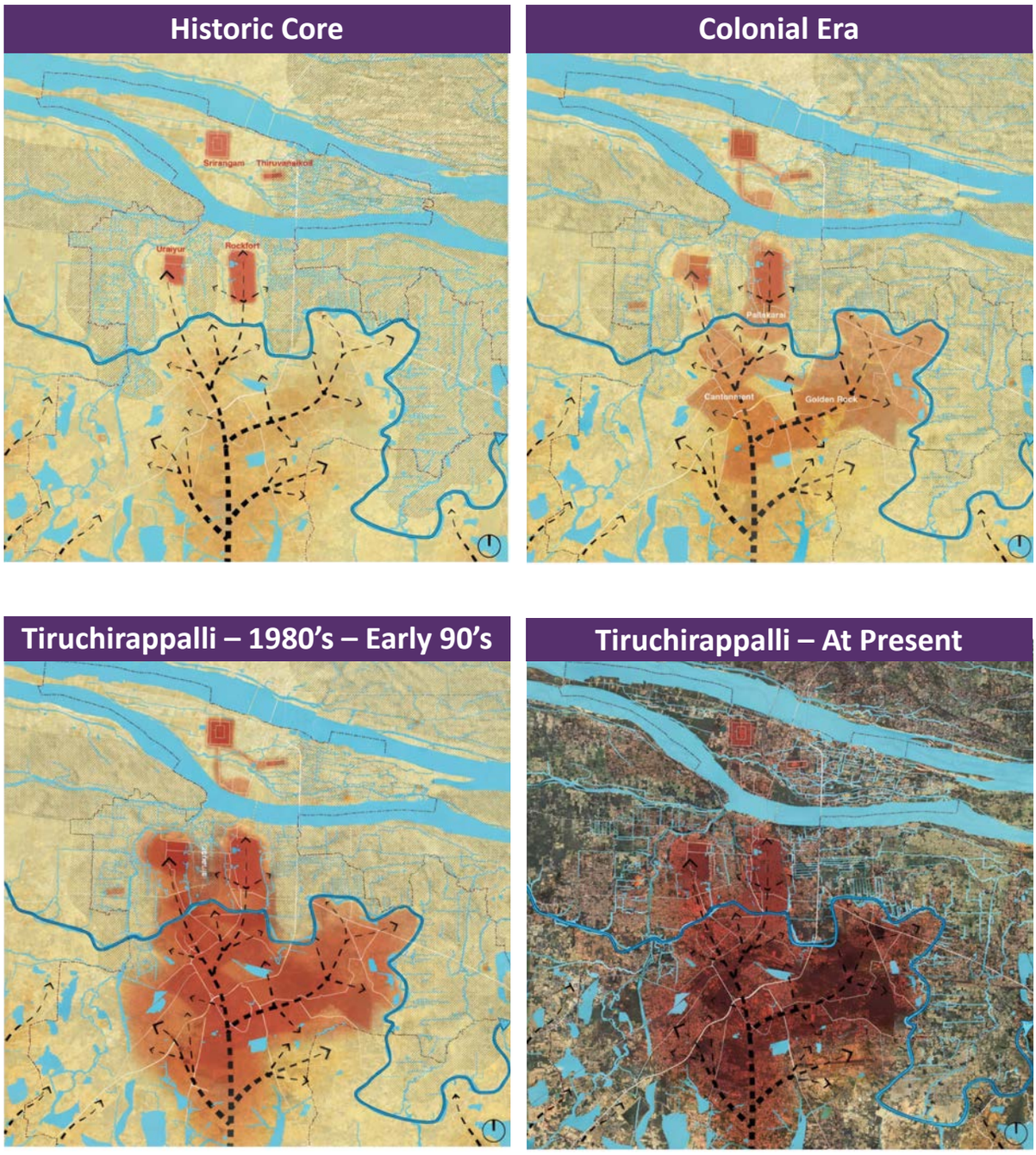



*Figure 2.3 Tiruchirappalli's Urban Morphology*

*Source: The Urban Lab*

## 2.5 Urban – Rural Profile

Tiruchirappalli city serves as the primary urban core supported by surrounding towns and peri-urban settlements such as Srirangam, Thiruverumbur, Manachanallur and Lalgudi. This core-periphery arrangement enables the city to provide higher-order services including administration, education, healthcare and commerce to its surrounding region. The Cauvery river system plays an important role in shaping regional development by influencing agriculture, water availability and ecological conditions, which involves systematic management of floodplains and environmentally sensitive areas as urbanisation expands. The region supports a diversified economy comprising engineering industries, small-scale manufacturing, institutional activities and agriculture while the availability of developable land along major transport corridors offers scope for planned urban expansion and infrastructure-led growth.

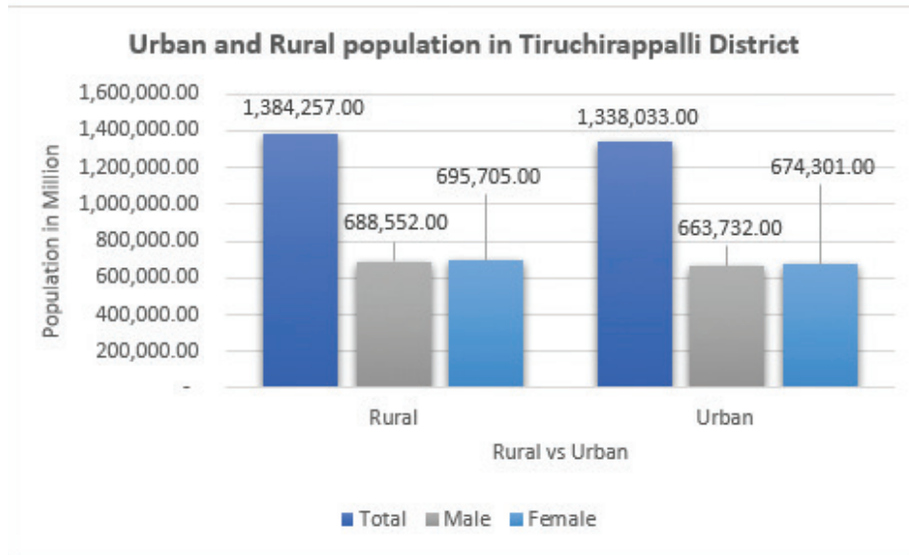
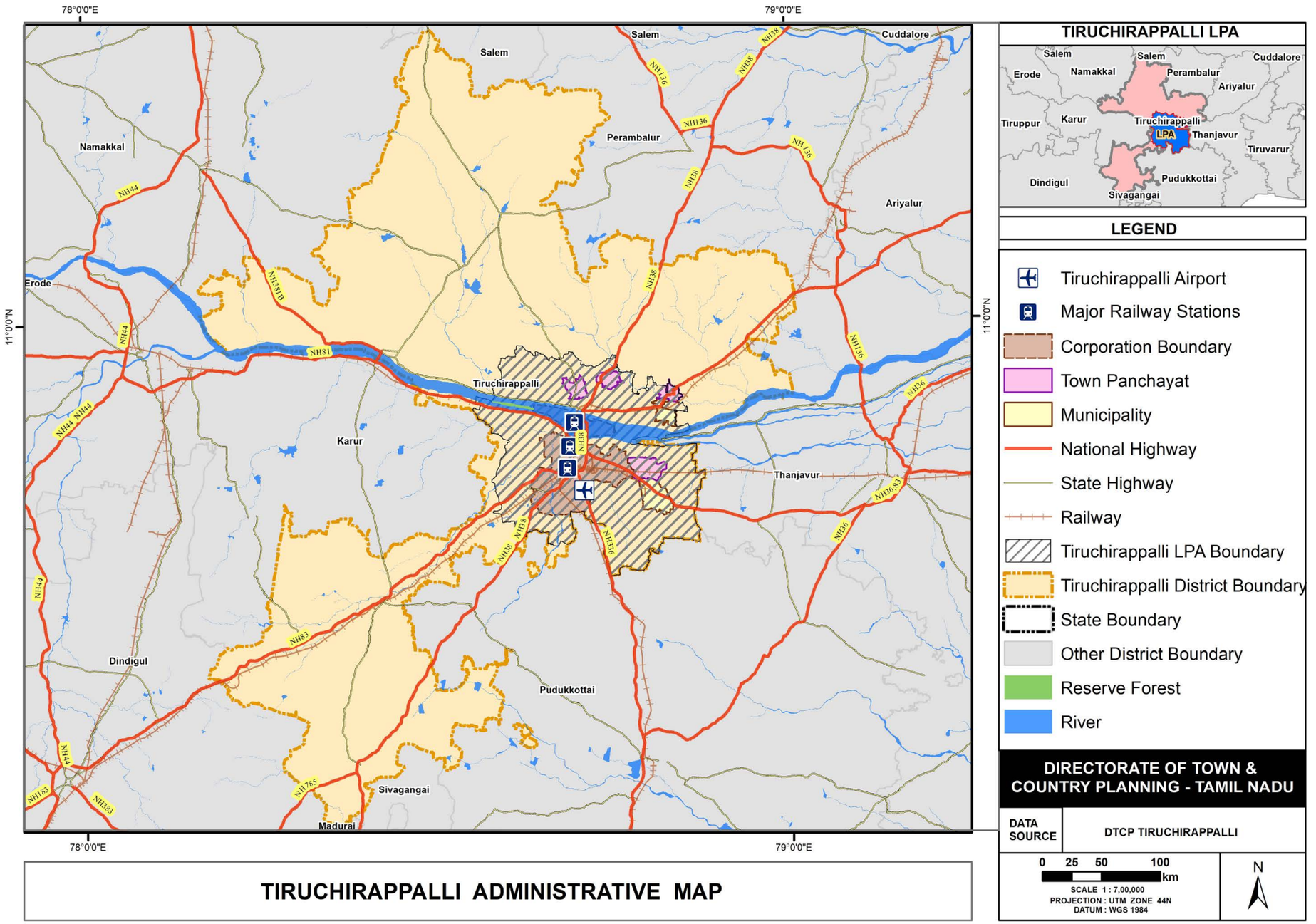



*Figure 2.4 Urban and rural population in Tiruchirappalli District* ***2011***

*Source: Statistical Hand Book of Tamil Nadu-2022-23*

## 2.6 Economic Profile

Tiruchirappalli district is an important economic region in central Tamil Nadu supported by a diversified base of services, manufacturing and agriculture. Its central location, strong institutional presence and balanced economic structure have enabled it to develop as a self-sustaining economic centre within the state. It is the fourth-largest municipal corporation in Tamil Nadu where the district recorded a Gross District Domestic Product of INR 44,529 crore in FY 2022–23, contributing about 3.1 per cent to the state's Gross State Domestic Product.




**TIRUCHIRAPPALLI ADMINISTRATIVE MAP**

*Map 2.2 Tiruchirappalli Administrative Boundary*

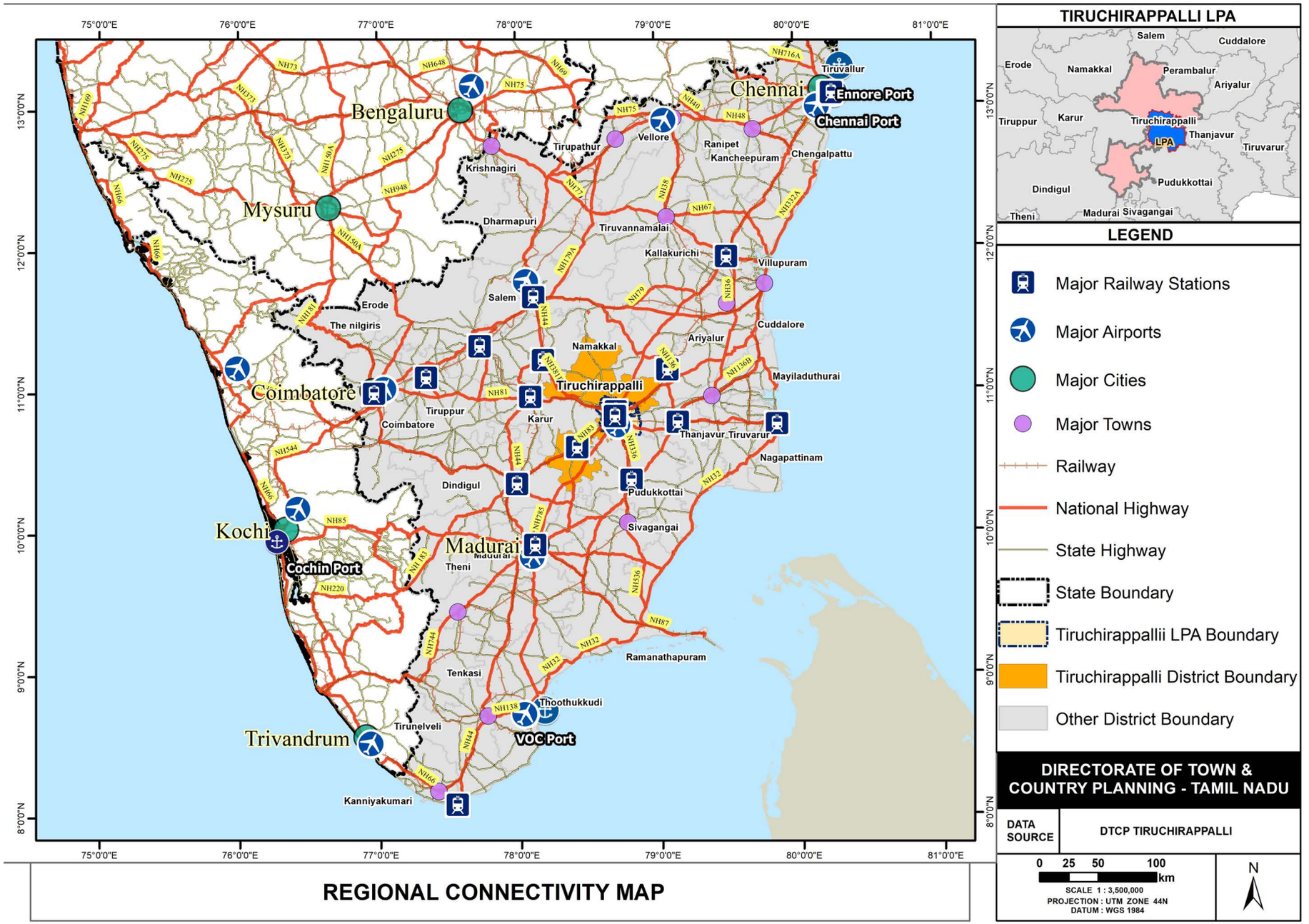
The district demonstrates economic stability through a balanced mix of services, manufacturing and MSMEs and agriculture-linked livelihoods associated with the Cauvery river basin. This diversified structure is supported by strong human capital and a sustained public-sector presence there by positions Tiruchirappalli as a stable and resilient contributor to the state's overall economic growth.

## 2.7 Regional Connectivity and Accessibility

Tiruchirappalli functions as a central regional hub within Tamil Nadu owing to its pivotal geographic location and extensive connectivity. Positioned at the core of the state's settlement and transport framework, the district shares boundaries with ten neighbouring districts enabling it to act as a key nodal interface linking diverse regions. This centrality allows Tiruchirappalli to effectively connect the industrial belts of western Tamil Nadu with the agricultural delta and port-influenced districts of the east. It is well-connected to major urban centres such as Thanjavur, Dindigul, and Madurai and maintaining strong hinterland access to Chennai Port and V.O. Chidambaranar Port at Thoothukudi, the city serves as a crucial interchange for passenger movement and freight logistics reinforcing its role as a regional anchor in the state.

### 2.7.1 Road Connectivity

The Tiruchirappalli region is served by a well-developed hierarchical road network comprising of National Highways (NH), State Highways (SH), Major District Roads (MDR) and Other District Roads (ODR). The city functions as a radial road transport hub with multiple National Highways passing through the urban areas providing direct connectivity to major cities, industrial centres and regional centres across Tamil Nadu and adjoining states. Tiruchirappalli district is served by 6 National Highways and 5 State Highways as below:




*Map 2.3 Connectivity of Tiruchirappalli to Major Cities and Towns*

*Table 2.3: Major Road Corridors Serving Tiruchirappalli*

| Road Category | Nomenclature | Major Route | Regional Connectivity Role |
|---|---|---|---|
| **National Highway** | NH – 36 | Pudukkottai – Thoothukudi | Connects Tiruchirappalli to southern port regions and industrial corridors |
| **National Highway** | NH – 38 | Vellore – Thoothukudi | Provides north–south regional connectivity linking western and southern Tamil Nadu |
| **National Highway** | NH – 81 | Coimbatore – Chidambaram | Connects western industrial belt to eastern coastal and delta regions |
| **National Highway** | NH – 83 | Coimbatore – Nagapattinam | Facilitates east–west movement between industrial centres and port towns |
| **National Highway** | NH – 336 | Pudukkottai – Tiruchirappalli | Serves as a direct regional connector to Tiruchirappalli urban area |
| **National Highway** | NH – 136 | Thanjavur – Attur | Strengthens connectivity to the Cauvery delta and northern districts |
| **State Highway** | SH – 22 | Kallanai – Poompuhar | Links Cauvery delta settlements and heritage towns |
| **State Highway** | SH – 25 | Tiruchirappalli – Namakkal | Provides access to northern districts and western Tamil Nadu |
| **State Highway** | SH – 62 | Tiruchirappalli – Thuraiyur | Enhances rural–urban connectivity within the district |
| **State Highway** | SH – 143 | Mathur – Thittakudi | Supports inter-district movement towards northern regions |
| **State Highway** | SH - 139 | Ariyalur – Sripuranthan | Connects mineral- and industry-influenced areas to Tiruchirappalli |

These corridors facilitate regional passenger movement as well as long-distance freight transport linking Tiruchirappalli with Chennai, Coimbatore, Thanjavur, Karur and Dindigul. In addition, the extensive state highway network enhances inter-district accessibility and strengthens rural–urban linkages.

Bus-based public transport forms the backbone of regional passenger mobility in and around Tiruchirappalli. Services operated by the Tamil Nadu State Transport Corporation (TNSTC), State Express Transport Corporation (SETC) providing connectivity to neighbouring districts as well as adjoining states such as Andhra Pradesh, Karnataka, Kerala and Puducherry. The city is served by two major operational bus terminals such as Trichy Central Bus Stand and Chathiram Bus Stand. An Additional greenfield integrated bus terminal Kalaignar Dr. M. Karunanidhi Integrated Bus Terminal (KDMK IBT) is developed at Panchappur to cater to growing transport demand.

### 2.7.2 Rail Connectivity

Rail connectivity forms a vital component of Tiruchirappalli's regional transport infrastructure. The city serves as the headquarters of the Tiruchirappalli Division of the Southern Railway Zone and functions as one of the most prominent railway junctions in southern India.

The district is primarily served by Tiruchirappalli Junction supported by Tiruchirappalli Fort and Srirangam railway stations. It acts as a major intercity and interstate rail node providing direct connectivity to Chennai, Coimbatore, Erode, Rameswaram, Thiruvananthapuram and other major destinations. In addition, Tiruchirappalli Junction acts as a pivotal rail interchange with five major rail corridors branching out in different directions:

- Northwards towards Villupuram via Virudhachalam
- Eastwards towards Villupuram via Thanjavur
- South-eastwards towards Karaikkudi
- Southwards towards Thiruvananthapuram via Dindigul
- Westwards towards Coimbatore via Karur

### 2.7.3 Air Connectivity

The Tiruchirappalli International Airport (TRZ) located approximately 5 km south of the city centre along National Highway 336 provides air connectivity for the Tiruchirappalli Region. It is declared as an International airport in 2012 where TRZ functions as the primary air gateway for Central Tamil Nadu.The airport provides direct domestic connectivity to major Indian cities such as Chennai, Bengaluru, Hyderabad, Vijayawada and other regional centres.

In addition to international destinations it connects to Southeast Asia and the Middle East including Kuala Lumpur, Singapore, Colombo, Doha, Dubai, Sharjah, Muscat and Kuwait. The airport plays a crucial role in facilitating passenger movement related to trade, employment, education and pilgrimage across the region.

In addition to passenger services, Tiruchirappalli International Airport supports limited air cargo movement primarily catering to perishable goods, courier consignments and select high - low volume cargo. While air cargo operations currently play a specialized and modest role in the regional logistics system, they contribute to the overall multimodal connectivity of the region and provide scope for gradual expansion in line with future economic growth.

### 2.7.4 Port Connectivity

Tiruchirappalli being an inland city maintains strong connectivity to major ports in Tamil Nadu supporting its role as an industrial and trade hub.

- **Thoothukudi Port:** ~300 km south handling bulk cargo and containers vital for imports and exports.
- **Chennai Port:** ~330 km northeast, one of India's busiest ports linking Tiruchirappalli to global markets.

- **Ennore Port:** ~340 km northeast, supports bulk and industrial cargo.
- **Nagapattinam Port:** ~150 km east, handles regional cargo and fisheries trade.

The connectivity from the district through efficient highways such as NH-38, NH-36 and rail links which facilitates transport to ports, while Tiruchirappalli International Airport supports high-value cargo.

# 3 PROFILE OF LPA

## 3.1 Spatial Context of Tiruchirappalli LPA

The city of Tiruchirappalli (Trichy) is widely regarded as the geographical center of both the district and the state of Tamil Nadu, underscoring the importance of planning the Tiruchirappalli Local Planning Area (LPA). Tiruchirappalli's strategic location enables seamless connectivity across the state, reinforcing its role as a pre-eminent educational hub, a key economic center, and a critical node for administrative functions. It is notable that, although the Tiruchirappalli LPA accounts for only 18.27% of the district's area, it accommodates 52.6% of the district's population, according to the 2011 census.

The Tiruchirappalli Local Planning Area (LPA) comprises six taluks, with the urban administrative framework encompassing the Tiruchirappalli City Municipal Corporation (TCMC), two municipalities (Lalgudi and Thuvakudi), four town panchayats (Koothappar, Puvalur, Manachanallur, and S. Kananoor), and the rural administrative framework comprising 91 Village panchayats.

## 3.2 Evolution and Morphology of Tiruchirappalli LPA

### 3.2.1 Evolution

Tiruchirappalli, one of the oldest continuously inhabited settlements in India, is situated on the banks of the River Cauvery and has a history dating back to the 2nd century BC. The city's suburb, Woraiyur, served as the capital of the Early Cholas from the 3rd century BC to the 3rd century AD and was a prominent business center with established trade links to Rome. The medieval period commenced in the 6th century AD with the reign of the Pallava king Mahendravarman I, who laid the foundation for the iconic Rock fort. Following the decline of the Cholas, the city was ruled by the Pandyas (1216–1311), followed by the Delhi Sultanate and the Madurai Sultanate (1311–1378). It was subsequently annexed by the Vijayanagar Empire and later became a key part of the Madurai Nayak kingdom, even serving as its capital at various times until 1736, before being annexed to the Carnatic kingdom. The British took control in 1801, incorporating the city, then known as Trichinopoly, into the Madras Presidency. Under British rule, it became a major city and the first headquarters for the South Indian Railway Company, remaining under their hegemony until India's independence. The municipality of Trichinopoly was created in 1866 as per the Town Improvements Act of 1865, followed by the municipalities of Srirangam in 1871 and Ponmalai (Golden Rock) in 1972.

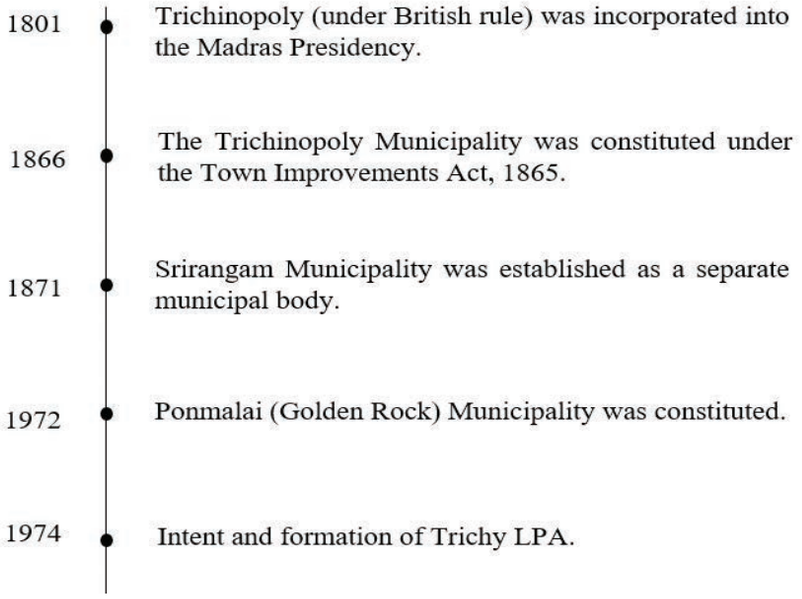
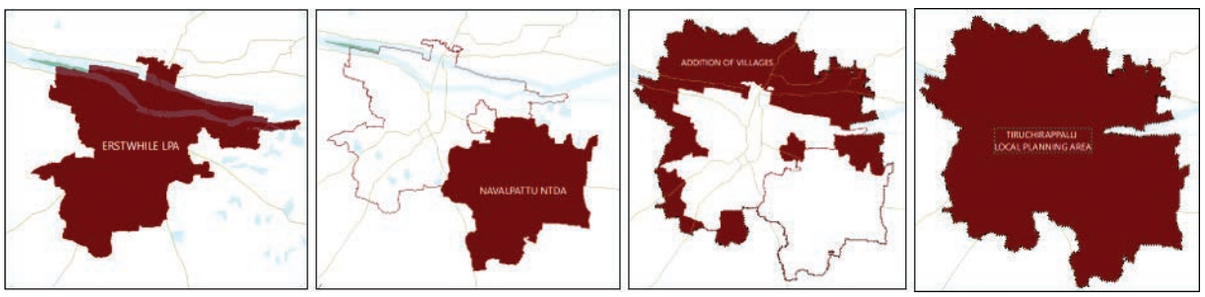



*Figure 3.1 Timeline on the formation of municipalities in Tiruchirappalli*

### 3.2.2 Local Planning Area Notification

The Tiruchirappalli Master Plan 2045 covers an extent of 804.53 Sq.km, incorporating the erstwhile LPA, Navalpattu NTDA and adjoining villages that are experiencing urbanisation. The expansion was initially notified under section 10 (1) of the Tamil Nadu Town and Country Planning Act 1971, through G.O. (Ms) No. 240 H & UD, dated 24.09.2013, under section 10 (4) in G.O. (Ms) No. 88, H & UD Department, dated 30.06.2021 and the same was confirmed in the Letter No. 4791974/UD4(2)/2023-1, dated 15.06.2023. In strategically planning for sustainable and comprehensive urban development, in G.O. (Ms) No. 207, H&UD, dated 23.11.2022, issued to constitute the Tiruchirappalli Urban Planning Area and Urban Development Authority for an area of 804.53 sq. km. Reinforcing this, the Second Master Plan of Tiruchirappalli is prepared to the same extent.




*Erstwhile LPA – as in First Master Plan* | *Navalpattu NTDA* | *Added Villages* | *Tiruchirappalli LPA for Second Master Plan*

*Figure 3.2 Formation of Tiruchirappalli LPA*

*Figure 3.3 Timeline on the formation of Tiruchirappalli LPA*

### 3.2.3 Morphology

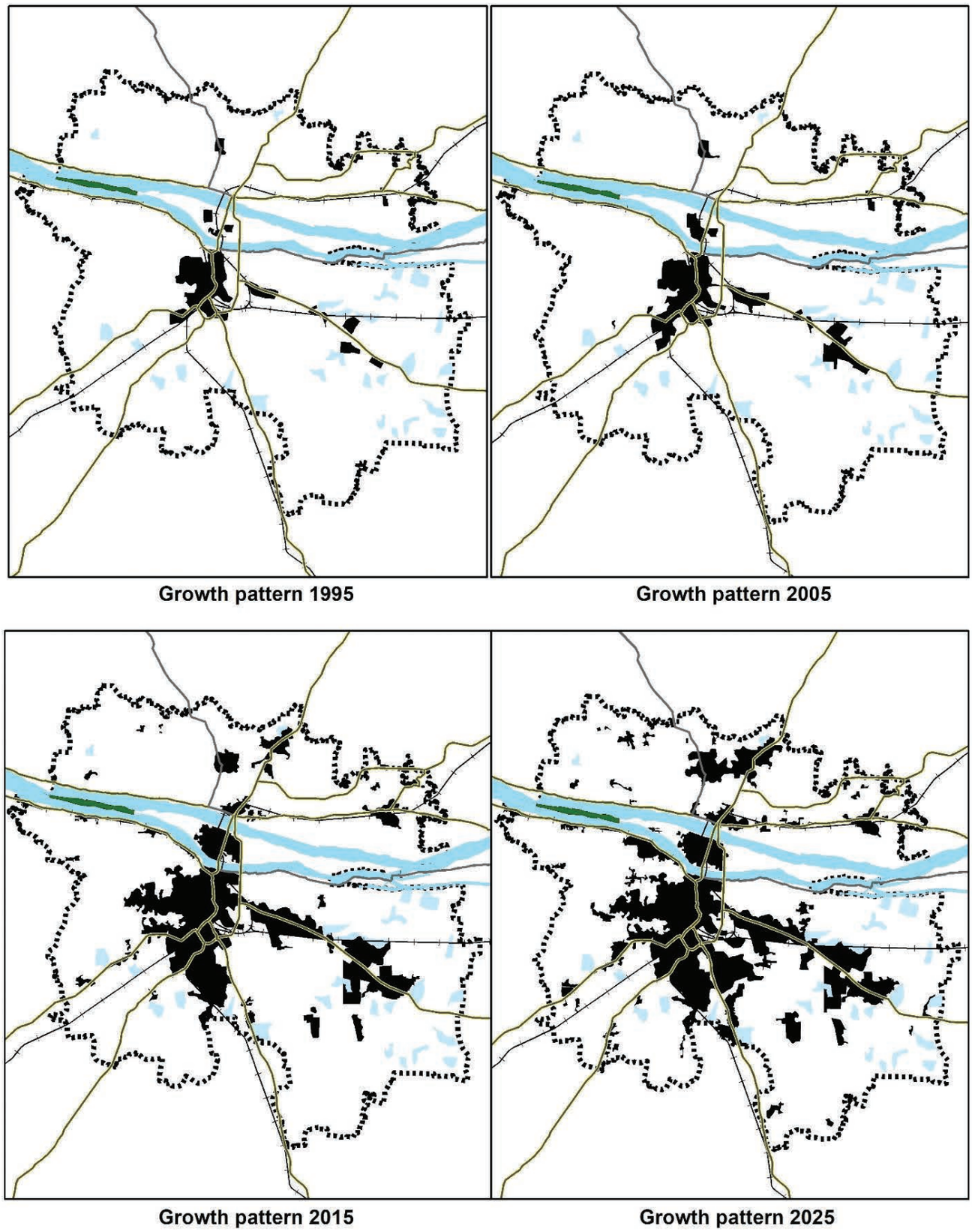
Tiruchirappalli is gradually transitioning from a core-oriented urban form to a more dispersed, corridor-led pattern of growth, as illustrated in Map 3.1, which depicts the spatial expansion of Tiruchirappalli over the four decades from 1995 to 2025. A combination of factors, including major infrastructure investments, improvement in the regional and intra-city connectivity, the diversification of economic and institutional activities, and natural constraints, has shaped this transformation.

In 1995, the growth was concentrated around the historic core, including Central Bus Stand, Cantonment, Rock Fort area, and Srirangam. NH-38 and NH-83 corridors were beginning to show linear growth, while the Cauvery River acts as a natural barrier, limiting large expansion towards the north.

In 2005, growth occurred along the NH-83 (Trichy–Thanjavur) highway, driven by industrial layouts and agro-based industries, while the NH-83 (Trichy–Dindigul) highway witnessed the emergence of new residential colonies.

In 2015, the city transformed from a core-centric form to a more polycentric urban structure. The belt of Thuvakudi–BHEL evolved into a major industrial–educational hub, while the airport corridor experienced growth driven by logistics, warehousing, and residential developments.

Between 2005-2025, the city experienced significant growth along all major corridors. Simultaneously, residential layouts have expanded well beyond the corporation limits, spreading towards Manachanallur, Panjappur, Allithurai and Navalpattu, indicating clear peri-urban growth.




*Map 3.1 Historical morphology of Tiruchirappalli LPA*

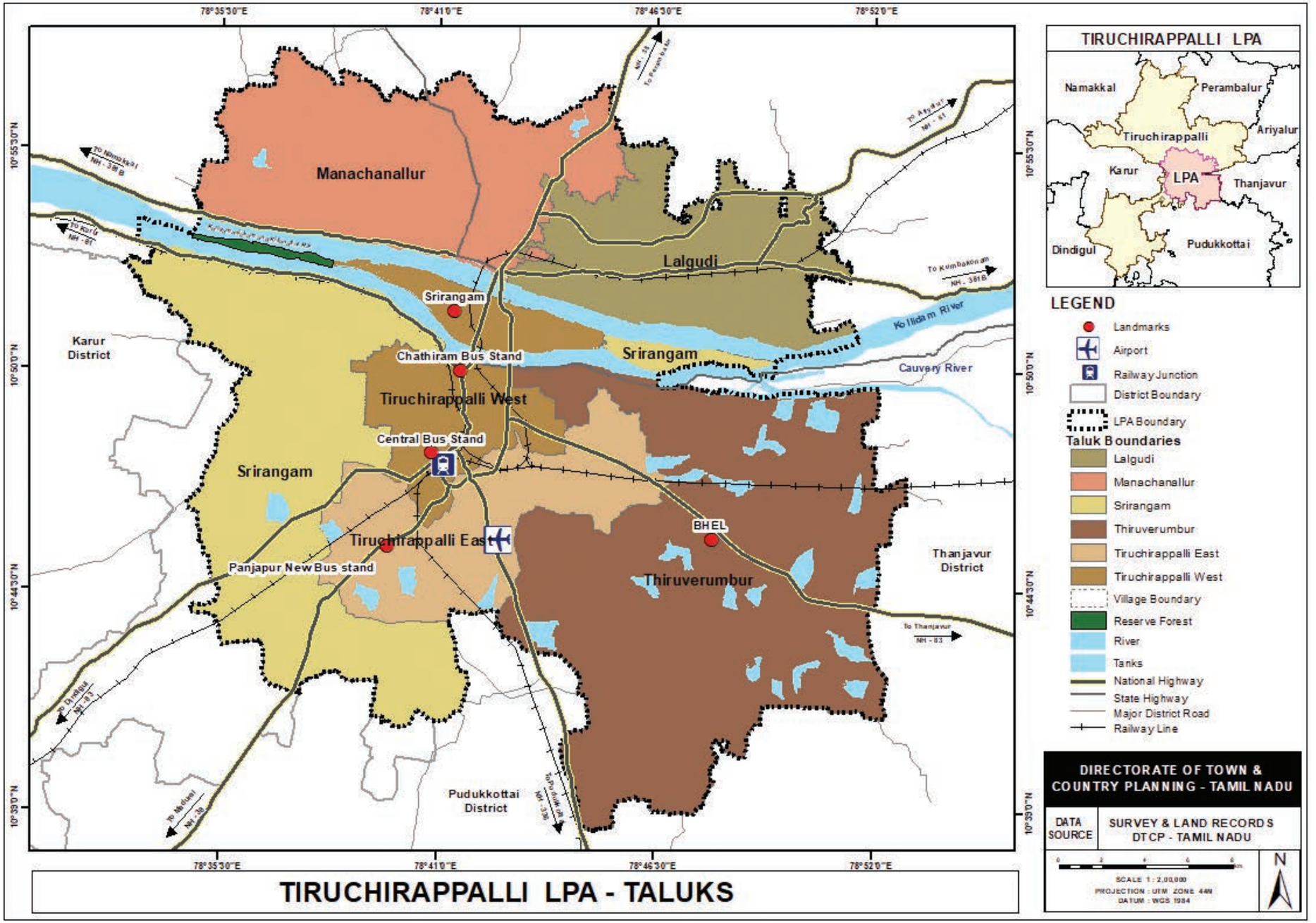
## 3.3 Details on Administrative Boundaries

The Second Master Plan of Tiruchirappalli (2045) covers an extent of 804.53 sq. km, comprising six taluks: Srirangam, Manachanallur, Lalgudi, Thiruverumbur, Tiruchirappalli East, and Tiruchirappalli West (as shown in Map 3.2). The administrative framework of the Tiruchirappalli LPA (as in Map 3.3) covers the Tiruchirappalli City Municipal Corporation (TCMC), two municipalities (Lalgudi and Thuvakudi), four town panchayats (Koothappar, Puvalur, Manachanallur, and S. Kananoor), and 91 Village panchayats (comprising 104 revenue villages).

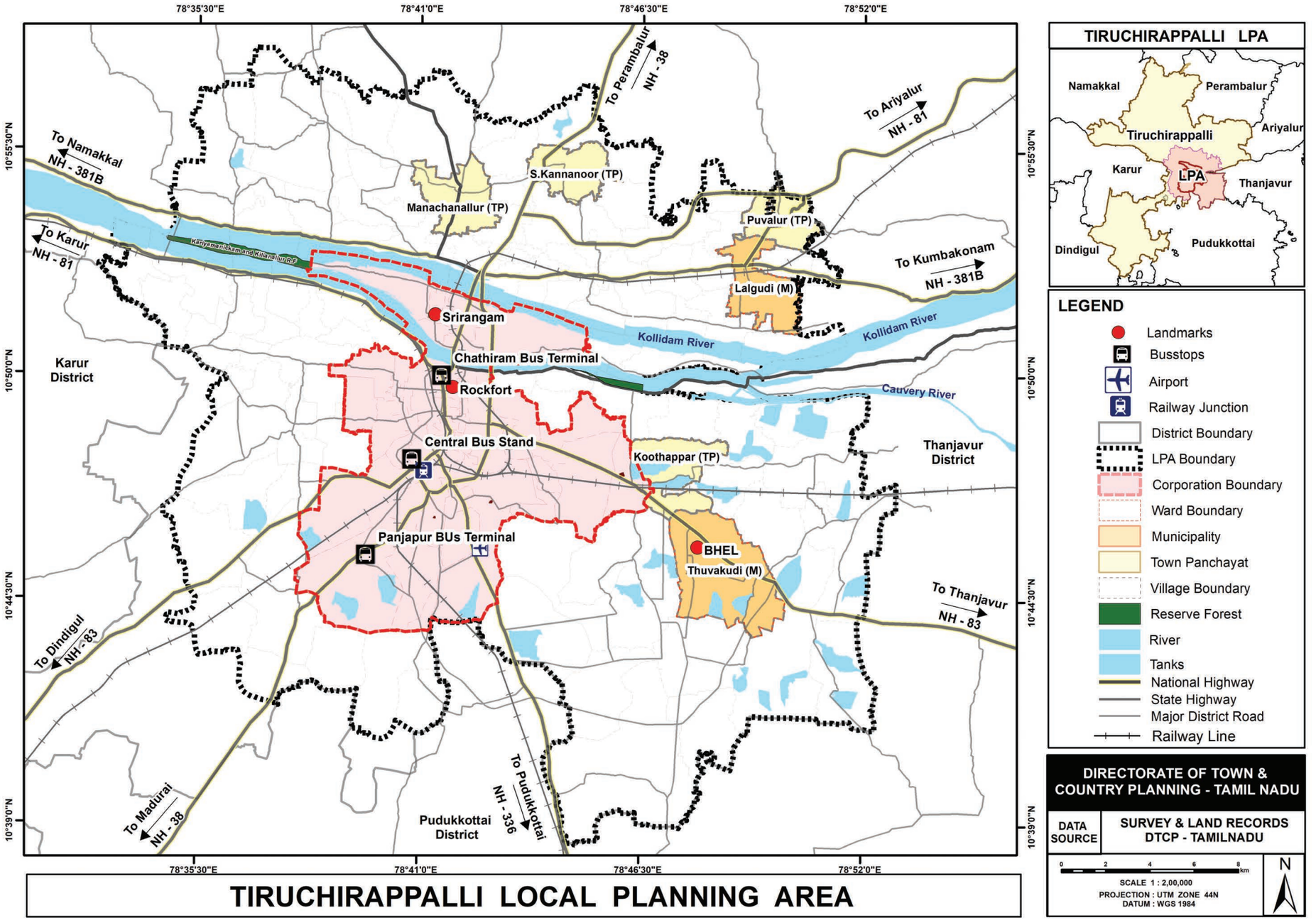
*Table 3.1 Administrative framework of Tiruchirappalli Local Planning Area*

| Administrative category | No. of Local bodies | Area (in Sq.km) | Spatial share (in %) |
|---|---|---|---|
| Tiruchirappalli City Municipal Corporation | 1 | 167.23 | 20.8 |
| Municipalities | 2 | 24.40 | 3.0 |
| Town panchayats | 4 | 21.53 | 2.7 |
| Village panchayats (comprising 104 revenue villages) | 91 | 591.37 | 73.5 |
| **Total area** | | **804.53** | **100** |

Furthermore, the Tiruchirappalli LPA comprises five blocks, namely Lalgudi, Manachanallur, Andanallur, Manikandam, and Thiruverumbur, in addition to the Tiruchirappalli City Municipal Corporation (as in Map 3.4).

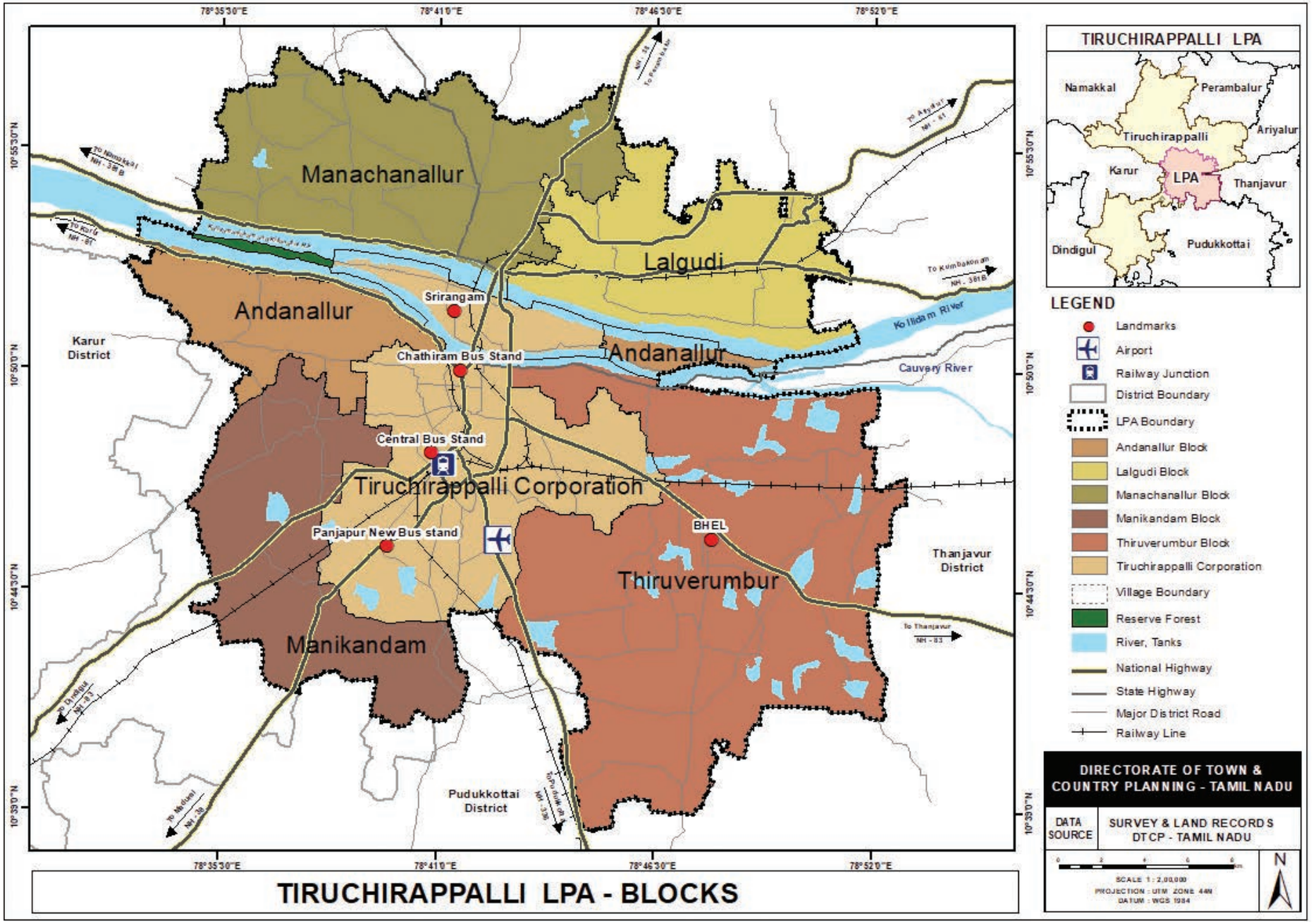



*Map 3.2 Taluks in Tiruchirappalli LPA*




# TIRUCHIRAPPALLI LOCAL PLANNING AREA

*Map 3.3 Administrative framework of Tiruchirappalli LPA*




*Map 3.4 Blocks in Tiruchirappalli LPA*

### 3.3.1 Tiruchirappalli Corporation

The Tiruchirappalli Municipal Corporation was formed in 1994 under G.O.Ms. No. 109 (dated 31.03.1994) by merging 13 local bodies, including Srirangam and Ponmalai (Golden Rock) Municipalities, along with the town panchayats K. Abishekapuram, Puthur, Ariyamangalam, and Melakalkandarkottai, and adjoining panchayats like Panayakurichi (with Devandanam Village), Ukkadai Ariyamangalam, K. Sathanur, Pandamangalam, Thiruvanaikovil, Uyyakondan Thirumalai, and the Golden Rock Railway Workshops Colony. With this formation, the Municipal Corporation covered an area of 146.90 sq. km and was administratively divided into four zones comprising 60 census wards.

Due to rapid urbanisation, the Thiruverumbur Town Panchayat, along with the Village Panchayats of Ellagudi, Alathur, Pappakurichi, and Kilakalkandarkottai were merged with the existing Tiruchirappalli Municipal Corporation in accordance with G.O. No. 218 dated 28.09.2010 and G.O. No. 244 dated 15.10.2010. Following the expansion, the jurisdiction of the Tiruchirappalli City Municipal Corporation was extended to 167.23 sq. km, comprising a total of 65 census wards by October 2011. Later in 2018, the administrative structure of the 65 wards was reorganized into five zones, as declared in G.O. No. 126, dated 14.12.2021.

*Table 3.2 Administrative units and formation (Corporation)*

| Local bodies | Administrative category | Area (in sq.km) |
|---|---|---|
| Erstwhile Corporation | | 146.90 |
| Thiruverumbur | Town Panchayat | 4.16 |
| Pappakurichi | Village Panchayat | 4.92 |
| Ellagudi | Village Panchayat | 4.30 |
| Kilakalkandarkottai Village Panchayat | | 4.72 |
| Alathur | Village Panchayat | 2.23 |
| **Tiruchirappalli City Municipal Corporation** | | **167.23** |

*Source: G.O. No. 218 dated 28.09.2010*

*60 wards covering an area of 146.90 sq. km.*

*65 wards after expansion covering an area of 167.23 sq. km.*

*65 wards reorganized into five zones.*

*Figure 3.4 Evolution of wards in TCMC*

### 3.3.2 Municipalities

There are two Municipalities in the Tiruchirappalli LPA: Lalgudi and Thuvakudi, acting as secondary growth centres within the planning region.

*Table 3.3 Administrative units and their Correlation (Municipalities)*

| Block | Municipalities | Revenue village | Area (in sq.km) |
|---|---|---|---|
| Lalgudi | Lalgudi | Sirudaiyur | 10.03 |
| | | L. Abishekapuram | |
| | | Mummudi Cholamangalam | |
| Thiruverumbur | Thuvakudi | Thuvakudi | 14.37 |

### 3.3.3 Town Panchayats

There are four town panchayats in the Tiruchirappalli LPA, namely Puvalur, Mannachanallur, S.Kannanoor (West), and Koothappar, forming the peri-urban belt and transitional zones.

*Table 3.4 Administrative units and their Correlation (Town Panchayats)*

| Block | Town Panchayats | Revenue village | Area (in sq.km) |
|---|---|---|---|
| Lalgudi | Puvalur | Puvalur (East) | 5.18 |
| | | Puvalur (West) | |

| Block | Town Panchayats | Revenue village | Area (in sq.km) |
|---|---|---|---|
| Manachanallur | Manachanallur | Mannachanallur | 2.45 |
| | | Melaseedevimangalam | |
| | | Ulunthangudi | |
| | S.Kannanoor (West) | S.Kannanoor (East) | 4.50 |
| | | S.Kannanoor (West) | |
| Thiruverumbur | Koothappar (TP) | Koothappar | 9.4 |

### 3.3.4 Village Panchayats

The Tiruchirappalli Local Planning Area (LPA) comprises 91 Village Panchayats, encompassing a total of 104 revenue villages. Some Village Panchayats span multiple revenue villages and, in certain cases, a revenue village falls under more than one Panchayat, highlighting the spatial and governance complexity within the LPA. Further, there are five constituent blocks, collectively comprising 104 revenue villages,

*Table 3.5 Administrative framework of Blocks comprising Village Panchayats*

| Blocks | No. of Village Panchayats | No. of Revenue villages |
|---|---|---|
| Lalgudi | 23 | 26 |
| Manachanallur | 16 | 20 |
| Andanallur | 18 | 19 |
| Manikandam | 14 | 16 |
| Thiruverumbur | 20 | 23 |
| **Total Village panchayats in blocks** | **91** | **104** |

*Table 3.6 Administrative units and their Correlation (Village Panchayats)*

| Blocks | Village Panchayats | Revenue Villages | Area (in sq.km) |
|---|---|---|---|
| Lalgudi | Aangarai | Aangarai | 3.36 |
| | Appadurai | Appadurai | 4.04 |
| | Thalagudi | Thalagudi(CT) | 2.56 |
| | | Keeramangalam | 0.83 |
| | Idayathumangalam | Idayathumangalam | 3.64 |
| | | Seshasamuthiram | 1.65 |
| | Esanakorai | Esanakorai | 2.79 |
| | Sevanthinathapuram | Sevanthinathapuram | 2.89 |
| | Keelaperungavur | Keelaperungavur | 2.79 |
| | Koohur | Koohur | 5.6 |
| | Madagudi | Madagudi | 5.13 |
| | | V.Thuraiyur | 3.12 |
| | Manakkal | Manakkal (East) | 1.24 |
| | Koopavalli | Manakkal (West) | 3.07 |
| | Marudhur | Marudhur | 4.64 |
| | Nagar | Nagar | 3.58 |
| | Nerujalakudi | Nerujalakudi | 2.34 |
| | Pambaramsuthi | Pambaramsuthi | 1.96 |
| | Puthukudi | Puthukudi | 2.19 |
| | R.Valavanoor | R.Valavanoor | 3.48 |
| | Sirumaruthur | Sirumaruthur | 1.79 |
| | T.Valavanoor | T.Valavanoor | 3.93 |
| | Thirumangalam | Thirumangalam part | 5.57 |
| | Agalanganallur | Thirumangalam part | |
| | Valadi | Valadi | 2.67 |
| | Thirumanamedu | Thirumanamedu (East) | 1.72 |
| | | Thirumanamedu (West) | 3.22 |

| Blocks | Village Panchayats | Revenue Villages | Area (in sq.km) |
|---|---|---|---|
| Manachanallur | Alakiyamanavalam | Alakiyamanavalam | 5.35 |
| | Pitchandarkoil | Pitchandarkoil(CT) | 6.16 |
| | InamKalpalayam | Kalpalayam | 4.54 |
| | Kariyamanikam | Kariyamanikam (West) | 6.38 |
| | | Kariyamanikam (East) | 3.91 |
| | | Cholanganallur | 9.69 |
| | Killianallur | Killianallur (South) | 4.94 |
| | | Killianallur (North) | 2.61 |
| | Koothur | Koothur | 3.29 |
| | Kovathakudi | Kovathakudi | 5.09 |
| | Mathavaperumalkoil | Mathavaperumalkoil | 5.9 |
| | Melpathu | Melpathu | 5.62 |
| | Poonampalayam | Poonampalayam | 13.44 |
| | Iyyampalayam | Rasampalayam | 1.94 |
| | Samayapuram | Samayapuram | 5.73 |
| | Theerampalayam | Theerampalayam | 7.05 |
| | Thiruppanjeeli | Thiruppanjeeli (North) | 10.44 |
| | | Thiruppanjeeli (South) | 11.19 |
| | Thiruvasi | Thiruvasi | 3.5 |
| | Venkankudi | Venkankudi | 2.5 |
| Andanallur | Allur | Allur | 4.11 |
| | Anthanallur | Anthanallur | 8.71 |
| | Kambarasampettai | Kambarasampettai | 5.61 |
| | Kilikkoodu | Kilikkoodu | 1.91 |
| | Kodiyalam | Kodiyalam | 4.91 |
| | Kulumani | Kulumani | 4.07 |
| | Malliampathu | Malliampathu | 3.42 |
| | Marudhandakurichi | Marudhandakurichi | 4.83 |
| | Mullikarrupoor | Mullikarrupoor | 2.31 |

| Blocks | Village Panchayats | Revenue Villages | Area (in sq.km) |
|---|---|---|---|
| Andanallur | Thiruchendurai | Thiruchendurai | 1.57 |
| | Mekudi | Kadayakurichi | 1.02 |
| | | Mekudi | 3.99 |
| | Periakaruppur | Periakaruppur | 1.86 |
| | Thiruparaithurai | Thiruparaithurai | 5.4 |
| | Uthamaseri | Uthamaseri | 5.17 |
| | Palur | Palur | 2.07 |
| | Panayapuram | Panayapuram | 3.42 |
| | Perur | Perur | 1.65 |
| | Mutharasanallur | Mutharasanallur | 4.64 |
| Manikandam | Athavathur | Athavathur (West) | 7.13 |
| | Allithurai | Athavathur (East) | 7.14 |
| | Nachikurichi | Solanganallur | 1.72 |
| | | Nachikurichi | 3.15 |
| | K.Kallikudi | Kallikudi (North) | 8.74 |
| | | Kallikudi (South) | 7.49 |
| | Kumaravayalur | Kumaravayalur | 3.2 |
| | Mudikandam | Mudikandam | 5.81 |
| | | Olaiyur | 4.81 |
| | Nagamangalam | Nagamangalam (CT) | 10.03 |
| | Navalurkottapattu | Navalurkottapattu | 11.25 |
| | Paganoor | Paganoor | 7.62 |
| | Somarasampettai | Somarasampettai | 2.44 |
| | Thayanoor | Thayanoor part | 12.84 |
| | Punganur | Thayanoor part | |
| | Mekkudi (Inam) | Mekkudi (Inam) | 6.74 |
| | Thirumalaisamuthiram | Thirumalaisamuthiram | 5.61 |

| Blocks | Village Panchayats | Revenue Villages | Area (in sq.km) |
|---|---|---|---|
| Thiruverumbur | Arasangudi | Arasangudi | 5.28 |
| | Asoor | Asoor | 10.84 |
| | Cholamadevi | Cholamadevi | 8.74 |
| | Kundoor | Kundoor | 13.59 |
| | Kanthaloor | Elanthapatti | 3.74 |
| | | Kanthaloor | 5.19 |
| | Keelamullagudi | Keelamullagudi | 3.47 |
| | Kiliyur | Kiliyur | 8.61 |
| | Kumbakudi | Kumbakudi - Velayudankudi | 10.39 |
| | Kuvalagudi | Kuvalagudi | 3.14 |
| | Natarajapuram | Natarajapuram | 5.46 |
| | Navalpattu | Navalpattu (CT) | 17.09 |
| | Palanganankudi | Palanganankudi(CT) | 13.87 |
| | | Theneripatti(CT) | 7.53 |
| | | Poolangudi(CT) | 6.19 |
| | Panayakurichi | Panayakurichi | 2.58 |
| | Pathalapettai | Pathalapettai | 13.09 |
| | Sooriyur | Sooriyur | 31.2 |
| | Thirunedunkulam | Thirunedunkulam | 13.36 |
| | Valavanthankottai | Valavanthankottai(CT) | 13.49 |
| | Vengur | Vengur | 6.11 |
| | Krishnasamudram | Krishnasamudram (including Semmankulam) | 6.04 |
| | Keelakurichi | Keelakurichi | 10.26 |

## 3.4 Characteristics of LPA

### 3.4.1 Tiruchirappalli Corporation

The Tiruchirappalli City Municipal Corporation (TCMC) covers an area of 167. 23 sq. km, divided into five zones (Srirangam, Ariyamangalam, Thiruverambur, Ponmalai, and K. Abishekapuram) comprising a total of 65 census wards (as in Map 3.5).

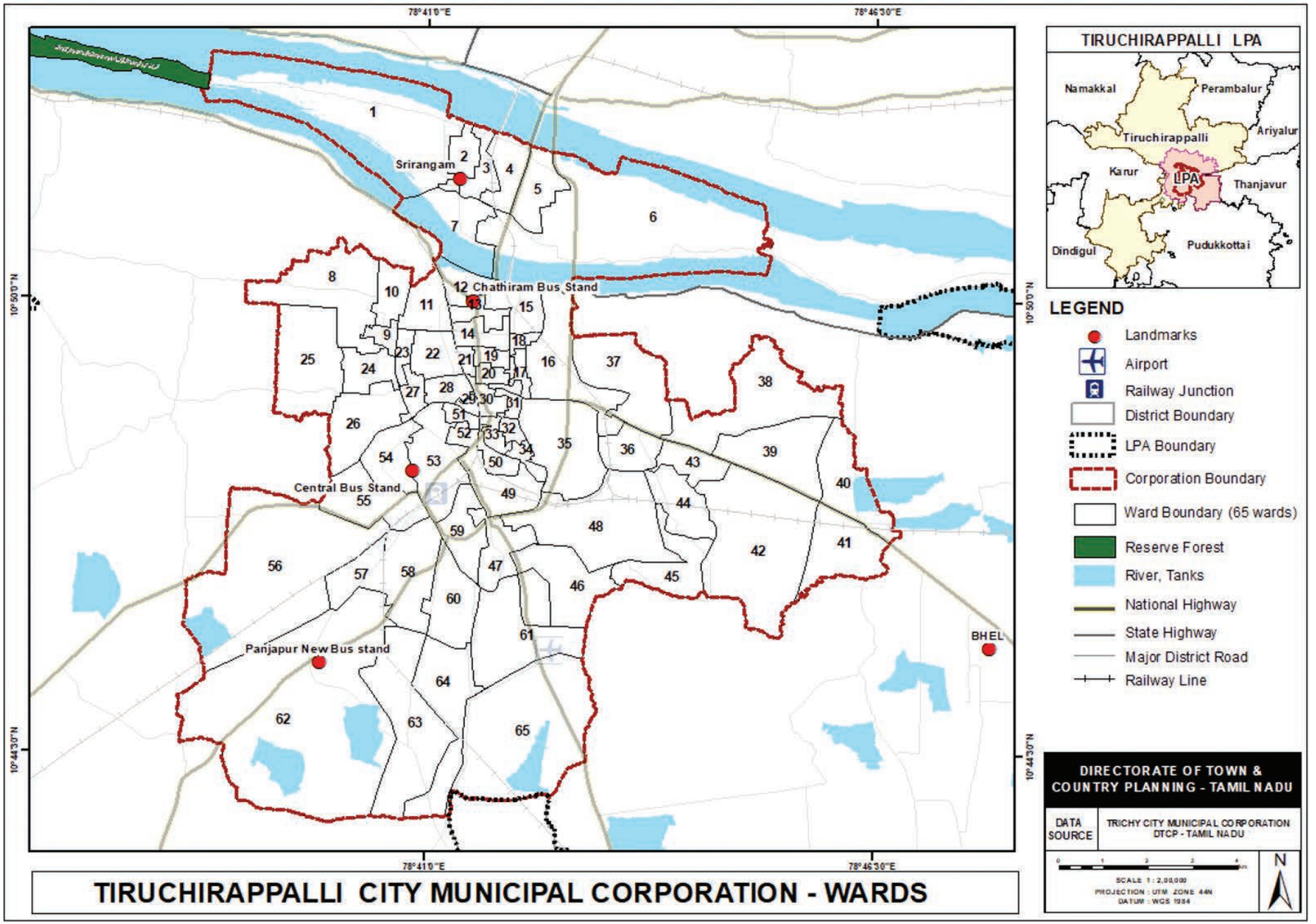
*Table 3.7 Distribution of wards in zones of the corporation*

| Zone no. | Zone | Ward No. | Total Wards |
|---|---|---|---|
| I | Srirangam | 1, 2, 3, 4, 5, 6, 7, 12, 13, 14, 15, 19, 21 | 13 |
| II | Ariyamangalam | 17, 18, 20, 30, 31, 32, 33, 34, 47, 48, 49, 50, 59 | 13 |
| III | Thiruverambur | 16, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 | 13 |
| IV | Ponmalai (Golden rock) | 51, 52, 53, 54, 56, 57, 58, 60, 61, 62, 63, 64, 65 | 13 |
| V | K. Abishekapuram | 8,9, 10, 11,22,23,24,25,26, 27, 28, 29, 55 | 13 |
| **Tiruchirappalli City Municipal Corporation** | | | **65** |

*Source: Tiruchirappalli City Municipal Corporation*

The TCMC constitutes the historic core of the city, around which growth has evolved. The spatial form of the city is defined by multiple interconnected growth centres, influenced by the presence of rivers and canal systems. The main components include Rockfort, Woraiyur and Srirangam, and the Rockfort area with Pillaiyar temple remains the primary core. Although most of the historic gates, fortification walls, and moats have disappeared, the fort boundary remains clearly visible even in the current urban fabric characterised by dense and organic development. Woraiyur is another historic core settlement, and the two core areas (Rockfort and Woraiyur) are connected by a strong linear axis - Salai Road.

Srirangam and Thiruvanaikoil, located on the island between the Cauvery and Kollidam rivers, form another important heritage-based cluster. The spatial pattern of the city has been significantly influenced by the development of the railway network and bridges, which modifies the historically dominant axis. The establishment of the Golden Rock railway workshop and colony was a result of this shift, which emerged as a prominent location within the city, influencing nearby development. Further, the establishment of the SIDCO Industrial estate in Ariyamanagalam and prominent educational institutions has contributed to the multi-nuclei urban structure of the TCMC area.




*Map 3.5 Wards in Tiruchirappalli City Municipal Corporation*

### 3.4.2 Municipalities

The Lalgudi Municipality is situated approximately 26 km northeast of the Tiruchirappalli Corporation and is located along the banks of the Kollidam River. It functions as a sub-regional service and commercial centre with its connectivity to Kumbakonam, catering to the surrounding rural and agrarian settlements. The presence of railway network and frequent bus services providing direct connectivity to the core have enhanced the town's accessibility, positioning it as a prominent growth node.

The Thuvakudi Municipality is located approximately 22 km southeast of the Tiruchirappalli Corporation, functioning as an industrial and residential satellite town. The urban form of Thuvakudi is predominantly linear, developing along major transport corridors, with a mix of residential neighbourhoods, institutional campuses, and industrial areas. The establishment of Bharat Heavy Electricals Limited (BHEL) complex, which acts as the primary economic anchor of the town, NIT Tiruchirappalli, a nationally significant educational institution, and the SIDCO Industrial Estate, supporting small- and medium-scale industries, has largely contributed to the growth of Thuvakudi.

### 3.4.3 Town panchayats

There are four Town Panchayats (TP) in the Tiruchirappalli LPA, namely Puvalur, Manachanallur, S.Kannanoor (West), and Koothappar, forming the peri-urban belt and transitional zones. Manachanallur and S.Kannanoor are located on the northern side of the LPA along the NH–38 connecting to Perambalur and are the growing suburbs of the Tiruchirappalli city. S. Kannanoor TP is renowned for the Samayapuram Mariamman Temple, a religious landmark in the region, while Manachanallur TP and Puvalur TP are well known for their modern rice mills and paddy cultivation, reflecting their strong agrarian base. Koothappar TP is a neighbourhood located in proximity to the Tiruchirappalli corporation, along the NH-83 connecting to Thanjavur, and only 7 km away from the Kallanai (Grand Anicut). Further, Koothappar TP was upgraded to a First Grade Town Panchayat in the year 1984 with eight wards separated by the BHEL Institution.

### 3.4.4 Blocks

The village panchayats of Tiruchirappalli LPA are predominantly agrarian in character, with growth primarily driven by the development of infrastructure, educational institutions, and related amenities. These settlements constitute agriculturally productive and culturally significant areas that complement the historic city, with their spatial organization, livelihoods closely linked to the Cauvery and Kollidam rivers.

The Lalgudi, Andanallur, and Manikandam blocks have a strong agrarian landscape, where agriculture forms the core of local livelihoods.

This is complemented by the presence of institutions such as the Agricultural University, Government Polytechnic College, CARE institutions, and the Tamil Nadu National Law University, fostering a setting where agricultural learning, practice, and allied education coexist. Further, Manikandam is home to the Vayalur Murugan Temple, while Andanallur, with the presence of the Mukkombu Dam, has emerged as an important cultural and tourism landmark in the region.

The Manachanallur block benefits from strong connectivity to the Chennai Highway, facilitating regional accessibility and contributing to a steady floating population associated with temple activities. The local economy is largely anchored in agriculture and modern rice mills, supported by industrial activity such as the Cement Factory. Further, it is also emerging as an educational hub.

Thiruverumbur block is emerging as a growth node exhibiting a balanced mix of commercial, industrial, and institutional development, largely influenced by its proximity to the Airport Road leading to Pudukkottai. While agriculture continues to support local livelihoods, the area has diversified with the establishment of the ELCOT IT Park and the SIDCO Industrial Estate, strengthening its industrial and employment base. The presence of major higher educational institutions such as Bharathidasan University, the Indian Institute of Management (IIM), and Anna University further reinforces its role as an important institutional hub in the region.

# 4 ADMINISTRATION AND GOVERNANCE

## 4.1 Introduction

Administrative governance forms the backbone of effective urban planning and implementation. In the context of the Master Plan, it refers to the institutional framework, decision-making processes, and interagency coordination mechanisms that ensure policies and proposals are translated into tangible outcomes. It is important to understand the existing administrative setup, including urban local body administration, development administration, and electoral constituencies, while also focusing on strengthening institutional capacity.

It is equally important to examine the statutory functions, powers, and responsibilities of various administrative units, with emphasis on their role in implementing the Master Plan. Special attention is given to the governance mechanisms of urban local bodies, highlighting their obligatory and discretionary functions as outlined in the 74th Constitutional Amendment Act, 1992. In addition, key stakeholders such as Municipal Corporations, Town Panchayats, and line departments must be identified.

## 4.2 Administrative Setup

The Tiruchirappalli district, covering an area of 4403.83 sq km, is administered by the District Collector, who serves as the principal authority for inter-departmental coordination and policy implementation.

Under it, there are three main parts:

- Revenue Administration,
- Local Bodies Administration, and
- Development Administration.

The Revenue Administration handles land records, taxes, and rules; the Local Bodies Administration, which includes the Tiruchirappalli Corporation, Municipalities, and Town Panchayats, manages public services, civic facilities, and community needs; and the Development Administration focuses on building infrastructure, improving city areas, housing projects, and economic growth. These three parts work together to form the main support for the Tiruchirappalli district urban governance.

## 4.3 Revenue Administration

The revenue administration of Tiruchirappalli district is organised into four revenue divisions, out of which three—namely Tiruchirappalli, Srirangam, and Lalgudi—fall within the Local Planning Area (LPA). The district's 11 taluks, 6 of which are included in the LPA, reflect its wide coverage of the district's administrative framework. Similarly, the LPA comprises 13 of the 43 firkas and 104 of the 507 revenue villages in the district. The revenue administration of Tiruchirappalli district and its coverage under the LPA are presented in Table 4.1

*Table 4.1: Revenue Administration in Tiruchirappalli District and Local Planning Area*

| Parameters | Tiruchirappalli District | Tiruchirappalli LPA |
|---|---|---|
| Revenue Divisions | 4 | 3 |
| Taluks | 11 | 6 |
| Firkas | 43 | 13 |
| Revenue Villages | 507 | 104 |

*Source: Tiruchirappalli. nic. in*

Within the Tiruchirappalli Local Planning Area (LPA), the revenue divisions of Tiruchirappalli, Srirangam and Lalgudi fall under its jurisdiction. Of the 11 taluks in the district, 6 taluks—namely Srirangam, Manachanallur, Lalgudi, Thiruverumbur, Tiruchirappalli East, and Tiruchirappalli West—are encompassed within the planning area.

In terms of subdivisions, 13 out of the 43 firkas are situated within the LPA. Similarly, out of the total 507 revenue villages in the district, 104 villages fall within the boundaries of the Tiruchirappalli Local Planning Area.

**The District Collector,** as the head of administration and revenue in Tiruchirappalli District, plays a central role in governance and development. He ensures effective coordination across all line departments, integrating their functions with the district's overall growth objectives, and serves as the Chairman of the Tiruchirappalli Local Planning Authority until the Tiruchirappalli Urban Development Authority comes into existence. The District Collector has a pivotal role in land administration, infrastructure development, and public service delivery, while also regulating land acquisition, resettlement, and maintaining law and order in development activities. By bridging state-level directives with local-level execution, the Collector guides Tiruchirappalli's growth in line with its development vision, ensuring sustainability and resilience.

**District Revenue Officer** supports the District Collector in strengthening revenue administration, which is vital for implementing the Tiruchirappalli Master Plan. The DRO is responsible for overseeing land records, revenue collection, and the resolution of land disputes, ensuring that land earmarked for residential, commercial, and infrastructure projects is managed legally and efficiently. In the absence of the Collector, the DRO functions as the head of the revenue staff, thereby maintaining continuity in governance and administrative control. This role is particularly crucial in facilitating land acquisition and conversion processes required for planned urban expansion.

**The Revenue Divisional Officer** oversees land acquisition, revenue appeals, and law and order at the divisional level, supervising Tahsildars across taluks.

Their role is crucial in ensuring that development projects align with land use zoning and master plan objectives while resolving local issues.

**Tahsildar,** as the head of taluk administration, plays a key role in revenue collection, maintaining land records, and managing law and order at the taluk level. They are responsible for services like patta transfers, land mutations, and issuing community, nativity, and income certificates. In the context of urban governance and master plan implementation, the Tahsildar ensures that land-related processes support planned development and equitable service delivery.

**Village Administrative Officer (VAO)** is the primary revenue functionary at the village level, maintaining land records and village accounts. They handle tax collection and assist citizens in obtaining essential revenue-related certificates. In the context of governance, the VAO supports grassroots-level implementation of land management and development provisions aligned with the master plan.

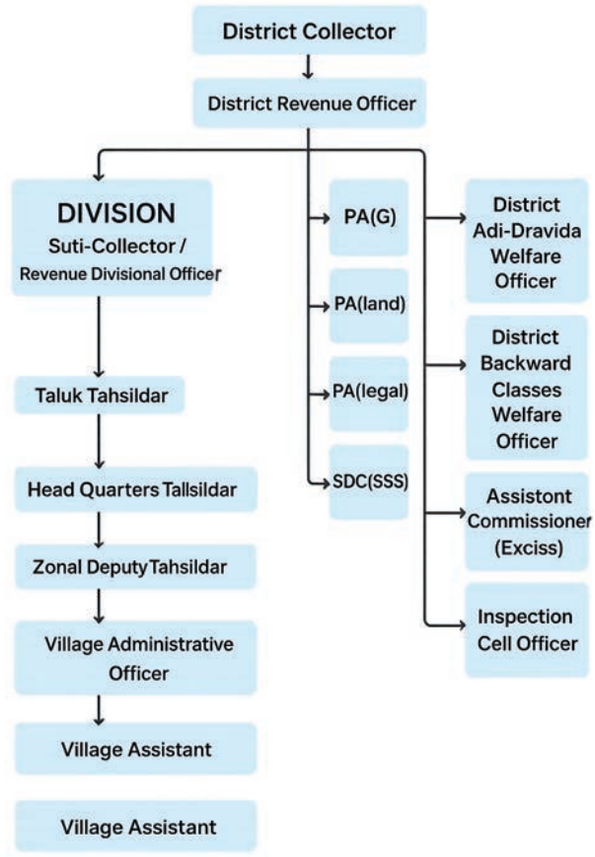
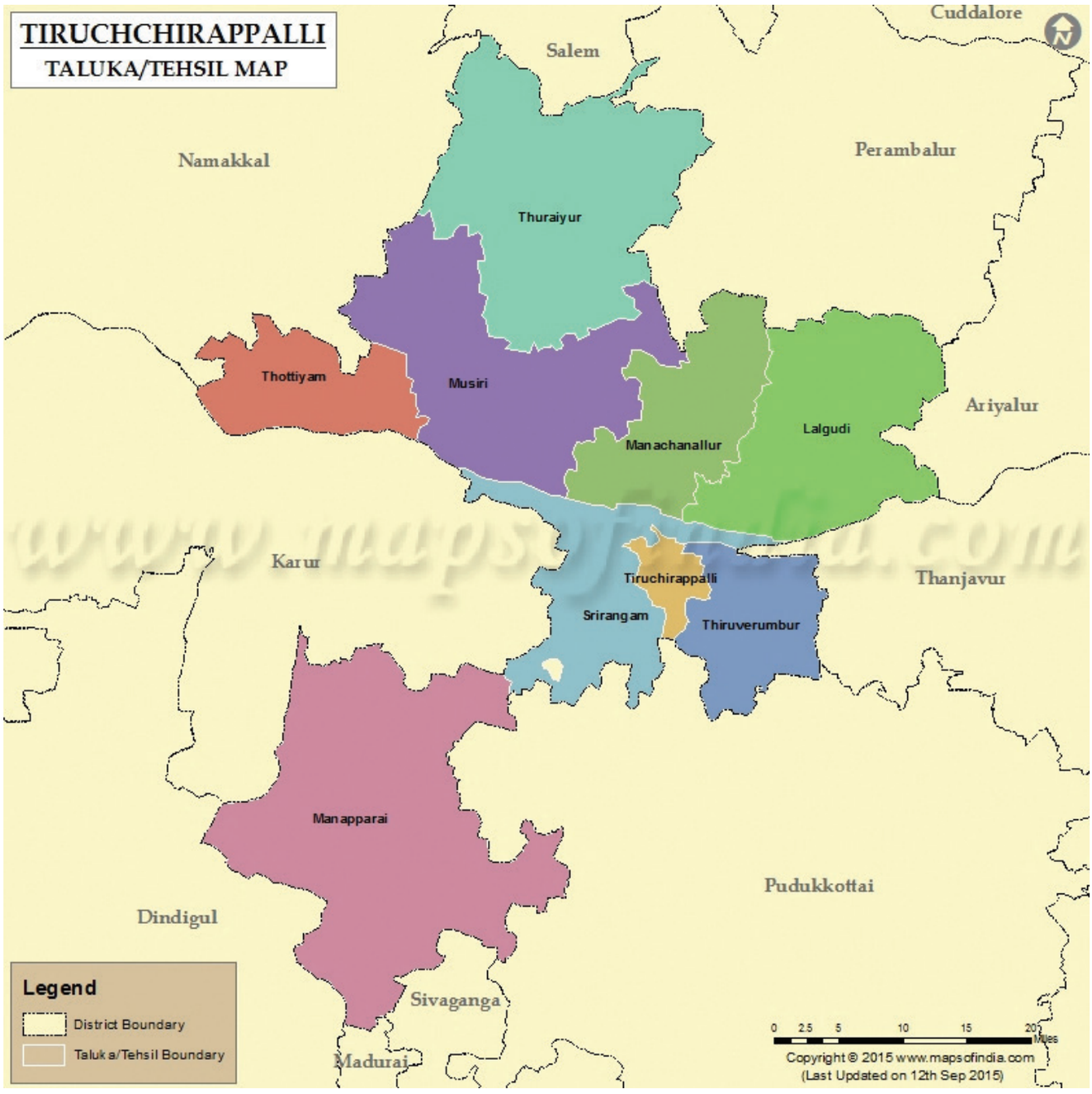
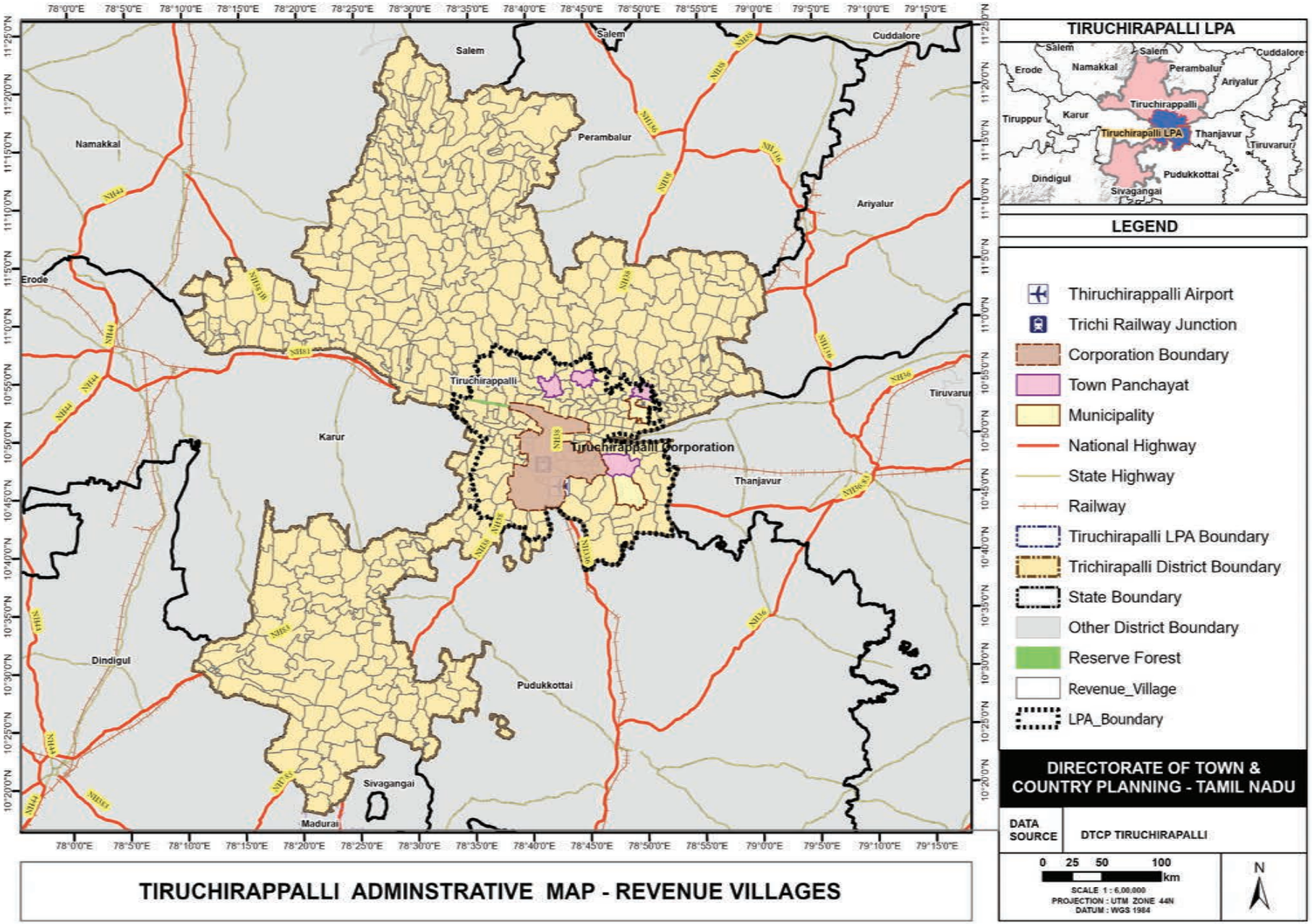



*Figure 4.1: Institutional setup of Revenue Administration in Tiruchirappalli District*




*Map 4.1: Taluks in Tiruchirappalli District*




*Map 4.2: Revenue Villages in Tiruchirappalli District and Local Planning Area*

## 4.4 Local Body Administration

Tiruchirappalli district has one Municipal Corporation, which is fully included within the Local Planning Area (LPA), five municipalities in the district, two of which, Lalgudi and Thuvakudi, fall within the LPA, reflecting its concentration on major urban centres. Similarly, out of the fourteen town panchayats, four panchayats, namely Koothappar, Puvalur, Manachanallur, and S. Kananoor, are covered by the LPA, indicating the selective inclusion of semi-urban settlements. This distribution highlights that the LPA encompasses the core urban administrative units of the district, while certain smaller towns and villages remain outside its jurisdiction. Overall, the LPA plays a central role in regional planning and governance by capturing the district's most significant urban centres. Table 4.2 presents a comparative overview of the local bodies' administration within the Tiruchirappalli district and the Local Planning Area (LPA).

*Table 4.2 Local Bodies Administration in Tiruchirappalli District and Local Planning Area*

| Parameters | Tiruchirappalli District | Tiruchirappalli LPA |
|---|---|---|
| Corporation | 1 | 1 |
| Municipalities | 5 | 2 |
| Town Panchayats | 14 | 4 |
| Village Panchayats | 404 | 91 |

**Tiruchirappalli Corporation**

The Tiruchirappalli Municipal Corporation serves as the primary implementing agency of the Master Plan, translating policy directions into on-ground development and service delivery. The Corporation is divided into 5 zones and 65 electoral wards, each represented by a directly elected councillor who participates in the Corporation Council and represents local community interests. These councillors collectively deliberate on urban policies, development works, and resource allocation.

The Corporation is headed by the Mayor, elected indirectly from among the councillors, and supported by the Deputy Mayor and the Corporation Commissioner, who oversees administrative functions. With five administrative zones, the Corporation manages urban planning, public health, sanitation, roads, water supply, and other essential civic services. Through ward committees and standing committees, it integrates citizen feedback, enhances accountability, and regulates land use and infrastructure provision in line with the objectives of the Master Plan, thereby promoting inclusive and sustainable urban development.

**Municipalities**

Lalgudi and Thuvakudi Municipalities, comprising 24 and 21 wards respectively, facilitate democratic governance through elected councillors who represent local communities and promote participatory decision-making at the grassroots level. In both municipalities, the Chairperson, supported by the Vice-Chairperson and Municipal Commissioner, leads civic administration and oversees essential services.

Additionally, ward councillors are directly elected and collectively determine priorities related to civic services, infrastructure development, and resource allocation. The municipal councils oversee water supply, sanitation, solid waste management, street lighting, public health, and regulation of construction activities, ensuring alignment with planning and development objectives.

**Town Panchayat**

The Tiruchirappalli Local Planning Area includes four Town Panchayats, namely Puvalur, Mannachanallur, S.Kannanoor (West), and Koothappar. These Town Panchayats are divided into electoral wards, with councillors directly elected by the residents.

From among the elected councillors, the Chairperson and Vice-Chairperson are indirectly elected to lead the council and oversee governance functions, supported by an Executive Officer. Their core responsibilities include the provision of drinking water, sanitation, road maintenance, street lighting, and other basic amenities. Through this ward-based governance system, Town Panchayats ensure effective citizen participation and facilitate the implementation of development initiatives consistent with the Master Plan framework.

**Village Panchayats**

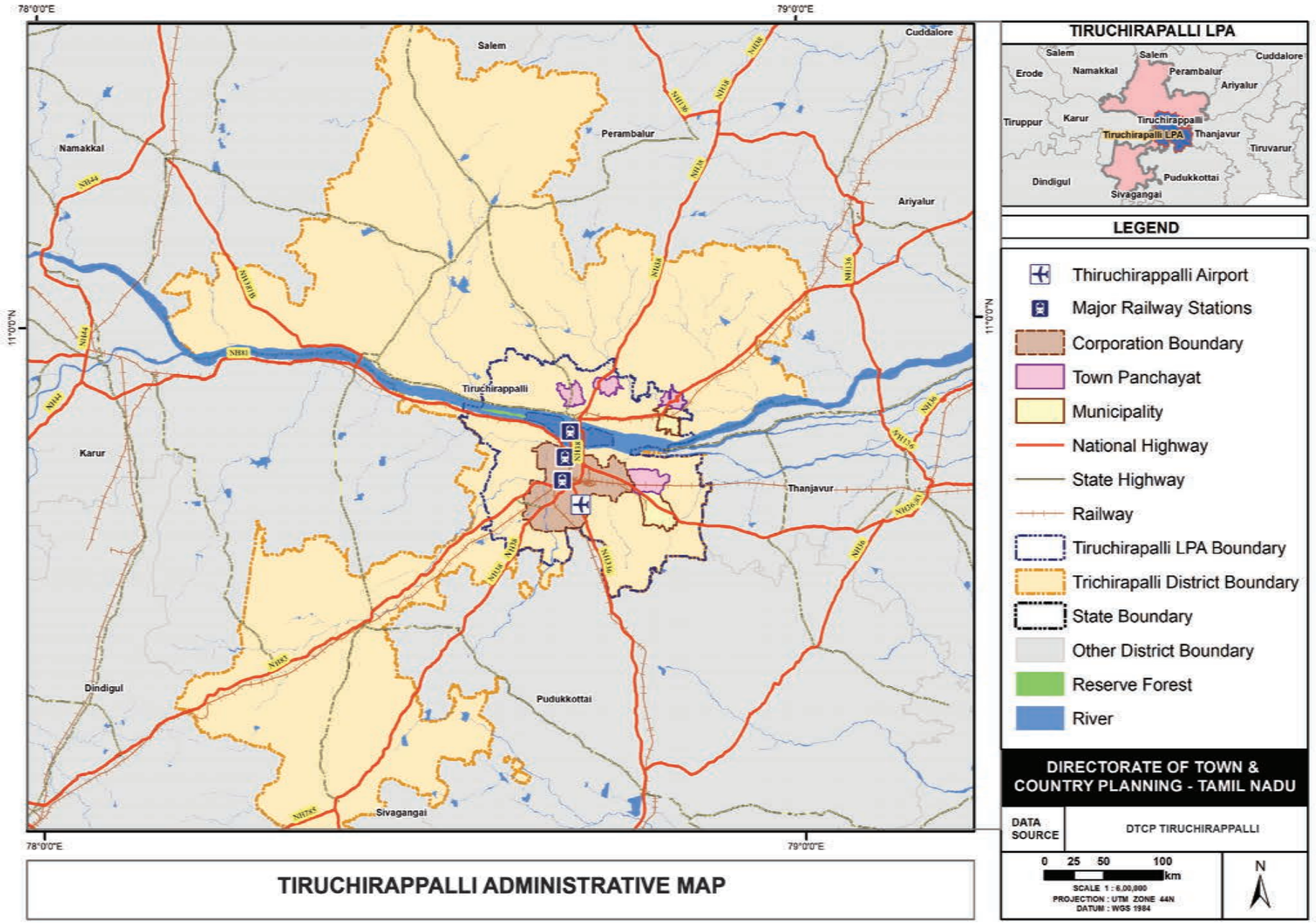
The Tiruchirappalli Local Planning Area encompasses 91 Village Panchayats, each headed by a directly elected President and supported by a Vice-President, ward members, and executive staff. These bodies function through the Grama Sabha, which serves as a platform for community deliberation, priority setting, and resolution of local issues.

Village Panchayats are responsible for maintaining rural roads, managing water resources, providing sanitation facilities, supporting livelihood activities, and implementing state and central government schemes. At the Panchayat Union level, members are elected from constituent Village Panchayats, and a Chairperson and Vice-Chairperson are chosen from among them. The Panchayat Union focuses on inter-village development, including roads, schools, health services, and other shared infrastructure.

Together, Village Panchayats and Panchayat Unions strengthen decentralised governance, ensure grassroots participation, and play a pivotal role in translating planning and development policies into effective rural service delivery.

## 4.5 Development Administration

Development Administration in Tiruchirappalli district is primarily responsible for the implementation of various state and centrally sponsored welfare schemes and development programmes across multiple sectors, including health, education, housing, rural development, and infrastructure. This administrative domain focuses on planning, execution, monitoring, and evaluation of developmental initiatives aimed at enhancing the quality of life. Development Administration plays a crucial role in bridging policy and practice, ensuring that government interventions reach the intended beneficiaries efficiently and effectively. Table 4.3 shows the comparative overview of the development administration within Tiruchirappalli district and the Local Planning Area (LPA).




*MAP 4.3: Local Bodies Administration in Tiruchirappalli District and Local Planning Area*

*Table 4.3: Development Administration in Tiruchirappalli District and Local Planning Area LPA*

| Parameters | Tiruchirappalli District | Tiruchirappalli LPA |
|---|---|---|
| Development Administration | | |
| Panchayat Union | 14 | 5 |
| Village Panchayats | 404 | 91 |

The Development Administration in Tiruchirappalli District comprises 14 Panchayat Unions (Blocks), of which 5, namely Lalgudi, Manachanallur, Andanallur, Manikandam, and Thiruverumbur, in addition to the Tiruchirappalli City Municipal Corporation, fall within the jurisdiction of the Tiruchirappalli Local Planning Area (LPA). The district has 404 Village Panchayats, which form the grassroots level of rural governance. Of these, 91 Village Panchayats are located within the boundary of the LPA.

**District Collector / Chairman, District Rural Development Agency (DRDA):** The Collector serves as the overall head of rural development in the district and chairs the DRDA. They coordinate the implementation of state and central rural development schemes, oversee fund allocation, monitor progress, and ensure convergence with other departments.

**Project Director DRDA:** A senior officer (usually from the Rural Development service) who manages the day-to-day functioning of DRDA. The PD ensures effective implementation of schemes such as MGNREGS, PMAY (Gramin), sanitation programs, and livelihood initiatives across blocks and villages.

**Project Director Tamil Nadu State Rural Livelihood Mission (TNSRLM) – Mission Management Unit:** This officer is responsible for strengthening Self-Help Groups (SHGs), promoting women's empowerment, livelihood generation, and poverty alleviation programs. They coordinate with block-level and village-level SHG federations.

Personal Assistant to Collector (Panchayat Development) Advises and assists the Collector in matters related to Panchayat governance and development. This officer supervises Panchayat Union activities, ensures compliance with Panchayat Raj Act provisions, and monitors scheme execution.

The Assistant Director (Panchayats) provides technical and administrative support in the functioning of Panchayats. They guide Panchayat Presidents, Secretaries, and BDOs in governance, planning, and execution of works. They also play a key role in capacity building and compliance monitoring.

Section 112 of the Tamil Nadu Panchayats Act, 1994, prescribes various powers and functions of Panchayat Union Councils. Some of the important functions of a Panchayat Union Council are as follows:

a) Construction, repair and maintenance of all Panchayat union roads.

b) Construction of water works for the supply of water for drinking, washing and bathing purposes.

c) Construction and maintenance of elementary and middle schools.

d) Control of fairs and festivals under the control of the Panchayat Union.

e) Opening and maintenance of Panchayat Union public markets.

f) Implementing various Centrally sponsored and State schemes.

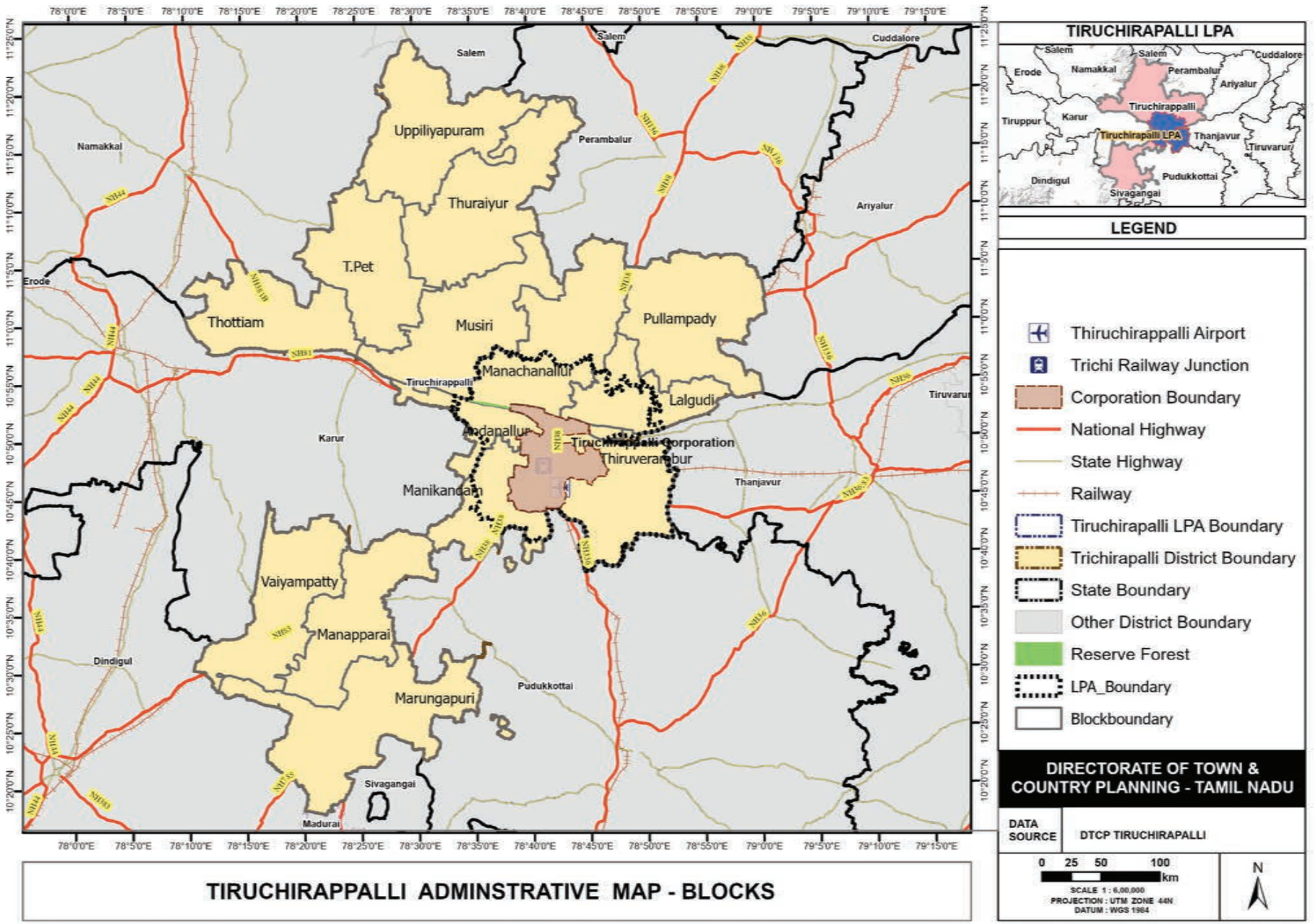
g) Preventive and remedial measures connected with any epidemic or withmalaria.

## 4.6 Electoral Constituencies

Tiruchirappalli district falls under multiple Parliamentary and Assembly Constituencies, ensuring representation at both the state and national levels. The Tiruchirappalli Parliamentary Constituency covers the Assembly segments of Melur, Tiruchirappalli East, Tiruchirappalli North, Tiruchirappalli South, Tiruchirappalli Central, and Tiruchirappalli West, providing a direct link between the citizens of Tiruchirappalli city and the surrounding areas with the Lok Sabha. The Theni Parliamentary Constituency includes Sholavandan and Usilampatti Assembly segments, while the Virudhunagar Parliamentary Constituency includes Thiruparankundram and Thirumangalam. The Parliamentary constituencies and their respective assembly constituencies within Tiruchirappalli LPA is given in Table 4.4.

*Table 4.4: Parliamentary Constituencies and their Respective Assembly Constituencies within Tiruchirappalli LPA*

| Parliamentary Consistency | Assembly Consistency |
|---|---|
| Tiruchirappalli | Tiruchirappalli East<br>Tiruchirappalli West<br>Tiruchirappalli Central<br>Srirangam<br>Thiruverumbur<br>Manachanallur |




*Map 4.4: Panchayat Union in Tiruchirappalli District and Local Planning Area*

## 4.7 E- Governance

The Community Service Centre (CSC) Project is part of the National e-Governance Plan, designed to provide government services to people in rural and remote areas in a transparent, reliable, and affordable way. These centres act as technology-enabled service delivery points where citizens can access facilities related to agriculture, education, banking, utility payments, and other essential services. A Village Level Entrepreneur who serves as the local operator, while implementation at the state level is carried out by the Tamil Nadu e-Governance Agency (TNeGA), manages each centre. The state has adopted multiple delivery channels to expand access, including Tamil Nadu Arasu Cable TV Corporation (TACTV), Electronics Corporation of Tamil Nadu Limited (ELCOT), Primary Agriculture Cooperative Credit Societies, Village Poverty Reduction Committees, and other public institutions. These agencies have been permitted to set up service centres at different levels—district headquarters, taluk offices, municipalities, and village panchayats—ensuring that both urban and rural populations benefit. In Tamil Nadu, CSCs have become an important link in bridging the digital divide by supporting government-to-citizen service delivery. In the Tiruchirappalli Local Planning Area, 88 centres are currently operational, providing services that connect local citizens with government schemes and facilities.

## 4.8 Departments and Implementation Agencies

The State Government's line departments play a crucial role in basic service delivery within the Tiruchirappalli Local Planning Area (LPA). The following are the key government bodies responsible for governance and administration.

### 4.8.1 Tiruchirappalli Corporation

The Municipal Corporation serves as the primary implementing agency of the Master Plan, translating policy directions into development works. The Municipal Commissioner provides leadership and coordinates interdepartmental functions, supporting SDG 11 - Sustainable Cities and Communities. The City Engineer manages roads, drains, and water supply projects, addressing SDG 6 - Clean Water and Sanitation and SDG 9 - Industry, Innovation, and Infrastructure. The Town Planning Officer ensures land use compliance, zoning enforcement, and layout approvals, contributing to SDG 11 - Sustainable Cities and Communities. The Public Health Officer oversees sanitation, waste management, and health-related infrastructure, fulfilling SDG 3 - Good Health and Well-Being and SDG 6 - Clean Water and Sanitation. The Finance Officer handles budgeting, resource mobilization, and fund allocation, ensuring progress towards SDG 8 - Decent Work and Economic Growth and

SDG 17 - Partnerships for the Goals. At the ward level, Assistant Engineers, Sanitary Inspectors, and Ward Committees support implementation. Together, these functions ensure the Master Plan delivers tangible improvements in urban life while advancing multiple SDGs.

### 4.8.2 Lalgudi and Thuvakudi Municipalities

Lalgudi and Thuvakudi Municipalities, comprising 24 and 21 wards respectively, play a crucial role in implementing the Master Plan at the sub-city level. The Municipal Commissioner coordinates infrastructure development, sanitation, and water supply, ensuring a better quality of life. The Town Planning Officer ensures land use compliance and zoning, guiding sustainable urban growth. Public Health Officers manage sanitation and waste systems, strengthening community health. Finance Officers mobilise resources and ensure projects remain financially viable. Ward-level staff and committees support participatory development across all sectors.

### 4.8.3 Town Panchayats (Puvalur, Mannachanallur, S.Kannanoor (West), and Koothappar)

The four Town Panchayats deliver essential civic services such as drinking water supply, sanitation, and maintenance of local roads. Chairpersons and Executive Officers oversee service delivery and citizen engagement. They regulate small-scale land use and coordinate local infrastructure projects. Public health and cleanliness initiatives enhance community well-being. Their governance bridges the urban–rural gap while aligning with the Master Plan's development goals.

### 4.8.4 Village Panchayats

Village Panchayats function as the grassroots level of governance, delivering basic services like water supply, sanitation, and rural roads. Presidents, with support from Vice-Presidents and executive staff, lead the implementation of government schemes. Grama Sabhas encourage democratic participation and community-led planning. Local health and sanitation initiatives strengthen rural resilience. By addressing livelihood and service needs, Village Panchayats

ensure rural development remains integrated with the Master Plan.

### 4.8.5 Regional Directorate of Municipal Administration

The Regional Director of Municipal Administration (RDMA) is the head of RDMA and functions under the Directorate of Municipal Administration. Tamil Nadu has seven RDMAs, and Tiruchirappalli is one among them. The RDMA supervises municipalities and town panchayats, ensuring implementation of government schemes, financial discipline, and compliance

with municipal laws. It also provides administrative and technical guidance on planning, infrastructure, and service delivery. Acting as a link between the state government and local bodies, the RDMA strengthens urban governance in its jurisdiction.

### 4.8.6 Rural Development & Panchayat Raj Department

The Rural Development & Panchayat Raj Department is responsible for rural infrastructure, poverty alleviation, livelihood programmes, and strengthening Panchayati Raj Institutions. It is headed by the Minister for Rural Development & Panchayat Raj and the Principal Secretary/Commissioner of Rural Development at the state level, while at the district level, the District Collector and the Project Director – DRDA oversee implementation, supported by Block Development Officers (BDOs) at the block level. Rural Development & Panchayat Raj Department implements several flagship schemes to improve rural infrastructure and livelihoods, with a focus on good governance and sustainability. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) provides wage employment through Gram Panchayats and ensures transparency through social audits, contributing to poverty reduction and decent work. The Swachh Bharat Mission (Rural) promotes sanitation and hygiene in villages by encouraging community participation and behaviour change. The National Rural Drinking Water Programme (NRDWP) works to supply safe drinking water through decentralised management at the village level. The Pradhan Mantri Awaas Yojana (Rural) provides pucca houses with financial assistance directly transferred to beneficiaries, ensuring secure housing for the poor. These programmes are closely linked with the Sustainable Development Goals (SDGs), including poverty reduction, clean water and sanitation, good health, decent work, and sustainable communities.

The Department also emphasises decentralisation and inclusivity, giving Gram Panchayats and local institutions a central role in implementation. Together, these efforts ensure that rural development is transparent, participatory, and sustainable.

### 4.8.7 Adi Dravidar and Tribal Welfare Department

The Project Officer heads the District Adi Dravidar and Tribal Welfare Department. The Project Officer is responsible for implementing welfare programmes for Scheduled Castes and Scheduled Tribes at the district level.

The Department promotes the welfare of SCs, STs, and other vulnerable groups through targeted schemes ensuring social justice and equity. Pre- and Post-Matric Scholarships support students by removing financial barriers to education and are implemented through Direct Benefit Transfer for transparency. The Special Central Assistance to Tribal Sub-Scheme provides financial aid and livelihood

opportunities for tribal households. The Umbrella Scheme for Development of Scheduled Castes and other Vulnerable Groups focuses on education, skill training, entrepreneurship, and housing. These schemes are carried out through decentralised mechanisms involving Gram Panchayats, district agencies, and direct beneficiary participation. By integrating good governance principles, the Department enables inclusive growth and sustainable development for disadvantaged communities.

### 4.8.8 BC, MBC & Minorities Welfare Department

The Project Officer at the district level heads the BC, MBC & Minorities Welfare Department. The Department implements various welfare schemes to promote education, skill development, and social inclusion among minority communities. The Merit-cum-Means Scholarship supports minority students pursuing professional and technical courses at undergraduate and postgraduate levels through transparent beneficiary selection and Direct Benefit Transfer. The Free Coaching and Allied Scheme provides structured coaching for competitive examinations, ensuring fair opportunities in public employment. The Multi-Sectoral Development Programme addresses development gaps in minority concentrated areas by investing in education, health, skills, and infrastructure. Special support is also extended to minority students who clear competitive examinations. These schemes are implemented in coordination with the district and local levels to ensure decentralisation and inclusivity. By embedding transparency, accountability, and good governance, the Department promotes equitable growth and empowerment of minority communities.

### 4.8.9 District Differently Abled Welfare Department

The District Differently Abled Welfare Department, headed by the Deputy Director and supported by the Assistant Director, implements schemes aimed at the welfare and empowerment of persons with disabilities. Key initiatives focus on providing assistive devices, rehabilitation services, and opportunities for education and skill development. Support is extended through scholarships, fellowships, and special institutions to ensure equal access and inclusion. Programmes are delivered through decentralised mechanisms, direct benefit transfers, and collaboration with local agencies to maintain transparency and accountability. By addressing accessibility, education, and livelihood needs, the Department promotes inclusive growth and social equity.

### 4.8.10 Water supply and sewerage

Tamil Nadu Water Supply and Drainage (TWAD) Board, along with the Tiruchirappalli City Corporation, plays a central role in managing water supply and sewerage services within the Local Planning Area (LPA). While the Corporation maintains the Vaigai riverbed, other water supply systems are

managed by TWAD through its district-level structure, comprising Divisional Offices headed by Executive Engineers, Sub-Division Offices led by Assistant Executive Engineers, Training Centres across major cities, and the Material Quality Control Laboratory in Tiruchirappalli. Sewerage systems are largely managed by Urban Local Bodies (ULBs), ensuring decentralised governance in service delivery. The implementation mechanism emphasises coordination between state-level technical agencies and local institutions, reflecting principles of accountability, inclusivity, and transparency in governance. By ensuring reliable access to safe drinking water, sanitation, and effective waste management, these institutions contribute directly to sustainable urban development, aligning with the objectives of the Sustainable Development Goals on clean water, sanitation, health, and sustainable cities.

### 4.8.11 Tamil Nadu Electricity Board

The electrical distribution system in the Tiruchirappalli Local Planning Area (LPA) functions within Tamil Nadu's restructured power sector framework, which separates generation, transmission, and distribution for improved efficiency and governance. Power transmission is managed by TANTRANSCO, while electricity distribution is undertaken by Tamil Nadu Power Distribution Corporation Limited (TNPDCL). Renewable energy development is supported by Tamil Nadu Green Energy Corporation Limited (TNGECL), which facilitates rooftop solar and grid-connected renewable projects within the LPA.

Electricity distribution in the Tiruchirappalli LPA falls under the region of Tiruchirappalli Electrical Distribution Circle and is administered through the Tiruchirappalli Metro Circle. The LPA is served by four divisions—Tiruchirappalli Urban, East Tiruchirappalli, Lalgudi, and Srirangam—reflecting varying urban, peri-urban, and rural demand patterns. The Tiruchirappalli Urban and East Tiruchirappalli divisions cater mainly to the dense municipal core and its extensions, while Lalgudi and Srirangam serve mixed town and rural settlements.

At the operational level, power supply is managed through a network of subdivisions and electrical sections that cover major residential, commercial, industrial, and institutional areas. High-load urban sections receive focused capacity management and maintenance, while peripheral and rural sections serve dispersed settlements. This structured administrative arrangement enables balanced electricity distribution, responsive service delivery, and network expansion aligned with Tiruchirappalli's spatial growth and economic development patterns.

### 4.8.12 Revenue Department

Revenue Department—is the administrative backbone responsible for land governance in Tiruchirappalli district. It maintains land records, oversees the issuance of titles such as Patta and Chitta, manages land revenue, stamp duties, and property taxes, and operates at the local level through a structure of Revenue Divisions, Taluks, Firkas, and Revenue Villages—with Revenue Divisional Officers (RDOs) overseeing each division. Administrative penetration, the department also delivers a wide range of social welfare services, issuing certificates (e.g., income, nativity, legal-heirship, community) and implementing welfare schemes—while playing the lead role in disaster response, coordinating rescue, relief, and rehabilitation efforts during natural calamities. At the district level, the District Collector, supported by the RDOs and the State Relief Commissioner (who also serves as Commissioner of Revenue Administration), directs both the administrative and disaster-related responsibilities. Additionally, the department supports urban planning, grievance redressal, and legal enforcement on land matters, working as the custodian of government land and facilitating land reforms and issuance of government property-related orders.

### 4.8.13 Housing and Urban Habitat Board

Tamil Nadu Housing Board (TNHB) and the Tamil Nadu Urban Habitat Development Board (TNUHDB) manage housing provision and slum redevelopment projects in Tiruchirappalli, functioning under their respective district heads. While TNHB focuses on developing plotted schemes, apartments, and integrated townships for middle- and higher-income groups, TNUHDB implements affordable housing and in-situ slum rehabilitation for low-income communities. Ongoing central and state schemes such as the Pradhan Mantri Awas Yojana–Urban (PMAY-U), Tamil Nadu Affordable Urban Housing Programme, and various Slum-Free City initiatives are implemented through these agencies in coordination with the Tiruchirappalli City Corporation. The governance mechanism emphasises transparent beneficiary selection, direct financial transfers, and community participation to ensure inclusivity. By integrating housing delivery with livelihood support, infrastructure provision, and social amenities, these initiatives contribute to good governance and align with Sustainable Development Goals by promoting adequate shelter, reducing urban poverty, and fostering equitable urban growth.

### 4.8.14 Economic and Employment Sector

**i) Tiruchirappalli District Industries Centre**

The District Industries Centre (DIC), headed by the General Manager, functions under the Department of Industries and Commerce. It plays a key role in promoting Micro, Small, and Medium Enterprises (MSMEs),

cottage industries, and handicrafts at the district level. MSMEs contribute to innovation, employment generation, and inclusive economic growth. As of 2023, Tiruchirappalli district has 24,970 registered MSME units under the Udyam Scheme. The DIC supports entrepreneurs through credit linkages, subsidies, and technical guidance. Skill training and capacity-building programmes are provided to strengthen small businesses and artisans. Through these initiatives, the DIC contributes to industrial growth, self-reliance, and sustainable development in the district.

**ii) TIDCO**

The Tamil Nadu Industrial Development Corporation Limited (TIDCO), established in 1965, is the premier industrial development agency of the Government of Tamil Nadu. The Chairman and Managing Director (CMD) head it. TIDCO promotes medium and large industries in the State through Joint Ventures to ensure balanced industrial growth. It also acts as the Nodal Agency for developing industrial corridor projects across Tamil Nadu. By facilitating investments and partnerships, TIDCO contributes to sustainable economic and industrial development.

**iii) SIPCOT**

The State Industries Promotion Corporation of Tamil Nadu (SIPCOT) is responsible for developing and managing large-scale industrial parks and industrial estates across the State by providing serviced land and core infrastructure. SIPCOT plays a key role in promoting medium and large manufacturing industries and attracting private investment. In Tiruchirappalli, the SIPCOT Industrial Park at Sooriyur–Elanthapatti, spread over about 51 acres, has been developed to attract investments in agro-processing, engineering goods, fabrication units, logistics services, and MSME-based manufacturing. This park leverages Tiruchirappalli's proximity to the Cauvery delta and its strong heavy engineering ecosystem anchored by BHEL and defence industries. Through these initiatives, SIPCOT enhances investor confidence, strengthens regional industrial competitiveness, and contributes significantly to employment generation and industrial diversification.

**iv) SIDCO**

The Tamil Nadu Small Industries Development Corporation (SIDCO) supports and promotes Micro, Small, and Medium Enterprises (MSMEs) across the State by developing industrial estates and providing basic infrastructure facilities. At the district level, it is headed by the Senior Regional Manager or Regional Manager. In Tiruchirappalli, SIDCO has developed multiple industrial estates including Thuvakudi, Valavanthankottai, Thiruverumbur, Ariyamangalam, and Kumbakudi, collectively forming a well-distributed industrial belt across the southern and southeastern parts of the LPA. These estates provide serviced

industrial plots, internal roads, power supply, and common facilities, enabling the growth of small and medium manufacturing units. Through these initiatives, SIDCO fosters entrepreneurship, strengthens local supply chains, and supports employment generation within the district.

### 4.8.15 Department of Agriculture

The Agricultural Department in Tiruchirappalli functions under the Department of Agriculture, Government of Tamil Nadu. At the district level, the Joint Director of Agriculture (JDA) heads it. The department implements state and central government policies, schemes, and regulations related to agriculture. It prepares and executes district-level agricultural development plans and coordinates with allied departments for effective governance. Training and awareness programmes are regularly conducted to support farmers with updated practices. Irrigation planning is carried out in coordination with the Public Works Department to improve water management. Market linkages are facilitated to help farmers secure fair prices for their produce. Through these measures, the department promotes sustainable agriculture, improves productivity, and strengthens rural livelihoods in Tiruchirappalli.

### 4.8.16 Department of Environment and Forest

The Department of Environment in Tamil Nadu functions under the Environment, Climate Change and Forests Department. At the district level, the Superintending Engineer of the Tamil Nadu Pollution Control Board (TNPCB) heads its activities. The department monitors and enforces environmental regulations, focusing on industrial pollution control, solid and liquid waste management, and air and water quality. It works in coordination with Urban Local Bodies and allied departments for effective implementation. Key initiatives include compliance with National Green Tribunal directives, climate change adaptation projects, and programmes under the National Clean Air Programme. The department promotes participatory environmental governance by involving local bodies and communities in decision-making. Transparency is ensured through continuous monitoring and public reporting. By integrating sustainability principles, the department safeguards ecosystems and fosters resilient urban and rural environments.

### 4.8.17 Transportation

**National and State Highway**

The National Highways Authority of India (NHAI) manages national Highways in Tiruchirappalli. At the district level, the General Manager of the NHAI Project Implementation Unit (PIU) heads them. Principal national corridors, including NH-38, NH-81, NH-83 and NH-336, pass through the

district, providing vital links across Tamil Nadu and to other regions. State Highways such as SH-22, SH-25 and SH-62, maintained by the Tamil Nadu Highways Department, further enhance connectivity between Tiruchirappalli and neighbouring districts, towns and economic centres. The Tiruchirappalli Corporation, supporting intra-city mobility and access, manages urban roads. Panchayat Unions oversee rural and local roads, enabling connectivity to villages and small settlements. Coordination between NHAI, the State Highways Department, and local bodies ensures integrated planning and road maintenance. Together, these networks contribute to trade, mobility, and the overall economic growth of the Tiruchirappalli district.

**Public Transport**

The Tamil Nadu State Transport Corporation (TNSTC) regulates and operates public transport services in Tiruchirappalli, supported by the Regional Transport Office (RTO) for vehicle registration, permits, and enforcement. The city has a dense bus network connecting urban and rural areas, ensuring accessibility for daily commuters, students, and workers. In addition, plans for a metro rail system and improvements to road infrastructure under state and central schemes aim to enhance mobility, reduce congestion, and support sustainable urban growth. Implementation mechanisms include coordination between TNSTC, the Tiruchirappalli City Corporation, the Highways Department, and the State Transport Department for route planning, fleet modernisation, road maintenance, and integration of multi-modal transport systems. Smart transport initiatives, such as digital ticketing and real-time passenger information, are also being introduced to improve service efficiency. These initiatives contribute to the Sustainable Development Goals by enabling affordable and accessible transport for all (SDG on inclusive infrastructure), reducing reliance on private vehicles to cut emissions (SDG on climate action), and strengthening urban mobility systems that support economic growth and social inclusion (SDG on sustainable cities and communities).

**Indian Railway Tiruchirappalli Division**

Tiruchirappalli Junction plays a pivotal role in the rail network of southern Tamil Nadu and functions as an independent division under the Southern Railway. Serving as the headquarters of the Tiruchirappalli Railway Division, it is one of the major revenue-generating divisions in the zone, next only to Chennai.

The junction offers direct rail connectivity to several important cities across India, including Chennai, Mumbai, New Delhi, Bengaluru, Jaipur, Hyderabad, Visakhapatnam, Thiruvananthapuram, Coimbatore, Kollam, Kanyakumari, Tirunelveli, Rameswaram, Thanjavur, Vijayawada, Kolkata, Nagpur, and Bhopal, thereby strengthening Tiruchirappalli's role as a key regional and national transport hub.

**Airport Authority of India**

Tiruchirappalli International Airport is the primary aviation gateway serving Tiruchirappalli and the surrounding region of central Tamil Nadu. Located along National Highway 336, about 5 km south of the city centre, the airport handles both domestic and international air traffic. It is spread over an area of approximately 702 acres (about 284 hectares) and was originally commissioned in 1936, later being designated as an international airport in 2012. The airport is operated by the Airports Authority of India under the Ministry of Civil Aviation and has emerged as one of the major regional aviation hubs in Tamil Nadu, supporting tourism, business travel, cargo movement, and overall economic development of the Tiruchirappallai region.

### 4.8.18 Social Infrastructure and amenities

Tiruchirappalli has long been recognised as a major centre of learning and technical education in Tamil Nadu, with a strong network of institutions that reinforce its identity as a national-level knowledge hub. At the district level, the education system is administered by the Chief Educational Officer (CEO) under the School Education Department. The district hosts a wide network of government and private primary, secondary, and higher secondary schools, ensuring broad access to foundational education.

In higher education, Tiruchirappalli is distinguished by the presence of nationally and regionally significant institutions such as National Institute of Technology, Tiruchirappalli, Bharathidasan University, Indian Institute of Management Tiruchirappalli, and Indian Institute of Information Technology Tiruchirappalli. The city also accommodates prominent institutions in engineering, science, arts, teacher education, law, polytechnic, industrial training, and vocational studies, contributing to a diversified academic ecosystem.

Academic governance and quality assurance are overseen by the Departments of School Education, Higher Education, and Technical Education through mechanisms such as accreditation, curriculum development, faculty standards, funding support, and inclusive education programmes for women, marginalised communities, and first-generation learners. This integrated institutional framework strengthens human capital formation, promotes equitable access to quality education, and equips youth with advanced technical, managerial, and professional skills, supporting inclusive and sustainable development in the Tiruchirappalli region.

### 4.8.19 Medical and Health Services

The Joint Director of Medical and Rural Health Services, Tiruchirappalli, oversees the district's healthcare delivery system, which integrates urban and rural health institutions. This includes medical college hospitals, district

hospitals, taluk hospitals, and Primary Health Centres (PHCs), along with sub-centres in rural areas. In addition, Tiruchirappalli is home to premier medical colleges and teaching hospitals that provide both advanced healthcare and medical education, strengthening service delivery and capacity-building in the health sector. Implementation mechanisms involve coordination between the Directorate of Medical Education, the Directorate of Medical and Rural Health Services, and the local bodies to ensure preventive, promotive, and curative healthcare. Public health programs such as immunisation drives, maternal and child health services, disease surveillance, and the National Health Mission (NHM) play a key role in strengthening grassroots access. These governance structures and schemes directly contribute to the Sustainable Development Goals by advancing SDG 3 (Good Health and Well-being), ensuring universal health coverage, reducing maternal and child mortality, controlling communicable and non-communicable diseases, and building a resilient healthcare system that addresses both urban and rural needs.

### 4.8.20 Archaeological Survey of India (ASI) & Tamil Nadu State

**Department of Archaeology**

In Tiruchirappalli district, archaeological sites and monuments of national importance are protected and managed by the Archaeological Survey of India (ASI) under the provisions of the Ancient Monuments and Archaeological Sites and Remains Act, 1958. The ASI is responsible for the conservation, documentation, research, and maintenance of centrally protected monuments within the district.

There are three major ASI-protected monuments in Tiruchirappalli, including the Rockfort Cave Temples, Pallava inscriptions at Rockfort, and the Erumbeeswarar Temple at Thiruverumbur, which reflect the region's early rock-cut architecture and medieval temple traditions. In addition, the ASI maintains a district museum at Rani Mangammal Mahal in Bharathidasan Nagar, which documents the archaeological and historical legacy of the region.

Complementing the ASI's role, the Tamil Nadu State Department of Archaeology manages eight sites of regional importance in the district, including temples, tanks, and historic structures located in Thiruvellarai, Alambakkam, Perungudi, Pazhur, and Cholamadevi. These institutions together ensure systematic conservation, protection, and promotion of Tiruchirappalli's tangible archaeological heritage.

### 4.8.21 Hindu Religious & Charitable Endowments Department (HR&CE)

The Hindu Religious and Charitable Endowments (HR&CE) Department is the statutory authority entrusted with the administration, financial supervision,

and property management of Hindu temples and endowments in Tiruchirappalli under the Tamil Nadu Hindu Religious and Charitable Endowments Act, 1959. The department functions under the leadership of the Commissioner and is supported by Joint, Deputy, and Assistant Commissioners and Executive Officers at the regional and local levels.

In Tiruchirappalli district, the HR&CE Department plays a critical role in safeguarding the religious, cultural, and spiritual heritage of the city, which is widely recognised for its rich temple traditions. The department oversees temple lands, mandapams, tanks, gardens, and associated properties, ensuring that they are utilised exclusively for religious and charitable purposes. It is also responsible for conservation and maintenance activities in accordance with the Conservation and Maintenance Manual of Temples.

Prominent temples under the department's jurisdiction include the Arulmigu Ranganathaswamy Temple, Srirangam; Arulmigu Mariamman Temple, Samayapuram; Arulmigu Thayumanaswamy Temple, Rockfort; and Arulmigu Jambukeswarar–Akilandeswari Temple, Thiruvanaikovil. The HR&CE Department also ensures the proper conduct of daily rituals and major festivals such as Vaikunda Ekadasi, Poo Choridhal, and Theppposthavam.

The department manages 2,441 temples and associated endowments in the district, of which 417 are located within the Local Planning Area, reflecting its extensive institutional presence. Through appointed Executive Officers and regulatory mechanisms, HR&CE ensures transparent administration, financial accountability, and sustained community services, thereby preserving Tiruchirappalli's living temple heritage for future generations.

### 4.8.22 Tourism Department

The Tourism Department in Tiruchirappalli, led by the District Tourism Officer, plays a key role in promoting the city as a major pilgrimage, heritage, and transit tourism hub in central Tamil Nadu. Tiruchirappalli has been identified as a Flagship Hub under the Integrated Tourism Master Plan and serves as an important node for thematic circuits such as the Chola, Ramayana, Gopuram, and Divya Desam Trails. Tourism master plans prepared under TNITPP focus on strengthening infrastructure, conserving heritage assets, and enhancing visitor experiences through phased development, public–private partnerships, community participation, and regulatory compliance.

The department facilitates the development of tourism infrastructure, including pedestrian-friendly streets, signage, sanitation facilities, information centres, digital platforms, safety systems, and transport linkages, in coordination with urban local bodies, heritage agencies, and private stakeholders. As a designated Gateway Hub under the Tamil Nadu State Tourism Policy, Tiruchirappalli is supported through initiatives such as HOHO bus services, tourist facilitation

centres, cleanliness drives, and enhanced security measures at major transit and pilgrimage nodes. Special emphasis is placed on managing large pilgrimage and festival inflows at destinations such as Srirangam, Samayapuram, Rockfort, and Cauvery riverfront ghats through coordinated inter-departmental mechanisms. The department also promotes major religious and cultural events and encourages diversification into educational, eco-tourism, and heritage circuits to increase visitor retention and length of stay.

These initiatives align with the Sustainable Development Goals by strengthening tourism-based livelihoods (SDG 8), safeguarding cultural and religious heritage (SDG 11), and promoting responsible and inclusive tourism practices (SDG 12), thereby supporting Tiruchirappalli's sustainable regional development.

### 4.8.23 Police Department

The Commissioner of Police, Tiruchirappalli City, and the Superintendent of Police for the district are responsible for maintaining law and order, crime prevention, traffic management, and public safety. Multiple police stations across urban and rural areas ensure local-level policing and quick response mechanisms. Specialised units such as the traffic wing, crime branch, cybercrime cell, and all-women police stations address sector-specific needs, ensuring inclusive and responsive law enforcement. Implementation mechanisms include coordination with local bodies for urban safety measures (such as CCTV surveillance under Smart City initiatives), community policing programs, women's safety helplines, and digital platforms for citizen grievance redressal. Capacity building through regular training, modernisation of equipment, and integration with disaster management systems further strengthens policing efficiency. These efforts contribute to the Sustainable Development Goals by ensuring safe, resilient, and inclusive urban spaces (SDG 11: Sustainable Cities and Communities), promoting justice and strong institutions (SDG 16: Peace, Justice, and Strong Institutions), and enhancing trust between citizens and the governance system.

### 4.8.24 Fire Safety Department

The Deputy Director heads the Fire and Rescue Services Department, which is responsible for fire safety, disaster response, and emergency rescue operations across the Tiruchirappalli Local Planning Area (LPA). Fire stations are strategically located to ensure timely response, supported by trained personnel and modern firefighting equipment. The department's functions extend beyond fire suppression to include fire prevention, public awareness programs, industrial safety inspections, and training institutions that build community preparedness for emergencies. Implementation mechanisms include coordination with the District Collector, Police, Health Department, and local bodies during disaster management, strict enforcement of the Tamil Nadu Fire

Service Rules in building approvals, and regular mock drills in public spaces, schools, and industries. The department also collaborates with the State Disaster Management Authority to strengthen resilience against natural and man-made disasters. These initiatives directly contribute to the Sustainable Development Goals by reducing risks to life and property (SDG 3: Good Health and Well-being), ensuring safe and sustainable urban infrastructure (SDG 11: Sustainable Cities and Communities), and strengthening institutional capacity for disaster risk reduction (SDG 13: Climate Action).

### 4.8.25 Pollution Control Board (TNPCB)

The Tamil Nadu Pollution Control Board (TNPCB) District Office in Tiruchirappalli functions as the key regulatory authority for environmental protection and pollution management. It monitors air and water quality, issues consent and environmental clearances, and ensures industrial compliance with state and national standards. The office works in coordination with local bodies, industries, and other government departments to implement waste management rules, control effluent discharges, and promote cleaner production practices. Implementation mechanisms include regular inspections, enforcement of statutory norms, public grievance redressal, and awareness campaigns on sustainable practices. These efforts align with the Sustainable Development Goals by addressing SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities and Communities, SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action), thereby fostering healthier ecosystems and a resilient urban environment in Tiruchirappalli.

# 5 PREVIOUS PLANNING EFFORTS

## 5.1 Introduction

The following plans have been prepared for Tiruchirappalli viz:

1. Tiruchirappalli First Master Plan (2001)
2. Tiruchirappalli Review Approved Master Plan (2011)
3. Navalpattu New Town Development Plan (2021)
4. 44 Detailed Development Plans.

The earlier Master Plans and Detailed Development Plans have been reviewed to assess how far the proposed road networks, land use allocations, and development proposals have been implemented over time. This review helps in understanding the extent to which the planned infrastructure has shaped the present urban structure and influenced the pattern of growth within the planning area. The purpose of this assessment is to establish a clear understanding of past planning efforts and their impact on the existing urban form, thereby providing a relevant basis for the preparation of the current Master Plan.

### Tiruchirappalli First Master Plan (2001)

The statutory planning framework for Tiruchirappalli during this period was established through the constitution of the Tiruchirappalli Local Planning Area under the provisions of the Tamil Nadu Town and Country Planning Act, 1971. The Local Planning Area was initially declared under Section 10(1) through G.O. Ms. No. 936, Rural Development and Local Administration Department, dated 05.04.1974, and subsequently confirmed under Section 10(4) through G.O. Ms. No. 1669, Rural Development and Local Administration Department, dated 16.07.1974.

During this period, a Master Plan was not prepared for the area. Administrative changes led to the addition and exclusion of certain villages, necessitating revision of the planning boundary. Accordingly, a revised declaration under Section 10(1)(b) was issued through G.O. Ms. No. 1414, H&UD, dated 25.10.1974. The same planning extent was later confirmed through G.O. Ms. No. 1415, H&UD, dated 25.10.1980. This Local Planning Area covered an extent of 281.14 sq.km, comprising 3 Municipalities, 5 Town Panchayats, and 39 revenue villages across three taluks, forming the statutory basis for subsequent planning efforts in Tiruchirappalli. The Master Plan was prepared for this context and received Government consent under Section 24(2) of the Tamil Nadu Town and Country Planning Act, 1971, through G.O. (Ms) No. 903, H&UD, dated 06.09.1989. The Master Plan was subsequently approved under Section 28 through G.O. (Ms) No. 374, H&UD Department, dated 29.08.1996.

### Review Approved Tiruchirappalli First Master Plan (2011)

The Tiruchirappalli First Master Plan was taken up for statutory review in the year 2003 for the same planning extent of 281.14 sq.km. During this period, significant administrative changes took place within the planning area. The earlier three Municipalities, five Town Panchayats, and eleven revenue villages were merged to form the Tiruchirappalli Municipal Corporation, resulting in a unified urban local body for a major portion of the planning area.

The Review Master Plan was prepared in this context and received Government consent under Section 32(2)(b) of the Tamil Nadu Town and Country Planning

Act, 1971, through G.O. (Ms) No. 237, H&UD, dated 07.07.2005. The Review Master Plan was subsequently approved under Section 32(4) through G.O. (Ms) No. 143, H&UD, dated 11.08.2009.

### Navalpattu New Town Development Area Plan (2021)

Adjacent to the Tiruchirappalli First Master Plan Local Planning Area, a New Town Development Plan was proposed for Navalpattu. The New Town Development Area was notified under Section 10(1)(c) of the Tamil Nadu Town and Country Planning Act, 1971, through G.O. Ms. No. 259, H&UD, dated 15.04.1981. This was subsequently confirmed under Section 10(4) through G.O. Ms. No. 1044, H&UD, dated 24.11.1982.

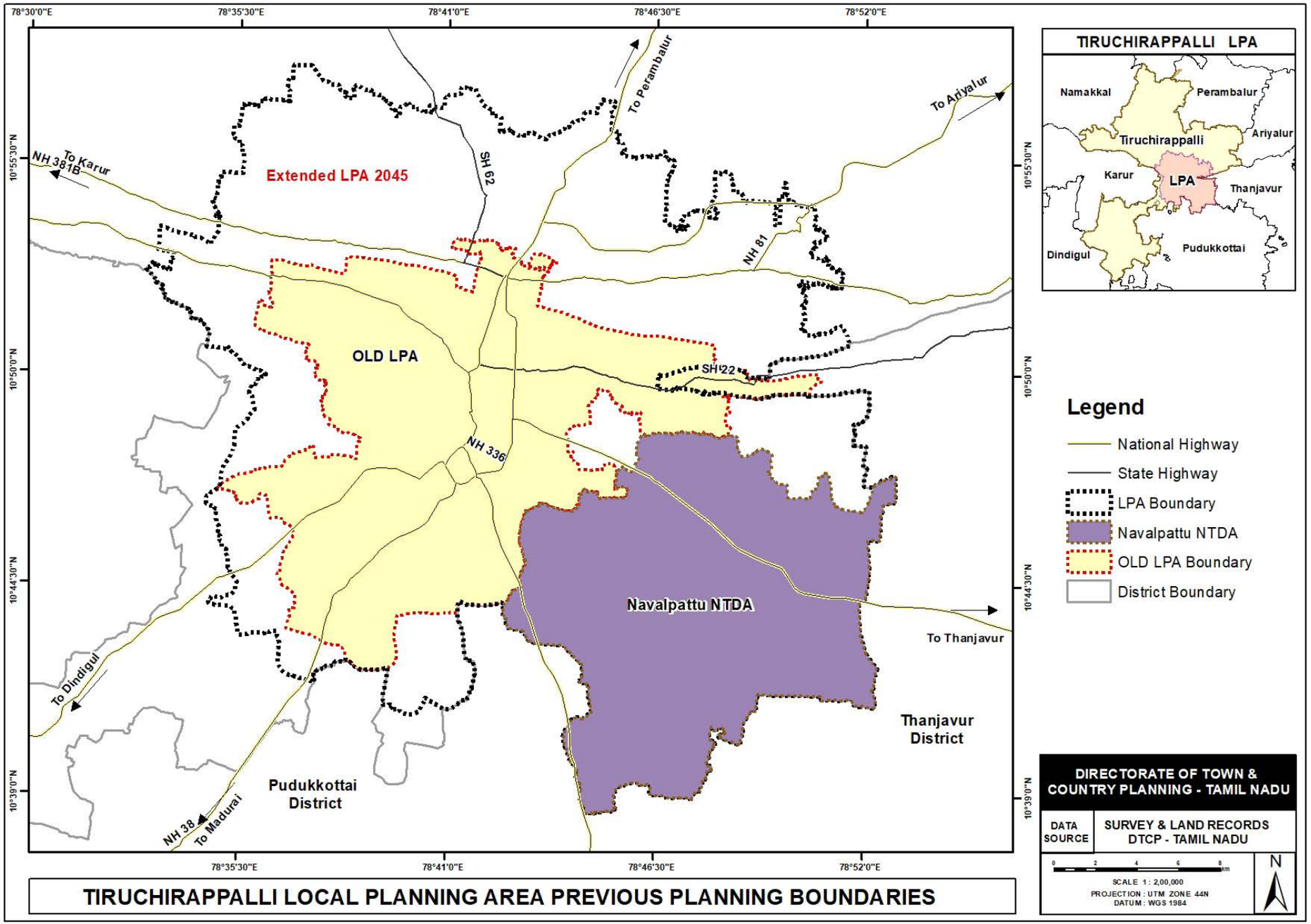
The notified New Town Development Area covered an extent of 208.14 sq.km, comprising 18 revenue villages. The Draft New Town Development Plan prepared for this area received Government consent under Section 24(2) through G.O. Ms. No. 438, H&UD, dated 06.11.2000. The New Town Development Plan was later approved under Section 28 of the Act through G.O. Ms. No. 180, H&UD, dated 19.07.2006.

### Tiruchirappalli Second Master Plan (2045)

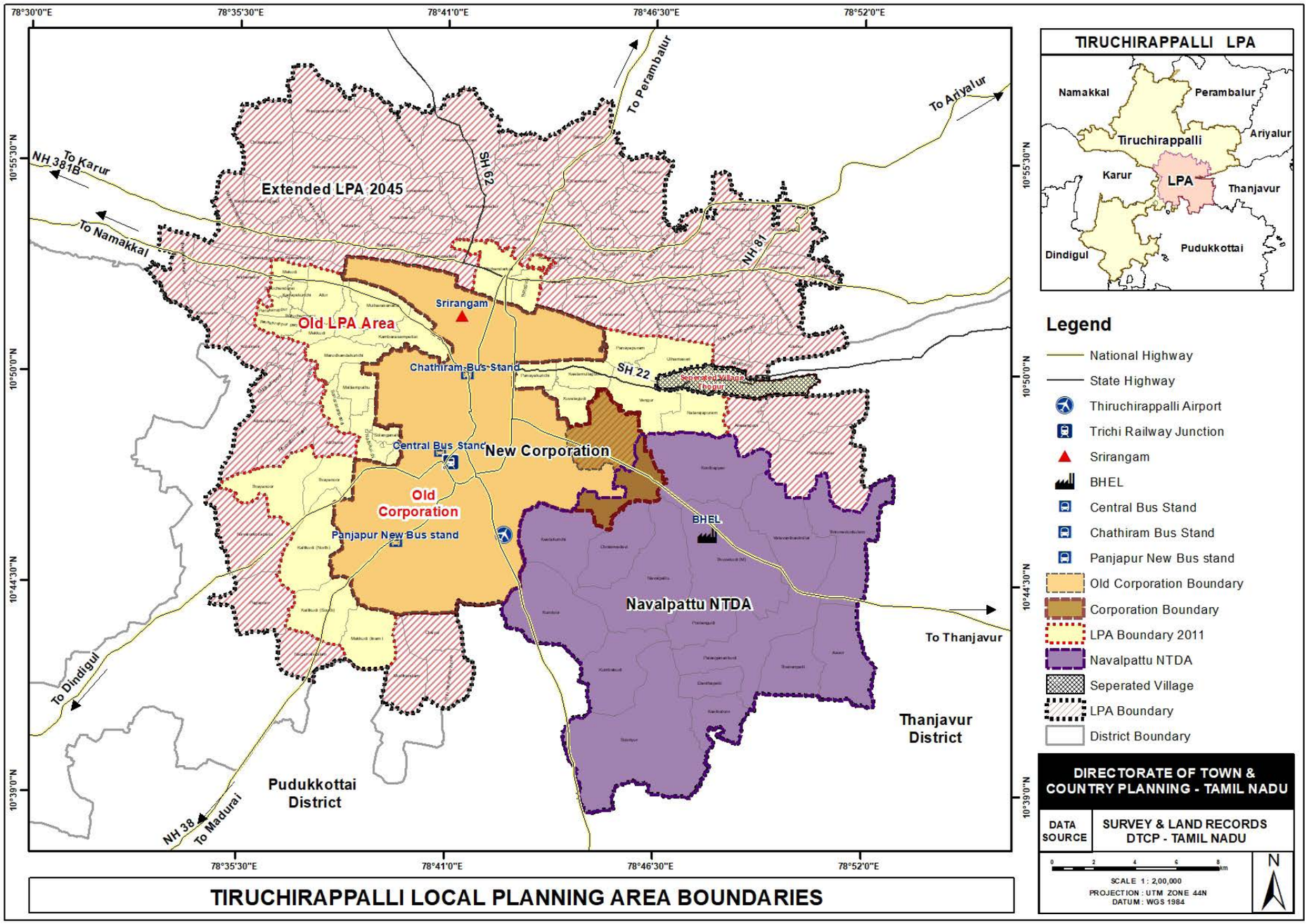
The Tiruchirappalli Master Plan 2045 has been prepared for a revised planning extent of 804.53 sq.km, comprising one Municipal Corporation, two Municipalities, four Town Panchayats, and 104 revenue villages.

In view of the urban expansion and changing development pattern, the earlier Tiruchirappalli First Master Plan area and the Navalpattu New Town Development Area were merged, and an additional revenue villages were included within the planning boundary. This revised planning area was declared under Section 10(6) of the Tamil Nadu Town and Country Planning Act, 1971, through G.O. Ms. No. 88, H&UD, dated 30.06.2021. Thogur revenue village (Budalur Taluk, Thanjavur District) which was included in the previous planning area is removed in the new planning area due to the Thanjavur district bifurcation.

The Tiruchirappalli Urban Development Authority was constituted under Section 48(2) through G.O. Ms. No. 207, H&UD, dated 23.11.2022. The Tiruchirappalli Second Master Plan for the horizon year 2045 received Government consent through G.O. Ms. No. 13, H&UD, dated 13.01.2024.




*Map 5.1 Previous Planning Boundaries of Tiruchirappalli LPA*




*Map 5.2 Planning Boundary of Tiruchirappalli LPA*

## 5.2 Tiruchirappalli First Master Plan 2001

The plan focused on improving major road corridors and guiding development along these routes, where institutional and commercial areas were proposed. It also emphasised residential development and improvement of infrastructure to support the growth of settlements, thereby strengthening Tiruchirappalli's role as an important regional hub.

### 5.2.1 Administrative Boundary

The detailed administrative breakup is as follows:

- 3 Municipalities – Tiruchirappalli, Srirangam, and Golden Rock
- Town Panchayats – Sattur Puthur, Pirattiyur, Abishekapuram, Ariyamangalam, and Allithurai
- 39 Revenue Villages within Tiruchirappalli, Lalgudi, and Thanjavur Taluks

*Table 5.1 Administrative Boundary Review Master Plan 2011*

| First Master Plan - 2001 | |
|---|---|
| **Administrative Category** | **Area (Sq. km)** |
| Municipality (3) | 67.46 |
| Town Panchayat (5) | 52.52 |
| Villages (39) | 161.16 |
| **Total** | **281.14 sq km** |

*Source: Tiruchirappalli Master Plan 2001*

### 5.2.2 Demographic Projections

The First Master Plan projected a population of 10.0 lakhs for the horizon year 2001 using the geometric curve method. However, as per the Census 2001 records, the actual population within the Local Planning Area was 7.2 lakhs. This indicates a variation of 2.8 lakhs between the projected and recorded population. The projected value is high when compared with the town's growth since the town exhibits a steady growth along the major corridors.

### 5.2.3 Workforce Projections

The First Master Plan projected a total workforce of 3,75,000 persons for the Tiruchirappalli Local Planning Area for the plan period. As per Census 2001, the actual workforce recorded within the planning area was 2.63 lakhs persons, indicating a variation of 1.12 lakhs from the projected figure.

### 5.2.4 Comparison of Proposed Landuse 2001 and Existing Landuse 2003

A direct comparison between the land use proposed in the Tiruchirappalli First Master Plan 2001 and the existing land use of the Review approved Master Plan period could not be carried out due to the absence of consolidated land use data. In addition, the 2001 Master Plan has become outdated in the present context, as significant changes have occurred in the urban structure and development pattern of the city. Therefore, this plan has not been considered for detailed land use comparison in the current review.

## 5.3 Review Approved Tiruchirappalli Master Plan 2011

The objective of this Master Plan is to establish Tiruchirappalli as a major regional connectivity hub by utilising its strategic geographic location and the presence of significant industrial and heavy manufacturing establishments. The plan aimed to support this role through planned residential and commercial development, ensuring balanced growth and orderly urban expansion within the planning area.

### 5.3.1 Administrative Structure

During the preparation of this master plan the earlier municipalities and town panchayats had been merged to form Tiruchirappalli Corporation. The Local Planning Area comprised of Tiruchirappalli Corporation area and 27 Revenue Villages as shown in the table 5.2.

*Table 5.2 Administrative Boundary Review Master Plan 2011*

| Review Master Plan 2011 | |
|---|---|
| **Administrative Category** | **Area (Sq. km)** |
| Corporation | 145.6 |
| Villages (27) | 135.54 |
| **Total** | **281.14 sq km** |

*Source: Tiruchirappalli Master Plan 2011*

### 5.3.2 Population Projection

The Review Master Plan projected a population of 11.0 lakhs for the Tiruchirappalli Local Planning Area for the year 2011 using the geometric increase method. As per Census 2011, the recorded population of the planning area was 10.08 lakhs. This indicates that the projected population was largely achieved and that the growth of the city is in alignment with the assumptions made in the Review Master Plan.

### 5.3.3 Land Use Comparison for Tiruchirappalli LPA 2011 & Existing Landuse 2025

The existing residential land use within the planning area is 49.19 sq.km, which is lower than the extent proposed for 2011. This under-realisation is largely due to physical and infrastructural constraints in the southern part of the corporation. The presence of railway lines towards Madurai and Pudukkottai, without adequate road or bridge connections, has restricted accessibility and continuity of development. As a result, growth in these areas has been limited and several proposed projects in locations such as Pirattiyur and Puthur did not materialise during the plan period.

In the case of commercial land use, the existing extent of 6.78 sq.km exceeds the proposed 5.89 sq.km. This increase reflects a shift from concentration-based commercial activity within the traditional core to corridor-based commercial development along major transport routes connecting Tiruchirappalli to other urban centres. Commercial development proposed along the 120 ft wide ring road has not been realised, while growth has instead occurred along existing arterial corridors with higher accessibility and traffic movement.

Industrial land use has achieved only 4.51 sq.km against the proposed 6.07 sq.km. This shortfall is mainly due to the concentration of industrial development outside the Local Planning Area, particularly within the Navalpattu New Town Development Area, which offers larger land parcels and better industrial infrastructure.

Transportation land use has increased from the proposed 12.91 sq.km to 15.70 sq.km, reflecting the formation of new roads, road widening works, and transport-related developments such as new bus terminals and bus stops.

Agricultural land and water bodies continue to occupy large portions of the planning area, reflecting the semi urban character of many peripheral villages and the presence of significant natural drainage and irrigation features that influence land development patterns.

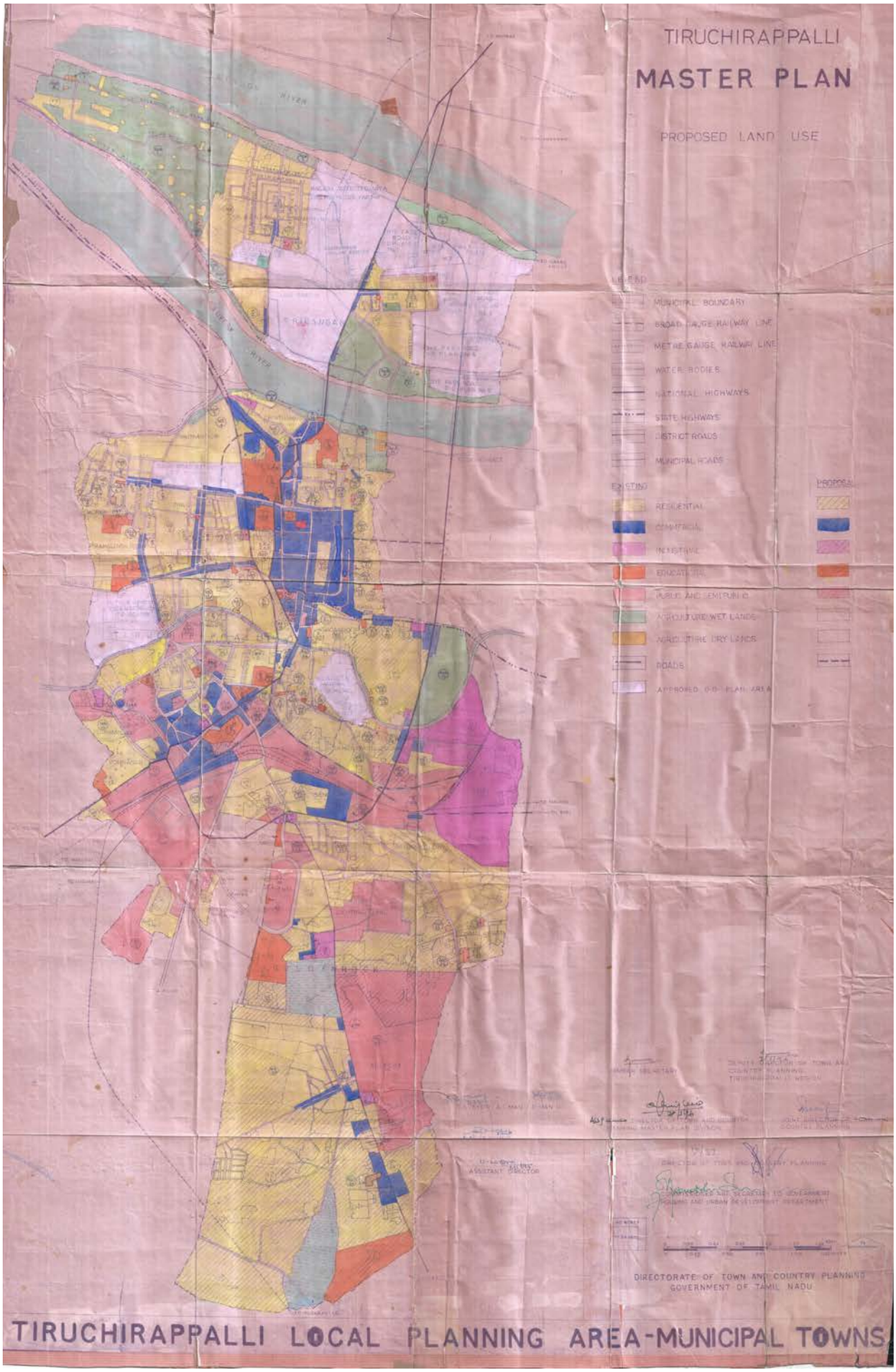



*Figure 5.1 Proposed Land Use 2001*

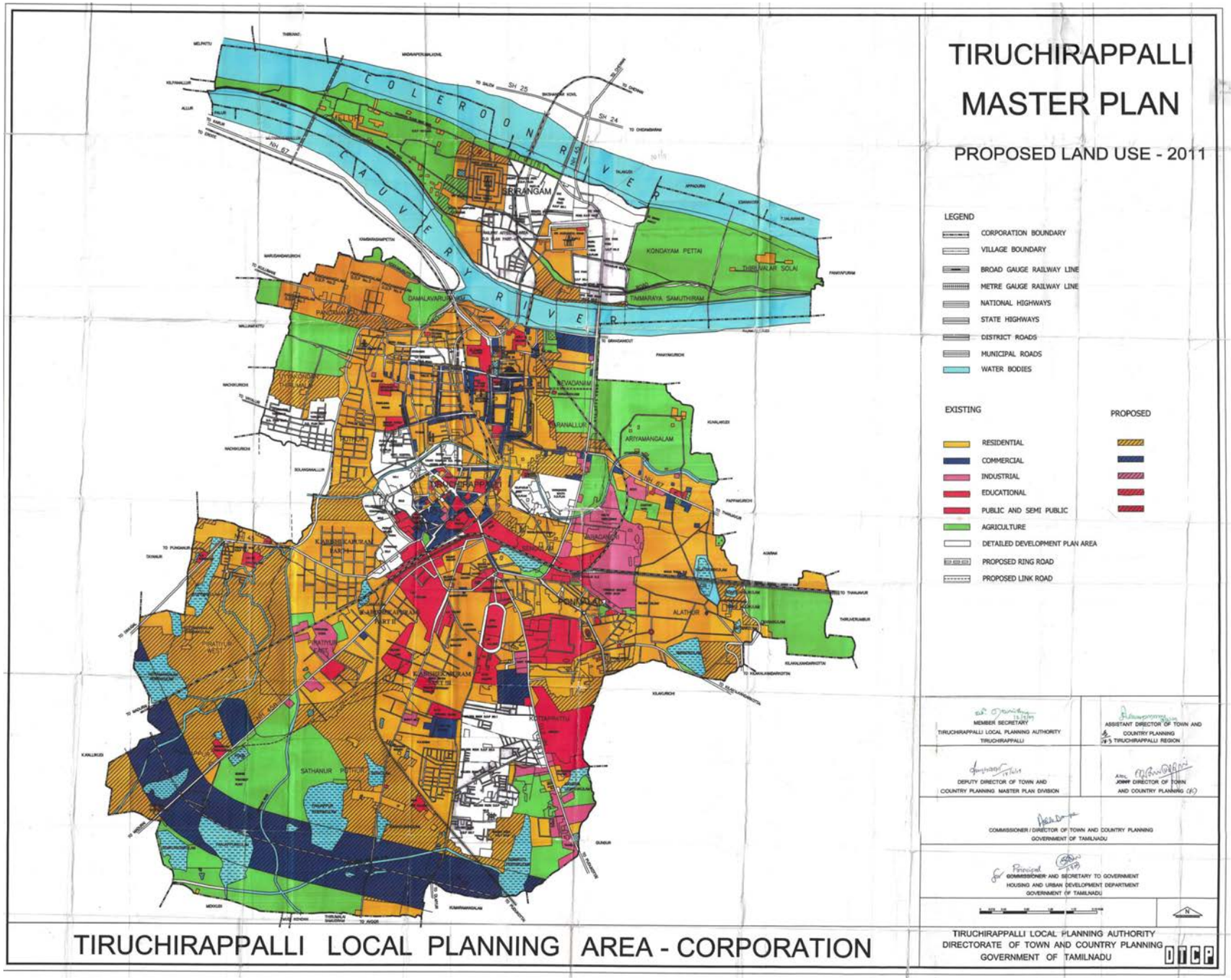
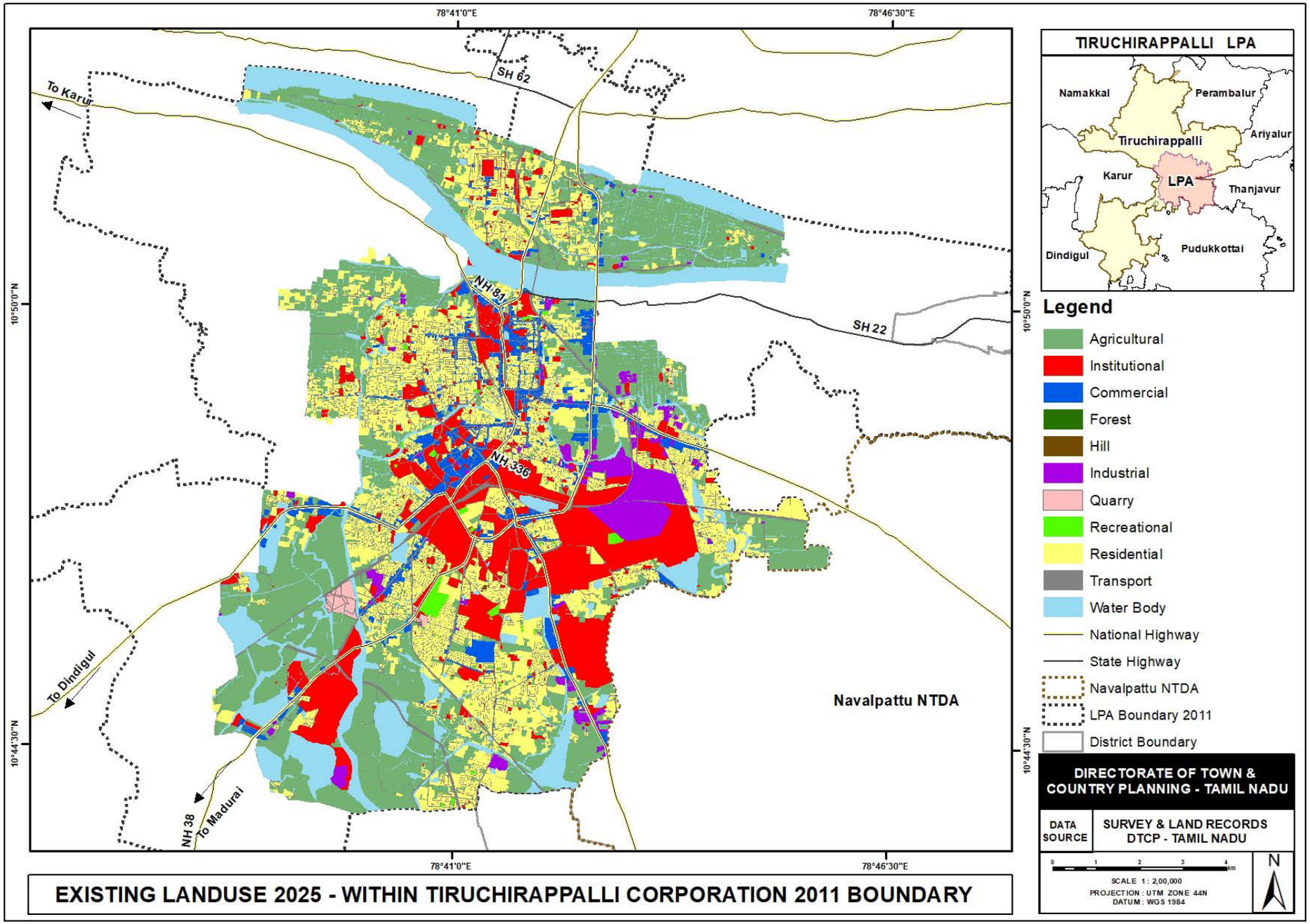



*Figure 5.2 Proposed Land Use 2011 Corporation Area*




*Map 5.3 Existing Landuse 2025 within Corporation Boundary 2011*

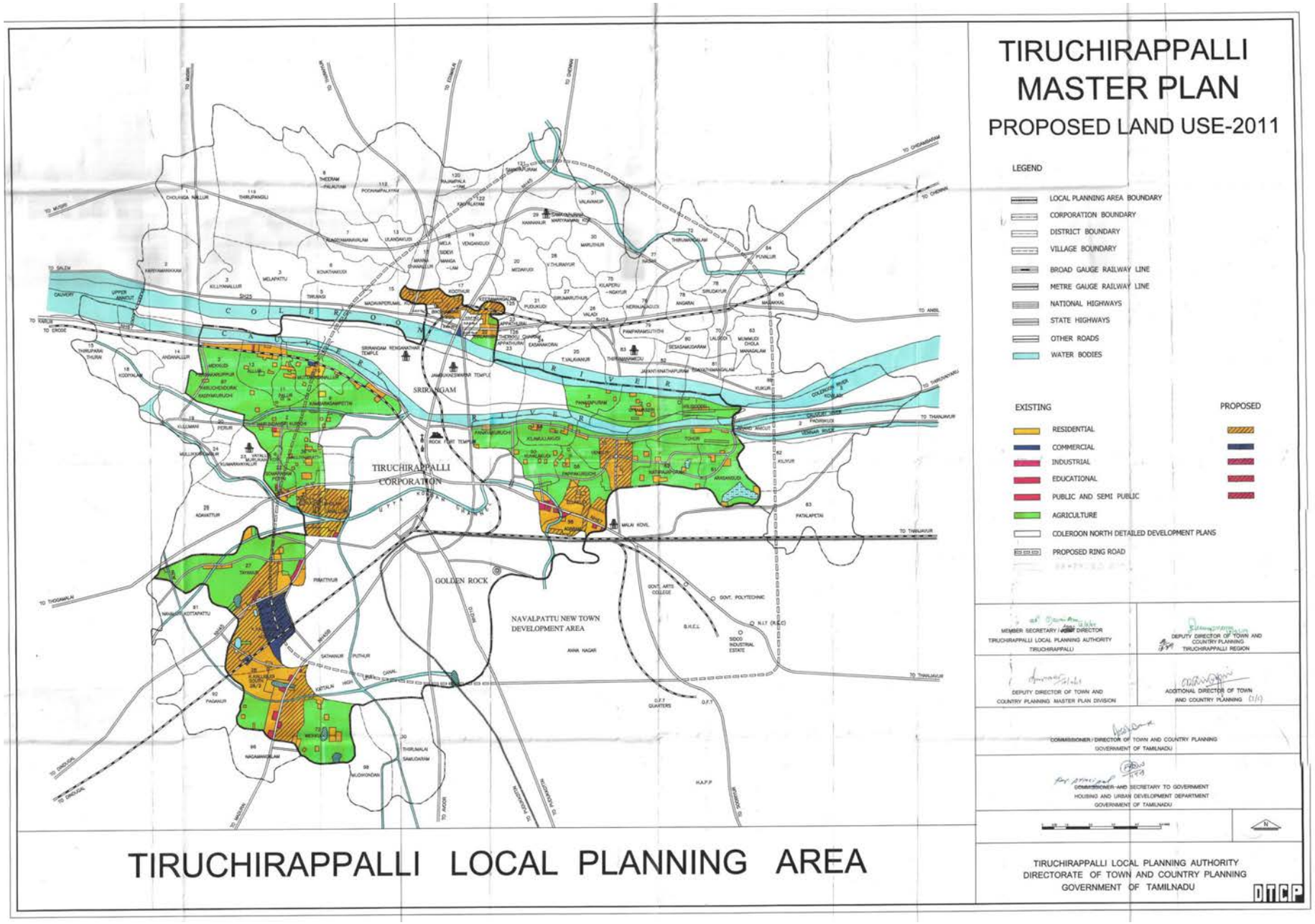
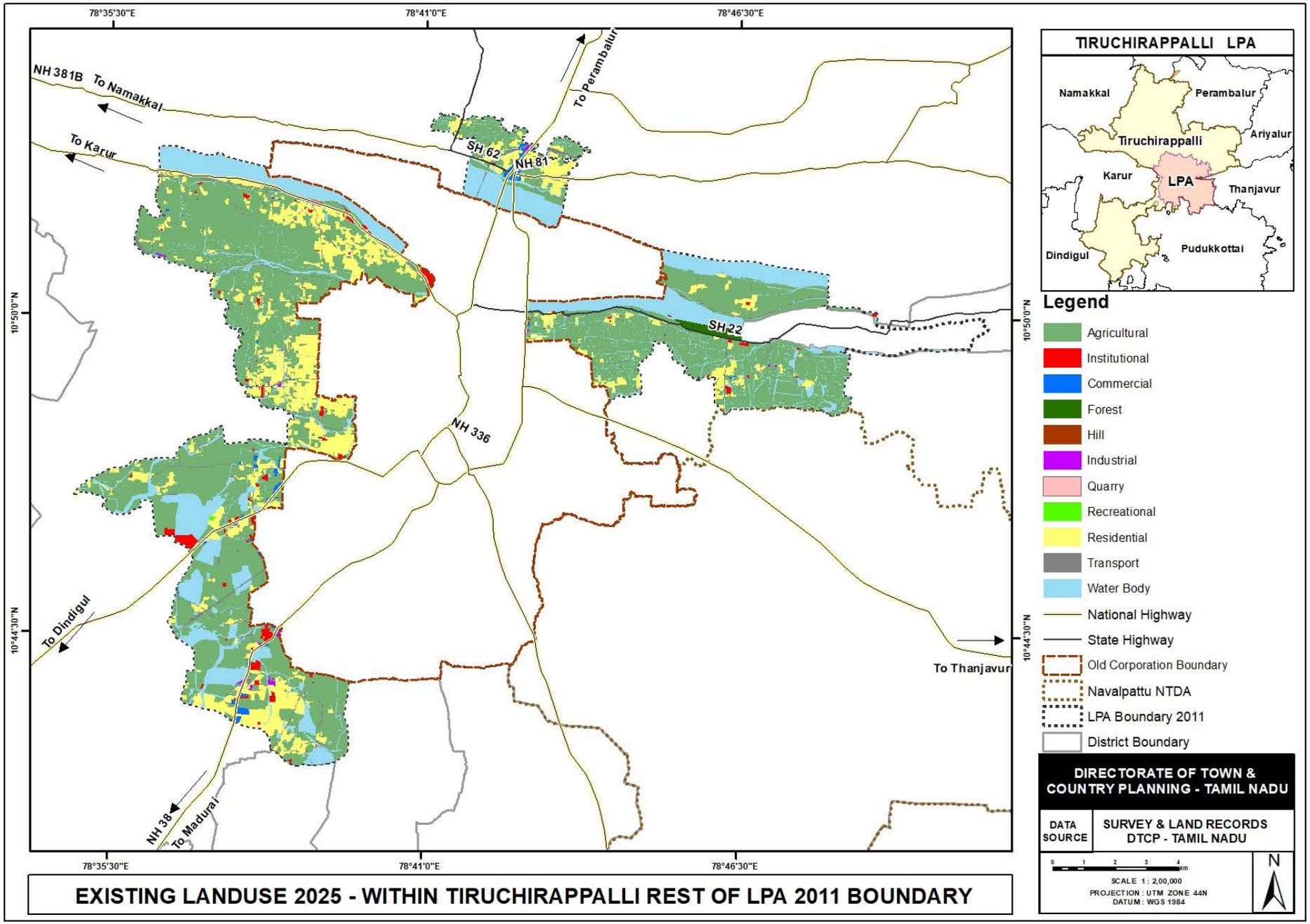
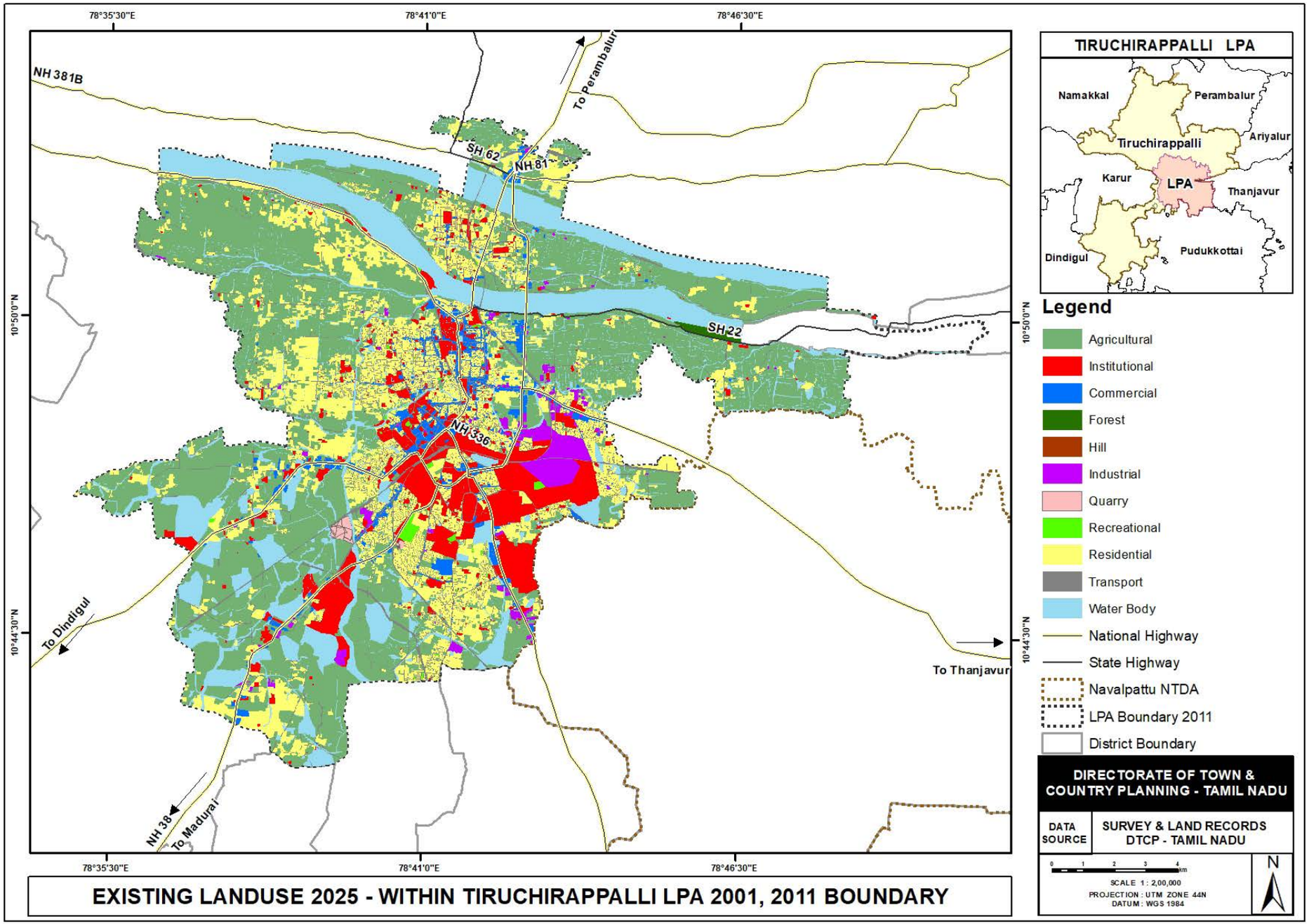



*Figure 5.3 Proposed Land Use 2011 Rest of LPA*




*Map 5.4 Existing Landuse 2025 within Rest of LPA Boundary 2011*




*Map 5.5 Existing Landuse 2025 within Old LPA Boundary 2011*

*Table 5.3 Comparison of Proposed Landuse Master Plan 2001, Master Plan 2011 and Existing Landuse 2025*

| Land Use | Proposed Land Use (2011) (Excluding Thogur Village) | | Existing Land Use (2025) | |
|---|---|---|---|---|
| | Area (sq. km) | % | Area (sq. km) | % |
| Residential | 103.83 | 37.04% | 49.19 | 19.49% |
| Commercial | 5.89 | 2.10% | 6.78 | 2.69% |
| Industrial | 6.07 | 2.16% | 4.51 | 1.79% |
| Educational<br>Institutional (Public & Semi-Public) | 25.06 | 8.91% | 21.25 | 8.42% |
| Transportation | 12.91 | 4.59% | 15.70 | 6.22% |
| Agricultural | 54.676 | 29.38% | 107.64 | 42.64% |
| Water Bodies | 43.99 | 15.82% | 47.35 | 18.76% |
| Total | 252.4 | 100.00% | 252.4 | 100.00% |

*Source: DTCP, Tiruchirappalli*

## 5.4 Tiruchirappalli Master Plan Proposals and Implementation Status

The First Master Plan and the subsequent Review Master Plan placed strong emphasis on improving the transport and circulation framework of Tiruchirappalli through proposals for ring roads, link roads, junction improvements, bridges, bus terminals, and truck terminals. These proposals were intended to decongest the core areas, improve connectivity between different parts of the Local Planning Area, and guide future urban growth along planned corridors.

A review of implementation status shows that junctions such as Mannarpuram, No.1 Tollgate, Palakarai, Main Guard Gate, and Puthur have been improved. Bridges across Uyyakondan and Kudamurutti rivers, multiple rail over bridges, and the development of the Panjappur bus and truck terminals have strengthened the city's transport infrastructure and reinforced its role as a regional transport hub. Many of the major link road and ring road proposals envisaged in the Master Plans remain only partially implemented. The proposed 120 ft ring road around the city has been completed between Panjappur and Thuvakudi. Link roads connecting Dindigul Road, Karur Road, Madurai Road, East Boulevard Road, and the Chennai Bypass have not been fully formed. These roads were

intended to redistribute traffic and influence peripheral development, but their incomplete execution has resulted in continued dependence on existing arterial roads.

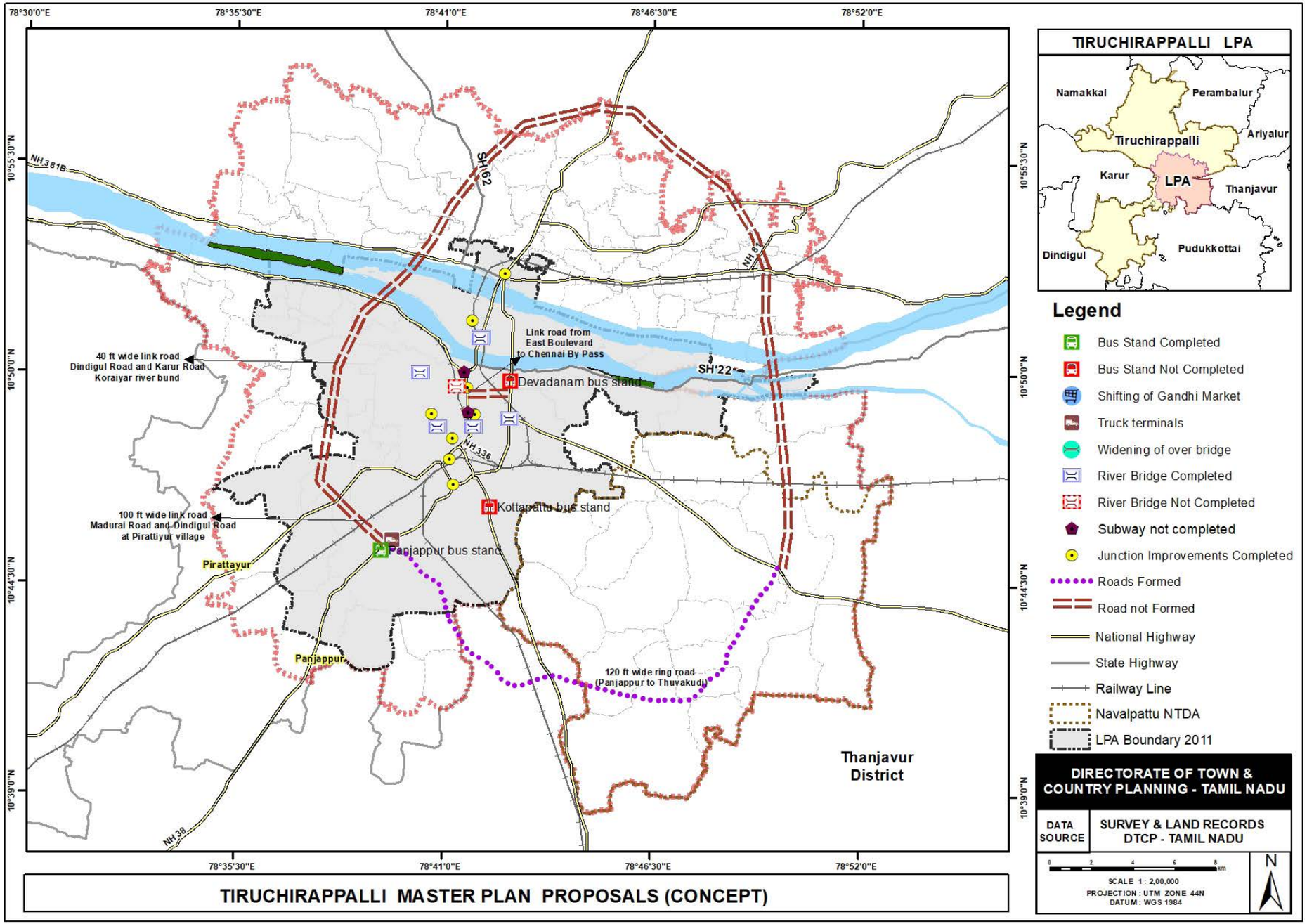
Subways proposed near Main Guard Gate and Singarathope, and certain bus stand proposals such as Devadanam and Kottapattu, have not materialised. While transport node improvements have progressed, the incomplete implementation of the broader road network has limited the intended restructuring of traffic movement and planned urban expansion. The review shows that while many individual infrastructure works have been completed, several of the larger road network proposals remain incomplete, affecting the intended circulation pattern within the Local Planning Area.

*Table 5.4 Master Plan Proposals and Implementation Status*

| S.no | Proposal | Status |
|---|---|---|
| 1 | Shifting of Gandhi Market and Vellamandi to Pirattiyur along inner ring road | In Progress, Changed to Panjappur |
| 2 | 40 ft wide link road connecting Dindigul Road and Karur Road along Koraiyar river bund | Not Completed |
| 3 | 80 ft wide link road connecting East Boulevard Road to Chennai Bypass Road. | Not Completed |
| 4 | 100 ft wide link road connecting Madurai Road and Dindigul Road at Pirattiyur village | Not Completed |
| 5 | Formation of 120 ft wide ring road around Tiruchirappalli town. | Partially Completed |
| **Junction Improvement** | | |
| 6 | Mannarpuram Junction | Completed |
| 7 | No.1 Tollgate Junction | Completed |
| 8 | Palakarai Bazaar Road and Heber Road Junction | Completed |
| 9 | Mainguard Gate Junction | Completed |
| 10 | Anandha Bhavan Junction | Completed |
| 11 | Junction of Thanjavur Road and Madurai Road near Gandhi Market | Completed |
| 12 | Junction of NH 45 and Gandhi road (Srirangam) | Completed |
| 13 | Improvement to Othakadai junction | Completed |
| 14 | Improvement to four road junction (puthur) | Completed |

| S.no | Proposal | Status |
|---|---|---|
| **Construction of River Bridges** | | |
| 15 | Bridge over Uyyakondan channel near Palakarai Police Station | Completed |
| 16 | River bridge on EVR Road near Court | Completed |
| 17 | River bridge on Kulumani Road over Kudamurutti River | Completed |
| 18 | Over bridges at level crossings (4-lane) | Completed |
| 19 | Level crossing on Heber Road at Beemanagar | Completed |
| 20 | Road over bridge across Trichy–Chennai railway line near Thiruvanaikovil | Completed |
| 21 | Road over bridge on Salai Road near Fort Station | Not Completed |
| 22 | Widening of over bridge in the bye pass at km 332/4 near junction | In Progress |
| **Bus stand Proposal** | | |
| 23 | Devadanam Bus Stand at chennai bye pass road near Cauvery Bridge | Not Completed |
| 24 | Panjapur New Bus Stand at madurai road saranathan engineering college | Completed |
| 25 | Kottapattu Bus Stand at Pudukkottai road near Dairy Farm | Not Completed |
| **Truck terminals** | | |
| 26 | Truck terminals along Dindigul Road | Relocated at Panjappur Completed |
| **Pedestrian Subway** | | |
| 27 | Subway opposite Main Guard Gate | Not Completed |
| 28 | Subway at Singarathope Junction | Not Completed |
| **Proposal** | | |
| 29 | Improvement to Anna Stadium | Completed |
| 30 | Walkers' track inside Anna Stadium | Completed |
| 31 | Accommodation for EWS at Kallikudi South village | Not Completed |
| 32 | Trichy–Srirangam UGS scheme under National River Conservation Project | Completed |

*Source: DTCP, Tiruchirappalli*




*Map 5.6 Tiruchirappalli Master Plan 2011 Proposals and their current status*

## 5.5 Detailed Development Plans (DDPs)

There are 47 Detailed Development Plans prepared within the Tiruchirappalli LPA of which 2 have been consented and 45 have been approved as given in Table 5.5, 328 New roads have been proposed in the DDP as shown in Table 5.5, of which 39 has been formed and 143 numbers of roads are yet to be developed and 146 roads are presently not feasible due to ground level constraints. Varaganeri DDP, Golden Rock DDPs, Salai Road Extension DDP has the highest number of roads formed.

*Table 5.5 Stages of Detailed Development Plan in Tiruchirappalli LPA*

| Consented DDP | Approved DDP | Total DDP |
|---|---|---|
| 2 | **45** | **47** |

*Source: DTCP, Tiruchirappalli*

*Table 5.6 Stages of New Roads proposed in the Detailed Development Plan - Tiruchirappalli LPA*

| Stages of Road | Number of Road |
|---|---|
| Roads already completed | 39 |
| Roads to be developed | 143 |
| Roads not feasible | 146 |

*Source: DTCP, Tiruchirappalli*

## 5.6 Navalpattu NTDA Plan 2025

### 5.6.1 Administrative Boundaries

The Navalpattu New Town Development Area covers an extent of 208.14 sq.km. This area is located south-east of Tiruchirappalli LPA along the Tiruchirappalli-Thanjavur National Highway comprising 18 villages, of which Thiruverumbur, Kuttappar, and Thuvakudi are town panchayat and 15 villages.

*Table 5.7 Administrative Boundaries of Navalpattu NTDA*

| Administrative Category | Area (Sq. km) |
|---|---|
| Town Panchayat (3) | 39.05 |
| Village Panchayat (15) | 169.09 |
| Total Area | 208.14 sq km |

*Source: NTDA Plan, 2021*

### 5.6.2 Planning Objectives

The Navalpattu New Town Development Plan was envisioned with the objective of developing the area as an industrial hub, considering the presence of major industries and the availability of large, contiguous tracts of flat land suitable for development. The area benefits from strong regional connectivity through the highway and railway network. The plan aimed to create a cluster of jobs and employment within the New Town, supported by residential and related activities in the surrounding Local Planning Area.

### 5.6.3 Demographic Projections

The Navalpattu New Town Development Plan projected a population of 2 lakhs for the horizon year 2021 using the average incremental increase method. As Census 2021 population data is not available for comparison, the population figures for 2025 obtained from the local bodies have been considered for analysis. The recorded population of the Navalpattu NTDA in 2025 is 1.84 lakhs. This indicates that the area population growth in line with the projections.

### 5.6.4 Comparison of Landuse in Proposed Navalpattu NTDA plan 2021 and Existing Landuse 2025

The comparison between the proposed land use for 2021 and the existing land use in 2025 within the Navalpattu New Town Development Area shows considerable growth across major categories. The proposed residential land use for 2021 was 20.36 sq.km, whereas the existing residential land use in 2025 has increased to 34.65 sq.km, exceeding the proposal by 14.29 sq.km. This growth has occurred largely within and around the proposed residential zones due to their proximity to major industrial establishments and improved accessibility.

The proposed commercial land use of 0.40 sq.km has increased to 1.05 sq.km in 2025. This rise can be attributed to the expansion of residential areas, which created demand for supporting commercial activities and services.

As the Navalpattu NTDA was envisioned as an industrial township, the proposed industrial land use of 15.47 sq.km has increased to 22.75 sq.km. This overachievement is mainly due to the availability of large, flat, and open land parcels, proximity to major roads, and the presence of technical and educational institutions that support industrial growth.

Agricultural land, which was proposed to be retained at 159.47 sq.km in 2021, has reduced to 93.45 sq.km in 2025. This reduction reflects the conversion of agricultural areas to residential, industrial and commercial uses indicating the extent of urbanisation within the New Town Development Area.

*Table 5.8 Comparison of Landuse in Proposed Navalpattu NTDA plan 2021 and Existing Landuse 2025*

| Land Use | Proposed Land Use (NTDA -2021) | | Existing Land Use (2025) | |
|---|---|---|---|---|
| | Area (sq. km) | % | Area (sq. km) | % |
| Residential | 20.36 | 9.78 | 34.65 | 16.54 |
| Commercial | 0.4 | 0.19 | 1.05 | 0.85 |
| Industrial | 15.47 | 7.44 | 22.75 | 11.61 |
| Institutional (Public & Semi-Public) | 12.44 | 5.97 | 12.85 | 5.61 |
| Agricultural | 159.47 | 76.62 | 93.45 | 46.28 |
| Transport | - | - | 6.39 | 2.47 |
| Water Body | - | - | 37.34 | 16.64 |
| **Total** | **208.14** | **100** | **208.14** | **100** |

*Source: Navalpattu NTDA plan 2021; DTCP, Tiruchirappalli*

## 5.7 Conclusion

The Tiruchirappalli Local Planning Area and the Navalpattu New Town Development Area are both located at a strategic node that supports the development of the region as a whole. An analysis of previous planning efforts indicates that most of the envisaged growth trajectories have been mostly achieved, though certain gaps remain. Several proposed link roads intended to connect major arterial corridors and guide development were not realised. As a result, development has occurred in a dispersed and non-contiguous pattern. These gaps have been recognised and addressed in the forthcoming Master Plan with the objective of promoting more contiguous and structured urban development.

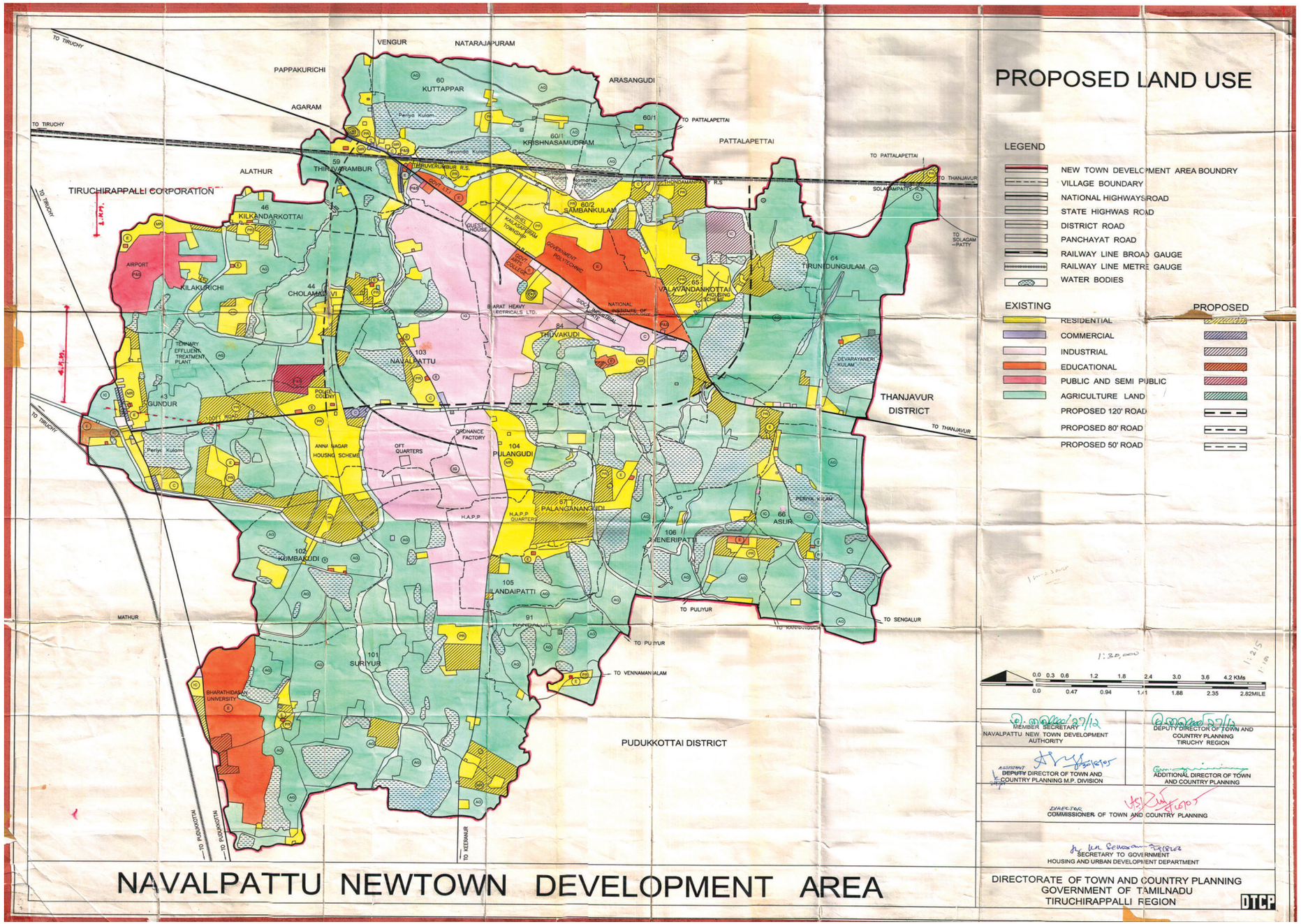
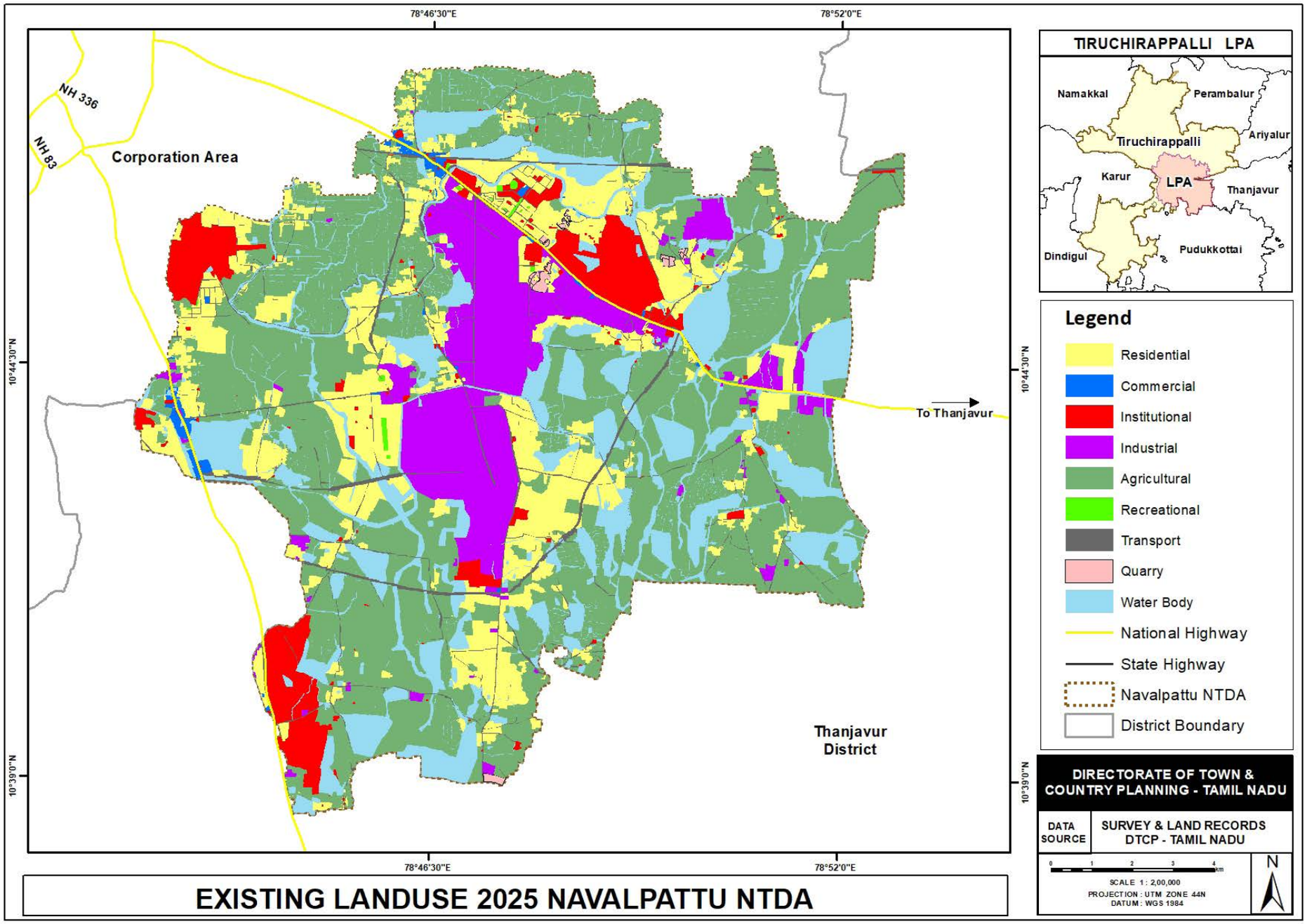



*Figure 5. 4 Navalpattu NTDA Plan Proposed Landuse 2021*




*Map 5.7 Existing Landuse Navalpattu NTDA Plan 2025*

# 6 NATURAL SETTING AND ENVIRONMENT



## Introduction

The environment of the Tiruchirappalli Local Planning Area (LPA) is shaped by the interaction of its river systems, landforms, climate, and ecological features, which together influence natural processes, resource availability, and development patterns. The Cauvery–Kollidam river system forms the primary environmental framework, supporting surface water availability, groundwater recharge, and fertile alluvial plains, while also influencing flood dynamics. The LPA is largely characterised by gently sloping plains with rocky uplands and pediplain formations, which govern drainage and groundwater occurrence, and is influenced by a tropical climate marked by high temperatures and seasonal monsoon rainfall. These interconnected environmental systems play a vital role in sustaining water resources, ecological balance, and urban development, while also determining the region's sensitivity to environmental risks such as flooding, heat stress, and groundwater depletion.

## 6.1 River-Plain-Rock Framework: Overview of Physical System

The physical structure of the Tiruchirappalli LPA is best interpreted through a River–Plain–Rock framework, which captures the spatial and functional interactions among the Cauvery river system, extensive alluvial plains, and isolated hard rock uplands. As depicted in the Map 6.1, this framework provides a coherent basis for interpreting the LPA's hydrology, landforms, settlement patterns, ecological systems, and development constraints. This framework provides the spatial logic for land suitability evaluation, infrastructure planning, environmental risk assessment, zoning and development regulation within the LPA.

At the core of this framework lies the Cauvery–Kollidam river system, which traverses the LPA from west to east and functions as the dominant organising element of the landscape. The bifurcation of the Cauvery at the Upper Anaicut (Mukkombu), located upstream of the LPA, gives rise to the Cauvery River and the Kollidam (Coleroon) River, together forming a broad, dynamic fluvial corridor across the central and northern portions of the planning area. In addition to the main rivers, the surface water system includes key channels and canals such as the Uyyakondan Channel, Koraiyar River, Kattalai Channel, Ayyar River, Panguni River, Vennar River and a network of feeder channels, streams and natural drainage systems. These watercourses interlink the main river channels with tanks, wetlands, agricultural lands and urban areas, collectively governing surface drainage, flood conveyance, irrigation and groundwater recharge. This interconnected hydrological network has strongly influenced settlement patterns, transport alignments and economic activity within the LPA.

Flanking the river corridors are extensive alluvial plains, traversed by major irrigation channels such as the Uyyakondan, Pullambadi and Kattalai canals, which occupy a substantial portion of the LPA, particularly along the Cauvery and Kollidam floodplains and in the eastern, delta-influenced tracts. These plains are characterised by gentle slopes, fertile alluvial soils, shallow groundwater conditions and a dense network of canals and tanks. They constitute the most productive agricultural zones and also accommodate significant urban development, including much of the Tiruchirappalli Corporation area. However, their location within active and historical floodplains renders them environmentally sensitive, with high susceptibility to seasonal flooding, waterlogging and groundwater contamination. As such, the plains represent both opportunity and constraint, necessitating flood-sensitive land-use zoning, overlay regulations, development controls, protection of drainage corridors, and long-term floodplain management strategies to carefully regulate urban expansion.

Interspersed within and along the margins of the plains are hard rock uplands and residual hills, forming the third component of the framework. Prominent features such as Rockfort Hill (Malaikottai), Ponmalai (Golden Rock), Khaja Hills and other isolated hillocks rise abruptly above the surrounding plains as structurally stable landforms associated with the underlying crystalline basement. These rocky outcrops influence local drainage patterns, generate surface runoff, and act as natural barriers to continuous urban expansion, thereby warranting careful regulation of slope modification, quarrying and intensive construction activity. Forested tracts such as the Kilianur and Kariamanickam Reserve Forests in the west and the Vengur and Kilamullakudi Reserve Forests in the east occur primarily along river corridors and transitional zones, functioning as ecological buffers, groundwater recharge areas and biodiversity habitats.

Together, the river systems, floodplains, drainage networks, groundwater regimes, landforms, soils, climate and ecological assets define the environmental framework governing the functioning and resilience of the Tiruchirappalli LPA. The river system drives hydrological and ecological processes, the plains provide the primary zones for agriculture and urban growth under flood-related constraints, and the rocky uplands offer geomorphic stability while limiting intensive land use. Understanding this integrated framework is essential for land suitability analysis, infrastructure placement, flood management, groundwater protection and sustainable urban development.

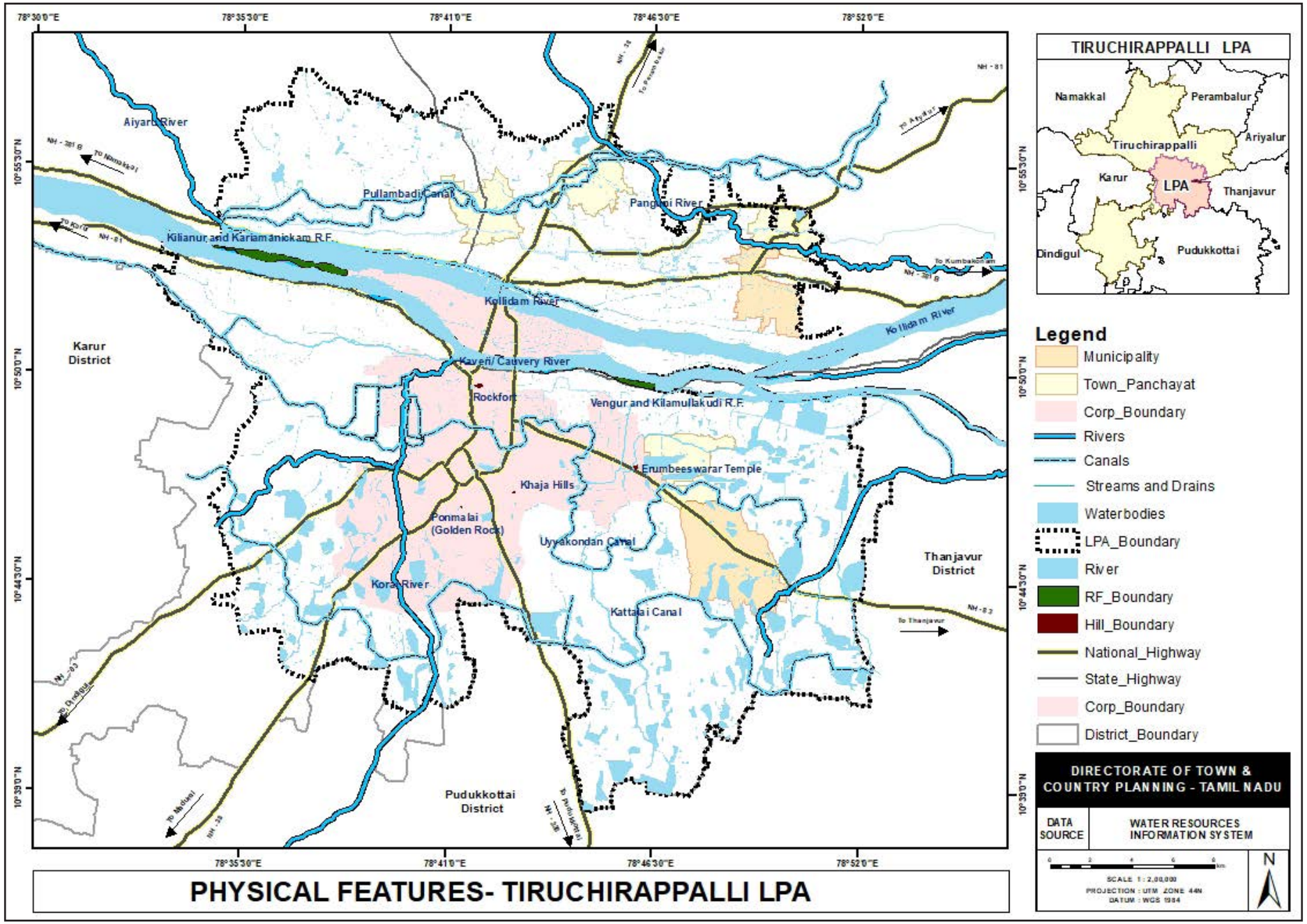
Building on this physical context, this chapter examines the environmental and ecological systems of the Tiruchirappalli LPA through a functional, analytical and risk-based lens, with emphasis on system behaviour, temporal change and vulnerability under urbanisation and climate stress. The chapter documents natural elements primarily as spatial attributes, and further focuses on how these systems operate, interact, degrade and influence environmental risk and urban resilience over time. Water systems form the core analytical entry point of this chapter, given their central role in groundwater recharge, flood moderation, microclimate regulation and ecological balance. The assessment moves beyond spatial inventory to evaluate surface water dynamics, groundwater conditions, water quality and rainfall variability, supported by geospatial and remote sensing analyses of temporal change, groundwater stress and pollution patterns.

Building on the hydrological assessment, the chapter evaluates climate-linked environmental risks, particularly flooding and heat stress, through an integrated analysis of land morphology, rainfall variability, air temperature, land surface temperature and vegetation–moisture interactions. Air quality is also assessed to capture cumulative environmental pressures and their implications for public health and urban liveability. The outcomes of this chapter provide an evidence-based foundation for integrating ecologically responsive planning interventions, climate resilience measures and resource-efficient environmental management strategies into the Tiruchirappalli Master Plan.

### 6.1.1 Role of Cauvery–Kollidam system in shaping settlement, ecology and risk

Among all physical determinants, the Cauvery river system remains the most influential factor shaping land suitability, environmental sensitivity and sustainable urban growth within the Tiruchirappalli LPA. The Cauvery–Kollidam river system has been the primary driver of settlement evolution within the Tiruchirappalli LPA. The availability of perennial surface water, fertile alluvial soils and an extensive irrigation and canal network supported early habitation and sustained agricultural development along the river corridors. Consequently, major settlements, transport alignments and economic activities evolved in close association with the Cauvery and its distributaries. Linear village patterns, tank-based agrarian systems and the historic urban core of Tiruchirappalli reflect a long-standing integration of water management practices with land use and settlement morphology shaped by this riverine landscape. This historic dependency underscores the centrality of river-based planning in shaping future urban growth trajectories and land-use strategies within the LPA.

From an ecological and risk perspective, the Cauvery–Kollidam system functions simultaneously as a life-supporting resource and a source of natural hazard. Floodplains, wetlands, tanks and riparian zones provide critical ecosystem services, including groundwater recharge, flood attenuation, biodiversity support and local microclimate regulation. At the same time, unregulated urban expansion into active and historical floodplains, encroachment of natural drains and the progressive loss of flood storage areas have significantly increased exposure to flooding, chronic waterlogging, infrastructure damage, and socio-economic vulnerability. Recognising the river and its floodplains as dynamic systems rather than static land parcels is therefore essential for sustainable urban planning, necessitating floodplain protection, restoration of natural drainage and tank networks, and the adoption of water-sensitive urban development practices to enhance ecological resilience, safeguard flood storage functions, and reduce long-term disaster.




*Map 6.1 Natural Setting and Physical Features of Tiruchirappalli LPA*

## 6.2 Climate

The climate of the Tiruchirappalli LPA is governed by temperature, rainfall, and wind regimes, whose long-term variations provide critical insights into climatic trends, variability, and the frequency of extreme events. In this section, the climatic baseline of the Planning Area is assessed through the analysis of Indian Meteorological Department (IMD) data for the past 30 years (1995–2024). This section also outlines the broader climatic, ecological, and biogeographical setting of the planning area, including climate classification, agro-ecological and agro-climatic zones, biogeographic regions, and forest types, as per national and state-level standard classification systems. A systematic understanding of these components is essential for environmental appraisal, spatial planning, climate risk assessment, and climate-resilient urban development.

**Climatic Zone:** Tiruchirappalli experiences a tropical climate, characterised by high temperatures and pronounced seasonal rainfall. According to the Köppen–Geiger climate classification, Tiruchirappalli falls under the Aw (tropical savanna) climate type, typified by hot conditions and a distinct dry winter season. This "dry winter" characteristic implies prolonged dry spells, making the city heavily reliant on the Northeast Monsoon (October–December) for the majority of its annual rainfall.

**Agro-Climatic Zone:** Tiruchirappalli falls within the Cauvery Delta Zone (CDZ) of Tamil Nadu. The zone receives a mean annual rainfall of approximately 984 mm, of which over 50% is contributed by the Northeast Monsoon. The region supports intensive agriculture, with rice as the predominant crop, along with significant cultivation of sugarcane, banana, and other irrigated crops.

**Agro-Ecological Zone:** Tiruchirappalli is located within the Eastern Coastal Plains agro-ecological region, classified as hot sub-humid to semi-arid, characterised by coastal alluvium-derived soils. The length of the growing period varies widely from 90 to over 210 days, depending on monsoonal performance and irrigation availability.

**Bio-Geographic Zone:** The region falls within the Deccan Peninsula biogeographic zone, situated in the rain-shadow region of the Western Ghats, which influences its rainfall distribution, vegetation patterns, and hydrological regime.

### 6.2.1 Temperature

The long-term temperature trend indicates a statistically significant warming trend of approximately 0.2°C over the past three decades, as shown in Figure 6.1. The highest annual average temperature recorded during this period is 28.28°C, while the lowest annual average temperature is 26.82°C, reflecting a steady warming tendency.

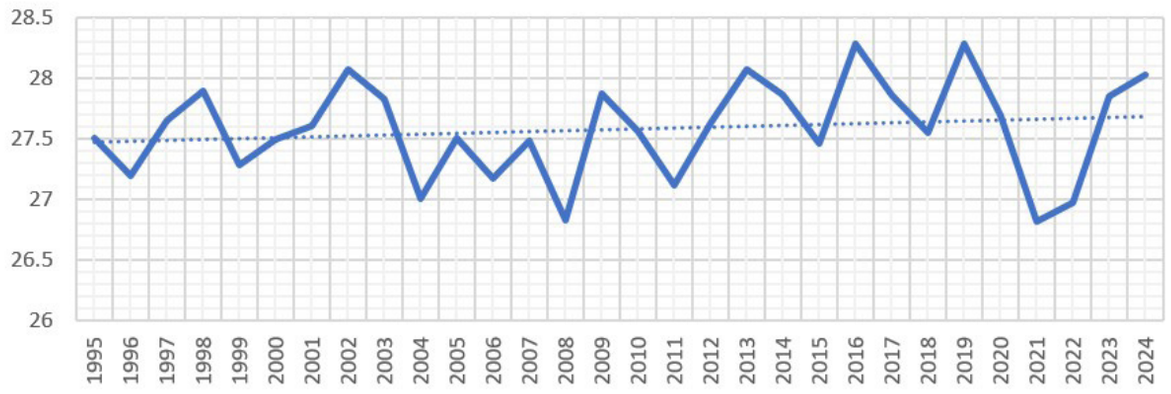



*Figure 6.1.Annual Average Temperature (1995-2024)*

*Source: DTCP, TN*

In 2024, the average annual mean maximum temperature of the LPA was 33.66°C, while the average annual mean minimum temperature was 24.62°C. April emerged as the hottest month, with average maximum temperatures reaching 38.80°C, whereas January was the coolest month, with temperatures dropping to around 21°C. As per the Tiruchirappalli Climate Action Plan (IMD, 1981–2023), May is the hottest month, with average maximum temperatures reaching 42.25°C, while December is the coolest month, with mean temperatures around 24.8°C. Elevated land surface temperatures are particularly observed in densely built-up urban areas with high impervious surface cover, limited green cover, and degraded riparian buffers, intensifying local heat stress.

*Table 6.1 Temperature trend based on IMD*

| Indicator (1981-2023) | Trend |
|---|---|
| Change in Maximum Temperature | + 0.07°C |
| Change in Average Temperature | + 0.016°C |
| Change in Minimum Temperature | + 0.06°C |
| Change in number of hot days | + 21 days (1969-2023) |
| Change in number of hot nights | + 22 days (1969-2023) |
| Number of Heatwave days | 14 heatwave events (1969-2023) |

*Source: Tiruchirappalli Climate Resilient City Action Plan- Towards a net zero future*

### 6.2.2 Temperature Projections

The assessment of future temperature trends for the Tiruchirappalli LPA is based on projections derived from the Net Zero Climate Action Plan for Tiruchirappalli, which utilises climate model outputs under the Shared Socioeconomic Pathway (SSP) framework.

*Table 6.2 Projected Increase in Annual Average Minimum and Maximum Temperature*

| Projection Period | SSP2 4.5 Scenario | SSP5 8.5 Scenario |
|---|---|---|
| **Increase in Annual Average Minimum Temperature (Degree Celsius)** | | |
| Near Century (2020-2046) | 0.3 | 0.5 |
| Mid Century (2047- 2073) | 1.1 | 1.7 |
| End Century (2074-2100) | 1.6 | 3.3 |
| **Increase in Annual Average Maximum Temperature (Degree Celsius)** | | |
| Near Century (2020-2046) | 0.7 | 0.9 |
| Mid Century (2047- 2073) | 1.4 | 2.3 |
| End Century (2074-2100) | 2.0 | 4.3 |

*Source: Tiruchirappalli Climate Resilient City Action Plan- Towards a net zero future*

Temperature projections indicate a consistent and progressive increase in both annual average minimum and maximum temperatures throughout the 21st century. During the near-century period (2020–2046), which closely aligns with the Master Plan horizon year of 2045, the Tiruchirappalli LPA is projected to experience increases of 0.3–0.5°C in minimum temperatures and 0.7–0.9°C in maximum temperatures. This early-stage warming is expected to cause warmer nights, intensified daytime heat stress, and gradual strengthening of the urban heat island effect, particularly in dense urban zones.

By the mid-century period (2047–2073), increases rise substantially, indicating a marked escalation in daytime and nocturnal thermal stress, while end-century projections suggest severe heat stress conditions under high-emissions pathways. In the context of the Tiruchirappalli Master Plan 2045, these projections highlight the urgent need for heat-resilient urban design, green–blue infrastructure expansion, climate-sensitive building regulations, ventilation corridors, shaded public spaces, and cool material applications to enhance thermal comfort, public health resilience, and long-term urban sustainability.

### 6.2.3 Rainfall and Variability

Tiruchirappalli receives the majority of its rainfall from the Northeast Monsoon (October–December), with comparatively lower contributions from the Southwest Monsoon (June–September). Rainfall exhibits pronounced seasonal and inter-annual variability, with February being the driest month (approximately 12 mm) and November the wettest month (up to 182 mm), reflecting strong seasonal concentration and increasing temporal variability.

The wet season extends for about 3.6 months, from late August to early December, with October averaging 12.8 rainy days, while the dry season spans the remaining 8.4 months. The average annual rainfall (1995–2024) is 976.38 mm, with extreme inter-annual variability, ranging from 2223.97 mm in 2011 to 280.66 mm in 2002. Intense rainfall events during the Northeast Monsoon significantly influence river discharge, tank filling, and flood occurrences within the LPA.

Decadal rainfall analysis indicates increasing variability, spatial concentration, and short-duration high-intensity rainfall events, particularly in recent years. These patterns significantly elevate urban flood risks, surface runoff, and pressure on stormwater drainage systems, especially within densely built-up areas characterised by high impervious cover. This trend necessitates a shift from conventional drainage planning towards integrated urban flood risk management.

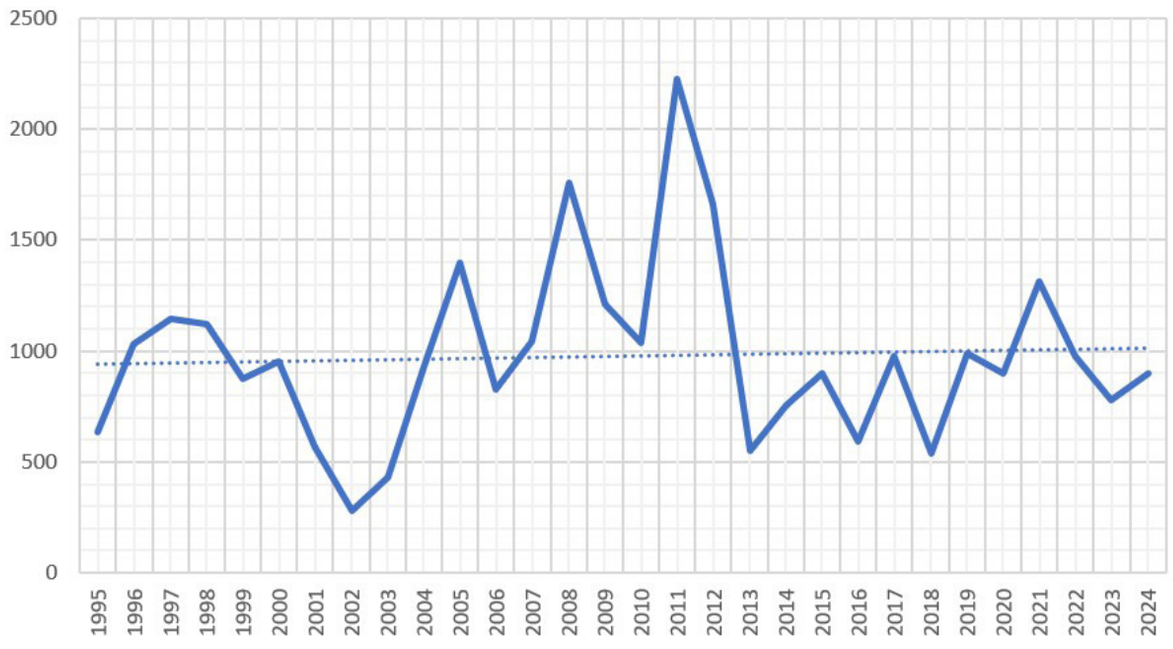
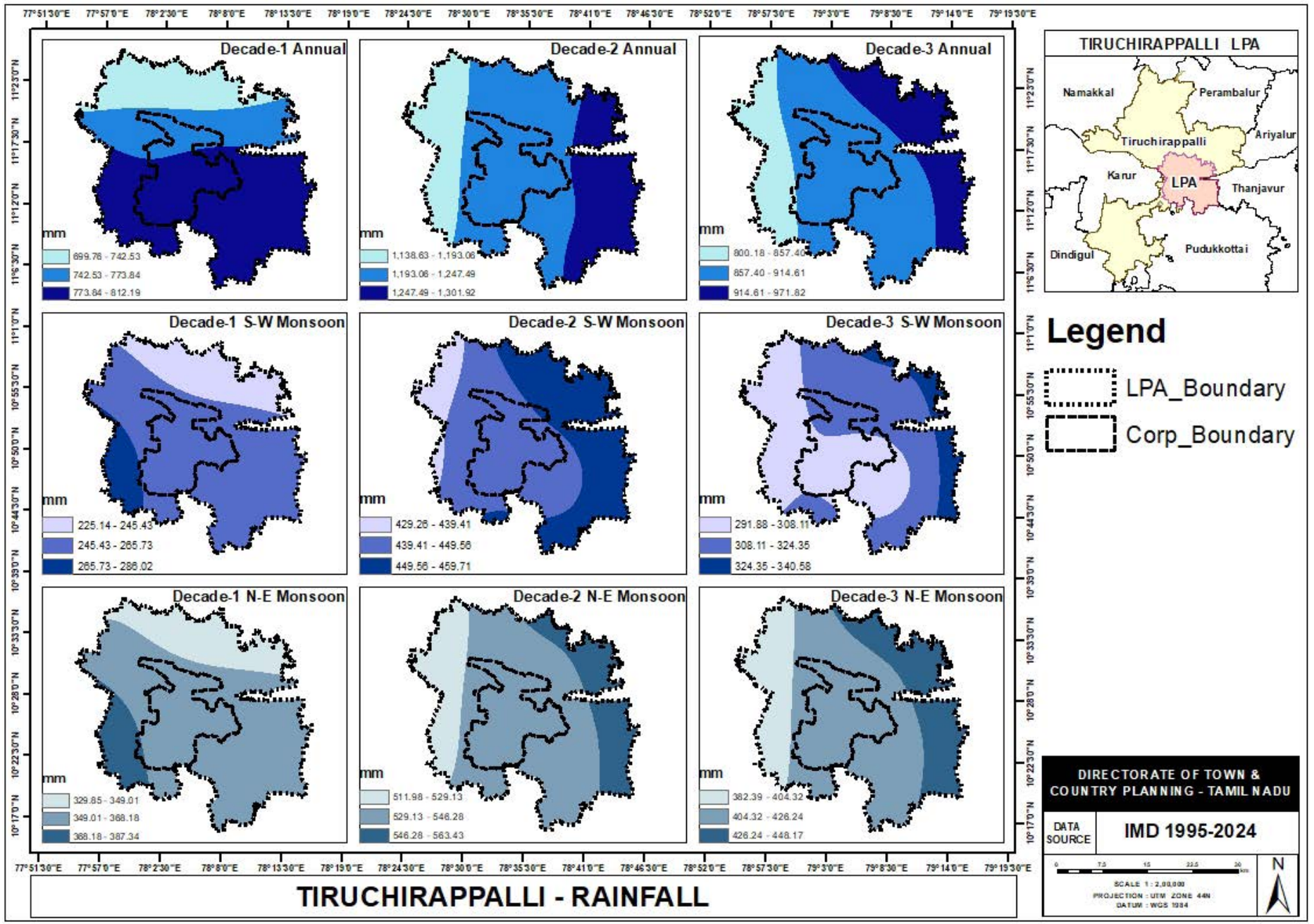



*Figure 6.2 Annual Rainfall (1995-2024)*

*Source: DTCP, TN*




*Map 6.2 Rainfall Distribution*

### 6.2.4 Rainfall Projections

Rainfall projections for the Tiruchirappalli LPA, derived from the Net Zero Climate Action Plan for Tiruchirappalli, indicate a progressive increase in annual rainfall under the SSP2–4.5 scenario.

*Table 6.3 Projected Increase in Rainfall (SSP2 4.5 Scenario)*

| Increase in Rainfall according to SSP2 4.5 scenario | | |
|---|---|---|
| **2020-2046** | **2047-2073** | **2074-2100** |
| 6.3 | 13.6 | 21.9 |

*Source: Tiruchirappalli Climate Resilient City Action Plan- Towards a net zero future*

The projected 6.3% increase during 2020–2046, aligning with the Master Plan horizon year of 2045, suggests that measurable intensification of monsoonal rainfall will occur within the planning period itself. While this may enhance surface water availability, groundwater recharge, and agricultural water security, it also raises significant concerns related to urban flooding, drainage system overload, infrastructure resilience, and settlement safety.

These projections highlight the necessity of integrating water-sensitive and flood-resilient planning strategies into statutory zoning regulations, infrastructure planning, and development control mechanisms. Key interventions include stormwater drainage upgrading, protection and restoration of tanks and floodplains, enhanced rainwater harvesting, aquifer recharge, green–blue infrastructure expansion, and permeable surface treatments. These measures are critical for aligning spatial development patterns with evolving hydro-climatic risks under the Master Plan 2045 framework.

### 6.2.5 Wind Characteristics

Wind rose analysis indicates that prevailing winds are predominantly from the west (W), followed by west–northwest (WNW) and northwest (NW) directions. Wind speeds are largely moderate, with 10–20 km/h being the most frequent range. The average wind speed at 50 m height for the period 1995–2024 is 5.39 m/s, with a recorded maximum of 8.95 m/s in July 2013. At 10 m height, the average wind speed is 3.79 m/s, with a peak of 6.97 m/s, also recorded in July 2013. These wind characteristics have important implications for urban ventilation corridors, dispersion of air pollutants, thermal comfort, and renewable energy potential.

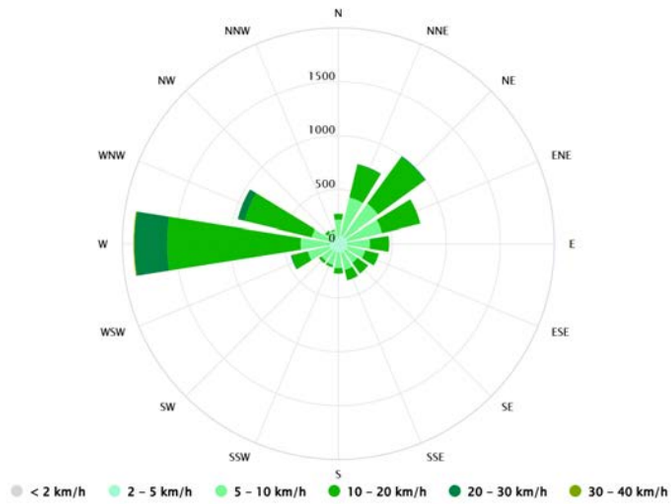



*Figure 6.3 Windrose Chart of Tiruchirappalli*

*Source: Meteoblue*

### 6.2.6 Relative Humidity

Long-term analysis indicates a moderate increasing trend in relative humidity, with average values ranging between 65–70%. The mean relative humidity (1995–2024) is 68.94%, with extremes ranging from 49.68% (April 2017) to 91% (November 2021). High humidity levels during monsoon months significantly reduce thermal comfort, particularly when combined with rising temperatures. Compared with ASHRAE, WHO, and ISO comfort standards, which recommend relative humidity ranges of 30–60%, Tiruchirappalli exceeds comfort thresholds for much of the year, indicating persistent thermal discomfort, elevated heat stress exposure, and reduced outdoor liveability.

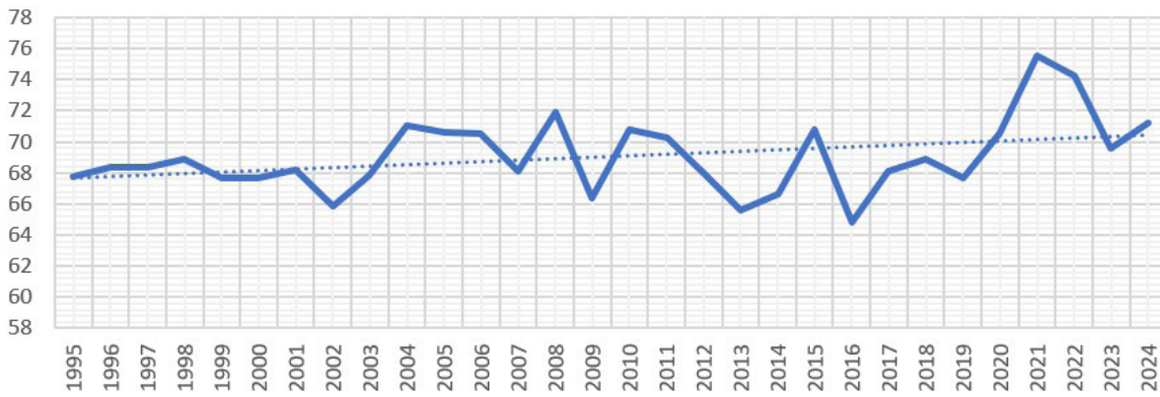



*Figure 6.4 Annual Relative Humidity of Tiruchirappalli*

*Source: DTCP, TN*

### 6.2.7 Seasonal and Monsoon Behaviour

The climate of Tiruchirappalli is strongly governed by seasonal and monsoonal dynamics, with the Northeast Monsoon playing a dominant role in water availability, agriculture, and hydrological processes. Increasing variability and intensification of short-duration rainfall events have heightened urban flood risks, underscoring the need for climate-responsive urban planning, flood-resilient infrastructure, and integrated water resource management.

## 6.3. Land Environment

This section presents a comprehensive overview of the land environment of the Tiruchirappalli LPA, focusing on its physical, topographic, geological and geomorphological characteristics. It examines elevation, slope and terrain patterns, which influence drainage behaviour, land suitability, hazard exposure and development potential within the LPA. The chapter further addresses geology, lithology, geomorphology and soil characteristics, which together define the region's structural framework, landform evolution and environmental constraints. Collectively, these components provide an integrated understanding of the land environment that underpins risk-sensitive, resource-efficient and climate-resilient spatial planning, zoning and development regulation under the Tiruchirappalli Master Plan 2045.

### 6.3.1 Landforms, Elevation, and Terrain

The Tiruchirappalli LPA is predominantly characterised by a gently sloping plain draining towards the Cauvery River system, with localized elevated pockets in the southern and western parts influencing drainage patterns, land suitability and development. The terrain generally slopes towards the Cauvery and Kollidam river plains, forming extensive low-gradient floodplains interspersed with isolated rocky uplands.

The elevation and contour characteristics of the Tiruchirappalli LPA, as shown in Map 6.3 indicate a moderate range of elevations, ranging from approximately 42 m to 119 m above mean sea level. The lowest elevation zones (42–66 m) are predominantly observed along the Cauvery River corridor and its adjoining floodplain areas, particularly across the central and eastern portions of the LPA. These areas are largely flat and low-lying, making them favourable for agriculture and urban development, while also rendering them more susceptible to flooding and waterlogging.

Moderate elevation zones, ranging from 66 m to 82 m, are widely distributed across the northern and central parts of the LPA. These areas form gently undulating plains that offer relatively stable terrain conditions and constitute the primary zones for urban expansion and mixed land uses. Higher elevation

areas, ranging from 82 m to above 91 m, are mainly concentrated in the southern and south-western parts of the LPA, particularly towards the boundary with Pudukkottai District. These zones represent slightly elevated and rolling terrain associated with hard rock formations.

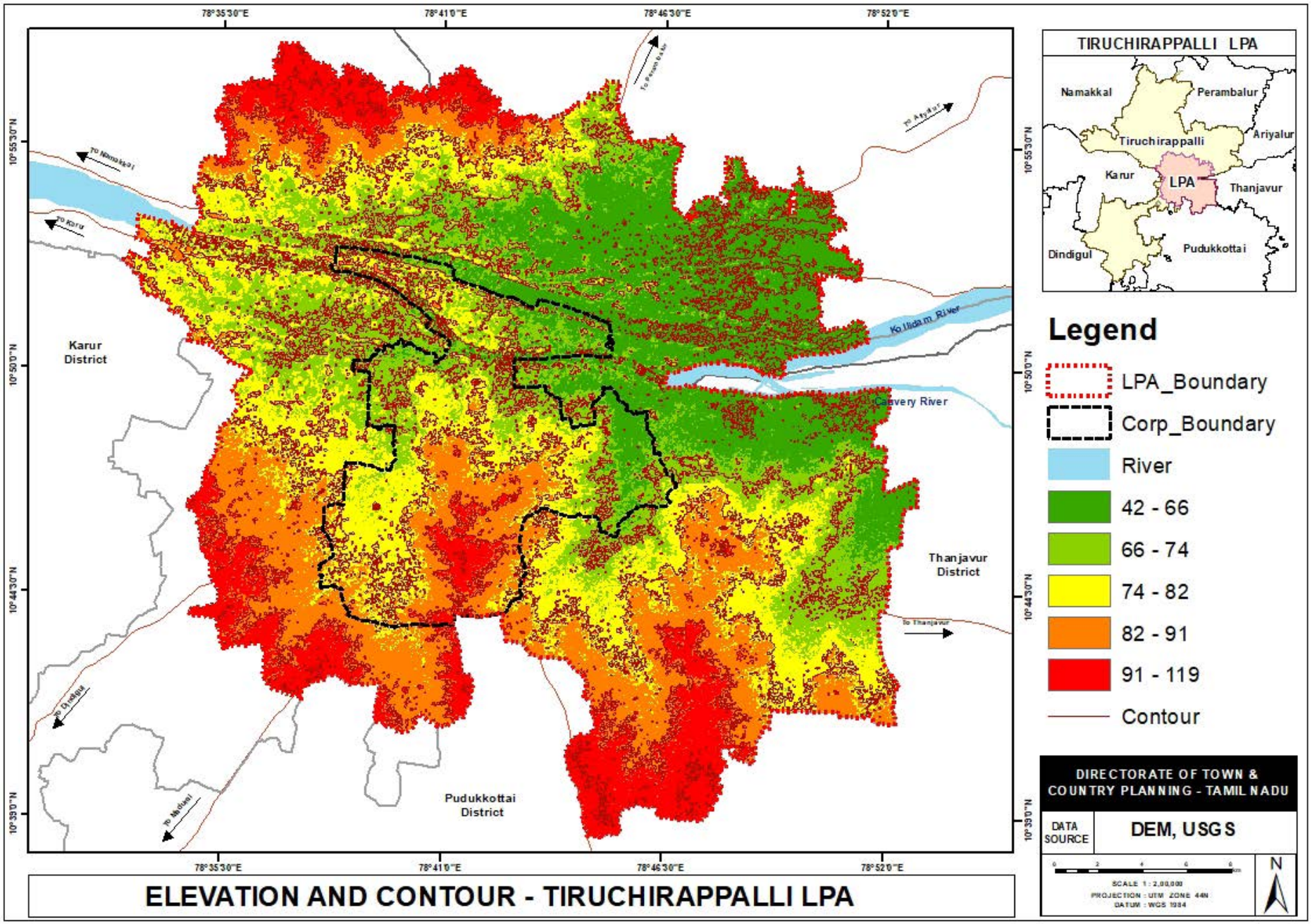
Within this predominantly plain landscape, Rockfort Hill (Malaikottai) emerges as a prominent and isolated high-elevation feature, characterised by closely spaced contours and a steep rise above the surrounding terrain. It represents one of the most significant topographic landmarks within the Tiruchirappalli LPA and plays an important role in local drainage and urban morphology.

### 6.3.2 Slope

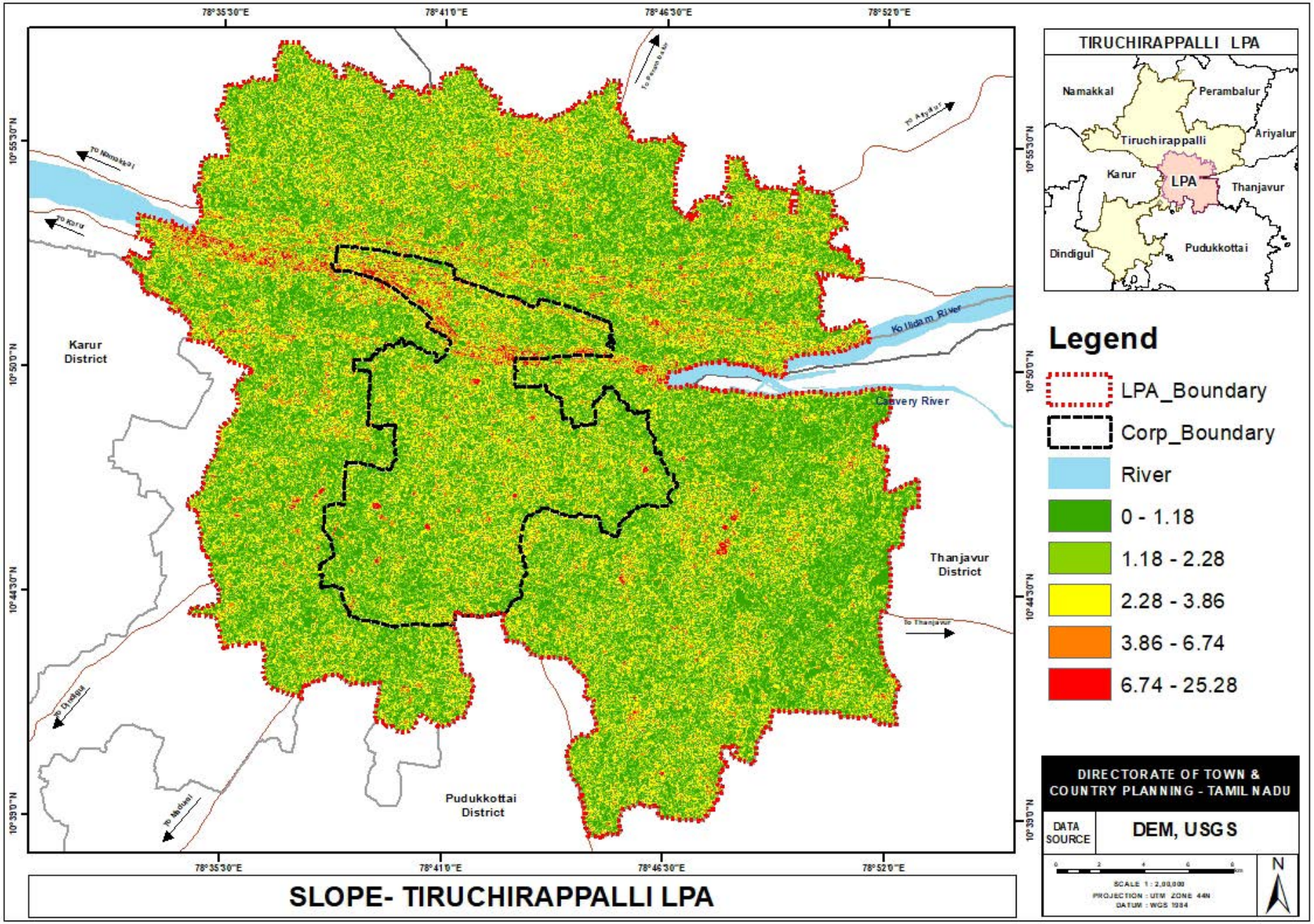
The slope characteristics of the Tiruchirappalli LPA, as shown in Map 6.4, indicate that the region is predominantly characterised by very gentle to gentle slopes, reflecting its largely plain topography. A major portion of the LPA falls within the 0–1.2% slope category, particularly along the Cauvery River basin and central areas, indicating nearly level terrain that is highly conducive for urban development and agricultural activities.

Areas with slopes ranging between 1.2% and 3.9% are widely distributed across the LPA and represent gently undulating surfaces. These zones generally offer favourable conditions for development, subject to appropriate drainage management.

Relatively steeper slopes, ranging from approximately 3.9% to above 6.7%, are limited in extent and occur as localized patches, primarily in the southern and south-western parts of the LPA and around isolated rocky outcrops associated with elevated terrain and tank systems. These steeper areas correspond to higher elevations, exhibit increased surface runoff potential and present constraints for intensive urban development, requiring careful planning, slope-sensitive zoning, appropriate drainage design, and construction regulation.




*Map 6.3 Elevation and Contour Map of Tiruchirappalli LPA*




*Map 6.4 Slope Map of Tiruchirappalli LPA*

### 6.3.3 Geology

The geology of the Tiruchirappalli LPA is characterised by a combination of ancient crystalline basement rocks and younger fluvial deposits, reflecting long-term geological evolution and ongoing riverine processes (Map 6.5). The regional geological framework is dominated by an Archaean crystalline complex, primarily composed of migmatite, which forms the stable basement across much of the inland and southern parts of the LPA. This Precambrian foundation is intersected by a prominent west–east trending belt of active fluvial deposits associated with the Cauvery and Kollidam river systems, representing zones of recent sediment accumulation and ongoing geomorphological activity.

A significant portion of the LPA, particularly across the central belt along the Cauvery River corridor, is underlain by active fluvial deposits comprising recent alluvium. These sediments create flat and fertile floodplains that support intensive agriculture and high groundwater recharge potential. At the same time, these areas remain inherently prone to flooding, bank erosion, and seasonal waterlogging, necessitating careful land-use planning, flood-resilient development strategies, and infrastructure design controls.

The southern and peripheral zones of the LPA are largely underlain by migmatite, representing highly metamorphosed crystalline rocks that provide structural stability and suitable foundation conditions for urban and infrastructure development. Charnockite occurs as prominent lenses and rocky outcrops, particularly in the southern and south-eastern sectors, often associated with slightly elevated terrain. Limited occurrences of khondalite are observed in the northern portions of the LPA. Together, these units form a stable hard-rock terrain with low primary porosity, where groundwater availability is controlled by weathered zones and fracture networks.

Overall, the geological framework of the Tiruchirappalli LPA reflects a structurally stable Precambrian basement interspersed with dynamic fluvial corridors, significantly influencing land suitability, groundwater potential, construction practices, flood risk, and long-term urban development planning.

### Manachanallur Taluk

Manachanallur Taluk is characterised by a combination of migmatite in its northern and central parts and a distinct belt of active fluvial deposits along its southern boundary, adjacent to the Cauvery–Kollidam river system. The fluvial zone supports fertile soils and high groundwater recharge but is also susceptible to flooding, while the hard-rock terrain provides relatively stable ground conditions.

### Lalgudi Taluk

Lalgudi Taluk exhibits a bimodal geological character, with migmatite dominating the northern portion and a significant southern belt of active fluvial deposits tracing the river corridor. This configuration supports intensive agriculture and high aquifer productivity in the fluvial areas, alongside more stable land conditions in the hard-rock zones.

### Srirangam Taluk

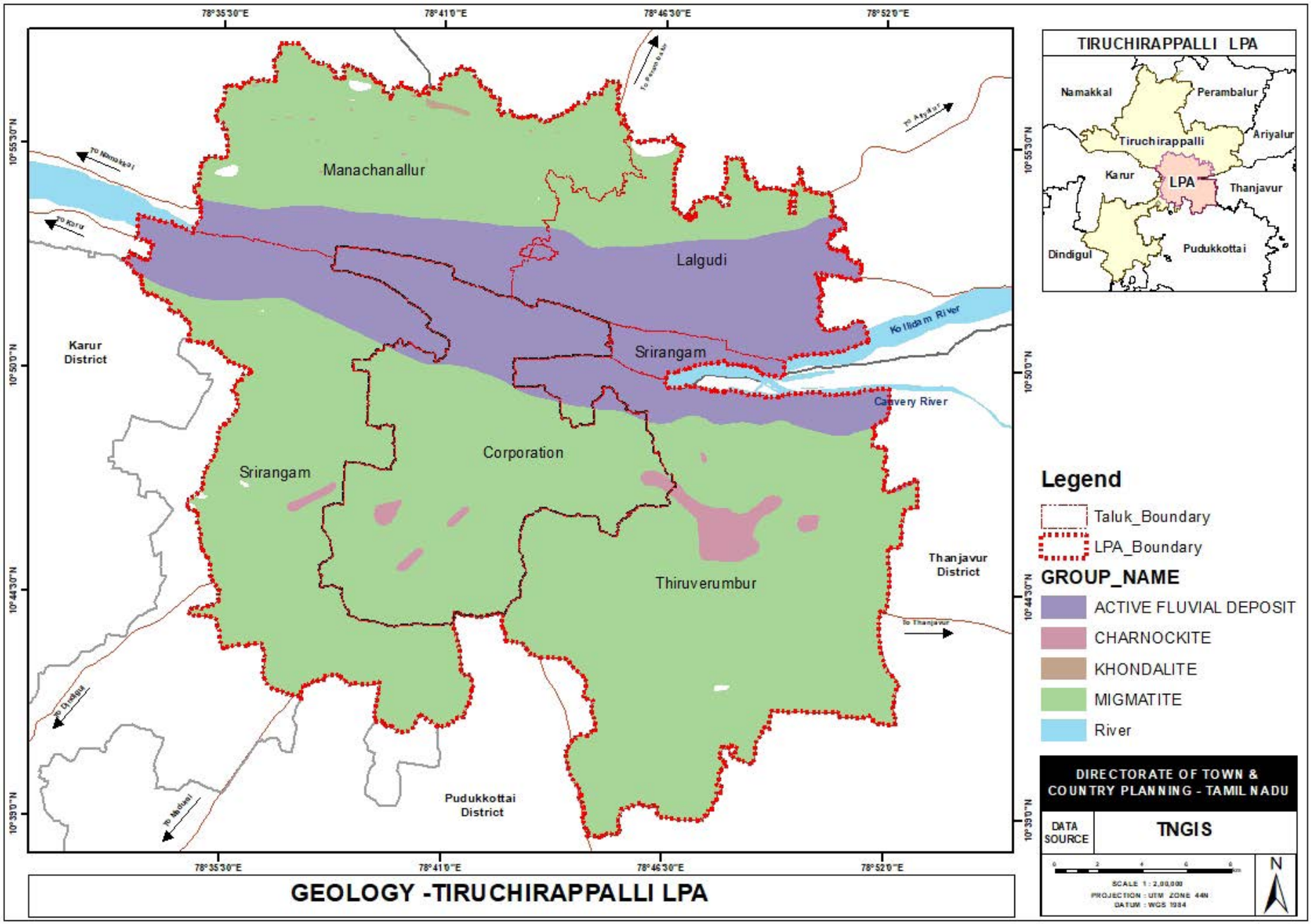
Srirangam Taluk is predominantly underlain by active fluvial deposits, particularly in its central portion situated between the Cauvery and Kollidam rivers. The western and southern extremities gradually transition into migmatite terrain. The taluk's geology reflects intense riverine influence, high groundwater availability, and high exposure to flooding and channel migration.

### Thiruverumbur Taluk

Thiruverumbur Taluk is largely dominated by migmatite, forming part of the southern crystalline basement terrain. It contains the most prominent exposures of charnockite in the LPA, occurring as large lenses in the central and south-eastern sectors. These hard-rock formations provide structurally stable ground suitable for industrial and infrastructure development, though groundwater availability is limited and fracture-dependent.

### Tiruchirappalli Corporation Area

The Tiruchirappalli Corporation area is primarily underlain by migmatite across its central and southern zones, offering stable foundation conditions for dense urban development. The northern fringe is characterised by active fluvial deposits, reflecting proximity to the river system, along with small isolated charnockite outcrops. This geological diversity necessitates differentiated planning approaches, balancing structural stability, flood risk management, and groundwater sustainability.




*Map 6.5 Geology Map of Tiruchirappalli LPA*

### 6.3.4 Lithology

The lithology of the Tiruchirappalli LPA is dominated by Archaean crystalline rock formations, with localised occurrences of recent fluvial deposits along the Cauvery River system, as shown in Map 6.6 Lithology Map of Tiruchirappalli LPA. These rock types reflect a complex geological history and exert strong control over landform development, groundwater occurrence, construction suitability, and long-term urban growth patterns within the LPA.

A major portion of the LPA is underlain by amphibolite and biotite gneiss, forming the regional basement rocks. These units are hard, compact, and structurally stable, commonly exhibiting foliation and jointing, and provide favourable conditions for large-scale infrastructure, urban development, and industrial activities. Interspersed within these are extensive bodies of acid to intermediate charnockite, particularly in the southern and western parts of the LPA, representing high-grade metamorphic rocks that contribute to elevated and undulating terrain, influencing drainage patterns, surface runoff behaviour, and site suitability for construction.

The LPA also contains granite and granite gneiss, occurring as intrusive bodies within the gneissic complex. These rocks are coarse-grained, massive, and mechanically strong, making them suitable for construction aggregates and building stone, while weathered zones over granite gneiss often act as moderate groundwater aquifers, supporting decentralised water supply systems. Patches of hornblende–biotite gneiss and calc-granulite with limestone indicate varied metamorphic conditions and further add to lithological and geotechnical diversity across the planning area.

Linear and localised occurrences of banded magnetite quartzite, quartzite, quartz veins or reefs, and pegmatite are present across the LPA. These units are structurally significant, often forming resistant ridges and locally influencing drainage alignments and surface morphology. Pegmatites and quartz veins also indicate late-stage intrusive activity and locally influence groundwater movement and rock weathering characteristics. Along the Cauvery River and its distributaries, black silty clay and recent alluvium representing active floodplain deposits are observed. These unconsolidated sediments are fertile and moderately to highly permeable, supporting intensive agriculture and groundwater recharge but posing constraints for dense urban development due to high compressibility and flood susceptibility.

#### Manachanallur Taluk

Manachanallur exhibits a clear lithological divide, with the northern half dominated by acid to intermediate charnockite, while the southern half is primarily composed of biotite gneiss. This transition influences variations in terrain, soil depth, groundwater potential, and construction suitability. The charnockite-dominated northern sector shows relatively shallow weathering

and lower groundwater storage, whereas the gneissic southern sector supports moderate aquifer development and relatively better suitability for agriculture and settlement expansion.

### Lalgudi Taluk

The northern parts of Lalgudi are largely underlain by biotite gneiss, providing stable ground conditions and moderate groundwater prospects. A narrow but continuous strip of black silty clay occurs along the southern river boundary, corresponding to the active floodplain of the Cauvery system. These alluvial zones support highly productive agriculture but are prone to seasonal flooding, requiring stringent development regulation and flood-compatible land-use planning.

### Srirangam Taluk

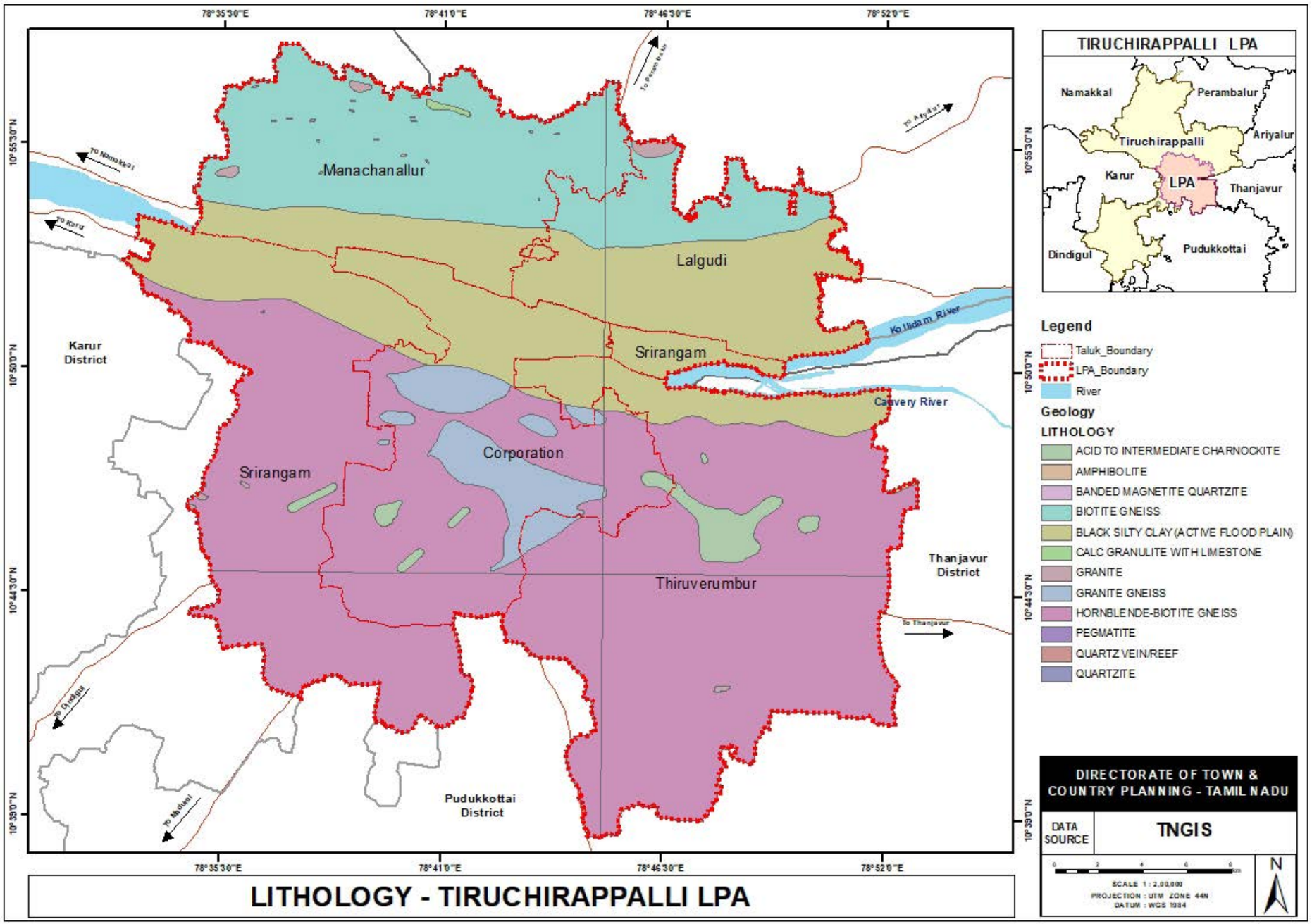
Srirangam is lithologically distinct due to its location within the Cauvery–Kollidam river bifurcation. The area is characterised by a mix of black silty clay and hornblende–biotite gneiss. The dominance of alluvial deposits explains the high groundwater availability and fertile soils, but also accounts for extreme flood susceptibility, compressibility issues, and infrastructure vulnerability, necessitating highly restrictive development controls, enhanced drainage infrastructure, and disaster-resilient planning strategies.

### Thiruverumbur Taluk

Thiruverumbur is predominantly underlain by hornblende–biotite gneiss, with distinct patches of granite gneiss and specialised deposits of calc-granulite with limestone. This lithological configuration supports stable terrain but comparatively lower groundwater storage, making surface water harvesting, tank rehabilitation, and recharge enhancement critical for sustainable water management. The presence of quarryable hard rock zones also necessitates careful regulation to balance construction material supply with environmental protection and land-use safety.

### Tiruchirappalli Corporation Area

The Corporation area exhibits a complex lithological assemblage dominated by hornblende–biotite gneiss and granite gneiss, with minor inclusions of acid to intermediate charnockite. This geological diversity translates into variable foundation conditions, groundwater availability, and construction responses across the urban fabric. The predominance of crystalline basement provides generally stable conditions for dense urban development, while localised weathered and fractured zones support groundwater extraction and supplementary urban water supply.




*Map 6.6 Lithology Map of Tiruchirappalli LPA*

### 6.3.5 Geomorphology

The geomorphology of the Tiruchirappalli LPA is predominantly shaped by the long-term interaction between the Cauvery river system and regional denudational processes, resulting in a diverse assemblage of fluvial and denudational landforms (Map 6.7). The landscape reflects a transition from older erosional surfaces to younger depositional plains, highlighting the dynamic geomorphic evolution of the region and its strong linkage with hydrological processes.

The most prominent geomorphic feature within the LPA is the Active Flood Plain associated with the Cauvery River and its distributaries. These low-lying, flat tracts comprise recent alluvial deposits and form a continuous fluvial corridor across the central parts of the LPA. Characterised by high soil fertility, shallow groundwater conditions, and extensive irrigation networks, these zones support intensive agriculture and urban-rural settlement. Simultaneously, their geomorphic position within active river corridors renders them highly susceptible to seasonal flooding, erosion, and sediment deposition, necessitating careful floodplain management within a risk-sensitive and climate-resilient planning framework.

Adjacent to the active floodplains are extensive Older Flood Plains, representing abandoned river courses and earlier phases of fluvial deposition. These surfaces are comparatively more stable, gently sloping, and widely utilised for agriculture and urban development. Their moderate elevation and better drainage conditions provide relatively safer locations for settlements, although residual flood risk persists during extreme rainfall events.

Large parts of the LPA, particularly across the southern and peripheral tracts, are dominated by the Pediment–Pediplain Complex, formed through prolonged weathering and erosion of the underlying crystalline basement. This geomorphic unit is characterised by gently undulating terrain, isolated rocky outcrops, shallow depressions, and thin soil cover, indicative of an advanced stage of landscape evolution. The pediplain areas exhibit comparatively lower natural groundwater potential, making surface water harvesting structures such as tanks and ponds critical for water availability. The high density of ponds, particularly in the southeastern sector, indicates both natural depressional features and long-standing human interventions aimed at enhancing surface water storage and groundwater recharge.

Localised geomorphic modifications are evident in the form of active and abandoned quarry zones, especially within the pediplain areas underlain by hard rock. These anthropogenic landforms alter local topography, drainage behaviour, and micro-hydrological conditions, and require careful regulation due to their environmental, hydrological, and safety implications.

Overall, the geomorphology of the Tiruchirappalli LPA reflects a structurally stable cratonic landscape strongly influenced by fluvial dynamics and long-term erosional processes. This geomorphic framework plays a critical role in determining land suitability, groundwater potential, flood vulnerability, infrastructure feasibility and patterns of urban expansion, forming a key foundation for environmentally responsive and climate-resilient planning.

### Manachanallur Taluk

The northern part of the taluk is dominated by the Pediment–Pediplain Complex, which gradually transitions southwards into Older Flood Plain and subsequently into Active Flood Plain along the Cauvery river corridor. This geomorphic gradient reflects a shift from stable erosional surfaces to dynamic depositional environments, influencing land-use suitability, agricultural productivity, and flood risk patterns.

### Lalgudi Taluk

Lalgudi exhibits a geomorphic configuration similar to Manachanallur, with Pediment–Pediplain Complex occupying the northern sectors and extensive belts of Older and Active Flood Plains across the southern half. These fluvial tracts form a highly productive agricultural zone but are also vulnerable to monsoonal flooding and riverine inundation.

### Srirangam Taluk

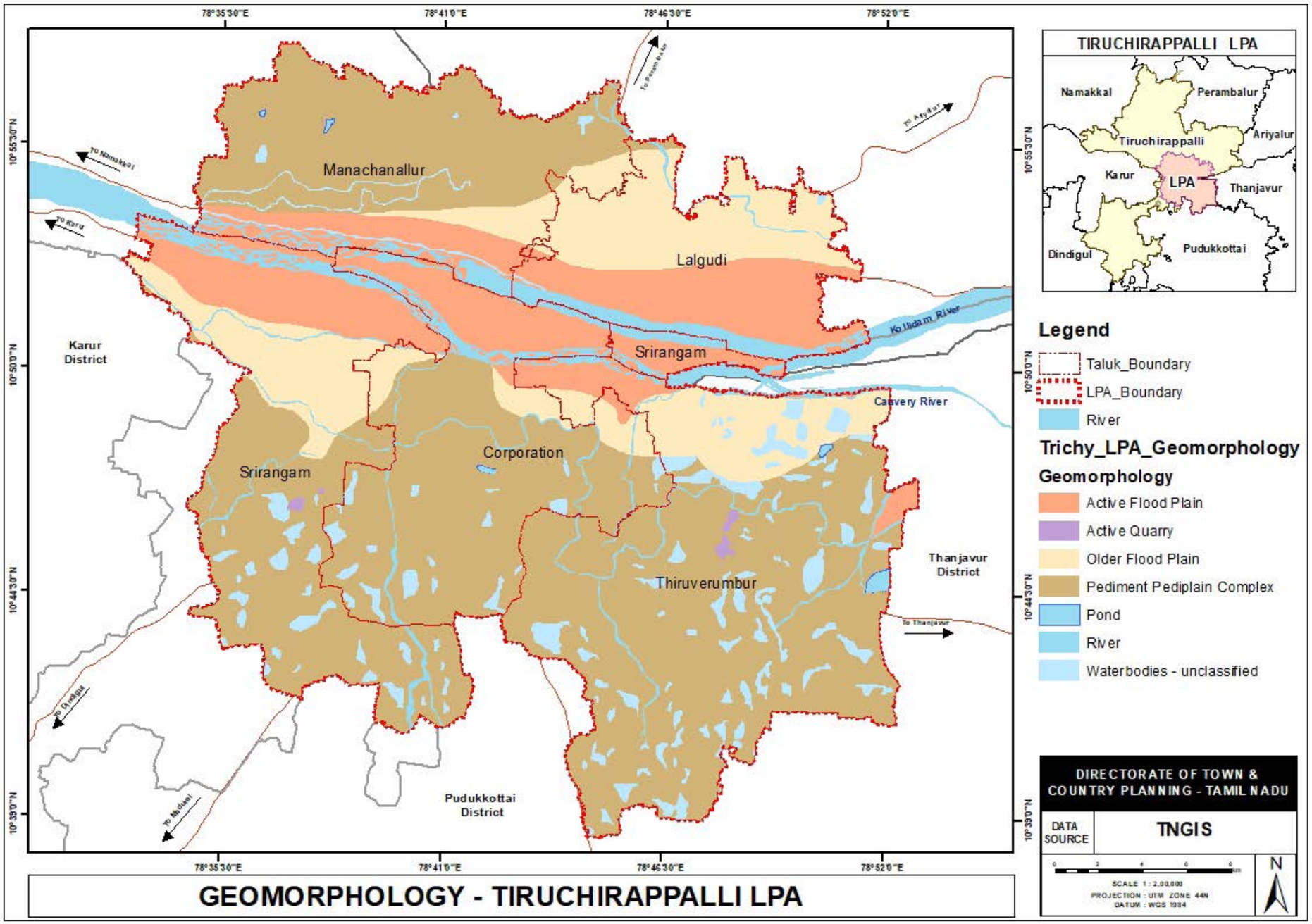
Srirangam is overwhelmingly dominated by riverine landforms, comprising almost entirely Active and Older Flood Plains. Enclosed between the Cauvery and Kollidam rivers, this taluk represents the most dynamic fluvial environment within the LPA, characterised by high groundwater potential, fertile soils, and extremely high flood susceptibility.

### Thiruverumbur Taluk

This taluk is almost entirely underlain by the Pediment–Pediplain Complex and is notable for its very high density of ponds and presence of active quarry zones, particularly in the eastern parts. These features significantly influence surface drainage, groundwater recharge, and land-use constraints, necessitating careful environmental and resource management.

### Tiruchirappalli Corporation Area

The northern part of the urban area lies within the Older Flood Plain, while the majority of the built-up core and southern sectors are situated on the Pediment–Pediplain Complex. This geomorphic setting explains the contrasting patterns of flood susceptibility, drainage behaviour, and construction suitability observed across different parts of the city.



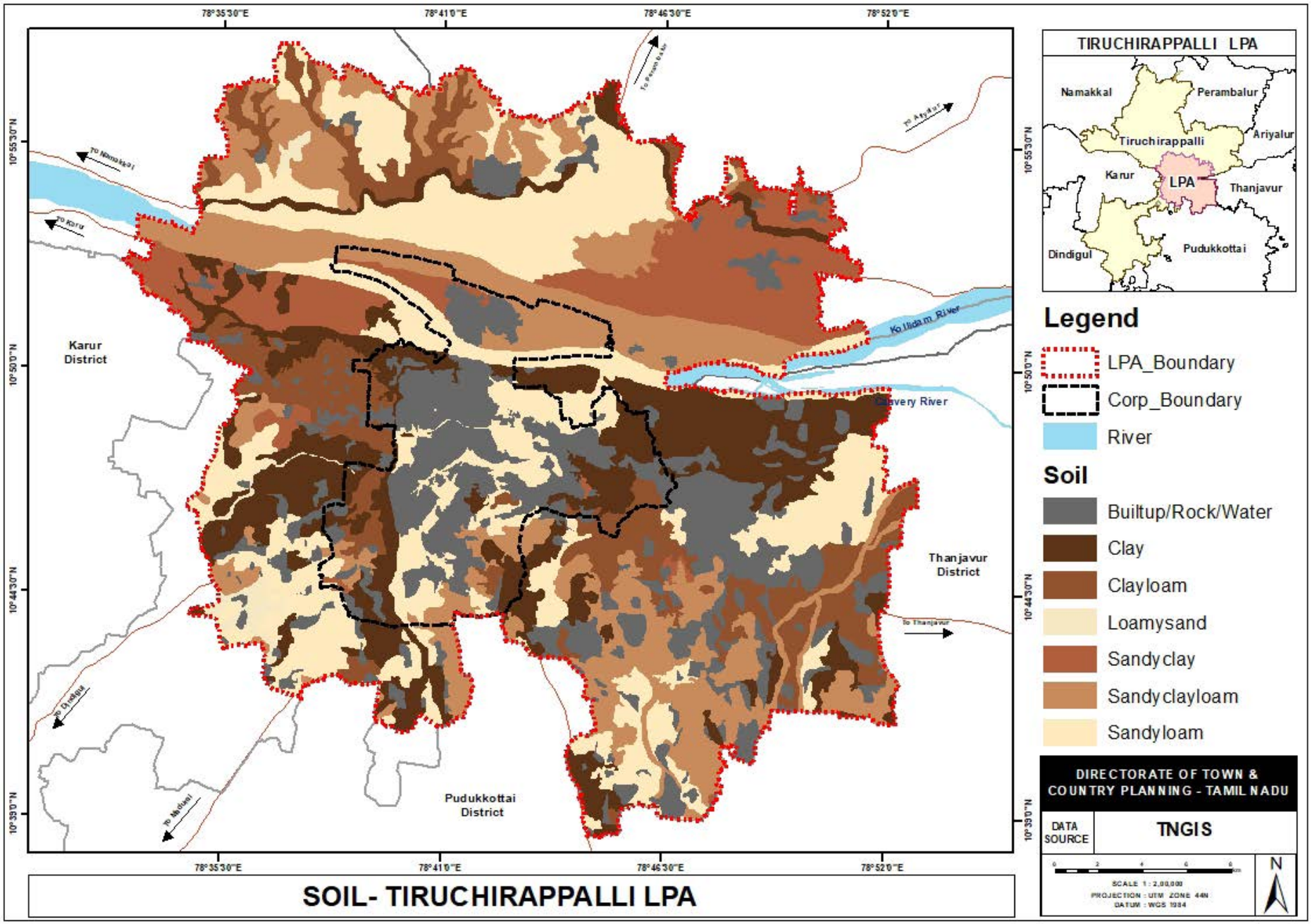

*Map 6.7 Geomorphology Map of Tiruchirappalli LPA*

### 6.3.6 Soil Types and Characteristics

The soil distribution within the Tiruchirappalli LPA plays a critical role in determining agricultural suitability, groundwater recharge potential, drainage behaviour and planning decisions related to infrastructure and land-use zoning. As shown in Map 6.8, soil characteristics exhibit considerable spatial variation, reflecting the influence of underlying geology, geomorphology and fluvial processes associated with the Cauvery River system.

The dominant soil types within the LPA include clay, clay loam, sandy clay, sandy clay loam, sandy loam and loamy sand, along with areas classified as built-up, rocky terrain and water bodies. Along the Cauvery River and its floodplain, clayey and clay loam soils are prevalent, formed from alluvial deposits. These soils are fertile and suitable for agriculture but exhibit poor drainage and higher shrink–swell behaviour, posing constraints for heavy construction, necessitating specialised foundation design, load management and land-use regulation.

The central and southern parts of the LPA are largely characterised by sandy clay loam and sandy clay soils, which offer moderate permeability and better load-bearing capacity, making them relatively favourable for urban development with appropriate foundation treatment. In the peripheral and elevated areas, particularly over crystalline rock formations, sandy loam and loamy sand soils occur; these are well drained but have lower water-holding capacity and are more prone to erosion. Scattered rocky and built-up zones indicate shallow soil depth over hard rock or extensively urbanised areas. Overall, the soil pattern reflects strong riverine influence and plays a key role in shaping land-use suitability and historical settlement patterns within the LPA.




*Map 6.8 Soil Map of Tiruchirappalli LPA*

## 6.4 Mining and Quarries

This section examines the spatial distribution, mineral profile, operational status, and environmental implications of mining and quarrying activities within the Tiruchirappalli LPA and its immediate influence zones. Quarrying constitutes a significant land-use component in the district, supplying essential raw materials for construction, infrastructure development, and industrial production. At the same time, these activities exert considerable pressure on land, water, and ecological systems, necessitating careful spatial planning, zoning regulation, statutory development control, and structured post-mining land management.

The quarrying landscape of the Tiruchirappalli region is characterised by the extraction of both major and minor minerals, including limestone, rough stone, gravel, earth, colour granite, gypsum, and limekankar. Quarrying activity is spatially concentrated within Lalgudi, Manachanallur, Srirangam, and Thiruverumbur taluks, along with select peri-urban zones adjoining the Tiruchirappalli Corporation Area. This distribution reflects underlying lithological conditions, industrial demand, accessibility, and historical land-use patterns.

### 6.4.1 Spatial Distribution and Mineral Profile

Among all taluks, Lalgudi Taluk exhibits the highest concentration and diversity of quarry leases, particularly for industrial-grade limestone. Large-scale limestone mining in the Kallakudi and Kovandakurichi belts supports major cement manufacturing units, forming a regionally significant industrial employment cluster. In addition to limestone, Lalgudi also hosts extensive rough stone, gravel, gypsum, and limekankar leases, underlining its strategic importance in both industrial raw material supply and construction aggregates.

*Table 6.4 Summary of Quarry Leases by Taluk*

| Taluk / Area | Existing Leases | Abandoned Leases | Expired Leases | Primary Minerals |
|---|---|---|---|---|
| **Lalgudi** | 17 | 1 | 17 | Limestone, Rough Stone, Gravel, Gypsum, Limekankar |
| **Manachanallur** | 6 | 0 | 6 | Colour Granite, Limestone, Gravel |
| **Srirangam** | 2 | 1 | 9 | Rough Stone, Gravel, Earth, Limestone |
| **Thiruverumbur** | 1 | 4 | 5 | Rough Stone, Gravel, Earth |
| **Corporation Area** | 1 | 3 | 2 | Rough Stone |

*Source: Department of Geology & Mines, GoTN*

Manachanallur Taluk supports a mixed mineral profile, with active limestone and gravel quarries in Sanamangalam, Thiruppattur, Palaiyur, and Kariyamanickam, alongside a notable colour granite lease in Ayakudi, representing a specialised resource base. This diversity contributes both to local infrastructure demand and to high-value dimensional stone markets.

Srirangam Taluk, characterised by riverine geomorphology and alluvial terrain, exhibits limited hard-rock quarrying. Instead, it supports rough stone, gravel, earth, and minor limestone extraction, primarily in Kulathur and Mathur, with numerous expired and abandoned leases across Puliyur, Sethurapatti, Thorakudi, and Inamkulathur. These activities are closely associated with floodplain environments, raising concerns regarding geomorphic stability, floodplain integrity, and groundwater interaction.

Thiruverumbur Taluk contains predominantly gravel and rough stone quarries, concentrated in Pathalapettai, ValavanthanKottai, and Suriyur. The taluk also exhibits a high density of abandoned quarry sites, reflecting extensive past extraction associated with infrastructure development and industrial corridor expansion.

Within the Tiruchirappalli Corporation Area (Trichy West) and its immediate urban fringe, quarrying activity is limited but environmentally sensitive. Active rough stone leases are located in Pirattiyur East, while multiple abandoned and expired sites in Pirattiyur West and K.O. Abisekapuram exert a direct influence on urban drainage, slope stability, land safety, and neighbourhood environmental quality.

### 6.4.2 Operational Status and Lease Characteristics

The mining environment of the Tiruchirappalli LPA is characterised by a high number of existing, expired, and abandoned quarry leases, indicating long-term and intensive mineral extraction. Existing leases operate under statutory approvals and validity periods ranging from 1–3 years for minor minerals such as gravel and earth, to 20–30 years for major minerals including limestone and colour granite.

A substantial proportion of quarry sites across the LPA are classified as expired or abandoned, particularly in Srirangam, Thiruverumbur, and the urban fringe of Tiruchirappalli Corporation. Expired leases frequently re-enter production cycles through renewal, particularly in high-demand zones such as Pirattiyur and Kulathur, indicating continuing pressure on land resources and regulatory enforcement mechanisms. In contrast, abandoned quarries represent permanently disturbed landscapes that no longer contribute economically and require structured rehabilitation, ecological restoration, and planned post-mining land reuse.

Mining operations occur across both Patta (private) and Poramboke (government) lands. Large-scale limestone quarries in Lalgudi utilise both land categories, while rough stone and gravel quarries near urban areas are predominantly located on poramboke land. This raises important concerns regarding land-use conflicts, regulatory enforcement, safety, and long-term land stewardship.

### 6.4.3 Environmental Implications and Planning Considerations

Quarrying activities significantly influence the land environment, hydrological regime, ecological stability, and settlement safety within the Tiruchirappalli LPA. Active quarry zones modify natural landforms, generate dust and noise pollution, disrupt drainage pathways, and locally affect groundwater conditions, particularly in hard-rock terrains. In floodplain and near-river environments, gravel and earth quarrying exacerbate bank instability, erosion, and flood vulnerability.

Abandoned and expired quarries present critical environmental challenges, including open pits, slope instability, stagnant water accumulation, illegal dumping, and safety hazards, especially within urban fringe zones. These degraded landscapes also fragment ecological continuity and reduce agricultural and development potential, necessitating systematic reclamation strategies, quarry rehabilitation zoning, and integration of post-mining landscapes into the urban and ecological network.

## 6.5 Water Environment and Hydrological Systems

### 6.5.1 River System and Surface Hydrology

#### 6.5.1.1 Cauvery-Kollidam River Basin Context- Basin and Sub-Basin

The Tiruchirappalli LPA forms part of the Cauvery River Basin, one of the major inter-state river basins of southern India. While 88.34 per cent of Tiruchirappalli District falls within the Cauvery Basin, the Tiruchirappalli LPA lies entirely within this basin, specifically within the Lower Cauvery Sub-Basin. This basin-scale setting constitutes the primary hydrological framework governing surface water availability, groundwater recharge, flood risk, irrigation infrastructure and regulatory provisions within the LPA. The Cauvery River originates at Talakaveri in the Brahmagiri ranges of the Western Ghats in Kodagu District, Karnataka, at an elevation of approximately 1,341 m above mean sea level. From its source, the river flows generally east and south-east across the Deccan Plateau, traversing the states of Karnataka and Tamil Nadu, before ultimately discharging into the Bay of Bengal through an extensive deltaic system along the Tamil Nadu coast.

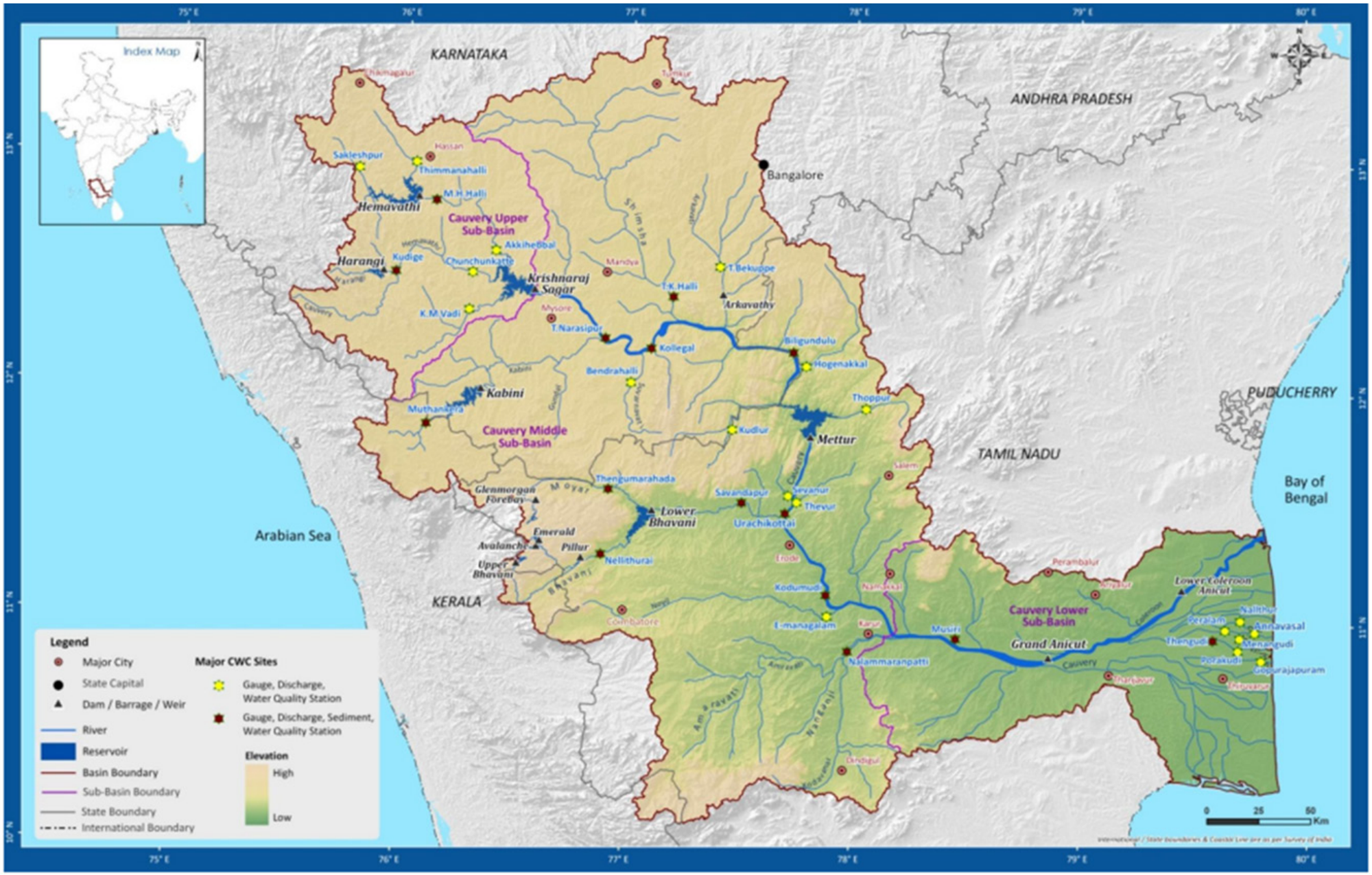
Within Tamil Nadu, the Cauvery River enters the Lower Cauvery Sub-Basin, which extends from the Upper Anaicut (Mukkombu) near Tiruchirappalli downstream to the deltaic region. The Lower Cauvery Sub-Basin represents the transition zone between the river's plateau course and its deltaic distributary system. The Tiruchirappalli LPA lies centrally within this sub-basin and is directly influenced by both upstream river regulation and downstream deltaic processes.

As the principal trunk channel within the LPA, the Cauvery River flows west to east through the central portion of the planning area, forming the primary axis of drainage, irrigation and settlement. At the Upper Anaicut (Mukkombu), located upstream of the LPA, the river bifurcates into the Cauvery and Kollidam (Coleroon) rivers, initiating the distributary system that characterises the Lower Cauvery region. This bifurcation marks a critical hydrological control point governing flow distribution, flood moderation and irrigation across the downstream reaches.

Within and around the Tiruchirappalli LPA, the Cauvery River receives inflows from several secondary sub-basins, including the Aiyar, Pungar, Koraiyar (Ariyar), and Nandhiyar–Kulaiyar systems. These tributary and sub-basin networks drain runoff from surrounding uplands and gently sloping plains, contributing seasonal flows, sediment and recharge to the main river. Collectively, they define the micro- and meso-scale drainage structure of the LPA and play a critical role in flood conveyance and groundwater replenishment.

Towards the eastern extents of the LPA, the river system progressively transitions into the Cauvery Delta Sub-Basin, characterised by a dense network of distributary channels, irrigation canals and flat alluvial terrain. This transition significantly influences land use, agricultural productivity, irrigation intensity, and flood dynamics within the eastern parts of the planning area.

Overall, the Cauvery Basin–Lower Cauvery Sub-Basin framework provides the fundamental hydrological context for the Tiruchirappalli LPA. The river's origin in the Western Ghats, its long eastward course across the plateau, and its eventual discharge into the Bay of Bengal define a highly regulated yet dynamic river system. Understanding the basin and sub-basin extents is essential for watershed-based spatial planning, flood risk zoning, groundwater protection, infrastructure siting, and sustainable water resource management within the Tiruchirappalli LPA.




*Map 6.9 Cauvery Basin and Cauvery Lower Sub-Basin*

#### 6.5.1.2 Watersheds and Micro Watersheds

Within the Lower Cauvery Sub-Basin, the Tiruchirappalli LPA is organised into multiple secondary watersheds and a dense network of micro-watersheds, reflecting variations in topography, drainage density, land use, soil characteristics, and hydrological response. As depicted in the map Map 6.10, the LPA is primarily influenced by the Aiyaar, Pungar, Nandhiyar–Kulaiyar, Ponnaniyar and Cauvery Delta watersheds, each contributing distinct runoff, recharge and flood characteristics particularly in rapidly urbanising and low-lying areas of the LPA.

##### Aiyaar Watershed

The Aiyaar watershed occupies the north-western portion of the LPA and drains towards the Cauvery–Kollidam system. This watershed receives runoff from gently undulating uplands and exhibits a moderately developed dendritic drainage pattern. Seasonal flows dominate, with channel activity intensifying during the northeast monsoon. The Aiyaar system plays an important role in conveying upstream runoff and supporting local groundwater recharge, particularly through its smaller tributaries and associated tanks.

##### Pungar Watershed

The Pungar watershed extends across the western and south-western parts of the LPA, draining towards the Cauvery River. Characterised by a mix of shallow valleys and agricultural plains, this watershed supports a network of minor streams, irrigation channels and waterbodies. The Pungar system contributes localized surface runoff and storage, and its micro-watersheds are closely linked with traditional tank-based irrigation and agricultural land use.

##### Nandhiyar–Kulaiyar Watershed

The Nandhiyar–Kulaiyar watershed dominates the northern and north-eastern sectors of the LPA. This system drains a relatively larger catchment with a higher density of first- and second-order streams, reflecting its role in collecting seasonal flows from upstream areas. The watershed is hydrologically significant for flood conveyance and groundwater recharge, particularly along its lower reaches where it interacts with the Cauvery and Kollidam river corridors.

##### Ponnaniyar Watershed

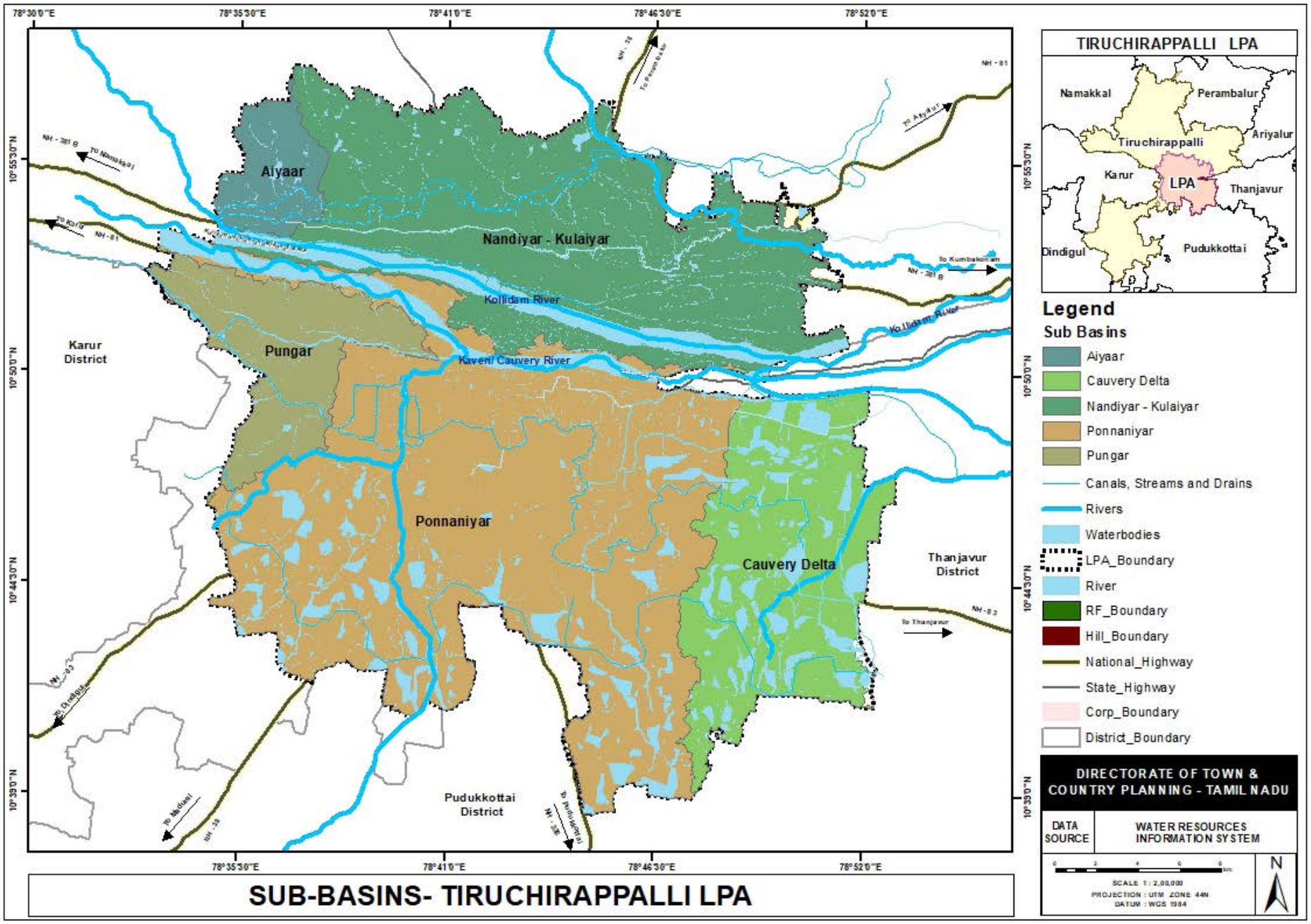
The Ponnaniyar watershed covers a substantial portion of the southern and south-central LPA, draining gently sloping terrain towards the Cauvery system. This watershed exhibits an extensive network of micro-watersheds and interconnected channels, indicating slower runoff velocities and greater opportunities for surface storage and infiltration. The Ponnaniyar system is closely associated with rural settlements, agricultural lands and tank systems, making it critical for local water security.

### Cauvery Delta Watershed

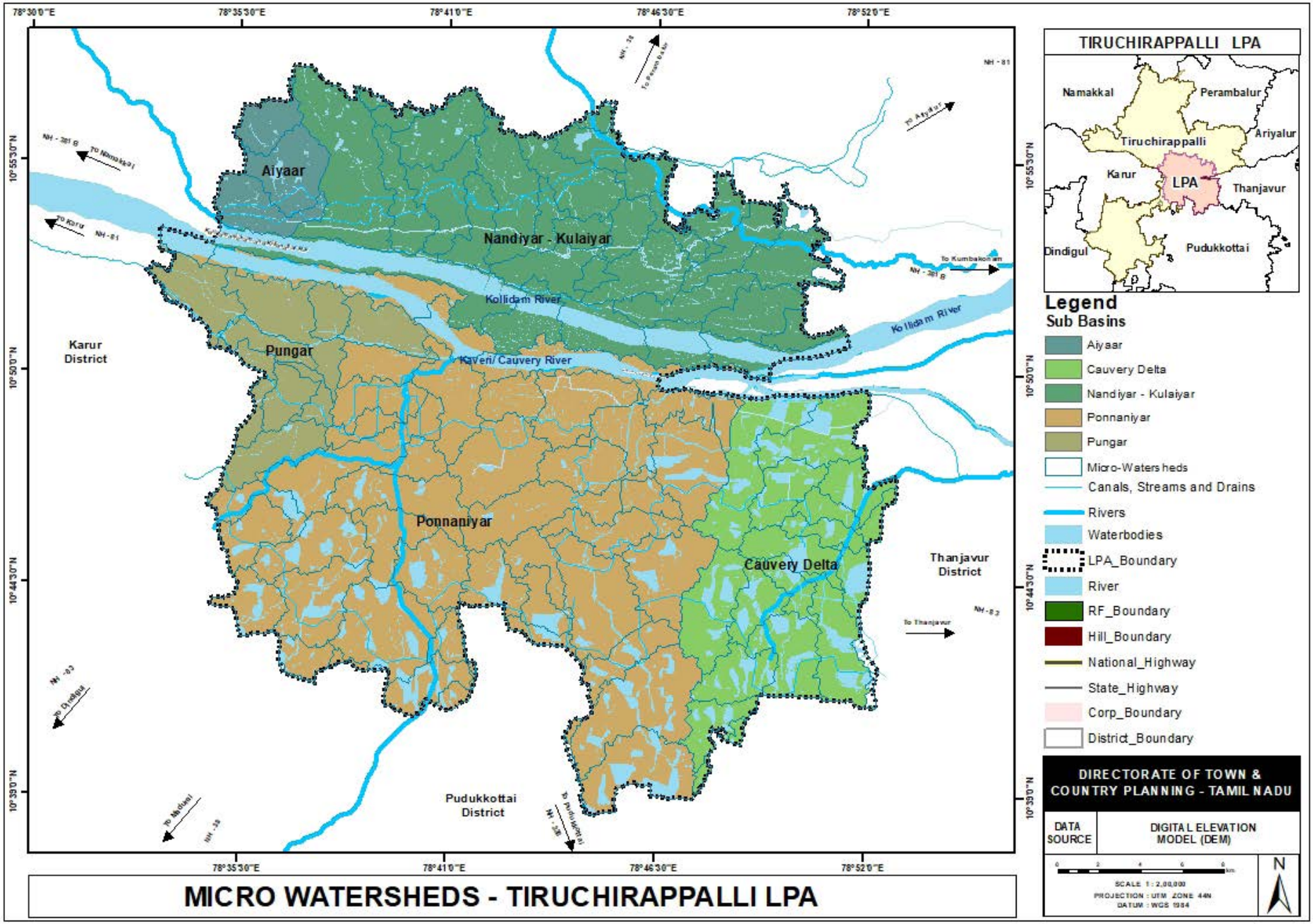
The Cauvery Delta watershed influences the eastern edge of the LPA, marking the transition from a riverine to a distributary-dominated hydrological regime. This zone is characterised by flat terrain, high drainage density and an intricate network of canals and distributaries branching from the Cauvery and Kollidam rivers. The deltaic watershed plays a key role in irrigation supply, flood moderation and sediment deposition, and its hydrological behaviour is strongly controlled by upstream river regulation structures.

### Micro-Watersheds

Superimposed on these major watersheds is a finely delineated network of micro-watersheds, each representing the smallest hydrologically distinct units within the LPA. These micro-watersheds define local drainage pathways, surface water accumulation zones and recharge areas. Their spatial distribution highlights variations in drainage density between upland, riverine and deltaic zones. From a planning perspective, micro-watershed delineation is critical for drainage-sensitive land-use zoning, flood mitigation planning, stormwater infrastructure design, groundwater recharge interventions, and climate-resilient urban development.




*Map 6.10 Watersheds (TN Sub-Basins) of Tiruchirappalli LPA*




*Map 6.11 Micro-Watersheds of Tiruchirappalli LPA*

### 6.5.2 Rivers, Canals, and Distributaries

Within the Tiruchirappalli LPA, the surface water system is defined by the Cauvery–Kollidam river corridor and an interconnected network of rivers, distributaries, canals and associated drainage channels that together regulate flows, irrigation supply and flood conveyance.

The Cauvery River forms the principal trunk stream of the LPA, flowing west to east through its central portion. Near the western edge of the LPA, the river bifurcates at the Upper Anaicut (Mukkombu) into the Cauvery and Kollidam rivers, marking a major hydrological control point within the Lower Cauvery Sub-Basin. Within the LPA, the Cauvery supports regulated irrigation, drinking water supply, groundwater recharge, ecological functions and historically evolved settlement patterns along its banks. Downstream, near the eastern edge of the LPA, flows are further regulated at the Vennar Anaicut, where the river transitions into a distributary-dominated system, giving rise to the Vennar River and associated deltaic channels.

The Kollidam (Coleroon) River, flowing along the northern half of the LPA, functions primarily as the major flood carrier of the Cauvery system. During high-flow periods, the Kollidam conveys excess discharge, reducing flood pressure on the main Cauvery channel and adjacent floodplains. Its wide channel and high conveyance capacity make it a key element in regional flood management and sediment transport.

Several secondary rivers and seasonal streams contribute to the internal drainage and recharge dynamics of the LPA. The Aiyaru River drains the north-western parts of the LPA, conveying runoff from upstream catchments and feeding into the Cauvery–Kollidam system. The Koraiyar (Ariyar) River drains the southern and south-western uplands of the LPA and plays an important role in seasonal flow conveyance, tank filling and groundwater recharge, particularly during the monsoon period. The Pungar River influences the western and south-western parts of the LPA, draining gently sloping plains and supporting local irrigation and surface storage structures.

In addition to natural river systems, the hydrology of the LPA is strongly shaped by a network of major irrigation canals derived from the Cauvery system. The Pullambadi Canal, originating from the Upper Anaicut, is a major supply channel serving agricultural command areas to the north and north-east of the LPA. The Kattalai Canal draws regulated flows from the Cauvery to support irrigation and groundwater recharge across the central and southern parts of the planning area. The Uyyakondan Canal, one of the oldest man-made channels in the region, traverses the urban core of Tiruchirappalli and functions as a vital irrigation, drainage and heritage waterway, historically shaping land use and settlement morphology. These canal corridors also function as critical urban drainage conduits and ecological corridors, requiring protection through

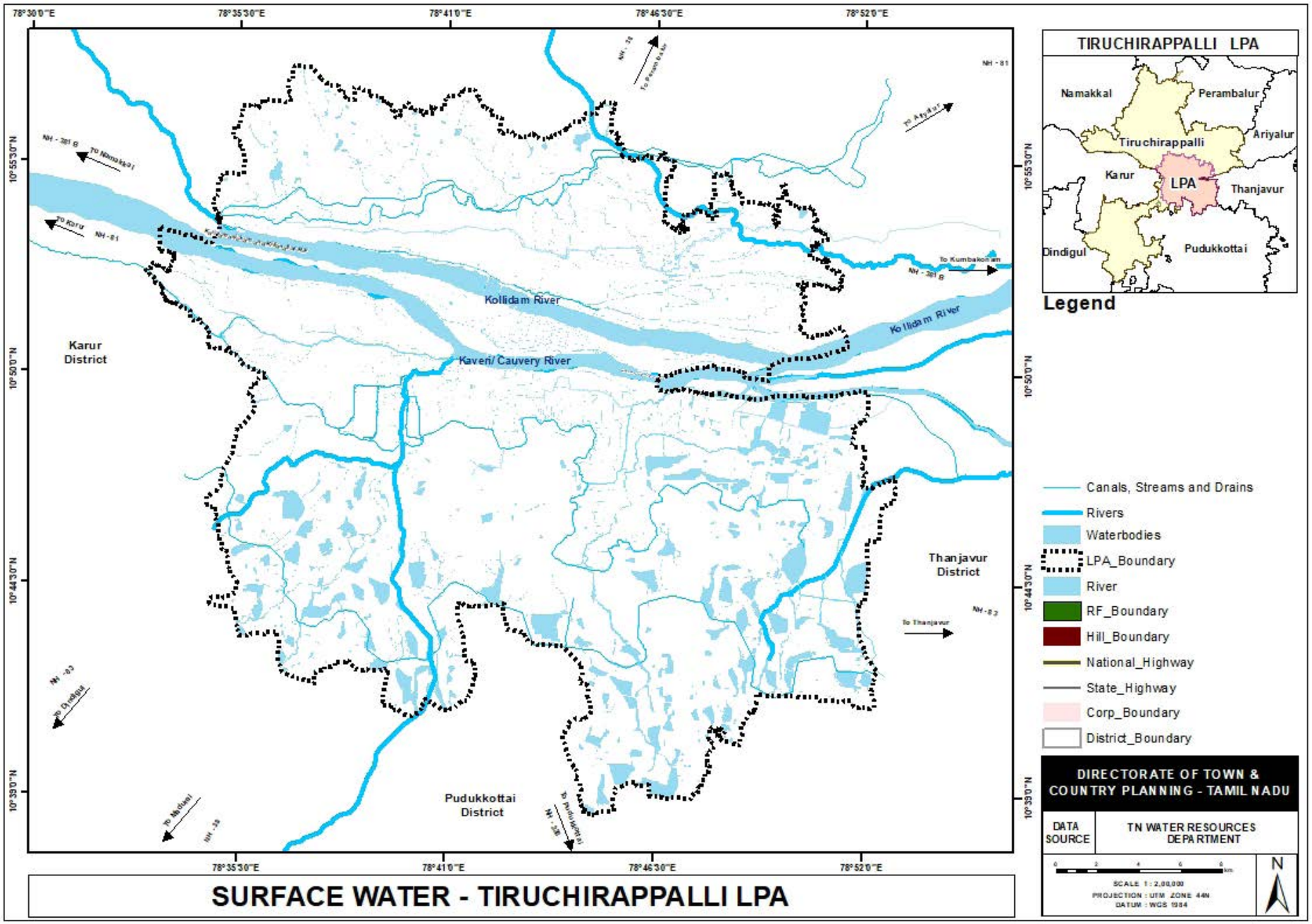
zoning regulations and buffer-based development control.

Collectively, the Cauvery, Kollidam, their distributaries, tributary rivers, and canal networks define the fluvial and hydraulic framework of the Tiruchirappalli LPA. This integrated river–canal system governs surface water availability, flood behaviour, sediment movement and groundwater recharge, and forms the basis for watershed-based land-use planning, flood risk management and sustainable water resource management within the LPA.

### 6.5.3 Drainage Network, Natural Drains and Stream Hierarchy

The Tiruchirappalli LPA is drained by a network of natural streams, odai-s, minor channels, canals and interconnected water bodies originating from local micro-catchments and draining towards the Cauvery system. These features, as depicted in Map 6.12, together form the primary surface drainage system of the LPA. These channels form the primary surface runoff pathways during monsoon rainfall and are critical for preventing water stagnation and urban flooding. Many of these drains are seasonal and historically integrated with irrigation tanks and surplus courses; however, encroachment and modification within urban areas have reduced their conveyance capacity, increasing flood risk, surface waterlogging, and infrastructure vulnerability during peak rainfall events.

The LPA exhibits a predominantly dendritic drainage pattern, with first- and second-order streams feeding into higher-order channels and canals that ultimately discharge into the Cauvery system. This stream hierarchy supports surface runoff conveyance, groundwater recharge, and tank filling, particularly during the northeast monsoon. From a planning perspective, protection, restoration and integration of these natural drains into the urban stormwater network are essential to enhance flood resilience, reduce infrastructure vulnerability, and improve environmental quality. The drainage network is closely integrated with a system of tanks, canals and surplus courses that function as intermediate storage and flow-regulating structures. These tanks intercept runoff, attenuate floods, support agriculture, and replenish groundwater, especially within alluvial and gently sloping zones.




*Map 6.12 Surface Water and Drainage Network*

### 6.5.4 Water Resources and Dynamics

Water resources have historically shaped the settlement pattern, economy, ecology, and cultural landscape of the Tiruchirappalli LPA. The city evolved along the Cauvery River, which has long served as the primary source of water for domestic use, agriculture, trade, and transportation. The continued presence of river systems, traditional tanks, and associated groundwater reserves has strongly influenced land-use patterns, settlement density, and urban form.

Water dynamics in the Tiruchirappalli LPA are driven by monsoonal rainfall patterns. Historically, this integrated system ensured seasonal storage, flood moderation, and sustained groundwater recharge. However, rapid urbanisation, land-use change, and increasing extraction have altered these linkages, resulting in emerging stresses on both surface and subsurface water systems. Accordingly, this section examines evolving water dynamics and their implications for sustainable urban development and infrastructure planning, followed by an assessment of surface and groundwater conditions and their planning implications.

Water dynamics in the Tiruchirappalli LPA are driven by monsoonal rainfall patterns and their interaction with rivers, tanks, and aquifers. Rainfall, the primary input to both surface and subsurface systems, influences how rivers, tanks, and aquifers behave seasonally. To assess these dynamics, changes in surface water conditions are analysed using remote sensing–based indicators, followed by an assessment of pre- and post-monsoon groundwater level variations over the past three decades. These dynamics provide a critical evidence base for integrated water-sensitive urban planning, infrastructure investment prioritisation, and climate adaptation strategies within the LPA.

#### 6.5.4.1 Surface Water Origin, Significance and Dynamics

Surface water bodies in Tiruchirappalli, including the Cauvery River and its distributaries (Kollidam, Vennar), along with traditional tanks and channels, originate from a combination of natural fluvial processes and historical human interventions. Rivers follow natural topography and monsoonal flows, while tanks and channels were constructed in cascaded systems to harvest runoff, support irrigation, and recharge groundwater. These water bodies also hold cultural and religious importance, with temples, ghats, and village ponds shaping settlement patterns, street networks, and communal spaces over centuries.

Surface water dynamics in the Tiruchirappalli LPA reflect the combined influence of rainfall variability, river flows, traditional tanks, land-use change, and urban expansion over the past decade. The primary surface water features include the Cauvery River and its distributaries—Kollidam and Vennar—along with an extensive network of tanks, channels, and ponds developed historically for irrigation and water storage. However, rapid urbanisation and infrastructure expansion have increasingly disrupted these traditional water

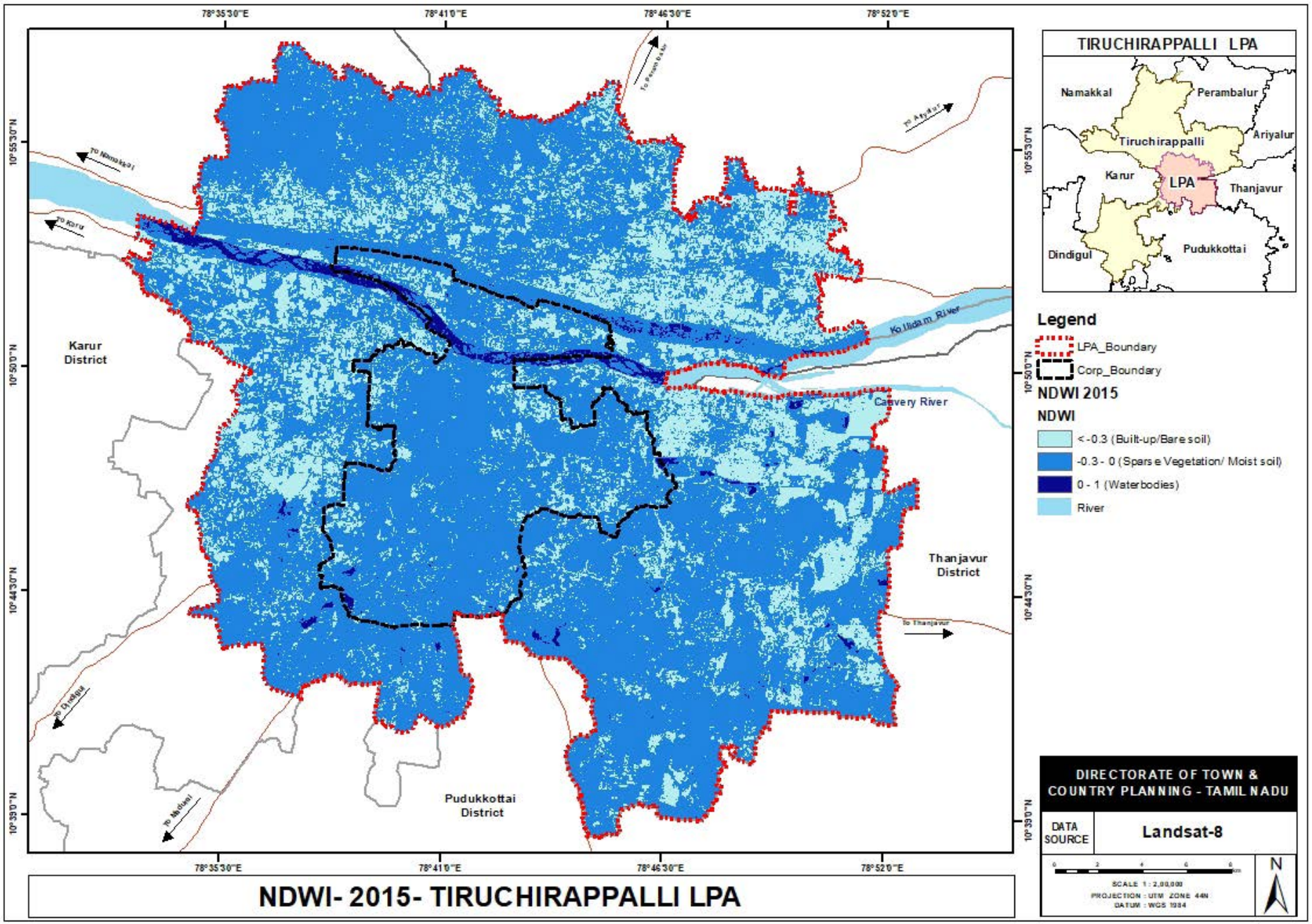
systems, necessitating restoration-led planning and protection-based regulatory frameworks.

### 6.5.5 NDWI Analysis

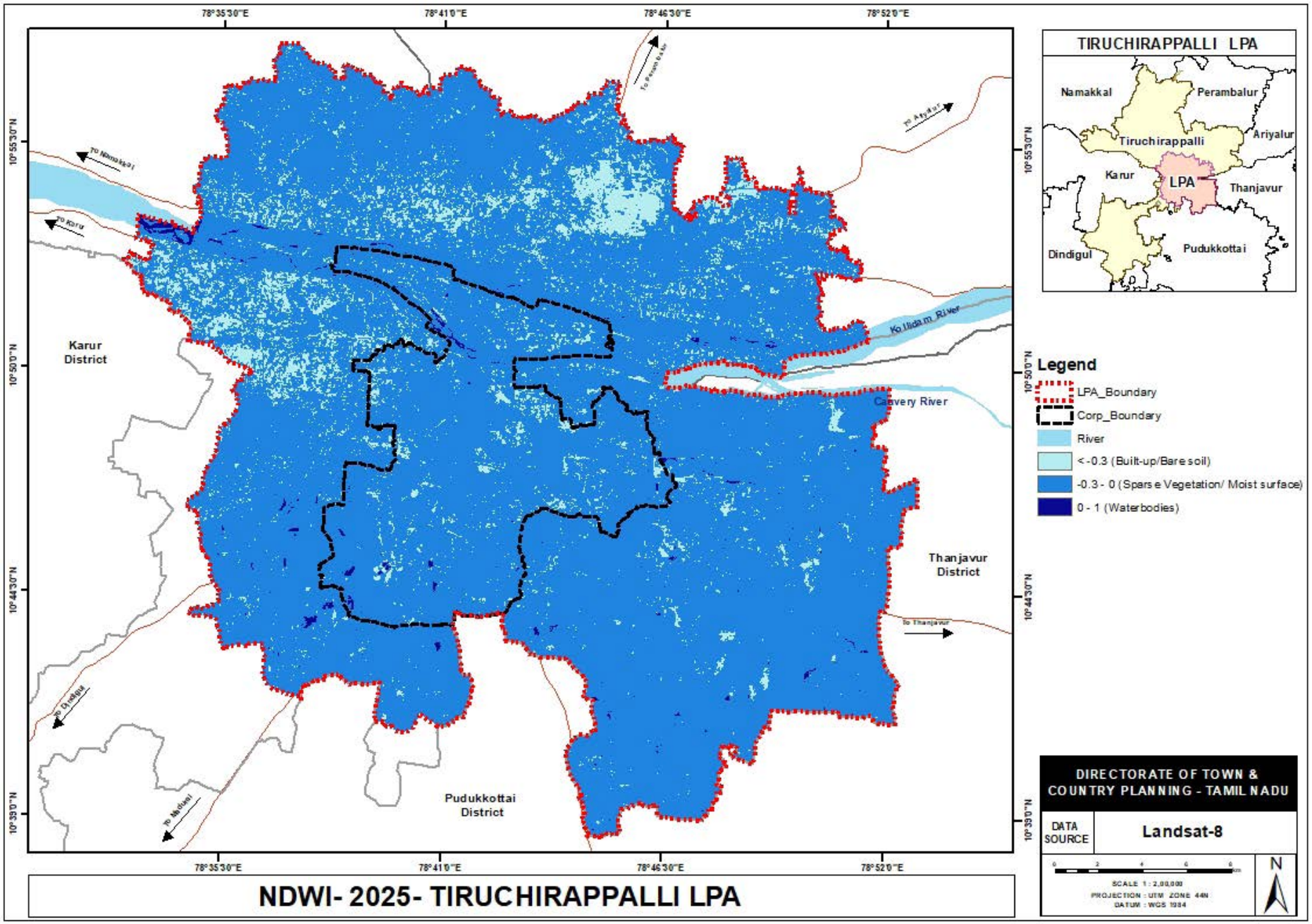
Changes in surface water availability were assessed using the Normalized Difference Water Index (NDWI) for the period 2015–2025. The analysis was carried out using cloud-free, post-monsoon satellite imagery to ensure seasonal comparability across years. NDWI values were classified to distinguish open water bodies, moist surfaces, built-up or barren land, and vegetated areas.

The 2015 NDWI map (Map 6.13) shows relatively extensive and continuous high NDWI zones, particularly along the Cauvery River corridor and across several tanks within the LPA. These areas indicate stable river stretches, connected channels, and functioning tank systems that supported surface water retention and groundwater recharge. By contrast, the 2025 NDWI map (Map 6.14) reveals a marked reduction in high NDWI zones, indicating a decline in open water spread across both riverine stretches and tank systems. Several areas that previously exhibited higher surface moisture have transitioned to lower NDWI ranges, reflecting reduced surface water presence and increased dry or built-up conditions.

The expansion of areas characterised by built-up or barren surfaces highlights ongoing urban growth, land-use conversion, and the loss of permeable surfaces. Simultaneously, the decline in moist surface zones indicates reduced surface moisture retention and growing stress on the local hydrological system. The temporal comparison indicates a clear trend of shrinking surface water bodies and expanding built-up areas within the Tiruchirappalli LPA over the past decade. This transformation has important implications for groundwater recharge, flood regulation, urban thermal conditions, and long-term water security, underscoring the need for stronger protection of water bodies, restoration of tank–drain linkages, and integration of blue–green infrastructure to enhance flood resilience, groundwater recharge, and thermal regulation in future planning.




*Map 6.13 NDWI Map for 2015*




*Map 6.14 NDWI Map for 2025*

## 6.6 Groundwater and Aquifer Systems

Groundwater forms a critical component of the water security framework of the Tiruchirappalli LPA, supporting domestic, industrial, institutional, and peri-urban agricultural water demands, particularly in areas with limited access to surface water supply systems. In a rapidly urbanising context characterised by expanding built-up areas, rising population, and increasing economic activity, groundwater functions both as a primary source of water and as a strategic buffer during periods of surface water stress. The behaviour of groundwater within the LPA is closely linked to regional rainfall patterns, riverine hydrology, and the distribution of tanks and drainage networks, making it a key determinant of long-term urban resilience.

### 6.6.1 Hydrogeological Setting of Tiruchirappalli LPA

Located within the Cauvery–Kollidam river basin system, the hydrogeological framework of the Tiruchirappalli LPA is governed by the combined influence of geological formations, geomorphology, surface water systems, and anthropogenic modifications. Groundwater occurrence, movement, and storage are primarily controlled by hard crystalline rock formations interspersed with alluvial deposits along the Cauvery River and its tributaries. Weathered and fractured zones of gneiss, granite, and charnockite constitute the principal groundwater-bearing formations across much of the LPA, while highly productive alluvial aquifers are developed along the river corridors and floodplains.

Recharge to groundwater systems is predominantly driven by monsoonal rainfall, river seepage, infiltration from surface water bodies such as tanks and channels, irrigation return flows, and urban runoff infiltration. Shallow alluvial aquifers along the Cauvery exhibit strong seasonal recharge responses, while hard rock aquifers display greater dependence on fracture connectivity and weathered mantle thickness. However, progressive urbanisation, loss of traditional tanks, encroachment upon floodplains, surface sealing, and modification of drainage networks have significantly reduced effective recharge capacity across large parts of the LPA.

Rising abstraction pressures resulting from population growth, industrial expansion, and declining per capita water availability have led to increasing groundwater stress, manifested in falling water levels, widening seasonal fluctuations, and localised water quality deterioration. These trends underline the importance of embedding groundwater considerations within land use planning, infrastructure development, and environmental management strategies to ensure long-term sustainability and climate resilience within the Tiruchirappalli Master Plan.

### 6.6.2 Aquifer Types and Characteristics

Groundwater in the Tiruchirappalli LPA occurs primarily within two major hydrogeological regimes: riverine alluvial aquifers and hard rock aquifer systems (Map 6.15).

The alluvial aquifers, developed along the Cauvery River corridor and associated floodplains, comprise unconsolidated sand, silt, clay, and gravel deposits, characterised by high porosity, permeability, and hydraulic conductivity. These aquifers represent the most productive groundwater zones within the LPA, offering higher well yields, rapid recharge, and direct hydraulic connectivity with surface water flows. Historically, the interconnected network of rivers, channels, and tanks facilitated sustained recharge across these zones.

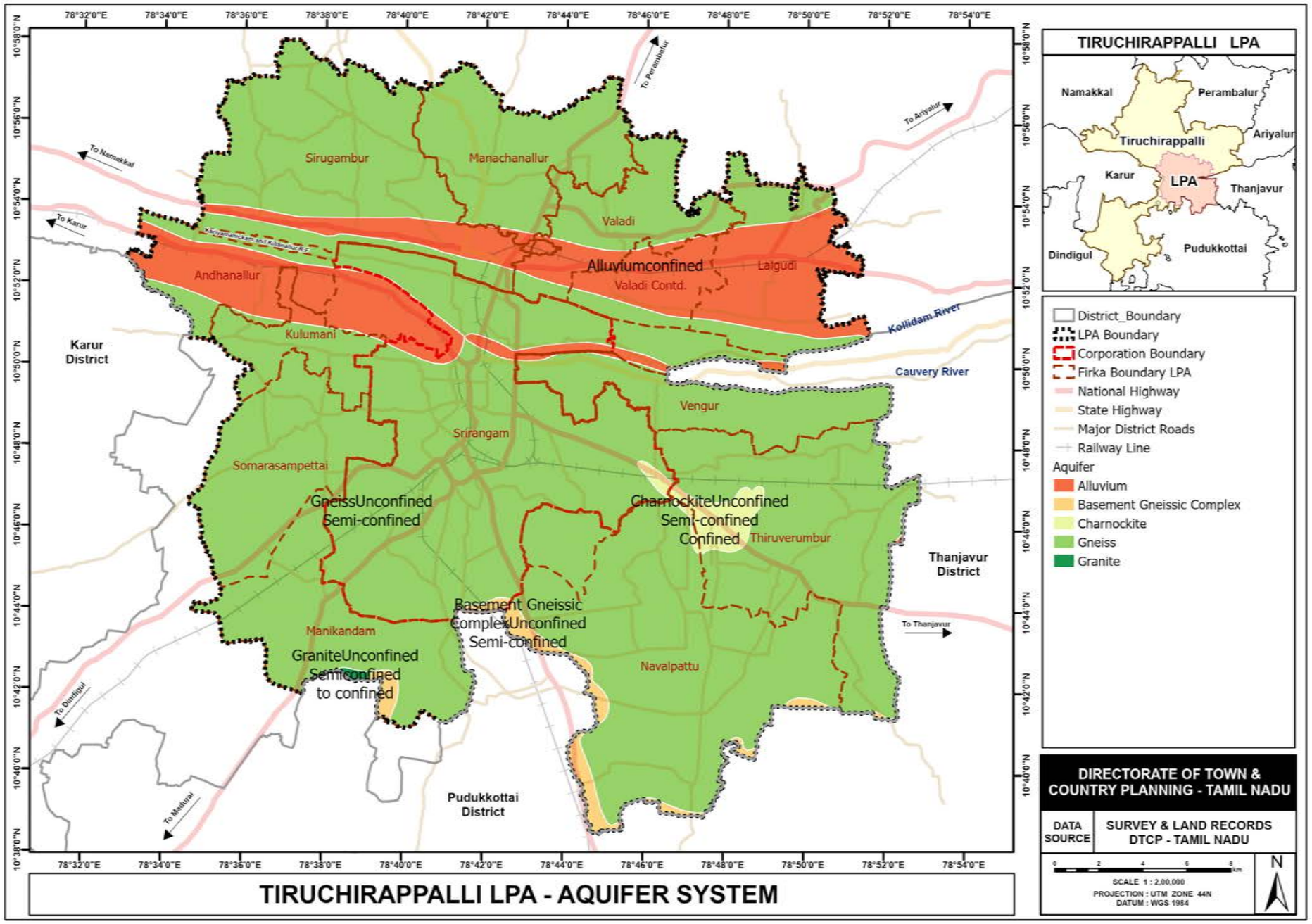
In contrast, the hard rock aquifers, predominantly formed within gneissic and granitic formations, occupy a major portion of the LPA. These formations store groundwater mainly within weathered mantles and fracture networks, resulting in relatively limited storage capacity and high spatial variability in yields. Charnockite formations occur in limited pockets and generally exhibit poorer groundwater potential due to their massive nature and low fracture density. Groundwater availability within these hard rock zones is therefore highly sensitive to seasonal rainfall variability, land use change, and abstraction intensity.

Aquifer thickness across the LPA exhibits pronounced spatial heterogeneity (Map 6.16). The eastern and south-eastern sectors, particularly around Tiruverumbur and Navalpattu, exhibit relatively thicker aquifers, commonly exceeding 6–8 metres and locally reaching over 10 metres, reflecting favourable weathering profiles and fracture development. Moderate aquifer thickness (4–6 metres) predominates across central and southern sectors, while thinner aquifers (less than 4 metres) characterise parts of the northern LPA, including Manachanallur and Sirugambur. The alluvial belts along the Cauvery maintain comparatively higher effective saturated thickness, reinforcing their role as key groundwater reservoirs.

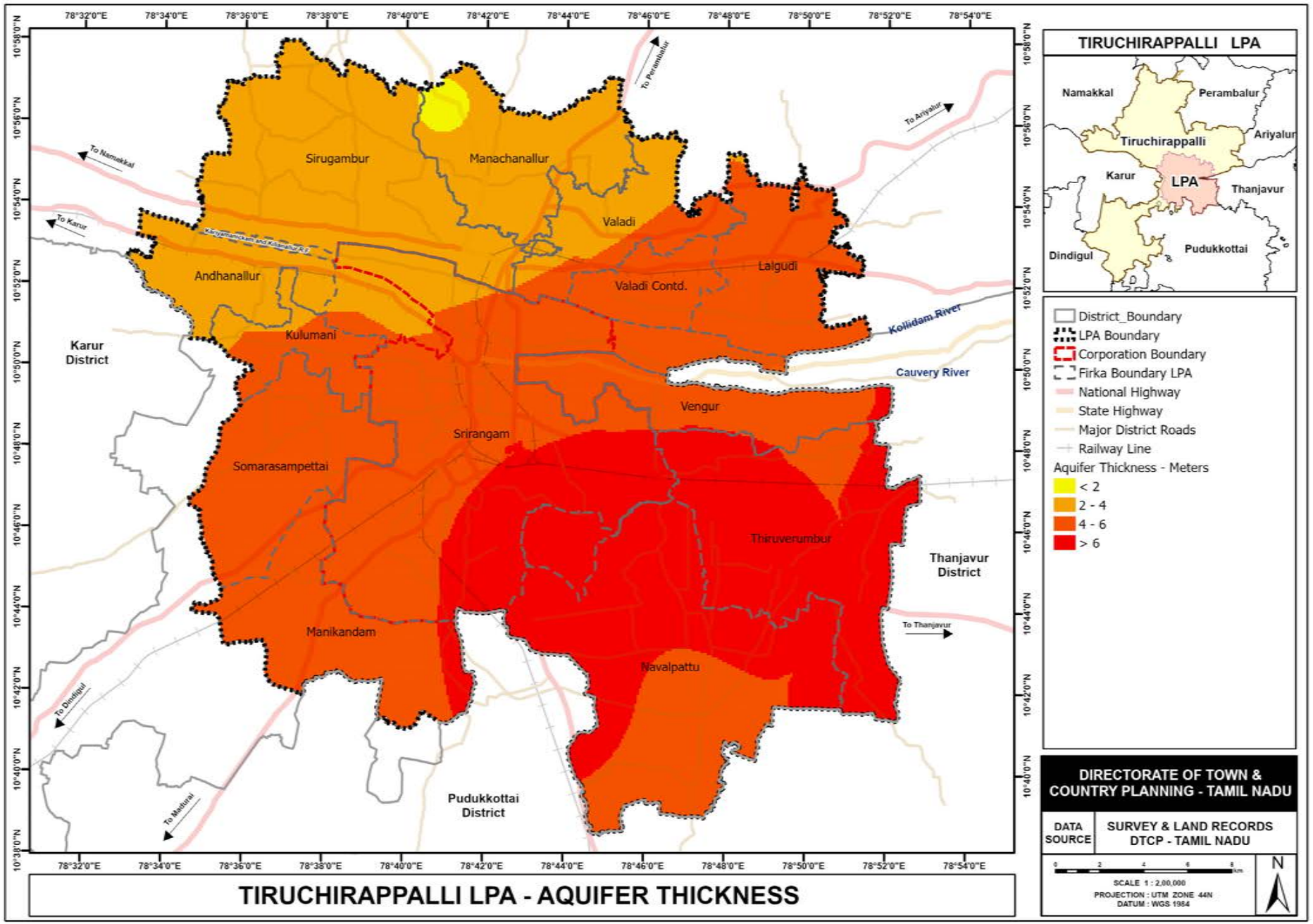
At the firka level, distinct spatial variations in aquifer types are evident across the Tiruchirappalli LPA. Andanallur, Lalgudi, Valadi, Srirangam and Kulumani Firkas, located along the Cauvery–Kollidam river corridor, are dominated by highly productive alluvial aquifers, characterised by unconsolidated sand, silt and gravel formations with high porosity and permeability. These firkas exhibit comparatively higher groundwater yields, rapid recharge, and strong hydraulic connectivity with surface water systems. In contrast, Manachanallur, Sirugambur, Somarasampettai, Manikandam, Navalpattu and Tiruverumbur Firkas are largely underlain by hard crystalline formations comprising gneiss, granite and charnockite, where groundwater occurrence is restricted to weathered and fractured zones, resulting in relatively lower and spatially

variable yields. Among these, Manikandam and Tiruverumbur display greater dependence on fractured rock aquifers, increasing vulnerability to over-extraction. These firka-level variations necessitate differentiated groundwater management strategies, with strict abstraction regulation in hard rock zones and enhanced protection of alluvial recharge corridors.

Aquifer thickness at the firka scale reflects significant heterogeneity in groundwater storage potential across the LPA. Tiruverumbur and Navalpattu Firkas in the south-eastern sector exhibit relatively higher aquifer thickness, frequently exceeding 6–8 metres and locally surpassing 10 metres, indicating favourable subsurface storage conditions. Srirangam, Andanallur, Valadi and Kulumani Firkas show moderate aquifer thickness ranging between 4 and 6 metres, supported by alluvial deposits and weathered rock profiles. In contrast, Manachanallur, Sirugambur and parts of Somarasampettai Firkas display thinner aquifers, generally below 4 metres, limiting groundwater storage and increasing seasonal vulnerability. Manikandam Firka, despite moderate aquifer thickness, exhibits high abstraction stress due to intense urbanisation and declining recharge. These spatial variations highlight the need for firka-specific groundwater development norms, with controlled extraction in thinner aquifer zones and prioritised recharge enhancement in thicker aquifer tracts.




*Map 6.15 Major Aquifers in Tiruchirappalli LPA and their types*




*Map 6.16 Thickness of Aquifers in Tiruchirappalli LPA*

### 6.6.3 Groundwater Levels and Seasonal Fluctuations

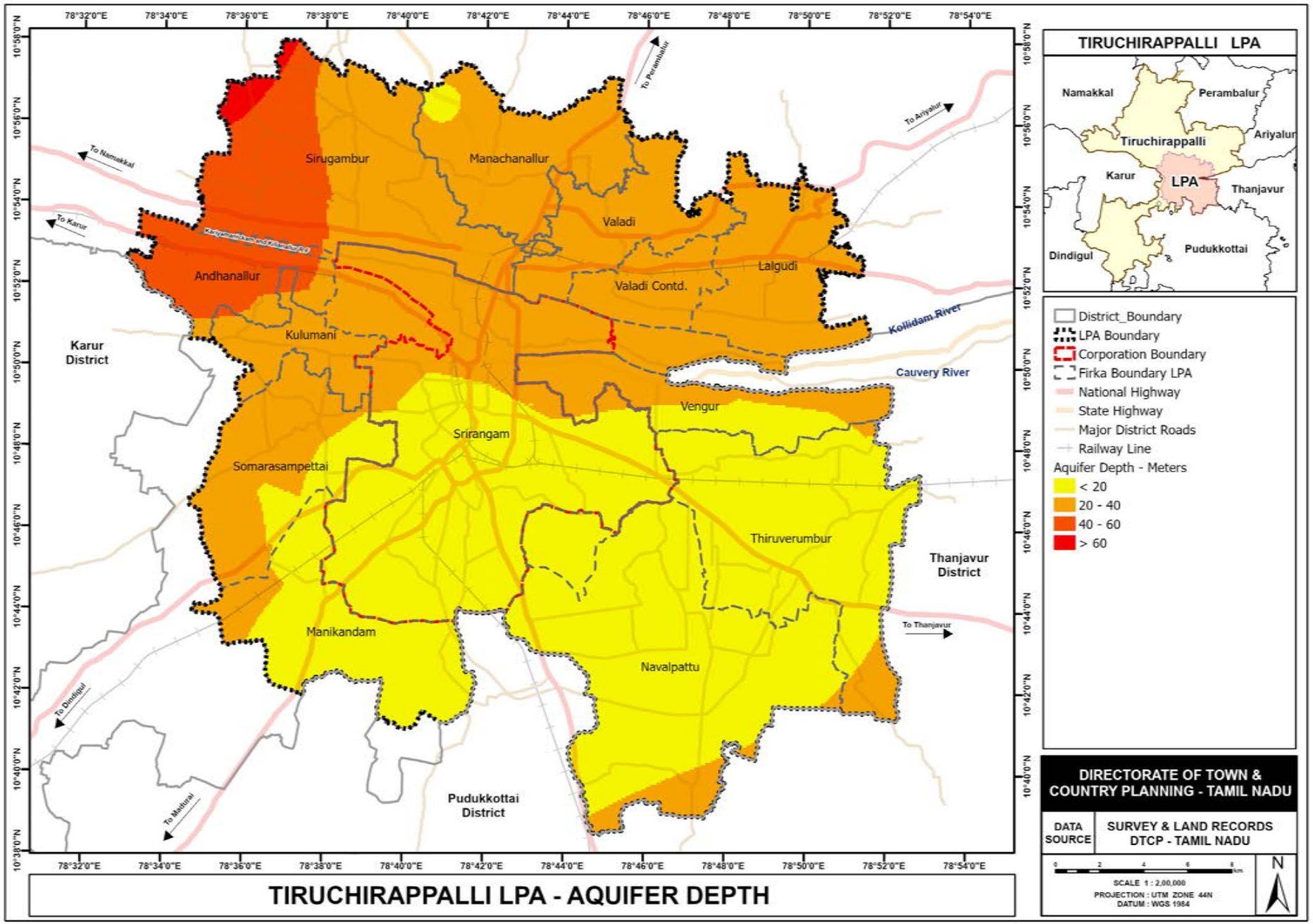
Depth to the first aquifer within the Tiruchirappalli LPA shows substantial spatial variability, reflecting differences in geology, geomorphology, recharge conditions, and abstraction pressures (Map 6.17). Shallow groundwater levels, generally ranging between 13 and 20 metres below ground level (mbgl), dominate the central and southern parts of the LPA, particularly in riverine and low-lying zones, facilitating easier access for domestic and agricultural use. Moderate groundwater depths (20–35 mbgl) characterise much of the northern and eastern sectors, while deeper water levels exceeding 35 mbgl and locally extending beyond 50 mbgl occur in parts of the north-western LPA, primarily within hard rock terrains where groundwater is confined to discrete fracture zones.

The combined assessment of aquifer type, thickness, and groundwater depth reveals a marked contrast between the high-potential alluvial tracts along the Cauvery and the relatively constrained hard rock aquifers elsewhere. While alluvial aquifers offer higher yields and faster recharge, they remain highly vulnerable to contamination, urban encroachment, and over-extraction. Hard rock aquifers, although extensive, possess limited storage and require careful management through abstraction regulation, artificial recharge interventions, and protection of recharge zones.

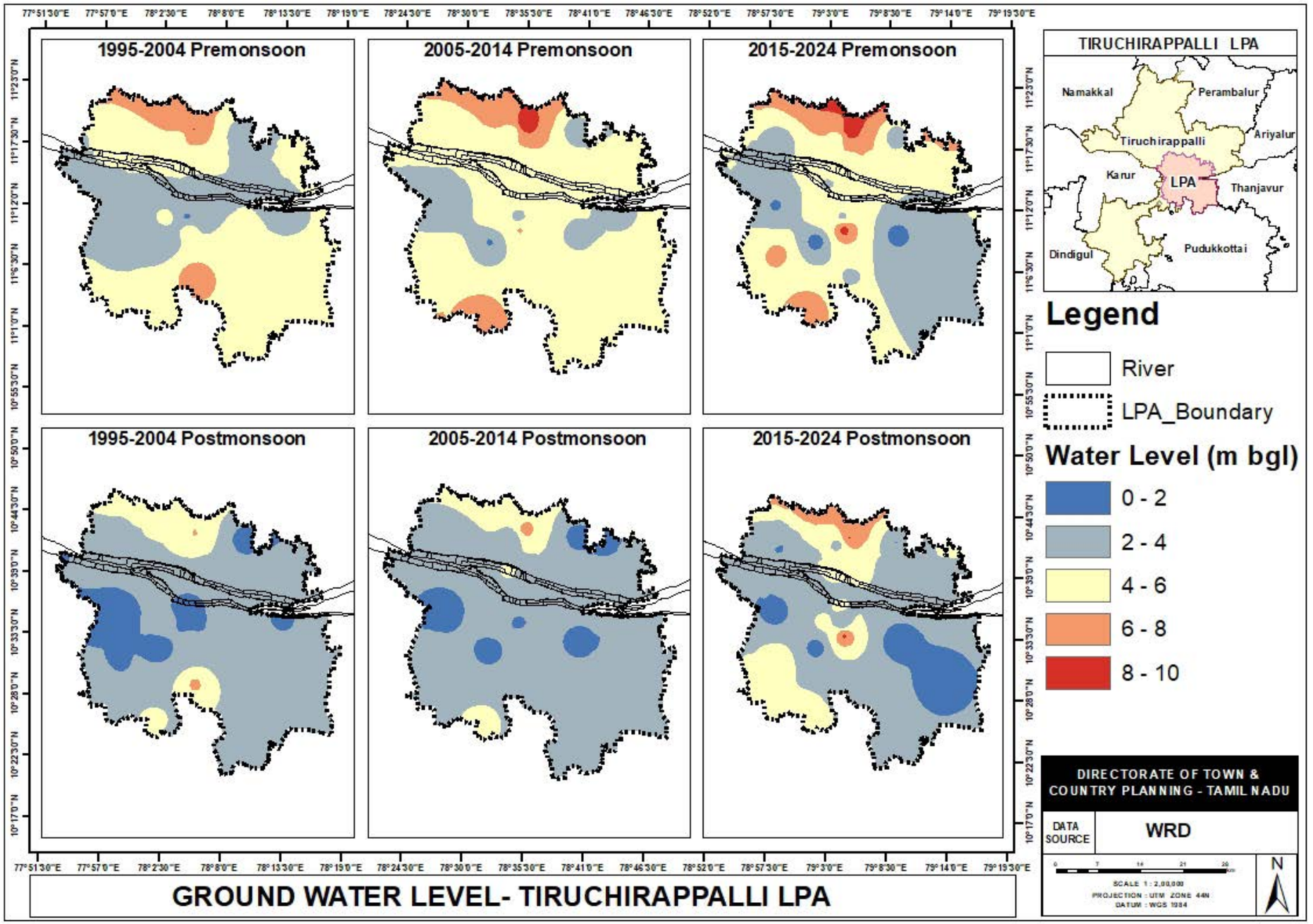
#### 6.6.3.1 Pre and Post Monsoon Behaviour

Analysis of long-term groundwater monitoring data from the Water Resources Department (WRD) indicates a distinct seasonal pattern across the LPA, with deeper water levels observed during pre-monsoon periods and shallower levels following monsoonal recharge (Map 6.18). During the first decade of analysis, groundwater levels remained relatively stable with limited spatial extent of deeper water tables. However, in the subsequent decades, the areal extent of deeper pre-monsoon groundwater levels expanded significantly, particularly within urbanised zones and emerging peripheral growth areas, reflecting intensified abstraction and declining recharge efficiency.

Post-monsoon groundwater levels continue to demonstrate seasonal recovery driven by rainfall and surface water contributions, especially along the Cauvery corridor. Nevertheless, a gradual reduction in post-monsoon rebound is evident, with fewer areas exhibiting shallow groundwater levels and a concurrent expansion of moderately deeper zones. The widening gap between pre- and post-monsoon groundwater levels indicates escalating groundwater stress and a weakening linkage between rainfall, surface water retention, and subsurface recharge, underscoring the need for integrated groundwater management strategies.




*Map 6.17 Depth to First Aquifer in Tiruchirappalli LPA*




*Map 6.18 Pre- and Post-Monsoon Ground Water Levels*

### 6.6.4 Groundwater Estimation and Planning Significance

Groundwater estimation at the LPA and firka levels is essential for assessing resource availability, identifying stressed zones, and guiding sustainable land use planning. Quantitative assessment of groundwater extraction relative to recharge provides critical inputs for zoning regulations, infrastructure planning, industrial siting, and prioritisation of artificial recharge interventions. Integrating groundwater estimation into statutory planning frameworks enables proactive management of aquifer systems, supports climate resilience, and ensures long-term water security for the Tiruchirappalli LPA.

### 6.6.5 Recharge and Discharge Areas

Recharge zones within the Tiruchirappalli LPA are primarily associated with river floodplains, tank beds, surplus courses, forested tracts, permeable pediplains, and gently sloping agricultural landscapes. These areas facilitate infiltration of rainfall and surface flows into subsurface aquifers, sustaining groundwater availability. Discharge zones occur mainly along river courses, low-lying terrain, and areas of intensive abstraction, where groundwater contributes to base flow or is withdrawn through wells.

NDWI analysis for the period 2015–2025 reveals a decline in surface water spread, contraction of traditional tanks, and reduction in riverine inundation extents, indicating diminished surface water retention across the LPA. These changes correspond closely with observed groundwater depletion patterns, particularly in zones exhibiting falling NDWI values. Although the Northeast Monsoon remains the dominant contributor to annual rainfall, increasing temporal variability and high-intensity short-duration events have reduced effective infiltration, thereby weakening recharge processes.

The observed widening seasonal groundwater fluctuations highlight the importance of micro-watershed-based planning approaches that integrate land use control, drainage management, tank restoration, and decentralised recharge structures to restore surface–subsurface connectivity and enhance aquifer sustainability.

### 6.6.6 Groundwater Potential Zones

Based on aquifer type, thickness, depth to water table, and geomorphological characteristics, groundwater potential within the Tiruchirappalli LPA exhibits strong spatial differentiation. High-potential zones are concentrated along the Cauvery River corridor and its alluvial floodplains, where aquifers display high storage capacity and rapid recharge rates. Moderate-potential zones dominate the pediplain and weathered hard rock areas, while low-potential zones occur within massive crystalline rock terrains characterised by limited fracture development and thin weathered mantles.

These spatial variations necessitate differentiated land use planning strategies, including controlled urban densification, groundwater abstraction regulation, zoning for recharge conservation, and prioritisation of artificial recharge infrastructure in stressed zones.

### 6.6.7 Firka-wise Groundwater Extraction Status and Planning Implications

Assessment of groundwater extraction at the firka level as of March 2023 (Table 6.5 and Map 6.19) reveals that Manikandam Firka is categorised as Over-Exploited, with extraction exceeding 100% of annual recharge. This reflects intense abstraction pressure arising from rapid urban expansion, increasing domestic demand, and industrial activity, compounded by declining recharge due to surface sealing and loss of traditional water bodies.

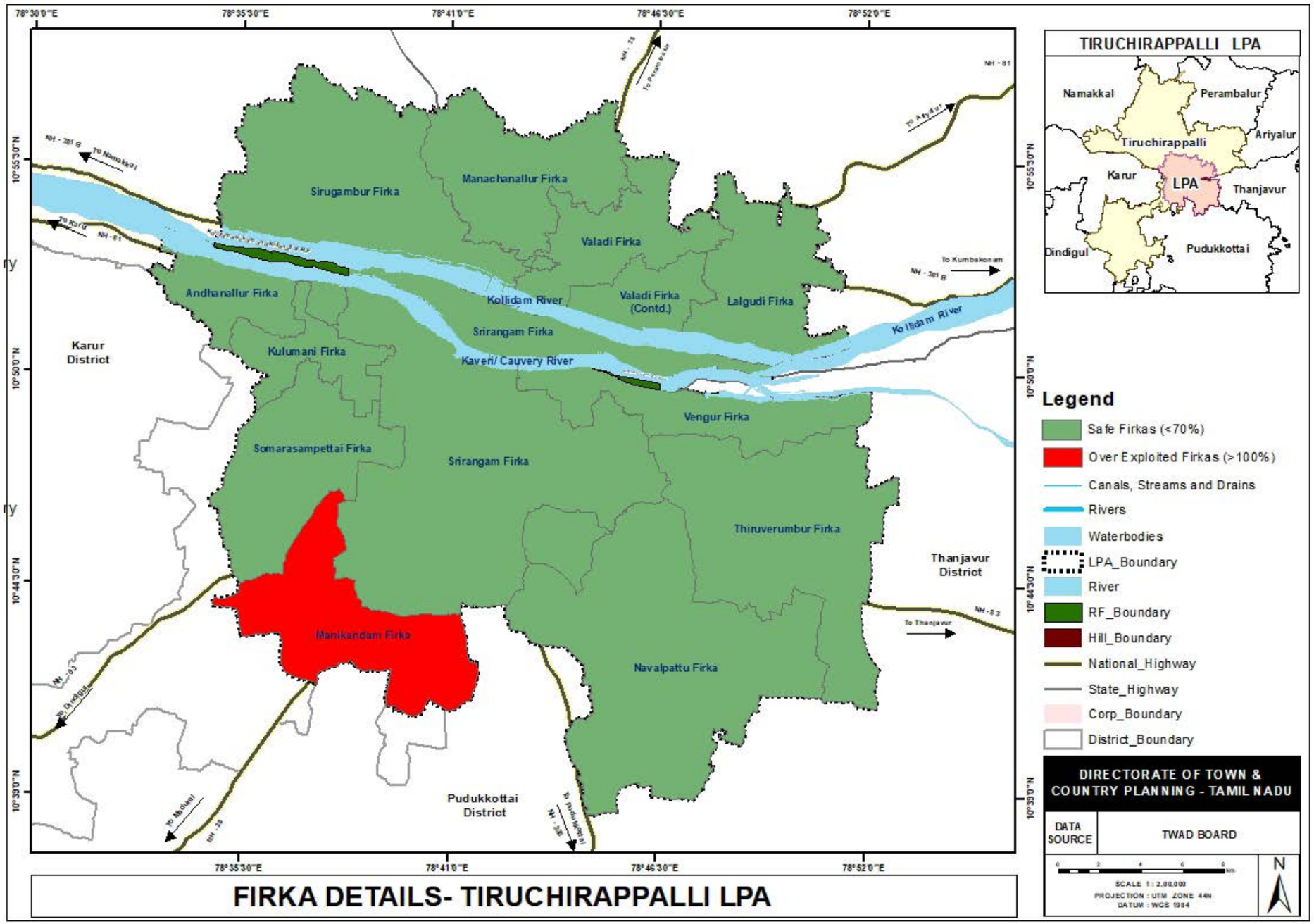
*Table 6.5 Firka Details*

| Categorisation based on Extraction | No. of Firkas | Firkas |
|---|---|---|
| Over Exploited (>100%) | 1 | Manikandam |
| Safe (<70%) | 11 | Andanallur, Manachanallur, Kulumani, Lalgudi, Navalpattu, Sirugambur, Somarasampettai, Srirangam, Tiruverumbur, Valadi, Vengur |

*Source: TWAD*

The remaining 11 firkas—Andanallur, Manachanallur, Kulumani, Lalgudi, Navalpattu, Sirugambur, Somarasampettai, Srirangam, Tiruverumbur, Valadi, and Vengur—are currently classified as Safe, with extraction levels below 70%. However, several of these firkas exhibit emerging stress indicators, including falling pre-monsoon water levels, declining post-monsoon recovery, and progressive loss of recharge zones.

From a planning perspective, Manikandam Firka warrants immediate regulatory intervention through restrictions on new borewell development, mandatory rainwater harvesting, enforcement of groundwater abstraction norms, and prioritised implementation of artificial recharge structures. In the Safe firkas, preventive planning measures should focus on conserving recharge areas, protecting tanks and floodplains, regulating high-water-demand land uses, and integrating water-sensitive urban design principles into development control regulations. A firka-wise groundwater governance framework is essential to ensure equitable resource distribution, long-term aquifer sustainability, and climate-resilient urban growth across the Tiruchirappalli LPA.




*Map 6.19 Firka Details within LPA*

## 6.7 Water Quality

Water quality constitutes a critical dimension of environmental sustainability and public health in the Tiruchirappalli Local Planning Area (LPA). Both surface water and groundwater resources are subject to increasing pressure from rapid urbanisation, industrial development, agricultural intensification, and expanding infrastructure networks. Degradation of water quality directly affects drinking water safety, ecosystem health, agricultural productivity, and the long-term resilience of urban systems. Within the Master Plan framework, systematic assessment of water quality trends provides essential inputs for land use zoning, infrastructure investment, environmental protection measures, and regulatory interventions.

### 6.7.1 Surface Water Quality

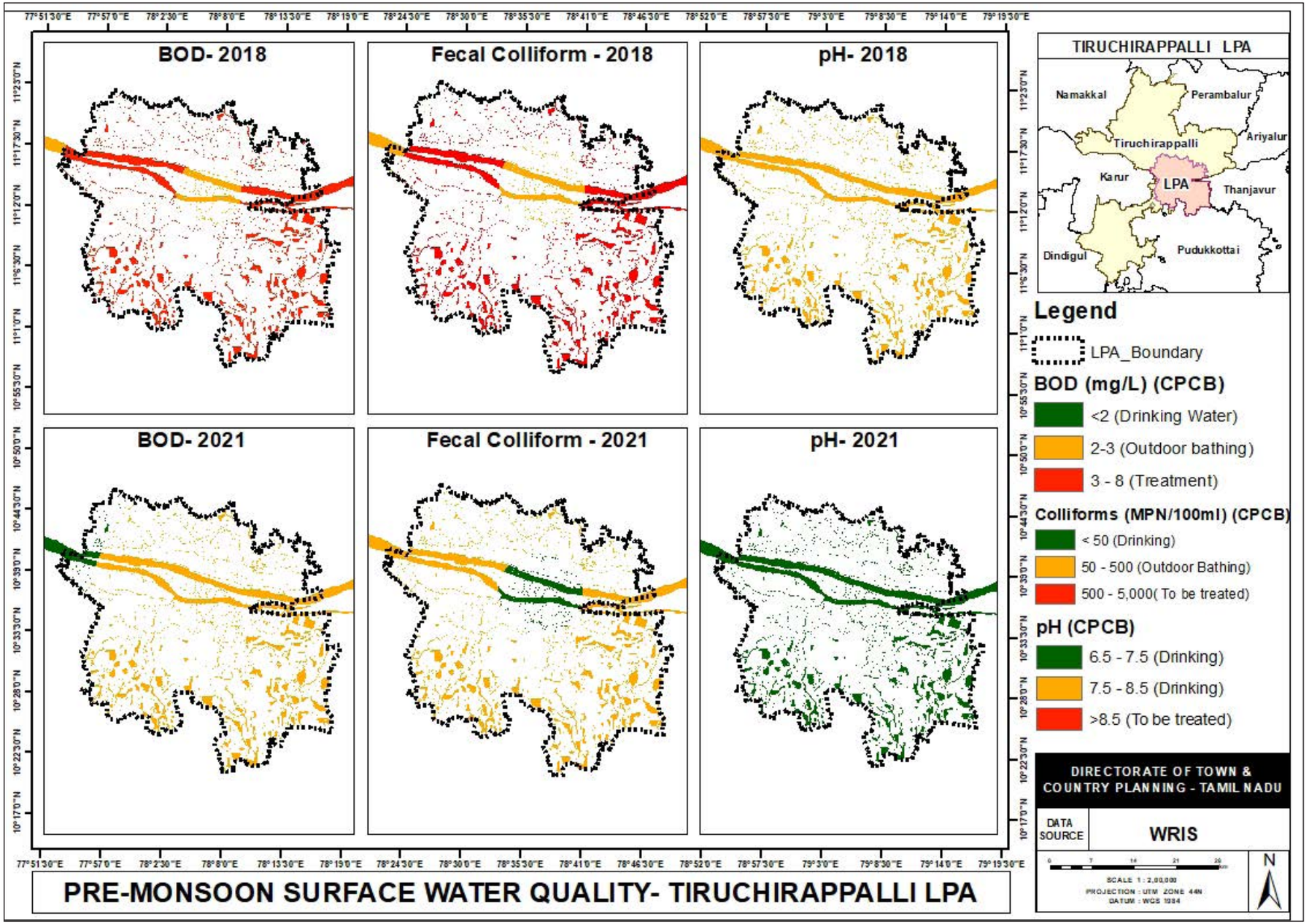
Surface water quality within the Tiruchirappalli LPA has been analysed using secondary data obtained from the WRIS portal as shown in the Map 6.20(Pre-monsoon) and Map 6.21 (post-monsoon). Due to the absence of continuous long-term monitoring datasets specific to the LPA, the analysis is based on two representative years—2018 and 2021—for which both pre-monsoon and post-monsoon observations were available. The assessment focuses on key indicators, namely Biochemical Oxygen Demand (BOD), Faecal Coliform (FC), and pH, covering major surface water bodies including the Cauvery River, its distributaries, and selected tanks.

In 2018, pre-monsoon BOD values generally range from 2.3 mg/L upwards, indicating moderate organic pollution during the dry season, when reduced river flows limit dilution capacity. Post-monsoon conditions show comparatively lower BOD concentrations, reflecting the flushing and dilution effects of monsoonal rainfall and enhanced surface runoff. This seasonal improvement underscores the importance of hydrological connectivity and rainfall-driven dilution in maintaining surface water quality, although localized pockets of moderate organic load persist.

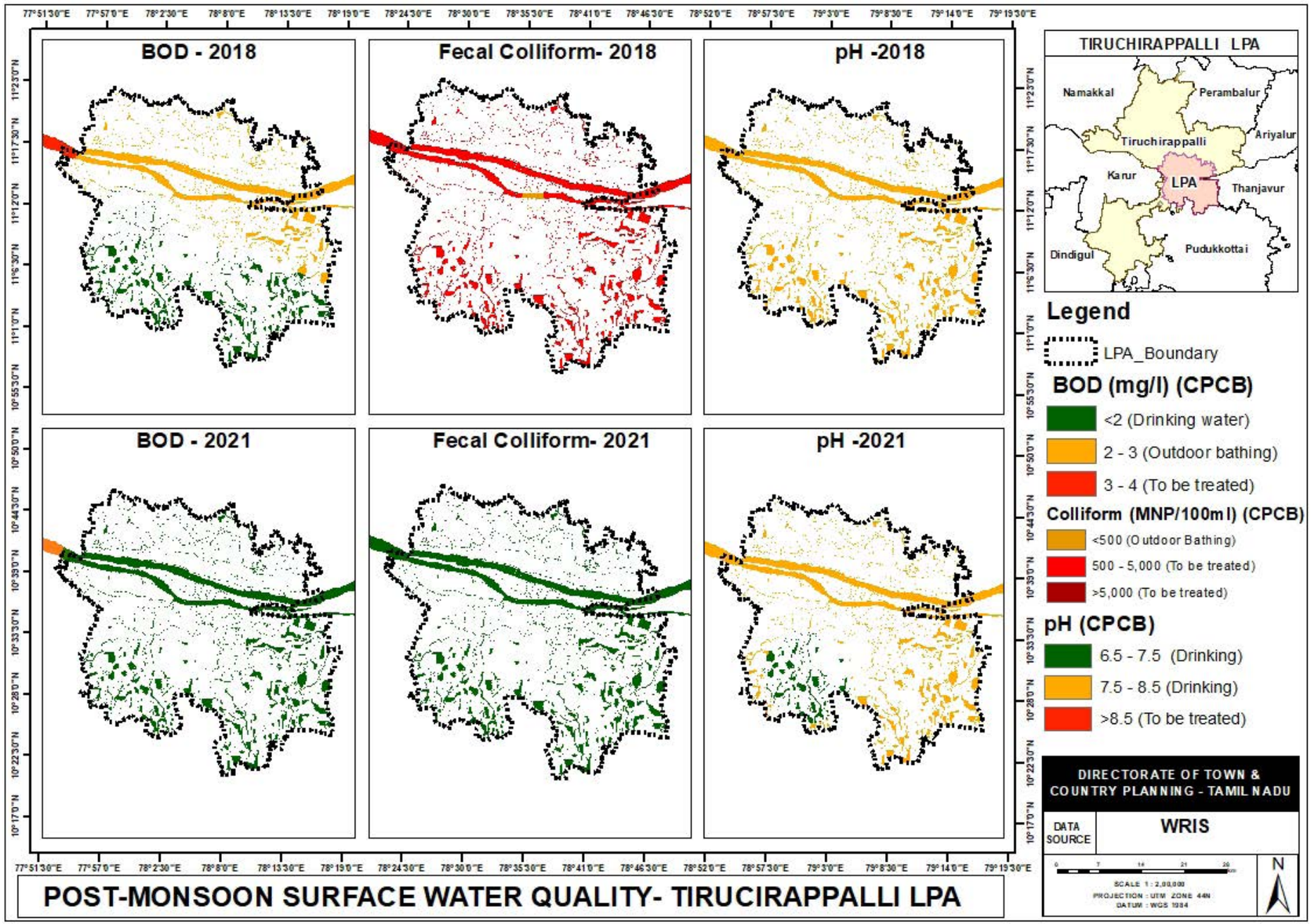
A similar seasonal pattern is evident in 2021, wherein pre-monsoon periods exhibit elevated BOD and Faecal Coliform concentrations, while post-monsoon conditions display relatively improved water quality across most river stretches and tanks. The observed pH values during both years remain largely within permissible limits, indicating stable acid–alkaline conditions, with only minor spatial variations.

Overall, the pre- and post-monsoon comparison for both years highlights the strong seasonal dependency of surface water quality, with monsoonal flows playing a crucial role in pollutant dilution and flushing. However, the persistence of moderate contamination levels in certain stretches even during post-monsoon

periods indicates continuous anthropogenic pressure, arising from untreated sewage discharge, urban runoff, solid waste dumping, and industrial effluents. These findings underline the urgent need for strengthening sewage treatment capacity, ensuring interception of wastewater drains, restoring tank systems, protecting river floodplains, and instituting regular water quality monitoring as integral components of the Tiruchirappalli Master Plan.




*Map 6.20 Pre-Monsoon Surface Water Quality*




*Map 6.21 Post-Monsoon Surface Water Quality*

### 6.7.2 Groundwater Quality

Groundwater quality is a critical planning concern in the Tiruchirappalli LPA, as a substantial proportion of households, agricultural activities, and small-scale industries depend on groundwater for daily water requirements. In peri-urban, rural, and newly developing zones, groundwater often constitutes the primary source of supply, while in urban areas it functions as a strategic buffer during periods of surface water scarcity. Progressive deterioration of groundwater quality due to over-extraction, sewage infiltration, industrial discharge, leaching from solid waste sites, and urban runoff poses significant risks to public health, agricultural sustainability, and long-term water security.

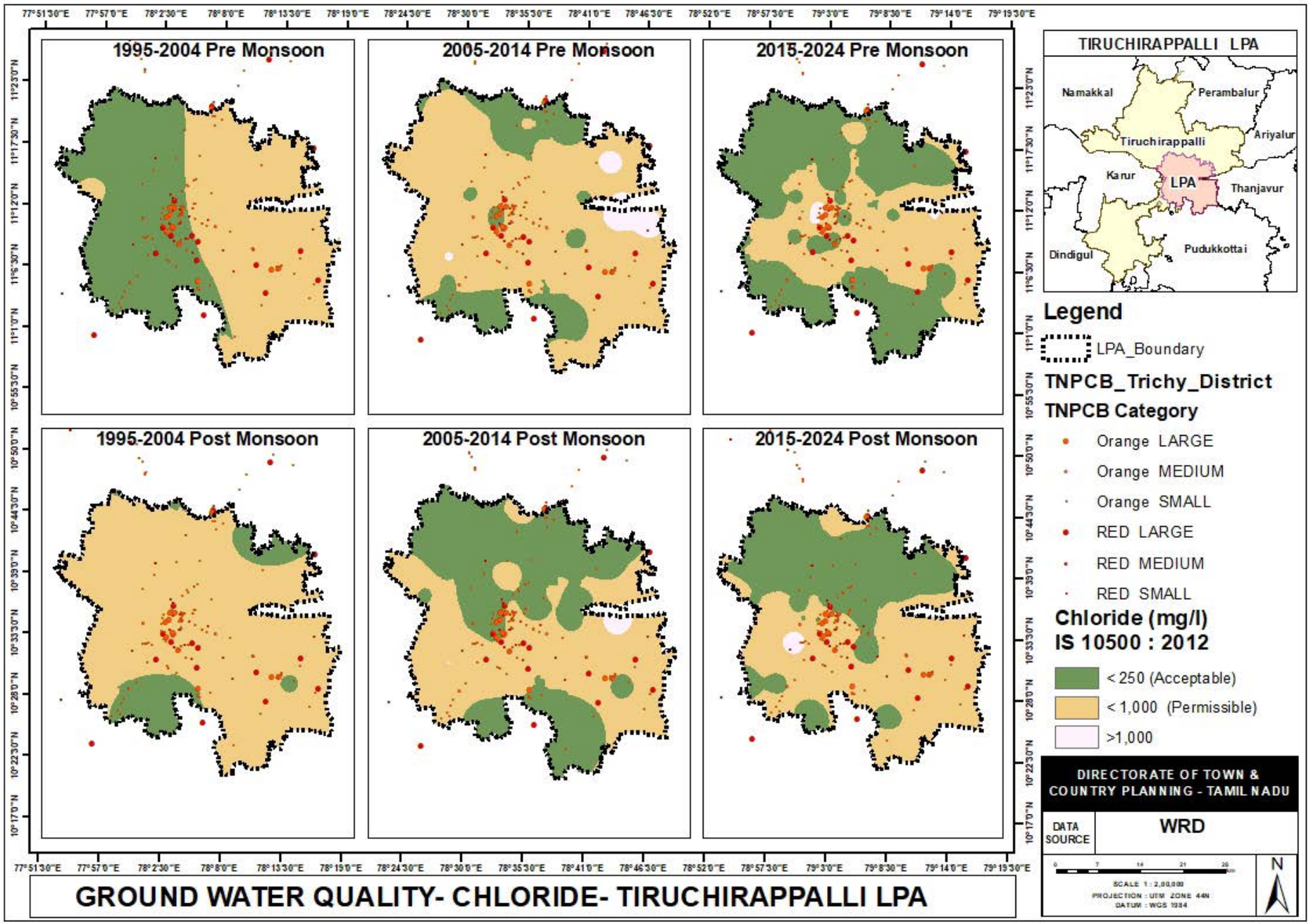
The groundwater quality assessment is based on multi-decadal datasets spanning 1995–2004, 2005–2014, and 2015–2024, analysed separately for pre- and post-monsoon periods. Key physical and chemical parameters include Chloride, Total Dissolved Solids (TDS), Electrical Conductivity (EC), and Total Hardness (TH) to assess salinity and mineralisation; pH and Sulphate to evaluate geochemical and contamination conditions; and Sodium Adsorption Ratio (SAR) and Residual Sodium Carbonate (RSC) to determine irrigation suitability. Together, these parameters provide a comprehensive understanding of spatial and temporal groundwater quality trends across the LPA.

#### 6.7.2.1 Salinity and Mineralisation Trends

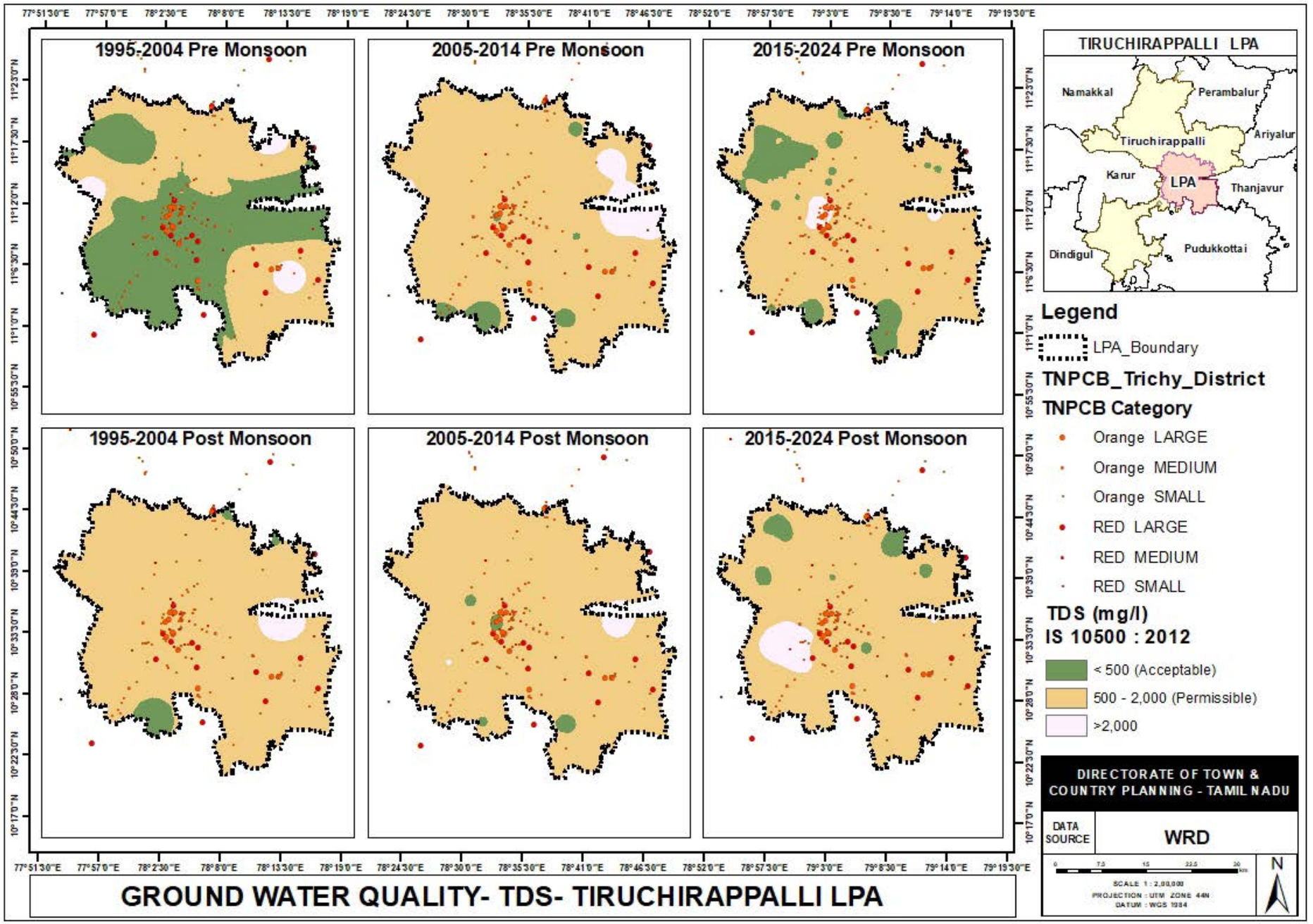
Spatial analysis of Chloride (Map 6.22), Total Dissolved Solids (TDS- Map 6.23), Electrical Conductivity (EC-Map 6.24), and Total Hardness (TH- Map 6.25) indicate a progressive increase in groundwater salinity and mineralisation across the Tiruchirappalli LPA over the past three decades. Zones exhibiting moderate to high chloride concentrations (200–1,000 mg/L and above), elevated TDS (500–2,000 mg/L and above), and higher EC values (1,500–3,000 µS/cm and above) have expanded considerably from the 1995–2004 period to 2015–2024, particularly during pre-monsoon conditions.

These emerging stress zones are predominantly concentrated within central urban areas, eastern industrial belts, and rapidly urbanising peri-urban corridors, reflecting the combined impacts of intensive groundwater abstraction, reduced recharge due to surface sealing and loss of tanks, and increasing anthropogenic contamination from sewage and urban runoff. Total Hardness across much of the LPA falls within the moderately hard category (200–600 mg/L), while localized pockets of high hardness (>600 mg/L) have expanded in recent decades. Although hardness is partly geogenic, its spatial association with dense urban and industrial zones suggests growing anthropogenic influence.

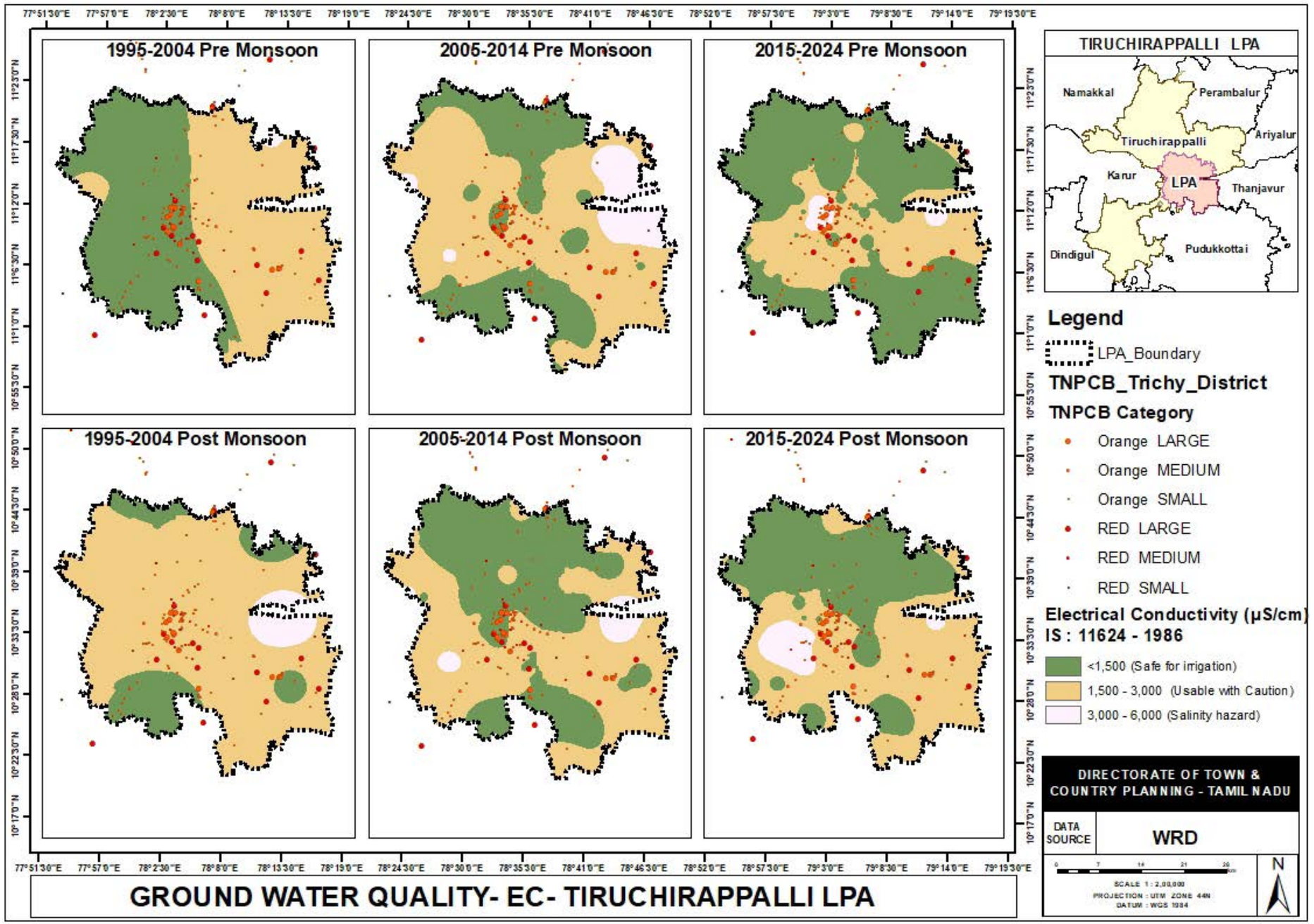
Elevated salinity and mineralisation levels directly affect drinking water acceptability, domestic usability, corrosion potential in pipelines, treatment costs, and long-term aquifer sustainability, thereby requiring targeted intervention within the planning framework.



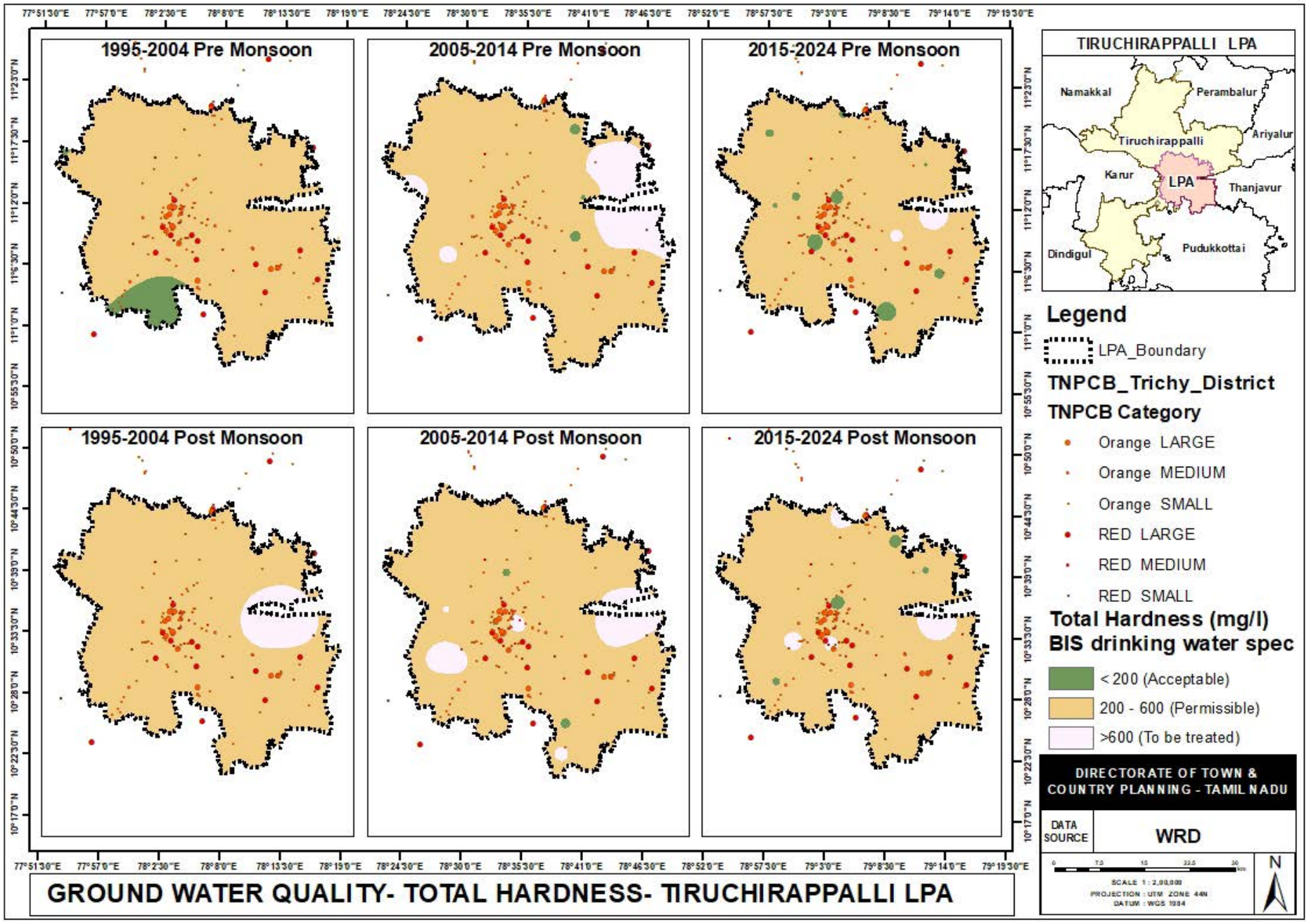

*Map 6.22 Chloride Levels in Ground Water*




*Map 6.23 Total Dissolved Solids (TDS) in Ground Water*




*Map 6.24 Electrical Conductivity (EC) in Ground Water*




*Map 6.25 Total Hardness in Ground Water*

### Geochemical Characteristics

Groundwater pH levels (Map 6.26) across the Tiruchirappalli LPA remain predominantly neutral to mildly alkaline (7.5–8.5) across all decades and seasons, indicating generally stable geochemical conditions. However, localized pockets of higher alkalinity (>8.5) have emerged in recent decades, particularly in the central and eastern parts of the LPA, suggesting increasing anthropogenic influence, possibly linked to wastewater infiltration and industrial effluents.

Sulphate concentrations (Map 6.27) across most of the LPA remain within acceptable limits (0–200 mg/L). Nonetheless, localized zones of moderate to high sulphate levels (200–400 mg/L and above) have appeared during the 2005–2014 and 2015–2024 periods, especially under post-monsoon conditions. These emerging hotspots indicate potential contamination from sewage leakage, industrial discharge, and urban runoff, highlighting the need for targeted monitoring, enforcement of effluent standards, and infrastructure upgrading in vulnerable zones.

### Irrigation Suitability

Assessment of irrigation suitability using SAR (Map 6.28) and RSC (Map 6.29) indicates that groundwater across much of the Tiruchirappalli LPA remains generally suitable for agricultural use. SAR values are predominantly low (0–10), suggesting minimal sodium hazard, while RSC values largely fall within the safe range (0–1.5 meq/L).

However, localized pockets exhibiting moderate SAR (10–18 and above) and elevated RSC (>3 meq/L) have emerged in recent decades, particularly in central and south-western parts of the LPA. These trends indicate a potential long-term risk to soil permeability, crop productivity, and agricultural sustainability, particularly under continued intensive groundwater usage without adequate recharge and soil management measures.

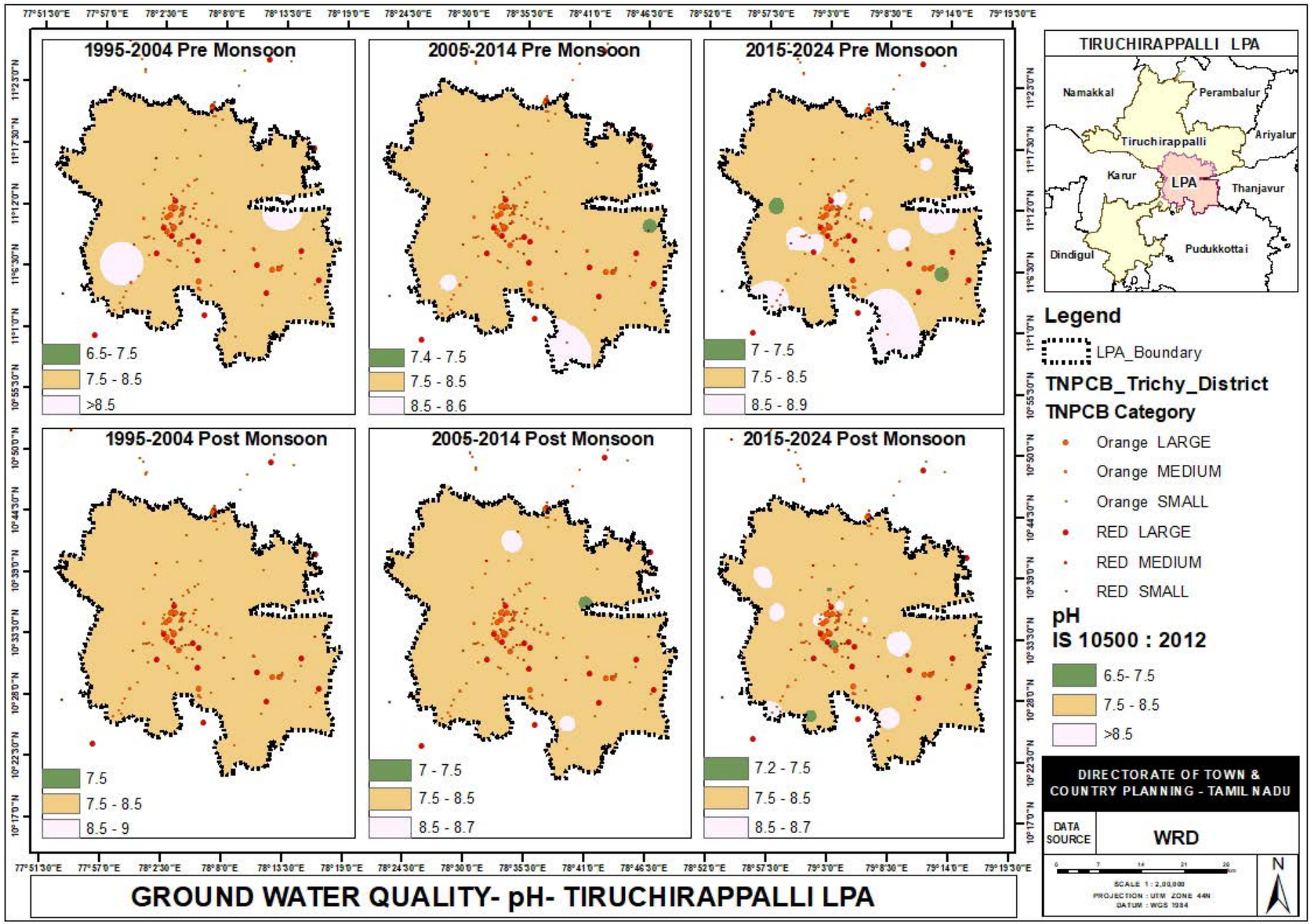
### Overall Assessment

Overall, groundwater quality trends within the Tiruchirappalli LPA indicate a gradual but persistent intensification of environmental stress over the past three decades. Salinity- and mineralisation-related parameters—Chloride, TDS, EC, and Total Hardness—show a clear spatial expansion of moderate to high concentration zones, particularly in urbanised and industrial-influenced areas. While pH and sulphate levels remain largely within permissible limits, emerging localized hotspots signal increasing contamination risks. Groundwater remains broadly suitable for irrigation, but recent increases in SAR and RSC in select pockets raise concerns regarding long-term soil and agricultural sustainability.

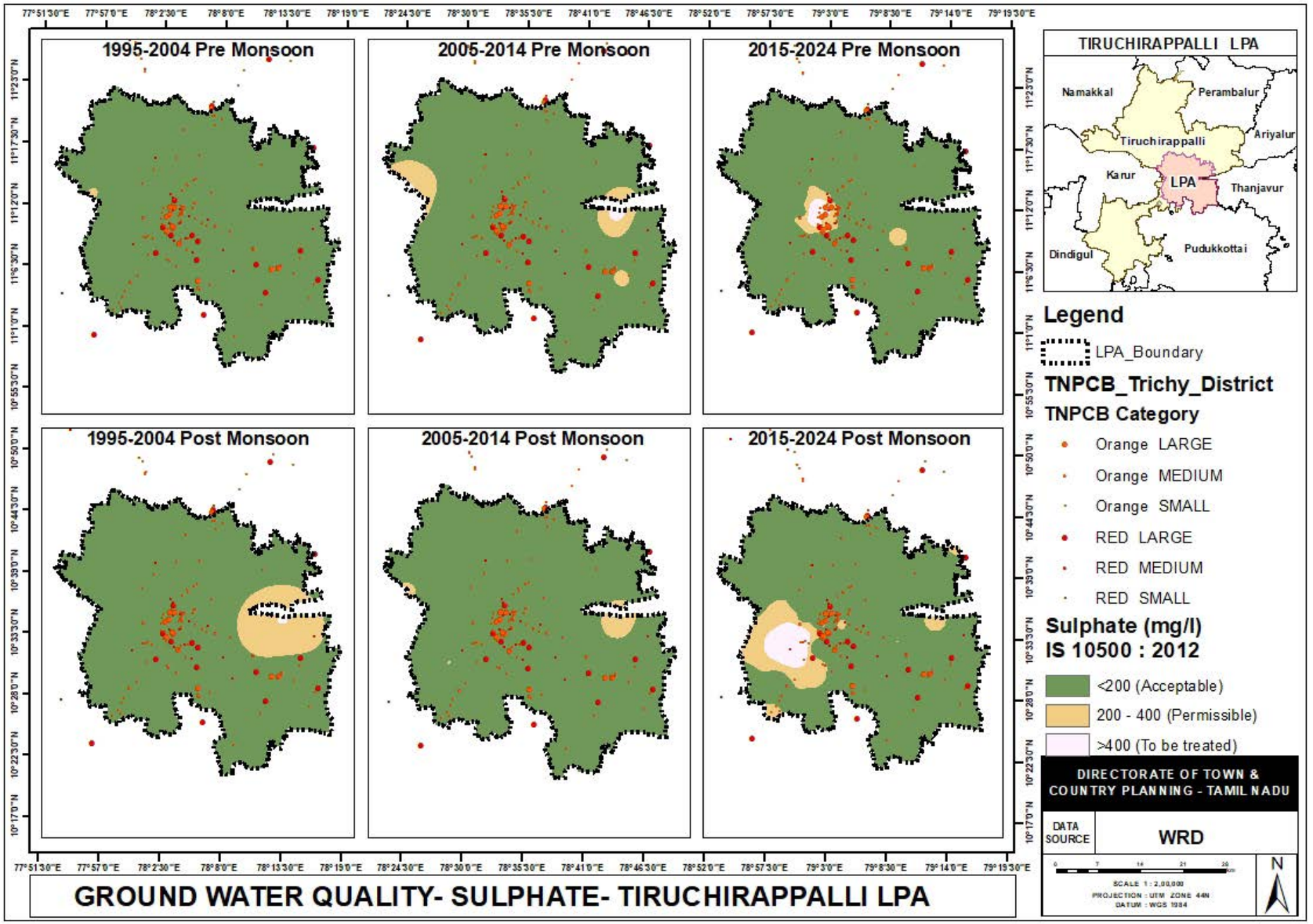
From a Master Plan perspective, these trends necessitate integrated water quality management strategies, including:

- Expansion and upgrading of sewage treatment infrastructure,
- Strict control of industrial effluent discharge,
- Protection and revival of tanks, wetlands, and floodplains,
- Regulation of groundwater abstraction in vulnerable zones, and
- Integration of water-sensitive urban design (WSUD) principles into land-use planning and development control regulations.

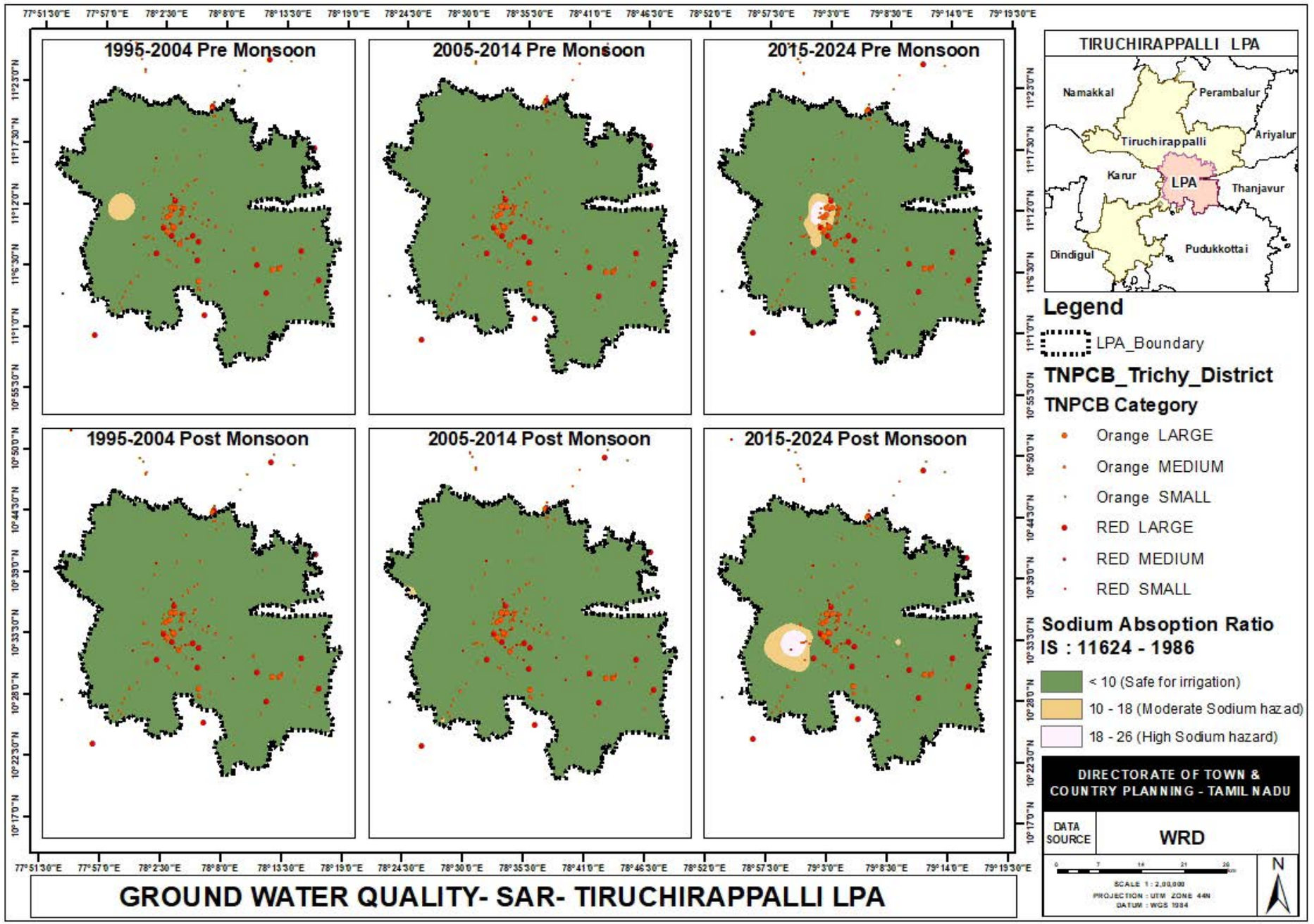
Embedding groundwater quality considerations into zoning, infrastructure investment, and environmental safeguards is essential to ensure long-term water security, public health protection, and ecological resilience within the Tiruchirappalli Master Plan framework.



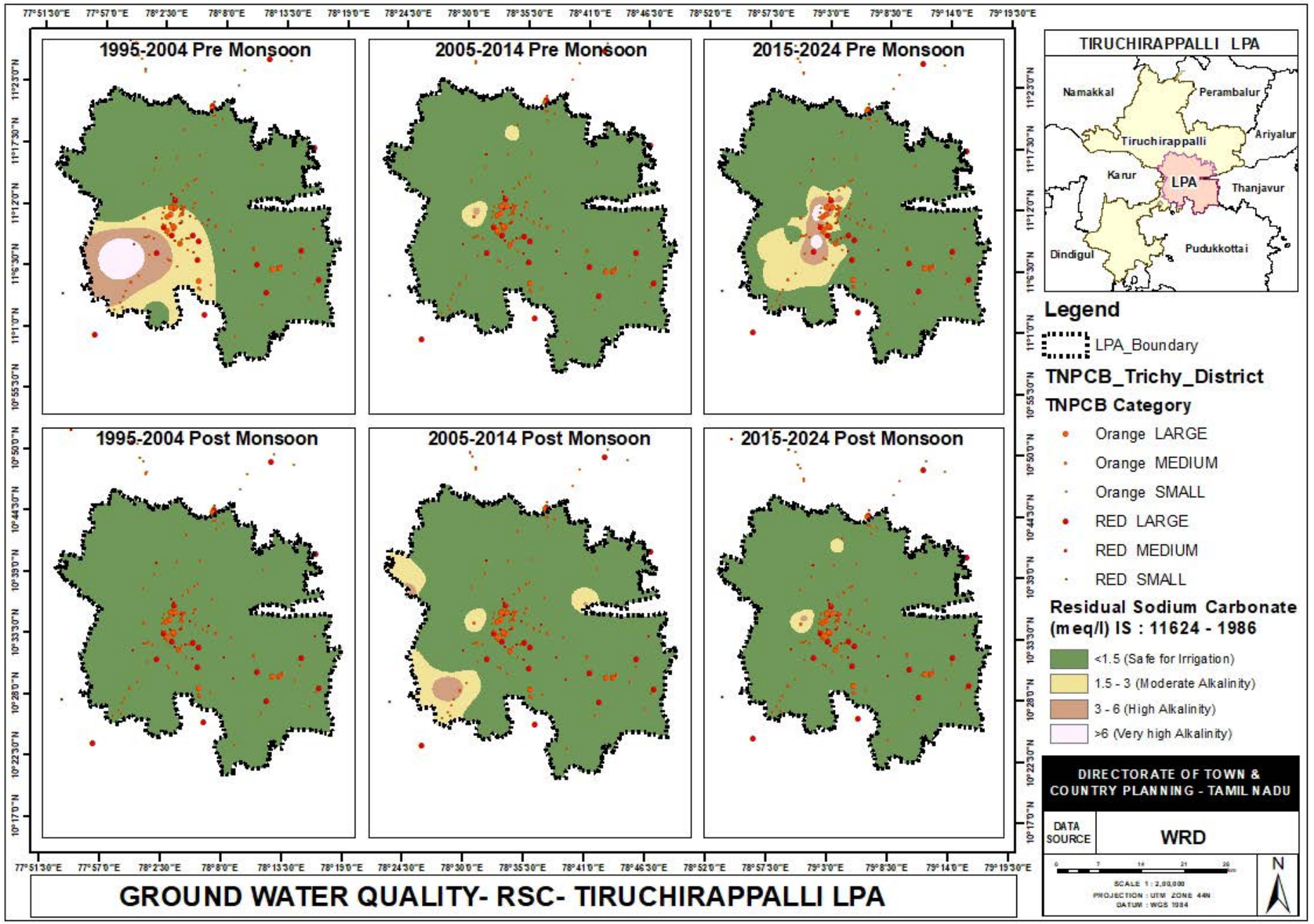

*Map 6.26 pH Levels in Ground Water*




*Map 6.27 Sulphate Levels in Ground Water*




*Map 6.28 Sodium Absorption Ratio (SAR) in Ground Water*




*Map 6.29 Residual Sodium Carbonate (RSC) in Ground Water*

## 6.8 Biotic and Abiotic Systems

The Tiruchirappalli Local Planning Area (LPA) supports a diverse assemblage of biotic and abiotic systems that collectively shape ecological balance, hydrological functioning, and long-term urban–rural sustainability. These include reserve forests, riparian vegetation, urban green cover, agroforestry plantations, fertile soils, hard rock formations, sand deposits, and groundwater reserves. Together, these natural assets regulate biodiversity, microclimate, soil productivity, surface and subsurface water dynamics, and land-use potential.

Rapid urban expansion, infrastructure development, and changing agricultural practices have, however, placed increasing stress on these systems, leading to habitat fragmentation, reduction in green cover, declining surface moisture, and intensified urban heat stress. Within the Master Plan framework, safeguarding and strengthening these ecological assets is essential for climate resilience, environmental quality, disaster risk reduction, and sustainable urban development.

### 6.8.1 Reserve Forests

The Tiruchirappalli LPA contains four notified forest patches—Kariyamanickam and Kilianur Reserve Forests in the western sector, and Vengur and Kilamullakudi forests in the eastern sector—strategically located within the interfluvial zone between the Cauvery and Kollidam rivers. These forest tracts form integral components of the regional riparian–wetland–forest continuum, supporting biodiversity, stabilising riverbanks, moderating floods, and enhancing groundwater recharge.

Beyond their ecological functions, these reserve forests play a critical role in microclimate regulation, carbon sequestration, habitat connectivity, and landscape resilience. Their spatial positioning along floodplains and river corridors enhances ecological continuity across the LPA, enabling species movement and supporting ecosystem services. These forests also serve as natural buffers against urban encroachment and hydrological disturbances, making their strict protection and integration into the ecological network of the Master Plan imperative.

The Tiruchirappalli Forest Range supports a diverse assemblage of small mammals, although habitat loss, fragmentation, and anthropogenic pressure have resulted in declining populations of several species. Recorded fauna includes Golden Jackal, Jungle Cat, Rusty Spotted Cat, Small Indian Civet, Asian Palm Civet, Indian Grey Mongoose, Black-naped Hare, Wild Boar, Slender Loris, Bonnet Macaque, and Spotted Deer. Notably, species such as the Bonnet Macaque (Vulnerable) and Rusty Spotted Cat (Near Threatened) highlight the ecological sensitivity of these habitats (Source: MBIMPH,

2023). Conservation of these forest patches is therefore critical not only for biodiversity protection but also for maintaining ecological stability within the rapidly urbanising landscape.

### 6.8.2 Urban Forests

Urban forestry initiatives within the Tiruchirappalli LPA are implemented through coordinated efforts of the City Corporation, municipalities, town panchayats, educational institutions, and the Forest Department. The City Corporation undertakes annual plantation drives, with approximately one lakh seedlings planted each year, while educational institutions and public agencies contribute through campus greening and roadside plantations. Municipal bodies complement these initiatives by developing green spaces within streetscapes, parks, playgrounds, and public institutions.

To enhance effectiveness and long-term survival, the Forest Department increasingly employs GIS-based spatial planning tools to identify vacant and underutilised urban and peri-urban parcels suitable for afforestation. Priority is accorded to areas with access to water, scope for long-term protection, and community stewardship, thereby improving plantation survival rates and ecological impact. Urban forestry thus forms a key instrument in mitigating heat stress, improving air quality, enhancing liveability, and strengthening urban ecological resilience.

### 6.8.3 Green Cover and Biodiversity

The ecological strategy for Tiruchirappalli LPA places emphasis on species diversity, ecosystem functionality, and livelihood integration. Plantation programmes prioritise native and high-value species such as Teak, Mahogany, Casuarina, Vengai (Indian Kino), and Red Sander, aimed at farmland reforestation, institutional greening, and agroforestry promotion. These interventions enhance carbon sequestration, improve microclimate, and supplement rural incomes.

Specialised initiatives such as the Pooncholai Pollinator Gardens at Poigaipatti and T. Idayappatti integrate soil analysis, selection of host and nectar species, and landscape design to support pollinator diversity, environmental education, and recreational functions. Over 94% of planted saplings have been geo-tagged under the Green Tamil Nadu Mission (GTM) portal (as of January 2026), enabling continuous survival monitoring and performance evaluation.

Despite these initiatives, overall green cover within Tiruchirappalli district remains low at approximately 10–11%, well below the 33% target set under the GTM. This gap underscores the urgent need for scaling up urban greening, corridor-based afforestation, institutional plantations, agroforestry expansion, and protection of existing vegetated spaces within the Master Plan framework.

*Table 6.6 Major Nursery Species used for Farmland Reforestation in Tiruchirappalli District*

| Species | Count | Ecological/Economic Role |
|---|---|---|
| Mahogany | 65,350 | Commercial timber |
| Teak | 48,400 | High-value hardwood |
| Casuarina | 46,100 | Bio-shield/Industrial use |
| Red Sander | 28,500 | Conservation value |
| Vengai (Indian Kino) | 20,950 | Indigenous hardwood |

*Source: Forest Department, Tiruchirappalli Division*

A list of small mammals in the Tiruchirappalli forest region is provided below.

*Table 6.7 Small mammals in Tiruchirappalli Forest Range*

| SPECIES | IUCN STATUS | NO.OF. INDIVIDUALS |
|---|---|---|
| Golden Jackal | Least concern | 2 |
| Jungle Cat | Least concern | 8 |
| Rusty spotted cat | Near Threatened | 1 |
| Small Indian Civet | Least concern | |
| Asian Palm Civet | Least concern | 2 |
| Indian grey Mongoose | Least concern | 18 |
| Black Naped Hare | Least concern | 22 |
| Wild Boar | Least concern | 2 |
| Slender Loris | Near Threatened | 1 |
| Bonnet Macaque | Vulnerable | 25 |
| Spotted Deer | Least concern | 10 |

*Source: https://mbimph.com/index.php/UPJOZ/article/view/2510/2137*

### 6.8.4 Plantation Schemes

Plantation strategies within the Tiruchirappalli LPA are aligned with the Green Tamil Nadu Mission (GTM), which aims to increase forest and tree cover to 33% by 2030–31. Implementation follows a multi-departmental convergence model, coordinated by the District Administration, integrating the

Forest Department, Rural Development, Highways, Urban Local Bodies, and educational institutions.

Major initiatives include:

- Village-level woodlots (Maragadha Pooncholai) on panchayat and revenue lands
- Agroforestry nurseries under RKVY, equipped with mist chambers and sprinkler systems
- Compensatory afforestation along highways, adopting a 1:10 replacement norm
- Species-specific climate resilience programmes, notably Palmyra (Borassus flabellifer) plantations

Between 2023–24, 23.76 lakh saplings were planted against a target of 20 lakh, while cumulative achievements by January 2026 reached 26.53 lakh saplings, marginally exceeding planned targets. Integration with MGNREGS further enhances employment generation while strengthening ecological restoration. These initiatives collectively form the backbone of the district's afforestation strategy, though sustained scaling and spatial targeting remain necessary to offset rapid urban expansion.

### 6.8.5 Abiotic Assets

The abiotic natural assets of the Tiruchirappalli LPA include fertile alluvial soils, weathered and fractured hard rock formations, riverine sand deposits, and extensive groundwater reserves. These resources underpin agricultural productivity, construction activity, and water supply systems. However, unregulated sand mining, soil sealing, quarrying, and over-extraction of groundwater pose significant risks of environmental degradation, hydrological imbalance, and long-term resource depletion. Strategic planning and regulatory oversight are therefore essential to ensure sustainable utilisation and conservation of these abiotic assets.

### 6.8.6 Green Cover

In the Net Zero Climate Action Plan 2023 for Tiruchirappalli Corporation Area, the green cover within the study area has been assessed by considering crop land and tree cover together, as both represent active vegetative surfaces contributing to ecological functioning, microclimate regulation, carbon sequestration, and environmental sustainability. Crop land constitutes the dominant component of green cover, covering 91.09 sq.km (54.47%), while tree cover accounts for 1.06 sq.km (0.63%) of the total area. Together, these categories form a total green cover of 92.15 sq.km, equivalent to 55.10% of the total geographical area. This indicates that more than half of the planning area

continues to remain under vegetative cover, primarily driven by agricultural land use, although the proportion of permanent tree cover remains limited. The spatial distribution and composition of this green cover have significant implications for urban environmental quality, hydrological regulation, thermal comfort, and long-term ecological resilience.

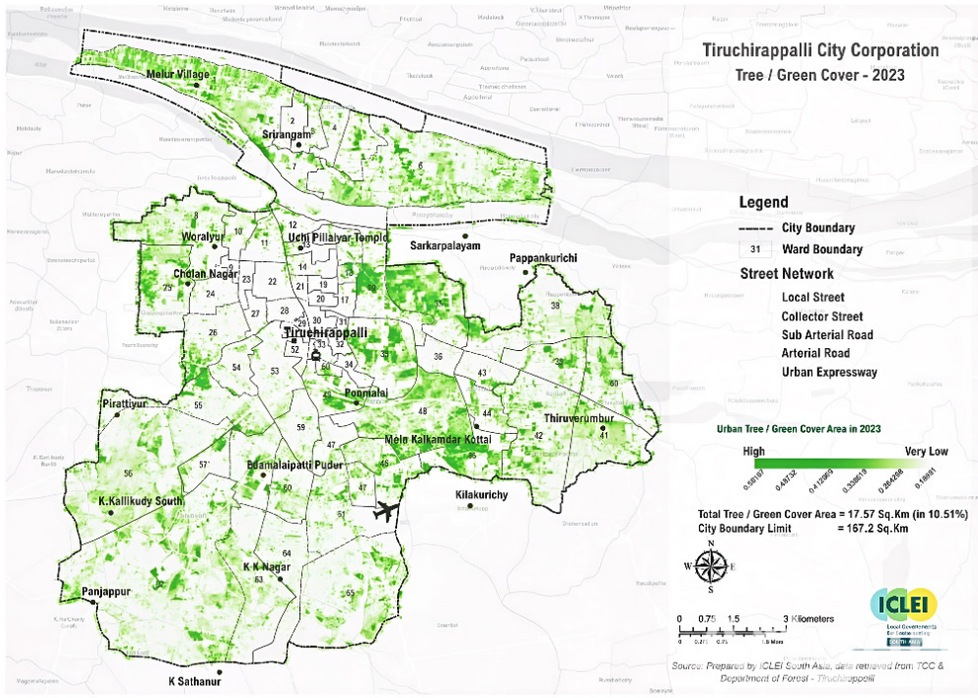



*Figure 6.5 Total Tree/ Green Cover within Tiruchirappalli Corporation (2023)*

*Source: Tiruchirappalli climate resilient city action plan*

## 6.8.7 NDVI and NDMI Analysis

Vegetation cover and surface moisture play a crucial role in regulating urban temperature and maintaining environmental balance. This subsection analyses the spatial and temporal variations in vegetation health and moisture conditions within the Tiruchirappalli LPA using NDVI and NDMI for the years 2015 and 2025 using the Map 6. 30, Map 6. 31, Map 6. 32, Map 6. 33. By examining changes over time and relating them with water availability indicators such as NDWI, the analysis helps in understanding how land-use changes and urban expansion have influenced ecological conditions and contributed to increasing heat stress in Tiruchirappalli LPA.

The Normalized Difference Vegetation Index (NDVI) map for 2015 indicates a moderate level of vegetation cover across the Tiruchirappalli LPA. Areas with higher NDVI values (0.3–1.0) are predominantly observed along the Cauvery River corridor, agricultural lands, and peripheral zones, reflecting healthy

vegetation and irrigated landscapes. The urban core and corporation boundary largely fall within the low to moderate NDVI range (0.1–0.3), while isolated patches of negative to very low NDVI values correspond to built-up surfaces, barren land, and transportation networks.

In 2025, the NDVI map shows a noticeable spatial redistribution of vegetation. While certain peripheral and river-adjacent areas continue to exhibit high NDVI values, the urban core shows an expansion of low NDVI zones, indicating vegetation loss due to urban expansion and densification. The fragmentation of green patches is more pronounced, suggesting reduced continuity of vegetated surfaces within the LPA. Although some increase in NDVI is visible in select agricultural pockets, overall vegetation within the corporation limits appears stressed and diminished.

The Normalized Difference Moisture Index (NDMI) map for 2015 reflects moderate surface moisture conditions across the LPA. Areas with higher NDMI values (0.1–0.3) are largely associated with water-influenced zones, irrigated agricultural lands, and vegetated areas, particularly near the Cauvery River. Conversely, negative to low NDMI values (–0.6 to 0) dominate the urban core and southern parts of the LPA, indicating dry surfaces and limited moisture availability.

By 2025, the NDMI map reveals a general decline in surface moisture across large portions of the LPA. Dryness intensifies within the corporation area and expanding urban fringes, as reflected by the spread of negative to near-zero NDMI values. Although some improvement in moisture levels is visible in peripheral and irrigated zones, these areas are spatially limited. The overall pattern suggests increased moisture stress, likely driven by higher temperatures, reduced vegetative cover, and land-use change.

A comparison of NDVI and NDMI between 2015 and 2025 highlights a clear decline in vegetative health and surface moisture within the urbanized parts of Tiruchirappalli LPA. The spatial expansion of low NDVI and low NDMI zones closely aligns with areas of rapid urban growth. While agricultural and river-influenced zones retain relatively better vegetation and moisture conditions, these benefits are increasingly confined to the periphery. The trends indicate that urban expansion has outpaced green and blue infrastructure development, exacerbating ecological stress.

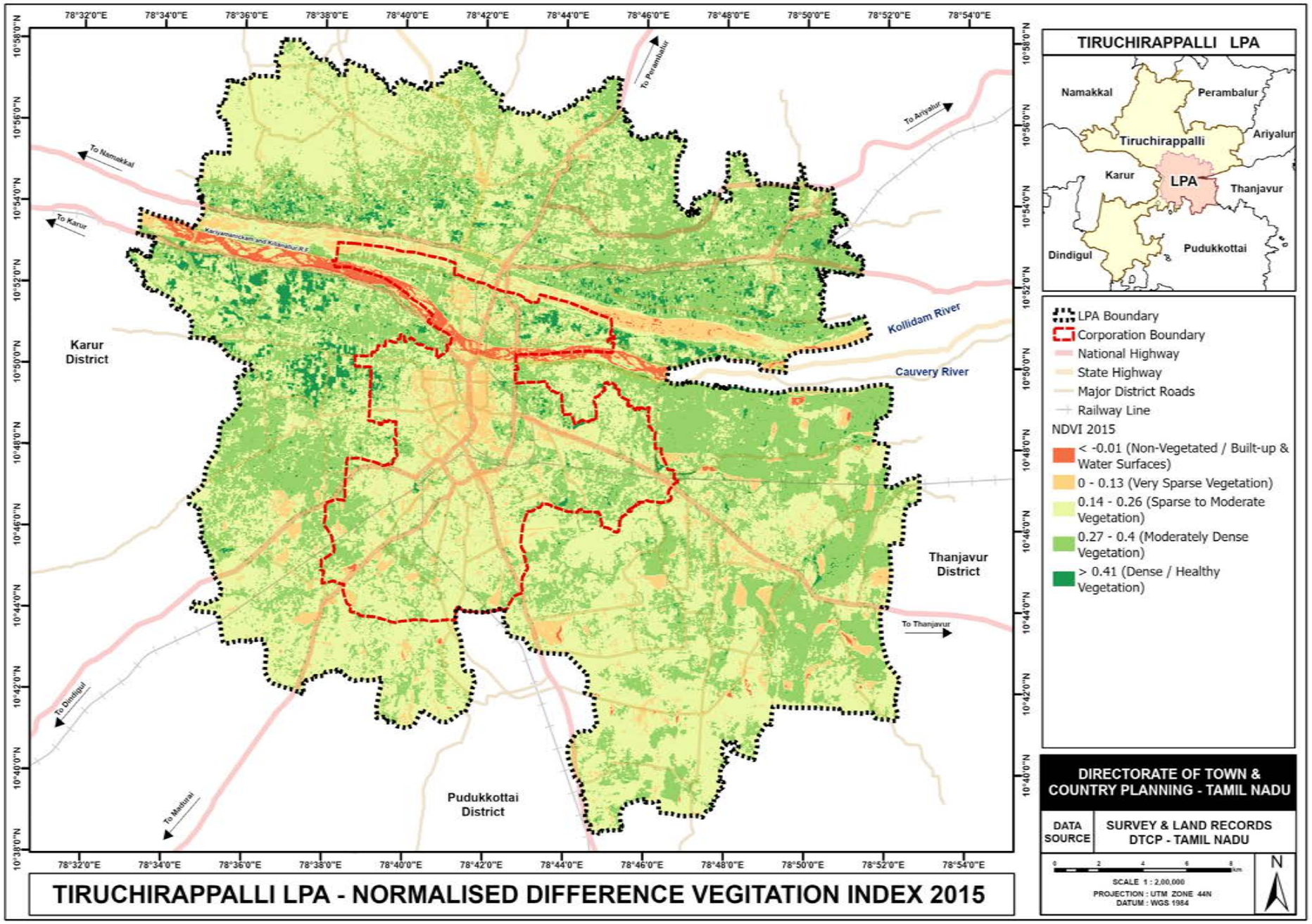
The spatial patterns observed across NDVI, NDMI, and NDWI (water index) reveal a strong interrelationship between vegetation, moisture availability, and surface water presence in the Tiruchirappalli LPA:

- Areas with high NDVI values consistently correspond with higher NDMI and NDWI values, indicating that healthy vegetation is strongly supported by adequate soil moisture and proximity to water bodies.

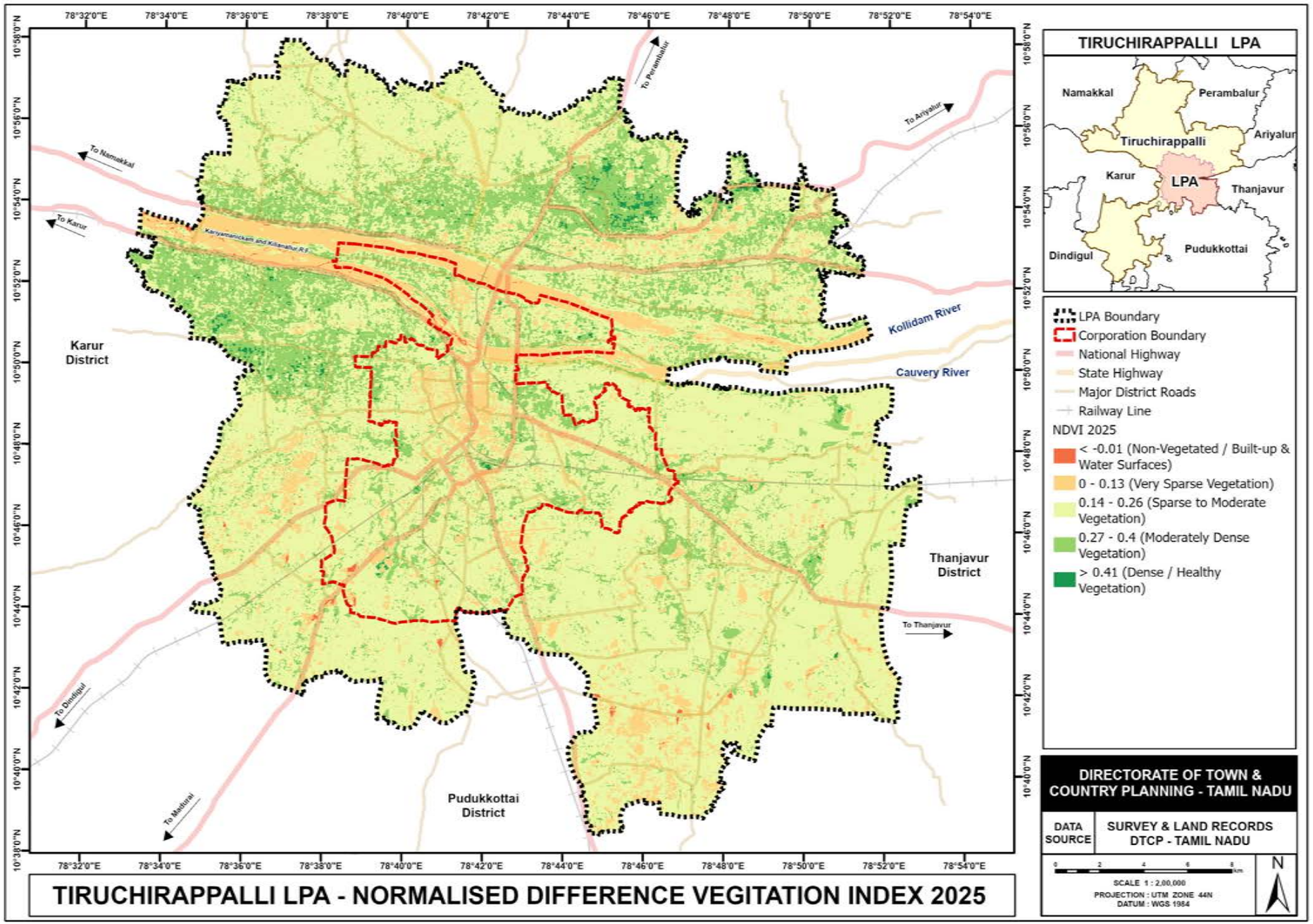
- Regions showing low NDVI also exhibit low NDMI and NDWI, particularly within dense built-up zones, reflecting dry, impervious surfaces with limited evapo-transpirative cooling.
- The decline in NDMI and NDWI between 2015 and 2025 has contributed to vegetation stress, as evidenced by reduced NDVI values, which in turn intensifies land surface temperatures and urban heat stress.

The combined analysis of NDVI, NDMI, and NDWI demonstrates that areas with high vegetation cover consistently retain more moisture and maintain lower surface temperatures, particularly along the Cauvery River and in peripheral agricultural zones. In contrast, urban cores and densely built-up areas show low NDVI, NDMI, and NDWI values, indicating vegetation loss, reduced moisture availability, and shrinking surface water. To complement these observations, the Normalized Difference Built-up Index (NDBI) was analysed to identify areas dominated by impervious surfaces. High NDBI values correspond with commercial, industrial, and high-density residential zones, coinciding with areas of low NDVI and NDMI. This interrelationship confirms that urban expansion and surface sealing exacerbate thermal stress by reducing evapotranspiration and water retention capacity. Over the decade 2015–2025, NDVI and NDMI trends indicate declining vegetation health and surface moisture, while NDBI trends reveal a progressive increase in built-up density, highlighting a mismatch between afforestation efforts and urban growth. The integrated pattern underscores the importance of blue–green infrastructure, such as vegetated corridors, urban forests, and water-sensitive landscapes, to mitigate heat, enhance ecological resilience, and restore hydrological balance within the Tiruchirappalli LPA.

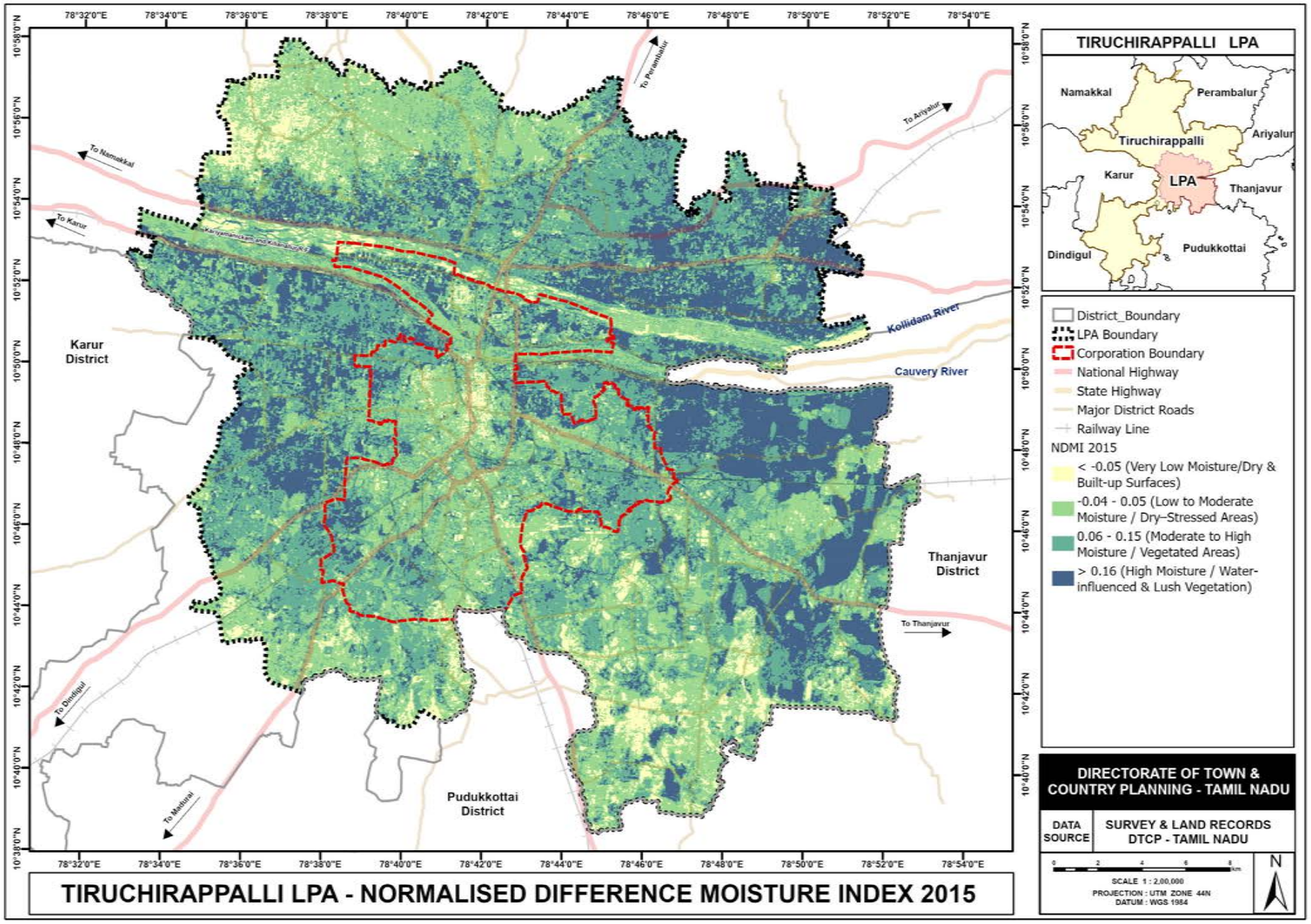
Complementing the vegetation and moisture indices, the Normalized Difference Built-up Index (NDBI) was analysed to identify areas of dense built-up expansion that contribute to increased surface temperatures. High NDBI values coincide with urban cores, commercial zones, and industrial areas, highlighting the link between impervious surfaces and localized heat intensification.



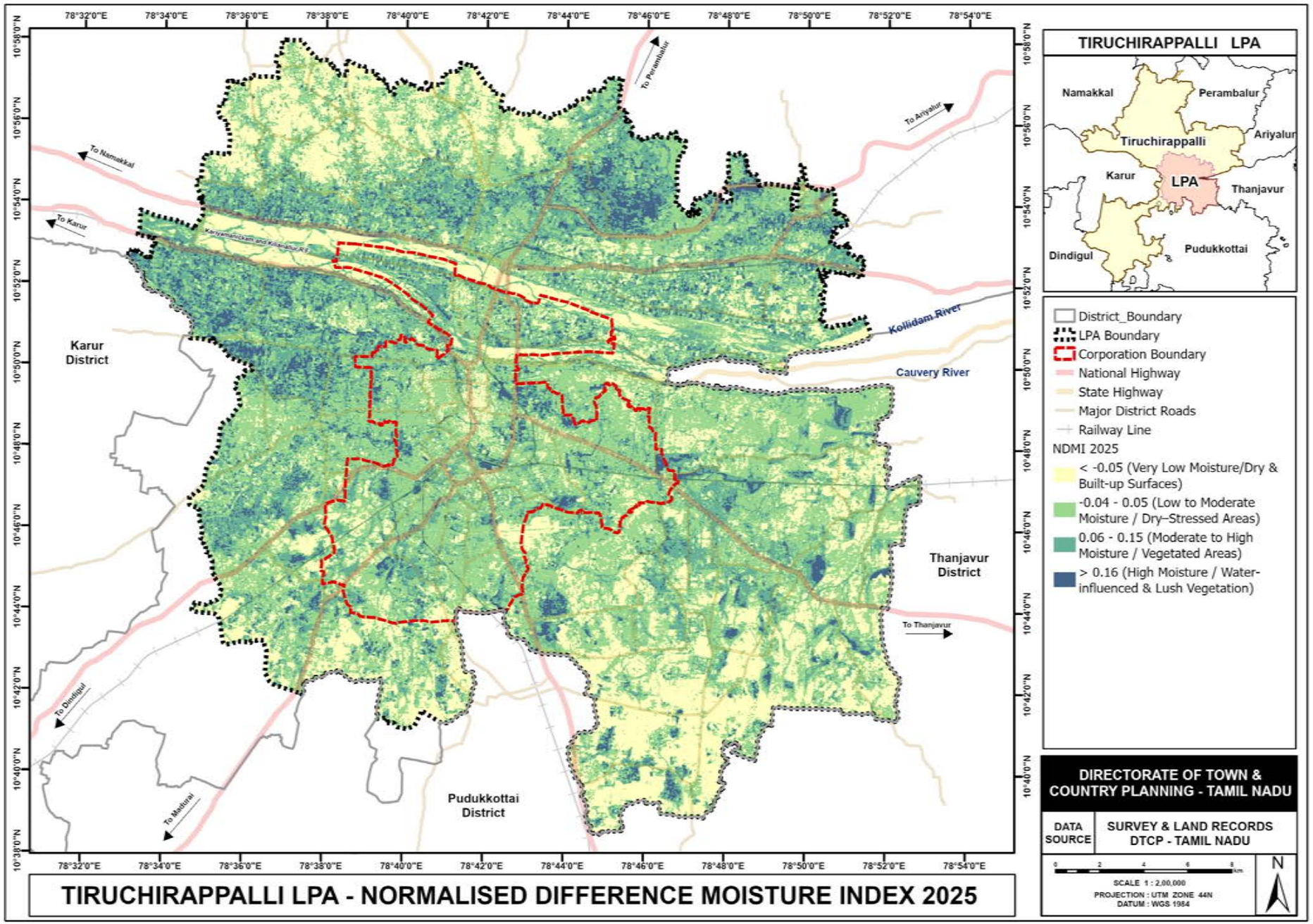

*Map 6.30 NDVI 2015*




*Map 6.31 NDVI 2025*




*Map 6.32 NDMI 2015*




*Map 6.33 NDMI 2025*

## 6.9 Pollution

Pollution within the Tiruchirappalli LPA is a multifaceted environmental challenge driven by rapid urbanization, industrial concentration, expanding transport activity, and pronounced seasonal climatic variations. The degradation of environmental quality is most evident in the central urban core and northern industrial corridors, where sustained anthropogenic pressures have resulted in measurable increases in atmospheric, surface water, and groundwater contaminants.

### 6.9.1 Air Pollution

The air quality within the Tiruchirappalli LPA is characterized by seasonal fluctuations and localized concentrations of pollutants, with current Air Quality Index (AQI) levels generally falling within a moderate range. Historical data from 2020 to 2025 indicates that while some years experienced significantly cleaner air, recent trends show a slight increase in pollutant concentrations during specific months.

#### Industrial Point Sources

The presence of industries—categorized by the TNPCB as Red and Orange (Large, Medium, and Small)— shows a strong spatial correspondence with areas of persistently elevated pollutant concentrations. A high density of "Red Large" and "Orange Large" industrial units is situated in the central-western portion of the LPA, which corresponds to the elevated levels of particulate matter and gaseous emissions observed in the spatial mapping

#### Historical Air Quality Index (AQI) Trends

Analysis of historical AQI data from 2020 to 2025 reveals distinct seasonal patterns and yearly variations. Notably, 2021 recorded the lowest AQI levels (healthiest air), particularly in June with an average of 43, which may reflect reduced activity during that period. In contrast, June 2024 saw a peak average AQI of approximately 78.1, indicating a decline in air quality.

*Table 6.8 Historical Air Quality Index (AQI) Trends*

| Year | January Average AQI | June Average AQI |
|---|---|---|
| 2020 | 61.86 | 51.56 |
| 2021 | 58.63 | 43.00 |
| 2022 | 67.43 | 84.00 |
| 2023 | 64.11 | 65.00 |
| 2024 | 68.90 | 78.13 |
| 2025 | 68.33 | 65.78 |

*Source: TNPCB*

### Particulate Matter Concentration (PM10 and PM2.5)

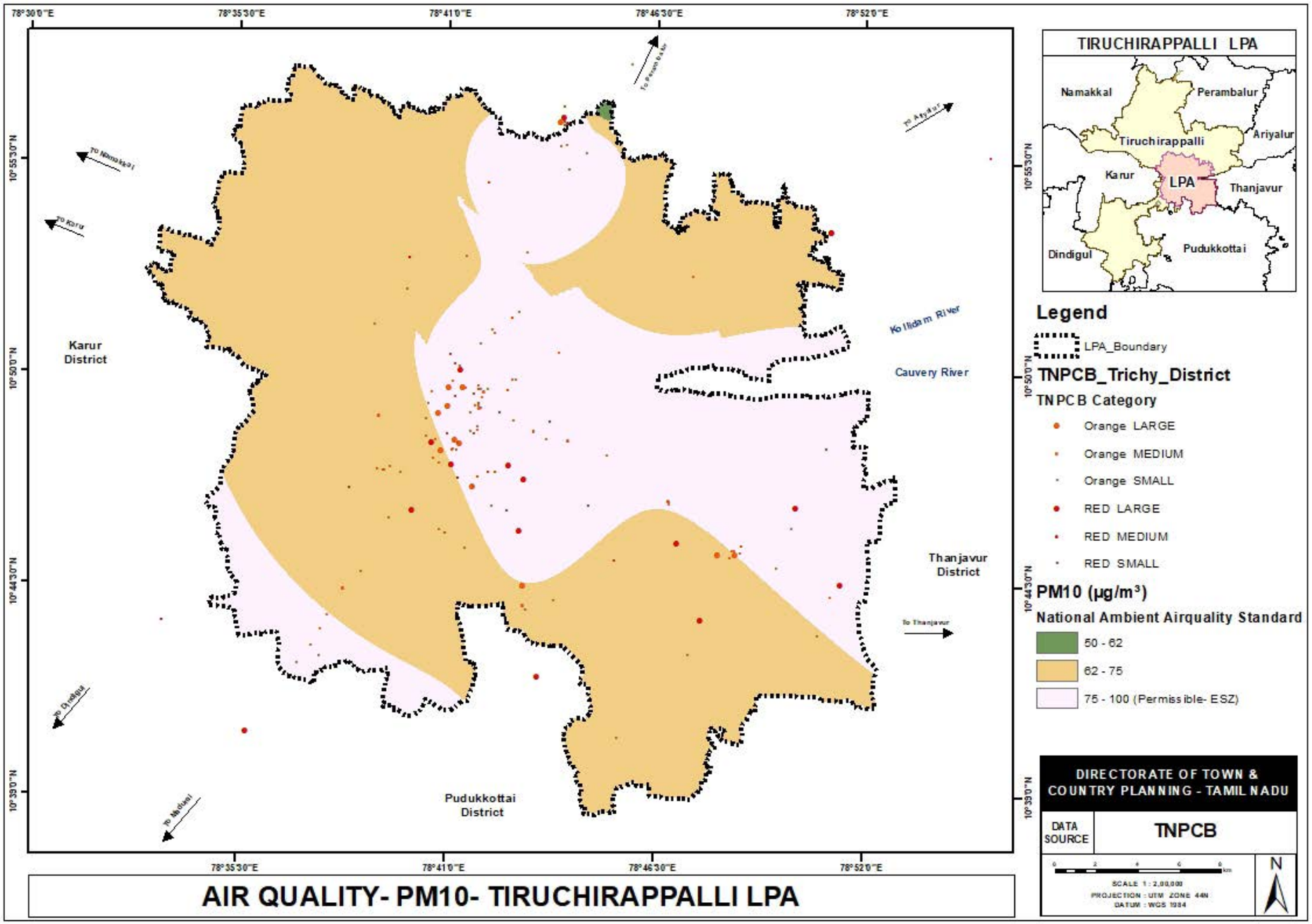
Particulate matter represents a significant environmental concern for the LPA, with higher concentrations typically clustered around the central urban core and industrial zones.

- PM10 Levels (Map 6.34): The LPA experiences PM10 concentrations ranging from 50 to 87 µg/m³. The highest concentrations (75-87 µg/m³) are predominantly found in a broad central corridor stretching toward the north and southeast.
- PM2.5 Levels (Map 6.35): Fine particulate matter follows a similar spatial distribution, with values ranging from 15 to 40 µg/m³. Large sections of the central and eastern LPA fall into the highest bracket of 32-40 µg/m³.

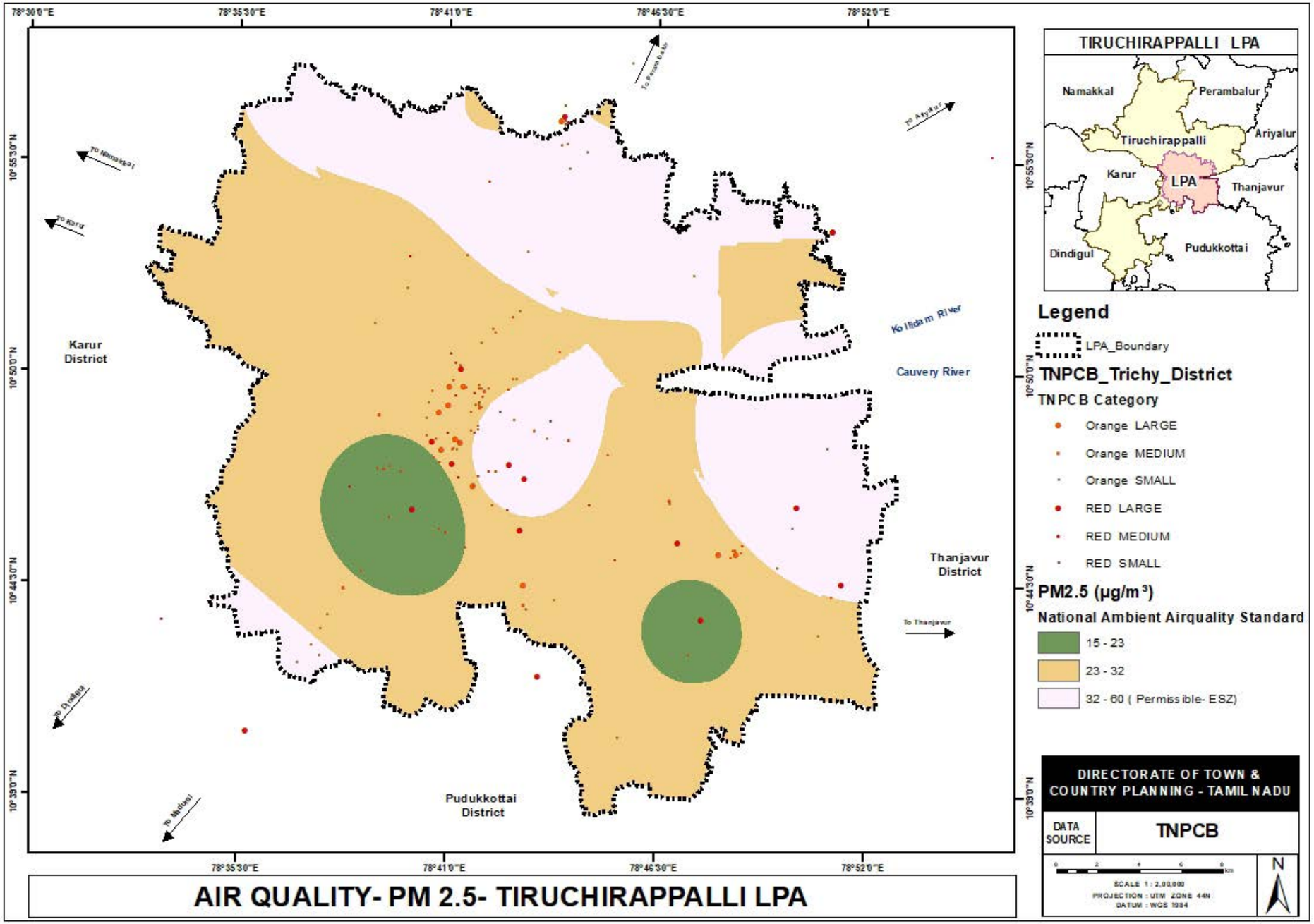
### Gaseous Pollutants (NO2 and SO2)

Gaseous pollutants like Nitrogen Dioxide and Sulphur Dioxide remain within relatively stable limits across most of the LPA, though specific "hotspots" exist near industrial clusters.

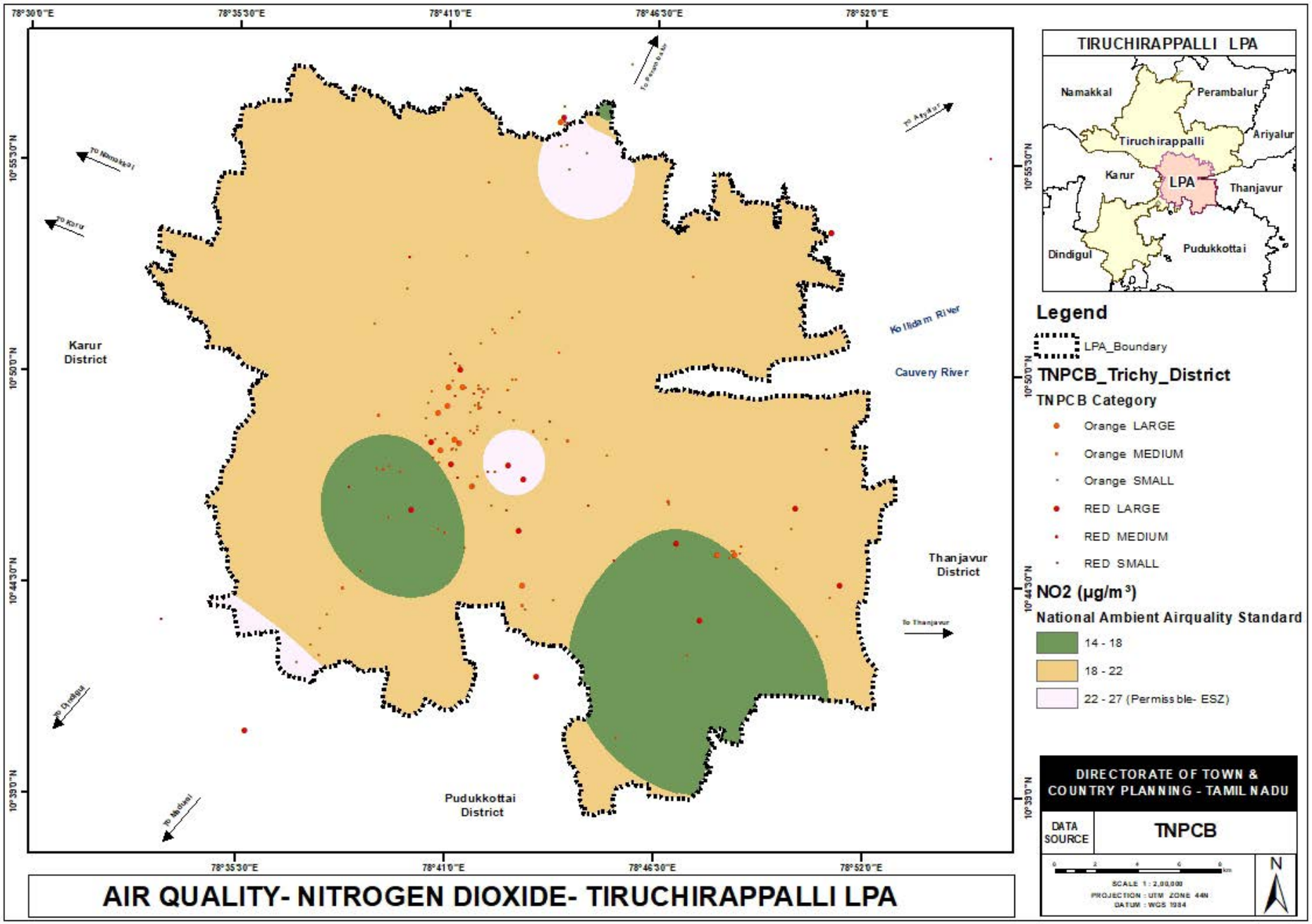
- Nitrogen Dioxide (NO2): As seen in Map 6.36, Most of the LPA maintains levels between 18 and 22 µg/m³. However, a distinct high-concentration pocket (22-27 µg/m³) is visible in the northern periphery of the planning area.
- Sulphur Dioxide (SO2): As seen in Map 6.37, SO2 levels generally range from 13 to 17 µg/m³. Similar to NO2, the highest recorded levels (17-20 µg/m³) are localized in the northern region.



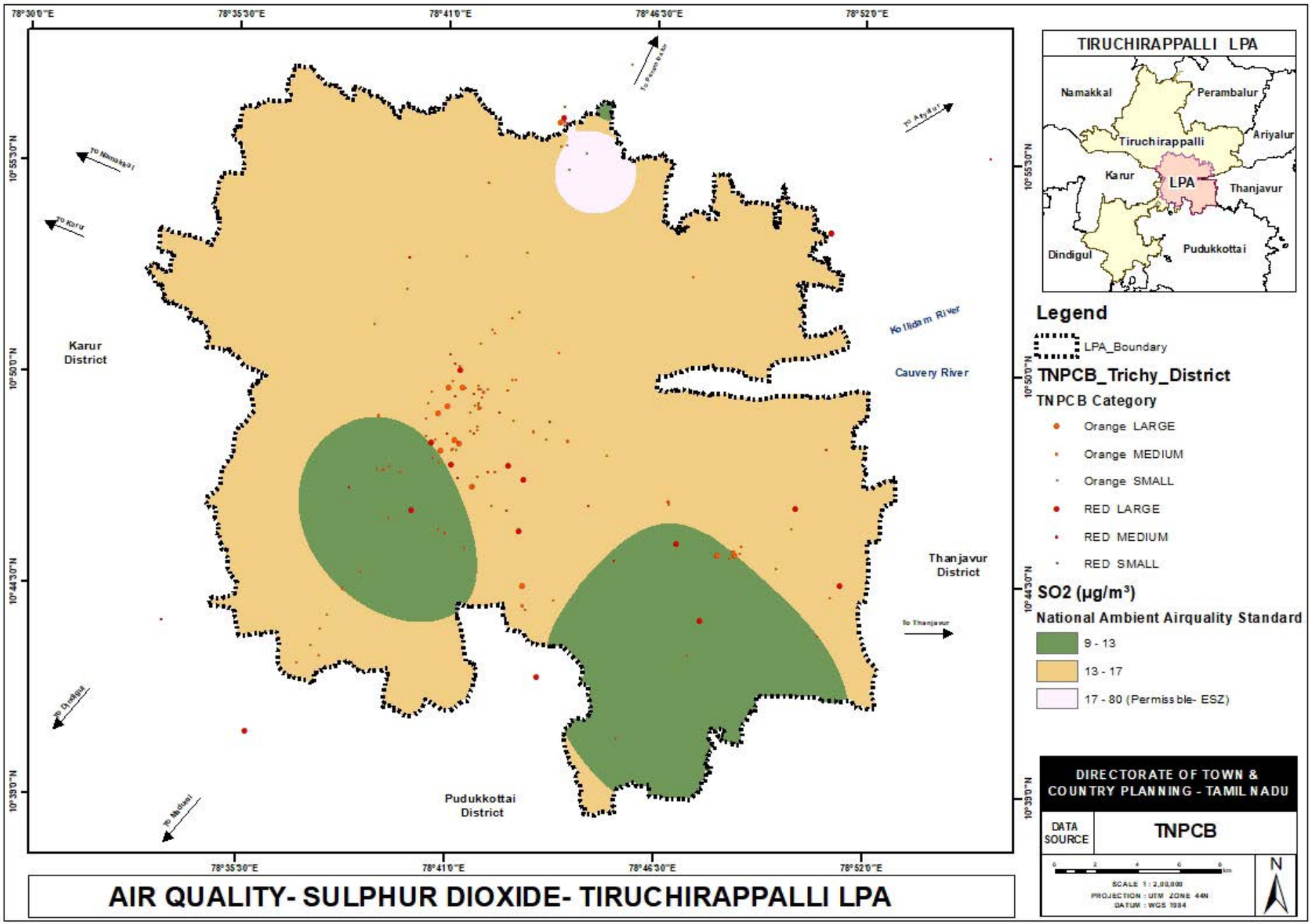

*Map 6.34 Particulate Matter 10 (PM10) Concentration*




*Map 6.35 Particulate Matter 2.5 (PM2.5) Concentration*




*Map 6.36 Concentration of Nitrogen Dioxides in LPA*




*Map 6.37 Concentration of Sulphur Dioxides in LPA*

### 6.9.2 Water Pollution

Water pollution within the Tiruchirappalli LPA reflects the cumulative impacts of urban expansion, industrial effluent discharge, inadequate sewerage coverage, agricultural runoff, and unscientific solid waste disposal. Both surface water and groundwater systems show increasing signs of stress, particularly in the central urban core, northern industrial belts, and rapidly urbanizing peri-urban areas. Spatial analysis reveals a distinct deterioration of water quality parameters over the past two decades, raising concerns regarding long-term water security, public health, and ecosystem sustainability.

#### Surface Water Pollution

The Cauvery River, Kollidam distributary, urban tanks, and drainage channels form the primary surface water system of the LPA. Water quality monitoring indicates that organic and microbial pollution levels rise significantly during the pre-monsoon period, when river discharge and tank storage are minimal, reducing natural dilution capacity.

Key problematic indicators include:

- **Biochemical Oxygen Demand (BOD):** Elevated BOD levels are observed in urban stretches, particularly downstream of densely populated and industrial zones, indicating high organic loading from untreated sewage and effluents.
- **Faecal Coliform:** Several monitoring locations record faecal coliform concentrations exceeding permissible bathing water standards, reflecting direct discharge of untreated domestic wastewater and poor sanitation connectivity in peripheral areas.
- **Nutrient Loading:** Increased nitrate and phosphate concentrations in tanks and channels point toward agricultural runoff and urban wastewater mixing, promoting eutrophication risks.

Spatially, urban drainage outfalls, industrial belts, and peri-urban settlements lacking sewerage infrastructure emerge as critical surface water pollution hotspots, particularly along the central and western sectors of the LPA.

#### Ground Water Pollution

Groundwater, the primary source of drinking and domestic water supply across much of the LPA, exhibits progressive chemical degradation, especially within urban and industrial zones. Analysis of long-term groundwater quality trends (1995–2024) reveals expanding zones of salinity, mineralization, and hardness, coinciding closely with areas of dense urbanization and industrial concentration.

Key problematic parameters include:

- Total Dissolved Solids (TDS): Elevated TDS concentrations are predominantly recorded in the central urban corridor and eastern expansion zones, indicating increasing salinization due to sewage infiltration, industrial discharge, and reduced recharge.
- Chloride: High chloride levels mirror the TDS distribution, reflecting anthropogenic contamination rather than natural geogenic sources.
- Total Hardness: Elevated hardness levels across large parts of the urban core and northern industrial clusters suggest long-term accumulation of dissolved minerals, aggravated by poor recharge quality and surface contamination.
- Nitrate: Localized nitrate enrichment in peri-urban and agricultural belts highlights fertilizer leaching and wastewater percolation risks.

The spatial coincidence of high groundwater salinity, hardness, and industrial clusters strongly indicates a common anthropogenic origin, underscoring the vulnerability of aquifers to surface land-use practices.

### Critical Water Pollution Zones

Based on integrated analysis of surface water and groundwater quality parameters, land use patterns, industrial distribution, and settlement density, the following critical water pollution zones have been delineated at taluk and firka level, enabling precise spatial targeting of mitigation and regulatory interventions:

**Central Urban Core – Trichy Corporation Area**

- Taluk: Tiruchirappalli West & Tiruchirappalli East
- Firkas: Srirangam, Somarasampettai, Valadi (part), Kulumani (part)
- This zone represents the most severely impacted water quality cluster within the LPA. High population density, intensive commercial activity, and legacy sewerage infrastructure result in:
    - Elevated BOD and Faecal Coliform levels in surface water bodies and urban drainage channels, indicating significant untreated sewage discharge.
    - High Total Dissolved Solids (TDS), Chloride, and Hardness in groundwater, reflecting long-term anthropogenic contamination and poor recharge quality.
- The dense built form and limited open recharge spaces further aggravate aquifer stress, making this zone a priority area for sewerage augmentation, decentralised wastewater treatment, and aquifer protection zoning.

**Northern and Western Industrial Corridor**

- Taluk: Tiruchirappalli West, Manachanallur
- Firkas: Manikandam, Sirugambur, Somarasampettai (part), Andanallur (part)
- This corridor constitutes the principal industrial pollution hotspot within the LPA. Spatial overlay indicates a strong correspondence between industrial clusters and degraded groundwater quality, characterised by:
    - High TDS and Chloride concentrations, indicating industrial effluent percolation and solid waste leachate infiltration.
    - Elevated groundwater hardness and localized nitrate enrichment.
    - Declining shallow aquifer quality, particularly in Manikandam firka, which is also classified as over-exploited, significantly heightening contamination vulnerability.
- This zone requires stringent effluent regulation, continuous groundwater quality monitoring, industrial wastewater reuse mandates, and recharge buffer creation as part of integrated environmental management.

**Eastern and South-Eastern Urban Expansion Belt**

- Taluk: Tiruchirappalli East, Thiruverumbur
- Firkas: Tiruverumbur, Navalpattu, Vengur, Lalgudi (part)
- These rapidly urbanizing peri-urban tracts are exhibiting emerging groundwater quality deterioration, driven by unregulated land conversion and infrastructure lag. Key concerns include:
    - Rising nitrate levels, reflecting agricultural runoff and on-site sanitation system leakage.
    - Increasing TDS and hardness, indicating early-stage aquifer mineralization.
    - Localized bacteriological contamination near expanding residential clusters.
- Although current pollution levels remain moderate, these zones represent high-risk future hotspots, necessitating proactive infrastructure provisioning, controlled groundwater abstraction, and land-use-linked wastewater management planning.

**Agricultural–Peri-Urban Interface Zones**

- Taluk: Lalgudi, Manachanallur
- Firkas: Lalgudi, Kulumani, Andanallur, Valadi

- These transitional landscapes show moderate but increasing water quality stress, primarily due to:
  - Fertilizer-induced nitrate contamination
  - Salinity buildup from irrigation return flows
  - Reduced natural recharge caused by surface sealing and canal lining
- Long-term sustainability in these zones depends on promotion of low-input agriculture, artificial recharge structures, and regulation of groundwater extraction, particularly in command and semi-command areas.

### 6.9.3 Correlation between Air and Water Quality

The correlation between air and water quality in the Tiruchirappalli LPA is primarily driven by seasonal environmental cycles and the spatial concentration of industrial activity. Both mediums exhibit a "dilution effect" during periods of heavy rainfall, though their specific responses to seasonal changes vary in intensity and timing.

#### 6.9.3.1 Seasonal Dependency and the Dilution Effect

Both air and water quality show distinct shifts between the dry (pre-monsoon) and wet (post-monsoon) seasons.

- Water Quality Improvement: Surface water quality shows a "clear seasonal dependency," where monsoonal rainfall plays a critical role in pollutant dilution and flushing. For instance, Biochemical Oxygen Demand (BOD) levels are higher in the dry season (pre-monsoon) when river flows are low and dilution capacity is limited.
- Air Quality Variability: Air quality trends are more volatile. While water quality consistently improves post-monsoon, air quality (AQI) data shows that June (often a peak dry/hot month) can see significantly higher pollutant concentrations, such as in 2022 (AQI 84) and 2024 (AQI 78.1), compared to January levels. However, in years with different climatic patterns, like 2021, June AQI was remarkably low (43.0), suggesting that atmospheric cleaning through rain or wind is less predictable than surface water flushing.

#### 6.9.3.2 Spatial Correlation of Pollutant "Hotspots"

The most significant correlation is geographical. The same areas experiencing the highest air pollution also face the most severe water quality degradation.

- Industrial Clusters: The central and western portions of the LPA house a high density of red and orange category industries. These areas correspond directly to:

- Air: High concentrations of PM10 (75–87 µg/m³) and PM2.5 (32–40 µg/m³).
- Water: Increased groundwater salinity and mineralization (TDS and Chloride), which are predominantly concentrated in the central and urbanized parts of the LPA.

- Anthropogenic Pressure: The sources note that the "spatial coincidence" of high groundwater hardness and salinity with urban and industrial areas suggests a shared anthropogenic cause, mirroring the distribution of gaseous pollutants like NO2 and SO2 near industrial nodes.

*Table 6.9 Comparative Summary: Air vs. Water Trends*

| Feature | Surface Water Trend | Air Quality (AQI) Trend |
|---|---|---|
| Pre-Monsoon (Dry) | Higher Pollution: Low flow leads to higher BOD and Faecal Coliform. | Generally Higher: Pollutants often concentrate; June averages reached 84.0 in 2022. |
| Post-Monsoon (Wet) | Improved Quality: Rainfall dilutes and flushes pollutants. | Variable: Generally, more stable; January averages hover around 58–68. |
| Primary Drivers | Rainfall, surface runoff, and river flow. | Industrial emissions and seasonal atmospheric conditions. |

*Source: DTCP, TN*

#### 6.9.3.3 Long-Term Sustainability Risks

The sources highlight that both air and water quality are under "continuous anthropogenic pressures". Just as PM10 levels are expanding across the central corridor, groundwater salinity and mineralization have notably expanded over the past three decades (1995–2024), particularly in the same central and eastern urbanized zones. This suggests that urban expansion is simultaneously degrading the LPA's atmospheric and hydrological health.

### 6.9.4 Soil Pollution

Soil quality in the Tiruchirappalli LPA is increasingly impacted by anthropogenic activities, particularly unscientific solid waste disposal, industrial effluent seepage, and urban runoff. Areas surrounding major waste disposal and processing sites, notably the Ariyamangalam dump yard and its hydrological influence zone, exhibit elevated levels of heavy metals such as lead, copper, cadmium, and manganese, primarily due to prolonged leachate infiltration. These contaminants degrade soil fertility, impair vegetation growth, and pose long-term risks to underlying groundwater systems.

In addition to formal dumping sites, peri-urban agricultural belts and low-lying urban pockets receiving untreated wastewater and storm runoff are emerging as secondary contamination zones. Progressive soil degradation in these areas threatens agricultural productivity, ecosystem health, and food-chain safety. The cumulative impact of improper waste handling, industrial discharge, and surface runoff underscores the need for scientific landfill management, leachate interception systems, continuous soil quality monitoring, and targeted remediation programmes as integral components of environmental planning within the LPA.

### 6.9.5 Noise Pollution

According to TNPCB, Noise pollution within the Tiruchirappalli LPA is primarily driven by vehicular traffic, commercial activity, industrial operations, and periodic socio-cultural events. High noise levels exceeding 96–97 dB(A) have been recorded along major arterial corridors such as NH-83, Trichy–Thanjavur Road, Dindigul Road, and within the central commercial zones, significantly surpassing the permissible daytime standard of 65 dB(A). These elevated levels particularly affect dense residential neighbourhoods, educational institutions, healthcare facilities, and mixed-use areas.

Seasonal peaks, notably during festivals such as Diwali and major temple events, result in episodic spikes ranging from 85–88 dB(A), extending noise exposure into late evening and night hours. Prolonged exposure to such elevated sound levels contributes to auditory stress, sleep disorders, reduced cognitive performance, and diminished urban liveability. Mitigation strategies including zoning-based land-use segregation, traffic calming, development of urban green buffers, enforcement of silence zones, regulation of loudspeaker usage, and public awareness initiatives are critical for achieving long-term noise environment management and improving quality of life across the LPA.

## 6.10 Climate and Environmental Risk Assessment

This section evaluates the key environmental hazards and urban climate stressors affecting the Tiruchirappalli LPA. By analysing flood susceptibility, thermal patterns, land surface temperature, heat risk, and cumulative multi-hazard exposure, the assessment provides a comprehensive understanding of areas vulnerable to natural and urban-induced environmental risks. These analyses inform planning interventions aimed at enhancing urban resilience, reducing human exposure, and integrating green–blue infrastructure for long-term sustainability.

### 6.10.1 Flood Susceptibility, Vulnerability and Risk

Vulnerability reflects the degree to which a system is susceptible to harm and is influenced by its sensitivity, exposure, and adaptive capacity. In line with IPCC frameworks:

**Vulnerability = Sensitivity + Exposure – Adaptive Capacity**

Risk represents the potential for adverse consequences and is defined as:

**Risk = Hazard × Exposure × Vulnerability**

Flood susceptibility refers to the relative likelihood of inundation based on the combined influence of topography, hydrology, land use, soil characteristics, and climatic drivers, rather than being defined by isolated extreme flood events. The Tiruchirappalli LPA, situated along the Cauvery and Kollidam rivers, is naturally prone to flooding due to seasonal monsoon rainfall and increasing frequency of extreme precipitation events. Rapid urbanisation, expansion of impervious surfaces, encroachment on wetlands, and reduction of natural drainage pathways have further intensified flood risk.

The flood susceptibility map (Map 6.38) integrates elevation, slope, river proximity, land use/land cover (LULC), soil type, and recent rainfall data to classify the LPA into five susceptibility categories: very low, low, moderate, high, and very high. Key observations include:

- Low susceptibility zones (dark and light green) correspond to elevated terrain with better drainage and minimal built-up areas.
- Moderate susceptibility zones (yellow) occur in transitional areas with mixed land use and moderate slopes.
- High and very high susceptibility zones (orange and red) are concentrated along river corridors, low-lying floodplains, and dense urban/agricultural areas, where gentle slopes, clay-rich soils, and high runoff potential coincide.

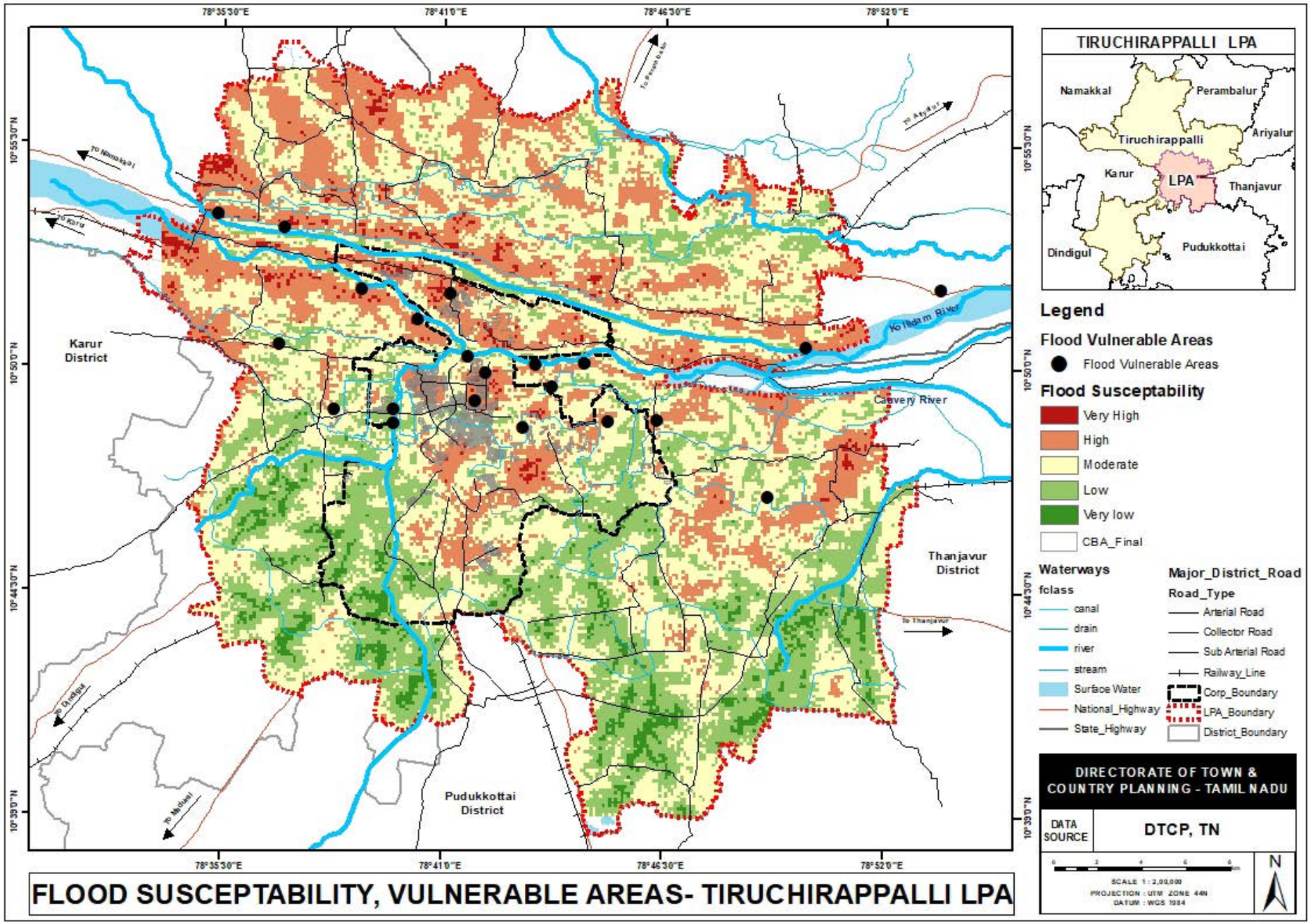
The flood susceptibility map provides critical guidance for urban development control, flood mitigation planning, and climate-resilient infrastructure design.

Spatially, very high flood susceptibility zones are concentrated along the Cauvery and Kollidam floodplains, encompassing Srirangam, Kambarasampettai, Jeeyapuram, Thiruvanaikovil, Kulumani, and low-lying tracts of Andanallur and Manachanallur firkas, where low elevation, fine-grained alluvial soils, and dense settlement patterns converge. Moderate to high susceptibility further extends into the urban expansion corridors of Tiruverumbur, Ariyamangalam, and Panjapur, where surface sealing, infill development, and drainage obstruction significantly increase runoff accumulation and localized flooding risk.

Historical flood records indicate that Tiruchirappalli has experienced repeated flood events over more than a century, with documented major floods in 1889, 1891, 1909, 1930, 1964, 1976, 1978, 1983, 1999, 2005, 2008, 2021, and 2025. While early flood events were primarily driven by extreme monsoonal rainfall and riverine overflow, the increasing frequency of floods in recent decades reflects the combined influence of climate variability, intensified short-duration rainfall, rapid urban expansion, encroachment on floodplains, and reduced natural drainage capacity. The clustering of flood events after 2000, particularly in 2005, 2008, 2021, and 2025, highlights a clear trend towards more frequent and high-impact flooding, underscoring the urgent need for strengthened flood zoning regulations, protection of natural flood buffers, drainage infrastructure upgrades, and climate-resilient urban planning interventions within the Tiruchirappalli LPA.

The spatial overlap between historical flood-affected areas and current high-susceptibility zones further confirms the persistence of flood-prone corridors along the Cauvery and Kollidam floodplains and low-lying urban tracts, reinforcing the scientific reliability of the susceptibility mapping. Overlay analysis of flood susceptibility, observed flood vulnerable points, and urban land-use patterns indicates that the highest flood risk is concentrated not only along the Cauvery–Kollidam floodplains but also within the dense urban core of the Tiruchirappalli Corporation area. Several flood-vulnerable points coincide with zones of high built-up density, drainage congestion, and encroached canal corridors, particularly along the Uyyakondan canal and its distributaries. This spatial overlap highlights the combined influence of natural floodplain exposure and anthropogenic factors such as surface sealing, obstruction of natural drains, and encroachment on historical water conveyance systems.

Furthermore, urban expansion corridors towards Ariyamangalam, Tiruverumbur, and Panjapur exhibit increasing flood susceptibility due to rapid conversion of permeable agricultural lands into impervious surfaces, compounded by limited stormwater drainage capacity. These spatial patterns




*Map 6.38 Flood Susceptibility Map*

indicate a progressive shift in dominant flood mechanisms from riverine overflow towards pluvial and urban flooding, driven primarily by intense short-duration rainfall, surface sealing, and constrained drainage capacity.

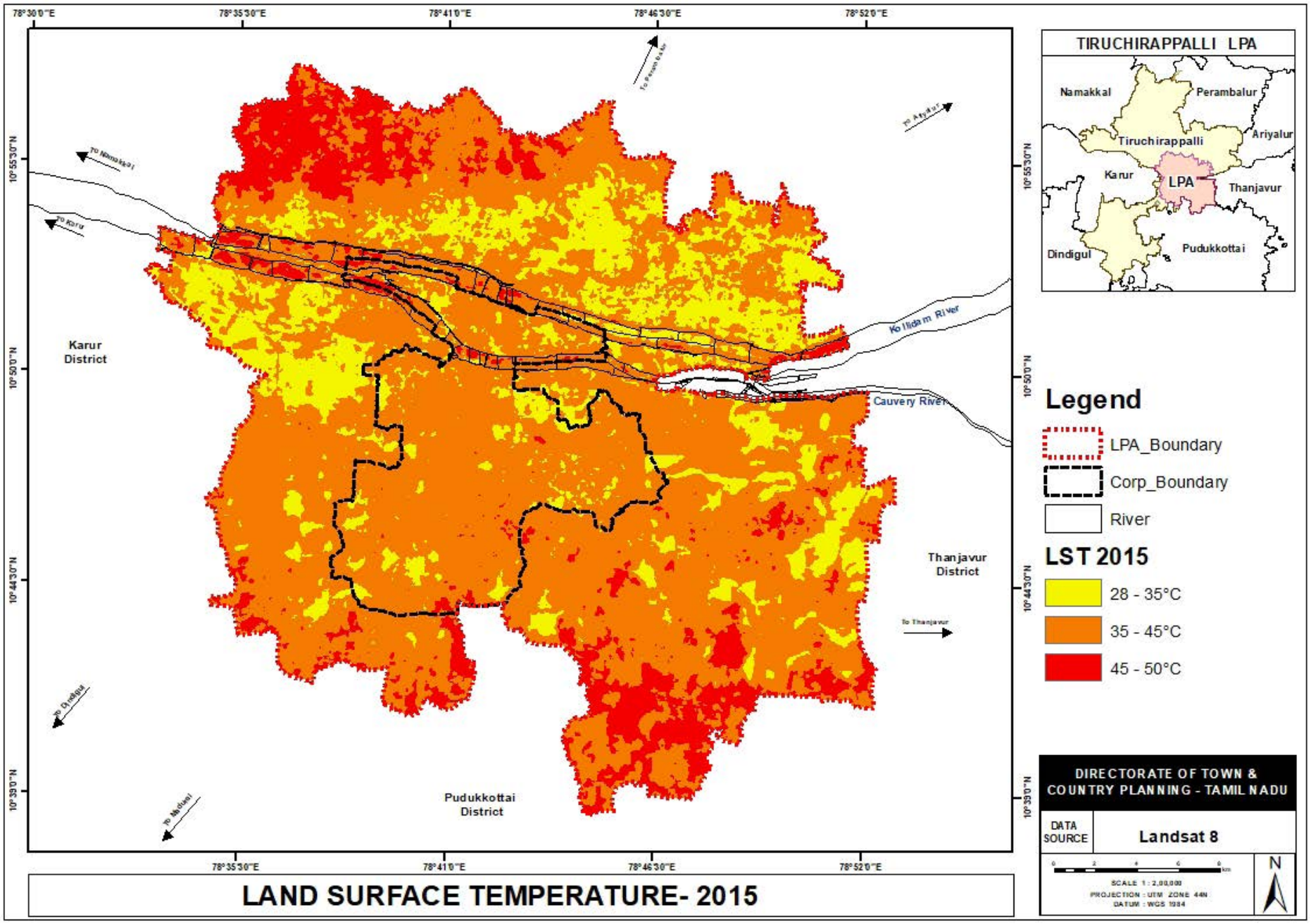
### 6.10.2 Land Surface Temperature Dynamics

Land Surface Temperature (LST) mapping provides a high-resolution perspective of urban heat distribution and the influence of land-use changes:

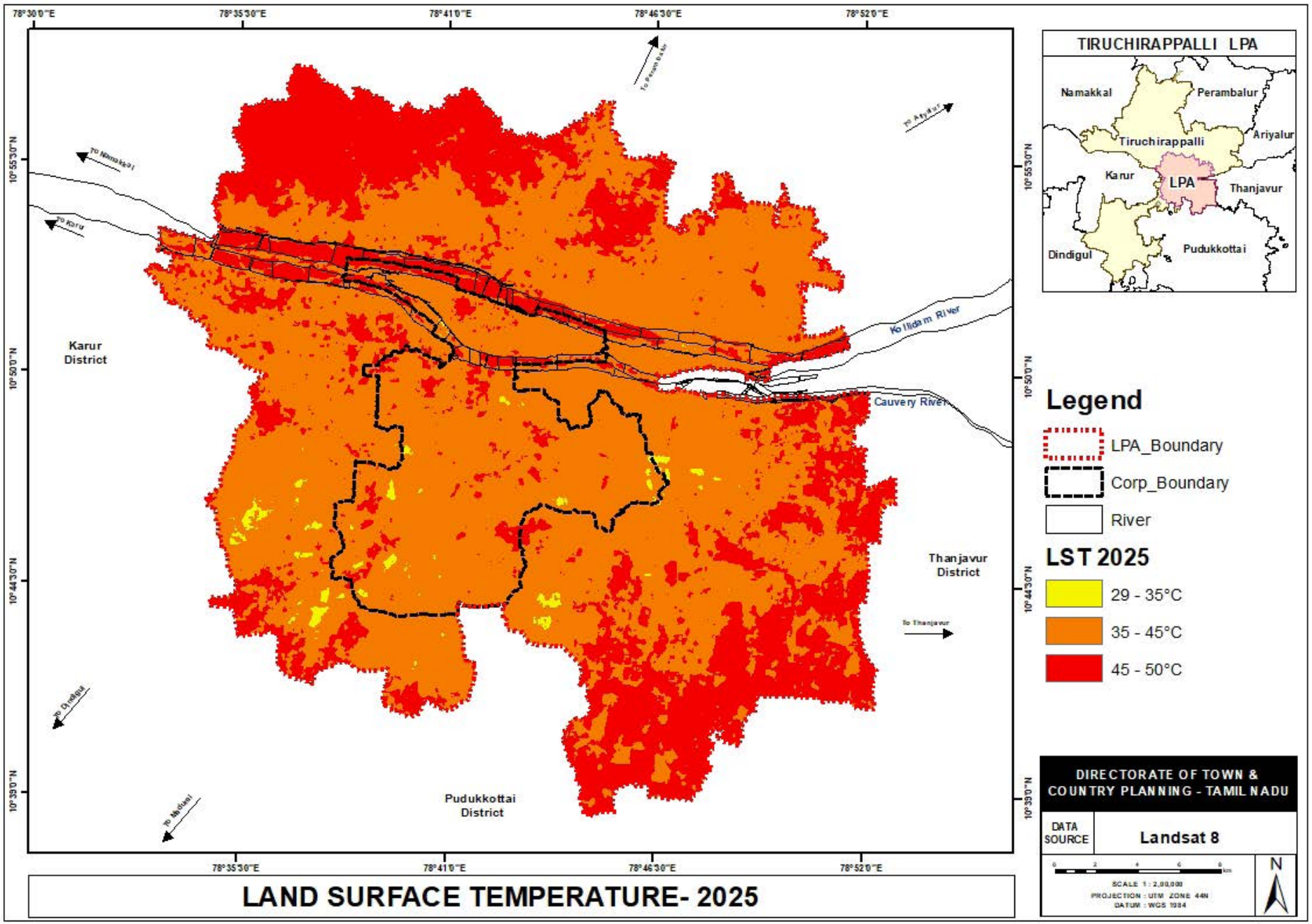
- 2015 LST (Map 6.39): The Tiruchirappalli LPA exhibits predominantly moderate to high surface temperatures ranging between 35–45 °C, with localized hotspots exceeding 45 °C in urban cores and expanding built-up zones. Lower temperature pockets (<35 °C) are mostly vegetated areas, agricultural lands, and river-adjacent zones, highlighting the cooling effect of water bodies and green cover.
- 2025 LST (Map 6.40): The spatial extent and intensity of high-temperature zones have increased, with significant areas falling in the 45–50 °C category. This expansion is most pronounced in southern, eastern, and peripheral areas, coinciding with rapid urbanisation, conversion of agricultural lands to built-up zones, and reduction in green spaces. Cooler areas have become fragmented, indicating declining effectiveness of natural cooling surfaces.

Comparison between 2015 and 2025 LST maps reveals a clear warming trend and an intensification of the urban heat island effect. Previously isolated heat pockets have merged into larger, continuous high-temperature zones, indicating a cumulative and spatially expanding thermal stress regime driven by urban densification, surface sealing, and declining green–blue infrastructure. These patterns have direct implications for human thermal comfort, public health outcomes, energy demand, infrastructure performance, and overall urban ecosystem stability.

Spatial overlay with the multi-hazard and groundwater maps reveals that zones exhibiting persistently high land surface temperatures largely coincide with areas of high built-up density, reduced vegetation cover, and groundwater-stressed firkas, particularly within the urban core, southern expansion areas, and eastern industrial corridors. This spatial concurrence indicates a reinforcing feedback loop wherein declining vegetation and moisture availability exacerbate surface heating, while elevated temperatures further intensify evapotranspiration losses and groundwater stress. The convergence of thermal stress with hydrological vulnerability underscores the need for integrated heat–water–land planning interventions.




*Map 6.39 Land Surface Temperature (LST) for Tiruchirappalli LPA- 2015*




*Map 6.40 Land Surface Temperature (LST) for Tiruchirappalli LPA- 2025*

## 6.10.3 Thermal Environment and Heat Risk

### 6.10.3.1 Thermal Environment

Temperature is a critical climatic parameter influencing urban liveability, environmental stress, and long-term sustainability in the Tiruchirappalli LPA. Tiruchirappalli is widely recognised as one of the hottest urban regions in Tamil Nadu due to its inland location, tropical savanna climate, low relief, and extensive built-up expansion. The city experiences persistently high temperatures throughout the year, with relatively small seasonal variations between summer and winter, making it highly susceptible to heat stress, urban overheating, and associated impacts on health, energy demand, and infrastructure.

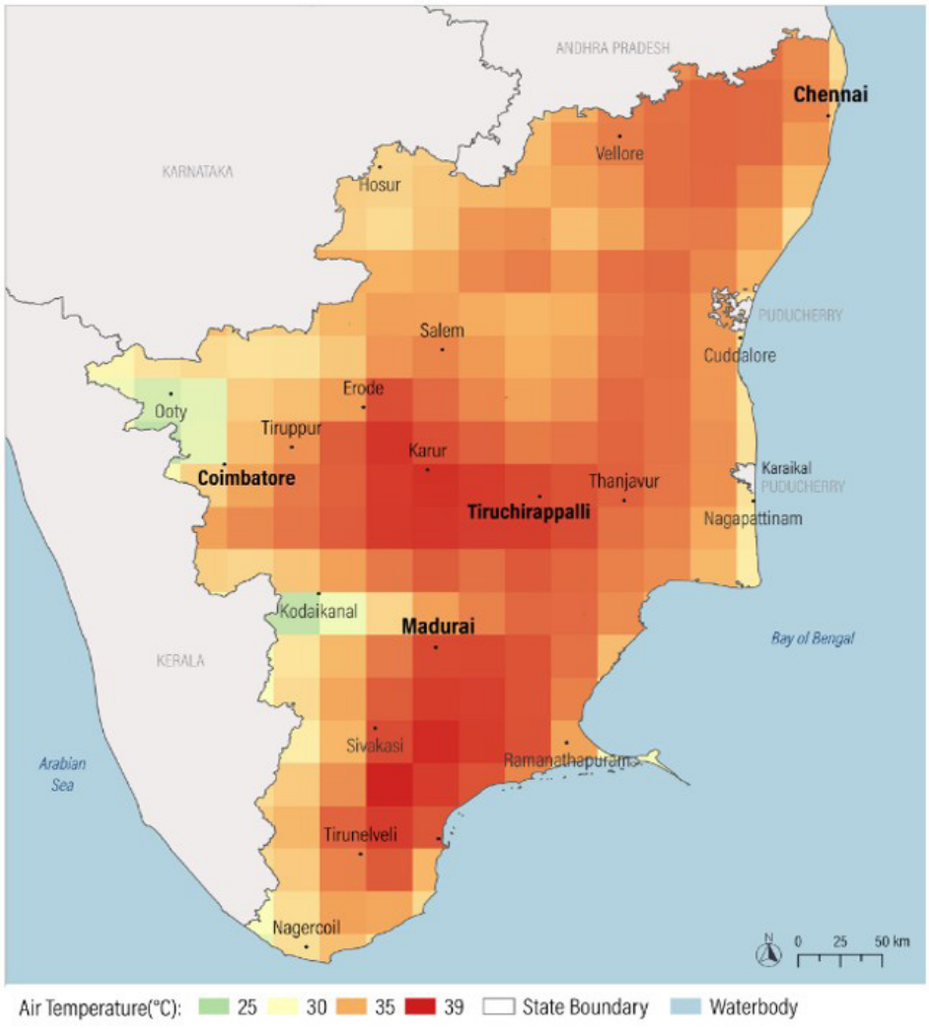



*Figure 6.6 Average Maximum Air Temperature During Summer Months*

*Source: Tamil Nadu Heat Mitigation Strategy*

The Tamil Nadu Heat Mitigation Strategy (2015–2019) indicates that during the summer months (March–June), Tiruchirappalli falls within the highest temperature zone in the state, with average maximum temperatures ranging between 35–39 °C. Unlike coastal cities such as Chennai, where sea breezes moderate daytime temperatures, Tiruchirappalli's inland location contributes to consistently higher heat. The city forms the core of a central heat belt extending across interior Tamil Nadu, reflecting intense summer heat stress amplified by urbanisation, reduced surface moisture, and limited natural cooling features such as vegetation and water bodies (Figure 6.6).

Persistent high temperatures in Tiruchirappalli have several implications:

- Human health: Increased risk of heat-related illnesses, particularly among vulnerable populations such as children, the elderly, and outdoor workers.
- Energy demand: Higher electricity consumption due to cooling requirements, potentially straining urban energy infrastructure.
- Urban microclimate: Elevated surface and air temperatures contribute to the urban heat island (UHI) effect, intensifying thermal discomfort.
- Environmental stress: Reduced soil moisture and higher evaporation rates exacerbate water scarcity and increase vegetation stress.

#### 6.10.3.2 Decadal Isotherm Analysis

Long-term air temperature data provides insight into the temporal and spatial evolution of heat stress. Isotherm map (Map 6.41) for three decades—1995–2004, 2005–2014, and 2015–2024—illustrate seasonal temperature variations across summer, North-East monsoon, and winter periods:

- Summer: Temperatures are consistently high across the LPA. Western and central areas exhibit higher summer isotherm values compared to eastern fringes, reflecting the influence of inland location, low vegetation cover, and heat-retaining surfaces such as concrete and asphalt. Even in earlier decades, Tiruchirappalli demonstrated pronounced spatial concentration of heat, establishing it as a high-temperature zone within Tamil Nadu.
- North-East Monsoon: Moderate seasonal cooling is observed; however, urban cores remain warmer than peripheral areas, highlighting early indications of urban heat retention.
- Winter: Cooling is limited, with slightly lower temperatures in eastern peripheral areas. Central and southern LPA areas retain higher temperatures, underscoring Tiruchirappalli's characteristic warm winters.

This decadal analysis establishes a baseline thermal regime, highlighting persistent summer heat, limited seasonal relief, and a gradual increase in thermal stress over three decades. The spatial patterns indicate that urban cores, low-vegetation zones, and densely built-up areas are particularly vulnerable to sustained high temperatures, providing a benchmark for planning mitigation interventions.

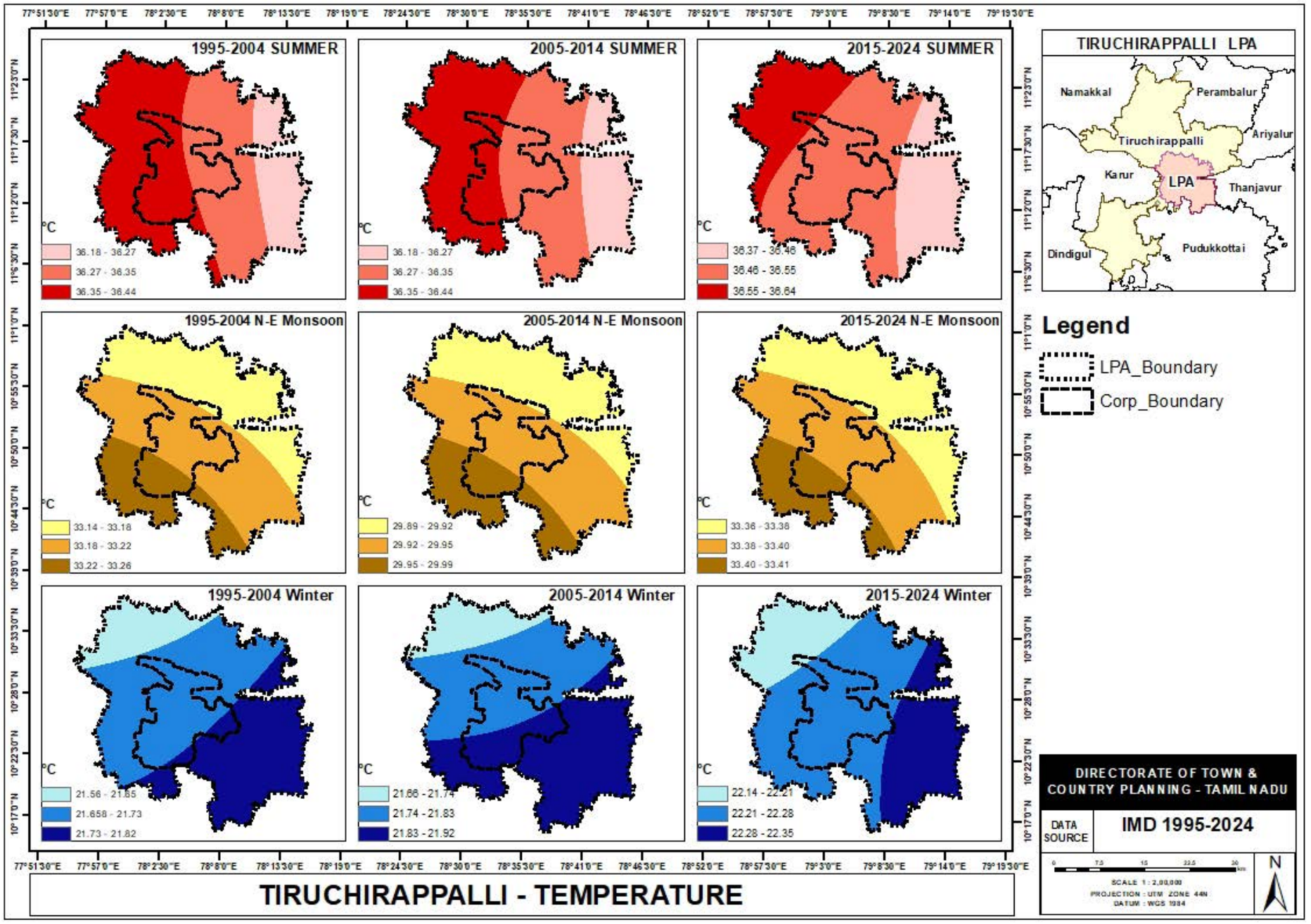
#### 6.10.3.3 Heat Risk Assessment

Heat risk refers to the potential threat to human health, infrastructure, and the environment arising from elevated surface and air temperatures, particularly when high temperatures coincide with dense urbanisation, limited vegetation, and high population exposure. In Tiruchirappalli, heat risk is intensified by the city's hot semi-arid tropical climate, prolonged summer seasons, and frequent heatwave events, where daytime temperatures often exceed 40 °C. The concentration of built-up areas with impervious surfaces, such as roads, rooftops, and industrial zones, leads to heat retention and re-radiation, creating localized temperature spikes and amplifying the urban heat island effect. The combination of high population density, especially in the urban core, and reduced green cover increases human exposure and vulnerability to heat-related illnesses.

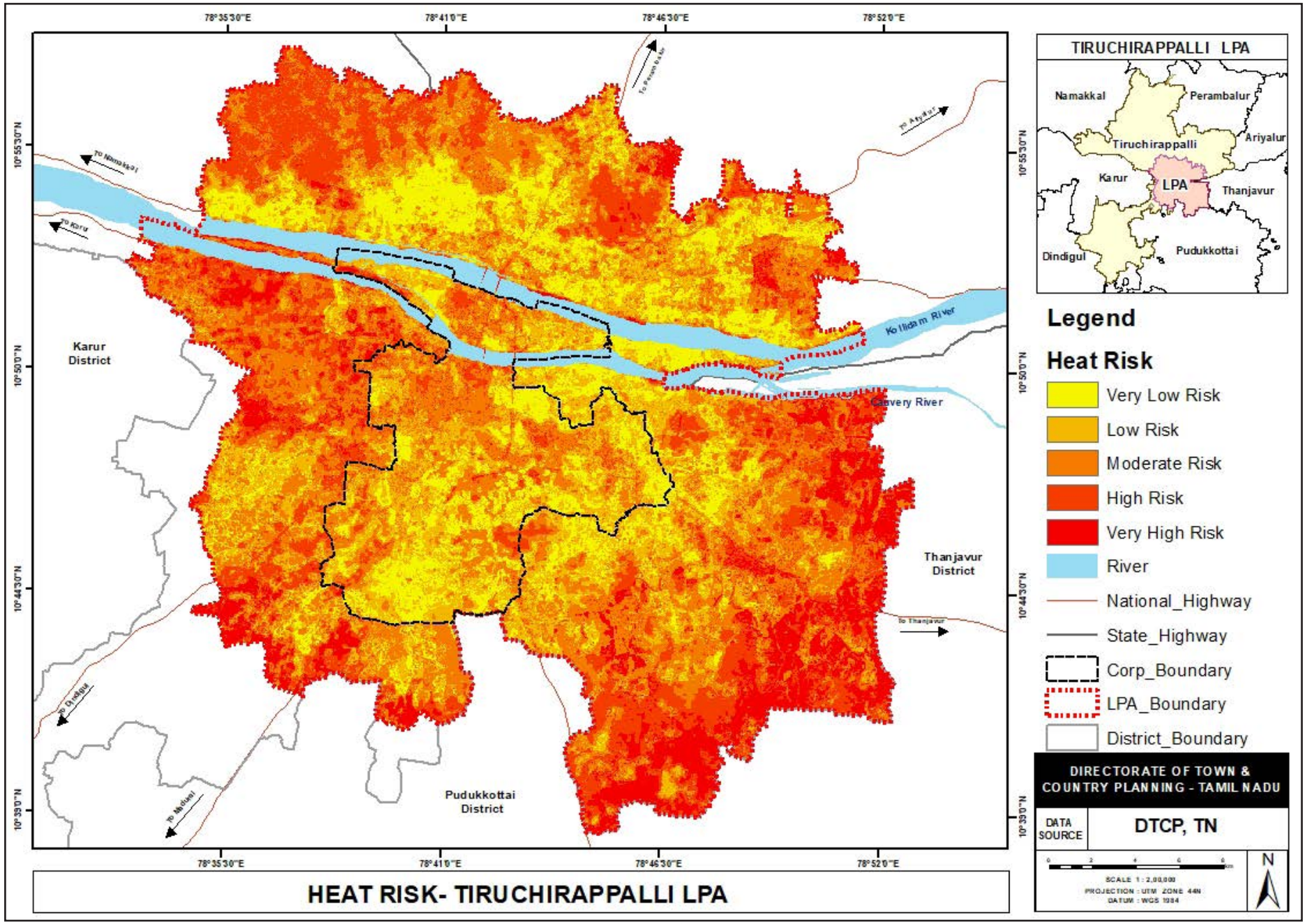
Analysis of the Tiruchirappalli LPA using Land Surface Temperature (LST), Normalized Difference Vegetation Index (NDVI), Normalized Difference Built-up Index (NDBI), population density, and elevation reveals distinct spatial patterns of heat risk (Map 6.42). Peripheral and vegetated areas exhibit lower risk due to cooler surface temperatures, abundant vegetation, and lower built-up density. In contrast, urban cores and rapidly expanding commercial and industrial zones are characterised by high LST, sparse greenery, and elevated population exposure, representing very high-risk areas. Semi-urban and peri-urban areas display moderate to high heat risk, reflecting a combination of rapid land-use conversion, intermediate building density, declining vegetation cover, and increasing population exposure.

This spatial understanding of heat risk provides a critical evidence base for climate-responsive urban planning, enabling targeted prioritisation of interventions such as climate-responsive building design, increased urban greenery, reflective surfaces, preservation of ventilation corridors, enhancement of urban water bodies, and community cooling strategies. These measures, supported by heat-sensitive land-use zoning, mandatory green cover norms, cool roof regulations, and public health initiatives including early warning systems and heat action plans, are essential to moderate rising land surface temperatures, reduce population exposure, and strengthen climate resilience across the Tiruchirappalli LPA.

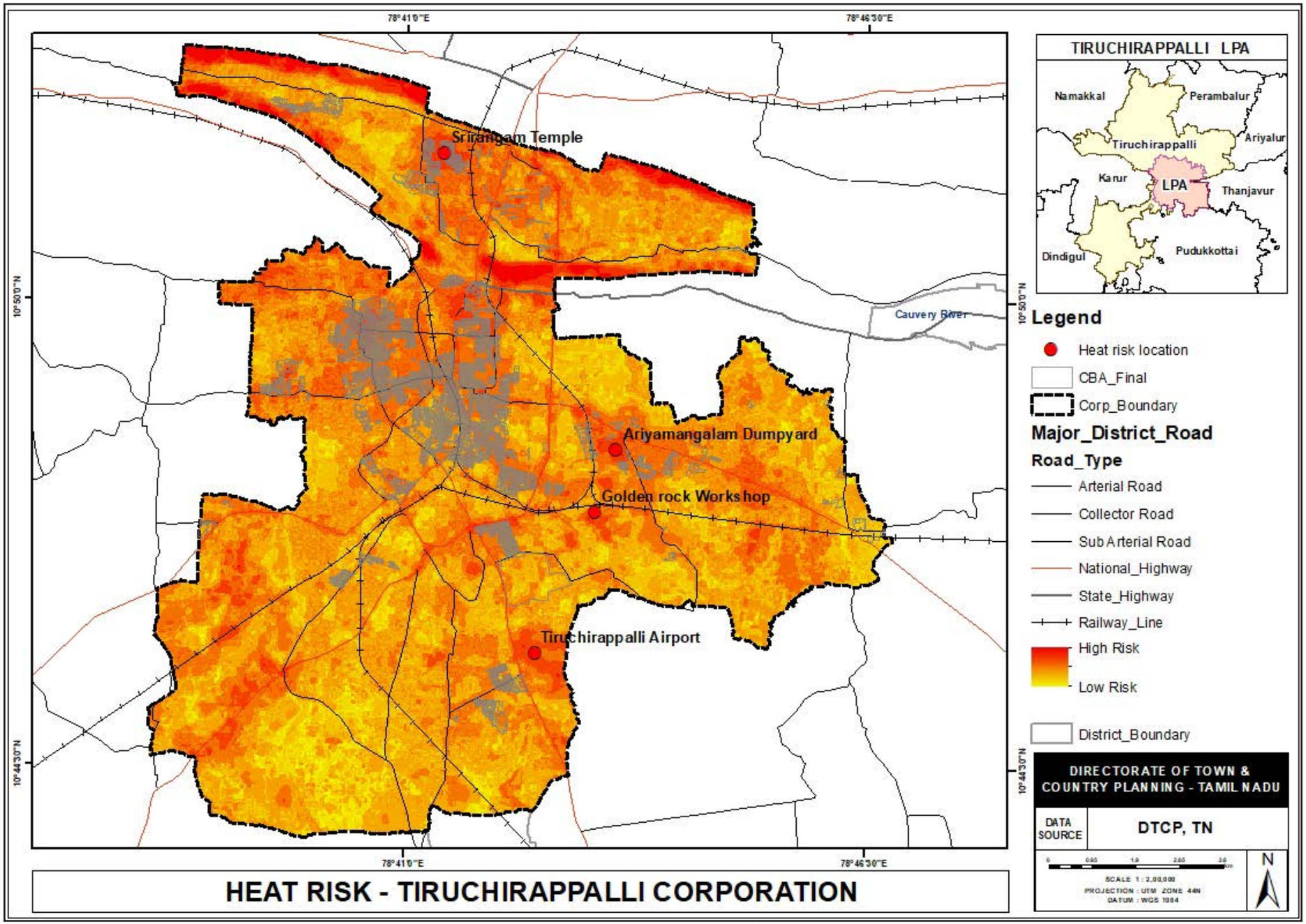
Overlay analysis further demonstrates a strong spatial correspondence between high heat risk zones, multi-hazard hotspots, and groundwater-stressed areas, particularly within the Tiruchirappalli Corporation limits, Srirangam, Ariyamangalam, and Tiruverumbur. These zones are characterised by dense impervious cover, limited tree canopy, declining groundwater levels, and high population exposure, making them priority areas for climate-sensitive urban design. Conversely, peripheral zones exhibiting lower heat risk largely overlap with areas of higher infiltration capacity, better vegetative cover, and relatively stable groundwater conditions, reinforcing the role of green–blue networks in moderating urban thermal stress.




*Map 6.41 Decadal Isotherm Analysis of Air Temperature*




*Map 6.42 Heat Risk Map of Tiruchirappalli LPA*




*Map 6.43 Heat Risk Map of Tiruchirappalli Corporation*

## 6.10.4 Spatial Assessment of ground water Quality and Quantity

### 6.10.4.1 Groundwater level Assessment

The groundwater level map indicates significant spatial variation in groundwater availability across the Tiruchirappalli LPA. Areas adjoining the Cauvery and Kollidam river corridors generally exhibit shallow groundwater levels (0–4 m bgl), reflecting the influence of surface water recharge and alluvial formations. In contrast, several interior and peripheral firkas record deeper groundwater levels ranging from 4–8 m bgl, indicating reduced recharge potential and higher dependence on groundwater extraction. The average ground water level between the year 2015-2024 is shown in the Map 6.44.

Notably, pockets within **Manachanallur, Manikandam, Somarasampettai, and parts of Srirangam** show comparatively lower groundwater levels. These areas are therefore classified as groundwater-stressed zones, where sustained abstraction combined with limited natural recharge has resulted in declining water tables. These conditions increase vulnerability during dry seasons and amplify pressure on already stressed groundwater resources.

### 6.10.4.2 Ground Water Quality Assessment

The groundwater quality assessment map (Map 6.45) indicates spatial variation in chemical characteristics across the Tiruchirappalli LPA. Multiple water quality parameters, including **chloride, sulphate, electrical conductivity (EC), total hardness (TH), and sodium adsorption ratio (SAR)**, exhibit elevated concentrations in several parts of the LPA, particularly in the peripheral and agriculturally dominant firkas. These elevated values reflect increasing mineralization and salinity of groundwater, adversely affecting its suitability for domestic and agricultural use.

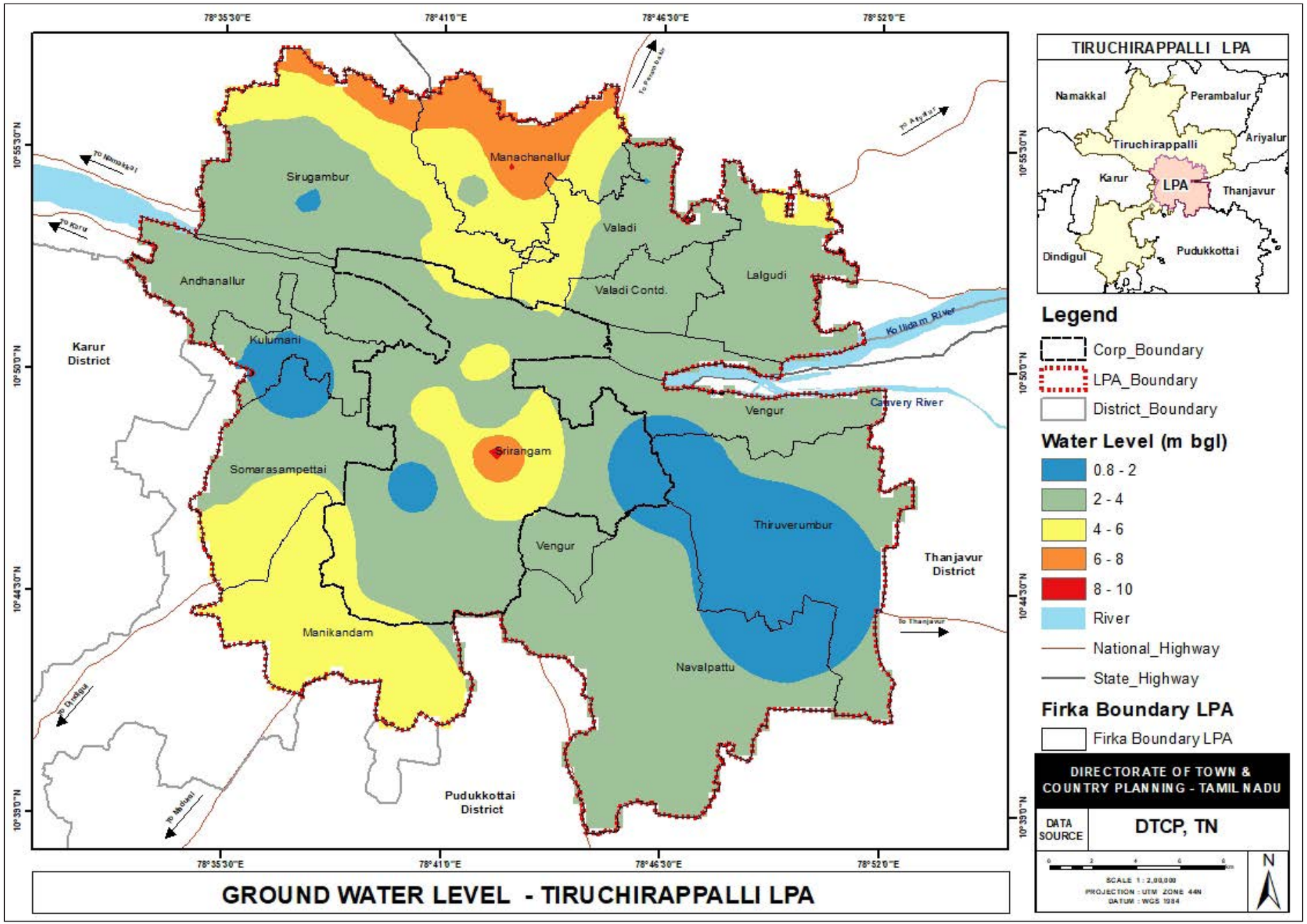
For integrated spatial interpretation, Total Dissolved Solids (TDS) has been adopted. TDS effectively summarizes the cumulative influence of major dissolved constituents and provides a comprehensive measure of overall groundwater quality degradation. The TDS map shows that a large portion of the LPA falls within the moderate to high concentration range (500–2,000 mg/l), while select pockets—especially in **Somarasampettai, Manikandam, and parts of Andhanallur and Sirugambur**—record very high TDS levels exceeding 2,000 mg/l.

The concurrence of high TDS concentrations with elevated chloride, sulphate, EC, TH, and SAR values indicates zones of deteriorating groundwater quality driven by intensive groundwater extraction, agricultural inputs, and limited natural recharge. These areas are therefore designated as groundwater quality–stressed zones, warranting immediate regulatory, infrastructural, and ecological interventions through recharge enhancement, regulation of abstraction, and water quality management measures.

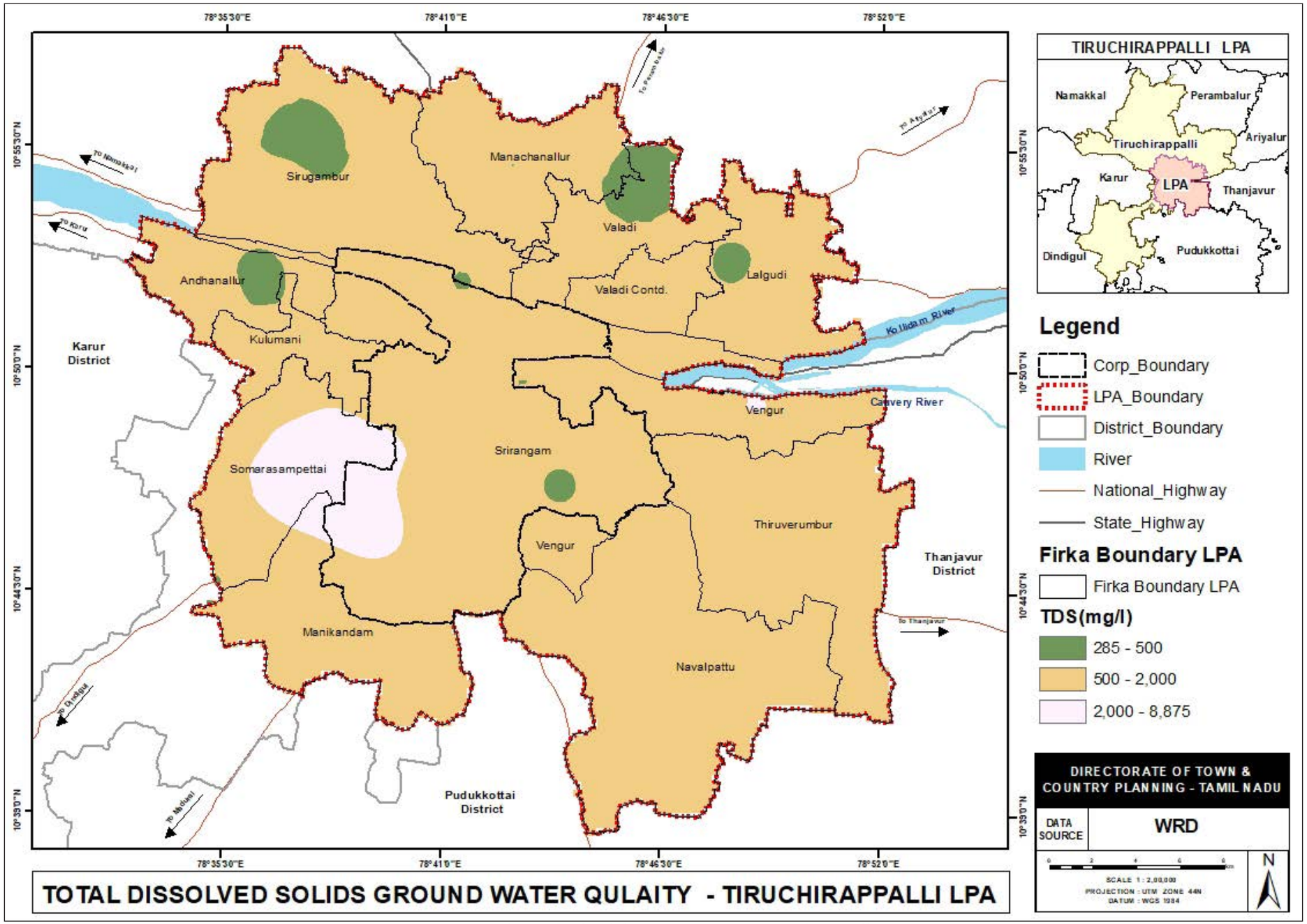
Spatial overlay with flood susceptibility and multi-hazard maps indicates that several groundwater-stressed zones also fall within areas of moderate to high flood susceptibility. This apparent paradox reflects the dominance of rapid surface runoff and inadequate infiltration in highly urbanised landscapes, where intense rainfall leads to flooding but contributes minimally to groundwater recharge. Such conditions are particularly evident in the Tiruchirappalli urban core and southern peri-urban expansion zones, highlighting the urgent need for water-sensitive urban design, infiltration-based drainage, and decentralised recharge interventions.

#### 6.10.4.3 Groundwater Stress Zones

The combined analysis of groundwater level and quality highlights **critically stressed groundwater zones** within the LPA, where low groundwater levels coincide with poor water quality. These areas represent priority zones for intervention through recharge augmentation, demand management, and water-quality improvement measures. The findings underscore the need for nature-based solutions such as bioswales, sponge parks, percolation structures, and protection of riparian buffers to enhance recharge and dilute contaminant concentrations. These zones also correspond closely with areas of high heat risk, flood susceptibility, and intensive land-use transformation, forming critical multi-hazard hotspots. Consequently, these priority intervention zones warrant integrated planning strategies combining recharge enhancement, abstraction regulation, urban greening, flood mitigation, and land-use controls to simultaneously address water scarcity, thermal stress, and flood vulnerability.




*Map 6.44 Ground Water level (2015 – 2024) Tiruchirappalli LPA*




*Map 6.45 Total Dissolved Solids (2015 – 2024) in Tiruchirappalli LPA*

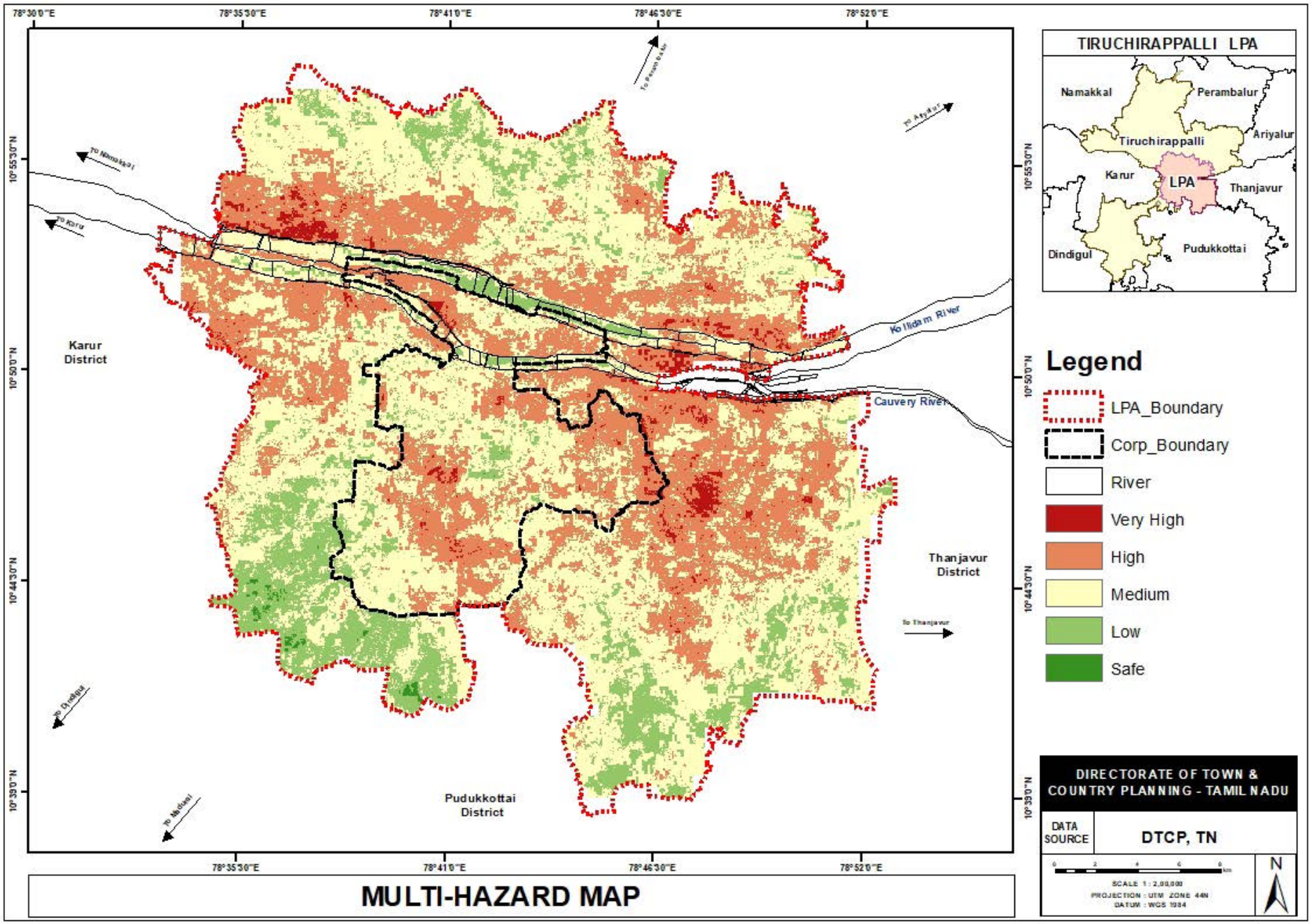
### 6.10.5 Multi-Hazard and Environmental Risk Zones

Urban areas increasingly face overlapping environmental stresses rather than isolated hazards. In the Tiruchirappalli LPA, rapid urbanisation, rising temperatures, recurring floods, and declining groundwater levels together create a complex hazard landscape. To address these interlinked risks, a multi-hazard assessment was carried out by integrating flood susceptibility, heat risk, and groundwater depletion layers to identify areas of compounded vulnerability.

Detailed spatial comparison indicates that the very high and high multi-hazard zones display strong convergence of elevated land surface temperatures, flood-prone low-lying terrain, dense built-up cover, and declining groundwater levels. These compounded risk conditions are most pronounced along the Cauvery–Kollidam urban stretch, the Uyyakondan canal corridor, Srirangam island, and the southern and eastern industrial–residential growth corridors. The spatial coherence of these stressors confirms the systemic nature of climate risk in the LPA, driven by coupled hydrological disruption, thermal amplification, and land-use change.

The resulting Multi-Hazard Map (Map 6.46) classifies the LPA into five hazard categories, ranging from Safe to Very High. Very High and High hazard zones are concentrated in the urban core, along river corridors, and in rapidly developing built-up areas. These zones experience a convergence of flood-prone conditions, intensified surface temperatures, and low groundwater availability, highlighting the compounded impact of impervious surfaces, loss of natural drainage, and over-extraction of water resources. Medium hazard zones represent areas with partial overlap of two risk factors, often serving as transitional regions between high-risk urban centres and safer peripheral areas. Low and Safe zones, generally located in the periphery or less urbanised areas, benefit from higher infiltration capacity, greater vegetation cover, and more stable groundwater conditions.

This integrated assessment establishes that multi-hazard hotspots require the highest planning priority and should be strictly regulated against high-density and vulnerable land uses. Integrated land-use and infrastructure strategies are essential, including flood-resilient structures, heat-mitigating designs, and water-sensitive urban interventions. Restoration of green and blue networks, maintenance of river buffers, and promotion of urban forestry can enhance natural resilience against overlapping hazards. Disaster preparedness measures, early warning systems, and climate-adaptive policies are critical for protecting communities and infrastructure. The multi-hazard framework thus serves as a comprehensive decision-support tool, guiding sustainable, climate-resilient development and reducing cumulative environmental risks within the Tiruchirappalli LPA.




*Map 6.46 Multi- Hazard Map of Tiruchirappalli LPA*

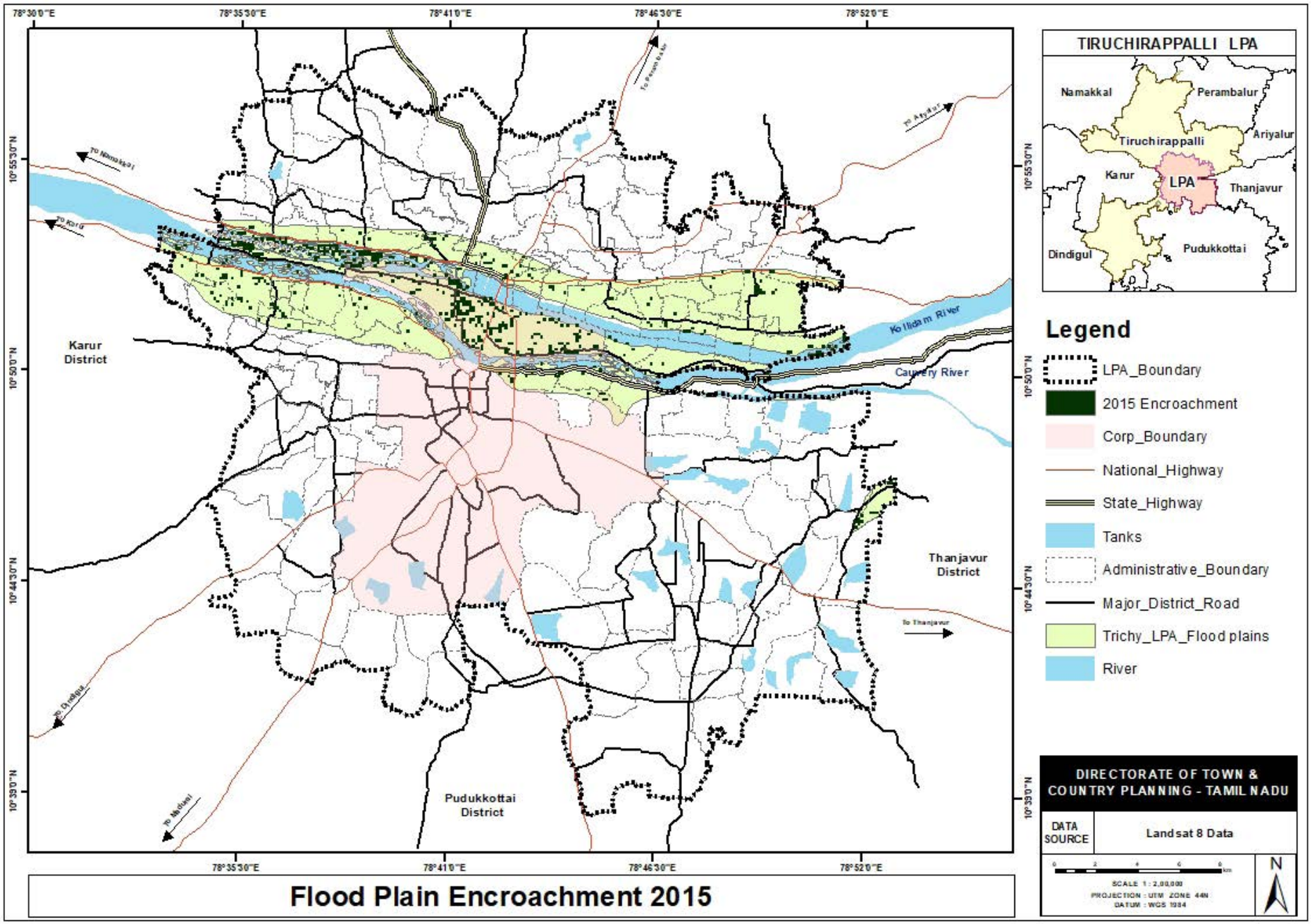
### 6.10.6 Floodplain Encroachment

The rapid expansion of built-up areas reflects encroachment into former water bodies, floodplains, and drainage corridors. Such encroachments have fragmented traditional tank cascades, drainage networks and disrupted surface flow pathways. Despite continued monsoonal rainfall, surface water bodies are shrinking, indicating that rainfall is increasingly converted into rapid runoff rather than being retained within tanks and floodplains. This growing surface water disconnectivity has weakened the hydrological resilience of the LPA and reduced opportunities for groundwater recharge.

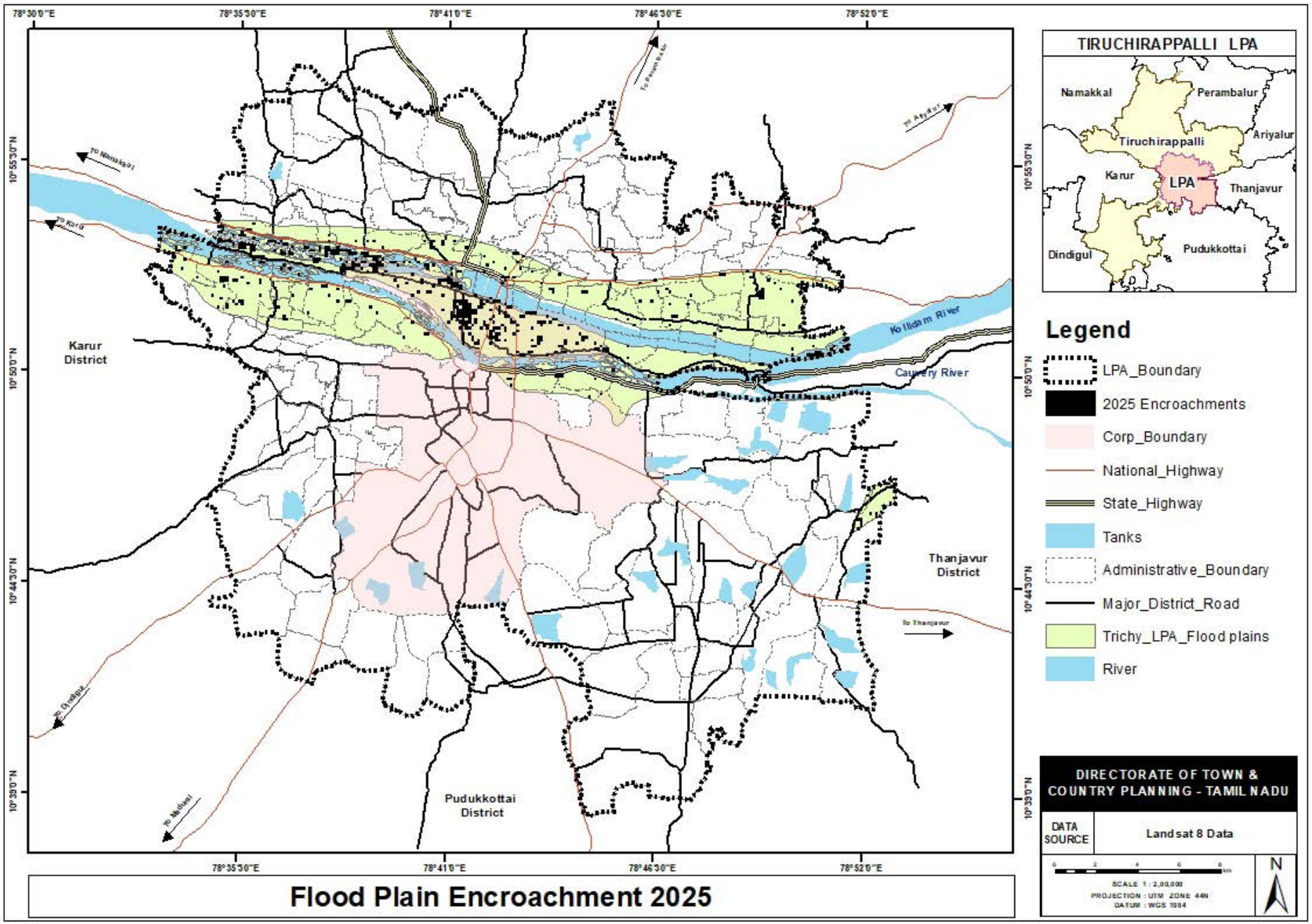
The flood plain encroachment maps for the years 2015 and 2025, as shown in the Map 6.47 and Map 6.48, illustrate the extent and spatial progression of built-up and anthropogenic activities within the designated flood plains of the Cauvery and Kollidam rivers in the Tiruchirappalli LPA. The flood plains, highlighted in the maps, represent ecologically sensitive and hydraulically active zones that play a critical role in flood conveyance, groundwater recharge, and sediment deposition. A comparative analysis of the two maps indicates a noticeable increase in encroachments between 2015 and 2025, particularly along the central and eastern stretches of the river corridor within and adjacent to the Tiruchirappalli Corporation limits. As shown in the 2025 map, encroachments are more widespread and spatially continuous when compared to the relatively scattered and limited encroachments observed in 2015. This trend reflects rapid urban expansion and infrastructure development within flood-prone areas.

The maps further reveal that several encroachments are located in close proximity to major transport corridors and existing urban settlements, suggesting development pressure along riverfront zones. Such encroachments reduce the effective width of the flood plain, obstruct natural flow paths, and diminish the flood buffering capacity of the river system. The progressive occupation of flood plains also adversely affects natural groundwater recharge processes and increases flood risk during high-flow events. The observed increase in flood plain encroachments between 2015 and 2025, as clearly depicted in the maps, underscores the need for stringent regulation of development within flood plains, enforcement of river buffer zones, and the adoption of climate-responsive riverfront planning strategies. Protection and ecological restoration of floodplains are therefore essential to reduce flood vulnerability, enhance groundwater recharge, and ensure long-term ecological resilience within the LPA.

Overlay with flood susceptibility and multi-hazard maps confirms that many recent encroachments fall within zones classified as high and very high flood risk, significantly amplifying disaster exposure. This spatial concurrence reinforces the urgency of enforcing strict floodplain zoning, restoring riparian buffers, and integrating river corridor management into statutory land-use planning frameworks.




*Map 6.47 Flood Plain Encroachment 2015*




*Map 6.48 Flood Plain Encroachment 2025*

## 6.11 State-led Environmental Initiatives and Policy Alignment

The environmental assessment and planning proposals for the Tiruchirappalli Local Planning Area (LPA) are closely aligned with the strategic objectives, regulatory frameworks, and implementation mechanisms established under key State and National environmental policies, programmes, and missions. This alignment ensures that the proposed interventions are not only scientifically robust but also institutionally feasible, financially supported, and administratively actionable.

Tamil Nadu has emerged as a national leader in climate-responsive planning, environmental governance, and sustainable urban development. A wide range of flagship initiatives implemented by the Government of Tamil Nadu provide a strong policy and institutional foundation for advancing environmental resilience within the Tiruchirappalli LPA. The major policy frameworks guiding this chapter include the Tamil Nadu State Action Plan on Climate Change (TNSAPCC), Tamil Nadu Heat Mitigation Strategy, Green Tamil Nadu Mission (GTM), Tamil Nadu Sustainable Groundwater Management Mission, Mission Amrit Sarovar, Jal Jeevan Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and Swachh Bharat Mission (Urban).

### 6.11.1 Climate Resilience and Heat Mitigation Alignment

The Tamil Nadu Heat Mitigation Strategy and the TNSAPCC emphasize urban heat risk reduction through urban greening, cool roofs, reflective surfaces, protection of ventilation corridors, and climate-sensitive land-use planning. The proposed heat mitigation interventions in the Tiruchirappalli LPA—including the development of urban forests, enhancement of green buffers along industrial and transport corridors, sponge parks, and expansion of urban green networks—directly respond to these objectives.

By prioritizing heat-vulnerable zones for urban forestry and green infrastructure deployment, the proposals support the State's goal of reducing heat stress, improving thermal comfort, and enhancing urban liveability. The integration of land surface temperature (LST) analysis and NDVI-based vegetation assessment into planning decisions further strengthens evidence-based climate adaptation in line with State policy directions.

### 6.11.2 Water Security and Groundwater Management Alignment

The State's groundwater governance framework, anchored by the Tamil Nadu Sustainable Groundwater Management Mission and supported by programmes such as Jal Jeevan Mission, AMRUT, and Mission Amrit Sarovar, emphasizes

aquifer recharge, demand management, water-use efficiency, and source sustainability.

The groundwater augmentation proposals for Tiruchirappalli LPA—including sponge parks, bioswales, recharge pits, desiltation of tanks, and protection of riparian buffers—are directly aligned with these objectives. Firka-specific groundwater management strategies, particularly for over-exploited zones such as Manikandam, reflect State priorities for micro-level aquifer management, demand-side interventions, and community-scale recharge enhancement.

In addition, the promotion of regenerative agriculture in groundwater quality–depleted zones aligns with State-led initiatives supporting sustainable farming practices, reduced agro-chemical dependency, and soil–water conservation, thereby contributing to long-term groundwater quality improvement.

### 6.11.3 Urban Flood Management and Blue–Green Infrastructure Alignment

Flood risk mitigation forms a central pillar of Tamil Nadu's climate adaptation strategy, particularly in rapidly urbanising riverine cities. State guidelines emphasize the protection of floodplains, restoration of tanks and drainage channels, and deployment of nature-based solutions for stormwater management.

The flood mitigation framework proposed for the Tiruchirappalli LPA—including bioswales, flood moderation tanks, desiltation of tanks, riparian buffers, and climate-sensitive riverfront development—is fully consistent with these policy directions. The focus on restoring hydrological connectivity, enhancing infiltration, and protecting floodplains reflects the State's commitment to transitioning from purely structural flood control measures toward integrated blue–green infrastructure systems.

### 6.11.4 Urban Forestry, Biodiversity Conservation and Green Tamil Nadu Mission

The Green Tamil Nadu Mission (GTM) aims to enhance the State's green cover to 33%, strengthen urban forestry, improve biodiversity, and restore degraded ecosystems. The proposed network of urban forests, riparian vegetation buffers, sponge parks, and quarry reclamation-based green spaces directly supports the objectives of GTM.

By strategically locating urban forests in heat-stressed and industrial-influenced zones, the proposals simultaneously address climate mitigation, biodiversity enhancement, air quality improvement, and public health objectives. The reuse of abandoned quarries for afforestation, eco-parks, wetlands, and ecological

buffers further contributes to landscape-level ecological restoration, consistent with State biodiversity and forestry goals.

### 6.11.5 Pollution Control, Water Quality Management and Circular Resource Use

The recommendations for sewerage expansion, STP augmentation, industrial effluent regulation, and groundwater protection zoning are aligned with the regulatory mandates of the Tamil Nadu Pollution Control Board (TNPCB), Swachh Bharat Mission (Urban), and AMRUT.

The action-zone-based approach for water pollution management enables spatial prioritization of infrastructure investment and regulatory enforcement, ensuring efficient use of public funds and improved environmental outcomes. Further, the emphasis on wastewater reuse, stormwater harvesting, and sustainable irrigation supports the State's transition towards circular water management and resource efficiency.

### 6.11.6 Institutional Convergence and Implementation Readiness

A defining strength of the proposed framework is its strong institutional alignment with existing State missions, enabling convergence of funding, governance, and implementation mechanisms. The integration of proposals with flagship schemes such as GTM, AMRUT, Jal Jeevan Mission, MGNREGS, and Mission Amrit Sarovar enhances feasibility, scalability, and long-term sustainability.

This institutional convergence ensures that the environmental planning framework for Tiruchirappalli LPA moves beyond conceptual planning and directly supports actionable, fundable, and monitorable interventions.

## 6.12 SWOT Analysis

The SWOT analysis synthesizes the findings of water resources, hydrological dynamics, vegetation, and environmental risks in the Tiruchirappalli LPA. It highlights the internal strengths and weaknesses of the urban-environment system, alongside external opportunities and threats, to inform evidence-based, resilient planning interventions.

### 6.12.1 Strengths

- **Strategic River Network:** The Cauvery River and its distributaries (Kollidam, Vennar) provide a reliable surface water source and cultural ecosystem services.

- **Historical Water Management Systems:** Traditional tanks, channels, and cascade systems support groundwater recharge, flood moderation, and seasonal water storage.
- **Existing Green Cover and Urban Forestry Initiatives:** GTM-driven afforestation, urban tree planting, and agroforestry initiatives contribute to ecological stability, microclimate regulation, and biodiversity enhancement.
- **High-Resolution Environmental Data Availability:** Remote sensing (NDVI, NDMI, NDWI, NDBI) and LST analyses enable spatially informed monitoring of water availability, vegetation health, and heat stress.
- **Institutional Framework:** Multi-departmental coordination (Forest Department, Urban Local Bodies, educational institutions) supports ecological restoration, urban forestry, and sustainability programs.
- **Cultural and Community Engagement:** Strong community and institutional involvement in water body maintenance, temple tank preservation, and plantation programs fosters stewardship.

### 6.12.2 Weaknesses

- **Declining Surface Water Availability:** Shrinking riverine spread and tank systems, reduced NDWI values, and encroachment on water bodies weaken hydrological resilience.
- **Groundwater Stress:** Widening pre- and post-monsoon groundwater level fluctuations indicate over-extraction, reduced recharge, and emerging salinity/mineralization hotspots.
- **Urban Heat Vulnerability:** Expansion of built-up areas, low NDVI, and high NDBI zones exacerbate urban heat island effects, impacting health and energy demand.
- **Fragmented Green Networks:** Despite plantation efforts, urban and peri-urban green cover remains insufficiently connected, limiting ecological and thermal regulation.
- **Pollution Pressures:** Moderate to high BOD, Faecal Coliform, TDS, EC, chloride, and hardness levels in surface and groundwater highlight persistent anthropogenic pollution.
- **Limited Continuous Long-Term Monitoring:** Sparse continuous data for water quality and groundwater trends hinders predictive planning and early intervention.

### 6.12.3 Opportunities

- **Blue-Green Infrastructure Development:** Integration of vegetated corridors, restored tanks, wetlands, and water-sensitive urban design can enhance infiltration, reduce flood risk, and mitigate heat stress.
- **Community-Led Water Management:** Strengthening participatory water governance and local stewardship can improve tank and riverbank conservation.
- **Climate-Resilient Urban Planning:** Micro-watershed-based strategies, land-use planning, and protective zoning for high-risk areas can sustain hydrological and ecological functions.
- **Technological Integration:** GIS, remote sensing, and environmental modeling can support real-time monitoring, predictive planning, and identification of recharge zones.
- **Policy and Funding Support:** State and national programs (GTM, MGNREGS, RKVY) provide resources for afforestation, urban forestry, and pollution mitigation initiatives.
- **Eco-Tourism and Cultural Promotion:** Protecting water bodies and associated heritage sites can enhance community value and foster conservation awareness.

### 6.12.4 Threats

- **Urban Encroachment:** Expansion into floodplains, tank systems, and river corridors threatens surface water retention, groundwater recharge, and flood mitigation capacity.
- **Climate Variability:** Increasing intensity of short-duration rainfall events, prolonged heatwaves, and rising temperatures exacerbate water stress and environmental risks.
- **Pollution and Over-Extraction:** Continued discharge of untreated wastewater, industrial effluents, and intensive groundwater pumping could compromise water quality and supply.
- **Biodiversity Loss:** Fragmentation of green spaces, reduced vegetation health, and declining habitat connectivity threaten native flora and fauna.
- **Compounded Hazard Exposure:** Multi-hazard zones combining flood risk, heat stress, and groundwater depletion increase vulnerability of communities and infrastructure.
- **Infrastructure Capacity Stress:** Rapid urbanization and high population density in vulnerable zones can overwhelm drainage, water supply, and cooling infrastructure.

## 6.13 Proposals and Recommendations

In response to the environmental risk conditions identified within the Tiruchirappalli LPA, a set of risk-specific, spatially targeted interventions is proposed to address flooding, heat stress, groundwater depletion, and groundwater quality deterioration. These risks, identified through detailed environmental, hydrological, and water quality analysis, exhibit distinct spatial patterns across the LPA and therefore require differentiated planning responses.

Accordingly, the revised proposal framework adopts a risk-based intervention strategy, wherein each environmental risk is addressed through a dedicated set of nature-based and climate-responsive measures, tailored to local physical, hydrological, and land-use contexts.

- **Heat Risk Mitigation Proposals**- Areas experiencing high land surface temperatures and reduced vegetation cover—particularly in the Tiruchirappalli corporation—are addressed through urban forest development. These zones exhibit elevated heat stress due increasing urbanisation. The proposed urban forests aim to enhance canopy cover, improve evapotranspiration, reduce ambient temperatures, and strengthen ecological resilience at the city scale.
- In addition, the central LPA along the Koraiyar River, where a concentration of red and orange category industries is present, is prioritised for heat mitigation interventions. Here, green buffers and urban forestry act as thermal regulators while also improving environmental quality and buffering industrial impacts on surrounding urban areas.
- **Flood Mitigation Proposals**- Flood-susceptible zones identified through drainage and flood susceptibility analysis—particularly south of the Cauvery River and north of the Kollidam River—are addressed through a suite of flood mitigation interventions. These include bioswales, riparian buffers, flood moderation tanks and desiltation of waterbodies.
- These measures are designed to restore natural drainage functions, increase channel and floodplain capacity, reduce surface runoff velocity, and minimise flood impacts in vulnerable areas.
- **Groundwater Augmentation and Quality Improvement Proposals**- Groundwater augmentation interventions, primarily in the form of sponge parks, are proposed in Ward 26 and Ward 52, where groundwater levels are critically low. These sponge parks are intended to enhance infiltration, increase recharge efficiency, and strengthen surface–subsurface water interactions within the urban fabric.
- Further, specific groundwater management recommendations are outlined for the Manikandam firka, which is categorised as an exploited groundwater zone according to the TWAD Board. These recommendations

emphasise recharge enhancement, regulated extraction, and protection of existing recharge areas to prevent further groundwater stress.

The detailed spatial components and implementation strategies for each proposal category are elaborated in the following sub-sections.

## 6.13.1 Flood Mitigation Proposals

Flood mitigation within the Tiruchirappalli Local Planning Area (LPA) is structured around an integrated river basin and urban drainage framework that combines river corridor protection, restoration of natural hydrological systems, enhancement of stormwater conveyance capacity, and deployment of nature-based solutions. The spatial strategy (Map 6.50) prioritises safeguarding of floodplains, protection of natural drainage networks, restoration of tanks and wetlands, and introduction of sponge-based urban systems to attenuate runoff, enhance infiltration, and reduce peak flood discharge. These interventions are spatially targeted in high and very high flood risk zones, particularly along the Cauvery–Kollidam river system, Uyyakondan Canal, Koraiyar River, and within low-lying urban pockets of the Tiruchirappalli Corporation area.

### 6.13.1.1 River Corridor Management and Riparian Buffers

Riparian buffers are vegetated or naturally protected strips of land provided along riverbanks and canal edges to safeguard floodplains, stabilise banks, filter surface runoff, and support riverine ecosystems. They function as transitional zones between river systems and adjoining land uses, playing a critical role in flood mitigation, water quality protection, ecological continuity, and groundwater recharge.

In accordance with statutory mandates, a minimum 15 m riparian buffer along all rivers, and 3m buffer along all canals, streams, and minor watercourses is proposed to be strictly enforced as a no-development zone, ensuring unobstructed hydraulic flow, facilitating desiltation and maintenance access, and enabling continuous linear ecological corridors. Along the Cauvery and Kollidam rivers, an enhanced buffer width of 50 m is proposed, exceeding statutory requirements, but according to WRD's recommendation to safeguard its quality.

These riparian buffers are proposed to function as predominantly natural and semi-natural landscapes, integrating native vegetation, wetlands, seasonal floodplain parks, and continuous pedestrian and cycling corridors. This approach simultaneously strengthens flood resilience, enhances biodiversity, improves water quality, and provides accessible blue–green public spaces.

In stretches where existing dense urban development directly abuts the river edge, limited riverfront interface zones are proposed under the tourism and

urban design framework... while remaining stretches are conserved as riparian buffers. In such locations, built-edge treatment shall follow flood-resilient urban design principles, incorporating stepped embankments, permeable surfaces, green terraces, and elevated public promenades. The remaining river corridors, particularly in peri-urban and rural stretches, are proposed to be conserved primarily as riparian buffers functioning as floodplains and ecological reserves.

#### 6.13.1.2 Sponge Parks

A distributed network of sponge parks is proposed across highly flood-susceptible urban pockets, low-lying residential areas, and major drainage corridors, particularly within dense zones of the Tiruchirappalli Corporation area. These sponge parks are designed as multifunctional landscapes integrating detention basins, infiltration trenches, rain gardens, constructed wetlands, and permeable surfaces, enabling temporary storage of stormwater, reduction of runoff velocity, and gradual groundwater recharge.

The sponge parks are strategically located to intercept surface runoff before it enters major drains, thereby reducing peak discharge, mitigating urban waterlogging, and improving subsurface aquifer replenishment. In addition to hydrological benefits, these spaces contribute to urban greening, microclimate moderation, recreational accessibility, and enhancement of ecological networks.

#### 6.13.1.3 Nature Based Urban Drainage Systems (Bio Swales)

Complementing sponge park development, bioswales and linear infiltration systems are proposed along selected arterial, sub-arterial, collector roads, national highways, and state highways, particularly at their interfaces with the Uyyakondan Canal, Koraiyar River, and other primary drainage corridors, where runoff generation and flood risk are high.

Bioswales are vegetated, shallow drainage channels designed to collect, convey, and treat surface runoff through natural filtration and infiltration processes. They reduce flood risk by slowing runoff velocity, improve groundwater recharge and water quality, and enhance the urban microclimate by introducing continuous green cover along transport corridors and open spaces.

These bioswales are designed to collect stormwater from road surfaces and adjoining built-up areas, enabling initial filtration and infiltration. During periods of lower groundwater levels, a portion of this runoff is allowed to percolate into the subsurface, while excess flows are conveyed to percolation pits and flood moderation tanks, thereby improving both the quantity and quality of groundwater. Treated overflow is safely directed towards the Cauvery River, through regulated outfalls and natural drainage channels maintaining hydrological continuity.

The width of bioswales varies according to road hierarchy, with 3 m along National Highways, 2 m along sub-arterial roads, and 1 m along collector roads. The bioswales are designed with a side slope of 1:3 and a ponding depth of 150–300 mm to enable effective runoff detention and infiltration. Native grasses, reeds, and shrubs are proposed to enhance filtration efficiency, stabilise slopes, and support ecological functioning. The spatial distribution and lengths of the proposed bioswales are detailed in Table 6.10 and illustrated in Map 6.50.

*Table 6.10 Bioswales- Locations and Length*

| PROPOSALS | NAME | LOCATION | LENGTH/ EXTENT | SOIL/ ROAD TYPE | ROW |
|---|---|---|---|---|---|
| BIO-SWALES | 1 | Kullumani-Mullikarruppar-Athavathur(W)-Kumaravayalur-Athavathur(W)- | 7 km | Sub-Arterial | 12m (Proposed) |
| | 2 | Athavathur(W)-Athavathur(E) | 6km | Sub-Arterial | 12m |
| | 3 | Allithurai-Nachikurichi | 4km | Sub-Arterial | 12m |
| | 4 | Ward.No- 40-45-52-60-58-57-9 | 11km | Collector | 12m |
| | 5 | Ward.No- 7 | 2km | NH | 60m |
| | 6 | Elanthapatti-Palanganakudi-Poolangudi-Navalpattu-Koothappar-Krishnasamudhram-64- Vengur | 24km | Collector | 12m |
| | 7 | Poonampalayam-Manachanallur-Pitchandarkoil-Mathavaperumal koil | 9 km | SH | 30 m (Proposed) |

### 6.13.1.4 Flood Moderation Tanks

Flood moderation tanks are engineered infiltration structures designed to receive treated stormwater and facilitate its controlled recharge into the groundwater system. They improve groundwater quantity and quality by allowing filtered runoff to percolate through soil layers while regulating discharge during peak rainfall events.

Two flood moderation tanks are proposed along Bioswales 3 and 6, as indicated in Map 6.50. One holding point is located at the intersection of the Uyyakondan Canal and Koraiyar River, while the Krishnasamudram tank is proposed to function as a large-scale percolation and holding structure. These interventions are intended to enhance groundwater recharge, regulate peak runoff, and support the effective management of stormwater conveyed through the bioswale network.

*Table 6.11 Flood Moderation Tanks locations*

| PROPOSAL | NUMBER | LOCATION | EXTENT (Acre) |
|---|---|---|---|
| Flood moderation tanks | 1 | Uyyaikondan- Koraiyar intersection | 0.5 |
| | 2 | Krishnasamudram tank | 68.79 |

#### 6.13.1.5 De-Siltation of Water Bodies

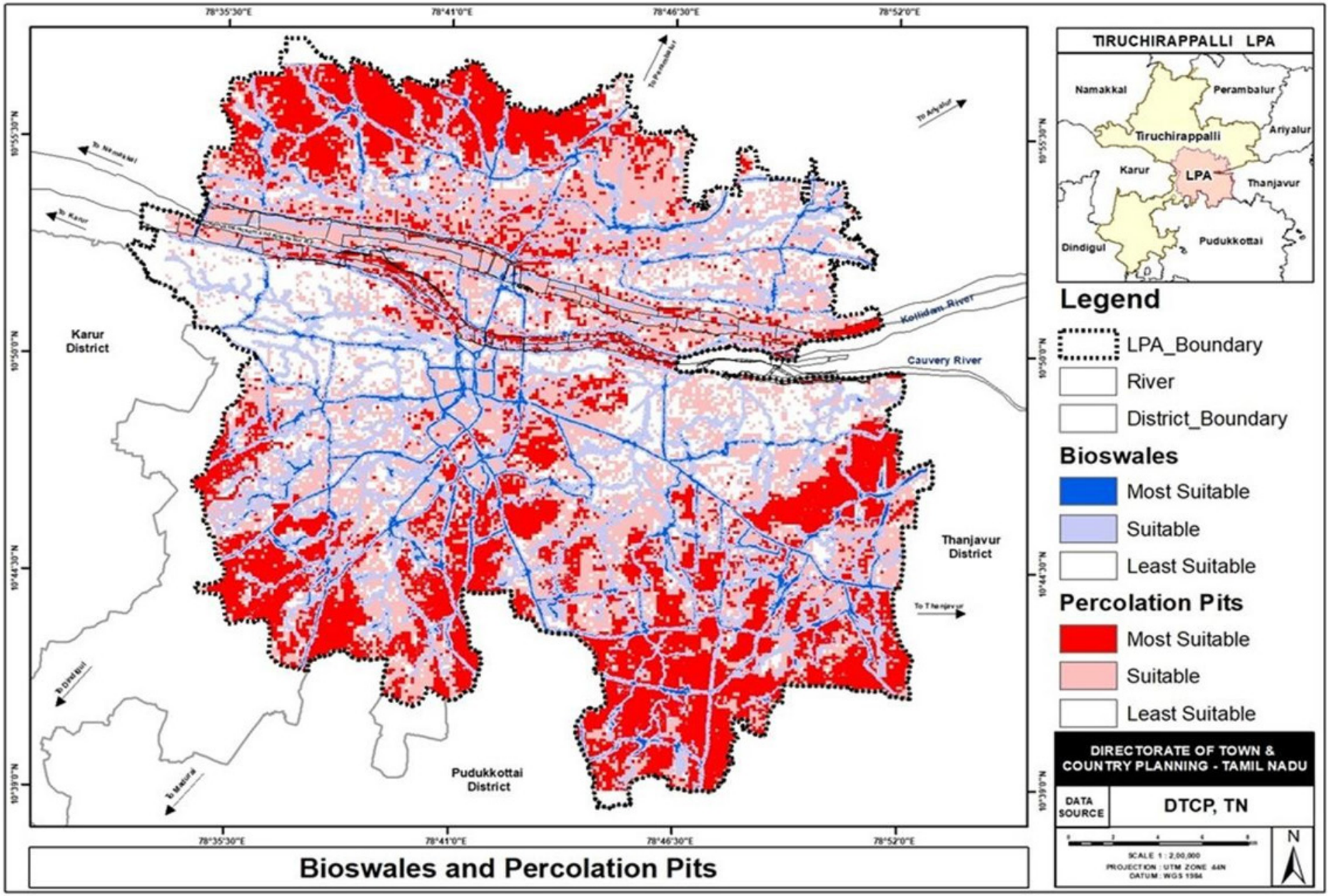
The significance of desiltation within the LPA lies in its role in flood risk reduction, groundwater recharge, and water quality improvement. By increasing water spread and residence time, desilted water bodies support natural percolation, particularly in areas with favourable soil and aquifer conditions. Removal of contaminated sediments also reduces nutrient loading and pollutant concentration, contributing to healthier aquatic ecosystems.

Systematic desiltation and ecological restoration are proposed for major tanks identified through NDWI-based temporal analysis (2015–2025), including Thayanur, Kallikudi South, Gundur, Navalpattu, Asur, Tirunedunkulam, Koothappar, Krishnasamudram, Semmangulam, and Kiliyur. These restored tanks are envisaged to function as distributed flood detention reservoirs, reducing downstream flood peaks, restoring traditional hydrological connectivity, and strengthening groundwater recharge. Along with this, the desiltation of canals and Koraiyar river is also proposed.

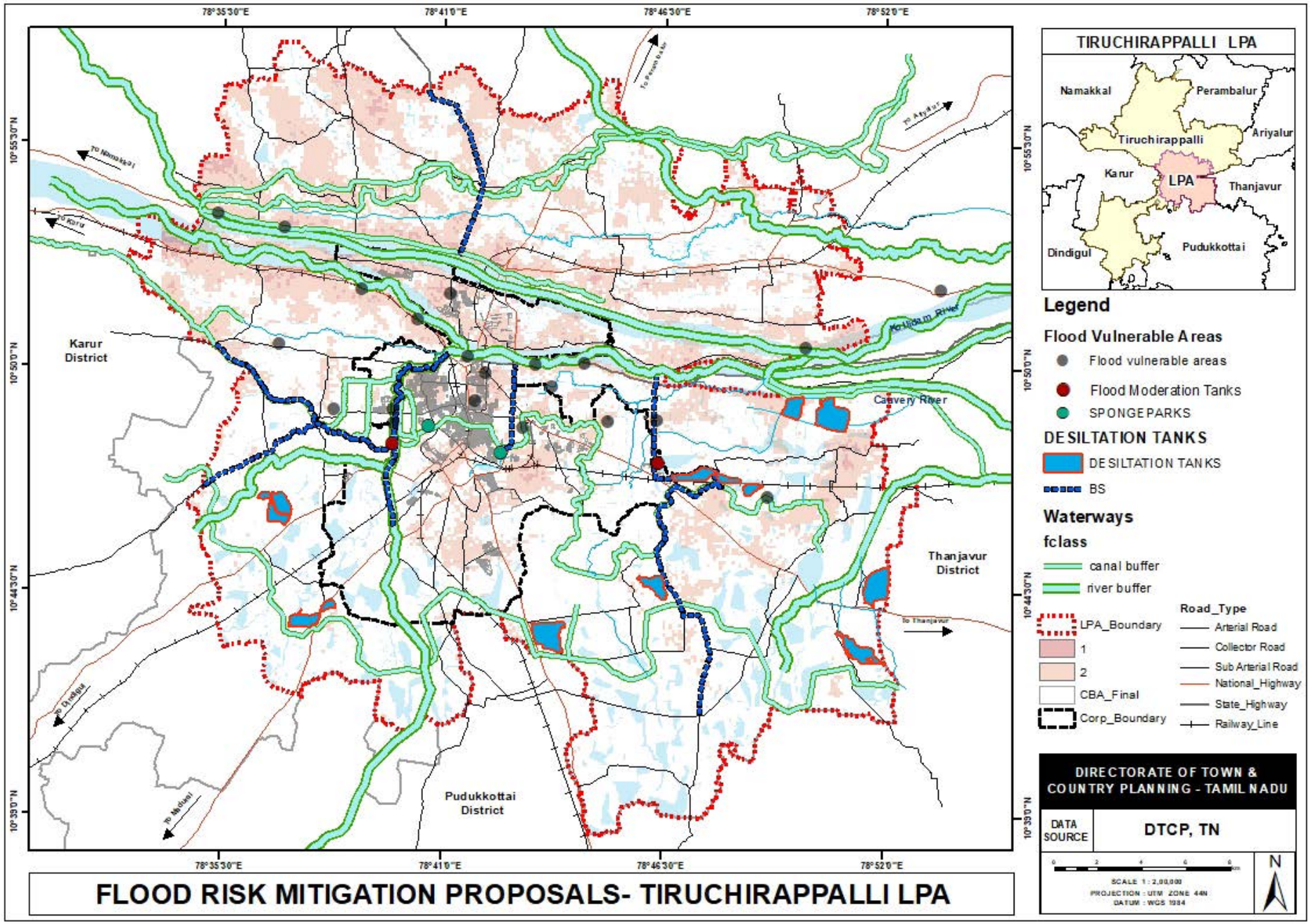
When integrated with bioswales, sponge parks, and riparian buffers, desiltation interventions significantly strengthen the overall resilience of the LPA to climate-induced flood and water stress conditions. The following table indicates the location and extent of the proposed desiltation, and is represented in Map 6.50.

*Table 6.12 Desiltation tanks locations*

| Number | Location | Area (Acres) |
|---|---|---|
| 1 | Thayanur | 305.26 |
| 2 | K.Kallikudi South | 166.8 |
| 3 | K.Kallikudi South | 56.51 |
| 4 | Gundur | 360.88 |
| 5 | Navalpattu (CT) | 176.78 |
| 6 | Asur | 270.07 |
| 7 | Tirunedunkulam | 360.94 |
| 8 | Koothappar(TP) | 163.72 |
| 9 | Krishnasamudram | 68.79 |
| 10 | Semmangulam | 68.77 |
| 11 | Kiliyur | 169.8 |
| 12 | Kiliyur | 400.44 |
| 13 | Uyyakondan canal | 348.66 acres |
| 14 | Kattalai canal | 271.81 acres |
| 15 | Pullambadi canal | 197.68 acres |
| 16 | Pullambadi canal | 224.8 acres |
| 17 | Koraiyar river | 222.4 acres |




*Map 6.49 Bioswales and Percolation pits Map*




*Map 6.50 Flood Risk Mitigation Map*

### 6.13.2 Heat Mitigation Proposals

Heat risk mapping of the Tiruchirappalli Local Planning Area (LPA) indicates that while high and very high heat stress zones are more pronounced along the peripheral and peri-urban extents, significant thermal stress is also evident within the dense built-up areas of the Tiruchirappalli Corporation. Given the higher population exposure, infrastructure concentration, and public activity levels within the urban core, priority interventions are proposed within the Corporation Area, supplemented by anticipatory planning controls for future growth zones in the periphery.

Accordingly, a two-tier strategy is adopted comprising:

i) Intensive heat mitigation interventions within the Corporation Area, and

ii) Heat-sensitive development controls for peripheral and future urban expansion areas.

#### 6.13.2.1 Heat Mitigation Strategy within Corporation Area (Developed Urban Core)

Within the Corporation Area, the heat mitigation strategy is anchored on a combination of urban forest development, blue–green buffer creation, cool roof implementation, and climate-responsive street design, aimed at regulating microclimate, improving outdoor thermal comfort, and reducing surface and ambient temperatures.

##### Urban Forest Development and Green Infrastructure Augmentation

Urban forests play a crucial role in improving urban microclimate, enhancing ecological resilience, strengthening urban biodiversity, and reinforcing carbon sinks. Within the LPA, six urban forest sites have been proposed, primarily located within and adjacent to the Corporation Area, in order to maximise population-level thermal comfort benefits.

The location, extent, and soil characteristics of each proposed urban forest are detailed in Table 6.13, while their spatial distribution is illustrated in Figure 6.7. and Map 6.51.

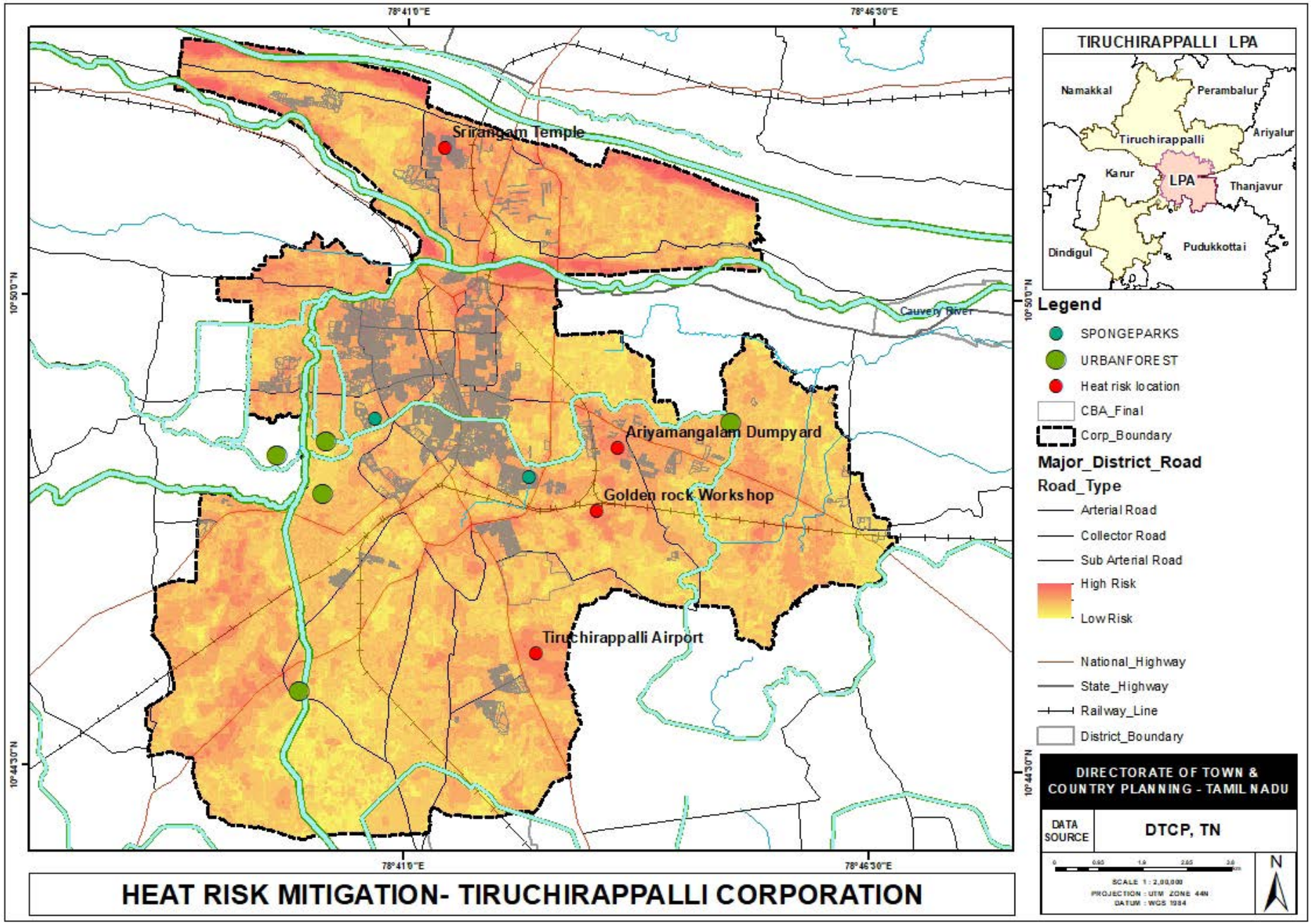
Collectively, these proposals add approximately 112.7 acres (≈45.6 ha) of urban forest cover within the LPA, substantially enhancing green cover continuity and landscape permeability. At the microclimatic scale, the proposed urban forests are expected to contribute to surface and ambient temperature reductions of approximately 1–3°C through shading, evapotranspiration, and improved wind circulation, particularly benefiting heat-stress–prone residential and commercial zones. From a climate mitigation perspective, these forests are estimated to sequester approximately 230–450 tonnes of $CO_2$ annually, depending on species composition, planting density, and canopy maturity,

thereby supporting long-term carbon reduction, air quality improvement, and urban ecological resilience.

*Table 6.13 Urban Forest Location and Area*

| Urban Forest | Area (Acres) | Location |
|---|---|---|
| 1 | 3.2 | Solanganallur+ Nachikurichi |
| 2 | 2.68 | Ward 52 |
| 3 | 3.4 | Ward 45 |
| 4 | 7.96 | Ward 39 |
| 5 | 1.5 | Pappakurichi |

*Figure 6.7 Urban Forest Locations*




*Map 6.51 Heat risk mitigation proposals*

### Blue-Green Heat Buffers along Rivers and Canals

Blue–green infrastructure enhancement forms the second major pillar of heat mitigation within the Corporation Area. In accordance with the Tamil Nadu Combined Development and Building Rules (TNCDBR), a mandatory buffer of 15 m is proposed along the Cauvery and Kollidam rivers, while a minimum buffer of 3 m is proposed along all canals and major drains. These buffers are envisioned as a continuous landscaped blue–green corridor is proposed within the mandatory river setback zones, integrating pedestrian movement, riparian plantations, and ecological restoration measures. The development of such riverine and canal-edge green corridors is expected to significantly reduce land surface temperatures along waterfront edges, enhance evaporative cooling, strengthen urban ventilation pathways, and simultaneously deliver flood resilience and biodiversity co-benefits.

### Cool Roofs and Cool Pavements – CBA

Given the predominance of compact built forms within the urban core, a comprehensive cool roof and cool surface programme is proposed for Continuous Building Areas (CBA). This includes regulated adoption of high-albedo roofing materials for all new government, institutional, commercial, and industrial buildings, coupled with phased retrofitting of existing residential and informal housing areas through DCRs and incentive-based schemes. The promotion of reflective façade finishes, green roofs, and cool pavements in parking areas, footpaths, and public plazas is also envisaged. These interventions are expected to reduce rooftop surface temperatures by 15–25°C and indoor ambient temperatures by 2–4°C, thereby significantly lowering cooling energy demand and improving indoor thermal comfort, particularly in vulnerable neighbourhoods.

### Shaded Pedestrian Network and Climate Sensitive Streets

At the street scale, the creation of a continuous shaded pedestrian network is proposed along major arterial and collector roads, commercial streets, and public transport corridors within the Corporation Area. Priority corridors identified for heat mitigation interventions include Bharathidasan Road, Salai Road, Madurai Road, Thillai Nagar Main Road, Thennur High Road, Sastri Road, Bharathiyar Road, College Road, Collector Office Road, Gandhi Road, Melapudur Main Road, Karur Bypass Road, and Vayalur Road. These streets shall be retrofitted with dense avenue tree plantations, shaded walkways, arcaded footpaths where feasible, permeable and high-albedo paving, and redesigned bus shelters with solar shading and green roofing. It is further suggested to incorporate minimum green cover thresholds, compulsory plantation ratios, permeable surface standards, and street canopy targets, thereby embedding heat resilience into the urban expansion framework in the Development control regulations. The integration of urban agriculture, community orchards, and water-sensitive landscaping is also encouraged to enhance evapotranspiration,

improve soil moisture retention, and reduce radiant heat loads across newly urbanising areas. Collectively, these measures aim to substantially reduce pedestrian heat exposure, improve walkability, enhance public realm usability, and promote sustainable mobility.

### 6.13.3 Ground Water Augmentation and Quality Improvement Proposal- Sponge Parks

Sponge parks are proposed as targeted nature-based groundwater recharge interventions aimed at enhancing aquifer replenishment, improving groundwater quality, and mitigating localised flood risk within the Tiruchirappalli LPA. These parks are designed to temporarily retain excess stormwater during rainfall events and facilitate its gradual release through infiltration and evapotranspiration, thereby reducing surface runoff, urban heat stress, and pressure on conventional drainage systems.

Two sponge parks are proposed within the Tiruchirappalli Corporation limits, located in **Ward No. 00Y (SP–1)** and **Ward No. AD (SP–2), as shown in the Table 6.14, Figure 6.8, and Map 6.51**. Each sponge park covers an area of **1.54 acres**. The sites have been identified based on favourable hydrogeological and soil conditions, including sandy loam soils, fractured gneiss aquifers, and aquifer thickness of 4–6 m, all of which are conducive to effective infiltration and sustained groundwater recharge. The site selection prioritises over-exploited and groundwater-stressed firkas to maximise recharge efficiency and long-term water security outcomes.

*Table 6.14 Sponge Park Details*

| PROPOSALS | NAME | LOCATION | LENGTH/ EXTENT | SOIL/ ROAD TYPE |
|---|---|---|---|---|
| SPONGE PARKS | 1 | Ward.No- 00Y | 1.54 Acres | Sandy Loam |
| | 2 | Ward.No- AD | 1.54 Acres | Sandy Loam |

Both proposed sponge park sites are strategically located along the **Uyyakondan Canal**, enabling integration with the existing blue–green infrastructure network, **as illustrated in the accompanying figure** (Figure 6.8) **and spatial proposal map** (Map 6.52). This strategic placement allows for the interception, temporary storage, and gradual infiltration of stormwater and canal overflow, contributing to groundwater level augmentation in surrounding groundwater-stressed and over-exploited firkas.

*Figure 6.8 Sponge Parks locations*

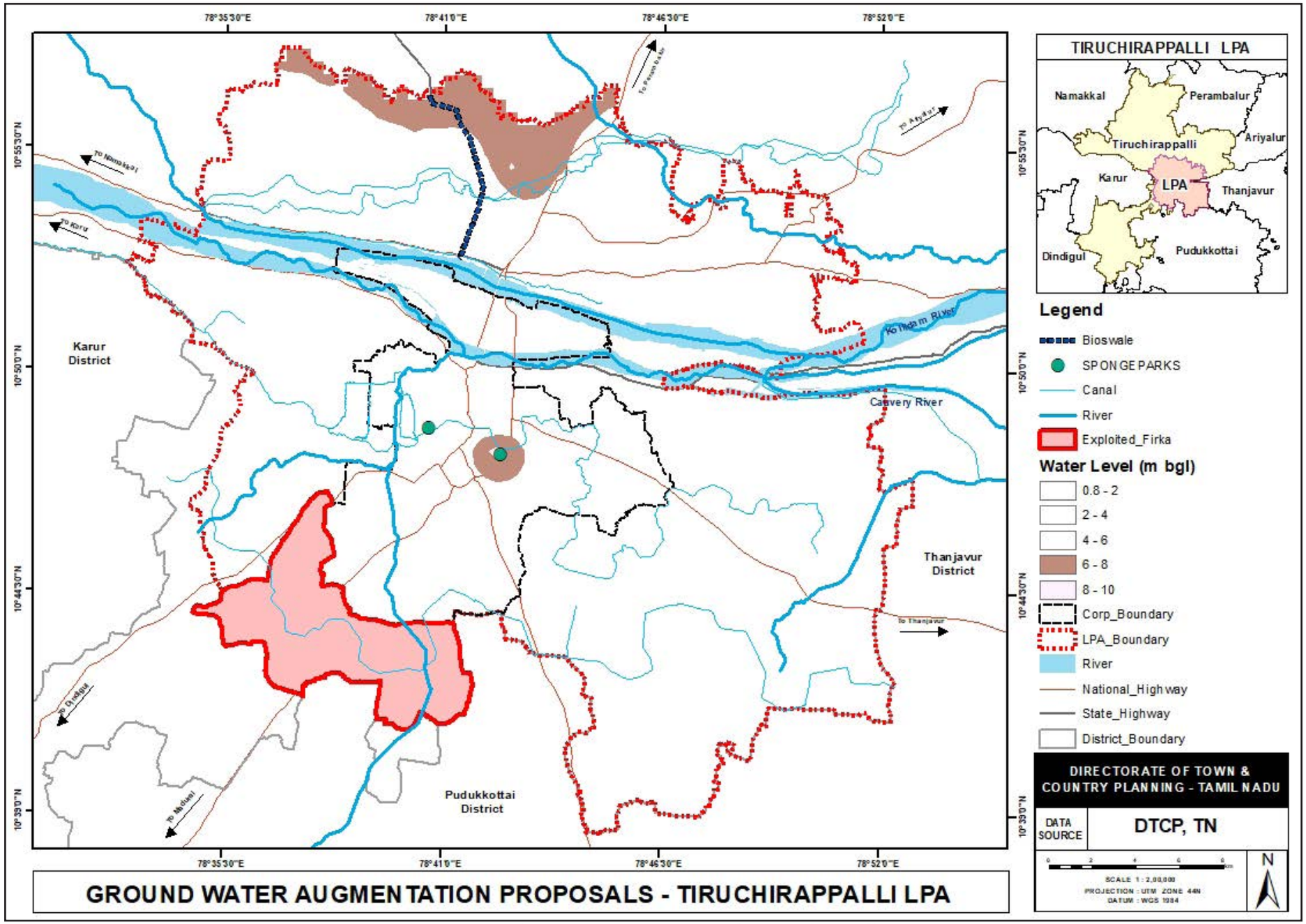
The proposed sponge parks are expected to function as key groundwater recharge nodes within the LPA, supporting groundwater augmentation and quality improvement objectives while simultaneously providing accessible urban green spaces with ecological and microclimatic benefits.

## 6.13.4 Recommendations

### 6.13.4.1 Heat Risk Mitigation

In alignment with the Tamil Nadu Urban Greening Policy, 3–30–300 urban greening principles, and climate-resilient planning guidelines, the following strategic recommendations are proposed for systematic heat risk reduction across the LPA:

- Mandate a minimum 15% green cover target at ward and planning zone levels, prioritising low-canopy and high heat-risk neighbourhoods within the Corporation area.
- Implement a street tree policy ensuring continuous canopy cover along all arterial, sub-arterial, and collector roads, with a target of minimum 30% canopy shading for pedestrian corridors.
- Introduce compulsory cool roof regulations for all new commercial, institutional, industrial and high-density residential developments, supported by incentives for retrofitting existing buildings.
- Establish riparian ecological corridors along Cauvery, Kollidam, and canal networks, integrating flood management, heat mitigation, biodiversity conservation, and recreational public space.




*Map 6.52 Groundwater Augmentation Proposals in Tiruchirappalli LPA*

- Integrate urban forestry reserves and green infrastructure overlays into land-use zoning for peripheral development areas to prevent future heat island formation.
- Promote nature-based solutions such as bioswales, rain gardens, permeable pavements, and shaded public plazas in all redevelopment and infrastructure projects.
- Develop a city-wide heat action planning framework, linking land-use planning, public health preparedness, green infrastructure investments, and community-based cooling initiatives.
- Establish urban microclimate monitoring systems using satellite data, sensor networks, and periodic thermal mapping to guide adaptive heat mitigation planning and investment prioritisation.

#### 6.13.4.2 Recommendation for Manikandam Firka – Water-Efficient Irrigation and Recharge Measures

Manikandam Firka has been identified as an **over-exploited groundwater unit**, characterized by declining groundwater levels and increasing pressure on aquifer systems. In view of this condition, **demand-side water management and recharge enhancement measures** are recommended to reduce groundwater abstraction and support aquifer recovery.

For agricultural lands within Manikandam Firka, the adoption of **drip irrigation systems** is recommended to significantly reduce groundwater extraction. Drip irrigation enables controlled and targeted application of water directly to the root zone, minimizing conveyance losses, evaporation, and excess runoff. This method improves irrigation efficiency, reduces water demand, and limits the leaching of salts and agro-chemicals into the subsurface, thereby contributing to both groundwater conservation and quality improvement.

In addition, the provision of **recharge pits in agricultural fields and along farm boundaries** is recommended to enhance localized groundwater recharge. These recharge structures facilitate the infiltration of excess surface runoff and irrigation return flows through permeable layers, allowing water to percolate into the underlying aquifer system.

Further, it is recommended that **recharge pits be made mandatory in all upcoming institutional buildings within Manikandam Firka**. Integrating recharge structures within institutional campuses will enable systematic capture and infiltration of rooftop and surface runoff, thereby supplementing groundwater recharge and reducing pressure on existing groundwater sources.

The integrated implementation of **drip irrigation, recharge pits in agricultural lands, and mandatory recharge pits in institutional developments** in Manikandam Firka is expected to reduce groundwater stress, improve irrigation efficiency, and contribute to the gradual stabilization of groundwater levels in this over-exploited zone.

# 7 DEMOGRAPHIC PROFILE

## 7.1 Overview of Tiruchirappalli LPA

The demographic profile of the planning area provides a fundamental basis for assessing existing conditions and future development needs. Tiruchirappalli District has a population approximately 27.22 lakh and contributes 3.8% of the total state population. The district consists of 49.15% share of population living in urban areas, exhibiting a moderate level of urbanization similar to the State average (48.4%). The growth of the urban population in Tiruchirappalli District can be attributed to factors such as economic opportunities, the presence of educational and research institutions, ease of connectivity and infrastructure facilities leading to in-migration from surrounding rural areas.

The Tiruchirappalli Local Planning Area (LPA) accounts for 52.6% of the total population of the district, indicating its significant demographic importance within the region. The literacy rate in the LPA is recorded at 89.3%, which is substantially higher than the district literacy rate of 83.23% and the State average of 80%. The Corporation area exhibits an even higher literacy rate of 91.4%, reflecting better access to educational facilities and higher levels of educational attainment in urbanized areas.

The sex ratio of the Local Planning Area (LPA) is recorded at 1,013 females. This value is equal to the district sex ratio (1,013), indicating that the LPA closely mirrors the overall demographic pattern of the district. When compared with the State average of Tamil Nadu, which stands at 996, the LPA exhibits a significantly higher sex ratio.

The population density of the Local Planning Area (LPA) is recorded at 18 persons per hectare, which is substantially higher than both the State and district population densities, each of which stand at 6 persons per hectare. This indicates a higher concentration of population within the LPA, reflecting its role as a major urban and economic hub within the district. In contrast, the Corporation area exhibits a significantly higher population density of 55 persons per hectare, highlighting the intense level of urbanization and compact development within the municipal limits.

A comparative assessment of Tamil Nadu State, Tiruchirappalli District, Tiruchirappalli Local Planning Area (LPA), and Tiruchirappalli City Municipal Corporation indicates a progressive increase in population density from the regional to the urban scale

*Table 7.1 - State, District, LPA and Corporation level comparison of demographic factors*

| Demographic Factor | Tamil Nadu State | Tiruchirappalli District | Tiruchirappalli LPA | Tiruchirappalli Corporation |
|---|---|---|---|---|
| Population (2011) | 7,21,47,030 | 27,22,290 | 14,32,404 | 9,15,569 |
| Area (in Ha.) | 1,30,05,800 | 4,40,383 | 80,453 | 16,723 |
| Population Density (Persons / Ha.) | 6 | 6 | 18 | 55 |
| Literacy Rate – 2011 (%) | 80% | 83.23% | 89.3% | 91.4% |
| Sex Ratio – 2011 (no. of females for 1000 males) | 996 | 1,013 | 1,013 | 1,023 |

*Source: Census of India*

## 7.2 Urbanization Trend in Tamil Nadu and Tiruchirappalli

As per Census 2011, Tamil Nadu has a population of 7.21 crore, accounting for 5.96% of India's total population. The state is among the most urbanised in the country, with 48.45% of its population residing in urban areas, significantly higher than the national average of 31.16%.

Tiruchirappalli District has a population of 27.22 lakh, constituting approximately 3.8% of the state's population with an urbanization rate of 49.15%. Within the district, the Tiruchirappalli Local Planning Area (LPA) accommodates an urban population of about 14.32 lakh, accounting for 52.6% of the district population, reflecting a similar concentration of population and economic activities in urban and rural areas. This trend highlights Tiruchirappalli's role as an important regional growth centre in central Tamil Nadu, supported by its administrative, educational, and transport functions.

## 7.3 Source of Baseline Data

The demographic analysis of the Tiruchirappalli Local Planning Area is primarily based on population data from the Census of India for the years 1981, 1991, 2001, and 2011. Estimates for the year 2024 have been corroborated with data from the Jal Jeevan Mission, Ministry of Jal Shakti, as well as updated records from Urban Local Bodies. On the basis of this data, population projections for the horizon years 2035 and 2045 have been prepared to support evidence-based long-term planning and development decision-making.

## 7.4 Classification of Towns

The classification of towns based on population size, as per Census of India 2011, provides an understanding of the settlement hierarchy and urbanization pattern within the Tiruchirappalli Local Planning Area (LPA). Using Census 2011 data, towns within the LPA are grouped into five population-based classes.

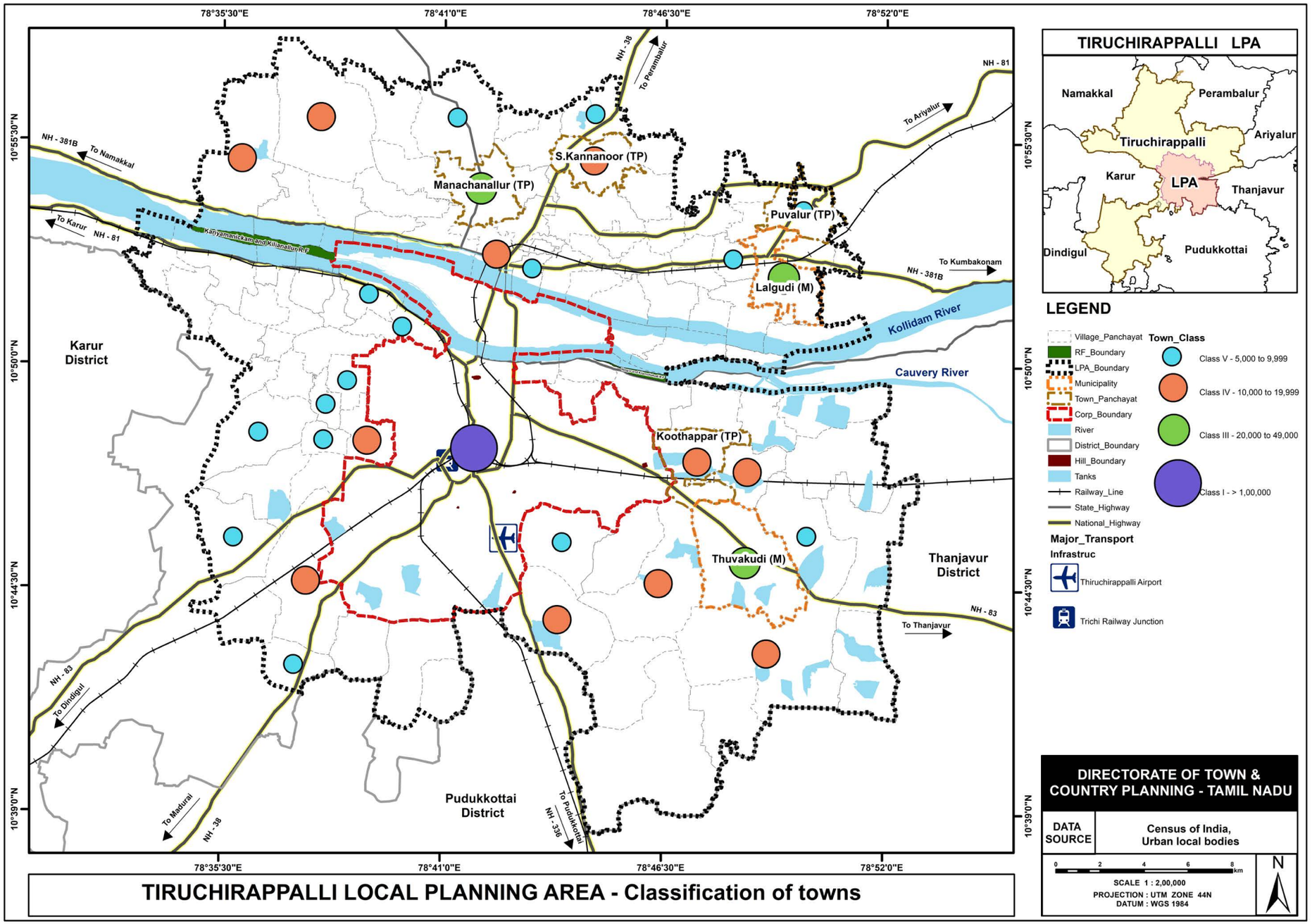
*Table 7.2 - Classification of towns in 2011(based on population size)*

| Classification of Town | Number of towns (Census – 2011) | Local Bodies/village panchayats |
|---|---|---|
| Class I (More than 1,00,000) | 1 | Tiruchirappalli Corporation (65 wards) |
| Class II (50,000 – 99,999) | - | None |
| Class III (20,000 – 49,999) | 3 | Lalgudi (M), Thuvakudi (M), Manachanallur (TP) |
| Class IV (10,000 – 19,999) | 11 | S. Kannanoor (TP), Kothappar (TP), Pitchandarkoil(CT), Kariyamanikam, Thiruppanjeeli, Nachikurichi, K.Kallikudi, Kundoor, Navalpattu (CT), Palanganankudi (CT), Krishnasamudram |
| Class V (5000 – 9999) | 16 | Puvalur (TP), Aangarai, Thalagudi, Poonampalayam, Samayapuram, Kambarasampettai, Malliampathu, Mutharasanallur, Athavathur, Allithurai, Nagamangalam, Navalurkottapattu, Somarasampettai, Punganur, Valavanthankottai, Keelakurichi |

*Source: Census of India 2011, Urban Local Bodies*

The urban structure of the Tiruchirappalli LPA exhibits a clear monocentric and corridor-oriented development pattern, with Tiruchirappalli city functioning as the dominant urban core and the only Class I city, concentrating the highest population density, administrative functions, transport nodes, and economic activities within its corporation limits.

- **Class I towns:** Tiruchirappalli Corporation is the sole Class I town in the region, serving as the dominant urban core within the Tiruchirappalli LPA.
- **Class II towns:** The classification analysis reveals that no settlements in the region qualify as Class II towns, highlighting a gap in the urban hierarchy between the dominant Class I city and the smaller Class III towns.
- **Class III towns:** The region comprises three Class III towns—Lalgudi (M), Thuvakudi (M), and Manachanallur (TP). These towns largely function as dependent satellite settlements with limited autonomous growth, reinforcing the primacy of Tiruchirappalli city. Urban development is mainly observed along major transport corridors such as national and state highways, railway lines, and the Cauvery River, resulting in linear or ribbon-type growth patterns.




*Map 7.1 - Classification of towns in 2011 (based on population size)*

*Source: Census of India*

- **Class IV and V towns:**A significant number of Class IV (11) and Class V (16) settlements are village panchayats or census towns located in the urban rural fringe.

Beyond these corridors, large portions of the LPA remain predominantly rural, with village panchayats and agricultural land, indicating a sharp urban–rural contrast and discontinuous sprawl at the periphery.

Overall, the spatial distribution of towns and population reflects a single-core urban system with transport-led expansion and emerging but weak peripheral centers, rather than a mature polycentric or decentralized development pattern. Based on the existing pattern, the region requires strategic urban planning interventions aimed at decentralization, balanced regional development, and sustainable growth.

## 7.5 Population Growth in Tiruchirappalli Corporation

The population of Tiruchirappalli corporation grew from 1.28 lakh in 1901 to about 8.47 lakh by 2011 (60 wards), with notable variations across decades influenced by phases of rapid urbanisation, administrative upgradation, territorial expansion, and migration trends, as presented as follows:

*Table 7.3 - Decadal growth rate of Tiruchirappalli Corporation*

| S.No. | Census Year | Population | Variation | Decadal Growth Rate (in %) | Remarks |
|---|---|---|---|---|---|
| 1 | 1901 | 127,760 | | | - |
| 2 | 1911 | 148,311 | 20,551 | 16.09% | - |
| 3 | 1921 | 143,575 | -4,736 | -3.19% | Due to the 1918 influenza epidemic |
| 4 | 1931 | 181,443 | 37,868 | 26.38% | - |
| 5 | 1941 | 202,654 | 21,211 | 11.69% | - |
| 6 | 1951 | 294,233 | 91,579 | 45.19% | - |
| 7 | 1961 | 338,881 | 44,648 | 15.17% | Establishment of the BHEL unit (Upgraded to Municipality) |
| 8 | 1971 | 452,313 | 113,432 | 33.47% | |
| 9 | 1981 | 547,793 | 95,480 | 21.11% | - |
| 10 | 1991(49 wards) | 645,134 | 97,341 | 17.77% | Municipal Corporation was formed in 1994 under G.O.Ms. No. 109 (dated 31.03.1994) by merging 13 local bodies |
| 11 | 2001 (60 wards) | 752,772 | 107,638 | 16.68% | |
| 12 | 2011 (60 wards) | 847,387 | 94,615 | 12.57% | - |

*Source: Census of India*

An analysis of Tiruchirappalli's population from 1901 to 2011 indicates substantial growth influenced by historical events, urbanisation, and administrative developments. Early 20th-century growth was moderate, with a slight decline between 1911 and 1921 due to the 1918 influenza epidemic, followed by accelerated expansion between 1941 and 1951. Steady population increases in subsequent decades, driven by industrialisation, migration, and urban expansion, necessitated changes in urban administration: the city was upgraded to a Municipality by 1961, reflecting its transition from a regional town to a formally administered urban centre.

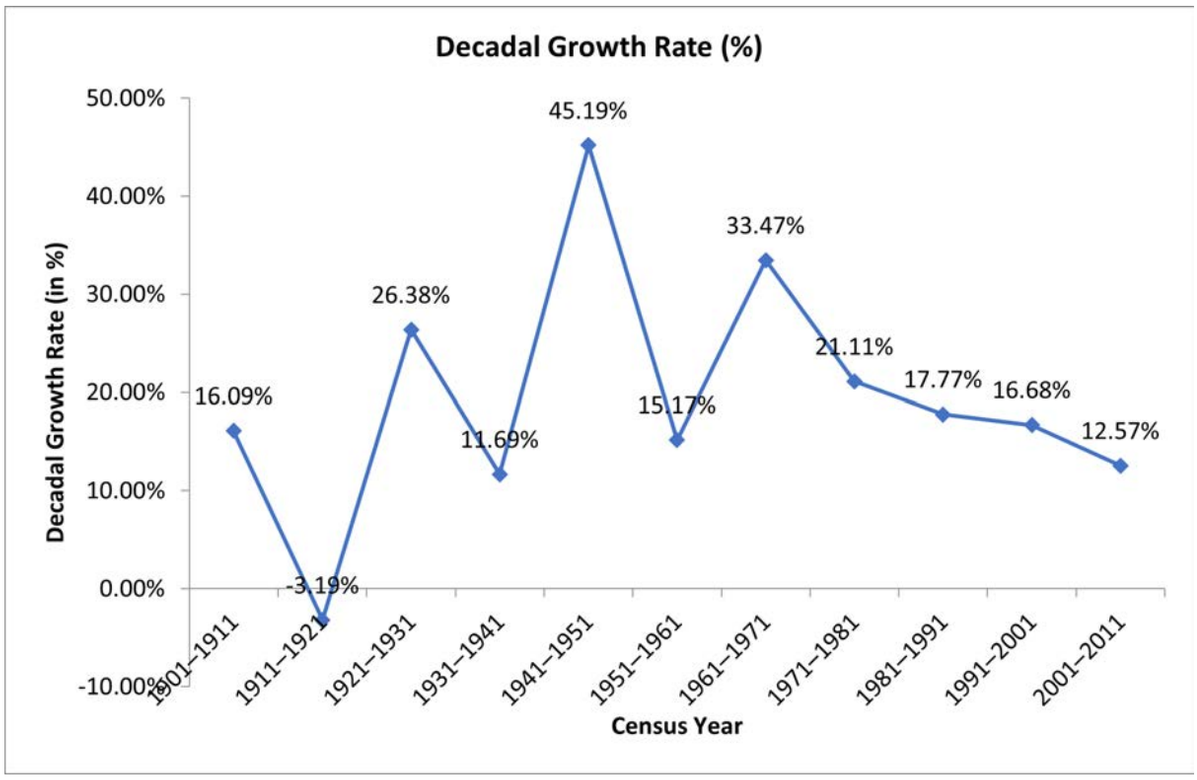



*Figure 7.1 - Decadal growth rate of Tiruchirappalli Corporation*

*Source: Census of India*

By 1991, the municipal area had expanded to 111.79 sq. km with 49 wards, and continued growth led to its designation as a Municipal Corporation by 2001, increasing the area to 146.90 sq. km and the number of wards to 60. Population growth between 2001 and 2011 was largely due to densification within the municipal boundaries. Subsequent administrative restructuring in 2018, which added villages [Thiruverumbur (TP), Pappakurichi, Ellagudi, Kilakalkandarkottai and Alathur] and increased the total wards to 65, underscores Tiruchirappalli's continued outward expansion and evolving urban requirements, highlighting its transformation into a major urban centre.

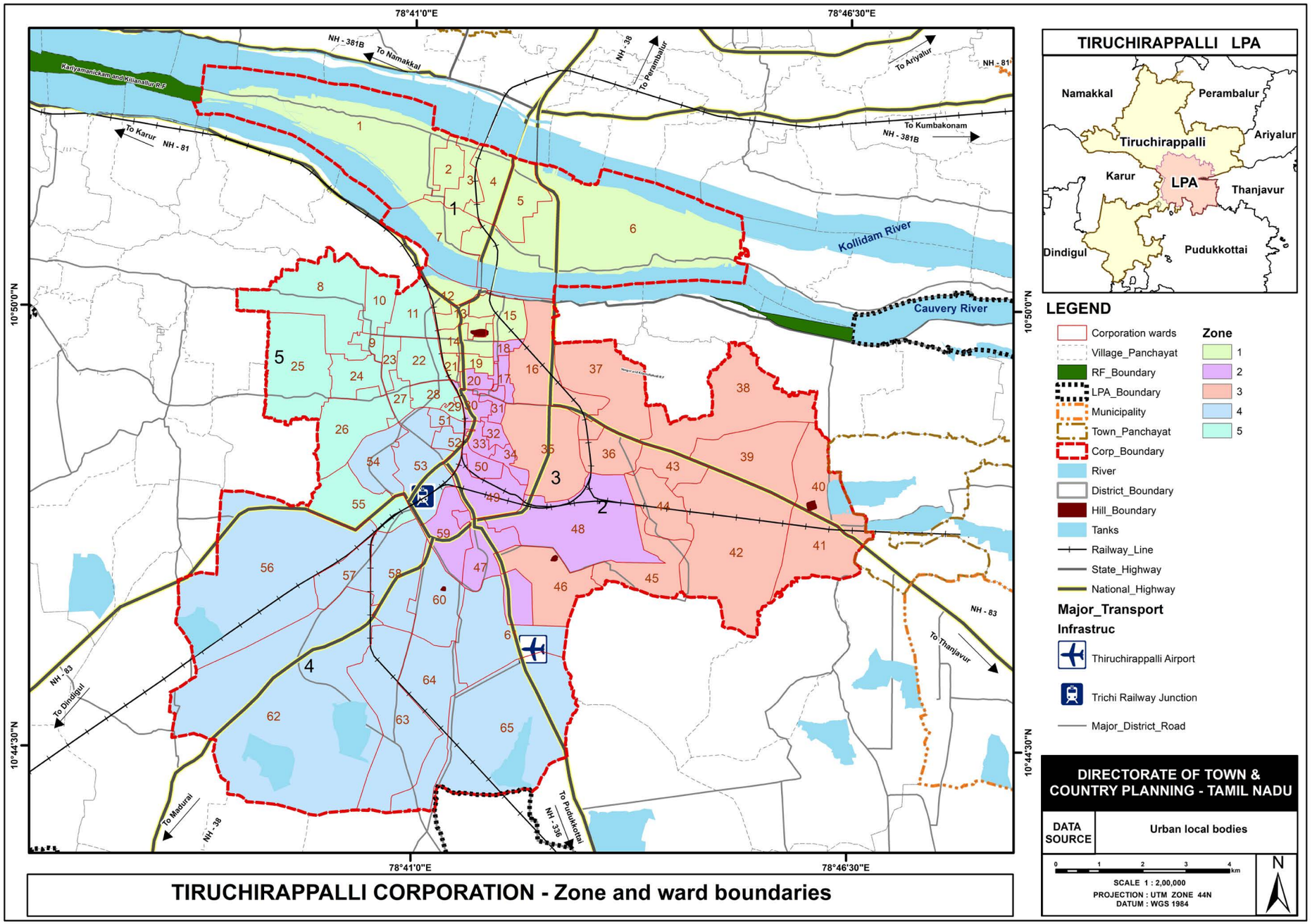
## 7.6 Population Distribution and Density: Tiruchirappalli Corporation

Following the constitution of 65 wards in 2018, the Census 2011 population has been allocated according to these wards, and the corresponding ward-wise population densities are presented in Table 7.4. These wards are grouped into five administrative zones, with an uneven spatial distribution that reflects variations in both population density and spatial extent. Zones 1 and 5 have a relatively higher concentration of wards, whereas Zones 2, 3, and 4 encompass larger areas covered under wards.

The ward-wise population and area details are as follows:

*Table 7.4 - Population distribution of Tiruchirappalli Corporation (based on 2011 census data)*

| S.No | Zone No | Wards | Population 2011 | Area (in Ha) | Population Density 2011 (persons per Ha) |
|---|---|---|---|---|---|
| 1 | Zone 1 | Ward 1 | 14,673 | 551 | 15 |
| 2 | Zone 1 | Ward 2 | 15,023 | 83 | 194 |
| 3 | Zone 1 | Ward 3 | 15,525 | 77 | 213 |
| 4 | Zone 1 | Ward 4 | 12,603 | 114 | 108 |
| 5 | Zone 1 | Ward 5 | 15,199 | 144 | 114 |
| 6 | Zone 1 | Ward 6 | 15,308 | 1,033 | 12 |
| 7 | Zone 1 | Ward 7 | 14,000 | 112 | 57 |
| 8 | Zone 5 | Ward 8 | 15,423 | 466 | 41 |
| 9 | Zone 5 | Ward 9 | 15,272 | 36 | 455 |
| 10 | Zone 5 | Ward 10 | 14,922 | 58 | 162 |
| 11 | Zone 5 | Ward 11 | 15,612 | 135 | 136 |
| 12 | Zone 1 | Ward 12 | 14,516 | 84 | 182 |
| 13 | Zone 1 | Ward 13 | 14,813 | 63 | 264 |
| 14 | Zone 1 | Ward 14 | 14,458 | 73 | 205 |
| 15 | Zone 1 | Ward 15 | 13,097 | 108 | 131 |
| 16 | Zone 3 | Ward 16 | 12,800 | 305 | 43 |
| 17 | Zone 2 | Ward 17 | 12,275 | 31 | 432 |




*Map 7.2 - Zone and ward boundaries*

*Source: Census of India, Urban Local Bodies*

| S.No | Zone No | Wards | Population 2011 | Area (in Ha) | Population Density 2011 (persons per Ha) |
|---|---|---|---|---|---|
| 18 | Zone 2 | Ward 18 | 13,225 | 46 | 333 |
| 19 | Zone 1 | Ward 19 | 15,143 | 37 | 478 |
| 20 | Zone 2 | Ward 20 | 15,661 | 30 | 531 |
| 21 | Zone 1 | Ward 21 | 15,118 | 23 | 716 |
| 22 | Zone 5 | Ward 22 | 15,129 | 111 | 147 |
| 23 | Zone 5 | Ward 23 | 15,175 | 40 | 404 |
| 24 | Zone 5 | Ward 24 | 15,413 | 107 | 155 |
| 25 | Zone 5 | Ward 25 | 15,601 | 283 | 46 |
| 26 | Zone 5 | Ward 26 | 15,302 | 237 | 70 |
| 27 | Zone 5 | Ward 27 | 15,359 | 52 | 325 |
| 28 | Zone 5 | Ward 28 | 15,671 | 61 | 266 |
| 29 | Zone 5 | Ward 29 | 15,376 | 15 | 952 |
| 30 | Zone 2 | Ward 30 | 13,895 | 34 | 327 |
| 31 | Zone 2 | Ward 31 | 13,273 | 23 | 621 |
| 32 | Zone 2 | Ward 32 | 12,552 | 31 | 468 |
| 33 | Zone 2 | Ward 33 | 12,558 | 39 | 359 |
| 34 | Zone 2 | Ward 34 | 12,966 | 43 | 391 |
| 35 | Zone 3 | Ward 35 | 13,330 | 350 | 41 |
| 36 | Zone 3 | Ward 36 | 12,452 | 122 | 109 |
| 37 | Zone 3 | Ward 37 | 12,452 | 342 | 39 |
| 38 | Zone 3 | Ward 38 | 12,685 | 638 | 30 |
| 39 | Zone 3 | Ward 39 | 13,089 | 273 | 46 |
| 40 | Zone 3 | Ward 40 | 12,798 | 275 | 57 |
| 41 | Zone 3 | Ward 41 | 12,952 | 559 | 55 |
| 42 | Zone 3 | Ward 42 | 12,134 | 860 | 18 |
| 43 | Zone 3 | Ward 43 | 12,722 | 102 | 133 |

| S.No | Zone No | Wards | Population 2011 | Area (in Ha) | Population Density 2011 (persons per Ha) |
|---|---|---|---|---|---|
| 44 | Zone 3 | Ward 44 | 14,153 | 167 | 92 |
| 45 | Zone 3 | Ward 45 | 12,623 | 264 | 67 |
| 46 | Zone 3 | Ward 46 | 13,100 | 236 | 56 |
| 47 | Zone 2 | Ward 47 | 15,929 | 225 | 76 |
| 48 | Zone 2 | Ward 48 | 14,285 | 539 | 30 |
| 49 | Zone 2 | Ward 49 | 12,367 | 150 | 88 |
| 50 | Zone 2 | Ward 50 | 12,594 | 52 | 272 |
| 51 | Zone 4 | Ward 51 | 12,761 | 26 | 472 |
| 52 | Zone 4 | Ward 52 | 12,601 | 42 | 286 |
| 53 | Zone 4 | Ward 53 | 13,102 | 249 | 58 |
| 54 | Zone 4 | Ward 54 | 13,706 | 146 | 99 |
| 55 | Zone 5 | Ward 55 | 14,555 | 504 | 69 |
| 56 | Zone 4 | Ward 56 | 15,199 | 1,002 | 15 |
| 57 | Zone 4 | Ward 57 | 15,205 | 123 | 133 |
| 58 | Zone 4 | Ward 58 | 15,818 | 253 | 64 |
| 59 | Zone 2 | Ward 59 | 14,205 | 148 | 104 |
| 60 | Zone 4 | Ward 60 | 13,386 | 195 | 71 |
| 61 | Zone 4 | Ward 61 | 13,809 | 356 | 42 |
| 62 | Zone 4 | Ward 62 | 15,833 | 1,765 | 10 |
| 63 | Zone 4 | Ward 63 | 13,522 | 545 | 30 |
| 64 | Zone 4 | Ward 64 | 14,095 | 546 | 47 |
| 65 | Zone 4 | Ward 65 | 15,171 | 984 | 20 |

*Source: Census of India 2011, Urban Local Bodies*

The zonal-wise population distribution of the Municipal Corporation is as follows.

*Table 7.5 - Population distribution in Tiruchirappalli Corporation zones (based on census 2011 data)*

| S.No | Zone No | Population 2011 | Area (in Ha) | Population Density 2011 (persons per Ha) |
|---|---|---|---|---|
| 1 | Zone 1 | 1,89,476 | 2,502 | 76 |
| 2 | Zone 2 | 1,75,785 | 1,391 | 126 |
| 3 | Zone 3 | 1,67,290 | 4,493 | 37 |
| 4 | Zone 4 | 1,84,208 | 6,232 | 30 |
| 5 | Zone 5 | 1,98,810 | 2,105 | 94 |
| 6 | Tiruchirappalli Corporation area | 9,15,569 | 16,723 | 55 |

*Source: Census of India 2011, Urban Local Bodies*

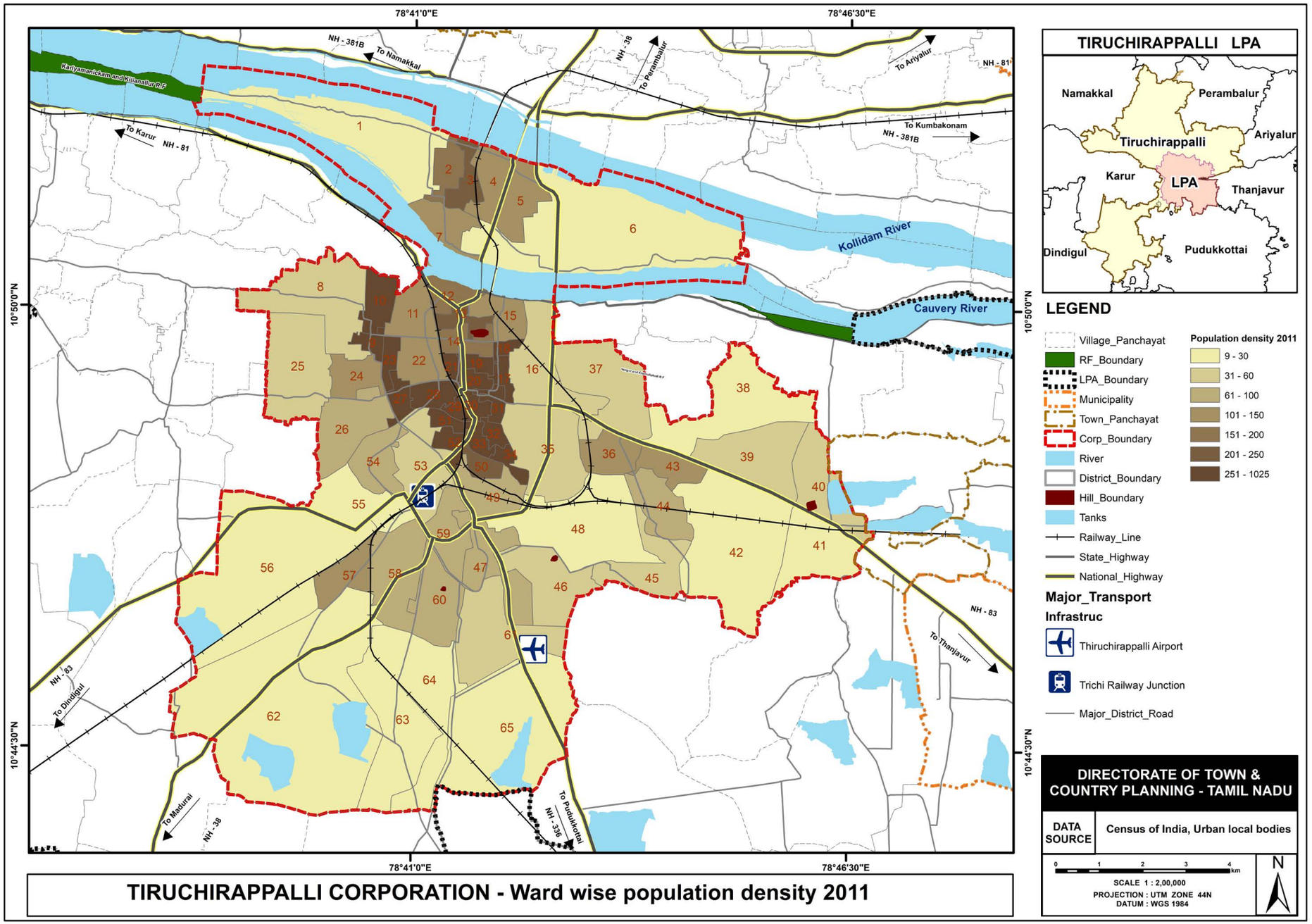
### Population density

The population density map of Tiruchirappalli Corporation from 2011 reveals a pattern of concentrated urban settlement in the city's core, with the highest densities found in the central wards. Approximately 35% of the wards fall within low-density categories, primarily corresponding to peripheral areas characterized by larger ward sizes and recent urban extensions. In contrast, about 27.7% of the wards are classified as extremely high density, concentrated predominantly in the core city, indicating intense population concentration, and compact built form.

*Table 7.6 - Classification of population density of Tiruchirappalli Corporation (based on 2011 census data)*

| S.No. | Classification | Density Range (Persons per Hectare) | No. of wards | Wards |
|---|---|---|---|---|
| 1 | Very Low Density | Less than 30 | 12 (18.5%) | 1,6,38,41,42,48,55,56,62,63,64,65 |
| 2 | Low Density | 30 - 60 | 11 (16.9%) | 8,16,25,35,37,39,40,45,46,53,61 |
| 3 | Moderate Density | 60 - 100 | 8 (12.3%) | 26,44,47,49,54,58,59,60 |
| 4 | High Density | 100 - 150 | 10 (15.4%) | 4,5,7,11,15,22,24,36,43,57 |
| 5 | Very High Density | 150 - 250 | 6 (9.2%) | 2,3,12,13,14,50 |
| 6 | Extremely High Density | More than 250 | 18 (27.7%) | Rest of the wards in the core area |

*Source: Census of India, 2011, Urban Local Bodies*




*Map 7.3 - Ward wise population density in Tiruchirappalli Corporation (based on census 2011 data)*

*Source: Census of India, 2011, Urban Local Bodies*

Only a limited proportion of wards fall under the moderate density (12.3%) category, suggesting a weak middle band in the density gradient. Overall, the pattern reflects clearly indicates a concentric pattern of urban development with decreasing density while moving towards the periphery.

### 7.6.1 Comparison of Population Density with Similar Corporation

A comparative assessment of population density (Census 2011) among selected Indian cities is undertaken to evaluate Tiruchirappalli's relative density and potential for future densification. The cities have been identified based on their similar characteristics, including the presence of prominent educational institutions, status as secondary cities within their respective states, a diverse range of small- to medium-scale manufacturing units, strategic geographical locations that ensure strong connectivity, and emerging IT sectors contributing to their economic diversification.

*Table 7.7 - Comparison of Population density with similar corporation*

| Municipal Corporation | Population | Area (in sq.km) | Population Density (Persons per Hectare) |
|---|---|---|---|
| Tiruchirappalli (65 wards) | 9,15,569 | 167.23 | 55 |
| Vijayawada | 10,34,358 | 59.69 | 173 |
| Nagpur | 24,05,665 | 217.56 | 111 |
| Mysore | 8,93,062 | 89.66 | 96 |
| Indore | 19,64,086 | 130.17 | 151 |

*Source: Census of India 2011*

Tiruchirappalli, with a population density of 55 persons per hectare, is much lower than Vijayawada (173), Indore (151), Nagpur (111), and Mysore (96), despite having a comparable population size to Mysore and Vijayawada. This indicates that Trichy's urban development is more spatially dispersed, with larger land area per capita, whereas the other cities are more compact and densely built, suggesting higher pressure on land, infrastructure, and services.

## 7.7 Population Distribution and Density: Municipalities and Town panchayats

### 7.7.1 Lalgudi Municipality

Lalgudi Municipality consists of 3 revenue villages that together form the municipal area. The overall population density of the municipality, based

on Census 2011 data, is 24 persons per hectare, reflects a relatively low to moderate settlement intensity, indicating the semi-urban nature of the area. The population growth of Lalgudi Municipality declined sharply from 17.5% during 1991–2001 to 1.4% during 2001–2011, indicating a significant slowdown in demographic growth in the latter decade.

*Table 7.8 - Population density of Lalgudi (M) - based on Census 2011 data*

| S.No. | Municipality | Revenue Villages | Area (in Ha.) | Population (2011) | Population Density – 2011 (Persons/ Hectare) |
|---|---|---|---|---|---|
| 1 | Lalgudi | Sirudaiyur | 1,003 | 23,740 | 24 |
| 2 | | L. Abishekapuram | | | |
| 3 | | Mummudi Cholamangalam | | | |

*Source: Census of India, 2011*

### 7.7.2 Thuvakudi Municipality

Thuvakudi Municipality, with a total area of 1,437 hectares and a population of 38,887 as per Census 2011, has an overall population density of about 27 persons per hectare. This density reflects a low to moderate settlement intensity, indicative of the semi-urban character of the municipality. The population growth of Thuvakudi increased from 6.6% during 1991–2001 to 9.8% during 2001–2011, indicating an acceleration in demographic growth in the latter decade. Thuvakudi's increased population growth between 2001 and 2011 can be plausibly linked to its strategic location along NH-83 and its proximity to industrial and institutional developments, particularly the BHEL industrial complex and associated ancillary activities

*Table 7.9 - Population density of Thuvakudi (M) - based on Census 2011 data*

| S.No. | Municipality | Revenue village | Area (in Ha.) | Population (2011) | Population Density – 2011 (Persons/ Hectare) |
|---|---|---|---|---|---|
| 1 | Thuvakudi | Thuvakudi | 1,437 | 38,887 | 27 |

*Source: Census of India, 2011*

### 7.7.3 Town panchayats

The Tiruchirappalli LPA includes four Town Panchayats—Puvalur, Manachanallur, S. Kannanoor (West), and Koothappar—forming the peri-

urban and transitional zones, with varying population sizes and densities as detailed below.

*Table 7.10 - Population density of Town Panchayats - based on Census 2011 data*

| S. No. | Municipality | Revenue village | Area (in Ha.) | Population (2011) | Population Density – 2011 (Persons/ Hectare) |
|---|---|---|---|---|---|
| 1 | Puvalur (TP) | Puvalur (East)<br>Puvalur (West) | 518 | 7,905 | 15 |
| 2 | Manachanallur (TP) | Manachanallur<br>Melaseedevimangalam<br>Ulunthangudi | 245 | 25,931 | 106 |
| 3 | S. Kannanoor (West) | S.Kannanoor (East)<br>S.Kannanoor (West) | 450 | 13,073 | 29 |
| 4 | Koothappar (TP) | Koothappar | 940 | 15,943 | 17 |
| Total | | | 2,153 | 62,852 | |

*Source: Census of India 2011*

The Town Panchayats collectively cover varying areas and exhibit a wide range of population densities, reflecting diverse settlement patterns and levels of urbanization. Manachanallur Town Panchayat, with a population of 25,931 in 245 hectares, shows a density of 106 persons per hectare. S. Kannanoor (West), accommodating 13,073 people over 450 hectares, has a moderate density of 29 persons per hectare, reflecting a semi-urban character. Puvalur and Koothappar Town Panchayats, with populations of 7,905 and 15,943 spread over 518 and 940 hectares respectively, have low densities of 15 and 17 persons per hectare, suggesting dispersed development and available land for future growth.

Overall, the Town Panchayats recorded a population growth of 16.5% during 1991–2001, which slowed significantly to 6.1% during 2001–2011. This overall decline in growth rate is influenced in part by declining population trend in specific Town Panchayats, notably Puvalur and Koothappar, which contributed to the reduced collective growth.

## 7.8 Population characteristics of the overall LPA

### 7.8.1 Urban concentration in Tiruchirappalli Corporation

The analysis of population, density, and growth trends reveals a clear hierarchy of urbanization and settlement intensity within the LPA. Tiruchirappalli Corporation functions as the central urban core, with moderate population density reflecting concentrated land development, availability of infrastructure, and a high level of economic, administrative, and cultural activity. The relatively balanced density suggests that while the area is developed, there remains some capacity for planned infill and redevelopment. The inflow of population from surrounding semi-urban and peri-urban areas reinforces the Corporation's role as the focal point of urban concentration, shaping a centralized urban development pattern.

### 7.8.2 Moderate settlements in Municipalities and Town panchayats

The Municipalities and Town Panchayats in the planning area recorded average decadal growth rates of 10.7% and 16.5% respectively during 1991–2001, which slowed significantly to 6.4% and 6.1% during 2001–2011, indicating a deceleration in population growth in both types of settlements. The average population densities remain moderate at 26 persons per hectare for Municipalities and 29 persons per hectare for Town Panchayats, reflecting relatively low to moderate settlement intensity and a semi-urban character in these areas.

### 7.8.3 Rural character

The 91 Village Panchayats, comprising 104 revenue villages, cover a vast area of 59,137 hectares, accounting for the majority of the planning area, and house a population of 3,91,356. These settlements exhibit a low population density of just 7 persons per hectare, reflecting the predominantly rural character of the region. The Village Panchayats recorded a moderate decadal growth rate of 10.5% during 1991–2001, which accelerated significantly to 23.5% during 2001–2011, indicating increasing population growth in rural areas.

## 7.9 Demography Trend in Tiruchirappalli LPA

Based on the Population Distribution of Tiruchirappalli Local Planning Area (1991–2011) presented in the table, Tiruchirappalli Corporation clearly emerges as the dominant urban center. It recorded the highest population of 9.16 lakh in 2011 and the highest population density of 55 persons per hectare, reflecting its role as the administrative, commercial, and service core of the

LPA. Among other urban components, Town Panchayats and Municipalities show moderate population sizes but comparatively healthy average decadal growth rates of 11.3% and 8.6%, indicating gradual urban expansion beyond the core city.

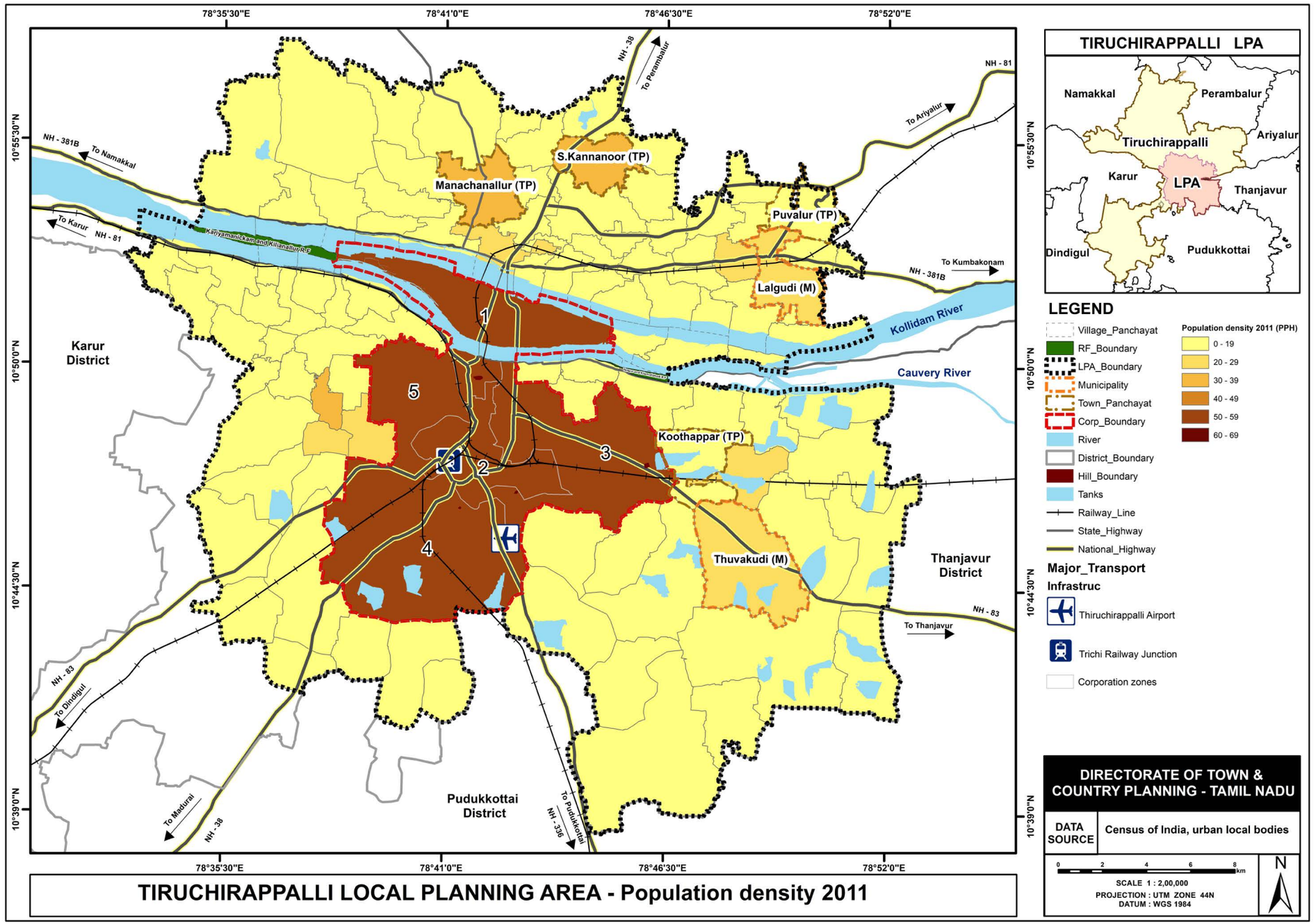
In the rural areas, Manikandam Block stands out as the fastest-growing block, registering a very high average decadal growth rate of 28.8%, followed by Manachanallur Block (18.7%) and Thiruverumbur Block (17.1%). The sharp population increase in these blocks, especially during the 2001–2011 decade, highlights their peri-urban character and increasing influence of Tiruchirappalli Corporation. In contrast, Lalgudi Block and Andanallur Block show relatively lower growth, maintaining more traditional rural characteristics with low population densities.

Overall, the Tiruchirappalli LPA recorded an average decadal population growth rate of 14.2% between 1991 and 2011. Despite substantial population growth, the overall population density remains low at 18 persons per hectare, largely due to the extensive rural area (about 74% of the LPA) and the predominance of agricultural land. This uneven distribution underscores the growing pressure on urban and peri-urban zones while much of the LPA continues to retain its rural character.

*Table 7.11 - Population distribution of Tiruchirappalli LPA*

| S. No. | Towns / Villages | Area (in Ha.) | Population 1991 | Population 2001 | Population 2011 | Decadal Growth Rate 1991 – 2001 (in %) | Decadal Growth Rate 2001 – 2011 (in %) | Average Decadal Growth rates (in %) | Population Density – 2011 (Persons per Ha.) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Tiruchirappalli Corporation | 16,723 | 7,07,688 | 7,96,644 | 9,15,569 | 12.6% | 14.9% | 13.7% | 55 |
| 2 | Municipalities | 2,440 | 53,158 | 58,833 | 62,627 | 10.7% | 6.4% | 8.6% | 26 |
| 3 | Town panchayats | 2,153 | 50,875 | 59,255 | 62,852 | 16.5% | 6.1% | 11.3% | 29 |
| 4 | Urban Total | 21,316 | 8,11,721 | 9,14,732 | 10,41,048 | 12.7% | 13.8% | 13.2% | 49 |
| 5 | Lalgudi Block | 7,980 | 51,251 | 58,699 | 62,640 | 14.5% | 6.7% | 10.6% | 8 |
| 6 | Manachanallur Block | 11,927 | 63,076 | 67,869 | 88,046 | 7.6% | 29.7% | 18.7% | 7 |
| 7 | Andanallur Block | 7,067 | 46,618 | 50,926 | 56,387 | 9.2% | 10.7% | 10.0% | 8 |
| 8 | Manikandam Block | 10,579 | 47,675 | 59,804 | 79,092 | 25.4% | 32.3% | 28.8% | 7 |
| 9 | Thiruverumbur Block | 21,926 | 78,006 | 79,462 | 1,05,191 | 1.9% | 32.4% | 17.1% | 5 |
| 10 | Rural Total | 59,137 | 2,86,626 | 3,16,760 | 3,91,356 | 10.5% | 23.5% | 17.0% | 7 |
| 11 | LPA Total | 80,453 | 10,98,347 | 12,31,492 | 14,32,404 | 12.1% | 16.3% | 14.2% | 18 |

*Source: Census of India, 2011*




*Map 7.4 - Population density 2011 - Tiruchirappalli LPA*

*Source: Census of India, 2011, Urban Local Bodies*

## 7.10 Other Demographic Characteristics

The other demographic characteristics of the Tiruchirappalli Local Planning Area (LPA) provide insights on the literacy rate, sex ratio, age composition, person with disabilities and migration trends.

### 7.10.1 Literacy Rate

The overall average literacy rate of the Tiruchirappalli Local Planning Area (LPA) is 89.3 per cent, comprising 93.7 per cent male literacy and 85.0 per cent female literacy, which reflects a generally high level of educational attainment within the planning area. Tiruchirappalli Corporation records the highest literacy rate at 91.4 per cent, with 94.9 per cent among males and 88.0 per cent among females, indicating the positive influence of urban infrastructure and access to educational facilities. This is closely followed by the Municipalities, which report an overall literacy rate of 90.1 per cent, with 94.4 per cent male literacy and 85.3 per cent female literacy.

*Table 7.12 - Distribution of Literacy rate in Tiruchirappalli LPA 2011*

| S.No. | Classification | Range of Literate Rate | No. of villages |
|---|---|---|---|
| 1 | High Literacy | Above 80% | 80 (including corporation) |
| 2 | Good Literacy | 71% - 80% | 19 |
| 3 | Transitional | 61% - 70% | 9 |
| 4 | Backward areas | 51% - 60% | - |
| 5 | Special Educational Deprivation | Below 50% | - |

*Source: Census of India, 2011*

In comparison, Town Panchayats exhibit a relatively lower literacy rate of 87.5 per cent, consisting of 93.0 per cent male literacy and 82.2 per cent female literacy. Rural villages record the lowest literacy levels in the LPA, with an overall literacy rate of 84.5 per cent, including 90.9 per cent among males and 78.3 per cent among females.

The literacy rate across the Tiruchirappalli Local Planning Area shows considerable variation among its revenue villages, town panchayats, census towns, and municipal areas. A large number of settlements fall under the "Above 80%" literacy category, indicating a generally high level of educational attainment in the region. Out of 5 blocks within Tiruchirappalli LPA, 4 blocks consist of revenue villages and urban settlements with literacy rate above 80%.

The revenue villages with highest literacy rates are located in Thiruverumbur block (Natarajapuram, Krishnasamudram, Koothappar (TP), Keelakurichi), Manachanallur block (Pitchandarkoil(CT)), Manikandam block (Nachikurichi, Cholanganallur) and Lalgudi block (Nerujalakudi) recording literacy rates exceeding 92%, with the highest levels observed in Natarajapuram (94.7%) and Krishnasamudram (94.5%).

In contrast, a group of revenue villages record substantially lower literacy levels in the range of 60–70%, primarily located in Manikandam block (Olaiyur, Mudikandam, Mekkudi),Manachanallur block [Thiruppangali (South), Thiruppangali (North)], Thiruverumbur block (Elanthapatti, Sooriyur), Andhanallur block (Uthamaseri). The observed disparity between high- and low-performing revenue villages highlights the need for area-specific and targeted educational interventions, with focused attention on rural and peri-urban settlements exhibiting persistently low literacy outcomes.

Based on literacy classification, areas falling in the 61–70% and 71–80% categories may be considered educationally transitional or moderately developed, requiring focused interventions. Priority measures should include targeted adult literacy programmes, strengthening of school retention—especially for girls—and improved access to secondary and higher education facilities to reduce disparities and achieve balanced educational development across the Tiruchirappalli LPA.

### 7.10.2 Sex Ratio

The Tiruchirappalli Local Planning Area (LPA) records an overall average sex ratio of 1,013. Tiruchirappalli Corporation exhibits a notably high sex ratio of 1,023, reflecting a strong presence of female population within the urban core. Town Panchayats also demonstrate a balanced population structure with a sex ratio of 1,016, while Revenue Villages record a slightly lower yet positive sex ratio of 1,008, suggesting near parity between males and females in rural areas.

In contrast, Municipalities show a comparatively low sex ratio of 90, indicating a significant gender imbalance within these urban settlements. This variation across settlement types highlights the need for focused policy interventions, particularly in municipalities, to address gender disparities and promote a more balanced population structure across the Tiruchirappalli LPA.

*Table 7.13 - Distribution of sex ratio in Tiruchirappalli LPA 2011*

| S.No. | Category | Sex Ratio Range | No. of Villages |
|---|---|---|---|
| 1 | Highly Healthy | 1020 and above | 45 (Including corporation) |
| 2 | Healthy / Balanced | 950 – 1019 | 56 |

| S.No. | Category | Sex Ratio Range | No. of Villages |
|---|---|---|---|
| 3 | Moderately Skewed | 900 – 949 | 5 |
| 4 | Severely Skewed | 850 – 899 | 0 |
| 5 | Critically Imbalanced | Below 850 | 2 |

*Source: Census of India, 2011*

The presence of very critically imbalanced sex ratio (Below 850) in several villages and urban settlements, notably Andanallur (795) and Thuvakudi Municipality (842) indicating a gender imbalance within these areas. Locations with moderately skewed sex (900 – 949), are observed in Thiruverumbur block (Natarajapuram, Kanthaloor, Cholamadevi), Manachanallur block (Samayapuram) and Andhanallur block (Perur), further reinforcing the spatial concentration of gender imbalance across select settlements. Overall, these patterns indicate the need for closer demographic monitoring and targeted gender-sensitive planning interventions to address the underlying socio-economic and migratory factors contributing to persistently low sex ratios in these locations.

### 7.10.3 Migrant population

As per Census 2011, a total of 15,04,900 migrants moved into the Tiruchirappalli Local Planning Area for employment purposes. The majority of job-related migrants originated from within the State, accounting for 47,195 persons (94.5%), of which 28,544 migrants (57.1%) came from urban areas and 18,651 migrants (37.3%) from rural areas. Migration from outside the State remains limited, with 2,145 migrants (4.3%) from urban areas and 619 migrants (1.2%) from rural areas.

In terms of educational attainment, the migrant workforce is predominantly literate, with 47,015 persons (94.1%) possessing some level of education, while 2,944 migrants (5.9%) are illiterate. Among the literate migrants, 11,020 persons (22.1%) have studied below matriculation, and 13,599 persons (27.2%) have completed matriculation or secondary education. Higher educational qualifications are also well represented, including 10,723 graduates, 5,689 diploma or certificate holders (non-degree), and 4,200 technically qualified or postgraduate migrants. Overall, migrants with technical qualifications, diplomas, and graduate-level education constitute a substantial share of the workforce, highlighting the significant contribution of skilled and semi-skilled labour to the economic structure of the Tiruchirappalli LPA.

*Table 7.14 - Migrant population of Tiruchirappalli District - 2011*

| Source of Migration | Total Migrants for Work | Illiterate | Literate | Literate but below Matric/ Secondary | Matric/Secondary but below graduate | Technical diploma or certificate not equal to degree | Graduate and above other than technical degree | Technical degree or diploma equal to degree or post-graduate degree |
|---|---|---|---|---|---|---|---|---|
| (i) From rural area within the State | 18,651 | 1,612 | 17,039 | 5,113 | 5,291 | 2,111 | 2,910 | 986 |
| (ii) From urban area within the State | 28,544 | 1,171 | 27,373 | 5,390 | 7,696 | 3,242 | 7,159 | 2,828 |
| (iii) From rural area outside the State | 619 | 51 | 568 | 196 | 159 | 81 | 73 | 45 |
| (iv) From urban area outside the State | 2,145 | 110 | 2,035 | 321 | 453 | 255 | 581 | 341 |

*Source: Census of India 2011*

### 7.10.4 Other demographic characteristics of Tiruchirappalli LPA – 2011

The total Scheduled Caste (SC) population in the Tiruchirappalli LPA is 2,11,917, comprising 1,05,080 males and 1,06,837 females, while the Scheduled Tribe (ST) population is 4,285, with 2,192 males and 2,093 females. In urban areas, the Tiruchirappalli Corporation accounts for the largest share of both SC and ST populations, with 1,01,551 SC persons and 2,601 ST persons. Other urban towns, including Lalgudi, Thuvakudi, Puvalur, Manachanallur, S. Kannanur, and Koothappar, contribute additional SC and ST populations, bringing the urban total to 1,23,879 SC individuals and 3,139 ST individuals.

Rural areas within the LPA have a total SC population of 88,038 and an ST population of 1,146. This indicates that SC populations are relatively evenly distributed across urban and rural areas, whereas ST populations are more concentrated in urban blocks. These figures highlight the demographic significance of SC and ST communities within the LPA and provide a critical basis for planning targeted social welfare measures and development initiatives.

*Table 7.15 - Other demographic characteristics of Tiruchirappalli LPA 2011*

| S.No. | Towns / Villages | SC Population | | | ST Population | | |
|---|---|---|---|---|---|---|---|
| | | Total | Male | Female | Total | Male | Female |
| 1 | Tiruchirappalli Corporation | 101,551 | 50,586 | 50,965 | 2,601 | 1,292 | 1,309 |
| 2 | Lalgudi (TP) | 3,730 | 1,846 | 1,884 | 36 | 18 | 18 |
| 3 | Thuvakudi (M) | 6,835 | 3,565 | 3,270 | 386 | 224 | 162 |
| 4 | Puvalur (TP) | 1,486 | 720 | 766 | 0 | 0 | 0 |
| 5 | Manachanallur (TP) | 4,789 | 2,360 | 2,429 | 47 | 28 | 19 |
| 6 | S. Kannanur (TP) | 2,611 | 1,283 | 1,328 | 18 | 9 | 9 |
| 7 | Koothappar (TP) | 2,877 | 1,462 | 1,415 | 51 | 27 | 24 |
| | Urban blocks | 123,879 | 61,822 | 62,057 | 3,139 | 1,598 | 1,541 |
| | Rural blocks | 88,038 | 43,258 | 44,780 | 1,146 | 594 | 552 |
| | **Total** | **211,917** | **105,080** | **106,837** | **4,285** | **2,192** | **2,093** |

| S.No. | Towns / Villages | Literacy rate | | | Sex ratio |
|---|---|---|---|---|---|
| | | Total | Male | Female | |
| 1 | Tiruchirappalli Corporation | 91.4% | 94.9% | 88.0% | 1,023 |
| 2 | Lalgudi (TP) | 91.9% | 95.3% | 88.6% | 1,020 |
| 3 | Thuvakudi (M) | 89.0% | 93.9% | 83.1% | 842 |
| 4 | Puvalur (TP) | 87.1% | 93.9% | 80.6% | 1,025 |
| 5 | Manachanallur (TP) | 86.3% | 91.8% | 80.9% | 1,024 |
| 6 | S. Kannanur (TP) | 83.8% | 90.5% | 77.5% | 1,050 |
| 7 | Koothappar (TP) | 92.8% | 96.2% | 89.3% | 971 |
| | Urban blocks | 91.1% | 94.8% | 87.5% | 1,015 |
| | Rural blocks | 84.5% | 90.9% | 78.3% | 1,008 |
| | **Total** | **89.3%** | **93.7%** | **85.0%** | **1,013** |

*Source: Census of India, 2011*

## 7.11 Age Sex Composition

The population pyramid indicates a broad working-age population (15–59 years), with the 35–59 age group forming the largest share, reflecting a strong economically active population. The younger age groups (0–14 years) show a gradual decline in size, suggesting reducing fertility rates. Overall, the sex distribution is fairly balanced, though females slightly outnumber males in the older age group (60+), indicating higher female longevity.

*Table 7.16 - Age sex composition of Tiruchirappalli District*

| S.No. | Age | Male | Female |
|---|---|---|---|
| 1 | 60 + | 146,324 | 155,653 |
| 2 | 35 - 59 | 419,823 | 439,594 |
| 3 | 25 - 34 | 222,178 | 230,771 |
| 4 | 15 - 24 | 237,125 | 234,780 |
| 5 | 10 - 14 | 119,847 | 113,139 |
| 6 | 5 - 9 | 106,562 | 101,078 |
| 7 | 0 - 4 | 99,249 | 93,756 |

*Source: Census of India, 2011*

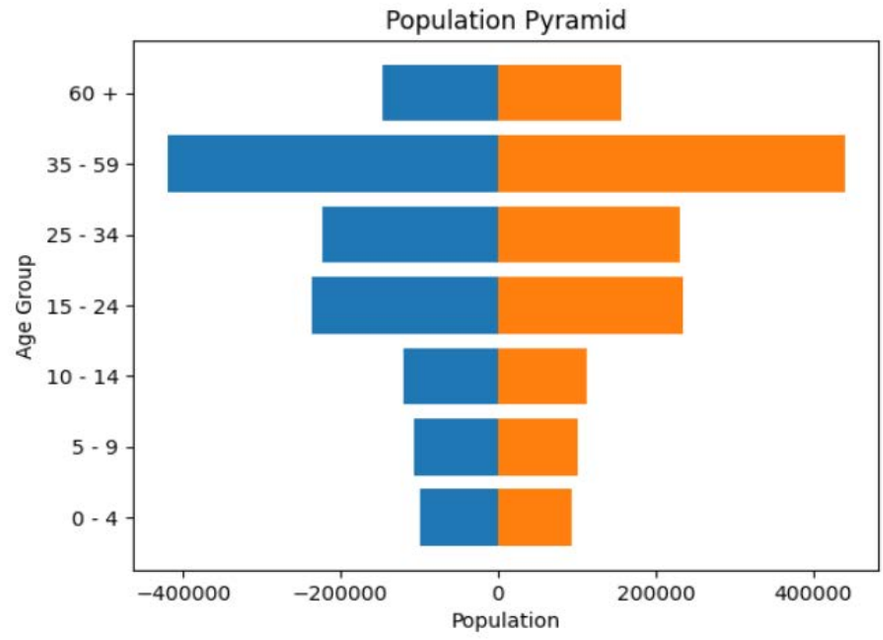



*Figure 7.2: Age Sex Pyramid of Tiruchirappalli District*

*Source: Census of India*

## 7.12 Persons with Disabilities

The age-wise distribution of persons with disabilities in Tiruchirappalli District shows a clear concentration in the economically active age groups, with the 20–39 years cohort recording the highest numbers, indicating early onset or working-age disabilities. The population gradually declines after 40 years, with a sharper reduction beyond 60 years, reflecting increased mortality and survivorship issues among persons with disabilities. The relatively lower numbers in the 0–9 age group may indicate underreporting or delayed identification of disabilities in early childhood. Overall, the pattern highlights the need for targeted health, rehabilitation, and employment-support interventions focused on working-age and elderly disabled populations

*Table 7.17 - Persons with disabilities in Tiruchirappalli District*

| S.No. | Administrative Unit | Age | Total Population of persons with disabilities (2011) |
|---|---|---|---|
| 1 | Tiruchirappalli District | 0 to 4 | 1,106 |
| 2 | | 5 to 9 | 2,239 |
| 3 | | 10 to 19 | 6,107 |
| 4 | | 20 to 29 | 7,494 |
| 5 | | 30 to 39 | 6,703 |
| 6 | | 40 to 49 | 5,830 |
| 7 | | 50 to 59 | 4,370 |
| 8 | | 60 to 69 | 3,619 |
| 9 | | 70 to 79 | 1,959 |
| 10 | | 80 to 89 | 659 |
| 11 | | 90 + | 149 |
| 12 | | Age not stated | 41 |
| 13 | | Total | 40,276 |

*Source: Census of India, 2011*

## 7.13 Population projection

To assess variations in population projection outcomes, census population data for the years 1981, 1991, 2001 and 2011 have been utilized to estimate future population using multiple projection techniques. The methods applied include the Arithmetic Increase Method, Geometric Increase Method, Incremental Increase Method, Least Squares Method, Exponential Curve Method, and the Compound Annual Growth Rate (CAGR) Method. Each method is based on distinct assumptions regarding population growth behavior, ranging from linear increase to compounded and statistically fitted growth patterns. By applying these methods to a common historical dataset, the study enables a comparative evaluation of projected population figures and highlights the influence of methodological assumptions on projection results.

*Table 7.18 - Projected population of Tiruchirappalli LPA using various methods*

| S.No | Methods | 1981 | 1991 | 2001 | 2011 | 2024 | Projected 2025 | Projected 2035 | Projected 2045 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Arithmetic | 9,08,506 | 10,98,347 | 12,31,492 | 14,32,404 | 17,29,189 | 17,53,157 | 19,73,223 | 21,95,032 |
| 2 | Geometric | | | | | | 17,58,401 | 20,71,800 | 24,74,349 |
| 3 | Incremental | | | | | | 7,03,713 | 20,67,775 | 22,89,579 |
| 4 | Least Square | | | | | | 18,57,466 | 22,30,082 | 25,93,313 |
| 5 | Exponential Curve | | | | | | 17,59,613 | 21,17,569 | 25,81,868 |
| 6 | CAGR | | | | | | 17,54,511 | 20,24,576 | 23,78,130 |

*Source: Census of India, Urban Local Bodies*

The comparative analysis of population projections using different methods indicates a consistent upward trend from 2025 to 2045. The arithmetic method projects a gradual increase from 17.53 lakh in 2025 to 21.95 lakh by 2045, reflecting steady linear growth based on past increments. In contrast, the geometric and exponential-based approaches show relatively higher projections, with the geometric method estimating 24.74 lakh and the exponential curve method 25.82 lakh by 2045, suggesting accelerated growth due to compounding effects.

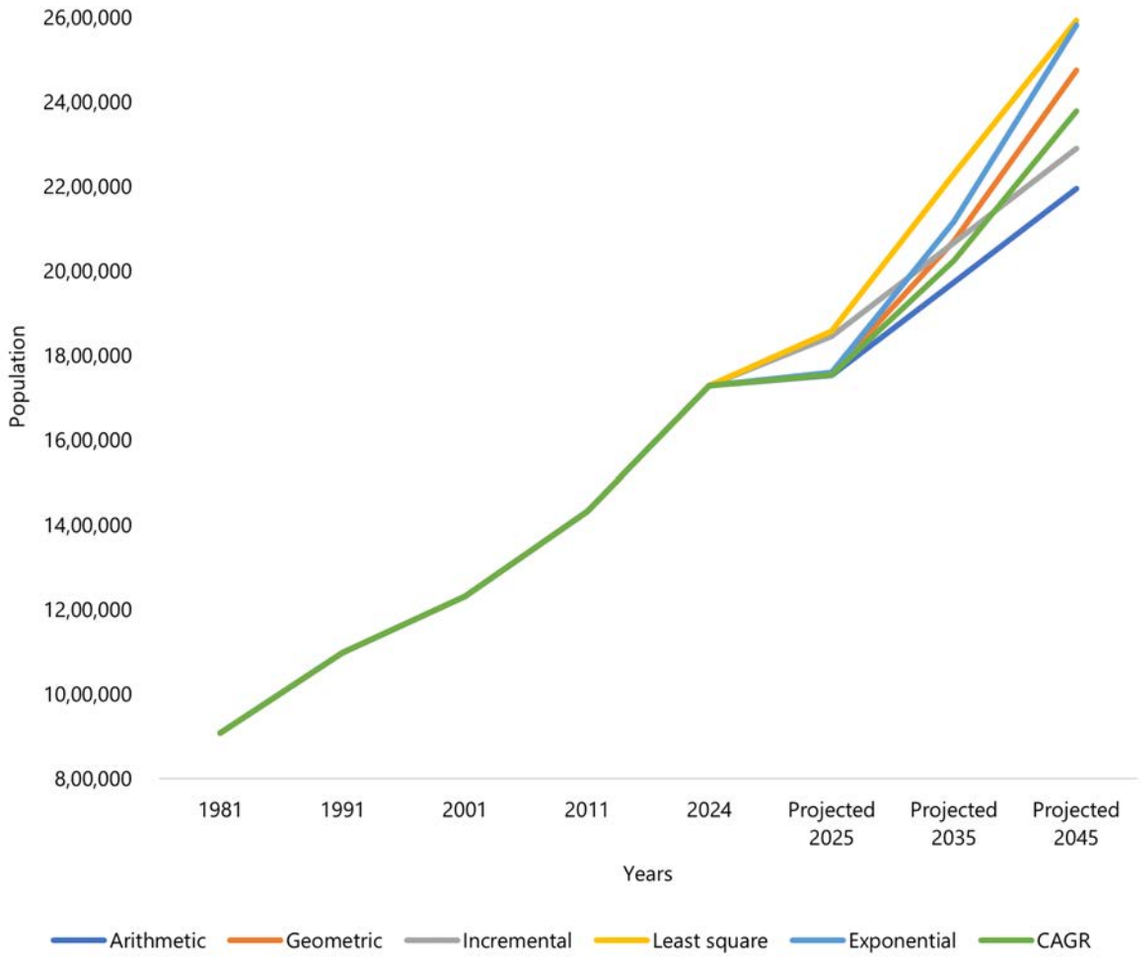



*Figure 7.3 - Projected population of Tiruchirappalli LPA using various methods*

*Source: Census of India*

The incremental increase method yields a comparatively conservative estimate of 22.90 lakh by 2045, accounting for variations in growth increments over successive decades. The least square method produces the highest projection of 25.93 lakh by 2045, indicating a stronger long-term growth trend by minimizing deviations from historical data. Similarly, the CAGR-based projection estimates the population to reach 23.78 lakh by 2045, representing moderate but sustained growth. The study explores two methods of population analysis to account for demographic dynamics influenced by education-driven migration, strategic industrial and employment growth, and the district's role as a regional service and transport hub, which have led to significant population inflows.

### 7.13.1 Option 1 - Comparative model validation method

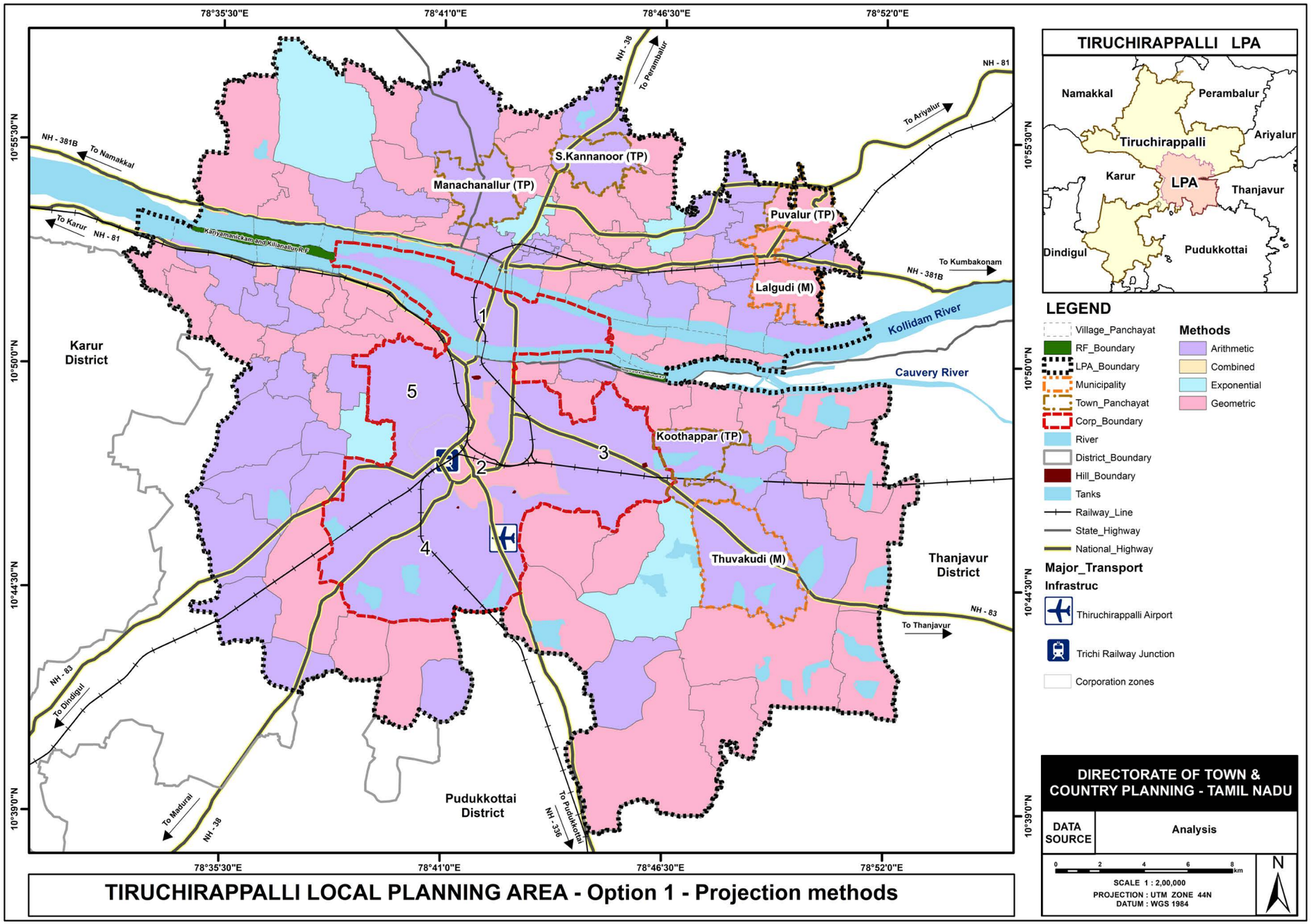
Comparative model validation is a method used to assess the accuracy of multiple projection models by applying them to historical data and comparing their outputs with observed values. The model that most closely matches the known data is considered the most reliable. This approach helps in selecting the most appropriate model for future projections based on empirical performance. This approach was adopted to capture the uncertainty and structural changes resulting from the influence of migration and economic growth within the region.

Additionally, information on forthcoming employment opportunities, estimated to generate approximately 1,08,650 jobs (Source: Guidance Tamil Nadu), has been duly considered in the population projections. The resultant incremental population attributable to these employment opportunities has been assessed using a workforce participation rate of 38 per cent and a migrant population share of 45 per cent. Based on these assumptions, an additional population of approximately 1.28 lakh persons is expected and has been appropriately incorporated into the projected population estimates.

*Table 7.19 - Existing and projected population (Option 1)*

| S.No | Description | Existing population | | | | Projected population (Option 1) | | |
|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Tiruchirappalli Corporation | 7,07,688 | 7,96,644 | 9,15,569 | 10,57,982 | 10,72,793 | 12,25,520 | 13,80,243 |
| 2 | Municipalities | 53,158 | 58,833 | 62,627 | 80,450 | 81,472 | 1,00,146 | 1,19,731 |
| 3 | Town panchayats | 50,875 | 59,255 | 62,852 | 72,746 | 73,678 | 83,001 | 92,356 |
| 4 | Rural villages | 2,86,626 | 3,16,760 | 3,91,356 | 5,18,011 | 5,28,205 | 6,75,601 | 8,61,190 |
| **5** | **TOTAL** | **10,98,347** | **12,31,492** | **14,32,404** | **17,29,189** | **17,56,148** | **20,84,268** | **24,53,520** |

*Source: Census of India, Urban Local Bodies*




*Map 7.5 - Combined projection method of population projection (Option 1)*

*Source: DTCP analysis*

### 7.13.2 Option 2 - Growth-rate-based model selection

Growth-rate-based model selection involves classifying locations into low, medium, and high growth categories based on historical population trends. The arithmetic growth method is applied to low-growth areas, the geometric growth method to medium-growth areas, and the exponential growth method to high-growth areas, reflecting increasing growth intensity. Additionally, the methods were cross verified with population densities to ensure the appropriateness and accuracy of the selected method. This ensures that the projection method selected is consistent with the observed demographic behavior of each location. This approach was adopted to capture the population growth due to natural increase and migration driven growth.

For Option 2, the projected population has been revised by explicitly accounting for the anticipated employment generation of approximately 1,08,650 jobs, consistent with the approach adopted for Option 1. The incremental population expected has been directly added to the base population projections under Option 2, and the final projected population figures reflect the combined effect of natural population growth and employment-induced migration.

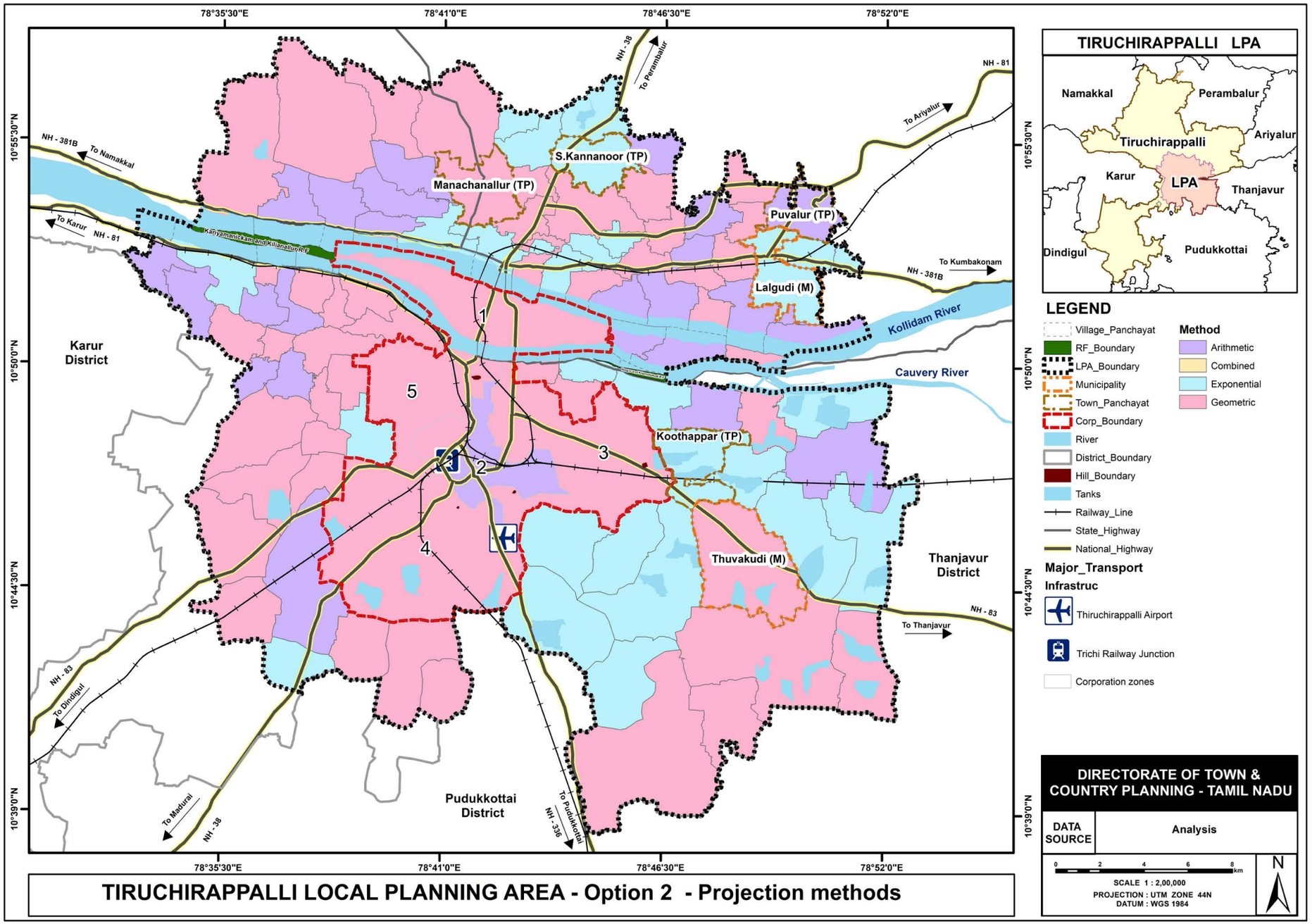
*Table 7.20 - Existing and projected population method (option 2)*

| S.No | Description | Existing population | | | | Projected population (Option 2) | | |
|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Tiruchirappalli Corporation | 7,07,688 | 7,96,644 | 9,15,569 | 10,57,982 | 10,72,793 | 12,44,067 | 14,39,978 |
| 2 | Municipalities | 53,158 | 58,833 | 62,627 | 80,450 | 81,702 | 1,03,366 | 1,27,355 |
| 3 | Town panchayats | 50,875 | 59,255 | 62,852 | 72,746 | 74,118 | 89,486 | 1,08,383 |
| 4 | Rural villages | 2,86,626 | 3,16,760 | 3,91,356 | 5,18,011 | 5,30,466 | 7,11,803 | 9,59,894 |
| **5** | **TOTAL** | **10,98,347** | **12,31,492** | **14,32,404** | **17,29,189** | **17,59,079** | **21,48,722** | **26,35,610** |

*Source: Census of India, Urban Local Bodies*

### 7.13.3 Final population projection results

Under the comparative model validation approach (Option 1), consistency with historical population trends is maintained at the aggregate level; however, emerging growth accelerations, particularly in peri-urban and rural areas, are not adequately reflected. In contrast, the growth-rate-based model selection approach (Option 2) ensures that the projection methodology is aligned with the observed demographic behaviour of each settlement category.




*Map 7.6 - Combined projected method of population projection (option 2)*

*Source: DTCP analysis*

### 7.13.3.1 Justification for the method considered:

Both projection approaches, being derived from historical population trends, have been examined, and Option 2 has been adopted as the final population projection for the year 2045 for the following reasons

- The approach provides a more accurate representation of the differential growth characteristics across various settlement categories within the study area.
- The projections obtained under Option 2 yield higher and more realistic population estimates for the year 2045, particularly for rural villages and town panchayats, reflecting their anticipated transition under the influence of urban expansion.
- The projections under Option 2 are more appropriate for long-term infrastructure and service planning, as they reduce the risk of population underestimation and facilitate adequate provision of housing, transportation, water supply, and social infrastructure.

The final projection results considered are as follows:

*Table 7.21 - Existing and final projected population of Tiruchirappalli LPA based on the administrative level*

| S.No | Description | Existing population | | | | Projected population | | |
|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Tiruchirappalli Corporation | 7,07,688 | 7,96,644 | 9,15,569 | 10,57,982 | 10,72,793 | 12,44,067 | 14,39,978 |
| 2 | Municipalities | 53,158 | 58,833 | 62,627 | 80,450 | 81,702 | 1,03,366 | 1,27,355 |
| 3 | Town panchayats | 50,875 | 59,255 | 62,852 | 72,746 | 74,118 | 89,486 | 1,08,383 |
| 4 | Rural villages | 2,86,626 | 3,16,760 | 3,91,356 | 5,18,011 | 5,30,466 | 7,11,803 | 9,59,894 |
| **5** | **TOTAL** | **10,98,347** | **12,31,492** | **14,32,404** | **17,29,189** | **17,59,079** | **21,48,722** | **26,35,610** |

*Source: Census of India*

*Note: The population projection for 2045 shall be reviewed and updated based on the findings of the upcoming Census 2027, ensuring improved accuracy and aligned with the latest demographic trends*

### 7.13.3.2 Population projection for Tiruchirappalli Corporation zones:

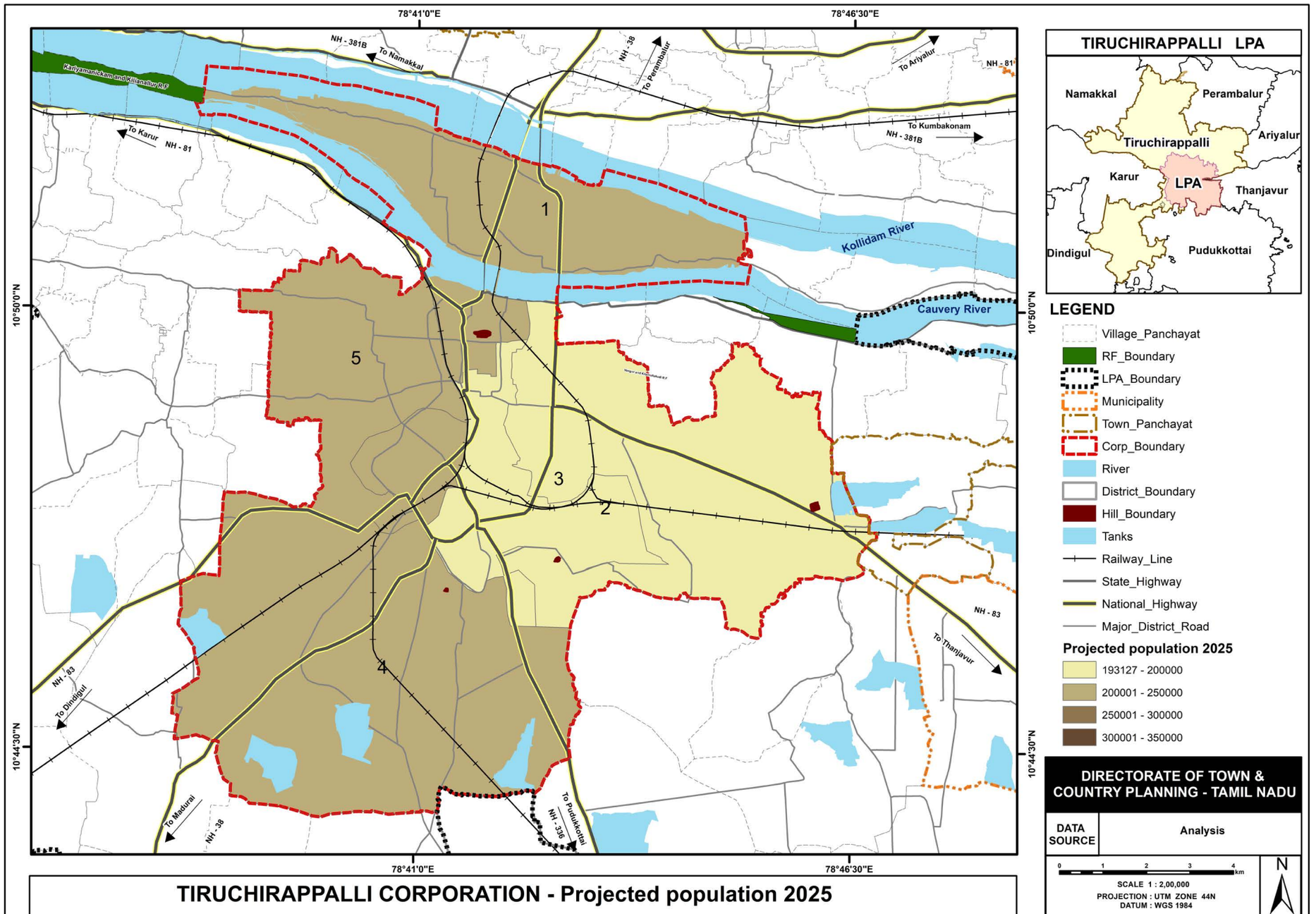
For the corporation area, zone-wise population projections have been prepared using methods consistent with those applied in the Tiruchirappalli Local Planning Area (LPA). Population projections at the zone level were derived based on the distribution of wards within each zone. Past population trends were analyzed, and appropriate projection techniques, similar to those employed in the LPA, were applied to estimate future population figures and population densities. The results of the calculation are as follows:

*Table 7.22 - Existing and projected zone wise population of Tiruchirappalli Corporation*

| S.No | Corporation zone | Existing population | | | Projected population | | |
|---|---|---|---|---|---|---|---|
| | | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Zone 1 | 1,58,474 | 1,89,476 | 2,19,589 | 2,22,663 | 2,56,736 | 2,95,931 |
| 2 | Zone 2 | 1,80,124 | 1,75,785 | 1,90,462 | 1,93,127 | 1,96,148 | 2,01,317 |
| 3 | Zone 3 | 1,45,619 | 1,67,290 | 1,96,311 | 1,99,059 | 2,34,117 | 2,73,039 |
| 4 | Zone 4 | 1,57,547 | 1,84,208 | 2,16,575 | 2,19,610 | 2,69,020 | 3,23,158 |
| 5 | Zone 5 | 1,54,880 | 1,98,810 | 2,35,045 | 2,38,334 | 2,88,046 | 3,46,533 |
| **Total** | | **7,96,644** | **9,15,569** | **10,57,982** | **10,72,793** | **12,44,067** | **14,39,978** |

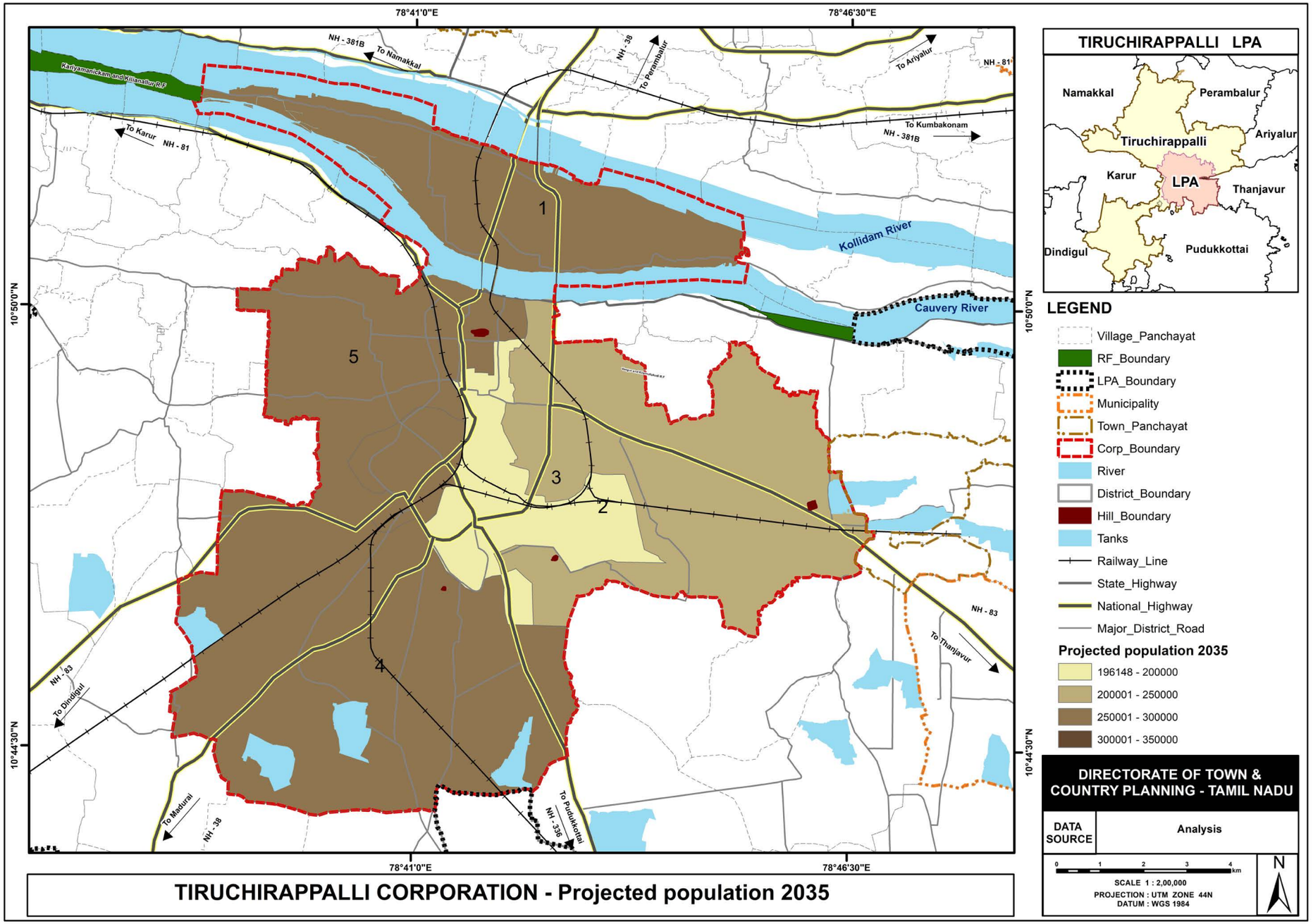
*Source: Census of India*

The population of the corporation zone is projected to rise steadily from 10,57,982 in 2024 to 14,39,978 in 2045. Zone-wise, the highest growth is anticipated in Zone 5, increasing from 2,88,046 in 2035 to 3,46,533 in 2045 (projected growth rate - 20.30%), followed by Zone 4, which is expected to grow from 2,69,020 to 3,23,158 over the same period (projected growth rate 20.12%). Zone 3 is projected to increase from 2,34,117 to 2,73,039 (projected growth rate - 16.63%), and Zone 1 from 2,56,736 to 2,95,931 (projected growth rate - 15.27%). Zone 2, representing the core area, is expected to experience the slowest growth, rising from 1,96,148 to 2,01,317 (projected growth rate 2.64%). These projections indicate that population growth will be concentrated primarily in Zones 4 and 5 over the decade.



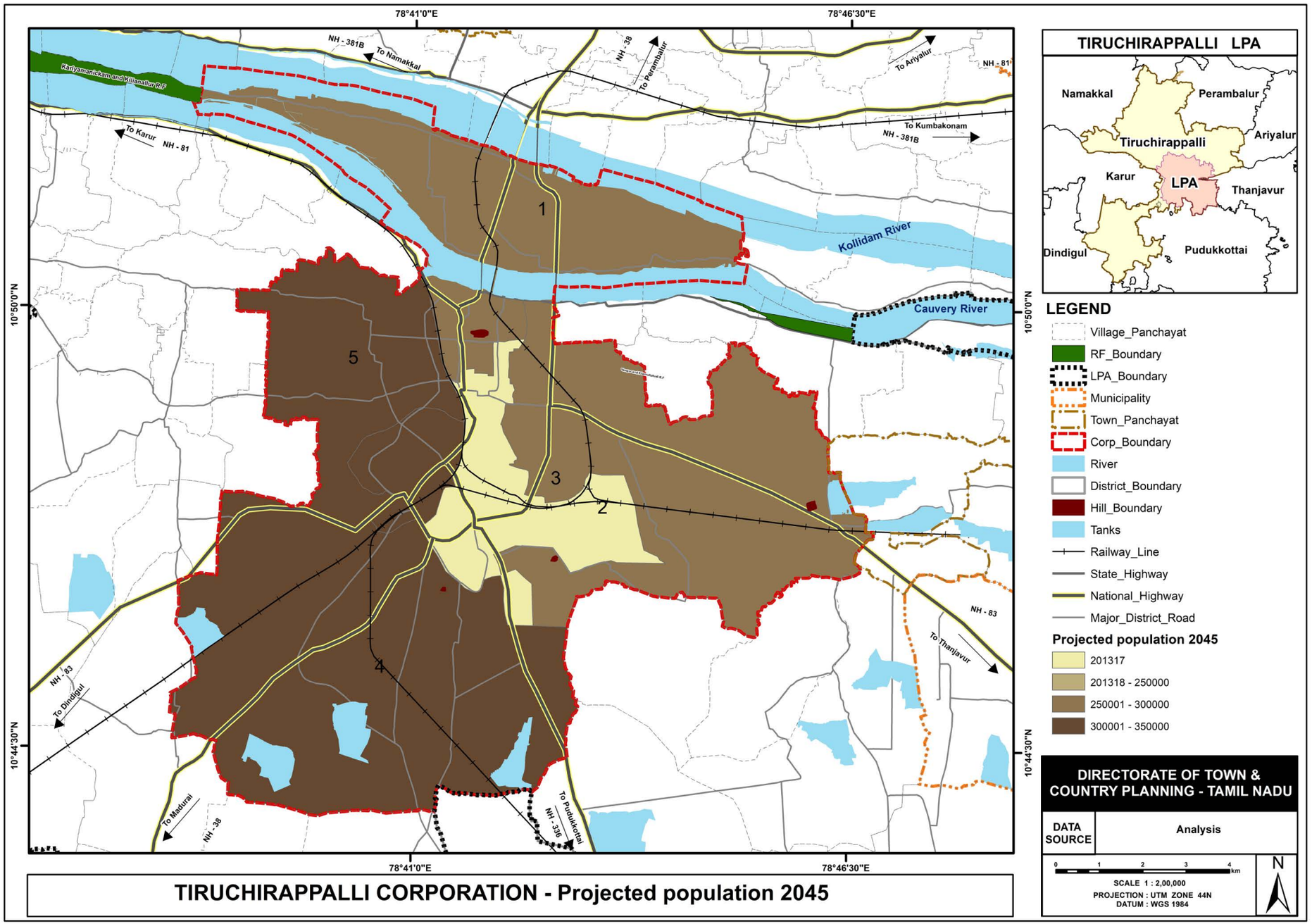

*Map 7.7 - Projected population 2025 Tiruchirappalli Corporation Zones*

*Source: DTCP analysis*




*Map 7.8 - Projected population 2035 - Tiruchirappalli Corporation zones*

*Source: DTCP Analysis*




*Map 7.9 - Projected population 2045 - Tiruchirappalli Corporation zones*

*Source: DTCP Analysis*

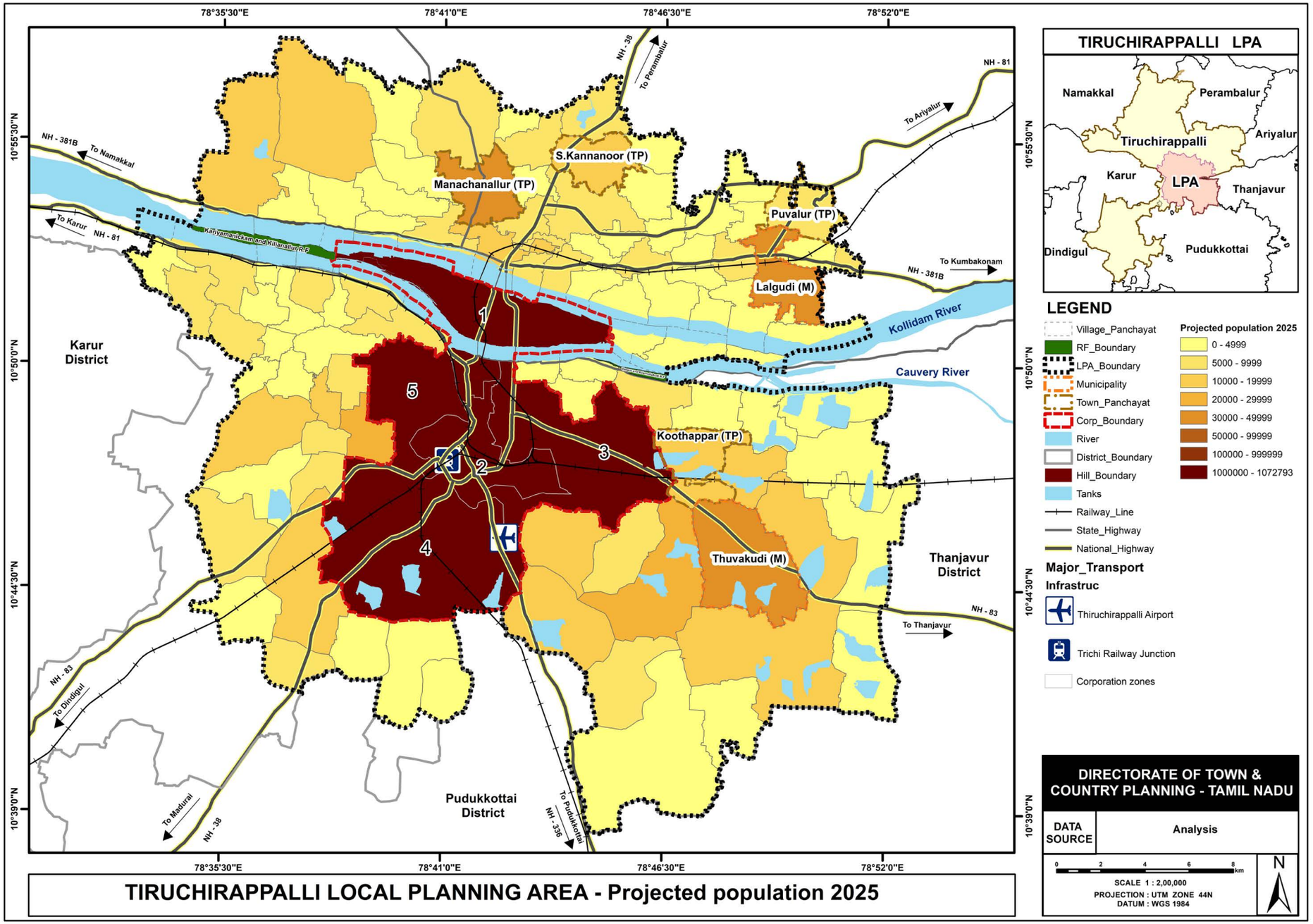
### 7.13.3.3 Population projection for rest of Tiruchirappalli LPA

The population trends of Tiruchirappalli indicate a clear pattern of rapid urbanization, with the city core and surrounding municipalities growing faster than rural areas. This suggests increasing migration from villages to urban and semi-urban centers, likely driven by economic opportunities, better infrastructure, and improved access to services. The steady growth of town panchayats and rural villages also highlights that peripheral areas will continue to expand, creating a need for balanced regional development. The overall rise in population underscores the importance of proactive planning in housing, transportation, healthcare, and public utilities, as well as the sustainable management of resources to support both urban and rural communities. These trends point to a future where integrated urban-rural planning will be essential to maintain quality of life and economic stability.

*Table 7.23 - Summary of projected population for Tiruchirappalli LPA*

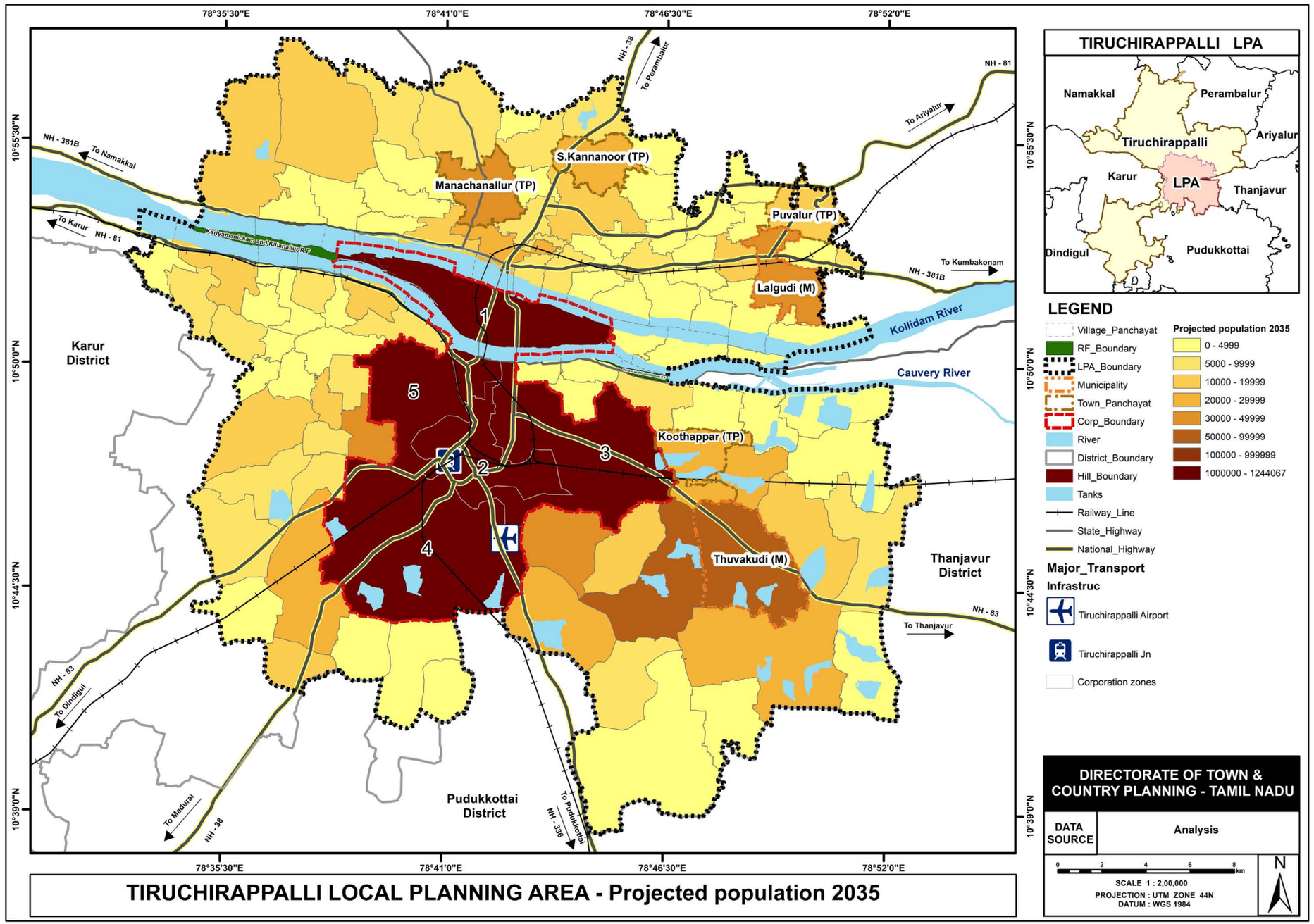
| Administrative units | Population 2025 | Population 2035 | Population 2045 | Decadal growth rate 2025 to 2035 (in %) | Decadal growth rate 2035 to 2045 (in %) | Population density 2045 (Persons per Ha) |
|---|---|---|---|---|---|---|
| Corporation zone 1 | 2,22,663 | 2,56,736 | 2,95,931 | 15.3% | 15.3% | 118 |
| Corporation zone 2 | 1,93,127 | 1,96,148 | 2,01,317 | 1.6% | 2.6% | 145 |
| Corporation zone 3 | 1,99,059 | 2,34,117 | 2,73,039 | 17.6% | 16.6% | 61 |
| Corporation zone 4 | 2,19,610 | 2,69,020 | 3,23,158 | 22.5% | 20.1% | 52 |
| Corporation zone 5 | 2,38,334 | 2,88,046 | 3,46,533 | 20.9% | 20.3% | 165 |
| **Total Corporation** | **10,72,793** | **12,44,067** | **14,39,978** | **16.0%** | **15.7%** | **86** |
| Lalgudi (M) | 36,862 | 45,070 | 54,641 | 22.3% | 21.2% | 53 |
| Thuvakudi (M) | 44,840 | 58,296 | 72,714 | 30.0% | 24.7% | 51 |
| Puvalur (TP) | 9,769 | 10,358 | 10,947 | 6.0% | 5.7% | 21 |
| Manachanallur (TP) | 31,094 | 36,871 | 43,721 | 18.6% | 18.6% | 178 |
| Kannanoor (TP) | 15,678 | 20,336 | 26,378 | 29.7% | 29.7% | 59 |
| Koothappar (TP) | 17,577 | 21,921 | 27,337 | 24.7% | 24.7% | 29 |
| **Urban** | **12,28,613** | **14,36,919** | **16,75,716** | **17.0%** | **16.6%** | **79** |
| Blocks | | | | | | |
| Lalgudi | 83,644 | 97,672 | 1,14,732 | 16.8% | 17.5% | 14 |
| Manachanallur | 1,04,964 | 1,25,786 | 1,52,438 | 19.8% | 21.2% | 13 |
| Andanallur | 72,559 | 86,344 | 1,04,419 | 19.0% | 20.9% | 15 |
| Manikandam | 1,05,642 | 1,54,599 | 2,26,098 | 46.3% | 46.2% | 21 |
| Thiruverumbur | 1,63,657 | 2,47,402 | 3,62,207 | 51.2% | 46.4% | 17 |
| Rural | 5,30,466 | 7,11,803 | 9,59,894 | 34.2% | 34.9% | 16 |
| **Total** | **17,59,079** | **21,48,722** | **26,35,610** | **22.2%** | **22.7%** | **33** |

*Source: Census of India, Urban Local Bodies*



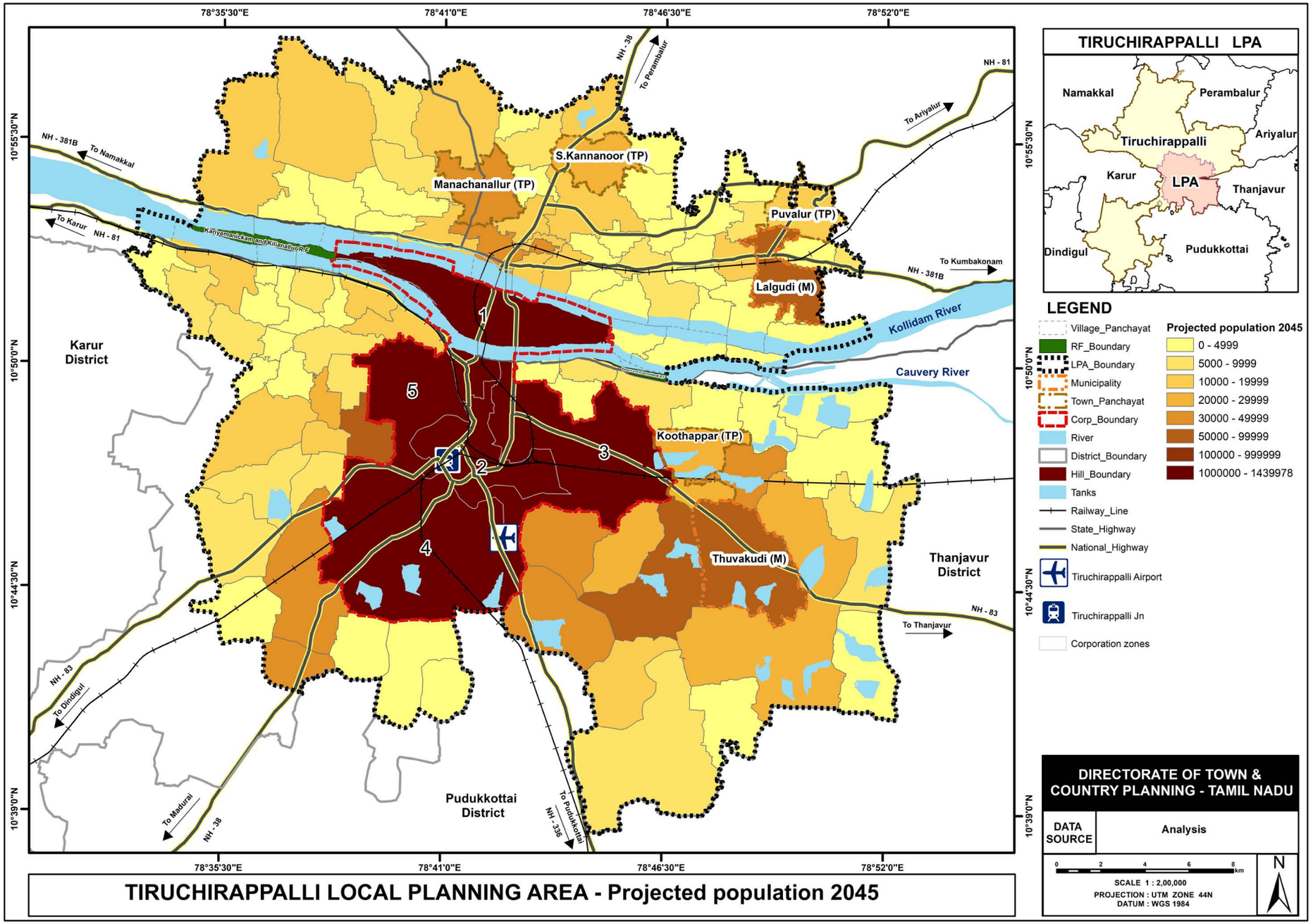

*Map 7.10 - Projected population - 2025 for Tiruchirappalli LPA*

*Source: DTCP Analysis*




*Map 7.11 - Projected population 2035 for Tiruchirappalli LPA*

*Source: DTCP Analysis*




*Map 7.12 - Projected population - 2045 for Tiruchirappalli LPA*

*Source: DTCP Analysis*

## 7.13.4 Projected densities

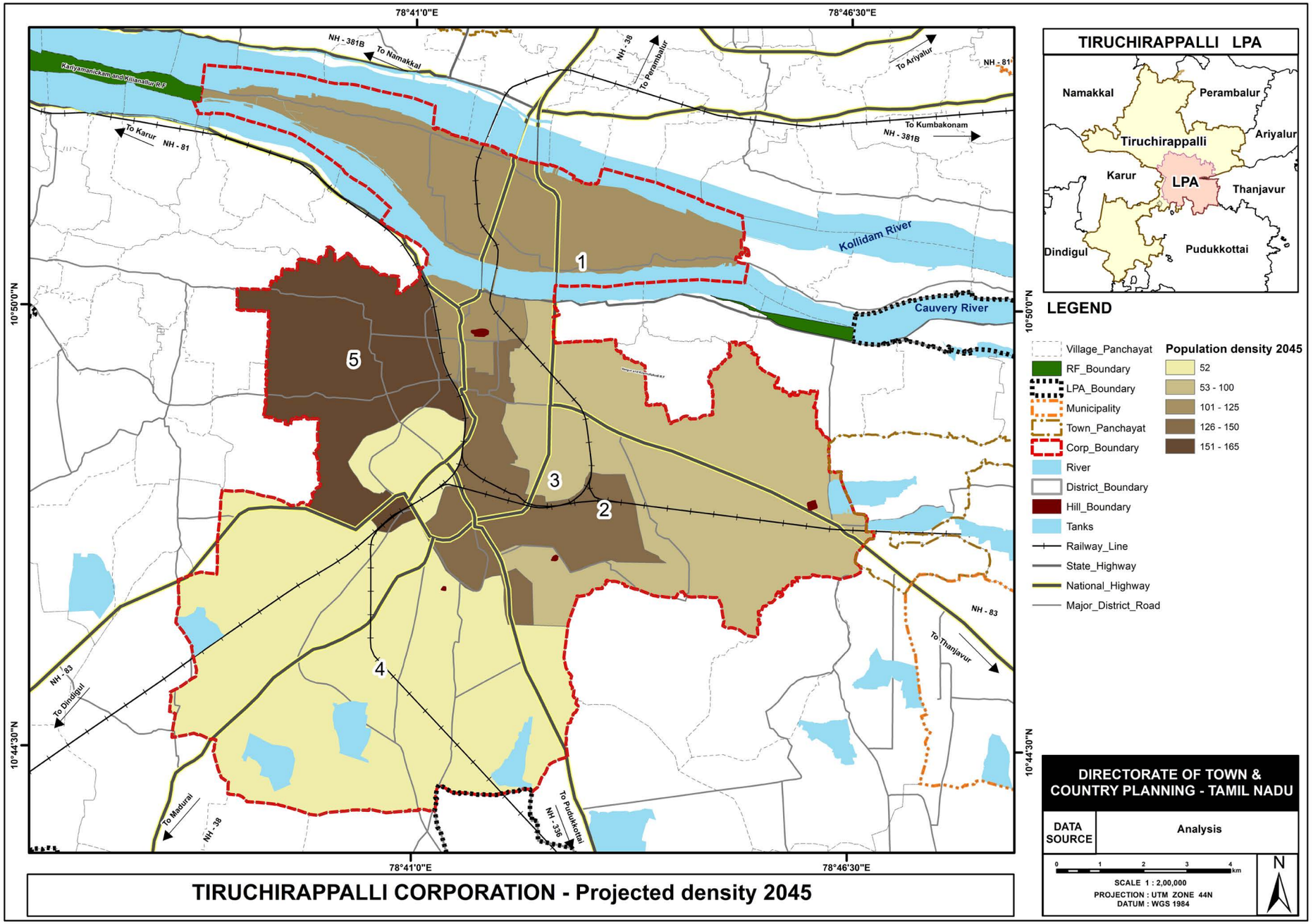
### 7.13.4.1 Projected densities in Tiruchirappalli Corporation zones

The population density of the corporation zone is projected to increase steadily from 63 persons per hectare in 2024 to 86 persons per hectare in 2045. Zone-wise, the highest increase in density is expected in Zone 5, rising from 137 to 165 persons per hectare, followed by Zone 1, which is projected to increase from 103 to 118 persons per hectare. Zone 3 is expected to grow from 52 to 61 persons per hectare, Zone 4 from 43 to 52 persons per hectare, while Zone 2, representing the core area, shows a moderate increase from 141 to 145 persons per hectare. The density of Tiruchirappalli's corporation zones are expected to rise overall, with peripheral zones experiencing faster growth than the already dense core, indicating a trend of gradual urban intensification and balanced expansion

*Table 7.24 - Existing and projected densities (persons per Ha) for Tiruchirappalli Corporation*

| S.No | Corporation zone | Existing population density (persons per Ha) | | | Projected population (persons per Ha) | | |
|---|---|---|---|---|---|---|---|
| | | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Zone 1 | 63 | 76 | 88 | 89 | 103 | 118 |
| 2 | Zone 2 | 129 | 126 | 137 | 139 | 141 | 145 |
| 3 | Zone 3 | 32 | 37 | 44 | 44 | 52 | 61 |
| 4 | Zone 4 | 25 | 30 | 35 | 35 | 43 | 52 |
| 5 | Zone 5 | 74 | 94 | 112 | 113 | 137 | 165 |
| **Total** | | **48** | **55** | **63** | **64** | **74** | **86** |

*Source: Census of India, Urban Local Bodies*




*Map 7.13 - Projected population density 2045 - Tiruchirappalli Corporation zones*

*Source: DTCP Analysis*

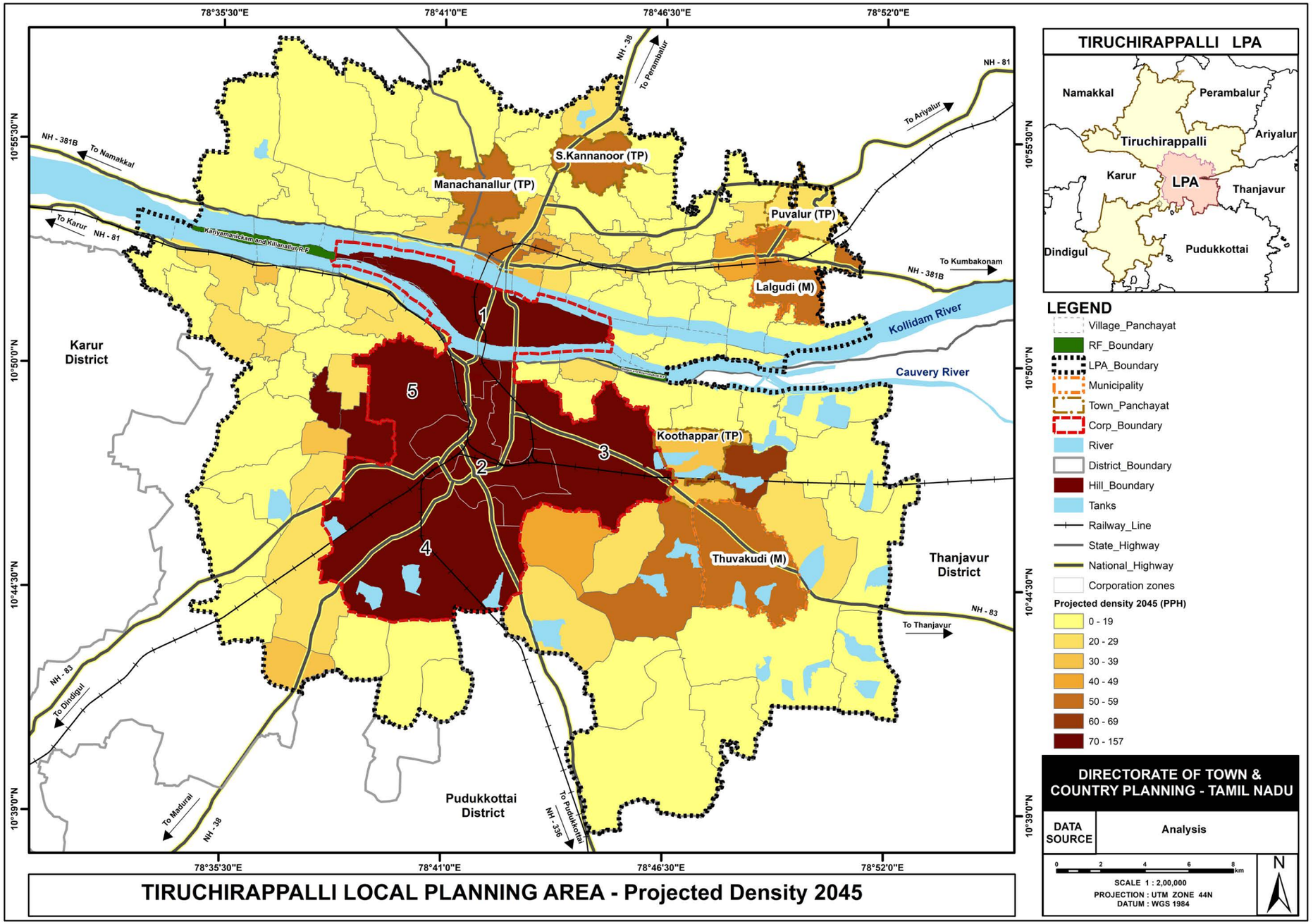
### 7.13.4.2 Projected densities in Rest of Tiruchirappalli LPA

*Table 7.25 - Existing and projected densities for Tiruchirappalli LPA*

| S.No | Administrative units | Existing densities (persons per Ha) | | | | Projected densities (persons per Ha) | | |
|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 2011 | 2024 | 2025 | 2035 | 2045 |
| 1 | Tiruchirappalli Corporation | 42 | 48 | 55 | 63 | 64 | 74 | 86 |
| 2 | Municipalities | 22 | 24 | 26 | 33 | 33 | 42 | 52 |
| 3 | Town panchayats | 24 | 28 | 29 | 34 | 34 | 42 | 50 |
| 4 | Rural villages | 5 | 5 | 7 | 9 | 9 | 12 | 16 |
| **Total** | | **14** | **15** | **18** | **21** | **22** | **27** | **33** |

*Source: Census of India, Urban Local Bodies*

The projected density data and the 2045 map of Tiruchirappalli Local Planning Area together reveal a clear pattern of intense population concentration in the city's core, where densities are highest, reflecting the corporation's projected increase to 86 persons per hectare. Surrounding municipalities and town panchayats show moderate to high densities, confirming suburban growth and expanding semi-urban zones as indicated by projected densities reaching up to 52 and 50 persons per hectare respectively. The rural villages, though less dense, are also growing steadily, with densities expected to rise to 16 persons per hectare, illustrating the gradual spread of peri-urban development. The spatial distribution of density highlights the pressing need for strategic urban planning focused on infrastructure, transport, and sustainable land use to accommodate growing populations while balancing urban expansion and rural development. Key transport infrastructure such as the airport and railway junction support these dense zones, emphasizing their importance in managing future growth and connectivity within the region.




*Map 7.14 - Projected population density - 2045 for Tiruchirappalli LPA*

*Source: DTCP Analysis*

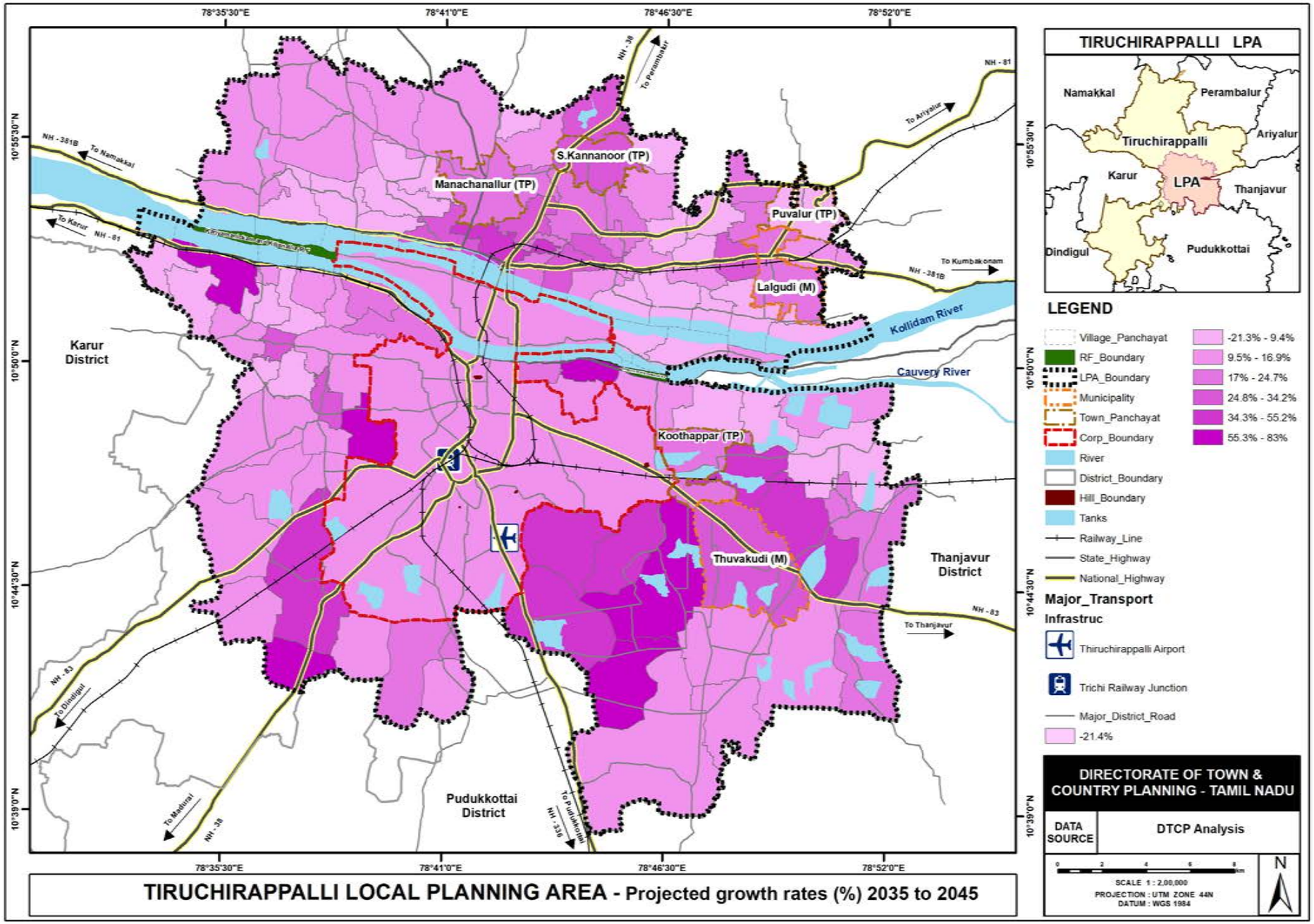
### 7.13.5 Projected growth rates

*Table 7.26 - Existing and projected growth rates for Tiruchirappalli LPA*

| S.No | Administrative units | Existing growth rates (in %) | | | Projected growth rates (in %) | | |
|---|---|---|---|---|---|---|---|
| | | 1991 to 2001 | 2001 to 2011 | 2011 to 2024 | 2024 to 2025 | 2024 to 2035 | 2035 to 2045 |
| 1 | Tiruchirappalli Corporation | 12.6% | 14.9% | 15.6% | 1.4% | 17.6% | 15.7% |
| 2 | Municipalities | 10.7% | 6.4% | 28.5% | 1.6% | 28.5% | 23.2% |
| 3 | Town panchayats | 16.5% | 6.1% | 15.7% | 1.9% | 23.0% | 21.1% |
| 4 | Rural villages | 10.5% | 23.5% | 32.4% | 2.4% | 37.4% | 34.9% |
| 5 | Total | 12.1% | 16.3% | 20.7% | 1.7% | 24.3% | 22.7% |

*Source: Census of India, Urban Local Bodies*

The projected growth rate map for Tiruchirappalli Local Planning Area between 2035 and 2045, combined with the table data, highlights notable spatial variations in population growth across different administrative units. The map shows that the highest growth rates, ranging from 55.3% to 83%, are concentrated in specific pockets within the corporation boundary, aligning with the table's projection of around 15.7% growth during this period for the corporation as a whole. Surrounding municipalities and town panchayats exhibit moderate to high growth rates, depicted on the map with shades corresponding to 24.8% to 55.2%, consistent with the projected growth rates of 23% and 21.1% respectively in the table. Rural villages display varied growth, with some areas showing rapid increases between 34.3% and 55.2%, reflecting the table's higher projected rural growth of 34.9%. This spatial pattern indicates that while urban centers will continue to grow steadily, peripheral and rural areas are also experiencing significant population surges, suggesting expanding peri-urbanization. The distribution emphasizes the need for targeted development strategies that address the demands of rapidly growing zones within and beyond the core city, ensuring infrastructure, housing, and services keep pace with population dynamics and prevent unplanned sprawl.




*Map 7.15 - Projected decadal growth rate (2035 to 2045) for Tiruchirappalli LPA*

*Source: DTCP Analysis*

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# 8 ECONOMY

## 8.1 Introduction

Tiruchirappalli district represents one of the key economic regions of central Tamil Nadu, with a diversified economic base comprising services, manufacturing and agriculture. Tiruchirappalli occupies a structurally strategic position within Tamil Nadu's economy, shaped by its central geography, institutional concentration and diversified production base. The district recorded a Gross District Domestic Product (GDDP) of Rs. 44,52,917 lakh (Rs. 44,529 crore / USD 5.36 billion), contributing about 3.1% to Tamil Nadu's Gross State Domestic Product (GSDP) in 2022 23 FY.

Unlike metropolitan-centric growth trajectories, Tamil Nadu has pursued a multi-nodal development strategy, enabling districts such as Tiruchirappalli to emerge as independent economic anchors rather than peripheral growth recipients *(Economic Survey of Tamil Nadu 2024-25 Highlights)*. This distributed development model aligns with national policy thinking that recognises intermediate cities and district economies as critical engines of inclusive and resilient growth *(NITI Aayog, Strategy for New India @75)*. Situated within one of India's most resilient sub-national economies, Tiruchirappalli benefits from sustained state-level momentum while maintaining a relatively stable and diversified district economy. Within this macroeconomic context, Tiruchirappalli functions as a regional stabiliser district, insulated from excessive dependence on export-led or single-sector growth; an increasingly valued attribute in national economic assessments.

At the district scale, Tiruchirappalli Local planning Area mirrors the state's balanced sectoral structure, combining a services-led urban economy, a manufacturing and MSME-driven secondary base and agriculture-linked livelihoods integrated with the Cauvery river basin. Its economic resilience is reinforced by human capital endowments, high institutional density and sustained public-sector presence, consistent with diversification principles advocated under the District Domestic Product framework. As Tamil Nadu advances towards its $1 trillion economy vision, Tiruchirappalli's role as a moderate-growth, high-stability, institution-anchored economy positions it as a critical contributor to balanced, inclusive and long-term state development *(Tamil Nadu Vision 2030)*.

This chapter provides an overview of Tiruchirappalli's economic structure, growth trends and sectoral composition. It examines district-level output, sectoral contributions, income patterns and workforce characteristics to understand the drivers of economic performance and inform long-term spatial and economic planning strategies.

## 8.2 Economic Profile of Tiruchirappalli District

This section analyses the district's economic profile through Gross District Domestic Product (GDDP), sector-wise performance, per capita income trends, inter-district comparisons and workforce participation. The analysis helps identify structural strengths, growth constraints and spatial variations influencing economic development.

*Figure 8.1 Teppakulam–Rockfort Market area*

*Source: Reconnaissance Survey*

### 8.2.1 Gross District Domestic Product

The Gross District Domestic Product (GDDP) acts as a crucial indicator, offering insights into the economic activities across various sectors within Tiruchirappalli's districts. It gauges the overall economic performance and growth of the region, typically by considering three main sectors: the primary sector, the secondary sector and the tertiary sector.

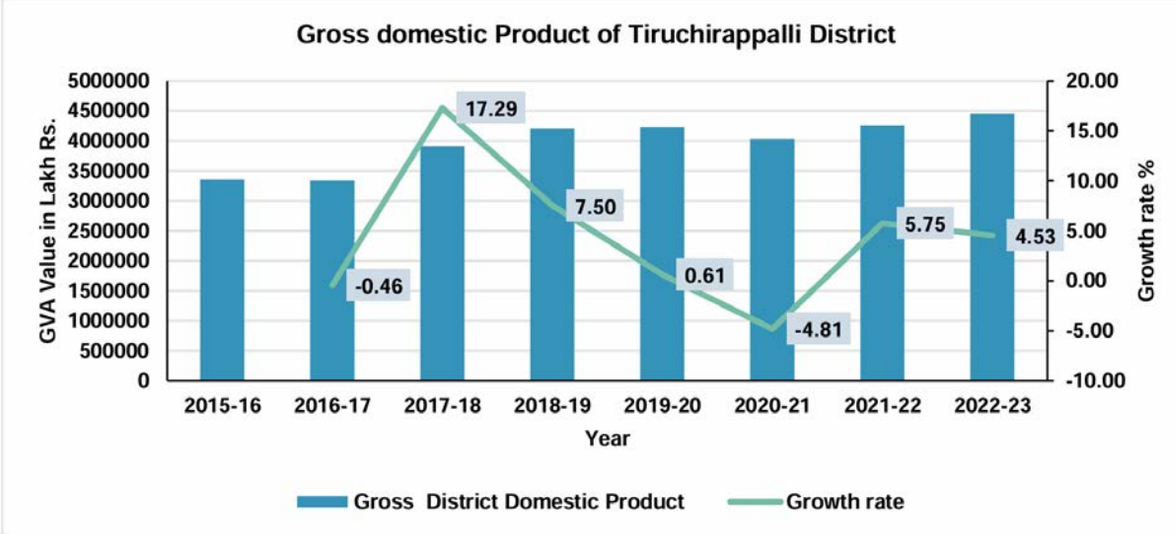



*Figure 8.2 GDDP Growth of Tiruchirappalli from 2015-16 to 2022-23*

*Source: Directorate of Economics & Statistics, Go TN*

Tiruchirappalli district has recorded a steady increase in Gross District Domestic Product (GDDP) from 2015–16 to 2022–23, indicating sustained economic growth despite short-term fluctuations. The GDDP increased from about Rs. 33,00,000 lakhs in 2015–16 to Rs. 44,52,917 lakhs in 2022–23. The district experienced strong growth during 2017–18 (17.29%), followed by moderation in subsequent years and a contraction during the pandemic year 2020–21 (-4.81%). Post-pandemic recovery is evident, with growth rates of 5.75% in 2021–22 and 4.53% in 2022–23, reflecting economic resilience and revival.

*Table 8.1 Tiruchirappalli's Economic Performance by sector FY 2022 23*

| Name of the Sector | %age of economic contribution to the State | Tiruchirappalli's Rank in the State economic by sector |
|---|---|---|
| Primary | 2.4 % | 14 |
| Secondary | 2.2 % | 15 |
| Tertiary | 3.84 % | 8 |
| Total | 3.1% | 11 |

*Source: Directorate of Economics & Statistics, Go TN*

Sector-wise, Tiruchirappalli contributes about 2.4% to the state's primary sector, 2.2% to the secondary sector and 3.84% to the tertiary sector. The district ranks 14th in the primary sector, 15th in the secondary sector and 8th

in the tertiary sector within Tamil Nadu, highlighting its strong position as a service-oriented regional economy.

Figure below illustrates the sector-wise composition of Tiruchirappalli's GDDP for FY 2022–23, highlighting the relative contribution of primary, secondary and tertiary sectors to the district economy.

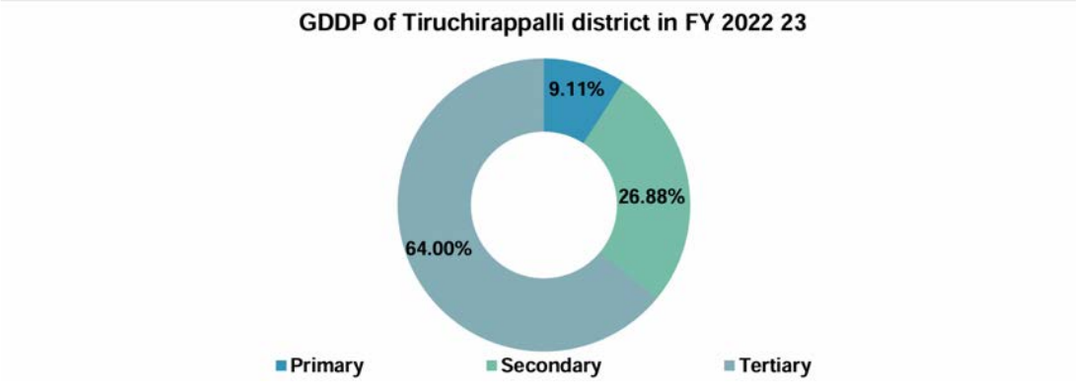



*Figure 8.3 Sector wise GVA composition of Tiruchirappalli District*

*Source: Department of economics and statistics, FY 2022 - 23*

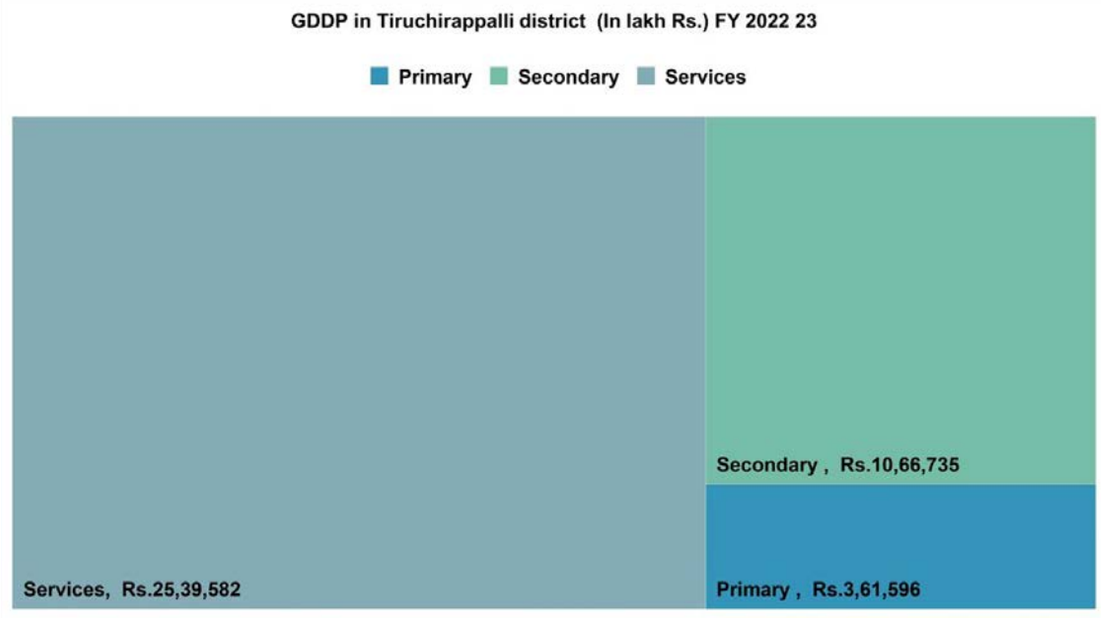



*Figure 8.4 Sector wise GVA composition of Tiruchirappalli District*

*Source: Department of economics and statistics, FY 2022 - 23*

The sectoral composition of Tiruchirappalli's GDDP in 2022–23 is dominated by the tertiary sector, which accounts for 64.0% of total output, reflecting the city's strong service-oriented economy. The secondary sector contributes

26.88%, highlighting the importance of manufacturing and construction activities, while the primary sector accounts for only 9.11%, indicating the declining share of agriculture and allied activities in the district economy.

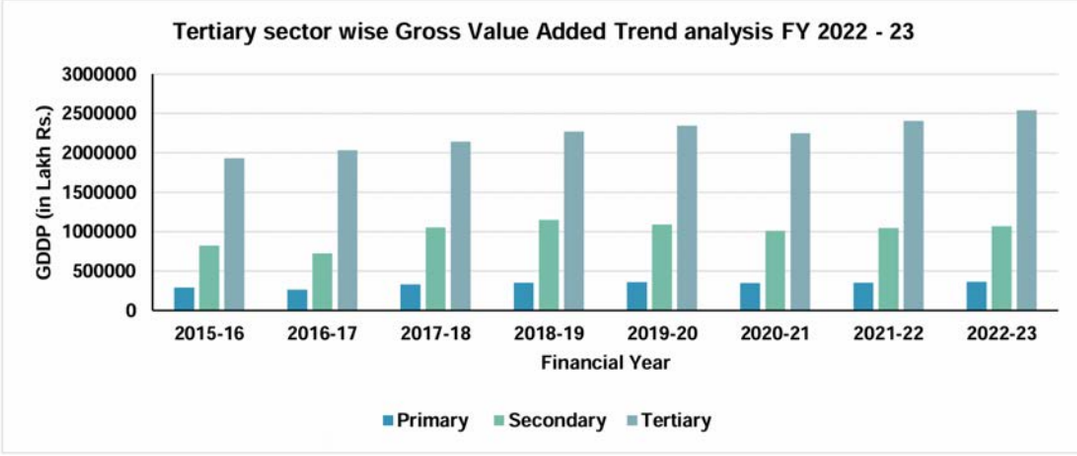



*Figure 8.5 Sector wise Gross Domestic Product at constant price year 2022-23*

*Source: Directorate of Economics & Statistics, Go TN*

*Table 8.2 Sector wise trend in GDDP in Rs.*

| Sector | 2015-16 (in lakhs) | 2019-20 (in lakhs) | 2022-23 (in lakhs) |
|---|---|---|---|
| Primary | 2,88,609 | 3,57,455 | 3,61,596 |
| Secondary | 8,24,600 | 10,91,014 | 10,66,735 |
| Tertiary | 19,31,760 | 23,44,663 | 25,39,582 |
| Gross District Value Added | 30,44,969 | 37,93,133 | 39,67,913 |
| Gross District Domestic Product | 33,51,488 | 4,231,682 | 44,52,917 |
| Per capita Income (in Rupees) | 1,22,546 | 1,47,756 | 1,53,732 |

*Source: Directorate of Economics & Statistics, Go TN*

The sector-wise GDDP trends indicate a steady expansion of the district economy, led predominantly by the services sector. Between 2015–16 and 2022–23, services GDDP increased from Rs. 19,31,760 lakhs to Rs. 25,39,582 lakhs, reinforcing Tiruchirappalli's position as a service-driven regional centre. The secondary sector also recorded moderate growth, rising from Rs.8,24,600 lakh to Rs.10,66,735 lakh, reflecting gradual recovery in manufacturing and construction activities. In contrast, the primary sector shows comparatively slower growth, increasing from Rs.2,88,609 lakh to Rs.3,61,596 lakh,

highlighting the declining economic role of agriculture and allied activities.

Overall, the trends reflect Tiruchirappalli's transition towards a service-led urban economy, supported by moderate industrial growth and a gradually declining dependence on agriculture, underscoring the need to strengthen industrial diversification and promote agro-based value addition for balanced economic development.

#### 8.2.1.1 Sector-wise Growth Trends in GDDP

This sub-section focuses on temporal growth patterns within each sector, rather than their relative shares.

Primary sector GVA shows fluctuating growth, with a sharp decline in 2016–17, strong recovery in 2017–18, moderate growth till 2019–20, contraction in 2020–21 and gradual recovery during 2021–22 and 2022–23. The primary sector is highly sensitive to climatic conditions, market fluctuations and external shocks, showing volatility but overall resilience with signs of stabilization in recent years.

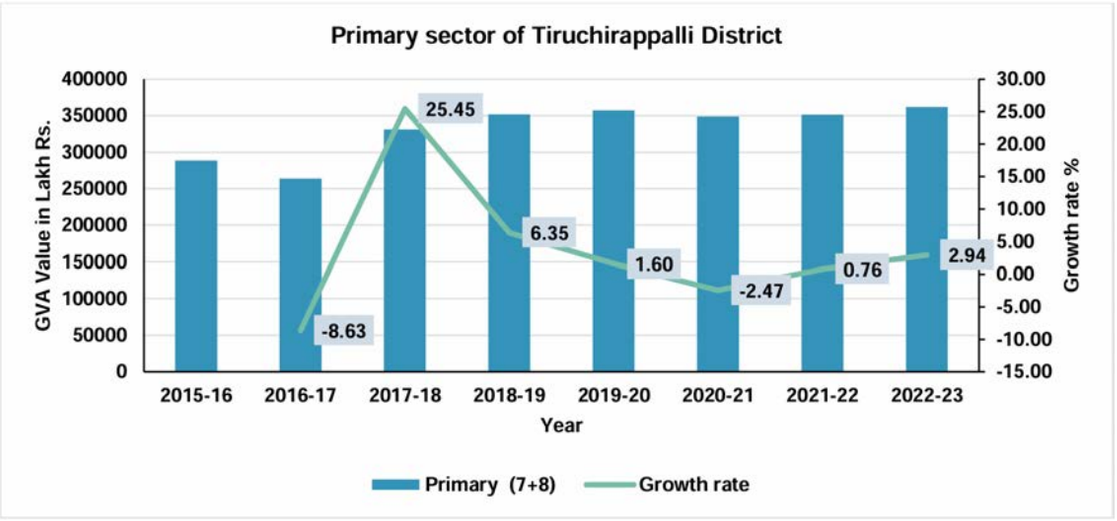



*Figure 8.6 Primary sector of Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

The secondary sector in Tiruchirappalli recorded strong growth in 2017–18, driven mainly by major industrial units such as BHEL, Ordnance Factory Tiruchirappalli (OFT), HEPF and the Golden Rock Railway Workshop, along with SIDCO-based MSME clusters. This was followed by contraction during 2019–20 and 2020–21 due to economic disruptions, with a steady recovery in 2021–22 and 2022–23 indicating revival in manufacturing and construction activities supported by infrastructure and industrial investments.

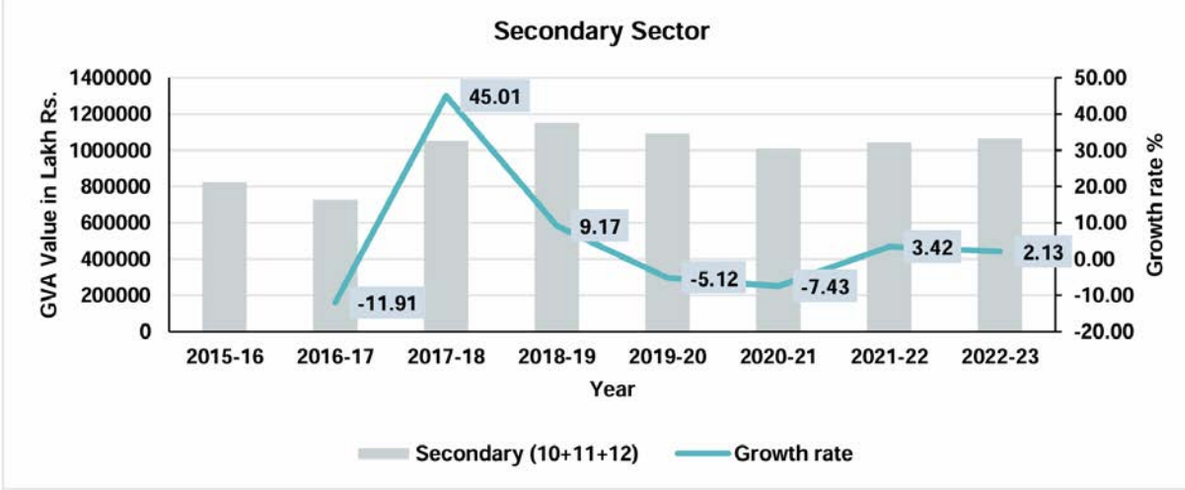



*Figure 8.7 Secondary sector of Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

The tertiary sector in Tiruchirappalli recorded steady growth from 2015–16 to 2018–19, followed by a decline in 2020–21 and a strong rebound in 2021–22 and 2022–23. The tertiary sector remains the primary growth engine of Tiruchirappalli's economy, supported by IT and IT-enabled services, public administration, education, trade, transport and real estate activities, reflecting high resilience.

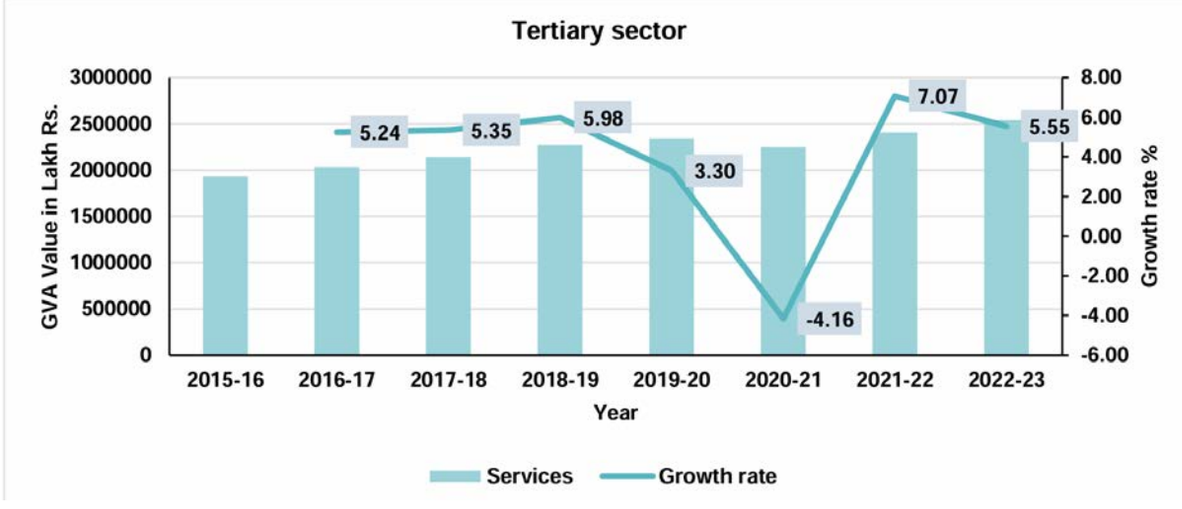



*Figure 8.8 Tertiary sector of Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

### 8.2.2 Per capita income

Per capita income is an important indicator of economic well-being, reflecting the average income earned per person and serving as a proxy for living standards,

access to services and economic opportunities. Although Tiruchirappalli's per capita income has shown a steady post-pandemic recovery, it consistently remains below the state average. While the State recorded an average annual growth rate of 5.54%, Tiruchirappalli grew at a comparatively lower rate of 3.54%, indicating slower income acceleration. This persistent gap highlights the need to promote higher-value employment, deepen industrial diversification and expand advanced service-sector activities to enhance income levels within the district.

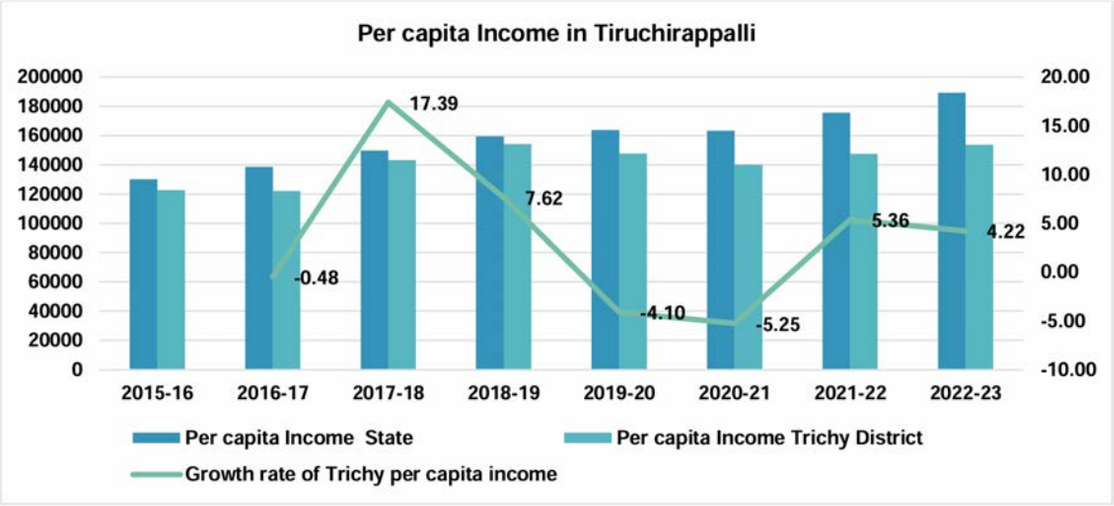



*Figure 8.9 State per capita income - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

*Table 8.3 Temporal details of per capita income, growth rate in %*

| S.No. | Year | State Per capita Income in Rs. | Per capita Income Tiruchirappalli District in Rs. | Growth rate of State per capita income (%) | Growth rate of Tiruchirappalli per capita income (%) |
|---|---|---|---|---|---|
| 1 | 2015-16 | 1,30,000 | 1,22,546 | | |
| 2 | 2016-17 | 1,38,529 | 1,21,959 | 6.56 | -0.48 |
| 3 | 2017-18 | 1,49,717 | 1,43,166 | 8.08 | 17.39 |
| 4 | 2018-19 | 1,59,457 | 1,54,079 | 6.51 | 7.62 |
| 5 | 2019-20 | 1,63,874 | 1,47,756 | 2.77 | -4.10 |
| 6 | 2020-21 | 1,63,222 | 1,39,998 | -0.40 | -5.25 |
| 7 | 2021-22 | 1,75,449 | 1,47,507 | 7.49 | 5.36 |
| 8 | 2022-23 | 1,89,139 | 1,53,732 | 7.80 | 4.22 |

| S.No. | Year | State Per capita Income in Rs. | Per capita Income Tiruchirappalli District in Rs. | Growth rate of State per capita income (%) | Growth rate of Tiruchirappalli per capita income (%) |
|---|---|---|---|---|---|
| Average Growth Rate | | 1,58,673 | 1,41,343 | 5.54 | 3.54 |

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

In addition to pandemic-related disruptions, Tiruchirappalli's higher income volatility can be attributed to its strong dependence on capital-intensive engineering and defence manufacturing industries such as BHEL, OFT and HEPF, which are sensitive to project-based demand. The district also has a large MSME base, where wages and employment fluctuate with market conditions. Further, real estate and construction cycles, along with agricultural income variability in peri-urban and rural blocks dependent on Cauvery irrigation, contribute to short-term income fluctuations, making Tiruchirappalli more sensitive to economic uncertainty than the state average. The district recorded an average annual growth rate of 3.54%, indicating gradual improvement in income levels. However, Tiruchirappalli's per capita income remains consistently below the state average, which grew at a higher rate of 5.54% during the same period and reached Rs.1,89,139 in 2022–23. This persistent gap highlights the need for strengthening high-value employment generation, industrial diversification and service-sector expansion to accelerate income growth and improve living standards in the district.

### 8.2.3 Comparison of Tiruchirappalli district GDDP with other districts

This section examines the Gross District Domestic Product (GDDP) at constant prices for selected districts of Tamil Nadu namely Tiruchirappalli, Tiruppur, Madurai and Erode for the period from 2011–12 to 2022–23.

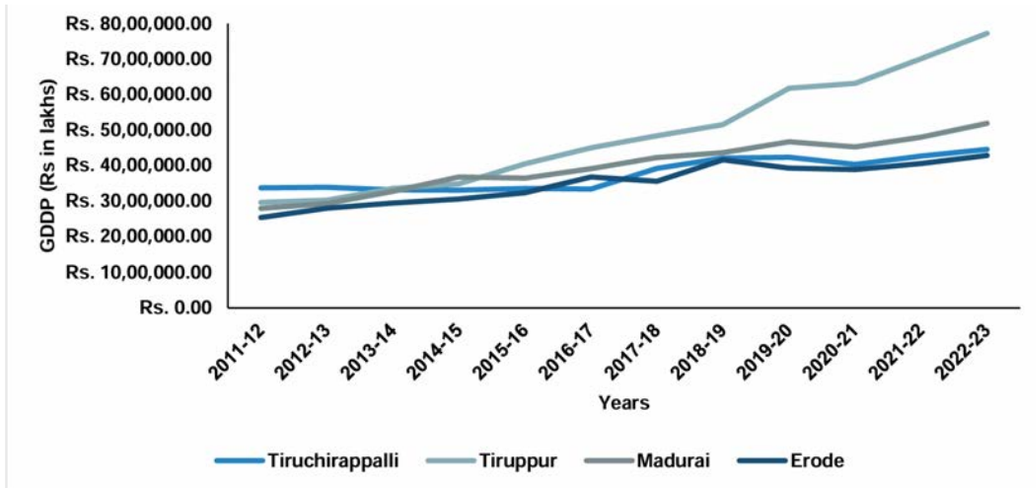



*Figure 8.10 Comparative analysis of GDDP*

*Source: Department of economics and statistics, FY 2015 16 to 2022 – 23*

- Tiruchirappalli maintained a relatively stable level of GDDP during 2011–12 to 2016–17, with output remaining around Rs.33–34 lakh lakh.
- Tiruppur recorded rapid and consistent growth, surpassing Tiruchirappalli from 2013–14 and reaching Rs.77,22,767 lakh in 2022–23, driven by strong industrial and export-led expansion.
- Madurai also outperformed Tiruchirappalli from 2013–14 onwards, with GDDP increasing steadily to Rs.51,86,623 lakh in 2022–23.
- Erode, despite a lower initial base, showed steady improvement and closely approached Tiruchirappalli's GDDP levels in several years after 2017–18.

Although Tiruchirappalli experienced growth acceleration after 2017–18 and recovered from the pandemic slowdown, its overall growth remained comparatively moderate. Tiruppur's rapid growth is driven by export-oriented manufacturing, strong global value-chain integration and high concentration of private industrial capital, while Madurai benefits from diversified services, trade, tourism and regional market functions. In contrast, Tiruchirappalli's economy, though diversified and stable, is more dependent on public-sector manufacturing and institutional services, resulting in moderate but resilient growth rather than rapid expansion. The comparative analysis indicates that Tiruchirappalli's economic performance, while stable and resilient, lags behind the faster-growing industrial economies of Tiruppur and Madurai, highlighting the need for targeted industrial and service-sector growth strategies.

### 8.2.4 Workforce Participation

Workforce Participation Rate (WPR) is a key indicator of the economic engagement of the population, reflecting the proportion of working people actively involved in productive activities. The analysis of workforce participation across different settlement typologies within the Tiruchirappalli Local Planning Area (LPA) namely Tiruchirappalli Corporation, municipalities, town panchayats and the rest of the LPA provides critical insights into spatial variations in employment patterns, gender participation and the underlying socio-economic structure.

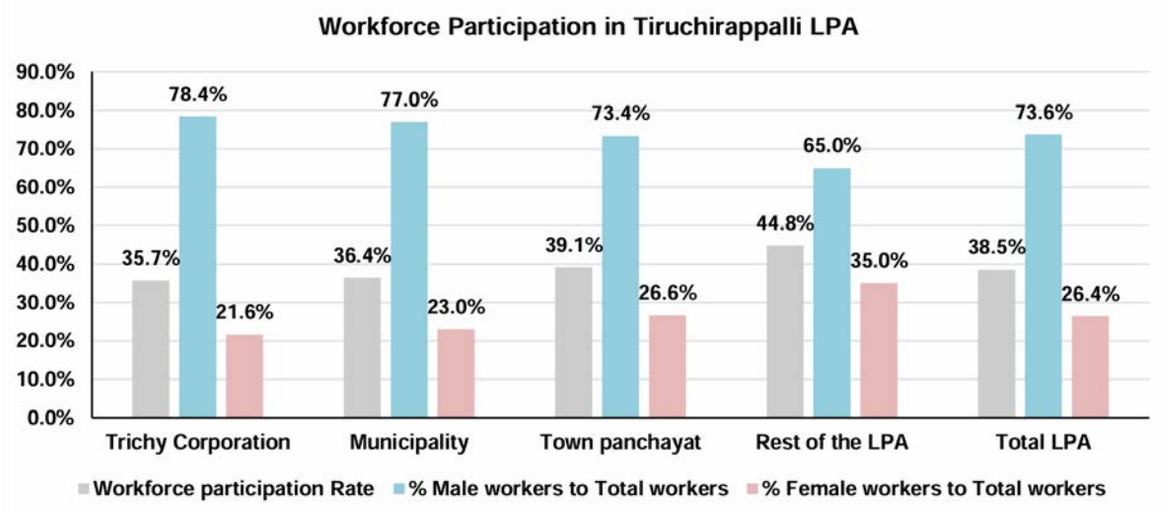



*Figure 8.11 Workforce participation in Tiruchirappalli LPA*

*Source: Census of India, 2011*

The workforce participation pattern in Tiruchirappalli LPA shows notable spatial and gender disparities, with the overall Workforce Participation Rate (WPR) standing at 38%. Higher participation is observed in the rest of the LPA (45%) and town panchayats (39%), indicating greater dependence on agriculture, informal sector activities and household-based livelihoods, while comparatively lower participation in Tiruchirappalli Corporation (36%) and municipalities (36%). Lower workforce participation in Tiruchirappalli Corporation and municipalities can be attributed to higher concentrations of educational institutions, students, dependents and service-sector households, as indicated by land-use patterns dominated by institutional and residential uses.

Male workers dominate across all settlement types, accounting for 74% of total workers in the LPA, peaking at 78% in Tiruchirappalli Corporation, whereas female workforce participation remains critically low at 10% overall, dropping to just 8% in the Corporation area and reaching a relatively high of 23% in municipalities. This gender gap highlights structural barriers such as limited access to suitable employment, safety concerns, skill mismatches and socio-cultural constraints, emphasizing the need for targeted interventions focused on enhancing female workforce participation, promoting inclusive job creation and strengthening skill development initiatives to support balanced and sustainable economic growth across Tiruchirappalli LPA.

### 8.2.4.1 Main and Marginal Workers in Tiruchirappalli LPA

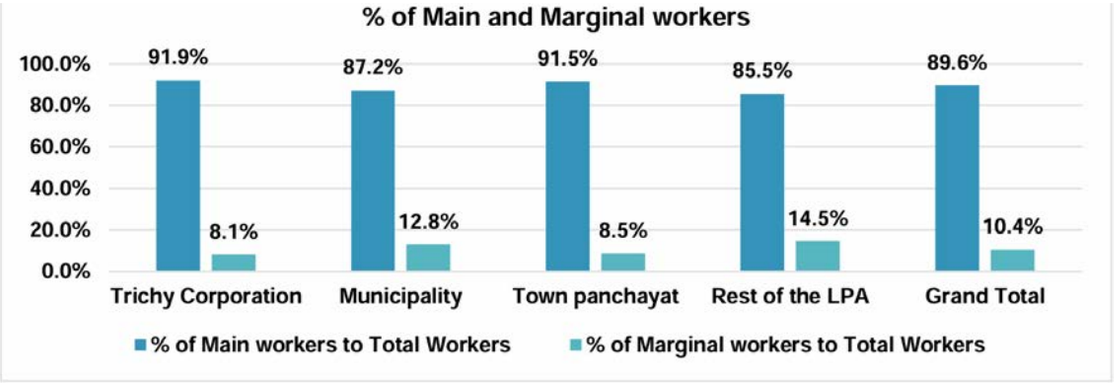



*Figure 8.12 Main and Marginal Workers in Tiruchirappalli LPA*

*Source: Census of India, 2011*

The high share of main workers (about 90%) corresponds with the workforce composition illustrated in figure above, indicating relatively stable employment across the LPA indicating a relatively stable employment base. Among settlement categories, town panchayats and Tiruchirappalli Corporation record the highest proportion of main workers at 92% each, followed by municipalities at 87% and the rest of the LPA at 86%. Conversely, marginal workers form a relatively higher share in the rest of the LPA (14%) and municipalities (13%), compared to town panchayats (8%) and Tiruchirappalli Corporation (8%). This spatial pattern suggests that urban and semi-urban areas provide more regular and continuous employment, whereas peripheral and rural-influenced zones exhibit greater dependence on seasonal, informal and irregular livelihood activities, particularly in agriculture and allied sectors.

### 8.2.4.2 Gender distribution of Main and marginal workers in Tiruchirappalli LPA

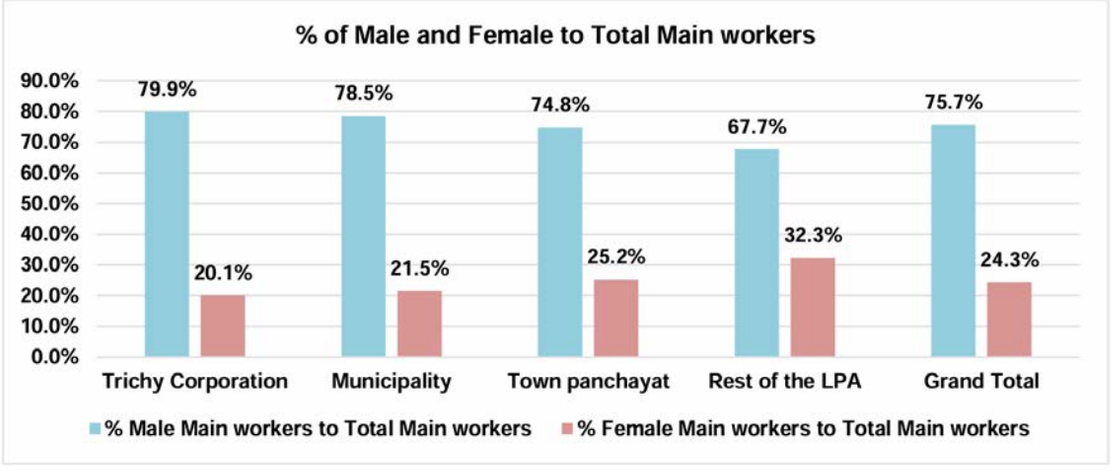



*Figure 8.13 Male and Female workers % to Total main workers in Tiruchirappalli LPA*

*Source: Census of India, 2011*

Female workers constitute a higher proportion of marginal employment compared to main employment across all settlement categories, indicating greater engagement in seasonal, temporary and informal work. This pattern reflects constraints such as limited access to stable jobs, care responsibilities and sectoral concentration in low-security employment, underscoring the need for targeted policies to enhance female participation in formal and regular employment.

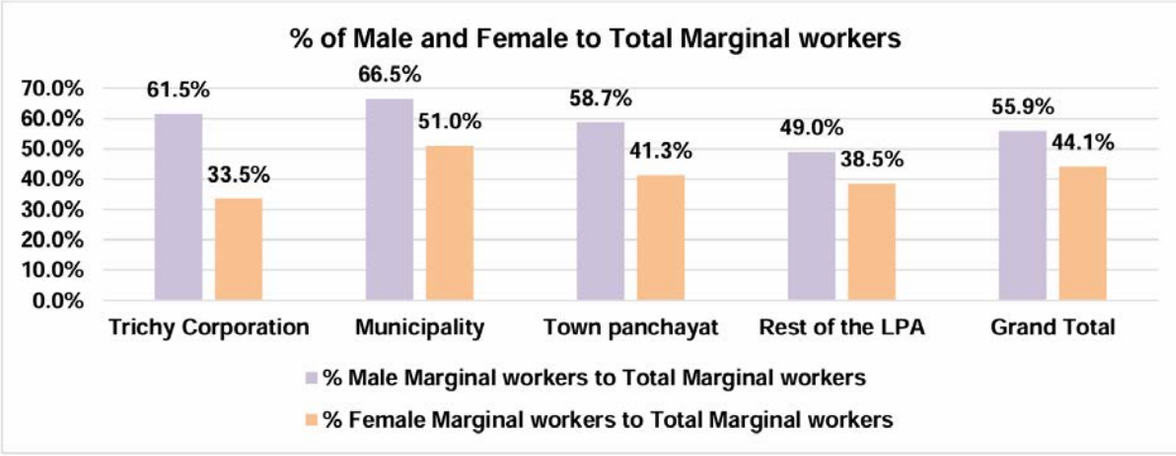



*Figure 8.14 Male and Female to Total Marginal workers in Tiruchirappalli LPA*

*Source: Census of India, 2011*

### 8.2.4.3 Distribution of Primary and Non-Primary workforce

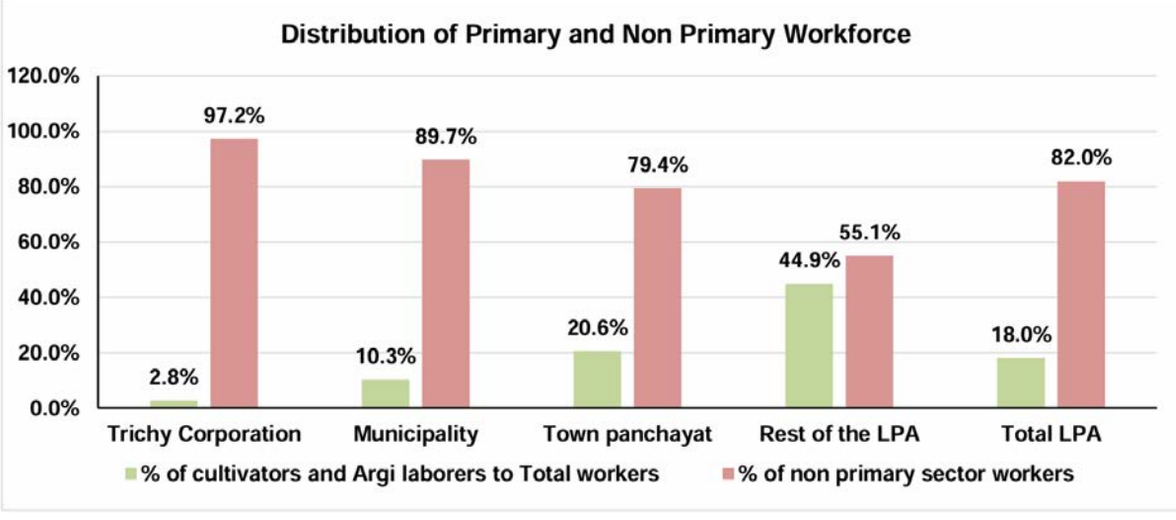



*Figure 8.15 Distribution of Primary and Non-Primary workforce in Tiruchirappalli LPA*

*Source: Census of India, 2011*

The distribution of primary and non-primary workforce in Tiruchirappalli LPA reveals a strong dominance of non-primary activities, with 82% of the total workforce engaged in non-primary sectors, while only 18% are involved in primary activities (cultivators and agricultural labourers). Spatially, Tiruchirappalli Corporation exhibits the lowest dependence on primary activities at just 3%, indicating a highly urbanised and service–industrial driven economy, followed by municipalities at 10%. In contrast, the rest of the LPA shows the highest share of primary workers at 45%, reflecting its predominantly rural character, while town panchayats record a moderate primary workforce share of 21%, suggesting a transitional economic structure. This clear urban–rural gradient highlights the shift from agriculture to non-agricultural employment towards the urban core, underscoring the need for diversified livelihood strategies, enhanced non-farm employment generation and targeted rural economic transformation to support balanced and sustainable regional development.

Overall, the workforce profile of Tiruchirappalli LPA reflects a predominantly urban service-oriented economy, with 79% of workers engaged in non-primary activities and a high share of main workers (90%), indicating relatively stable employment. However, significant spatial and gender disparities persist, with low female workforce participation in the urban core and higher dependence on primary sector livelihoods in the peripheral areas, underscoring the need for inclusive and spatially balanced employment strategies.

*Table 8.4 Details of workforce participation in LPA*

| Demographic profile | Tiruchirappalli Corporation | Municipality | Town panchayat | Rest of the LPA | Grand Total |
|---|---|---|---|---|---|
| Total population | 8,47,387 (60 wards) | 62,627 | 62,852 | 3,91,356 | 13,64,222 |
| Total Workforce | 3,02,442 | 22,815 | 24,596 | 1,75,338 | 5,25,191 |
| % Workforce to total Population | 35.7 | 36.4 | 39.1 | 44.8 | 38.5 |
| Total Male Workforce | 2,37,170 | 17,565 | 18,052 | 1,13,996 | 3,86,783 |
| % Male workforce to Total workforce | 78.4 | 77.0 | 73.4 | 65.0 | 73.6 |
| Total Female workforce | 65,272 | 5,250 | 6,544 | 61,342 | 1,38,408 |
| % Female workforce to Total workforce | 21.6 | 23.0 | 26.6 | 35.0 | 26.4 |
| Total Main workforce | 2,78,036 | 19,889 | 22,508 | 1,49,922 | 4,70,355 |
| % of Main workforce to Total Workforce | 91.9 | 87.2 | 91.5 | 85.5 | 89.6 |
| Total Marginal workforce | 24,406 | 2,926 | 2,088 | 25,416 | 54,836 |
| % of Marginal workforce to Total Workforce | 8.1 | 12.8 | 8.5 | 14.5 | 10.4 |
| Cultivators and Agri. Labors | 8,506 | 2,349 | 5,065 | 78,776 | 94,696 |
| % of cultivators and agri. labors to Total workers (Primary sector) | 2.8 | 10.3 | 20.6 | 44.9 | 18.0 |
| Household workers | 7,584 | 393 | 651 | 5,134 | 13,762 |
| % of HH workers to Total workers | 2.5 | 1.7 | 2.6 | 2.9 | 2.6 |
| Other Trade workers | 2,86,352 | 20,073 | 18,880 | 91,428 | 4,16,733 |
| % of other trade workers to total workers | 94.7 | 88.0 | 76.8 | 52.1 | 79.3 |

*Source: Census of India, 2011*

*Table 8.5 Work force in Tiruchirappalli district as per PLFS*

| Work force participation | | | |
|---|---|---|---|
| Year | Primary (%) | Secondary (%) | Tertiary (%) |
| **Tiruchirappalli District** | | | |
| 2017 18 | 31 | 21.2 | 47.8 |
| 2021 22 | 9.7 | 20.4 | 69.3 |
| 2023 24 | 7 | 22 | 71 |
| **Tamil Nadu** | | | |
| 2024 25 | 28.7 | 23.5 | 47.8 |

*Source: PLFS 2017, 2021, 2023, 2024*

The tertiary sector share in Tiruchirappalli's workforce has increased sharply from 47.8% (2017–18) to 71% (2023–24), which is significantly higher than the Tamil Nadu average (47.8%) and also above the national average, indicating strong urbanisation and service-sector dominance. Tiruchirappalli's primary sector workforce fell from 31% to just 7%, far below the State average (28.7%) and national levels, reflecting reduced dependence on agriculture and faster structural transformation than both Tamil Nadu and India. The secondary sector in Tiruchirappalli remains around 20–22%, slightly below the State average (23.5%) and comparable to national trends, suggesting that industrial employment growth has not kept pace with services. Compared to both Tamil Nadu and India, Tiruchirappalli exhibits a more advanced transition towards a service-led employment structure, driven by trade, transport, education, health, IT, and allied urban services, while agriculture plays a diminishing role in employment.

## 8.3 Sectoral Contribution

While earlier sections examined sectoral shares and growth trends at an aggregate level, this section provides a detailed sector-specific assessment of internal structure, spatial distribution, value-chain characteristics and productivity drivers within each sector. This enables identification of sector-wise constraints, opportunities and targeted planning interventions.

### 8.3.1 Primary Sector

The primary sector GDDP in Tiruchirappalli is largely driven by agriculture and livestock, which together account for the dominant share across all years.

While agriculture continues to form the base of the sector, livestock has shown a steady increase over time, indicating its growing importance in supporting rural livelihoods and economic stability. In contrast, forestry, fishing and mining & quarrying contribute only marginally, reflecting their limited role in the district economy.

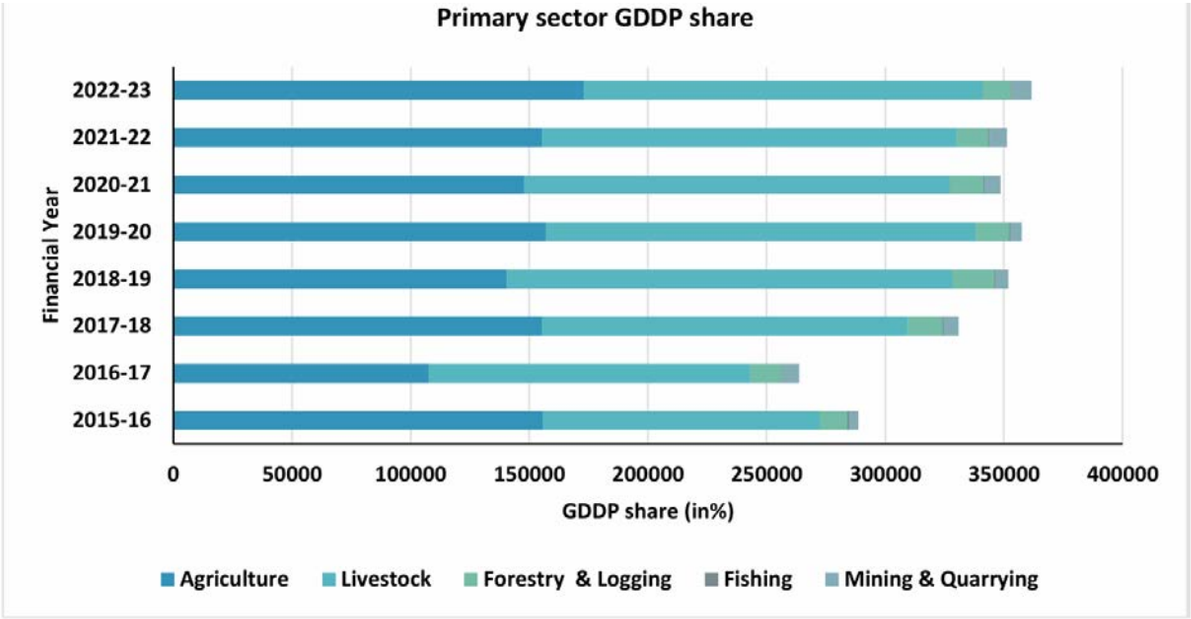



*Figure 8.16 Primary sector GDDP share*

*Source: Department of Economics and Statistics, Government of Tamil Nadu*

The observed fluctuations in primary sector GVA are primarily influenced by monsoon variability, Cauvery water releases, crop pattern shifts and allied sector performance. The sharp recovery in 2017–18 reflects favourable rainfall, improved irrigation availability and increased dairy output, while the contraction in 2020–21 resulted from pandemic-related labour shortages, supply chain disruptions and reduced market demand. The gradual post-pandemic recovery is supported by procurement mechanisms and allied sector resilience, leading to stabilisation of agricultural and rural incomes.

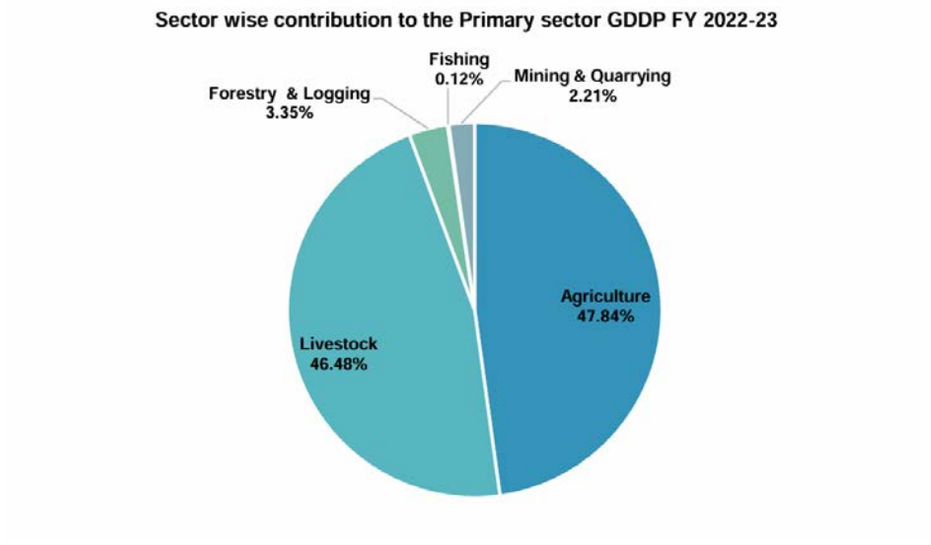



*Figure 8.17 Sectoral Distribution within the Primary sector GDDP (Rs. in lakhs)*

*Source: Department of Economics and Statistics, Government of Tamil Nadu*

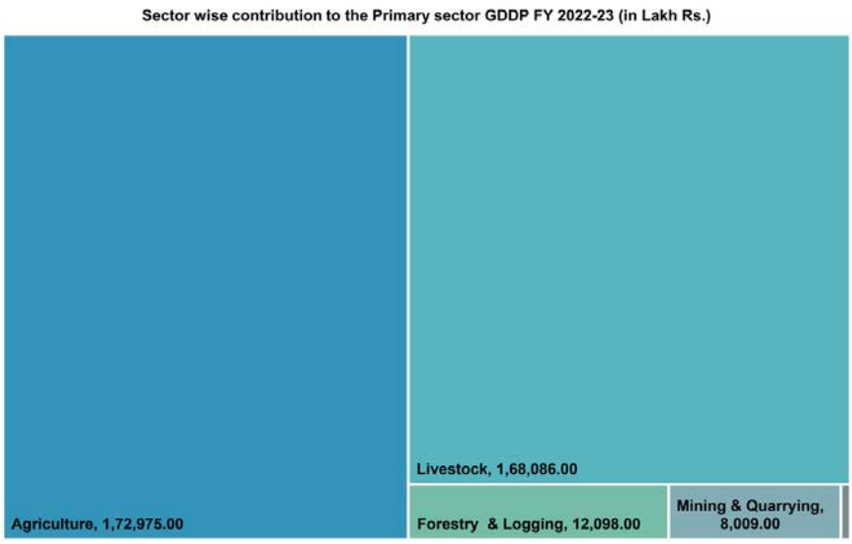



*Figure 8.18 Sector wise contribution to the Primary sector GDDP (Rs. in lakhs)*

*Source: Department of Economics and Statistics, Government of Tamil Nadu*

#### 8.3.1.1 Agriculture

Tiruchirappalli exhibits a dual agrarian structure, with intensively irrigated agriculture along the Cauvery belt and predominantly rainfed, semi-arid farming in its interior LPA blocks of Lalgudi andanallur, Manachanallur, Manikandam and Thiruverumbur. Out of Tiruchirappalli's total geographical area of about 4,40,383 hectares, approx. 32.1% of total area constitutes the net cultivated area. Of this net cultivated area, around 69.9% of area is irrigated, while about

47.2% of area is rainfed, reflecting overlapping use due to multiple cropping and seasonal shifts between irrigated and rainfed cultivation. The Cauvery irrigates about 51.7% of the district's total irrigated area, underscoring its central role in sustaining agricultural productivity in the Cauvery belt blocks *(Agriculture and Farmers Welfare Department, Tiruchirappalli)*.

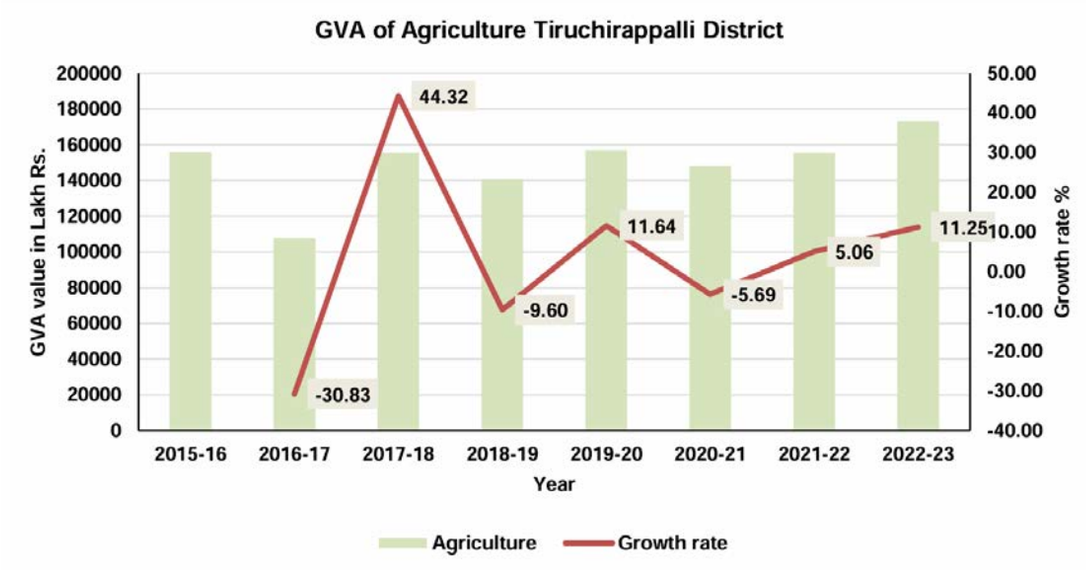



*Figure 8.19 GVA of Agriculture sector in Tiruchirappalli district*

*Source: Directorate of Economics & Statistics, Go TN*

The agriculture sector in Tiruchirappalli district exhibits significant year-to-year fluctuations during the period 2015–16 to 2022–23, reflecting its sensitivity to climatic variability and irrigation dependency. After a sharp decline in 2016–17 (-30.83%), the sector recorded a strong recovery in 2017–18, registering a high growth of 44.32%. This was followed by moderate growth in 2019–20 (11.64%) and subsequent contraction during 2020–21 (-5.69%), largely due to adverse climatic conditions and pandemic-related disruptions.

*Table 8.6 Crop details in Tiruchirappalli district*

| Type of Crop | Crop details |
|---|---|
| Food crop | Paddy, Cholam (Sorghum), Cumbu (Pearl millet), Ragi (Finger millet), Maize, Samai, Varagu, Thinai, Kuthiraivali, Other Millets, Red Gram, Black Gram, Green Gram, Bengal Gram, Horse Gram, Cowpea, Other Pulses |
| Cash crop | Cotton, Sugarcane, Groundnut, Gingelly (Sesame), Castor, Sunflower, Soyabean |
| Horticulture crop | Plantation crops (e.g., coconut, banana, arecanut, etc.), Fruits, Vegetables, Flowers, Spices, Medicinal plants |

*Source: Directorate of Agriculture, Go TN and DTCP, District and Block Statistical handbooks*

#### 8.3.1.1.1 Impact of Land Utilization on Agricultural Intensity

The agricultural structure of Tiruchirappalli's LPA (excluding Corporation area) reflects a spatially differentiated rural economy shaped by irrigation access, land availability and urban influence.

Lalgudi forms the agrarian core, with 74.25% of its area under cultivation, a high per-capita net sown area (1.75 ha/person) and substantial agricultural labour dependence (37.91%) supporting a relatively stable, irrigation-led farming economy. Manikandam shows agrarian potential with the highest per-capita net sown area (2.15 ha/person), although cultivation covers only about 19% of its area, indicating rising land conversion pressures. Manachanallur, despite 39.69% agricultural land, faces acute stress due to severe land scarcity (0.09 ha/person) and heavy reliance on agricultural labour (52.93%), pointing to a fragmented and vulnerable agrarian base. In contrast, Thiruverumbur, with just 24.84% land under agriculture, low per-capita net sown area (0.71 ha/person) and minimal agricultural labour dependence (4.27%), reflects a decisive shift towards non-farm economic activities. Andanallur occupies an intermediate position, with 26.71% cultivated area and growing land-use volatility *(Block Statistical Handbook, Tiruchirappalli, 2023-24)*.

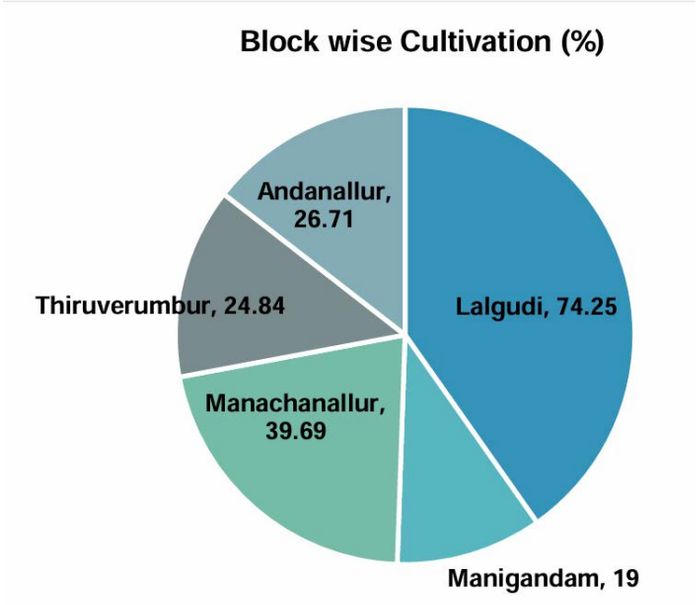



*Figure 8.20 Block wise Cultivation (%)*

*Source: Based on Block Statistical Handbook, Tiruchirappalli, 2023-24; 'G' Return, 2018-19 to 2023-24)*

*Table 8.7 Block-wise Agrarian Structure*

| Block | Cultivation (%) | Land per Capita (ha/person) | Agri Labor (%) | Agrarian Character |
|---|---|---|---|---|
| Lalgudi | 74.25 | 1.75 | 37.91 | Irrigated agrarian core |
| Manikandam | 19.00 | 2.15 | – | Agrarian potential with strong land-conversion pressure |
| Manachanallur | 39.69 | 0.09 | 52.93 | High population-to-farmland ratio, stressed agrarian base |
| Thiruverumbur | 24.84 | 0.71 | 4.27 | Decisive non-farm shift |
| Andanallur | 26.71 | – | – | Intermediate zone with rising land-use volatility |

*Source: Based on Block Statistical Handbook, Tiruchirappalli, 2023-24; 'G' Return, 2018-19 to 2023-24)*

Between 2018-19 and 2023-24, land-use trends in Tiruchirappalli indicate rising pressure on the district's agrarian economy despite an unchanged geographical area. District-wide, the expansion of non-agricultural land and the increase in current fallow lands reflect weakening cultivation resilience. Within the LPA, excluding the Tiruchirappalli Corporation area (about 19% of the LPA), agriculture remains dominant but uneven. Lalgudi (8,701.50 ha) and Manachanallur (11,861.63 ha) form the stable agricultural core with high net sown area and assured irrigation, while Thiruverumbur, with only 2,158.57 ha net sown area and 17,085.87 ha under non-agricultural uses, shows strong peri-urban transition ('G' Return, 2018-19 to 2023-24). Manikandam and Andanallur lie in between, with moderate cultivation but rising fallows. The LPA reflects a dual agricultural economy; an irrigated core sustaining output and transitional blocks where land-use change is weakening agriculture's economic role.

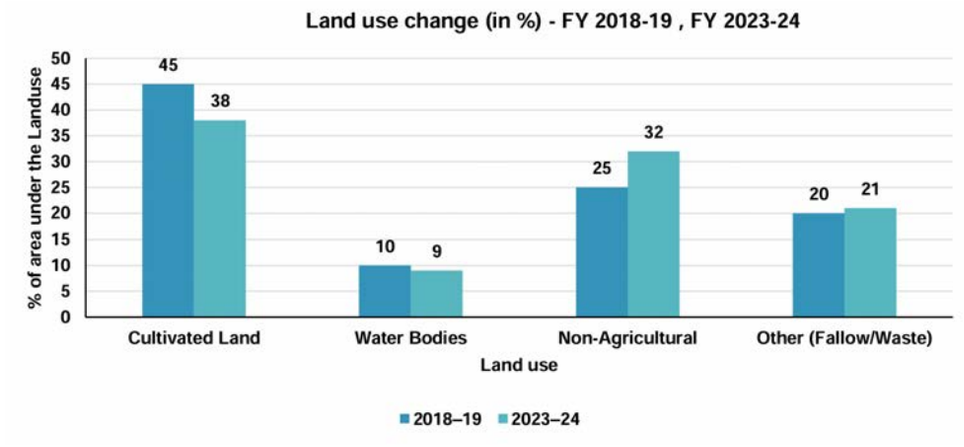



Figure 8.*21 Land use change in Tiruchirappalli district*

*Source: Based on Block Statistical Handbook, Tiruchirappalli, 2023-24; 'G' Return, 2018-19 to 2023-24)*

*Table 8.8 District-level Land-Use Change (2018–19 to 2023–24)*

| Land Use Category | 2018–19 (%) | 2023–24 (%) | Net Change |
|---|---|---|---|
| Cultivated Land | 45 | 38 | –7% |
| Water Bodies | 10 | 9 | –1% |
| Non-Agricultural | 25 | 32 | +7% |
| Other (Fallow/Waste) | 20 | 21 | +1% |

*Source: Based on Block Statistical Handbook, Tiruchirappalli, 2023-24; 'G' Return, 2018-19 to 2023-24)*

#### 8.3.1.1.2 Soil and Agro climatic characteristics in Tiruchirappalli

This subsection provides a brief synthesis of soil characteristics relevant to agriculture, drawing from the physical features chapter, to explain their implications for crop suitability, irrigation dependence and agricultural productivity within the LPA.

Soil characteristics within the Tiruchirappalli district provide the structural base for its agricultural economy, strongly shaping cropping choices, irrigation intensity and productivity across the LPA. Positioned between the Cauvery Delta and the Southern Plateau, the district exhibits a transition from fertile alluvial soils along riverine corridors to weathered hard-rock, derived soils in upland zones, a pattern further modified by long-standing agricultural practices. This soil diversity underpins varied farming systems across blocks, influencing water requirements, crop suitability and the overall resilience and performance of Tiruchirappalli's agrarian landscape. As shown in the physical features chapter, the soil profile of LPA forms a key foundation of the district's agricultural economy, excluding the urbanized Corporation area.

Andhanallur's sandy clay loam soils with Cauvery irrigation support stable and diversified cultivation, while Manikandam's mixed loams enable both irrigated and semi-dry farming. Thiruverumbur's clay loam soils favour paddy but increase dependence on assured irrigation, making incomes water-sensitive. Lalgudi's fertile alluvial soils sustain intensive, market-linked multiple cropping despite localized waterlogging risks. Mannachanallur's sandy loam soils suit less water-intensive and horticultural crops, reducing irrigation reliance but requiring careful nutrient management *(Soil Map of CLPA, Tiruchirappalli District)*.

*Table 8.9 Block level agricultural Characteristics*

| Block | Dominant Soil Type | Agricultural Characteristics & Implications |
|---|---|---|
| Andhanallur | Sandy clay loam | Supports stable and diversified cultivation under Cauvery irrigation, enabling multiple cropping patterns. |
| Manikandam | Mixed loams | Enables both irrigated and semi-dry farming, offering flexibility in crop selection and water use. |
| Thiruverumbur | Clay loam | Favourable for paddy cultivation but highly dependent on assured irrigation, making farm incomes water-sensitive. |
| Lalgudi | Fertile alluvial soils | Supports intensive and market-linked multiple cropping, though localized waterlogging risks persist. |
| Manachanallur | Sandy loam | Suitable for less water-intensive and horticultural crops, reducing irrigation dependence but requiring careful nutrient management. |

*Source: Soil Map of CLPA, Tiruchirappalli District*

Together, these soil-based variations drive differentiated farming systems, productivity and income stability across Tiruchirappalli's agrarian landscape. As per climate data (physical features chapter), it has been observed that the climatic trends have become a critical stress multiplier for agriculture within the LPA. Over the past three decades, average temperatures have risen by about 0.2°C, accompanied by an increase in hot days, hot nights and heatwave events, intensifying evapotranspiration and irrigation demand. Rainfall, though averaging about 976 mm annually, shows high inter-annual variability and strong dependence on the short north-east monsoon season, making both irrigated and rainfed agriculture highly sensitive to monsoon failure or excess rainfall *(Indian Meteorological Department)*. The combined land, soil and climate dynamics explain the recent volatility in net area sown, multiple cropping and expansion of fallow lands.

#### 8.3.1.1.3 Water Supply and Irrigation Coverage

Irrigation is the principal driver of agricultural performance in the LPA. In 2023-24, the LPA recorded a cropping intensity of about 138%, excluding the Corporation area. *(Fasli 1433 "G" Return)*. This indicates that agricultural growth in the LPA is largely intensification-led, enabling multiple cropping cycles and higher land productivity rather than expansion of cultivated area. Irrigation in LPA underpins the district's agricultural economy, with surface

water canal systems accounting for about 60-65% of the net irrigated area and forming the backbone of cultivation in Thiruverumbur and Andhanallur, where canal dependence exceeds 70-90%. This supports paddy-based, relatively stable production and sustains rural incomes in normal water years, but also exposes a large share of the agrarian economy to hydrological risk due to dependence on Cauvery flows and canal releases. Tank irrigation contributes less than 5%, limiting its role as a drought buffer. Groundwater irrigation constitutes roughly 35-40% of net irrigated area and dominates Manikandam and Mannachanallur (over 80%), enabling crop diversification and higher-value production but increasing energy costs and risks of groundwater depletion. The widespread use of pump-set irrigation, especially in groundwater-dependent blocks like Lalgudi, reflects intensification that raises short-term output and incomes while heightening exposure to power supply and input cost volatility *(Fasli 1433 "G" Return)*.

*Table 8.10 Block-wise Irrigation Sources – Tiruchirappalli LPA (2023–24)*

| Block | Surface Water -Tanks | Flow Irrigation Canals | Private Tube Wells | Public Tube Wells | Dug Wells | Pump Sets | Total Net Irrigated Area (ha) |
|---|---|---|---|---|---|---|---|
| Manikandam | 415 | 132 | 2,071.4 | — | 1,304.0 | — | 3,973.50 |
| Thiruverumbur | — | 8,011 | — | — | 24.14 | — | 8,035.14 |
| Andanallur | — | 2,582 | 20 | 3,628 | — | — | 2,638.29 |
| Manachanallur | 171 | — | 54.56 | — | 489.05 | 3,659.1 | 4,867.79 |
| Lalgudi | — | 4,777.79 | 301.58 | — | 177.10 | 3,178.6 | 11,135.1 |

*Source: Based on Fasli 1433 "G" Return*

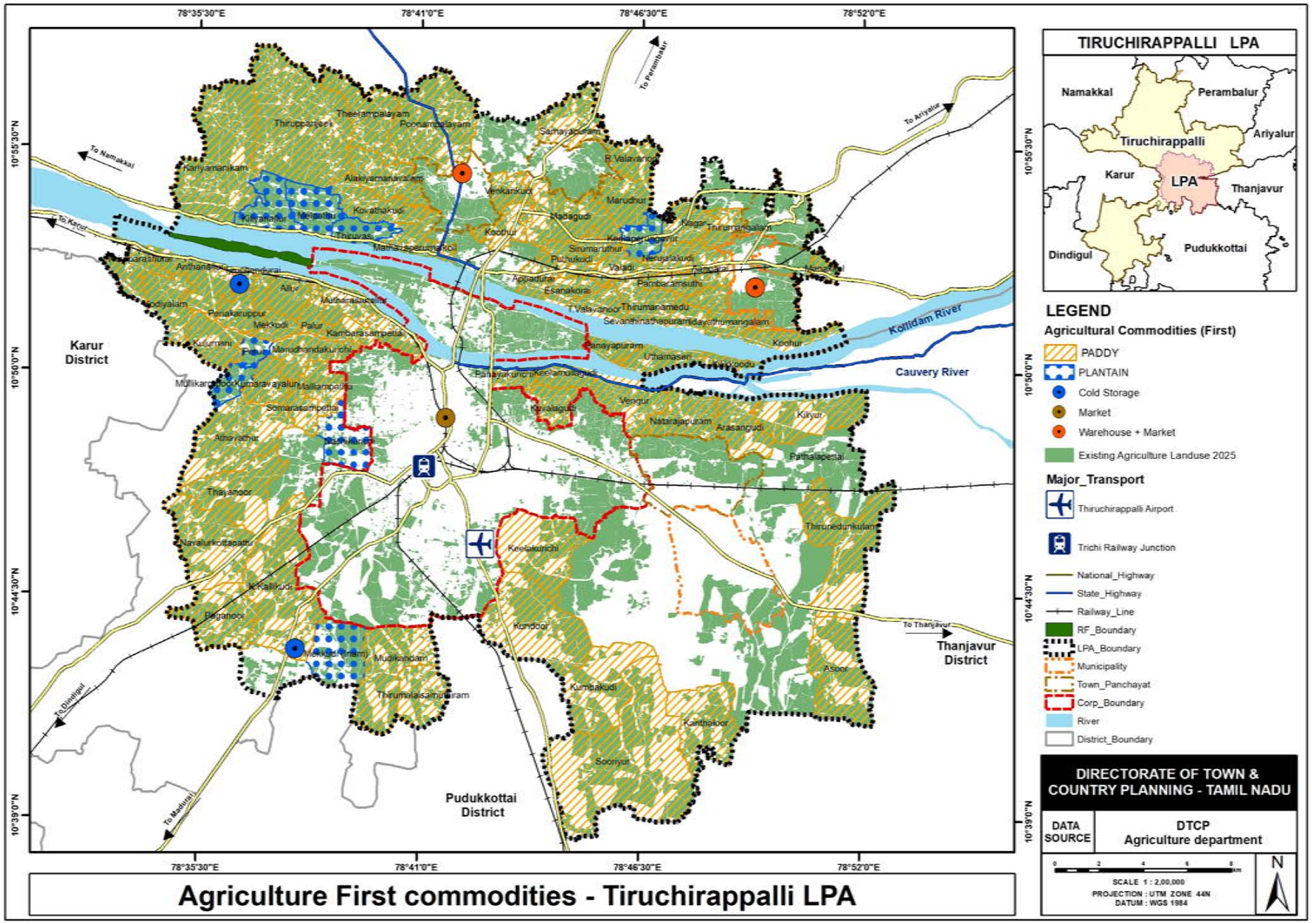
Based on the analysis of *G-Return 2024-25*, the %age-wise distribution of irrigated area by crop across the LPA (excluding the Corporation area) highlights a clear irrigation-income linkage shaping the district's agricultural economy. Paddy and high-yield millets record nearly 100% irrigated coverage across all blocks, reaffirming their role as water-dependent food security crops that ensure yield stability but concentrate water use in a narrow crop base.

Blocks with higher irrigation intensity, notably Manikandam and Andanallur show 70-90% irrigated coverage for vegetables, cotton, fruits and other non-food crops, indicating that assured irrigation here supports diversification, higher value per hectare, stronger market integration and faster income

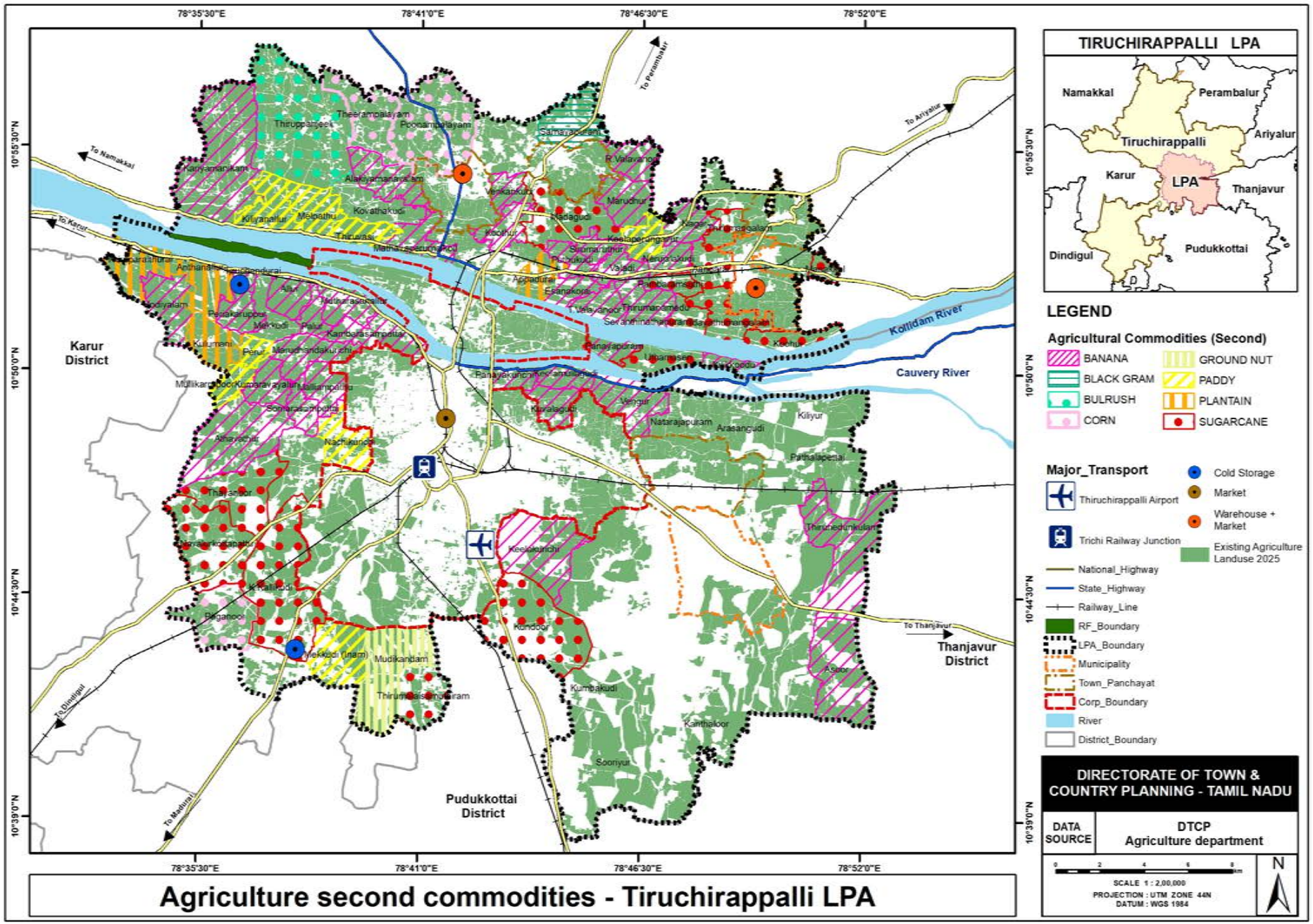
growth. Mannachanallur also displays 70-85% irrigation coverage for cotton, vegetables and flowers, positioning it as a semi-commercial agrarian zone, albeit with rising dependence on groundwater. In contrast, Thiruverumbur and Lalgudi exhibit lower irrigated shares for high-value crops (generally below 60%) and remain anchored to canal-fed paddy and sugarcane systems, resulting in lower diversification and slower income expansion, though with relatively stable outputs in normal water years. The irrigation pattern within the LPA emphasizes the need for crop-specific irrigation planning, promotion of less water-intensive high-value crops and stronger groundwater governance to sustain long-term agricultural productivity and resilience in Tiruchirappalli.

#### 8.3.1.1.4 Crop Coverage

Tiruchirappalli District's crop coverage grew moderately by 3.18%, reflecting seasonal stability with sectoral variations. Paddy, the main staple, rose 4.79%, ensuring food security and production stability. Millets expanded 6.13%, driven by Cholam, Cumbu and Maize, indicating a shift toward climate-resilient cereals. Pulses led growth at 11.06%, supported by Cowpea and Horse Gram, promoting income stability and low-input farming. Conversely, plantation crops fell 19.07%, mainly due to reduced Cotton, while oilseeds declined 8.81%, partially offset by minor gains in Castor and Sunflower *(Tiruchirappalli District Area Coverage Report 2025-26, ARS, 05.01.2026)*. The district's agricultural economy shows resilience in staples and pulses, emerging opportunities in millets and vulnerabilities in commercial and oilseed crops, highlighting the need for targeted interventions.




*Map 8.1 Agriculture Commodities (First) in Tiruchirappalli LPA*




*Map 8.2 Agriculture Commodities (Second) in Tiruchirappalli LPA*

*Figure 8.22 National Research Centre for Banana*

*Source: ICAR NRCB*

The western and south-western parts of the LPA exhibit significant cultivation of plantain, banana and coconut, reflecting a shift towards commercial and market-oriented agriculture. These areas benefit from better road connectivity and proximity to urban markets, enabling higher value realisation and quicker supply chain integration. As a high-value cash crop, banana offers higher returns and shorter crop cycles than paddy, making it well suited to fragmented landholdings and rising input costs. The overlap of banana belts with peri-urban areas strengthens employment generation and allied activities such as transport, ripening, wholesale trade and packaging, positioning banana as a critical link between agriculture and the urban service economy. This ecosystem is further reinforced by the presence of the ICAR-National Research Centre for Banana (NRCB), Tiruchirappalli, which enables technology transfer, varietal development and value-chain integration, enhancing the crop's strategic role in agro-based economic development within the LPA.

Horticultural crops in these zones are more labour-intensive, contributing to higher rural employment absorption and acting as a stabilising factor amid the declining share of agriculture in overall workforce participation. Pockets of sugarcane and tapioca cultivation, particularly along the Thuraiyur-Manapparai and southern LPA corridors, indicate cropping decisions driven by price incentives and agro-processing linkages rather than ecological suitability alone. While these crops support downstream processing industries, their high-

water demand raises concerns regarding long-term sustainability, especially in the context of competing urban and industrial water requirements.

Peripheral and rain-fed areas of the LPA show cultivation of pulses, maize, flowers and mixed crops, reflecting adaptive strategies under conditions of limited irrigation and smaller landholdings. These zones demonstrate potential for low-water, climate-resilient crop diversification and resource conservation objectives. Taken together, the commodity patterns reveal a three-tier agricultural structure within the LPA:

- A riverine paddy core ensuring food security
- A peri-urban horticulture belt integrated with markets and employment and
- Peripheral commercial and mixed-crop zones with varying resource intensities.

This spatial structure has direct implications for land-use regulation, agro-based industrial development, water resource management and climate resilience planning. Future strategies for the Tiruchirappalli LPA must therefore move beyond treating agriculture as a residual land use and instead integrate it as a key component of the regional economic and spatial development framework, balancing food security, farmer livelihoods and sustainable urban expansion.

#### 8.3.1.1.5 Markets and Post-Harvest Infrastructure

The regulated markets within the Tiruchirappalli LPA play a central role in integrating agricultural production with the district's trading and consumption systems by facilitating crop aggregation, price discovery and primary marketing. As per *Agricultural Sales and Agribusiness Department, Tirichirapalli Sales Committee, 2024-25*, the three regulated markets at Manikandam, Mannachanallur and Lalgudi together handled approximately 26,062 MT of agricultural produce and generated nearly Rs.173 lakh in receipts, indicating their significance in sustaining the local agrarian economy. Manikandam emerged as the principal market, contributing about 60% of total receipts (Rs.102.94 lakh), supported by its diversified commodity portfolio including paddy, pulses, oilseeds, spices, coconut, banana and maize, which enables higher-value transactions and attracts traders from a wider hinterland. Mannachanallur recorded the highest arrivals (9,937.7 MT), reflecting its role as a bulk-handling centre for cereals, oilseeds and jaggery, though its relatively low receipts (Rs.46.17 lakh) indicate lower average unit values. Lalgudi, with 6,629.5 MT of arrivals and Rs.23.59 lakh in receipts, functions mainly as a secondary aggregation node serving surrounding rural areas. The consistently low levels of godown stock across markets, particularly the absence of storage at Manikandam, point to a rapid turnover, spot-trading-oriented system with limited holding capacity. While this ensures quick cash flow for farmers and

traders, it also restricts the ability of markets to undertake price stabilisation, temporal arbitrage and distress-sale mitigation. Strengthening these regulated markets through expanded warehousing, grading, sorting, cold-chain linkages and digital trading platforms could enhance farm-gate price realisation, reduce post-harvest losses and improve the overall resilience of Tiruchirappalli's agricultural marketing system.

Post-harvest infrastructure in the LPA remains constrained relative to production levels. Warehousing is limited to two facilities with a combined capacity of 2,875 MT, of which only about 1,551 MT was utilised during the year. While warehouses in Mannachanallur and Lalgudi provide some buffering for paddy and maize, their limited scale restricts farmers' ability to store produce, access credit against stocks or optimize market timing. Cold storage infrastructure is similarly concentrated, with two facilities totalling 3,000 MT capacity but handling over 8,000 MT of fruit arrivals, indicating high turnover and strong demand *(Agricultural Sales and Agribusiness Department, Tirichirapalli Sales Committee, 2024-25)*. While the existing market and post-harvest facilities support basic agricultural trade within the Tiruchirappalli LPA, their limited capacity and spatial concentration constrain value addition, price realisation and supply-chain efficiency, highlighting the need for strengthened market-linked infrastructure to support the LPA's agrarian economy.

#### 8.3.1.2 Horticulture and Other Plantation

Block-wise horticultural trends within the LPA from 2020-21 to 2024-25 (excluding the Corporation area) show gradual, stable growth driven by consolidation rather than rapid expansion. Andhanallur and Lalgudi hold the largest shares, reflecting their established agrarian base, while Manikandam and Mannachanallur expand moderately through diversification into vegetables, flowers and plantation crops under groundwater irrigation. Thiruverumbur records lower and more variable growth due to peri-urban pressures. Fruit crops dominate across blocks, providing income stability, while plantation crops show gradual expansion as low-risk perennial investments. Vegetable cultivation fluctuates with market and water conditions but remains a key income source, particularly in Manikandam and Mannachanallur. Smaller segments such as flowers, spices and medicinal crops are slowly expanding, signaling early-stage diversification *(Tiruchirappalli Horticulture 5-year District crop-wise detailed book)*. The horticultural development within LPA is risk-aware and productivity-oriented, emphasizing yield improvement, water efficiency and value-chain support amid constrained land availability.

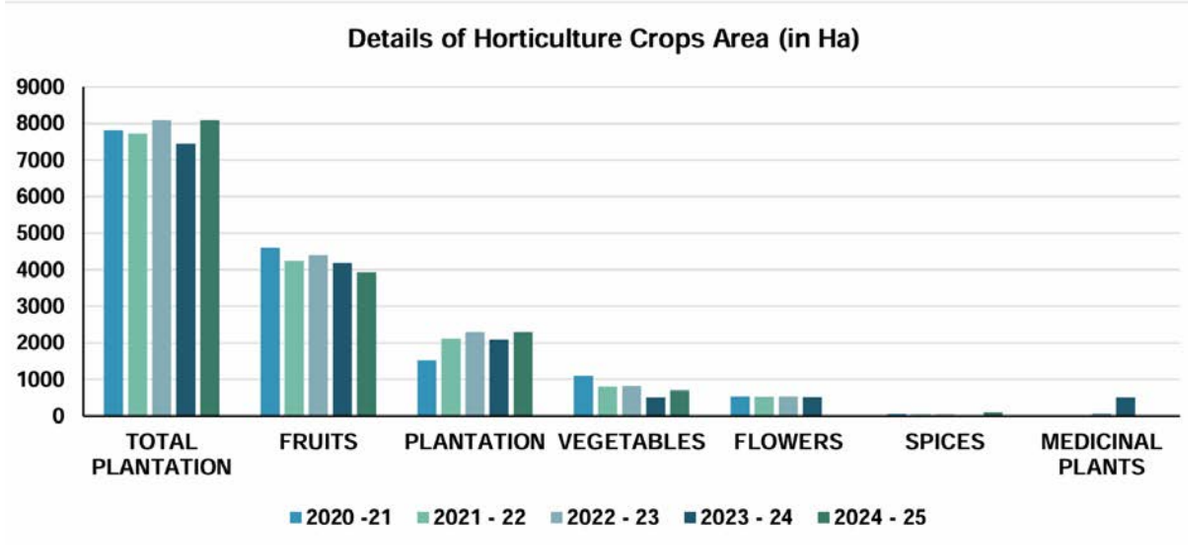



*Figure 8.23 Details of Horticulture crops Area (in Ha)*

*Source: G returns, Agriculture Department*

#### 8.3.1.3 Sericulture

Although sericulture is limited in spatial extent, the sector generates high economic returns relative to land area, making it an important source of supplementary income for farming households. Sericulture is inherently labour-intensive, supporting rural employment through activities such as mulberry cultivation and cocoon rearing and enables income diversification beyond conventional field crops. Its integration within irrigated and semi-irrigated farming systems contributes to greater resilience of the local agrarian economy and strengthens value addition within the primary sector.

*Table 8.11 Area under Sericulture*

| Indicator | Manachanallur | Lalgudi | Thiruverumbur | Total |
|---|---|---|---|---|
| Area under Mulberry (Acres) | 68.05 | 22.00 | 8.50 | 98.55 |
| Number of Farmers | 32 | 10 | 4 | 46 |
| Cocoon Production (kg) | 13,610 | 4,400 | 1,700 | 19,710 |
| Total Value (Rs.) | 68,05,000 | 22,00,000 | 8,50,000 | 98,55,000 |

*Source: Asst. Director, Department of Sericulture, Tiruchirappalli*

Within the LPA, mulberry cultivation is located in three blocks. It is predominantly concentrated in Manachanallur, which accounts for the largest share of cultivated area, cocoon production and economic value, supported by favourable agro-climatic conditions, irrigation availability and

higher farmer participation. Lalgudi follows as a secondary centre, where sericulture complements irrigated agriculture within the Cauvery belt. In contrast, Thiruverumbur exhibits only marginal sericulture activity, reflecting its predominantly urban-industrial land-use character and limited agricultural base *(Asst. Director, Department of Sericulture, Tiruchirappalli)*. Overall, sericulture in the LPA demonstrates strong potential for income augmentation and livelihood security for small and marginal farmers, reinforcing agricultural resilience and rural employment generation.

#### 8.3.1.4 Livestock, Animal Husbandry and Diary Production

Livestock, poultry and dairy activities together constitute a vital component of the economy of Local Planning Area (LPA), contributing significantly to rural livelihoods, income diversification and nutritional security. These activities complement crop agriculture, particularly in rainfed and semi-arid areas of the LPA, where exclusive dependence on cropping is increasingly vulnerable to climatic variability.

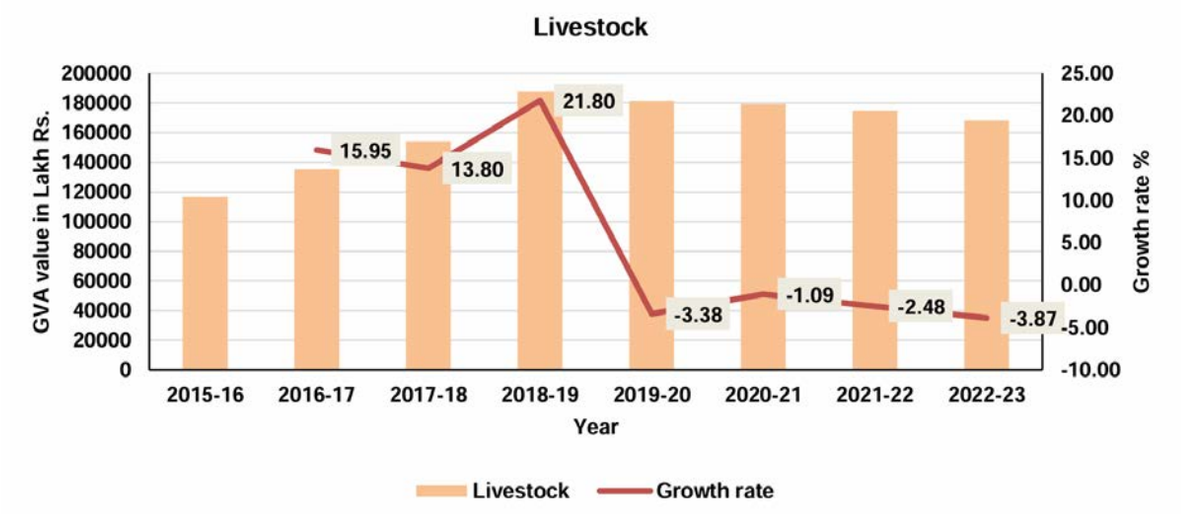



*Figure 8.24 GVA of Livestock sector - Tiruchirappalli District*

*Source: Department of Economics and Statistics, Government of Tamil Nadu*

Between 2015-16 to 2022-23, livestock-based activities emerged as the most resilient sub-sector within the district and the GDVA saw a strong increase of 44%. At the state level, livestock GSVA expanded even more rapidly with a growth of 72.9% *(Department of Economics and Statistics, Government of Tamil Nadu)*. While the district follows the same upward structural trend, its relatively lower growth rate suggests untapped potential for scaling livestock-based value chains. Livestock distribution varies across blocks, closely linked to land-use patterns and urbanisation. Lalgudi, Manachanallur and Thiruverumbur record the highest livestock populations, reflecting their rural and peri-urban character, while Andhanallur and Manikandam also show significant dependence on

livestock-based livelihoods. In contrast, the Tiruchirappalli Corporation area records a lower livestock population, shaped by urban land constraints. Poultry farming emerged as an important allied activity, with higher concentrations in Thiruverumbur andhanallur and Manikandam, indicating the presence of commercial and semi-commercial units. Lower poultry numbers in Lalgudi and Manachanallur reflect the continued dominance of crop-livestock systems, while the Corporation area highlights the shift towards space-efficient, market-oriented poultry activities in urban and peri-urban settings *(Animal Husbandry Department, Tiruchirappalli)*.

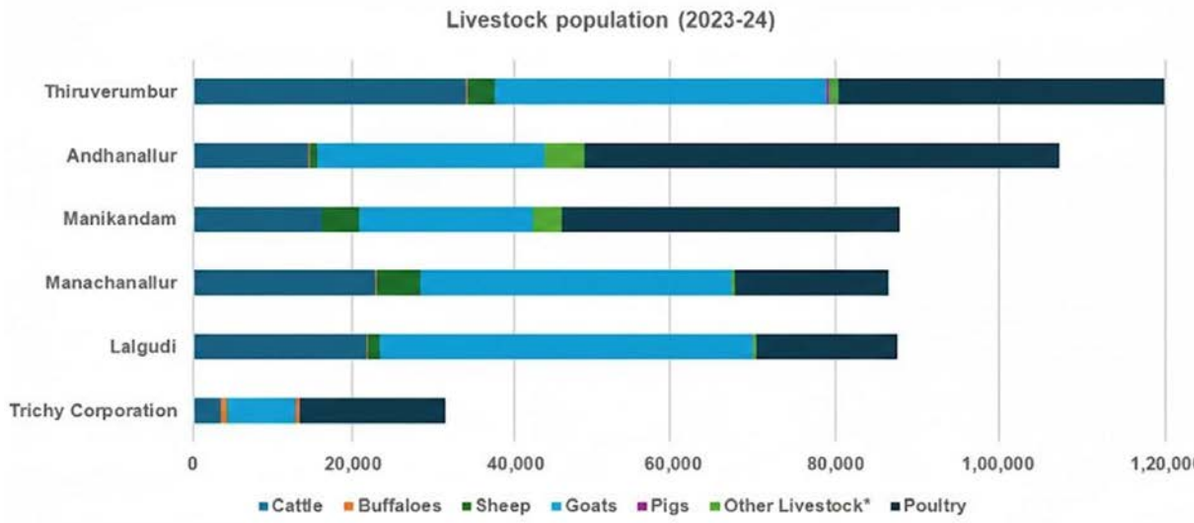



***Figure 8.25 Livestock population** (2023-24)*

*Source: Animal Husbandry Department, Tiruchirappalli*

*(Note: Other Livestock* - Domestic dogs, horses & ponies, mules, donkeys and camels)*

The dairy development pattern within the LPA (excluding the Tiruchirappalli Corporation area) is entirely cooperative-driven, with no government or private dairies or milk chilling plants reported, underscoring the critical role of milk cooperative societies in the local dairy economy. Milk production is unevenly distributed across blocks, with Lalgudi emerging as the dominant contributor, reflecting its strong agrarian base and higher livestock concentration within the Cauvery belt. Manachanallur and Manikandam show moderate and stable production, while Andhanallur and Thiruverumbur record relatively lower outputs, consistent with their mixed and peri-urban land-use characteristics. Across all blocks, milk procurement declines during the lean season compared to the flush season, highlighting the sector's vulnerability to fodder availability, water stress and seasonal climatic variations *(Deputy Registrar, Dairy development Tiruchirappalli)*.

*Table 8.12 Diary Development (2023-24)*

| Block | No. of Milk Cooperative Societies | Daily Avg. Production – Flush Season (Litres) | Daily Avg. Production – Lean Season (Litres) |
|---|---|---|---|
| Thiruverumbur | 6 | 1,207 | 791 |
| Andanallur | 10 | 5,250 | 4,663 |
| Manikandam | 18 | 4,701 | 4,321 |
| Lalgudi | 25 | 31,568 | 1,104.80 |

Source: Deputy Registrar, Dairy development Tiruchirappalli

The LPA's dairy sector remains dependent on cooperative systems and concentrated in agriculturally intensive areas, indicating the need for improved fodder management and supportive infrastructure to enhance production stability.

### 8.3.1.5 Fisheries

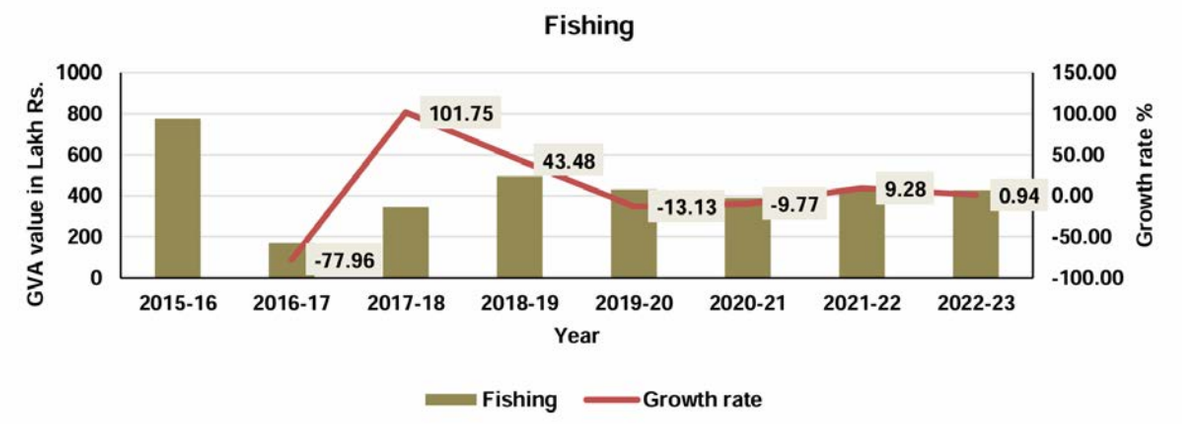



*Figure 8.26 GVA of Fishing sector in Tiruchirappalli District*

*Source: Department of Economics and Statistics, Government of Tamil Nadu*

Although Tamil Nadu's fishing GSVA increased from Rs.5,09,124 lakh to Rs.5,97,386 lakh (17.3% increase), the fisheries GDVA in Tiruchirappalli declined significantly from Rs.776 lakh to Rs.428 lakh, recording a reduction of 44.8% over the period of 2015-16 to 2022-23 *(Department of Economics and Statistics, Government of Tamil Nadu)*. This widening divergence underscores Tiruchirappalli's structural disadvantage as an inland, non-coastal district, where fisheries play only a marginal economic role. The Cauvery River, Colleroon River stretch and associated tanks together account for a total inland fish production of 874.3 tonnes worth 961.7 lakhs. The total spread area for inland fresh water production is 3940.09 hectares and no marine fish catch is

reported, indicating the district's complete dependence on inland fisheries. This sector provides employment to 1,319 fishermen, reflecting its significance as a source of livelihood for a considerable section of the rural population *(District Fisheries Department, Tiruchirappalli)*.

*Table 8.13 Fisheries Production within LPA*

| Block | Production (Tonnes) | Share of Total (%) | Value (Rs. Lakhs) |
|---|---|---|---|
| Thiruverumbur | 400.24 | 77% | 440.26 |
| Manikandam | 35.00 | 7% | 38.50 |
| Lalgudi | 60.90 | 12% | 66.99 |
| Manachanallur | 25.16 | 5% | 27.68 |
| Total | 521.30 | 100% | 573.43 |

*Source: District Fisheries Department, Tiruchirappalli*

Within the LPA, fisheries activity is unevenly distributed and strongly concentrated in a few blocks. Thiruverumbur emerges as the dominant contributor, with a production of 400.24 tonnes valued at Rs.440.26 lakh, reflecting the presence of productive inland water bodies, effective utilisation of tanks and river stretches and strong participation of fishing communities. Lalgudi follows with a moderate output of 60.9 tonnes worth Rs.66.99 lakh, where fisheries play a supplementary role in the local economy. Manikandam and Manachanallur record relatively lower production of 35.0 tonnes and 25.16 tonnes respectively, yet fisheries remain important as secondary livelihood sources and for local food supply. Andanallur reports no fisheries production, indicating limited or underutilised inland water resources *(District Fisheries Department, Tiruchirappalli)*.

#### 8.3.1.6 Mining and Quarrying

The quarrying sector is a key component of the LPA's primary economy, supporting construction and industrial mineral supply, but with notable structural and spatial imbalances. Between 2015-16 and 2022-23, Tamil Nadu's mining and quarrying GSVA grew by about 50%, while Tiruchirappalli recorded a much sharper increase of nearly 112%, indicating a disproportionately faster expansion of extractive activity within the LPA compared to the State average (*Department of Economics and Statistics, Government of Tamil Nadu)*.

*Figure 8.27 Mining and Quarrying*

*Source: District Fisheries Department, Tiruchirappalli*

The LPA contains 95 quarries (marked as zones in land use chapter) covering 354.78 ha, of which 40 existing quarries occupy 42% of quarry numbers but 77% of total quarry area, indicating that economic output and land impact are concentrated in a limited number of large, active operations. In contrast, expired quarries constitute about 48% of quarries but only 21% of area, reflecting high churn among small-scale operations with limited long-term economic contribution, while abandoned quarries are minimal (9 quarries, 1.8% of area). The extractive economy is structurally dominated by limestone, which represents 22% of quarries but over 63% of total extraction area, with an average lease size of 10.67 ha, making limestone quarries six to seven times larger than other mineral operations. In contrast, rough stone and gravel account for 55% of quarries but only about 25% of area, with average sizes of 1.5 ha to 3 ha, resulting in high spatial dispersion, frequent truck movements and associated dust and traffic impacts *(Department of Geology & Mining)*.

Spatially, Lalgudi functions as the extractive epicenter, hosting 52% of quarries and 81% of total quarry area, driven by large limestone leases, making any environmental or groundwater impacts here economically significant at a regional scale. Other LPA areas, including Srirangam, Thiruverumbur and Tiruchirappalli West, contain numerous small quarries that impose localised impacts without large-scale land conversion. In terms of land tenure, patta lands account for 37% of quarry area across 65 quarries, while poramboke lands host 28 quarries but only 16% of area and a single mixed patta-poramboke quarry accounts for 47% of total quarry area, highlighting the dominance of one large industrial lease. The prevalence of short-term leases (≤5 years) covering 54 quarries and 27% of area, incentivises rapid extraction with limited restoration, leading to clusters of expired and abandoned quarries. *(Department of Geology & Mining)*. From an economic planning perspective,

these sites represent a major opportunity for post-mining land recovery, including rehabilitation, water retention and green buffer uses, to improve the long-term sustainability and efficiency of the Tiruchirappalli LPA economy.

*Figure 8.28 Quarry in Tiruchirappalli district*

*Source: District Mineral Foundation Trust, Tiruchirappalli*

### 8.3.2 Secondary sector

Tiruchirappalli has emerged as a prominent energy and engineering manufacturing centre in Tamil Nadu. The growth of industrial activity in the district was significantly accelerated with the establishment of Bharat Heavy Electricals Limited (BHEL) in 1964, a Maharatna Central Public Sector Enterprise and one of the country's largest engineering manufacturing units. The presence of BHEL led to the development of a strong industrial ecosystem, with numerous private manufacturing units and MSMEs functioning as ancillary and vendor industries in its vicinity. In addition to BHEL, major public sector undertakings such as the Golden Rock Railway Workshop, Ordnance Factory Tiruchirappalli (OFT) and the Heavy Alloy Penetrator Project (HAPP) further strengthened the district's industrial base. However, industrial development within the district remains spatially uneven. Out of the 14 blocks in Tiruchirappalli district, concentration of industrial activity is in three blocks namely Andhanallur, Manikandam and Thiruverambur. These blocks, located in the suburban areas of Tiruchirappalli city and in close proximity to BHEL, have become the primary industrial growth centres of the district.

*Figure 8.29 BHEL, Tiruchirappalli*

*Source: BHEL website*

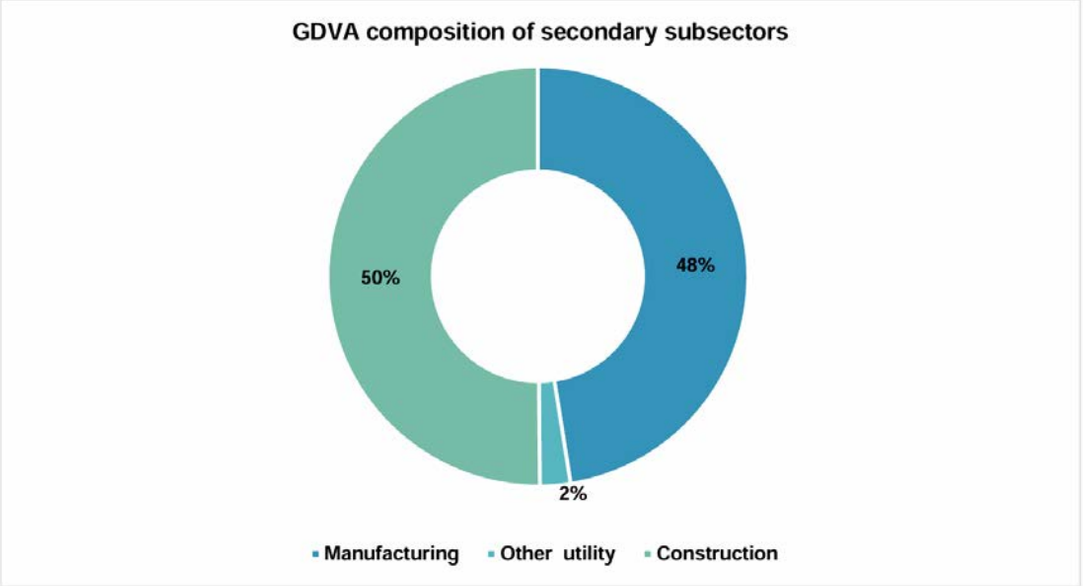



*Figure 8.30 GVA of Secondary subsectors in Tiruchirappalli District*

*Source: Department of economics and statistics, FY 2022 - 23*

The graph above illustrates the Gross District Value Added (GVA) composition of the secondary sector for the year 2022–23, highlighting the relative contribution of its key sub sectors Manufacturing, Construction and Electricity, Gas, Water Supply & other utility services to the overall secondary sector economy. Construction emerges as the dominant sub-sector, contributing 50% of the secondary sector GVA, closely followed by Manufacturing at 48%, indicating a strong industrial and infrastructure-driven economy. In contrast, Electricity, Gas, Water Supply and other utility services account for a marginal share of 2%, reflecting their supportive but limited direct contribution to GVA. Overall, the composition shows a balanced dominance of manufacturing and construction activities within the secondary sector.

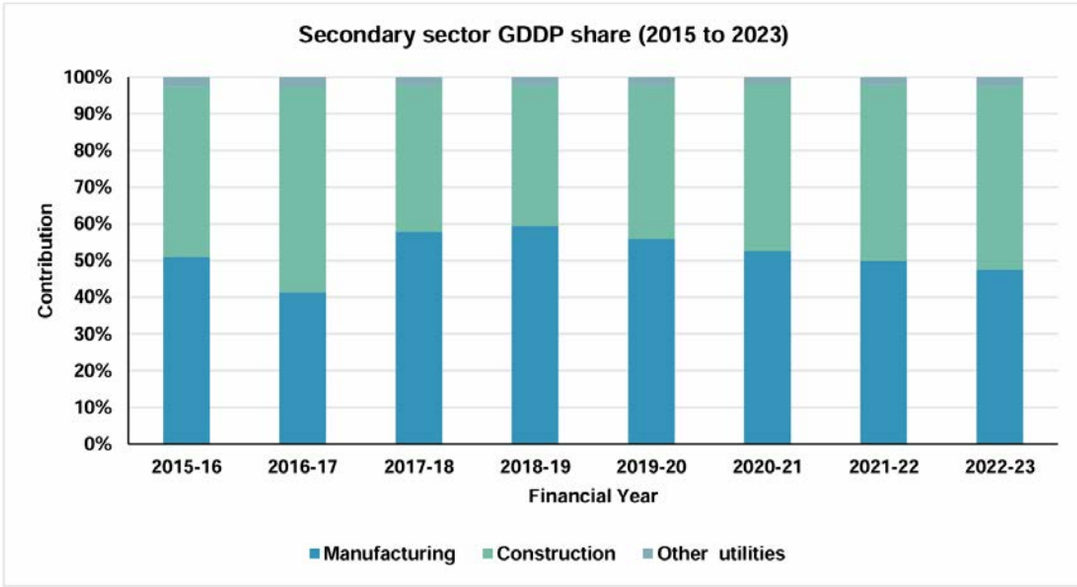



*Figure 8.31 Secondary sector GDDP share - Tiruchirappalli district*

*Source: Department of economics and statistics*

The secondary sector GDDP composition of Tiruchirappalli district from 2015–16 to 2022–23 is primarily dominated by manufacturing and construction activities, with manufacturing consistently accounting for the larger share. Manufacturing contribution shows moderate fluctuations, declining in 2016–17, peaking during 2017–18 and 2018–19 and gradually moderating thereafter. Construction maintains a relatively stable contribution throughout the period, indicating sustained infrastructure and real estate activity. The share of electricity, gas, water supply and other utility services remains marginal, reflecting their limited direct contribution to the secondary sector output. Overall, the trend highlights the steady but moderate industrial growth of the district, with manufacturing continuing as the principal driver.

### 8.3.2.1 Manufacturing and Industrial profile of Tiruchirappalli LPA

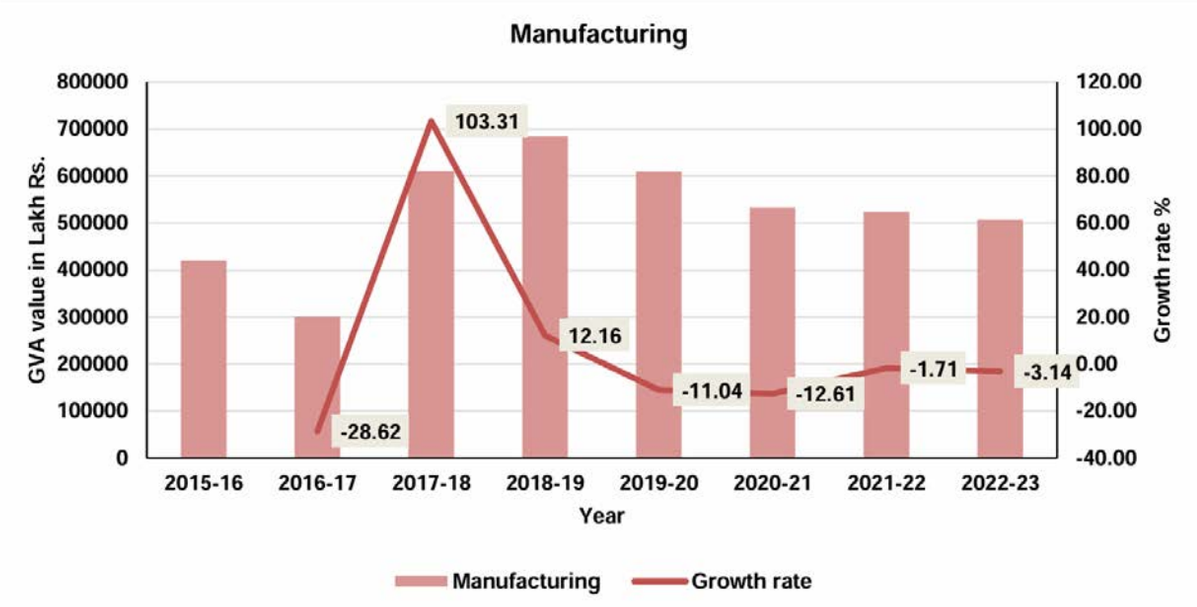



*Figure 8.32 Manufacturing sector GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The graph above shows the trend of Gross District Value Added (GDVA) of the manufacturing sector in Tiruchirappalli district from Year 2015–16 to 2022–23 along with its annual growth rate. Manufacturing GDVA recorded a decline in 2016–17, followed by a sharp rebound in 2017–18 with a very high growth rate, indicating a phase of rapid industrial expansion. From 2018–19 onwards, GDVA levels remained relatively high but exhibited a fluctuating and largely negative growth trend, with notable contractions during 2019–20 and 2020–21, reflecting economic slowdown and external shocks. In the subsequent years, growth remained marginally negative, suggesting stabilization at a lower growth trajectory. Overall, the trend indicates that while manufacturing continues to be a significant contributor to the district economy, its growth has moderated in recent years, highlighting the need for renewed industrial investment and diversification.

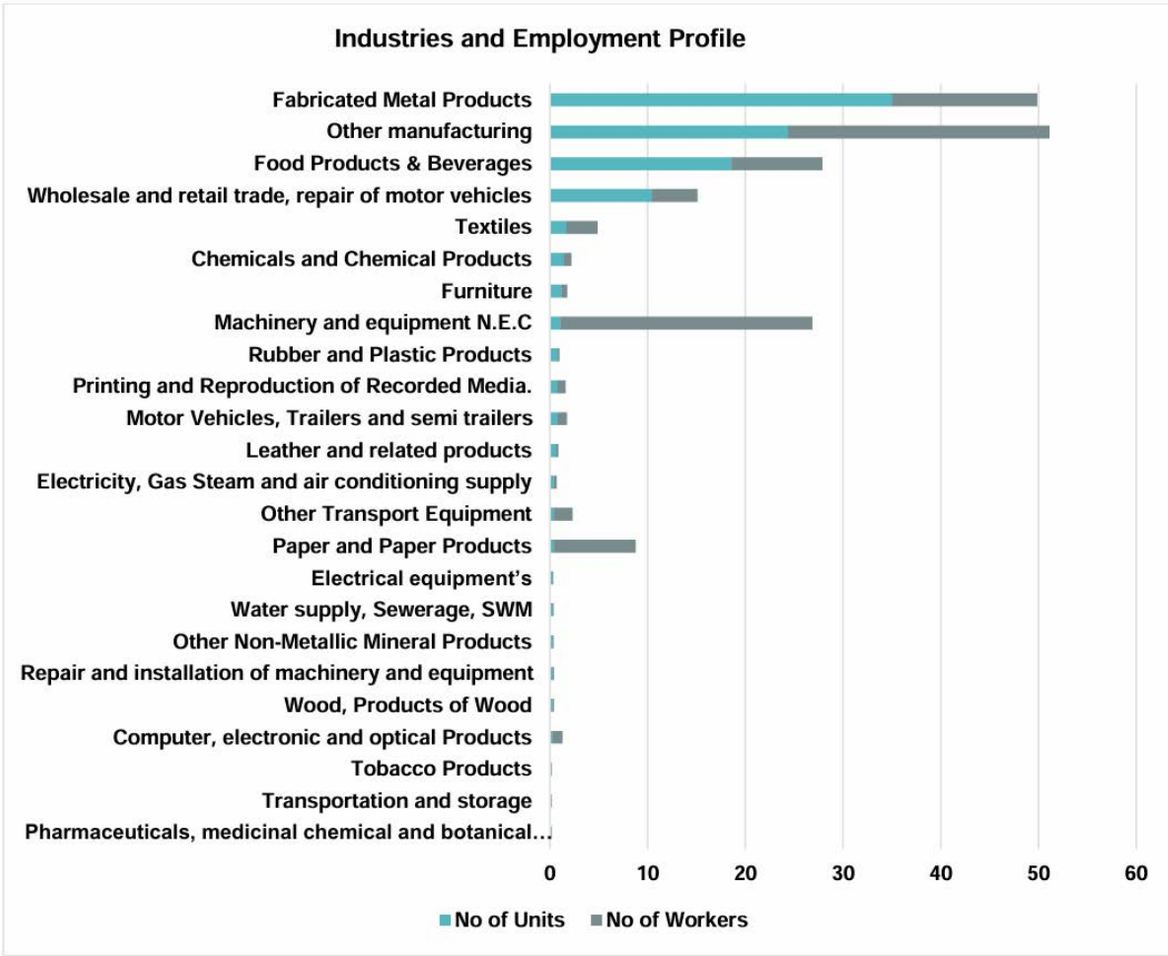



*Figure 8.33 Industrial and employment profile of Tiruchirappalli district*

*Source: District statistical handbook, 2023-24*

The combined analysis of industrial units and employment distribution in Tiruchirappalli LPA reveals that employment generation is highly concentrated in a few key manufacturing sectors. Fabricated metal products, other manufacturing, machinery and equipment and food products and beverages together account for the largest share of industrial employment, highlighting the dominance of metal-based and general manufacturing activities. While fabricated metal products and other manufacturing also record a high number of units, sectors such as machinery and equipment and food processing exhibit relatively higher labour intensity per unit. Service-oriented activities, including wholesale and retail trade and motor vehicle repair, contribute moderately to employment. In contrast, sectors such as chemicals, textiles, electronics, rubber and plastic products and pharmaceuticals account for relatively smaller shares, indicating limited industrial diversification and underscoring the need to promote higher value-added and technology-intensive industries.

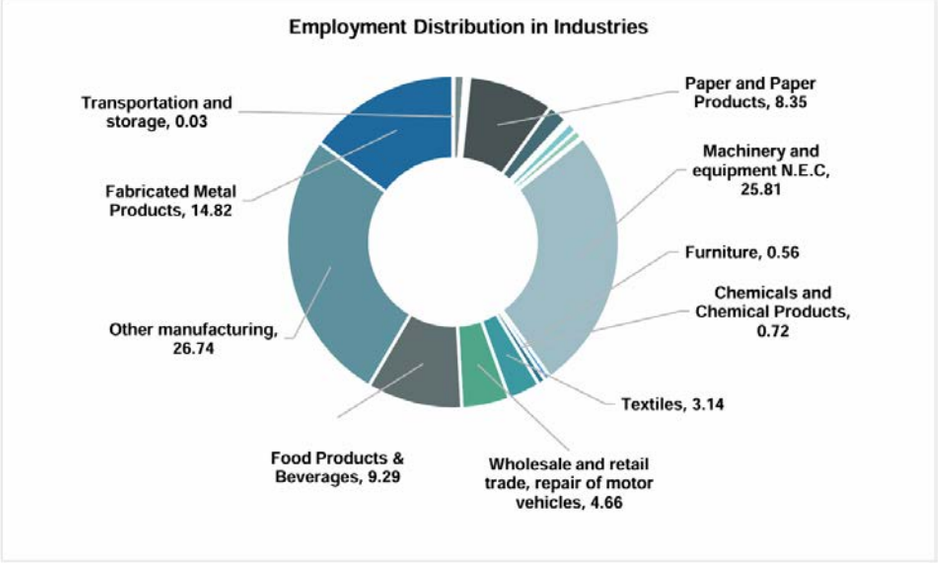



*Figure 8.34 Employment district in Industries in Tiruchirappalli district*

*Source: District statistical handbook, 2023-24*

#### 8.3.2.1.1 Industrial Profile Tiruchirappalli LPA

The industrial profile of the Tiruchirappalli Local Planning Area is diverse but clearly dominated by agro-based and manufacturing-oriented activities. Agriculture and agro-based industries, including food processing, form the largest share at 26%, reflecting the strong linkage between the surrounding agrarian hinterland and industrial activity within the LPA. This highlights Tiruchirappalli's role as a processing and value-addition center for regional agricultural produce.

Manufacturing (general and light manufacturing) accounts for 22%, followed by heavy engineering and metal industries (14%) and automobile-related industries (13%), indicating a strong engineering and industrial manufacturing base. These sectors collectively underscore Tiruchirappalli's importance as a regional hub for engineering, fabrication and allied industrial activities. In contrast, sectors such as chemicals and petrochemicals (8%), construction materials (5%), mining and quarrying (5%) and infrastructure and utilities (3%) occupy smaller shares, while cottage industries and specialized engineering units remain marginal.

Overall, the industrial typology suggests that the Tiruchirappalli LPA is characterized by resource linked, manufacturing-led industrial development, with scope for diversification into higher-value, technology driven and clean industries. For the Master Plan, this calls for strengthening agro processing and manufacturing clusters, upgrading industrial infrastructure and promoting balanced sectoral growth while ensuring environmental sustainability.

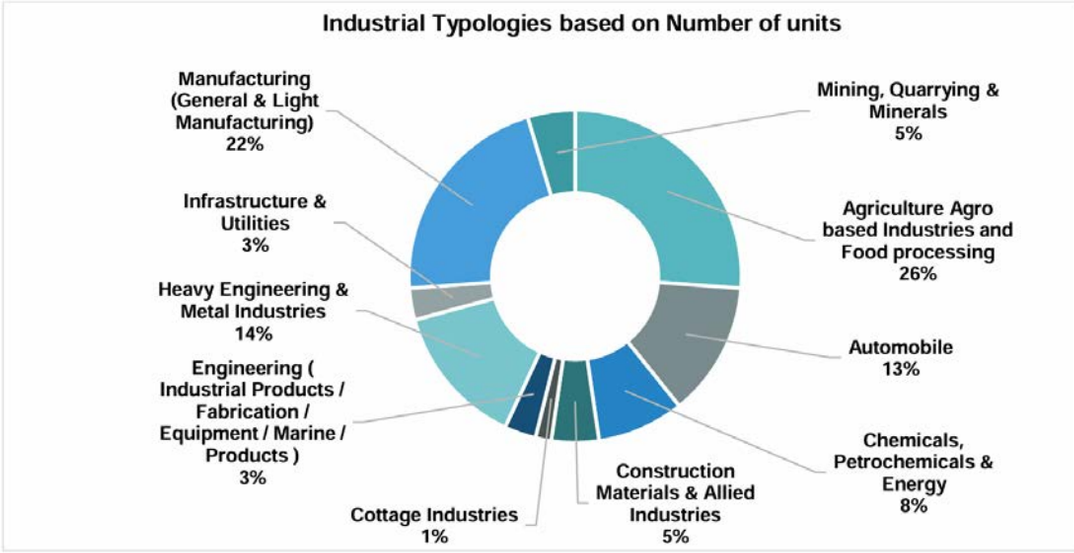



*Figure 8.35 Industrial Typologies in Tiruchirappalli LPA*

*Source: District Industrial Centre, TNPCB*

#### 8.3.2.1.2 Construction sector in Tiruchirappalli

*Figure 8.36 Construction sector GVA in Tiruchirappalli district*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The construction GDVA shows a steady and consistent increase over the period, indicating sustained expansion of construction activities in the district. Growth remained positive in most years, with moderate fluctuations and experienced a marginal slowdown in 2020–21, reflecting the impact of economic disruptions. This was followed by a strong recovery in 2021–22, recording the highest growth rate and continued positive growth in 2022–23. Overall, the trend highlights the resilience of the construction sector and its significant role in driving the district's secondary sector and infrastructure development.

#### 8.3.2.1.3 Other utilities sector in Tiruchirappalli

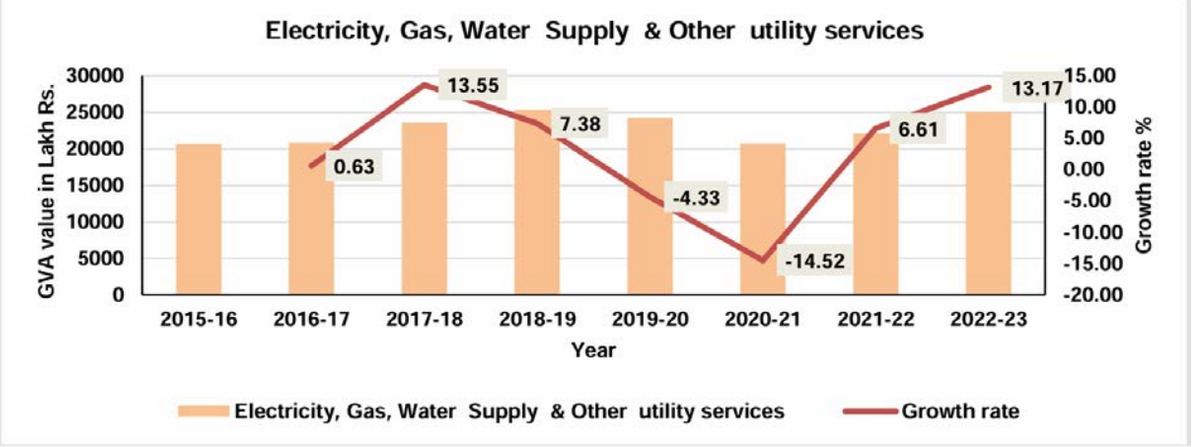



*Figure 8.37 Other utilities sector GVA in Tiruchirappalli district*

*Source: Department of economics and statistics, FY 2015 16 to 2022-23*

This sub sector shows relatively modest GDVA levels compared to other secondary sub-sectors, with gradual growth up to 2018–19, followed by a decline during 2019–20 and a sharp contraction in 2020–21, reflecting reduced demand and operational disruptions. Subsequently, the sector recorded a strong recovery in 2021–22 and 2022–23, with growth rates turning significantly positive. Overall, the trend indicates that while the utilities sector contributes a smaller share to the district economy, it has shown resilience and recovery in the post-disruption period, supporting overall industrial and urban activities.

Overall, the secondary sector in Tiruchirappalli district is primarily driven by manufacturing and construction, which together account for almost the entire GVA of the sector. Manufacturing remains a key economic base with high GDVA levels; however, its growth has been volatile in recent years, showing signs of slowdown and marginal contraction after a strong expansion phase, indicating the need for revitalisation through diversification and technological upgradation. In contrast, the construction sector has demonstrated steady and resilient growth, with a strong post-pandemic recovery, reflecting sustained infrastructure development, urban expansion and public and private investments. The electricity, gas, water supply and other utility services sector contributes a relatively small share to GDVA but plays a critical supporting role; despite experiencing sharp fluctuations and a significant decline during 2020–21, it has shown a robust recovery in the subsequent years.

#### 8.3.2.1.4 Spatial Distribution of industries in Tiruchirappalli LPA

The spatial distribution of industries within Tiruchirappalli LPA provides critical insights into the patterns of economic development, land-use dynamics, infrastructure utilization and environmental implications. Understanding the

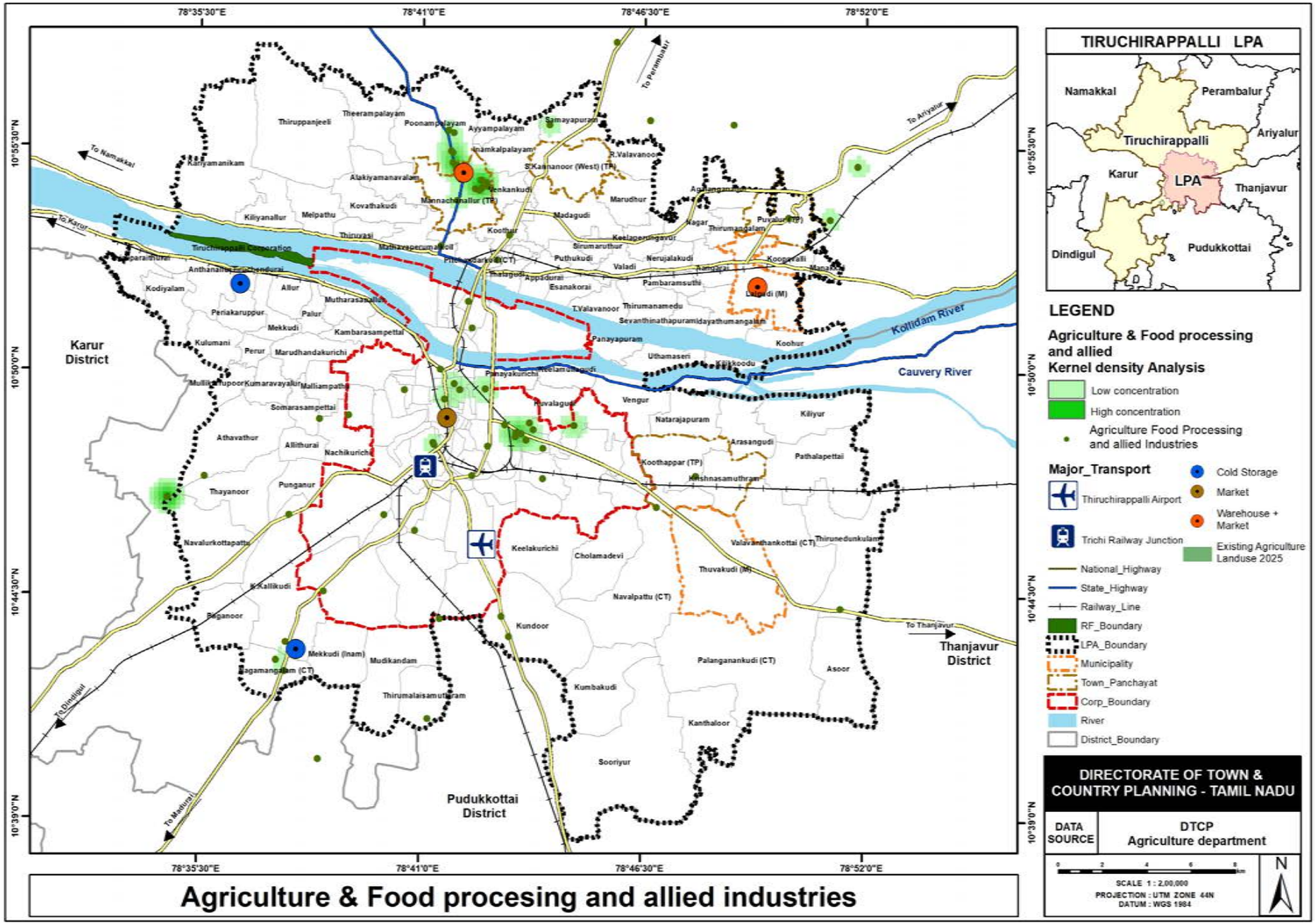
locational characteristics of industrial activities is essential for formulating informed strategies related to industrial zoning, infrastructure provisioning, environmental management and sustainable urban growth.

The spatial distribution of industries within the Tiruchirappalli Local Planning Area (LPA) shows strong clustering along major transport corridors, industrial estates and urban–peri-urban transition zones, indicating a transport-led and infrastructure-driven industrial growth pattern. The southern and south-eastern parts of Tiruchirappalli LPA, particularly around Thuvakudi, Kumbakudi, Navalpattu and K. Kallikudi, emerge as the primary industrial concentration belt, dominated by engineering, heavy engineering, automobile, construction-related and chemical industries. This belt aligns with the NH corridors towards Thanjavur and Pudukkottai, highlighting logistics efficiency as the key locational driver. In contrast, the northern and north-western sectors, particularly Manachanallur, S. Kannanur, Puvalur and Lalgudi, exhibit moderate to low industrial presence, dominated mainly by agro-based and small-scale allied industries, reflecting their rural agrarian economic base.

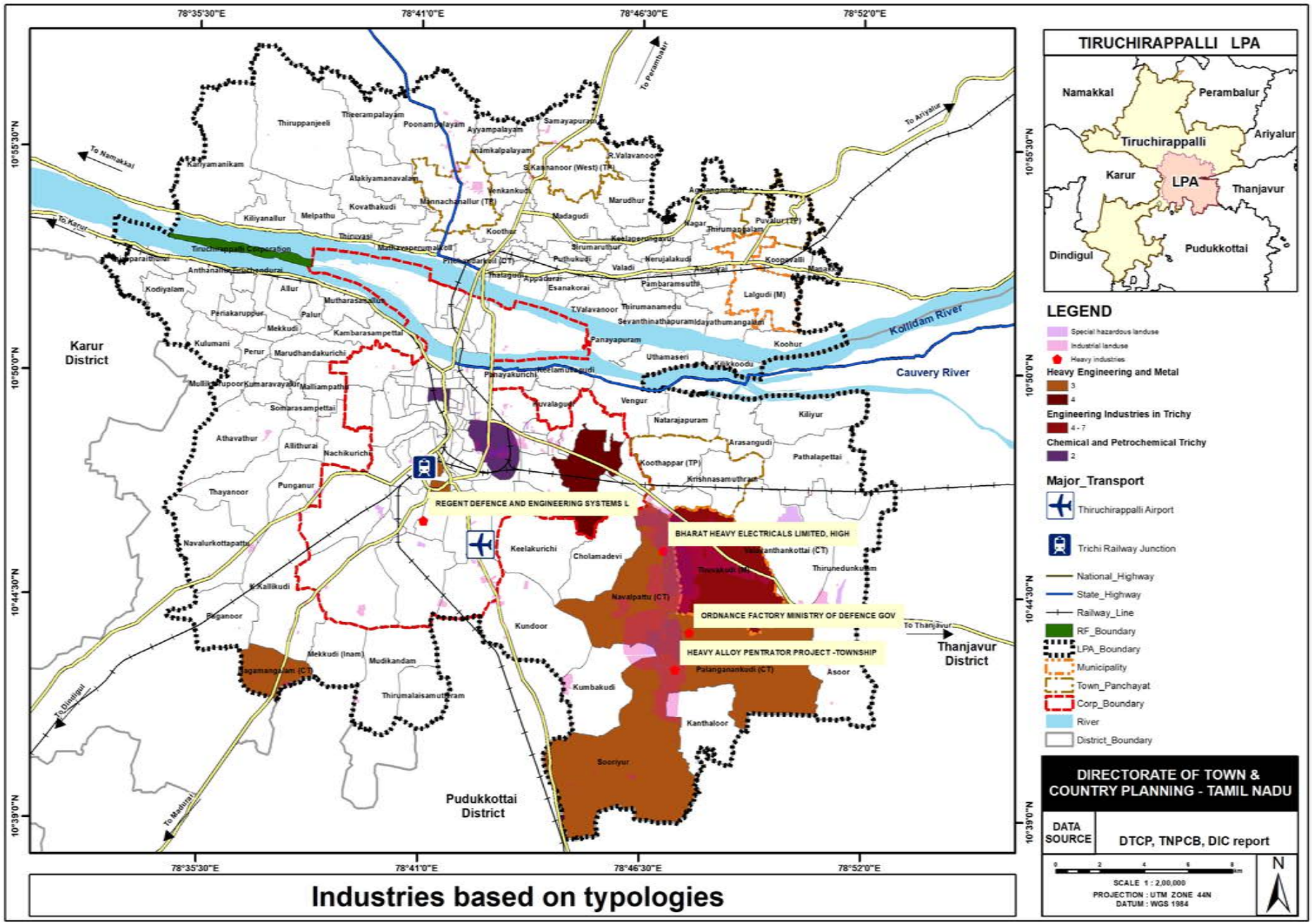
*Table 8.14 Description of Category and Sub-category of Industries Mapped below*

| Category | Sub-category |
|---|---|
| Agriculture, Agro-based & Food Processing | Agro (Processing / Poultry / Equipment / Tobacco / Trading / Chemical), Dairy / Food Processing, Fertilizer, Food Processing, Poultry, Rice Mill, Water packaging. |
| Automobile | Automobile, Automobile (Components / Services / Dealership), General Engineering & Auto Equipment Fabrication. |
| Chemicals, Petrochemicals & Energy | Chemical, Energy Engineering, Energy Meters, Chemical Manufacturing & Fabrication, Petroleum / Petrochemical / Chemicals, Renewable Energy, Waste to Energy / Utility. |
| Construction Materials & Allied | Bricks, Cement / Construction, Construction Materials / Services, Fly Ash Bricks, Ready Mix Concrete. |
| Cottage Industries | Cottage Industry, SHG based industry. |
| Engineering (Industrial Products / Fabrication / Equipment / Manufacturing) | Engineering (Industrial Products / Fabrication / Equipment / Manufacturing), General Engineering, Fabrication Units, Steel, Windmill Components. |
| Heavy Engineering & Metal Industries | Defence Manufacturing / Engineering, Heavy Engineering (PSU), Metallurgical |
| Manufacturing (General & Light) | Electrical Equipment / Services, Electronics Manufacturing, Electrical Equipment Manufacturing & Fabrication, Plastic Products Manufacturing & Fabrication, Jewellery, Manufacturing, Plastics, Printing / Packaging, Recycling / Paper Products, Rubber Products, Soap / FMCG Manufacturing, Surface Coating, Wood Products |

*Source: DTCP Analysis*




*Map 8.3 Agriculture and Allied, Food processing Industries in Tiruchirappalli LPA*




*Map 8.4 Industries based on typologies in Tiruchirappalli LPA*

*Table 8.15 Industries typology spatial observation and inferences*

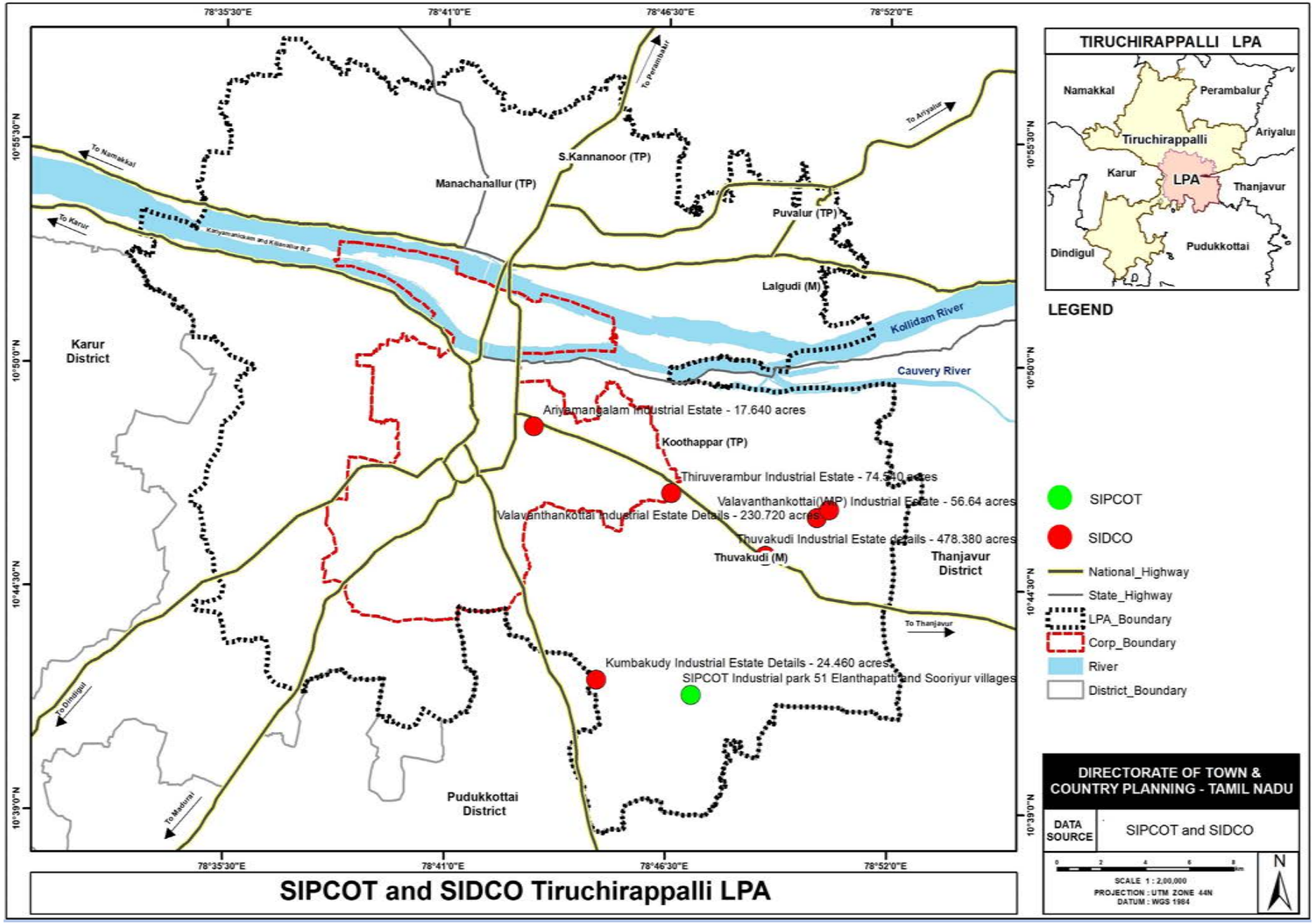
| Industrial Typology-wise Observations & Inferences | | | |
|---|---|---|---|
| **Industrial Typologies** | **Spatial Observation** | **Inference** | **Potential** |
| Agriculture & Allied Industries | Concentrated mainly in:<br>Manachanallur (TP)<br>S. Kannanur (TP)<br>Lalgudi (M)<br>Peripheral rural panchayats along Cauvery river belt.<br>Sparse presence inside Tiruchirappalli Corporation core. | The pattern clearly reflects proximity to fertile Cauvery delta agricultural zones.<br>Industries are input-oriented, depending heavily on:<br>Agricultural produce,<br>Rural labour availability,<br>Local markets. | Agro-processing parks<br>Cold storage hubs<br>Value-addition clusters (rice mills, oil mills, poultry, dairy, food processing). |
| Automobile Industries | Major clustering in:<br>Thuvakudi (M)<br>K. Kallikudi<br>Kumbakudi<br>Southern corporation fringe.<br>Minimal presence in northern rural zones. | Automobile industries exhibit strong corridor-based clustering, primarily along:<br>NH to Thanjavur<br>NH to Pudukkottai.<br>Indicates:<br>Dependence on transport logistics, skilled workforce and supplier ecosystems. | Auto-component clusters<br>Logistics parks<br>Industrial corridors. |
| Chemical & Petrochemical Industries | Highly limited and localized.<br>Major concentration in:<br>Thuvakudi (M)<br>Select southern panchayats. | Strict environmental regulations and land requirements have:<br>Restricted chemical industries to controlled industrial pockets.<br>Preference for peripheral locations away from dense habitation. | Designated chemical industrial zones<br>Buffer-based zoning regulations. |
| Construction & Allied Industries | Widely distributed but dense in:<br>Southern corporation limits<br>K. Kallikudi<br>Navalpattu<br>Thuvakudi | Distribution reflects:<br>Rapid urban expansion of Tiruchirappalli city<br>High demand for:<br>Bricks,<br>Blue metal,<br>Sand processing,<br>Construction materials. | Indicates urban-driven industrial demand.<br>Requires:<br>Zoning controls to manage environmental degradation<br>Regulation of quarry-based industries. |

| Industrial Typology-wise Observations & Inferences | | | |
|---|---|---|---|
| **Industrial Typologies** | **Spatial Observation** | **Inference** | **Potential** |
| Engineering Industries | Strong clustering in:<br>Thuvakudi (M)<br>K. Kallikudi<br>Tiruchirappalli Corporation southern zones<br>Kumbakudi | Dominance of BHEL ecosystem and heavy engineering supply chains.<br>Skilled labour availability and industrial land parcels drive location. | Potential for:<br>Engineering industrial clusters<br>Ancillary industrial estates<br>Skill-based industrial corridors. |
| Heavy Engineering & Metal Industries | Highest intensity in:<br>Thuvakudi (M)<br>Kumbakudi<br>Navalpattu<br>Southern corporation fringe | Clearly anchor-industry driven, especially influenced by:<br>BHEL Tiruchirappalli<br>Large-scale fabrication and metal processing units. | Protected as core industrial belts<br>Upgraded with:<br>Freight infrastructure,<br>Power supply,<br>Logistics hubs. |

*Source: Spatial analysis, DTCP*

#### 8.3.2.1.5 SIDCO and SIPCOT Industrial Estates

The spatial distribution of SIDCO and SIPCOT industrial estates within the Tiruchirappalli Local Planning Area (LPA) exhibits a strategic and corridor-oriented pattern, largely influenced by regional transport networks. These industrial estates are predominantly located along major national and state highways and in the southern and south eastern peripheries of the LPA, ensuring efficient regional connectivity while minimizing conflicts with dense urban residential zones. Major industrial nodes such as Thuvakudi Industrial Estate (478.38 acres), Valavanthankottai Industrial Estate (230.72 acres), Thiruverumbur Industrial Estate (74.50 acres), Ariyamangalam Industrial Estate (17.64 acres), Kumbakudi Industrial Estate (24.46 acres) and the SIPCOT Industrial Park at Sooriyur–Elanthapatti (51 acres) collectively form a well-distributed industrial belt in the south eastern and southern parts of the LPA. Among these, Thuvakudi and Valavanthankottai emerge as the dominant industrial clusters in terms of spatial extent and concentration of industrial activity. Proximity to NH-38 (Tiruchirappalli–Thanjavur corridor) and NH-81 (Tiruchirappalli–Pudukkottai corridor) enhances logistics efficiency, supports supply chain integration and promotes regional industrial growth. Additionally, the location of estates away from the Cauvery and Kollidam river corridors reduces environmental risks and preserves sensitive ecological zones.




*Map 8.5 SIPCOT and SIDCO Tiruchirappalli LPA*

*Table 8.16 SIPCOT and SIDCO Industrial Estate / Park*

| Industrial Estate / Park | Area (Acres) |
|---|---|
| Thuvakudi Industrial Estate | 478.38 |
| Valavanthankottai Industrial Estate | 230.72 and 56.64 |
| Thiruverumbur Industrial Estate | 74.50 |
| Ariyamangalam Industrial Estate | 17.64 |
| Kumbakudi Industrial Estate | 24.46 |
| SIPCOT Industrial Park, Sooriyur–Elanthapatti | 51.00 |

*Source: SIPCOT, SIDCO*

#### 8.3.2.2 Pollution wise Industrial Classification

The TNPCB category-wise distribution of industries reveals a predominantly environment-friendly industrial structure, with Green category industries forming the largest share at 45%, followed by Orange category industries at 35%. Together, these two categories account for nearly 80% of the total industrial units, indicating that most industries fall within low to moderate pollution levels. This reflects effective regulatory mechanisms and a inclination towards sustainable and compliant industrial development. Red category industries constitute only 11%, suggesting a limited presence of highly polluting and hazardous industrial activities, thereby reducing the overall environmental burden. White category industries account for 9%, indicating relatively fewer non-polluting or service-based industrial units.

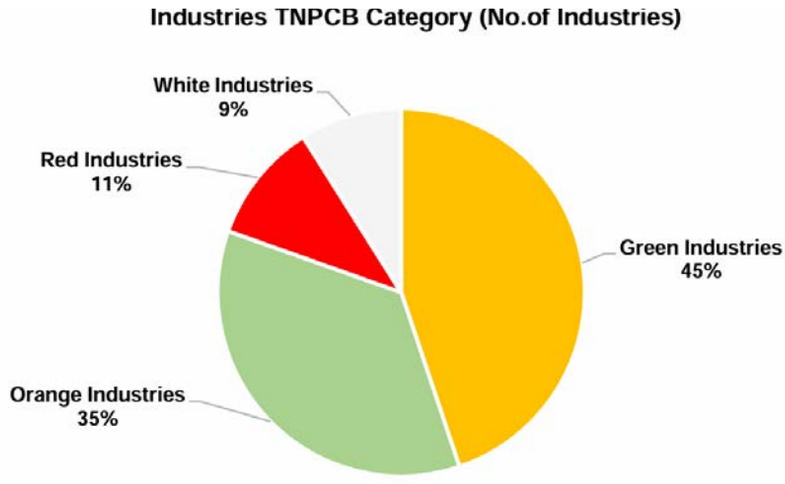



*Figure 8.38 Industries TNPCB category composition in Tiruchirappalli LPA*

*Source: TNPCB*

#### 8.3.2.2.1 Category-wise Distribution of Industries by TNPCB Classification in Tiruchirappalli LPA

The sector-wise TNPCB category distribution of industries in Tiruchirappalli LPA indicates a predominantly environment-friendly industrial structure, with Green and Orange categories dominating across most sectors, reflecting low to moderate pollution levels.

*Table 8.17 Category wise distribution of Industries by TNPCB in Tiruchirappalli LPA*

| Category of industries (in numbers) | Green | Orange | Red | White |
|---|---|---|---|---|
| Agro based Industries and Food processing | 56 | 16 | 2 | - |
| Automobile | 3 | 15 | 1 | - |
| Chemicals, Petrochemicals & Energy | 3 | 1 | 7 | 4 |
| Construction Materials & Allied | 5 | 4 | 1 | 6 |
| Cottage, SHG & Informal Sector | 2 | - | - | - |
| Engineering (Industrial Products / Fabrication / Equipment / Marine / Products) | 11 | 2 | 1 | 8 |
| Heavy Engineering & Metal | 19 | 11 | 6 | |
| Industrial Estates / Parks | 6 | 7 | 1 | 4 |
| Infrastructure & Utilities | 3 | 3 | 1 | 2 |
| Manufacturing | 23 | 13 | 1 | 3 |
| Mining, Quarrying & Minerals | - | 6 | 8 | - |
| Services & Commercial Activities | 4 | 29 | 3 | - |

*Source: TNPCB*

Agro-based and food processing industries show a strong concentration in the Green category (56 units), highlighting their environmentally compatible nature, while manufacturing and engineering sectors also exhibit significant Green

category presence, indicating higher regulatory compliance and adoption of cleaner technologies. The automobile and services sectors are largely dominated by the Orange category, suggesting moderate pollution-intensive activities associated with assembly, processing and commercial operations. In contrast, Red category industries are mainly concentrated in chemicals, heavy engineering and mining sectors, indicating localized zones of higher environmental risk that require strict monitoring and pollution control measures. The presence of White category industries in engineering, construction materials and industrial estates reflects opportunities for promoting non-polluting and service-based economic activities.

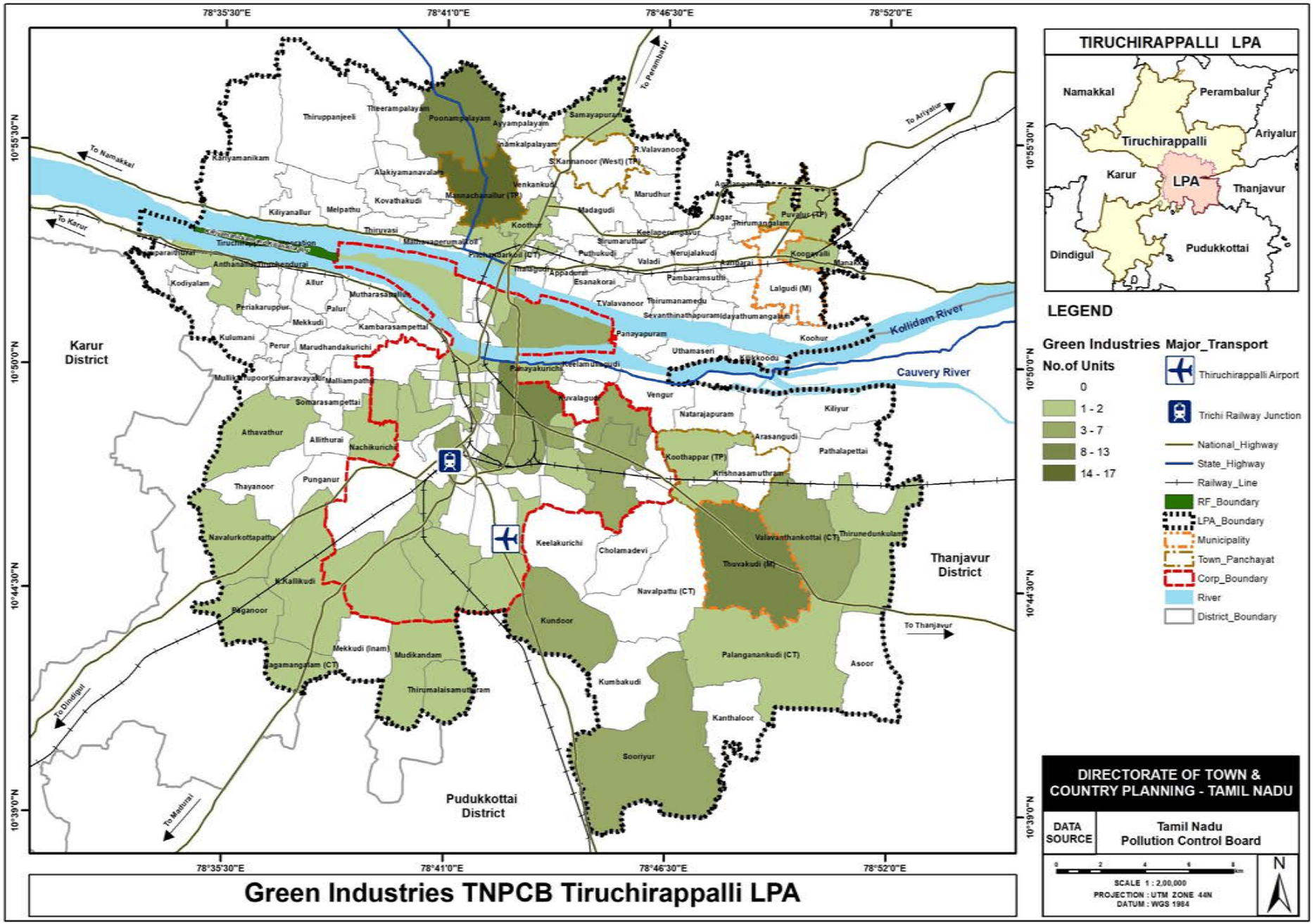
The spatial distribution of Green, Orange and Red category industries within the Tiruchirappalli Local Planning Area (LPA) reveals a distinct spatial pattern strongly influenced by transport corridors, urban proximity and land availability.

Green category industries exhibit widespread distribution, with higher concentrations observed along major transport corridors, particularly NH-38 (Tiruchirappalli–Thanjavur) and NH-81 (Tiruchirappalli–Karur) and in peripheral village panchayats such as Thuvakudi, Valavandankottai and Palanganangudi, indicating the availability of larger land parcels and better freight accessibility. This pattern reflects the dominance of agro-based, manufacturing and engineering industries, which typically require moderate infrastructure and benefit from regional connectivity.

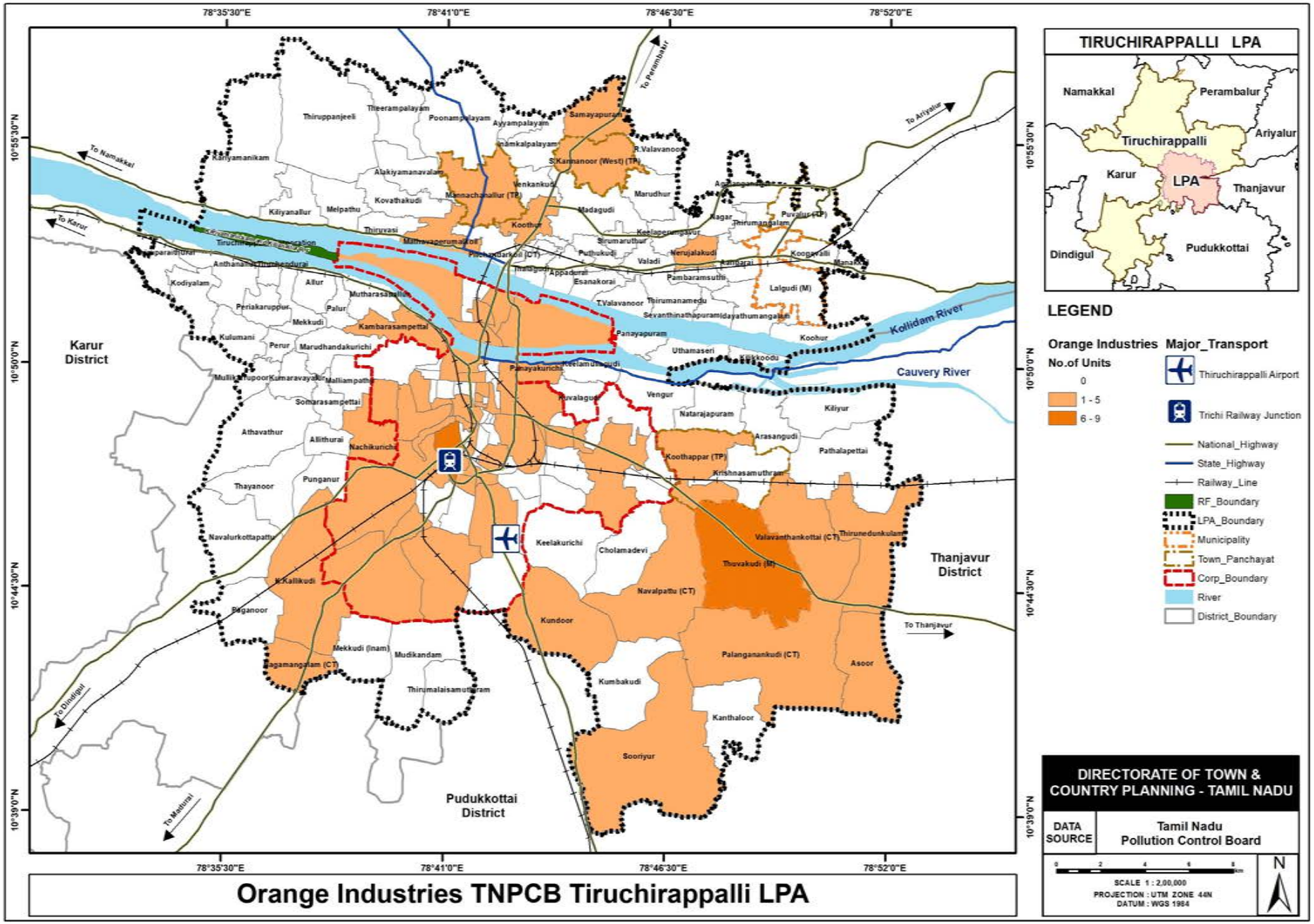
Orange category industries show a semi-concentrated pattern, largely clustered around the urban core and along major radial road networks, especially within and around the Tiruchirappalli Corporation boundary, highlighting the preference of moderate-pollution industries to locate closer to market areas, labour pools and service infrastructure. The highest concentrations of Orange category units are evident in southern and eastern growth corridors, suggesting ongoing industrial expansion along these axes.

In contrast, Red category industries exhibit a highly localized and clustered distribution, predominantly situated in southern and south-eastern peripheral zones, particularly in areas such as Thuvakudi, Navalpattu and Palanganangudi and along major highways and railway corridors.

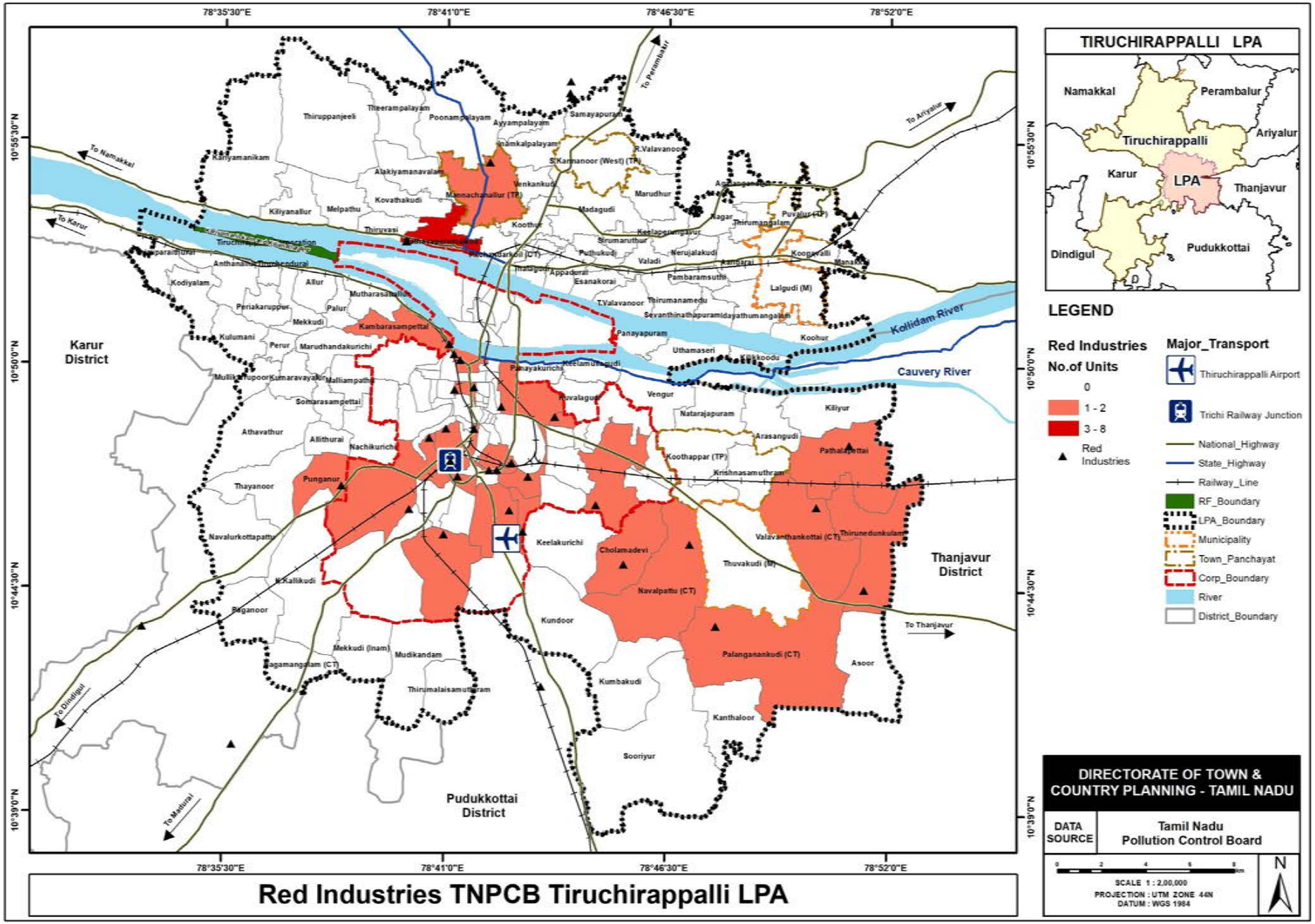
Overall, the spatial pattern demonstrates a clear functional zoning structure, wherein low-pollution industries are widely distributed, moderate-pollution industries concentrate around the urban-industrial interface and high-pollution industries are strategically confined to peripheral industrial belts, thereby supporting balanced economic development while maintaining environmental safeguards within the Tiruchirappalli LPA.




*Map 8.6 Green Industries in Tiruchirappalli LPA*




*Map 8.7 Orange Industries in Tiruchirappalli LPA*




*Map 8.8 Red Industries in Tiruchirappalli LPA*

*Table 8.18 Industries TNPCB category spatial distribution*

| Industrial Category | Major Concentration Zones / Locations | Spatial Characteristics & Locational Factors |
|---|---|---|
| Green Industries | Thuvakudi, Valavandankottai, Palanganangudi, Kumbakudi, Kallikudi, Manachanallur, Lalgudi, Samayapuram, Koothur, Srirangam fringes | Dispersed spatial pattern; strong alignment along NH-38 (Tiruchirappalli–Thanjavur) and NH-81 (Tiruchirappalli–Karur) corridors; preference for peripheral village panchayats, availability of land and regional connectivity |
| Orange Industries | Tiruchirappalli Corporation core, Thillainagar, Cantonment, Woraiyur, Srirangam, Thuvakudi, Navalpattu, Valavandankottai, Panayapuram | Semi-concentrated pattern; located along major radial roads, highways and railway corridors; proximity to urban services, labor markets and transport nodes |
| Red Industries | Thuvakudi, Navalpattu, Palanganangudi, Valavandankottai, Kumbakudi, Cholamadevi, Panjappur, Nachikurichi | Highly clustered peripheral distribution; located along highways and railway lines; spatial segregation from dense residential zones; planned industrial zoning areas |
| Mixed Industrial Zones | Panjappur, Thuvakudi SIPCOT, Manachanallur, Koothur, Samayapuram | Industrial clusters with co-existence of green, orange and red units; driven by infrastructure availability, transport connectivity and land suitability |

*Source: Spatial distribution analysis*

#### 8.3.2.3 Micro, Small and Medium Enterprises (MSMEs)

Micro, Small and Medium Enterprises (MSMEs) as engines of grassroots entrepreneurship, MSMEs contribute significantly to balanced regional growth by dispersing economic activities beyond major industrial centers and fostering localized development. Their flexibility, low capital requirements and adaptability to market dynamics make them particularly crucial in urban and peri-urban economies. In the context of Tiruchirappalli Local Planning Area (LPA), MSMEs form the backbone of the local economic structure, supporting diverse sectors such as manufacturing, services and trade.

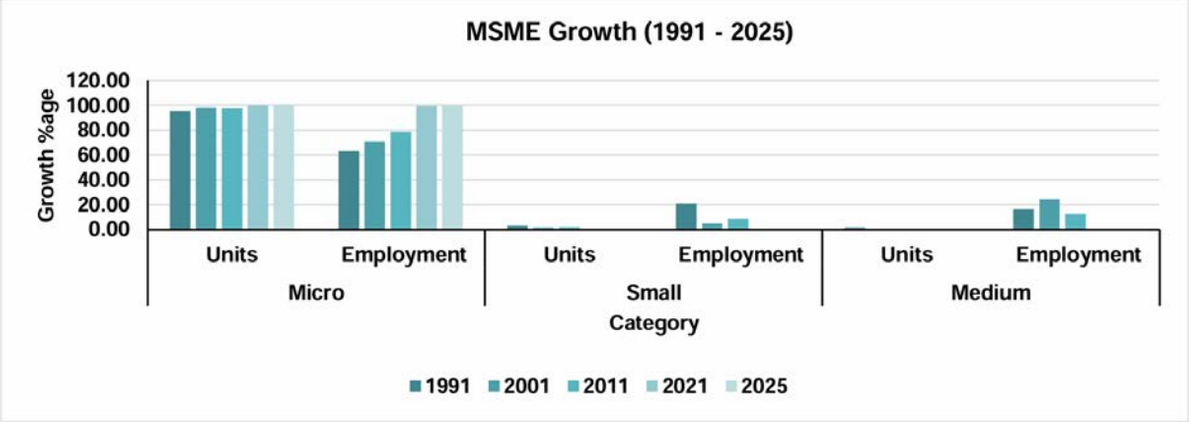



*Figure 8.39 MSME Growth trend (1991 to 2025) in Tiruchirappalli District*

*Source: Udayam data from 1991 to 2025*

*Table 8.19 MSME Growth trend (1991 to 2025) in Tiruchirappalli District (in numbers)*

| Year | Micro | | Medium | | Small | |
|---|---|---|---|---|---|---|
| | Units | Employment | Units | Employment | Units | Employment |
| 1951 | - | - | - | - | 1 | 16 |
| 1961 | 7 | 97 | - | - | 1 | 28 |
| 1971 | 4 | 23 | - | - | - | - |
| 1981 | 13 | 106 | - | - | 1 | 20 |
| 1991 | 62 | 282 | - | - | 2 | 93 |
| 2001 | 272 | 1,361 | 1 | 467 | 4 | 91 |
| 2011 | 600 | 3,235 | 3 | 525 | 10 | 354 |
| 2021 | 4,309 | 21,281 | 1 | 65 | 10 | 94 |
| 2025 | 7,073 | 30,558 | 1 | 60 | 2 | 40 |
| Grand Total | 12,340 | 56,943 | 6 | 1,117 | 31 | 736 |

*Source: Udayam data from 1951 to 2025*

*Table 8.20 MSME in Tiruchirappalli LPA*

| MSME Category | Manufacturing | Services | Trading | Grand Total | %age |
|---|---|---|---|---|---|
| Medium | 3 | 1 | 1 | 5 | 0.02 |
| Micro | 5354 | 12297 | 7264 | 24915 | 99.8 |
| Small | 14 | 16 | 20 | 50 | 0.2 |
| Grand Total | 5371 | 12314 | 7285 | 24970 | 100.0 |
| %age | 21.5 | 49.3 | 29.2 | 100.0 | |

*Source: Udayam data from 2020 to 2025*

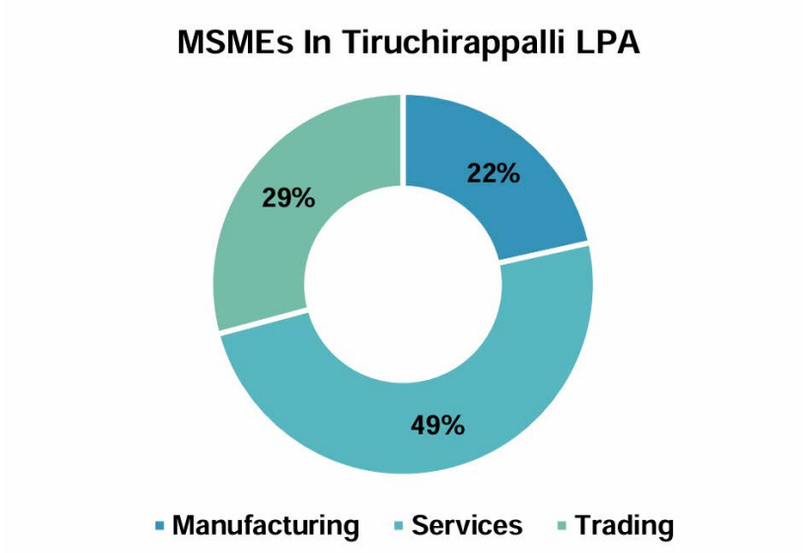



*Figure 8.40 MSMEs category in Tiruchirappalli LPA*

*Source: Udayam data from 2020 to 2025*

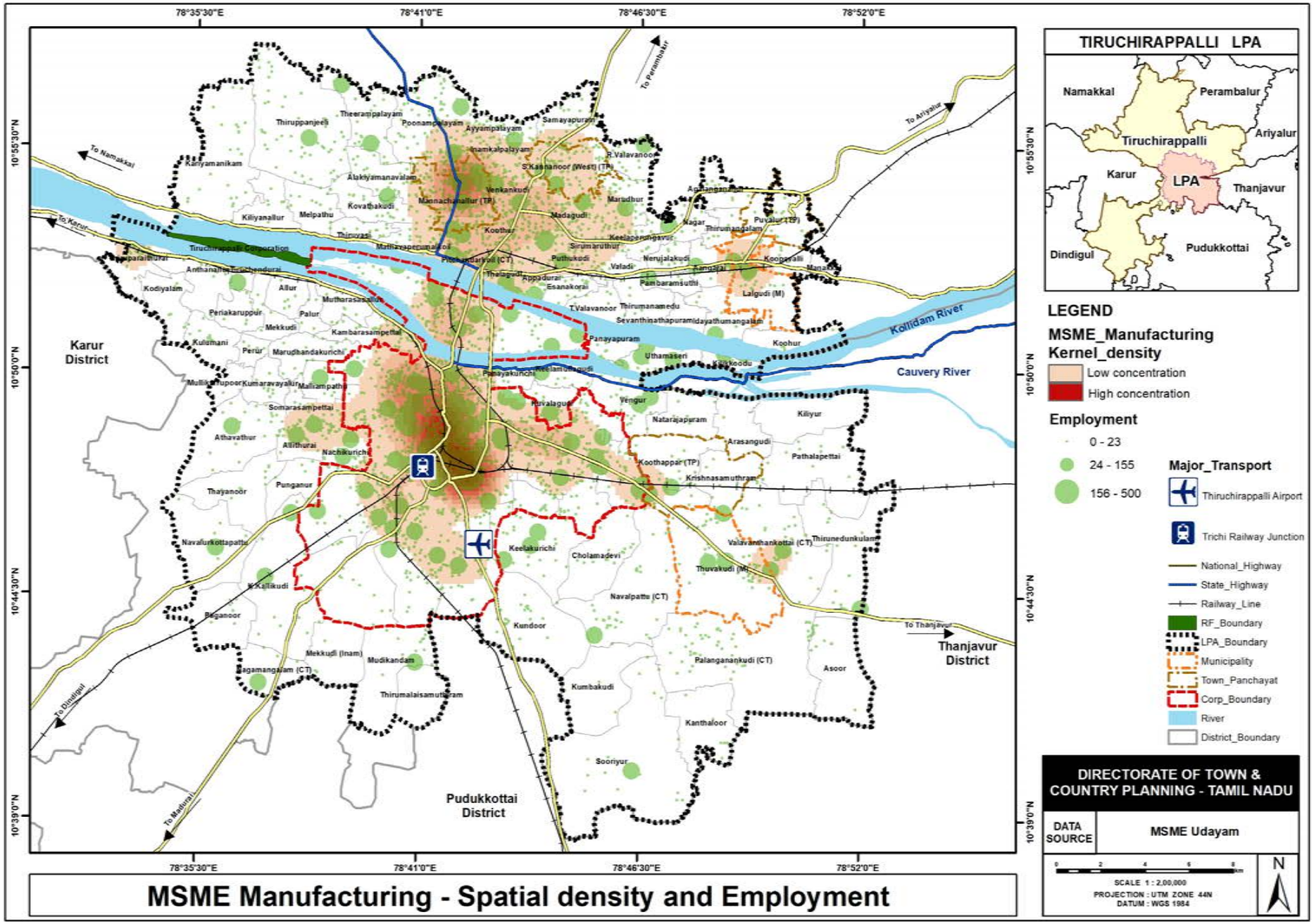
A total of 24,970 MSMEs are recorded in Tiruchirappalli LPA, reflecting a highly vibrant and diversified MSME base dominated overwhelmingly by micro enterprises, which account for 99.8% of the total units. The extremely marginal presence of small and medium enterprises (only 0.2% and 0.02% respectively) highlights low capital-intensive industrial investment, implying that the economy is primarily sustained by low-investment, employment-intensive and informal to semi-formal enterprise structures.

Sector-wise, the services sector emerges as the most dominant, contributing 49.3% (12,314 units) of total MSMEs, followed by trading activities at 29.2% (7,285 units) and manufacturing at 21.5% (5,371 units). This indicates a strong shift towards service-led and commerce-driven economic activities,

characteristic of urbanizing and consumption-oriented regional economies. Overall, the MSME landscape of Tiruchirappalli LPA reflects a service-oriented urban economy with strong entrepreneurial participation at the micro scale, contributing significantly to employment generation and localized economic resilience.

#### 8.3.2.3.1 Manufacturing MSMEs

The spatial distribution of manufacturing MSMEs exhibits a strong corridor-oriented and peripheral clustering pattern, largely aligned along major transport routes and industrial zones. High concentrations are observed in Thiruverumbur, Thuvakudi, Ariyamangalam, Navalpattu, Kattur and parts of Manachanallur, which correspond with the presence of SIDCO industrial estates, railway workshops, engineering units, fabrication industries and logistics facilities. These areas benefit from larger land availability, freight connectivity and proximity to rail and highway networks, particularly along NH-81 (Tiruchirappalli–Pudukkottai corridor) and NH-38 (Tiruchirappalli–Thanjavur corridor). The employment density pattern mirrors these industrial clusters, with high employment concentrations in the Thiruverumbur–Thuvakudi industrial belt and Ariyamangalam zone, indicating the labour-intensive nature of manufacturing activities. In contrast, the central urban core shows comparatively lower manufacturing concentration, reflecting land constraints, zoning regulations and environmental considerations. Overall, manufacturing MSMEs in Tiruchirappalli LPA demonstrate a decentralized, transport-driven spatial structure, emphasizing the need for planned industrial corridors, improved logistics infrastructure and worker housing provisions in peri-urban zones.




# MSME Manufacturing - Spatial density and Employment




**LEGEND**

**MSME_Manufacturing Kernel_density**

- Low concentration
- High concentration

**Employment**

- 0 - 23
- 24 - 155
- 156 - 500

**Major_Transport**

- Thiruchirappalli Airport
- Trichi Railway Junction
- National_Highway
- State_Highway
- Railway_Line
- RF_Boundary
- LPA_Boundary
- Municipality
- Town_Panchayat
- Corp_Boundary
- River
- District_Boundary

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | MSME Udayam |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

*Map 8.9 Manufacturing MSME in Tiruchirappalli LPA*

#### 8.3.2.3.2 Service MSMEs

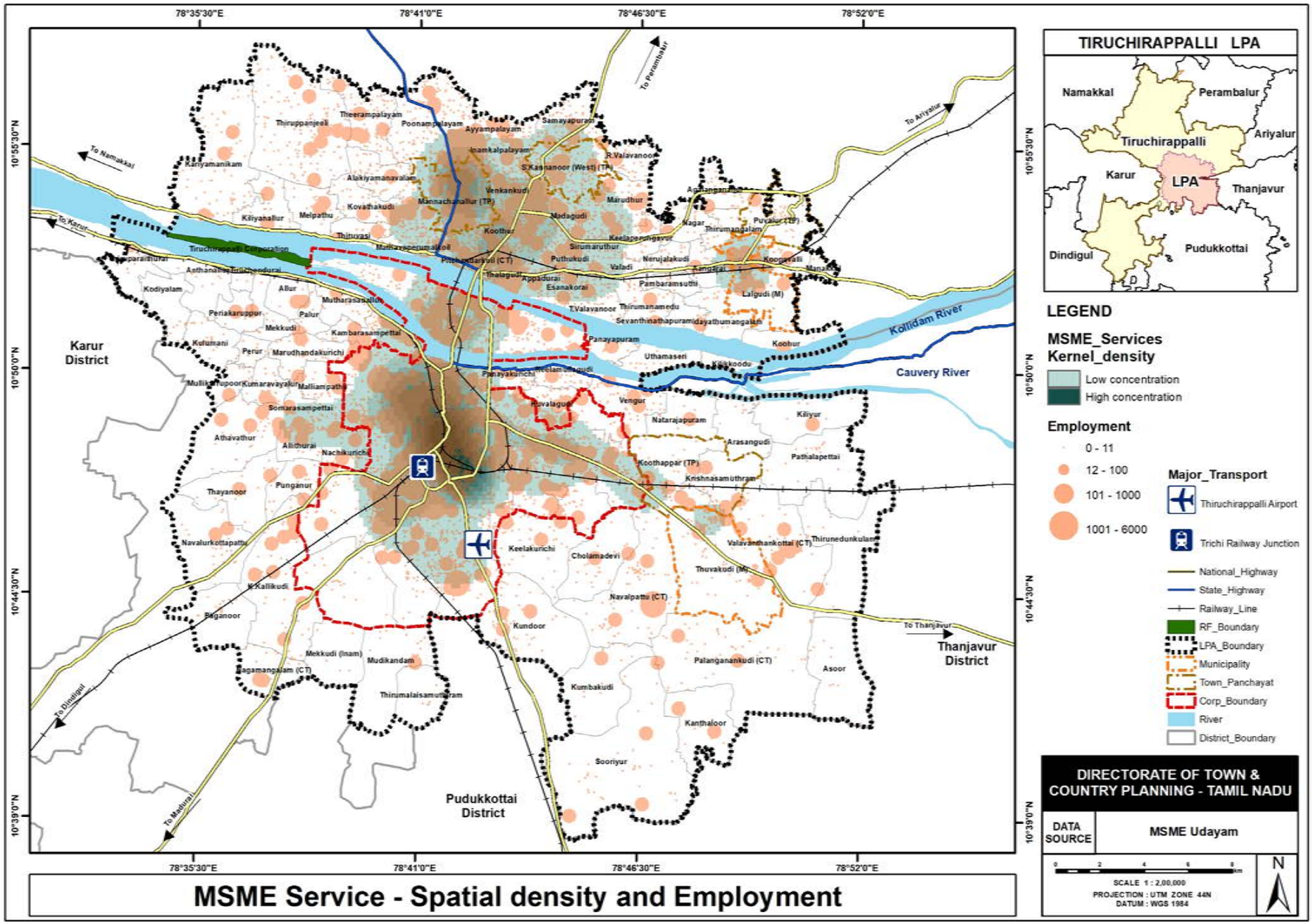
The service sector MSMEs display a highly centralized spatial pattern, with intense clustering within the Tiruchirappalli Corporation area, particularly across Cantonment, Thillai Nagar, Uraiyur, Srirangam, K. Abishekapuram, Palakkarai and Chathram Bus Stand areas. These zones exhibit the highest concentration of service enterprises and employment, reflecting their role as commercial, institutional, healthcare, education, hospitality and administrative hubs.

Employment density is most pronounced within the city core, signifying the labour-intensive nature of service activities and their dependence on market accessibility, footfall, public transport and proximity to consumers. Secondary service clusters are observed in Manachanallur, Lalgudi, Thiruverumbur and Thuvakudi, driven by suburban growth and improved regional connectivity. The spatial pattern indicates a strong core-dominated service economy, highlighting increasing pressure on central urban infrastructure, traffic congestion and land values. This underscores the need for decentralized service nodes, transit-oriented development and secondary commercial hubs to promote spatial balance and reduce congestion in the urban core.

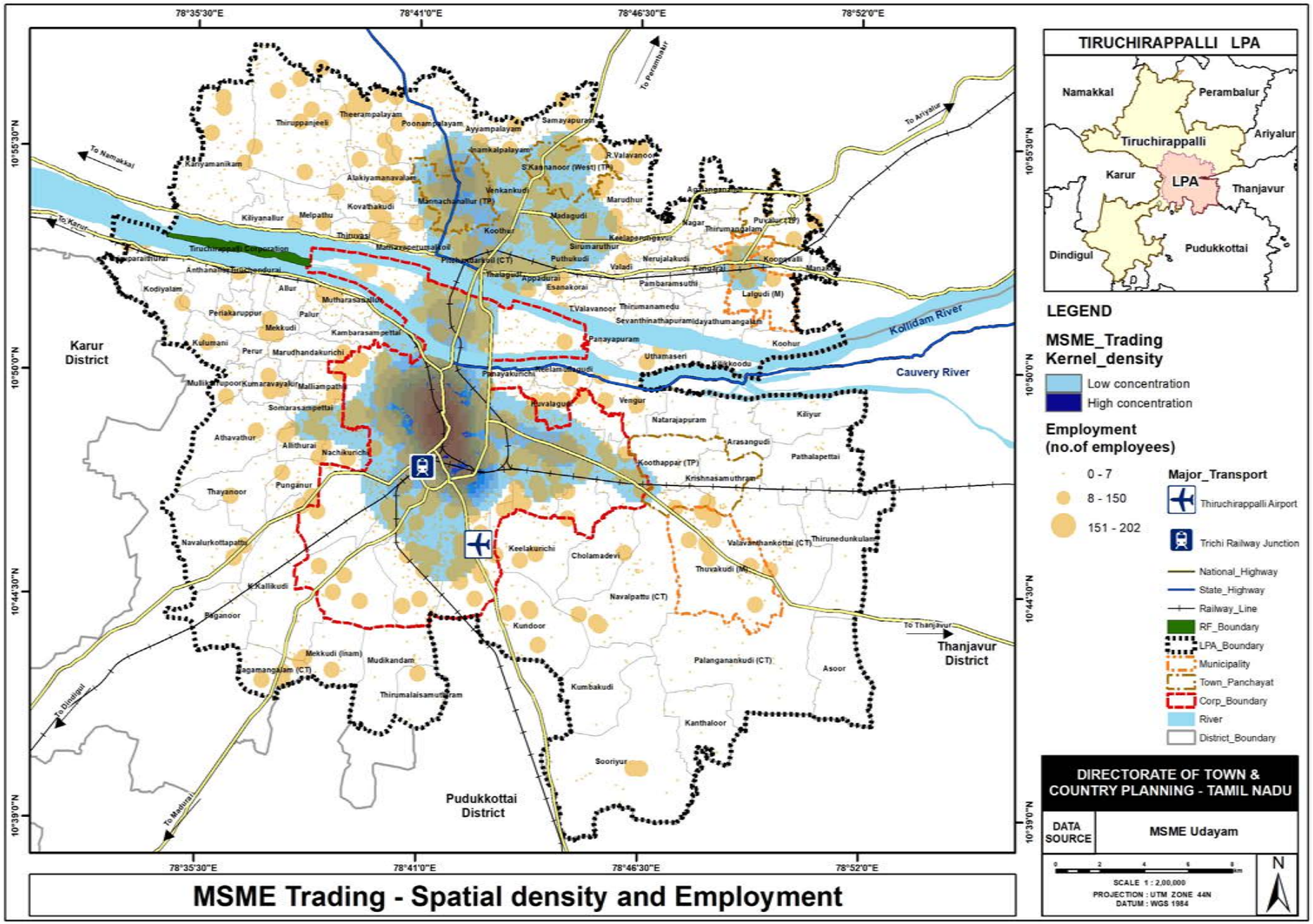
#### 8.3.2.3.3 Trading MSMEs

Trading MSMEs exhibit a distinct linear and nodal clustering pattern, strongly aligned along major arterial roads, commercial corridors and transport nodes. High concentrations are observed in Cantonment, Palakkarai, Chathram Bus Stand area, Srirangam, Thillai Nagar and Uraiyur, which function as the principal wholesale and retail trade zones of the city. These locations benefit from high pedestrian movement, transit accessibility and market proximity.

In peri-urban and rural zones, trading activities are concentrated along NH-38, NH-81 and State Highways linking Lalgudi, Manachanallur and Thiruverumbur, forming ribbon-type commercial development patterns. Employment concentrations closely follow these trade corridors, indicating the market-oriented and mobility-dependent nature of trading enterprises. The observed pattern reflects a strong integration between transport infrastructure and commercial location dynamics, suggesting the need for structured commercial zoning, organized market complexes and traffic management strategies along major corridors to enhance efficiency and urban liveability.




*Map 8.10 Service MSMEs in Tiruchirappalli LPA*




*Map 8.11 Trading based MSMEs*

*Table 8.21 Sector wise spatial distribution and employment characteristics of MSMEs*

| Sector | Concentration Areas | Spatial Pattern | Employment Concentration | Key Inferences |
|---|---|---|---|---|
| Manufacturing | Corporation Thiruverumbur, Thuvakudi, Manachanallur, Lalgudi | Corridor-based clustering along NH-81 (Tiruchirappalli–Pudukkottai), NH-38 (Tiruchirappalli–Thanjavur), railway corridors | High employment density in Thiruverumbur–Thuvakudi industrial belt and Ariyamangalam | Manufacturing activities are transport-oriented and land-dependent, preferring peri-urban zones with large land parcels, industrial estates, logistics access and reduced urban congestion. |
| Services | Cantonment, Thillai Nagar, Woraiyur, Srirangam, K. Abishekapuram, Palakkarai, Chathram Bus Stand area Towards Koothappar TP | Strong centralized clustering in urban core | Highest employment concentration in Corporation area | Services dominate the urban core, driven by market accessibility, institutional presence, footfall and transit connectivity, indicating a service-led urban economy. |
| Trading | Cantonment, Palakkarai, Chathram Bus Stand, Srirangam, Thillai Nagar; along NH-38, NH-81, SH corridors | Linear ribbon development along major roads & transport nodes | Moderate to high along commercial corridors and market hubs | Trading activities are highly transport-dependent, clustering along arterial roads and commercial spines, reinforcing corridor-based commercial development. |

*Source: Spatial analysis*

#### 8.3.2.3.4 Employment in MSMEs

The employment distribution clearly indicates that micro enterprises are the largest contributors to job generation, accounting for the overwhelming share of employment across all sectors. Among them, the services sector provides the maximum employment, followed by manufacturing and trading, reflecting the labour-intensive nature of urban service activities.

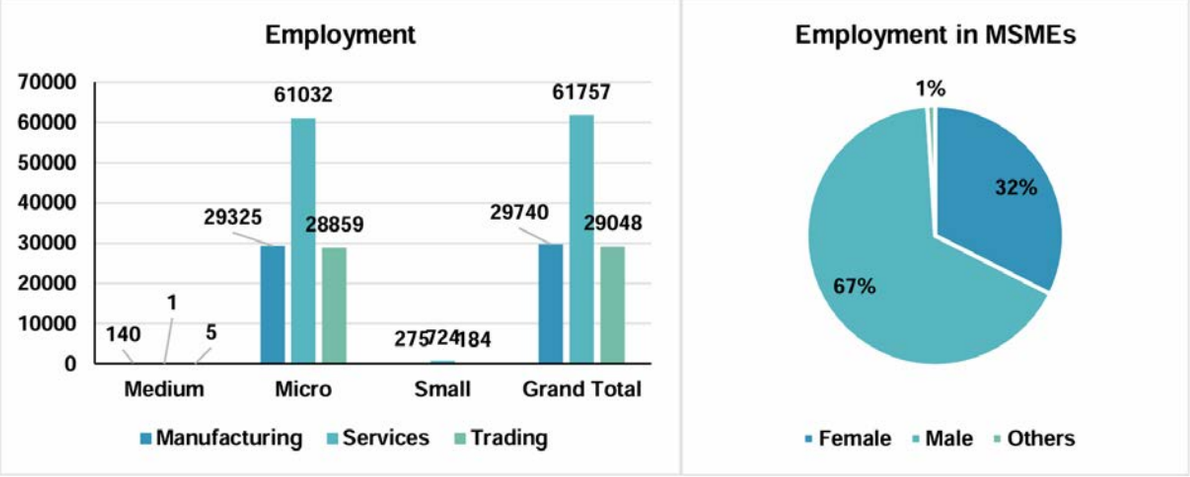
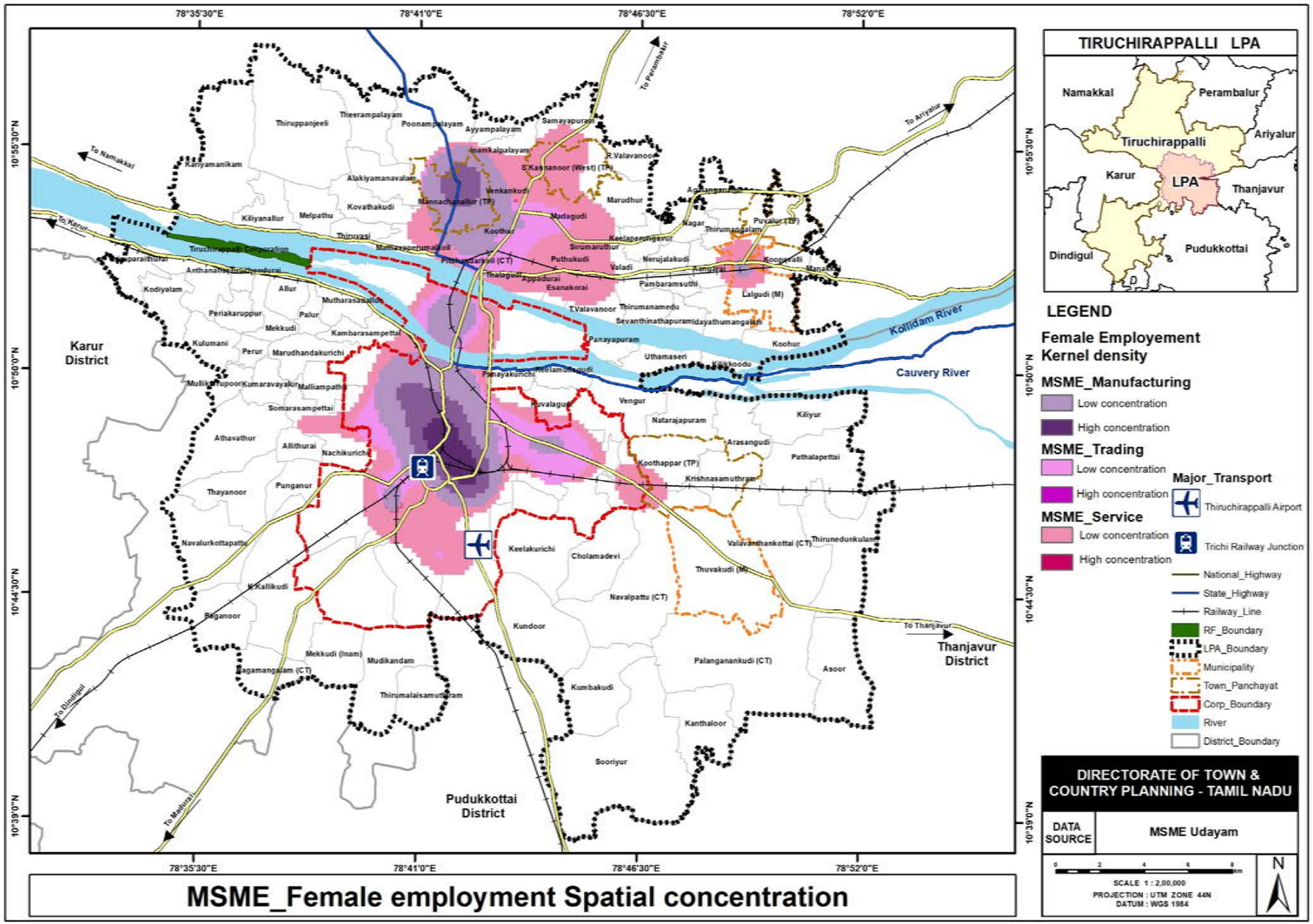



*Figure 8.41 Employment in Tiruchirappalli LPA*

*Source: Udayam data from 2020 to 2025*

The gender-wise employment distribution in MSMEs indicates a predominant participation of male workers, who constitute the major share of total employment, while female employment accounts for a relatively smaller yet significant proportion. This pattern reflects the male-dominated nature of industrial, trading and service activities, particularly in manufacturing and commercial sectors, which traditionally exhibit lower female workforce participation. However, the notable presence of female workers also highlights emerging opportunities for women in service-oriented and small-scale enterprise activities. The MSME employment structure (2025) indicates that women account for about 32% of MSME employment, compared to a female workforce participation share of only 26.4% at the LPA level as per Census 2011. This suggests that MSMEs, particularly in services and trade, provide more accessible and inclusive employment opportunities for women than the broader economy. It acts as a key entry point for female employment in Tiruchirappalli LPA, outperforming the general labour market in terms of gender inclusion. Female participation improves where homework proximity, informal sector flexibility, and agro-linked MSMEs are present, reinforcing the need for decentralised employment nodes.

The spatial pattern suggests that female employment in MSMEs within Tiruchirappalli LPA is closely aligned with urbanisation, accessibility, and service-sector dominance, rather than with large-scale industrial zones. The findings underline the importance of compact urban growth, mixed-use environments, and service-linked MSME clusters in supporting inclusive employment, particularly for women, within the LPA.




*Map 8.12 MSME Female employment concentration in Tiruchirappalli LPA*

### 8.3.2.3.5 Investment, Net turnover In MSMEs

The investment distribution across MSME categories indicates a clear dominance of micro enterprises, which account for the highest share of total investment, particularly in the services sector, followed by trading and manufacturing. Among all sectors, services attract the maximum investment, highlighting the growing importance of service-based economic activities within the Tiruchirappalli LPA.

Manufacturing investment, remains comparatively lower, while small and medium enterprises contribute only a marginal share, reflecting limited large-scale or capital-intensive industrial activity. Overall, the pattern suggests a service-driven, low-to-moderate capital investment structure, characterized by widespread micro enterprises and a strong orientation towards urban service functions and commercial activities.

The net turnover pattern reveals that micro enterprises generate the highest overall turnover, with a particularly strong contribution from the trading sector, followed by services and manufacturing. This indicates the dominance of commercial and market-oriented activities within the MSME ecosystem of Tiruchirappalli LPA. At the aggregate level, trading and services together account for the majority of total turnover, highlighting a consumption-driven and service-led urban economy. Overall, the trend underscores the critical role of micro-scale commercial enterprises in sustaining local economic activity and revenue generation in Tiruchirappalli LPA.

### 8.3.2.3.6 Average employment size in MSMEs

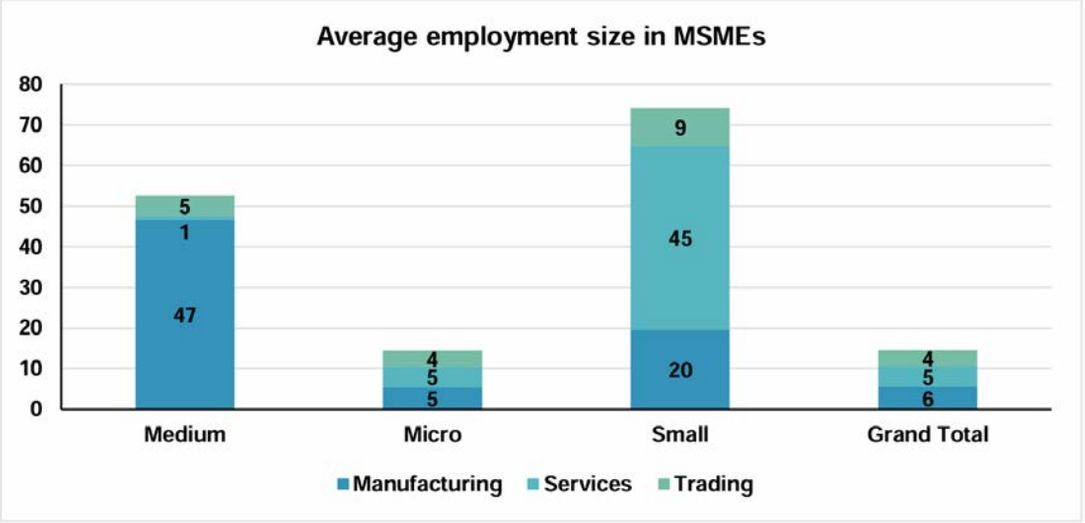
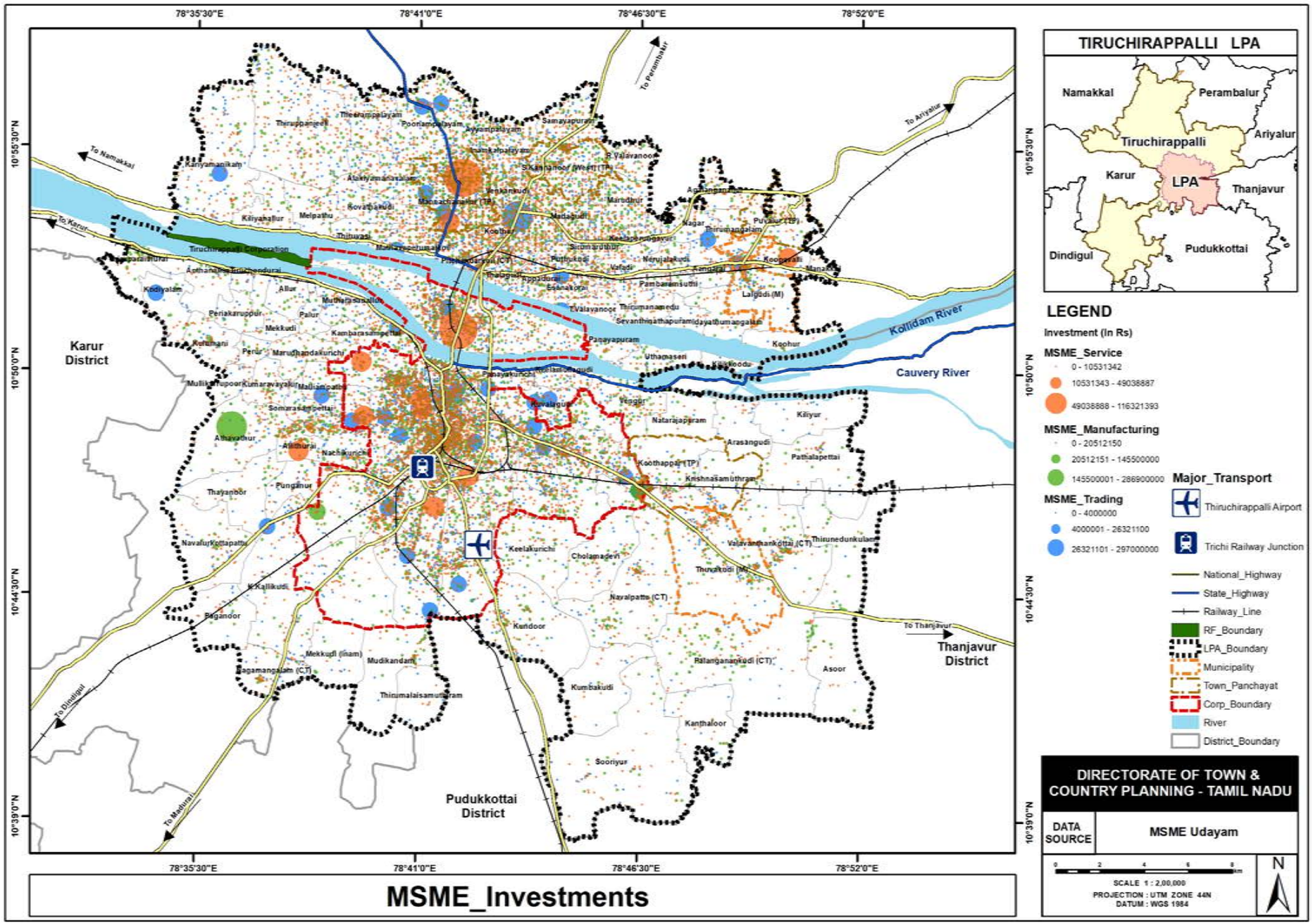



*Figure 8.42 Average employment in MSMEs in Tiruchirappalli LPA*

*Source: Udayam data from 2020 to 2025*




*Map 8.13 Investments in MSME*

The average employment size across MSME categories indicates clear variation in workforce scale. Small enterprises exhibit the highest average employment, particularly within the services sector, reflecting their relatively larger operational capacity and labour absorption potential. Medium enterprises also show a high average employment size, largely driven by manufacturing activities, indicating their role in supporting skilled and semi-skilled industrial jobs. In contrast, micro enterprises display the lowest average employment, confirming their small-scale, family-based and self-employment-oriented nature.

Overall, the trend highlights a graduated employment structure, where enterprise size directly influences workforce capacity, emphasizing the importance of supporting micro enterprises to scale up into small and medium units for enhanced employment generation and economic stability.

### 8.3.2.3.7 MSME NIC 2 classification

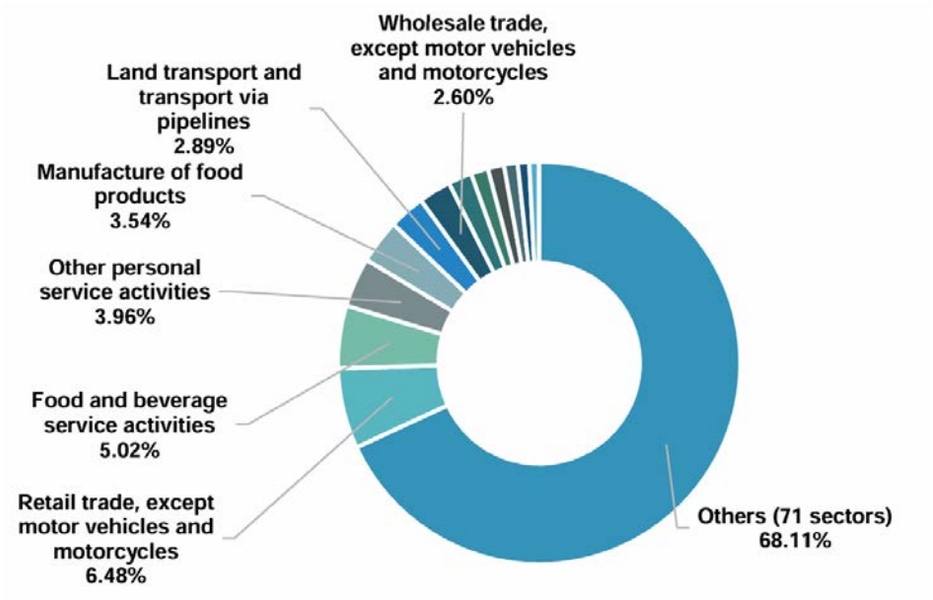



*Figure 8.43 MSME NIC 2 classification*

*Source: Udayam data from 2020 to 2025*

The MSME profile of Tiruchirappalli LPA shows a highly diversified enterprise base, with 71 small sectors aggregated under "Others", accounting for 68.11% of total units, reflecting the dominance of micro, informal and service-oriented activities. Among the major sectors, retail trade (6.48%), food & beverage services (5.02%), personal services (3.96%) and food manufacturing (3.54%) lead, highlighting a consumption-driven and service-led economy. Transport, logistics and light manufacturing sectors further support the district's role as a regional trade and industrial hub. Overall, the MSME structure emphasizes entrepreneurial diversity, employment generation and economic resilience.

### 8.3.2.4 Traditional Economy and Artisan Clusters in Tiruchirappalli

Tiruchirappalli district retains a vibrant traditional economic base, primarily anchored in handloom weaving, handicrafts and Khadi & Village Industries, which continue to provide livelihood security, cultural continuity and inclusive employment, particularly for rural and semi-urban communities. Key handloom clusters are concentrated in Tiruchirappalli Corporation, Thiruverumbur, Lalgudi and Manachanallur, supporting over 770 weaving families. The production of sarees, dhoties and towels, totalling 15.43 lakh metres annually, underscores the district's sustained craftsmanship and textile heritage.

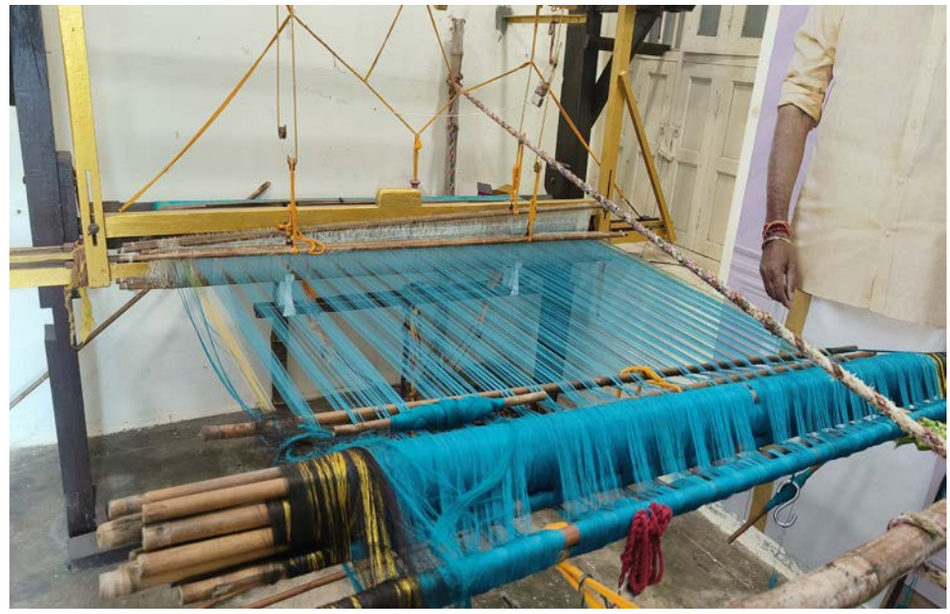


*Figure 8.44 Uraiyur Cotton Handloom*

*Source: Reconnaissance Survey*

*Table 8.22 Traditional Economic Clusters – Tiruchirappalli District*

| Sector | Key Locations | Scale of Activity | Economic Role |
|---|---|---|---|
| Handlooms | Tiruchirappalli Corporation, Thiruverumbur, Lalgudi, Manachanallur | 772 families engaged; 15.43 lakh metres annual cloth production | Rural livelihoods, textile heritage, MSME employment |
| Handicrafts | Tiruchirappalli Corporation | 150+ families (Tanjore paintings, paper maché, clay products) | Tourism-linked income, micro-enterprises |
| Khadi & Village Industries | District-wide | Rs.1,142.05 lakh production; 81 persons employed | Self-employment, rural economy, artisan livelihoods |

*Source: District and Block statistical handbook, 2023-24*

In addition, handicraft clusters within Tiruchirappalli Corporation, especially Tanjore paintings, paper-mâché and clay products, engage over 150 families, contributing to micro-enterprise development and tourism-linked income generation. The Khadi and Village Industries sector, with a total production value of Rs.1,142.05 lakh, plays a significant role in rural employment, providing direct employment to 81 persons, particularly through soap manufacturing, which alone contributes Rs.1,124 lakh in production. However, the relatively low sales turnover of Rs.215.78 lakh indicates substantial untapped market potential, highlighting the need for improved branding, marketing, product diversification and supply chain integration.

*Table 8.23 Khadi and Village Industries – Production & Economic Contribution*

| Product Category | Production Value (Rs. lakhs) | Sales Value (Rs. lakhs) | Key Economic Contribution |
|---|---|---|---|
| Soap Manufacturing | 1124.00 | 125.24 | Largest contributor, employment generation |
| Yarn Khadi | 18.50 | 18.50 | Rural spinning livelihoods |
| Khadi Products / Cloth | – | 20.26 | Traditional textiles |
| Silk Products | – | 15.10 | Niche handloom segment |
| Honey | – | 16.04 | Natural & forest-based livelihoods |
| Leather Products | – | 2.07 | Small artisan enterprises |
| Others | – | 8.55 | Cottage & informal industries |
| Total | 1142.05 | 215.78 | Rural income & employment generation |

*Source: District and Block statistical handbook, 2023-24*

Although modest in scale compared to large industries, these traditional sectors significantly contribute to inclusive economic growth, women's participation, rural income stability, skill preservation and cultural tourism. Strengthening these clusters through infrastructure support, cluster-based development programs, e-commerce integration, design innovation and tourism linkages can substantially enhance their economic contribution, ensuring sustainable livelihoods and socio-economic resilience in the district.

#### 8.3.2.5 Exports from Tiruchirappalli district

Exports from Air Cargo Tiruchirappalli in 2018-19 were Rs 241 Crore ($ 34.68 million). There were 53 commodities exported during the year.

*Table 8.24 Principal commodities exported from Air Cargo Tiruchirappalli*

| S.no. | Export commodity | Value (Rs. crore) | Value (us $ million) |
|---|---|---|---|
| 1 | Petroleum Products | 179.3 | 25.87 |
| 2 | IC Engines & Parts | 20 | 2.83 |
| 3 | Fresh Vegetables | 17.97 | 2.58 |
| 4 | Floriculture Products | 10.23 | 1.47 |
| 5 | Fresh Fruits | 4.3 | 0.62 |
| 6 | Dairy Products | 3.73 | 0.53 |
| 7 | Others | 5.45 | 0.78 |
| 8 | Total | 240.98 | 34.68 |

*Source: DIC 2019 20 Tiruchirappalli report*

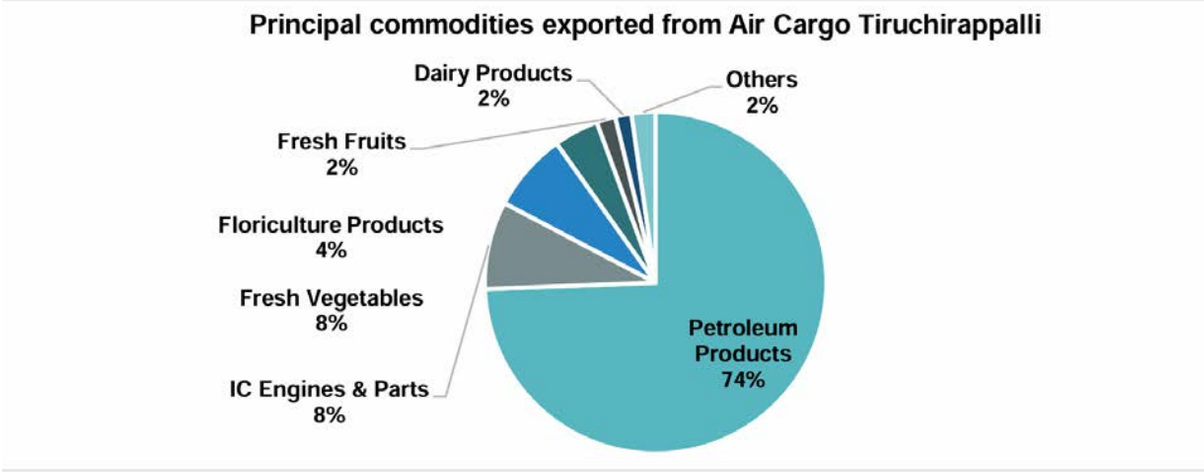



*Figure 8.45 Principal commodities exported from Air Cargo Tiruchirappalli*

*Source: DIC 2019 20 Tiruchirappalli report*

*Table 8.25 Destination of exports from Air cargo Tiruchirappalli*

| S.no. | Country | Value (Rs. crore) | Value (us $ million) |
|---|---|---|---|
| 1 | Malaysia | 57.83 | 8.45 |
| 2 | Singapore | 55.44 | 8.03 |

| S.no. | Country | Value (Rs. crore) | Value (us $ million) |
|---|---|---|---|
| 3 | United Arab Emirates | 29.57 | 4.3 |
| 4 | New Zealand | 20 | 2.83 |
| 5 | Sri Lanka | 8.47 | 1.24 |
| 6 | Others | 69.67 | 9.83 |
| 7 | Total | 240.98 | 34.68 |

*Source: DIC 2019 20 Tiruchirappalli report*

The destination profile of exports from Tiruchirappalli Air Cargo Terminal indicates a strong orientation towards Southeast Asia and Middle Eastern markets. Malaysia (Rs.57.83 crore, 24%) and Singapore (Rs.55.44 crore, 23%) together account for nearly half of total exports, reflecting robust trade linkages with ASEAN economies. The United Arab Emirates (Rs.29.57 crore, 12%) further highlights Tiruchirappalli's connectivity with Gulf markets, which are major hubs for petroleum products, engineering goods and agro-commodities.

New Zealand and Sri Lanka, though smaller in share, indicate the district's reach into Oceania and South Asian trade networks, while the diversified 'Others' category (Rs.69.67 crore, 29%) demonstrates market spread across multiple countries, reducing export dependency risks. This diversified export geography enhances economic resilience, stabilizes industrial demand and promotes sectoral growth in petroleum products, engineering components, food processing and perishables. Strong international connectivity supports higher industrial output, MSME export participation, foreign exchange earnings and employment generation. The export pattern further reinforces the importance of improving air cargo infrastructure, multimodal logistics facilities and the proposed Dry Port at Tiruchirappalli, which can significantly reduce logistics costs, improve turnaround time and expand the district's export footprint.

### 8.3.3 Tertiary sector

The service sector constitutes the dominant component of Tiruchirappalli Local Planning Area's economy and is primarily anchored in education, healthcare, public administration, trade, transport and other institutional and professional services. Supported by the city's role as a regional service centre for central Tamil Nadu, the sector provides stable employment and underpins urban economic activity, with emerging contributions from IT-enabled and knowledge-based services linked to its institutional base.

*Figure 8.46 Gandhi Market Road, Tiruchirappalli*

*Source: Reconnaissance survey*

The Gross District Value Added (GDVA) of the tertiary sector in 2022–23 is predominantly driven by Real Estate, Ownership of Dwelling and Business Services, which accounts for 30.12%, indicating strong urban expansion, housing demand and growth in commercial and professional activities. This is followed by Trade, Repair Services, Hotels and Restaurants at 24.82%, reflecting a vibrant retail economy, strong consumer demand and the growing importance of hospitality and tourism-related activities. The Other Services category contributes 19.06%, highlighting the diversification of service-based activities, including personal, social and community services. Financial Services, contributing 9.38%, indicate a moderately developed financial ecosystem supporting economic transactions, business operations and household investments. Public Administration (5.69%) and Transport by Other Means (5.72%) together suggest steady growth in governance functions and transport-linked services. In contrast, Railways (2.29%), Communication & Broadcasting Services (2.87%) and Storage (0.06%) exhibit comparatively smaller shares, pointing towards potential areas for infrastructure and service sector enhancement. Overall, the tertiary sector structure reflects a service-led urban economy, dominated by real estate, trade and diversified service activities, underscoring the district's transition towards a consumption-driven and service-oriented economic base.

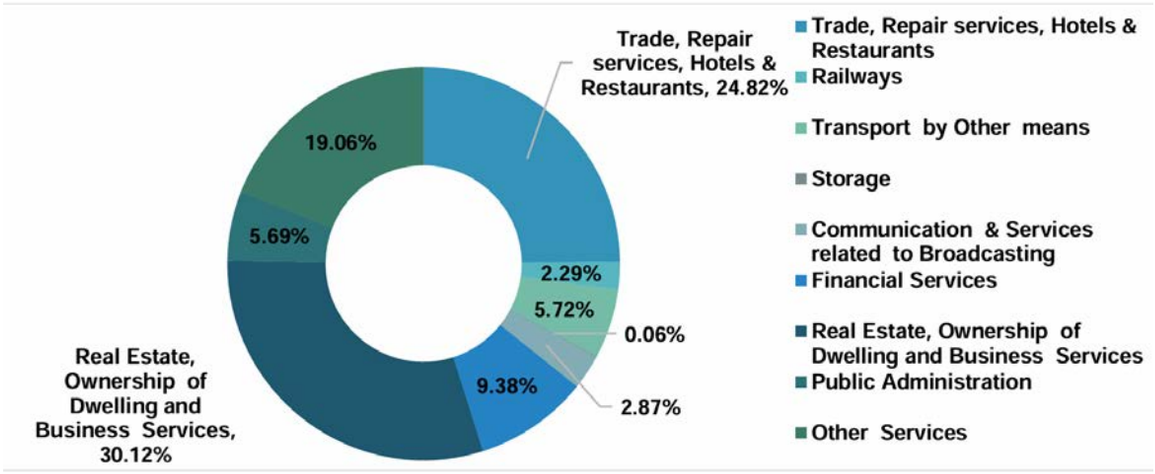



*Figure 8.47 Tertiary subsector GVA composition*

*Source: Department of economics and statistics, FY 2022 – 23*

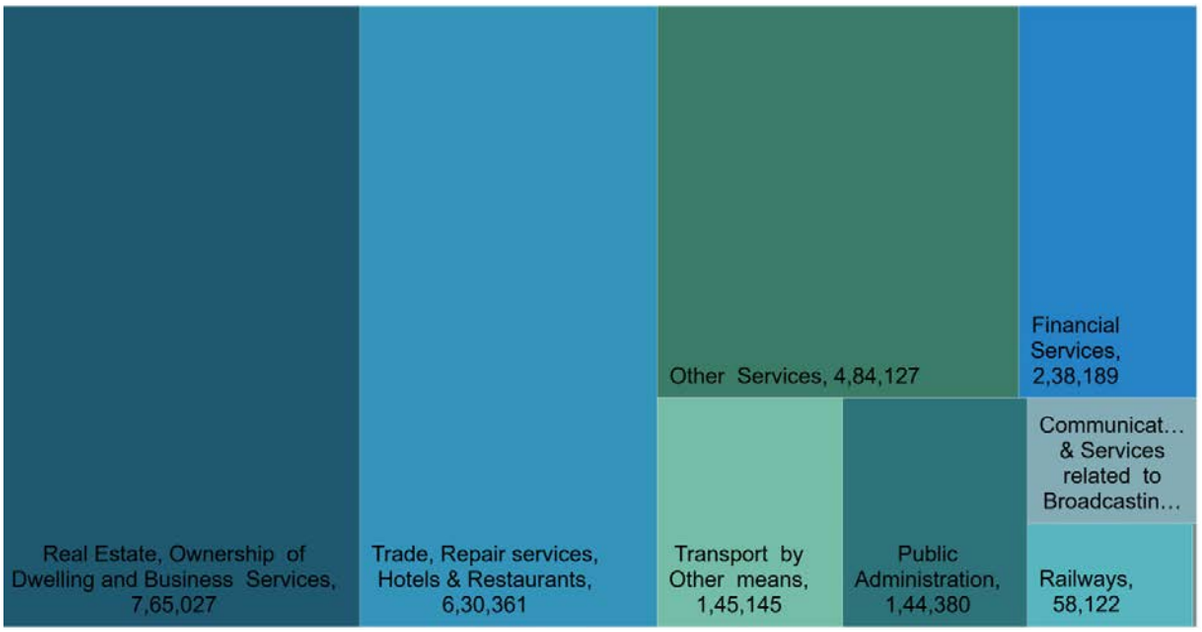



*Figure 8.48 Tertiary subsector GVA composition (in lakh Rs.)*

*Source: Department of economics and statistics, FY 2022 – 23*

### 8.3.3.1 Real Estate, Ownership of Dwellings and Professional Services

Real Estate, Ownership of Dwellings and Professional Services combines several distinct and heterogeneous activities, including: Real estate services, Ownership of dwellings, Information and computer-related services, Professional, scientific and technical services (including R&D and real estate) and Administrative and support service activities.

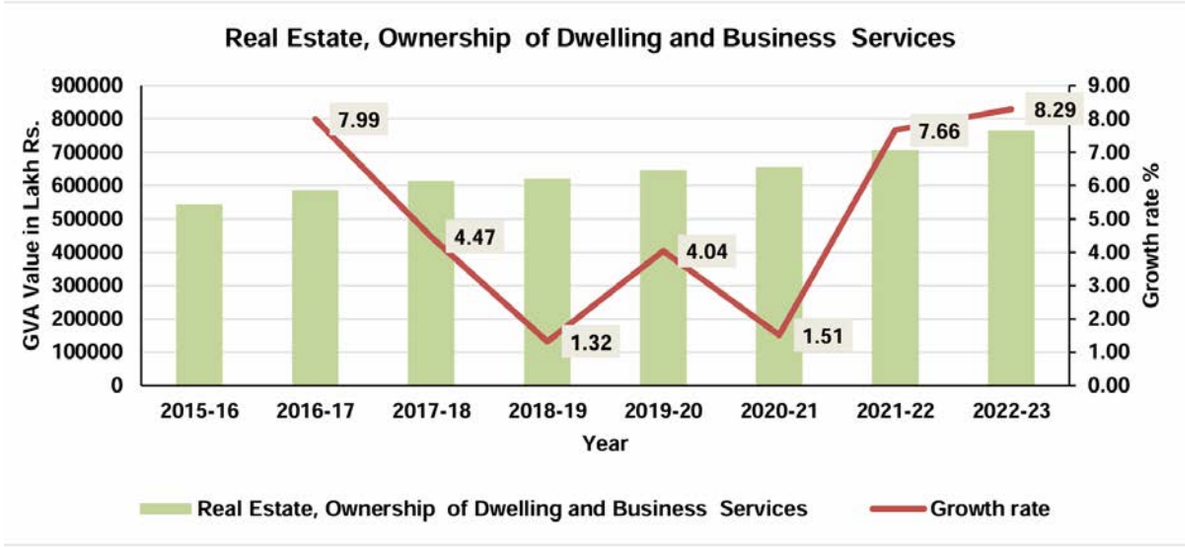



*Figure 8.49 Real-estate GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The Real Estate, Ownership of Dwelling and Business Services sector demonstrates steady and resilient growth, with GVA consistently increasing throughout the period. Growth moderated between 2017–18 and 2020–21, reflecting market slowdown and pandemic impacts, but rebounded strongly in 2021–22 (7.66%) and 2022–23 (8.29%). Overall, the trend highlights robust post-pandemic recovery, sustained urban expansion and rising demand for housing and commercial services, reinforcing the sector's role as a key driver of the tertiary economy.

### 8.3.3.2 Trade and commerce, Major commercial spaces

The Trade, Repair Services, Hotels and Restaurants sector shows strong long-term growth, with GVA steadily rising from 2015-16 to 2018-19, supported by robust consumer demand and commercial expansion. However, the sector recovered strongly in 2021-22 achieving 9.50% growth in 2022-23, indicating resilient revival, renewed tourism activity and strengthening retail and service demand.

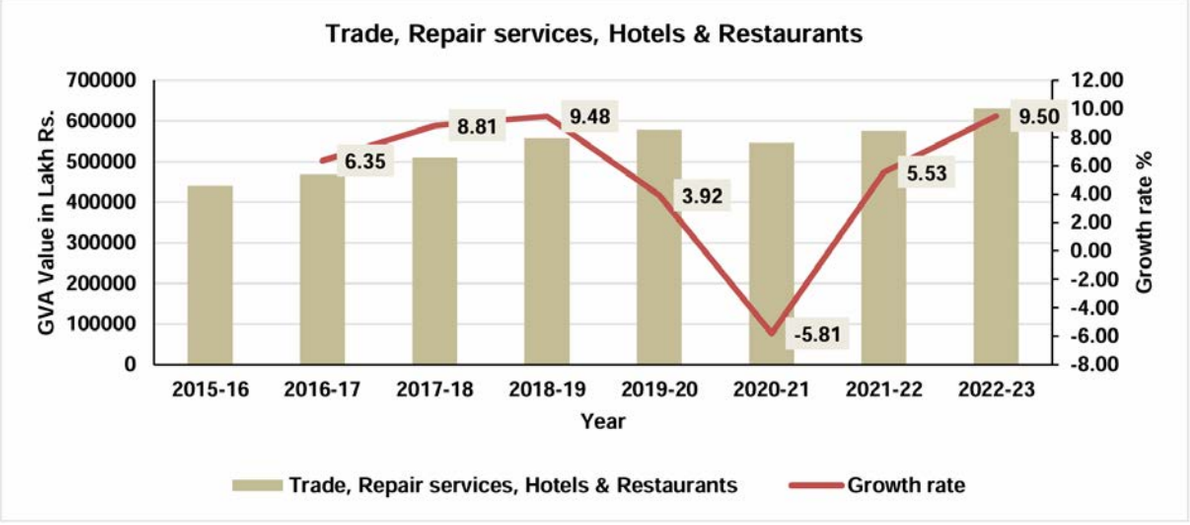



*Figure 8.50 Trade, Repair services etc GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

*Figure 8.51 NBS Commercial road*

*Source: Reconnaissance survey*

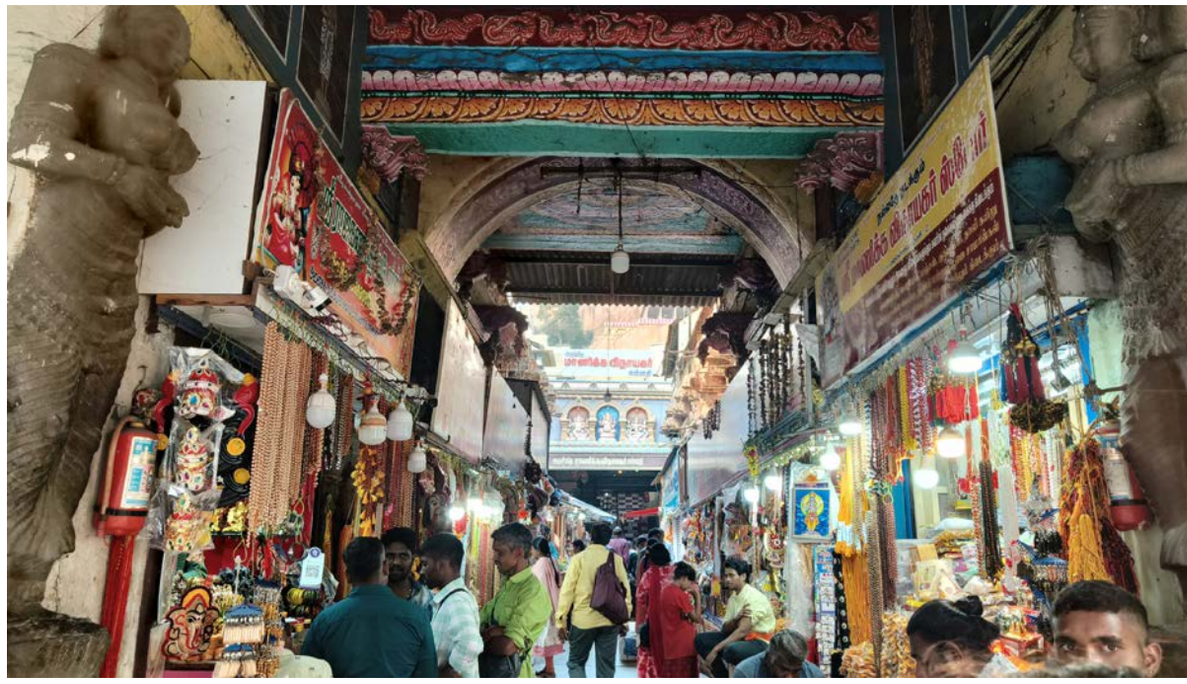


*Figure 8.52 NBS Commercial road*

*Source: Reconnaissance survey*

The Storage sector exhibits high volatility, with modest decline during 2016–17 and 2017–18, followed by a sharp surge in 2018–19 (93.36%), indicating a temporary expansion in warehousing demand. However, the sector shows gradual recovery in 2021–22 and 2022–23, with positive growth, suggesting revival in logistics activity and improving supply-chain dynamics, though overall performance remains limited and unstable.

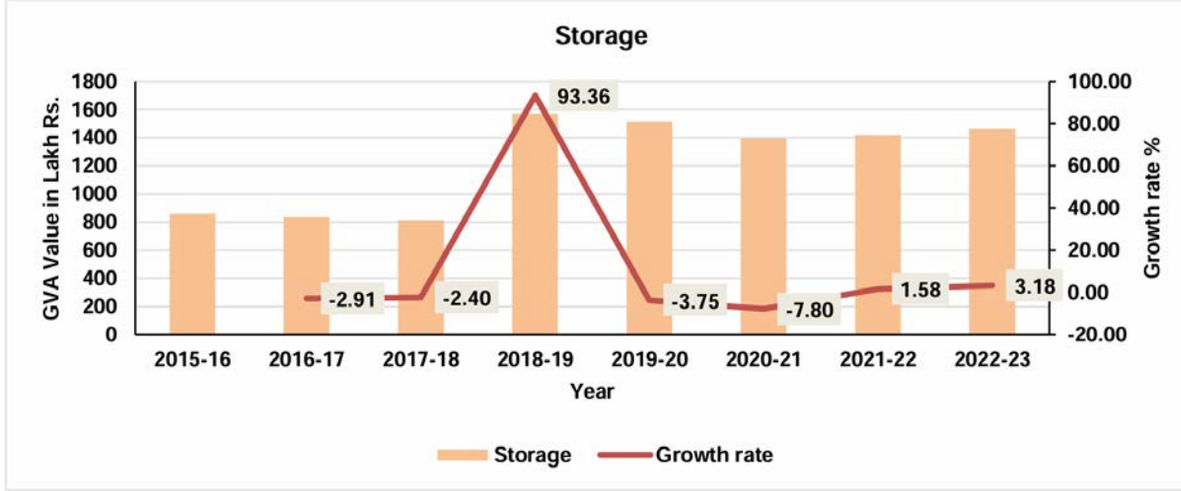
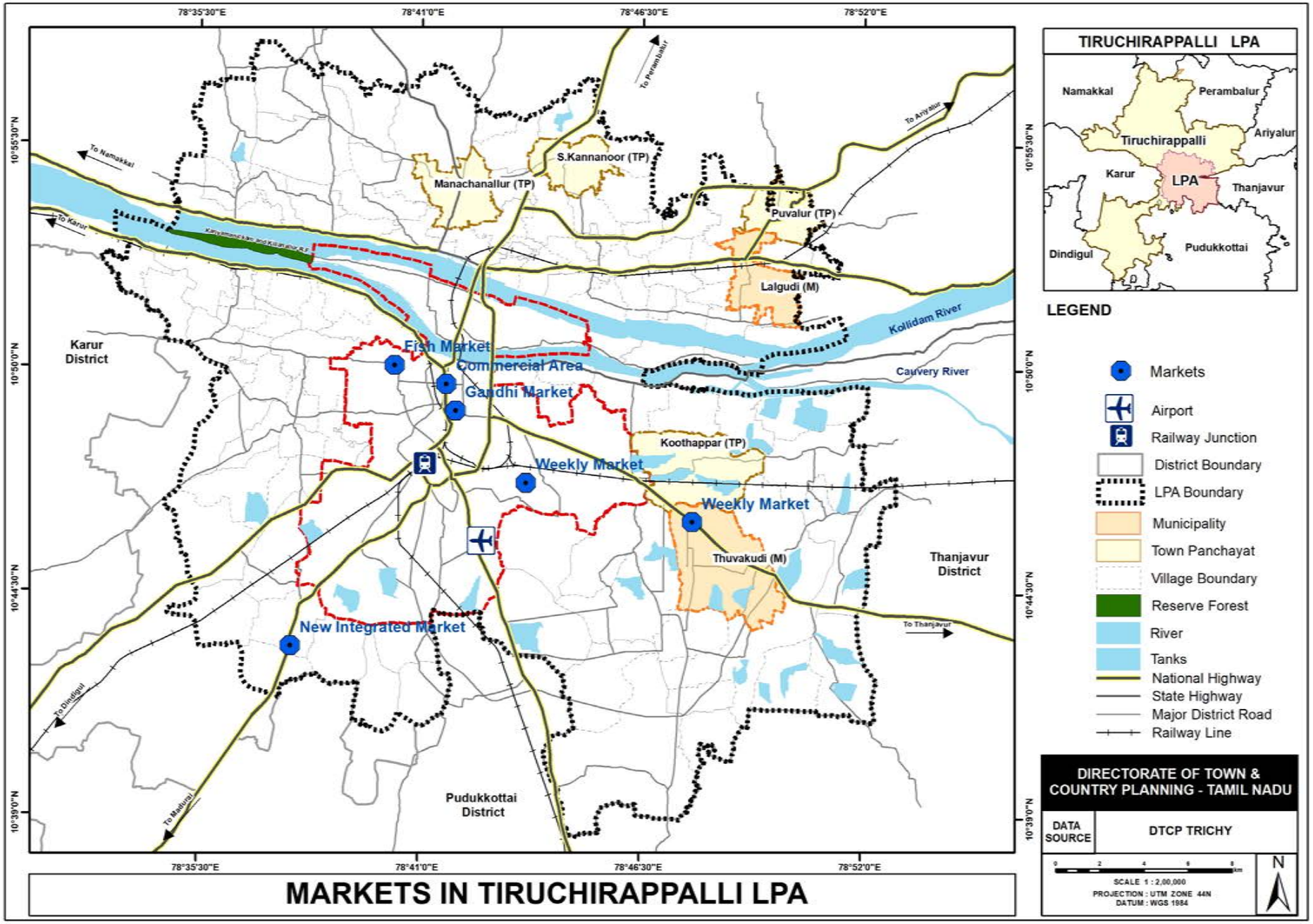



*Figure 8.53 Storage GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*




*Map 8.14 Markets in Tiruchirappalli LPA*

*Table 8.26 Regulated markets in Tiruchirappalli district*

| Sl.No | Regulated Market | No. of Commodities arrived | Arrivals (in M.T) | Receipts (in Lakhs) |
|---|---|---|---|---|
| 1 | Tiruchirappalli | 25 | 11076.319 | 34.83 |
| 2 | Manachanallur | 15 | 4856.267 | 9.53 |
| 3 | Lalgudi | 14 | 5118.448 | 8.34 |

*Source: District statistical handbook 2023 24*

*Figure 8.54 Palakarai Market Street, Tiruchirappalli*

*Source: Reconnaissance survey*

*Figure 8.55 Ghandhi Market (Vegetable market), Tiruchirappalli*

*Source: Reconnaissance survey*

#### 8.3.3.3 Financial Services, Public Administration, Communications & Broadcasting Services

The Financial Services sector shows a steady long-term increase in GVA from 2015–16 to 2022–23, indicating sustained expansion and growing economic significance. Growth peaked sharply in 2017–18 (13.21%), followed by moderation and fluctuations, with a notable contraction in 2021–22 (–1.16%). The sector rebounded in 2022–23 with a growth of 3.81%, indicating recovery and renewed momentum. Overall, the trend reflects structural resilience, gradual financial deepening and stable expansion of financial activities in the district economy.

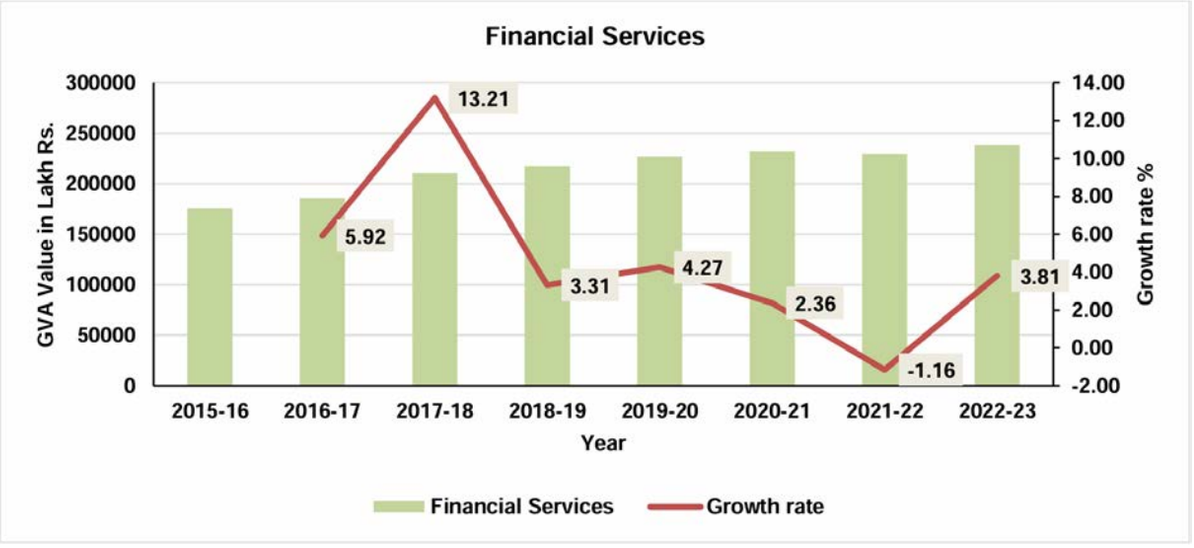



*Figure 8.56 Financial services GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The Public Administration sector exhibits high volatility in GVA growth over the period, with modest fluctuations until 2017–18 and a strong rebound in 2021–22 (18.29%). However, growth again declined in 2022–23 (–9.58%), indicating fiscal tightening and expenditure adjustments. Overall, the trend suggests instability driven by policy shifts, economic shocks and fluctuating public spending patterns.

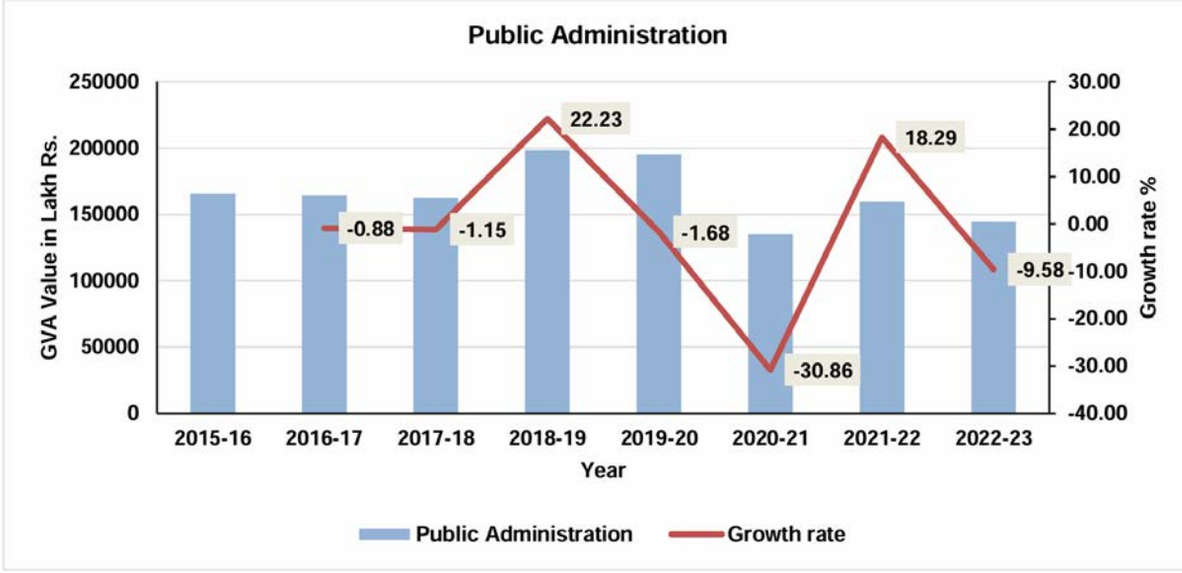



*Figure 8.57 Public administration GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The Communication and Broadcasting Services sector shows overall fluctuation with moderate long-term recovery, declining steadily from 2015–16 to 2018–19, followed by a strong rebound in 2019–20 (6.65%). The sector recovered significantly in 2022–23 (6.26%), indicating renewed demand for digital, communication and media services.

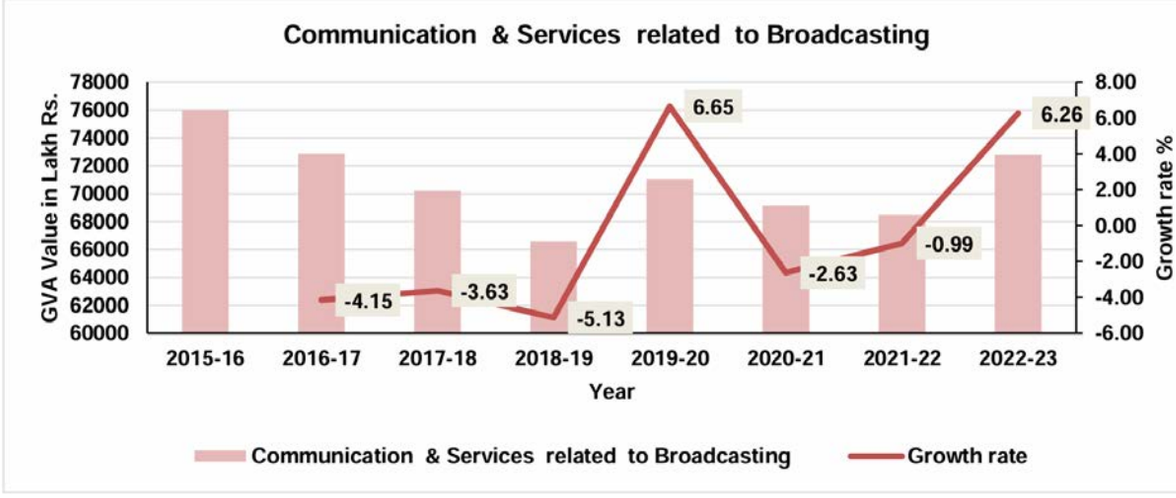



*Figure 8.58 Communications & Services GVA in Tiruchirappalli district*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

#### 8.3.3.4 Transport and Other modes service sectoral GVA

The Railways sector exhibits notable volatility, with moderate growth up to 2017–18, followed by a steady decline culminating in a sharp contraction during 2020–21 (–18.71%), reflecting pandemic-induced disruptions in passenger and freight movement. The sector recovered strongly in 2021–22 (10.09%) and maintained positive growth in 2022–23 (7.51%), indicating revival in rail operations, mobility and logistics demand, though overall performance remains sensitive to external shocks.

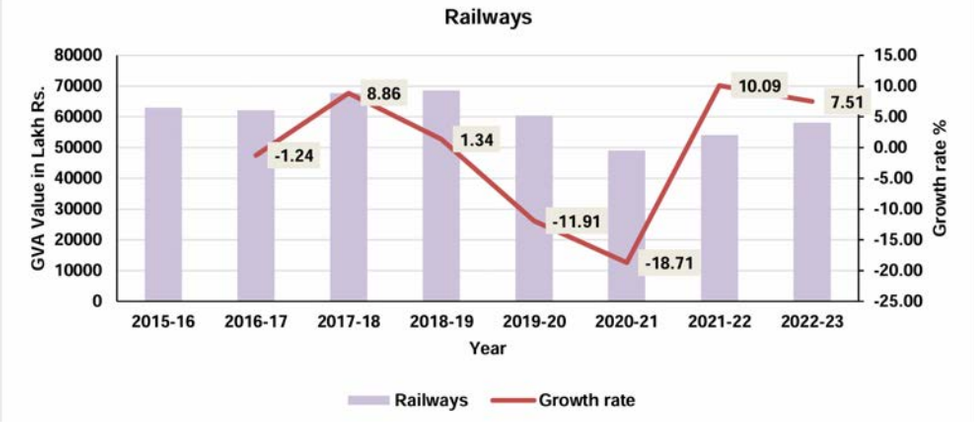



*Figure 8.59 Railways GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The Transport by Other Means sector shows a consistent declining trend from 2016–17 to 2020–21. A strong rebound in 2021–22 (11.63%) indicates recovery in transport activity, though growth again turned negative in 2022–23 (–9.43%), suggesting continued volatility and sensitivity to economic and demand fluctuations.

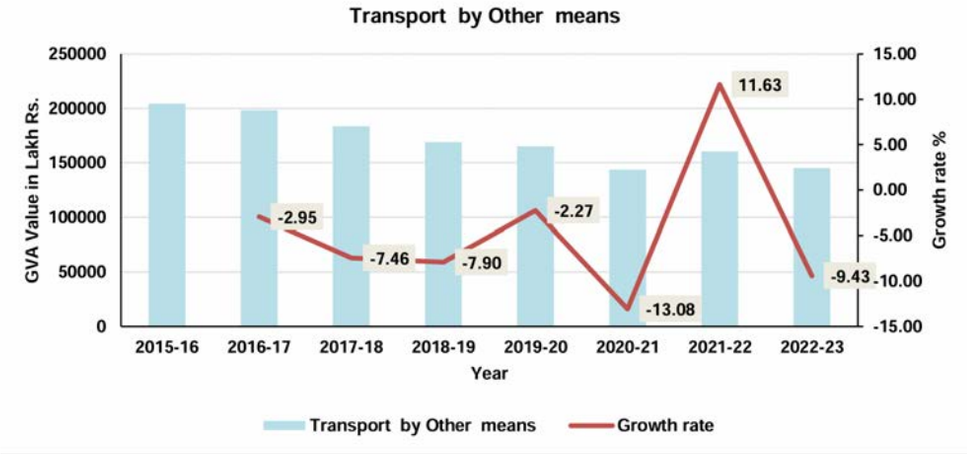



*Figure 8.60 Transport by other means GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

#### 8.3.3.5 IT sector, ITES and GCCs (Global Capability Centres)

Tiruchirappalli is steadily strengthening its technology ecosystem through the development of both existing and upcoming infrastructure projects. At present, the ELCOT IT Park at Navalpattu provides approximately 1 lakh square feet of office space, with plans underway to significantly expand the facility to accommodate future growth. A major upcoming development is the TIDEL Park at Panjapur, a six-storey IT complex currently under construction. Spanning significant area and involving an investment of Rs.415 crore, the project is expected to generate over 5,000 direct employment opportunities, positioning Tiruchirappalli as an emerging technology hub.

In addition, co-working spaces are available across the city at affordable rates, ranging between Rs.3,500 and Rs.5,500 per seat per month, supporting start-ups and flexible working models. Further, as per a recent CII Tiruchirappalli survey, over 8 lakh square feet of prime commercial space is readily available, offering significant potential for the establishment of Global Capability Centres (GCCs) and large-scale IT operations.

*Figure 8.61 ELCOT IT park, Tiruchirappalli*

*Source: DTCP, Tiruchirappalli*

*Table 8.27 IT sector, ITES in Tiruchirappalli*

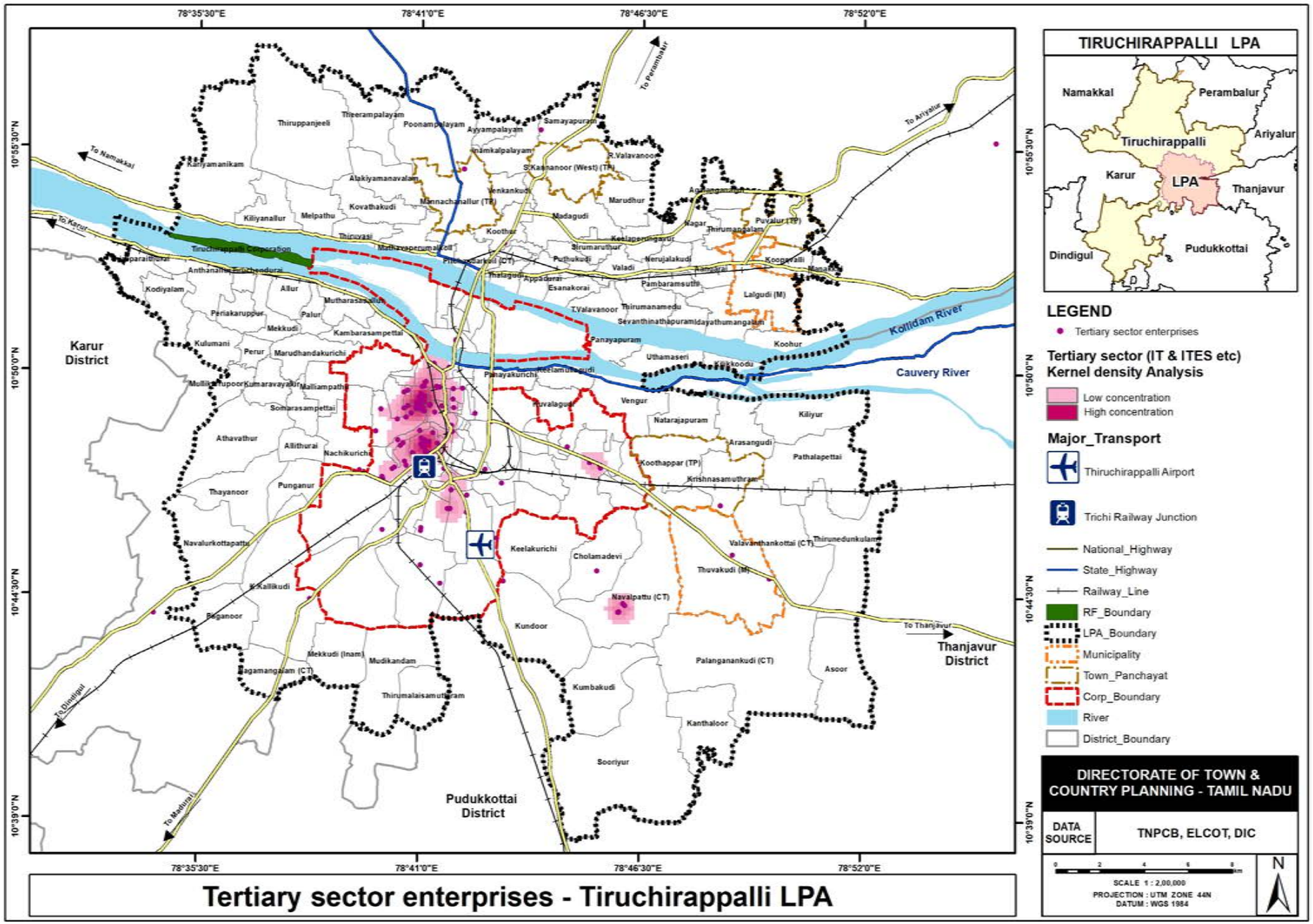
| Component | Details |
|---|---|
| ELCOT IT Park, Navalpattu (SEZ) | 147.61 acres IT SEZ; major tenants include Sutherland, WNS, Zylog, Assyst, HCL Infosystems, Vdart; current built-up area 1.8 lakh sq.ft, expansion to 7.3 lakh sq.ft underway |
| TIDEL Park Tiruchirappalli (Upcoming) Panjapur | Rs. 315.2 crore investment; expansion will triple IT office space; total govt IT office space 7.3 lakh sq.ft |
| Major IT / BPM Companies in Tiruchirappalli | Accenture (upcoming), Sutherland, WNS, Capgemini, Allsec, Omega Healthcare, Firstsource, Vuram, Assyst |
| Overall IT City Ranking | Identified as emerging Tier-II IT hub after Coimbatore, Madurai & Salem |

*Source: Government of Tamil Nadu IT Department, The Hindu, Times of India, CII Tiruchirappalli Zone and industry reports (2023–2025).*

**Spatial distribution of IT&ITES sector**

The spatial pattern of IT sector activities in Tiruchirappalli LPA shows a highly concentrated distribution within the Tiruchirappalli Corporation limits, particularly in Thillai Nagar, Cantonment, Uraiyur, K.K. Nagar which together form the IT service core. Significant IT clusters are observed in Navalpattu ELCOT, indicating IT growth nodes along major transport corridors and near institutional and industrial areas. Moderate presence is also noted along the NH and State Highway, reflecting the importance of connectivity, accessibility and infrastructure availability in driving IT location choices. Peripheral village panchayats show absence of IT&ITeS, highlighting the urban-centric and corridor-driven nature of IT sector growth. Overall, the spatial trend indicates compact core concentration with gradual outward expansion, suggesting strong potential for planned decentralization through suburban IT parks and knowledge corridors.

A globally integrated technology and staffing is operating a Global Centre at Anna University's EDO ABIRF campus in Tiruchirappalli. The centre functions as a key innovation hub for research and development in compact CO capture and advanced thermal management solutions, contributing to sustainable semiconductor manufacturing and clean technology advancement. In addition, Modelon's advanced system modelling and simulation platforms facilitate innovation-driven product development and industrial efficiency. The presence of such high-technology and knowledge-intensive activities reinforces Tiruchirappalli's role as a growing regional hub for IT-enabled services, R&D and advanced engineering, supporting the city's long-term economic diversification and knowledge-based urban development objectives.




*Map 8.15 IT and ITES in Tiruchirappalli LPA*

### 8.3.3.6 Education and other services-based economy

The "Other Services" sector encompasses diverse socio-economic service activities, including education, healthcare and social assistance, services of membership organizations, cultural, artistic and recreational services, personal service activities (such as laundry, grooming, tailoring and funeral services) and domestic household services employing personnel, collectively contributing to social infrastructure and urban liveability.

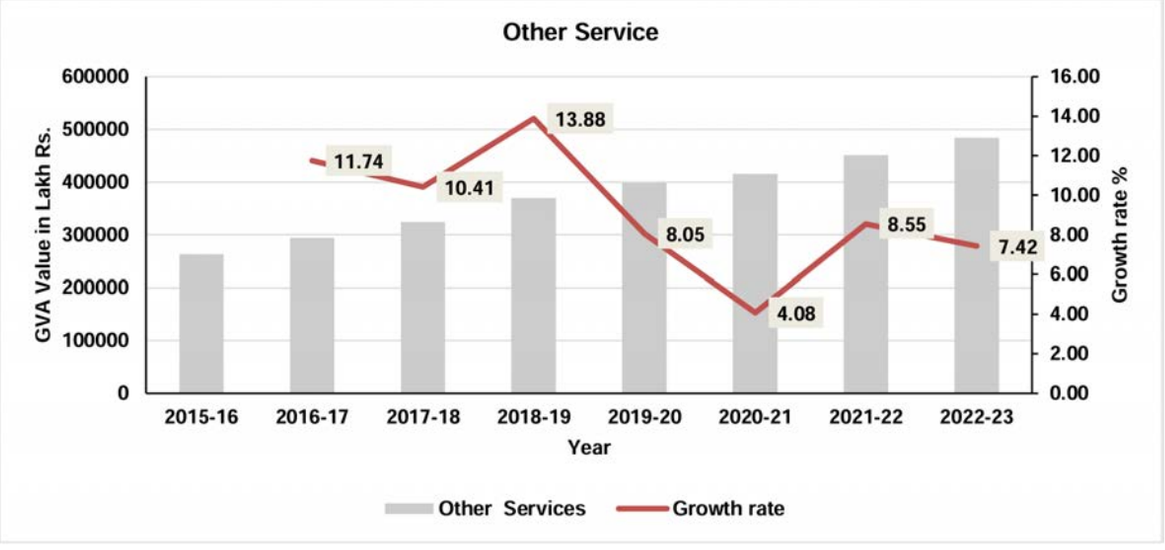



*Figure 8.62 Other Services GVA in Tiruchirappalli district - Trend analysis*

*Source: Department of economics and statistics, FY 2015 16 to 2022 23*

The Other Services sector demonstrates steady and consistent growth in GVA throughout the period, reflecting expanding personal, social and professional service activities. Growth peaked in 2018–19 (13.88%), moderated during 2019–20 and 2020–21, with a notable slowdown in 2020–21 (4.08%) and the sector recovered in 2021–22 and maintained stable growth in 2022–23 (7.42%), indicating resilience, diversification and sustained demand for service-based activities.

**Tiruchirappalli's Talent Ecosystem**

Tiruchirappalli is a major higher education and talent hub, supported by over 180 institutions, producing more than 55,000 graduates annually. Around 30,000 graduates are from Arts and Science streams, supporting business services, administration and analytics, while nearly 15,000 engineering graduates form a strong base for IT, manufacturing, electronics and R&D sectors. About 5,000 polytechnic graduates provide skilled technical manpower for industrial operations. In addition, around 2,000 graduates each from medical

and management streams support healthcare and corporate services and about 1,200 law graduates strengthen legal and regulatory services. The presence of premier institutions such as Bharathidasan University, NIT Tiruchirappalli, SASTRA, SRM and Tamil Nadu National Law University ensures high-quality talent, fostering innovation and entrepreneurship. This strong and diversified talent base positions Tiruchirappalli as a strategic location for IT/ITES, R&D, healthcare, education-based industries and high-value service sector investments, offering both cost advantages and skilled workforce availability.

*Table 8.28 Education opportunities in Tiruchirappalli*

| Educational hub | Talent Pipeline | Graduates in Engineering | Premier Institutions | Diverse skills in Arts and Science |
|---|---|---|---|---|
| Concentrated ecosystem of 180+ colleges | 55,000+ graduates annually | 15,000+ Engineering & Technology graduates yearly | High-quality talent from Bharathidasan University, NIT, BDU, 11M, Dhanalakshmi Srinivasan, SRM, SASTRA. Tamil Nadu National Law School | 32,000+ graduates in Arts & Science for all business roles |

*Source: CII GCC report of Tiruchirappalli*

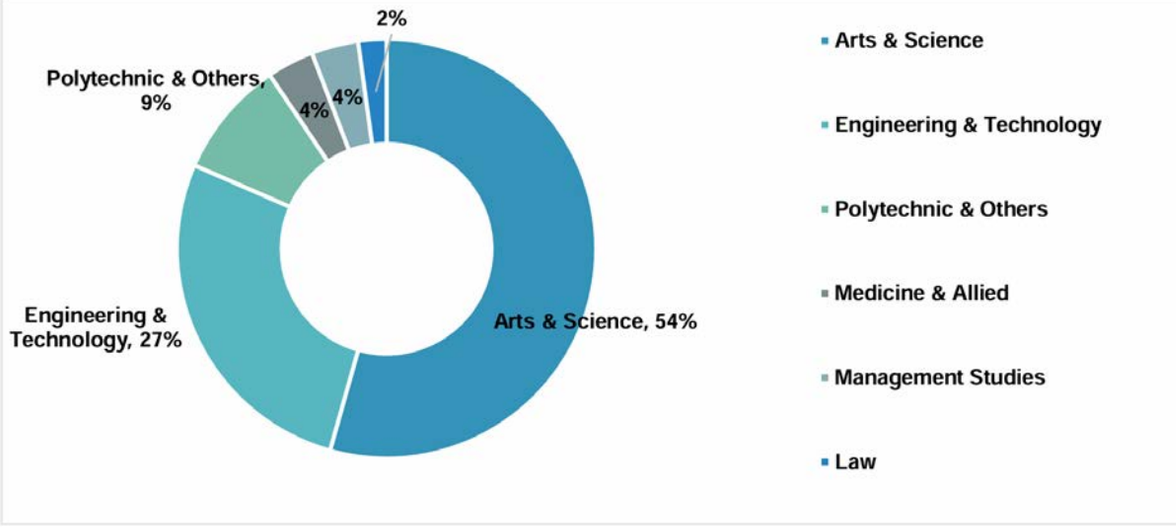



*Figure 8.63 Student enrolment distribution in Tiruchirappalli*

*Source: CII GCC report of Tiruchirappalli*

### 8.3.3.7 Tourism in Tiruchirappalli's Economy

Tourism plays a significant role in Tiruchirappalli's economy by generating employment, supporting local trade, hospitality, transport and services and contributing substantially to the district's GDDP. Driven mainly by pilgrimage, heritage and educational tourism, Tiruchirappalli attracts over 2.4 crore domestic visitors annually, creating strong multiplier effects across retail, accommodation, food services, transport and informal sectors, thereby strengthening the tertiary economy and local livelihoods.

*Table 8.29 Key Tourist Locations and Characteristics – Tiruchirappalli LPA*

| S.No | Tourist Location | Tourism Type | Remarks |
|---|---|---|---|
| 1 | Sri Ranganathaswamy Temple, Srirangam | Religious / Heritage | One of the 108 Divya Desams; major Vaikunta Ekadasi crowds |
| 2 | Samayapuram Mariamman Temple | Religious | Second highest revenue-generating temple in TN |
| 3 | Rock Fort Temple | Religious / Heritage | Iconic city landmark and panoramic viewpoint |
| 4 | Jambukeswarar Temple, Thiruvanaikkaval | Religious / Heritage | Panchabootha Sthalam (Water element) |
| 5 | Butterfly Park, Srirangam | Eco-Tourism | One of Asia's largest butterfly parks |
| 6 | Mukkombu (Upper Anaicut) | Eco-Leisure | Major weekend recreational destination |
| 7 | Kallanai (Grand Anicut) & Museum | Heritage / Engineering | Oldest functional dam in the world |
| 8 | Tiruchirappalli District Government Museum | Heritage / Educational | Core heritage tourism circuit |
| 9 | Tiruchirappalli Railway Museum | Industrial Heritage | Popular among students and families |
| 10 | Anna Science Centre & Planetarium | Educational Tourism | Regional science learning hub |
| 11 | Birds Park, Srirangam | Eco-Tourism | Emerging family tourism destination |
| 12 | Puliancholai Forest | Eco-Tourism | Picnic and short-trip destination |
| 13 | Pachamalai Hills | Eco / Adventure Tourism | Nature and tribal tourism |

*Source: Tourism Chapter ESA*

#### 8.3.3.8 Logistics and Storage

Tiruchirappalli's strategic central location, strong highway connectivity (NH-38, NH-81, NH-83), rail junction and international airport make it a key logistics and distribution hub for central Tamil Nadu. The city supports efficient movement of agro-products, engineering goods and industrial cargo, thereby reducing transport time and costs for industries and MSMEs. The proposed Dry Port / Inland Container Depot (ICD) along Manapparai - Dindugul road is expected to significantly strengthen Tiruchirappalli's export ecosystem by enabling local customs clearance, container handling, cold storage and multimodal freight transfer, transforming Tiruchirappalli into a regional logistics hub for central Tamil Nadu.

*Table 8.30 Key Logistics Infrastructure Supporting Tiruchirappalli Economy*

| Component | Details | Economic Impact |
|---|---|---|
| National Highways | NH-38, NH-81, NH-83 | Regional freight mobility, industrial access |
| Rail Connectivity | Major railway junction | Bulk goods movement, container freight |
| Tiruchirappalli International Airport | Cargo + international connectivity | Agro & FMCG exports |
| SIPCOT Industrial Park (Sooriyur–Elanthapatti) | Manufacturing & logistics support | Export-oriented industrial growth |
| Proposed Dry Port (ICD) | Near Manapparai–SIPCOT | Cost reduction, MSME export facilitation |
| Cold Storage & Warehousing | Proposed under logistics park | Boosts agro-export & food processing |

*Source: ELU, CII, Stakeholders Meet, SIPCOT*

*Table 8.31 Upcoming Dry Port (Inland Container Depot – ICD) at Tiruchirappalli*

| Parameter | Details |
|---|---|
| Proposed | Near Manapparai–Dindigul Highway, close to SIPCOT Industrial Park |
| Land Requirement | 21 acres |
| Project Type | Inland Container Depot (ICD) / Dry Port |
| Key Benefits | Reduces dependency on Chennai, Tuticorin & Kochi ports; Enables local customs clearance, packing and containerization; Lowers logistics cost and turnaround time; Supports engineering, agro-products, textiles and MSME exports |
| Economic Significance | Will position Tiruchirappalli as the primary logistics hub of Central Tamil Nadu, improving industrial competitiveness and export efficiency |

*Source: CII, Stakeholders meet*

## 8.4 Sunrise Sectors and Industrial Development Strategy

Tiruchirappalli has emerged as a strategically significant industrial and economic hub in central Tamil Nadu. In alignment with the Tamil Nadu Industrial Policy 2021, the Vision Tamil Nadu 2030 framework and strategic inputs from Guidance Tamil Nadu, Tiruchirappalli has been identified as a high-potential location for the promotion of industries such as EV Components, Electronics & Semiconductor Manufacturing, Food Processing & Agri-based Industries, Aerospace & Defence, Medical Devices & Biotechnology, Battery Manufacturing, Renewable Energy, Industrial Ancillary & Engineering Units, Advanced Engineering, Non-Leather Footwear and Logistics.

The identification of these sectors is based on a comprehensive assessment of the region's existing industrial strengths, locational advantages, logistics accessibility, land availability, workforce skills and market proximity. The proposed strategy aims to diversify the industrial base beyond traditional engineering and fabrication activities, promote technology-intensive and value-added manufacturing, enhance employment generation and improve the long-term economic resilience of the Tiruchirappalli.

### 8.4.1 Recent Investment Activities & Expansion Plans in Tiruchirappalli

Tiruchirappalli has witnessed significant recent investments across electronics manufacturing, advanced materials, IT services and food processing sectors, reflecting strong investor confidence and growing industrial momentum.

Major electronics manufacturing investment of approximately Rs. 2,000 crore has been announced for Tiruchirappalli, involving the establishment of a large-scale production facility with the potential to generate around 5,000 direct jobs. This investment is expected to significantly strengthen the district's electronics manufacturing ecosystem and position it as an emerging node in the state's electronics value chain. In addition, an advanced materials manufacturing project with an investment commitment of about Rs. 1,000 crore has been formalised through a memorandum of understanding with the Government of Tamil Nadu, enhancing Tiruchirappalli's profile in high-value and technology-intensive manufacturing. The district is also witnessing expansion in the IT and business services sector, with a new large-scale facility planned along the Karur Bypass near Annamalai Nagar. This development reinforces Tiruchirappalli LPA's gradual emergence as a regional hub for IT-enabled and knowledge-based services.

A large-scale snack manufacturing facility is being established at the SIPCOT Food Park, Manapparai, with an investment exceeding Rs. 500 crore. This project is expected to significantly strengthen the food processing and fast-moving consumer goods (FMCG) manufacturing ecosystem in the region and

enhance value addition to agri-based supply chains. In addition, interest has been expressed in setting up a manufacturing unit for malted beverage products within the district, indicating strong future investment potential in the food processing and consumer goods sector. Also, to support MSME modernization, a Common Facility Centre (CFC) for printing units has been established at Perumalpalayam near Thuraiyur, with a project cost of Rs. 29.93 crore. The facility provides advanced shared infrastructure for printing and packaging, improving productivity, technology adoption and competitiveness among local MSMEs.

Multiple firms across manufacturing, electronics, food processing, industrial infrastructure and IT-enabled services have announced capacity expansions and new project investments in Tiruchirappalli, reflecting strong medium-term growth prospects for the district economy.

The scale, diversity and sectoral spread of recent and proposed investments underscore Tiruchirappalli's rapid transition towards a diversified industrial and services hub. Growth in electronics manufacturing, advanced and precision industries, food processing and IT-enabled services is expected to drive substantial employment generation, technology upgradation and deeper regional supply-chain integration. To fully realise the economic and spatial benefits of this investment momentum, planning interventions in industrial zoning, infrastructure augmentation, logistics and freight connectivity, workforce housing provision and skill ecosystem strengthening will be critical over the plan period.

## 8.5 Key Organisations – Stakeholder consultation

1. **State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT)** - SIPCOT plays a pivotal role in promoting industrial development in Tiruchirappalli by creating large-scale industrial complexes equipped with modern infrastructure, utilities and logistics connectivity. It supports medium and large-scale industries by providing developed industrial land, power supply, water infrastructure, internal road networks and common facilities. In Tiruchirappalli, the SIPCOT Industrial Park at Sooriyur–Elanthapatti (51 acres) has been developed to attract investments in agro-processing, engineering goods, fabrication units, logistics services and MSME-based manufacturing, leveraging Tiruchirappalli's proximity to the Cauvery delta and its strong heavy engineering ecosystem anchored by BHEL and defence industries. SIPCOT's initiatives enhance investor confidence, strengthen regional industrial competitiveness and contribute significantly to employment generation and industrial diversification.

2. **Tamil Nadu Small Industries Development Corporation Limited (SIDCO)** - SIDCO plays a central role in promoting industrial development by developing industrial estates, providing affordable industrial land and ensuring basic infrastructure such as roads, drainage, power supply and common facilities. In Tiruchirappalli, SIDCO has developed multiple industrial estates including Thuvakudi, Valavanthankottai, Thiruverumbur, Ariyamangalam and Kumbakudi, collectively forming a well-distributed industrial belt across the southern and southeastern parts of the LPA. These estates primarily accommodate small and medium manufacturing units, engineering workshops, fabrication units, food processing enterprises and service-based MSMEs, thereby supporting decentralized employment generation, local entrepreneurship and supply-chain linkages.
3. **District Industries Centre (DIC), Tiruchirappalli** - The District Industries Centre functions as the nodal agency for industrial promotion, enterprise facilitation, industrial development and MSME development at the district level. It provides end-to-end support for entrepreneurs through enterprise registration, regulatory clearances, subsidy facilitation, financial linkages, skill training coordination and investment promotion services. DIC plays a critical role in implementing state and central government industrial schemes, encouraging startup formation, promoting rural & women entrepreneurship and supporting cluster-based industrial development.
4. **Tamil Nadu Industrial Investment Corporation Limited (TIIC)** - TIIC acts as the principal state-level financial institution supporting industrial development by providing term loans, working capital assistance, project finance and rehabilitation support to MSMEs and medium-scale industries. In Tiruchirappalli, TIIC plays a crucial role in enabling industrial expansion, modernization, technology upgradation and capacity enhancement, particularly for manufacturing, agro-processing, engineering and service-based enterprises. By bridging financing gaps and supporting capital investment, TIIC strengthens industrial resilience, promotes entrepreneurship and facilitates sustained industrial growth in the region.
5. **Bharat Heavy Electricals Limited (BHEL)** - BHEL serves as the single largest industrial anchor of Tiruchirappalli, forming the backbone of the district's heavy engineering and power equipment manufacturing ecosystem. The High-Pressure Boiler Plant and associated manufacturing units support large-scale production of power plant equipment, pressure vessels and engineering components, generating substantial direct and indirect employment. BHEL also anchors a vast network of ancillary industries and MSMEs through vendor development programmes, technology transfer and supply chain integration, significantly strengthening Tiruchirappalli's industrial base, skill ecosystem and technological capabilities.

6. **Golden Rock Railway Workshop (Southern Railway)** - The Golden Rock Railway Workshop is a major railway manufacturing, repair and maintenance facility, contributing significantly to railway equipment production, rolling stock maintenance and engineering services. It provides stable, high-skill employment and supports a large ecosystem of ancillary units, fabrication workshops and service enterprises. The workshop plays a key role in sustaining Tiruchirappalli's engineering-driven industrial economy and contributes to regional economic stability and skilled workforce development.

7. **Ordnance Factory Tiruchirappalli (OFT) & High Energy Projectile Factory (HEPF)** - The Ordnance Factory Tiruchirappalli and High Energy Projectile Factory together form a defence manufacturing cluster, specializing in munitions, projectile systems and precision engineering components. These units significantly strengthen Tiruchirappalli's position in defence manufacturing, advanced engineering and industrial production, while generating high-skill employment and supporting technology-intensive industrial growth. Their presence enhances Tiruchirappalli's role in India's defence industrial corridor and fosters downstream industrial opportunities for specialized MSMEs.

8. **Electronics Corporation of Tamil Nadu Limited (ELCOT) – IT Park & Startup Ecosystem** - ELCOT supports the development of knowledge-based industries in Tiruchirappalli. The ELCOT IT Park promotes IT services, digital enterprises, innovation-driven startups and knowledge-intensive employment, contributing to economic diversification beyond traditional manufacturing. These initiatives aim to strengthen Tiruchirappalli's emerging role as a regional IT and innovation hub, attract young talent and foster technology-led entrepreneurship.

9. **Industry Associations and Enterprise Support Institutions** - Key industry associations such as the Tiruchirappalli District Chamber of Commerce, TANSTIA / TIDITSSIA, BHELSIA, TIMEA, Confederation of Indian Industry (CII – Tiruchirappalli Zone) and Dalit Indian Chamber of Commerce and Industry (DICCI) collectively strengthen the local industrial ecosystem through policy advocacy, market access and enterprise networking. These organisations play a critical role in capacity building, MSME modernization, inclusive entrepreneurship and industrial competitiveness, thereby enhancing Tiruchirappalli's overall industrial resilience.

## 8.6 Human development Index of Tiruchirappalli

The Human Development Index (HDI) is a composite indicator developed by the United Nations to assess overall human well-being by integrating dimensions of health, education and standard of living. It provides a comprehensive perspective on development outcomes beyond conventional economic measures. The index evaluates development using three core indicators: life expectancy at birth to reflect health status, mean and expected years of schooling to represent educational attainment and Gross National Income (GNI) per capita to indicate standard of living. In the context of Tiruchirappalli, HDI serves as a critical tool for understanding spatial and social disparities and for guiding targeted policy and infrastructure interventions aimed at inclusive and balanced regional development.

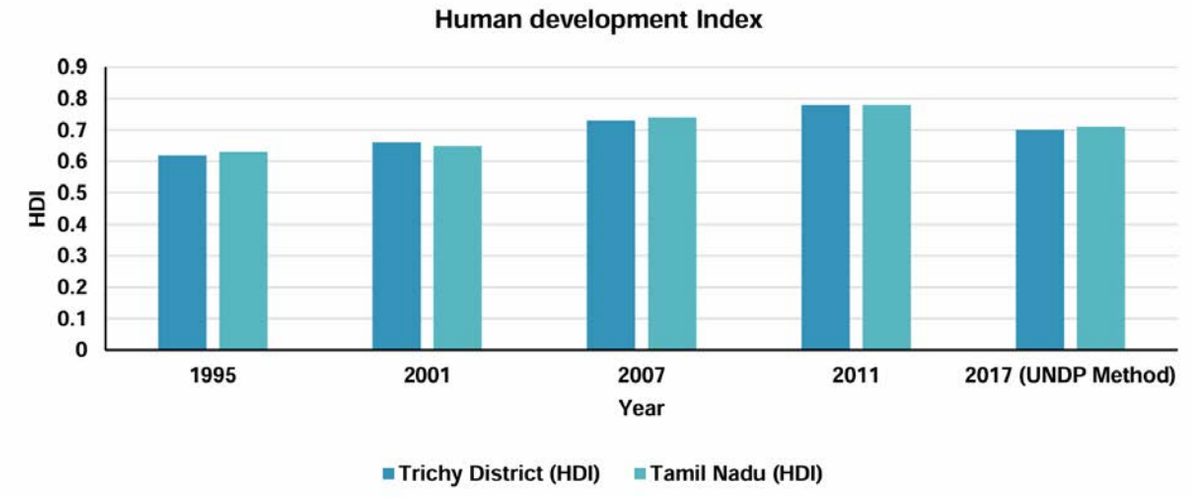



*Figure 8.64 Human Development Index of Tiruchirappalli District*

*Source: Human development report of Tiruchirappalli District*

The HDI trend for Tiruchirappalli district indicates a steady improvement in human development outcomes from 1995 to 2011, reflecting sustained progress in health, education and living standards. The district's HDI increased from around 0.62 in 1995 to about 0.78 in 2011, closely tracking the overall development trajectory of Tamil Nadu. However, in 2017 (UNDP revised methodology), Tiruchirappalli's HDI shows a marginal moderation to around 0.70, broadly aligning with the state average. Overall, the trend suggests consistent long-term improvement, while also highlighting the need for continued investments in social infrastructure, healthcare access, education quality and living conditions to sustain and accelerate human development gains.

*Table 8.32 HDI, Top 5 Block of Tiruchirappalli District*

| Indicator | Top Five Blocks | HDI Value | Bottom Five Blocks | HDI Value |
|---|---|---|---|---|
| HDI | Tiruchirappalli Corporation | 0.878 | Manikandam | 0.444 |
| | Thiruverumbur | 0.770 | Andanallur | 0.484 |

*Source: Human development Index Report*

Among the blocks, Tiruchirappalli Corporation records the highest HDI value (0.878), reflecting strong performance in access to drinking water, electricity, sanitation, literacy and education enrolment, indicating a highly developed urban profile. Thiruverumbur ranks next, supported by high literacy, near-universal electricity access, reflecting a relatively advanced peri-urban development pattern. In contrast, Manikandam and Andanallur exhibit lower HDI values. Lalgudi and Manachanallur occupy an intermediate position, showing moderate development levels, with relatively better access to housing, electricity and education, but continued gaps in health and sanitation indicators. Overall, the HDI pattern indicates a strong urban–rural divide, with Tiruchirappalli Corporation and Thiruverumbur exhibiting high human development outcomes, while Manikandam, Andanallur, Lalgudi and Manachanallur require focused investments in water supply, sanitation, healthcare access and educational quality to achieve balanced and inclusive regional development.

## 8.7 Strengths, Emerging opportunities and Key challenges

*Table 8.33 Strengths, Weakness, Opportunities and Threats*

| SWOT | Insight | Strategies | Planning / Spatial Action |
|---|---|---|---|
| Strength: Central Location | Strategic position in central Tamil Nadu with regional connectivity | Leverage location for region-serving activities rather than export-heavy growth | Designate logistics-support, institutional and service corridors linked to highways and rail |
| Strength: Institutional Density | High concentration of universities, hospitals, PSUs and research institutions | Anchor economic growth around institutions | Create Institutional–Mixed Use Zones permitting R&D, consulting, health-tech, edu-tech |
| Strength: Skilled Human Capital | Large graduate and technical workforce with limited local absorption | Retain talent through local employment ecosystems | Allow incubation centres, co-working spaces, startup zones near educational hubs |

| SWOT | Insight | Strategies | Planning / Spatial Action |
|---|---|---|---|
| Strength: Public Sector Manufacturing Base | Presence of BHEL, OFT, Railways provides stable industrial anchor | Build precision manufacturing and ancillary ecosystems | Develop buffer industrial zones for MSMEs, testing labs and vendor parks |
| Strength: Diverse Agrarian Base | Productive Cauvery belt and horticulture zones | Enable value addition without land displacement | Protect Agro-Production Zones; promote Agro-Processing Nodes near markets |
| Weakness: Moderate GDDP & Income Growth | Growth is stable but slower than state leaders | Shift focus from volume growth to productivity growth | Prioritise high-value services, engineering services and specialised manufacturing |
| Weakness: Low Female Workforce Participation | Particularly low in urban core | Promote inclusive, accessible employment | Mixed-use employment zones near transit with social infrastructure |
| Weakness: MSME Fragmentation | Scattered, informal and low-productivity MSMEs | Cluster-based consolidation | Upgrade SIDCO estates; develop sector-specific MSME clusters |
| Weakness: Graduate Underemployment | Skill mismatch and out-migration | Align skills with local economic base | Skill hubs linked to nearby industrial, service and agro clusters |
| Opportunities: Defence & Engineering Ecosystem | Existing PSU demand can support ancillaries | Strengthen defence and engineering value chains | Zone defence-support MSME parks and shared testing facilities |
| Opportunities: Agro-Based Value Chains | Strong banana, millet, pulse and dairy base | Promote processing and logistics | Cold-chain, warehousing and agro-logistics zones along transport corridors |
| Opportunities: Knowledge Services | Growing demand nationally | Position Tiruchirappalli as regional service hub | Education service clusters with mixed-use zoning |
| Threat: Water Stress & Climate Variability | Cauvery dependence and rainfall variability | Avoid water-intensive industries | Restrict high-water-use industries; promote low-impact economic activities |
| Threat: Unplanned Peri-Urban Sprawl | Agricultural land loss and infrastructure strain | Guide peri-urban transition | Designate Peri-Urban Economic Transition Zones |
| Threat: Speculative Real Estate Growth | Risk of jobless urban expansion | Tie land use to employment generation | Limit residential-only expansion; mandate employment-linked zoning |
| Threat: Overdependence on Single Growth Model | Vulnerability to uncertainty | Diversify but within local capacity | Balanced mix of services, manufacturing and agro-based systems |

*Source: Existing Situation Assessment*

## 8.8 Land Use requirement

The estimation of workforce and corresponding land use requirements for the Tiruchirappalli Local Planning Area (LPA) has been undertaken using a methodology that integrates demographic and workforce trends, workforce distribution, and economic growth indicators. The approach combines Census data, Periodic Labour Force Survey (PLFS) statistics, and district-level economic trends to ensure realistic long-term projections aligned with the Master Plan horizon of 2045.

### 8.8.1 Methodology for Workforce and Land Requirement Estimation

The key steps followed in the estimation process are outlined below:

- Workforce participation rates for the Tiruchirappalli LPA were derived using Census data for the years 1991, 2001, and 2011.
- Using the similar demographic projection approach, the total workforce was projected for the years 2025, 2035, and 2045.
- Periodic Labour Force Survey (PLFS) data for Tiruchirappalli district was used to assess the existing distribution of workforce across the primary, secondary, and tertiary sectors as give in the Table 8.5.
- The observed sectoral distribution was applied to the projected workforce for the year 2025.
- For the year 2045, sectoral workforce shares were estimated by analysing long-term trends (CAGR) in Gross District Domestic Product (GDDP) and per capita income along with changes observed in PLFS workforce trend (CAGR).
- Based on these trends, revised sector-wise employment shares were derived using estimated CAGR and applied to the projected 2045 workforce.
- Additional workforce requirements were calculated by comparing projected demand with existing workforce levels.
- Land requirements were estimated by applying URDPFI norms for workers per hectare to the additional workforce projected for 2045.

#### 8.8.1.1 Workforce Projections

The workforce in Tiruchirappalli LPA has shown consistent growth over the past three decades and is expected to continue expanding through 2045.

- The total workforce increased from about 2.6 lakh in 1991 to 5.5 lakh in 2011.

- The workforce is projected to reach approximately 7.4 lakh by 2025, 9.4 lakh by 2035, and about 11.7 lakh by 2045.

This growth reflects population increase, rising workforce participation, and structural economic transformation within the LPA.

*Table 8.34 Projected Workforce Tiruchirappalli LPA*

| Year | Workforce (in Persons) |
|---|---|
| 1991 | 2,59,306 |
| 2001 | 4,25,177 |
| 2011 | 5,50,229 |
| 2025 (Projected) | 7,42,577 |
| 2035 (Projected) | 9,39,357 |
| 2045 (Projected) | 11,74,929 |

*Source: Census of India, Projections*

#### 8.8.1.2 Sectoral Distribution of Workforce

Analysis of PLFS data indicates a gradual shift in employment structure towards higher-value sectors:

- The primary sector share is expected to decline from around 7 % in 2023–24 to about 4 % by 2045, reflecting ongoing urbanisation and productivity improvements.
- The secondary sector share is projected to increase from about 22 % to 26 % by 2045, driven by industrial diversification and manufacturing growth.
- The tertiary sector is expected to remain dominant, accounting for approximately 70 % of total employment by 2045, supported by institutional, IT-enabled, and service-based activities.

*Table 8.35 Sectoral Distribution of Workforce*

| Sector | 2023–24 Actual Share (%) | 2045 Estimated Share (%) |
|---|---|---|
| Primary | 7 | 4 |
| Secondary | 22 | 26 |
| Tertiary | 71 | 70 |

*Source: PLFS, GDDP, Per Capita Income Trend Analysis*

#### 8.8.1.3 Additional Workforce Requirement for 2045

Based on the projected workforce and sectoral distribution:

- The additional industrial workforce requirement for 2045 is estimated at approximately 1,42,115 persons.
- The additional tertiary workforce requirement for 2045 is estimated at approximately 2,95,221 persons.

*Table 8.36 Additional Workforce Requirement for 2045*

| Sector | Additional Workforce Required (2045) |
|---|---|
| Secondary | 1,42,115 |
| Tertiary | 2,95,221 |

*Source: DTCP Analysis*

### 8.8.2 Land Requirement Assessment

Land requirements for secondary and tertiary activities were estimated by applying standard worker density norms and accounting for existing developed land.

**Secondary Sector**

- The secondary workforce projected for 2045 is estimated at about 1,42,115 persons.
- Applying per-worker land norms, the additional land area requirement for the sector is estimated to be 13.77 sq.km.

**Tertiary Sector**

- The tertiary workforce projected for 2045 is estimated at approximately 2,95,221 persons.
- The corresponding additional land area requirement is estimated at about 23.62 sq.km.

*Table 8.37 Land Requirement Assessment for Tiruchirappalli LPA*

| Sector | Land Required (Ha) | Land Required (sq km) |
|---|---|---|
| Secondary | 1,377 | 13.77 |
| Tertiary | 2,362 | 23.62 |

*Source: DTCP Analysis*

## 8.9 Goals and strategies for 2045

To develop Tiruchirappalli LPA as a knowledge driven, productivity led economy that supports inclusive, environmentally responsible growth, equal sectoral opportunity and long-term resilience through existing institutions base, skilled manpower and balanced spatial development.

### 8.9.1 Objectives and Strategic direction

Tiruchirappalli LPA's economic strategy prioritises stability, inclusivity and environmental responsibility by strengthening institution-linked services, precision manufacturing and agro-based value chains.

*Table 8.38 Objectives and Strategic direction*

| Objective | Strategic direction | Strategies / Recommendation | Case Studies |
|---|---|---|---|
| Strengthen Institution-Anchored Economic Clusters | Develop Institution–Industry–Service Clusters around existing universities, PSUs and research centres to convert knowledge presence into local employment. | Zone Institutional–Mixed Use.<br>R&D offices, Testing labs, Design & consulting firms.<br>Edu-tech, Encourage vendor, start-up and consultancy co-location near institutions. | Pune – Hinjewadi + university belt<br>Knowledge institutions + services created high-value jobs without heavy manufacturing.<br>Bengaluru – medical & research clusters |
| Precision Manufacturing & Defence Ancillary Strategy | Shift from large-scale industry attraction to precision manufacturing, defence and engineering ancillaries linked to BHEL, OFT and Railways. | Create buffer industrial zones<br>Focus on:<br>Component manufacturing.<br>Testing & calibration.<br>Fabrication & repair units.<br>Provide shared infrastructure: testing labs, certification centres. | Hosur<br>Ancillary-driven growth around large industries without ecological overload.<br>Coimbatore<br>Precision MSME clusters sustained growth without export volatility. |

## Economy

| Objective | Strategic direction | Strategies / Recommendation | Case Studies |
|---|---|---|---|
| Agro-Based Value Addition | Protect productive agricultural land while enabling value addition through agro-processing, logistics and cold chains. | Agro-Production Protection Zones.<br>Identify Agro-Processing Nodes near highways & markets.<br>Encourage: Banana, millet, pulse processing.<br>Dairy & livestock-linked units.<br>Integrate cold storage and grading facilities. | Davangere – agro-processing clusters<br>Increased rural income without urban sprawl<br>Erode – turmeric & agro trade hubs<br>Value-chain approach sustained agriculture-linked employment. |
| Inclusive Workforce & Female Employment Strategy | Enable safe, proximate and flexible employment zones, especially in services, education, food processing and light manufacturing. | Mixed-use employment zones near transit.<br>Mandatory infrastructure: Creches, Safe last-mile access.<br>Flexible floor-use norms, Skill hubs aligned to nearby job clusters. | Indore: Women-oriented service clusters + transit planning raised female participation.<br>Trivandrum: IT + healthcare employment integrated with inclusive urban design. |
| Planned Peri-Urban Transition | Guide peri-urban growth into employment-rich transition zones instead of uncontrolled real estate sprawl. | Designate Peri-Urban Economic Transition Belts<br>To allow: MSMEs, Warehousing, Logistics, Repair & service industries, Restrict speculative residential-only layouts. | Surat: Peri-urban industrial belts absorbed growth without core congestion.<br>Ahmedabad: Transition zones stabilised land markets and employment distribution. |
| Environmental Safeguard as an Economic Strategy | Embed environmental thresholds into economic zoning to avoid long-term risk. | To Prohibit: High-water, high-pollution industries.<br>Promote: Low-emission services, Precision manufacturing, Circular economy MSMEs, Mandate water-neutral & energy-efficient standards. | Mysuru: Environment-first planning preserved tourism & services<br>Udaipur: Environmental controls protected economic base |
| National-Level Parity without Competition | Position Tiruchirappalli as a nationally relevant support economy. | Focus on: Engineering services, Defence support, Education and Knowledge Hub, Agro-processing.<br>Integrate with national supply chains without over-dependence | Nagpur: Logistics + services hub without export volatility<br>Vadodara: PSU + services-led balanced growth |

*Source: Exiting Situation Assessment*

#### 8.9.1.1 Priority sectors in Tiruchirappalli LPA

**Advanced Institutional & Professional Services** - Advanced institutional and professional services, including education, healthcare, public administration, research and consultancy, form the primary economic strength of Tiruchirappalli LPA. Anchored by a high concentration of universities, medical institutions and public-sector establishments, this sector provides stable employment, supports higher female workforce participation and generates sustained demand for formal service and office spaces with minimal environmental impact.

**IT-Enabled, GCCs and Knowledge-Based Services** - Selective IT-enabled and knowledge-based services such as engineering design, technical consulting, analytics, health IT and education-related digital services are well suited to Tiruchirappalli's skilled graduate base and institutional ecosystem. Rather than large-scale IT parks, compact service clusters and incubation spaces can support local employment retention, productivity enhancement and gradual integration into national service value chains.

**Precision Manufacturing and Engineering MSMEs** - Precision manufacturing and engineering MSMEs, including defence and heavy engineering ancillaries, fabrication, repair and component manufacturing, represent a core secondary-sector priority for Tiruchirappalli LPA. Leveraging the presence of major public-sector units and a strong MSME base, this sector offers stable industrial employment while requiring comparatively lower land and resource intensity than large-scale manufacturing.

**Agro-Processing and Food-Based Industries** - Agro-processing and food-based industries linked to paddy, millets, pulses, banana, mango, vegetables, dairy and livestock activities are critical for strengthening rural–urban economic linkages within the LPA. By promoting value addition, storage, packaging and marketing, this sector enhances farm incomes, supports rural employment and reduces pressure for unplanned agricultural land conversion.

**Logistics, Warehousing and Trade-Support Services** - Logistics, warehousing and trade-support services constitute an enabling sector for Tiruchirappalli's manufacturing, agricultural and service economies. The city's central location within Tamil Nadu and improving regional connectivity provide opportunities for regional distribution, agri-logistics and supply-chain services, supporting economic efficiency without high environmental costs.

**Education Innovation Services –** Education linked innovation services, including training, simulation, research support, complement Tiruchirappalli's institutional strengths. These activities generate skilled employment, encourage knowledge transfer and reinforce the city's role as a regional hub for human capital development and specialised services.

**Urban Services and Local Employment Sectors** - Urban services such as retail and wholesale trade, construction, repair services, personal services and hospitality continue to play an important role in sustaining local employment across the LPA. While largely domestic in orientation, these sectors support livelihood stability and urban functionality when integrated with planned commercial and mixed-use development.

#### 8.9.1.2 Observed, Emerging and Strategic Economic Clusters of Tiruchirappalli LPA

*Table 8.39 Observed, Emerging and Srategic Economic Clusters of Tiruchirappalli LPA*

| Cluster / Growth Direction | Key Activities | Spatial Logic / Location Basis | Planning Direction |
|---|---|---|---|
| Institutional–Knowledge Cluster | State and Central Institutions offering technical education (Engineering, Management), public administration, professional services, selective IT-enabled services | Concentration of universities, colleges and public institutions in the urban core and at periphery | To Strengthen and densify and To avoid incompatible industrial or speculative commercial uses |
| Engineering & Precision Manufacturing Cluster | Defence and heavy engineering ancillaries, precision engineering, fabrication, repair, testing | Presence of BHEL, OFT, Railways and related industrial areas | Support nodal, cluster-based growth; avoid large, land-intensive or polluting industries |
| MSME Consolidation & Industrial Transition Zones | Micro MSMEs (Service and Manufacturing), light manufacturing, construction materials, local supply-chain industries | Existing SIDCO estates, peri-urban industrial pockets, highway proximity. MSME concentration (Urban core to Northern periphery) | Consolidate and upgrade existing areas; prevent unplanned peri-urban industrial sprawl |
| Agro-Processing & Rural Value-Addition Cluster | Food processing (Rice Mills), cold storage, grading, packaging, dairy and livestock processing. | Cauvery-irrigated belt, horticulture and livestock zones | Promote value addition without converting productive agricultural land. |
| Logistics, Warehousing & Trade Support Nodes | Warehousing, agri-logistics, regional distribution, wholesale trade | Central location in Tamil Nadu, road and rail connectivity | Enable only to support priority sectors; avoid oversizing and land speculation |

| Cluster / Growth Direction | Key Activities | Spatial Logic / Location Basis | Planning Direction |
|---|---|---|---|
| Urban Services | Retail, wholesale trade, construction, repair, personal and household services | Existing urban and mixed-use areas | Recognise as employment stabilisers; integrate with planned urban development |
| Peri-Urban Economic Transition Zones | MSMEs, logistics support, agro-processing, service back-end activities | Urban–rural interface areas under development pressure | Guide phased, infrastructure-led transition; restrict ribbon and residential-only growth |

*Source: Existing Situation Assessment*

### 8.9.2 Spatial clusters framework

This section presents a cluster-based economic development framework that spatially organises Tiruchirappalli's key economic activities based on existing strengths and future growth drivers. The identification of economic clusters has been undertaken through a multi-layered analytical approach to ensure strategic alignment and long-term viability. The process is guided by the overarching strategic direction for regional development, wherein sunrise sectors were also systematically assessed as a key analytical layer in the identification of economic clusters.

An assessment of existing industrial units and their typologies has been conducted to understand the current industrial base, complemented by an evaluation of upcoming industrial units to identify emerging trends and sectoral diversification. Additionally, connectivity has been comprehensively assessed, incorporating proposed mobility components to ensure seamless integration with regional transport systems. This includes consideration of the proposed road network, logistics terminals, and public transport facilities to enhance accessibility, reduce transit time, and strengthen supply chain efficiency. Collectively, these layers form a robust framework for the systematic identification and planning of economic clusters.

- **AG – Agro-based & Food Processing Cluster** (Near Mannachanallur, Theerampalayam, Poonampalayam, Alakiyamanavalam, Thiruppanjeeli): The Agro-based cluster is proposed in the northern and eastern peri-urban areas of the Tiruchirappalli LPA, close to fertile regions and existing rural settlements. These locations enable direct linkage with agricultural hinterlands for food processing, storage, cold chains, and agri-logistics, while reducing transport costs and post-harvest losses.

- **RW – Renewable Energy Cluster** (Keelaperungavur, Towards Lalgudi): Renewable energy clusters are proposed along the western and north-western growth corridors, leveraging strategic highway access and proximity to existing industrial estates. These locations are well suited for large-format manufacturing and component assembly, in alignment with Tamil Nadu's clean energy transition and EV ecosystem strategies. Additionally, the presence of existing ground-mounted, utility-scale solar projects on the north-eastern side of the LPA serves as a significant locational advantage, reinforcing the area's renewable energy ecosystem. This established base, coupled with strong potential for manufacturing solar mounting structures and support structures for wind turbines, further strengthens the region's integrated renewable energy value chain.

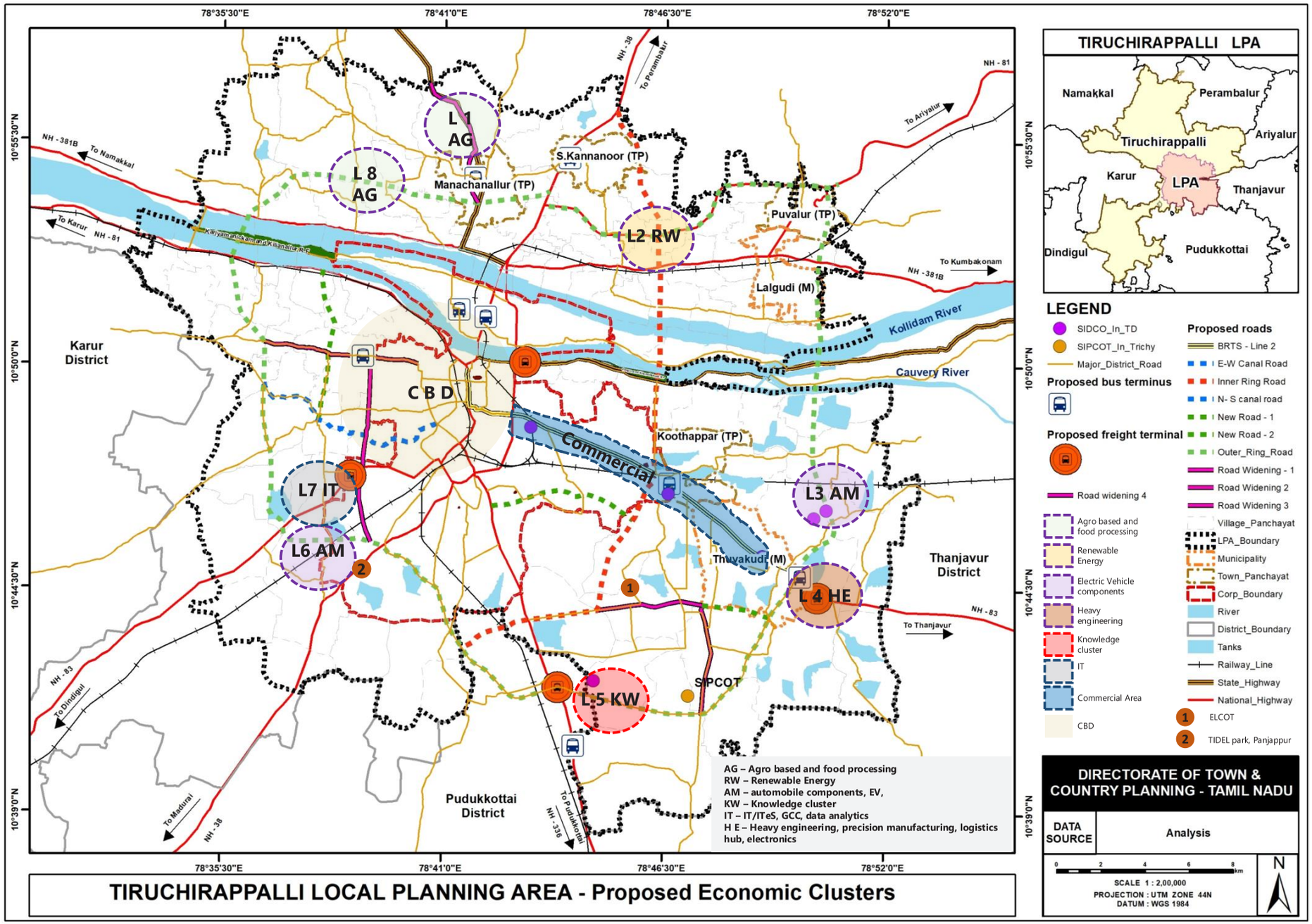
- **AM – Automobile Manufacturing Components Cluster** (K.Kallikudi, Valavanthankottai)**:** Automobile clusters are strategically located in the south-eastern and southern parts of the LPA, near existing SIDCO/SIPCOT estates and major transport corridors. This positioning supports integration with automotive ancillaries, precision engineering units, and logistics infrastructure while minimizing heavy freight movement through the CBD. Additionally, the cluster K. Kallikudi benefits from its proximity to the Chennai–Kanyakumari Industrial Corridor, further strengthening regional connectivity, supply chain linkages, and access to broader industrial markets.

- **HE – Heavy Engineering & Precision Manufacturing Cluster** (Thirunedunkulam, Pathalpettai, Asoor): Heavy engineering clusters are proposed in the eastern and south-eastern edges of the LPA, where land availability, freight connectivity, and buffer distances from residential areas are adequate. These clusters build on Tiruchirappalli's legacy in fabrication, rail engineering, and large-scale manufacturing, while enabling modernization and precision-based industries. The proximity of the proposed freight terminal further enhances the locational advantage, enabling efficient movement of raw materials and finished goods, reducing logistics costs, and strengthening supply chain integration for heavy engineering activities.

- **KW – Knowledge & Innovation Cluster** (Kumbakudi, Sooriyur): Knowledge clusters are concentrated in the southern-central zone of the LPA, close to educational institutions, research centers, IT parks, and urban residential areas. These locations support IT/ITeS, GCCs, R&D, design services, and data analytics, encouraging walk-to-work environments and higher-skilled employment. The proposed bus terminal further enhances accessibility and public transport integration, strengthening workforce mobility. In addition, connectivity to the existing incubation centre at NIT Tiruchirappalli through the proposed road network reinforces industry–academia linkages, encouraging innovation, entrepreneurship, and knowledge-driven economic growth.

- **IT – Information Technology & ITeS Cluster** (Panjappur, Punganur, Nachikurichi)**:** IT clusters are proposed along key urban corridors and near existing IT parks, service based units and SEZs, ensuring access to digital infrastructure, skilled workforce, and public transport. The spatial strategy promotes compact, low-impact employment hubs integrated with institutional and commercial areas. while also being located near residential neighbourhoods to support convenient live–work environments. Additionally, their proximity to the upcoming TIDEL Park in Tiruchirappalli further strengthens the IT ecosystem, enabling synergies, business expansion opportunities, and enhanced investor attractiveness.

- **Commercial Cluster (CBD & Sub-CBDs):** Commercial clusters are anchored around the existing CBD and emerging sub-centres along major arterial roads. These areas support wholesale trade, offices, services, and retail, reinforcing Tiruchirappalli's role as a regional service and commercial hub.




*Map 8.16 Proposed Economic Clusters*

Overall, Tiruchirappalli LPA's economy reflects a structurally balanced and resilient development trajectory, characterised by a strong service-led urban core, a stable manufacturing and Micro MSME base anchored by public-sector undertakings and emerging private investments and a progressively transforming agrarian economy shaped by irrigation access and market integration. While the district has demonstrated moderate but steady growth, its economic structure reveals clear spatial differentiation across the Local Planning Area, with agriculture-dominated rural blocks, peri-urban transition zones and institution - industry driven urban centres coexisting within a single regional system. Persistent challenges such as income disparities, low female workforce participation, lack of sectoral diversification, water stress and informal employment underline the need for targeted, spatially differentiated planning interventions.

Looking ahead to 2045, Tiruchirappalli's economic future will depend on its ability to deepen industrial and MSME diversification, strengthen high-value service and knowledge sectors, enhance agro-based value chains and align land-use, infrastructure, mobility and workforce strategies with emerging growth corridors. By integrating economic planning with spatial development, environmental sustainability and inclusive employment generation, the Tiruchirappalli Local Planning Area is well positioned to evolve into a resilient, competitive and regionally balanced economic hub within Tamil Nadu's long-term development framework.

# 9 MOBILITY

## 9.1 Introduction

Mobility and transportation play a critical role in shaping the spatial structure, economic vitality, and quality of life of Tiruchirappalli. As a major urban centre in central Tamil Nadu, Tiruchirappalli functions as an important regional transport hub, facilitating the movement of people and goods within the city, across the district, and to other parts of the State and country.

The city's transport system is characterised by the convergence of road, rail, and air networks, supported primarily by a bus-based public transport system. Tiruchirappalli's strategic location along multiple National and State Highways, the presence of a major railway junction, and an international airport have historically contributed to its growth as an administrative, industrial, educational, and commercial centre. However, rapid urbanisation, expansion of the urban footprint, and increasing motorisation have placed significant pressure on the existing transport infrastructure.

## 9.2 Regional Connectivity

Tiruchirappalli's central location in Tamil Nadu positions it as a critical regional node connecting Madurai, Dindigul, Thanjavur, Ariyalur, and the Cauvery delta districts with the southern and western parts of the State. The city hosts major industrial areas, a large concentration of educational institutions, and important regional destinations, resulting in high inter-district passenger and freight movement. Regional access is supported by a dense road network with a significant share of National Highways, State Highways, Major District Roads, Other District Roads, and Village Roads converging within the planning area. However, increasing regional travel demand and through-traffic highlight the urgent need to strengthen and upgrade the existing connectivity framework to sustain Tiruchirappalli's role as a regional economic and mobility hub. This road dominance is complemented by the Tiruchirappalli International Airport, which acts as a global gateway for the Cauvery delta's exports, and a massive railway division that serves as a primary interchange for the state. By integrating these modes, Trichy ensures that specialized cargo from the Ariyalur cement belt and Karur's textile hubs reaches domestic and international markets efficiently.

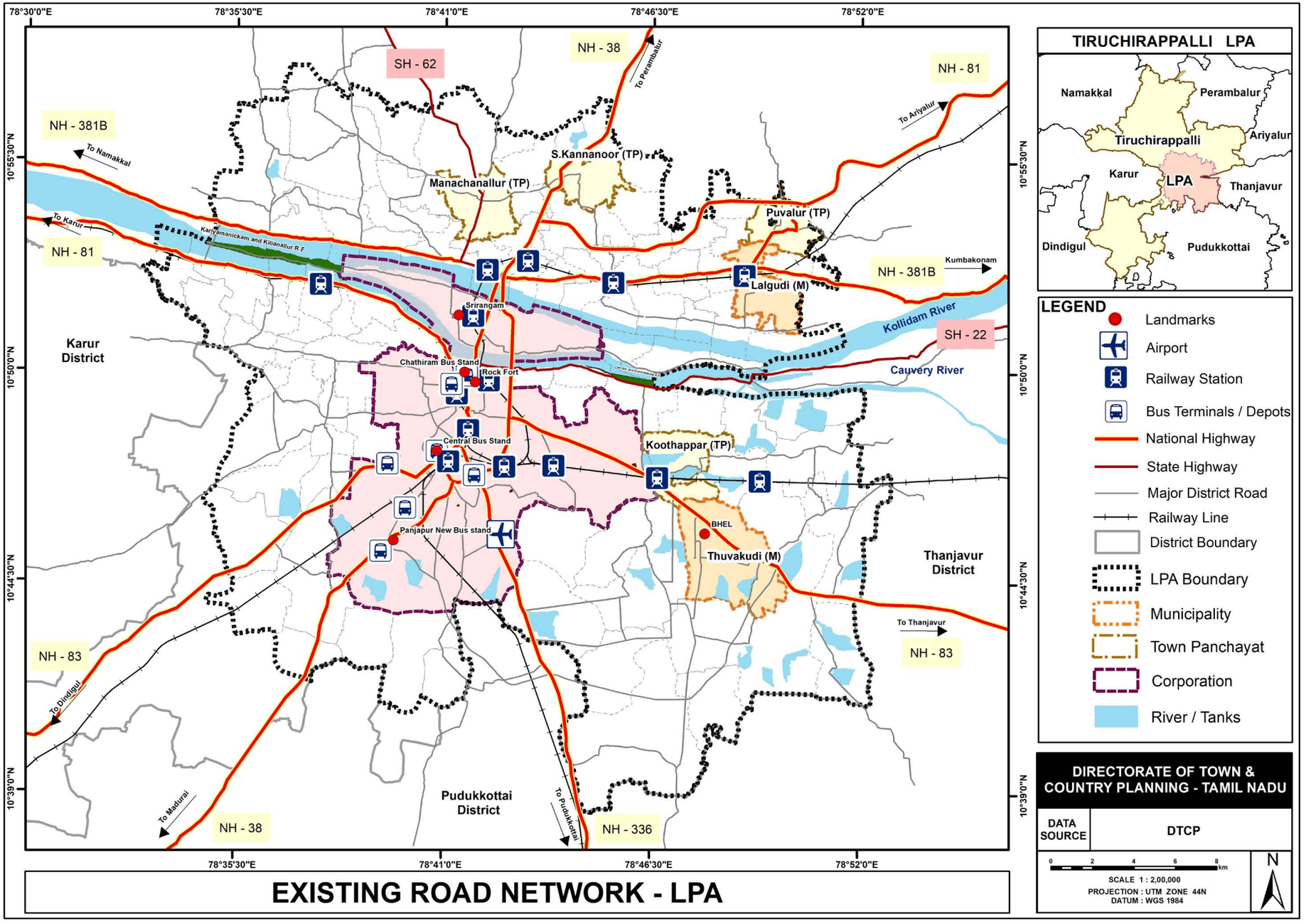
The region's economic trajectory is being further accelerated by its inclusion in the Chennai-Kanyakumari Industrial Corridor (CKIC). As a primary node in the CKIC, Trichy is transitioning into a manufacturing powerhouse that leverages its proximity to eastern ports. To support this industrial surge, major infrastructure projects like the Panjapur Integrated Bus Terminus and the Outer Ring Road are being developed to divert through-traffic away from the city center, ensuring that regional transit remains fluid even as local demand scales.

To future-proof its role as a mobility hub, the city is shifting toward integrated urban planning and high-capacity transit. Furthermore, the development of TIDEL Park and the expansion of the airport terminal signify a shift toward a more diversified economy. By strengthening these connectivity frameworks, Tiruchirappalli is successfully evolving from a transit-dependent city into a self-sustaining regional core that balances heavy industrial growth with modern urban mobility.

## 9.3 Existing Transportation Scenario

### 9.3.1 Road Network

The city has a well-developed road network that provides strong connectivity to major urban centres across the state. The regional road system comprises National Highways (NH), State Highways (SH), Major District Roads (MDR), and Other District Roads (ODR). Five National Highways—NH 38, NH 81, NH 381 B, NH 83, NH 336—pass through Tiruchirappalli City.




*Map 9.1 Existing Road Network – Highways in Tiruchirappalli LPA*

In addition, State Highways connect the city with important towns such as Thanjavur, Pudukkottai, Madurai, Chennai, Dindigul, and Karur, while Major District Roads link Tiruchirappalli to Thuraiyur, Ariyalur, and Kumbakonam.

*Table 9.1 Details of Major Highways Passing through Tiruchirappalli LPA*

| Sl. No. | Road No. | Classification | Origin and Destination | Approx. Length (Km) inside LPA |
|---|---|---|---|---|
| 1 | NH 38 | National Highway | Vellore - Thoothukudi | 26 Km |
| 2 | NH 81 | National Highway | Coimbatore - Nagapattinam | 64 Km |
| 3 | NH 381 B | National Highway | Musiri - Namakkal | 12 Km |
| 4 | NH 83 | National Highway | Coimbatore - Cuddalore | 38 Km |
| 5 | NH 336 | National Highway | Pudukottai - Tiruchirappalli | 12 Km |
| 6 | SH 22 | State Highway | Poompuhar | 11 Km |
| 7 | SH 62 | State Highway | Thuraiyur | 10 Km |

Of the total road network within the city limits, National Highways account for approximately 152 Km in length, including routes connecting Tiruchirappalli to Madurai, Thanjavur, Dindigul, and Pudukkottai. The NH Bypass Road, extending from Mannarpuram Four lane Road to the Coleroon Bridge, also falls under this category.

The higher-order road network within the planning area extends to a total length of 1059.02 km. Within this network, arterial roads constitute the largest share at about 58.4%, reflecting their primary role in accommodating regional and through traffic. Collector roads account for nearly 26.9% of the total length, facilitating traffic distribution between arterial corridors and urban areas, while sub-arterial roads comprise around 14.7%.

*Table 9.2 Road Hierarchy – Length and Share (Higher Order Roads)*

| Sl. No. | Road Category | Length (Km) | Share of Total (%) |
|---|---|---|---|
| 1 | Arterial Roads | 614.68 | 58.4% |
| 2 | Collector Roads | 283.79 | 26.9% |
| 3 | Sub Arterial Roads | 161.55 | 14.7% |
| **Total** | | **1052.02** | **100%** |

The transport mode share in the region reveals a heavy reliance on private motorized vehicles, with Two-Wheelers dominating the landscape at 41%. This significant preference for personal transport often stems from inadequate or insufficient public transit options, leading to increased traffic congestion

and longer travel times. While Buses maintain a substantial share at 22%, and other shared services like Autos (7%) and Cars (15%) contribute to the mix, the combined footprint of motorized transport highlights a critical need for infrastructure upgrades. Conversely, Non-Motorized Transport (NMT), such as Walking (11%) and Cycling (4%), remains underutilized, reflecting a lack of dedicated, safe pathways like segregated cycle tracks or upgraded footpaths. Addressing these disparities through projects like the proposed Metro Rail or improved pedestrian zones is essential to transition the city toward a more balanced and sustainable mobility framework. Of the total trips, 83% are work trips followed by Educational trips constituted only 11% shopping trips constitute 4%.

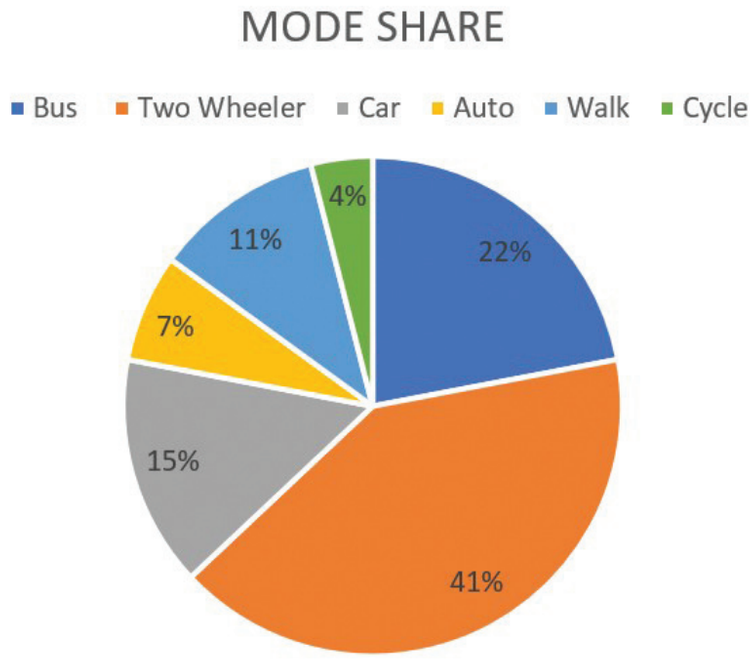


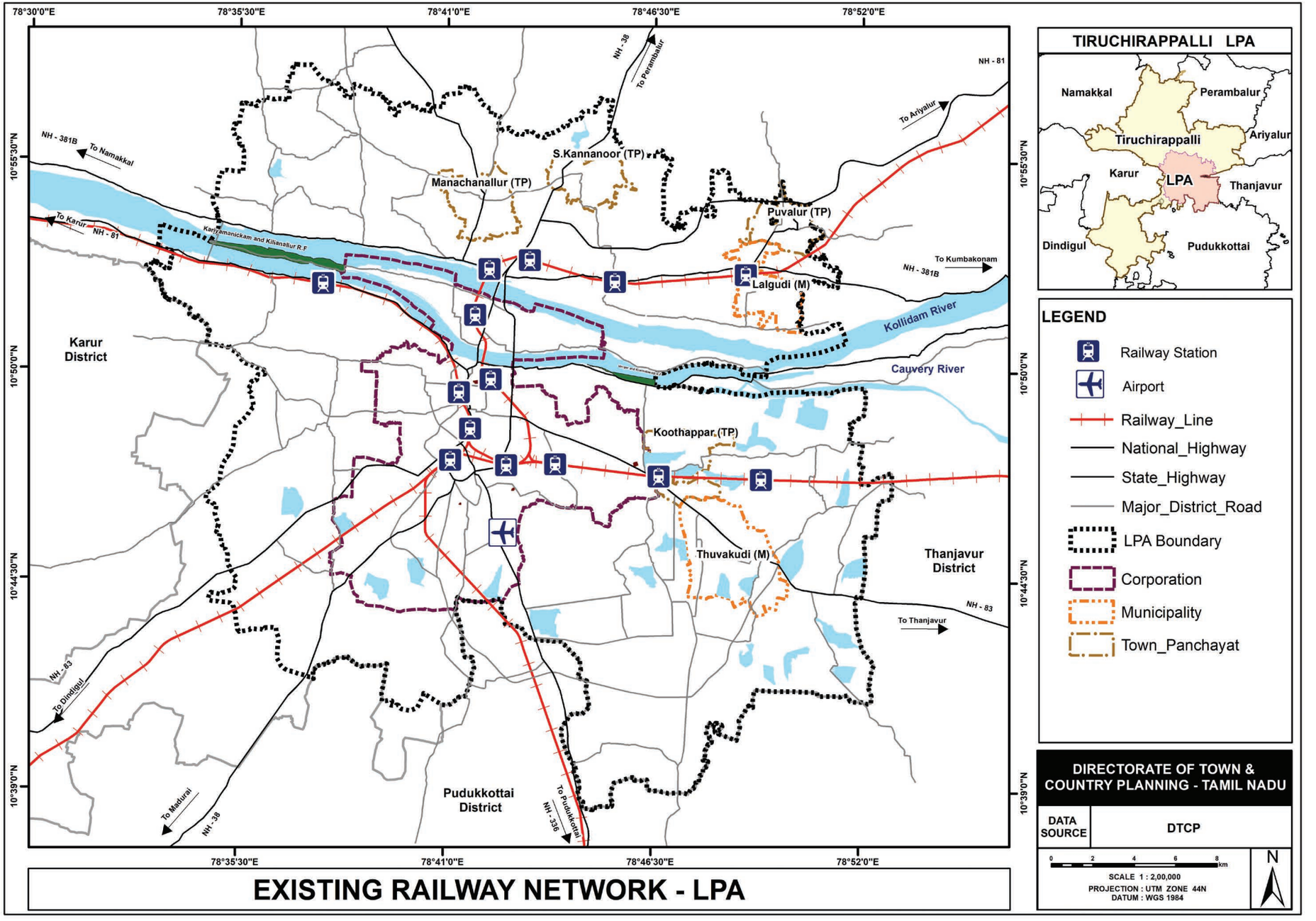

*Figure 9.1 Mode Share in Tiruchirappalli LPA*

### 9.3.2 Rail Transport

Tiruchirappalli constitutes a distinct and strategically important division of the Southern Railway, highlighting its significance within the rail network of Central and Southern Tamil Nadu. Tiruchirappalli Railway Junction functions as a major nodal interchange from which five principal rail corridors radiate towards Chennai, Erode/Coimbatore, Karaikal, Rameshwaram, and Kanyakumari. Owing to this multi-directional connectivity, the junction ranks among the busiest in Central Tamil Nadu, facilitating substantial volumes of long-distance passenger movement as well as regional and inter-state freight traffic.

*Table 9.3 Category and Annual Passenger Flow of Railway Stations of Tiruchirappalli LPA*

| Sl. No. | Station Name | Category | Dominant Direction / Corridor | Annual Passenger Flow (2019 – 2020) |
|---|---|---|---|---|
| 1 | Tiruchirappalli Junction | NSG 2 | All directions (Primary Nodal Junction) | 1,92,93,541 |
| 2 | Srirangam | NSG 5 | North / North-East (Viluppuram – Ariyalur) | 7,95,144 |
| 3 | Golden Rock / Ponmalai | NSG 6 | South / South-West (Dindigul – Madurai) | 1,59,485 |
| 4 | Palakkarai | HG 2 | South / South-East (Thanjavur – Karaikkudi) | 1,51,247 |
| 5 | Tiruchirappalli Town | NSG 6 | East / South-East (Thanjavur – Karaikkudi) | 2,77,778 |
| 6 | Manjattidal | HG 2 | West / North-West (Karur – Erode) | 3,70,864 |
| 7 | Uthamarkovil | HG 3 | North / North-East (Viluppuram – Ariyalur) | 52,910 |
| 8 | Pichchandarkovil | HG 3 | North / North-East (Viluppuram – Ariyalur) | 1,16,846 |
| 9 | Valadi | NSG 6 | North / North-East (Viluppuram – Ariyalur) | 32,129 |
| 10 | Lalgudi | NSG 5 | North / North-East (Viluppuram – Ariyalur) | 41,936 |
| 11 | Tiruverumbur | NSG 5 | South / South-East (Thanjavur – Karaikkudi) | 9,47,555 |
| 12 | Tondamanpatti | HG 3 | West / North-West (Karur – Erode) | 36,574 |
| 13 | Solagampatti | NSG 6 | West / North-West (Karur – Erode) | 1,39,343 |
| 14 | Tiruchirappalli Fort (historical) | NSG 5 | Central City / Mixed Direction | 7,43,420 |




*Map 9.2 Existing Rail Transportation Network in Tiruchirappalli LPA Map*

In addition to the main junction, the Tiruchirappalli Local Planning Area (LPA) is served by 13 other railway stations, including Tiruchirappalli Town, Fort, Golden Rock, Palakkarai, and Srirangam, together forming a network of 14 stations. These stations are distributed along the major directional corridors radiating from the city—north and northeast towards Viluppuram and Ariyalur, west and northwest towards Karur and Erode, east and southeast towards Thanjavur and Karaikkudi, and south towards Dindigul and Madurai. Each station primarily serves trains along a dominant corridor, reflecting its functional role within the rail network. Tiruchirappalli Junction records the highest annual passenger footfall, while stations located in the central city exhibit higher passenger volumes compared to peripheral stations due to major activity nodes such as Rockfort and the Srirangam Temple. Collectively, this corridor-based rail network plays a critical role in supporting commuter travel, long-distance passenger services, and goods movement, reinforcing Tiruchirappalli's position as a key rail-based mobility and logistics hub in Central Tamil Nadu.

### 9.3.3 Air Transport

Strategically positioned just 5 km south of the city center along the Tiruchirappalli–Pudukkottai corridor (NH-336), Tiruchirappalli International Airport functions as the primary aviation hub for Central Tamil Nadu. Its location ensures seamless accessibility for both the urban core and a sprawling hinterland that encompasses several neighbouring districts. By serving this wide geographic area, the airport acts as a critical gateway that links the regional population and its economic activities to global destinations.

The airport is the second largest in Tamil Nadu after Chennai International Airport and plays a critical role in facilitating domestic and international passenger movement. Recognising its growing importance, Tiruchirappalli International Airport is proposed for expansion, which is expected to enable the operation of larger aircraft and the augmentation of international services to additional destinations.

Given Tiruchirappalli's role as a major industrial, educational, and commercial centre, the airport functions as a key regional facility, serving the air travel needs of nearly twelve districts, including Tiruchirappalli, Thanjavur, Ariyalur, Perambalur, Dindigul, Karur, Namakkal, Pudukkottai, Sivagangai, Nagapattinam, Thiruvarur, and Karaikal (UT). The airport also serves as a key international gateway, offering direct connectivity to major global hubs such as Singapore, Kuala Lumpur, Dubai, Abu Dhabi, Doha, Muscat, and Kuwait, in addition to extensive domestic connections. This reinforces the airport's strategic importance in supporting regional and international connectivity, economic activity, and outward migration linkages.

*Table 9.4 Domestic and International Air Traffic Statistics (2021 – 2025)*

| Year | Aircraft Movement | | Passenger Movement | | Freight (in MT) | |
|---|---|---|---|---|---|---|
| | International | Domestic | International | Domestic | International | Domestic |
| 2025 | 9698 | 9337 | 1410351 | 781254 | 6990 | 0 |
| 2024 | 9128 | 7973 | 1385638 | 557460 | 6551 | 0 |
| 2023 | 8114 | 5701 | 1280907 | 414910 | 6339 | 0 |
| 2022 | 6509 | 4371 | 876208 | 294986 | 5933 | 0 |
| 2021 | 3079 | 3112 | 332125 | 157423 | 4659 | 0 |

*Source: Airport Authority of India*

The above table indicates a strong and sustained growth in aircraft, passenger, and freight movement at Tiruchirappalli International Airport between 2021 and 2025, with international operations consistently exceeding domestic activity. Passenger traffic has increased significantly in the post-pandemic period, crossing 2 million in 2025, while international freight movement has shown steady growth. This trend highlights the airport's increasing role as a major international gateway for Central Tamil Nadu and underscores the need for capacity augmentation to meet future demand.

#### 9.3.3.1 Air Craft Movement

Aircraft movements at Tiruchirappalli International Airport display a clear recovery and growth trend over the study period. Following subdued activity levels in 2021 due to pandemic-related restrictions, both international and domestic aircraft movements show a steady rebound from mid-2022 onward, with pronounced increases during 2023–2025. Monthly trends reveal recurring seasonal peaks, particularly during April–May and October–December, reflecting higher travel demand during holiday and festive periods. International aircraft movements consistently remain higher than domestic movements across most months, indicating the airport's stronger orientation toward international operations and expanding global connectivity.

*Figure 9.2 Monthly Trend of Aircraft Movements (2021 – 2025)*

### 9.3.3.2 Passenger Movement

Passenger movement at Tiruchirappalli International Airport exhibits a strong and sustained growth trajectory over the study period, with international passengers contributing a dominant share of total traffic. Following a sharp decline in 2021, passenger volumes show a steady recovery from 2022 onwards, with significant acceleration during 2023–2025. Monthly trends highlight pronounced seasonality, with higher passenger volumes during the summer months and the October–December period, and relatively lower traffic during February and the early monsoon months. The faster growth in passenger traffic compared to aircraft movements indicates improving load factors and increased passenger throughput per flight. By 2024–2025, passenger volumes consistently exceed pre-recovery levels across most months, reflecting sustained and robust demand for air travel.

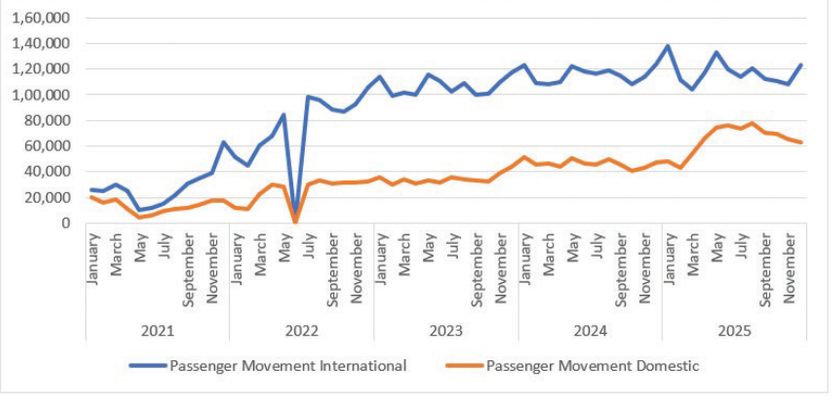



*Figure 9.3 Monthly Trend of Aircraft Passengers (2021 – 2025)*

### 9.3.3.3 Freight Movement

International freight movement at Tiruchirappalli International Airport shows a generally stable pattern with a gradual upward trend over the study period.

After lower volumes in 2021, freight activity recovers from 2022 onwards and remains relatively consistent through 2023–2025, with only moderate month-to-month fluctuations. Slight increases are observed during the October–December period, corresponding to higher trade and export activity. The absence of domestic freight operations and the limited seasonal variation compared to passenger traffic indicate that freight demand is primarily influenced by regional economic and trade dynamics rather than tourism or holiday-driven travel patterns.

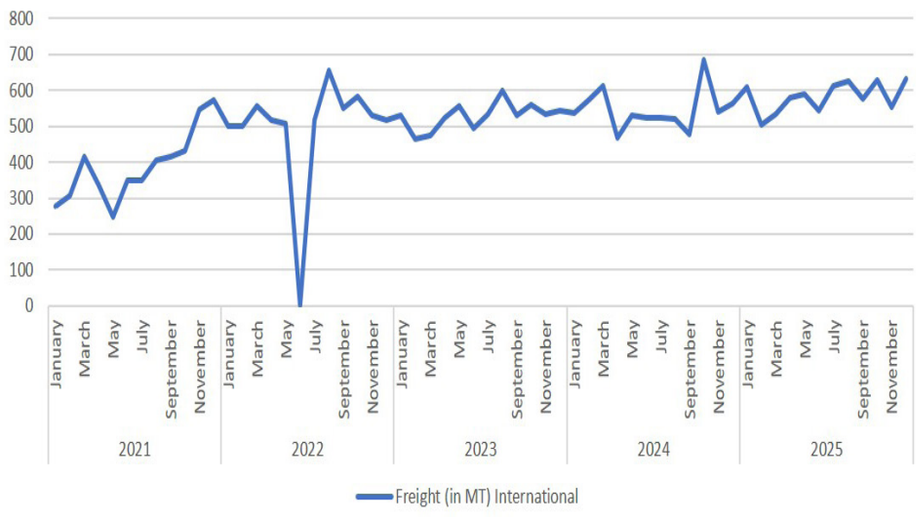



*Figure 9.4 Monthly Trend of Freight Movements (2021 – 2025)*

## 9.3.4 Public Transportation

Public transport is a key component of the urban mobility framework, enabling efficient movement of people while reducing dependence on private vehicles. In Tiruchirappalli, among the available modes, bus services constitute the primary means of public transport, supporting both daily commuting and longer-distance travel.

### 9.3.4.1 Bus Based Public Transport System

Bus-based public transport forms the backbone of passenger mobility in Tiruchirappalli, supporting both intra-city travel and regional connectivity. Services are primarily operated by the Tamil Nadu State Transport Corporation (TNSTC), Kumbakonam Limited, supplemented by private operators, to cater to daily commuting, inter-district, and inter-state travel demands.

TNSTC Kumbakonam Limited, an agency of the Government of Tamil Nadu, operates a comprehensive range of services including Town, Mofussil, Express, Inter-District, and Inter-State routes. These services provide extensive connectivity to neighbouring districts and adjoining states such as

Andhra Pradesh, Karnataka, Kerala, and the Union Territory of Puducherry. Tiruchirappalli's central geographical location and extensive route network position it as a major inter-district and inter-state bus transport hub in Central Tamil Nadu.

A key policy intervention influencing public transport usage is the fare-free bus travel scheme for women introduced by the Government of Tamil Nadu. This initiative has resulted in a significant mode shift from private vehicles, walking, and cycling to public transport, increasing the share of women passengers from 40 percent to 64.65 percent.

#### 9.3.4.2 Bus Terminals and Passenger Handling

The city is presently served by two major operational bus terminals—Tiruchirappalli Central Bus Stand and Chathiram Bus Stand. Passenger counts indicate that Chathiram Bus Stand (New Bus Stand) handles approximately 1,01,846 passengers per day, nearly double the passenger volume of the Central Bus Stand, highlighting its role as the city's primary bus terminal.

To accommodate growing passenger demand and reduce congestion at existing facilities, Muthamizharignar Kalaignar Dr. M. Karunanidhi Integrated Bus Terminal (MKMKIBT) has been developed as a greenfield terminal at Panjapur. The terminal is designed to support long-term operational requirements and improve overall terminal-level efficiency. Its strategic peripheral location ensures direct regional connectivity to major corridors leading towards Madurai, Dindigul, Thanjavur, and other southern districts, while maintaining effective linkage with the city core through arterial and collector road networks. By diverting inter-district and long-distance bus operations away from the inner city, the terminal is expected to decongest central areas and enhance the overall performance of the urban transport system.

#### 9.3.4.3 Distribution of Bus Services and Functional Hierarchy

The distribution of bus services across major terminus reflects a clear functional hierarchy within the city's public transport system. Chathiram Bus Stand emerges as the primary transit hub, handling the highest number of services (671 buses), comprising a significant share of both TNSTC and private operations. Tiruchirappalli Muthamizharignar Kalaignar Dr. M. Karunanidhi Integrated Bus Terminal (MKMKIBT) and the Central Bus Stand function as secondary terminals with comparatively lower service volumes, together accommodating roughly one-fourth of the total services.

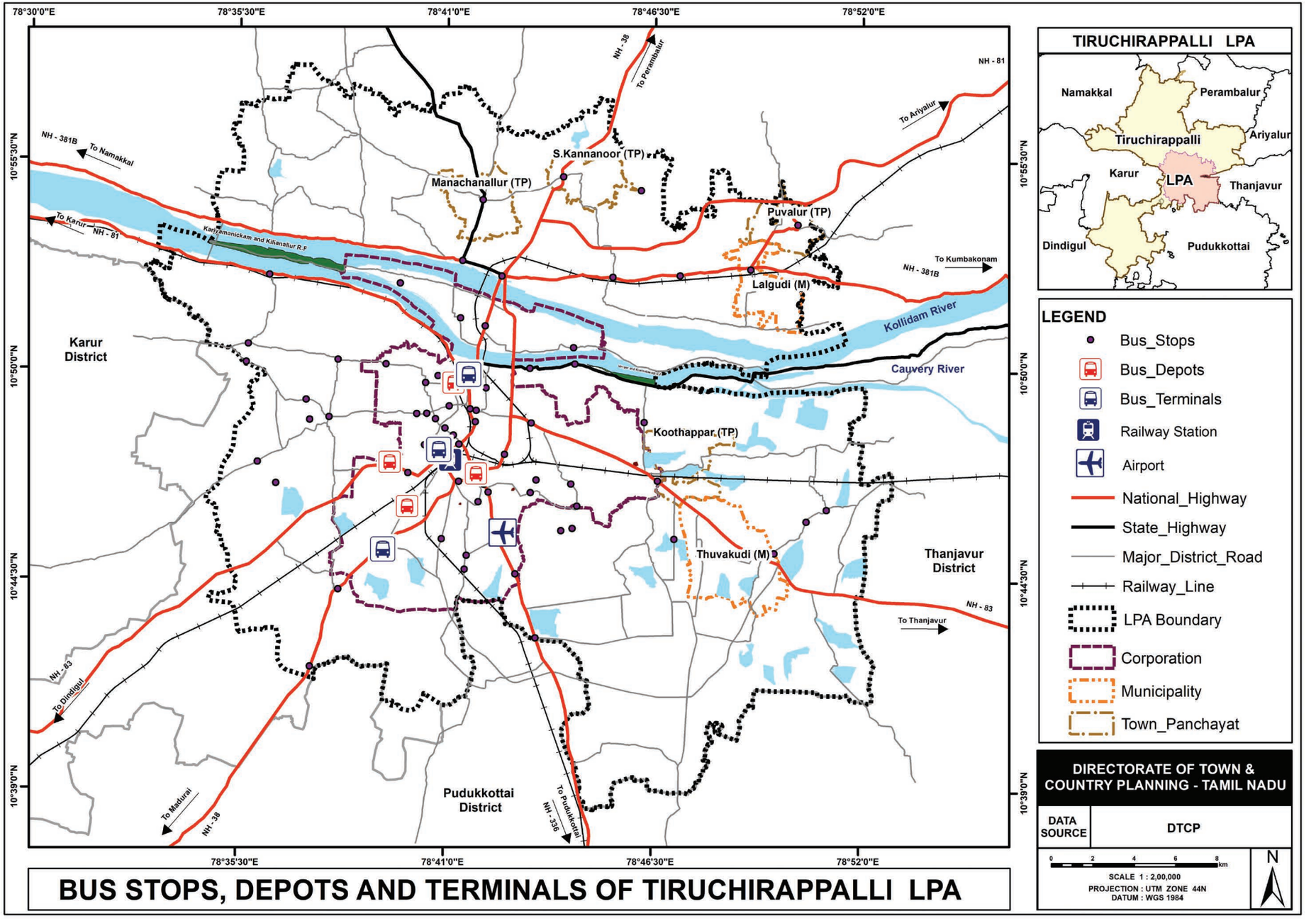
*Table 9.5 Distribution of Bus Services across major termini*

| Sl.No. | Terminus name | Area (in acres) | TNSTC | Private | Total |
|---|---|---|---|---|---|
| 1 | Tiruchirappalli Muthamizharignar Kalaignar Dr. M. Karunanidhi Integrated Bus Terminal (MKMKIBT) Panjapur | 40 | 105 | 3 | 108 |
| 2 | Central Bus Stand | 6.66 | 69 | 28 | 97 |
| 3 | Chatiram Bus Stand | 2.88 | 395 | 276 | 671 |
| **Total** | | | 569 | 307 | 876 |

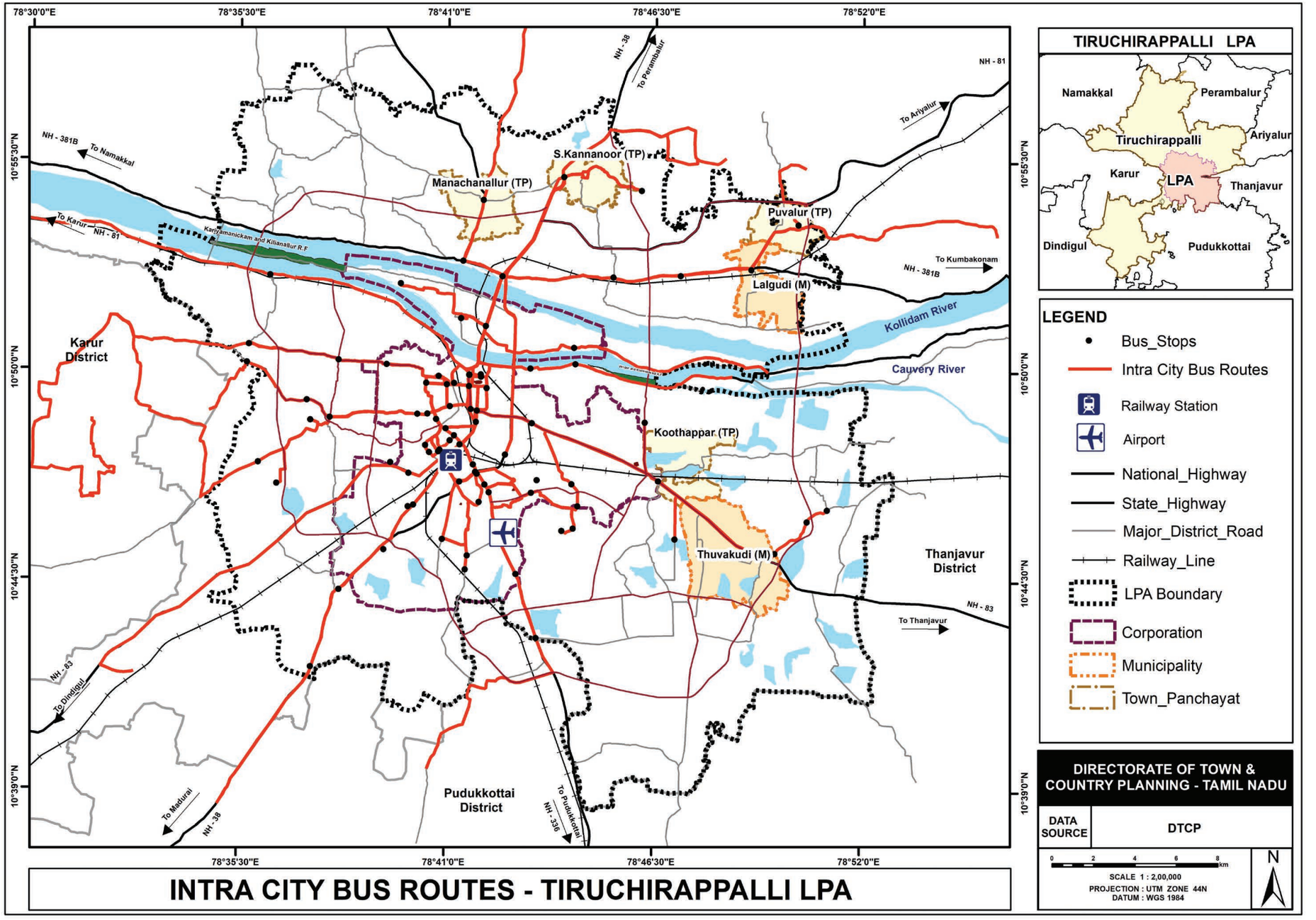
*Source: TNSTC (Kum) Ltd., Tiruchirappalli Region*

In addition to these major terminals, secondary bus stands at Lalgudi, Thuvakudi, Thiruverumbur, and Srirangam handle a considerable number of services and play an important role in strengthening intra-city and peripheral connectivity. Including services operating from secondary bus stands, the total bus fleet serving the city amounts to 1,014 buses. With a population of approximately 17 lakhs, the fleet size meets the Urban Bus Fleet Specification norm of 40 buses per lakh population, indicating that the current supply is broadly adequate.

Tiruchirappalli is served by four major bus depots that support the operation and maintenance of both intra-city and long-distance bus services. The SETC Bus Depot caters primarily to long-distance and inter-state services, handling premium and express operations. The TNSTC Dheera Nagar Bus Depot and the TNSTC Salai Road Bus Depot function as key operational bases for town and mofussil services, supporting daily intra-city and inter-district connectivity. In addition, the Pudukkottai Division Bus Depot plays an important role in managing regional services towards Pudukkottai and adjoining areas, together ensuring efficient fleet deployment, maintenance, and continuity of bus operations across the Tiruchirappalli region.




*Map 9.3: Bus Stops, Depots and Terminals of Tiruchirappalli LPA*




*Map 9.4 Intracity Bus Routes – Tiruchirappalli LPA*

*Source: DTCP Analysis*

#### 9.3.4.4 Bus Route Network and Operations

The bus route network within the Tiruchirappalli LPA exhibits extensive spatial coverage, ensuring connectivity between the city core, peripheral towns, and surrounding regional areas. The network is predominantly radial, converging towards the city core and major transit nodes, thereby facilitating efficient intra-city, inter-city, and regional movement. Major corridors along National Highways, State Highways, and Major District Roads are well served, enabling seamless connectivity to neighbouring districts such as Karur, Thanjavur, Pudukkottai, and Dindigul. Integration with railway stations and the airport further strengthens the multimodal transport framework.

City bus services operate on routes with a maximum length of 30 km, with buses covering an average of 200–250 km per day. The average occupancy rate is around 55 percent throughout the day. As of 2022, the minimum fare for city bus services is Rs. 5.00. The staff-to-bus ratio for private city bus operations stands at 5.5, and no new route permits are currently being issued for private city bus services.

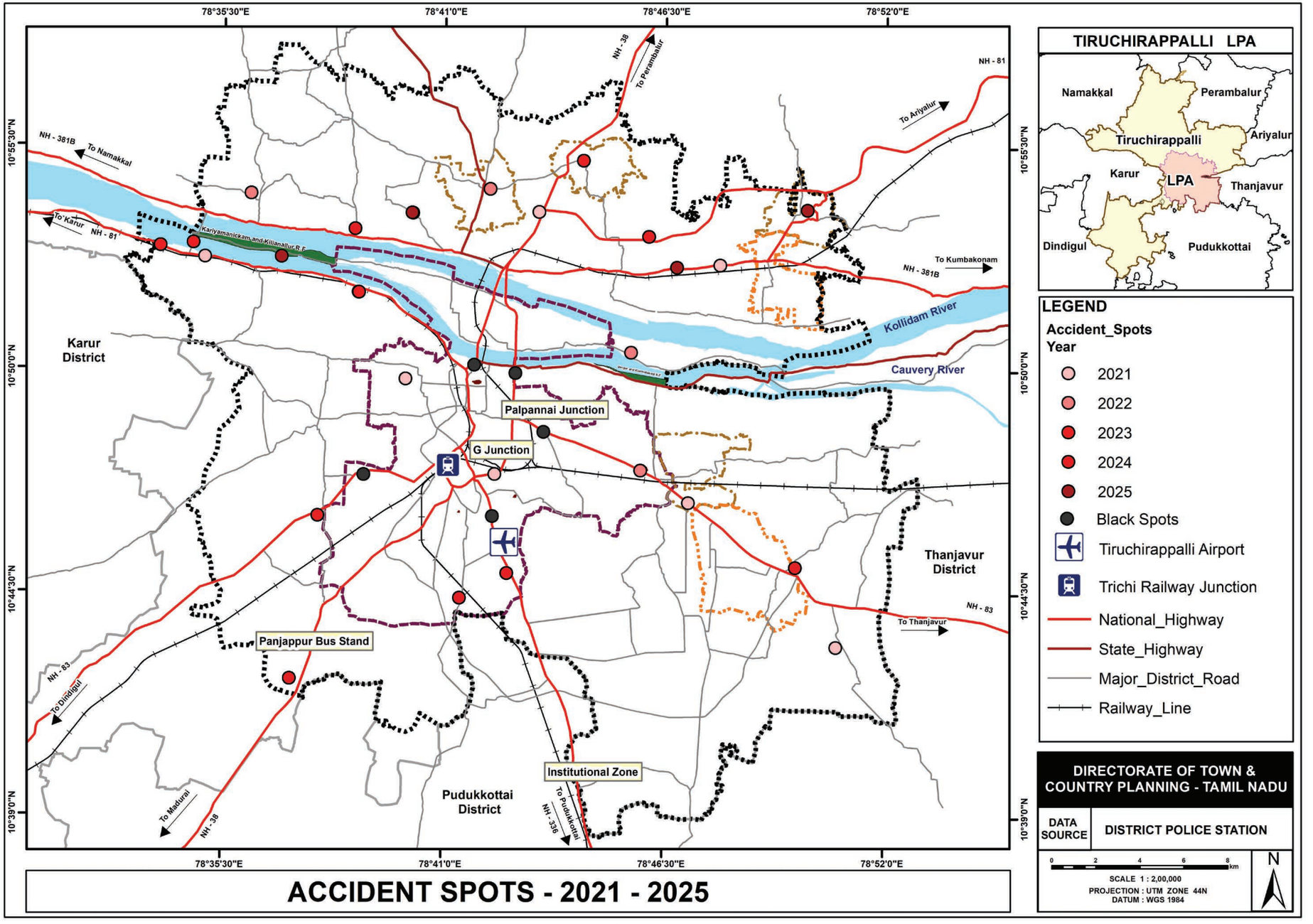
### 9.3.5 Road Safety

Road safety is a critical concern in Tiruchirappalli due to its function as a major regional centre with high levels of passenger and freight movement. The city's road network carries a mix of fast-moving through traffic, local traffic, public transport, pedestrians, and non-motorised vehicles, often within limited right-of-way. Rapid urban growth, increasing vehicle ownership, and expanding peri-urban development have placed additional pressure on the existing road infrastructure. In this context, an assessment of road accident trends is essential to understand the magnitude and characteristics of road safety issues in Tiruchirappalli and to support the formulation of effective safety improvement measures.

*Table 9.6 Road Accident Statistics in Tiruchirappalli (2021 – 2025)*

| Year | Total Accidents | No of Persons Died | No. of Person Injured |
|---|---|---|---|
| 2021 | 2290 | 470 | 1820 |
| 2022 | 2225 | 554 | 1671 |
| 2023 | 2642 | 555 | 2087 |
| 2024 | 2812 | 643 | 2169 |
| 2025 | 2382 | 562 | 1820 |

*Source: Tiruchirappalli Police*




*Map 9.5 Accident Spots – 2021 to 2025*

An analysis of road accident data for the period 2021–2025 indicates that Tiruchirappalli has experienced a generally increasing trend in road accidents up to 2024. The total number of accidents rose from 2,290 in 2021 to a peak of 2,812 in 2024, reflecting growing safety risks associated with rising traffic volumes and complex traffic conditions. Although the number of accidents declined to 2,382 in 2025, the overall trend highlights persistent safety challenges on the city's road network.

The number of fatalities shows a concerning upward trend during the study period. Deaths increased from 470 in 2021 to 643 in 2024, indicating an increase in accident severity, particularly on major corridors and at high-conflict junctions. While fatalities reduced to 562 in 2025, they remain higher than earlier years, underscoring the need for focused interventions to reduce the severity of crashes.

Similarly, the number of persons injured increased steadily from 1,820 in 2021 to 2,169 in 2024, closely following the rise in total accidents. The reduction in injuries to 1,820 in 2025 corresponds with the decline in accidents during that year.

The spatial distribution of accident hotspots within the Tiruchirappalli LPA indicates a clear concentration along major movement corridors and high-traffic junctions. Prominent clusters are observed along the National Highway and State Highway stretches, particularly near Panjapur Junction, Gandhi Junction, and Palpannai Junction, highlighting the safety risks arising from high traffic volumes, mixed vehicular movement, and frequent conflict points. Additional accident occurrences are noted along river-crossing corridors and near the airport access road, where through-traffic, local traffic, and pedestrian movement intersect. Peripheral accident locations along radial corridors toward Thanjavur, Karur, and Pudukkottai suggest increasing vehicular speeds and inadequate traffic calming measures at entry–exit points of the urban area. Overall, the pattern reflects the need for targeted junction-level interventions rather than corridor-wide widening, with a focus on conflict reduction and improved traffic management.

Recent district-level road safety trends further reinforce the findings from the accident analysis. During 2025, Tiruchirappalli recorded one of the highest reductions in road accidents among districts in Tamil Nadu, with accidents declining by about 13 percent and fatalities reducing by nearly 12 percent compared to the previous year. The improvement has been particularly pronounced in rural and peri-urban areas, indicating the effectiveness of enforcement measures, traffic regulation, and targeted safety interventions outside the core city area. However, the persistence of accident hotspots along National Highway corridors and emerging peripheral stretches suggests that while overall accident occurrence has reduced, risk remains concentrated on high-speed regional corridors and urban edge locations. This highlights the

need to complement enforcement-led improvements with engineering measures at identified hotspots, enhanced pedestrian safety at junctions, and access management along major corridors to sustain and further improve road safety outcomes across the Tiruchirappalli LPA.

## 9.4 Traffic and Travel Characteristics

### 9.4.1 Registered Vehicles – Tiruchirappalli

Of the total vehicles registered during the years 2020 and 2021, approximately 94 percent comprised private vehicle registrations. Within the overall vehicle registrations recorded under the city Regional Transport Office (RTO), two-wheelers alone accounted for nearly 70 percent of the total, highlighting their dominance in the urban vehicle fleet.

*Table 9.7 Vehicle Registration Details for Tiruchirappalli*

| S.No. | Vehicle Class | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| 1 | 2-Wheelers | 29,550 | 30,840 | 17,591 | 23,134 | 11,011 |
| 2 | 4-Wheelers | 3,421 | 3,335 | 3,024 | 2,776 | 10,571 |
| 3 | Taxis | 264 | 263 | 11,308 | 557 | 1,358 |
| 4 | Autos | 487 | 703 | 925 | 557 | 181 |
| 5 | Buses | 1,435 | 1,437 | 1,536 | 295 | 110 |
| 6 | Goods Vehicles | 592 | 788 | 808 | 634 | 694 |
| 7 | Tractors | 367 | 504 | 54 | 494 | 87 |
| 8 | Trailers | 7 | 65 | 105 | 115 | 101 |
| 9 | Others | 55 | 428 | 469 | 153 | 129 |
| **Total** | | **36,178** | **38,363** | **35,820** | **28,715** | **24,242** |

*Source: Comprehensive Mobility Plan, 2022*

The impact of the COVID-19 pandemic is evident from the vehicle registration trends, which indicate a notable increase in registrations of both two-wheelers and four-wheelers, reflecting a shift away from shared and public transport modes during the pandemic period. Notably, four-wheeler registrations peaked in 2021 at 10,571 vehicles—the highest recorded in the past decade.

### 9.4.2 Survey Locations

Under the traffic and transportation surveys, a comprehensive set of locations was identified across the Tiruchirappalli Local Planning Area to capture diverse

travel characteristics and traffic conditions. The survey locations include Outer Cordon (OC) points along major National and State Highways such as NH-38, NH-81, NH-83, NH-336 and SH-62 to assess external traffic movements; Screen Line / Classified Volume Count (SCR–CVC) locations at critical river crossings and arterial links including Thennur Bridge, Aristo Roundabout, Kalkandar Kottai Main Road and Kollidam Bridge to understand internal traffic flows; major intersections and junctions at high-activity nodes such as Central Bus Stand, Railway Junction, Anna Statue, Palpannai Junction and Gandhi Market to evaluate intersection performance and congestion levels; and mid-block sections on key arterial and sub-arterial roads like Thillai Nagar Main Road, Shastri Road, Thanjavur Main Road, Karur Bypass Road and Srirangam Road to analyse operating speeds and traffic composition. Together, these locations provide a representative coverage of regional, city-level and local road networks, enabling a comprehensive assessment of travel demand, traffic operations and mobility patterns within the LPA.

*Table 9.8 Outer Cordon Locations*

| Sl.No. | Location ID | Corridor |
|---|---|---|
| 1 | OC 1 | SH 62 |
| 2 | OC 2 | NH 81 (West) |
| 3 | OC 3 | NH 83 (West) |
| 4 | OC 4 | NH 336 |
| 5 | OC 5 | NH 83 (East) |
| 6 | OC 6 | NH 81 (East) |
| 7 | OC 7 | NH 38 |
| 8 | OC 8 | NH 38 (South / Madurai) |

*Source: Comprehensive Mobility Plan, 2022*

*Table 9.9 Screen Line Locations*

| Sl.No. | Location ID | Location |
|---|---|---|
| 1 | Scr-CVC 1 | Thennur Bridge |
| 2 | Scr-CVC 2 | Aristo Roundabout |
| 3 | Scr-CVC 3 | Kalkandar Kottai Main Road |
| 4 | Scr-CVC 4 | Kollidam Bridge |

*Source: Comprehensive Mobility Plan, 2022*

*Table 9.10 Intersections*

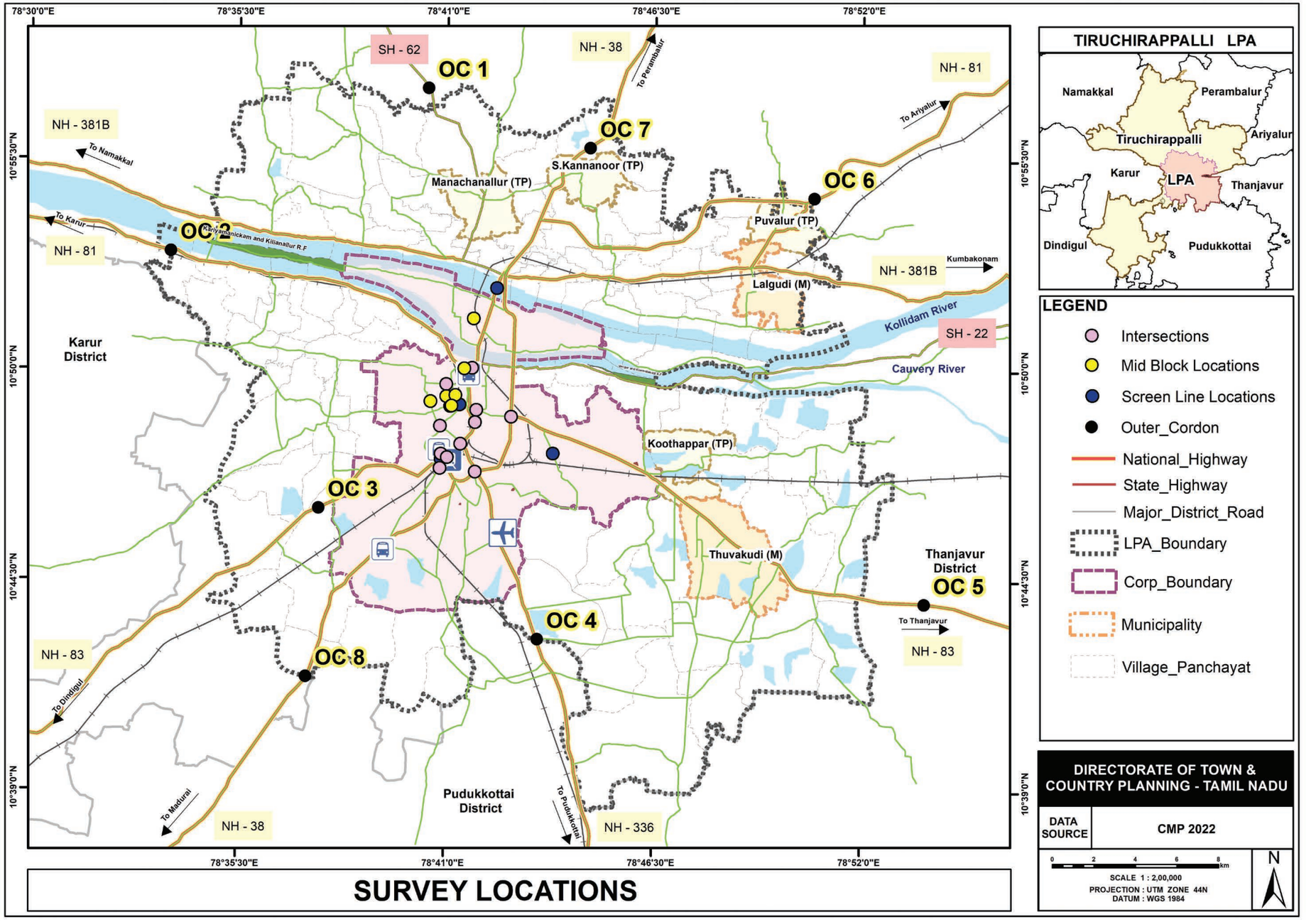
| Sl.No. | Location ID | Location |
|---|---|---|
| 1 | Intersection 1 | Central Bus Stand (opp. Hotel Anand) |
| 2 | Intersection 2 | Anna Statue |
| 3 | Intersection 3 | Head Post Office Roundabout |
| 4 | Intersection 4 | Railway Junction |
| 5 | Intersection 5 | TVS Toll Gate |
| 6 | Intersection 6 | MGR Circle |
| 7 | Intersection 7 | Salai Road & Thillai Nagar Junction |
| 8 | Intersection 8 | Keela Chathiram Rd – Thennur High Rd |
| 9 | Intersection 9 | Old Madurai Road |
| 10 | Intersection 10 | Palpannai Junction |
| 11 | Intersection 11 | Gandhi Market (Thanjavur Road) |
| 12 | Intersection 12 | Sivaji Ganesan Statue |
| 13 | Intersection 13 | Sanjeevi Nagar Junction |
| 14 | Intersection 14 | Mambala Salai Junction |

*Source: Comprehensive Mobility Plan, 2022*

*Table 9.11 Mid-Block Locations*

| Sl.No. | Location ID | Location |
|---|---|---|
| 1 | MB 1 | MS Thillai Nagar Main Road |
| 2 | MB 2 | Shastri Road (Thennur–Woraiyur) |
| 3 | MB 3 | Keela Chathiram Road |
| 4 | MB 4 | Shastri Road (Melapudhur–Salai Nagar) |
| 5 | MB 5 | Thanjavur Main Road |
| 6 | MB 6 | Karur Bypass Road |
| 7 | MB 7 | Srirangam Road |

*Source: Comprehensive Mobility Plan, 2022*




*Map 9.6 Mobility Survey Locations for Tiruchirappalli LPA*

## 9.4.3 Road Network Inventory

### 9.4.3.1 Median Availability

An assessment of the existing road network indicates that nearly 58% of the surveyed roads are undivided, reflecting the predominance of narrow carriageways across the city. The provision of medians is largely restricted to major arterial roads, where higher traffic volumes and speeds necessitate traffic segregation for improved safety and flow. The absence of medians on a majority of roads contributes to frequent conflicts between opposing traffic streams, unsafe overtaking, and reduced overall roadway efficiency, particularly in areas experiencing mixed traffic conditions.

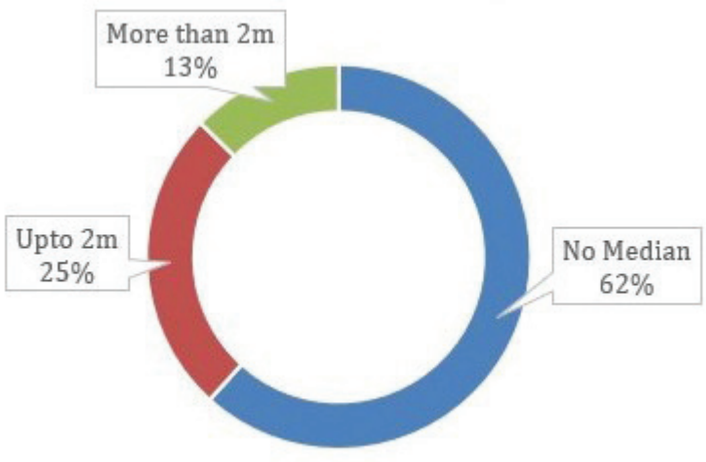



*Figure 9.5 Distribution of Roads by Carriageway*

### 9.4.3.2 Pavement Conditions

The pavement condition survey reveals that the road infrastructure in Tiruchirappalli is predominantly flexible paved, accounting for approximately 94% of the total surveyed road length. Unpaved roads constitute about 6%, primarily located in peripheral areas and developing zones, indicating gaps in last-mile connectivity and infrastructure provision. Rigid pavements account for only 1%. While the dominance of flexible pavements allows for easier maintenance and phased upgrading, the presence of unpaved stretches poses challenges in terms of accessibility, ride quality, and resilience during monsoon seasons.

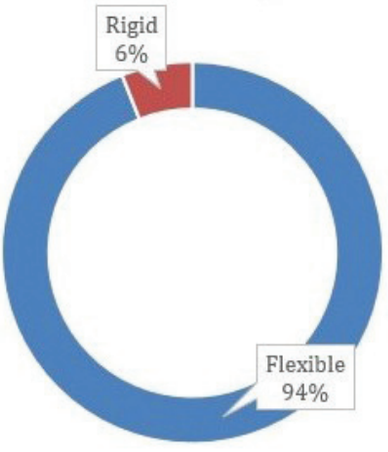



*Figure 9.6 Type of Road Pavement Surface*

### 9.4.3.3 Footpath Availability and Condition

Pedestrian infrastructure assessment shows that around 68% of the surveyed roads are provided with footpaths on both sides, indicating a reasonable level of pedestrian infrastructure coverage across the city. However, approximately 12% of roads lack footpaths entirely, forcing pedestrians to share carriageways with vehicular traffic. This condition is particularly critical in core city areas, where high pedestrian activity combined with traffic intensity leads to frequent pedestrian–vehicular conflicts.

Further, the quality and usability of footpaths remain a significant concern, as nearly 50% of the existing footpaths are encroached upon by commercial activities such as hawking, advertisements, utility installations, and on-street parking. These encroachments substantially reduce the effective walking width, discouraging pedestrian movement and compromising safety and universal accessibility.

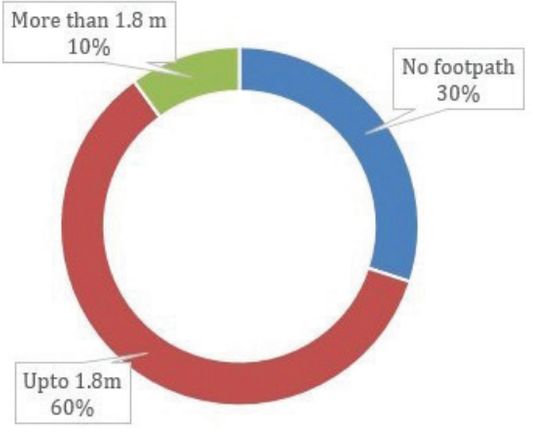



*Figure 9.7 Availability of Footpaths*

### 9.4.4 Speed and Delay

Speed and delay surveys were conducted on about 150 km of major road network within the Tiruchirappalli Local Planning Area during both peak and non-peak periods to assess the level of service and quality of traffic flow. The survey analysed running speed, journey speed, and different types of delays including stopped delay and operational delay.

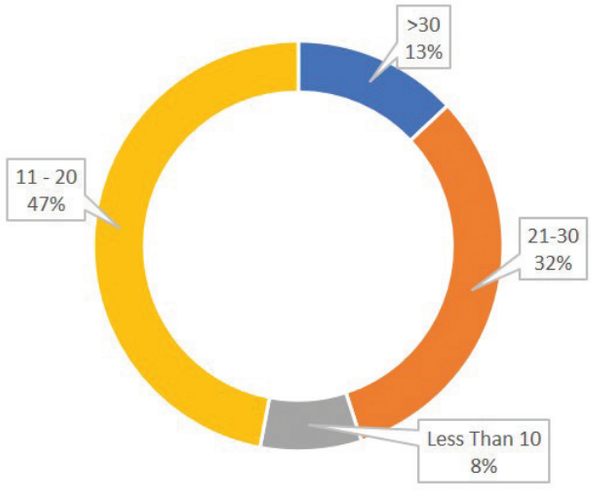



*Figure 9.8 Average Journey Speed in the Major Corridors*

The analysis indicates that the journey speed on major corridors ranges between 11 and 20 kmph, reflecting congested traffic conditions during peak periods. The average journey speed for cars is observed to be 26 kmph. Nearly 67 percent of the surveyed road network experiences delays due to traffic congestion, while around 12 percent of roads are affected by delays caused by buses stopping at bus stops.

Further, the results show that 47 percent of the total road network operates at speeds of 11–20 kmph during peak hours, indicating constrained operating conditions. Only 13 percent of the roads achieve average speeds exceeding 30 kmph, suggesting limited availability of free-flow conditions within the urban road network. Overall, the findings highlight the need for traffic management measures, public transport prioritisation, and corridor-level capacity improvements to enhance mobility and level of service across the LPA.

### 9.4.5 Traffic Volume in Tiruchirappalli LPA

#### 9.4.5.1 Outer Cordon Survey

The Outer Cordon Survey was conducted to assess vehicular movement entering and exiting the Tiruchirappalli urban area along major National and

State Highway corridors. The survey helps in understanding through traffic volumes, directional flow patterns, and peak-hour traffic intensity, which are critical for planning bypasses, ring roads, and traffic decongestion strategies.

*Table 9.12 Outer Cordon Traffic Volume (Daily)*

| Location ID | Corridor | Total Vehicles (Both Directions) | Total PCUs (Both Directions) | Traffic Intensity |
|---|---|---|---|---|
| OC1 | SH 62 | 17,277 | 20,767 | Moderate |
| OC2 | NH 81 (West) | 11,036 | 17,866 | Low–Moderate |
| OC3 | NH 83 (West) | 27,030 | 39,977 | High |
| OC4 | NH 336 | 41,289 | 49,175 | Very High |
| OC5 | NH 83 (East) | 29,154 | 36,938 | High |
| OC6 | NH 81 (East) | 24,995 | 35,317 | High |
| OC7 | NH 38 | 49,913 | 70,127 | **Very High** |
| OC8 | NH 38 (South / Madurai) | 37,434 | 52,371 | Very High |
| **Total** | – | **2,38,128** | **3,22,538** | – |

*Source: Comprehensive Mobility Plan, 2022*

The total traffic crossing the outer cordon is estimated at 2.38 lakh vehicles per day, equivalent to 3.22 lakh PCUs, indicating a very high influence of regional and inter-city traffic on Tiruchirappalli's road network. Among the surveyed corridors, NH 38 (OC7 and OC8) records the highest traffic volumes, underscoring its role as a major regional artery connecting Madurai and the southern districts. NH 336 (OC4) also experiences very high traffic volumes, reflecting significant commuter as well as freight movement along this corridor. In contrast, comparatively lower traffic volumes are observed on NH 81 (West) and SH 62, suggesting relatively lesser regional traffic pressure on these routes.

*Table 9.13 Peak Hour Traffic Characteristics*

| Location ID | Corridor | Peak Hour | Peak Hour Vehicles (Both Directions) | Peak Hour PCUs |
|---|---|---|---|---|
| OC1 | SH 62 | 08:45–09:45 | 1,134 | 1,044 |
| OC2 | NH 81 (West) | 18:15–19:15 | 539 | 787 |
| OC3 | NH 83 (West) | 10:30–11:30 | 1,365 | 1,596 |

| Location ID | Corridor | Peak Hour | Peak Hour Vehicles (Both Directions) | Peak Hour PCUs |
|---|---|---|---|---|
| OC4 | NH 336 | 09:00–10:00 | 2,509 | 2,268 |
| OC5 | NH 83 (East) | 08:45–09:45 | 1,963 | 1,797 |
| OC6 | NH 81 (East) | 13:00–14:00 | 1,221 | 1,379 |
| OC7 | NH 38 | 08:30–09:30 | **2,979** | **3,197** |
| OC8 | NH 38 (South / Madurai) | 10:30–11:30 | 1,834 | 2,846 |

*Source: Comprehensive Mobility Plan, 2022*

Peak hour traffic conditions vary significantly across the outer cordon corridors, indicating diverse travel patterns shaped by commuter, commercial, and through traffic movements. NH 38 (OC7) registers the highest peak-hour traffic, exceeding 3,100 PCUs, which highlights a high potential for congestion during morning peak periods. The predominance of morning peak hours on corridors such as OC1, OC5, and OC7 reflects strong commuter-oriented travel demand, whereas evening and mid-day peaks on other corridors suggest the influence of freight and inter-city traffic. The consistently high peak-hour PCU values observed on National Highways and major State Highways underscore the necessity for traffic diversion measures, development of bypass facilities, and implementation of ring road infrastructure to segregate regional traffic from intra-city movement and improve overall mobility efficiency.

The traffic composition by vehicle ownership at the outer cordon locations indicates a clear dominance of private vehicles, which account for 61% of the total traffic volume. Within the private vehicle category, two-wheelers constitute the highest share, varying between 27% and 50% across locations, reflecting a strong reliance on personalized modes of transport for both commuter and regional travel.

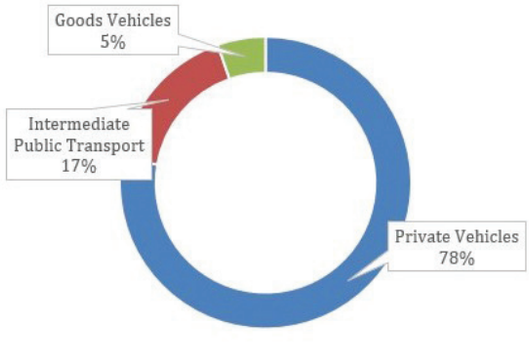



*Figure 9.9 Traffic Composition in Outer Cordon points*

In addition, goods and commercial vehicles contribute approximately 25% of the total traffic, highlighting the critical role of the outer cordon corridors in freight movement and logistics operations.

### 9.4.5.2 Screen Line Survey

Screen line volume counts were conducted at four critical locations within Tiruchirappalli city to assess classified vehicular movement across major internal corridors. The survey captures daily traffic volumes, peak-hour characteristics, and traffic composition, providing insights into intra-city movement patterns and congestion intensity.

*Table 9.14 Daily Traffic Volume at Screen Line Locations*

| Screen Line ID | Location | Total Vehicles (Both Directions) | Total PCUs (Both Directions) | Traffic Intensity |
|---|---|---|---|---|
| Scr-CVC 1 | Thennur Bridge | 54,797 | 47,665 | High |
| Scr-CVC 2 | Aristo Roundabout | **70,795** | **69,309** | **Very High** |
| Scr-CVC 3 | Kalkandar Kottai Main Road | 10,926 | 9,241 | Low |
| Scr-CVC 4 | Kollidam Bridge | 69,164 | 61,209 | Very High |
| **Total** | – | **2,05,682** | **1,87,424** | – |

*Source: Comprehensive Mobility Plan, 2022*

The total daily traffic crossing the screen lines is estimated at 2.05 lakh vehicles, equivalent to 1.87 lakh PCUs, indicating high internal traffic movement within the city. The maximum traffic volume is observed at Aristo Roundabout (Scr-CVC 2), followed closely by Kollidam Bridge (Scr-CVC 4), highlighting these locations as critical internal traffic bottlenecks. The dominant flow at Aristo Roundabout is observed towards Subramaniapuram Roundabout, emphasizing its strategic importance in city-level circulation. In contrast, Scr-CVC 3 records relatively low volumes, indicating limited corridor-level traffic pressure.

*Table 9.15 Peak Hour Traffic Characteristics at Screen Line Locations*

| Screen Line ID | Location | Peak Hour | Peak Hour Vehicles (Both Directions) | Peak Hour PCUs |
|---|---|---|---|---|
| SC1 | Thennur Bridge | 09:30–10:30 | 4,445 | 3,783 |
| SC2 | Aristo Roundabout | **09:00–10:00** | **6,363** | **5,995** |
| SC3 | Kalkandar Kottai Main Road | 18:45–19:45 | 938 | 777 |
| SC4 | Kollidam Bridge | 09:00–10:00 | 6,545 | 5,558 |

*Source: Comprehensive Mobility Plan, 2022*

Peak hour analysis reveals that the highest peak-hour traffic is observed at Aristo Roundabout (Scr-CVC 2) during the morning peak, followed by Kollidam Bridge (Scr-CVC 4). This indicates strong commuter-oriented movement during morning hours along these corridors. The lowest peak-hour volume is observed at Scr-CVC 3, reflecting its relatively lower role in citywide traffic circulation. The concentration of high peak-hour PCUs at select screen lines highlights locations with severe congestion potential and capacity stress.

Private vehicles constitute the largest share of screen line traffic at 58%, followed by goods vehicles (12%) and public transport vehicles (11%). The presence of 9% IPT traffic indicates significant dependence on para-transit modes for internal city movement.

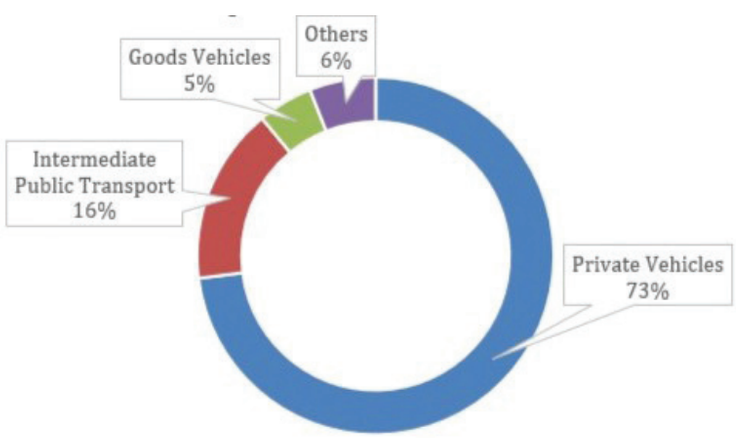



*Figure 9.10 Traffic Composition at Screen Line Locations*

### 9.4.5.3 Traffic Volume at Junctions / Intersections

Traffic Volume Counts (TVC) were carried out at 14 critical junctions across Tiruchirappalli city to assess daily traffic volumes, peak-hour characteristics, and traffic composition at major intersections.

*Table 9.16 Daily and Peak Hour Traffic Volume at Intersections*

| Junction Name | Daily Traffic (Vehicles) | Traffic Intensity | Peak Hour | Peak Hour Vehicles |
|---|---|---|---|---|
| Central Bus Stand (opp. Hotel Anand) | 62,255 | High | 09:45–10:45 | 4,739 |
| Anna Statue | 1,28,011 | **Very High** | 09:45–10:45 | 10,482 |
| Head Post Office Roundabout | 1,23,262 | **Very High** | 10:45–11:45 | 10,197 |
| Railway Junction | 58,113 | Moderate | 09:30–10:30 | 4,633 |
| TVS Toll Gate | 1,31,287 | **Very High** | 09:45–10:45 | 10,551 |
| MGR Circle | **1,40,850** | **Very High** | 09:30–10:30 | **12,166** |
| Salai Road & Thillai Nagar Junction | 1,02,153 | High | 18:45–19:45 | 8,117 |
| Keela Chathiram Rd – Thennur High Rd | 95,165 | High | 09:15–10:15 | 8,101 |
| Old Madurai Road | 85,756 | Moderate–High | 10:30–11:30 | 6,819 |
| Palpannai Junction | 1,19,973 | **Very High** | 09:30–10:30 | 10,546 |
| Gandhi Market (Thanjavur Road) | 65,150 | High | 18:45–19:45 | 4,840 |
| Sivaji Ganesan Statue | 1,05,958 | High | 11:00–12:00 | 7,876 |
| Sanjeevi Nagar Junction | 1,06,351 | High | 09:45–10:45 | 8,927 |
| Mambala Salai Junction | 96,708 | High | 09:15–10:15 | 8,598 |

*Source: Comprehensive Mobility Plan, 2022*

The intersection traffic analysis indicates very high traffic concentration at key city junctions, particularly along primary arterial corridors. MGR Circle, TVS Toll Gate, Anna Statue, and Head Post Office Roundabout carry more than 1.20 lakh vehicles per day, confirming their role as major traffic convergence points. Several other junctions, including Palpannai Junction, Sanjeevi Nagar Junction, Sivaji Ganesan Statue, and Salai Road & Thillai Nagar Junction, also serve over 1.00 lakh vehicles daily, reflecting widespread pressure on the urban road network.

Peak hour traffic volumes further highlight operational stress at these junctions. MGR Circle records the highest peak-hour traffic, exceeding 12,000 vehicles, followed by TVS Toll Gate, Palpannai Junction, Anna Statue, and Head Post Office Roundabout. The dominance of morning peak hours at most locations indicates strong commuter-oriented travel demand, while evening peak hours at selected junctions reflect commercial and market-related activity.

Private vehicles dominate intersection traffic, accounting for approximately 84% of the total volume across all surveyed junctions. The consistently high share of private vehicles (ranging between 79% and 87%) highlights heavy dependence on personalized transport and contributes significantly to congestion at major intersections.

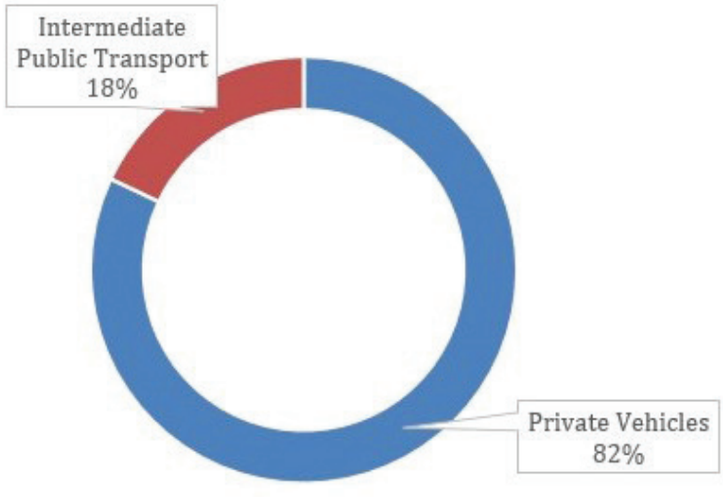



*Figure 9.11 Traffic Composition at Intersections*

### 9.4.5.4 Traffic Volume at Mid-Block Locations

Mid-block traffic volume surveys were conducted at seven locations within Tiruchirappalli city to assess directional traffic flow, daily volumes, peak-hour characteristics, and traffic composition. The surveys were carried out for 16 hours a day, capturing representative intra-city traffic movement along major corridors.

*Table 9.17 Daily Traffic Volume at Mid-Block Locations*

| Mid-Block ID | Location | Total Vehicles (Both Directions) | Total PCUs (Both Directions) | Traffic Intensity |
|---|---|---|---|---|
| MB 1 | MS Thillai Nagar Main Road | 59,598 | 53,823 | High |
| MB 2 | Shastri Road (Thennur–Woraiyur) | 49,506 | 45,467 | Moderate–High |
| MB 3 | Keela Chathiram Road | 56,464 | 49,624 | High |
| MB 4 | Shastri Road (Melapudhur–Salai Nagar) | 66,387 | 60,476 | Very High |
| MB 5 | Thanjavur Main Road | 44,789 | 42,963 | Moderate–High |
| MB 6 | **Karur Bypass Road** | **78,384** | **73,206** | **Very High** |
| MB 7 | Srirangam Road | 62,578 | 58,366 | High |
| **Total** | – | **4,17,706** | **3,83,925** | – |

*Source: Comprehensive Mobility Plan, 2022*

The total traffic observed across the mid-block locations amounts to 4.18 lakh vehicles per day, equivalent to 3.84 lakh PCUs, indicating very high intra-city traffic movement along major corridors. The maximum traffic volume is recorded along Karur Bypass Road (MB 6), with dominant flow towards Thennur, highlighting its role as a critical arterial and bypass corridor. This is followed by Shastri Road (MB 4), which also experiences very high traffic volumes. The remaining mid-block locations record moderate to high traffic volumes, reflecting their importance in supporting daily urban mobility.

Peak hour analysis shows that the highest peak-hour traffic volume is observed at Karur Bypass Road (MB 6) between 09:15 and 10:15, followed by Srirangam Road (MB 7). All seven mid-block locations exhibit relatively uniform traffic distribution throughout the day, with limited temporal variation, indicating sustained traffic demand rather than sharp peak congestion.

Private vehicles constitute the dominant share of mid-block traffic at 73%, followed by IPT vehicles (16%), indicating significant dependence on para-transit modes for intra-city movement. Goods vehicles contribute only about 5%, suggesting that mid-block corridors primarily serve passenger-oriented urban traffic rather than heavy freight movement.

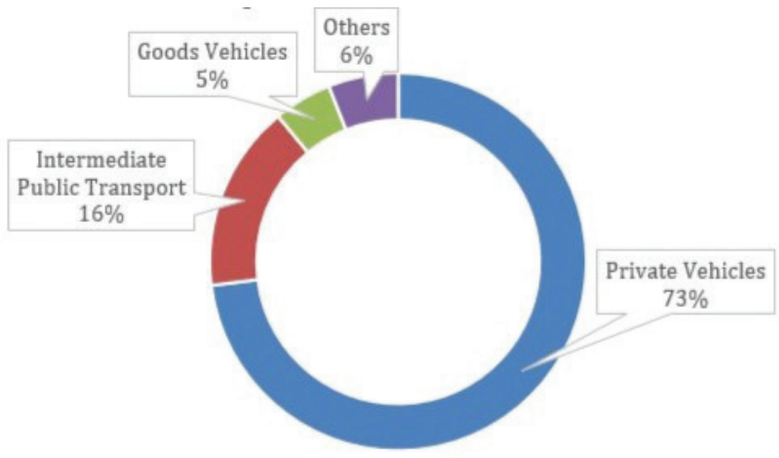



*Figure 9.12 Traffic Composition at Mid-Block Locations*

## 9.4.6 Origin Destination Survey

### 9.4.6.1 OD Survey at Outer Cordon

An Origin–Destination (O–D) survey was conducted at seven outer cordon locations to assess passenger and goods vehicle movement patterns, including vehicular flow, trip frequency, trip purpose, commodity type, and trip length.

#### 9.4.6.1.1 Passenger Vehicle Trip Characteristics

##### 9.4.6.1.1.1 Vehicular Flow

The overall Origin–Destination analysis indicates that external–internal (38%) and internal–external (28%) movements together constitute nearly two-thirds of the total traffic, highlighting Tiruchirappalli's strong functional linkage with its surrounding regions. This confirms the city's role as a regional attractor for employment, education, trade, and services, while also generating significant outward trips to neighbouring towns and cities. Internal–internal and external–external movements together account for 34%, indicating a balanced presence of both intra-city circulation and through traffic.

*Table 9.18 Passenger Vehicle Flow Pattern at Outer Cordon Locations*

| Flow Type | Share (%) |
|---|---|
| External → Internal | 38% |
| Internal → External | 28% |
| Internal→ Internal / External → External | 34% |

*Source: Comprehensive Mobility Plan, 2022*

The location-wise OD distribution further reinforces this trend. Outer cordon locations such as OC1 and OC6 exhibit high shares of internal–external and external–internal flows, reflecting strong commuter and economic interactions between the city core and peripheral areas. In contrast, OC3, OC4, OC7, and OC8 show a dominant external–external movement pattern, clearly indicating the presence of substantial through traffic bypassing the city. These corridors function as regional transit routes and experience significant non-destination traffic.

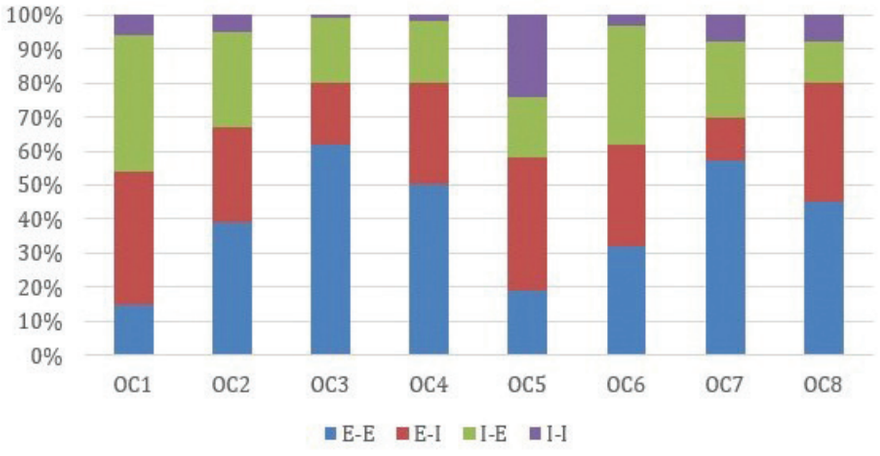



*Figure 9.13 Cordon wise Trip Distribution*

Based on the survey, several outer cordons exhibit high levels of through-traffic, which significantly impacts the city's internal congestion levels. OC3 and OC7 show the highest percentage of External-to-External (E-E) movement, both exceeding 50%, indicating that more than half the vehicles at these points are passing through without stopping in the city. Other significant nodes for through-traffic include OC4, which sits at exactly 50%, and OC8, which nears 45%. Conversely, OC1 and OC5 show much lower E-E shares but have high External-to-Internal (E-I) and Internal-to-External (I-E) volumes, suggesting these areas are primary entry and exit points for local urban activity rather than through-traffic. These findings reinforce the strategic necessity of the urban bypass and the Panjapur Integrated Bus Terminus to intercept these high E-E volumes at the periphery, particularly at the high-traffic cordons of OC3, OC4, and OC7.

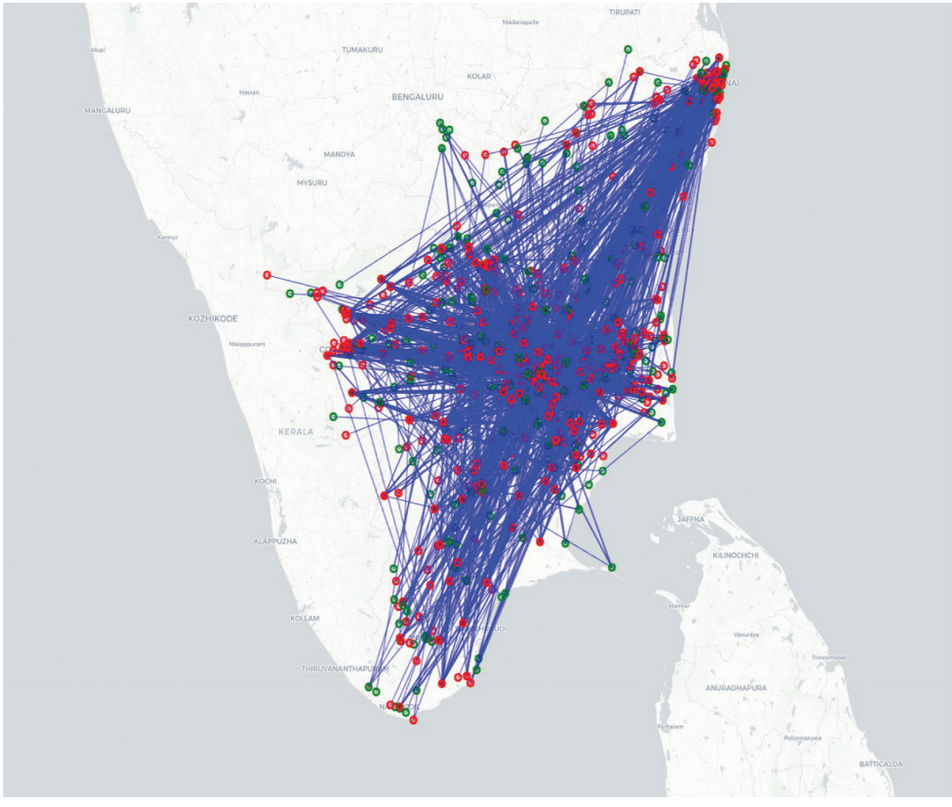



*Figure 9.14 Origin – Destination Desire Line Map from Outer Cordon Survey Locations*

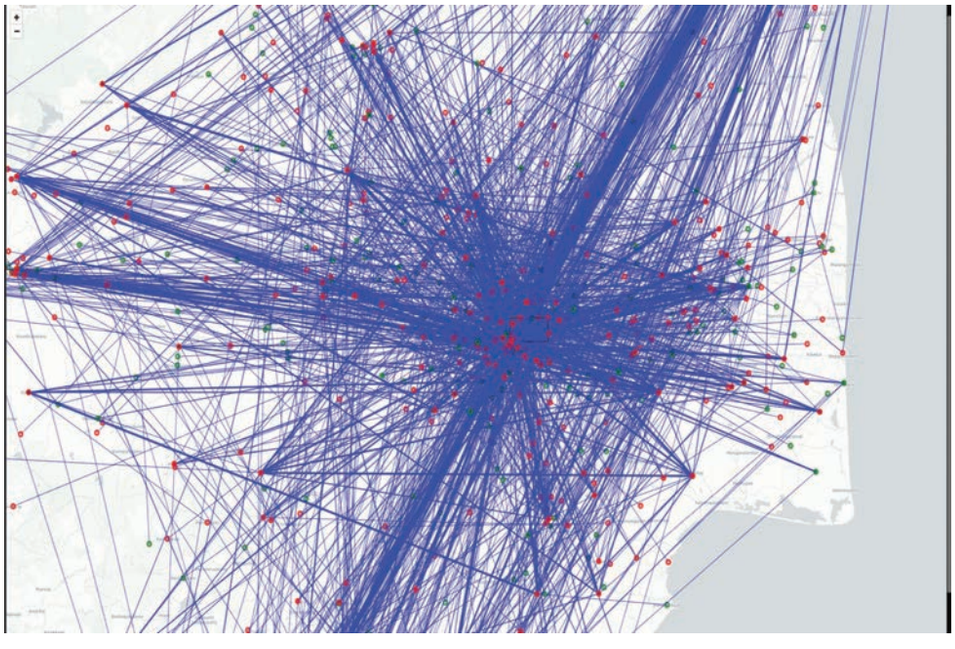


*Figure 9.15 Origin – Destination Desire Line Map Showing Concentration of Trips around Tiruchirappalli*

#### 9.4.6.1.1.2 Trip Frequency

The trip frequency distribution indicates that weekly trips dominate the traffic pattern, accounting for 38% on average, highlighting the strong regional and inter-city travel influence on Tiruchirappalli. Daily trips (once and twice combined) form a substantial share, especially along NH 38 and NH 81 corridors, reflecting regular commuter and work-related movements. Occasional trips (22%) suggest flexible travel linked to social, commercial, and service-oriented purposes. The share of high-frequency trips (daily thrice or more) remains minimal at about 2%, indicating limited repetitive short-cycle travel across cordon points. Overall, the pattern confirms a mix of commuter-oriented daily travel and dominant longer-cycle regional trips, reinforcing the need for efficient inter-city connectivity and demand management at city entry points.

*Table 9.19 Passenger Vehicle Trip Frequency distribution at Outer Cordon Locations*

| Outer Cordon | Location | Daily Twice (Up & Down) | Daily Once (One-way) | Occasional | Weekly | Daily Thrice or More |
|---|---|---|---|---|---|---|
| OC 1 | SH 62 | 25% | 10% | 30% | 33% | 2% |
| OC 2 | NH 81 (West) | 5% | 35% | 19% | 42% | 0% |
| OC 3 | NH 83 (West) | 11% | 2% | 37% | 47% | 3% |
| OC 4 | NH 336 | 25% | 1% | 22% | 50% | 2% |
| OC 5 | NH 83 (East) | 8% | 31% | 23% | 36% | 2% |
| OC 6 | NH 81 (East) | 5% | 32% | 27% | 36% | 0% |
| OC 7 | NH 38 | 28% | 25% | 11% | 32% | 3% |
| OC 8 | NH 38 (South / Madurai) | 25% | 19% | 9% | 28% | 2% |
| Average | | 17% | 19% | 22% | 38% | 2% |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.4.6.1.1.3 Trip Purpose

Work trips account for 44%, followed by education and social trips at 12% and 10%, respectively. Health-based trips accounted for 3% of the total share.

Work trips dominate across all outer cordon locations, ranging from 20% to 64%, indicating strong commuter-driven travel patterns. Education-related trips form a significant secondary share, especially along corridors serving institutional zones. Social and shopping trips together account for a noticeable

proportion, reflecting mixed-purpose and discretionary travel. Health- and religious-based trips remain consistently low, contributing marginally to overall trip generation. Overall, the trip purpose pattern highlights a clear emphasis on employment-led travel, reinforcing peak-hour congestion on major corridors.

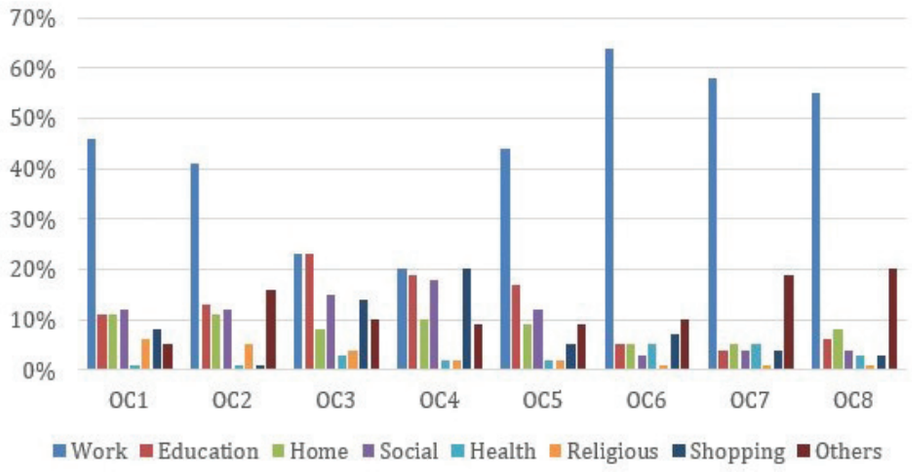



*Figure 9.16 Cordon Wise Trip Distribution*

### 9.4.6.1.2 Goods Vehicles Travel Characteristics

#### 9.4.6.1.2.1 Vehicular Flow

Of the total freight flow, share of external-to-external flow, at 36%, followed by internal to external flow with a share of 31%.

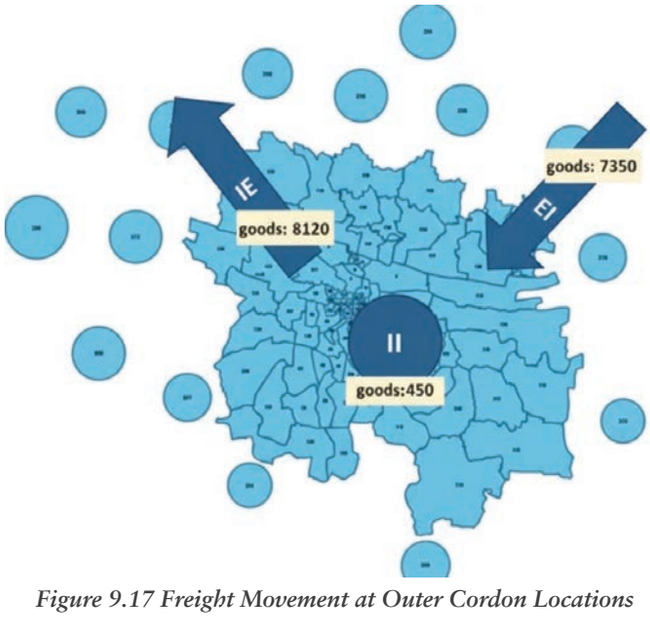



*Figure 9.17 Freight Movement at Outer Cordon Locations*

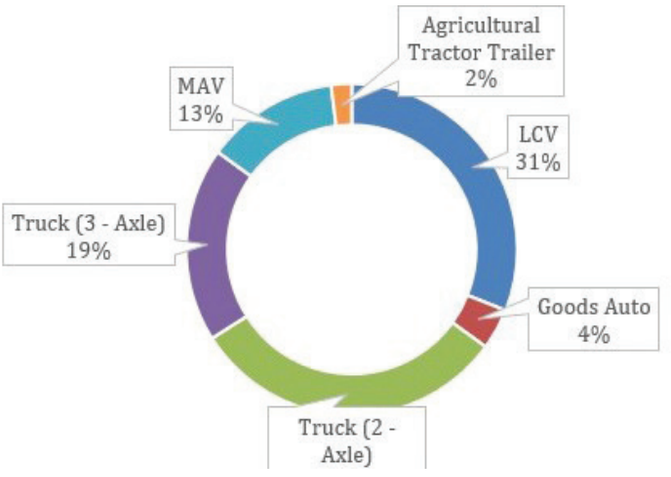



*Figure 9.18 Goods Vehicle Type Distribution at OC Locations*

#### 9.4.6.1.2.2 Trip Frequency

The trip frequency distribution of goods vehicles at the Outer Cordon locations indicates a predominance of high-frequency daily movements. On average, daily trips account for about 65% of the total movements, with daily twice (21%) and daily once (34%) forming the major share. This reflects the city's strong dependence on regular inflow and outflow of goods to support day-to-day commercial, industrial, and consumption activities.

Weekly trips constitute approximately 35% of the total movements, suggesting the presence of planned and bulk-oriented goods transport, particularly catering to wholesale trade and regional supply chains. Locations such as OC3, OC6, OC7, and OC8 show a relatively higher proportion of weekly trips, indicating their role as key entry points for long-distance and inter-city freight movement.

*Table 9.20 Outer Cordon Trip Frequency*

| Outer Cordon Location | Daily Once (One-Way) | Daily Twice (Up & Down) | Daily Thrice or More | Weekly |
|---|---|---|---|---|
| OC1 | 36% | 37% | 24% | 2% |
| OC2 | 45% | 30% | 3% | 22% |
| OC3 | 23% | 27% | 8% | 42% |
| OC4 | 24% | 42% | 18% | 15% |
| OC5 | 42% | 17% | 2% | 39% |
| OC6 | 31% | 16% | 2% | 51% |

| Outer Cordon Location | Daily Once (One-Way) | Daily Twice (Up & Down) | Daily Thrice or More | Weekly |
|---|---|---|---|---|
| OC7 | 36% | 0% | 8% | 56% |
| OC8 | 34% | 4% | 12% | 50% |
| Average | 34% | 21% | 10% | 35% |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.4.6.1.2.3 Commodity Type

Of the total commodities captured at the Outer Cordon locations, food grains constitute the largest share at 60%, indicating the city's strong reliance on external regions for staple food supplies.

Further, perishable food items account for about 32% of the total commodity movement, reflecting substantial daily inflow of vegetables, fruits, dairy products, and other short-shelf-life goods. The dominance of food-related commodities highlights the need for efficient freight movement and reliable transport infrastructure to ensure uninterrupted supply chains.

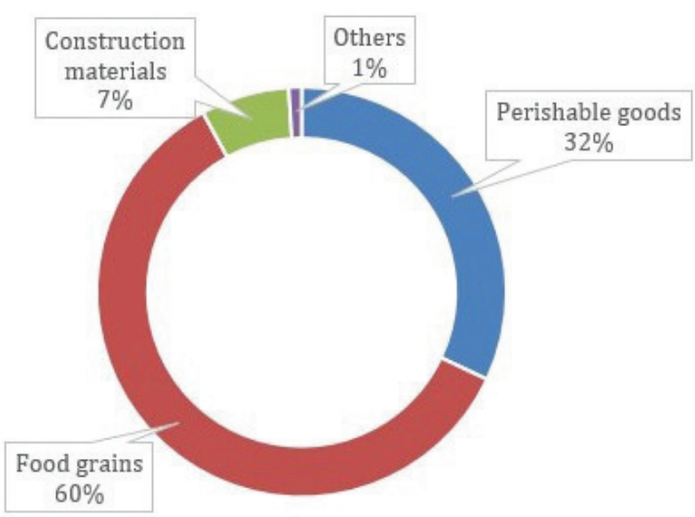



*Figure 9.19 Commodity Type*

#### 9.4.6.1.2.4 Trip Length Distribution

Sixty-eight percent of the trips are in the range of 30-1500 km. This clearly shows that a large number of regional freight movement takes place in Tiruchirappalli from adjoining towns/cities.

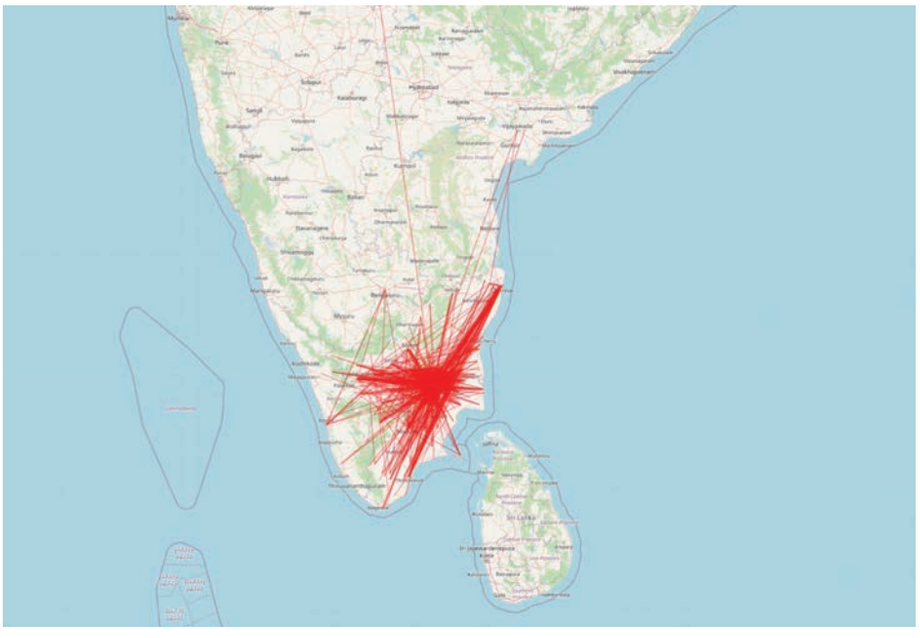


*Figure 9.20 Regional Freight Origin Destination Desire Line Pattern from Outer Cordon Survey Locations*

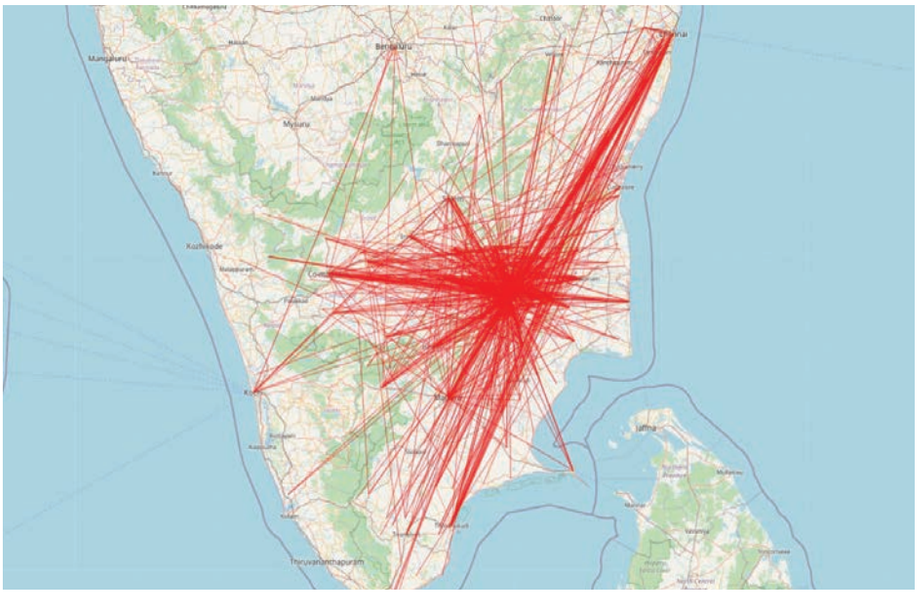


*Figure 9.21 Freight Origin Destination Desire Lines at Local Extent based on Outer Cordon Surveys*

### 9.4.6.2 OD Survey at Screen-Line Locations

OD Survey was conducted at four screen line locations. At each identified location, the origin and destination along with other trip characteristics of the passengers by vehicle type were recorded.

#### 9.4.6.2.1 Passenger Vehicle Trip Characteristics

##### 9.4.6.2.1.1 Vehicular Flow

The trip category distribution across screen lines indicates a diverse mix of internal and external travel movements, reflecting the functional role of the city within the regional transport network.

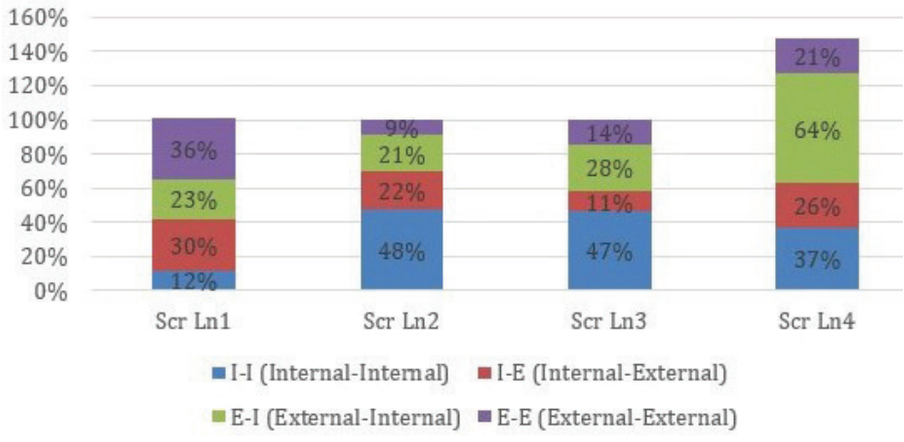



*Figure 9.22 Screen Line wise Private Vehicle Trip Distribution*

Across the screen lines, External–External (E–E) and External–Internal (E–I) trips together form a substantial share, highlighting the importance of through traffic and regional connectivity. In particular, Screen Line 4 records a dominant share of External–Internal trips (64%), suggesting its role as a major entry corridor for traffic destined to the city.

Internal–External (I–E) trips also constitute a significant proportion, especially along Screen Line 1 (30%) and Screen Line 4 (26%), indicating strong outward movement from the city towards peripheral and regional destinations. This pattern reflects daily freight, commuter, and service-related travel extending beyond the urban limits.

##### 9.4.6.2.1.2 Trip Frequency

Almost 52% of the trips were observed to be daily trips broadly constituting work-based trips. About 20% are weekly and 27% are occasional trips.

*Table 9.21 Passenger Vehicle Trip Frequency Distribution at Screen Line Locations*

| Trip Frequency | Daily Twice (Up & Down) | Daily Thrice or More | Daily Once (One – way) | Weekly | Occasionally |
|---|---|---|---|---|---|
| SC 1 | 23% | 5% | 16% | 23% | 32% |
| SC 2 | 21% | 6% | 37% | 9% | 23% |
| SC 3 | 15% | 5% | 25% | 23% | 33% |
| SC 4 | 17% | 2% | 36% | 23% | 20% |
| Average | 19% | 5% | 28% | 20% | 27% |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.4.6.2.1.3 Trip Purpose

Work trips account for 47%, followed by Education, shopping and social trips at 11% respectively. Health-based trips and religious and recreational trips accounted for 6% and 7% of the total share respectively.

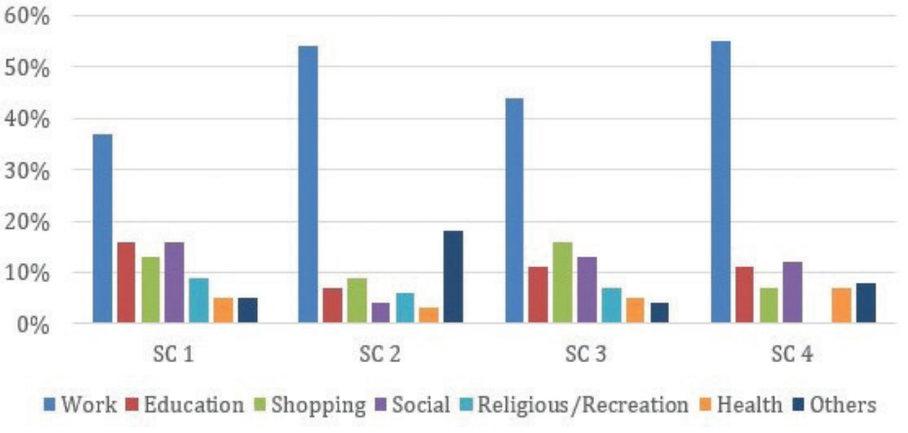



*Figure 9.23 Trip Purpose Distribution at Screen Line Locations*

### 9.4.6.2.2 Goods Vehicles Travel Characteristics

#### 9.4.6.2.2.1 Vehicular Flow

The total freight vehicle flow at all the cordon locations is 811, of which the highest share is external to internal flow, at 31%, followed by internal to internal flow at 28%.

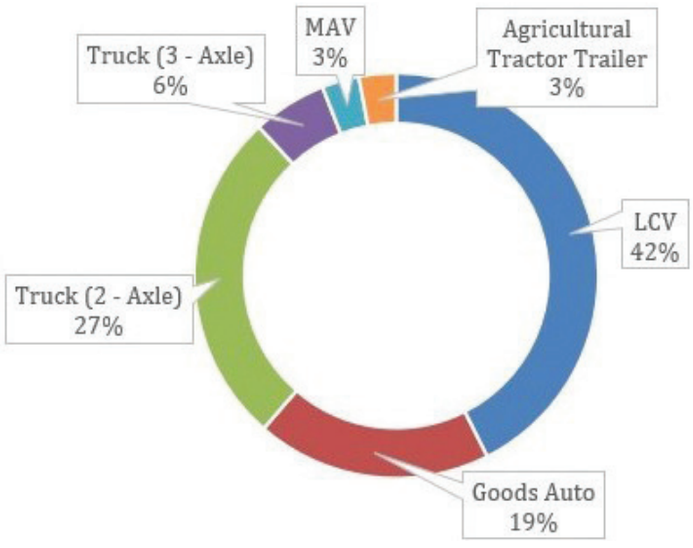



*Figure 9.24 Goods Vehicle Type Distribution*

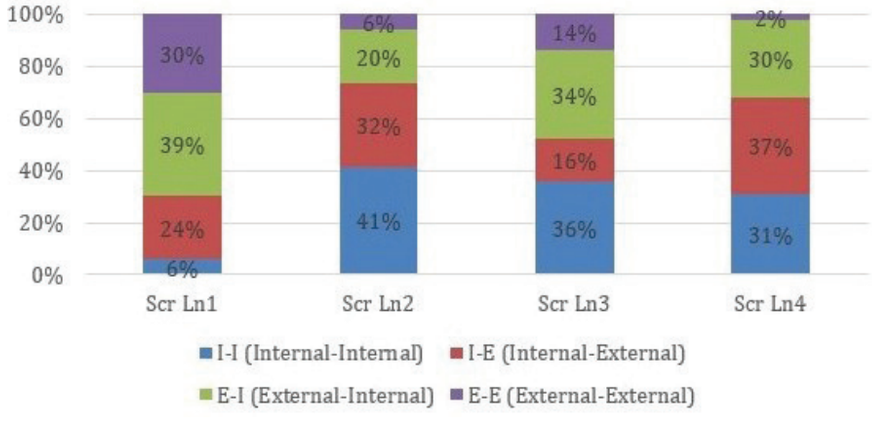



*Figure 9.25 Screen Line wise Goods Vehicle Trip Distribution*

#### 9.4.6.2.2.2 Trip Frequency

Daily trips constituted 85% of the trips, including once, twice, thrice, and more daily trips. While 11% of the trips happen twice a week, about 20% of the trips are weekly trips and 4% are occasional trips.

*Table 9.22 Goods Vehicle Trip Frequency Distribution at Screen Line Locations*

| Trip Frequency | Daily Twice (Up & Down) | Daily Once (One – way) | Occasionally | Weekly | Daily Thrice or more |
|---|---|---|---|---|---|
| SC 1 | 51% | 28% | 0% | 2% | 19% |
| SC 2 | 27% | 26% | 7% | 27% | 12% |
| SC 3 | 46% | 13% | 0% | 1% | 40% |
| SC 4 | 30% | 48% | 7% | 14% | 0% |
| Average | 39% | 29% | 4% | 11% | 18% |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.4.6.2.2.3 Trip Length Distribution

34 per cent of the trips (majority of the trips) are in the range of 20–30 km followed by 28% of the trips within 10–20 km.

## 9.4.7 Public / Intermediate Public Transport Facilities

### 9.4.7.1 Rail Terminal Survey

Rail terminal surveys were conducted at major railway stations within Tiruchirappalli to assess passenger demand characteristics, peak hour patterns, trip purpose, and access–egress behaviour. Passenger counts were observed for a duration of 12 hours and extrapolated to represent daily volumes.

*Table 9.23 Daily Passenger Volumes at Railway Stations*

| Station Name | Total Daily Passengers (16 hrs) |
|---|---|
| TPJ Junction | 15,997 |
| Srirangam RS | 2,338 |
| Town RS | 1,301 |
| Fort RS | 2,062 |
| Palakarai RS | 2,835 |

*Source: Comprehensive Mobility Plan, 2022*

TPJ Junction accounts for the highest passenger volume, clearly establishing it as the primary regional rail hub of the city. Secondary stations such as Palakarai

and Srirangam also exhibit notable passenger movement, supporting their role as important suburban access points. Peak hour activity is distinctly observed during morning and evening commuter periods, indicating work-related travel dominance.

#### 9.4.7.1.1 Passenger Trip Characteristics at Railway Stations

The trip purpose analysis indicates that work trips constitute 21% of total passenger movements, followed by education trips at 10%, while other purposes (36%) include social, personal, and recreational travel. This reflects the multifunctional role of rail transport beyond daily commuting.

Access and egress mode analysis reveals a strong reliance on mass transport systems, with public and chartered buses accounting for 55% of access/egress trips. Intermediate Public Transport (IPT) and Non-Motorized Transport (NMT – walking and cycling) each contribute 15%, highlighting good last-mile connectivity and walkability around stations.

Further, access and egress distance analysis show that 82% of commuters travel less than 10 km to reach railway stations, indicating that rail services primarily cater to short- and medium-distance regional movements within and around the urban agglomeration.

### 9.4.7.2 Bus Terminal Survey

Passenger count surveys were conducted at the two major bus terminals in Tiruchirappalli, namely Central Bus Stand and Chathiram Bus Stand, to assess passenger demand, peak hour characteristics, trip purpose, and access–egress patterns. Passenger volumes were observed for a period of 16 hours.

*Table 9.24 Daily Passenger Volumes at Bus Terminus*

| Location Name | Total Volume |
|---|---|
| Chathiram Bus Stand | 1,01,846 |
| Central Bus Stand | 49,551 |

*Source: Comprehensive Mobility Plan, 2022*

Chathiram Bus Stand handles nearly twice the passenger volume compared to Central Bus Stand. This can be attributed to the concentration of intra-city and short-distance services at Chathiram, whereas most long-distance and regional services operate from the Central Bus Stand. Distinct morning and evening peaks indicate strong commuter-oriented travel demand.

#### 9.4.7.2.1 Passenger Trip Characteristics at Bus Terminals

Trip purpose analysis shows that work trips account for 33% of total passengers, followed closely by education trips at 30%, highlighting the critical role of bus transport in serving daily commuters and students.

Access and egress mode analysis indicates that walking is the most preferred mode, contributing 28% of total access/egress trips, reflecting good terminal accessibility and high dependence on nearby catchment areas. This is followed by local buses (25%) and Intermediate Public Transport (IPT) (27%), indicating strong multimodal integration at both terminals.

Access and egress distance analysis reveals that 92% of trips are within a distance of 0–10 km, demonstrating that bus terminals primarily cater to short- and medium-distance urban and peri-urban travel.

### 9.4.7.3 Intermediate Public Transport – Survey

In the absence of a fully formalized city bus network, Intermediate Public Transport (IPT) modes play a critical role in meeting the public transport demand in Tiruchirappalli. Auto-rickshaws, including hired and shared autos, form the backbone of last-mile and short-distance mobility in the city. An operator-based survey was conducted to understand ownership patterns, operating characteristics, and passenger service levels.

*Table 9.25 Intermediate Public Transport – Survey*

| Parameter | Observation |
|---|---|
| Ownership Pattern | 88% of auto-rickshaws are self-owned by drivers |
| Daily Distance Travelled | Majority operate in the range of 88–100 km per day |
| Average Passengers per Trip | 3 passengers per trip |
| Passenger Waiting Time | 78% of passengers wait less than 5 minutes |

*Source: Comprehensive Mobility Plan, 2022*

The survey indicates that IPT operations in Tiruchirappalli are largely driver-owned, which reflects a decentralized and informal operational structure. This ownership pattern provides livelihood opportunities but also limits route regulation and service standardization.

The high daily distance travelled (up to 100 km per day) suggests extensive dependence on IPT modes for short- and medium-length trips across the city. An average occupancy of three passengers per trip indicates moderate vehicle utilization, particularly in shared auto operations.

Passenger feedback highlights a high level of service responsiveness, with 78% of users experiencing waiting times of less than five minutes, underscoring the importance of IPT modes in providing flexible and demand-responsive mobility, especially in areas with limited bus coverage.

### 9.4.8 Household Survey

A household travel survey was conducted covering a sample size of 2% of the total population of Tiruchirappalli to understand socio-economic characteristics and travel behaviour. The major findings are summarized below.

#### 9.4.8.1 Household size and socio-economic characteristics

The average household size in Tiruchirappalli is 3.9 persons per household, indicating a predominance of small to medium-sized households.

*Table 9.26 Key Socio-economic Characteristics of Surveyed Households*

| Parameter | Dominant Observation |
|---|---|
| Household Size | < 5 members in 88% of households |
| Vehicle Ownership | Two-wheelers dominate (88%); 4% households own no vehicle |
| Main Activity | Workers/Labour (26%), Students (19%), Retired/Unemployed (33%) |
| Education Level | Graduate (28%), Secondary School (21%), Illiterate (21%) |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.4.8.2 Trip Rate

The average trip rate for the city is 1.69 trips per person per day including walk trips and 1.65 trips excluding walk trips, indicating a high dependence on walking for daily activities.

#### 9.4.8.3 Modal Share

The modal share indicates a clear dominance of two-wheelers, which account for 41% of total trips, reflecting their affordability and flexibility for daily travel in the city. Bus services contribute 22%, highlighting their important role as the primary mass public transport mode, though with scope for further strengthening. Private cars account for 15% of trips, indicating moderate but growing reliance on personal four-wheelers. Walking (11%) and cycling (4%) together form a significant share, underscoring the relevance of non-motorized transport for short-distance trips.

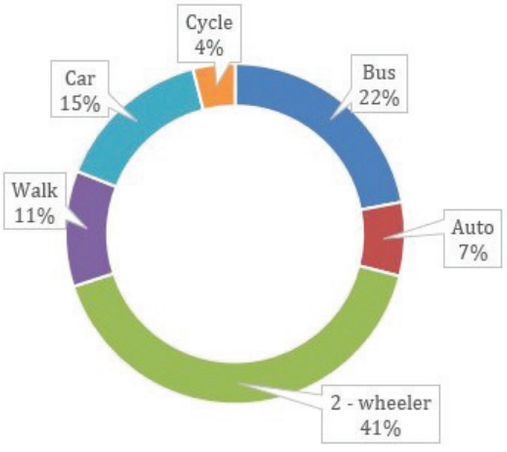



*Figure 9.26 Modal Share*

### 9.4.8.4 Trip Purpose

Work-related trips dominate travel behavior, accounting for 83% of total trips, followed by education trips (11%) and shopping trips (4%).

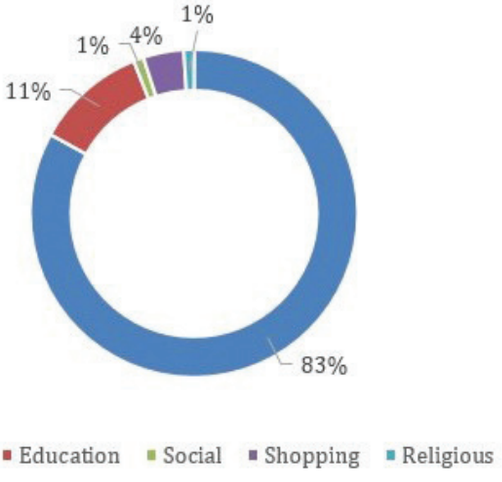



*Figure 9.27 Trip Purpose*

### 9.4.8.5 Mode Split by Trip Purpose

The mode split by trip purpose shows clear variation in travel behaviour based on activity type. Work trips are predominantly undertaken using two-wheelers (57%), indicating strong reliance on private motorized modes for daily commuting, while public transport (22%) and walking (17%) play a secondary role. Education and social/recreational trips show a much higher dependence on walk, cycle/rickshaw, and public transport, reflecting shorter trip lengths and localized travel patterns. Health-related trips are dominated by cars (91%) and IPT modes (58%), highlighting the preference for faster, more comfortable, and door-to-door modes for medical access.

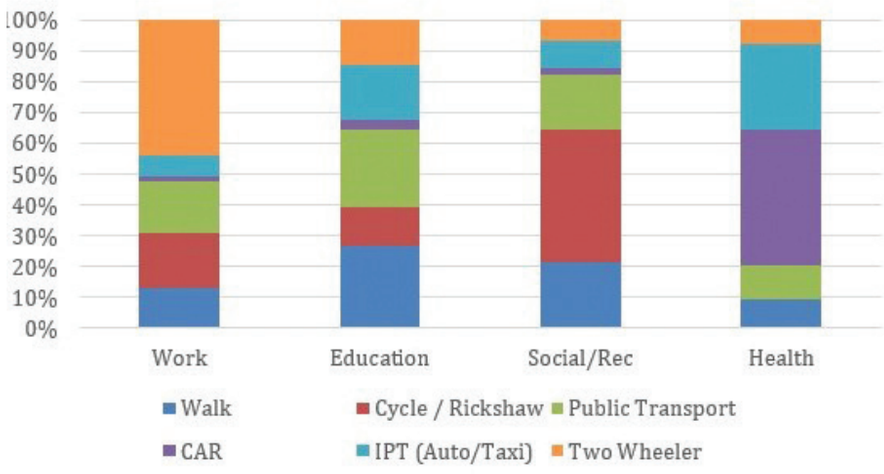



*Figure 9.28 Mode Split by Trip Purpose*

#### 9.4.8.6 Mode Wise Travel Cost

Mode-wise travel cost analysis indicates that four-wheelers incur the highest operating cost at ₹22 per km, followed by IPT modes, while two-wheelers have relatively lower costs of ₹9–10 per km, making them the most preferred motorized mode for daily travel.

### 9.4.9 On-Street and Off-Street Parking Survey

#### 9.4.9.1 On-Street Parking Survey

On-street parking surveys were conducted near all major commercial establishments for a total road stretch of 6.25 km.

*Table 9.27 Summary of on-street Parking Survey*

| On-Street Parking Stretches | Total Stretch (m) | Type of Parking | Peak Accumulation (ECS) | Peak Time | Parking Load (ECS Hours) | Total Accumulation |
|---|---|---|---|---|---|---|
| Main Guard Gate | 430 | Perpendicular / Parallel | 88 | 14.00 – 15.00 | 22 | 756 |
| Rock Fort | 820 | Perpendicular / Parallel | 200 | 9.00 – 10.00 | 50 | 1956 |
| Chathiram Bus Stand | 700 | Perpendicular / Parallel | 152 | 12.00 – 13.00 | 38 | 1636 |

| On-Street Parking Stretches | Total Stretch (m) | Type of Parking | Peak Accumulation (ECS) | Peak Time | Parking Load (ECS Hours) | Total Accumulation |
|---|---|---|---|---|---|---|
| Gandhi Market | 970 | Perpendicular / Parallel | 240 | 20.00 – 21.00 | 60 | 1996 |
| Big Bazaar | 1120 | Perpendicular / Parallel | 432 | 12.00 – 13.00 | 108 | 3484 |
| West Boulevard | 980 | Perpendicular / Parallel | 244 | 17.00 – 18.00 | 61 | 2476 |
| Chinnakadai Street | 560 | Perpendicular / Parallel | 168 | 9.00 – 10.00 | 42 | 1640 |
| Srirangam | 670 | Perpendicular / Parallel | 184 | 15.00 – 16.00 | 46 | 1992 |

*Source: Comprehensive Mobility Plan, 2022*

The demand reflected along the West Boulevard and Big Bazaar Streets are further validated by the high parking accumulation observed at these locations. The maximum demand is garnered between 12:00 pm and 1:00 pm along Big Bazaar Street and between 5:00 pm and 6:00 pm along West Boulevard Street.

### 9.4.9.2 Off-Street Parking Survey

Off-street parking was conducted at two designated off-street parking locations.

*Table 9.28 Summary of Off-Street Parking Survey*

| Off-Street Parking Locations | Capacity (Parking bays) | Peak Accumulation (ECS) | Peak Time | Parking Load (ECS Hours) | Capacity Utilization |
|---|---|---|---|---|---|
| Central Bus Stand | 91 | 276 | 14.00 – 15.00 | 69 | 36% |
| Chathiram Bus Stand | 72 | 198 | 12.00 – 13.00 | 51 | 25% |

*Source: Comprehensive Mobility Plan, 2022*

Central Bus Stand and Chathiram Bus Stand parking exhibits its peak during the day between 14:00 pm to 15:00 pm and 12:00 pm to 13:00 pm but has a continuous parking demand throughout the day.

## 9.5 Key Issues and Challenges

The key issues and challenges affecting urban mobility in Tiruchirappalli, including congestion, infrastructure gaps, road safety concerns, and accessibility limitations, are identified and presented below:

### 9.5.1 Connectivity Gaps and Road Infrastructure

- Tiruchirappalli lacks a fully functional hierarchical ring road system. Although the Outer Ring Road (ORR) has been proposed, significant stretches remain incomplete, resulting in continued diversion of regional, interstate, and freight traffic through the city core via National Highways.
- Absence of an intermediate circumferential corridor has increased dependence on radial roads, leading to congestion on arterial corridors connecting the city core with growth centres such as Thiruverumbur, Navalpattu, Panjapur, and Samayapuram.
- Several arterial and sub-arterial roads have inadequate carriageway widths, non-uniform cross-sections, and poor edge management, resulting in reduced operating speeds and unsafe traffic conditions.
- Canal-side corridors, despite their potential to function as parallel mobility routes, remain underdeveloped and poorly integrated into the overall road network.

### 9.5.2 Public Transport Network Limitations

- While the existing bus fleet is currently adequate for the present population, projected population growth will place increased pressure on fleet size, depot capacity, and service frequency.
- Bus services are predominantly radial in nature, converging at the Central Bus Stand and Chathiram area, leading to congestion and inefficient cross-city travel.
- The absence of dedicated bus priority corridors affects travel time reliability and discourages modal shift towards public transport.
- Several bus stops are located close to junctions and lack bus bays, disrupting traffic flow and reducing operational efficiency.
- Existing bus terminals and depots require upgrading to accommodate increasing passenger demand, modern fleet requirements, and transition towards electric mobility.

### 9.5.3 Freight Movement and Logistics Constraints

- Heavy commercial vehicles accessing industrial areas, wholesale markets, and logistics hubs are compelled to pass through residential and commercial streets due to the absence of peripheral freight consolidation facilities.
- Freight movement along radial highways and inner-city roads creates conflicts with local traffic, pedestrians, and public transport, leading to safety risks and congestion.
- Lack of organized loading and unloading zones near markets and commercial areas contributes to roadside encroachments and operational inefficiencies.

### 9.5.4 Pedestrian Infrastructure, Accessibility and Safety

- Footpath infrastructure in Tiruchirappalli is discontinuous across major road corridors. Where footpaths exist, they are frequently encroached upon by utilities, parking, vendors, and informal activities.
- Several high-footfall locations such as transit hubs, commercial streets, religious precincts, and educational institutions lack safe pedestrian crossing facilities.
- Poor maintenance of pedestrian infrastructure, including uneven surfaces and broken pavements, poses safety risks, particularly for elderly persons, children, and persons with disabilities.
- Universal accessibility features such as tactile paving, ramps, and level crossings are limited, restricting independent mobility for vulnerable users.
- High pedestrian volumes around the Railway Junction, Central Bus Stand, Srirangam, Rockfort, and Gandhi Market intensify pedestrian–vehicular conflicts in the absence of dedicated infrastructure.

### 9.5.5 Road Safety Infrastructure and Traffic Management

The major reasons for road safety issues in Tiruchirappalli are as follows:

- Many important junctions such as Palpannai, Aristo Circle, TVS Tollgate, and Cauvery Bridge Junction have poor layout and inadequate channelization, leading to traffic conflicts and accidents.
- Lack of proper footpaths and safe pedestrian crossing facilities on major roads forces pedestrians to share road space with vehicles, increasing accident risk, especially for vulnerable users.
- Inadequate road markings, signboards, street lighting, and poor coordination of traffic signals reduce driver awareness and safety at intersections.

- Mixed traffic movement, poor lane discipline, and weak enforcement of traffic rules further contribute to unsafe road conditions.

### 9.5.6 Unorganized Parking and Encroachments

- Unregulated on-street parking is prevalent across commercial, institutional, and heritage areas, significantly reducing effective carriageway width.
- Encroachment of footpaths and road edges by parked vehicles adversely impacts pedestrian movement and road safety.
- High parking demand around Srirangam, Rockfort, Singarathope, Thillai Nagar, and Central Bus Stand areas contributes to recurrent congestion.

## 9.6 Proposals

### 9.6.1 Road Network Strategy

#### 9.6.1.1 Improvement of Outer Ring Road and Proposal of New Urban Bypass Road

The proposed Tiruchirappalli Outer Ring Road (ORR), with a total length of 94.14 km, is a key regional mobility intervention aimed at diverting through-traffic and heavy freight vehicles currently passing through the city core via major National Highways connecting Chennai, Madurai, Thanjavur, Karur, and Dindigul. By intercepting interstate and commercial traffic at the urban periphery through a high-capacity corridor with a proposed 60 m ROW, the ORR is expected to reduce congestion, improve road safety, and mitigate environmental impacts at critical inner-city junctions. However, with nearly 40 km of the ORR yet to be completed its effectiveness as an immediate decongestion measure remains limited.

To address this gap and cater to increasing travel demand generated by emerging growth centres such as Navalpattu and Thiruverumbur, the Master Plan proposes an Urban bypass road of 30.3 km with a 45m ROW. The bypass provides an intermediate circumferential corridor for intra-city and cross-city movements, reducing dependency on radial routes and easing traffic pressure on the central city road network.

Together, the ORR and bypass form a hierarchical ring road system, wherein the ORR primarily serves long-distance freight and regional traffic, while the bypass facilitates medium-distance urban travel, supporting balanced urban growth and improved network efficiency within the Tiruchirappalli LPA.

#### 9.6.1.2 Proposal of New Roads and Widening of Existing Roads

C-category roads (30m ROW) are proposed to enhance connectivity between emerging residential, institutional, industrial, and employment areas and to provide efficient access to major transport corridors and the Outer Ring Road. The C1 corridor (Kottapattu–Sholamadevi, 6.91 km) functions as a critical west–east connector facilitating cross-city movement and improving accessibility to growth areas around Sholamadevi. The C2 corridor (Bharath Nagar–Palanganamgudi, 3.08 km), C2 corridor (Trichy IT Park Road–Bharath Nagar, 4.91 km) and C4 corridor (Pirattitur–Panjapur, 3.50 km) improve access to developing residential and mixed-use zones, with C4 comprising 0.90 km of existing road widening and 2.60 km of newly proposed road sections with the support of C4 corridor (Pirattiyur–Aravanoor, 5.07 km).

C3 corridor (Bharath Nagar–HAPP Road, 5.05 km) serve major industrial and employment centres and are proposed through existing road widening to accommodate peak-hour commuter movement and freight traffic. The C5 corridor (Poonampalayam–Manachanallur, 6.50 km) is proposed for road widening in view of the proposed agro-based industrial cluster along the corridor, to support increased freight movement, agricultural produce logistics, and worker commuting demand, while ensuring safe and efficient traffic operations.

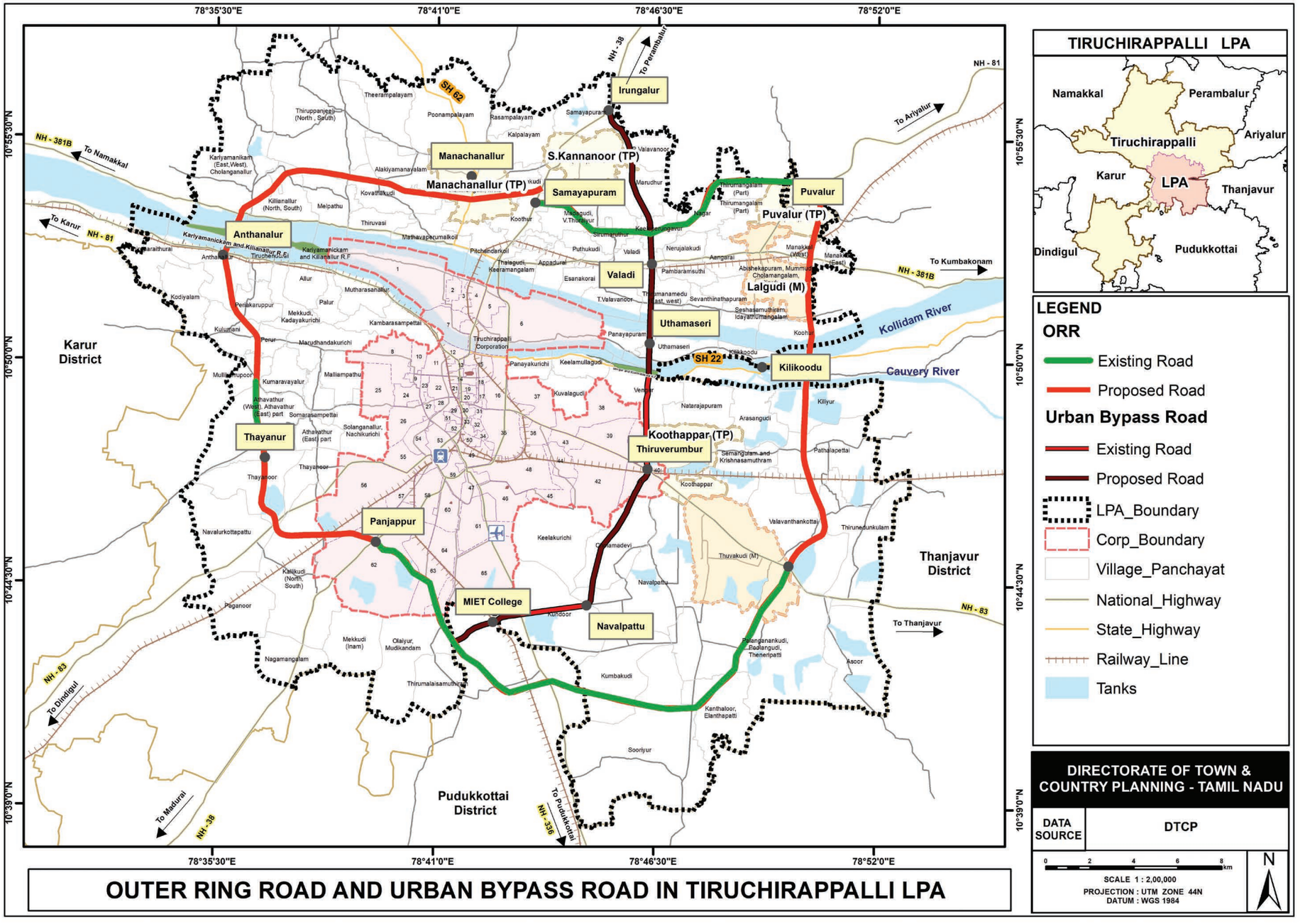
D-category roads (24m ROW) are proposed to strengthen intra-city and peripheral connectivity by linking residential areas with peri-urban zones. The D1 corridor (Somarasampettai–Allur, 7.02 km), D2 corridor (Mullikarumbur–Woraiyur, 7.19 km), will reduce dependency on congested inner-city roads and facilitate smoother movement of local and intermediate traffic.

E-category roads (12m ROW) are proposed primarily to improve neighbourhood-level accessibility and local circulation. The E1 corridor (Adavathur–Tennur, 9.84 km) strengthens last-mile connectivity and improves access to adjoining residential areas.

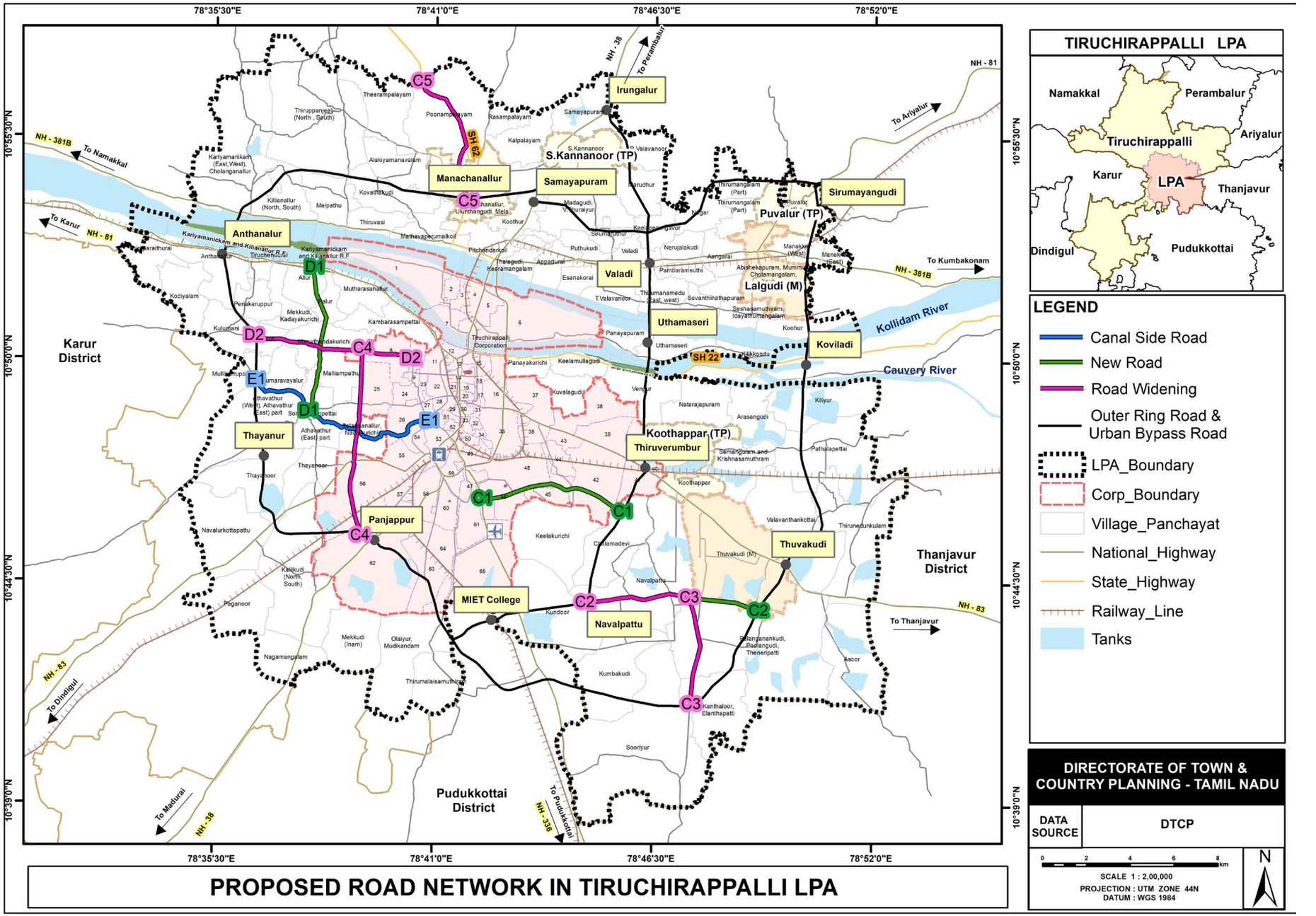
*Table 9.29 Strategies for Road Network*

| Proposed Road name | Origin | Destination | Length (in Km) | Proposed ROW(m) | Nature of Proposal |
|---|---|---|---|---|---|
| A1 – A1 (ORR) | Madakudi | Madakudi | 94.14 | 60 | Outer Ring Road - Existing road widening – 43.58 Km, Proposed new road – 50.56 Km |
| B1 – B1 (Urban Bypass Road) | Irungalur | Kumaramangalam | 30.38 | 45 | Urban Bypass Road - Existing road widening – 7.38 Km, Proposed new road – 23 Km |
| C1 – C1 | Kottapattu | Sholamadevi | 6.91 | 30 | New road |
| C2 – C2 | Bharath Nagar | Palanganamgudi | 3.08 | 30 | New road |
| C2 – C2 | Trichy IT park Road | Bharath Nagar | 4.91 | 30 | Existing road widening |
| C3 – C3 | Bharath Nagar | Happ Road | 5.05 | 30 | Existing road widening |
| C4 – C4 | Pirattitur | Panjapur | 3.5 | 30 | Existing road widening – 0.9 Km, Proposed new road – 2.6 Km |
| C4 – C4 | Pirattiyur | Aravanoor | 5.07 | 30 | Existing road widening – 1.71 Km, Proposed new road – 3.36 Km |
| C5 – C5 | Poonampalayam | Manachanallur | 6.5 | 30 | Existing Road Widening |
| D1 – D1 | Somarasampettai | Allur | 7.02 | 24 | Existing road widening – 3.14 Km, Proposed new road – 3.88 Km |
| D2 – D2 | Mullikarumbur | Woraiyur | 7.19 | 24 | Existing road widening |
| E1 – E1 | Adavathur | Tennur | 9.84 | 12 | Existing road widening |
| **Total** | | | **183.59 Km** | | |

*# Note:*
*All roads proposed for widening to the designated Right of Way (ROW) in this Plan shall be implemented on the ground by taking the existing center line of the road as the reference point with the widening distributed equally on either side, subject to site-specific technical feasibility.*




*Map 9.7 Proposed Outer Ring Road and Urban Bypass Road in Tiruchirappalli LPA*







**LEGEND**

- Canal Side Road
- New Road
- Road Widening
- Outer Ring Road & Urban Bypass Road
- LPA_Boundary
- Corp_Boundary
- Village_Panchayat
- National_Highway
- State_Highway
- Railway_Line
- Tanks

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | DTCP |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

# PROPOSED ROAD NETWORK IN TIRUCHIRAPPALLI LPA

*Map 9.8 Proposed New Roads and Widening of Existing Roads*

### 9.6.1.3 Proposed Cross Sections

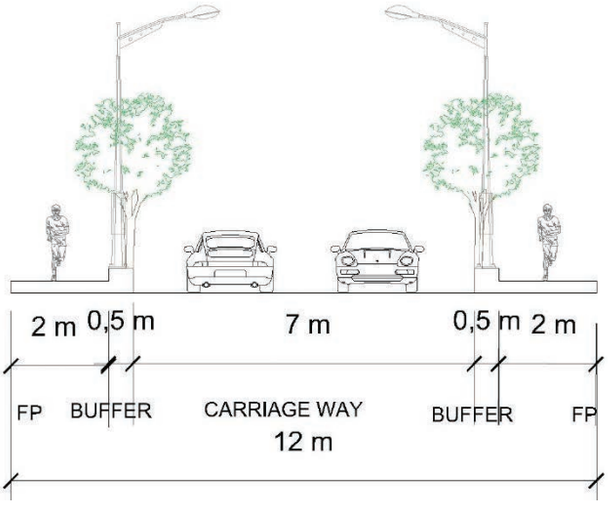



*Figure 9.29 Cross Section for 12m ROW*

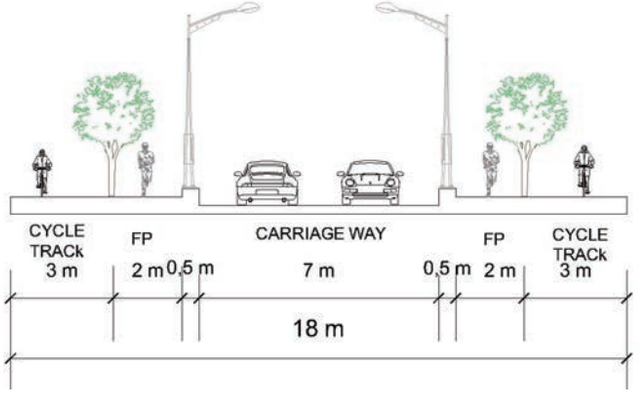
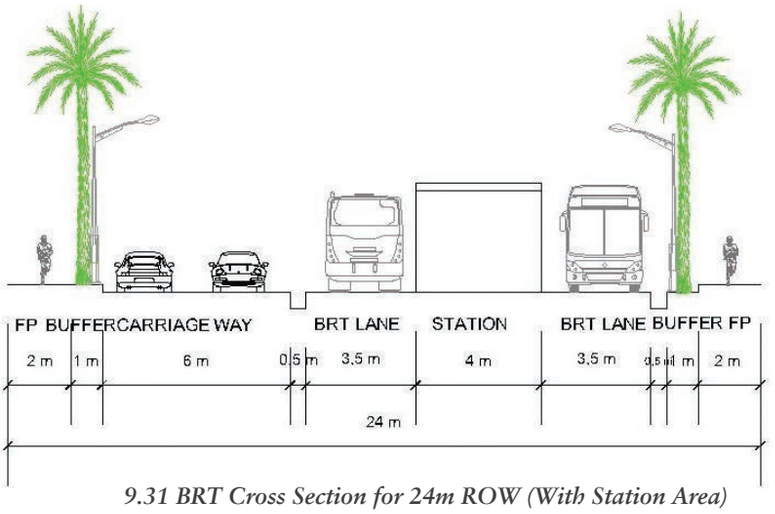



*Figure 9.30 Cross Section for 18m ROW with Cycle Track and Footpath*

*Figure*




*9.31 BRT Cross Section for 24m ROW (With Station Area)*

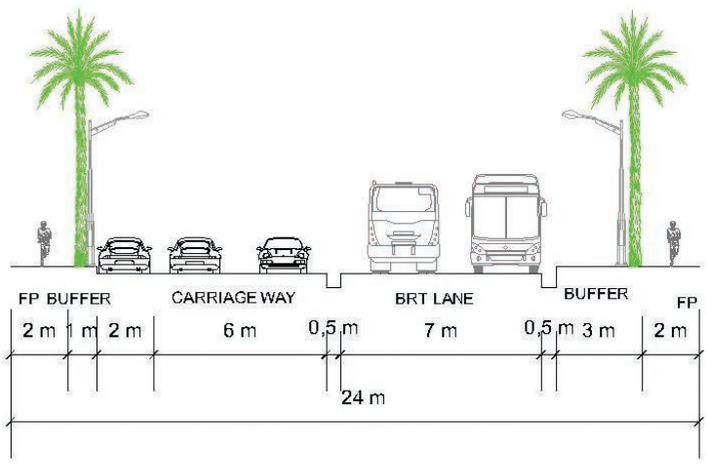



*Figure 9.32 BRT Cross Section for 24m ROW (Without Station Area)*

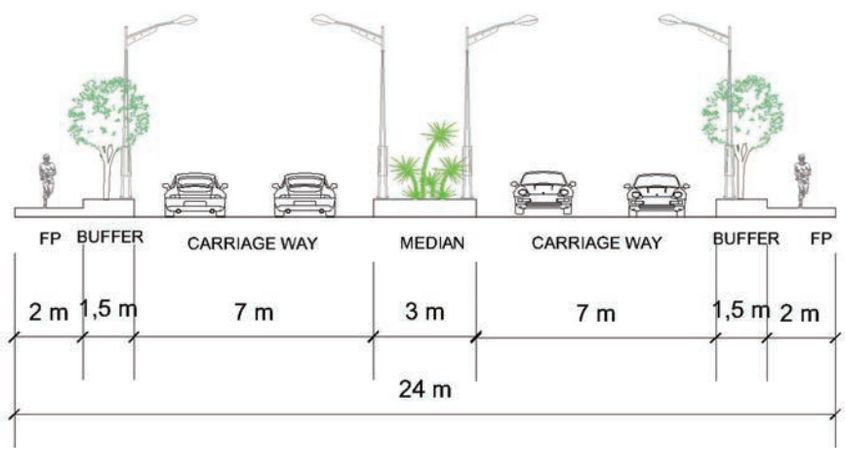



*Figure 9.33 Cross Section for 24m ROW*

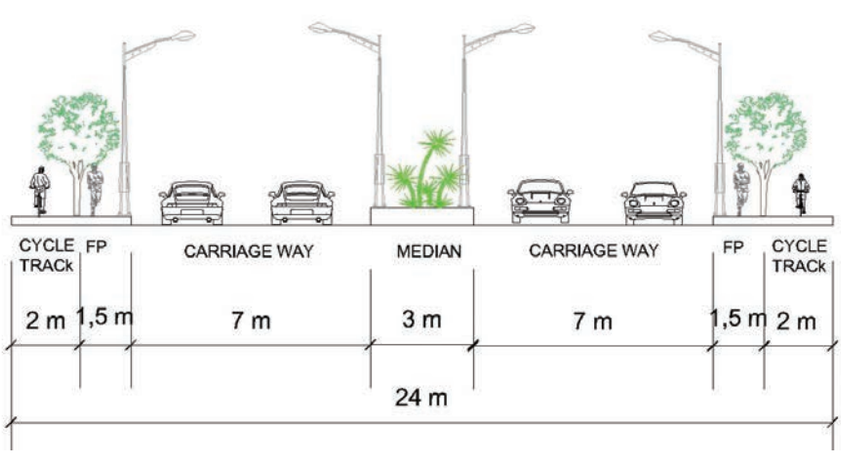



*Figure 9.34 Cross Section for 24m ROW with Cycle Track and Footpath*

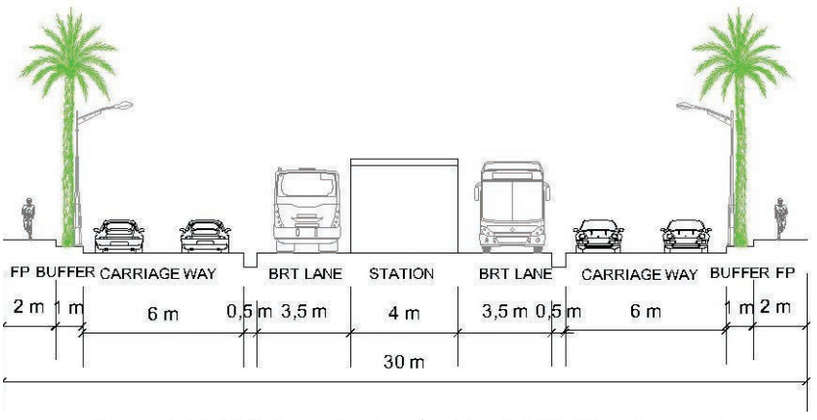



*Figure 9.35 BRT Cross Section for 30m ROW (With Station Area)*

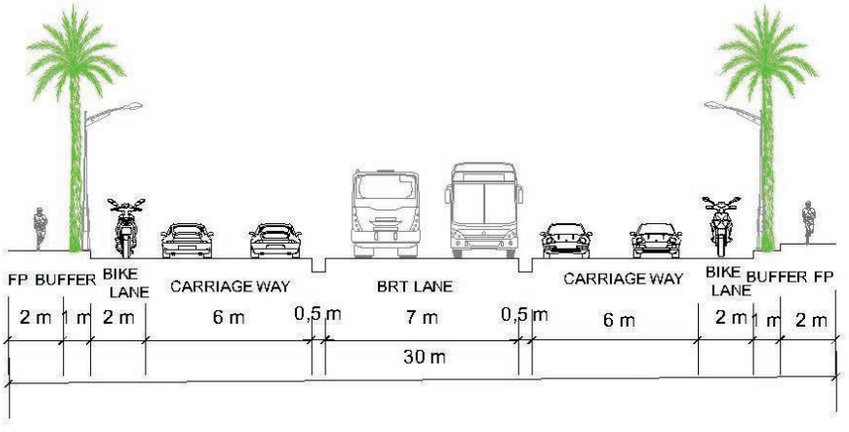



*Figure 9.36 BRT Cross Section for 30m ROW (Without Station Area)*

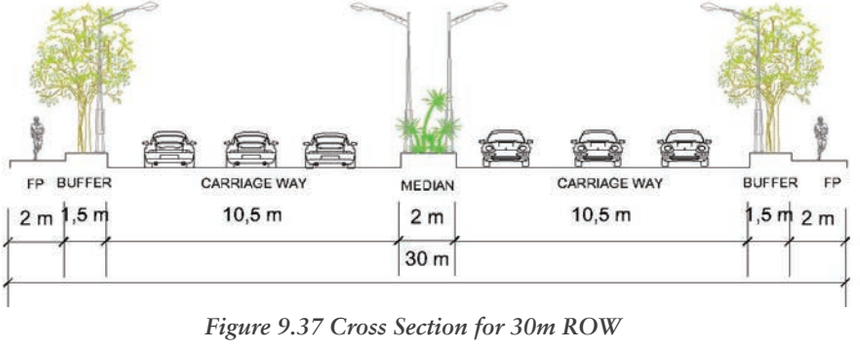



*Figure 9.37 Cross Section for 30m ROW*

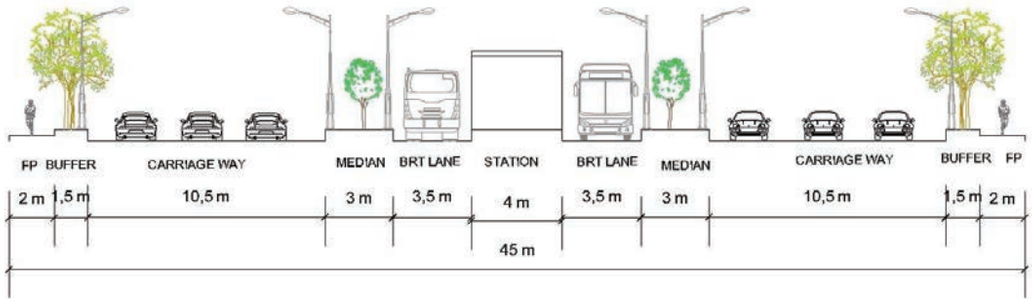



*Figure 9.38 BRT Cross Section for 45m ROW (With Station Area)*

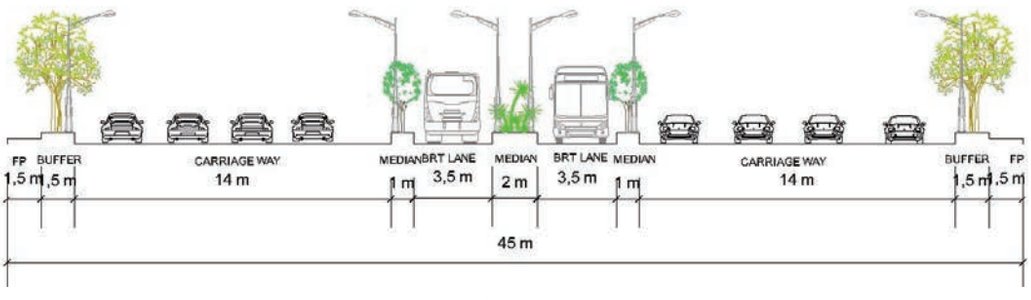



*Figure 9.39 BRT Cross Section for 45m ROW (Without Station Area)*

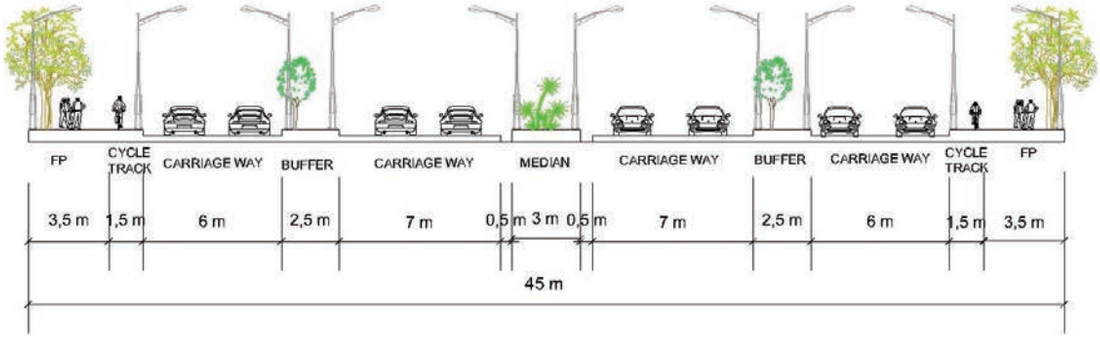



*Figure 9.40 Cross Section for 45m ROW*

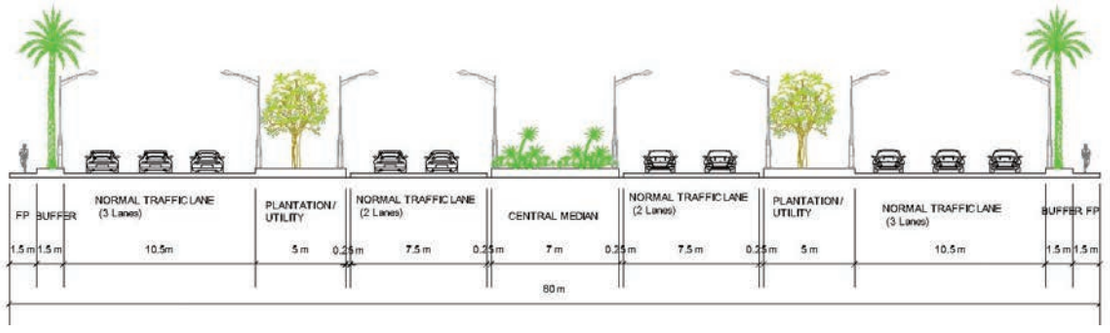



*Figure 9.41 Section through Mid-Block for Typical Design with 60 m ROW*

### 9.6.2 Public Transport Strategy and Action Plan

Tiruchirappalli LPA aims to prioritize the movement of people over vehicles, promoting public transport as a sustainable and energy-efficient mode of travel. Strengthening the intra-city bus network, improving last-mile connectivity, and integrating multimodal transport are key objectives to enhance mobility and reduce reliance on personal vehicles.

#### 9.6.2.1 Bus Fleet Replacement

*Table 9.30 Bus Fleet Replacement*

| Year | Existing Bus Fleet | Tiruchirappalli LPA Population and Projection (lakhs) | Projected Bus Fleet Size |
|---|---|---|---|
| 2025 | 1014 | 17.56 | 702 (sufficient) |
| 2035 | - | 21.48 | 859 |
| 2045 | - | 26.35 | 1054 |

*Table 9.31 Phasing of Augmentation of Bus Fleets*

| S No | Phases | No of Buses to be Augmented |
|---|---|---|
| 1 | Phase 1 | 20 +15 (Shuttle Service) |
| 2 | Phase 2 | 20 |

The existing bus fleet of 1,014 buses in 2025 serves a population of 17.56 lakh, which meets the requirement of 702 buses (sufficient per MoHUA standard of 40 buses per lakh population). Considering projected population growth, the bus fleet should be expanded to 859 buses by 2035 and 1,054 buses by 2045 to maintain adequate service levels. Regular replacement of aging buses, along

with procurement of low-floor air-conditioned buses, will improve passenger comfort and encourage a modal shift towards public transport.

The augmentation is structured into two distinct phases, with an equal distribution of 20 buses allocated to each phase. Upon completion of both Phase 1 and Phase 2, the regional bus fleet will be strengthened by a total of 40 new units. This phased approach suggests a systematic strengthening of public transit, likely aimed at gradually increasing the 22% bus mode share identified in the transport data. The timing of these additions may coincide with the development of the Panjapur Integrated Bus Terminus, ensuring that new fleet capacity is met with modern terminal facilities.

### 9.6.2.2 Proposed Terminals

To optimize urban connectivity, the Panjapur MKMK Integrated Bus Terminus (IBT) will serve as the central primary hub, streamlining long-distance transit for the region. The expansion strategy is divided into two strategic stages, with Phase 1 focusing on high-traffic areas like Thiruverumbur, Samayapuram, Thuvakudi, and Thillai Nagar to ease immediate congestion. Phase 2 will further extend this network to Thiruvanaikaval, Bharathidasan University, and Manachanallur, ensuring comprehensive suburban coverage. This decentralized model effectively redistributes traffic flow, reducing the pressure on the city's core infrastructure. Ultimately, these seven satellite terminals will create a seamless multi-modal web that enhances commuter convenience across the entire metropolitan area. This terminal will be equipped with modern facilities, including provisions for electric bus (e-bus) services, ensuring sustainable and future-ready public transport infrastructure.

*Table 9.32 Proposed Bus Terminals Locations*

| S.No. | Bus Terminal Proposals | Phase |
|---|---|---|
| 1 | Thiruverumbur | Phase -1 |
| 2 | Samayapuram | Phase -1 |
| 3 | Thuvakudi | Phase -1 |
| 4 | Thiruvanaikaval | Phase -2 |
| 5 | Bharatidasan University | Phase -2 |
| 6 | Thillai Nagar | Phase -1 |
| 7 | Manachanallur | Phase -2 |

*Source: Comprehensive Mobility Plan, 2022*

### 9.6.2.3 Proposed Bus Terminal Upgradation

*Table 9.33 Proposed Bus Terminals Upgradation and Phasing*

| S No | Proposed Bus Terminal Upgradation Locations | Phase |
|---|---|---|
| 1 | Chathiram Bus Stand | Phase -1 |
| 2 | Central Bus Stand | Phase -2 |

### 9.6.2.4 Bus Depots

*Table 9.34 Phasing of Bus Depots Proposal*

| S No | Proposed Bus Depot Locations | Area (acres) | Phase |
|---|---|---|---|
| 1 | Thillai Nagar | 6.5 | Phase -1 |
| 2 | Thiruverumbur | 6.5 | Phase -1 |
| 3 | Lalgudi | 6.5 | Phase -2 |
| 4 | Panjapur (Electric Depot) | 6.5 | Phase -2 |
| 5 | Chathiram (Electric Depot) | 6.5 | Phase -1 |
| 6 | Samayapuram (Electric Depot) | 6.5 | Phase -2 |
| 7 | Srirangam (Electric Depot) | 6.5 | Phase -1 |

The proposal for new bus depots at Thillai Nagar, Thiruverumbur, and Lalgudi is a strategic intervention to decongest Tiruchirappalli's core urban areas and accommodate its rapid expansion toward the 2045 horizon. As the city transitions its long-distance operations to the new Panjapur Integrated Bus Terminus, these satellite facilities are essential to manage the high volume of intracity and mofussil traffic that currently oversaturates narrow service roads and internal arteries. The Thiruverumbur terminus serves as a vital eastern gateway for the industrial and educational belt (OFT, BHEL, and NIT), while the Lalgudi facility addresses the critical space constraints of its old town stand, providing modern bays for the 150+ daily services connecting to the Ariyalur highway. Similarly, a facility at Thillai Nagar serves the city's primary commercial and medical hub, ensuring that public transit remains accessible while reducing the reliance on personal vehicles. Apart from this Panjapur, Chathiram, Samayapuram and Srirangam bus terminals to be upgrated to electric depots. Collectively, these depots will restore the Level of Service on major highways, provide better amenities for commuters and bus crews, and create a hub-and-spoke transit model that fosters structured, sustainable urban growth across the Trichy Local Planning Area.

### 9.6.2.5 Improvement of Railway Stations

Tiruchirappalli Junction functions as an existing multimodal interchange that requires optimisation and integration strengthening rather than major new infrastructure interventions. While Srirangam is proposed for station redevelopment under the Amrit Bharat Station Scheme, the scope of this plan focuses on complementary station-area and access improvements. Tiruverumbur is proposed as a key multimodal integration node considering its high passenger volumes, strategic location along the southern corridor, and its planned interface with the upcoming BRTS and Transit-Oriented Development corridor, necessitating structured interchange facilities, coordinated bus and IPT access, and enhanced pedestrian connectivity. Other high-demand NSG-5 stations such as Tiruchirappalli Fort and Tiruchirappalli Town are proposed for sub-regional interchange upgrades focusing on improved station forecourts, organised pick-up and drop-off areas, and universal accessibility to support commuter and work-related travel. Corridor-based NSG-6 stations including Golden Rock, Lalgudi, Valadi and Solagampatti are proposed for commuter-oriented upgrades comprising improved platforms, shelters, lighting, passenger information systems and safe access routes. Halt stations such as Palakkarai, Manjattidal, Uthamarkovil, Pichchandarkovil and Tondamanpatti are proposed for essential safety and accessibility improvements including standardised platforms, basic shelters, lighting, signage and improved approach paths, ensuring minimum service standards across the suburban rail network.

*Table 9.35 Improvement of Railway Stations*

| S.No. | Railway Station Improvements | Key Reason |
|---|---|---|
| 1 | Tiruchirappalli Junction | Major Multimodal integration node |
| 2 | Tiruverumbur | Multimodal integration node |
| 3 | Tiruchirappalli Fort | Sub-regional interchange Upgrades |
| 4 | Tiruchirappalli Town | Sub-regional interchange Upgrades |
| 5 | Golden Rock | Commuter-oriented upgrades |
| 6 | Lalgudi | Commuter-oriented upgrades |
| 7 | Valadi | Commuter-oriented upgrades |
| 8 | Solagampatti | Commuter-oriented upgrades |
| 9 | Palakkarai | Safety and accessibility improvements |
| 10 | Manjattidal | Safety and accessibility improvements |
| 11 | Uthamarkovil | Safety and accessibility improvements |
| 12 | Pichchandarkovil | Safety and accessibility improvements |
| 13 | Tondamanpatti | Safety and accessibility improvements |

### 9.6.2.6 Shuttle Bus Services

#### 9.6.2.6.1 Primary Route - Chathiram Bus Stand to the Srirangam and Thiruvanai Kovil

The TNSTC shuttle service connecting Chathiram Bus Stand, Central Bus Stand / Junction Railway Station to the Srirangam and Thiruvanai Kovil temples is designed for high-frequency pilgrim transit, operating approximately 15 daily trips at intervals of 30 to 45 minutes. The service primarily utilizes Economy AC (3x2 configuration) buses and modern Low-Floor Urban buses to ensure accessibility for elderly devotees. These vehicles are built to Indian AIS (Automotive Industry Standards), featuring air-conditioning to combat Tiruchirappalli's heat, emergency exits, and speed governors for safety. The route covers roughly 11 kms offering a premium limited-stop experience compared to standard town buses.

For tourists and larger groups, the service often functions as a Circuit Tour, typically running from 6:00 AM to 9:00 PM to align with temple darshan timings. While the standard shuttle focuses on point-to-point transit, which uses higher-end AC Seater or Deluxe buses. Passengers should note that while digital booking is available for long-distance routes, these local temple shuttles usually operate on a conductor-based cash ticketing system. The buses are easily identifiable by LED destination boards in both Tamil and English, typically stationed at dedicated bays within the Chathiram Bus Stand, Central Bus Stand / Junction Railway Station.

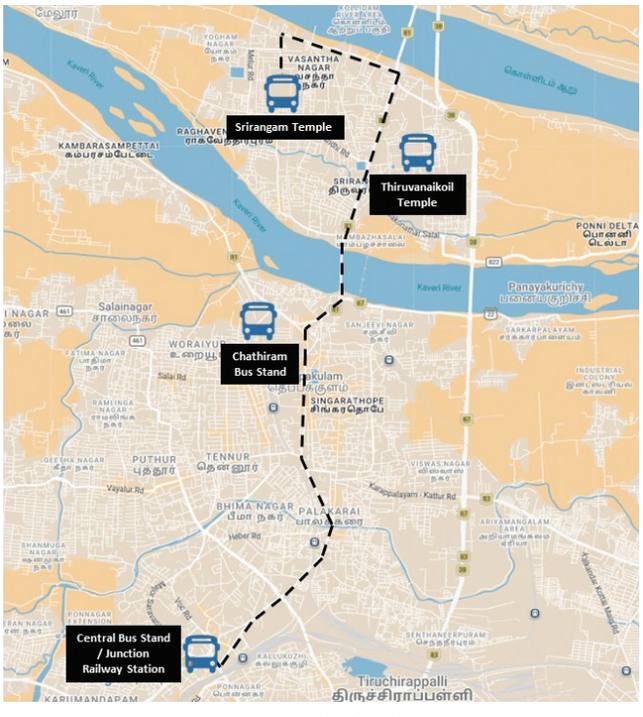



*Figure 9.42 Proposed Shuttle Bus Service*

### 9.6.3 Dedicated High Demand Public Transport Corridor (BRTS)

A Bus Rapid Transit System (BRTS) corridor has been identified in two phases to provide efficient and high-capacity public transport along key city routes. Phase 1 extends from Thuvakudi to Palpannai Junction with a right-of-way (ROW) of 35–40 m, which allows for segregated bus lanes, pedestrian pathways, and future integration of cycle tracks, ensuring smooth and uninterrupted bus movement in a high-demand corridor. Phase 2 extends from Palpannai Junction to Chathiram Bus Stand with a ROW of 20–25 m, reflecting narrower urban streets and higher land constraints in the city core, while still enabling dedicated bus lanes and priority signaling for rapid transit. The phased approach balances operational efficiency, land availability, and cost considerations, while improving overall connectivity and reducing travel times for commuters.

*Table 9.36 Proposed BRTS Corridor*

| BRTS Corridor | Route | Length (in Kms) | Reason for location | Phase |
|---|---|---|---|---|
| BRTS Corridor -1 | Thuvakudi – Palpannai Junction | 15 | Connects industrial zones and residential neighborhoods; serves high commuter demand along the northern corridor. | Phase -1 |
| | Palpannai Junction – Chathiram Bus Stand | 5 | Links city center, commercial hubs, and transit terminals; enhances last-mile connectivity to major destinations. | Phase -2 |

#### 9.6.3.1 Creating Supporting Infrastructure

To improve bus accessibility in Tiruchirappalli, bus stops have been planned at regular 500 m intervals along existing routes, making it easier for commuters to access the bus network and encouraging greater use of public transport. Many existing bus stops are located very close to intersections, which can disrupt traffic flow and reduce operational efficiency. To address this, all such bus stops are proposed to be relocated at least 100 m away from intersections.

### 9.6.4 Transit Orient Development (TOD) Corridor

The introduction of a Transit-Oriented Development (TOD) Corridor along the 15 km BRTS stretch from Palpannai Junction to Thuvakudi is a strategic initiative to guide Tiruchirappalli toward compact, sustainable urban growth. This corridor aligns high-density residential, commercial, and mixed-use development within a 500–800 m radius of the BRTS line, fostering a “walk-

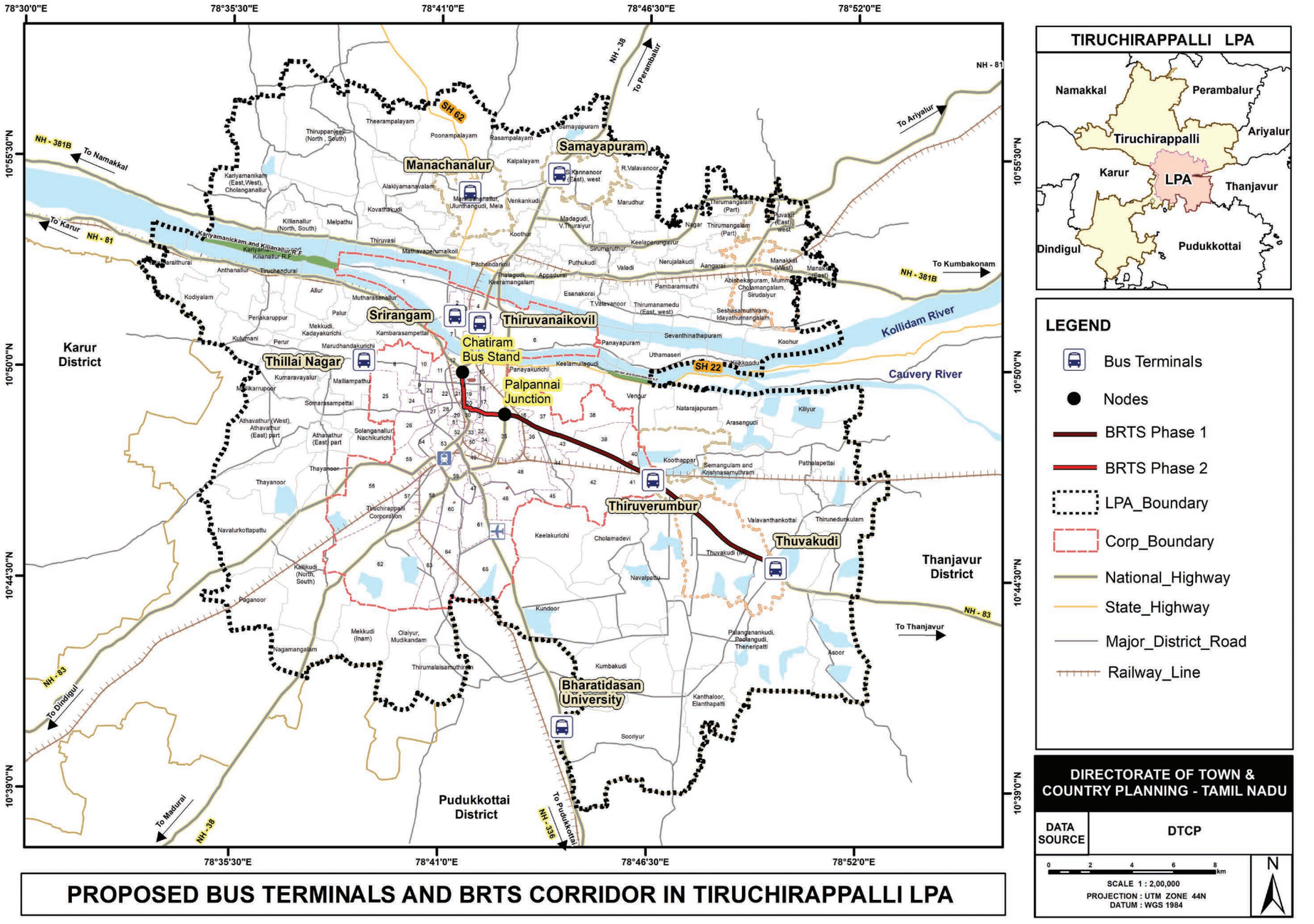
to-transit" culture that reduces dependence on private vehicles. Locating the TOD along this corridor maximizes the ridership and financial viability of the BRTS, ensuring a steady passenger base while optimizing the city's multi-crore investment in transit infrastructure. The corridor leverages the eastern industrial and residential zones, providing immediate access to employment hubs, educational institutions, and commercial centers, thereby reducing long commutes and improving quality of life. By concentrating growth along this well-connected spine, the TOD strategy also prevents haphazard urban sprawl, preserves peripheral green areas, and encourages vertical, high-intensity development within existing urban land. Moreover, the corridor supports economic integration, creating opportunities for ancillary commercial services, retail, and mixed-use developments, while promoting low-carbon mobility and efficient, equitable access to the city's core. Overall, this TOD-BRTS synergy transforms the Palpannai–Thuvakudi stretch into a sustainable, transit-ready urban corridor that balances industrial, residential, and commercial growth with environmental and social benefits.

### 9.6.5 Freight Terminal and Distribution Centres

The proposed freight infrastructure strategy comprises Freight Terminals at Thuvakudi, Kulathur, and Punganur, each planned on approximately 5 acres of land, along with a Freight Distribution Centre at Sarkarpalayam, to manage heavy vehicle movement and limit freight intrusion into the city core. The freight terminals are located at peripheral gateway locations along major highway corridors to intercept long-haul trucks and prevent their movement through congested urban areas.

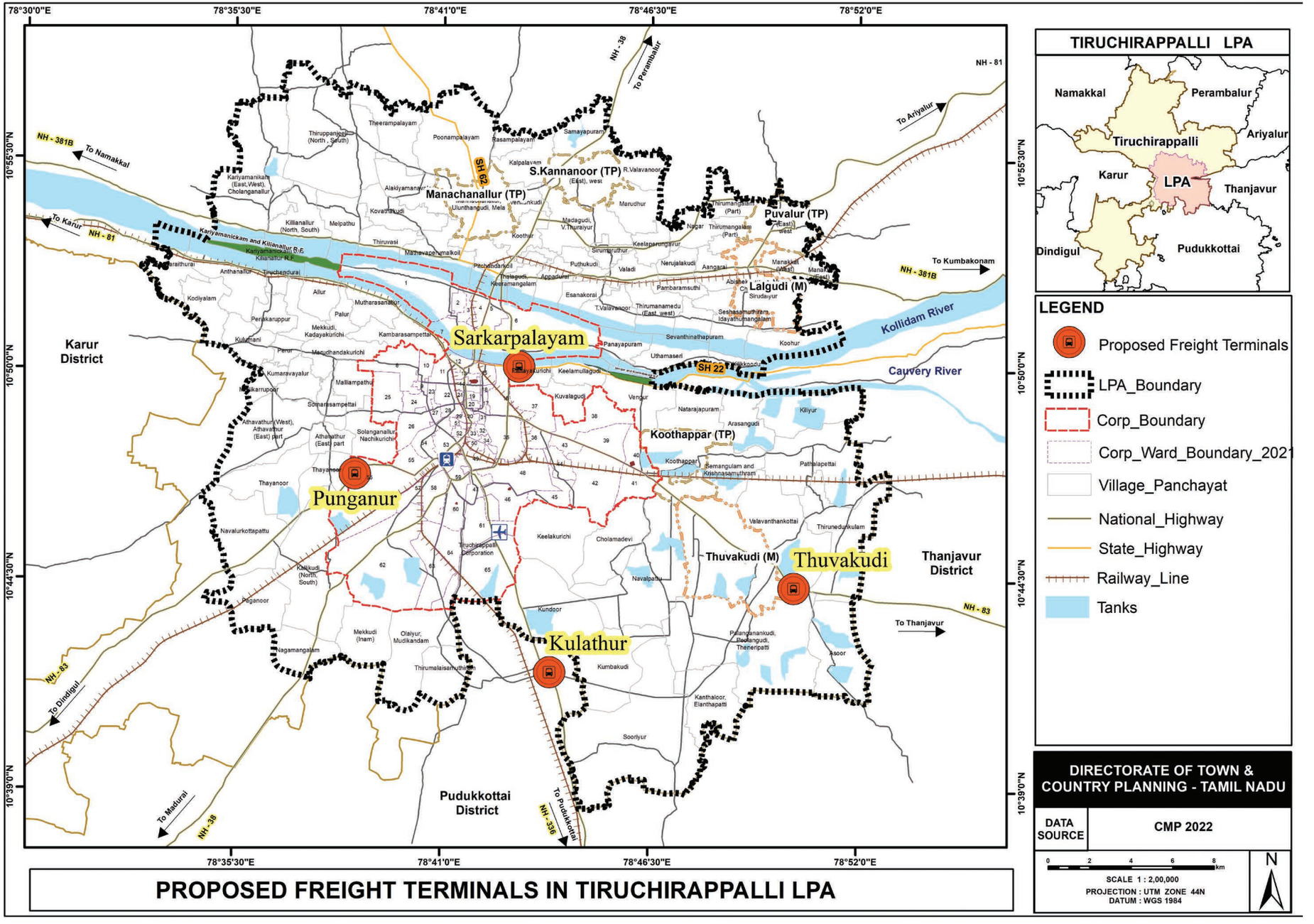
Sarkarpalayam, being situated at the Corporation entry, is proposed as a Freight Distribution Centre rather than a freight terminal, and therefore does not function as a long-haul truck holding facility. Its role is limited to aggregation, sorting, and redistribution of goods through light commercial vehicles, particularly for agricultural produce and construction materials, thereby easing freight pressure on northern inner-city roads and the Chathiram Bus Stand area.

Together, these facilities support a hub-and-spoke logistics system, reduce multi-axle truck penetration into residential areas, and contribute to a more efficient, safer, and environmentally responsive urban freight network.




# PROPOSED BUS TERMINALS AND BRTS CORRIDOR IN TIRUCHIRAPPALLI LPA

*Map 9.9 Proposed Bus Terminals and BRTS Corridors in Tiruchirappalli LPA*




*Map 9.10 Proposed Freight Terminals in Tiruchirappalli LPA*

### 9.6.6 Junction Improvements

The proposed Junction Improvement Plan for Tiruchirappalli targets 18 critical bottlenecks, including high-traffic nodes like the Aristo Roundabout, Palpannai, TVS Tollgate, and the Cauvery Bridge Junction. These intersections are currently the primary sources of urban delay, characterized by complex multi-arm movements and high conflict points between local traffic and highway transit. The justification for these improvements lies in the need to optimize operational capacity without necessarily expanding road footprints by implementing geometric corrections, signal synchronization, and dedicated slip lanes, the city can significantly reduce idling times and fuel consumption. Ultimately, these upgrades create a predictable and safer traffic flow, transforming chaotic intersections into efficient conduits that support the city's expanding economic and industrial volumes.

*Table 9.37 Proposed Junction Improvement*

| Sl.No. | Junction Name | Key Challenges | Proposed Engineering Solutions |
|---|---|---|---|
| 1 | Cauvery Bridge Junction | Merging conflict from bridge traffic. | Provision of dedicated slip lanes and improved channelization. |
| 2 | Kalaingar Arivalayam | Turning movement congestion. | Signal synchronization and widening of turning radii. |
| 3 | Aristo Circle | Multi-arm complex movement. | Geometric correction of the roundabout and installation of smart signaling. |
| 4 | Vellamandi Main Rd Junction | Commercial vehicle interference. | Dedicated loading/unloading bays and clear lane marking. |
| 5 | Periyar Statue Junction | High pedestrian-vehicle conflict. | Refuge islands and pedestrian-actuated signal phases. |
| 6 | Amma Mandapam Junction | Religious/Tourism peak surges. | Dynamic signal timing to handle seasonal traffic variations. |
| 7 | Gandhi Statue Junction | Core commercial congestion. | Removal of encroachments and strict No Parking zones near the junction. |
| 8 | TVS Tollgate Junction | Intersection of highway and local flow. | Grade-separated U-turns or signal-free left turns. |
| 9 | Mambilai Salai Junction | Narrow approach roads. | Junction bell-mouth widening to facilitate smoother turns. |
| 10 | Shanmuga Medical Junction | Emergency vehicle priority needs. | Emergency Vehicle Pre-emption systems for hospital access. |

| Sl.No. | Junction Name | Key Challenges | Proposed Engineering Solutions |
|---|---|---|---|
| 11 | Railway Stn Junction | High churn of transit vehicles. | Dedicated pickup/drop-off lanes to prevent main-road idling. |
| 12 | Palpannai Junction | Heavy highway freight merging. | Channelizers to segregate local traffic from through-traffic on the NH. |
| 13 | Thillai & Salai Junction | Peak-hour commercial gridlock. | Integrated Signal Control - Using sensors and AI to adjust signal timings in real-time based on actual traffic volume. |
| 14 | MGR Circle | High-volume circulatory traffic. | Improved signage and high-intensity lighting for night safety. |
| 15 | Thennur & KeelaChathiram | Residential-commercial mix bottlenecks. | One-way circulation loops during peak hours if feasible. |
| 16 | Anna Statue Junction | High footfall and market traffic. | Raised tabletop crossings for pedestrian safety at the junction. |
| 17 | Netaji Nagar Rd Junction | Unregulated peripheral growth. | Standardization of ROW at the junction and utility ducting. |

*Source: Comprehensive Mobility Plan, 2022*

Nodes like No. 1 Toll Gate, Palpannai, and TVS Tollgate act as the entry valves for the city. Improving these ensures that heavy traffic from the National Highways is filtered smoothly into the city's inner ring. The Aristo Roundabout and Railway Junction are the focal points for inter-modal transfers. Improvements here prioritize bus and pedestrian movement to support the Central Bus Stand and Railway station connectivity. Junctions such as the Cauvery Bridge, Anna Statue, and MGR Circle are constrained by geographical and historic features. The plan focuses on intelligent signaling and channelization to manage peak-hour surges across the river and through the commercial core.

### 9.6.7 Multi-Level Car Parking (MLCP)

The proposed Multi-Level Car Parking (MLCP) facilities at Srirangam, Rock Fort, Thiruverumbur, and Singarathope are critical infrastructure interventions designed to reclaim the city's streets from the paralysis of on-road parking. These locations are the highest-density commercial and religious hubs in Tiruchirappalli, where the current lack of organized parking leads to severe traffic friction, reducing effective road width and increasing congestion. By shifting parked vehicles into high-capacity, vertical structures, these MLCPs will allow for smoother vehicular movement and safer pedestrian environments

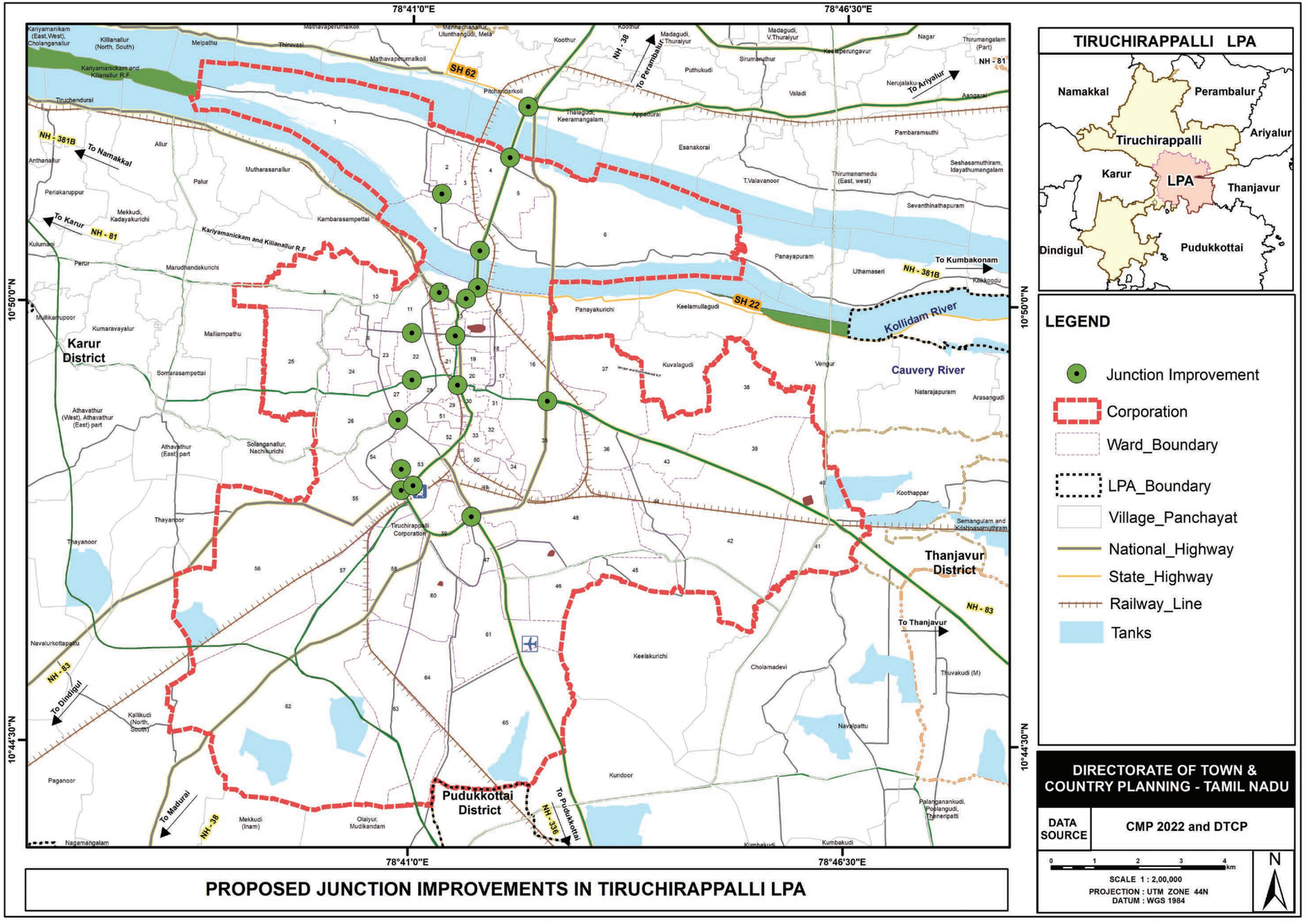
in some of the city's most historically narrow corridors. This proposal is not merely about storage, it is a vital prerequisite for the success of the broader transit plan, as it clears the way for the proposed BRTS lanes and pedestrian-friendly zones by removing the obstacle of haphazardly parked private vehicles.

The strategic selection of these four sites addresses the unique urban challenges of Tiruchirappalli's most congested pockets, Srirangam & Rock Fort as major pilgrimage centers, these areas face a massive influx of tourist buses and private cars, especially during festivals. Currently, vehicles are often parked in narrow lanes, blocking emergency access and local movement. MLCPs here will preserve the sanctity and accessibility of these heritage sites. Singarathope being the primary retail heart of the city, Singarathope suffers from extreme kerbside parking demand. An MLCP here will support the local economy by making it easier for shoppers to visit without the stress of navigating gridlocked streets. Thiruverumbur located on the busy Thanjavur Highway, this node serves as a transition point for employees and students. An MLCP here acts as a Park and Ride facility, allowing commuters to park their private vehicles safely and switch to the proposed BRTS or public transit.

*Table 9.38 Proposed MLCP Details*

| Proposed MLCP Location | Supporting Survey Stretches | Total Peak Accumulation (ECS) | Recommended MLCP Capacity (Bays) | Justification |
|---|---|---|---|---|
| Srirangam | Srirangam Stretch | 184 | 250 - 300 | Covers peak demand with a 30% buffer for festival surges. |
| Rock Fort | Main Guard Gate, Rock Fort, Chinnakadai St | 456 | 500 - 600 | Consolidates three major high-demand heritage/ retail zones. |
| Singarathope | Big Bazaar, Gandhi Market | 672 | 750 - 850 | Handles the city's highest accumulation from intensive retail hubs. |
| Thiruverumbur | West Boulevard (Proxy data) | 244 | 300 - 350 | Supports the industrial gateway and future "Park & Ride" demand. |

*Source: Comprehensive Mobility Plan, 2022*




**PROPOSED JUNCTION IMPROVEMENTS IN TIRUCHIRAPPALLI LPA**




**LEGEND**

- Junction Improvement
- Corporation
- Ward_Boundary
- LPA_Boundary
- Village_Panchayat
- National_Highway
- State_Highway
- Railway_Line
- Tanks

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

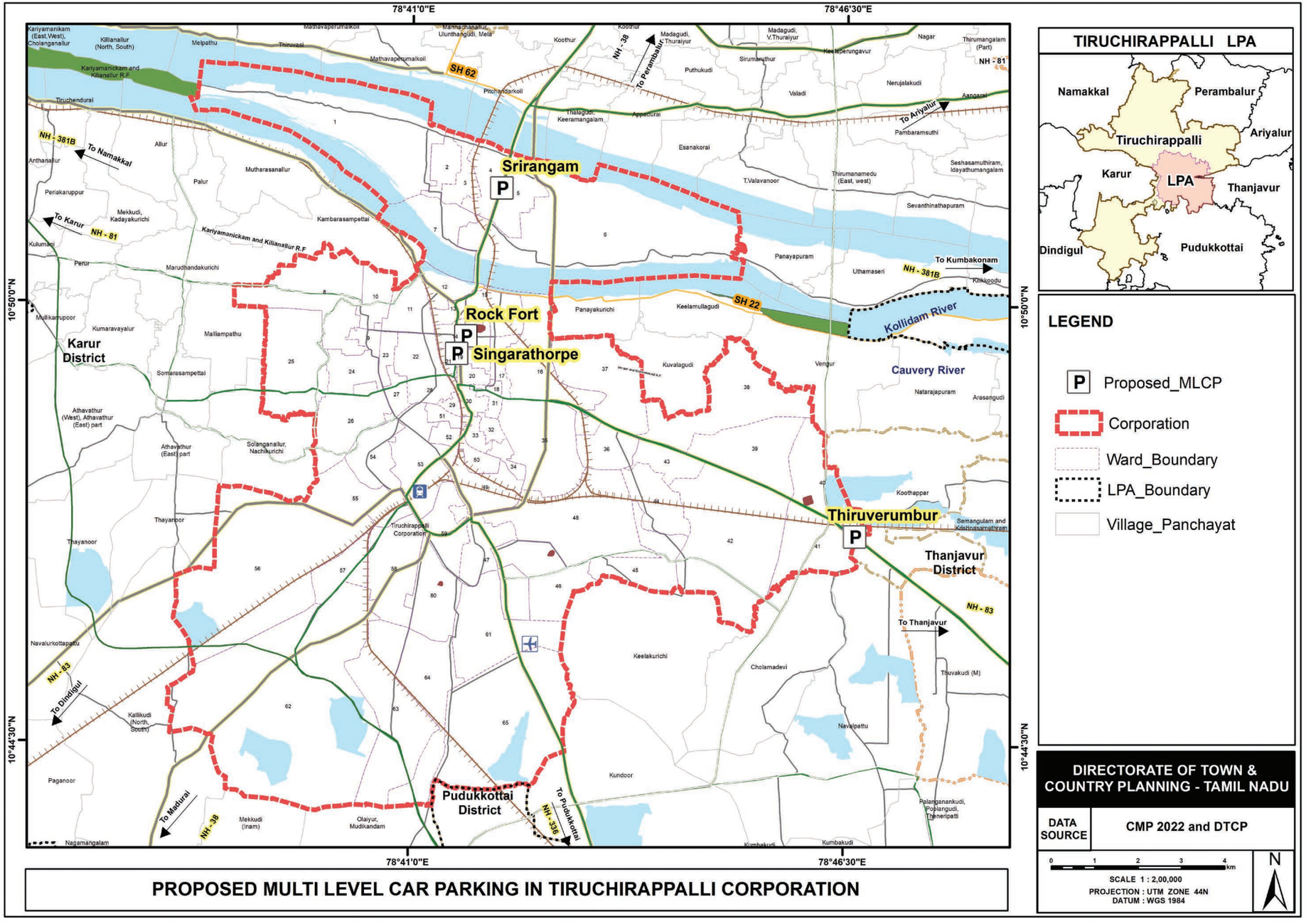
| DATA SOURCE | CMP 2022 and DTCP |
|---|---|

0 1 2 3 4 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

*Map 9.11 Proposed Junction Improvements in Tiruchirappalli LPA*




*Map 9.12 Proposed Multi Level Car Parking in Tiruchirappalli Corporation*

### 9.6.8 Non-Motorized Transport

Tiruchirappalli is envisioned as a walkable and people-oriented city, where walking is encouraged through equitable allocation of public space, high-quality pedestrian infrastructure, and improved access to opportunities and mobility. The primary objective is to enhance the share of walking and other non-motorised modes by creating a safe, continuous, and pleasant pedestrian network comprising well-designed footpaths, greenways, and supporting facilities that cater to all users, including children, the elderly, and persons with disabilities. Street design across the city shall conform to best practices in pedestrian-oriented and multi-modal street design, with an emphasis on safety, comfort, and universal accessibility.

At present, Tiruchirappalli lacks adequate pedestrian infrastructure, with discontinuous or encroached footpaths and several intersections devoid of safe pedestrian crossings, adversely impacting pedestrian safety and convenience. In response, the proposed pedestrian infrastructure strategy focuses on the development of continuous and accessible footpath facilities, provision of safe and well-marked pedestrian crossing infrastructure at intersections and mid-block locations, and improvement of overall pedestrian environments along major corridors and activity streets. These interventions aim to improve road safety, enhance walkability, and contribute to a more inclusive and liveable urban environment.

#### 9.6.8.1 Footpath Network Development

Footpaths are proposed along identified arterial and sub-arterial roads wherever the available right-of-way permits, in accordance with IRC 103:2012: Guidelines for Pedestrian Facilities. Standard road cross-sections have been adopted for road widths of 7 m, 9–12 m, 12–15 m, 15–18 m, 18–25 m, and 25–30 m. Roads with a right-of-way exceeding 30 m shall be designed as per applicable NHAI guidelines or the Urban Street Design Codes issued by MoHUA.

Footpath provision is also proposed at important activity nodes within the planning area, including institutional, recreational, public, and semi-public areas, where pedestrian volumes are high. As a short-term measure, the development of approximately 70 km of footpaths is proposed across the city.

All junctions in Tiruchirappalli shall be designed with due consideration for pedestrian movement and safety, ensuring continuity of footpaths and provision of safe pedestrian crossing infrastructure. Footpath design shall be uniform across the city, with a minimum clear width of 1.8 m in core areas and 2.5 m in other areas, and a maximum height of 150 mm above the finished road surface.

In locations where right-of-way constraints make it difficult to provide a minimum clear footpath width of 1.8 m, pedestrian space shall be segregated

at road level using distinct paving materials. Barrier-free footpath elements, including tactile paving and ramps, shall be incorporated in accordance with the guidelines issued by the Institute of Urban Transport (IUT) and the Government of Tamil Nadu to ensure universal accessibility.

*Table 9.39 Links on which footpaths are proposed*

| S. No | | Road Name | Length (km) |
|---|---|---|---|
| 1 | One Side | Big Bazaar Street | 1.6 |
| 2 | | Melaputhur Main Road | 0.5 |
| 3 | | McDonalds Road | 0.4 |
| 4 | | LIC Nagar | 1.2 |
| 5 | | KK Nagar | 4.6 |
| 6 | | McDonalds Road | 0.8 |
| 7 | | Alwarthoppe Street | 1.7 |
| 8 | | Vathukara Street | 1.3 |
| 9 | | Old Karur Road | 0.2 |
| 10 | | Amma Mandabam | 0.4 |
| 11 | | Srirangam Kovil | 9.2 |
| 12 | | Thiruvanaikovil | 3.8 |
| 13 | | EB Road | 0.6 |
| 14 | | Srirangam Kovil | 0.1 |
| 15 | | Singarathoppu | 1.2 |
| 16 | | Sub Jail Road | 0.6 |
| 1 | Both Sides | Nandhi Kovil Street | 1.0 |
| 2 | | NSB Road | 0.9 |
| 3 | | Karapalayam Kattur Road | 1.8 |
| 4 | | Thanjavur Main Road | 0.9 |
| 5 | | Palakarai – Gandhi Market Road | 1.0 |
| 6 | | Old Madurai Road | 0.8 |
| 7 | | Thanjavur Main Road | 1.8 |
| 8 | | Bharathiyar Salai | 2.2 |
| 9 | | Race Course Road | 4.2 |

| S. No | | Road Name | Length (km) |
|---|---|---|---|
| 10 | Both Sides | Simco Road | 2.3 |
| 11 | | Williams Road | 1.2 |
| 12 | | VOC Road | 1.0 |
| 13 | | Major Saravanan Road | 2.2 |
| 14 | | Kulumani Main Road | 1.5 |
| 15 | | Karur Bypass Road | 3.2 |
| 16 | | Old Karur Road | 1.2 |
| 17 | | Amma Mandabam Road | 1.1 |
| 18 | | Andal Nagar | 1.3 |
| 19 | | Srirangam Temple | 3.4 |
| 20 | | Gandhi Road | 0.9 |
| 21 | | Tiruchirappalli–Namakkal Road | 2.0 |
| 22 | | Keelachatriam Road | 0.7 |
| 23 | | Herbers Road | 1.2 |
| 24 | | Vayalur Road | 2.9 |
| 25 | | Cauvery Nagar Main Road | 1.3 |
| 26 | | VOC Road | 0.4 |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.6.8.2 Pedestrian Crossing Infrastructure

The proposed Pedestrian Crossing Improvements at nine critical high-density locations—including the Main Guard Gate, Railway Junction, and Central Bus Stand—are essential for transforming Tiruchirappalli into a safer, more walkable city. These points represent the most intense conflict zones where massive volumes of foot traffic from transit hubs, heritage sites, and commercial markets intersect with high-speed vehicular flow. By implementing dedicated, well-engineered crossings at these specific landmarks, the city can drastically reduce pedestrian-vehicle accidents and improve permeability, ensuring that the elderly, students, and commuters can navigate these complex junctions without risk. This initiative is the social cornerstone of the broader transit plan without safe first and last-mile pedestrian infrastructure at these nodes, the multi-crore investments in the BRTS and Outer Ring Road cannot achieve their full potential in shifting people away from private vehicles toward public transport.

The locations identified in the proposal are not merely intersections; they are the functional heartbeats of Tiruchirappalli's daily life. Locations like the Railway

Junction Roundabout, Central Bus Stand (Water Fountain), and Periyar Statue Junction see thousands of passengers switching between trains, inter-city buses, and local transport every hour. Safe crossings are vital to manage this constant churn of movement. The Main Guard Gate Arch and Anna Statue areas are high-footfall zones for shoppers and tourists. Current vehicular congestion in these historic narrow corridors often squeezes pedestrians out, making skywalks or raised crossings a necessity for safety and economic vitality. At high-speed signals like Kohinoor and Post Office, pedestrians often struggle to cross during short signal cycles. Proper pedestrian-controlled phases and refuge islands are needed to ensure that crossing the road doesn't require a sprint, thereby improving the overall flow and predictability of traffic for drivers as well.

*Table 9.40 Locations of Pedestrian Infrastructure*

| Sl.No. | Location | Identified Conflict / Context | Proposed Infrastructure Solutions |
|---|---|---|---|
| 1 | College Road / Main Guard Gate Arch | Heritage/Commercial footfall and narrow corridors. | Skywalks or Raised Crossings to segregate shoppers from heavy vehicular flow. |
| 2 | Railway Junction Roundana | High-volume transit mix (train-to-bus). | Refuge Islands & Pelican Signals to manage the constant flow of passengers. |
| 3 | MGR Statue Junction | Major intersection conflict. | High-Visibility Zebra Markings and dedicated pedestrian-controlled phases. |
| 4 | Kohinoor Signal | High-speed traffic, short signal cycles. | Extended Pedestrian Green Phases and tactile paving for accessibility. |
| 5 | Water Foundation / Central Bus Stand | Massive foot traffic from inter-city buses. | Grade-Separated Crossings (Foot Over Bridges) with elevators for elderly/luggage. |
| 6 | Periyar Statue Junction | Multi-modal intersection. | Refuge Islands and improved corner radii to slow turning vehicles. |
| 7 | Anna Statue Junction | Tourism and shopping hub. | Raised Pedestrian Crossings (Tabletop Crossings) to prioritize foot traffic. |
| 8 | Main Guard Gate Water Tank Junction | Local commercial congestion. | Bollard-Protected Walkways and clear signage to define pedestrian zones. |
| 9 | Post Office Signal | High-speed arterial movement. | Pedestrian-Actuated Signals and mid-block crossing islands. |

*Source: Comprehensive Mobility Plan, 2022*

#### 9.6.8.3 Development of Cycle Friendly Infrastructure

To promote sustainable urban mobility and mitigate greenhouse gas emissions, the master plan proposes a 15 km cycle track network for Tiruchirappalli, addressing current infrastructure gaps where NMT (Non-Motorized Transport) users—who account for 4% of daily trips—face high conflict points and a lack of connectivity. Grounded in the core principles of safety, connectivity, comfort, and ambience, the proposal seeks to transform cycling into a viable, pleasant alternative to motorized transport. The network is strategically phased into two categories: 4 km of shared cycle lanes in the dense city core (covering high-traffic arteries like Old Madurai Road, Shastri Road, and Keela Chathiram Road) and 11 km of dedicated cycle tracks in peripheral areas to ensure segregated, secure movement. By creating a consistent network that links major attractions to transit hubs and schools, this initiative aims to foster a bicycle-friendly ecosystem that improves road safety and encourages a shift toward cleaner, active transportation.

#### 9.6.8.4 Public Bicycle Sharing System Proposal

To enhance first- and last-mile connectivity, the master plan proposes the implementation of a Public Bicycle Sharing (PBS) system, an emerging transit model designed for short-duration urban trips. By providing a network of docking stations where users can rent and return bicycles at different locations for a nominal fee, the system functions as a vital feeder for existing public transport. Implementation is strategically prioritized at high-demand nodes, beginning with major transit hubs such as the Junction Railway Station, Central Bus Stand, and Chathiram Bus Stand, followed by educational clusters including the vicinities of St. Joseph's and Holy Cross Colleges. This integrated approach not only provides a flexible, affordable transport alternative but also encourages a multimodal shift, reducing the city's reliance on motorized vehicles for short commutes.

##### 9.6.8.4.1 PBS Implementation Priority:

Tier 1 (Transit Hubs) : Junction Railway Station, Central Bus Stand, Chathiram Bus Stand.

Tier 2 (Educational Hubs) : St. Joseph's College and Holy Cross College vicinities.

## 9.6.9 Intelligent Transport System Based Recommendations

For a city like Tiruchirappalli, which balances heavy regional transit (over 50% through-traffic at key points) with a high local reliance on two-wheelers (41%), implementing Basic ITS Systems is the most cost-effective way to modernize infrastructure. These systems provide immediate relief by smart-managing existing roads rather than just building new ones.

### 9.6.9.1 Advanced Traveller Information System (ATIS)

A digital network providing real-time traffic updates via Variable Message Signs (VMS) on highways and mobile apps. Since cordons like OC3 and OC7 handle massive through-traffic, ATIS can alert long-distance drivers before they enter the city core, suggesting they take the Outer Ring Road or bypass routes to avoid peak-hour congestion at Main Guard Gate or Chathiram.

### 9.6.9.2 Passenger Information System (PIS) & Smart Ticketing

Real-time bus tracking displays at shelters and QR-code/RFID-based contactless payments. With new buses being augmented in phases, a PIS ensures that the 22% of commuters using buses have predictable wait times. Smart ticketing (like a "Trichy One Card") would allow seamless transfers between the new Panjapur IBT, the Railway Station, and local town buses, reducing the friction that currently drives people toward two-wheelers.

### 9.6.9.3 Automatic Traffic Counter & Classifier (ATCC)

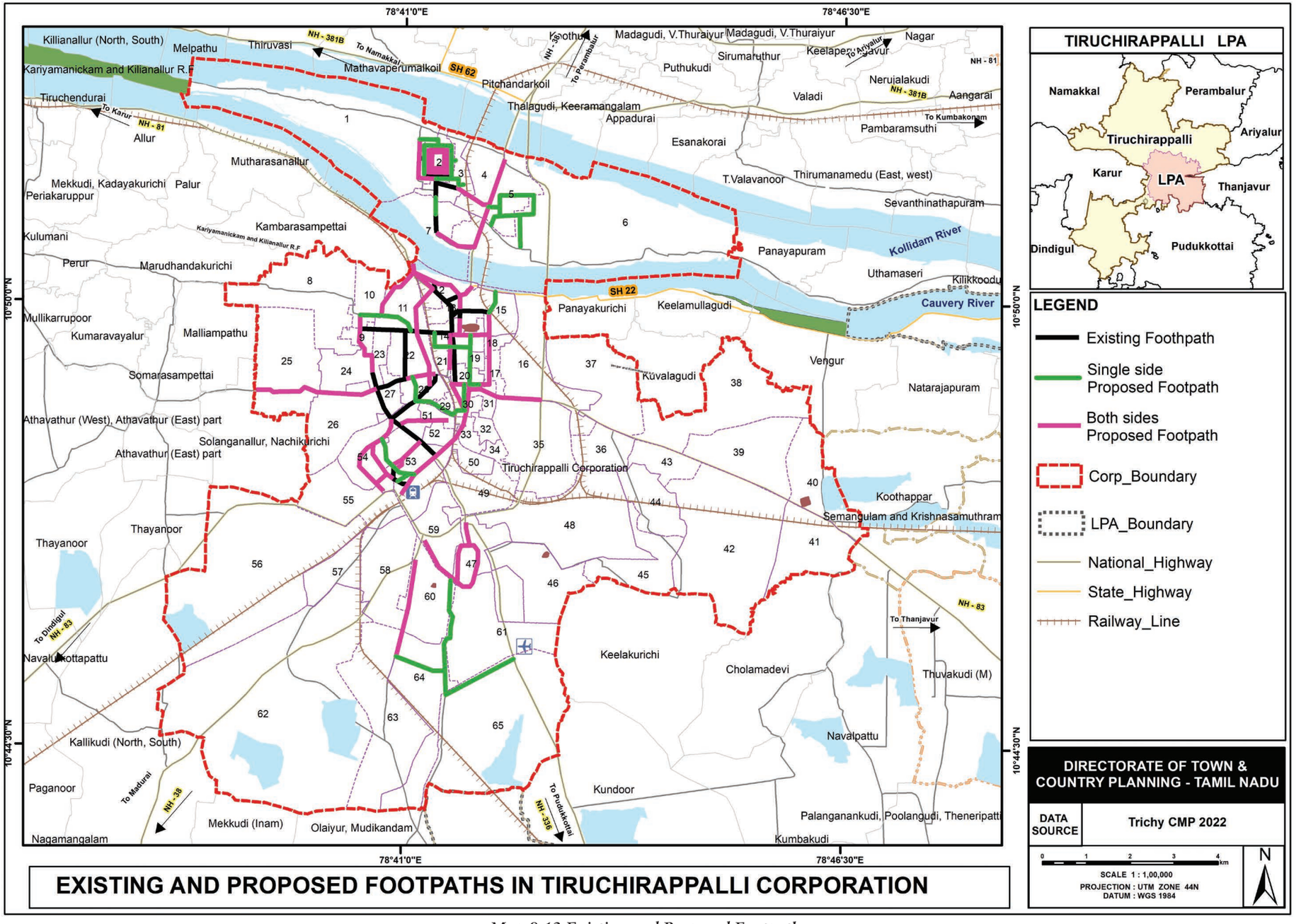
Radar or video-based sensors that automatically count and categorize vehicles (cycles, cars, heavy trucks). Manual surveys are insufficient for a regional node. ATCC is essential for the CKIC to monitor freight volume. It provides the hard data needed to decide when to restrict heavy truck movement within city limits to prioritize local safety.

### 9.6.9.4 Smart Signaling & Queue-Length Measurement

Sensors that detect the length of a queue at a red light and dynamically extend green lights for the busiest lanes. Fixed-timer signals often cause ghost congestion where one side of a junction is empty while the other is backed up for a kilometer.

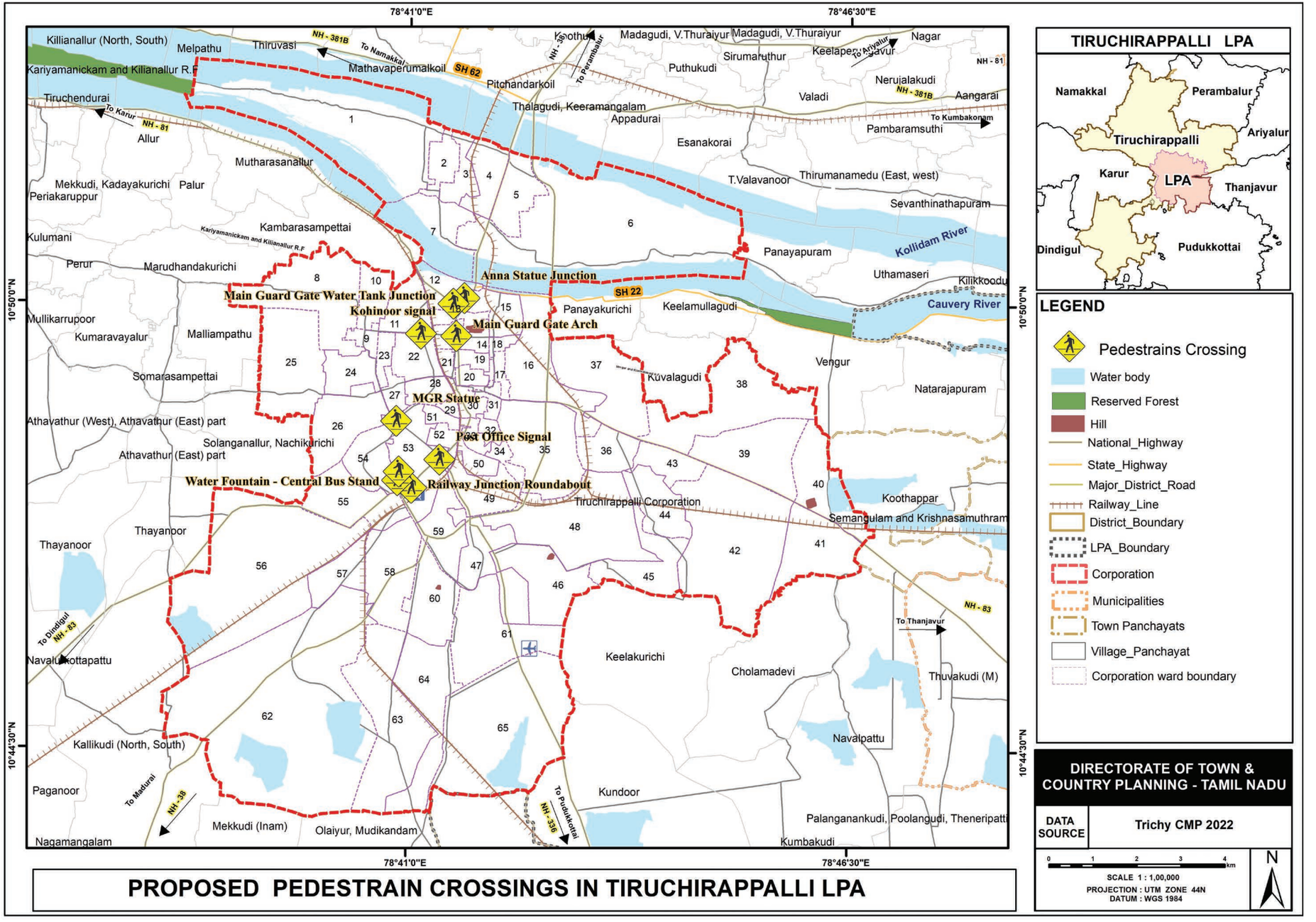
### 9.6.9.5 Pedestrian Monitoring & Smart Crossings

AI-cameras or infrared sensors that detect pedestrians waiting to cross and trigger a pedestrian phase in the traffic signal. Walking and cycling currently only account for 15% of the mode share, largely due to safety fears. Smart crossings at high-footfall areas would protect pedestrians from the 41% motorized two-wheeler traffic, encouraging more people to walk for short trips.




# EXISTING AND PROPOSED FOOTPATHS IN TIRUCHIRAPPALLI CORPORATION

*Map 9.13 Existing and Proposed Footpath*







LEGEND

- Pedestrains Crossing
- Water body
- Reserved Forest
- Hill
- National_Highway
- State_Highway
- Major_District_Road
- Railway_Line
- District_Boundary
- LPA_Boundary
- Corporation
- Municipalities
- Town Panchayats
- Village_Panchayat
- Corporation ward boundary

DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU

| DATA SOURCE | Trichy CMP 2022 |
|---|---|

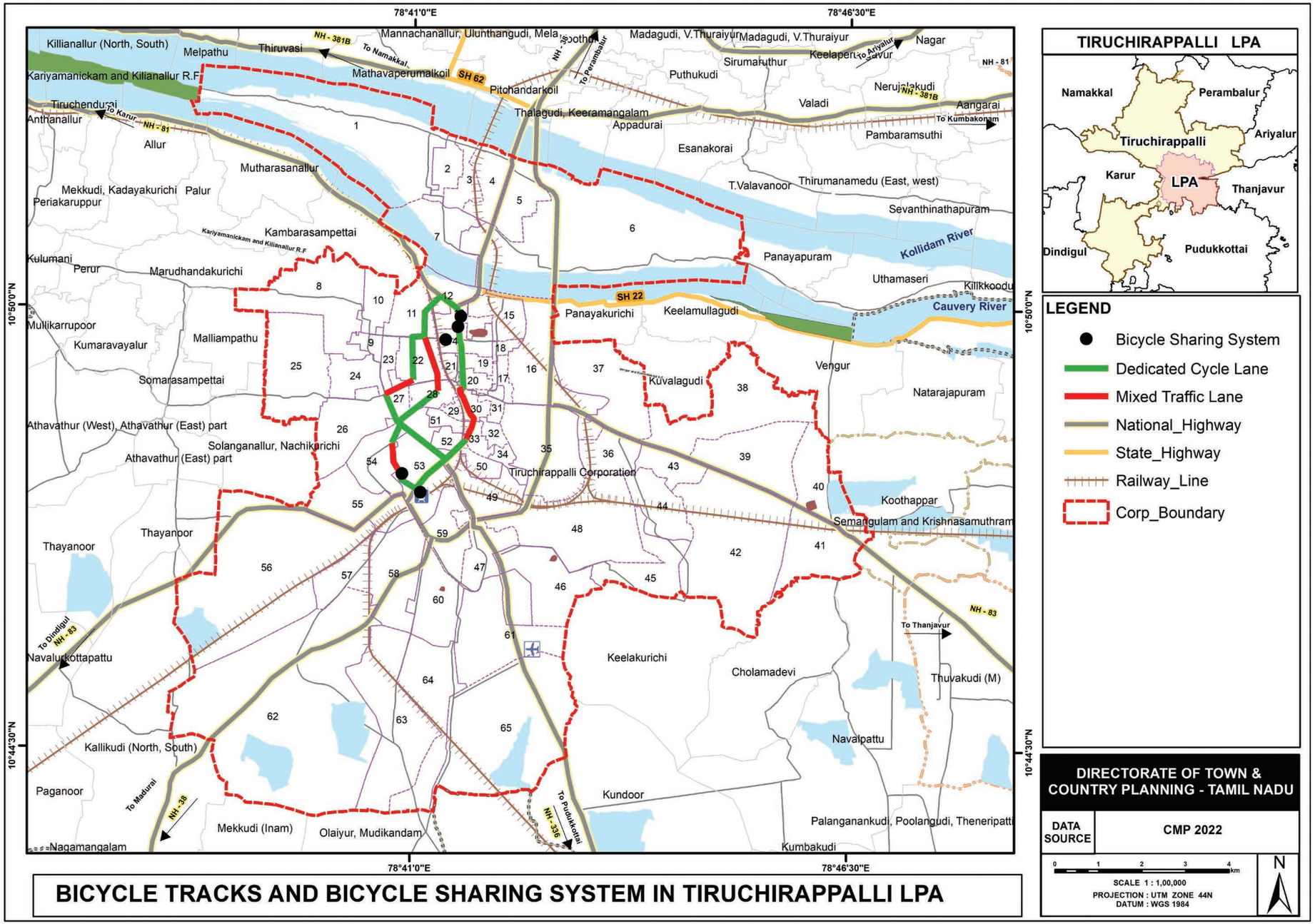
0 1 2 3 4 km

SCALE 1 : 1,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

# PROPOSED PEDESTRAIN CROSSINGS IN TIRUCHIRAPPALLI LPA

*Map 9.14 Proposed Pedestrian Crossing in Tiruchirappalli LPA*




*Map 9.15 Bicycle Tracks and Bicycle sharing system in Tiruchirappalli LPA*

# 10 HOUSING

## 10.1 Housing Dynamics in Tiruchirappalli LPA

Housing is a basic necessity and a core component of development. The availability of adequate, affordable and well-serviced housing greatly influences settlement patterns, access to livelihoods and the overall social and economic development of individuals, communities, and the city at large.

The evolution of settlement in Tiruchirappalli can be traced through the sequential development of Srirangam, Woraiyur, and Rockfort, each reflecting a distinct phase of residential and urban growth shaped by geography, culture and governance. Srirangam evolved as a temple-centric town around the Sri Ranganathaswamy Temple. The development in Srirangam followed a concentric rectangular pattern aligned with the temple prakarams, where the residential fabric is characterized by compact plots, narrow streets, and mixed-use houses supporting religious and pilgrimage-related activities. Subsequently, Woraiyur developed as a prominent residential and administrative settlement. It evolved as a planned residential area with larger dwelling plots, characterised by traditional courtyard houses and low-rise structures, integrated with the agricultural hinterland. The Rockfort area emerged later as a strategic and defensive settlement centered on the Rockfort hill, exhibiting a compact, high-density historic core, shaped by earlier fort boundaries. The areas around the Fort, Puthur, Woraiyur, Thennur and Beemanagar are the old residential localities with narrow streets. Over time, Rockfort evolved into the commercial and civic core of Tiruchirappalli, with residential uses gradually interwoven with markets, institutions and transport corridors. As the city expanded, these historically distinct residential settlements gradually merged, forming the present urban core of Tiruchirappalli. Thillai Nagar, Ramalinganagar, Sengulam Colony, Kajamalai, K.K. Nagar, and Ponnagar are among the planned residential colonies that developed around the core area. The surrounding municipalities and town panchayats experienced phased development as transport infrastructure and urban services expanded. They emerged with different settlement characteristics shaped by their functional roles. Municipalities like Lalgudi emerged as an agrarian market town within the fertile Cauvery delta, characterized by temple-centered settlements, whereas Thuvakudi evolved from a small rural settlement into a planned industrial–institutional town with growth accelerated by the establishment of BHEL and associated industrial units. Evidently, residential growth in Tiruchirappalli is largely associated with the combination of core religious centers, industrial areas, and institutional areas.

The First Master Plan of Tiruchirappalli primarily focused on the spatial distribution of various land uses and their development potential. Based on this assessment, the plan emphasised land use planning as the central framework to guide the city's future growth and development. With respect to residential development, the First Master Plan mentions a sudden spurt in land development and housing activity across the entire planning area. The establishment of several industries and the associated demand for home ownership provided a strong impetus to this growth. However, the development occurred at a rapid pace and in a haphazard manner. In response, the First Master Plan designated considerable areas of land for residential development to mitigate unplanned growth, with areas east of the Chennai–Tiruchirappalli Trunk road specifically identified for expansion. The plan also emphasized that all new residential development should be coordinated with adequate infrastructure provision, while also guiding the direction of urban growth through planned land allocation.

The need and demand for housing in present-day Tiruchirappalli is shaped by historical, economic, educational, and connectivity factors that have established the city as a major hub in Tamil Nadu. The expansion of institutions, industrial growth, the emerging IT sector, city's pivotal location facilitating regional connection, temple tourism, and migration from surrounding areas, all facilitated by infrastructure development, have collectively engendered diverse housing demands. These dynamics necessitate a comprehensive range of housing solutions to meet the city's current needs. Consequently, addressing these housing challenges requires a coordinated approach that integrates land use planning, infrastructure provision and a variety of residential options to ensure sustainable and inclusive urban growth.

This chapter analyses the existing housing situation within the planning area, providing a comprehensive overview of current housing conditions. It analyses the spatial distribution of housing across the LPA, along with key characteristics such as the structure of housing, housing conditions, tenure patterns, and informal housing. It identifies housing challenges, such as overcrowding, limited variety of housing options, and affordability gaps and examines the current dynamics of housing, considering factors like population growth, development trends, transient population and economic drivers that influence housing demand and supply. This assessment forms a strategic basis for planning interventions aimed at meeting future housing needs in a sustainable, equitable and balanced manner.

## 10.2 Existing Housing Scenario

The Tiruchirappalli Local Planning Area (LPA) comprises the Tiruchirappalli City Municipal Corporation (TCMC), two municipalities (Lalgudi and Thuvakudi), four town panchayats (Koothappar, Puvalur, Manachanallur, and S. Kananoor), and the rural administrative framework comprising 91 Village panchayats.

### 10.2.1 Distribution and Decadal Growth of Households

According to the Census 2011, Tiruchirappalli District had a population of 27,22,290 comprising 6,98,404 households with an average household size of 3.9.

*Table 10.1 Population And Households in Tiruchirappalli district*

| Tiruchirappalli District | Population in 2011 | Households in 2011 | Composition in % |
|---|---|---|---|
| Rural | 13,84,257 | 3,57,244 | 51.15 |
| Urban | 13,38,033 | 3,41,160 | 48.85 |
| **Total** | **27,22,290** | **6,98,404** | **100** |

*Source: Census of India 2011*

According to the 2011 Census, the Tiruchirappalli Local Planning Area (LPA) recorded a population of 14,32,404, comprising 3,62,884 households, with an average household size of 3.9. Urban areas account for 73% of households (64% of which are concentrated in the Corporation area), while 27% are located in rural areas. The Tiruchirappalli Corporation comprised 2,31,645 households and an average household size of 3.9. Municipalities had 15,531 households with an average household size of 4.0, town panchayats had 16,415 households with an average household size of 3.8, and village panchayats had 99,293 households with an average household size of 3.9.

The Tiruchirappalli LPA has seen a steady increase in population and households between the 1991, 2001, and 2011 censuses. Between 1991-2011, the number of households in the Tiruchirappalli LPA increased from 2,37,555 in 1991 to 2,81,337 in 2001 to 3,62,884 in 2011, indicating a growth of 52.7%. The increase was particularly higher during the decade 2001 to 2011. Meanwhile, there has been a declining trend in household size over the past decades, as tabulated in Table 10.2. The household size in Tiruchirappalli LPA was 4.6, 4.4 and 3.9 in 1991, 2001, and 2011 respectively. The steady increase in households, with a sharp decline in household size can be attributed to the shift from joint to nuclear families, migration-driven household formation and lifestyle shifts toward smaller and more independent living arrangements. Across the LPA, the number of households is increasing faster than the population, highlighting the need for housing.

*Table 10.2 Household size in Tiruchirappalli LPA*

| Area | Household size | | |
|---|---|---|---|
| | 1991 | 2001 | 2011 |
| Tiruchirappalli Corporation | 4.7 | 4.4 | 4.0 |
| Municipalities | 4.4 | 4.5 | 4.0 |
| Town Panchayats | 4.4 | 4.3 | 3.8 |
| Village Panchayats | 4.4 | 4.3 | 3.9 |
| **Tiruchirappalli LPA** | **4.6** | **4.4** | **3.9** |

*Source: Census of India 1991, 2001, and 2011*

The decadal growth observed in Tiruchirappalli Corporation is largely attributable to the expansion of municipal boundaries, enhanced connectivity and infrastructure, the city's emergence as a major educational and healthcare hub and sustained urban–urban as well as rural–urban migration.

The Tiruchirappalli Corporation remained the core growth center, registering a 21.20% increase between 1991 – 2001 and 28.04% increase in households between 2001 – 2011. Municipalities and Town Panchayats exhibited distinct growth patterns influenced by their spatial characteristics and functional roles. Despite its peripheral location, Lalgudi recorded significant household growth during 1991–2001 (22.30%), surpassing that of the Corporation, largely attributed to strong railway connectivity. This was followed by a moderated growth of 13.69% during 2001–2011. In contrast, Thuvakudi exhibited limited household growth during 1991–2001, reflecting its industrial-dominated character. However, a shift towards residential development is evident in 2001–2011, with household growth accelerating to 21.10%.

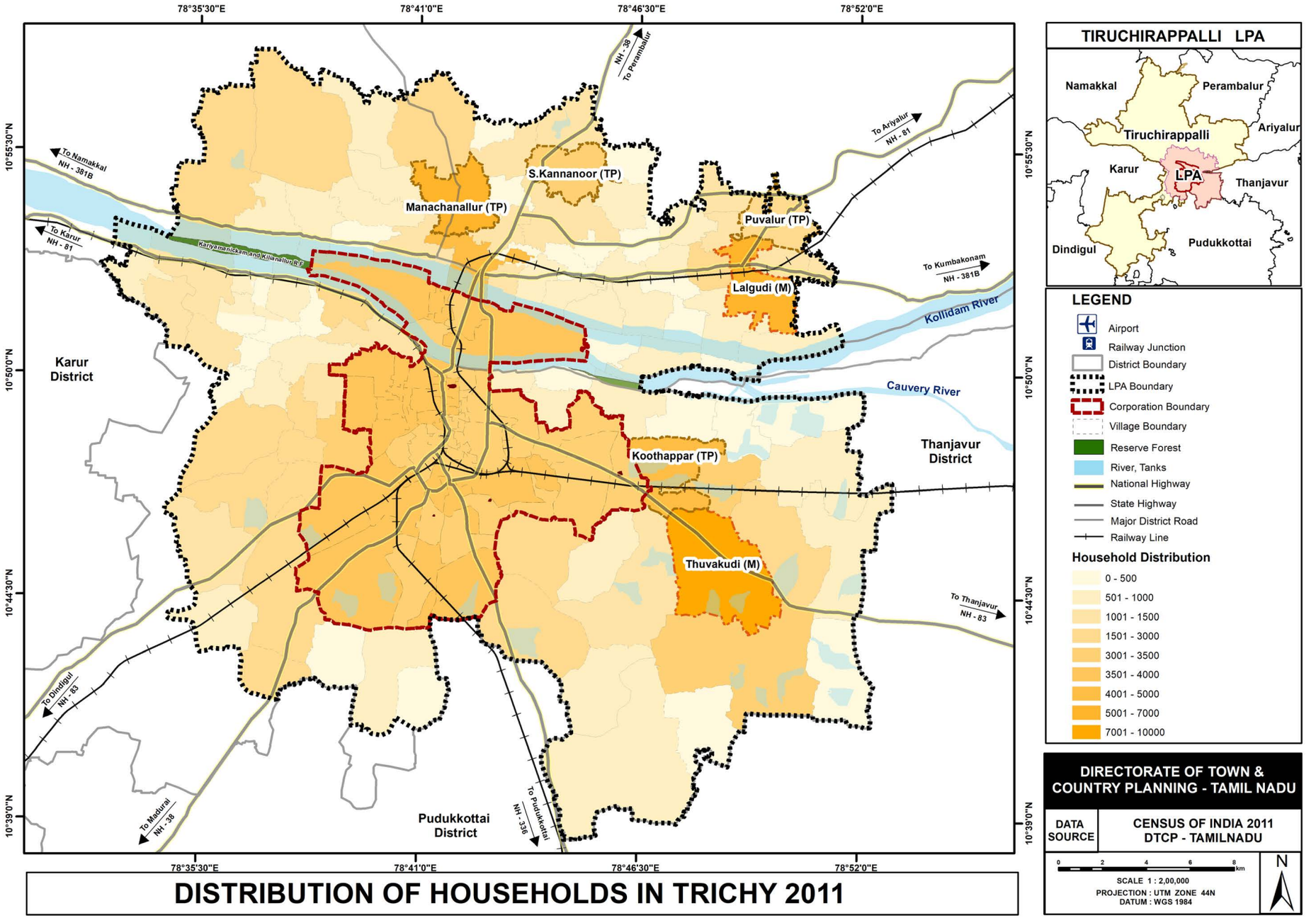
The Town Panchayats of Manachanallur and S. Kannanoor, located along NH-38 towards Perambalur, are witnessing sustained growth with a strong residential character. This pattern is driven by improved regional connectivity through the Nochiam–Manachanallur Road, proximity to emerging employment hubs, and the outward expansion of Tiruchirappalli's urban footprint. Despite their proximity to nearby municipalities, the Town Panchayats of Koothappar and Puvalur experienced a decline in household growth during 2001–2011. However, this trend reversed in the subsequent period, with both Town Panchayats registering a growth in households between 2011 – 2025, likely reflecting spill-over development, improved connectivity, and increasing residential demand from adjoining urban areas.

The village panchayats exhibit a steady increase in both population and number of households, indicating peri-urban growth. This is reflected in the gradual transition and diversification of landuse patterns in areas that were primarily agrarian in character. The spread of housing layouts and local commercial activities further reinforces urban influence in these areas. Overall, peri-urban development is increasingly evident along key transit corridors and growth nodes.

*Table 10.3 Decadal growth of population and households*

| Area | Population | | | Households | | | Decadal Growth of Population | Decadal Growth of Population | Decadal Growth of HHs | Decadal Growth of HHs |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 2001 | 2011 | 1991 | 2001 | 2011 | 1991-2001 | 2001-2011 | 1991-2001 | 2001-2011 |
| Tiruchirappalli Corporation | 7,07,688 | 7,96,644 | 9,15,569 | 1,49,266 | 1,80,917 | 2,31,645 | 12.57% | 14.93% | 21.20% | 28.04% |
| Lalgudi (M) | 19,917 | 23,405 | 23,740 | 4,408 | 5,391 | 6,129 | 17.51% | 1.43% | 22.30% | 13.69% |
| Thuvakudi (M) | 33,241 | 35,428 | 38,887 | 7,762 | 7,764 | 9,402 | 6.58% | 9.76% | 0.03% | 21.10% |
| Municipalities | 53,158 | 58,833 | 62,627 | 12,170 | 13,155 | 15,531 | 10.68% | 6.45% | 8.09% | 18.06% |
| Koothappar (TP) | 16150 | 17,056 | 15,943 | 3,641 | 3,970 | 4,250 | 5.61% | -6.53% | 9.04% | 7.05% |
| Puvalur (TP) | 8,109 | 8,906 | 7,905 | 1,810 | 2,054 | 2,083 | 9.83% | -11.24% | 13.48% | 1.41% |
| Manachanallur (TP) | 18,611 | 21,511 | 25,931 | 4,246 | 5,042 | 6,679 | 15.58% | 20.55% | 18.75% | 32.47% |
| S. Kannanoor (TP) | 7,915 | 11,782 | 13,073 | 1,787 | 2,718 | 3,403 | 48.86% | 10.96% | 52.10% | 25.20% |
| Town Panchayats | 50785 | 59255 | 62852 | 11484 | 13784 | 16,415 | 16.68% | 6.07% | 20.03% | 19.09% |
| Village Panchayats | 286626 | 316760 | 391356 | 64635 | 73481 | 99,293 | 10.51% | 23.55% | 13.69% | 35.13% |
| **Tiruchirappalli LPA** | **10,98,257** | **12,31,492** | **14,32,404** | **2,37,555** | **2,81,337** | **3,62,884** | **12.13%** | **16.31%** | **18.43%** | **28.99%** |

*Source: Census of India 1991, 2001, and 2011*







**LEGEND**

- Airport
- Railway Junction
- District Boundary
- LPA Boundary
- Corporation Boundary
- Village Boundary
- Reserve Forest
- River, Tanks
- National Highway
- State Highway
- Major District Road
- Railway Line

**Household Distribution**

- 0 - 500
- 501 - 1000
- 1001 - 1500
- 1501 - 3000
- 3001 - 3500
- 3501 - 4000
- 4001 - 5000
- 5001 - 7000
- 7001 - 10000

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | CENSUS OF INDIA 2011<br>DTCP - TAMILNADU |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

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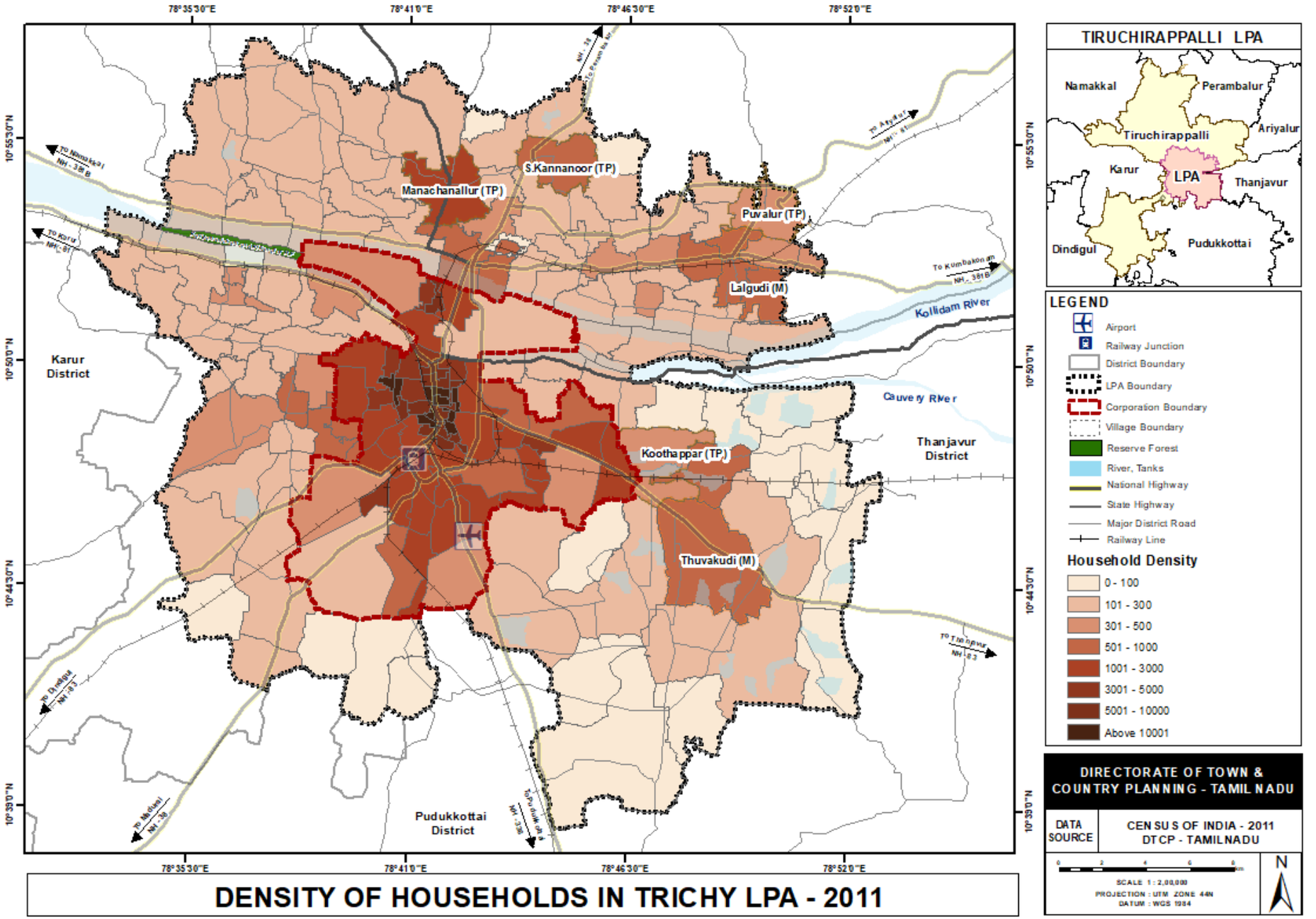
# DISTRIBUTION OF HOUSEHOLDS IN TRICHY 2011

*Map 10.1 Distribution of Households in Tiruchirappalli LPA - 2011*










DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU

| DATA SOURCE | CENSUS OF INDIA - 2011<br>DTCP - TAMILNADU |
|---|---|

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

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# DENSITY OF HOUSEHOLDS IN TRICHY LPA - 2011

*Map 10.2 Density of Households in Tiruchirappalli LPA - 2011*

### 10.2.2 Density of Households

The Tiruchirappalli LPA accounts for only 18.27% of the district's area but contains 52.6% of the district's population, underscoring its role as the district's urban and densely populated region. The average household density in 2011 was 64 HH/ha in the corporation, 30 HH/Ha in the municipalities, 25 HH/Ha in town panchayats, and 13 HH/Ha in the village panchayats, with an average net residential density of 29 HH/ha in the overall LPA. Currently, the net residential density is 80 HH/ha in Tiruchirappalli Corporation, 38 HH/Ha in Municipalities, 31 HH/Ha in Town Panchayats, and 23 HH/ha in Village Panchayats, with an average net residential density of 40 HH/ha in the overall LPA.

*Table 10.4 Household Density in Tiruchirappalli LPA*

| Boundaries | Net residential Area (in sq.km) | Households 2025 | Net HH density 2025 (per ha) |
|---|---|---|---|
| Tiruchirappalli Corporation | 35.96 | 2,87,998 | 80 |
| Lalgudi (M) | 2.17 | 9,129 | 42 |
| Thuvakudi (M) | 3.04 | 10,831 | 36 |
| Municipalities | 5.21 | 19,960 | 38 |
| Koothappar (TP) | 2.99 | 5,644 | 19 |
| Puvalur (TP) | 0.89 | 2,210 | 25 |
| Manachanallur (TP) | 1.89 | 8,436 | 45 |
| S. Kannanoor (TP) | 0.87 | 4,201 | 48 |
| Town Panchayats | 6.64 | 20,491 | 31 |
| Lalgudi | 9.37 | 24981 | 27 |
| Manachanallur | 11.52 | 38749 | 34 |
| Andanallur | 7.7 | 24151 | 31 |
| Manikandam | 18.17 | 42122 | 23 |
| Thiruverumbur | 30.73 | 45453 | 15 |
| Village Panchayats (Blocks) | 77.49 | 1,75,456 | 23 |
| **Tiruchirappalli LPA** | **125.3** | **5,03,905** | **40** |

The household density pattern within the Tiruchirappalli LPA shows a clear contrast between the urban core and peripheral areas. Tiruchirappalli Corporation exhibits the highest net household density (80 households/ha), reflecting the historic urban core, established residential neighbourhoods, driven by employment and services. The corporation area, particularly the old settlement near Rockfort, parts of Woraiyur and the area around Srirangam temple are Continuous Building Areas. Density declines outward toward the LPA boundary, indicating a transition from urban core to lower-density suburban and rural settlement pattern. Surrounding municipalities and town panchayats demonstrate moderate densities, reflecting their transitional role as urban extensions absorbing population spill over from the core city. The presence of the Cauvery and Kollidam rivers has also influenced settlement patterns, with relatively compact habitation along riverine belts while limiting continuous spread in certain stretches.

Directionally, higher-density areas extend prominently along major National Highways and arterial routes, particularly along the NH corridors towards Thiruverumbur (south-east), Lalgudi (east), Manachanallur (north), and Puvalur (north-east), highlighting corridor-led linear urban expansion.

### 10.2.3 Housing conditions

According to the 2011 Census, 71.7% of houses in Tiruchirappalli District were in good condition, 25.0% were deemed livable and 1.8% were classified as dilapidated.

*Table 10.5 Housing conditions in Tiruchirappalli District*

| Housing Conditions | | Good (in %) | Livable (in %) | Dilapidated (in %) |
|---|---|---|---|---|
| Tiruchirappalli District | Urban | 76.6 | 21 | 1.2 |
| | Rural | 66.7 | 29 | 2.4 |
| | Total | 71.7 | 25.0 | 1.8 |

*Source: Census of India 2011*

Within the Tiruchirappalli Local Planning Area (LPA), 73.7% of houses were in good condition, 23.1% were livable, and 2% were in a dilapidated state. In the Tiruchirappalli Corporation, 80.29% of houses were in good condition, while 18.08% were in livable condition and 0.76% were in a dilapidated state. Lalgudi and Thuvakudi Municipalities together recorded an average of 77.05%, 21.2%, and 1.25% in these categories, respectively. Across the four Town Panchayats, 67.1% of houses were in good condition, 27.7% livable, and 3.45% dilapidated. In the 91 Village Panchayats, 70.45% of houses were in good condition, 25.25% were livable, and 2.5% were in a dilapidated state.

*Table 10.6 Housing conditions in Tiruchirappalli LPA*

| Housing Conditions | Good (in %) | Livable (in %) | Dilapidated (in %) |
|---|---|---|---|
| Tiruchirappalli Corporation | 80.29 | 18.08 | 0.76 |
| Lalgudi (M) | 78.3 | 20.2 | 1.1 |
| Thuvakudi (M) | 75.8 | 22.2 | 1.4 |
| Municipalities | 77.05 | 21.2 | 1.25 |
| Koothappar (TP) | 75.25 | 23.7 | 0.4 |
| Puvalur (TP) | 57.8 | 32.7 | 6.8 |
| Manachanallur (TP) | 66.45 | 30.7 | 1.9 |
| S. Kannanoor (TP) | 68.9 | 23.7 | 4.7 |
| Town Panchayats | 67.1 | 27.7 | 3.45 |
| Village Panchayats | 70.45 | 25.25 | 2.5 |
| **Tiruchirappalli LPA** | **73.7** | **23.1** | **2.0** |

*Source: Census of India 2011*

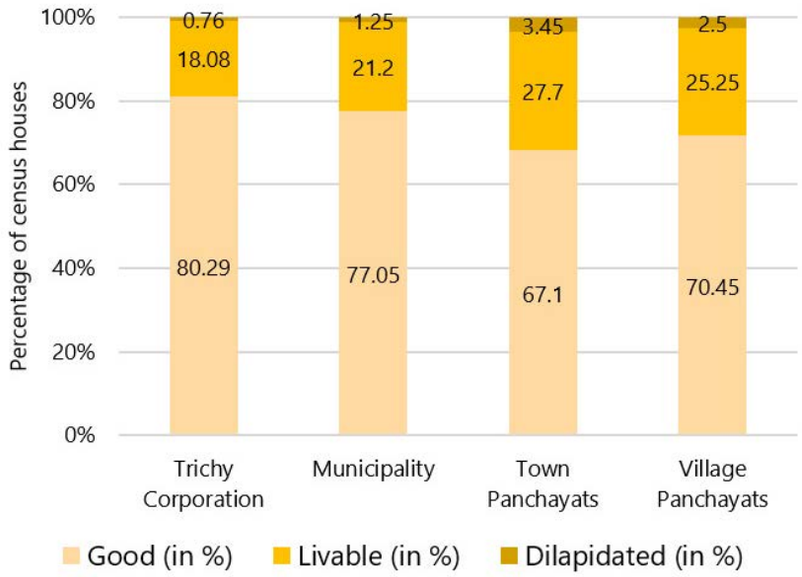



*Figure 10.1 Housing conditions in Tiruchirappalli LPA*

Overall, housing conditions across the LPA were good (73.7%), though town and village panchayats require further improvement. While the overall proportion of dilapidated houses remains low (2.0%), a higher concentration is observed in town panchayats such as Puvalur and S. Kannanoor. Additionally, the influence of the adjacent Lalgudi Municipality, which has emerged as an urban node, has contributed to development pressures and uneven housing conditions within Puvalur.

### 10.2.3.1 Structure of the Census house

As per Census 2011, Tiruchirappalli District accounted for 71.8% of households living in pucca houses, 15.05% in semi-pucca houses, and 12.3% in kutcha houses.

*Table 10.7 Structure of Census houses in Tiruchirappalli District*

| Category | Type | Pucca (in %) | Semi-pucca (in %) | Kutcha (in %) |
|---|---|---|---|---|
| Tiruchirappalli District | Urban | 82.5 | 9.8 | 6.7 |
| | Rural | 61.1 | 20.3 | 17.9 |
| | Total | 71.8 | 15.05 | 12.3 |

*Source: Census of India 2011*

In the Tiruchirappalli LPA, 77.6% of households lived in pucca houses, 10.4% in semi-pucca houses, and 11.2% in kutcha houses. Within the Tiruchirappalli Corporation, 87% of households lived in pucca houses, followed by 7.2% in semi-pucca houses and 4.9% in kutcha houses. Lalgudi and Thuvakudi Municipalities together recorded an average of 82.3% of the housing stock living in pucca houses, 7.15% in semi-pucca houses, and 10.2% in kutcha houses. Across the four Town Panchayats, 73.05% of households lived in pucca houses, 13.97% in semi-pucca houses, and 12.06% in kutcha houses. In the 91 Village Panchayats, 68.19% of households reside in pucca houses, 13.19% in semi-pucca houses, and 17.82% in kutcha houses.

*Table 10.8 Structure of Census houses in Tiruchirappalli LPA*

| Category | Pucca (in %) | Semi-pucca (in %) | Kutcha (in %) |
|---|---|---|---|
| Tiruchirappalli Corporation | 87.0 | 7.2 | 4.9 |
| Lalgudi | 87 | 4.6 | 7.9 |
| Thuvakudi | 77.6 | 9.7 | 12.5 |
| Municipalities | 82.3 | 7.15 | 10.2 |
| Koothappar (TP) | 88.3 | 7.4 | 4.1 |
| Puvalur (TP) | 61.7 | 17.8 | 18.9 |
| Manachanallur (TP) | 71.75 | 17.25 | 10.15 |

| Category | Pucca (in %) | Semi-pucca (in %) | Kutcha (in %) |
|---|---|---|---|
| S. Kannanoor (TP) | 70.5 | 13.5 | 15.1 |
| Town Panchayats | 73.05 | 13.97 | 12.06 |
| Village Panchayats | 68.19 | 13.19 | 17.82 |
| **Tiruchirappalli LPA** | **77.6** | **10.4** | 11.2 |

*Source: Census of India 2011*

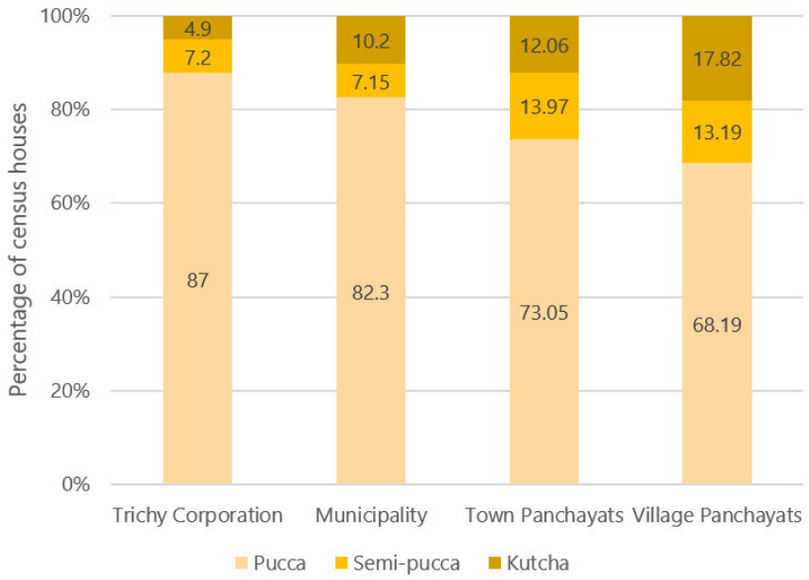



*Figure 10.2 Structure of Census houses in Tiruchirappalli LPA*

The data indicate that housing in Tiruchirappalli LPA was predominantly pucca (77.6%), indicating good quality overall. However, Puvalur and Manachanallur show higher shares of semi-pucca and kutcha houses, while Village Panchayats record the highest proportion of kutcha housing (17.82%), reflecting an evident urban–rural disparity in housing conditions.

### 10.2.3.2 Dwelling rooms per household

According to the 2011 Census, Tiruchirappalli District accounted for 44.5% of households residing in one-room dwelling units, 27% in two-room units, 11.75% in three-room units, 4.05% in four-room units, 1.15% in five-room units, and 0.75% in six-room units. About 10.8% of households had no exclusive room. This distribution indicates a wide range of dwelling room arrangements at the district level, with one-room and two-room units together accounting for over 70% of the total housing stock.

*Table 10.9 Residential dwelling rooms in Tiruchirappalli District*

| Category | Type | No Exclusive rooms (in %) | One room (in %) | Two rooms (in %) | Three rooms (in %) | More than three rooms (in %) |
|---|---|---|---|---|---|---|
| Tiruchirappalli District | Urban | 7.5 | 40.5 | 29.4 | 15.2 | 5 |
| | Rural | 14.1 | 48.5 | 24.6 | 8.3 | 3.1 |
| | Total | 10.8 | 44.5 | 27.0 | 11.75 | 5.95 |

*Source: Census of India 2011*

In the Tiruchirappalli Local Planning Area (LPA), the overall room distribution shows that 42.6% of households were in one-room units, 25.3% in two-room units, 13.5% in three-room units, 4.2% in four-room units, 1.51% in five-room units, and 3.2% in six-room units. There were 12.4% households with no exclusive room. One-room and two-room units together constitute over 67% of the total stock.

*Table 10.10 Residential dwelling rooms in Tiruchirappalli LPA*

| Category | No Exclusive rooms (in %) | One room (in %) | Two rooms (in %) | Three rooms (in %) | More than three rooms (in %) |
|---|---|---|---|---|---|
| Tiruchirappalli Corporation | 7.1 | 41.2 | 29.3 | 15 | 7.4 |
| Lalgudi | 19.0 | 45.0 | 23.2 | 8.3 | 4.7 |
| Thuvakudi | 1.9 | 40.4 | 26.1 | 24.6 | 7.1 |
| Municipalities | 10.4 | 42.7 | 24.6 | 16.4 | 5.9 |
| Koothappar (TP) | 4.0 | 28.0 | 34.9 | 23.2 | 10.0 |
| Puvalur (TP) | 14.8 | 44.5 | 23.0 | 11.0 | 6.7 |
| Manachanallur (TP) | 12.9 | 49.4 | 23.7 | 10.1 | 4.1 |
| S.Kannanoor (TP) | 16.5 | 42.8 | 24.2 | 10.3 | 6.2 |
| Town Panchayats | 12.0 | 41.1 | 26.4 | 13.6 | 6.7 |
| Village Panchayats | 20.29 | 45.4 | 20.9 | 8.9 | 4.4 |
| **Tiruchirappalli LPA** | **12.4** | **42.6** | **25.3** | **13.5** | **8.5** |

*Source: Census of India 2011*

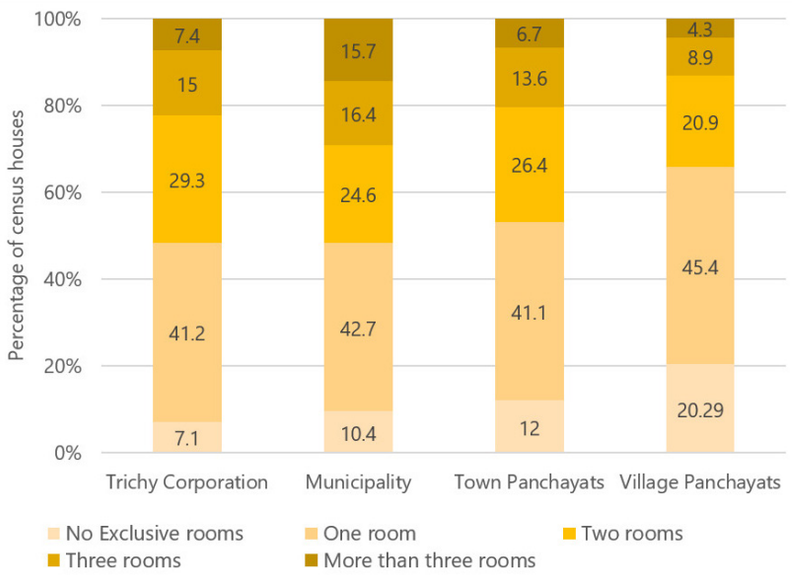



*Figure 10.3 Residential dwelling rooms in Tiruchirappalli LPA*

The distribution of residential dwelling rooms in the Tiruchirappalli LPA shows a predominance of one-room and two-room houses across local bodies, indicating a compact living pattern. The proportion of houses with no exclusive rooms, considered an indicator of housing congestion, accounts for 12.4% at the LPA level, with relatively higher shares in Village Panchayats (20.29%) and Town Panchayats (12.0%). Further, the distribution of dwelling rooms broadly reflects the underlying income characteristics of households. No exclusive and single-room dwellings are generally associated with EWS and sections of LIG, reflecting space constraints and congestion. Two-room units largely correspond to LIG and MIG, indicating relatively stable yet compact living conditions, while three-room and larger dwellings, more prevalent in the Tiruchirappalli Corporation and Municipal areas, are indicative of MIG and HIG households with better housing affordability and living standards. Overall, the housing conditions speak volumes about the socio-economic standing and living conditions of households.

### 10.2.3.3 Tenure Pattern

According to the Census definition, a household is considered to be living in an 'owned' house if a dwelling is occupied without paying any rent. A household that pays rent, either in cash or in kind, for the accommodation it resides in, including units provided by an employer, such as government quarters, is classified as living in a 'rented' house. The 'others' category includes households that do not fall under either the owned or rented classifications.

As per the Census 2011, Tiruchirappalli District recorded 70.9 % of households living in owned houses, 27.3 % living in rented houses, and 1.8 % under the 'others' category.

*Table 10.11 Tenure pattern of housing in Tiruchirappalli District*

| Category | Type | Owned (in %) | Rented (in %) | Others (in %) |
|---|---|---|---|---|
| Tiruchirappalli District | Urban | 51.6 | 46.4 | 2 |
| | Rural | 90.2 | 8.2 | 1.6 |
| | Total | 70.9 | 27.3 | 1.8 |

*Source: Census of India 2011*

In the Tiruchirappalli LPA, 63.9% of households lived in owned houses, 34.1% in rented houses, and 2.0% in the 'others' category. Tiruchirappalli LPA has a higher and consistent demand for rental housing when compared to the district rental value, largely driven by the concentration of employment activities.

*Table 10.12 Tenure pattern of housing in Tiruchirappalli LPA*

| Category | Owned (in %) | Rented (in %) | Others (in %) |
|---|---|---|---|
| Tiruchirappalli Corporation | 56.0 | 42.1 | 1.8 |
| Lalgudi | 55.5 | 40.5 | 4.0 |
| Thuvakudi | 40.3 | 59.3 | 0.4 |
| Municipalities | 47.9 | 49.9 | 2.2 |
| Koothappar (TP) | 46.6 | 52.5 | 1.0 |
| Puvalur (TP) | 79.9 | 17.3 | 2.9 |
| Manachanallur (TP) | 77.3 | 21.9 | 0.9 |
| S. Kannanoor (TP) | 60.8 | 37.1 | 2.1 |
| Town Panchayats | 66.15 | 32.17 | 1.7 |
| Village Panchayats | 85.73 | 12.03 | 2.25 |
| **Tiruchirappalli LPA** | **63.9** | **34.1** | **2.0** |

*Source: Census of India 2011*

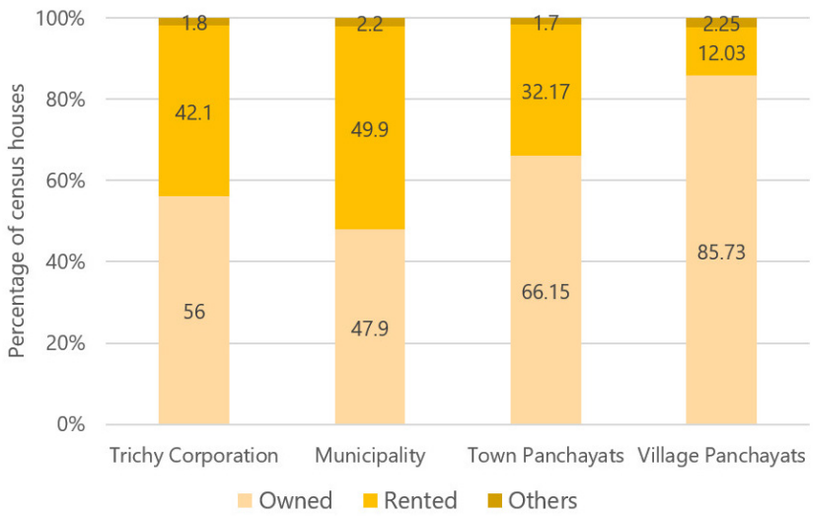



*Figure 10.4 Tenure pattern of housing in Tiruchirappalli LPA*

Overall, the LPA indicates that rural households largely reside in self-owned dwellings, while urban areas exhibit a greater reliance on rental housing, shaped by higher demand, population mobility, and constraints on home ownership.

Typically, rental housing is more concentrated within the corporation and gradually declines towards peri-urban areas. However, in the Tiruchirappalli LPA, the Municipalities of Thuvakudi and the Koothappar Town Panchayat exhibit a comparatively high reliance on rental housing, accounting for 59.3% and 52.5% respectively. This pattern is likely influenced by their proximity to the urban core and their industrial character, which drives demand for rental accommodation. Village Panchayats record the highest ownership levels (85.73%) and the lowest rental share (12.03%), reflecting traditional settlement patterns, lower mobility, and inherited housing.

The rental housing in LPA accounts for nearly 34%, driven largely by its economic activity, connectivity, educational activity, and spiritual tourism. Core city areas and well-established neighbourhoods such as the Tiruchirappalli Core, Cantonment, Srirangam, Woraiyur, and Raja Colony command higher rents across all BHK categories, reflecting better accessibility, infrastructure, and proximity to employment and commercial centres. In contrast, peripheral areas and the rest of the LPA areas, such as Navalpattu, Palanganagudi, Samayapuram, and Thuvakudi, exhibit comparatively lower rental values, especially for one and two-BHK units, indicating affordability-driven demand.

*Table 10.13 Rental housing demand and supply*

| Supply typology | Average rent (in Rs.) | Areas with high demand | Inference |
|---|---|---|---|
| One BHK | 5000 – 9000 | Ammappappa Nagar, Kallukuzhi, Thuvakudi, Samayapuram, Srirangam (select pockets) | High demand from the student community, migrant workers, small households, and lower-income groups. These areas offer affordable rents and proximity to industries, educational institutions, and peripheral employment zones. |
| Two BHK | 8000 – 15000 | KK Nagar, K.K. Nagar, Thillai Nagar, Kothur, Woraiyur, Srirangam | Preferred by small families and salaried middle-income households. Demand is driven by better access to schools, hospitals, public transport, and proximity to the city core and employment hubs. |
| Three BHK | 12000 – 25000 (extends up to Rs.40,000 in prime areas) | Thillai Nagar, Cantonment, Woraiyur, Raja Colony, Tiruchirappalli Core | High demand from upper-middle and higher-income households. These areas have superior infrastructure, central location, social amenities, and better living environments, making them attractive for larger families and professionals. |

*Source: CREDAI, Primary and secondary data*

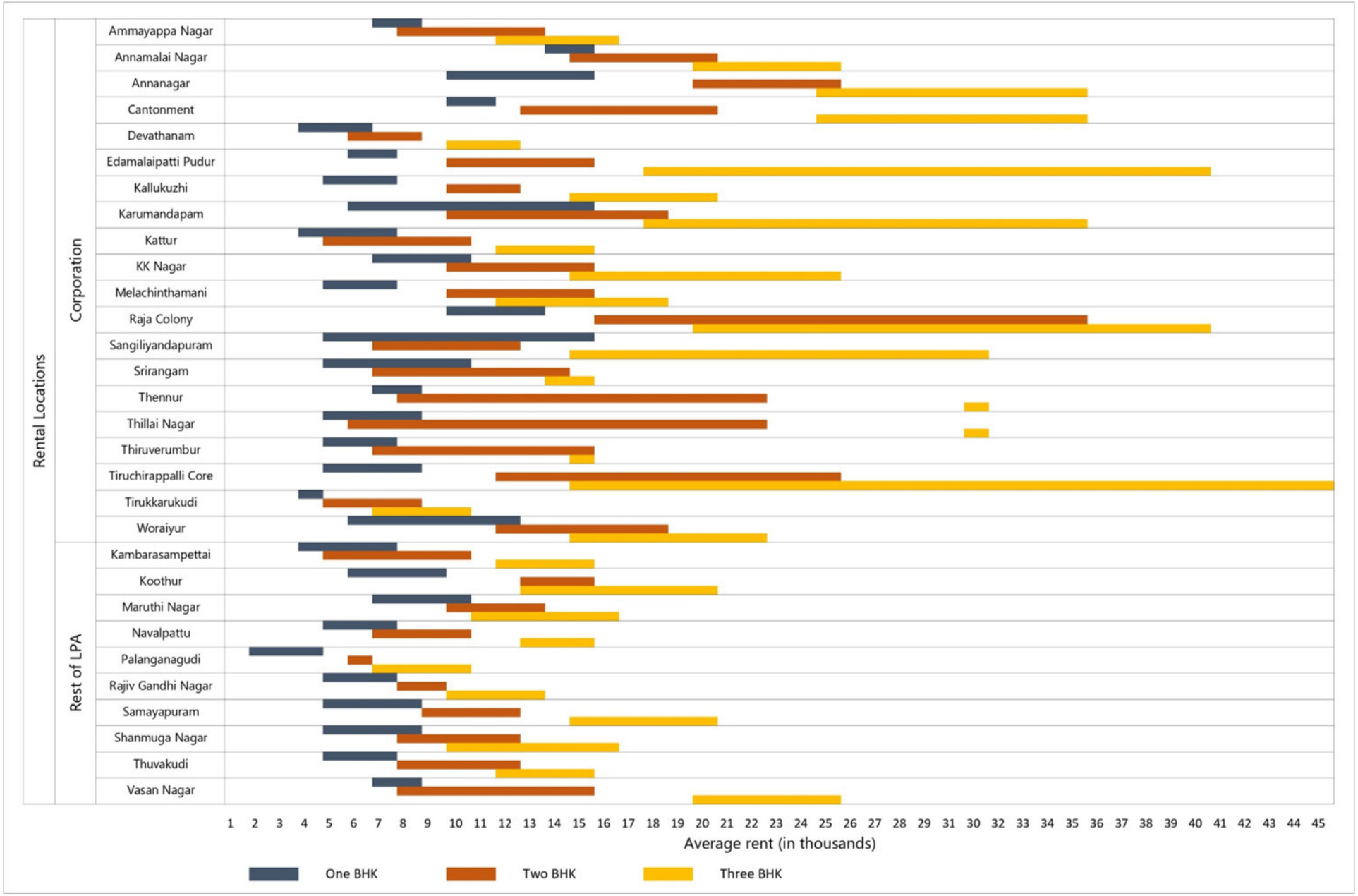
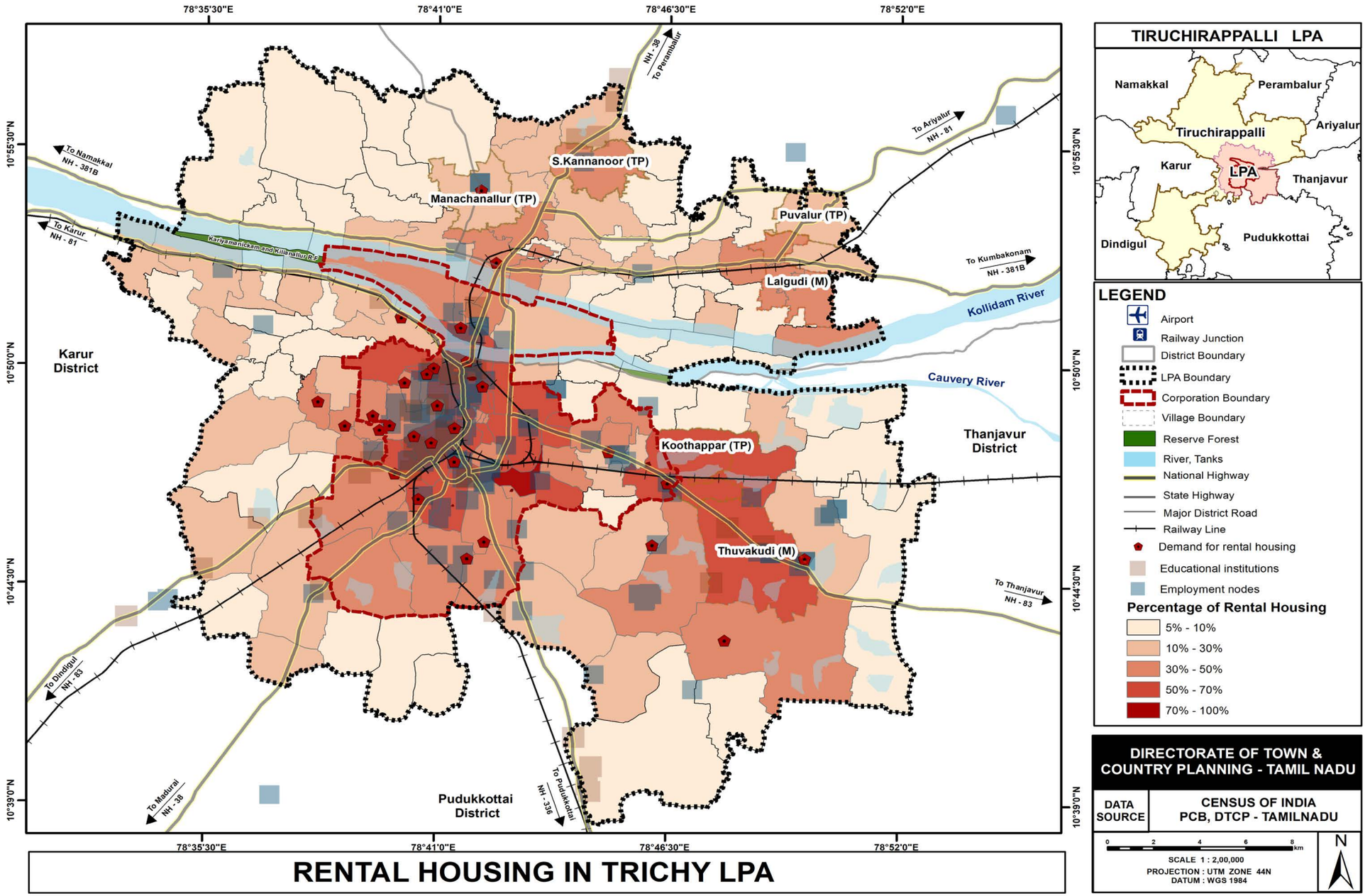



*Figure 10.5 Prominent locations and average cost of rental housing in Tiruchirappalli LPA*




*Map 10.3 Intensity and Demand for Rental Housing in Tiruchirappalli LPA*

### 10.2.4 Student Housing

Tiruchirappalli district serves as an important educational hub, featuring a diverse range of colleges in arts, science, engineering, medicine, and polytechnics. Within the Tiruchirappalli LPA, residential development patterns are strongly influenced by the presence of educational institutions, leading to a higher demand for rental housing driven by the student community. Map 10.4 indicates the location of Government-supported hostels outside the institution campus, which include 7 facilities under the Adi Dravidar and Tribal Welfare Department and 14 facilities under the Backward Classes and Minorities Welfare Department. Most facilities are clustered near educational institutions and along key transport corridors, particularly in the corporation and Thuvakudi belt of the LPA, indicating the influence of accessibility and proximity to colleges.

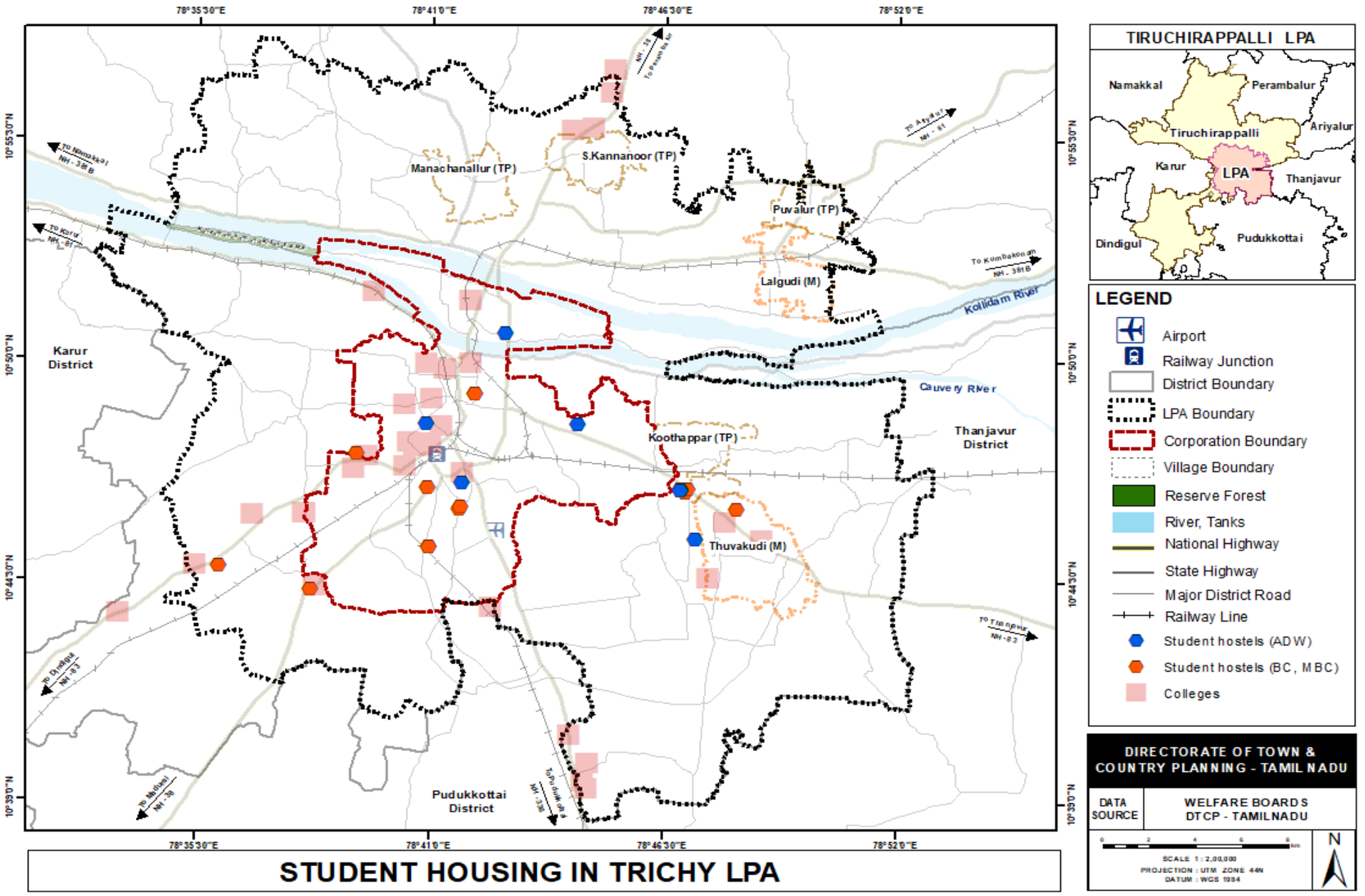
As the Tiruchirappalli LPA continues to emerge as a major educational hub with a growing student population, the demand for additional student housing is expected to increase significantly. Despite the availability of on-campus hostel facilities, high hostel fees often make them less affordable, resulting in students opting for comparatively economical off-campus accommodation.

In particular, focused development of student accommodation is required along NH-38 (towards Perambalur) in areas of S.Kannanoor, Samayapuram, and NH-336 (towards Pudukkottai), in Kumbakudi, where expanding institutional activity and strong regional connectivity are evident.

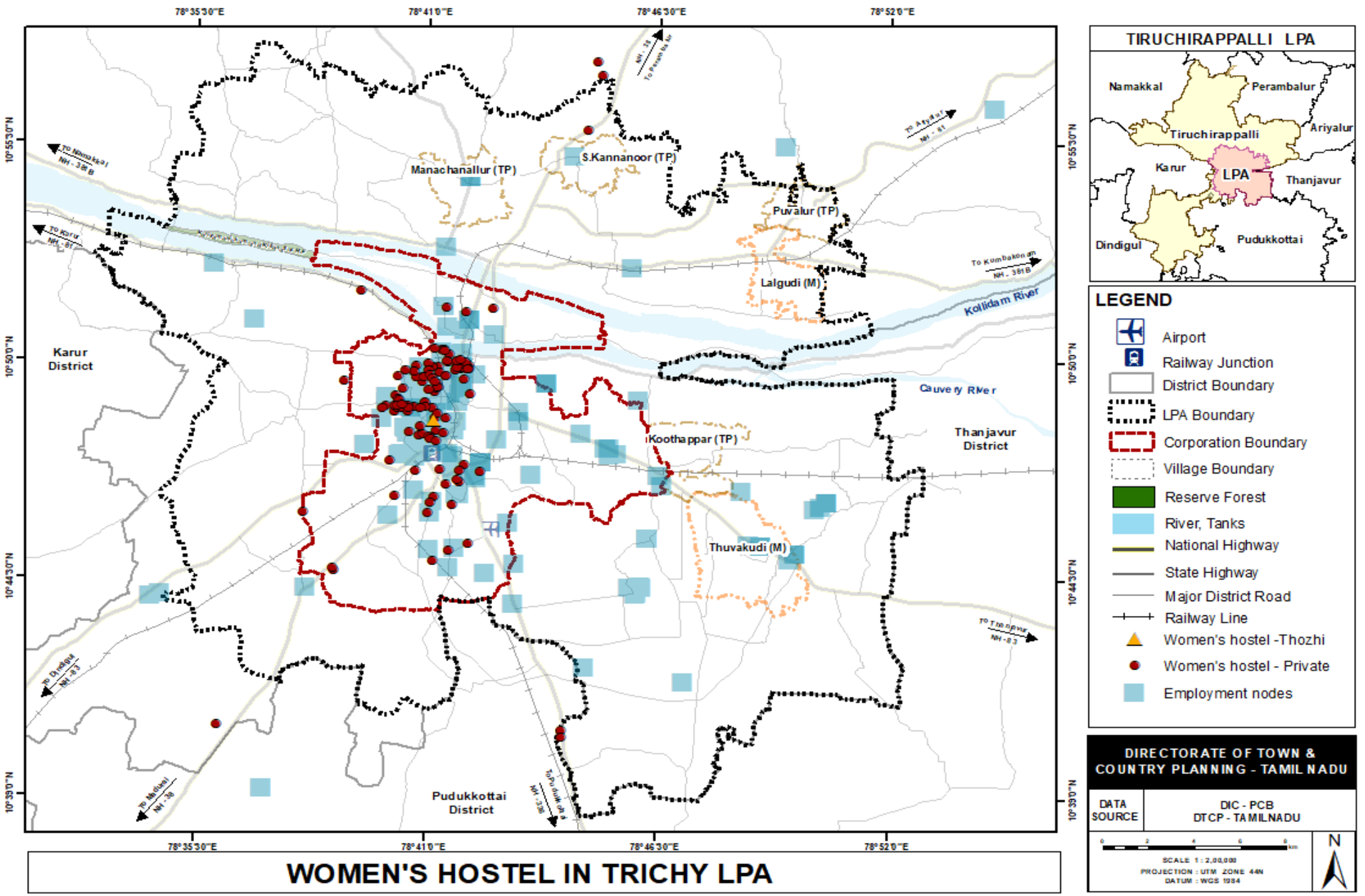
### 10.2.5 Women's Hostel

A spatial assessment of women's hostels within the Tiruchirappalli LPA reveals a high concentration within the core areas of the corporation as in Map 10.5. These facilities in the core areas are predominantly operated by the private sector. Although women's hostels are available in the core areas of Tiruchirappalli, they are often not conveniently located near major workplaces in the peri-urban areas.

The Tamil Nadu Working Women Hostels Corporation Limited (TNWWHCL), under the Social Welfare and Women Empowerment Department, has established a Thozhi working women's hostel at Bheema Nagar to provide safe, affordable, and well-equipped accommodation. The facility comprises 32 rooms with a total capacity of 106 residents. Owing to its affordability, enhanced security, and availability of essential amenities, the demand for such organised working women's hostels remains high in the Tiruchirappalli LPA. With increasing female workforce participation and the city's growing role in the service sector, there is a clear need for additional Thozhi-type hostels to meet present and future demand adequately.




*Map 10.4 Existing Student Housing in Tiruchirappalli LPA*




*Map 10.5 Women's Hostel in Tiruchirappalli LPA*

## 10.3 Informal housing

According to the 2011 Census, a substantial share of the housing stock in the Tiruchirappalli LPA was classified as in 'good' condition. However, some areas require attention, particularly informal settlements, where rapid urbanisation has led to an increase in slum households and growing urban homelessness. Addressing informal housing is significant for achieving inclusive urban development.

### 10.3.1 Slums

As per the First Master Plan of Tiruchirappalli (Survey of slums in Tiruchirappalli urban agglomeration – 1989), there were 155 slums with an estimated population of 77,610, comprising about 15,222 households accommodated in 10,553 shelters, of which nearly 70% were located on government land. Spatially, more than 85% of the slums were scattered, while linear slums along major roads accounted for around 10%. To address encroachments by EWS households along wide arterial roads within the city limits, a focused resettlement approach was proposed.

Accordingly, land was earmarked in Kallikudi South village along the Madurai Road, and this proposal was subsequently implemented through housing developments at Nagamangalam, JJ Nagar. Further, 4510 households in tenable slums were developed as 42 schemes under the Tamil Nadu Urban Development Project between 1989 - 1996. Subsequently, tenements constructed under the Slum Clearance Scheme, Cash Loan Scheme, Nehru Rojgar Yojana, Vambay Houses and Fire Proof Houses provided housing to 8,863 households. Additionally, through the Integrated Housing and Slum Development Programme (IHSDP), which focuses on upgrading or relocating slum settlements providing basic infrastructure, 36 slum locations were developed, benefiting 1,128 households. Collectively, these interventions addressed the housing needs of 14,501 slum households between 1989 - 2007.

Later, as part of efforts to promote slum-free cities, the Rajiv Awas Yojna (RAY) advocated a twofold strategy - (i) a Curative Strategy, a plan to improve existing slums through the participation of slum dwellers, and (ii) a Preventive Strategy to prevent the formation of future slums. As part of the Slum Free City Plan of Action (SFCPoA), a total of 264 slums were identified across the four administrative zones (now reorganized into five zones) of the Tiruchirappalli Municipal Corporation, housing a population of about 1,16,538 across 29,015 households. Among the 264 slums, 143 are notified slums and 121 are non-notified slums.

These slums were further classified based on settlement conditions and suitability for in-situ improvement. Of these, 155 were identified as tenable slums (non-objectionable) and 109 as untenable slums (objectionable). Out of 264 slums, 22 slums required infrastructure upgradation and 122 slums needed in-situ housing and infrastructure upgradation. The 109 untenable slums are located in environmentally and physically hazardous zones, such as railway lines, riverbeds, drains, nallahs, and waterbody beds.

*Table 10.14 Composition of Slums in Tiruchirappalli Corporation*

| Zone | Tenable | | Untenable | |
|---|---|---|---|---|
| | Slums | Households | Slums | Households |
| Srirangam | 26 | 4186 | 39 | 3634 |
| Ariyamangalam | 49 | 5690 | 31 | 3051 |
| Ponmalai | 42 | 5601 | 17 | 1453 |
| Ko. Abishekapuram | 38 | 2853 | 22 | 2547 |
| Total | 155 | 18330 | 109 | 10685 |

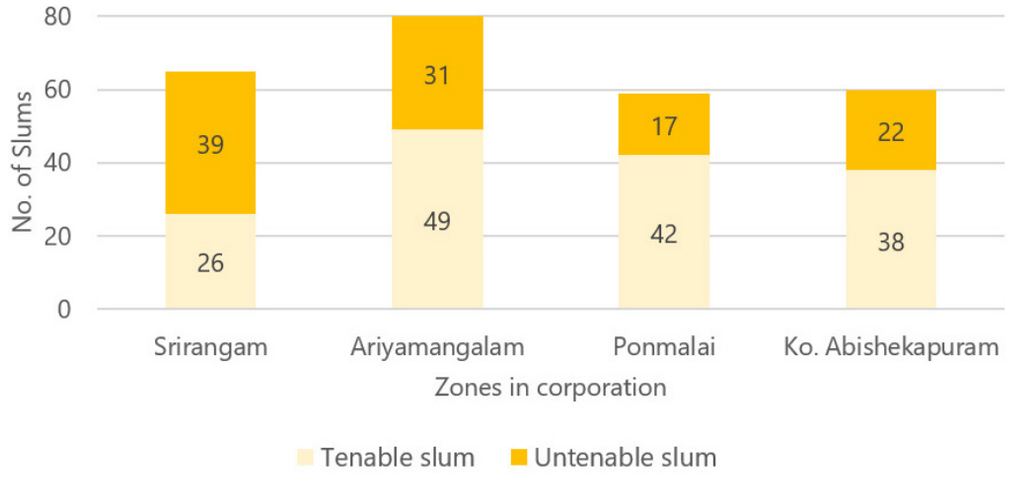



*Figure 10.6 Composition of slums in Tiruchirappalli Corporation*

*Source: SFCPoA, RAY*

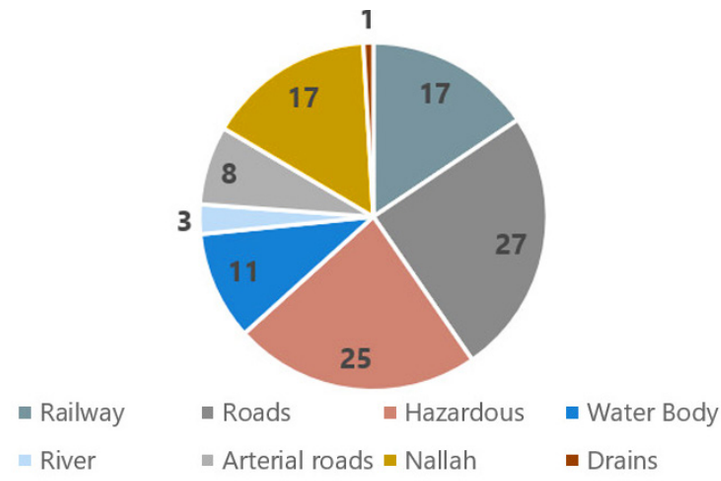


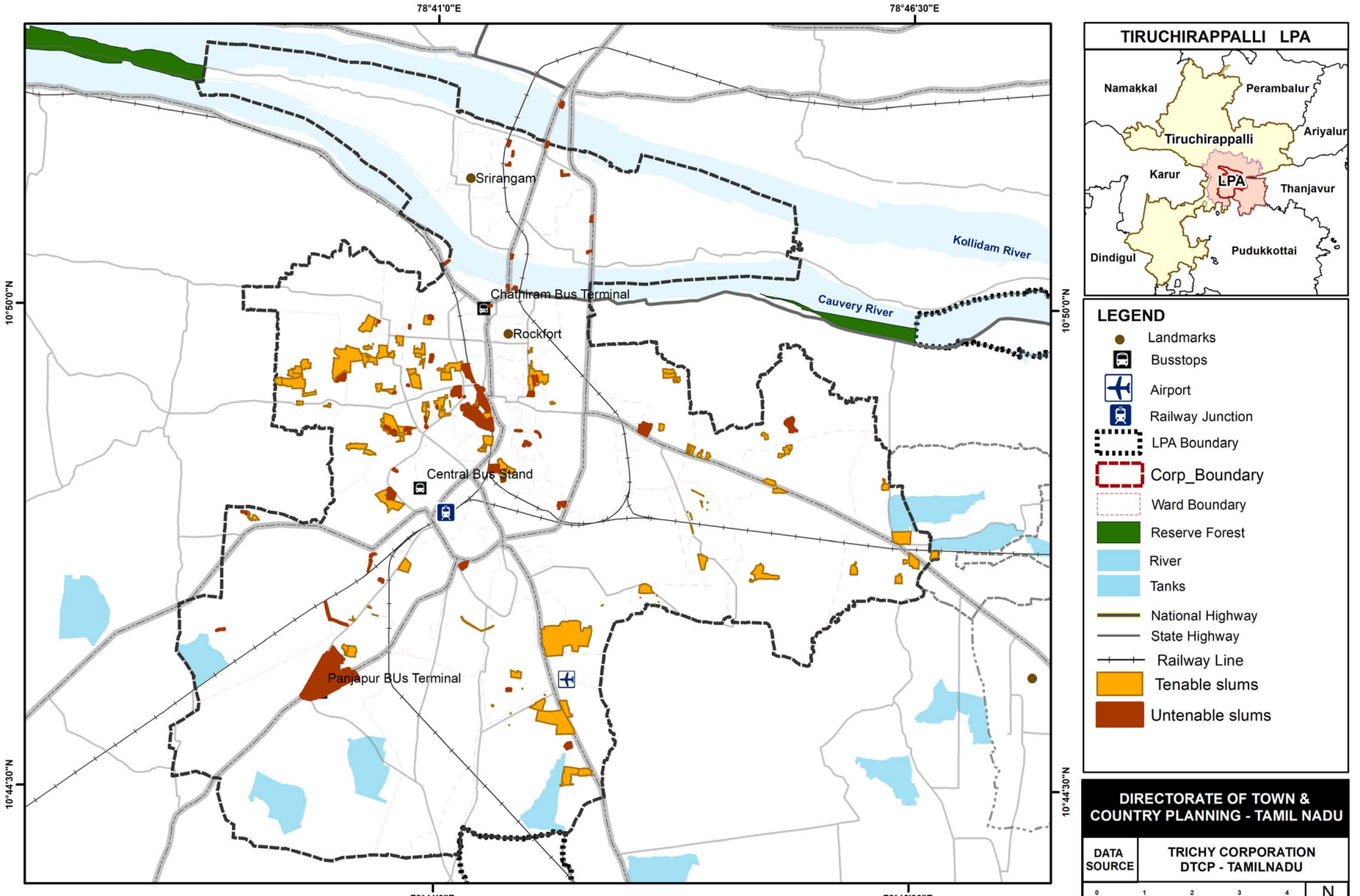

*Figure 10.7 Distribution of untenable slums*

The spatial distribution of notified slums in Tiruchirappalli Corporation indicates a noticeable concentration within the city's older settlement areas, particularly in the core urban zones and along major transport corridors.

Over time, most of the tenable slums have been developed, with in-situ tenements and plotted developments implemented by TNUHDB. Further, some of the untenable slums near Panjapur new bus terminal and core areas near Rockfort have been rehabilitated. However, the untenable slums located along rivers, waterbodies and low-lying areas persist and are highly vulnerable to flooding and substandard living conditions.

The survey indicates that the livelihoods of slum dwellers are predominantly self-employment-based, followed by regular wage employment and casual labour. The untenable slums developed in proximity to temple precincts, where dwellers have established small petty shops to cater to local activity. The slum population is primarily engaged in construction-related work, support and service roles in the nearby government hospital. It also includes a smaller proportion of households belonging to the weaving community, attributable to its proximity to Woraiyur. Specific location-based occupations are also observed, with some dwellers in Alagiripuram of the Srirangam zone engaged in manual washing of clothes, while households along the Cauvery riverbank are involved in brick-making activities.

As part of this effort (SFCPoA 2013-2022), the role of various institutions, of which a primary role is attributed to the Tamil Nadu Urban Habitat Development Board (TNUHDB). Subsequently, tenements were constructed under the components of the 12th Finance Commission Project, the 13th Finance Commission Project, and predominantly through Pradhan Mantri Awas Yojana – Housing for All (Affordable Housing in Partnership). Collectively, these provided tenements to 4165 households in Tiruchirappalli between 2014 and 2024. Considering all housing provisions made so far, an estimated 25,571 slum households continue to require housing intervention.




# TENABILITY OF NOTIFIED SLUMS IN TIRUCHIRAPPALLI CORPORATION

*Map 10.6 Tenability status of notified slums in Tiruchirappalli corporation*

### 10.3.2 Homeless Population

According to the 2011 Census, Tiruchirappalli District recorded 645 houseless families. The Census defines houseless families as those without any fixed shelter and residing in open or locations such as pavements, streets, railway platforms, temple mandapams, parks, bus terminals, or temporary structures. Given that approximately 50% of the district's population is located within the Tiruchirappalli LPA, about 322 families did not have houses within the LPA boundary. This population remains less visible due to the transient and informal nature of their living conditions.

#### 10.3.2.1 Night Shelters

It is essential to provide night shelters to ensure that everyone has access to safe, dignified shelter. Several homeless individuals were found seeking temporary shelter along roadsides, beneath bridges, and on road medians, particularly near the Srirangam check post, exposed to the vagaries of the weather. According to TNULM, 6 night shelters are functioning in Tiruchirappalli under the Scheme of Shelter for Urban Homeless (SUH) of the National Urban Livelihoods Mission (NULM). The civic body has constructed these night shelters for homeless people in good mental and physical health, especially elders, at three locations, including Bharathiar Road near the railway junction, E B Road, and Madurai Road near the holy cross college, to accommodate 50 homeless people each. Given prevailing adverse weather conditions, the civic body has permitted the homeless to stay during the day as well. The shelter on E.B. Road is dedicated to women, and the one near Railway Junction is for men. The one on Madurai Road is occupied by scroungers.

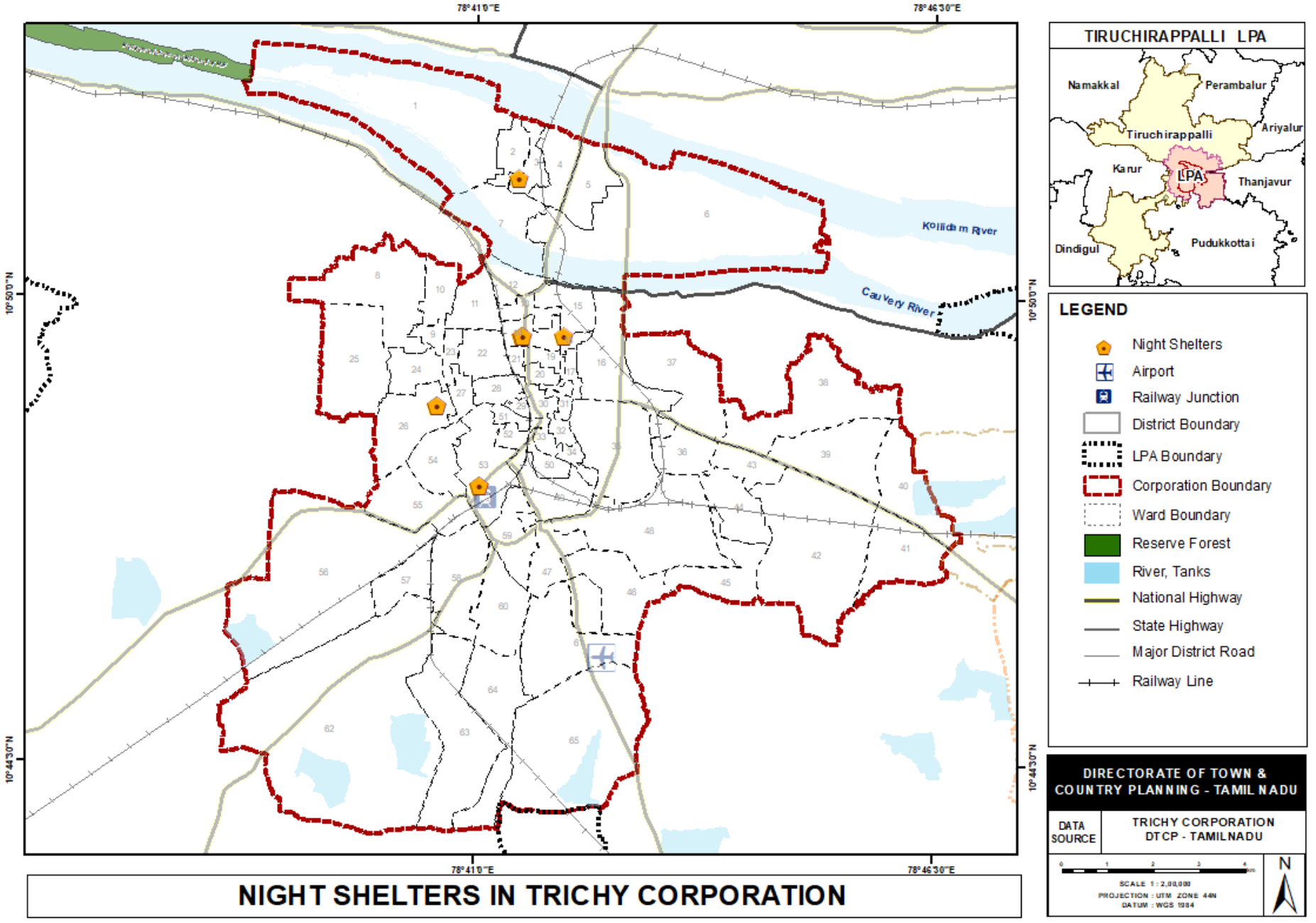
*Table 10.15 Functional night shelters in Tiruchirappalli Corporation*

| Zone | Ward | No. of shelters |
|---|---|---|
| 2 | 18 | 1 |
| 4 | 53 | 1 |
| 1 | 3 | 2 |
| | 14 | |
| 5 | 26 | 2 |

*Source: Tiruchirappalli Corporation*

New shelters are proposed at Thiruverumbur, Woraiyur, and Srirangam with all amenities, including dining hall, kitchen, dormitory, sanitary complex, and meditation hall.

The NULM guidelines recommend one community shelter for every 1 lakh urban population, with a capacity of 100 and depending on local conditions, shelters may range from 50 to 100 persons. Based on population estimates, there is currently a requirement for six additional night shelters. The total need is projected to increase to 15 night shelters by 2035 and further to 17 night shelters by 2045, to adequately cater to the urban homeless population.




*Map 10.7 Night Shelters in Tiruchirappalli Corporation*

## 10.4 Supply of Housing

The supply of housing can be broadly categorized into the private and public sectors, each playing a distinct role in meeting the city's residential demand.

### 10.4.1 Public sector

Public housing projects that prioritise the provision of safe and affordable housing for all residents are being formulated and implemented primarily through Tamil Nadu Housing and Urban Development Board (TNUHDB) and Tamil Nadu Housing Board (TNHB). Further, government-operated transient accommodations cater primarily to pilgrims, ensuring affordable and accessible lodging within key tourism areas.

#### 10.4.1.1 Tamil Nadu Urban Habitat Development Board (TNUHDB)

The Tamil Nadu Urban Habitat Development Board (TNUHDB), with its focus on housing for the weaker sections, provides housing through the construction of tenements, grants, and slum rehabilitation. The TNUHDB has implemented several slum rehabilitation schemes and housing for EWS through various central and state-supported schemes, including components under the 12th and 13th Finance Commissions, Nehru Rojgar Yojana, Fire Proof Houses, Vambay Houses, Clearance Scheme, Rajiv Awas Yojana, and PMAY–HFA (AHP) over different time periods. Cumulatively, these initiatives have resulted in the implementation of 13,028 tenements.

*Table 10.16 Schemes implemented - TNUHDB*

| Schemes | No. of schemes | No. of tenements |
|---|---|---|
| 12th Finance Commission | 1 | 90 |
| 13th Finance Commission | 2 | 720 |
| Cash Loan Scheme | 1 | 1782 |
| Nehru Rojgar Yojana | 1 | 2133 |
| Fireproof Houses | 1 | 3000 |
| Vambay Houses | 2 | 566 |
| Clearance Scheme | 5 | 1382 |
| PMAY HFA AHP | 5 | 2366 |
| Rajiv Awas Yojana | 1 | 144 |
| Reconstruction Programme | 2 | 845 |

*Source: TNUHDB*

Further, the Tamil Nadu Urban Development Programme (TNUDP) was an urban sector reform initiative implemented by the Government of Tamil Nadu to improve urban infrastructure, service delivery, and living conditions of the urban poor, particularly in slum areas. The programme was implemented in multiple phases (TNUDP I, II, III) from the late 1980s onwards. Under this scheme, 4,510 slum households in 42 schemes were developed through the Tamil Nadu Urban Development Programme (TNUDP). Additionally, through the Integrated Housing and Slum Development Programme (IHSDP), which focuses on upgrading or relocating slum settlements along with basic infrastructure provision, 36 slum locations were developed, benefiting 1,128 households. Collectively, these interventions have resulted in the provision of improved housing for 18,666 households.

In addition, ageing tenements developed under earlier schemes are taken up for reconstruction under the Reconstruction Programme and the Announcement projects for 2024–25. Accordingly, 160 tenements are currently in the pipeline to augment housing provision.

*Table 10.17 Ongoing and Proposed Schemes - TNUHDB*

| Schemes | No. of schemes | No. of tenements |
|---|---|---|
| PMAY HFA AHP | 1 | 64 |
| Announcement project for 2024–25 | 1 | 96 |

*Source: TNUHDB*

#### 10.4.1.2 Tamil Nadu Housing Board (TNHB)

The Tamil Nadu Housing Board (TNHB) has provided housing through various schemes structured in accordance with land availability, funding mechanisms, and housing demand. The schemes include Area Development Schemes (ADS), Small-Medium Town (SMT), Neighbourhood Scheme (NHS), Self-Finance Schemes, hire purchase, Outright purchase, and Site and Services Scheme (S&S), targeting various income groups ranging from Economically Weaker Sections (EWS) to High-Income Groups (HIG), reflecting a mix of ownership and financing models. Additionally, there is the Tamil Nadu Government Rental Housing Scheme to provide rental accommodation to the Government of Tamil Nadu employees. Collectively, these interventions have resulted in the completion of 14,069 units.

*Table 10.18 Schemes implemented - TNHB*

| Schemes | No. of schemes | No. of units |
|---|---|---|
| Area Development Scheme | 4 | 2762 |
| Hire Purchase | 2 | 324 |
| Outright purchase | 1 | 56 |
| Self-Finance Scheme | 2 | 108 |
| Site and service scheme | 2 | 7872 |
| Neighbourhood Scheme | 1 | 2093 |
| TNGRHS | 2 | 854 |

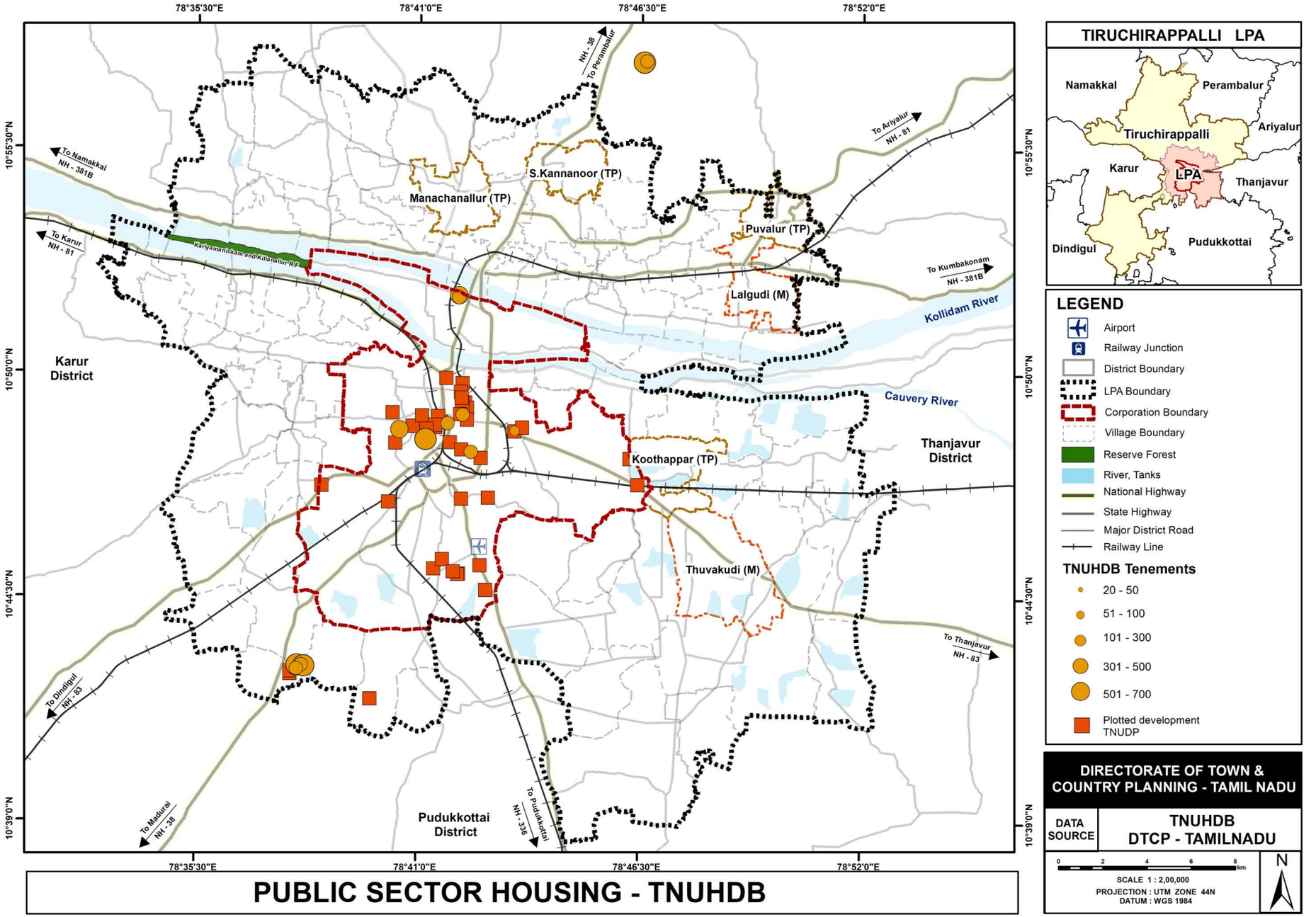
*Source: TNHB*

In addition to these completed projects, TNHB has two proposed TNGRHS schemes that are expected to add 928 rental units for Government employees in Tiruchirappalli LPA.

*Table 10.19 Proposed Schemes - TNHB*

| Schemes | No. of schemes | No. of tenements |
|---|---|---|
| TNGRHS | 2 | 928 |

*Source: TNHB*







**LEGEND**

- Airport
- Railway Junction
- District Boundary
- LPA Boundary
- Corporation Boundary
- Village Boundary
- Reserve Forest
- River, Tanks
- National Highway
- State Highway
- Major District Road
- Railway Line

**TNUHDB Tenements**

- 20 - 50
- 51 - 100
- 101 - 300
- 301 - 500
- 501 - 700
- Plotted development TNUDP

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | TNUHDB DTCP - TAMILNADU |
|---|---|

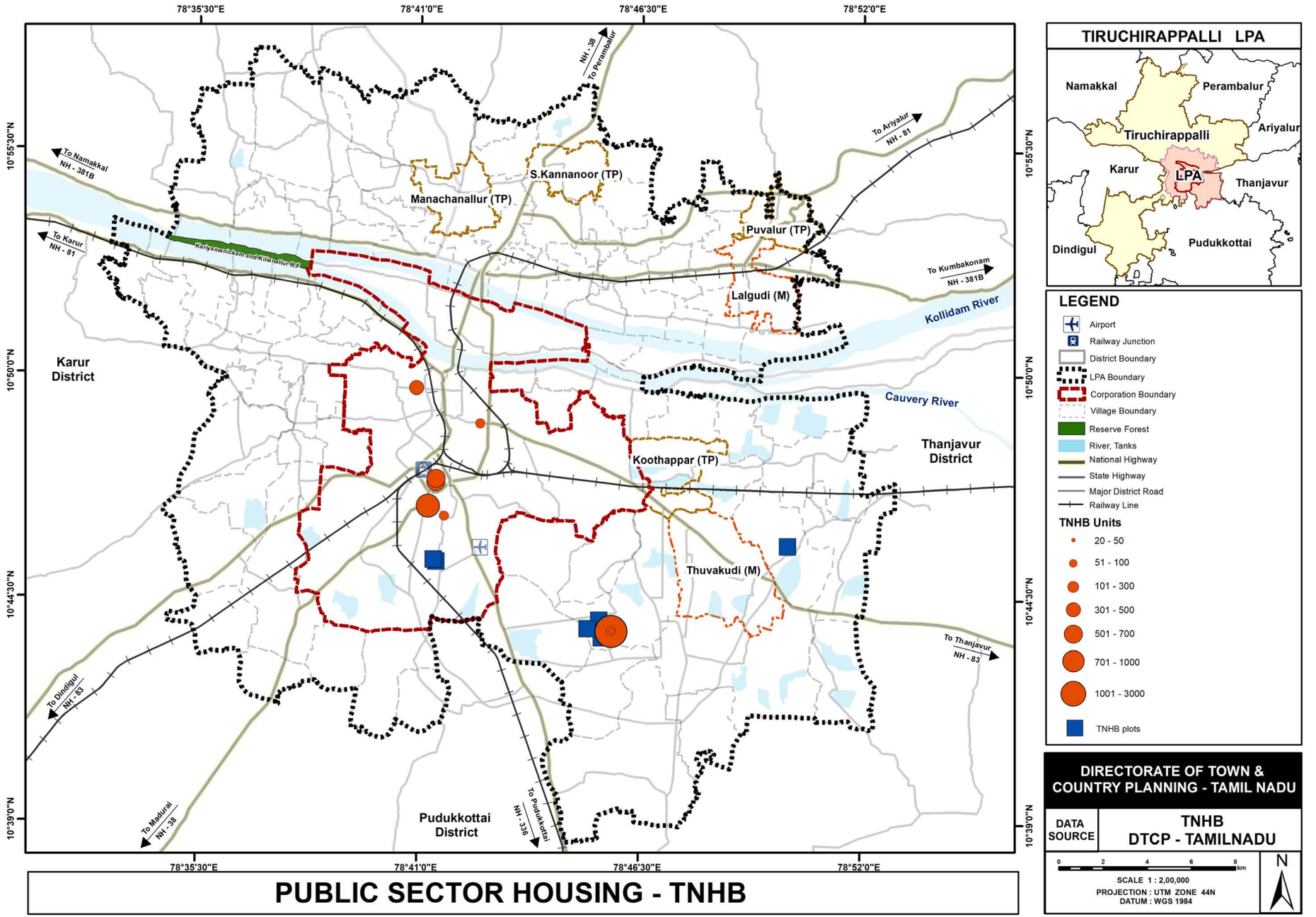
0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

# PUBLIC SECTOR HOUSING - TNUHDB

*Map 10.8 Distribution of Implemented Public Housing (TNUHDB) in Tiruchirappalli LPA*










DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU

| DATA SOURCE | TNHB<br>DTCP - TAMILNADU |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

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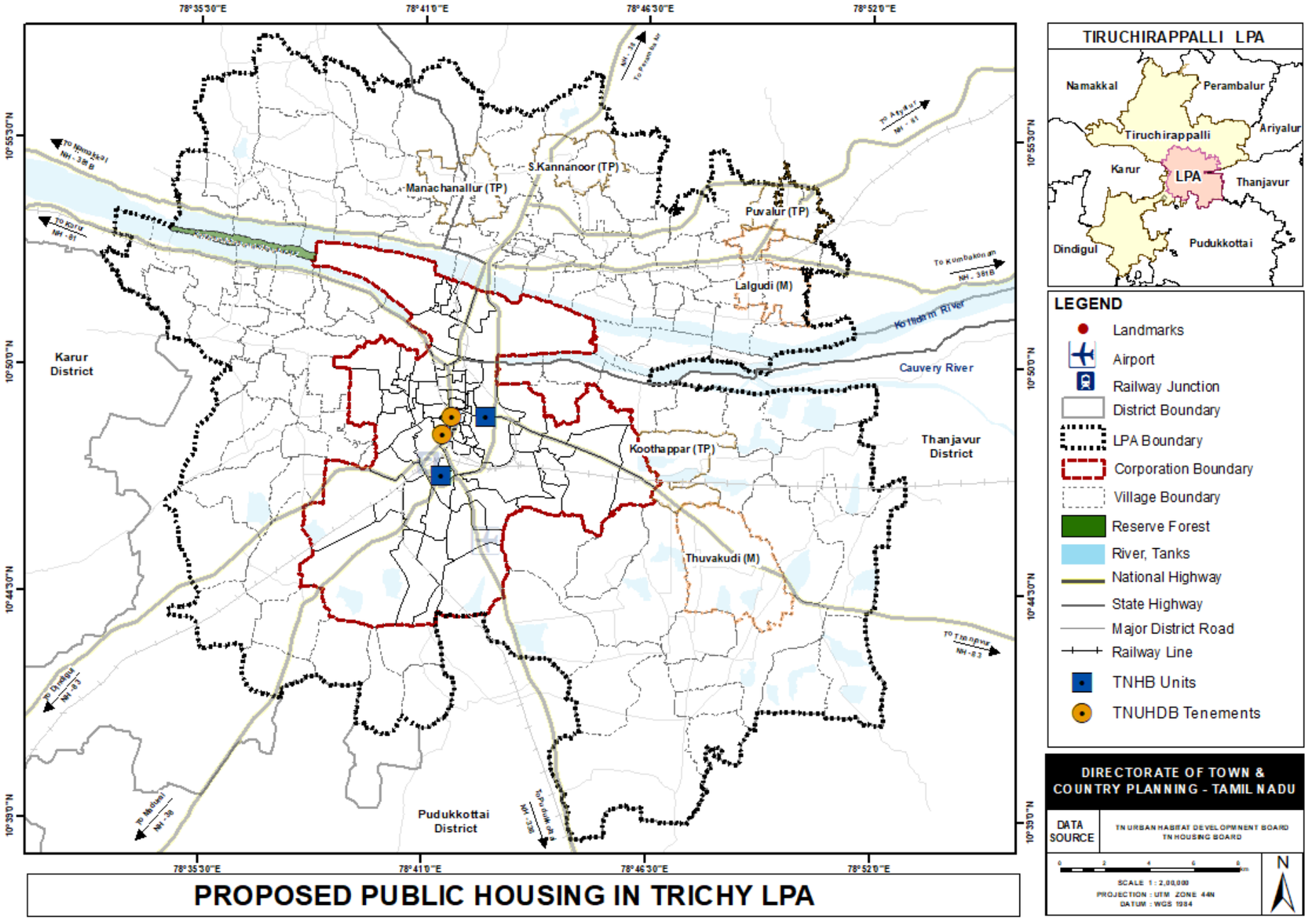
# PUBLIC SECTOR HOUSING - TNHB

*Map 10.9 Distribution of Implemented Public Housing (TNHB) in Tiruchirappalli LPA*




# PROPOSED PUBLIC HOUSING IN TRICHY LPA

*Map 10.10 Distribution of Ongoing & Proposed Public Housing in Tiruchirappalli LPA*

#### 10.4.1.3 Transient Housing

The high influx of pilgrims, tourists, and through-travellers to Tiruchirappalli highlights the necessity for well-distributed transient accommodation. Owing to its central geographic location, Tiruchirappalli functions as a regional transit node, accommodating a large transient population that uses the city primarily as a connecting point. Their presence, though short-term, has significant implications for urban infrastructure, including transportation, temporary accommodation, sanitation, and crowd management, particularly in areas surrounding temples and market hubs. At present, there is one Yatri Niwas located in Srirangam, catering to pilgrims visiting the surrounding temples and two Hotel Tamil Nadu. The facility has been functioning successfully, recording high occupancy levels due to sustained pilgrimage demand and its strategic proximity to major religious destinations as well as transit locations.

*Table 10.20 Activities of the Transient population and housing requirements*

| Activity Zone | Dominant Transient Groups | Existing condition | Challenges |
|---|---|---|---|
| 1. Core Precinct (Rock fort, Chathiram bus stand, Gandhi market, Woraiyur) | Pilgrims, festival-season visitors, and wholesale traders. | High concentration of short-term visitors, reliance on lodges, and intense mixed land use. | Peak-season overcrowding, inadequate affordable stays, and pressure on civic services. |
| 2. Southern Institutional Belt (Navalurkottapattu, Thayanoor, Mandaiyur, Sooriyur, Kumbakudi) | Students, medical tourists, business travellers | Presence of hostels, guest houses, and rental units catering to institutions; growing demand due to the expansion of educational and healthcare facilities. | Shortage of affordable rentals, limited purpose-built accommodation. |
| 3. Northern Pilgrimage Corridor (Srirangam, Thiruvanaikovil) | Pilgrims, festival-season visitors. | Seasonal surge in transient population; dependence on lodges, | Festival-time congestion, inadequate temporary housing, and sanitation. |
| 4. Transport Nodes (Panjapur, Airport belt) | Tourists, Transit travellers. | Limited transit-oriented accommodation; short stays near terminals with basic facilities. | Lack of organised transit housing, poor last-mile connectivity. |
| 5. Peripheral Rural/ Heritage Belt (Samayapuram, Grand Anicut, Butterfly Park, Upper Anicut) | Pilgrims, researchers, nature/ecotourists, weekend visitors. | Low-density areas with limited accommodation. | Inadequate visitor facilities, unregulated development pressures. |

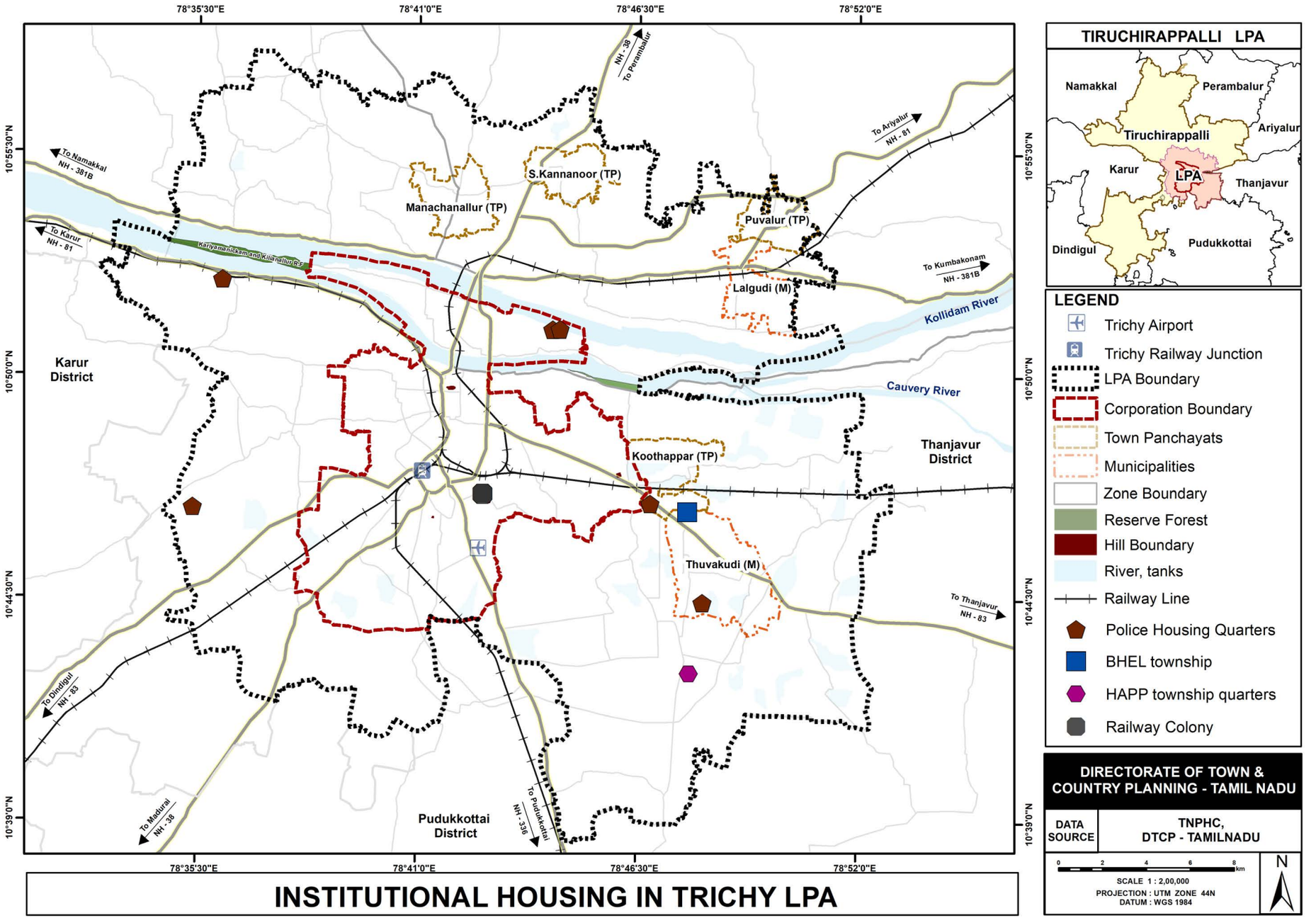
Based on the above, the transient population in Tiruchirappalli needs diverse housing across different activity zones. There is a clear need to provide affordable short-stay accommodation, seasonal and transit housing, and purpose-built facilities for pilgrims, students, medical tourists, and transit travellers, particularly in high-footfall areas such as the core Precinct, pilgrimage corridors, and transport nodes. In addition, supporting infrastructure, pedestrian facilities, and last-mile connectivity need to be strengthened to manage peak-season demand and reduce pressure on existing neighbourhoods, while ensuring planned and regulated development in heritage corridors, transit hubs and environmentally sensitive areas.

#### 10.4.1.4 Institutional Housing

Institutional housing forms an important component of Tiruchirappalli's residential stock, with Southern Railways providing residential quarters for railway employees, industrial establishments such as BHEL and HAPP providing dedicated residential colonies for their workforce, and Tamil Nadu Police Housing Corporation (TNPHC) catering to police personnel. These housing clusters are largely self-contained and service-oriented, influencing local density patterns and infrastructure demand.

The Southern Railway (Tiruchirappalli Division) is one of the oldest institutional landholders in the city, with railway colonies concentrated around major rail lines and the junction area, reflecting the operational requirements. They are primarily located around Golden Rock (Ponmalai) and the DRM Office (Cantonment) areas. BHEL Township (Kailasapuram) is an example of industrial urban planning. It provides a massive volume of housing across several sectors (A-Sector, B-Sector, etc.) for its workforce. HAPP & OFT Colonies, located near Elandapatti is surrounded by major industrial units, serving the production workforce. These industries provide housing for such a large percentage of their workforce; the private rental market in the Thiruverumbur-Navalpattu belt is primarily driven by ancillary workers. Police housing quarters are more dispersed across the LPA, ensuring proximity to administrative areas and effective service coverage. Recent TNPHC projects in Tiruchirappalli focus on vertical growth by adopting multi-storey housing developments instead of low-rise layouts.

Overall, institutional housing constitutes a dominant and integral component of Tiruchirappalli's urban fabric, playing a significant role in shaping the city's spatial structure and economic growth.




# INSTITUTIONAL HOUSING IN TRICHY LPA

*Map 10.11 Institutional housing in Tiruchirappalli LPA*

### 10.4.2 Private Sector - Residential Demand & Supply Trends

The private housing landscape in Tiruchirappalli is currently undergoing a dual transformation. The city, traditionally characterized by independent homes and religious landmarks, is witnessing the emergence of gated communities and high-rise apartments, while simultaneously expanding from the urban core toward peripheral areas along major transit corridors.

A combination of connectivity, employment, lifestyle, and investment trends shapes Tiruchirappalli's housing demand. The city's accessibility has improved with major projects like the airport expansion, Panjapur Integrated Bus Terminus, and the semi-ring road, making it more attractive for long-term residence. At the same time, new employment hubs, including Tidel Park, industrial parks, and IT/ITES centers, are drawing residents closer to workplaces. Changing lifestyles, especially after COVID, have increased a preference for larger flats, modern apartments, and gated communities with recreational and modern amenities. Adding to this momentum, NRIs and buyers from nearby districts are actively investing in both central and peripheral areas, further boosting the city's housing growth.

The supply of new private housing is concentrated in three distinct zones, based on functional character and inventory type, as tabulated in the table below.

*Table 10.21 Development trends in different zones of LPA*

| Zone | Primary Localities | Supply Type | Supply frequency |
|---|---|---|---|
| The New Hub | Panjapur, Manikandam, Navalurkottapattu | Large-scale plots, Gated townships | Highest |
| The IT & Industrial Belt | Thiruverumbur, Navalpattu, Kattur | Mid-range apartments, Budget plots | High |
| Established Suburbs | KK Nagar, Karumandapam, Vayalur Road, Manachanallur | Premium apartments, Independent homes | High - Moderate |
| Temple & Heritage | Srirangam, Thiruvanaikoil | Independent homes, apartments | Niche |

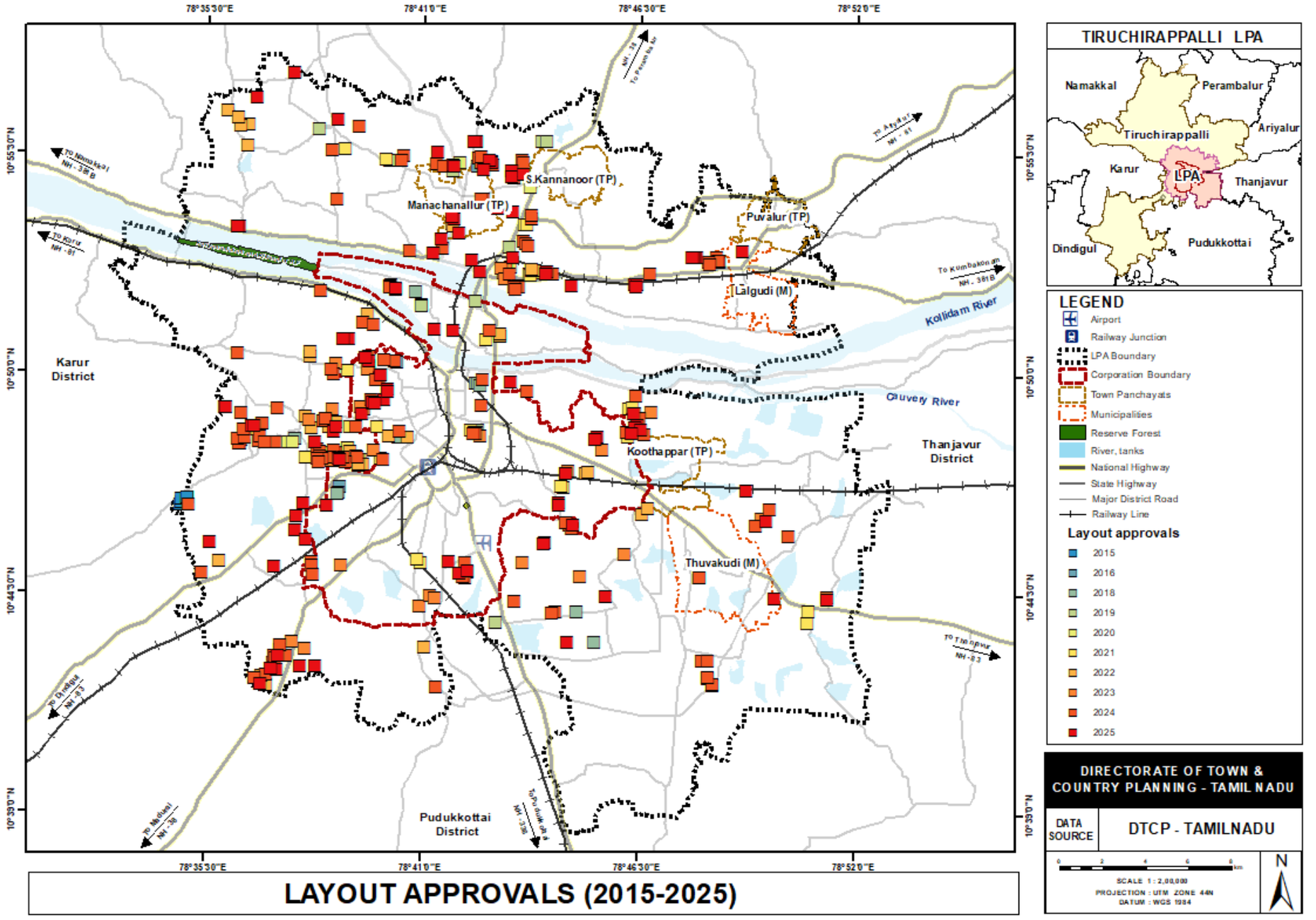
*Source: Secondary sources*

Between 2015 and 2025, DTCP issued 443 residential layout approvals and 1330 building approvals in the Tiruchirappalli LPA. The residential layout approvals sharply increased from the year 2022 onwards, recording the highest number of approvals in 2024. The trends indicate a predominantly corridor-led outward expansion, with stronger residential growth toward the west and south-west, followed by the north and south-east.

*Table 10.22 Residential layout trends in Tiruchirappalli LPA*

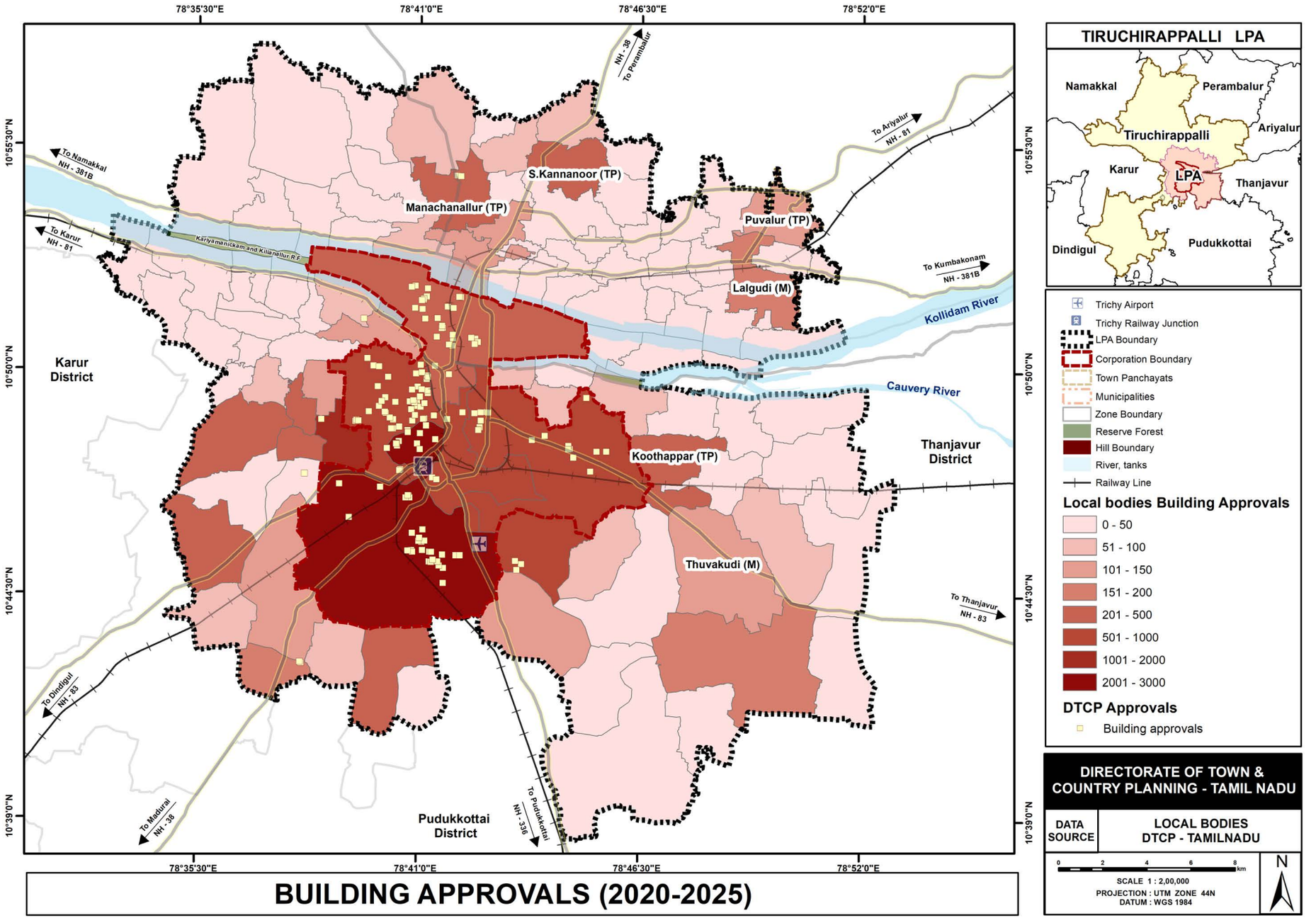
| Corridor/ Direction | Trend in Layout Approvals | Inference |
|---|---|---|
| West and South-West (Athavathur, Somarasampettai, Nagamangalam) | High concentration | Strong residential expansion driven by highway connectivity, land availability, and proximity to industrial and employment zones. |
| North and North-West (Manachanallur - Kalpalayam) | Moderate to high | Emerging growth corridor with development aligned along highways, supported by improving accessibility and lower land values. |
| South and South-East (Koothappar–Thuvakudi) | Moderate to high | The layout activity is influenced by industrial areas, institutions, and rail connectivity, indicating housing demand for the workforce. |
| East (Lalgudi–Puvalur side) | Moderate and scattered | Growth is constrained by river systems and agricultural land, resulting in slower, more fragmented residential expansion. |
| Core City/Corporation | Low | Limited new layout approvals due to land saturation, with development shifting toward redevelopment and vertical growth. |

*Source: DTCP approval trends*




# LAYOUT APPROVALS (2015-2025)

*Map 10.12 Layouts approved by DTCP between 2015 and 2025*







Trichy Airport
Trichy Railway Junction
LPA Boundary
Corporation Boundary
Town Panchayats
Municipalities
Zone Boundary
Reserve Forest
Hill Boundary
River, tanks
Railway Line

**Local bodies Building Approvals**

- 0 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 3000

**DTCP Approvals**

Building approvals

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | LOCAL BODIES DTCP - TAMILNADU |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

# BUILDING APPROVALS (2020-2025)

*Map 10.13 Residential Building approved by DTCP and local bodies between 2020 and 2025*

### 10.4.3 Housing supply by the Public and Private sectors

The public sector has delivered approximately 1,460 housing units over the last five years, while the private sector has supplied around 6,264 housing units. Further, the private sector had developed 380 residential layouts with over 12,000 plots during the same period. Private sector output was 12 times that of the public sector. Layout approvals are higher in village panchayats, specifically along the stretches of Vayalur road – Somarasampettai, and Panjapur - Nagamangalam. A comparative assessment of residential development hotspots, based on the pace of capital appreciation, key characteristics, and commercial investment volume, is presented below.

*Table 10.23 Development trends in various localities*

| Localities | Key Features | Investment Appeal |
|---|---|---|
| High Growth | | |
| Panjapur | Integrated Bus Terminus (IBT), TIDEL Park, & wholesale market | Primary growth node; massive capital appreciation expected due to core infrastructure. |
| Thillai Nagar | Premium, central, well-serviced | Rental demand, stable appreciation. |
| KK Nagar / Woraiyur | Middle-income residential zones, good social infrastructure | Affordable, steady growth. |
| Gundur | Integrated township, extreme airport proximity (New Terminal impact) | High projected returns, premium residential layouts. |
| Thiruverumbur | Strong Industrial-linked growth (BHEL, SIPCOT) | Shift from budget to mid-range projects; strong student/worker rental yields. |
| Moderate Growth | | |
| Srirangam | Religious tourism, heritage neighbourhood | High rental yields from short-term pilgrimage traffic. |
| Thuvakudi | Proximity to industrial estates | Affordable residential layouts, Mixed-use developments |
| Manachanallur | Plotted residential layouts | Market with steady but slow price appreciation |
| Low-growth | | |
| Lalgudi | Municipal-level residential growth, Local commercial activity | Suitable for small-scale residential projects and long-term holding |
| Kannanur (TP) | Peri-urban location near NH, Availability of developable land | Plotted developments, Budget housing projects |
| Outer Pudukottai Road Fringe Villages | Peripheral location, Infrastructure to be improve, Scattered development pattern | Slow absorption; speculative investment only |

*Source: Secondary sources*

## 10.5 Housing shortage

The housing shortage represents the gap between the number of adequate houses available and the actual need for housing. The housing shortage has been calculated based on the methodology adopted in the Technical Group on Housing – XII Five Year Plan (TG 12), the Ministry of Housing and Urban Poverty Alleviation, Government of India. This approach considers multiple factors, which inter alia include the deficit in housing stock against the existing number of households, the number of temporary houses, the shortage due to congestion (overcrowding), and the dilapidated condition of existing units.

### 10.5.1 Shortage due to congestion

As per the 2011 census, 7.1%, 10.4%, 12.0%, and 20.29% houses did not have a separate room in corporation, municipalities, town panchayats, and village panchayats, respectively. Accordingly, the shortage due to congestion in LPA is estimated to be 40,178 units.

*Table 10.24 Shortage due to congestion*

| Category | Houses |
|---|---|
| Corporation | 16,447 |
| Municipalities | 1,615 |
| Town Panchayat | 1,970 |
| Village Panchayat | 20,147 |
| Total | 40,178 |

*Source: Census of India 2011*

### 10.5.2 Slum households

Considerable progress has been achieved through various housing schemes implemented by the Tamil Nadu Urban Habitat Development Board (TNUHDB), Tamil Nadu Housing Board (TNHB), and BMTPC, which resulted in addressing 18,666 slum households. Building on these efforts, a total of 25,571 slum households require further intervention.

### 10.5.3 Shortage due to obsolescence

As per the 2011 census, 1.59%, 0.38%, 0.35%, and 0.98% houses are non-serviceable in the corporation, municipalities, town panchayats, and village panchayats, respectively. Accordingly, the shortage due to obsolescence in LPA is estimated to be 4,773 units.

*Table 10.25 Shortage due to obsolescence*

| Category | Houses |
|---|---|
| Corporation | 3,683 |
| Municipalities | 59 |
| Town Panchayat | 57 |
| Village Panchayat | 973 |
| **Total** | **4,773** |

*Source: Census of India 2011*

### 10.5.4 Dilapidated houses

According to the census 2011, 0.76%, 1.25%, 3.45%, and 2.5% houses are in dilapidated condition in corporation, municipalities, town panchayats, and village panchayats respectively, totalling to 5,003 houses.

*Table 10.26 Dilapidated Houses*

| Category | Houses |
|---|---|
| Corporation | 1,761 |
| Municipalities | 194 |
| Town Panchayat | 566 |
| Village Panchayat | 2,482 |
| **Total** | **5,003** |

*Source: Census of India 2011*

### 10.5.5 Kutcha Houses

As per the census 2011, 4.9%, 10.2%, 12.06%, and 17.82% are kutcha houses in corporation, municipalities, town panchayats and village panchayats respectively, totalling to 32,608 houses.

*Table 10.27 Kutcha Houses*

| Category | Houses |
|---|---|
| Corporation | 11,351 |
| Municipalities | 1,584 |
| Town Panchayat | 1,980 |
| Village Panchayat | 17,694 |
| **Total** | **32,608** |

*Source: Census of India 2011*

Overall, the housing shortage in Tiruchirappalli LPA is estimated to be 1,08,456 units, which includes kutcha houses, slum households, homeless population, and dilapidated houses.

*Table 10.28 Overall Housing Shortage*

| Housing Shortage | Units |
|---|---|
| Shortage due to congestion | 40,178 |
| Slum Households | 25,571 |
| Shortage due to obsolescence | 4,773 |
| Dilapidated Houses | 5,003 |
| Kutcha Houses | 32,608 |
| Homeless population | 322 |
| **Total shortage** | **1,08,456** |

*Source: Census 2011; TG2012 report; SFCPoA*

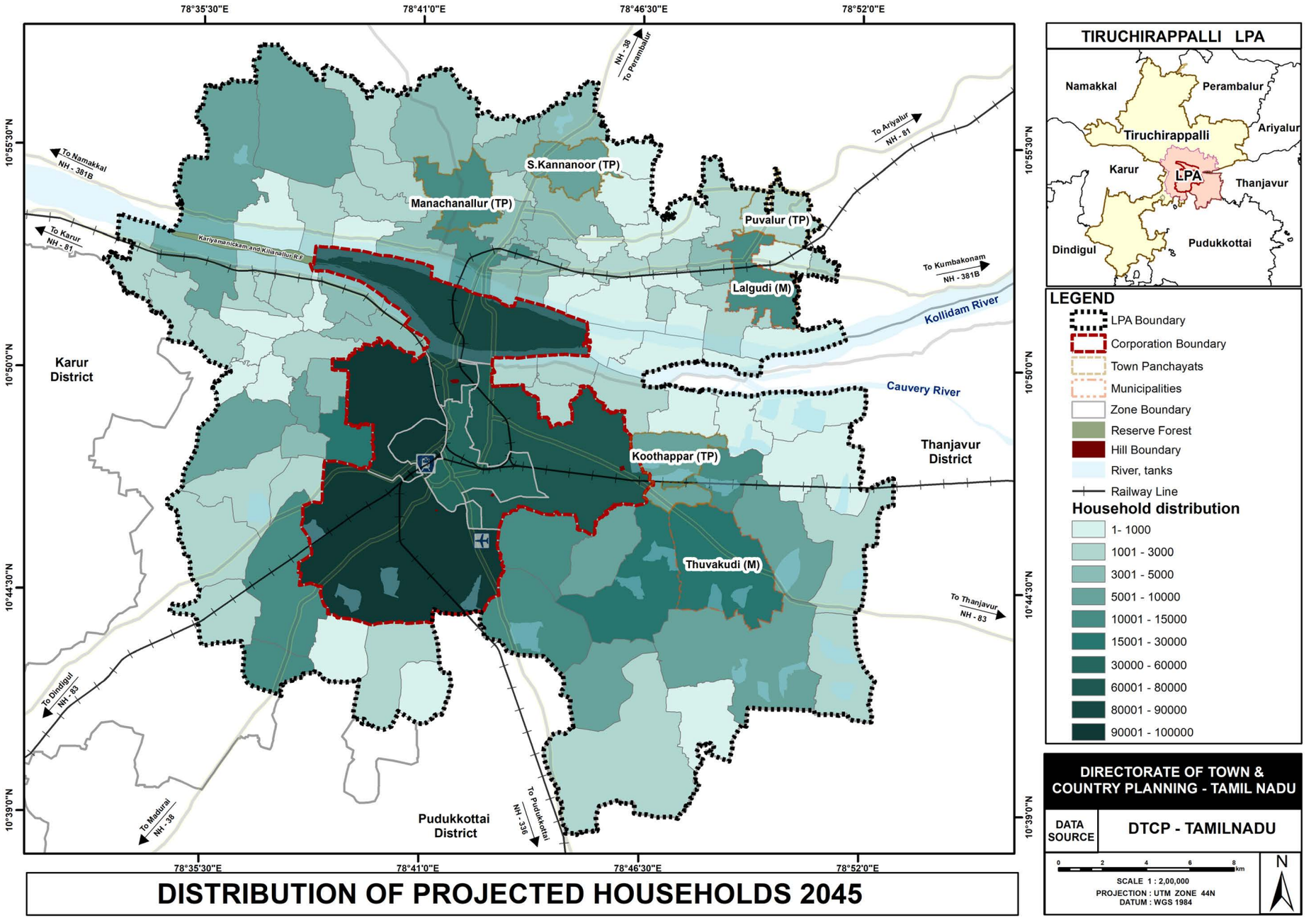
## 10.6 Household Projections

The population of Tiruchirappalli LPA by 2045 is projected to be 26,35,610, comprising 14,39,978, 1,27,355, 1,08,383, and 9,59,894 in the Tiruchirappalli Corporation, Municipalities, Town panchayats, and Village Panchayats, respectively. Accordingly, the assessed households are 4,06,825, 34,726, 31,593, and 3,14,821 households in the Corporation, Municipalities, Town panchayats, and Village Panchayats. The increase in the number of households is projected using an average household size of 3.2 persons by 2035 and 3.0 persons by 2045, estimated through a non-linear projection that accounts for the gradual decline in household size.

*Table 10.29 Projection of Households and Density 2045*

| Boundaries/Year | Projected Population 2045 | Projected Households 2045 | Gross Household Density 2045 (per sq.km) |
|---|---|---|---|
| Corporation | 14,39,978 | 4,06,825 | 2433 |
| Municipalities | 1,27,355 | 34,726 | 1423 |
| Town panchayats | 1,08,383 | 31,593 | 1467 |
| Village Panchayats | 9,59,894 | 3,14,821 | 532 |
| **Tiruchirappalli LPA** | **26,35,610** | **7,87,964** | **979** |

The projected household distribution and density pattern for 2045 indicates a continued concentration of high-density residential development within the core areas of Tiruchirappalli city, reflecting sustained demand, driven by established infrastructure, employment centers, and services. Moderate to high household densities are projected along major transport corridors extending toward the peripheral areas, highlighting a shift toward corridor-led urban expansion. Areas along key roads and transit routes are likely to witness intensified residential development due to improved accessibility and land availability. Overall, the spatial distribution reflects a transition from a compact core to a more dispersed urban form, underscoring the need for infrastructure augmentation, housing diversification, and density management aligned with projected growth patterns.







**LEGEND**

- LPA Boundary
- Corporation Boundary
- Town Panchayats
- Municipalities
- Zone Boundary
- Reserve Forest
- Hill Boundary
- River, tanks
- Railway Line

**Household distribution**

- 1- 1000
- 1001 - 3000
- 3001 - 5000
- 5001 - 10000
- 10001 - 15000
- 15001 - 30000
- 30000 - 60000
- 60001 - 80000
- 80001 - 90000
- 90001 - 100000

**DIRECTORATE OF TOWN & COUNTRY PLANNING - TAMIL NADU**

| DATA SOURCE | DTCP - TAMILNADU |
|---|---|

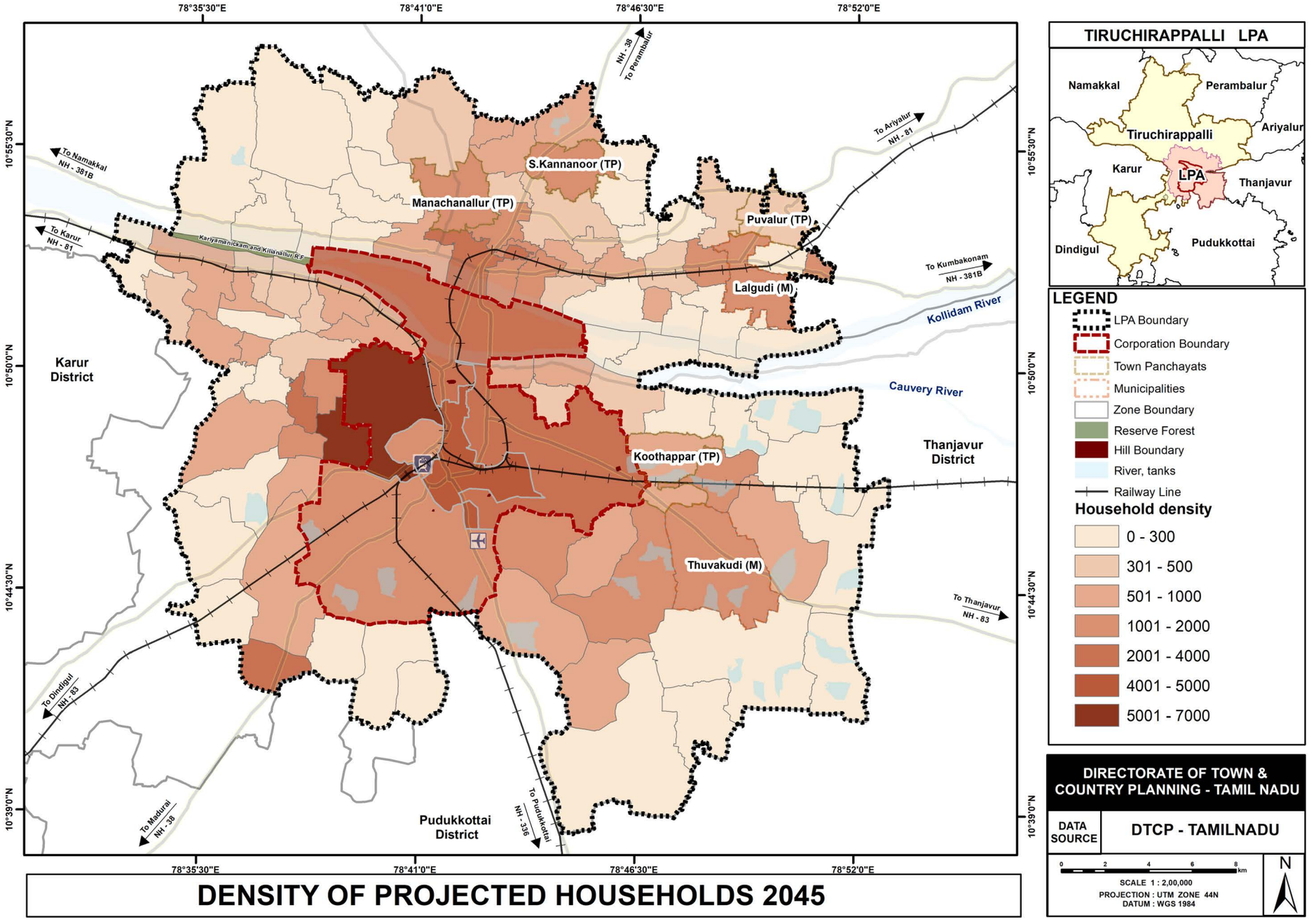
0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

N

# DISTRIBUTION OF PROJECTED HOUSEHOLDS 2045

*Map 10.14 Distribution of projected households 2045*




# DENSITY OF PROJECTED HOUSEHOLDS 2045

*Map 10.15 Density of projected households 2045*

### 10.6.1 Housing requirement for 2045

The housing requirement assessment, based on the current housing status and the projected number of households for 2045, is provided in Table 10.30 below.

*Table 10.30 Assessment of Housing Requirements for 2045*

| Boundaries/Year | Existing Households 2025 | Projected Households 2045 | Requirement of HH for 2045 |
|---|---|---|---|
| Corporation | 2,87,998 | 4,06,825 | 1,18,827 |
| Municipalities | 19,960 | 34,726 | 14,766 |
| Town panchayats | 20,491 | 31,593 | 11,102 |
| Village Panchayats | 175456 | 3,14,821 | 1,39,365 |
| **Tiruchirappalli LPA** | **5,03,905** | **7,87,964** | **2,84,059** |

During the preparation of the 'Comprehensive Mobility Plan for Tiruchirappalli Local Planning Area 2022-2042, household interview surveys were conducted where income was recorded and based on the same, the projected households are categorised into income categories.

*Table 10.31 Assessment of Housing Requirements for Income categories*

| Income Categories | Percentage | No. of projected households |
|---|---|---|
| EWS | 5 | 14203 |
| LIG | 31 | 88058 |
| MIG | 38 | 107943 |
| HIG | 26 | 73855 |

The overall housing requirement for the year 2045 in the Tiruchirappalli Local Planning Area (LPA), encompassing both the additional housing demand and the existing housing shortage, has been estimated and presented in Table 10.31

*Table 10.32 Overall Housing Requirements for 2045*

| S.No. | Description | Units |
|---|---|---|
| A | Projected housing need | 2,84,059 |
| B | Existing shortage | 1,08,456 |
| **A+B** | **Total Households Demands 2045** | **3,92,515** |

### 10.6.2 Land allocation

The total number of households is projected to reach 7,97,964 by 2045, against an existing 5,03,905 households. Accordingly, the additional housing requirement by 2045 is estimated at 2,84,059 households. Further, the existing housing shortage is assessed at 1,08,456 households. To address the total projected housing demand of 3,92,515 dwelling units by 2045, encompassing both the additional requirement and the existing shortage, the corresponding land requirement for 2045 has been assessed based on the spatial distribution of households across different areas in LPA and Density Growth Projection using Tiered Multipliers*.

**It involves grouping areas by current density level (low, medium, high), applying different proportional growth factors (multipliers) to each group based on urban planning principles, and projecting future densities by scaling current densities.*

The Tiruchirappalli LPA encompasses a total extent of 804.53 sq. km, of which 532.3 sq.km is the developed area (it excludes the rivers, canals, tanks, quarries, reserved forests, special & hazardous areas and portions of wet agricultural areas). The household density within the developed area is 25 HH/Ha in the Corporation area, 11 HH/Ha in Municipalities, 10 HH/Ha in Town Panchayats, and 5 HH/Ha in Village Panchayats, with an overall density of 9 HH/Ha across the LPA in 2025. The projected number of households is used in estimating the developable area, while accounting for the housing within commercial and industrial zones. For the purpose of long-term planning, the household density for 2045 has been derived by analysing the density growth observed during the period 2011–2025. Based on this trend, a 20% increase over the current household density has been adopted to project the developable area for 2045.

Based on the projected housing requirement and the increased household density for 2045, the developable area (346 sq.km) has been derived. Subsequently, a proportion of the developable area is proposed as additional residential area. This proportion has been determined with reference to the share of residential land (125.64 sq.km) within the total developed area estimated for the year 2025 and more importantly, based on their residential characteristics and development potential. Accordingly, the developable area has been categorised into very Low (0–10%), Low (10–20%), Medium (20–40%), and High (40–60%) residential intensity zones.

The Corporation area exhibits high growth potential, necessitating focused development of already serviced land while curbing urban sprawl. The Municipalities exhibit relatively low growth, primarily due to their distance from the Corporation area (Lalgudi) and their predominantly industrial character (Thuvakudi). The Town Panchayats of Manachanallur and S. Kannanoor exhibit relatively higher residential growth, as reflected

in the greater number of layout approvals. In contrast, Koothappar and Puvalur record relatively lower growth, as development pressures are likely to be absorbed initially by the adjoining Municipalities before gradually extending into these areas. Manachanallur Block is projected to experience high growth, driven by its residential character and connectivity to the urban core. The Blocks of Lalgudi, Andanallur, and Manikandam are expected to record moderate growth, supported by improved transport connectivity and incremental urban development. In contrast, Thiruverumbur Block is likely to witness comparatively low growth, as the extensive presence of water bodies and industrial areas limits the scope for residential expansion.

Accordingly, the additional residential area required for the year 2045 is estimated at 28.9 sq. km in the Corporation area, 1.7 sq. km in Municipalities, 2.13 sq. km in Town Panchayats, and 83.32 sq. km in Village Panchayats, resulting in an overall additional residential area requirement of 116 sq. km. For the horizon year 2045, a total area of 239.86 sq. km is provided for residential purposes, including the newly proposed residential area, reflecting the continued expansion of housing needs across the LPA. Thus, the residential area accounts for 29.81% of the total local planning area.

*Table 10.33 Land requirement for the overall housing requirement*

| Area | Total Housing requirement (Additional requirement and Shortage) (in HHs) | Current Density in developed area (in HH/Ha) | Increased density for Developable density (in HH/Ha) | Developable area (in sq.km) | Developable area accounting for the proposed residential area* (in percentage) | Additional residential area proposed (in sq.km) |
|---|---|---|---|---|---|---|
| | 2045 | 2025 | 2045 | 2045 | 2045 | 2045 |
| **Tiruchirappalli Corporation** | **1,45,941** | **25** | **30** | **48** | **40-60** | **28.81** |
| Very low Density | | | | | | |
| Lalgudi (M) | 19,312 | 20 | 24 | 8 | 0-10 | 0.65 |
| Thuvakudi | 22,568 | 8 | 10 | 22 | | 1.08 |
| **Municipalities** | | | | | | **1.73** |
| Very low Density | | | | | | |
| Koothappar (TP) | 9,941 | 9 | 11 | 9 | 0-10 | 0.27 |
| Puvalur (TP) | 7,159 | 5 | 6 | 13 | | 0.25 |
| Low Density | | | | | | |
| Manachanallur (TP) | 10,867 | 18 | 21 | 5 | 10-20 | 0.76 |
| S.Kannanoor (TP) | 10,248 | 11 | 13 | 8 | | 0.85 |
| **Town Panchayats** | | | | | | **2.13** |
| Very low Density | | | | | | |
| Thiruverumbur | 69,861 | 3 | 4 | 189 | 10-20 | 22.67 |
| Medium Density | | | | | | |
| Lalgudi | 15,493 | 6 | 8 | 20 | 20-40 | 8.11 |
| Andanallur | 15,756 | 8 | 9 | 17 | 20-40 | 6.96 |
| Manikandam | 44,555 | 7 | 8 | 56 | 20-40 | 22.45 |
| High Density | | | | | | |
| Manachanallur | 20,814 | 4 | 5 | 39 | 40-60 | 23.13 |
| **Village Panchayats** | | | | | | **83.32** |
| **Trichy LPA** | **3,92,515** | **9** | **11** | **346** | **20-40** | **116** |

Thus, the proposed residential land use for the horizon year 2045 for the Tiruchirappalli LPA is 239.86 sq.km: Corporation – 65.6 sq.km, Municipalities – 5.86 sq.km, Town Panchayat -7.18 sq. km, and the Village panchayats – 161.16 sq.km.

## 10.7 Proposals and Strategies

### 10.7.1 Affordable rental housing for workers

Affordable rental housing for workers is proposed near existing and upcoming industrial clusters, as the demand for rental housing is closely linked to employment hubs and transit corridors for accessibility. These locations are strategically identified based on their potential to emerge as the next major rental housing hubs in the future.

| S.No. | Localities | Rationale for Location Selection |
|---|---|---|
| 1 | Punganur | • Identified along NH-83 (towards Dindigul), in proximity to the existing institutions and employment in the core.<br>• The area has growing demand for rental housing.<br>• Considering the proposed economic cluster (services) this location will certainly cater to service sector employees. |
| 2 | Allithurai | • Identified along the prominent residential corridor (Vayalur-Somarasampettai).<br>• The area experiences high rental demand owing to its proximity to the urban core and its established residential neighbourhood character. |
| 3 | Thuvakudi | • Identified along the developing Outer Ring Road.<br>• It is in proximity to the proposed economic cluster (Heavy manufacturing industries) |
| 4 | Cholamadevi | • Identified along NH-83 (towards Thanjavur) in proximity to existing industrial clusters.<br>• It is an emerging residential area, owing to its strategic location between the Corporation area and the major industrial hub of Thuvakudi.<br>• It has a high demand for rental housing. |

The following table presents the details of the scheme, implementing agency and the estimated quantity required along with the suitable typology.

| Scheme | Implementation agency | Unit |
|---|---|---|
| Affordable Rental Housing Complex (ARHC) scheme (which is a sub-scheme of Pradhan Mantri Awas Yojana – Urban / PMAY-U) | Tamil Nadu Housing Board (TNHB), Tamil Nadu Urban Habitat Development Board (TNUHDB), and ULBs under the Municipal Administration & Water Supply Department Private entities under PPP models. | Four complexes<br>• Dormitories type in Punganur and Thuvakudi.<br>• Apartment type in Allithurai and Cholamadevi. |

### 10.7.2 Women's hostel

Women's hostels in the Tiruchirappalli LPA are largely concentrated in the Corporation areas, mainly operated by the private sector due to proximity to employment centres and transport nodes. However, their limited presence in peri-urban areas highlights a gap in hostel availability near emerging workplaces. With increasing female workforce participation and the city's growing role in the service sector, there is a clear need for additional Thozhi-type hostels to meet present and future demand adequately.

| S.no. | Localities | Rationale for Location Selection |
|---|---|---|
| 1 | Punganur | • Identified along NH-83 (towards Dindigul), in proximity to the existing institutions and employment.<br>• The area is expected to become a preferred location for hostel development, given the saturation of private hostels in the core city.<br>• Considering the proposed economic cluster (services). |
| 2 | Kumbakudi | • Identified along the major district road in proximity to the developing institutional area.<br>• Considering the proposed economic cluster (Knowledge center) |
| 3 | Bheema Nagar | • Identified in the core area, in proximity to existing employment opportunities.<br>• There is one Thozhi facility operating at full capacity, demonstrating demand for more such facilities. |

The following table presents the details of the scheme, implementing agency and the estimated quantity required.

| Scheme | Implementation agency | Unit |
|---|---|---|
| Thozhi hostel | Social Welfare and Women Empowerment Department and the Tamil Nadu Working Women's Hostels Corporation Limited (TNWWHCL) | Three complexes |

### 10.7.3 Student Housing

Tiruchirappalli LPA is emerging as a prominent educational hub, with a growing student population driving demand for affordable off-campus housing. Although there are 21 government-run student hostels within and around the corporation, additional facilities are needed, particularly in the northern and southern parts of the LPA, as highlighted in the proposals.

| S.No. | Localities | Rationale for Location Selection |
|---|---|---|
| 1 | S. Kannanoor (West) | • Identified along NH-38 (towards Perambalur), in proximity to the existing institutions. |
| 2 | Sooriyur | • Identified along NH-336 (towards Pudukkotai), in proximity to the important existing institutions.<br>• Considering the proposed economic cluster (Knowledge center), it will also cater to visiting scholars. |

The following table presents the details of the scheme, implementing agency and the estimated quantity required.

| Scheme | Implementation agency | Unit |
|---|---|---|
| Social Justice Hostels | Department of Social Justice & Empowerment and Welfare Departments | Two complexes |

### 10.7.4 Transient Housing

The transient activities in Tiruchirappalli LPA vary across different zones. The Core Precinct (Rock Fort, Chathiram Bus Stand, Gandhi Market, and Woraiyur) primarily attracts pilgrims, seasonal visitors, and wholesale traders. The Southern Institutional Belt, covering Navalur, Kottapattu, Thuvakudi, Mandavur, Sooriyur, and Kumbakudi, sees a mix of students, medical tourists, and scholars visiting institutions. The Northern Pilgrimage Corridor and Peripheral Rural/Heritage Belt (Srirangam, Thiruvanaikovil, Samayapuram) is frequented by pilgrims, weekend visitors, and festival-season visitors. Finally, the key transport nodes such as the Panjapur and Airport belt cater to tourists and transit travellers. Based on these, the suitable locations for transient housing are proposed.

| S.No. | Localities | Rationale for Location Selection |
|---|---|---|
| 1 | Udayanpatti | • Identified in proximity to the Tiruchirappalli airport, Panjapur bus terminal and major transit corridors. |
| 2 | Keeramangalam | • The site is strategically located to connect the spiritual tourism corridor of Samayapuram, Srirangam, and Thiruvanaikovil.<br>• It can also cater to the tourist spots in the peri-urban area.<br>• It is positioned away from the main city traffic and minimizes congestion.<br>• It is identified with connectivity and in proximity to Pichchandarkoil railway station. |

The following table presents the details of the scheme, implementing agency and the estimated quantity required.

| Scheme | Implementation agency | Unit |
|---|---|---|
| Yatri Niwas | Hindu Religious and Charitable Endowments Department, Tamil Nadu Tourism Development Corporation (TTDC) | Two complexes |

### 10.7.5 Night shelters

It is essential to provide night shelters to ensure that everyone has access to safe and dignified shelter, and they are recommended near major temple precincts and key transit locations (Central Bus Stand, Chathiram Bus Stand, and Tiruchirappalli Junction railway station), where footfall and informal livelihood opportunities are high. Based on population estimates, there is currently a requirement for six additional night shelters. The total demand is projected to increase to 15-night shelters by 2035 and further to 17-night shelters by 2045, to adequately cater to the urban homeless population.

| Scheme | Implementation agency | Unit |
|---|---|---|
| Deendayal Antyodaya Yojna –National Urban Livelihoods Mission (NULM) | Tiruchirappalli City Municipal Corporation, supported by NGOs and CSR | Immediate requirement of Six shelters.<br>Five more required by 2045. |

### 10.7.6 Rehabilitation of Informal settlements & housing for EWS

The spatial distribution of slums in Tiruchirappalli Corporation indicates a noticeable concentration within the city's older settlement areas, particularly in the core urban zones and along major transport corridors. Over time, most of the tenable slums have been developed, with in-situ tenements and plotted developments implemented by TNUHDB. Further, some of the untenable slums near Panjapur bus terminal and core areas near Rockfort have been rehabilitated. However, the untenable slums located along rivers, waterbodies and low-lying areas persist and are highly vulnerable to flooding and substandard living conditions.

These settlements require relocation to nearby TNUHDB schemes or appropriate peri-urban locations that offer better connectivity to the urban core and major employment centres, ensuring that livelihoods are not affected. In view of this, areas in the vicinity of Panjapur, Pirattiyur, and Kondayampettai (Srirangam area), are identified as suitable locations for resettlement due to their connectivity and proximity to employment hubs.

| Phasing | Localities identified | Rationale for Location Selection (Slum formation is closely tied to livelihood opportunities, rehabilitation must be livelihood-sensitive) | No. of HHs requiring immediate intervention |
|---|---|---|---|
| I | Piratttiyur | • The slum population is primarily engaged in construction-related work, support and service roles in the nearby government hospital.<br>• Slums developed in proximity to temple precincts, where dwellers have established small petty shops to cater to local activity.<br>• The relocation is identified in proximity to the cluster of existing slums so livelihood is unaffected. | 1200 |
| II | Kondayampettai | • Location-based occupations are observed in Alagiripuram (manual clothes washing) and along the Cauvery riverbank (brick-making).<br>• Hence an appropriate site has to be identified in Kondayampettai in proximity to the Transit corridors. | 550 |
| III | Panjapur | • The shall cater to the dwellers along major roads and daily wage labours located along railway lines, who work bus stops. | 750 |
| IV | Angarai | • This location shall cater to the projected EWS households.<br>• As Lalgudi Municipality is emerging as a growing urban node, an increased requirement is anticipated. | 280 |

In line with this, the TNUHDB has proposed the allocation of land near Panjapur (4.7 acres), Pirattiyur (7.62 acres), and one more site in Angarai (1.40 acres). The sites at Pirattiyur and Panjapur shall emphasis on rehabilitation of slum dwellers. Whereas the site in Angarai shall cater to the projected EWS households.

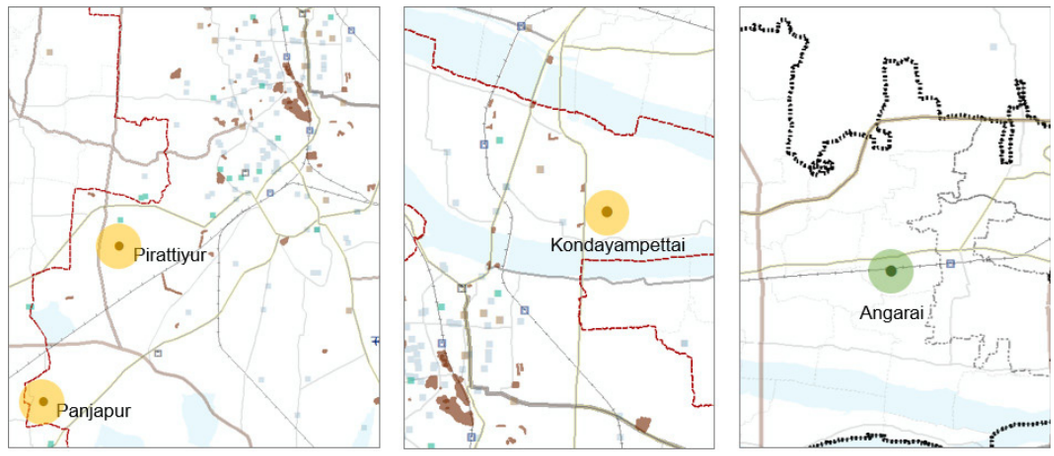
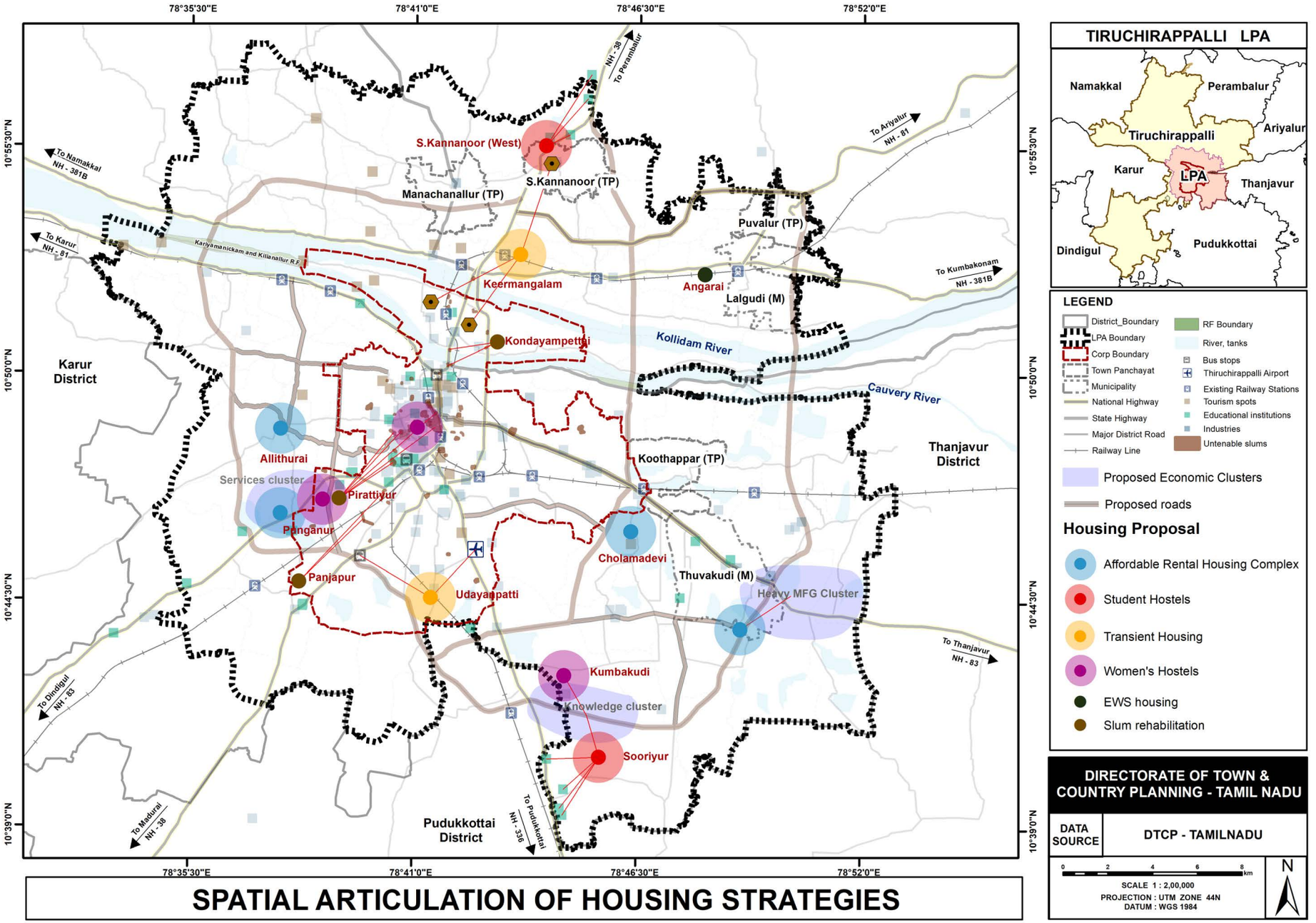



*Figure 10.8 Location of proposed rehabilitation and housing site for EWS*







LEGEND

- District_Boundary
- LPA Boundary
- Corp Boundary
- Town Panchayat
- Municipality
- National Highway
- State Highway
- Major District Road
- Railway Line
- RF Boundary
- River, tanks
- Bus stops
- Thiruchirappalli Airport
- Existing Railway Stations
- Tourism spots
- Educational institutions
- Industries
- Untenable slums
- Proposed Economic Clusters
- Proposed roads

**Housing Proposal**

- Affordable Rental Housing Complex
- Student Hostels
- Transient Housing
- Women's Hostels
- EWS housing
- Slum rehabilitation

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| DATA SOURCE | DTCP - TAMILNADU |
|---|---|

0 2 4 6 8 km

SCALE 1 : 2,00,000
PROJECTION : UTM ZONE 44N
DATUM : WGS 1984

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# SPATIAL ARTICULATION OF HOUSING STRATEGIES

*Map 10.16 Spatial articulation of housing strategies*

JIM
JESUIT B-SCHOOL
SUNDARAM AGENCIES