

Chennai Metropolitan Development Authority

TERMS OF REFERENCE

A Study on the Spatial Distribution of Employment and Income Categories in Chennai Metropolitan Area

Section 1: Introduction

Chennai, as the capital city of Tamil Nadu and fourth largest metropolitan city in India is among economic powerhouses in the state. It contributes to 8% of the State's income¹. Chennai is an important employment centre in the state that witnessed successive waves of economic growth in the past century. The post-independence period witnessed the rise of manufacturing in Chennai and surrounding regions, often following strong state measures to attract and retain industries. India's first industrial estate was set up in Chennai at Guindy in 1958. The establishment of the Tamil Nadu Industrial Development Corporation (TIDCO) in 1965 and the State Industries Promotion Corporation of Tamil Nadu Ltd (SIPCOT) in 1971 strengthened the efforts to create policy and infrastructure ecosystem required to attract and retain investments. Half of the special economic zones established in the State are in districts that are part of Chennai Metropolitan Area. While Chennai continues to have strong manufacturing output in its growing industrial estates and special economic zones, the 21st century Chennai economy is dominated by the performance of the software and related services sector. These successive shifts in employment also brought in migrants to the city. As per the 2011 census, migrants constituted 28% of the Chennai District's population, of which close to one-fifth migrated for employment or business purposes.²

Chennai's economic growth has been cumulative, yet spatially dispersed, making it essential to get a grasp of spatial economic patterns. The core city retains port activity (Madras Port Trust and Chennai Harbour) and houses the seat of administration (Secretariat) and services. Manufacturing has developed in peripheral areas (Orgadam, SriPerumbudur). Software Services have developed in clusters spread across the IT corridor along OMR, Tidel Parks in Siruseri and a number of SEZs that have risen in and around the city. Chennai now has multiple business districts and this dynamic within the city is not well understood due to the

¹ For 2017-18, based on 2011-12 prices. Chennai refers to Chennai District. Income refers to the Net Domestic Product. Data from Tamil Nadu Statistical Hand Book 2020 available at <https://www.tn.gov.in/deptst/stateincome.pdf>.

² Data from 2011 Census

lack of disaggregated city-level data. There are some insights into how the changes in the economy affect the city. The impacts of these trends are visible in terms of increasing density in the city (from 111 persons/ha in 1951 to 247 persons/ha in 2001)³, pressure on the transportation system (visible in the slowing down of average speeds on 27 of the 34 major roads between 1993-94 and 2008, and increasing trip lengths⁴.

While there is some information on industrial patterns in the city, information on income and employment patterns are usually aggregated at the district level or higher and are not recent. A sample of data available are as follows. As per data from the Report on District Level Estimates for the State of Tamil Nadu for 2013-14⁵ released by the Ministry of Labour and Employment. Chennai (District)⁶ had a labour force participation rate of 516 (per 1000 persons), lower than the rate in TN's urban areas. The participation rate is much higher for men than for women. Chennai (District) has a higher unemployment rate as compared to overall urban areas in TN and the other districts that form the CMA. The overall unemployment rate is 63% higher than TN urban rate, where women's unemployment rate is 74% higher, and men's unemployment is 51%. The figures on higher unemployment in Chennai, which is a fully urban district, is in line with the theoretical expectation that in cities with high urban wage premium – the expectation of high potential wage leads to greater migration, but not everyone secures the jobs; or higher reservation wages – where people have higher wage threshold to enter into the labour market. Similarly, higher unemployment among women correlated to lower women's labour force participation in urban India. Tiruvallur and Kancheepuram, with their share of non-urban areas, have higher labour force participation among men and lower labour force participation among women. However, unemployment among both men and women is lower than Chennai's rates.

The structure of employment in Chennai, Tiruvallur and Kancheepuram District is different as compared with the patterns in average urban areas in the state, as a higher percentage of workers were regularly employed as salaried or wage employees than the state average for

³ Second Master Plan Volume 1

⁴ Data from Comprehensive Transportation Study. Accessible at http://www.cmdachennai.gov.in/pdfs/CCTS_Executive_Summary.pdf

⁵ The Report on District Level Estimates for the State of Tamil Nadu for 2013-14 released by the Ministry of Labour and Employment, available at <https://labour.gov.in/sites/default/files/TN%20District%20Level%20Report.pdf>

⁶ CMA includes Chennai districts, parts of Kancheepuram, Tiruvallur and Chengalpattu District at present. Chengalpattu was formed out of Kancheepuram only in 2019, since the data used is from 2013-14 only Tiruvallur Chennai and Kancheepuram Districts are used here. Chennai District, CMA, and Chennai Corporation limits are not congruent boundaries.

urban areas. Finally, Chennai (District) has greater employment rates among persons with better educational qualifications (higher secondary, diploma/ certificate, or graduate degree) than average urban areas in TN, but, on the other hand, it has more of its post-graduates out of the workforce

Finally, on classifying employment into categories as per the National Industrial Classification Manufacturing, and Trade, Transportation, Hospitality and IT sectors have the highest number of employees. However, covers several activities that are all Chennai's stronghold: Wholesale and retail trade; repair of motor vehicles and motorcycles, Transportation and storage, Accommodation and food service activities, Information and communication. The availability of this data at a more disaggregated industrial classification level, and for geographical units within CMA, will provide insights into how each of these sectors contribute to CMA. Appropriate statistical tools may be then applied to ascertain place-specific economic activities that act as force multipliers due to agglomeration effects. The Master Planning exercise would follow these spatial indicators to arrive at optimal usage of land and other resources.

The Third Master Plan will greatly shape the future urban patterns in CMA. Recently the jurisdiction of Chennai Metropolitan Area (CMA) was expanded from 1189 sq.km. to 5904 sq.km. This expansion will significantly affect present trends of employment and income distribution. By including new economic zones, which were in the erstwhile CMA limits, the city planner now has the responsibility to address the needs of these additional workers and firms. Further, the new policies involve the establishment of new employment corridors among others. These decisions will require responsive and resilient spatial planning for the housing demands in the city with provisions to ensure safety and encourage affordability across income segments. Similarly, these changes will produce greater demand for transportation infrastructure, that needs to be developed and managed sustainably. The interrelationship between these factors is explained in the following section.

Urban employment, incomes and spatial patterns

The pattern of urban spatial growth in any city is closely tied to its economy, driven by the performance of the employment-generating segments. Within economic thinking, job-market functioning is recognized to be a predominant basis for urban areas that manifests the agglomeration effect of economics. **Urban spatial form and changes to it, including expansion, are significantly driven by spatial patterns in the location of industries and**

firms, employment and income patterns. There is a correlation between the location of jobs, housing and commute time from home to the workplace.

The link between urban spatial patterns of interest to planners, like density and commute, and employment and income can be summarised as follows.

- 1. Employment opportunities in cities place demands on land and resources.** Development of various industrial clusters requires sustainable and responsive land use zoning and development controls updatation inclusive of FSI incentives and permissible relaxations, land and infrastructure development responsive to growing needs and eco-sensitivity of the region and ensuring connectivity between the industrial regions and other parts of the city. Hence CMDA has direct interest in understanding employment patterns.
- 2. Labour demand and supply determine the size of the cities.** Agglomeration economies lead to higher productivity of firms located within urban areas, and higher wages in urban areas when compared to rural areas. These employment opportunities and the expectation of higher wages fuels migration to cities. One reason for urban expansion is to accommodate new migrants. Aggregate migration hence affects the population living within the city, and consequently its size. Improper planning and management of urban agglomeration can lead to deteriorating urban environments (including increased pollution risks and hazard vulnerabilities) and can pose significant risk to safety and health of its population. Hence CMDA have a direct responsibility of managing the increasing size of cities and needs of the incoming migrants.
- 3. Income determines where and how people live in cities shaping its spatial form in terms of density and resource demand.** It is widely acknowledged that as we move away from employment cores, land and rental values fall while commute expenses and time increase. In having to allocate income between commute and rental values, employees shape the urban spatial form. Cities have higher density with small unit sizes in urban core areas and gradually larger unit sizes with lower density away from core. These patterns create different demands for living spaces, recreational and open/green spaces, and associated civic infrastructures that are within areas of functioning of urban planning authorities.

4. Residential and employment patterns in turn determine commute patterns. **Transportation system needs arise within such a formulation.** As prices in Central Business Districts (CBDs) rise and people shift further out looking for more space, their commute to work becomes longer. As jobs concentrate in these CBDs, and more workers commute to work, the peak hour congestion emerges. This has both individual costs in terms of commute time and cost, and social costs in terms of lost productivity, pollution and added infrastructure capacity to meet peak hour needs. When left unchecked, congestion invalidates the very economics that make urban areas productive and prosperous. Planning decisions that bring about shorter and sustainable commute to work, promote use of green transport, optimize use of public transportation systems, and increased transit connectivity, hence need to understand and predict patterns in income and employment.
5. **There arise questions of equity and sustainability that need redressal during future planning.** Qualitative differences in urban jobs, including in the typologies of work (formal/informal, skilled/unskilled/semiskilled and other categories) translate into differences in earning capacities, spatial distribution of the jobs in cities, and associated quality of life for the residents. Equity issues arise in this context as the spaces, opportunities and amenities at disposal of residents varies greatly with their incomes. Sustainability concerns arise both within the context of managing larger urban populations within the urban footprint, managing its expansion, and pollution and climate related challenges arising from land use and transportation.

For the city planning authority, urban spatial patterns in employment and income hence become crucial for both empirical planning, and policy decisions.

Inorder to effectively inform the Third Master Plan, CMDA needs information on current employment and income patterns, clusters of economic activity, and dynamics of labour market, as these influence other important Master Plan facts like the spatial demand for housing, commute and other factors as outline above. Information on these patterns hence will allow CMDA to identify current needs, model and forecast important future patterns. Through such data-backed planning that responds to the needs of the growing economy, Chennai can hope to ensure sustainable quality of living for all its residents.

At present there are no study results available with disaggregated and recent data on Chennai's economy, creating a wide gap in the understanding of the City planners. Therefore,

CMDA wishes to engage a consultancy firm to conduct a study to understand the spatial economic patterns of Chennai's economy and use the information as inputs to the Third Master Planning process.

Section 2: Objective

This project will study the spatial distribution of employment and income patterns in the Chennai Metropolitan Area (5904 Sq. Km) to support the Third Master Planning efforts at CMDA and analyse its connection to geographical spread of economic activity, as well as the demand for housing, transport and basic urban infrastructure/services in Chennai.

Specific activities shall include the following among others:

1. Develop an understanding of the current employment and income distribution in CMA and its surrounding areas through primary data collection at a suitable disaggregated scale, and relevant geo-spatial secondary data, when it is available at a suitable disaggregated scale. The Analysis should cover the following areas among others:
 - a. Analyse Economic activity clusters, Central Business district. Standard classifications like National Industrial Classification shall be followed; (Activity Categories)
 - b. Employment distributions within CMA with insights into categories of economic activity, workforce status, sector, formal/informal categories, worker demographics (age, gender, etc), educational attainment levels and other relevant groups (Refer to classifications in Labour Bureau statistics, and National Occupational Classification);
 - c. Labour market dynamics and outcomes including in daily wage labour market, seasonal labour markets, and job-seeking migration patterns;
 - d. Income distribution across different categories of labour segments;
 - e. Geographic demand and supply of housing, transport and other basic urban infrastructure/services raised by workers, and its affordability, including information on recurring housing expenditures;

- f. Work commute patterns, including mode, distance travelled and time taken, directional patterns, and distribution across the day, commute expenditure.
2. Predict the future trends in employment, income and related variables inclusive of the potential effects of expansion of CMA and prospective economic development proposals that will be part of the Third Master Plan;
 - a. Model different trajectories for these developments, and related policies that CMDA and other departments/agencies will need to develop and adopt;
 - b. Identify current and future growth nodes within CMDA and policies required to support their substance;
 - c. Map and assess (quantify where possible) anticipated impacts of these growth nodes/economic development activities on i) surrounding urban environments, ii) increase in pollution load, iii) occupational health & safety and iv) resultant climate vulnerabilities.

Section 3: Scope of Work

The scope of work will comprise, inter-alia, of tasks described below:

Task 1: Study Kick-Off

- Defining an appropriate and feasible methodology for the study;
 - Study the ToR and understand its context, background and needs, including the context of the Third Master Planning process for CMA;
 - Define study technicalities, inclusive of study area boundaries, unit of analysis, temporal horizon, level of precision, expected in the output, types of analyses and analytical tools to be used, and areas of findings;
 - Conduct a literature review to identify appropriate methods, and variables for the study based on standard classifications, and urban spatial patterns that have a relationship with employment and income, inclusive of labour markets

trends, residential and commute patterns, urban environment, workforce health and safety, climate vulnerabilities, and pollution in line with the objectives;

- Identify primary and secondary data requirements. Develop a strategy and tools for primary data collection that is adequately representative of the study area and its composition. CMDA shall be kept in a close loop in developing the study design;
 - Develop a sampling strategy to be adequately representative of the study area, current growth nodes, and employment/income patterns. Analysis of already available secondary data including PLFS unit level data, mobility data and any other agreed-upon sources shall guide strategy for sampling, study design and questions;
 - Primary data collection tools may include representative household/individual surveys (sampling method and size to be proposed by the consultant based on the needs of analysis), travel pattern and volume studies and other methods like interviews, focussed group discussions, participant observation, and others.
 - Identify knowledge sources and sectoral experts to be consulted during the course of the study.
- At this stage, the consultant is expected to make a presentation on their approach to the study based on;
 - Determine the expected methodology and outcome of the study with CMDA, including defining required roles and responsibilities, and point of contact etc. for day-to-day communication;
 - Stakeholder Engagement with relevant organisations of workers, employees, employers and members of the public to disseminate information on the study, its objective, methods and schedule and gather inputs on broad, and specific issues around employment and income, and relevant dependent variables for inclusion into the study focus. All such instances of engagement are to be minuted, with relevant comments, questions and suggestions noted down. Consultant shall provide comments to each suggestion or question raised and how it will be considered, or why it will not

be considered, in the study. The engagements shall be held in a form, manner and language that makes it possible for stakeholders to be completely informed.

Deliverable 1: Inception Report

Task 2: Data Collection on Spatial Patterns of Employment and Income Categories in CMA

- Collect geocoded primary data on employment, income and relevant socioeconomic variables from household/individual surveys and identify spatial patterns of jobs/income distribution for identified study areas. The jobs data collected should include both formal and informal jobs to the extent possible and categorized into sectors using government industrial classification standards. Wherever official statistics are not available for informal jobs/employment, innovative technology and proxies such as home-work location identification from mobile phone data can be proposed and considered.
- Collect relevant secondary data on variables. Collect data on historical policy, political, and other factors influencing economic patterns. This data may be collected from secondary sources or through primary interviews with key informants;
- Conduct a preliminary descriptive statistical analysis of the data collected along with mapping of spatial patterns and trends;
- Raise any challenges and barriers that need to be resolved, or if any of the agreements at the Inception Phase needs to be modified;
- Make a tentative outline of the final report, including chapter and section titles and expected content for each section.

Deliverable 2: Interim Report

Task 3: Detailed Technical Analysis

- Based on the primary and secondary data collected in the previous stage, the consultants will undertake detailed technical analysis in the following areas of inquiry;
 - Analyse the current employment and income category distribution in CMA;

- Present the empirical picture of the patterns in employment and income characteristics with analysis of their significance as per the objective of the study;
 - Present discursive trends in light of historical evolutions in policy, planning and related market forces. Eg. identify actions of CMDA, TN State government and Corporation that may explain some of the trends visible in the data;
 - Find significant consequent patterns in urban spatial form, commute, and other relevant planning variables in the city;
 - Present concentration of jobs and housing (market-rate and affordable) around mass transit station (metro/suburban/high-frequency buses) areas (within a half-mile radius);
 - Conduct geostatistical analysis to analyse the factors that affect the density of jobs/income and their trends in CMA, using an appropriate unit of analysis (could be established neighbourhood boundary polygons or raster cells of a suitable size proposed by the consultant). Suggested independent variables could include types of urban build-up, distance from city centre/CBD, distance from closest mass transit station, commuting time from major business centres, distance from other major amenities (parks, major schools, etc.) and other factors that may be significant based on the literature review conducted under Task 1;
 - Identify opportunities, and challenges arising from the above analyses including in areas of equity, environmental sustainability.
- Analyse the potential effects of the expansion of CMA and prospective economic development proposals that will be part of the Third Master Plan;
 - Model and compare the spatial patterns of the key variables and related patterns for (i) an as-is scenario, (ii) at least 2 future scenarios, one that captures a no-intervention case, and another that is based on possible policies that CMDA and related agencies can adopt;
 - Highlight the consequences of these trajectories for the urban spatial patterns in CMA, in particular, identify opportunities, and challenges

arising from the above analyses including in areas of equity, and sustainability.

- Consultants will keep in mind to highlight CMDA's ability to influence the spatial economy through its functions as relevant to the areas, in doing the analysis and coming up with recommendations;
- Based on the results of its analysis, the consultant shall provide recommendations on policy and empirical measures for consideration for the Third Master Planning process to address current issues and encourage sustainable growth of employment and income after CMA expansion.

Task 4: Draft Report on Findings

At this stage, a draft report on present spatial economic patterns with attention to distribution of income and employment categories in CMA should be submitted. It should comprise the following:

- Outcomes of Tasks 1-3, including both statistical analysis and thematic maps (vector and raster, using kernel density or other methods) that present the spatial concentration across the CMA and zoom-in to specific key urban areas (urban core, major growth centres, urban mass transit corridors, etc.);
- List of recommendations on policy and empirical measures to be considered in during the Third Master Planning process.

At this stage, the consultants may undertake further stakeholder consultation for refining their analysis and findings.

Deliverable 3: Draft Report on Findings

Task 5: Final Report

At this stage, a final report will be prepared incorporating comments on the draft report and feedback from stakeholder consultations. The final report shall be accompanied by a presentation that summarises all of the key policy recommendations from the study, along with accompanying analytical studies, maps, plans, diagrams etc. in an editable format, as may be applicable.

Deliverable 4: Final Report on Findings

Section 4: Deliverables

Deliverables for the tasks mentioned above are as per the table below:

Deliverables	Timeline	Payment (% of value)
<p>Deliverable 1: Inception Report</p> <ul style="list-style-type: none"> • To contain an introduction and background to the study, its methodology and future plan of action with a timeline • All tools to be used in the study, interview schedules, • List experts to be consulted, details stakeholders engagements events • Inputs from stakeholder (within CMDA and related agencies, and from stakeholder engagement), and response to it. 	T+4 weeks	15%
<p>Deliverable 2: Interim Presentations and Report</p> <ul style="list-style-type: none"> • 2a. Descriptive Analysis of Data Collected and summary of findings on policy and related factors • 2b. Submission of datasets (primary and secondary) collected, or utilised for the study • 2c. Tentative outline of final report 	<p>2a part 1 - first draft analysis presentation: T+10 weeks</p> <p>2a part 2 - final draft analysis presentation: T+16 weeks</p> <p>2b: T+18 weeks</p> <p>2c: T+20 weeks</p>	<p>35% total:</p> <p>20% after 2a approval by the client</p> <p>15% after 2b and 2c approval by the client</p>
<p>Deliverable 3: Draft Report on Findings</p> <p>Inclusive of</p> <ul style="list-style-type: none"> • Analysis of spatial patterns of employment and income in CMA • Potential effects of expansion of CMA and future development proposals on spatial economic patterns • List of Recommendations 	<p>Draft Presentation of main findings of the report: T+24 weeks</p> <p>Final report submission: T+28 weeks</p>	30%
<p>Deliverable 4: Final Report on Findings</p>	T+32weeks	20%

Section 5: Proposed Staffing and Qualifications

The successful completion of the required tasks under this ToR will require a multi-disciplinary, qualified, and experienced team. The qualifications, appropriateness and experience of team members will be crucial in assessment. Expertise in the following areas should be represented:

SL. No.	Position	Qualification	Experience Requirements
1.	Team Leader	Post graduate in Business Administration / Economics (Regional economic development, or similar specialisation) or equivalent from a recognised institution	Min. 10 years' experience She / He should have experience of leading studies or projects in areas of regional or local economic development. Experience of working on economic development planning is required. Experience in leading urban planning projects with particular expertise/ deep understanding of functioning of urban economy, labour markets and economic planning and its relevance to spatial patterns. International experience is preferred.
2.	Urban Economist/Economist	Postgraduate in Regional Economics or graduate degree in Economics with post-graduation in public policy or related field from a recognised institution, with expertise in regional economic development, or labour economics.	Min. 10 years' experience She/ He should have experience working in the area of urban, development economics, regional economics, labour studies, or equivalent. Knowledge of the economy, labour market and real estate market is highly desirable. She/He should have experience designing and leading surveys, statistical analysis of data collected. Knowledge of software that are capable of handling spatial datasets like Python or R is required.
3.	Urban Planner	Postgraduate in Urban Planning / Regional Planning or equivalent from a recognised institution	Min. 10 years' experience She/ He should have experience of working in the area of urban development and environment planning and management and urban economics. Knowledge of urban areas, and the real estate market is highly desirable.

4.	Data Analyst/Statistician	Postgraduate in Econometrics, Economics, Statistics or related field from a recognized institution	<p>Minimum of 8 years' experience.</p> <p>She/He should have relevant experience in handling survey and secondary datasets. She/he should have experience handling spatial datasets, cleaning, mapping, and analysing them through relevant software like Python, R, etc.</p>
5.	Urban Transport Expert	Postgraduate in Transportation Planning from a recognised institution	<p>Min. 5 years' experience</p> <p>She/ He should have experience of working in the area of urban development, and the Urban Transportation sector. Knowledge of urban areas, urban transportation and labour and employment market is highly desirable.</p>
6.	GIS Specialist	Postgraduate in GIS/Planning	<p>Minimum 5 years' experience.</p> <p>She/ He should have relevant professional experience in developing data models for datasets, GIS applications etc. Proven experience in conducting spatial analyses and production of maps of various scales. Excellent ability in using software such as Esri's GIS, ACAD, Python, R and other relevant visualisation software.</p>
7.	Social development specialist/communication specialist	Postgraduate in social studies, sociology, psychology, communication studies, public policy or a related field	<p>Minimum of 5 years' experience.</p> <p>She/He should have relevant experience in working with the statistician on household surveys and secondary datasets. She/he should have experience engaging with communities and holding stakeholder consultation sessions, informant interviews, focus group discussions, etc.</p>

Section 6: Review of the Reports

A review committee consisting of officials from CMDA departments, experts and selected academic institutions will be constituted to review each report. Based on the suggestions given by the committee all the draft reports should be revised/corrected and submitted for payment.

Section 6: Other Requirements

Duration and Location

The assignment is expected to take 32 weeks with a start date of April 1, 2023. The services shall be delivered in Chennai, Tamil Nadu, and the core members of the consultant's team are expected to stay in Tamil Nadu for at least 50% of the time. The client (CMDA) will provide facilitation support to help with access to other stakeholders and relevant government institutions, and organise workshops when needed.

Data, local services/coordination, facilities to be provided by CMDA

CMDA will facilitate setting up of meetings with government stakeholders. It will arrange only for venues and refreshments (in CMDA offices or other facilities depending on number of participants) for various stakeholder consultation exercises and workshops; overall coordination with stakeholders, resource persons, etc. will have to be done by the consultant. CMDA will also facilitate the consultants to connect with other consultants who are working on related sectoral studies in parallel, in particular the team studying the demand and supply of housing in the CMA. As both studies will initiate some primary data collection, it is encouraged that the consultant teams coordinate with each other in terms of sampling methods, timing, and procedures, as well as community awareness activities. CMDA can provide meeting rooms for up to 05 team members of consultants in CMDA premises, and in DTCP premises when outside CMDA, if required, on an as-is basis depending on availability of meeting rooms.

Institutional and Organisational arrangements

Member Secretary, CMDA, will be the Nodal reporting authority for this Study. <> will be the point of contact for all procurement and reimbursement related issues.
