

Urban Form of Coromandel Region – a Case of Chennai

The Institutional Hindrance of the Commons and Anticommons

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Keywords: Coromandel Coast, India, Wetlands, Flood

Abstract: The medieval period word ‘Coromandel’ has two versions- Chola-mandala indicating the grand kingdom, and another is karu-manel-medu (black-soil-high ground) emphasizing the toponymy. The ecology of this region had great influence on the history, urban-form, and administrative setup of India. It is the only region to depend on Northeast monsoon and supports a unique type of vegetation called Tropical Dry Evergreen forest/region. The literature study and analysis points out historical, and geographical facts. The research part focuses on the evolution of the urban form with reference to the ecology of the region that is wetlands ecosystem. Historically, Madras (old name of Chennai) was evolved from and around the British trading post. The annexation of various self-sustaining villages during 18-19 CE had a significant impact on its urban morphology. The colonials dictated the morphological form that Madras would take by demarcating certain areas of the city for particular occupational purposes, and by settling migrants in colonies according to their economic skills. This segregated themselves from the indigenous inhabitants, and the new neighborhoods followed western models of design, expanding laterally and replicated land use without vernacular principles. The paper gives an in-depth analysis of the historical urban-form with GIS study that highlights the influence of temperate-climate design principles in this sub-tropical landscape. The alteration of nature-culture linkages which existed in the vernacular urban form has risen into frequent flooding and disaster. The paper concludes stating the sustainable strategies and need of vernacular-thinking to reduce the impact of climate change.

1. Introduction

The city has usually been first of all a ‘place’ – a clearly defined space visibly possessed and controlled by human beings and often sacred to gods, a statement of man imposed upon the chaotic and threatening vastness of nature (Evenson, 1966). Cities are complex systems composed of many human agents interacting in physical urban space (Boeing G, 2018). The cities in the twentieth century correspond to the notions of progress, industrial development, social welfare and aesthetic beauty that differ intrinsically from cities built at different points in history and embodying different notions of use of space (Lewandowski S, 1977).

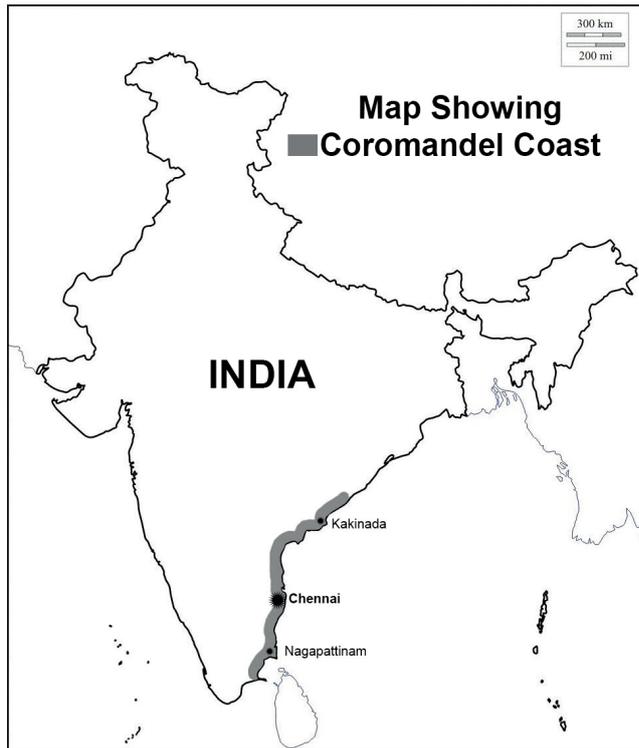
Indian cities are complex with contrasts of function, patterns, and forms reflecting long history. Urban form evolves constantly in response to social, environmental, economic and tech-

nological developments (Williams K., 2014). Traditionally, urban forms were evolved around physical space either a market space or religious structure in European and Middle Eastern cities located closer to rivers (Morris A.E.J., 1972). The Coromandel region is the first colonial posting of the British from the beginning of 17th CE. The city of Chennai was official became the first trading post for the English Empire, which underwent many morphological changes. This paper makes an attempt understand various physical and cultural factors in the development of city's patterns. To develop broader concepts one needs to study geographical and geological factors influence in the morphology. In 1996, the city of Madras was official got its native name 'Chennai', the word reflects the Nayak ruler Chennappa Nayakudu of the region from whom the British acquired the town in 1639 (Muthiah S., 2004). The paper deals with urban historical geography researching on various social, cultural, economic, geological, and environmental processes that have shaped city of Chennai. The incorporation of historical data, issues and perspectives into the theory and practice of urban design has yet to be fully embraced by the profession (Stapp N.L., 2009). "The physical setting has profoundly influenced the entire history of human occupation of the site of Madras (Chennai); but this has never been recognized properly, in spite of the fact that Madras has been foremost in developing the geographical knowledge of the country" (Thirunaranan B.M., 1939). The modern era of human development, growth of towns and cities displayed a separation between nature and human activities. This was not the case in pre-modern times, when human settlements either integrated or co-existed peacefully with the nature (Kaveh Samiei, 2013). The paper takes us from regional level to the built environment of the Coromandel Coast with Chennai as a case finding nature-culture linkages. By which, the paper would evolve to answer What is the unique historical geographic character of Chennai? And How the character shaped and changed in last three centuries with external influence?

2. Coromandel Coast

The word 'Coromandel' indicate a coastal region of Southeast Indian peninsular. It is a broad plain sea coastal line along Tamilnadu state and part of Andhra Pradesh stretching approximately 722 km (CMDA, 2010). The word has its origin in medieval period (Stephen J., 2009). The geographical area runs parallel to the coast of Bay of Bengal sea from the Krishna River basin to Point Calimere, and extending southwards up to Rameshwaram coast (Thurston E., 1918). Many historians term the word as 'Land of the Cholas' -Cholamandalam, the mighty kingdom existed in this part of country from 9th to 13th CE. According to geological observation of the coast from the sea, a thin layer of black soil would be visible making to look like black high ground. The eighteenth traveller Bishop Claudwell mentions it as *Karu-manal-medu* -black soil high ground, later deriving it in to Coromandel (Stephen J., 2009). It is a possible derivation as there are few settlements with the name *Kari-manal* on this coast. The village in Pulicat Lagoon was the first place of arrival by the visitors from Europe in Madras in the 16th and 17th centuries. Geologically, the coast has black clayey layer at 1.5 to 2 meters from the ground level. However, the name that has the geological reference to 'black-sand' would rightly be suitable for our understanding of this landscape (Anameka, 2010; Stephen J., 1997).

The rock *charnockite* formation is mainly confined to the Coromandel coast. Charnockite is frequently described as an orthopyroxene granite. Granites are felsic rocks that usually contain no or very little pyroxene. Its durability is such that the numerous ancient temples and monuments of South east coast of India, built of granite, stand to-day almost intact after centuries



Map 1.

of wear, and to all appearance are yet good for centuries to come. From their wide prevalence, forming nearly three-fourths of the surface of the coast is an inexhaustible source of good building and architectural material [Geology of India – DN Wadia – Macmillan publishers (1919)]

Tropical Dry Evergreen Vegetation Along the Coromandel, a unique type of vegetation named Tropical Dry Evergreen (TDE) is found in coastal plains extending in about 80-100 km inland. This unique coastal vegetation is dry for 6 to 8 months in a year stretching within the Northeast monsoon region – starting from Machilipattinam to Point Calimere in South-east of Indian coast (Champion and Seth, 1968). The TDE occur as patches, are short statured, largely three-layered, tree-dominated evergreen forests with a sparse and patchy ground flora (N. Parthasarathy, 2008; Mani N.S., 1976). It is common to find this small patches of forest at regular intervals called as *Sacred Groves* which act as a mini-biospheres with religious significance and excellent indicators of local biodiversity health, especially because local communities participate to protect them (Khan *et al.* 2008). It has been seen that religious beliefs and taboos that were central to the protection of sacred groves are being eroded over the years due to various reasons and thus the present status of sacred groves is rather precarious. Various anthropogenic pressures due to developmental activities, urbanization, exploitation of resources and increase in human population have threatened many sacred groves of the country (Khan *et al.*, 2008).

2.1. Coastal Dunes and Wetlands Ecosystem:

Full stretch of Coromandel coast comprised of dunes and wetlands. The dunes which consist of Quaternary to Recent sediments are a major part of the various coastal land forms such as lagoons, estuaries, bays, beaches, spits, bars, deltas, marshes, tidal flats, mud flats, etc. The dunes occupy a large part of the Coromandel coast and have a key role in the morphology and land use planning of this coastal zone. These dunes are an important source of ground water, heavy minerals, silica (glass) sands and are also potential avenues for social forestry, mixed forests, plantations and recreational resorts (Mani N.S., 1976; N. Parthasarathy, 2008). Coastal Wet-

lands comprise areas that transition between terrestrial (land) areas and aquatic (water) areas. The wetlands represent transitional areas between land and water. The balanced ecosystem of wetlands relies upon the interaction between living factors such as plants and animals and non-living, abiotic factors. Coromandel coast (N. Parthasarathy et al., 2008).

2.2. Northeast Monsoon (NE)

South Asia experiences two monsoons, the southwest or summer monsoon during June to September and the northeast or winter monsoon during October to December. While the summer monsoon is responsible for a major portion of the annual rainfall over India, only Tamilnadu fully, and part of Andhra Pradesh coast depend on the NE Monsoon. The black soil rich Coromandel coast was suitable for the finest quality of cotton. The cotton produce and by products were attracting Arab and European traders for two milleniums. The monsoon played a significant roll in export of this product. The maritime traders' vessels could reach the shores of India before the Southwest monsoon and return only after the beginning of Northeast monsoon (Sila Tripathi and Raut L.N., 2006). This effectively made the Coromandel Coast as the most flourishing center for trade and establishment of modern India.

2.3. Toponymy

Toponyms gives a meaning of understanding the relationship between people and the environment. Place names are the way to identify geographic features. It is an expression of culture, social structure, and ecology which has received very less attention in the morphological study. . The neighborhoods or villages along the Coromandel coast has geographical or geological suffix in their names (Sethupillai R.A.P., 1923). The first inhabitants of the marshy landscape were fishermen, and the agriculture came later when the lagoon had been filled up. The spread of agriculture with the increase in trade and export the fishing villages called as *kappam* became agriculture land. The original inhabitants in the *kappam* were pushed to settle near to sea shore. The new settlements of fishermen are called *kuppam*. Triplicane-Chennai lagoon fishermen moved to Parthasarathy-kuppam sea fishermen, named after the temple of Parthasarathy in Triplicane Thirunaranan, B.M. (1939).

2.4. Rivers and Tanks of Chennai and Surrounding Districts

The lack of perpetual snow-fed rivers in Southeast India led to the system of water harvesting with the aid of reservoirs or tanks. The tanks were available for drinking, domestic use, and also irrigated large tracts of land. There were different types of tanks: percolation ponds, natural lakes, artificial reservoirs and temple tanks (Krishna N., Amirthalingam M., 2014). More than three fourth of the rivers in India flow towards the east forming delta along the Bay of Bengal Coast. However, the city of Chennai is traversed by three major rivers namely Kosasthalaiyar, Coovum and Adyar Rivers originating from neighboring districts. At present, the Coovum collects surplus from about 75 rain-fed tanks and Adyar River collects surplus from about 450 tanks in its catchments, apart from overflows from the large Chembarambakkam Tank. The flood discharge of Adyar River is almost three times that of the Cooum River. More than six hundreds tanks comprising of Temple-tanks, drinking and irrigation, were present in the city till 1909 as per the Madras irrigation department. These tanks were naturally profiled to catch water flowing along the slope towards the sea. The tanks proved to very effective during non NE monsoon months.

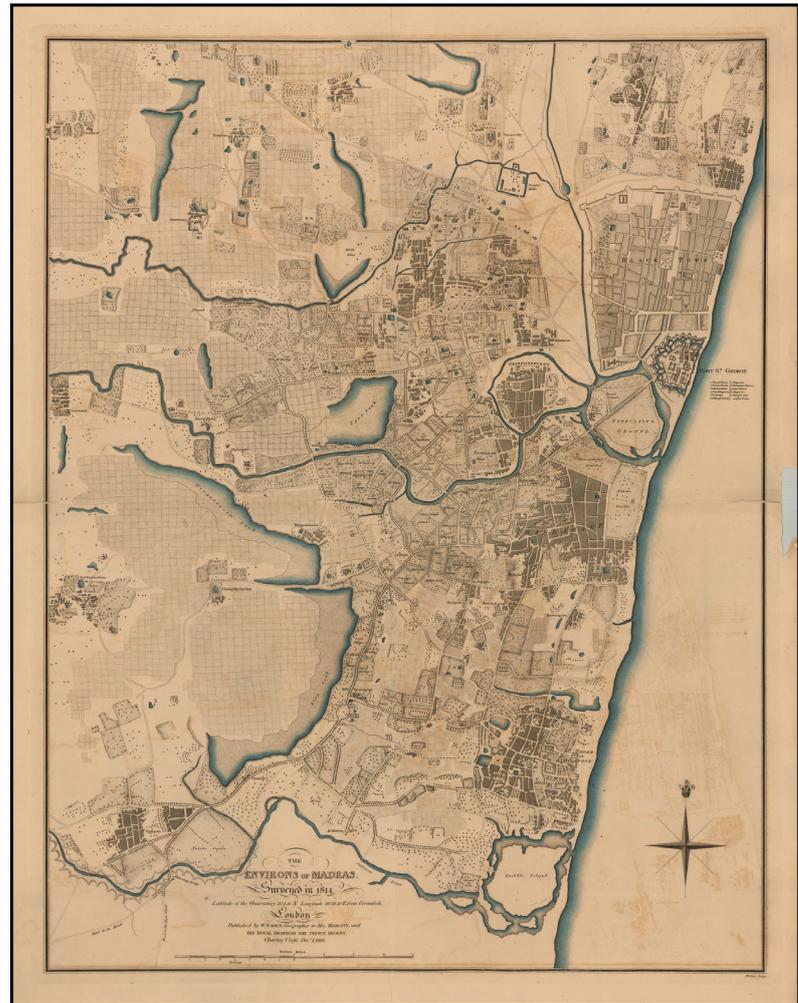


Figure 1.

3. Chennai

Chennai is the capital of Tamilnadu state and the fourth largest metropolis in India. Its older name Madras was officially changed to Chennai in 1996. The Chennai Metropolis with a latitude between $12^{\circ}50'49''$ and $13^{\circ}17'24''$, and a longitude between $79^{\circ}59'53''$ and $80^{\circ}20'12''$ is a flat coastal sandy plain with average elevation of 6.7 mts. (CMDA, 2006). The city stretches nearly 31 km along the sea coast from South to North, with a maximum width of 22 km on east to west. This gave way for the establishment of five radial roads from the founding of the city by the British, and followed by suburban railways expanding the city in a semi-circle.

The city of Madras was the first properly chosen site for the capital of power by the British East India company in 1639. It has sea as a boundary and naval establishment. The roads and canal-navigation as strategic routes to connect with the hinterlands for the trade and commerce. Later with the development of railways the power of the establishment became far more extended to bigger territory. In India, Madras (Chennai) was the most advanced and first in all scientific and industrial establishments. This gave rise to development of town-planning, urban engineering, and surveying technology.

The colonial city's form and functions became a direct reflection of its foreign origins, and as such it represented the microcosm of the larger colonial empire of which it was a product [susan-madurai]. In 1639, after several abortive attempts to establish factories on the Coro-

mandel Coast, the EIC chose a site south of the town of Madrasapatam. The region was a rich cotton and rice growing country laced with lagoons and rivers that were capable of supporting an expanding population. In 1653, Madras was made a Presidency and five years later all English settlements on the Coromandel Coast and other regions of the Sub-Continent were subordinated to it. The houses of the Britishers and its naval officers are placed inside the first fort. And business communities from other European nations and Indian are placed in Black-Town. The streets of Black Town were laid out on a grid and the houses were built of brick with thick walls to insure coolness in the summer heat. The streets of Black Town were wide and planted with trees.

Aside from the planned settlement inside the Fort and Black Town, there were a many self-contained villages which were incorporated into the city which remained marginally dependent on the commercial centre. The villages of Mylapore and Triplicane, both eighth-century temple complexes with large populations with own functions, service castes, bazaars and commerce.

From mid-eighteenth century, Europeans began moving out of the Fort and Black Town in to newly developing garden suburbs. Substantial portion of the urban landscape were dominated and annexed by the colonials. The banks of the Adyar and Coovum Rivers were areas sought for the construction of garden houses. The sites were most popular for they provided open vistas, and protection from spread of disease, located on high ground and conducive to suitable drainage. By 1780, the area between two rivers had more than 600 garden houses with easy connection to two of radial roads connecting the Fort. The new garden house settlement, each surrounded by large compound wall with several acres of garden, stretched over ten kilometers extending up to Choultry Plain.

3.1. *High Roads*

The city has many roads called high-road – Nungambakkam high road, Kodambakkam high road, Ponnamallee high road, Tiruvallur high road etc. the only city in India have to more than twenty high-roads. The Britishers constructed road connecting various villages during the process of annexation. These roads were raised from the swampy wetlands and paddy fields by filling. Hence, the word high-road came to origin (mtvolume). A closer look on the historical maps we would find high roads crisscrossing with culverts on the paddy fields for motor vehicles to pass.

3.2. *Sacred Groves*

Pre-colonial period, the nature-centered worship was more ritualized, with temples gaining greater popularity among the masses mixture cultures. With arrival of trans-oceanic trades from 16th CE these rituals were further modified or lost its importance. Leading to the construction of temples and providing new identities for the deities of the groves, thus linking them with the deities of the Hindu textual tradition in the Coromandel coast (M. Amirthalingam, 20//////; Chandran). In Chennai, one of the last remnants of tropical dry evergreen forest is located within Indian Institute of Technology campus. The 2.7 km² forest was once four times the size was taken over by the colonials to build garden house for one of their Governors in 1670s.

3.3. *Long Tank*

The Long Tank was a natural lake which was situated on the western frontier of the city Madras. Comprising two sections – the Mylapore Tank to the south and a feeder lake Nungambakkam

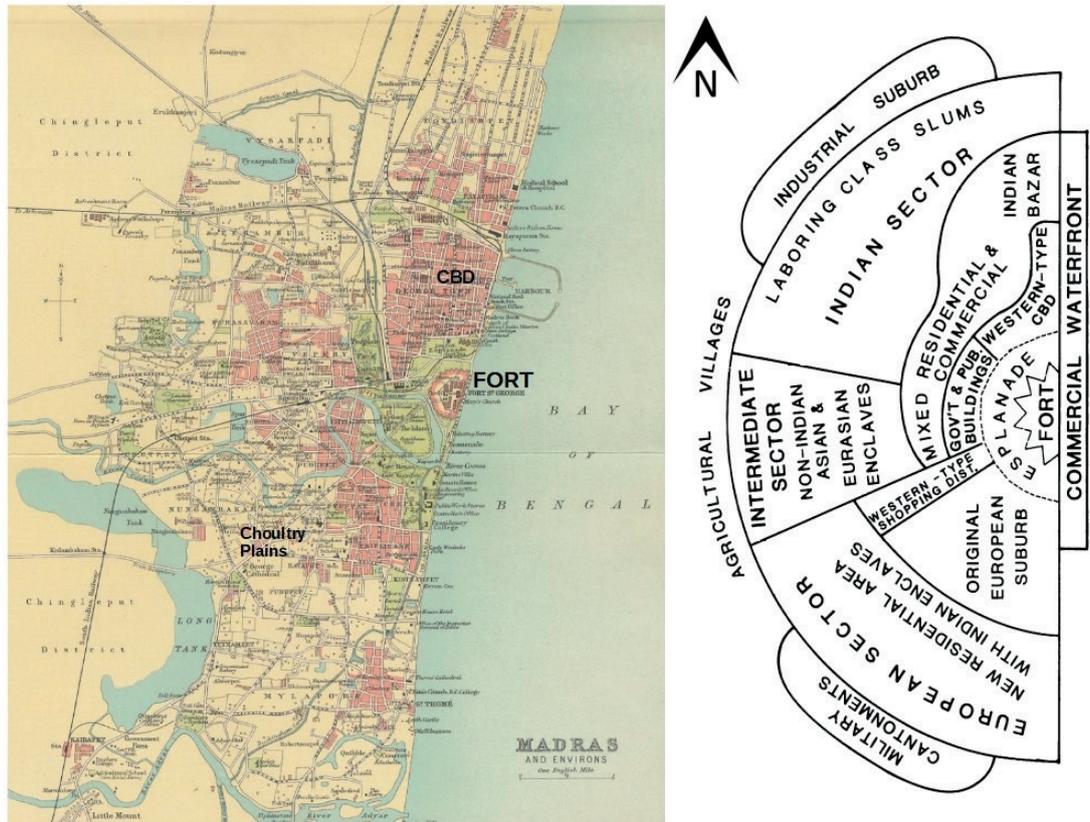


Figure 2.

Tank to the north, it extended for about 8 sq. km from Sterling Road in the north to the suburb of Saidapet in the south. About a mile in width, it formed the boundary of Madras city as well as the district till 1921. The catchment area of this tank covers approximately double its size. The high-roads were constructed to cross over the tank – Kodambakkam High Road, and Tank Bund Road by the British.

The Indian merchant population of Madras remained heavily concentrated in or near Black Town and Triplicane, where locally specialized bazaars provided indigenous types of goods and services. (Meera Kosambi and John E. Brush). With the city's population growing from approximately 398,000 in 1871 to 527,000 in 1921, the British Government decided to reclaim the Long Tank to support its population. The Mambalam Housing Scheme was mooted by the Town Planning Trust in 1923 and approved by the Municipal Corporation. Long Tank was incorporated into the city and by the 1931 Census were added to the city. Work began on the housing scheme, which involved planned residential and ancillary development over 1600 acres. This was called Theagaroya Nagar, or T'Nagar, named after the Mayor who initiated the scheme.

3.4. Eri-Scheme

In 1679, the administration of Madras started making grants of ground for garden houses. By 1771, the conversion of grassing-land, called as *commons* in UK or *waste-ground* in Madras, was stopped after a flood of applications. However, such practice of claiming lagoon and waterbodies continued till the Britishers left India.

Reclamation continued apace to find space for a population grown to 647,000 by 1941. The Nungambakkam Tank was further drained from that year to create Lake Area Residential colony. Before that, a part of the tank bed was allotted for the expansion of Loyola College campus.

In 1974, the remnants of the Tank made way for the construction of Valluvar Kottam. The Long Tank giving way for urban development has been followed as a concept ever since by the authorities. Of the ten major tanks and hundreds of minor ones the city once had been built upon with the funding from the World Bank under *Eri-Scheme*. The word *eri* refers, tank or lake, to a water reservoir that takes advantage of a natural dip in the land to store water. The presence of such lakes had been a centuries-old adaptation to store rain for non monsoon season use. Post independence, the Corporation of Chennai adapted the method of accommodating growing population by draining Lakes and Tanks to create land for housing with funding support from the World Bank. This development meant converting a public resource into profitable but environmentally unsustainable real estate [Anjali Vaidya].

3.5. 2015 Chennai Deluge

Chennai lying on the coast of Bay of Bengal is prone to annual severe cyclonic storm between September to December. Historically record show frequent storm and flooding in the city. However, the year 2015 deluge was the disastrous in records. More than 315 people got killed and more than three billion dollars economic of lose (Govt. of TN 2015). Many research reports pointed the deluge as a manmade than climate change. Our analysis prove that the deluge is due to systematic encroachment of lagoon, wetlands, and tanks of Chennai. The flow of water from larger tanks to smaller ponds to the ocean was blocked. The satellite image of Chennai proves to the evidence. Climate change is not the only guilty party: the scale of the disaster at Chennai was magnified by a rampant disregard for town planning, and the basic principles of ecology and hydrology. To name just a few of the violations: the international airport is built on the floodplain of the Adyar river; the Mass Rapid Transit System sits atop the Buckingham Canal; the government allowed buildings to be erected over more than 273 hectares of the marshland to the south of the city that would normally act as a sink for flood water (Anna University and Fl....).

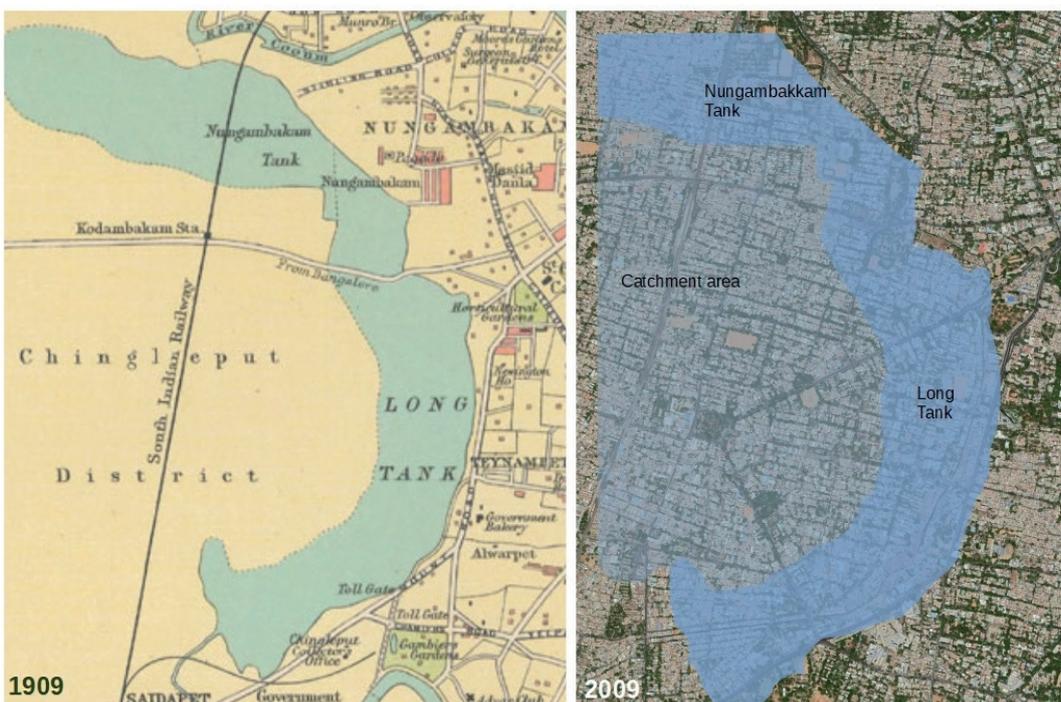


Figure 3.

4. Analysis

The increasing segregation of the colonials from the indigenous inhabitants went hand in hand with growing permanence among new settlers in India. Indigenous settlement patterns were formulated on the basis of a very different set of principles. Small self sustaining villages surrounded by temple and located on high grounds belonging to the same caste or occupation. Over time, as migrants entered the city, the composition of the neighborhoods underwent change with more mixed occupation and caste. A new form pattern started evolving by end of eighteenth century.

- British garden houses with forms and functions that reflect English cultural and spatial concerns facing waterbodies originally. This large garden houses later was converted in to business houses or office complexes facing wide road with back to rivers and tanks.
- Native villages with temple or mosque as foci, in few reflecting the rich class Indian merchants projecting themselves as king-like status governing the settlement. These traditional villages annexed by the Britishers functioned as nuclues with narrow roads reflecting local identity.
- Commercial and administration loosely defined with unique architectural style and monumental scale. Unique style of architecture Indo-Sarasic Architecture was evolved with English touch constructed by local craftsmen and new building material chunam (lime).
- High grounds with native villages were connected with high-roads. The roads were wide and became commercial roads with large complex with availability of garden houses.
- Reclaiming tanks and lakes to accommodating population became norm. Every water body was claimed by the government agencies to accommodate the population.

The configuration reflects a new urban form India. The form that reflects European character of seperation of work and house. The ideology of individualism clearly reflected which was absent in the traditional settlement.

5. Conclusion

The paper was framed to understand the importance of regional factors which would directly impact the character and features of urban conglomerate. Taking from macro level – regional geographical and geological character to vegetation gave a larger picture of influence. Further narrowing the study to micro level to the water bodies and roads that rises the holistic understanding of the urban features. The historical geographical study revealed the unique character of Chennai clearly defined by the Coromandel Coast.

After the December 2004 tsunami that hit the south-east coast of India, there has been recognition among coastal communities living adjacent to coastal sand dunes about the value of these habitats in protecting the hinterland and coastal hamlets, and their role in preventing salt water intrusion as a result of inundation by large waves (Coastal Sand Dunes of Tamil Nadu, India). 2015 Chennai Deluge made to realise the linkage between nature-culture in urban morphology. The two rivers which would carry excess water was over flowing as it does not have adqueate capacity to discharge into centuries old canal and tanks. Thus made us to look into topographically and hydrological study on urban form. A further study and analysis would through brighter ideas on urban morphology.

The hypothesis is that there is a correlation between nature and urban-form is presented clearly need further deliberation for developing native urban design principals. Particularly, the climatic condition, linguistic culture, and natural habitat of a place influencing the urban form.

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