



CHENNAI: URBAN VISIONS

A PLATFORM FOR INTEGRATED WATER
GOVERNANCE IN METROPOLITAN CHENNAI:
DEVELOPING FUTURE SCENARIOS AND
STRATEGIES THROUGH PARTICIPATORY
SIMULATIONS

AUTHORS

Dr. Parama Roy, Krishna Kumar, Zachariah Karunakaran, Akshaya Ayyangar, A. Ramachandran, Ayushman Banerjee, Auralice Graft and Dr. Ashwin Mahalingam

FUNDERS



TECHNICAL PARTNERS



ABOUT THE ORGANIZATIONS

Funders

Tamil Nadu State Land Use Research Board

The State Planning Commission established TN SLURB as a permanent body in 2011. TN SLURB evolves formal interactions with various stakeholders and arrives at various policy options besides enabling the State Planning Commission to host seminars/workshops and to commission studies on sustainable land water resource management. The objectives of TN SLURB range from assessing land resources and assigning priorities for land-use changes to building databases and utilizing such databases for improved integration.



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Technical Partners



Okapi Research & Advisory

Okapi is an IIT Madras-incubated research and consulting group focused on strategies for addressing the institutional voids that handicap collaboration and innovation in delivering sustainable development. It works with government, corporate, philanthropic and community-based clients, primarily but not exclusively in India, to help them reach environmental and human development goals. Its current work focuses largely on infrastructure and service governance, in sectors ranging from energy to urban infrastructure and at scales from social enterprise development to national policy. It also has a growing portfolio of projects focused on developing scenarios as a tool for anticipating, preparing for and influencing the future; including adoption of new technologies and science-based approaches across sectors.



Fields of View

Fields of View is a Bangalore-based non-profit organization that uses simulations and games as visual representations to engage specific groups or diverse stakeholders on a wide range of issues from framing and defining vague but pressing policies to solving “wicked problems”. Tools such as Agent-Based Models enable policymakers to explore multidimensional implications of their decisions prior to implementation. The visualization process broadly functions as a means to deepen participation in social, economic and environmental problems that require solutions through involving multiple actors including the general public. The interdisciplinary team works with academia, civil society and the government around complex public policy problems ranging from urban poverty to waste management.



The Indian Institute of Technology, Madras/Centre for Urbanization, Buildings and Environment (CUBE)

CUBE, a centre of excellence being raised as a society in IITM, is an applied research centre founded to address the practical challenges being faced by urban built environment through development and deployment of innovative technology and policy-based solutions in partnership with academia, government and the private sector. Its mission is to innovate and translate academic research into actionable solutions. Its primary focus is on housing and construction, smart cities, urban planning, transportation and environmental sustainability.

EXECUTIVE SUMMARY

The floods of 2015 caught Chennai completely off guard and brought the city to a grinding halt. Many critiqued the poor policies and lack-of inter-departmental co-ordination amongst crucial government agencies as the primary reasons of the damage incurred. Even after 3 years, experts argue that the city's responses towards such events have remained reactive and uncoordinated.

This report is the first in a series of reports under the ongoing project, "A Platform for Integrated Water Governance in Metropolitan Chennai: Developing Future Scenarios and Strategies through Participatory Simulations." The project was conceived to understand the institutional dynamics amongst the actors and the processes shaping the urban ecosystem in Chennai with a focus on land, water, and waste. In addition to a series of policy-oriented reports, the final output will include an Agent Based Modelling tool that would assist policy makers and key stakeholders in the land-waste-water nexus make informed decisions.

To begin with, this report offers a chronological overview of the city's urban and administrative evolution, including the impact of colonialism, the entrance of the World Bank in India's governance scene, and of India's economic liberalization in influencing its urban trajectory. The report then presents an analysis of the recent trends in population growth, economic growth and spatial growth that reflects different facets of Chennai's urbanization process. Based on this, the following key points emerged as pivotal in shaping Chennai's future:

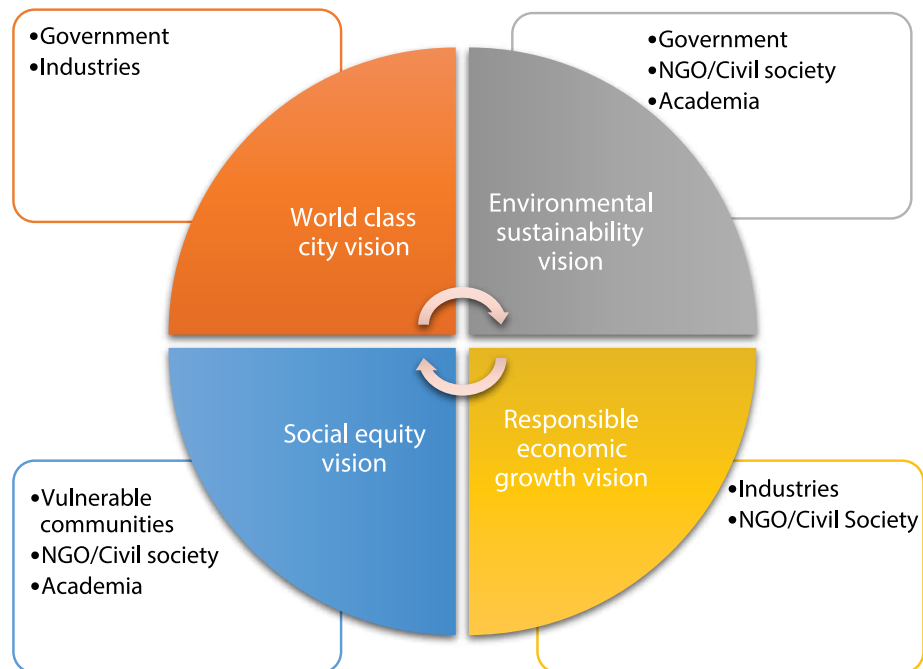
1. The high population density in the city combined with increasing land prices and lack of affordable housing has triggered migration to the peripheries of the city.
2. Similarly, the city's increasing water woes, along with the scarcity of land is likely to push industries to the city's peripheries which is bound to disrupt the land-waste-water dynamics in these areas.
3. The pressure placed on the government to provide infrastructure, stemming from the migrations, will lead to further loss of waterbodies and ecologically vulnerable areas.
4. Additionally, the marked increase in the informal economy with its associated housing challenges will intensify encroachments along waterbodies and in vulnerable areas.

Through a series of stakeholder workshops, semi-structured interviews with key actors, analysis of public data-sets, planning, policy and budget documents, this report also sheds light on the dominant visions of development amongst the government and non-governmental stakeholders (industries, non-profit/civil society, academia, vulnerable communities) for Chennai.

Four dominant visions seem to shape Chennai's development based on multiple stakeholder groups' preferences and priorities:

1. World-class city vision (global competitive city development)
2. Environmental sustainability vision (developing the city within environmental limits)
3. Social equality vision (developing the city as a socio-economically just space)
4. Responsible economic growth vision (developing the city to remain ecologically sound for the sake of economic competitiveness).

The figure below represents the affiliations of various stakeholders to the multiple visions.



While government priorities broadly touch upon needs of environmental sustainability and social equity, the predominant focus is on the world class city vision. Similarly, while other stakeholders understand the inherent importance of the articulated visions, their dominant vision is influenced by their aspirations for the city and the associated advocacy efforts.

However, inherent tension and contradictions become evident as theory translates into action.

In the end, the report seeks to understand which of the interpretations or visions of development most influence action on the ground and what makes it into policy by carrying an analysis of: 1) financial budget

of the GCC; 2) land reclassification decisions of the CMDA; 3) industrial development policy of the Government of Tamil Nadu and the IT corridor development. This analysis shows, while multiple visions may exist, what translates into action, projects, policies, budgets often tend to favor the economic development centric vision. In addition, some interesting points also emerge from this analysis:

1. The push for building new infrastructure or services without equal focus and resources for maintaining the existing ones has limited the effectiveness and longevity of the new infrastructure.
2. The expenditure on storm water drains is not reflective of the vulnerability data available in Chennai Disaster Management Plan, 2017.
3. The land reclassification decisions show how developmental pressure tends to guide government's action on the ground at the expense of environmental damage or loss of people's livelihood.
4. The reclassification data shows that increasing quantities of land have been converted from agricultural use to non-agricultural use, to accommodate the rising need for land for housing and commercial development.
5. The analysis further shows how the water bodies have been classified as wastelands in the past in order to justify planning permissions for industry and real estate development.
6. The growing housing and water related challenges along with the environmental degradation in the contentious IT corridor shows how economic advancement and augmentation appear to dominate the city's growth trajectory.

In conclusion, drawing on the ecosystem mapping exercise and the continuous engagement with key stakeholders to understand the multiple visions for development, the report provides the following scenarios which will help address the challenges arising from an exclusively growth driven development trajectory at the cost of environmental degradation:

1. Data-driven policy decisions – a scenario where alternative forms of knowledge (for instance, community-based knowledge) and technology is accommodated in planning and decision-making.
2. Better operations and maintenance funds – a scenario where more resources are allotted for daily operations and maintenance of existing infrastructure to ensure the proliferation and sustainability of new infrastructure.
3. Stringent land-use reclassification procedure – a scenario where the reclassification process is made institutionally more rigorous, involving multiple stakeholders/agencies especially in cases of transforming unbuilt or ecologically vulnerable land into built-up area.
4. Participatory planning – a scenario which envisages of broad participation

from local residents, non-profits, industries and government bodies to ensure protection of the multiple interests/visions than to give in to the economic pressure for more growth.

5. Integrated Planning via a Nodal Agency – a scenario where the master planning exercises are prepared simultaneously and in conjunction with relevant agencies in order to ensure coordination between the planning agency and the rest of the implementing agencies.

The findings from the report has contributed to define the contours of the Agent based model. Stakeholders, irrespective of their affiliations have been forthcoming to share their vision, aspirations and challenges. While they are cognizant of the uncertainties around water security, lack of concerted efforts or efforts undertaken in silos have provided little relief to the public. It is hoped that this report series acts as a valuable resource for policy makers and private individuals to gain granular insights into the institutional relationships and the decision-making process.

TABLE OF CONTENTS

Foreword	14
CHAPTER 1: INTRODUCTION: HOW WE GOT HERE	18
BACKGROUND	19
HISTORY	19
RECENT TRENDS IN URBANIZATION AND GROWTH	25
POPULATION GROWTH	27
ECONOMIC GROWTH	30
SPATIAL GROWTH	34
CHAPTER 2: REPORT FRAMEWORK AND METHODOLOGY	37
STAKEHOLDER ANALYSIS APPROACH	38
DATA COLLECTION AND ANALYSIS METHODS	40
CHAPTER 3: ACTORS SHAPING CHENNAI'S DEVELOPMENT	43
CHAPTER 4: VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT – GOVERNMENT VISIONS	47
TAMIL NADU VISION 2023	48
CMDA'S SECOND MASTER PLAN	49
CITY DEVELOPMENT PLAN	51
STAKEHOLDER CORROBORATION OF DOMINANT VISIONS	53
CHAPTER 5: VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT–NON-GOVERNMENTAL STAKEHOLDERS	57
INDUSTRIES' VISIONS	58
NON-PROFITS/CIVIL SOCIETY STAKEHOLDERS' VISIONS	59
ACADEMIC VISIONS	62
VULNERABLE COMMUNITIES' PRIORITIES AND VISIONS	63
CONVERGENCES/DIVERGENCES BETWEEN MULTIPLE VISIONS OF DEVELOPMENT	65

CHAPTER 6: VISIONS TO ACTION	67
GREATER CHENNAI CORPORATION BUDGET	68
ANALYSIS	70
LAND RECLASSIFICATION BY THE CMDA	70
ANALYSIS	75
THE GOTN'S IT POLICY AND THE IT CORRIDOR MEGAPROJECT	75
ANALYSIS	81
CHAPTER 7: CONCLUSION	82
PLANNING WITH ALTERNATIVE VISIONS OF DEVELOPMENT	83
LOOKING AHEAD TO FUTURE SCENARIOS	85
BIBLIOGRAPHY	87
APPENDIX 1	93
APPENDIX 2	94
APPENDIX 3	96

LIST OF FIGURES

Figure 1: Urban Political Ecology approach	17
Figure 2: Chennai historical pictures	23
Figure 3: Evolution of urban development in Chennai	25
Figure 4: CMDA map	26
Figure 5: Decadal growth rate – CC and CMA	28
Figure 6: Decadal growth rate map 1991-2001	29
Figure 7: Migrant data	30
Figure 8: Trend of percentage of employment in different sectors in Chennai Corporation	31
Figure 9: Trend of percentage of employment in different sectors in the CMA	31
Figure 10: Agricultural land reclassification 1971-2001	32
Figure 11: Land reclassification 1971-2001	32
Figure 12: Formal and informal economy distribution	33
Figure 13: Land-use and land-cover change	34
Figure 14: Land-use and land-cover change	35
Figure 15: Stakeholder analysis framework for examining who drives Chennai's development	39
Figure 16: Stakeholder Workshops	41
Figure 17: Landsat datasets	41
Figure 18: Stakeholder map	45
Figure 19: Stakeholder visions and priorities	66
Figure 20: SWM expenditure (in crores)	69
Figure 21: Corporation expenditure on storm water drains (in crores)	69
Figure 22: Land conversion data	71
Figure 23: Uses for which agricultural land was converted	72
Figure 24: Agricultural land conversion map	72
Figure 25: Uses for which residential land was converted	73
Figure 26: Residential land-use conversion	73
Figure 27: Waterbodies conversion map	74
Figure 28: Industrial and IT corridors in Chennai	76
Figure 29: Growth of IT units in TN	77
Figure 30: Private water tanker illegally dumping sewage water in an SWD	80

ABBREVIATIONS

CAG Citizen Consumer and Civic Action Group

CDP City Development Plan

CMA Chennai Metropolitan Area

CMDA Chennai Metropolitan Development Authority

CMWSSB Chennai Metropolitan Water and Sewerage Supply Board

Cr crore

CRC Coastal Research Centre

CRRT Chennai Rivers Restoration Trust

CSR Corporate Social Responsibility

ELCOT Electronics Corporation of Tamil Nadu

GCC Greater Chennai Corporation

GIS Geographic Information System

GoI Government of India

GoTN Government of Tamil Nadu

IGCS Indo-German Centre for Sustainability

IT Information Technology

ITES Information Technology Enabled Services

JNNURM Jawaharlal Nehru National Urban Renewal Mission

LULC Land Use Land Cover

MAWS Municipal Administration and Water Supply

MCCI Madras Chamber of Commerce and Industry

MIDS Madras Institute of Development Studies

MSME Micro, Small and Medium Enterprises

MRTS Mass Rapid Transport System

O&M Operations and Maintenance

OMR Old Mahabalipuram Road

PPC People's Plan Campaign

PWD Public Works Department

RWH Rainwater Harvesting

SCF Sustainable Chennai Forum

SEZ Special Economic Zone

SIDCO Small Industries Development Corporation Limited

SIPCOT State Industries Promotion Corporation of Tamil Nadu Limited

SWD – Storm Water Drain

SWM Solid Waste Management

TANSIDCO Tamil Nadu Small Industries Development Corporation Limited

TIDCO Tamil Nadu Industrial Development Corporation Limited

TNHB Tamil Nadu Housing Board

TNPCB Tamil Nadu Pollution Control Board

TNRDC Tamil Nadu Road Development Company

TNSCB Tamil Nadu Slum Clearance Board

TNSDMA Tamil Nadu State Disaster Management Agency

TNUIFSL Tamil Nadu Urban Infrastructure Financial Services

TUFIDCO TamilNadu Urban Finance and Infrastructure Development Corporation Ltd

TWAD Tamil Nadu Water Supply and Drainage Board

FOREWORD

Chennai, the fourth largest city in India, on the one hand aspires to sustain its growth and development and, on the other is increasingly facing environmental limitations in multiple forms (water scarcity, floods, droughts, sea-level rise and loss of greenery, wetlands and other natural resources/habitats). Okapi Research & Advisory, the Center for Urbanization, Buildings & Environment (CUBE) at IITMadras and Fields of View, funded by Tamil Nadu State Land Use Research Board, Cholamandalam Investment and Finance Company Limited, and Tata Trusts have initiated a project titled, "A Platform for Integrated Water Governance in Metropolitan Chennai: Developing Future Scenarios and Strategies through Participatory Simulations". This project is an attempt to develop a process of planning and decision-making that can help integrate concerns and actions around urban growth and environmental management, particularly with respect to water-related vulnerabilities, so that Chennai may develop as a sustainable and resilient city.

This process of integrated planning and decision-making encompasses a three-step methodology:

- I. **Context Development:** This involves using primary and secondary research to gather background information on current trends of the city's development, its state of water and emerging tensions, particularly with respect to institutional and governance-related challenges.
- II. **Scenario and Tool Development:** This involves agent-based model development to present multiple scenarios based on varied decisions and actions undertaken by different public, private and civic agencies.
- III. **Strategy Development:** Finally, scenarios and games will be used to enable multiple actors to design strategies that can help address current challenges characterizing the city's development and its intersection with water-related risks.

The specific outcomes of this work will include:

1. Five policy-oriented reports

- a. Chennai: Urban Visions – A report on the city's socio-economic drivers, their visions and the overall trajectory of development.
- b. Chennai: State of Water – A report on the current state of water and associated risks.
- c. Chennai: Emerging Tensions in Land, Water and Waste Governance – A report on institutional and decision-making challenges related to how land, water and waste is dealt with in the context of rapid urban development and need for greater water resilience.

- d. Building an Integrated Governance Platform – Drawing on grounded experience, a report on challenges and good practices around data collection, workshop facilitation and project design to facilitate replication of similar scenario-based integrated governance platforms.
- e. Shaping Public, Private, Community Actions for Transformative Change – A comprehensive, grounded, tactical strategic blueprint to guide, public, private and civil society actions to transform the system.

2. An agent-based model to help assess implications of specific land, water and waste-related decisions on the Chennai Metropolitan Area (CMA)'s water vulnerability scenario.

The reports and the agent-based model will offer the essential integrated/interdisciplinary knowledge and practical tool and guidance for planners and policy makers to make informed decisions for a more sustainable water resilient Chennai. The first phase of work has synthesized existing data and collected some primary data to set the stage for stakeholder engagement and deliberation in the following two steps of the integrated planning process, namely, the scenario and strategy development phases. This work is presented in the first three reports: 1. Chennai: Urban Visions; 2: Chennai: State of Water; and 3: Chennai: Emerging Tensions in Land, Water and Waste Governance. The overarching thought that binds the three reports is grounded in Urban Political Ecological (UPE) scholarship rooted in the work of David Harvey (2000; 1996; 1989; 1973) and Neil Smith (1996; 1984; 1980 with Keefe).

Since our core purpose in this project is to develop a process of integrated and participatory planning that can make Chennai more resilient towards water-related risks, a common question is whether such integrated planning falls within the scope of urban planning or environmental planning? We often think of urban/human issues and environmental/natural issues as distinct, and hence tend to differentiate urban planning and governance from environmental planning and governance. However, UPE scholars contend that our cities and the state of their resources including land, water, vegetation, air, etc., are a result of the complex interaction between existing environmental conditions and human processes. For instance, flooding in Chennai in 2015 was not simply a natural disaster. Rather, as one activist described, "it was in the making since 1990s". Land-use change due to fast urbanization and economic development lead by human decisions and actions across CMA, interacted with the hydrological and climatological dynamics, leading to the city to come to a stand-still in December that year.

The UPE approach can be summarized in terms of its three core tenets. Each of these tenets provides a theoretical and analytical basis for examining our cities and its environment.

Tenet 1: Understanding city and its environment as a manifestation of the dialectic interaction of social and environmental processes

Counter-intuitive to the traditional and popular expectation of finding nature outside the city's boundaries (Keil, 2003) and necessarily contentious understanding of "pristine nature" vs. "destructive humanity" (Braun, 2002), the UPE approach focuses on the dialectic/two-way and symbiotic relation between nature and society (Swyngedouw, 1996; Swyngedouw and Kaika 2000; Cronon, 1991; Keil and Graham, 1998). It enables us to think of the urban environment as a product of interaction between human elements of planning decisions, policies, infrastructure funding, investment and ownership practices, public engagement, local politics, etc. and nature (Kaika 2005; Swyngedouw and Heynen, 2003; Braun and Castree, 1998). As such, in our effort to present an understanding of the current state of waterbodies in Chennai, we pay attention not only to the physical/environmental aspects of rainfall, local topography and drainage patterns, but also engage with social aspects of urbanization and planning and policies around water and waste management to highlight the complex two-way society-nature interaction (see the State of Water report). This dialectic interaction is evident, for instance, in the extent to which rapid encroachment on waterbodies impacts the quality and quantity of water while this state of water itself poses threats to future development of the region in absence of sustainable solutions.

Tenet 2: Excavating socio-political power play in production of city environment

UPE recognizes the existence of the deeply uneven power relations through which the contemporary city environment is produced (Heynen et al., 2006). Harvey explains that urbanization is a process of contestation for achieving control over society's scarce resources. In this struggle, it is usually those with relatively more socio-economic power who win, letting the marginalized fall further back in the struggle. This explains the continued inequality in distribution of resources like drinking water, which are scarce to start with in a city like Chennai (Janakarajan, 2013; Srinivasan et al., 2010). However, this power play is not only driven by economic power but also by social, political and institutional power, which plays an equally important role in determining who benefits from and who is threatened by the state of the socio-natural condition of a city. As such, uncovering these intricate power relations remains an extremely important part of our three reports as we attempt to explain the process of peripheralization of the water problem in Chennai (in the State of Water report), the limited incorporation of citizens' inputs, especially those of marginalized ones, in urban planning and policy-making (in the Urban Visions report) and the interaction between various government agencies with differential power and jurisdiction, divided responsibilities across sectors and geographies and blurred accountability shaping urban-water governance ecosystem in Chennai (in the Emerging Tensions report).

Tenet 3: Understanding the present through a historical-geographic perspective

The UPE framework highlights that a proper understanding of the present state and plans to modify the future towards sustainability requires a historical geographic perspective. In other words, to understand the present and predict and/or modify the future, we need to look at the past trajectory. Similarly, for a complete picture, it is essential to pay attention to social and ecological processes interactively shaping our cities at various geographic scales/spaces. As such, in our analysis of the present state of urban development, water resources and governance we have time and again highlighted how past events have shaped or have been transformed by current trends. In the Urban Visions report, for instance, we describe the historical trajectory of development of Chennai as the fourth largest city in India, underlying political-economic shifts and implications for the city's environment. Similarly, in examining the role and relation of agencies involved in governing Chennai, we have paid particular attention to how these agencies work at various scales and with what implications, specifically in the Emerging Tensions report. As such, each of the three reports in the Context Development phase of our work emphasizes on different aspects of the human-environment interaction process that ultimately shape Chennai and its waterscape (see Figure 1).

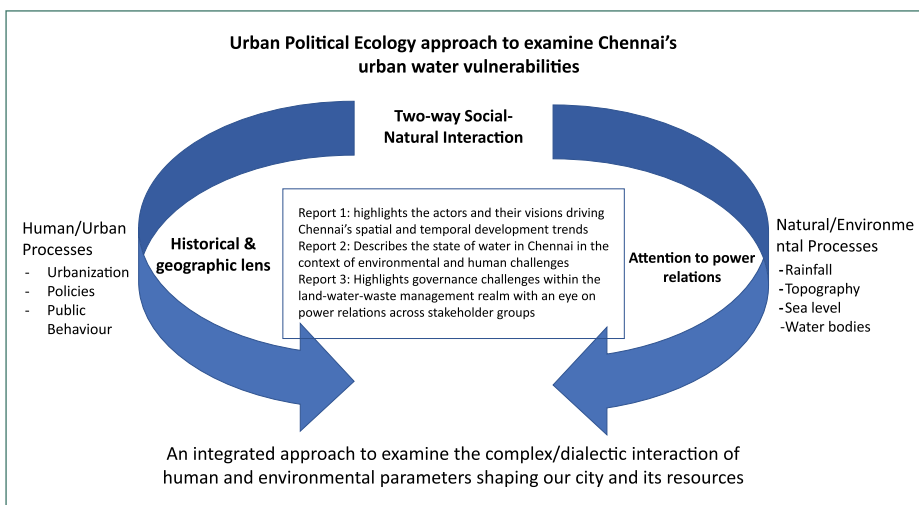


Figure 1: Urban Political Ecology Approach

Counter-intuitive to the traditional and popular expectation of finding nature outside the city's boundaries and necessarily contentious understanding of "pristine nature" vs. "destructive humanity", the UPE approach focuses on the dialectic/two-way and symbiotic relation between nature and society.

The following report, Chennai: Urban Visions, is one of the three reports that present the context development work. This report develops a comprehensive understanding of Chennai's socio-economic development trends and the planning and political-economic context that drives these trends. Inspired by the purpose of integrating the actions of multiple agencies (public, private and community) towards a sustainable development track, this report first identifies all the relevant actors who collectively shape the present and future development of the city and its water resources; highlights their visions and aspirations for Chennai's future; and finally examines which of the multiple visions of the city translate into action and shape policy.

CHAPTER 1

INTRODUCTION: HOW WE GOT HERE



CHAPTER 1: INTRODUCTION: HOW WE GOT HERE

BACKGROUND

Chennai (until 1996 known as Madras) in south-east India is a sprawling city along the Bay of Bengal's Coromandel Coast. The city serves as the capital of Tamil Nadu and had an estimated population of 8.6 million in 2011, compared to 3.5 million in 1971 (Census, 2011). It is governed by the Greater Chennai Corporation (GCC), whose jurisdiction was expanded to an area of 426 square kilometres (sq. km) from 174sq. km in 2011. A diverse economic base feeds into the city's GDP (US \$58 billion), including information technology (IT), automobile and hardware manufacturing, health care and financial services (Global Metro Monitor, 2015). The port city contributes 60 percent to Tamil Nadu's manufacturing and produces 60 percent of India's automotive exports, thus playing a significant role in the state and central economy (Ramesh, 2015).

Chennai's unbridled development trajectory, combined with its geography, have posed complex and far-reaching problems for the city's environment, in particular to its hydrology, as evidenced during the 2015 floods (Arabindoo, 2016). For instance, the city's low-lying elevation, at an average of 6 metres above sea level, subjects it to the risks of storm surges and tsunamis emerging from its coast, where sea levels are rising approximately 0.5 mm per year (Chowdhury and Behera, 2016). In addition, the city's recent history of flood risk and water scarcity reflect the prominent ways in which urban development and planning shape and interact with the city's hydrological dynamics. Following the 2015 floods, greater attention is directed towards understanding this intersection between the city's development trajectory and environmental concerns.

HISTORY

A brief glance at Chennai's history presents interesting facets of the city's social, political and economic developments and practices that made the city what it is today. Evidence of settlements in Chennai can be traced back to the second century AD when the polymath Ptolemy documented Mylapore's trade links with the Romans and Greeks. The city's geography served as a trading hub that subsequently attracted the Portuguese, Armenians and Dutch between the fifteenth and seventeenth centuries (Manohar & Muthaiah, 2016).

Religion also played a role in partly shaping the social geography of the city, given long-held traditions of communities clustering around temples and religious centres. Neighbourhoods such as Thiruvanmiyur, Triplicane, Thiruvottiyur and Mylapore functioned as important religious nodal points.

At the same time, the topographical and hydrological constraints influenced settlement patterns in a way that communities tended to concentrate in more elevated areas (Manohar & Muthaiah, 2016).

These villages, to a large extent, organized resources and land collectively (Arabindoo, 2011, 2008). For example, the Poromboke system of land use and segmentation, dating back to the medieval era, designated areas that ranged from grasslands and groves to waterbodies and village forests as shared-use spaces (the term “Porom” means “outside”). At the same time, such commons were also shaped by the caste system, whereby uses would be divided by various professions to the extent that “the historically oppressed had clear inalienable rights” as well (Jayaraman, 2016).

The greater flexibility afforded to such forms of classification is also associated with traditionally blurred boundaries between public and private spaces. Social and day-to-day activities, ranging from washing and bathing to celebrations and defecation, often unfolded in communal spaces. As such, segmentation of land use according to economic terms, as public or private land, did not factor into the decision-making process (Arabindoo, 2011).

Specifically, with respect to water, Madras’ deeply entrenched and sophisticated relationship with water was reflected in its intricate networks of water tanks or “Erys”. Typically, Erys were local resources of isolated or interconnected waterbodies built to address the disparities in the annual monsoon cycle. While their primary use was for irrigation, they played a crucial role in conservation, aquifer recharge, and notably the inter-connected Erynetwork served as an important buffer against flooding (Manohar & Muthaiah, 2016; Jameson & Baud, 2016). Commonly, a committee (EryVariyam) was constituted by the villagers to oversee the maintenance of the Ery, in addition to raising funds and utilizing resources. Data, mostly from inscriptions, describes an elaborate fundraising network which consisted of allocating a dedicated percentage of the gross produce of each village for maintenance of the Ery. Additionally, the rent from fishing rights in the Ery served as a supplementary source of income. The funds were used for deepening the Ery and other major repairs (Mukundan, 2005).

Today, Erys have lost their relevance in an urbanized Chennai. Most of the Erys have been encroached upon or reclassified as domestic plots, or they are poorly maintained. Further, the transition to building centralized water management structures (dams/canals) and the proliferation of unregulated private borewells have rendered Erys, and the associated social organization structure, obsolete.

In essence, Madras, until the advent of British colonization, was not urban. In fact, its deep-rooted religious and associated bucolic traditions are stated to have a continued to influence contemporary life in the city. In addition, the harsh climate, vulnerable location and lack of agricultural hinterland made it even more unlikely that the British would form its first municipal corporation here. It was and arguably remains a “city that was never meant to be” (Arabindoo, 2011, 2008, p. 383).

In essence, Madras, until the advent of British colonization, was not urban. In fact, its deep-rooted religious and associated bucolic traditions are stated to have a continued influence on contemporary life in the city.

Yet there was strategic value to setting up a base in Madras. British ventures into the area began in the early seventeenth century. In 1639, the British East India Company was granted a tract of beachfront land by a Hindu officer to set up a cloth manufacturing company. The city's location afforded the British East India Company military advantage in defending a larger terrain to exploit resources that were still contested by other colonial powers (Arabindoo, 2011, 2008).

The Corporation of Madras came into being in 1688 on the advice of the East India Company, based on a prevailing Dutch model of government followed in the East Indies. The corporation came into being with a British elected mayor, and a collective of aldermen and burgesses, representing all castes and other British officials (Coehlo et al., 2011). In effect, this process created the foundations for the British East India Company to extend control across the south and begin refashioning the physical and socio-economic landscape of the city (Manohar & Muthaiah, 2016).

The first formulation of the corporation was constituted in line with prevailing British approaches to municipal governance, whereby local revenues would be raised and administered for the creation of urban services and infrastructure including a jail, school, town hall and drainage systems (Coehlo et al., 2011). A military base was set up in the northern area of Fort St. George, which also served as homes and a thriving market for the indigenous "black" community. Public spaces retained the chaotic and crowded affairs characteristic of the traditionally communal use of lands. The white communities formed residential neighbourhoods south of the Cooum (Arabindoo, 2008; Manohar & Muthaiah, 2016), segregating the city along racial/ethnic lines.

The overarching approach to urban development favoured suburbanization, whereby investments into road networks and railway systems would perpetuate this trend (refer to Fig. 2) (Kanchanamala and Sekar, 2011). Topographical and hydrological factors were not accounted for in planning decisions. The introduction of the Royapuram Railway Station in 1862 was one of the clearest manifestations of this strategy. This not only induced migration northwards towards the low-lying Royapuram neighbourhood where a timber industry had developed, but the railway's pathway traversed sensitive swamplands such as Perambur in North Chennai. Migrants started settling around such transportation networks, in areas that were traditionally uninhabited (Manohar & Muthaiah, 2016).

Furthermore, land-use classifications focused on rudimentary, western distinctions between private and public with a particular focus on the economic value of land, thus demarcating many Poromboke areas such as wetlands as "wastelands" – this differentiation method would continue well into the twentieth century (Jayaraman, 2016; Manohar & Muthaiah, 2016).

The premium placed on engineering interventions to manage the city's functioning and growth was also reflected in prioritizing drainage systems over the traditional tanks for water supply. While the former system may

have contributed to some advancement in public sanitation, the gains were limited and belied by the deteriorating conditions of many of the neglected tanks which often became hotbeds for diseases such as malaria. To resolve such matters, they were often filled up, with scant attention given to conservation practices as a potential alternative (Jameson & Baud, 2016).



Madras Presidency in 1914

Source: University of Texas at Austin Libraries



*Figure 2: Chennai historical pictures
Clockwise from Left Top: Marina, Mount Road, Napier Bridge and Parry's Corner in 1914
Source: Housing.com*

From the 1900s to the 1940s the city, in terms of size and population, grew from 70 sq.km and 540,000 to 80 sq. km and 860,000 respectively. Additional infrastructure projects, such as the Electrified Metre-Gauge Railway perpetuated the developmental trajectory set forth during the seventeenth and eighteenth centuries (CMDA, 2006). The trajectory of growth and urbanization of Madras was significant relative to its local counterparts in Tamil Nadu, and in the South more broadly (Arabindoo, 2008; Coehlo et al., 2011), and it picked up pace after independence (Manohar & Muthaiah, 2016). The boundary of the city was expanded to 129 sq. km to accommodate annual population growth rates of 2 percent from 1951 to 1961 and 3.51 percent from 1961 to 1971 (CMDA, 2006). In 1978 the boundary of Chennai proper was once again expanded to cover 176 sq. km to manage the continuing growth (CMDA, 2006). However, this was not accompanied by systematic investments into civic amenities for a population that was becoming increasingly urban across the entire State of Tamil Nadu (Arabindoo, 2011). While the increase in population and spatial

expansion demanded effective planning and sufficient infrastructure support, it has been argued that barriers to the robust growth of Chennai were rooted in misplaced priorities of state governments, particularly from the mid-sixties (Arabindoo, 2011, 2008; Kennedy et al., 2014).

With the rise of regionalism in Tamil Nadu, reflected in the promotion of local language, ethnicity and culture, the political apparatus that emerged consolidated its power based on a combination of patronage politics and populist policies that skewed resources towards subsidies and spectacles (Arabindoo, 2011, 2008; Kennedy et al., 2014). Furthermore, investments targeted towards on-site slum reconstruction to improve the well-being of many poor residents were rendered inefficient due to lack of transparency and haphazard investments in infrastructure, diminishing the productive capacity of the region. That is, industrial policies such as setting up industrial estates proved ineffective (Arabindoo, 2008; Kennedy et al., 2014; Raman, 2011). These actions were shaped by a broader move that has been interpreted as the state “looking inwards” (Kennedy et al., 2014).

In conjunction, post-independence, urban planning continued to follow the pre-independence trends and practices, specifically in terms of continuing development without due consideration of the environment. For example, during the 1970s the Tamil Nadu Housing Board (TNHB) used World Bank funding to fill up “unusable” tanks to construct housing (for instance in Ambattur and Mogappair) ignoring the ecological function of the waterbodies and perpetually putting these neighbourhoods and eventually the city at risk of flooding (Coelho, 2016). The entrance of international funding agencies into the realm of urban development during this period further complicated the situation, as their interest was primarily in cost recovery of their investments, with little regard for the social or environmental context (Coelho et al., 2011).

Liberalization of the economy in the early 1990s provided an additional push for aggressive development to attain economic growth, often with blatant disregard for socio-ecological concerns. Examples like the development of the Phoenix City Mall on part of what used to be Velachery Lake, and the construction of the mass rapid transport system in the same area during the same period, exemplified this disregard for the environment. The timeline in Fig. 3 presents an overview of this evolution of the urban development and planning trend of Chennai graphically.

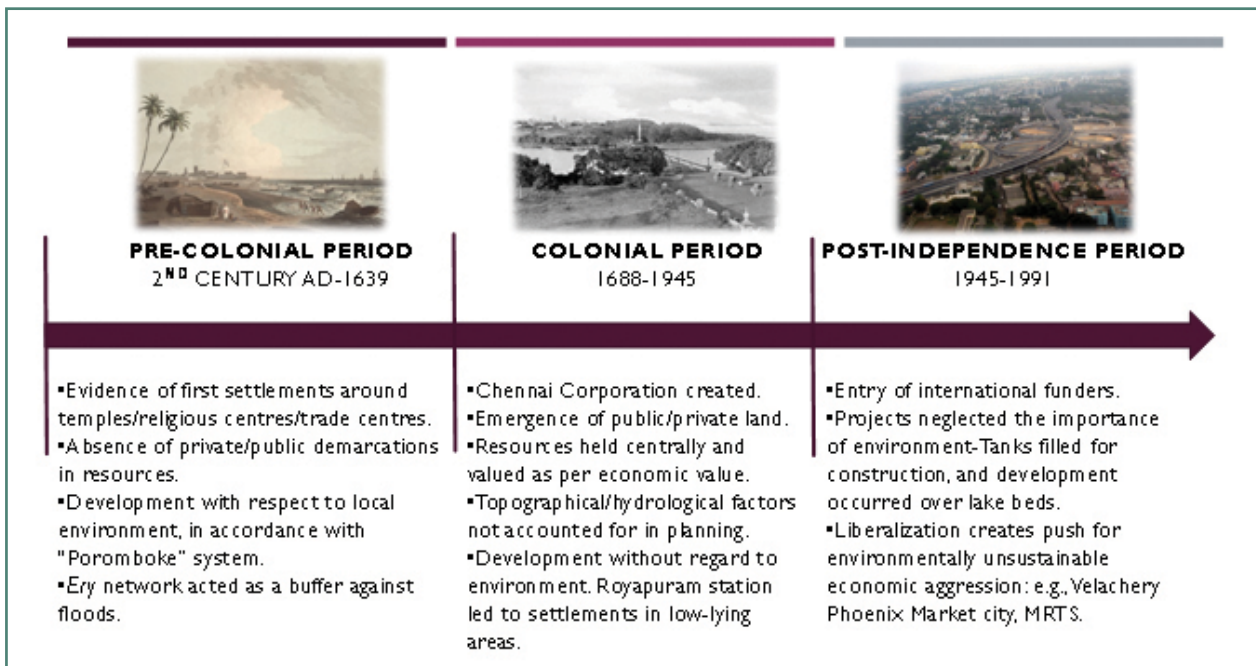


Figure 3: Evolution of urban development in Chennai

RECENT TRENDS IN URBANIZATION AND GROWTH

Chennai's urban and administrative history has played an important role in establishing its status as the fourth largest metropolis in India after Delhi, Mumbai and Kolkata. The Corporation of Chennai is demarcated at 176 sq. km with a population of 4.7 million as per data from the 2011 Census (Government of India, 2011). The CMA with a population of 86,535,521 comprised, until recently, 1189 sq. km (Gol, 2011). The region is poised for further economic and population growth, underwritten by a proposed metropolitan expansion covering 8878 sq. km, whereby the entirety of the adjacent districts of Kanchipuram and Tiruvallur, along with the Arakkonam division within the Vellore district, will come within its boundaries (Kabirdoss, 2018) (see Fig. 4).

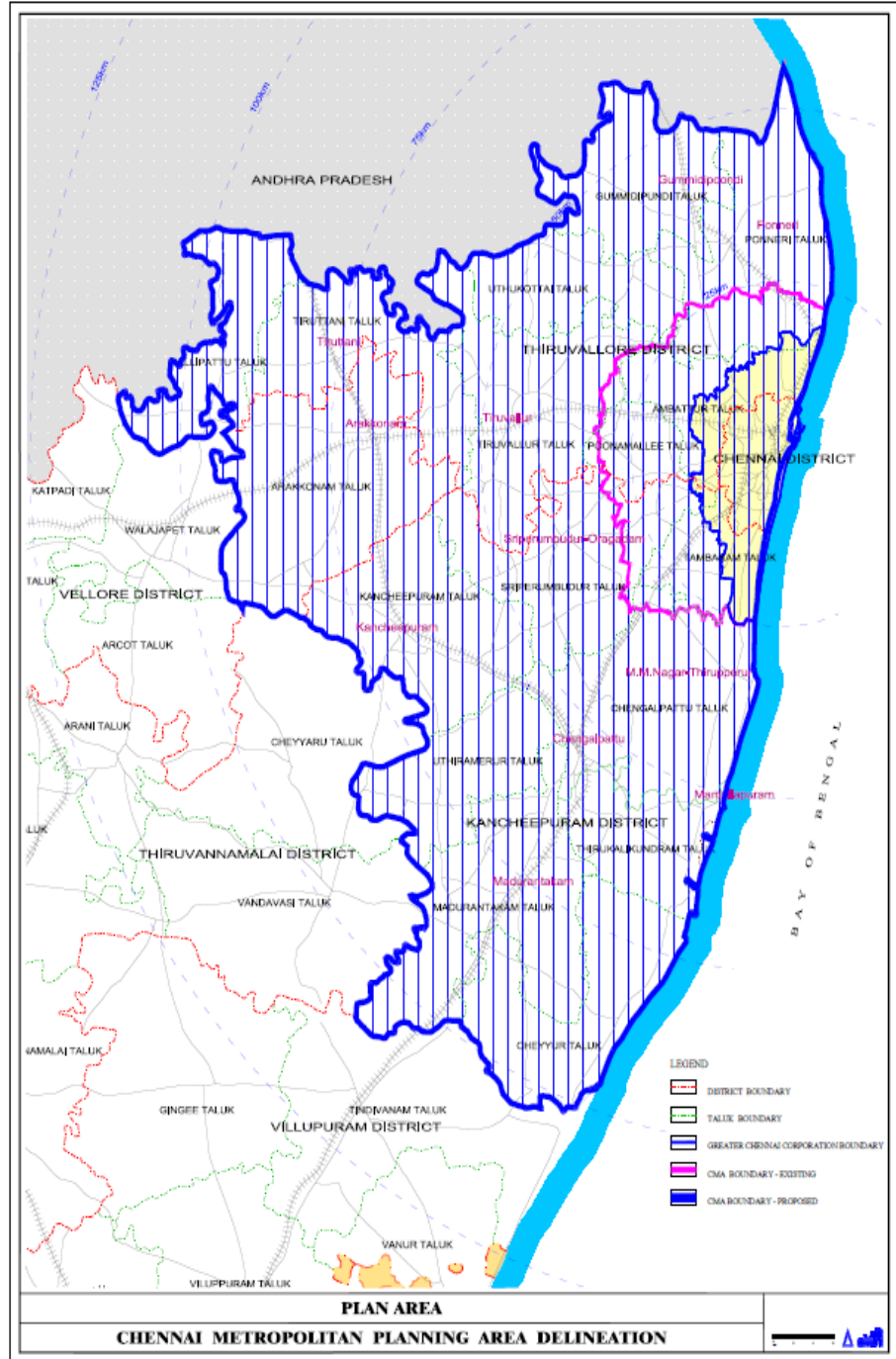


Figure 4: CMDA map

Note: Red dotted line – District Boundary; Green dotted line – Taluk Boundary;
Thin Blue line – GCC; Pink line – Existing CMA; Thick Blue line – Proposed
expansion

Source: CMDA

Today, the city remains the capital of Tamil Nadu and has substantively diversified into the service and knowledge economy, while also having a thriving automobile and IT sector, buttressed by established healthcare industries, financial services, post-secondary educational institutions and manufacturing in various types of hardware (Ministry of MSME, 2013). Overall, the growth rates of the CMA have averaged approximately 2 percent on an annual basis from 1971 onwards, which is comparatively slower than some of the other major metropolises (Arabindoo, 2011; CMDA, 2006). Reasons for this may include the city's reorientation towards cultural and regional politics reminiscent of the sixties. In addition, the fact that Tamil Nadu comprises multiple urban centres with strong rural linkages leads to alternative opportunities for prospective jobseekers entering into the urban economy. Furthermore, neighbouring cities such as Hyderabad and Bengaluru present intense competition for jobs and growth (Arabindoo, 2011; Coehlo, 2011; Kennedy et al., 2014)

POPULATION GROWTH

Existing expansionary forces have, nonetheless, raised important challenges and opportunities worth investigating. First, it is important to note that the relatively slow growth has still more than doubled the population of the entire metropolitan area in four decades, increasing from 35.06 lakh in 1971 to 86.53 lakh in 2011. Furthermore, the prominence of the metropolitan area is reflected in the region's increasing share of the state's population, rising from 8.51 percent in 1971 to 11.28 percent in 2011. This reality is brought into sharp relief when one considers the fact that this current proportion of the population resides within the borders of what amounts to only 1 percent of the entire state of Tamil Nadu (CMDA, 2006).

From Figure 5, it is evident that the decadal population growth in Chennai Corporation as well as in the CMA has taken a downward trend, while the CMA is observed to experience a higher decadal growth rate compared to Chennai city. The marked decrease in population growth in Chennai city can be attributed to the high population density (247 individuals per hectare) which has led the CMA (59 individuals per hectare) to accelerate much-needed infrastructure development to accommodate the growing urban populace (Sekar & Kanchanamala, 2011).

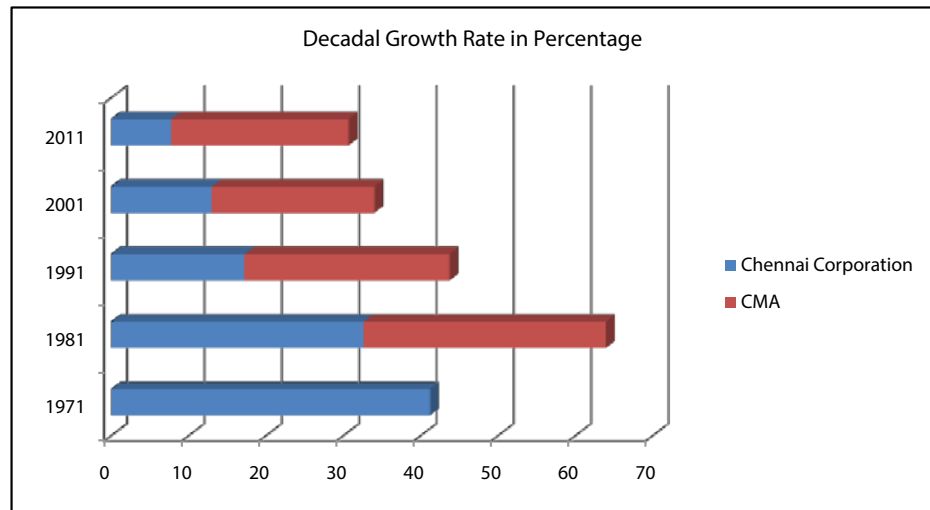


Figure 5: Decadal growth rate – CC and CMA
Source: Census 2011 & Second Master Plan CMDA-2026

Till 1981, there were only 24 villages with a population of more than 10,000 in the CMA, and Thiruvottiyur municipality held the position of being the most populous with 134,000 residents. But it was replaced by the Ambattur municipality in 1991 with a population of 215,000, which rose to 310,000 in 2001. The sharp increase can be attributed to the post-1991 liberalization reforms which pronounced the role of Ambattur industrial estate and augmented development. Nonetheless, villages neighbouring the city boundary (Thiruvottiyur, Madhavaram, Ambattur, Valasaravakkam, St. Thomas Mount Cantonment and Alandur) have been steadily developing since 1971. Similar patterns can be observed in villages along the Old Mahabalipuram Road (OMR) and the East Coast Road, which showed a marked increase in population growth, allied with the development of the IT corridor.

Based on the decadal growth rate from 1991-2001, Sekar and Kanchanamala (2011) divided all CMA villages into four categories: High growth, Medium growth, Slow growth and Decreasing growth (Fig. 6). The majority of the villages experiencing high growth were clustered around development epicentres along the southern and western fringes of the CMA, while only four villages with high growth rate were located in the northern CMA. The north-south divide is further pronounced in villages with medium growth rate, where out of the 28 villages, only five are situated in the northern CMA.

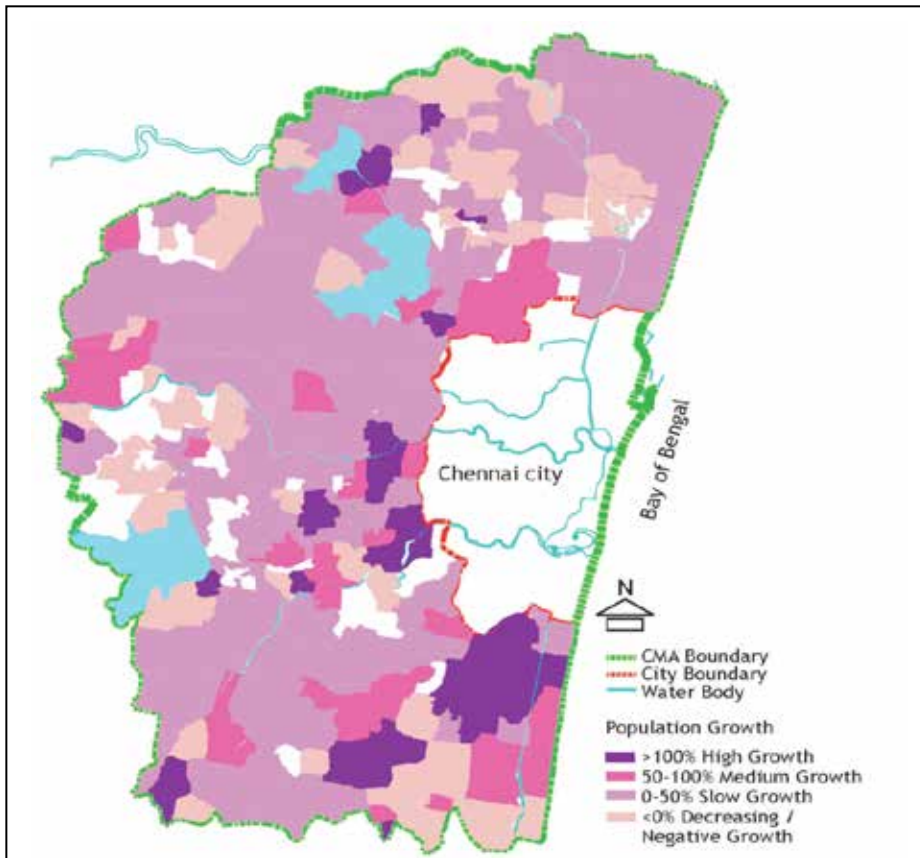


Figure 6: Decadal growth rate map 1991-2001
Source: Sekar and Kanchanamala, 2011

This north-south divide is also characterized by a sharp differentiation in the population composition. The racial divisions of the colonial era between north and south have now translated into class divisions where the latter comprises the largest share of new industries and a mobile middle class, whereas the traditional polluting industries and low-wage employees are concentrated in the north. At the same time, in the south, a large number of low-wage workers continue to service their upper-middle and middle-class clients in jobs that range from homecare to driving. The influx of the service industry in the south has also led to a demographic shift such that higher shares of younger, predominantly single, men are moving to fill up jobs in sectors such as IT where males are disproportionately represented (Arabindoo, 2008; Kennedy et al., 2014; Manohar & Muthaiah, 2016).

The city's growth rate is primarily driven by migration to meet demand for jobs whereby the proportion of in-state migrants has increased from 70 percent in 1961 to 75 percent in 2001. Migrants from the rest of India and the negligible figures from abroad are often found in the new service-sector jobs. At the same time, the overall proportion of migrants in the city has declined considerably from 37 percent in 1961 to 21 percent in 2001 (CMDA, 2006).

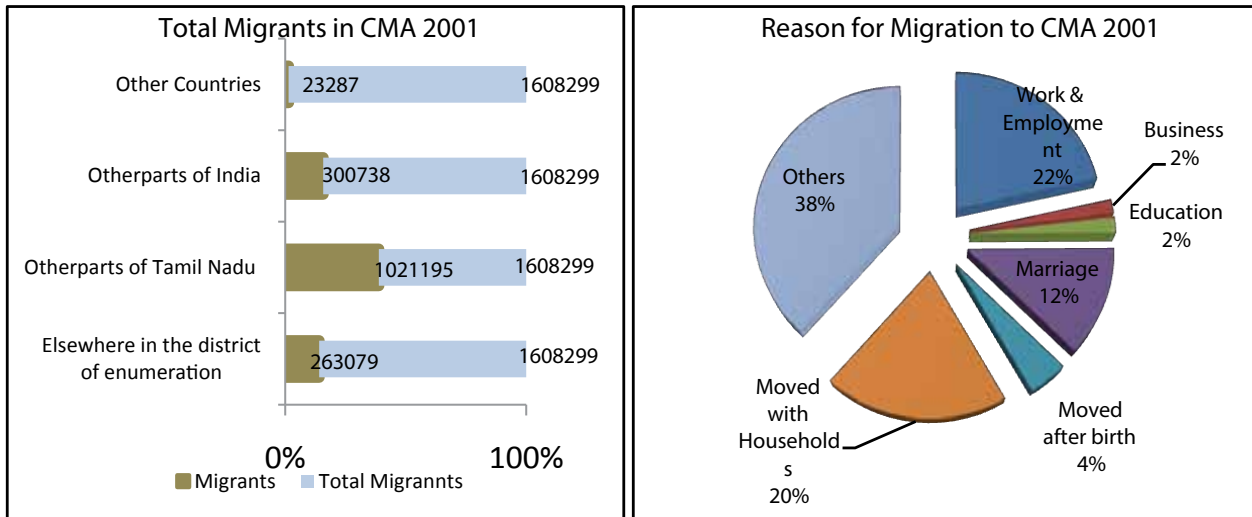


Figure 7: Migrant data
Source: Second Master Plan CMDA-2026

In 2001, the total migrant population in the CMA was estimated to be 1.6 million of which 1 million were from Tamil Nadu. Nearly a quarter, i.e., 22 percent of migrants chose work and employment as their reason to migrate, while interestingly only 2 percent migrated for education (Fig. 7). A study commissioned by the Chennai Metropolitan Development Authority (CMDA) in 1991 observed that out of the total migration taking place, urban areas accounted for 63.4 percent of all inward migration, and rural areas accounted for 36.6 percent of all inward migration. Similar migration trends can be observed in Chennai Corporation where migrants constituted 16 percent of the total population (Census, 2001). But, the influx of migrants has been steadily decreasing over the last three decades, mainly due to the conversion of residential areas to non-residential ones for commercial purposes. With the envisaged economic and development trajectory, this trend is only expected to continue in the future.

ECONOMIC GROWTH

Economic growth in Tamil Nadu since the early 1960s has been characterized by a slow primary sector and parallel growth in the secondary sector. The tertiary sector, which witnessed robust growth throughout the last many decades, experienced particularly high growth in the post-1980s period. The Tamil Nadu State Domestic Product, which crossed US \$80 billion in 2013-14, was estimated at US \$210 billion for 2015-16. The state sector-wise break-up of GDP for 2014 revealed that the tertiary sector accounted for a major portion of this GDP (45 percent), followed by the secondary sector (34 percent) and the primary sector (21 percent). Similar patterns of sectoral distribution of GDP were reflected for the CMA.

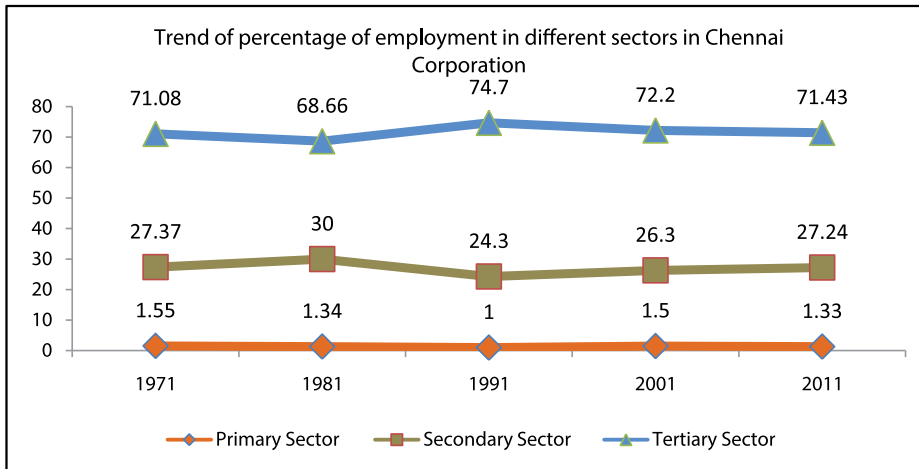


Figure 8: Trend of percentage of employment in different sectors in Chennai Corporation
Source: Second Master Plan CMDA -2026& Smart City Profile

The growing influence of IT/IT enabled services/business process outsourcing industries, has tilted the diverse economic base of Chennai city from trade and commerce to administration and services.

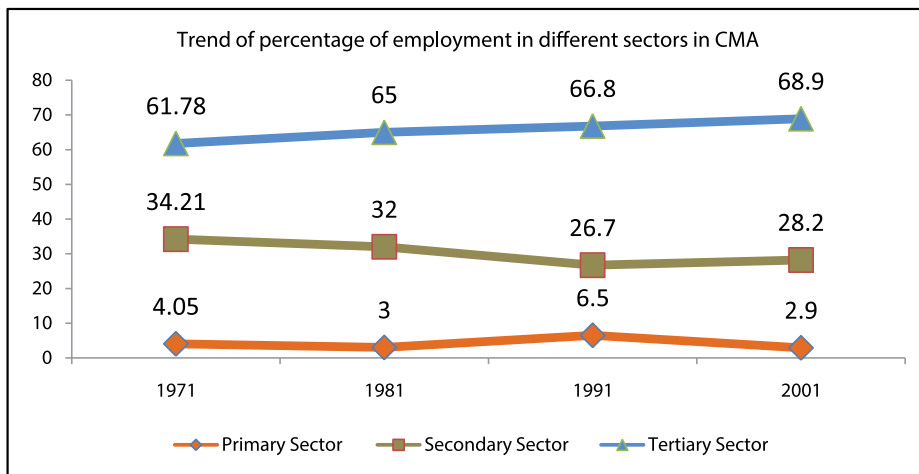


Figure 9: Trend of percentage of employment in different sectors in the CMA
Source: Second Master Plan CMDA-2026

From Fig. 8, it is evident that employment in the primary sector has been experiencing a dip since 2001. The pattern is consistent for the CMA area as well since 1991 (Fig. 9). However, Chennai's port infrastructure and its significant contribution to the automotive sector (local and export) at the state and central levels has sustained employment in the secondary and tertiary sectors. The city's effort, in fulfilling its economic and development agenda, has had a significant impact on its land-use patterns. Between 1971 and 2001, approximately 60 percent of agricultural land has been converted for non-agricultural use (Fig. 10), while the built-up area witnessed a 65 percent increase and the waterbody area decreased to 27.34 sq.km from 33 sq.km during the same time period (Fig. 11).

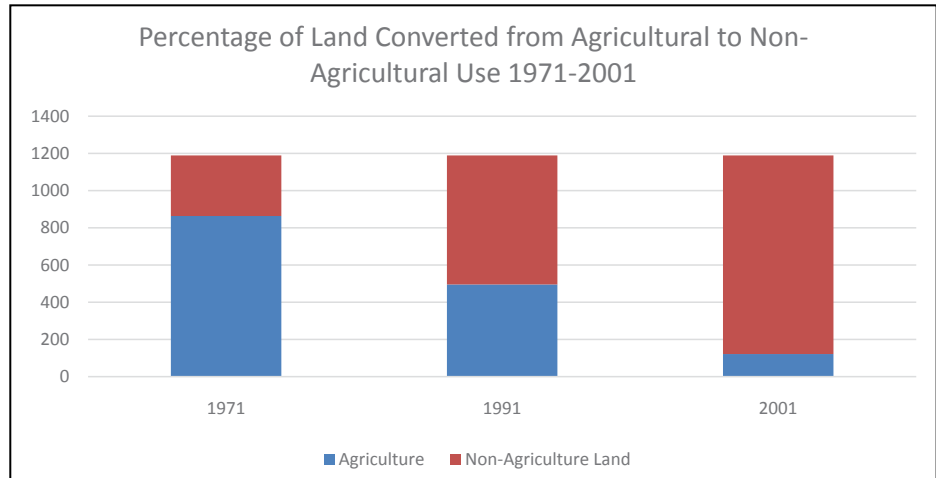


Figure 10: Agricultural land reclassification 1971-2001
Source: Second Master Plan CMDA-2026 & Smart City Profile

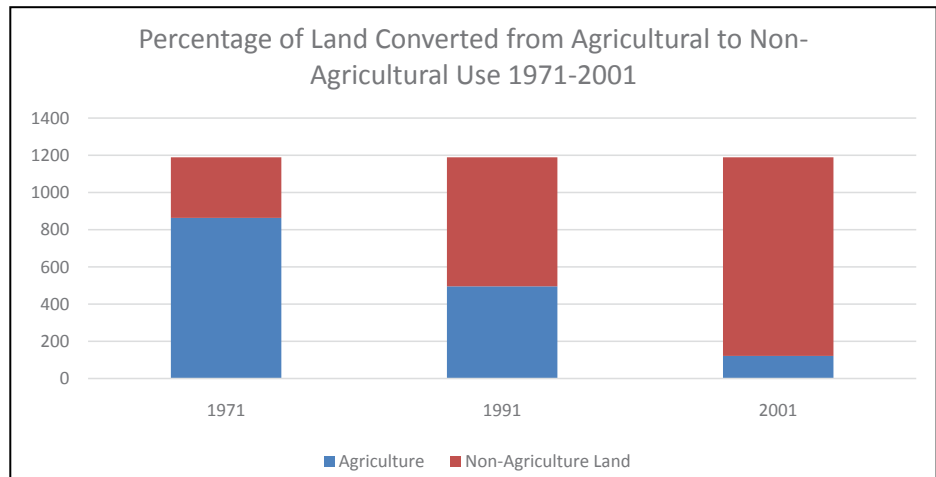


Figure 11: Land reclassification 1971-2001
Source: Second Master Plan CMDA-2026

Furthermore, the city's economic activity has witnessed a considerable shift, with the informal sector making up 80 percent in 2011, an increase from 53 percent in 1971 (Fig.12). However, the organized sector during the same time period witnessed a drop from 47 percent in 1971 to 20 percent in 2011. These findings can be attributed to the diversification of economic activities from traditional agricultural practices to adoption of modern technologies and the ensuing rise in manufacturing, real estate and trade. The shift in the economic base in Chennai from trade and commerce to administration and services occurred in the early part of the twentieth century. As of today, Chennai shows a growing contribution of IT/IT enabled services and is also seen as an emerging major export hub of automobiles in South East Asia.

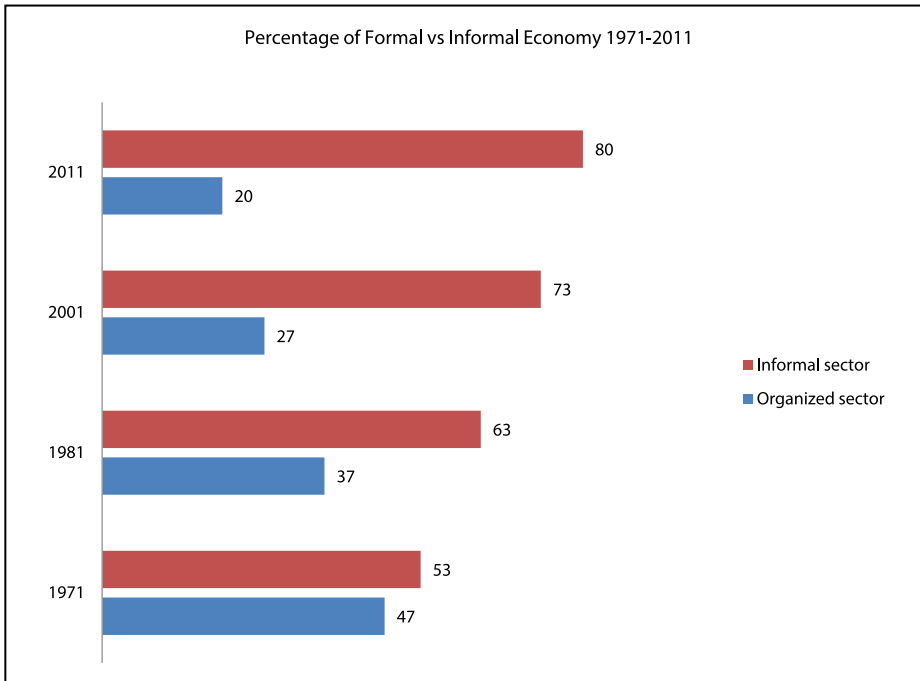


Figure 12: Formal and informal economy distribution
Source: Second Master Plan CMDA-2026 & TN Vision Document 2023

SPATIAL GROWTH

How population and economic growth in Chennai has played out in terms of spatial land transformation can be illustrated in multiple ways. For instance, comparing old, small-scale topographic maps with current Google maps reveals how rapid and dense urban development has encroached upon and in some cases completely replaced natural landuse such as vegetation and waterbodies (Govindarajan, V., 2017).

Remote-sensing mapping exercises have more comprehensively demonstrated a dramatic decline in agricultural and natural lands from the eighties onwards. For example, in studying the city proper along with a significant portion of the outer bounds within the metropolitan area, Rajendranand Kaneda (2014) find that the built-up land has increased from 16 percent to 44 percent.

Our own analysis (Fig. 13) shows that Land Use Land Classification classes of Chennai have experienced rapid changes, particularly in the built-up category. Built-up area of Chennai witnessed an overall increment of 24 percent of the total area during the study period 1988-2014. Waterbodies, bare land and vegetation show a decreasing trend in the extent of area from 1988-2001 to 2009-14. However, in the years 2001-09, the extent shows an increase, most likely due to the influence of the monsoon. As a result of monsoon changes during these decadal years, huge variations are experienced in the extent of land classes of vegetation, barren land and waterbodies (Fig. 14).

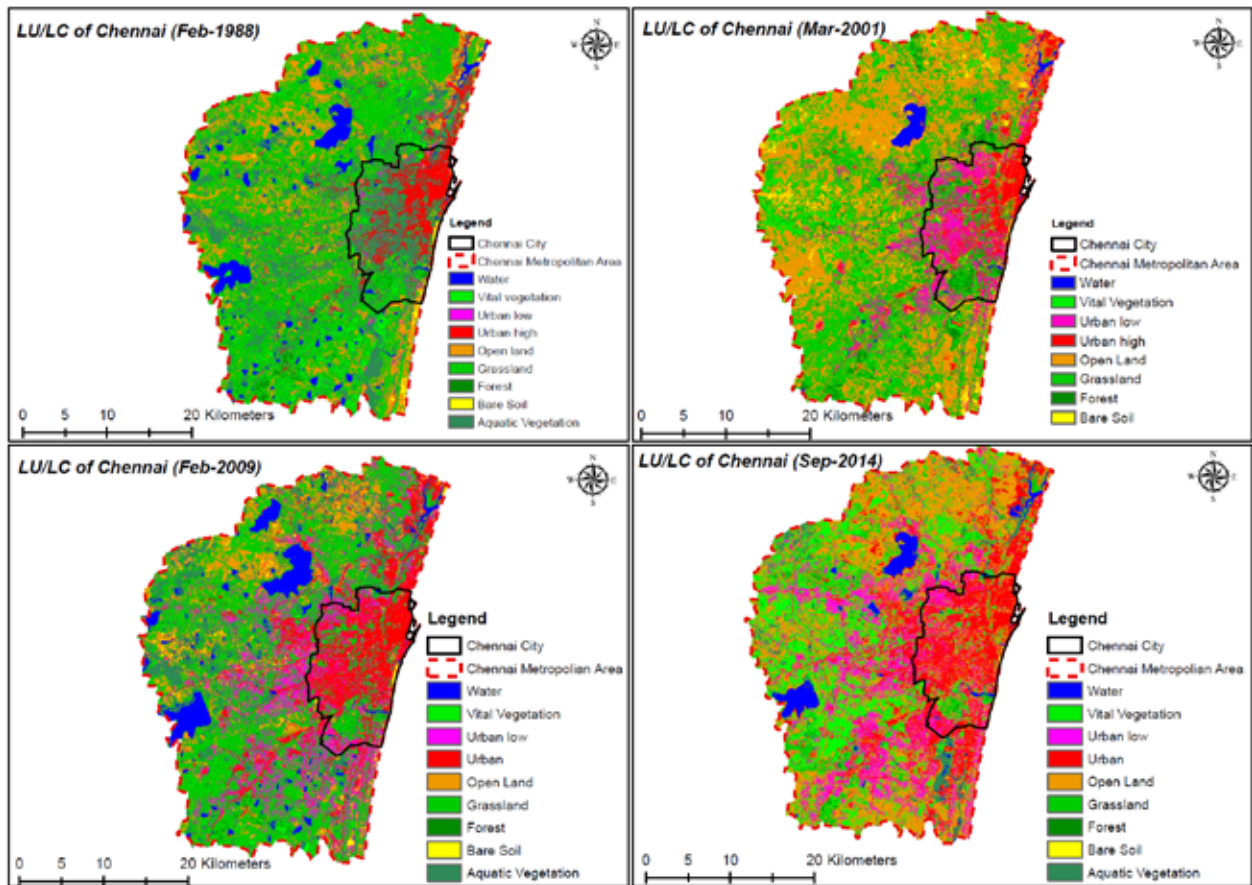


Figure 13: Land-use and land-cover change
Source: Ramachandran (2016)

From 2000 onwards, a considerable amount of agricultural land use appears to have changed to non-agricultural uses in the south-west, and to a lesser extent, in the north. This is also supported by the land reclassification data analysis in Chapter 6, which shows that most of the reclassification of agricultural land authorized by the CMDA to other uses remains concentrated in the southern and south-western parts of the CMA.

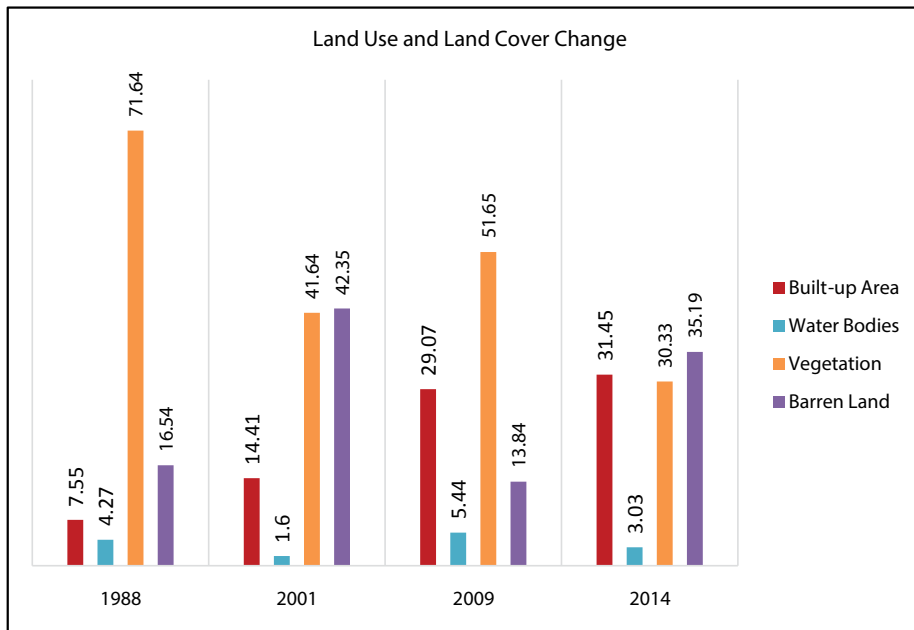


Figure 14: Land-use and land-cover change
Source: Ramachandran (2016)

Overall, the trajectory of urbanization in the CMA is best characterized by sprawl where urbanization proceeded in the peripheries in a fragmented fashion albeit, over time, at a faster rate than the urban core. That is, areas such as Avadi in the west, Ennore in the north and Vandalur in the south were the first tracts of land to experience urbanization and population densification in the seventies and eighties. However, the growth was primarily because of their proximity to the city core where a considerable number of employment opportunities were located (Kanchanamala&Sekar, 2011).

Following the construction of additional transportation networks and incentive schemes to induce capital into peripheral regions, urbanization is expressed almost contiguously across the peri-urban regions. In addition, cheap land in the south has skewed the allocation of resources to this area (Kanchanamala&Sekar, 2011). In fact, migration patterns show that the move towards suburbanization has not only attracted migrants from other parts of Tamil Nadu, as, and partly from out of state, to the CMA, but has also induced outmigration from the city core. For example, approximately 20 lakh of the populace migrated towards the peripheries between 1981 and 2001 (CMDA, 2006).

This trend in spatial transformation of rural/peripheral agricultural land into built-up area, in conjunction with a) migration data, that suggests most people move from the rest of Tamil Nadu to the CMA for work, b) the data on higher share of the population's involvement in the informal economy, and c) data on poverty levels and slums, indicates the crucial intersection of urban planning/development and water-related vulnerabilities. Based on

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an integrated view of these multiple parameters, it is evident that there is a likelihood of a substantial low-income population moving to the CMA (in the corporation area, but more so outside) and settling down, particularly in vulnerable and cheap locations such as flood-prone areas close to existing waterbodies. This in turn presents all kinds of implications for water quality, flood risk, health risk, the city's access to water, etc.

Based on the above historical-geographic analysis of the CMA and Chennai city's growth trajectory, we may identify some key points that are likely to shape the future scenario of Chennai:

1. The high population density in the city combined with increasing land prices and lack of affordable housing has triggered migration to the peripheries of the city.
2. Similarly, the city's increasing water woes, along with the scarcity of land, will eventually push industries to the city's peripheries. The inevitable migration is bound to disrupt the land-waste-water dynamics in these areas. The pressure put on the government to provide infrastructure, stemming from the migration of people and industries, will lead to further loss of waterbodies and ecologically vulnerable areas.
3. Additionally, the marked increase in the informal economy with its associated housing challenges will intensify encroachments along waterbodies and in vulnerable areas.
4. The proposed expansion of the CMA, though still in its early stages, has yet to account for the ensuing developmental pressures on natural resources and, as in the existing area, will only result in induced and inorganic urbanization.

Keeping the complex intersection of development trends and environmental futures in mind, the rest of the report focuses on identifying the drivers of Chennai's growth and their visions.

CHAPTER 2

REPORT FRAMEWORK AND METHODOLOGY



CHAPTER 2: REPORT FRAMEWORK AND METHODOLOGY

STAKEHOLDER ANALYSIS APPROACH

In the introduction we have presented a comprehensive understanding of Chennai's socio-economic development trend primarily drawing on available secondary data. In the rest of the report we would like to make sense of this development trajectory through a stakeholder analysis approach that can identify and explain who drives such development trends and how. Stakeholder analysis has become popular in many different fields such as planning and policymaking, business management, construction management and organizational studies to examine who influences and who is affected by a specific decision or condition and how (Friedman & Miles, 2006). As such, stakeholders are most commonly defined as those who are affected by and those who can influence a certain action (see Freeman's seminal work on stakeholder theory, 1984). However, there is considerable variation in what is really meant by stakeholders and stakeholder analysis within different contexts (Reed et al., 2009; Stoney & Winstanley, 2001).

In some cases, stakeholders are more instrumentally defined as those groups or individuals "without whose support the organization (or a project, action, or system) would cease to exist" (Bowie, 1988, p. 112). This is often true within construction management work where effective management of those who are particularly interested and influential is key for project success (Olander, 2007; Olander & Landin, 2005). In other cases, a more normative view is incorporated to suggest that stakeholders should include all who influence as well as get affected by the workings of an organization. This is more common, for instance, in a planning and policymaking context, where at least theoretically, the importance of public participation and involving citizens, particularly marginalized citizens, as stakeholders in decision-making processes is increasingly being emphasized (Brugha & Varvasovsky, 2000). Exactly how stakeholders are defined and stakeholder analysis conducted, largely depends on the purpose of the exercise, particularly on whether it is purely normative, instrumental or a combination (as is true for this work).

In this report, the purpose of stakeholder analysis is to generate information on all "relevant actors" to understand their interests, agenda, vision and level of influence on driving the city's development trend. As such, we would broadly define stakeholders as those who do, potentially can, and should influence policy and planning around issues of urban development with or without an eye on its implications for the city's resilience with respect to water vulnerabilities. This broad definition ensures we remain open to the

Stakeholder analysis has become popular in many different fields such as planning and policymaking, business management, construction management and organizational studies to examine who influences and who is affected by a specific decision or condition and how

possibility of including those who already play a key role along with those who can or should have a say, either because of their alternative vision of development, their knowledge, or their position as victims or members of a vulnerable group. Our purpose is thus partly normative, but also partly instrumental, because we want to identify relevant stakeholders in order to find leverage points within the decision-making realm that can be moulded relatively easily towards more sustainable development pathways.

Usually, stakeholder analysis involves one or more of the following three steps: identifying stakeholders; differentiating and categorizing stakeholders; and investigating stakeholder relations. In this report, we engage primarily with stakeholder identification and classification based on their respective vision or priorities for Chennai's development. Stakeholder relationship is also partly addressed by examining whose visions translate into action and play a stronger role in decision-making. However, the inter-stakeholder relationship is dealt with in depth in the Governance Challenges report. The methodology followed for the stakeholder analysis in this report is a combination of what Reed et al. (2009) describe as an analytical (top-down) and reconstructive (bottom-up) approach. As such, initial attempts to identify and categorize stakeholders based on our analysis (the analytical phase) were followed by validation through direct stakeholder engagements in a reconstructive phase. Figure 15 is partly inspired by Reed et al. (2009) and represents the way stakeholder analysis is applied in the context of this report.

In Chapter 3 we begin by identifying all relevant actors by drawing on existing literature and experiential knowledge on government, civil society and industrial agencies working in the CMA. The initial stakeholder identification process was then corroborated through direct stakeholder engagement in a series of interviews and workshops held from September 2017 to March

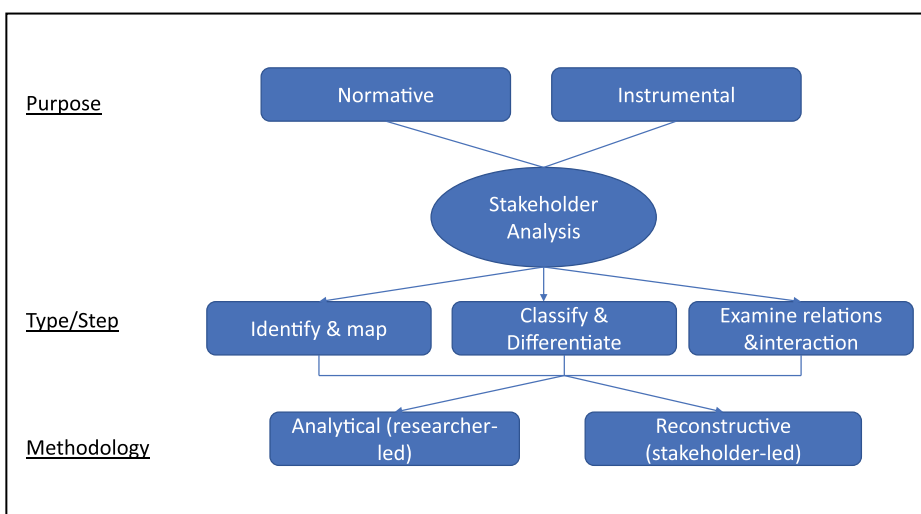


Figure 15: Stakeholder analysis framework for examining who drives Chennai's development

2018. During these interactions, initially identified stakeholders helped us validate our list and also helped us identify a few additional agencies.

Next, in Chapters 4 and 5, the government and non-government stakeholders' goals and visions for the city's future development are discussed respectively. How do they envision the city's future? What sort of development do they seek? Why? Do they recognize the intersecting complications of urban development and environment/water vulnerabilities? These questions formed the basis for clustering the various stakeholders into specific groups with predominant visions. It is the priorities and long-term visions of these groups that ultimately shape or can shape the future of the city. This vision data was collected through secondary research of literature, policy documents and master plans in combination with primary work through interviews and workshop engagement.

Finally, in Chapter 6 we analyse which of the multiple visions of development expressed by different stakeholder groups get translated into action. In the process, we present a glimpse of the relationship (or lack thereof) between the multiple stakeholder groups, namely the government, industries and civic agencies. Specifically, we examine which of the visions predominate in action by: a) analysing the trend of Chennai Corporation's budget allocations, b) mapping the nature of permitted land-use reclassification by the CMDA, and c) examining the Government of Tamil Nadu's (GoTN) IT policy and the IT corridor megaproject along the OMR.

DATA COLLECTION AND ANALYSIS METHODS

Interviews:

The data for this report has been collected and analysed using a mixed method approach. Twenty-one interviews with stakeholders from government agencies primarily responsible for Chennai's urban development including water and waste-related policymaking, along with representatives from the CMA's business community and civil society organizations, were conducted between October 2017 and March 2018 (see Appendix 1 for a list of agencies interviewed). An illustrative sampling method (Valentine, 2001) has been used to consciously recruit the appropriate agencies and individuals who are most likely to have useful insights regarding our topic of interest. This sampling method is commonly used in qualitative research, where the main aim is to conduct intensive interviews to enhance the depth and richness of the study, rather than its statistical representativeness. The interviews were semi-structured in nature with a set of guiding questions that helped keep the 1-2-hour conversation focused on issues related to Chennai's development and environmental, specifically water-related, challenges (see Appendix 2 for a sample questionnaire specifically for public agencies).

Workshops:

The interview data was supplemented by four hands-on workshops where government officials representing relevant agencies like the CMDA, GCC, Public Works Department (PWD), etc. were asked to reflect on their priorities,

visions for the city's future, opportunities and challenges related to their work, interdepartmental relations, etc. These workshops were particularly helpful for stakeholder mapping exercises which allowed participants to identify problems, associated agencies that influence or are affected by such problems, and the role and relation between such agencies (see Fig. 16).

The information gathered both through interviews and workshops was transcribed and coded with the purpose of identifying the visions and priorities of multiple agencies and groups who currently shape and are affected by Chennai's development trajectory.

The primary data from interviews and workshops was supplemented by secondary research drawing on academic literature, policy documents, organizational websites and reports.



Fig 16: Stakeholder Workshops

LULC ANALYSIS USING REMOTE SENSING

Specifically, for examining the spatial transformation of the CMA, land-cover and land-use analysis has been conducted using freely available optical remote-sensing data. This data has been collected from Landsat satellite images provided by the US Geological Survey from its earth-observing satellite mission, which is jointly managed by NASA and the US Geological Survey. This analysis is an attempt to identify the spatio-temporal pattern of land-use and land-cover (LULC) changes which occurred in Chennai using satellite images from 1988-2014.

Four different Landsat scenes from three different Landsat satellites were chosen for the analysis (see Fig. 17 below).

Year	Sensor	Date	Path/Row	Spatial Resolution (m)
1988	Landsat - 5 TM	6.2.1988	051/142	30
2001	Landsat - 7 ETM	21.3.2001	051/142	30
2009	Landsat - 5 TM	15.2.2009	051/142	30
2014	Landsat - 8 OLI	9.9.2014	051/142	30

Figure 17: Landsat datasets

These satellite images were processed, and land-cover and land-use classes were created using a supervised classification method in ArcGIS (Geographic Information System) software. In the supervised classification method, training samples using different band combinations of satellite images were created to represent each land-cover class, and these representations were used as the final class for detecting all images of land-cover and land-use class. The land-cover data for the study is divided into four major classes and eight minor classes; for instance, built-up area was differentiated as urban high-density and urban low-density built-up area; vegetation into vital vegetation, aquatic vegetation, grassland and forest; and bare land into bare soil and open land. Water remained a separate class.

LAND RECLASSIFICATION DATA AND ANALYSIS

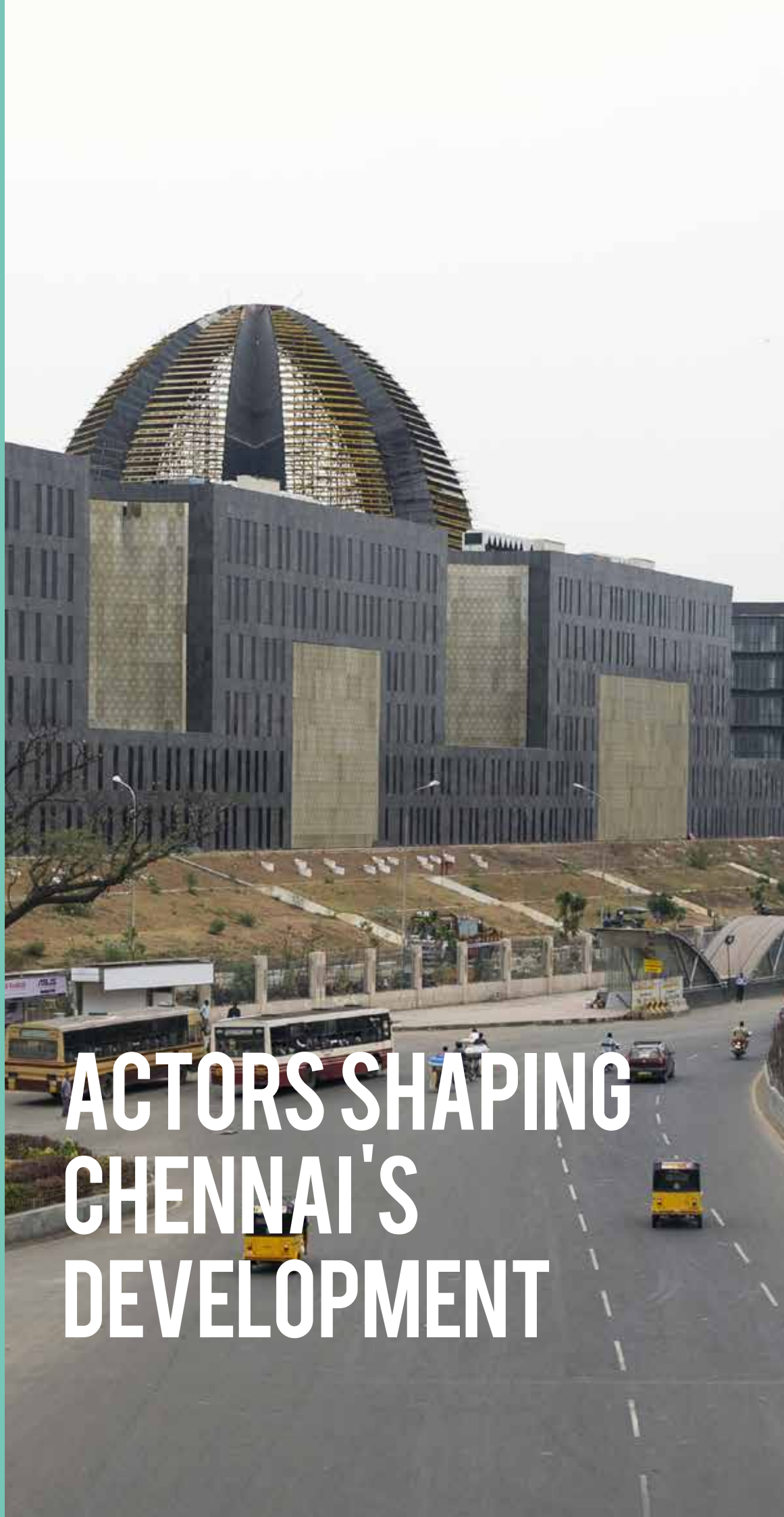
We also analysed land reclassification data from 2008 to 2017 shared by the CMDA to examine spatial and temporal trends in land reclassification practices. While the Second Master Plan presents similar data on land reclassification from 1977 to 2005, this more recent dataset included details on the parcel size and village location of each reclassification case. Analysis of this data was carried out using ArcGIS software. First, the village boundaries were obtained through openly available datasets from the PWD. These village boundaries had errors which had to be corrected, for instance, by digitizing the missing village boundaries using land-use reference maps from the CMA and the GCC. After this, village-wise land-conversion data was created using an open attribute table for each village, and separate layers were created for each land reclassification. Finally, ArcGIS software was used to create maps and graphs to present the spatial and temporal trends in the CMDA's land reclassification practices over the past nine years.

BUDGET ANALYSIS

The purpose of analysing the GCC's budget was to provide an account of the primary developmental priorities for the corporation. Data for the analysis was sourced from official budget documents – budget speeches and related documents. Data was extracted for the periods between 2013-14 and 2017-18. The data from the GCC was not in a suitable format to analyse as it was in text format in pdf documents, rather than an XML or sav file that makes analysis easier. These files provided data on revenues and expenditures in the form of numerous tables. While the documents differentiated between revenue and capital expenditure in total and by zone, they did not specify what each heading meant – e.g. storm water drains (SWD). The type of data extracted was actual expenditures wherever available and revised estimates for the other years.

CHAPTER 3

ACTORS SHAPING CHENNAI'S DEVELOPMENT



CHAPTER 3: ACTORS SHAPING CHENNAI'S DEVELOPMENT

Making sense of urban development trends through an exercise of stakeholder analysis is complex. The number of stakeholder groups and specific stakeholder agencies making decisions or hoping to influence such decisions around how to grow the economy, how to develop specific parts of the city, how to control and manage such growth, what goals to prioritize, etc., are many. Elected officials and government agencies, ranging from the department of housing, industries, transportation, planning agencies, etc., working at various scales, undoubtedly play a key role. In addition, environmental public departments managing forests, pollution, waste, waterbodies, etc., can, and in many cases do, have an important role to play in driving a city's development policies. Beyond government agencies, non-profit organizations, educational institutions, media and community groups can also be influential, or at least be interested, in shaping a city's urban development policies.

We began the stakeholder identification process using an analytical approach (Reed et al., 2009) listing all actors directly, indirectly, potentially and desirably relevant for the CMA's development. While the initial stakeholder map was based on secondary research and experiential knowledge, following a reconstructive approach, over the course of interviews and workshops, we allowed stakeholders themselves to validate our initial list. Fig. 18 represents the primary stakeholder groups and agencies identified. Only selective agencies within civil society and academic stakeholder groups are listed here.

See Appendix 3 for further details of the roles and responsibilities of selected agencies in order to identify the type of influence that these various stakeholder groups have as a collective on the CMA's development.

Stakeholders in Urban Governance

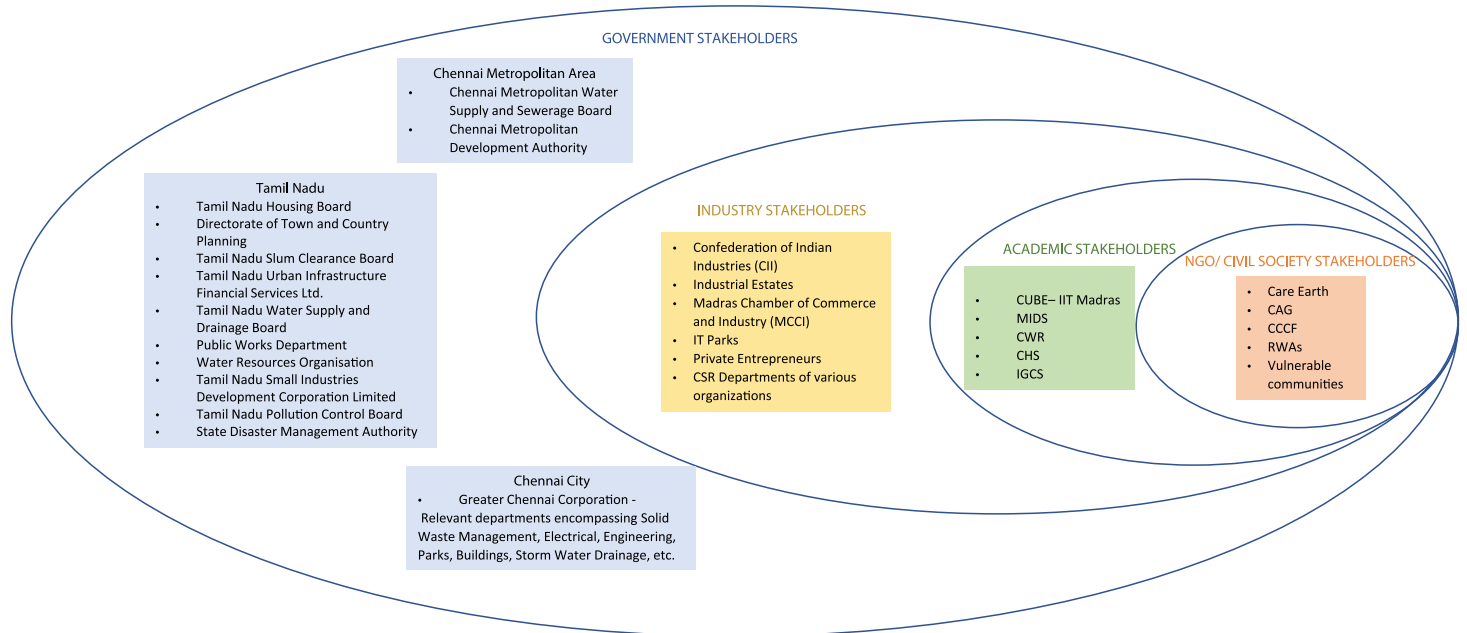


Figure 18: Stakeholder map

During the reconstructive or bottom-up phase of the stakeholder identification process, interesting trends emerged in terms of how one stakeholder group spoke of other stakeholder groups. This presented the way they perceive each other, their role, and the nature of their influence within Chennai's development and decision-making process.

First and foremost, all stakeholders, including non-profit organizations and representatives from academia, as well as private industrial interest groups, recognized the crucial role played by government agencies like the CMDA, GCC or PWD in shaping Chennai's development trajectory and its infrastructure. In many cases, they were recognized as part of the problem of rapid development with limited regard for ecological or social concerns. Simultaneously, they recognized the need for government support in finding solutions to issues of unsustainable growth. This is understandable given that any solution to challenges related to urban governance places the government as the primary responder.

Government agencies, however, were at times apprehensive or unsure regarding civic agencies or academic agencies as important stakeholders or partners. These other stakeholder groups were largely perceived as troublemakers and not as solution-givers. One government agency remarked that although they do recognize the ecological unsustainability of certain developmental initiatives, as pointed out repeatedly by many civic action groups and academicians, their mandate was to meet the needs of the ever-growing urban population in the city and its peripheries using the resources available. A similar reflection on the media was also obvious during workshop discussions amongst government officials. A government official from one of the key agencies pointed out that the media, despite fulfilling its role of raising pertinent issues, often drew attention to the shortcomings of the agency, thus resulting in government and city authorities spending significant time on "fighting the fires created by the media" rather than executing the mandate of their respective departments. This was especially true in post-disaster scenarios when the concerned government departments are

already stretched. According to the official, "The media created a frenzy that channelled the productive resources of the department in directions that instead could have been directed at meeting the demands of the population in a systematic and consistent manner, especially during critical times." This illustrates the somewhat tenuous relationship that exists between the government/city authorities and external actors.

Finally, the public at large, and those communities who are socio-economically marginalized and most affected by the negative impact of rapid urbanization, were mentioned repeatedly by all stakeholders, more so by the non-profits and academic organizations than the public agencies. While public officials seemed sympathetic towards the needs and vulnerabilities of the poorer sections of the community, they frequently highlighted the lack of civic responsibility amongst the residents as a major impediment for sustainable growth. So, the discussion seemed to place more emphasis on the lack of civic responsibility than on protecting citizens' right for better city life and/or services. Non-profit and academic representatives, on the other hand, tend to highlight the disempowered state of the marginalized sections and envision these groups as deserving of a greater voice in urban development and planning processes.

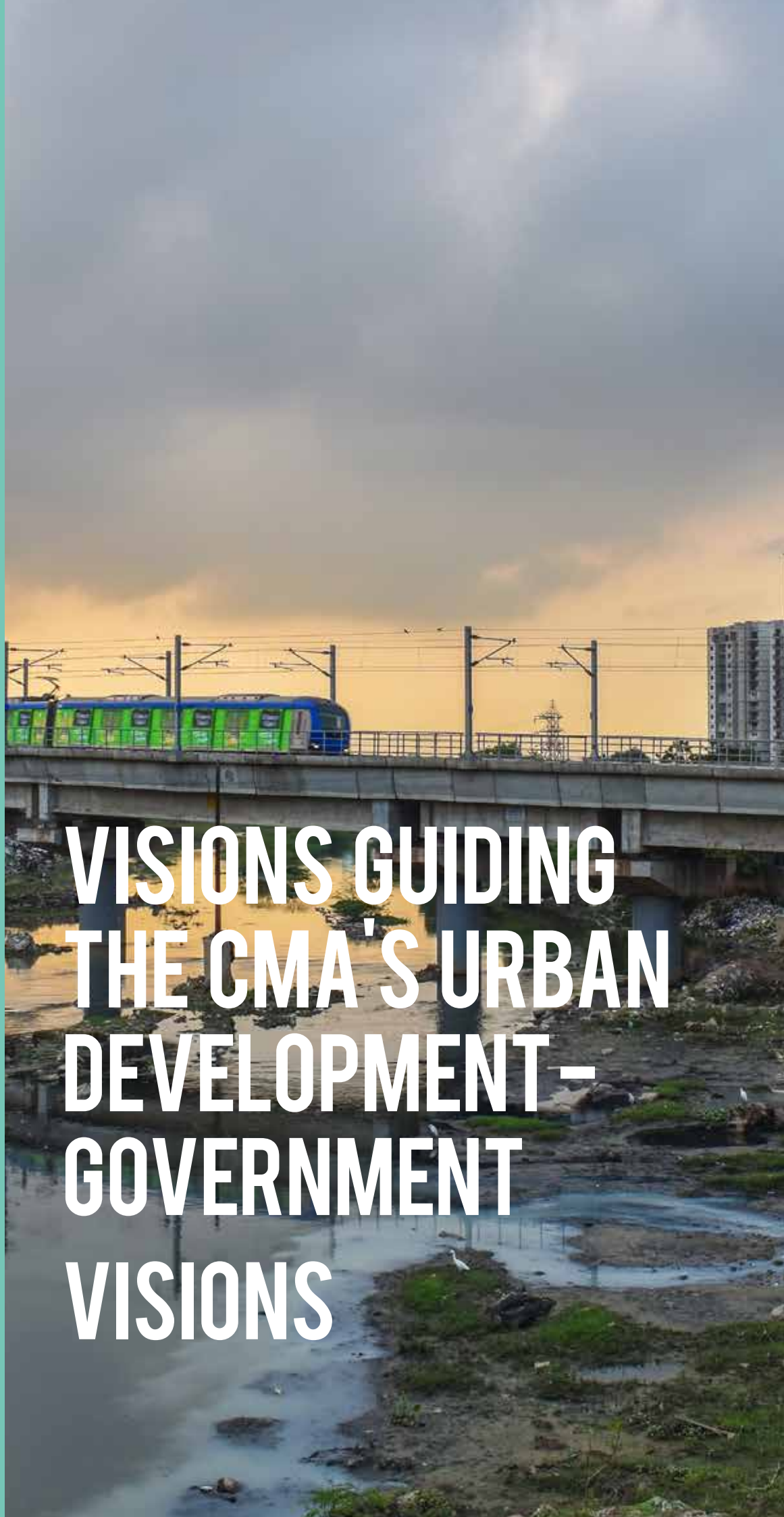
Based on how each stakeholder group is perceived by other stakeholder groups, and the organization type and the specific work they do (see Appendix 3), we hypothesized that some of these actors, mostly government agencies and private/business-related interest groups, more strongly and clearly shape the CMA's development trajectory and are generally the Key Actors. In comparison, the civic and academic spheres, as well as the media, shape the CMA's present and future somewhat indirectly and tangentially. Hence, they may be described as Peripheral Actors. Yet others, specifically socio-economically marginalized and vulnerable citizen groups who are often heavily affected by developmental decisions, but play a minimal role in making those decisions, may be described as the Vulnerable Actors. This hypothesis will be tested based on how each of these group's vision finds a place in actual plans and projects implemented on the ground in Chapter 6. Of course, government agencies play a key role in determining what translates into action, but it is important to analyse to what extent visions/priorities of other stakeholder groups are accommodated within such actions.

In the following two chapters we will explore the priorities, concerns and visions of these multiple stakeholder groups. This will enable us to highlight the numerous ways that various groups envision development or aspire to develop, and to identify to what extent these multiple visions of development converge and/or diverge.

Government agencies play a key role in determining what translates into action, but it is important to analyse to what extent visions/priorities of other stakeholder groups are accommodated within such actions.

CHAPTER 4

VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT - GOVERNMENT VISIONS



CHAPTER 4: VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT – GOVERNMENT VISIONS

Rapid urban development has been characteristic of most cities across India in the context of population expansion, economic growth and diversification, transformation of agricultural land to other uses, and corresponding rural-urban migration. However, the manner in which cities urbanize, manage their growth, and prioritize such growth depends on the type of development the drivers of development wish to achieve. In this chapter we highlight the priorities of government stakeholders through an analysis of key planning and policy documents, supplemented by our interaction with representatives from various government agencies. This exercise reflects the way these agencies collectively define and envision present and future development at least in theory.

TAMIL NADU VISION 2023

Over the years, the state and the city have engaged in multiple visioning and planning exercises. These exercises were commissioned to understand the current status of the city's development, and identify a vision and a realistic growth trajectory by focusing on key thrust areas. In parallel, a blueprint expanding on strategies and interventions to achieve the vision was formulated. Such efforts have been deemed imperative in order to couple urban infrastructure development with the needs of the city's growing population and prevailing development pressures.

In 2012, Tamil Nadu Vision 2023 was formulated with support from the Asian Development Bank and inputs from ICRA Management Consultancy Services Pvt. Ltd. This presented the grand vision of the Tamil Nadu state government for the future trajectory of growth in the state for an 11-year period. The exercise was Phase 1 of a three-phased approach to bring the vision to fruition. The resulting document explicitly suggests that, "The vision for Tamil Nadu for 2023 is to become India's most prosperous and progressive state with no poverty, and where its people enjoy all the basic services of a modern society and live in harmonious engagement with the environment and with the rest of the world" (Vision 2023, p.9). With an emphasis on attaining economic growth, TN Vision 2023 envisages two industrial corridors for Chennai city: 1) Chennai-Bengaluru industrial corridor and 2) Chennai-Trichy industrial corridor. While the latter has been planned to improve the industrial base in central Tamil Nadu, the Chennai-Bengaluru corridor is envisioned to "provide faster movement of freight between Chennai and Bengaluru and spur enhanced economic activity along the Chennai Bengaluru Industrial Corridor" (Vision 2023, p. 90). The planned industrial corridors seek to expand and integrate the existing industrial

corridors in the city, which include a 60-km-long automotive corridor from Gummidipoondi to Maraimalai Nagar, an electronics manufacturing services corridor from Sriperumbudur to Oragadam, and the IT corridor on the OMR. Further, TN Vision 2023 plans to develop a finance city in Chennai to attract a range of financial institutions through modern infrastructure, connectivity and a high-end knowledge base.

As such, with an investment of INR 15 lakh crores, the exercise of developing TN Vision 2023 was primarily structured to make Tamil Nadu “prosperous” and a top destination for private-sector investment. However, it also raised questions such as, “How should the benefits be distributed in society?” and “What is the ideal balance between development and environment?” as central concerns in developing the vision document (Vision 2023, p. 9).

A look at the various sectors of investment prioritized in TN Vision 2023 also shows a broad-based emphasis on economic as well as environmental infrastructure development. It envisages 237 infrastructure projects across six broad sectors: Energy, Transportation, Industrial and Commercial Infrastructure, Urban Infrastructure, Agriculture and Human Development. Specifically, INR 93,350 crores is allocated for Chennai agglomeration in TN Vision 2023. Out of this, the bulk of the investment has been earmarked for water and its allied sectors (INR 25,000 crores) and for creating slum-free cities (INR 25,000 crores), in addition to dedicating investments for urban transport, housing, sanitation and solid waste management. The projects in the water sector address the water security challenges faced by the city through augmenting water resources (restoration), desalination plants and wastewater treatment. Based on the information outlined in Vision 2023, the provision of 24*7 water supply coupled with sewage treatment, solid waste management (under the aegis of urban infrastructure) and the restoration of wells, tanks and canals (under the aegis of agriculture) have been identified as priorities for the government. Moreover, four projects including restoration of Chennai waterways, solid waste processing facilities at Minjur and Kuthambakkam, and desalination plants (Nemmeli, Minjur plants) were placed on the fast track, indicating GoTN's focus on infrastructure development with an eye to the current growth-related ecological and social concerns around waste and water. Based on these priorities, this vision document seems to present the government's multiple discourses or visions of Chennai's desired form of development. Chennai as an economically prosperous/globally competitive/world-class city, Chennai as a socio-economically inclusive city, and Chennai as an environmentally sustainable city, all seem to converge within the TN Vision 2023 plan.

CMDA'S SECOND MASTER PLAN

Perhaps the most relevant planning document for Chennai is the Second Master Plan prepared by the CMDA. Constituted as a statutory body in 1974 under the Tamil Nadu Town and Country Planning Act 1971, the CMDA is the nodal planning authority with jurisdiction over the 1189-sq.-km CMA, including Chennai city. The CMDA is responsible for developing master plans and determining development regulation rules to shape the way the

CMA grows. The CMDA's First Master Plan, released in 1995 met with major protests, primarily on the grounds of limited solicitation of public input (Ellis, 2012). After this plan was stalled by the high court, it was not until 2008 that the Second Master Plan was released.

While this planning document does not explicitly describe its vision, given that the CMDA's vision is to make Chennai a prime metropolis, which will become "more liveable, economically vibrant, environmentally sustainable and with better assets for future generations", similar sentiments are likely to form the basis of the Second Master Plan. What does become evident through an analysis of the strategies and plans described in the document for various sectors is that, in principle, multiple priorities focusing on attaining economic and infrastructural growth, environmental protection, and meeting the needs of CMA residents all factor in the Second Master Plan.

Some of the major objectives mentioned in the plan specifically relating to land development include the optimum utilization of land by streamlining development, preserving and conserving ecologically sensitive areas in the CMA, creating a conducive climate/environment to ensure sustainable development, improving the quality of life and maintaining efficient transportation networks, while integrating the land-use patterns for balanced growth. Also, emphasis is placed on having planned development through land-use and development regulations, decongestion measures and creation of new towns and satellite towns.

The Second Master Plan of the CMDA appears to adopt a comprehensive and well-rounded approach to the development trajectory of the city. It attempts to strike a judicious balance of urban governance priorities by targeting parallel development along various frontiers. Land-zoning for industrial use while earmarking land zones for housing development, storing and distributing water across the city through holistic water management, providing recycling facilities for waste, protecting waterbodies and implementing greening strategies for the city, are a few of the desired strategies that fall under the aegis of the various departments of the city, mentioned in the Second Master Plan. As such, a similar multiplicity of priorities and hence visions for the city's growth is apparent within the CMDA's Second Master Plan as in TN Vision 2023.

According to the Second Master Plan document, it is the culmination of multiple priorities and concerns of various departments/agencies and other stakeholders. Close collaboration between government departments, as well as private agencies, and a four-month public consultation period guided the master plan development process to accommodate different needs and concerns. The CMDA also organized a two-day workshop to elicit views from experts, engineers, architects, NGOs, etc. to ensure that multiple viewpoints were incorporated. However, in the course of stakeholder interviews with numerous public authorities, some degree of dissatisfaction amongst participating stakeholder agencies was evident in terms of how effective they thought such collaborative engagements really

were. This intergovernmental-agency tension is also reflected in the fact that the Chennai Metrowater and Sewerage Supply Board (CMWSSB), GCC and Tamil Nadu State Disaster Management Agency (TNSDMA) all seem to develop their own plans in silos without much consideration of the Second Master Plan. During our interviews with representatives of these agencies, they recognized this lack of interdepartmental coordination. A CMDA representative articulated the challenge by pointing out that the projects implemented under smart cities fall within the purview of the GCC with limited inputs and participation from other departments. He also explained how projects/efforts are often perceived as the brainchild of specific department secretaries, and when they are transferred (which happens quite frequently) there is a lack of ownership that threatens the sustainability of ongoing efforts.

Despite such tensions, officially, the CMDA's Second Master Plan is meant to guide the CMA's present and future development. The emphasis on environmental and social needs within the Second Master Plan was also corroborated during interviews and workshops, as CMDA representatives specifically pointed out that one of the primary benefits of the proposed expansion of the CMA would be to increase enforcement capacity. It was opined that the ability of the CMDA to enforce and implement existing regulations around land and water use would be further augmented through this expansion of the CMA. This would automatically help protect ecologically vulnerable land as well as agricultural land from being indiscriminately transformed into other uses, thus protecting farmers' livelihood. While several non-governmental stakeholders disagree with this argument (New Indian Express, 2018), it reflects the CMDA's multifaceted vision for the city with an eye towards economic, environmental and social causes.

CITY DEVELOPMENT PLAN

The City Development Plan (CDP) was prepared by the Chennai Corporation for the physical planning area comprising the Chennai Corporation, 16 municipalities, 20 town panchayats, 214 village panchayats and satellite towns lying beyond the CMA. The first draft of the CDP was developed in 2006 and revised in 2009 as a requirement for the Gol's Jawaharlal Nehru National Urban Renewal Mission (JNNURM).

While JNNURM's toolkit specifies that the objective of the CDP is "creating economically productive, efficient, equitable and responsive cities", the Ministry of Urban Development guidelines envisage a four-step process to create the CDP. This specifically emphasizes stakeholder participation in developing the vision of the city and formulating strategies to achieve this vision (Ministry of Urban Development, 2005). But the formulation of the Chennai CDP in 2006 didn't necessarily adhere to these expansive guidelines. In fact, the first draft of the CDP was sent back due to several errors identified by an appraisal conducted by the Administrative Staff College of India (ASCI, 2006). A conspicuous flaw was the lack of consultative process with key stakeholders during the development of the CDP. The only

consultative process cited was a decade old, which was carried out under the Sustainable Cities Programme initiated by the UNEP and UNCHS in 1995 (ASCI, 2006).

It was in this climate that the second iteration of the CDP was rewritten in 2009. The Chennai Corporation received a grant from the organization Cities Development Initiative for Asia, which in turn selected GHK Consulting to reformulate the CDP.

Like the CMDA's Second Master Plan, the CDP also envisions that Chennai will develop into a prime metropolis in the next 20 years. It emphasizes a range of issues, including delivery of equitable services, and remaining economically vibrant and environmentally sustainable. With respect to achieving economic growth, the CDP mentions multiple strategies. Some of these include:

- Provide locations and incentives for the physical development of IT parks/buildings and develop the area along the IT Expressway as an IT corridor zone to allow IT and other related development
- Development of a Digitech city to accommodate the requirements of the IT sector including housing with all attendant infrastructure at international standards in an area of about 5000 acres
- Formulation of appropriate policy framework to enhance the CMA's competence in new economy industries such as IT, tourism and biotechnology
- Development of special economic zones (SEZ) for port-based industries and a multi-product SEZ in the CMA to attract foreign direct investments
- Encourage private-sector investments to achieve economic growth and generate substantial employment

Simultaneously, with respect to environmental concerns, specifically with respect to water, the CDP mentions:

- Conservation of waterbodies and protection of environmental resources
- Encroachment will be removed and waterbodies will be brought back to their original shape
- The lakes will be developed as a flood accommodator and also for groundwater recharge

For watersupply, the CDP states the goal is "to enhance customer satisfaction by providing pressurized continuous quality water in an equitable, efficient, sustainable manner and create Chennai as a world class city" (CDP, p. 117). For managing the city's waste, the CDP mentions the city's goal for a sustainable waste management system would be to "(P)rovide to its citizens an environmentally friendly and sustainable waste management system..."

(CDP,p. 132).

In addition to mentioning the need to provide good services to everyone, the CDP further explicitly addresses concerns related to the city's marginalized population and presents strategies for reducing poverty in the CMA. Suggested strategies include:

- Community empowerment
- Linking livelihoods to the city's economy
- Relocation of slums currently situated in objectionable and vulnerable areas
- Provision of basic infrastructure – both physical (water, roads, sanitation and sewerage) and social (clinics, schools, training facilities, etc.)

Thus, the CDP once again presents the multiplicity of discourses of development that emphasize the need to become a world-class city, while protecting its environment, and “linking” its growth to the lives of its citizens at the same time. Based on an analysis of these primary planning documents that are meant to guide the CMA's future growth, and the priorities and concerns of the government stakeholders that are repeatedly mentioned, three dominant visions of development seem to emerge:

1. Vision to develop Chennai as a world-class city.
2. Vision to develop Chennai as an environmentally sustainable city.
3. Vision to develop Chennai as an inclusive city for all.

STAKEHOLDER CORROBORATION OF DOMINANT VISIONS

These findings related to predominant visions were further supplemented by reflections of government officials during our interview and workshop engagements.

The CDP and TN Vision 2023 both signify a commitment to social justice. The former advocates addressing the challenges faced by the city's marginalized population through community empowerment and the establishment of linkages to the larger economy, and the latter recommends greater social inclusiveness in the course of advancing the development of the region. This commitment to social inclusivity was also reflected in the way various government officials/departments viewed and spoke about the challenge of encroachment on public land and waterbodies.

Many officials opined that the issue of encroachment stemmed from deeper fundamental shortcomings/challenges that the communities faced on a day-to-day basis, such as the lack of adequate/satisfactory housing options within the city limits, or the absence of effective and affordable rental housing policies for the lower-income and economically weaker sections

of the populace. Therefore, officials from the Tamil Nadu Slum Clearance Board (TNSCB) and the TNHB, having encountered these challenges in the course of discharging their duties, called for greater consideration along these nuanced lines.

Keeping the workforce relevant to the economy was also identified as an important goal, especially with regard to encroachers who had been resettled at great distances from their original habitations within the city. The high social and economic cost of resettling lower-income groups away from the city and the associated loss of livelihood, employability and job opportunities amongst these communities was recognized as an important issue that needs attention. In keeping with the focus of the government vision documents, which called for establishing linkages between the livelihoods of the people and current economic structures, opinions were advanced by many of the government representatives in this regard. Several officials called for a greater commitment by the Ministry of Skill Development and Entrepreneurship and other nodal agencies to impart vocational and other skill-based training programmes to these resettled communities, in order to maintain their relevance to the larger economy of the city and to “take everyone along” in the process of development.

“...they are not educated and not skilled in labour and they continue to encroach due to the lack of affordable rental housing.” – Government Official from TNSCB

Representatives from government agencies/parastatals (such as the TNSCB and TNHB), engaged in dealing with vulnerable communities on a daily basis, appeared to be highly cognizant of the multifaceted challenges faced by these sections of the population. Many of the officials expressed the need to go beyond the mere physical relocation and resettlement of low-income and vulnerable communities to new locations, and suggested a more holistic and socially just approach in dealing with encroachments (evictions and resettlements). In their view, this comprehensive approach had the potential to empower communities economically, as well as socially, thereby tackling encroachments in the long term, in a well-rounded, effective and fair manner.

Another key point echoed in the three documents (TN Vision 2023, CMDA Second Master Plan, CDP) revolved around the efficient management of water within the city and the peripheries, in an equitable, holistic and ecologically sustainable manner. In the course of interviews with officials from concerned agencies such as the Municipal Administration and Water Supply department (MAWS), the CMWSSB and Tamil Nadu Urban Finance and Infrastructure Development Corporation Ltd (TUFIDCO), this issue of sustainable water management found notable mention. While occasionally viewpoints of agencies differed on the details, overall their take on the need to better manage water resources resonated with the path charted out by the planning documents.

CMWSSB officials, in the course of lengthy discussions, pointed out that the process of matching demand and supply of water for the city was proceeding as planned in the quest to make the city “world class” and at the same time “ecologically sustainable”. They were of the view that the city is now nearly self-sufficient as far as water supply was concerned. They did not anticipate any major increase in demand for water in the city and also mentioned that 50 percent of the required water supply could be met from desalination alone, even in the absence of any rainfall in a particular year. However, they did mention that with the expansion of the CMA and the addition of 42 new urban local bodies, the demand-supply requirements might undergo changes. In keeping with this uncertainty, they also mentioned that treatment capacity was also being shored up, in parallel.

“We do not have any major concerns with regard to water balancing at this stage but are more concerned about metering and water wastage. Although some areas have witnessed a loss in porosity, absorption levels, etc., all areas are receiving water currently without any hiccups and we do not foresee any major increase in water requirements.” –Government Official from CMWSSB

With the revival of tanks and restoration of other waterbodies on the agenda of the planning process, officials from the CMWSSB pointed out that tanks and ponds do indeed have the potential of fulfilling “localized” water requirements (Ponneri being a case in point), and meetings are being convened to examine the feasibility of the same in many peripheral areas. However, they mentioned that the revival of traditional tanks cannot be relied upon as a large-scale measure to address supply-demand mismatches for various reasons such as loss in capacity, blockage of interlinkages between waterbodies, and costs of transportation.

An official from the MAWS further corroborated the emphasis currently being placed on desalination with the intention of ensuring consistency of water supply by stating that desalination ensures consistency and reliability of water supply, in keeping with the Vision 2023 aim to ensure “24*7 water supply”.

“To ensure consistent water supply, two more desalination plants have been planned with a capacity of 150 Million Litres per Day (MLD) and 400 MLD.” – Government Official from MAWS

In keeping with the planning agenda of ensuring the sustainability of water management within the city in a holistic manner, especially with regard to augmenting treatment capacity and encouraging the use of treated water, an official from TUFIDCO mentioned that there is a general framework attempting to stop groundwater extraction by industries and to provide them with treated waste water. This claim was supported by a CMWSSB official who mentioned that many industries are reaching out to the CMWSSB to secure tertiary treated water supply and that capacity is being shored up in response.

“...for this purpose, 90 MLD of additional tertiary treatment is being constructed. Once complete 90 MLD of the 550 MLD of secondary treated water will go through the plant and will then be supplied to industry.” – Government Official from CMWSSB

Officials from both the CMWSSB and TUFIDCO pointed out that for individual households, greater emphasis ought to be placed at this “micro-level” in order to harvest surface water to the largest extent possible and prevent excessive run-off. Senior officials at the CMWSSB mentioned that rainwater harvesting (RWH) has been successful in inculcating behavioural change amongst the majority of the populace and in raising awareness on the potential role and benefits of RWH structures in improving the quality and extent of water supply in an area over time. They mentioned that efforts in this direction were likely to continue to ensure greater citizens’ engagement in ensuring a city with a sustainable and eco-friendly water supply component.

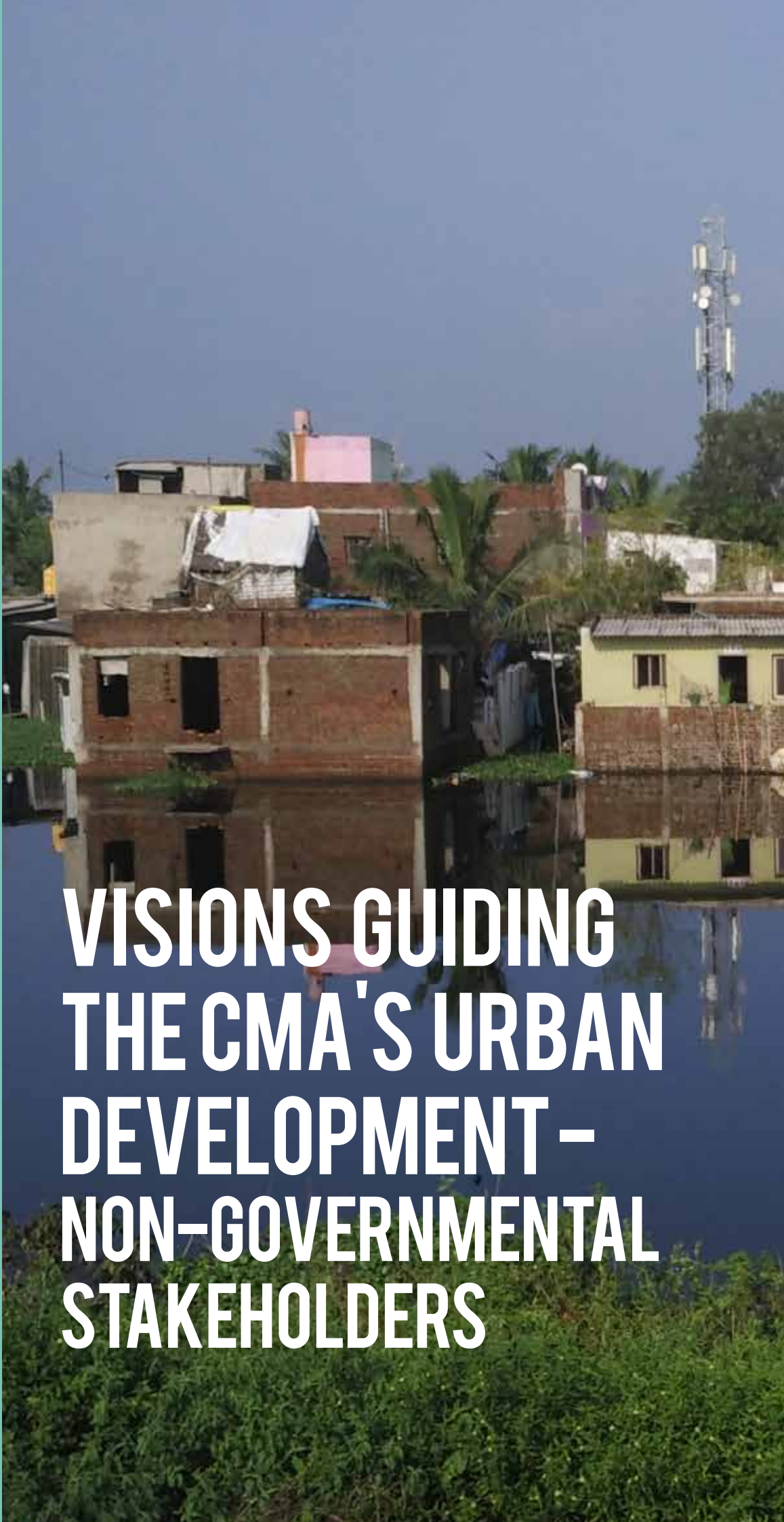
“... after people saw their borewells and other wells run dry after the drought, there is renewed interest in ensuring that the RWH system works. Recharge this past monsoon has also further fuelled this interest.”– Government Official from CMWSSB

Officials from the Tamil Nadu Water Supply and Drainage Board (TWAD) were of the view that with the demand for water set to increase in the future, treated water should be leveraged as far as possible, especially for industrial use, while addressing in parallel, the mental block that the general populace has towards the usage of treated water within their households, in any capacity. Officials from both the TWAD and CMWSSB envisioned a path that addressed existing “infrastructural inadequacies” and also called for a dual piping system for drinking water and grey water.

The above discussion reveals the commitment of the various city authorities to come together to manage the water resources within and outside the city, with a focus on developing ecological sustainability as well as on developing as a world-class city with world-class services and infrastructure. At the same time, government officials’ sensitivity to the concerns of the vulnerable communities in the city reflects their recognition of the need for developing Chennai as an inclusive city. Discursively speaking, government visions therefore present multiple streaks of a future Chennai that should be a world-class, environmentally sustainable and inclusive city.

In the following chapter, we focus primarily on how the non-governmental sector, including industries, non-profit organizations, academia and vulnerable communities present their interpretation of current development and in turn present their vision(s) for future development

CHAPTER 5



VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT – NON-GOVERNMENTAL STAKEHOLDERS

CHAPTER 5: VISIONS GUIDING THE CMA'S URBAN DEVELOPMENT—NON-GOVERNMENTAL STAKEHOLDERS

INDUSTRIES' VISIONS

Chennai, with its access to all four transit corridors – road, rail, sea and air – provides a crucial geography for industries to thrive. A well-balanced base comprising automobile, financial services, healthcare, software services and hardware manufacturing contributes to the city's economy. Further, Chennai's economy has an overarching impact on the country's economy with the city producing 60 percent of India's automotive exports, and it is the second largest exporter of IT and business process outsourcing services. The Tamil Nadu government has always been proactive in extending its support to the development of the IT corridor in Chennai. Tamil Nadu was one of the first states to formulate an IT policy in 1997, and since then, the growth of this industry vis-à-vis its counterparts in Bengaluru and Hyderabad has been remarkably robust and continues to drive economic growth in the city and its peripheries.

A critical point garnered from industry stakeholders with regard to their commitment to the development trajectory of Chennai has been their apprehensiveness towards the sometimes lengthy process and waiting time for clearances in Tamil Nadu. This was a point noted in the Vision 2023 document as well which stated, "In terms of the number of procedures required to set up a business, Tamil Nadu (Chennai) is the best in India and is reasonably on par with Asian countries, but scores poorly in terms of waiting time, even vis-a-vis Hyderabad. A deeper analysis indicates that it is a couple of procedures that take inordinate time" (Vision 2023, p. 42). As such, from the industrial stakeholder's perspective it is this regulatory condition that interferes with their vision of Chennai as an attractive place for business compared to any other social or ecological barrier.

Undoubtedly, the two climate catastrophes (2015 floods and 2016 Cyclone Vardah) had a debilitating impact on the business community. The economic losses from the two disasters were estimated at INR 21,600 crores. The effects have prompted the business community to lobby for infrastructure resilience against climate change disasters. As per our conversation with industry representatives, while the disasters have not triggered the industries to gravitate to other regions and states, the exorbitant price of land parcels in the city is beginning to push them to the city's peripheries. Such migrations are bound to pressurize the land-use dynamics and water demand in the expanded CMA.

These departures might also be an outcome of the increasing paucity of water resources, which will impact the long-term sustainability of industries in the city. Industries have become collectively cognizant of the effects of unsustainable, unbridled development and the ensuing pressures on the environment and resources. According to industry stakeholders, the CSR initiatives that were once undertaken as an obligation are now being reconfigured to address the developmental challenges and promulgate sustainability. Industries view them as crucial investments “in their own interest” to sustain their future in the city (MCCI representative, 2018).

Realizing the vacuum in the sustainable development narrative in the city, the Madras Chamber of Commerce and Industry (MCCI), a consortium of more than 600 industries, started the Sustainable Chennai Forum (SCF). The primary objective of the SCF is “assisting and promoting a business case for sustainable development and evolving a congenial policy and action-oriented environment for the all-round sustainable development of the Chennai metropolitan region in collaboration with like-minded institutions”. While the MCCI acknowledges the need to transform Chennai into a world-class city, the SCF ensures that development is anchored to principles of inclusivity and sustainability through its quest to create a clean and green metropolis.

Recently, during a conference on “Synergy for Maximising Social Impact” conducted by the MCCI, water restoration efforts stood out as one of the highly prioritized areas by a variety of industry bodies. This and other similar efforts suggest that the vision of industries may be described as one of developing Chennai through responsible investment decisions that balance economic success with environmental accountability. Alternatively, we could describe this as a “responsible economic growth vision”. While industries are keen to participate in city development initiatives, to ensure both economic and ecological sustainability, they are apprehensive about engaging directly with municipalities and local bodies, as they feel there is a lack of institutional support for monitoring and sustaining these efforts at lower levels of governance.

NON-PROFITS/CIVIL SOCIETY STAKEHOLDERS' VISIONS

Compared to government stakeholders and industry stakeholders, a distinctly alternative vision of development seems to persist amongst various NGOs. While overall emphasis depends on the NGO's scope of work, a general inclination towards envisioning development as a process of social empowerment, equality and environmental conservation is evident within the non-profit sphere. One long-term Chennai resident and activist therefore posed the question, “Can we not think of urban development beyond the growth in GDP?” The need for an alternative discourse and understanding of development beyond economic gain is thus emphasized by civil society stakeholders. This becomes clear in the multiple roles the NGOs play through activism, advocacy and scientific/technological knowledge management and transfer around land-water-waste governance.

According to industry stakeholders, the CSR initiatives that were once undertaken as an obligation are now being reconfigured to address the developmental challenges and promulgate sustainability.

One of the primary areas highlighted within the non-profit sphere was the importance of using rigorous scientific and also alternative/community-based sources of data and evidence to drive decision-making processes by the authorities. The recent 2015 floods witnessed a marked rise in “maptivism” where citizens, with the help of environmental NGOs, have used spatial tools, open source data, and their local and personal knowledge to map civic issues (Vaidya, 2016). Many individual citizens initiated various projects aimed at providing data on real-time floods as well as flood-prone areas across the city. Such initiatives also made use of local knowledge from citizens garnered through real-time social media updates to build these models. Along similar lines, Transparent Chennai, a non-profit, has undertaken the task of digitizing maps of unrecognized slums in the city, highlighting the developmental challenges related to service delivery and environmental risk. Such efforts have strengthened the public’s demand for greater government attention and improved infrastructure investments (Vaidya, 2016).

The Citizen Consumer and Civic Action Group (CAG) working in the areas of consumer protection, urban governance, and environment and climate change since 1985 has focused on improving the data acquisition/synthesis process, improving data transparency, and pushing the government to adopt a data-driven approach to policy and planning. They have been spearheading efforts to increase government accountability through access to open data. But often their efforts are curtailed by bureaucratic red tape. For instance, their requests to access data around open space reservations from the GCC, and hydrology data from the State Ground and Surface Water Resources Data Centre have been repeatedly declined (Interview with CAG representative, 2017).

On another occasion, the CAG developed an app to map the water stagnation points in the GCC. It was commissioned by the Deputy Commissioner (Works) and was installed on junior engineers’ phones. They were then asked to take pictures of water stagnation in their wards, geo reference them, and send them back to the server. Based on this exercise, temporal measures were recommended to fix the stagnation problem. However, this and similar data-gathering efforts, such as a Rapid Assessment Report on the 2015 floods undertaken by the CAG, have failed to become direct inputs in formal decision-making processes around land-water-waste management. This clearly shows the gap between data gathering/availability and data-driven governance.

A similar data gap and neglected knowledge source is brought to our attention by the Coastal Research Centre (CRC), an NGO based in Chennai, whose scope of work involves land-use change in coastal areas. During our interviews, the CRC highlighted how the very existence of fishing communities has been neglected in government plans that have identified the latter’s homes and workspaces as unused and marked them for development. The CRC has been working with fishing villages to document the existing land use and to map livelihood in inland waterbodies. Close to 50 villages have sent their land-use data to the government in the hope

that it will be considered during the preparation of the next draft of coastal zone management plans and that the government will undertake efforts to collect similar data for the rest of the 600-odd fishing villages. As such, the CRC is working to incorporate the alternative/marginalized voice and vision of the fishing communities in mainstream planning. Further, they have been mobilizing communities and organizing awareness campaigns against the development trend in the Ennore creek area (an area originally designated as a “no development zone”), highlighting the social and ecological costs it entails.

Several other non-profits such as Rain Centre, Care Earth and the Environmentalist Foundation of India have all been active in raising the alarm about the ecological sustainability of the city. Rain Centre, an NGO and advocacy group, has been staunchly promoting rainwater harvesting in Chennai to address the city's seasonal water woes. The government mandate on installing RWH systems in households was a result of concerted lobbying and campaigning efforts by the Rain Centre, which resulted in a 6-metre increase in the groundwater level. A recent audit on rainwater systems undertaken by the Rain Centre, however, revealed that only 50 percent of the systems remain functional and fewer remain efficient. This audit resulted in the creation of the Sustainable Water Security Mission, a multipronged initiative to improve water security which includes other stakeholders like the CMWSSB, GCC, CRRT and Chennai Smart Cities amongst others.

Care Earth is a technical NGO with sound expertise in the area of conservation of biodiversity. Their work in Chennai includes restoration of marshlands, eco-restoration of vulnerable waterbodies, and research on indigenous flora. They played a central role in the restoration of the Pallikaranai marsh, a large part of which has already been encroached upon by development. Care Earth initiated a project aimed at the protection, restoration and conservation of the Pallikaranai marsh “based on the notion of the Adaptive Management, a flexible, inclusive and knowledge-based approach” (Care Earth Trust, 2018). This plan gives equal consideration to people and nature, reconciling conservation and development goals. After Cyclone Vardah, Care Earth also undertook an extensive study with Tamil Nadu Urban Infrastructure Financial Services Ltd (TNUIFSL) for the GCC, on the scientific greening strategies that should be adopted in Chennai city. In this study they emphasize the need to plant specific types of trees that are resilient and suitable for Chennai's local environment.

As such, collectively the civil society stakeholder group seems to prioritize the need to address the social and environmental costs related to present trends of development and, by extension, professes a vision of development that is more in line with social equity and environmental sustainability. This is not to say that they do not recognize the need or the pressure of development. Rather, they seek to move away from the development vs environment debate and believe it should be reframed as a discussion on growth vs environmental and social boundaries.

Several other non-profits such as Rain Centre, Care Earth and the Environmentalist Foundation of India have all been active in raising the alarm about the ecological sustainability of the city.

ACADEMIC VISIONS

The development trajectory of Chennai city and its peripheries has been of interest to many academicians who have sought to comprehensively analyse the steps taken by the government, as well as the contributions made by industry and civil society to various development initiatives. The success or implications of these initiatives have been examined by scholars through various lenses of social justice, environmental sustainability, economy, livelihoods and public-private participation in initiatives, while simultaneously recognizing the mandate of meeting the growing demands of an ever-increasing urban population in Chennai city.

Using the December 2015 flood of Chennai as a case in point, the consensus among academicians is that the disaster was a result of unhealthy urban development practices, most of which revolved around “a lack of respectful mutuality in the human-environment interaction” (Arabindoo, 2017). This stands in contrast to the dominant paradigm of the state government and city authorities to explain the disaster in terms of its “unprecedented” nature.

Academic research has paid substantial attention to the socio-economic implications of such “unprecedented” disasters over the years, specifically for the marginalized communities. Karen Coelho, from the Madras Institute of Development Studies (MIDS), notes that the government has often reacted to events of disasters by investing in resettlement initiatives for the urban poor, moving them en masse from the city to the peripheries. While sometimes these efforts have been justified in the name of “reclaiming waterbodies”, “protecting communities from disasters” and more simply “beautifying the city”, within the academic sphere, they have raised concerns about social justice, welfare and livelihoods of the vulnerable sections of the urban population. Coelho notes that these mass resettlement programmes of families, from informal settlements located within the city, to newly constructed tenements by the TNSCB and TNHB, in the wake of the Indian Ocean tsunami of 2004 and subsequent “incidents” have led to a persistent recurrence of urban poverty through unfavourable employment opportunities and living standards in the new settlement colonies in areas such as Kannagi Nagar, Perumbakkam and Semmancheri (Coelho et al., 2012).

Today, many academicians and scientists are issuing warnings of impending sea-level rise and have identified certain high-risk areas in Tamil Nadu, with Chennai city being on the list as well. Scientists from the Indo-German Centre for Sustainability (IGCS) are already indicating the need to immediately address this issue by ensuring the protection of the existing ecosystem (Ennore creek, Adyar estuary, Adyar Eco Park) (Sah, 2018). In order to avoid propagating the paradigm of “unprecedented” disasters, many writers have begun to identify risks associated with the development trajectory of Chennai city that contribute to exacerbating the city’s environmental dilemmas.

Professor S. Janakarajan from MIDS, an expert on water management and drainage, has been stressing the crucial hydrological functions of the natural ecosystem of the city, including the floodplains, rivers and wetlands. He points to encroachments of these environmental assets by industries and other bodies as being responsible for the loss of the unique flood carriage systems of Chennai city. He is also one of the leading proponents of the reclamation of tanks across the city and in the peripheries as a means to meet the ever-growing demand for water.

Other academicians have gone a step further by roping in the environment-citizen vulnerability paradigm and stressing that the nature of peripheralization, as it exists in contemporary Indian cities such as Chennai, attempts to channel precious environmental resources away from the periphery towards those living in the city, thereby creating greater imbalances and marginalization of the vulnerable communities living in the city peripheries (Gopakumar, 2009). Gopakumar cites the case of the year 2004 when piped water supply was absent and tankers were deployed by the CMWSSB to fulfil the water requirements of the city. In this instance, the extraction of groundwater from the city outskirts and rural areas caused significant stress to those living in peripheral areas. Opposition to the same by the affected was sternly dealt with by the authorities. A consensus therefore seems to emerge from the viewpoints of various academic works that the rapid development of Chennai to become a “world-class” city, with “world-class” infrastructure for all might not be as inclusive as it is perceived, and may need to be more cognizant of the local environmental boundaries.

VULNERABLE COMMUNITIES' PRIORITIES AND VISIONS

A key stakeholder group, in the development trajectory of the city, is the socio-economically marginalized population, often living in environmentally vulnerable or development-wise attractive spaces. Post-2004 tsunami and 2015 floods, and driven by several government initiatives to cleanup rivers and other waterbodies and to beautify the city, people living along the banks of the Cooum and Adyar rivers and Buckingham Canal, and along the coastline, have been relocated to government-constructed tenements in areas such as Perumbakkam, Semmancheri, Kannagi Nagar and Ezhil Nagar.

It is crucial to understand these vulnerable communities' priorities and concerns, first because their voice is rarely represented within formal decision-making processes around the city's economic or environmental infrastructure development efforts. While middle- or upper-income neighbourhoods are in a better position to react to or participate in the city's development through residential welfare organizations and other civic organizations, poorer communities are not in a position to do so. Second, it is these marginalized groups who remain most vulnerable to the burdens associated with development efforts in the city as well as disasters like floods. As is evident from the previous sections, the work of the non-profit and academic spheres largely focuses on the concerns and experiences of these communities and specifically emphasizes the need to accommodate

the voice/vision of the vulnerable communities in mainstream decision-making processes. Similarly, the media too plays a significant role in bringing to light the challenges faced by vulnerable communities.

We chose to supplement this knowledge from the media and academia with direct interaction with members of one such vulnerable community. Interviews with approximately 20 individuals during a field visit to Semmancheri, a resettlement colony south of Chennai city, proved instrumental in examining how this community perceived their own position in the overall development of the city.

The residents of Semmancheri revealed that they largely viewed the shifts they were forced to make as being a concerted effort by the state and city authorities to "remove the poor" from the city and place them in the peripheries. Many of the respondents felt that their problems have been further aggravated by a recent rise in public transport costs, thus adding to the feeling that they are unfairly targeted despite their low-income status and the challenges they face in seeking employment away from the city. The fact that many of the evictions occurred at a time when the school season had begun for children, without adequate warning, has also heightened their feeling of alienation from the city development narrative.

Furthermore, a key point that emerged in the course of stakeholder interviews with the resettled families in Semmancheri was the residents' dissatisfaction over the provision of basic services and utilities. While many residents pointed out the absence of a doctor at the nearby medical centre during the night, other residents highlighted the poor quality of rations distributed through the Public Distribution System. The limited availability of piped water supply and intermittent electricity supply were also flagged as a major concern since these issues had persisted even after they had been brought to the attention of the authorities. Many residents also noted with concern the deteriorating law-and-order situation in the area, with the emergence of rowdy elements and the apparent inaction of police officials in the vicinity in relation to this.

The fact that many of the evictions occurred at a time when the school season had begun for children, without adequate warning, has also heightened their feeling of alienation from the city development narrative.

Another key point noted by many of the interviewees was the lack of aspiration to reach higher levels of socio-economic achievement that has become prevalent in their new resettlement tenements. Some residents explained that when they lived in the city, the frequent interaction with different and often higher economic classes created aspirations for their future upward mobility, especially amongst the younger generation. The "ghettoization" which has resulted in them only interacting with "similar" families appears to have affected their aspirations. Overall, one may argue that their perception of the present development trajectory is that it is unfair and unequal, and by extension their likely future vision for the city would be to see it follow a more socially just development path that meets their basic needs and does not alienate them, or ignore their livelihood, health and economic concerns in the name of economic growth or ecological conservation.

CONVERGENCES / DIVERGENCES BETWEEN MULTIPLE VISIONS OF DEVELOPMENT

Drawing on the above discussion, four dominant visions for Chennai seem to resonate across the multiple stakeholder groups: 1) the world-class city vision (global competitive city development), 2) the environmental sustainability vision (developing the city within environmental limits), 3) the social equality vision (developing the city as a socio-economically just space), and 4) the responsible economic growth vision (developing the city to remain ecologically sound for the sake of economic competitiveness). While the non-profit and academia stakeholders seem to strongly lean towards an environmental sustainability and inclusive city vision, and the private sector recognizes the need for an ecologically responsible economic growth path, government agencies seem to present a dominant discourse of making Chennai a world-class city, while simultaneously mentioning environmental and social sustainability. Vulnerable communities' vision, however, primarily aligns with the social equality vision, as often the environmental sustainability vision has led to as much damage to their livelihoods as the world-class city vision. Overall, there seems to be greater convergence amongst the predominant visions garnered from government agencies and other civic and academic stakeholders, primarily because in theory government priorities remain all-encompassing (Fig. 19). However, inherent tension and contradictions become evident as theory translates into action.

To cite an example, while all the planning documents discussed in this report emphasize social inclusivity, they were all critiqued on account of neglecting to conduct sufficient effective stakeholder sessions (Ellis, 2012). This was corroborated in the course of the workshops with government officials and in interviews as well. Furthermore, a cursory reading of some of the planning documents presents a stark disparity between policy and practice. For instance, while the Second Master Plan advocated a holistic and progressive vision insofar as water management was concerned, the plan simultaneously called for the expansion of the Ennore SEZ, an area that had been earmarked as a "no development zone" nearly two decades earlier.

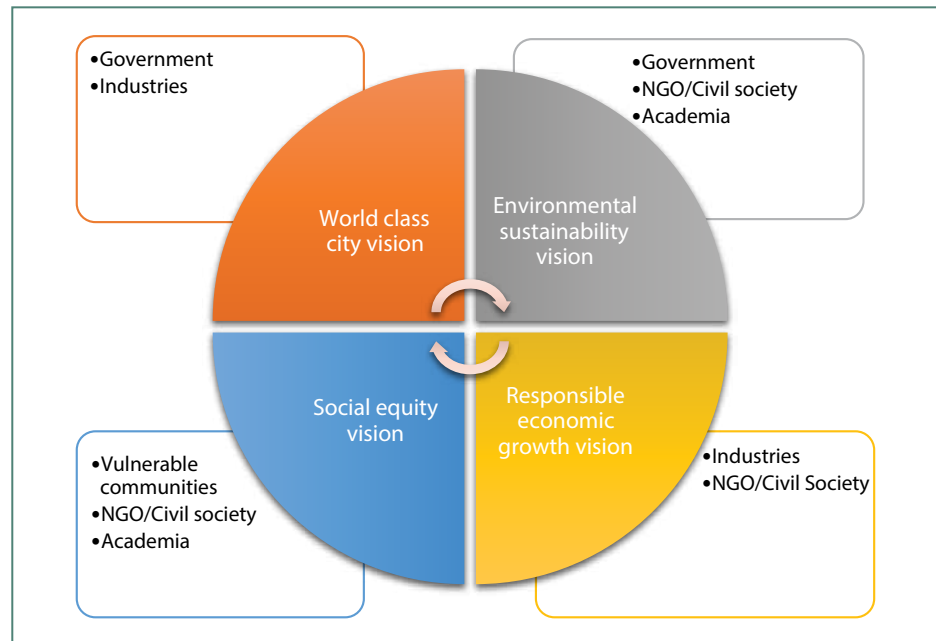


Figure 19: Stakeholder visions and priorities

It thus seems imperative to inquire, ultimately, which of the interpretations or visions of development most influence action on the ground? What makes it into policy? Which consideration dominates decisions? What drives action?

In the next chapter these questions are addressed in the context of the rising tension between rapid urban development and water and waste-related vulnerabilities. The chapter specifically examines three issues to understand which of the visions are more commonly translated into action at various scales: 1) financial budget of the GCC; 2) land reclassification decisions of the CMDA; 3) industrial development policy of the GoTN and the IT corridor development.

CHAPTER 6



VISIONS TO ACTION

CHAPTER 6: VISIONS TO ACTION

GREATER CHENNAI CORPORATION BUDGET

The purpose of analysing the GCC's budget was to understand how it allocates/spends its resources on the ground on various developmental items. We specifically focused on storm water drainage and solid waste management (SWM) as they are two critical components that contribute to Chennai's water-related vulnerabilities, specifically to flooding. Data for the analysis was sourced from official budget documents for the periods between 2013-14 and 2017-18.

The GCC is a consolidated municipal government responsible for a range of services in Chennai city (covering an area of 426 sq.km) such as roads, street lighting, SWM, SWDs, parks, primary health care, and recreation and education. The corporation's revenue expenditure over the past five years (2013-14 to 2017-18) has been steadily increasing by approx. 10 percent every year and the highest spending has been on "establishment expenditure" (predominantly salaries and allowances for staff), which was 40 percent of total expenditure. Contrary to revenue expenditure, the corporation's capital expenditure has been fluctuating over the past five years. This is not unusual, as expenses for one year might be substantially higher than others due to new infrastructure development, such as building roads. Examining the capital expenditure of the corporation over the five-year period revealed some interesting facts.

The capital expenditure specifically on SWM has been limited from 2013-14 to 2017-18. In total only approx. INR 102 crores (Cr) has been spent in five years (Greater Chennai Corporation, 2015; 2016; 2017). In contrast to this low expenditure, the expenditure of Bengaluru city to maintain the existing drains, remodel a portion of them, and construct retaining walls, saw a release of an INR 800 Cr grant in 2016 alone. Chennai city's largest allocation during the 2013-14 to 2016-17 period was in 2016-17, while in 2014-15 there was no allocation for SWM. Furthermore, the nature of SWM is such that it requires more revenue to maintain and operate existing systems. Yet INR 5.15 Cr spent in five years represents a fairly insignificant amount which was solely spent on community bins (Budget documents 2013-14 to 2017-18) (Fig. 20).

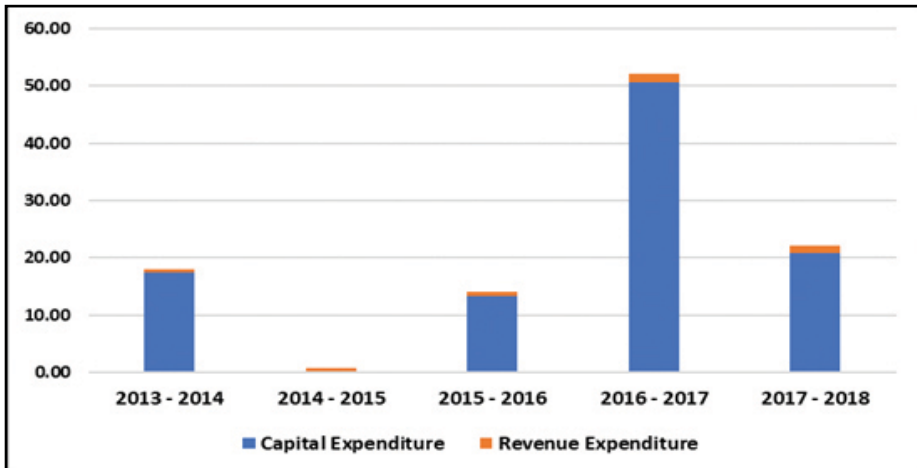


Figure 20: SWM expenditure (in crores)
Source: Greater Chennai Corporation

Expenditure on SWDs has also been mostly capital in nature, indicating that the focus is more on adding new infrastructure, while in comparison much less is spent on regular operations and maintenance of existing systems. Further, there is a substantial increase in spending in 2016-17 (approx. INR 540 Cr from INR 117 Cr in 2015-16). This increase could be a result of the impact of the December 2015 floods, which revealed the inadequacies of the existing drainage system (Fig. 21).

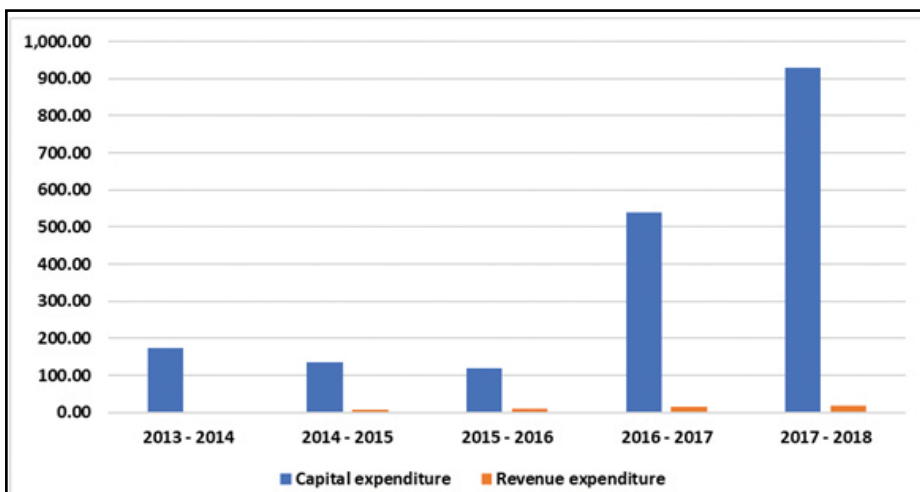


Figure 21: Corporation expenditure on storm water drains (in crores)
Source: Greater Chennai Corporation

The corporation's budget provides a break-up of capital expenditure in each zone. Over the past five years, the maximum zonal expenditure has been on roads – concrete and blacktopped– with approx. INR 2400 Cr. spent in total. On the other hand, the total expenditure on SWDs is only approx. INR 305 Cr. Anna Nagar and Perungudi have the highest spending on SWDs with approx. INR 46 Cr and INR 31 Cr spent/allocated from 2013-14 to 2017-18. These areas were actually listed as having “low vulnerability” in the Chennai Disaster Management Plan. Comparatively, only approx. INR 32 Cr was spent in Teynampet, INR 19 Cr in Valasaravakkam, and INR 7 Cr in Adyar in these five years – some of the most impacted zones during the 2015 floods with the highest number of inundated locations (Chennai Disaster Management Plan, 2017).

ANALYSIS

The above data presents several interesting points.

- Solid waste and storm water drainage are two of the key issues that lie at the intersection of any city's developmental and environmental trajectory. For Chennai's future sustainability and water resilience, rapid urban growth must be matched with substantial attention to managing large amounts of solid waste derived from the growing population and increased industrial and commercial activities. It is important to prioritize effective drainage of storm water run-off, which is aggravated by an increase in built-up area. However, the above discussion highlights the need for higher investment in these infrastructures and services, specifically to maintain existing infrastructure and run day-to-day operations effectively. During one of the workshops, one public official made an interesting observation, saying, “The government is more willing to pay for marriages, but not for family maintenance.” Thus, it seems imperative that along with building new infrastructure or services, attention is also focused on maintaining the existing ones. This will allow existing infrastructure to function better while ensuring the effectiveness and longevity of the new infrastructure.
- The mismatch between the expenditure on SWDs in specific zones and their vulnerability to flooding shows that the way expenses are allotted needs to be re-evaluated. Now that the Chennai Disaster Management Plan, 2017 provides the required knowledge on how different zones fare in terms of their risk of flooding, the corporation's spending on SWDs, solid waste, etc. may be better aligned to this data.

The mismatch between the expenditure on SWDs in specific zones and their vulnerability to flooding shows that the way expenses are allotted needs to be re-evaluated.

LAND RECLASSIFICATION BY THE CMDA

The CMDA's Second Master Plan presents zonal classification of land use across the CMA, indicating the type of development permitted in specific areas, in other words, presenting a vision of development for specific locations. However, historically, the CMDA has allowed exceptions by reclassifying the zonal classification of specific plots based on applications from interested parties (individual citizens, real estate companies, industries, etc.). The following section presents an analysis of the CMDA's land reclassification decisions which can help us gauge to what extent

Chennai’s nodal planning agency allows for changes in its original vision in response to developmental pressures.

We engaged in an in-depth analysis of the land-use reclassification data for the period between 2008 and 2017. Total land conversion since 2008 is 586.623 ha, which accounts for 0.5 percent of the land in CMA villages. Within this, the agricultural land converted is 250.576 ha, which accounts for 42.64 percent of total land conversion (see Fig. 22). The second highest land-use conversion is for primary residential use at 124.22 ha or 21.17 percent. Finally, 10.997 ha of waterbodies were converted to other uses, which accounts for 1.87 percent of the total land conversion.

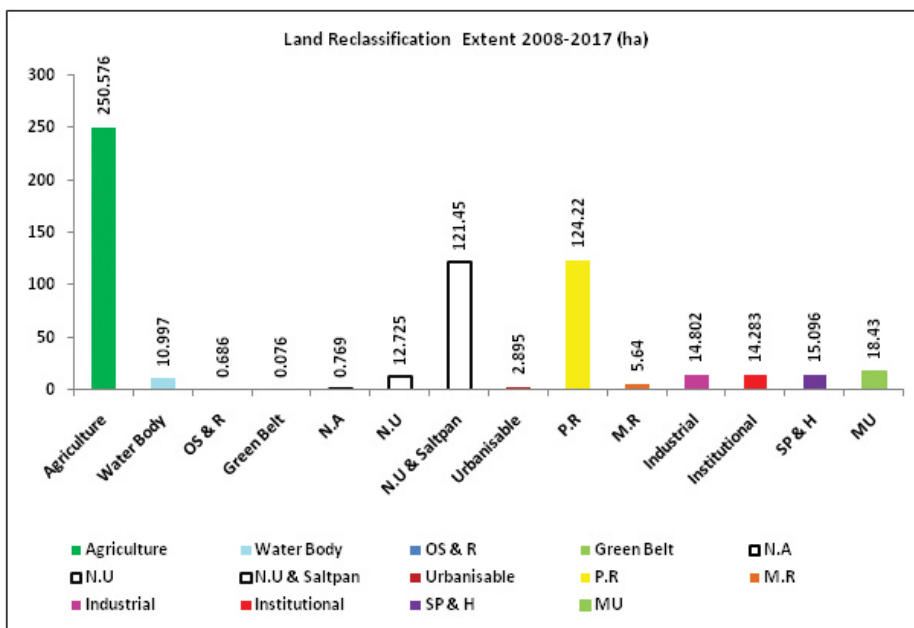


Figure 22: Land conversion data

*Note: P.R. - Primary Residential, M.R. -Mixed Residential, M.U. -Mixed Use, OS&R- Open Space & Recreational Use, N.A. -Non-Assigned Use, N.U. - Non-Urban, SP&H- Special & Hazardous Use.

Source: CMDA

The total agricultural land converted to various other uses for the period 2008-17 is 250.576 ha, which is 0.25 percent of the total land in the CMA (excluding Chennai Corporation). But, the land converted from the CMA accounts for 2 percent of the reduction in the existing total agricultural land of the CMA (existing agricultural use is 12,470 ha, as per the CMDA Master Plan 2008). Agricultural land was most commonly converted into primary residential use, accounting for 87.27 percent of the conversions with an area of 218.683 ha. The rest was converted to various other uses including industrial use (5.23 percent or 13.102 ha), mixed residential use (3.40 percent or 8.519 ha), both primary & mixed residential use (3.40 percent or 8.519 ha), commercial use (2.39 percent or 5.982 ha), both commercial &

primary residential use (3.63 percent or 9.101 ha) and institutional use (1.71 percent or 4.290 ha) (see Fig. 23).

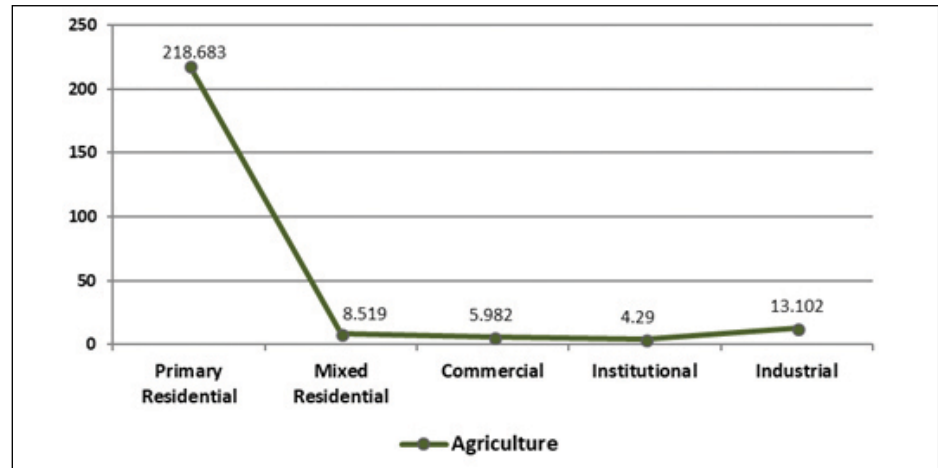


Figure 23: Uses for which agricultural land was converted

In 46 villages agricultural land has been converted for other uses. In most of these cases agricultural land has been converted to primary residential use. Also, most of the villages that experienced conversion are located in the west, right outside the GCC's boundary, and in the south along the fringes of the CMA limit. Similarly, the higher frequency of land-use conversion remains concentrated in the west and the south, outside of the GCC (see Fig. 24).

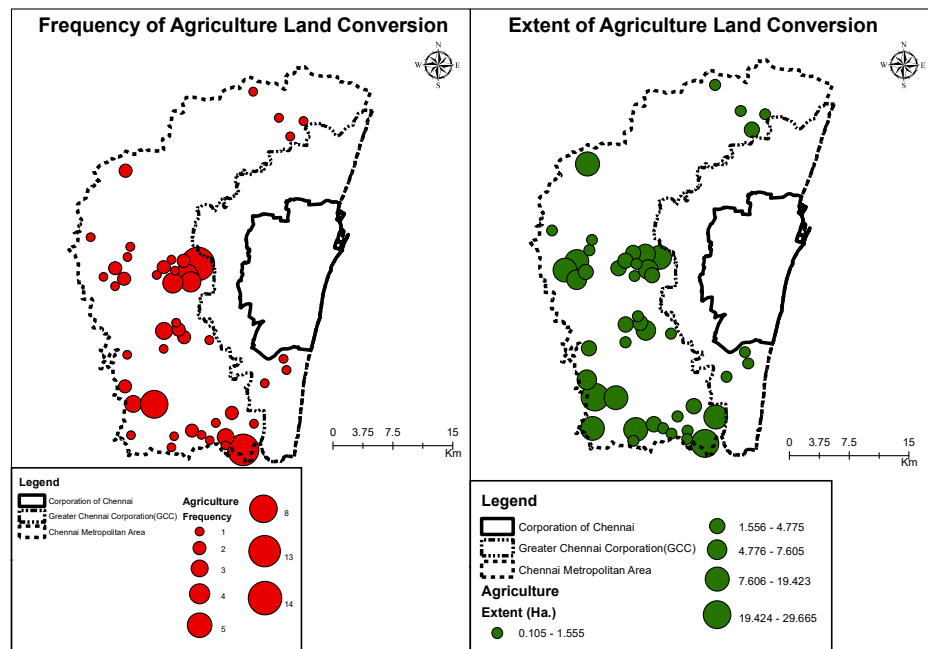


Figure 24: Agricultural land conversion map
Data Source: CMDA Land Reclassification 2008-17

Residential land (primary residential and mixed residential), which is the next highest category of use being reclassified, was mainly converted to industrial (58.18 percent or 68.15 ha) & institutional use (38.56 percent or 50.07 ha) respectively (see Fig. 25). The conversion to commercial use accounts for 5.716 ha, while conversion to special & hazardous use accounts for 2.251 ha.

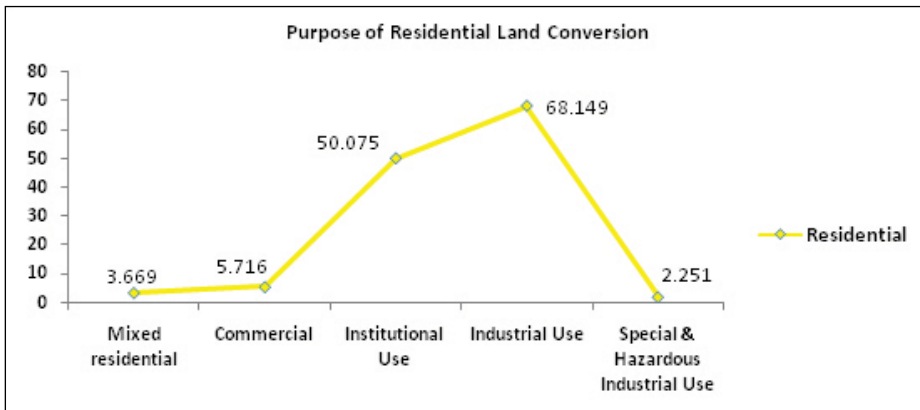


Figure 25: Uses for which residential land was converted
Data Source: CMDA Land Reclassification 2008-17

In 43 villages residential land was converted for other uses. These villages are spread across the north, south-west, and south of the CMA (see Fig. 26), the least number of villages being on the southern side of the CMA.

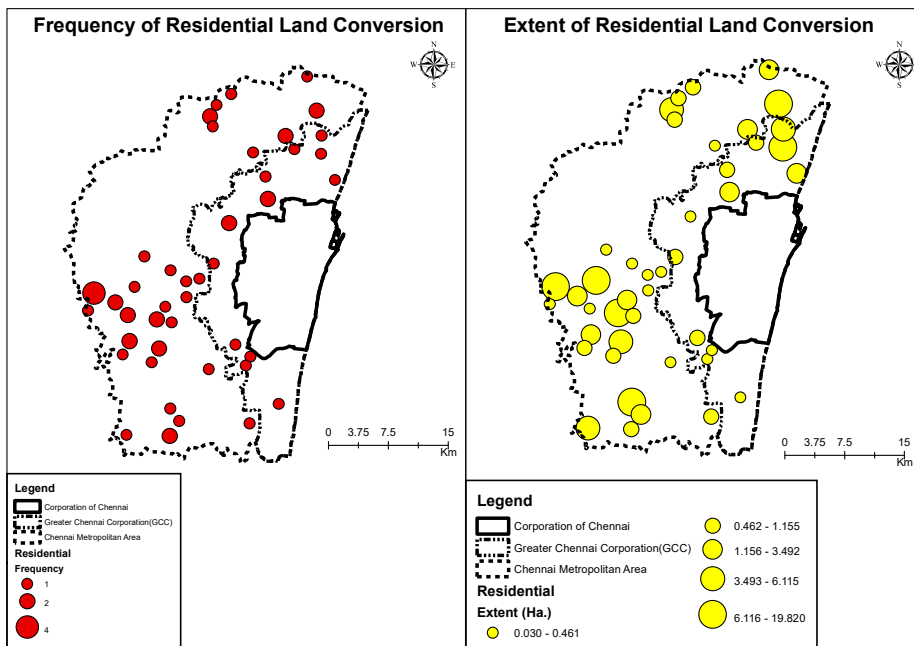


Figure 26: Residential land-use conversion
Data Source: CMDA Land Reclassification 2008-17

The total land converted from waterbodies to other uses is 10.997 ha, which accounts for 0.02 percent reduction in the total waterbody use of CMA land (total CMDA land: 56,570 ha). This conversion was experienced in the villages of Palathandalam, Ambattur, Manapakkam, Nandambakkam, Varadharajapuram, Vaikkadu, Polichalur and Rajakilpakkam. Waterbodies were mostly converted into primary residential use with an extent of 5.7 ha. The second highest conversion occurred in Vaikkadu village panchayat for special & hazardous use with an extent of 4.6 ha. Conversion to other uses includes mixed residential at 0.443 ha and institutional at 0.254 ha. In total, nine villages experienced conversion of waterbodies during 2008-17, and only one village experienced land-use conversion twice for different uses (see Fig. 27).

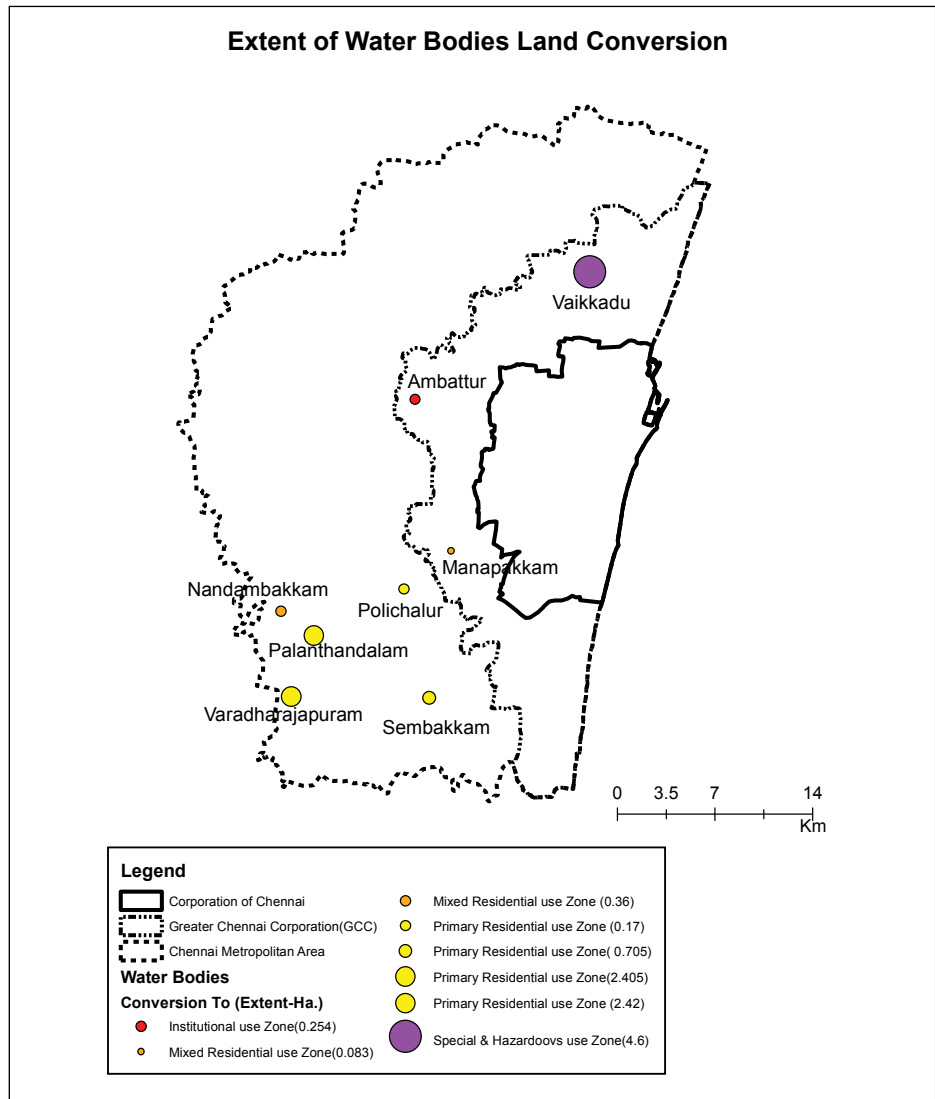


Figure 27: Waterbodies conversion map
Data Source: CMDA Land Reclassification 2008-17

ANALYSIS

Key findings relate to the fact that with the rising need for housing as well as commercial and industrial development, increasing quantities of land have been converted from agricultural use to non-agricultural use, mostly towards the southern and western parts of the CMA. To the north, much of the land reclassification has transformed residential use to industrial/institutional use. Overall, these reclassification rates highlight the pressure of development that the CMDA has to accommodate irrespective of its desire/vision/theoretical emphasis on protecting agricultural land and the environment. While, according to this data set, conversion of waterbody use is not very high, in terms of area or frequency, the fact that on occasions permission has been granted for waterbodies to be transferred into other uses, specifically special & hazardous use, is alarming.

Also, we should note that the reclassification information alone does not represent the whole picture of the way waterbodies have been transformed on the ground into infrastructural, industrial and residential uses. This is because many of the waterbodies (e.g., the Pallikaranai marshland) were historically classified as “wasteland” until mid-2000. As such, development on these waterbodies was authorized and did not require land-use reclassification. In fact, the Second Master Plan estimates the loss of waterbodies during the period between 1971 and 2001 to be 5.659 sq.km, which is a significant loss. This is a more accurate representation of the extent to which waterbodies across the CMA have been transformed in response to development pressure.

Overall, land reclassification decisions reflect the way developmental pressure tends to guide action on the ground at the expense of alternative visions to protect the environment or people’s livelihood. Therefore, it remains a particularly difficult task for agencies like the CMDA to balance their multiple visions, often prioritizing economic incentives over others. For instance, the recent development of industries along and within the Ennore creek, despite it being earmarked as a “no development zone” as far back as 1996, as well as the development of residential tracts along the Pallikaranai marsh, all indicate the government’s intention to continue to cater to the needs of the rapidly growing urban population, while simultaneously maintaining the image of Chennai as a world-class city.

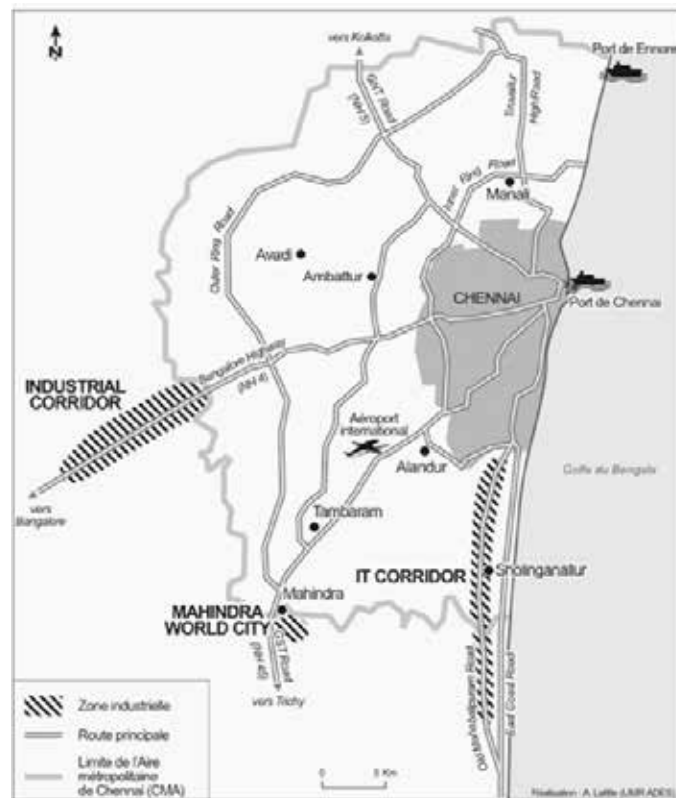
THE GOTN’S IT POLICY AND THE IT CORRIDOR MEGAPROJECT

In order to examine the dynamics of economic development, in tandem with the social and ecological considerations of a rapidly developing city, the growth of the IT corridor and associated infrastructure since the late 1990s along the OMR in the vicinity of the Pallikaranai marsh was analysed as a case in point. The development of the IT corridor is an outcome of a strategic move of the GoTN which formulated one of the first state-level IT policies in India in 1997 (Kennedy et al., 2014). This was inspired by the government’s faith in the IT sector as the growth engine for the entire nation. Currently, Chennai has more than 1500 IT/IT Enabled Services (ITES) companies, employing over 375,000 professionals, and annual IT exports worth INR 50,000 crores. The majority of these companies are located along the OMR IT corridor (GoTN, 2014).

Overall, land reclassification decisions reflect the way developmental pressure tends to guide action on the ground at the expense of alternative visions to protect the environment or people’s livelihood. Therefore, it remains a particularly difficult task for agencies like the CMDA to balance between their multiple visions, often prioritizing economic incentives over others.

The development of the corridor began in the late 1990s and early 2000s when the Tamil Nadu Road Development Company Ltd (TNRDC) was formed as a 50:50 venture between the Tamil Nadu Industrial Development Corporation (TIDCO) and Infrastructure Leasing and Financial Services Ltd. By this time several companies had already begun to set up offices along the OMR. In 2000, Tidel Park, one of the largest IT parks at the time, was set up as a joint venture between two state government subsidiaries – TIDCO and the Electronics Corporation of Tamil Nadu (ELCOT). After Tidel Park started operating, the newly elected government realized the poor condition of roads and support services such as pavements and street lighting in the area, so it commissioned the TNRDC to provide world-class infrastructure for the OMR (Kennedy et al., 2014).

The TNRDC's assignment was/is primarily to transform the OMR into an IT Expressway (ITEL) that would connect all IT industries along this road (Fig. 28). The project was expanded to two phases with the assumption that this would enable development of surrounding areas. The first phase, a 20-km stretch from Madhya Kailash to Siruseri, was inaugurated in 2008 and its special feature was a service trench for utility lines including water and sewerage under the footpath. The second phase (ongoing), extending from Siruseri to Mahabalipuram, of 25km is yet to be completed (TNRDC website).



Source: Kamala Marius-Gnanou, 2010

Figure 28: Industrial and IT corridors in Chennai

Source: Kamala Marius-Gnanou, 2010

Supported by the road improvement work, along with supportive IT state policies, several other IT companies have been attracted to this area. The supportive policies favouring many software companies, for instance, over the last two decades, range from ease of starting operations, and access to investors and capital (Babu & Narasimhan, 2015). The GoTN has 28 operational SEZs for IT companies and ITES companies in the entire state. As per the Information and Communication Technology policy of 2008, structured incentives have been made available to IT/ITES facilities set up in Chennai, Tiruvallur and Kanchipuram with a minimum investment of INR 250 crores. Furthermore, the GoTN initiated the land acquisition process in 2015 to establish an IT Investment Region covering nearly 1600 sq.km (GoTN, 2015). Following Tidel Park, two more IT parks – ELCOT in Sholinganallur and State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT) in Siruseri (which later became SEZs), as well as a healthy assortment of multinational and other leading organizations have set up shop along the OMR. In 2008 the CMDA demarcated the OMR as the IT corridor in its development regulations. This has been particularly indicative of the government's "proactive attitude" towards IT-sector development (The Hindu, 2017).

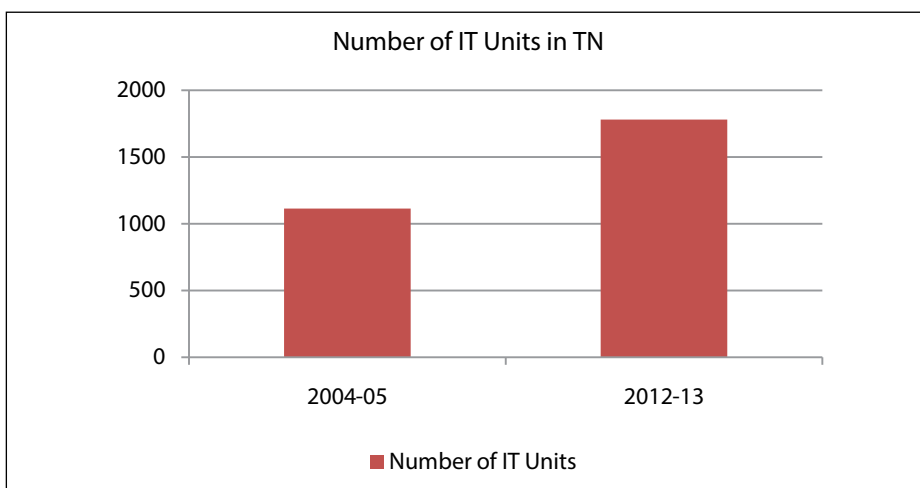


Figure 29: Growth of IT units in TN

Source: GoTN, 2015

The IT corridor development has had a striking influence on the state and on the CMA's economy. Experts currently place the growth rate of the IT industry in the range of 8-10 percent and have remarked that the IT industry continues to grow steadily (Fig. 29) (The Hindu, 2017). However, it has also had far-reaching repercussions on people and the environment. These are already well-documented by academic and non-profit stakeholders and well recognized by government stakeholders.

Housing and water challenges: The rapid development along the OMR has created a ripple effect in other related sectors along the corridor, especially real estate, as people sought to reduce commuting time to and from the

city and were looking to invest in residences near their workplace. Kennedy et al. (2014) report that in 2004, the TNRDC and ELCOT convened a meeting with major real estate developers where it was decided to encourage the latter to meet current and future demand through a relaxation of floor space index in the FSI rules. The relaxation of the FSI, coupled with a quicker land acquisition process under the Tamil Nadu Highways Act 2001 with just a public notification by a team from the TNRDC, resulted in the setting up of several residential complexes such as DLF Garden City in Semmancheri, Hiranandani in Egattur, etc. This has increased development density and is changing the pattern of land use, rapidly urbanizing once largely rural areas.

The corridor is also home to some of the largest slum resettlement sites in Chennai such as Kannagi Nagar (15,656 tenements), Semmancheri (5164 tenements) and Perumbakkam (16,440 tenements) (Peter, 2017). In a bid to improve the living conditions of the urban poor and create a slum-free city by 2020, the TNSCB continues to relocate slum dwellers living along river margins, roads and even those living along the coast to large resettlement sites, through the Tamil Nadu Slum Areas (improvement and clearance) Act 1971.

The justification for resettling slum dwellers along the IT corridor was that they would have access to work opportunities along the corridor, thereby meeting the increasing demand for services. However, Coelho et al. (2012) found that 10 years after slum dwellers were resettled in Kannagi Nagar, it had become increasingly challenging for residents to find meaningful employment in the corridor because of the social stigma attached to their residence and limited access to local networks in a labour market that relies heavily on recommendations and contacts.

The rapid influx of workers and residents along the IT corridor has placed severe pressures on the provision of water supply and sewerage. The construction of water and sewerage networks outside the limits of the GCC (about 90 percent of the corridor was outside the city limits until 2011) is the mandate of the TWAD. However, the GoTN directed the CMWSSB to implement a "special adhoc project to provide 24/7 water supply and efficient sewerage infrastructure to the corridor" (Roumeau et al., 2015). This was despite the fact that city residents received intermittent water supply for only a few hours a day, several pockets of the city were yet to get household connections, and unaccounted-for water averaged 50 percent. Thus, the CMWSSB, already hard-pressed to meet the city's water need, was mandated by the state to take charge of the IT corridor's water demand.

While the TNRDC is said to have provided for utility lines under footpaths, it was only in 2011 that the CMWSSB may have started to supply piped water, when the GCC's limits were extended (in the south) from Perungudi to Semmancheri to include a greater part of the corridor (Roumeau et al., 2015). Therefore, the water demand was primarily met by a combination of private sources from an unregulated and informal sector such as water tankers, borewells and packaged water whose availability and price were determined purely by market forces, thereby rendering them inaccessible

to the poorer residents of the corridor. The practice continues even today as several pockets of the corridor are yet to get a piped connection for water and sewerage, and residences pay anywhere between INR 800 and INR 1600 per tanker (12,000 litres) and around INR 2000-INR 3000 per tanker load for sewerage disposal (CitizenMatters, 2017). In addition, the CMWSSB's inability to provide an underground drainage network, which as explained during workshops conducted with government agencies is largely because of lack of adequate resources to match the mandate imposed on them, has led to the rise of an informal private sewage disposal market. This has resulted in adverse effects on the environment. Despite the presence of state-operated sewage treatment plants and pumping stations, the unregulated private tankers typically dump the raw sewage water into open fields, waterbodies and storm water drains, thus polluting/clogging the waterbodies (Citizen Matters, 2017) (see Fig. 30).

The system of meeting water demand through private and unregulated sources as mentioned above not only skews access in favour of the rich but is also environmentally unsustainable as it leads to severe groundwater depletion and contamination. As Gopakumar (2009) notes, the development of water supply infrastructure in the corridor and indeed, in the city has led to "an engine of peripheralization" that draws water from peri-urban areas to meet the needs of the city, and this process is more predominant during periods of water shortage. Water tankers draw water from shallow peri-urban agricultural wells (located just outside the city) because this is more profitable for landowners than farming, and if water is not available tankers go farther away, consequently increasing the price of water and causing severe groundwater depletion in the region (Srinivasan et al., 2010).

A similar process operates in the IT corridor where around 850 water tankers (each containing 12,000 litres) have been sourcing water from nearby villages for several years to meet the demands of the corridor and surrounding areas (Kandavel, 2014). While the commitment of the government to provide reliable and good-quality water for the IT corridor is recognized, inequalities in access exist within the corridor itself, exacerbated by the fragmented governance structure and financially and technically constrained water utilities. As such, the unfettered nature in which megaprojects such as the IT corridor have been instituted seems to have failed to account for or ignored the available natural resources to support the desired economic development.

The Pallikaranai marsh has been a potent symbol of degradation that has galvanized many residents and community groups into elevating the topic of environmental conservation. Over the last couple of decades, the area's classification as wasteland by planning mechanisms and its unrestricted growth have led to the concreting of substantial portions (reclaimed for residential, industrial and commercial projects) of the marsh, while other sections serve as garbage dumps and sites for disposal of partially treated sewerage.



*Figure 30: Private water tanker illegally dumping sewage water in an SWD
Source: Citizen Matters, 2017*

Environmental concerns along the IT corridor: Indeed, the high priority placed on developing megaprojects in an expeditious manner is supported by the state's IT policy, which completely exempts these endeavours from environmental clearances. This speaks more broadly of the failure to factor environmental and natural-resource-related vulnerabilities into urban decision-making throughout the metropolitan area, especially the IT corridor.

The Buckingham Canal runs along the eastern part of the IT corridor, while Pallikaranai marsh runs along the western side. Kannagi Nagar and Ezhil Nagar (another resettlement colony neighbouring Kannagi Nagar) were constructed from reclaimed land along the Buckingham Canal (Ramakrishnan, 2016). Further, part of Chennai's beach line suburban train from Thiruvanmiyur to Madhya Kailash is built on the canal.

The Pallikaranai marsh has been a potent symbol of degradation that has galvanized many residents and community groups into elevating the topic of environmental conservation. Over the last couple of decades, the area's classification as wasteland by planning mechanisms and its unrestricted growth have led to the concreting of substantial portions (reclaimed for residential, industrial and commercial projects) of the marsh, while other sections serve as garbage dumps and sites for disposal of partially treated sewerage. The National Institute of Ocean Technology, the Centre for Wind Energy Technology and the Perungudi dump site exemplify a few of the developments accommodated on the marsh. This wetland was spread over 6000 ha in the 1960s with a thriving ecosystem, and it also functioned as a natural flood mitigation system whereby it drained rainwater into the sea. Now it is reduced to 593 ha, increasing the risk of flooding considerably as seen during the extreme floods in December 2015 (Arabindoo, 2016; Devadas & Esther, 2016; Kennedy et al., 2014; Manohar & Muthaiah, 2016; Vencatesan et al., 2014).

Furthermore, the quantity of waste dumped in Perungudi dump site (which is now at full capacity) is 2800 to 3000 tonnes/day (as of 2015) of which 500 tonnes is construction debris (as we were told by aGCC representative). As this is an uncontained and open landfill, the continued dumping of waste has a direct impact on groundwater quality. IIT Madras conducted tests of groundwater in the area and found the presence of salts (not caused by saline water intrusion), metals such as manganese and lead, and an increase in sediments (Nambi, 2017).

Responding to pressure from the public, the government reclassified the marsh from “wasteland” in the revenue classification (Vencatesan, 2007) to reserve forest in 2007 and constituted the “Conservation Authority of Pallikaranai Marshland” in 2012 under the Tamil Nadu Forest Department to ensure its protection. In its Second Master Plan, the CMDA also classified the marsh as “swamp area for conservation”. In 2017, the forest department constructed a 1600-m bund along the western side of the marsh on Velachery main road and desilted/deepened 1800 sq. m on this stretch (Madhavan, 2017).

ANALYSIS

The above discussion highlights the state and metropolitan government’s strong inclination towards supporting IT-sector development, specifically along the OMR as a strategy to sustain economic development. Malmarugan and Narayan thus comment that the ITEL project reflects “the IT/ITES prowess of Tamil Nadu, and the commitment of successive governments to create and nurture world class infrastructure to preserve the State’s position as one amongst the most favoured investment destinations in the country”(Malmarugan & Narayan, 2006).

Economic advancement and augmentation appear to have taken a front seat in the growth path of the city. The discussion also reveals that this desire to grow has come at a very high cost. The fact that the IT corridor development has neglected social and ecological concerns confirms that the vision of developing the CMA and the state as a competitive location for businesses in the global economy has been given primacy, overriding other concerns and/or discourses of environmental sustainability or socio-economic equality.

The IT corridor development along the OMR is not the only example highlighting heavy infrastructure investments in vulnerable areas. Ecologically insensitive urban and economic planning in the CMA is exemplified in projects that range from the international airport constructed over the Adyar river to the Koyambedu bus station located in a flood-prone zone (Madhavan, 2017). The 2015 flood has led to/prompted a sense of urgency amongst public agencies to emphasize the need to plan our city better and specifically to deal with water-related challenges. As such, efforts are being directed at removing encroachments on waterbodies, reviving existing water tanks, enforcing proper development regulations, etc. However, these efforts remain only partially effective due to their piecemeal nature. In addition, ongoing projects (Chennai Metro Rail) and new infrastructure project propositions (SWD network) across the CMA show the continued primacy of the world-class city vision over other visions of development.

CHAPTER 7

CONCLUSION



CHAPTER 7: CONCLUSION

PLANNING WITH ALTERNATIVE VISIONS OF DEVELOPMENT

The advent of liberalization since the nineties has given a state like Tamil Nadu considerable opportunities to improve the well-being of its citizens. In fact, it has made considerable headway not only in terms of economic indicators, but also in key human development indicators (Kennedy et al., 2014). The Tamil Nadu State Human Development Report-2017 places Chennai District amongst the top five in terms of Human Development Index value. However, it is evident from this report, civil society, academia and the media that the pressure of continuing to fit into the model of a world-class city in the global economy in the post-liberalization era has simultaneously presented barriers for a more environmentally sensitive development trajectory, with particularly negative implications for the socio-economically marginalized.

This report presents a detailed picture of the urban development ecosystem, first mapping all relevant stakeholders, and then engaging with their overall vision for development of the city. This analysis presents the multiple visions of collective stakeholder groups, emphasizing that the economic-growth-driven vision of development plays a central role in actual policy and in the decision-making realm. As such, one of the key takeaways from this report relates to the existing disjuncture between the public planning agenda as it exists on paper, which is all-encompassing, incorporating economic, social and ecological sustainability, and its implementation in practice. While there is significant convergence in the plans of the state/city authorities and the personnel working on the ground, as well as the visions of non-governmental stakeholders, in practice many deviations emerge.

Furthermore, from the analysis on whose visions get translated into action, it is evident that our initial hypothesis regarding the Key, Peripheral and Vulnerable Actors stands true. It is indeed the strong economic growth inclination of government and industries, more than their ecological, social, sustainability concerns, that drive Chennai's development trajectory, making them the Key Actors within the urban governance realm. Academia and civil society occupy a peripheral position in comparison, sporadically reshaping policy through their activism and advocacy, and by presenting scientific/alternative knowledge and raising public awareness. The vulnerable communities on the other hand remain the Vulnerable Actors. They are most affected, especially by the negative implications of rampant urban and economic growth. Yet they essentially remain outside of policy domain with extremely limited power or means to shape important decisions around city development.

The predominant focus on economic growth in action within urban governance can largely be explained by the pressure that government agencies feel towards protecting their competitive position in the open market. The lack of connection between plans/visions and action/practice

indicates that there is an urgent need to take cognizance of the challenges of converting the ambitious plans into practice, which we discuss in more depth in the Chennai: Emerging Tensions and Governance Challenges at the Intersection of Land-Water-Waste Management report.

Also, as Kennedy et al. (2014) argue, the overemphasis on economic sustainability as opposed to social and/or ecological sustainability in action lies in a fragmented governance system with limited avenues for public participation that perpetuates and amplifies the risks (Kennedy et al., 2014). If there were a more integrated planning approach that provided greater opportunity for multiple interest groups/stakeholders to meaningfully participate in decision-making processes, alternative visions of development would be more likely to shape our future development trajectory. Thus, it is not due to a lack of technical or financial expertise, but because of collaboration failures across different stakeholder groups that development tends to follow a less sustainable path.

Greater collaboration seems necessary on multiple counts:

- First, it is imperative that information available through multiple stakeholder groups is well accommodated to justify a truly data-driven policy and planning practice, where data includes alternative knowledge sources. Our discussion on community-based land-use mapping of coastal areas, and the inconsistent allocation of solid waste-related expenditure in low-vulnerability areas in the corporation highlights the need for collaborating and coordinating with non-profits as well as vulnerable communities and incorporating the knowledge available through them into decision-making.
- Second, the tenuous position of government and non-governmental stakeholders was evident in the way they represented one another during interviews and workshops, indicating the need for them to better understand/appreciate each other's limitations and strengths. Only through dedicated collaborative efforts we may hope to build trust for continued engagement towards achieving common sustainability goals.
- Third, genuine and broader consideration of stakeholder inputs in urban environmental decision-making processes will ensure that our city's development may be imagined alternatively instead of following the prominent global imaginaries that might not fit best with our local specificities.

Therefore, as "(C)ities are...ideas and visions — or prejudices and biases — realised in concrete" (Palavalli & Krishnan, 2018), we must accommodate multiple visions and manage multiple biases through broad stakeholder involvement and collaborations in order to create a Chennai that is truly a liveable city for all with a future that is bright, both economically and environmentally.

If there were a more integrated planning approach that provided greater opportunity for multiple interest groups/stakeholders to meaningfully participate in decision-making processes, alternative visions of development would be more likely to shape our future development trajectory.

LOOKING AHEAD TO FUTURE SCENARIOS

Drawing on the above analysis, we would like to end with some broad and some specific suggestions that relate to a set of potential/desirable future scenarios. These scenarios are likely to facilitate better collaboration, greater convergence between planning and action, and convergence between multiple stakeholder visions for future development of the city along a more socio-environmentally as well as economically sustainable path.

1. **Data-driven Policy Decisions:** Based on our findings on the corporation's spending on solid waste management, we propose that future budget allocation is based on the Chennai Disaster Management Plan document's vulnerability mapping. This would allow such expenditures to be more effectively targeted towards higher-risk-prone areas. Similarly, other expenses in areas of storm water drainage should be data-driven. Another extremely important aspect of data-driven policy is to accommodate alternative forms of knowledge (for instance, community-based knowledge) in planning and decision-making.
2. **Better Operations and Maintenance Funds:** Stakeholder input has also highlighted that the budget available for operations and maintenance (O&M) for existing infrastructure is low. While depending on the agency, this could vary between 20 percent and 50 percent, according to CMA representatives, the State Finance Commission assigns them only 5 percent for O&M. This low O&M allocation has been identified as a major challenge in maintaining existing storm water drains, sewerage systems, roads, etc. A sustainable future scenario seems possible only under circumstances where agencies dedicate more resources for daily operations and maintenance. Without this, even newly added infrastructure continues to fall into disrepair with time.
3. **Stringent Land-Use Reclassification Procedure:** In order to check land-use reclassification, especially in cases of transforming unbuilt or ecologically vulnerable land into built-up area, the process of reclassification should be made institutionally more rigorous, involving multiple stakeholders/agencies. While there is a technical working group with representatives from the CMWSSB, PWD, GCC, Tamil Nadu Pollution Control Board (TNPCB), etc. to weigh in on the reclassification process, their presence, according to our interviews, is fairly ceremonial and the reclassification decisions are carried forward unopposed, despite reservations from various government departments about the feasibility of the reclassification. Further, the reclassification process does not take into account the existing master plans and visioning exercises of various other government departments. During our interviews, the CMWSSB pointed out that the infrastructure projects conforming to their master plan had to be put on hold to accommodate infrastructure requirements in the newly classified areas. In addition to making the process of land reclassification stringent, conversion of waterbodies or land in close proximity to waterbodies, particularly

into industrial/hazardous land-use classification needs to be rigorously restricted.

4. **Participatory Planning:** While state and parastatal agencies have been taking the call on pushing for economic development policies/investments that support megaprojects, the IT corridor development and its subsequent consequences discussed in the report reiterates the need for more participatory planning processes. A system of broad participation from local residents, non-profits, industries and government bodies is more likely to protect the multiple interests/visions than to give in to the economic pressure for more growth (even when it comes at the cost of local livelihood and the environment). Perhaps we can learn from efforts like the People's Plan Campaign (PPC) in Kerala. This was a very successful experiment in participatory planning where the citizen movement, aided by strong participation from neighbourhood groups, self-help groups and the local government with a strong participatory institutional set-up, was able to decentralize the financial powers up to the panchayat level. Some of the landmark policies in the state have been born out of the PPC movement, including poverty alleviation programmes, the EMS Housing Scheme and the Kerala Food Security Programme. Therefore, steps taken to involve multiple stakeholder groups in planning and empowering urban local bodies must be accommodated in the formal governance realm. Further, with the advent of technology, a data-driven approach to governance which includes spatial mapping and simulation tools should be employed to test the outcome/projection of new policies/projects.
5. **Integrated Planning via a Nodal Agency:** In light of multiple master plans drawn up by multiple agencies and non-compliance with the legally binding Second Master Plan and the CMDA's development regulations, an argument can be made for better integrating all planning functions within a single nodal agency. This can potentially lead to better coordination while all existing departments function as implementation and monitoring agencies. But, as public agencies point out, this system will work effectively only when the coordination between the planning agency and all the rest of the implementing agencies is substantial. Otherwise it will replicate the current tension between the CMDA (a nodal planning agency) and other government departments. This would be counterproductive to any attempt towards building a more inclusive and participatory planning process. Hence, the master planning exercises should be prepared simultaneously and in conjunction with relevant agencies. For example, while the CMDA's Second Master Plan was prepared for a time period of 20 years, the CMWSSB master plan was prepared for a time period of 30 years with different starting points.

Using some of these ideas of future scenarios, in the next phase of our work, we will validate the visions from various stakeholder groups as to what they think are the desirable and feasible scenarios that we may work towards, to make Chennai a more sustainable city.

BIBLIOGRAPHY

Administrative Staff College of India (ASCI). Development Plan for Chennai Metropolitan Area (submitted to the MoUD, Gol, under JNNURM)– Appraisal Report, 2006. Retrieved from: <http://www.transparentchennai.com/wp-content/uploads/downloads/2013/03/plan%20appraisal.pdf>.

Arabindoo, P. Unprecedented natures? An anatomy of the Chennai floods. *City*, vol. 20, No. 6 (2016): 800-821.

Arabindoo, P. "City of sand": stately re-imagination of Marina Beach in Chennai. *International Journal of Urban and Regional Research*, vol.35, No. 2 (2011): 379-401.

Arabindoo, P. Mobilising for water: hydro-politics of rainwater harvesting in Chennai. *International Journal of Urban Sustainable Development*, vol.3, No. 1 (2011): 106-126.

Arabindoo, P. *Absent societies: Contouring urban citizenship in postcolonial Chennai* (Thesis Paper). London: The London School of Economics, 2008.

Babu, G. & T.E Narasimhan. What Bengaluru is to start-ups, Chennai is to SaaS talent pool: experts. *Business Standard*, 2015. Retrieved from: http://www.business-standard.com/article/companies/after-bengaluru-it-s-chennai-for-ittalent-pool-and-favourable-system-notably-a-vast-and-growing-youth-talent-pool-propels-growth-of-saas-industry-in-this-southern-metropolis-say-experts-to-the-extent-of-it-now-being-a-globally-notable-developmen-115102200623_1.html.

Bowie, S.N. The moral obligations of multinational corporations. In S. Luper-Foy, ed., *Problems of International Justice*. Boulder, CO: Westview Press, 1988, pp. 97-113.

Brugha, R. & Z. Varvasovsky. Stakeholder analysis: a review. *Health Policy and Planning*, vol. 15 (2000): 239-246.

Braun, B. *The Intemperate Rainforest: Nature, Culture, and Power on Canada's West Coast*. Minneapolis and London: University of Minnesota Press, 2002.

Braun, B. & N. Castree, eds. *Remaking Reality: Nature at the Millennium*. London and New York: Routledge, 1998.

Brookings Institute. *Global Metro Monitor*, 2015. Retrieved from: <https://www.brookings.edu/research/global-metro-monitor/>.

Care Earth Trust. *Areas of research – website*. Retrieved from: <http://careearthtrust.org/restoration-and-conservation-of-critical-landscapes/>. Accessed 3 June 2018.

Census of India 2011. *District Census Handbook. Village and Town Wise Primary Census Abstract (PCA)*. Directorate of Census Operations Tamil Nadu.

Chennai Metropolitan Development Authority (CMDA), 2008. *Second Master Plan for Chennai Metropolitan Area, 2026*.

Chowdhury, P. & M.R. Behera. *A study on regional sea level variation along the India coast*. 8th

International Conference on Asian and Pacific Coasts (APAC 2015). *Procedia Engineering*, vol. 116, (2015): 1078-1084.

Citizen Matters. Rs 700 crore spent annually as OMR residents wait in vain for piped water, 4 August 2017. Retrieved from: <http://chennai.citizenmatters.in/omr-it-corridor-piped-water-supply-and-sewerage-network-problem-2433>.

Coelho, K., S. Narayanan, T. Venkat & M. Vijaybaskar. State Level Background Paper on Tamil Nadu. Tata Institute of Social Sciences, 2011.

Coelho, K., T. Venkat & R. Chandrika. The spatial reproduction of urban poverty – labour and livelihoods in a slum resettlement colony. *Review of Urban Affairs – Economic & Political Weekly*, vol. XLVII, Nos 47 & 48 (2012).

Cronon, W. *Nature's Metropolis– Chicago and the Great West*. New York, London: W.W. Norton & Company, 1991.

Deccan Herald. Rs 800 crore for remodelling 125 km of stormwater drains, 15 June 2016. Retrieved from: <http://www.deccanherald.com/content/552400/rs-800-crore-remodelling-125.html>.

Devadas, M.D. & S. Esther. A calamity of a severe nature: case study – Chennai, India. 5th International Conference on Flood Risk Management and Response (FRIAR 2016). *WIT Transactions on the Built Environment*, vol. 165 (2016).

Ellis, R. Public performances: enacting citizenship through public consultation for Chennai's Second Master Plan. In Coelho, K., L. Kamath & M. Vijaybaskar, eds, *Participolis: Consent and Contention in Neoliberal Urban India. Cities and the Urban Imperative*. Routledge. New Delhi: Taylor and Francis, 2012, pp. 253-273.

Freeman, R.E. *Strategic Management: A Stakeholder Approach*. New York: Basic Books. 1984.

Friedman, A.L. & S. Miles. *Stakeholders: Theory and Practice*. Oxford: Oxford University Press, 2006.

Gopakumar, G. Investigating “degenerated peripheralization” in Chennai: water supply infrastructure, Dravidian politics & urban governance. *Public Works Management & Policy*, vol. 14, No. 2 (2009): 109-129.

Government of India. Provisional Results, 2011. Retrieved from: http://censusindia.gov.in/2011-prov-results/data_files/tamilnadu/3.Tamil%20Nadu_PPT_2011-BOOK%20FINAL.pdf.

Government of Tamil Nadu. *Vision 2023: Strategic Plan for Infrastructure Development in Tamil Nadu*, 2012. Retrieved from: [http://tnidb.tn.gov.in/forms/TN_Vision_2023\(PHASE%201\).pdf](http://tnidb.tn.gov.in/forms/TN_Vision_2023(PHASE%201).pdf).

Government of Tamil Nadu. *Vision 2023: Strategic Plan for Infrastructure Development in Tamil Nadu, Phase 2*, 2014a. Retrieved from: [http://tnidb.tn.gov.in/forms/TN%20VISION%202023\(PHASE%202\).pdf](http://tnidb.tn.gov.in/forms/TN%20VISION%202023(PHASE%202).pdf).

Government of Tamil Nadu. *Tamil Nadu Industrial Policy*, 2014b. Retrieved from: http://www.investingintamilnadu.com/tamilnadu/doc/policy/Tamil_Nadu_Industrial_Policy_2014.pdf.

Government of Tamil Nadu. Tamil Nadu State Action Plan for Climate Change. Chapter 6: Water Resources, 2015. Retrieved from: <http://www.environment.tn.nic.in/doc/TNSAPCC%20PDF/Chapter%206%20%20Water%20Resources%20%20.pdf>.

Government of Tamil Nadu. Tamil Nadu Global Investors Meet 2015: IT & ITeS Sector Profile, 2015. Retrieved from: <http://www.investingintamilnadu.com/doc/TN-GIM-IT-ITeS-sector-profile.pdf>.

Govindarajan, V. Six Chennai maps spanning over a century explain why the city faces flood danger every year. Scroll, 6 November 2017. Retrieved from: <https://scroll.in/article/856756/six-chennai-maps-spanning-over-a-century-explains-why-the-city-faces-flood-danger-each-year>.

Greater Chennai Corporation. Budget Estimate, 2015-2016 to 2017-2018. Retrieved from: <http://www.chennaicorporation.gov.in/>.

Harvey, D. From managerialism to entrepreneurialism: the transformation in urban governance in late capitalism. *Geografiska Annaler. Series B, Human Geography*, vol. 71, No. 1: 3-17. The roots of geographical change: 1973 to the present (1989).

Heynen, N., M. Kaika & E. Swyngedouw. In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism. Abingdon: Routledge, 2006.

Janakarajan, S. Optimising local water resources and availability in urban and peri-urban Chennai. Centre for Science and Environment. Workshop Presentation on Anil Agarwal Dialogues: Excreta Does Matter, 2013.

Jayaraman, N. Why engineering interventions won't prevent another flood in Chennai. Scroll, 7 September 2016. Retrieved from: <https://scroll.in/article/815821/why-engineering-interventions-wont-prevent-another-flood-in-chennai>.

Jameson, S. & I. Baud. Varieties of knowledge for assembling an urban flood management governance configuration in Chennai, India. *Habitat International*, vol.54, No. 2 (2016): 112-123. Retrieved from: <http://www.sciencedirect.com/science/article/pii/S0197397515303192?via%3Dihub>.

Kaika, M. *City of Flows - Modernity, Nature, and the City*. New York: Routledge, 2005.

Kanchanamala, S. & S.P. Sekar. An Analysis of Growth Dynamics in Chennai Metropolitan Area. *Institute of Town Planners, India Journal*, vol. 8, No. 4 (2011): 31-57.

Kandavel, S. Water supply affected on OMR as tankers go on strike. *The Hindu*, 15 October 2014. Retrieved from: <http://www.thehindu.com/news/cities/chennai/water-supply-affected-on-omr-as-tankers-go-on-strike/article6501205.ece>.

Kabirdoss, Y. Expansion of Chennai Metropolitan Area: TN govt. likely to hold public hearings. *Times of India*, 28 February 2018. Retrieved from: <https://timesofindia.indiatimes.com/city/chennai/expansion-of-chennai-metropolitan-area-tn-govt-likely-to-hold-public-hearings/articleshow/63112544.cms>.

Kennedy, L. et al. *Engaging with Sustainability Issues in Metropolitan Chennai*. Chance2Sustain. Bonn: EADI, 2014.

Keil, R. Urban political ecology. *Urban Geography*, vol. 24 (2003): 723-738.

Keil, R. & J. Graham. Reasserting nature: constructing urban environment after Fordism. In Braun, B. & N. Castree, eds. *Remaking Reality: Nature at the Millennium*. London and New York: Routledge, 1998.

Krishnan, S. & B.M. Palavalli. Surveys and the city. *Sunday Magazine – The Hindu*, 25 March 2018. Retrieved from: http://www.thehindu.com/todays-paper/tp-features/tp-sundaymagazine/surveys-and-the-city/article23345342.ece?utm_source=tp-sundaymagazine&utm_medium=sticky_footer.

Madhavan, T. Pallikaranai marsh gets much-needed protection. *The Hindu*, 30 June 2017. Retrieved from: <http://www.thehindu.com/news/cities/chennai/pallikaranai-marsh-gets-much-needed-protection/article19181882.ece>.

Malmarugan K. & S. Narayan, eds. *Evolution of an Integrated Urban Facility. The IT Corridor Story*, Chennai, 2006.

Manohar, L. & K.T. Muthaiah. Towards resilience in Chennai. *International Planning History Society Proceedings (Floods and Infrastructure)*, vol. 17, No. 3 (2016):252-260.

Ministry of Urban Development. *Jawaharlal Nehru National Urban Renewal Mission Toolkit*. Government of India, 2005. Retrieved from: <http://urban.bih.nic.in/Docs/JNNURM-Toolkit.pdf>.

Ministry of Micro, Small and Medium Enterprises (MSME). *Brief Industrial Profile of Chennai District, 2012-2013*. Government of India. Chennai: Micro, Small & Medium Enterprises Development Institute, 2013.

Mukundan, T.M. *The Ery Systems of South India*. Chennai: Akash Ganga Trust, 2005.

Nambi, I. Management of urban wetlands system: Pallikaranai marshland and associated lakes. Presentation at Conference on Peri-Urban Development: concept, emerging ideas and notions of sustainability held at IIT Madras on 27 and 28 January 2017.

NASA Landsat Programme, *Landsat Satellite Imagery for Chennai, India (Landsat 5TM, 7ETM, 8OLI)*, US Geological Survey. Retrieved from: <https://earthexplorer.usgs.gov/>. Accessed 8 August 2015.

New Indian Express. Chennai Metropolitan Area expansion proposal riddled with unanswered questions, 24 April 2018. Retrieved from: <http://www.newindianexpress.com/cities/chennai/2018/apr/24/chennai-metropolitan-area-expansion-proposal-riddled-with-unanswered-questions-1805559.html>.

Olander, S. Stakeholder impact analysis in construction project management. *Construction Management and Economics*, vol. 25, No. 3 (2007): 277-287.

Olander, S. & A. Landin. Evaluation of stakeholder influence in the implementation of construction. *International Journal of Project Management*, vol. 23, No. 4 (2005): 321-328.

Peter, V. *From Deluge to Displacement: The Impact of Post-flood Evictions and Resettlement in Chennai*. Information and Resource Centre for the Deprived Urban Communities (IRCDUC). New Delhi: Housing and Land Rights Network, 2017. Retrieved from: http://hlrn.org.in/documents/Deluge_to_

Displacement_Chennai.pdf.

Rajendran, V. & T. Kaneda. A Simulation of Land Use/Cover Change for Urbanization on Chennai Metropolitan Area, India. 19th International Conference on Urban Planning, Regional Development and Information Society, 2014.

Ramakrishnan, D. "Encroachments on Pallikaranai marsh must be removed". The Hindu, 22 September 2016. Retrieved from: <http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/Encroachments-on-Pallikaranai-marsh-must-be-removed/article14633743.ece>.

Raman, N. The board and the bank: changing policies towards slums in Chennai. *Economic & Political Weekly*, vol.46, No. 31 (2011): 74-80.

Ramesh, N. Local Waterscapes and Global Technologies: Micro-politics of Desalination in Chennai (SOAS South Asia Institute Working Papers). *South Asian Institute*, vol. 1 (2015): 32-47.

Reed, M.S. et al. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, vol.90, No. 5 (2009): 1933-1949.

Roumeau, S., A. Seifelislam, S. Jameson & L. Kennedy. Water Governance and Climate Change Issues in Chennai. *USR 3330 "Savoirs et Mondes Indiens" Working papers series no. 8*, 2015.

Sah, P. Sea-level rise in 30 years a threat to Chennai. *Times of India*, 28 February 2018. Retrieved from: <https://timesofindia.indiatimes.com/city/chennai/sea-level-rise-in-30-years-a-threat-to-chennai/articleshow/63057586.cms>.

Stoney, C. & D. Winstanley. Stakeholding: Confusion or Utopia? Mapping the conceptual terrain. *Journal of Management Studies*, vol. 38 (2001): 603-626.

Smith, N. *The New Urban Frontier: Gentrification and the Revanchist City*. London: Routledge, 1996.

Smith, N. & P. O' Keefe. Geography, Marx and the concept of nature. *Antipode*, vol.12, No. 2 (1980): 30-39.

Smith, N. *Uneven Development – Nature, Capital and the Production of Space*. Oxford: Basil Blackwell Publisher Ltd, 1984.

Srinivasan, V., S.M. Gorelick & L. Goulder. Sustainable urban water supply in south India: desalination, efficiency improvement, or rainwater harvesting? *Water Resources Research*, vol. 46, No. 10 (2010a). Retrieved from: <http://onlinelibrary.wiley.com/doi/10.1029/2009WR008698/full>.

Srinivasan, V., S.M. Gorelick & L. Goulder. A hydrologic-economic modelling approach for analysis of urban water supply dynamics in Chennai, India. *Water Resources Research*, vol.46, No. 7 (2010b). Retrieved from: <http://onlinelibrary.wiley.com/doi/10.1029/2009WR008693/abstract>.

Swyngedouw, E. The city as a hybrid: on nature, society and cyborg urbanization. *Capitalism Nature Socialism*, vol. 7 (1996): 65-80.

Swyngedouw, E. & M. Kaika. The environment of the city or.... the urbanization of nature. In G. Bridge & S. Watson, eds. *Reader in Urban Studies*. Oxford: Blackwell Publishers, 2000, pp. 567-580.

Swyngedouw, E. & N. Heynen. Urban political ecology, justice and the politics of scale. *Antipode*. vol. 35, No. 5 (2003): 898-918.

The Hindu. IT industry is growing, say experts, 22 July 2017. Retrieved from: <http://www.thehindu.com/news/national/tamil-nadu/it-industry-is-growing-say-experts/article19333557.ece>.

Times of India. CMDA takes stock of expansion of Chennai Metropolitan Area, 2 August 2017. Retrieved from: <https://timesofindia.indiatimes.com/city/chennai/cmda-takes-stock-of-expansion-of-chennai-metropolitan-area-limits/articleshow/59870563.cms>.

Transparent Chennai. Development Plan for Chennai Metropolitan Area, April 2006. Retrieved from http://www.transparentchennai.com/wp-content/uploads/downloads/2013/03/CDP_CHENNAI.pdf

Vaidya, A. "Unnatural Disaster: After the Chennai Floods", *Dissent*. 22 April 2016. Retrieved from https://www.dissentmagazine.org/online_articles/after-chennai-floods-development-disaster-climate-change-democracy

Valentine, G. At the drawing board: developing a research design. In M. Limb & C. Dwyer, eds. *Qualitative Methodologies for Geographers: Issues and Debates*. London and US: Oxford University Press Inc, 2001, pp. 41-54.

Vencatesan, J. Protecting Wetlands. *Current Science*, vol. 93, No. 3 (2007): 288-290. Retrieved from: http://www.currentscience.ac.in/Downloads/article_id_093_03_0288_0290_0.pdf.

Vencatesan, J. et al. Comprehensive Management Plan for Pallikaranai Marsh. Conservation Authority for Pallikaranai Marsh (GoTN) and Care Earth Trust, 2014. Retrieved from: <http://www.pallikaranaimarsh.tn.gov.in/userfiles/files/Pallikaranai%2520Management%2520Plan%25202014.pdf>.

APPENDIX 1

List of organizations/groups interviewed	Nature	Number of interviews
Chennai Metropolitan Development Authority	Government	2
Chennai Metropolitan Water Supply and Sewerage Board	Government	1
Greater Chennai Corporation	Government	1
Public Works Department	Government	2
Tamil Nadu Water Investment Company	Private	1
Tamil Nadu Urban Infrastructure Financial Services Ltd	PPP	1
Tamil Nadu Urban Finance and Infrastructure Development Corporation Limited	PPP	1
Urban Workshop	Private	1
Coastal Research Centre	NGO	1
Care Earth	NGO	1
Citizen Consumer and Civic Action Group	NGO	1
Indo-German Centre for Sustainability	Think tank	1
Rain Centre	NGO	1
MIDS	Academia	2
MCCI	Industry	1
IIT Madras	Academia	1
Semmancheri Residents	Vulnerable communities	2 groups (10 in each)

APPENDIX 2

Interview Questionnaire

Thematic issues covered

Thematic area	Number of interviews
Organizational data (background work – only clarifications)	Size – people, budget, jurisdiction – at what scale it works; what are the areas of work; caste?
Interdepartmental/organizational interaction – influence/control over decisions	Monetary; regulatory; policy formulation; policy implementation; how Central govt changes effect
Interdepartmental/organizational interaction – interactions/flows	Finance; data; collaborations (beyond group actors)
Knowledge/perceptions	Problemframing and decision framing – understanding the need for integrated thinking/ planning
Preferences/aspirations/priorities	Environmental protection, growth, env-sensitive growth, etc.
Actions/policies/regulations	Following up on aspirations/goals: nature and temporal character of plans; nature of regulations
Areas of tension	Identifying tension between sectors (urban growth vs water sustainability) and across actors (civil society, govt, industries, etc.)
Organizational capacity	Hiring process (proxy for qualification); data, skilllevel, finances

Background

1. Briefly describe the primary role of your agency – what are the specific duties or areas of work your agency covers?
2. Describe the capacity of the organization– in terms of funding sources/budget, nature and size of organizational personnel, technical resources supporting your work (data, software, hardware, personnel, research and development).

Goals/aspirations/pri/orities

3a. How would you describe the primary goals of the organization OR when you make decisions on the areas of work (transportation, waste water, flood mitigation, etc.) what are some of the concerns/ interests that you prioritize in your decision-making process OR are there specific goals that your agency aspires to achieve in doing its work?

3b. If you had to list a few of the most important and relatively recent achievements (effective policies/ regulations/plans/programmes) of the agency (past 5 years) what would those be?

Influence/control (will also address interaction).

4a. With respect to planning for (whatever is their focus of work... it could be waste water, landuse, economic dev., etc.) who are some of the most influential agencies?

4b. These agencies are influential in (waste water, landuse, planning) because:

1. they provide/control financial support; 2. define policy goals; 3. provide knowledge/data support; 4. are responsible for implementing plans; 5. other reasons.

Interaction

5a. Who are some of the other agencies you interact with regularly for completing your duties? How do you interact?

In terms of: 1. financial flow; 2. policy influence; 3. knowledge/data flow; 4. collaborative flow; 5. other.

5b. Beyond your sector (public, private, community) which are some of the other agencies that you interact/collaborate with? How? (through funding, personnel, data sharing, co-creating policies, co-managing programmes, etc.).

5c. Who else do you think you should interact with more? Or Who else do you feel should be playing a more important role within (the focus of work) the planning process and currently is not?

Resources/barriers to current system: problem framing and worldview

(These questions will elicit respondents to identify elements of ideal planning/resources that can make their work more effective, identify barriers to their work, and possibly ways of overcoming those barriers. This will be a good way to examine how they perceive the present governance system, its strengths, limitations, means of improvement without us putting words in their mouth).

6a. What other resources could help you better do your job? Or How can present work be optimized?

6b. What are some of the barriers that hinder your work?

(Specifically, in terms of technology (data, tools, infrastructure, equipment), economic (money, personnel), planning (more horizontal or vertical interaction, short- or long-term planning), political (system, support), social (awareness and participation), environmental, education and research.

7a. How do you think the issues you handle contribute to Chennai's socio-economic development (for agency dealing with water or waste) or to Chennai's future environmental sustainability (for agency dealing with urban planning)?

7b. Would you describe the work you do as an integral component of urban planning or environmental planning?

In the end ask them about existing studies/policy documents relevant for understanding the current focus/efforts of their organization and the challenges they face (also studies more generally relevant for this project).

APPENDIX 3

Sphere	Organization/Group	Role/Responsibility
Public	Tamil Nadu Housing Board (TNHB)	The TNHB has developed many neighbourhood schemes, housing schemes and a mega township with all infrastructure facilities. It mainly caters to the housing needs of people belonging to economically weaker sections and low-income groups, providing accommodation at affordable prices.
	Tamil Nadu Slum Clearance Board (TNSCB)	The TNSCB provides slums with liveable housing, basic infrastructure facilities and livelihood programmes to improve residents' living conditions. Further, they implement various programmes like insitu tenement schemes, insitu plotted and infrastructure development, rehabilitation and resettlement schemes, community development activities, etc.
	Tamil Nadu Urban Infrastructure Financial Services Ltd (TNUIFSL)	The TNUIFSL is a public limited company with the objective to carry out the business activities in respect of management of trust funds and other funds and to act as managers, consultants, advisers, administrators, attorneys, agents or representatives of or for any funds, and to act as consultants, financial advisers and investment advisers and to render such consultancy, financial and investment advisory services. Funds managed by TNUIFSL include: Tamil Nadu Urban Development Fund, Project Development Grant Fund, Project Sustainability Grant Fund, Chennai Mega City Development Fund, Tamil Nadu Urban Road Infrastructure Fund, Water & Sanitation Pooled Fund.
	Tamil Nadu Water Supply and Drainage Board (TWAD)	The TWAD's objective is to provide protected water supply to the rural and urban population as well as underground sewerage schemes to the urban local bodies in Tamil Nadu excluding the Chennai Corporation. Its main activities include planning, investigation, design, implementation and commissioning of water supply and sewerage schemes in rural and urban areas, and operations & maintenance of combined water supply schemes.
	Public Works Department – Water Resources Organization (PWD)	Primary activities of the PWD– Water Resources Organization include impounding of water and its regulation, flood control and management, creation of water resources, rehabilitation and proper upkeep of irrigation infrastructure, coastal protection works, artificial groundwater recharge and interlinking of rivers within the state.
	Tamil Nadu Small Industries Development Corporation Limited (TANSIDCO)	The focus of the corporation has been largely on developing and providing quality infrastructure to the MSMEs. Besides, TANSIDCO also extends marketing assistance and supplies raw materials to MSMEs. TANSIDCO undertakes development and management of industrial estates for the benefit of MSMEs and other industries. So far, TANSIDCO has developed 105 industrial estates.
	Tamil Nadu Pollution Control Board (TNPCB)	The TNPCB is the governing body to monitor and control air, noise and water pollution in the State of Tamil Nadu. It is also a key stakeholder in the issuance of environmental clearances to development projects in the State of Tamil Nadu.

Sphere	Organization/Group	Role/Responsibility
	Tamil Nadu State Disaster Management Authority (TNSDMA)	The objective of the TNSDMA is to provide immediate relief and long-term rehabilitation; to convert the traumatic challenge into an opportunity and create environment friendly and safe habitations; to provide livelihood options with specific focus on the empowerment of the vulnerable sections of society, especially women; to enhance the effectiveness of the community to face disasters in the future; and to obtain sustainable and lasting outcomes by forging strong public-private partnerships.
	Chennai Metropolitan Development Authority (CMDA)	The main functions of the CMDA include planning –preparation of master plans, detailed development plans and formulation of any other plan or project for the development of the CMA, including their enforcement, coordination, supervision and execution, and providing financial assistance for development projects in the CMA.
	Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)	The CMWSSB is vested with the responsibility of promoting and securing the planned development of water supply and sewerage services, operations & maintenance and creation of the required infrastructure, and implementation of prospective plans to meet the requirements of the CMA. Water supply services include water treatment and desalination plants. Sewerage services include wastewater treatment, reuse of treated water and power generation from sewage treatment plants. It also serves some local bodies as well as bulk and industrial consumers.
	Greater Chennai Corporation (GCC)	The GCC is the civic body that governs the city of Chennai. With an area of 426 sq.km, it is divided into 200 wards and 15 zones. Its functional areas include roads, parks, education and health facilities, solid waste and waste management and water supply.
Private	Confederation of Indian Industries	The Confederation of Indian Industries has over 500 “intellectual groups” – councils, committees, task forces, working groups, among others – working at the national and regional levels, across industry sectors. These groups give shape to and articulate members’ concerns to government policymakers, regulators, think tanks, etc. They work proactively with government to formulate policies that would empower businesses.
	Industrial Estates	Established by TANSIDCO, they are specially designated industrial areas in the CMA, stretching across several acres and home to many small and medium enterprises, specializing largely in automobile components, garments and engineering products.
	IT Parks	Established to accommodate the city’s fast-emerging destination for IT outsourcing, they are typically clustered in the IT corridor (southern Chennai) and the northern suburbs of Ambattur.
Academia	Centre for Urbanization, Buildings and Environment (CUBE-IIT)	The focus of CUBE is on applied research for innovative technology and policy-based solutions in partnership with the government, academia, the private sector and other stakeholders.

	Madras Institute for Development Studies (MIDS)	The objectives of MIDS are to undertake studies and research pertaining to development problems, with special reference to the agro-rural aspects of Tamil Nadu and the socially and economically backward sections of the population throughout the country. The research concerns of the faculty are wide-ranging. MIDS has become a centre for critical thinking on development issues. The service of faculty members is sought by state and Central government departments, autonomous agencies, universities and colleges, non-governmental and international organizations.
	Centre for Disaster Mitigation Management	The Centre for Disaster Mitigation and Management at Anna University was born of a major initiative on the part of the university in response to the call of the International Decade for Natural Disaster Reduction. Its main strengths lie in its vision for disaster-free India, its multidisciplinary expertise, its international and national linkages and its vibrant work programme driven by innovation and ideas.
	Centre for Water Resources	The Centre for Water Resources was established to pursue teaching, research and consultancy, and to impart training programmes in hydrology, water resources engineering, irrigation management and water quality and quantity management.
	Centre for Human Settlements	The Centre for Human Settlements is involved in conducting multidisciplinary research and capacity-building programmes related to regional, urban and community development.
	Indo-German Centre for Sustainability (IGCS)	The IGCS serves the cooperation between German and Indian scientists on fundamental and applied research, teaching and training, and dissemination of information in the area of sustainable development. Its special focus is the protection of the environment, water resources, energy, land use and rural development and waste management.
NGO/Civil Society	Care Earth	Care Earth is a technical non-governmental organization concerned with the conservation of biodiversity. Their objectives include: to provide scientific services in the area of biodiversity, to assess human impact on the environment and to strategize methods for improving the environment.
	Citizen Consumer and Civic Action Group (CAG)	The CAG is a non-profit, non-political and professional organization that works towards protecting citizens' rights in consumer and environmental issues and promoting good governance processes including transparency, accountability and participatory decision-making.
	Chennai City Connect Foundation	Chennai City Connect assists government agencies by providing the knowledge base and expert advice needed to develop urban infrastructure and services in the CMA. It also provides a platform for various stakeholders to engage in and advocate for a variety of issues around improving the city's quality of life and competitiveness.
	Residential Welfare Associations	Residential Welfare Associations mobilize residents to adopt solid waste management practices and rainwater harvesting, and they lobby for the environmental interests of the community.
	Vulnerable Communities	Represent the interests of resettled and informal settlements for access to basic amenities and services.

