THE NATURE OF A GROWING METROPOLIS

Layering of complex environmental ideologies in the city of Bengaluru, India

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Abstract

The city of Bengaluru in Southern India, like many other large South Asian cities, has undergone expansion at an exponential rate in the past few decades leading to rapid transformation of its urban landscape. This has also involved a drastic change in the forms of nature in the city, and a change in the attitude and relationship of people in the city towards nature. Having major ecological footprints, densely populated and booming cities such as Bengaluru need to be better studied when investigating the global environmental crisis. This paper is a historical analysis of the change in the material and functional role of nature in the city through an in-depth literature review. An ideological framework of nature in the city is first established. The paper then discusses nature in the urban landscape as a manifestation of these different ideologies, from the city's formation around the 16th century CE to the colonial period, followed by the period of rapid urbanization after independence.

In Bengaluru today, several ideologies of nature that are multifaceted and often self-contradictory coexist in the same space. Remnants of the Garden city aesthetics from the colonial period intermesh with native elements of nature regarded as sacred in temples, as a source of livelihood in peripheral areas, and as spaces for recreation by the bourgeoisie. Therefore, tackling these issues must go beyond multidisciplinary action and include an approach that involves participation of multiple actors across social groups.

Keywords: Bengaluru, environment, nature, urbanization, ideologies

Introduction

In today's world, urban spaces growing and expanding in area is a global phenomenon and more than half of the world's population lives in cities. A report from the United Nations predicts an increase to 68% by 2050.[1] Cities, having major ecological footprints, need to be of prime focus when addressing the global ecological crisis.[2] Nature in cities may contribute several ecosystem services. To name a few functions, urban parks, street trees, and so on help to absorb carbon from the air[3], counter urban heat island effect[4], act as noise buffers[5], regulate water flows[6], and even contribute to the psychological well-being of city dwellers[7]. Urban parks can possess high levels of biodiversity despite their smaller areas. Yet, the focus of ecological research has been more on forested areas and urban nature remains a relatively under-researched category of ecology.[8]

Many South Asian cities are seeing rapid economic and population growth, increasing the pressure on near and distant ecosystem services.[9] In these cities, environmental degradation is complex and driven by multiple factors such as population growth, urbanisation, climate change, industrialisation, widespread poverty and high dependence on natural resources.[10] Yet, the environmental effects of rapid urbanization in these cities have been studied far lesser in comparison to studies in Europe or North America. The city of Bengaluru, like many emerging cities in India and South Asia in general, tells a similar story of rapid growth, densification, urban sprawl amidst a neglected ecological environment in the late 20th and 21st centuries. Taking Bengaluru as a case study, this paper analyses how colonialisation, followed by rapid post-colonial urbanization, has affected the material and functional role of nature in the city, and further how different ideologies around nature are reflected in the urban realm today.

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[1] "World Urbanization Prospects - Population Division - United Nations," accessed March 3, 2024, https://population.un.org/wup/Download/.

[2] Timothy Beatley, *Green Urbanism: Learning From European Cities* (Island Press, 2012).

[3] Dan Zhao et al., "Carbon Sinks in Urban Public Green Spaces under Carbon Neutrality: A Bibliometric Analysis and Systematic Literature Review," *Urban Forestry & Urban Greening* 86 (August 1, 2023): 128037, https://doi.org/10.1016/j.ufug.2023.128037.

[4] Alexander Hayes et al., "Nature-Based Solutions (NBSs) to Mitigate Urban Heat Island (UHI) Effects in Canadian Cities," *Buildings* 12 (June 30, 2022): 925, https://doi.org/10.3390/buildings12070925.

[5] Nevil Wickramathilaka et al., "INFLUENCE OF URBAN GREEN SPACES ON ROAD TRAFFIC NOISE LEVELS: - A REVIEW," *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XLVIII-4/W3-2022 (December 2, 2022): 195–201, https://doi.org/10.5194/isprs-archives-XLVIII-4-W3-2022-195-2022.

[6] Liyun Yang et al., "Water-Related Ecosystem Services Provided by Urban Green Space: A Case Study in Yixing City (China)," *Landscape and Urban Planning* 136 (April 1, 2015): 40–51, https://doi.org/10.1016/j.landurbplan.2014.11.016.

[7] Emilia Janeczko et al., "The Psychological Effects and Benefits of Using Green Spaces in the City: A Field Experiment with Young Polish Adults," *Forests* 14, no. 3 (March 2023): 497, https://doi.org/10.3390/f14030497.

[8] Harini Nagendra and Divya Gopal, "Tree Diversity, Distribution, History and Change in Urban Parks: Studies in Bangalore, India," *Urban Ecosystems* 14, no. 2 (June 1, 2011): 211–23, https://doi.org/10.1007/s11252-010-0148-1.

[9] Nancy B. Grimm et al., "Global Change and the Ecology of Cities," *Science* 319, no. 5864 (February 8, 2008): 756–60, https://doi.org/10.1126/science.1150195.

[10] "Turning the Tide on Environmental Degradation in South Asia: Scoping Study of Research-to-Action Priorities for the REDAA Programme | REDAA," accessed April 17, 2024, https://www.redaa.org/turning-tide-environmental-degradation-south-asia-scoping-study-research-action-priorities-redaa.

Bengaluru is a metropolitan city located in the state of Karnataka in Southern India. The city rests on top of the Deccan plateau and has an average altitude of 900m above sea level. It is a semi-arid region that receives about 89 cm of rainfall on average per annum.[11] Bengaluru was originally a small township founded in the medieval period but attracted more settlement from the period of British colonial rule onwards owing to its famously salubrious climate. Today, the city houses a thriving Information Technology industry and has a population of 9,621,551 as per the 2011 census.[12]

Various accounts exist, documenting and analysing Bengaluru's history as a city. Historian and author Janaki Nair, in *The Promise of a Metropolis*, provides a comprehensive account of the city's urban political, economic and cultural evolution in 60 years post-colonial rule in India, highlighting planning principles and ideologies that were employed as well as conceptualizations of citizenship and democracy in the form of unanticipated spatial practices. Ecologist Harini Nagendra, in *Nature in the city: Bengaluru in the Past, Present and Future* provides a narrative of the changing role and state of nature in the city through an analysis of extensive investigative research as well as oral histories. Several other articles also address the current state of the natural environment in Bengaluru, such as the drying up of its water table, the disappearance of its many lakes, and the sheer neglect and destruction that many groves, gardens and boulevards in the area have been subject to. This paper is an effort to bridge the gap between the prevalent ideological frameworks about nature and the environment as well as their physical manifestations in urban space. Many scholars have highlighted the need to incorporate history and anthropology in ecological research. Such a study is necessary because it can support our understanding of current patterns and processes. Moreover, it helps to place ecology and conservation in a larger interdisciplinary context. Cultural heritage and natural heritage are strongly interlinked.[13] Therefore, interdisciplinary study can foster new knowledge for better policy and governance in both domains. Many scholars advocate for an understanding of world views when dealing with environmental ethics, as it is these world views and core beliefs that define our relation with the environment around us.[14]

This paper takes on a multi-disciplinary approach as it delves into themes of landscape architecture, sociology, urbanism and architecture through an in-depth literature review. An analysis of primary sources such as maps, reports, images and so on will be done to gather data. A review of existing literature such as books, published articles and research papers will be done to gather contextual information and support the data collected. The research first investigates ideologies that influence urban nature across the globe such as bio-centric, anthropocentric and other models of nature conservation. Ideas prevalent in ancient Indian philosophy and culture that were materialised in the pre-colonial city are then elaborated to establish a conceptual framework. These ideologies are then placed in a historical context through the chapters following.

The historical analysis is divided into three basic periods – during the 16th to 19th century pre-colonial era, the British colonial period of the 19th and early 20th century, and the post-independence period

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[11] Harini Nagendra, *Nature in the City: Bengaluru in the Past, Present, and Future* (Oxford University Press, 2016), https://doi.org/10.1093/acprof:oso/9780199465927.001.0001.

[12] Census of India, 2011

[13] Péter Szabó, "Why History Matters in Ecology: An Interdisciplinary Perspective," *Environmental Conservation* 37 (December 1, 2010): 380–87, https://doi.org/10.1017/S0376892910000718.

[14] Marjorie Woollacott, Anne Shumway-Cook, and Natasha Tassell-Matamua, "Worldviews and Environmental Ethics: Contributions of Brain Processing Networks," *Explore (New York, N.Y.)* 19, no. 5 (2023): 630–35, https://doi.org/10.1016/j.explore.2023.03.005.

from 1947 onwards. The historical role of urban nature is analysed in relation to the cultural, economic and political context of the region during each of these periods. The first chapter discusses the prevalence and role of urban nature in the pre-colonial city. The second chapter deliberates the emergence of the garden city of Bangalore during the colonial period, and the influences on urban planning and policy during this time. The third chapter then elaborates on the changes that took place post-independence, focusing on specific examples of nature's presence or resilience in the city's built environment. The conclusion discusses how different ideological frameworks around urban nature in global discourse as well as in philosophy can be interpreted in the context of Bengaluru.

Historical Contextualization

Bengaluru rests on the ridge-top of the Deccan plateau at an average of 900m above sea level. Being a semi-arid region in the rain shadow area of the Western hills, the relatively clearer and flatter landscape made the region amenable to cultivation and consequently, settlement. The ridge also serves as a major watershed boundary in the state of Karnataka. Although traces of settlements go as far back as 517 CE[15], the city was founded by a local chieftain Kempe Gowda in 1537 CE[16], who, followed by his successor Immadi, was responsible for the creation of lakes to cater to the needs of the growing town.[17] This area was then known as Pettah and comprises a small central portion of the city today. During colonial times, Bengaluru, then known as Bangalore, served as a cantonment town or a military station in British India. In colonial Bangalore, there was a strong distinction between the cantonment and the city areas. In 1898, the city encountered a plague epidemic to which people living in the dense and unhygienic areas within the Pettah were more vulnerable. As a consequence, residential layouts like Basavangudi, Malleswaram, Sankarapuram were developed, catering primarily to the upper middle-class population, and characterized by wide, treelined streets and larger plots. Several large parks were established from the 18th century up to the early 20th century, mainly managed by British appointed foresters, of which the largest and oldest ones are known as Lal Bagh and Cubbon Park.[18] A large number of British-style houses known as bungalows, characterized by a front porch or "veranda" opening out into a garden, were also built in Bengaluru around the 1920's and 1930's. The emergence of these spatial characteristics led Bengaluru to become known as a "garden city".[19]

Following Indian independence in the year 1949, old city and the Cantonment were combined to form the Bangalore City Corporation. In the years following, the city saw a rapid spatial transformation, especially due to the growth of public sector industries during this time. Since the 1980's, the rate of growth in the city has rapidly increased, owing to the liberalization of economic policies and the emergence of the information technology sector that followed. The population has exploded from

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[15] Annaswamy TV, 2003, Bengaluru to Bangalore: Urban history of Bangalore from the pre-historic period to the end of the 18th Century, Vengadam Press, Bangalore.

[16] Rice BL, 1905, Epigraphia Carnatica volume IX: In-scriptions in the Bangalore district, Mysore Government Central Press, Bangalore.

[17] Nagendra, Nature in the City: Bengaluru in the Past, Present, and Future. Pg-34-43

[18] Nagendra, H., Gopal, D. Tree diversity, distribution, history and change in urban parks: studies in Bangalore, India. Urban Ecosystem 14, 211–223 (2011). https://doi-org.tudelft.idm.oclc.org/10.1007/s11252-010-0148-1

[19] "Bangalore – Dysfunctional Boom Town" 2012

roughly 2.8 million in 1980 to 14 million in 2020[20] and today, Bangalore has gained the title of a metropolis globally recognized for its Information Technology sector.[21] The increasing demand for land, infrastructure and services not only led to more urban sprawl towards the peripheries, but also overtaking of existing breathing spaces in the city[22]. Moreover, traditional, ecosystem dependent systems that tied the local people to their natural environment were replaced by more modern and mechanized systems due to advancement of technology. Eventually, these systems were erased from the collective memory of citizens and weakened awareness amongst both local residents and policy makers about the importance of conserving the local ecosystem.[23]

Today, general narratives around the city's natural environment mostly encapsulate themes of neglect and degradation. Various accounts discuss the lack of accessible natural spaces in the city, the dumping of wastes into the city's lakes, and there is serious concern with regards to the depleting underground water table in the area.[24] However, many of these accounts fall short of an all-round perspective on the different ways in which nature shows resilience in the city and holds meaning to its people. In recent years, many non-governmental organizations, private companies and activist groups have joined efforts to clean up the cities' lakes. Groups such as Hasiru Usiru (meaning Greenery is Life), a network of organisations and individuals concerned with the protection and accessibility to public green spaces, show a growing effort, particularly amongst the middle class, to re-green the city.

Conceptual Framework: Ideas around Nature

Before delving into the study of physical manifestations of urban nature throughout history, it is important to first understand how these physical traits have resulted from certain ideologies of nature and the environment. Julia B. Corbett, professor of environmental humanities and communication, describes an environmental ideology as "a way of thinking about the natural world that a person uses to justify actions towards it". Such ways of thinking have been key in influencing human interaction with the natural environment, and they are shaped not only by socio-cultural and historical contexts, but also by peoples' personal experiences with nature and their sense of place. The relationship between people and the natural world is primarily determined by *their cultural place in time*.[25] In *Understanding Environmental Philosophy*, philosopher Andrew Brennan enumerates the ways in which our environmental problems are a product of such world views and attitudes.[26]

In popular discourse, the present geological age has been referred to as the Anthropocene, suggesting that human activity has been the most dominant influencing factor on the globe's ecology, climate and environment. As of 2020, human made mass would have exceeded the quantity of all existing biomass

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[20] Publications, U. N. (2019). World Urbanization Prospects: The 2018 Revision.
[21] "Bangalore – Dysfunctional Boom Town" 2012v
[22] Thippaiah, P. (2009). Social and Economic Change Monograph Series Number 17
[23] 2017b. "Making Water Flow in Bengaluru: Planning for the Resilience of Water Supply in a Semi-arid City." Journal of Sustainable Urbanization, Planning and Progress 2 (1). https://doi.org/10.18063/jsupp.2017.01.002.
[24] "Bengaluru: Water Crisis Shakes India's Silicon Valley," March 14, 2024, https://www.bbc.com/news/world-asia-india-68509409.
[25] Julia B. Corbett, *Communicating Nature: How We Create and Understand Environmental Messages* (Washington, DC: Island Press, 2006), http://site.ebrary.com/id/10202488.
[26] Andrew Brennan and Y. S. Lo, *Understanding Environmental Philosophy* (Acumen Publishing, 2010).

on the planet.[27] Anthropocentrism, or "human centred thinking", has frequently been attributed as the root cause of environmental destruction, and by extension, of today's environmental crisis.[28] Anthropocentrism, viewed in opposition to "bio-centrism" or "eco-centrism", is an ideology in which human beings are believed to be separate from, and often superior to, the rest of the natural world.[29] On the other hand, biocentric views of nature state that there is an intrinsic value to nature apart from its utilitarian function in the human environment.[30] According to Corbett, anthropocentric views can be interpreted as falling on one extreme end of a whole spectrum of ideologies about human beings and nature with eco-centrism (or bio-centrism) on the other end. In between these two extremes fall *unrestrained instrumentalism, conservatism, preservationism, ethics and value driven ideologies and transformative ideologies.* These perspectives have not come about linearly in their historical development and many of them can exist in a society at the same time. Scholars attribute several factors to the evolution of anthropocentric views, including some fundamental Christian beliefs[31], the age of enlightenment followed by the scientific revolution[32] and the disenchantment of nature.[33] Corbett classifies many eastern religious views, Native American ideologies, ecofeminism, and deep ecology under transformative ideologies. This falls on the eco-centric side of the spectrum. For the sake of this study, some of the conceptualisations of nature in early Indian philosophy are looked at as independent from the spectrum detailed above, and in later chapters, their representations in urban areas over time are delineated.

In the Vedas, an ancient Indian text establishing the foundation of Indian religious thought, each of nature's elements were attributed to a god and each of these deities are known for their distinct qualities and powers. There is the god of thunder, Indira, the god of wind, Vayu, and the god of fire, Agni, to name a few. The gods were essentially worshipped for the natural elements they provided and in fear of having to surrender to the wrath of any of these elements. However, this form of worship should be distinguished from animism as physical forms of nature such as trees, rivers, etc. were seen only as material manifestations or symbols of divinity, and not divine objects in themselves. A more monotheistic faith evolved in around 800 BCE to 200 BCE, in which the different gods representative of the natural elements came to be seen as manifestations of one supreme being. Natural locations such as river banks and mountain tops have been sanctified by texts such as the Bhagavad Gita, and often temples or shrines are built in these locations. Plant species with medicinal properties or other unique characteristics such as the banyan tree, the neem tree, the holy basil and so on were consecrated. [34]

Oral prayers and sacred rituals, such as offerings placed into a fire, are further evidence of the importance given to nature and the elements as a metaphysical manifestation of a higher power in the ancient Indian religious and philosophical outlook. These rituals and ceremonies are still performed to

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[27] Emily Elhacham et al., "Global Human-Made Mass Exceeds All Living Biomass," *Nature* 588, no. 7838 (December 2020): 442–44, https://doi.org/10.1038/s41586-020-3010-5.
[28] Brennan and Lo, *Understanding Environmental Philosophy*.
[29] Corbett, *Communicating Nature*.
[30] Meera Baindur, "Nature in Indian Philosophy and Cultural Traditions," *Sophia Studies in Cross-Cultural Philosophy of Traditions and Cultures*, 2015, https://www.academia.edu/76801877/Nature_in_Indian_Philosophy_and_Cultural_Traditions.
[31] Lynn White, "The Historical Roots of Our Ecologic Crisis," *Science* 155, no. 3767 (1967): 1203–7.
[32] Corbett, *Communicating Nature*.
[33] Brennan and Lo, *Understanding Environmental Philosophy*.
[34] R. C. Pandeya, "Indian Attitude towards Nature," *GeoJournal* 26, no. 2 (February 1, 1992): 135–38, https://doi.org/10.1007/BF00241207.

this day. Hinduism, as it is commonly known today, encompasses a diverse range of beliefs and practices, from elaborate temple rituals to sophisticated philosophical inquiries into the nature of reality.[35] Despite the later influences of colonialism and modernization, the synthesis of ritualistic practices and metaphysical beliefs remains prevalent in contemporary Indian religious life.

Urban nature, specifically, is reflective of the dichotomy in human relationships with the natural environment. Since the natural environment is often viewed as separate and inaccessible from the human environment[36], cities offer opportunities for the two to coexist. In urban areas, nature can exist both due to and in spite of human interventions. Environmental psychologist Kaplan delineates the diverse range of scales and functions of nature in urban areas – parks, backyards, tree-lined streets, overgrowth in empty plots as well as landscaped gardens.[37] Bengaluru-based ecologist Nagendra has highlighted that elements of urban nature do not exist in a vacuum. Instead, they interact with each other as part of complex urban ecosystems such as wetlands, lakes, parks etc. that contribute greatly to the sustainability of cities.[38]

Often, there is a clear and visible contradiction between ideology and environmental action in urban areas. For a multitude of reasons, South East Asian cities such as Bengaluru have plundered their natural resources and neglected the natural environment.[39] There is a need to understand better the existing gap between ideology and action in such cities. In order to understand these contradictions, it is important to place the ideas existing around nature in such a city, as well as their physical manifestations in urban space, within a historical context.

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[35] Baindur, "Nature in Indian Philosophy and Cultural Traditions."

[36] Rachel Kaplan, "The Role of Nature in the Urban Context," in *Behavior and the Natural Environment*, ed. Irwin Altman and Joachim F. Wohlwill (Boston, MA: Springer US, 1983), 127–61, https://doi.org/10.1007/978-1-4613-3539-9_5.
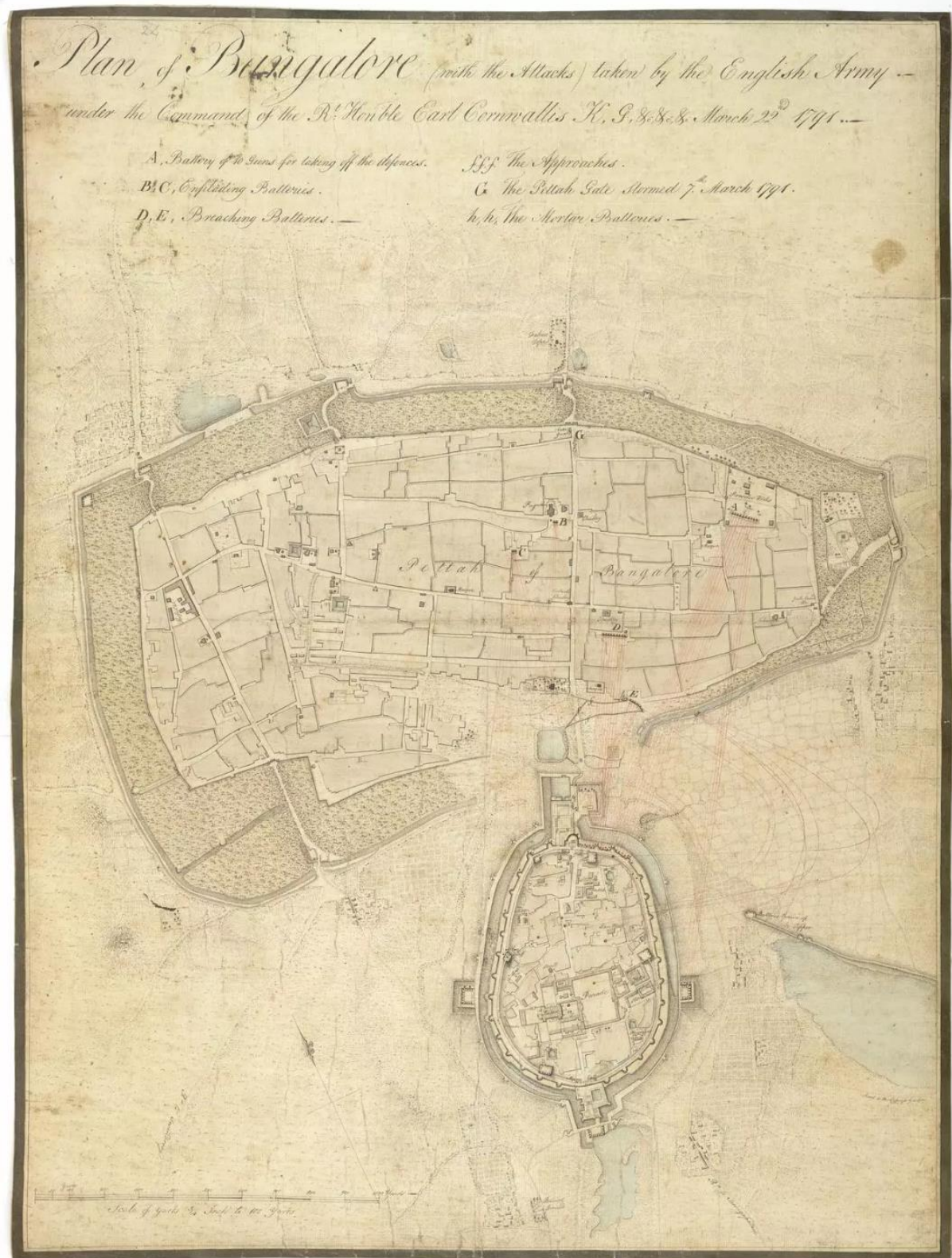
[37] Kaplan.

[38] Nagendra, *Nature in the City*.

[39] Corbett, *Communicating Nature*.

Nature in the Pre-Colonial City

Figure 1 *Map of Bangalore, 1791*

Plan of Bangalore in 1791, prior to colonial rule. This plan also displays the direction of attacks on Bangalore by the forces of the East India Company during the Third Anglo-Mysore War

Source: British Library

Figure 2 *Photographs from the Nallur Tamarind Grove Biodiversity Heritage Site, Devanahalli, Bengaluru (Rural)*

The images show protected tamarind trees from the site of the grove. Carbon dating has revealed that the oldest trees on the site are about 400 years old. Amidst the grove, a dilapidated temple dedicated to the deity Chennakeshava is believed to have been built in the Chola period, i.e., between the 9th and 10th century CE.

Source: Karnataka Biodiversity Board
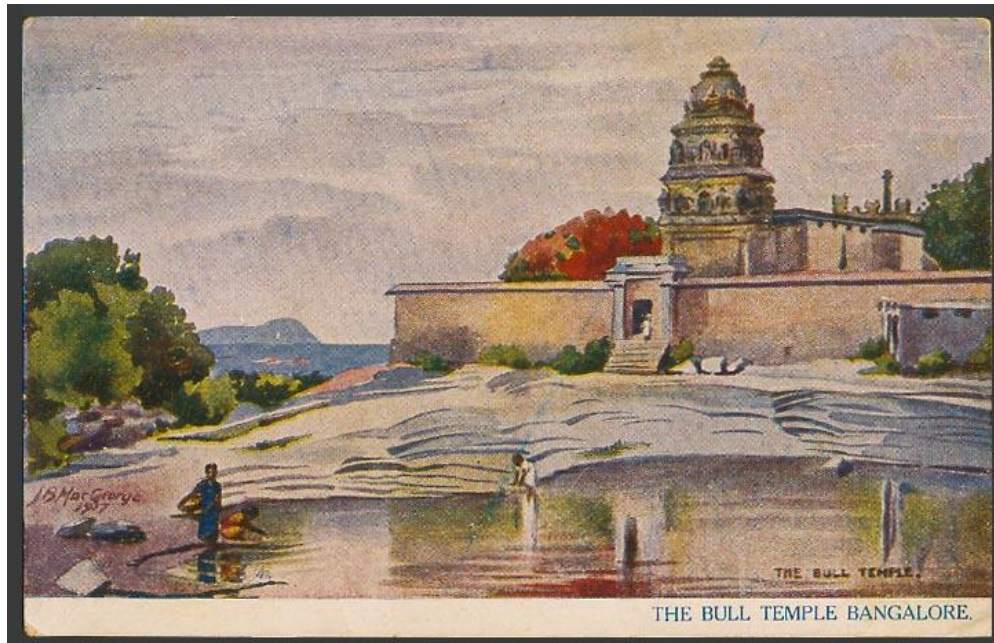
Figure 3 *1917 Watercolour of the Bull Temple on the Bugle Rock on a postcard signed by J.B. MacGeorge*

The postcard issued during colonial rule in India depicts the Bull Temple atop Bugle rock. Today, the temple is inside a fenced park. In the foreground of the image, women collect water from an open lake.

Source: The Calcutta Phototype Co.

In order to understand how ideologies of nature have transformed over the centuries, an understanding of how traditional systems and livelihoods reflected these ideologies prior to colonial rule is necessary. A number of stories and inscriptions exist from the medieval period about the founding of empires in the Deccan region such as Bengaluru, Mysuru and Hampi.[40] Such records and oral histories are an important indicator of peoples' awareness about the natural world held in their memories and cultural beliefs.[41] One such legend is that of Kempe Gowda I, a governor from the Vijayanagara empire known as the founder of the Bangalore Town, who saw a hare chasing a dog while hunting in the area, in 1537 AD. Considering this to be a good omen indicative of a promised land, he built a mud fort and raised a township in the region.[42] Often citing nature in the form of wild life found in these regions as sacred omens or as obstacles to be battled, these stories are reflective of a strong presence of nature, along with its sacred significances, in the collective imaginary.

Historical architecture sites such as temples and ruins in and near the region often feature natural elements such as trees and water bodies, pointing to a strong relationship existing between people and the natural environment, both in terms of the spatio-corporeal realm of their day-to-day activities and the believed importance of nature in the spiritual and even metaphysical realm. Even today, natural elements such as certain flora and fauna, rock formations etc. in the region are associated with sacred spaces, and these spaces still serve as important intersection points of social congregation and protection of biodiversity.[43] Much of the medieval architecture prevalent in what is now the modern

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[40] Nagendra, *Nature in the City*.

[41] A. Nightingale, "Oral History, Ecological," in *International Encyclopedia of Human Geography*, ed. Rob Kitchin and Nigel Thrift (Oxford: Elsevier, 2009), 34–36, https://doi.org/10.1016/B978-008044910-4.00486-7.

[42] M. Fazlul Hasan, *Bangalore Through the Centuries* (Historical Publications, 1970).

[43] Nagendra, *Nature in the City*.

state of Karnataka, is indicative of this close relationship between the sacred imaginary held by people and their natural environment. Sculptures present on edifices of temples represent elephants, cows, bulls, peacocks and other creatures considered to be auspicious. Water tanks were also an important feature of temple architecture at the time, and they served both ceremonial and functional purposes.[44]

Moreover, in the city area, a large number of village forests or "sacred groves" used to exist. According to records from the 17th century, such groves were numerous in Bengaluru district and 106,103 trees were preserved in about 2118 such groves.[45] Generally located near lakes, sacred groves were preserved by the local communities who held beliefs and followed traditions tied to these areas across several generations. For example, the Nallur Tamarind Grove Biodiversity Heritage Site, located in Devanahalli in rural Bangalore, has its origin during the period of Chola dynasty reign, with trees dated to be more than 400 years old. This grove spans an area of around 53.2 acres has been protected and worshipped by local bodies up until 2007, when it was declared a biodiversity heritage site and taken over by the state government. Articles suggest that the grove has been neglected since then and the biodiversity of fauna living in the grove has reduced since then.[46] Traditionally, old trees in such sacred groves are protected due to superstitions of bad luck being brought upon those who cut them.[47] Patches of vegetation in these groves are also often dedicated to local folk deities or tree spirits.[48] Although many such groves have disappeared due to urban sprawl and subsequent changes in land-use, very little else has been recorded about the history of these preserved spaces.[49]

Urban traditions and festivals are also important markers of the role of nature in the cityscape. The *Kadlekai Parishe* is a festival held annually to this day celebrating the harvest of groundnuts. The festival is held at the Bull Temple in the district of Basavanagudi. The Bull Temple, is believed to have been built in the around 1600 CE by Kempegowda I and is located on a large and ancient rock formation popularly known as the Bugle Rock. Some urban legends exist about the formation of the temple and the origins of the groundnut fair, alluding to a wild bull that would enter the groundnut fields located in this area, destroying the crops every year.[50] While the real story remains unknown and groundnut cultivation no longer takes place in the area, the festival continues to take place each year.

Thus, in the pre-colonial city that preceded Bangalore, nature was not only deeply intertwined with people's daily lives in the form of agriculture, sources of water, domesticated animals and so on, but also held a place of sanctity in the cultural imagination of the people. Places such as wooded groves,

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[44] Crispin Branfoot, "Regional Pasts, Imperial Present: Architecture and Memory in Vijayanagara-Period Karnataka," ed. Adam Hardy (London: British Association for South Asian Studies, 2007), 105–25, https://eprints.soas.ac.uk/3267/.

[45] Seema Mundoli, B. Manjunatha, and Harini Nagendra, "Commons That Provide: The Importance of Bengaluru's Wooded Groves for Urban Resilience," *International Journal of Urban Sustainable Development* 9, no. 2 (May 4, 2017): 184–206, https://doi.org/10.1080/19463138.2016.1264404.

[46] Apoorva Puranik and Nikunj Dalmia, "Bengaluru's Nallur Tamarind Grove Gets a Sour Twist," *The Economic Times*, July 12, 2019, https://economictimes.indiatimes.com/news/politics-and-nation/bengalurus-nallur-tamarind-grove-gets-a-sour-twist/articleshow/70188019.cms?from=mdr.

[47] Meera Bhardwaj, "Savour Tamarind Grove in Bangalore Rural," The New Indian Express, April 14, 2019, https://www.newindianexpress.com/cities/bengaluru/2019/Apr/14/savour-tamarind-grove-in-bangalore-rural-1964124.html.

[48] Mayanka Kala and Aruna Sharma, "Traditional Indian Beliefs: A Key toward Sustainable Living," *The Environmentalist* 30, no. 1 (March 1, 2010): 85–89, https://doi.org/10.1007/s10669-009-9247-z.

[49] Mundoli, Manjunatha, and Nagendra, "Commons That Provide."

[50] Nagendra, *Nature in the City*.

temple complexes, and lakes were accessible by all and often legends came to spread amongst the people about them. Many of these areas still exist today, which tells us that sacred spaces in the city of Bengaluru have been areas of resilience of nature amidst rapid changes over decades and even centuries. The sanctification of nature in the collective imaginations of the people has been a powerful factor in the preservation of some isolated flora and fauna in the city.

The "Garden City" of Colonial Bangalore
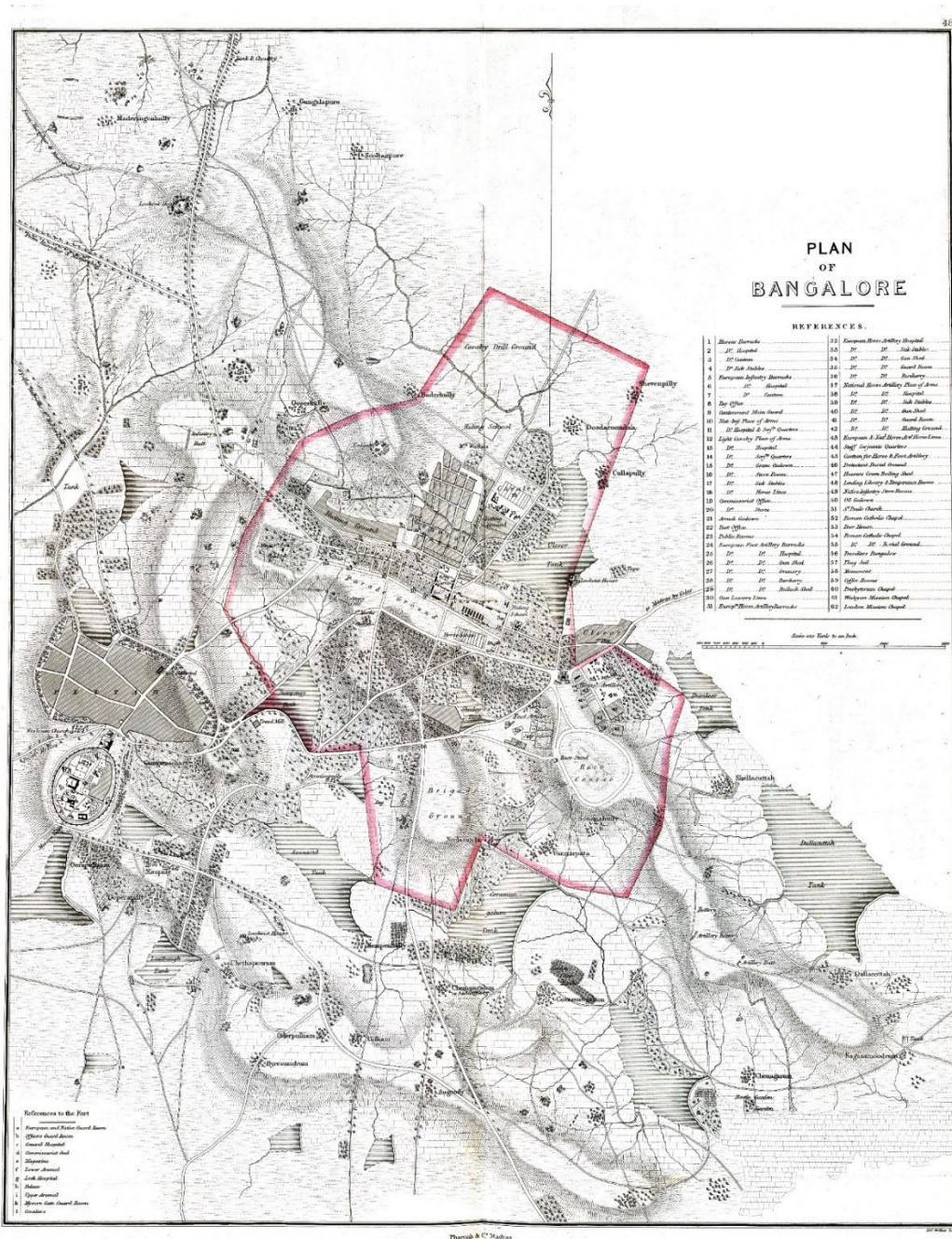
***Figure 4**| Map of Bangalore, 1854*

Pharaoh's Atlas of Southern India, Pharaoh & Co. (1854)

The map above shows Bangalore from the 19th Century as primarily a Cantonment town, highlighting mainly military buildings and infrastructure that were situated in Bangalore at the time. The map also highlights lakes that existed which have dried up or been dug up since. The terrain is indicated roughly with the use of light strokes, and areas that are more populated are also marked. This map gives us an idea of how Bangalore materialised into a "ridge and valley" town with a cantonment area and a city area.
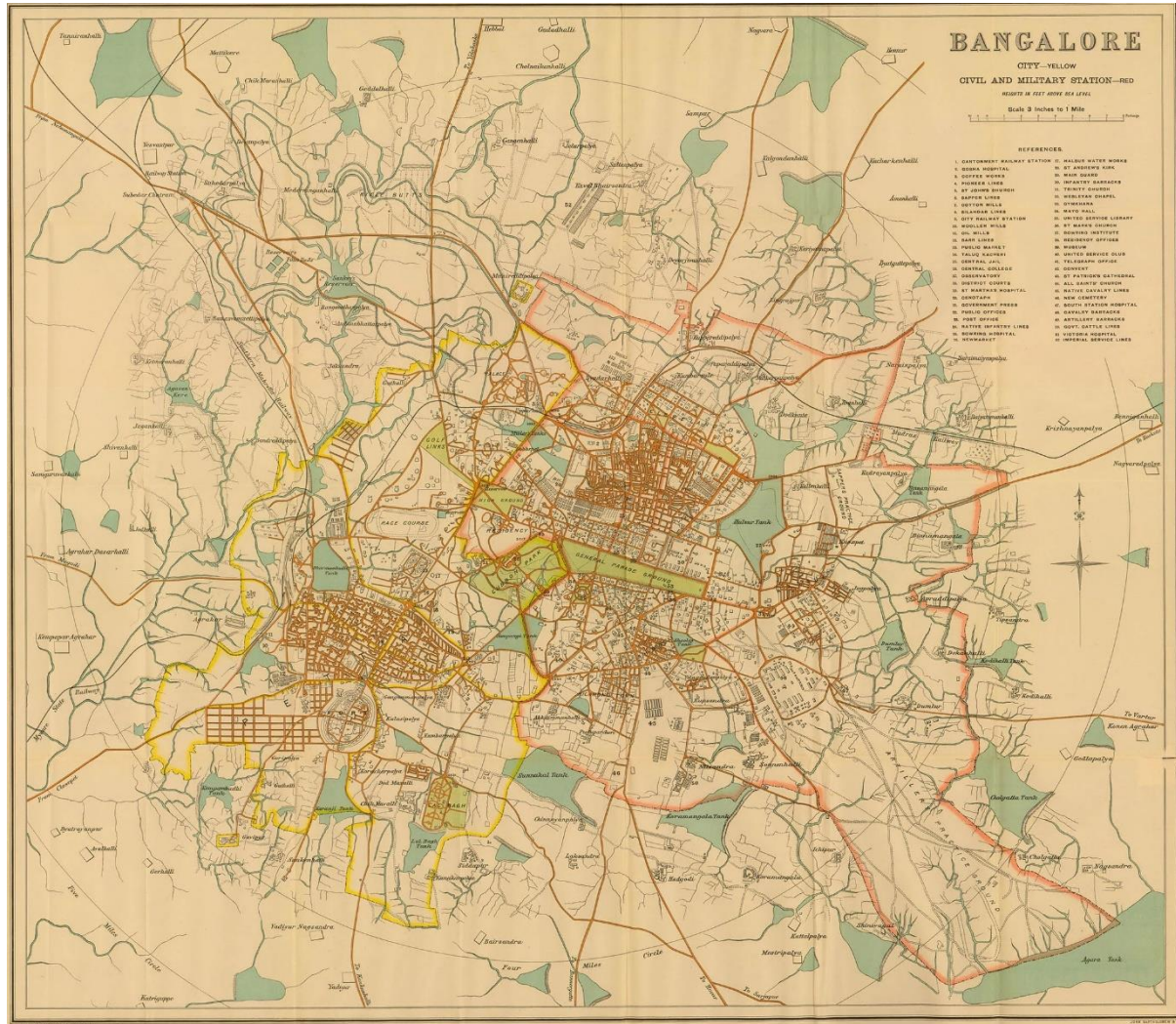

Figure 5: *Map of Bangalore, 1930*

Bartholomew & Co.

The map above indicates Bangalore's lakes, tanks and water channel network as they were during the colonial period. This map differentiates the cantonment portion of the city (outlined in red) from the civilian portion outlined in yellow.

The city of Bengaluru, called by its anglicised version "Bangalore" during the colonial period, was relatively politically stable during this time. In the early 19th Century, Bengaluru was attractive to the ruling classes of the East India company in South India, primarily because of its year-long pleasant climate. In 1800, a French historian had written the following in reference to the Deccan Plateau: "The plains of Mysore afford the most beautiful habitation that nature has to offer upon earth."[51] It

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[51] Joseph Michaud, *History of Mysore Under Hyder Ali and Tippoo Sultan* (Asian Educational Services, 1996).

was in 1807 that the British troops moved from their station in Serinagapatnam, now Srirangapatnam, to the village of Halasuru, about 9 kilometres north-east of the Bangalore fort. Eventually, the increase of trade between India and Europe in that period led to more and more settlements in the area, and the salubrious climate of Bangalore drew many European, and British migrants who sought to settle in India. As trade grew, the cantonment expanded into the surrounding villages.[52]

Reputed professor of Cultural Geography & Heritage Studies, R.L. Singh's monograph on Bangalore describe the city as a "ridge and valley" town whose urban morphology was a product of the region's physical characteristics – considering soil drainage, water supply systems and so on.[53] The ridge and valley are the cantonment and the city respectively, separated by a relatively unoccupied parkland, which eventually came to become Bengaluru's Cubbon Park. Historical accounts of the city during British rule describe the two as independently evolving entities with a strong physical and functional separation between them. Each part had its own central markets, railway stations, hospitals and governing bodies. [54] It was only in 1949 that the two were brought under one municipal administration. The valley region is depicted as a thriving centre of trade and industry, while the cantonment was essentially a "by-product of British imperialism in India"[55] The cantonment and the city therefore follow an entirely different spatial logic. The western portion of "Bengaluru" is a more functional, organically grown area driven by manufacturing processes and the marketplace. The streets are narrow and treeless. It is clear that aesthetics and the integration of urban nature were never a priority in this portion of the city.

The Cantonment was much more planned and structured. A lot of importance was given to the city aesthetics in this region – streets were made much broader and lined with flower bearing trees, the military compounds were large and homes had well-maintained gardens. In *Bengaluru: Samagra Lalitha Prabandhagulu*, popular author and essayist A.N. Murthy Rao states that while the English maintained the Cantonment beautifully, they were relatively uninterested in city matters. All the aesthetic qualities of the area were "produced by the unconscious alienated labour of our people for the foreigners."[56] Upon visiting these areas today, once can see the remnants of this distinction in their spatial and architectural qualities. The integration of urban nature has been much more intentional in the Cantonment while in the city area, the approach has been oriented towards the practical needs of the industrial and commercial spaces.

Being a landlocked town situated on an elevated ridge approximately 3000m above sea level, the lakes or "tanks" built from the 16th century were key sources of water for both domestic and agricultural needs. The network of tanks in the city were deeply linked to peoples' livelihoods and even acted as urban place markers. In *the Promise of the Metropolis*, Nair refers to a "tank economy" existing in Bangalore of the 20th century. Since tanks required a lot of maintenance and upkeep, especially as the population of the city expanded, competitions were frequently held during this time to design new reservoir systems.[57] Small temples emerged on the tank bunds dedicated to the lake deities. Another example of "sacredness" ascribed to the city's natural features; these shrines adopted

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[52] Hasan, *Bangalore Through the Centuries*.

[53] R. L. Singh, *Bangalore; an Urban Survey*, [1st ed.] (Varanasi: Published by Tara Publications on behalf af [sic] the National Geographical Society of India, 1964).

[54] Nair, Janaki, *The Promise of the Metropolis*, n.d.

[55] Hasan, *Bangalore Through the Centuries*.

[56] Nair, Janaki, *The Promise of the Metropolis*.

[57] Nair, Janaki.

independent identities after the disappearance of the lakes and today many of them stand as the only indicator of the lake's former existence. In around 1900, the Halasuru (Ulsoor) tank required massive drainage and de-weeding to manage plague spread. A British engineer commented that the failure to drain this lake was because "many Hindus worship the water and cannot find it in their hearts to see a tank drained".[58]

Much prior to this, in the late 18th Century, Haider Ali, sultan and de-facto ruler of what was then under the Mysore kingdom, was responsible for the setting up of Lal Bagh, which translates to "red garden" or "beloved garden". The story goes that he was inspired to build a garden upon visiting the fine colonial gardens of the French settlement of Pondicherry. Originally a small plot of about 40 acres, the park grew in size and significance with the addition of foreign plant species from Kabul, Persia, Mauritius and Turkey during Tippu Sultan's reign, and gained the title of *Lal Bagh* when it became a royal retreat. Expert gardeners were later on brought in from Tamil Nadu to cultivate the garden, contributing to a growing horticultural prowess and aesthetic consciousness in Bangalore.[59]

Areas even within the Cantonment region were segregated into "native" and "European", the former being a mix of commercial and residential buildings similar to the rest of the valley, characterised by narrow, organically developed streets with very little room for urban greenery, and the latter being more spacious and well zoned. Houses typically adopted the British bungalow style that became characteristic of Bangalore's historical image, on plots that were typically 2 or 3 acres large and landscaped with Hibiscus, Bougainvillea, Gardenia and Royal Poinciana among others. These private gardens emerged due to a desire to emulate the English countryside in India, spurring nursery trade. Bangalore was known for its numerous private and public ornamental gardens. However, horticultural gardens fostered by expert gardeners, producing a range of fruits, flowers and vegetables for colonial rulers, gained more prominence.[60] It was the beautifully landscaped character of these colonial bungalows, as well as the two main parks known as Lal Bagh and Cubbon Park, that contributed to Bangalore being titled a "Garden City". In *Bangalore through the Centuries,* a detailed historical account of the city written by revenue-officer-turned-historian Fazlul Hasan, the gardens, boulevards and park spaces that characterized the city during this time have been eloquently described. The Langford Gardens, Richmond Park, Cole's Park were some of the parks that emerged in the Cantonment. In 1864, the famous Cubbon Park was laid. Apple farms and vineyards cultivating the Bangalore Blue grape were known to have existed around the city during this time. Many areas of the city with names such as Khader Sharief Gardens, Pillana Gardens, and Chinnappa gardens account for this history. In later decades, many of these gardens were later on turned into slums or middle class housing areas.[61]

Thus, the colonial period saw the rise of two very separate parts of the Bangalore: one characterised by western idealized garden aesthetics, meant to be enjoyed by colonial powers and British migrants, and a "Pete" that saw much more unplanned, organic and dense growth with little to no incorporation of nature into the city fabric.

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[58] J. H. Stephens, *Plague-Proof Town Planning in Bangalore, South India* (Methodist Publishing House, 1914).
[59] Hasan, *Bangalore Through the Centuries*.
[60] Nair, Janaki, *The Promise of the Metropolis*.
[61] Nair, Janaki.

Figure 6. *Photograph of the trough of parkland that was eventually planned as Cubbon Park in Bangalore, 1870*

Photographer unknown.

Leiden University Libraries, KITLV Collection

Figure 7. *St Mark's Church from Cubbon Park, Bangalore, circa 1920 postcard:*

Families in British India Society (FIBIS)

(CC BY-NC-ND 3.0)

Nature in an Emerging Metropolis

SUMPEGAY TANK.

Figure 8. Photograph of Sampangi Tank, showing women washing clothes, from Picturesque Bangalore by CH Doveton, 1900 Wikimedia (public domain)


Figure 9. Sampangi Tank Bed served variously as polo ground, slum area and even hosted a cattle fair before it was transformed into a sports complex today known as Kanteerava stadium. (T.L. Ramaswamy, early 1960s)

Source: J.Nair, The Promise of the Metropolis

The area photographed in the image is the Sampangi tank bed. Today this plot houses the large and well known cricket ground and sports facility known as "Kanteerva Stadium". It is interesting to see that the former tank bed was used as a public ground for cattle trade and informal housing prior to the building of the stadium.

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Large mayflower trees flank the outer edges of the tank bed, which served as a multi-functional public ground open to all.
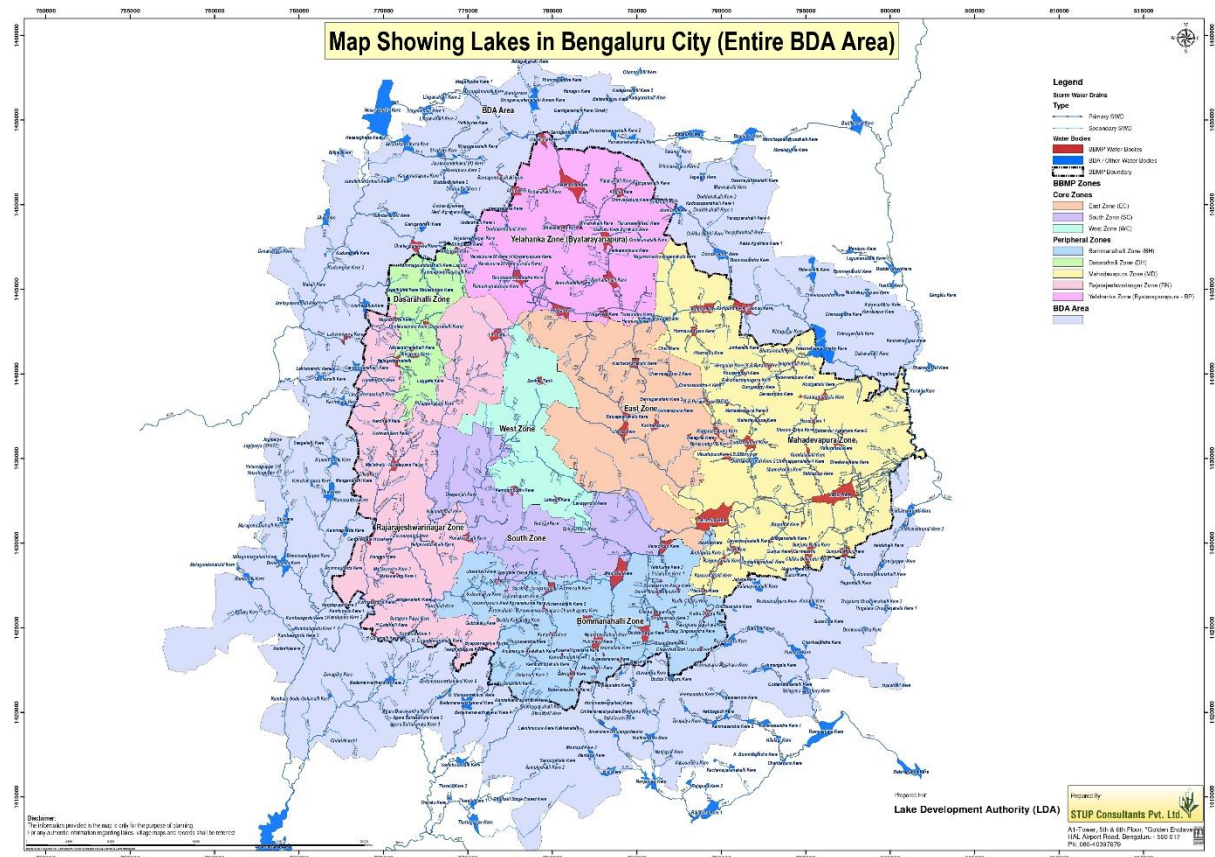
Figure 10. *Map showing lake distribution in Bengaluru region, it is noteworthy that the density of lakes is lesser n the centre and more towards the outer edges of the city.*

Source: *STUP Consultants Pvt. Ltd.*

Figure 11. Photographs taken in the botanical garden, Lal Bagh

Source: Author

Following the independence of India from British colonial rule in 1947, the city began to shift from a focus on agriculture and textiles into a hub for industry and later on private sector enterprises, which sparked the trajectory of accelerated growth in the decades to come. This led to rapid subsequent spatial changes in its urban form and boundaries. The British government emphasized cash crops and exporting of resources, and restricted the growth of Indian-owned industry.

In 1949, the cantonment and the Pete were merged under the Bangalore City Cooperation.[62] As industry boomed unobstructed, the land began to be viewed for its real estate opportunities rather than as a valuable resource for agricultural productivity.[63] This period around the late 1950s was mainly characterized by the change in land use of agricultural land for industry and the prominence of the public sector. The first jump in population growth was seen between 1941-51, owing to the two large public sector enterprises that were set up at the time, namely Hindustan Aircraft and Indian Telephone Industries, and the ancillary industries they fostered.[64] Historians have described unauthorized constructions that took place on agricultural land and lake beds as a way to supplement the insufficient public provision housing for industrial workers flocking to the city. Workers spilled over into neighbouring villages where land was cheaper, thereby beginning to blur the boundaries of the city with surrounding rural areas. Fazlul Hasan blames this phenomenon for "marring the charm" of the city.

Indeed, many accounts discuss this period of industrialization as the major cause of congestion and fragmentation of the visual landscape of the city.[65] In his 1962 address to the Bangalore Municipal Corporation, the then Prime Minister Jawaharlal Nehru depicted Bangalore as the city of the future, "more than any other great cities of India.. more specially because of the concentration of science, technology and industries in the Public Sector here." He emphasized on the need for planning for the future of Bangalore with a long-term vision.[66] Subsequent planning measures in the city, such as the Comprehensive Development Plans over the next few decades, have predominantly been focused on developmental goals, nationalistic ideals, and, as Nair has argued, even nostalgia for British Garden aesthetics overlooking many of the more nuanced and complex problems of a burgeoning South Asian metropolis.

The 1970s and 80s saw the rise of the private sector economy and industries such as textile, machinery, and electrical equipment boomed. The city had already been established as a centre for learning, with premier institutes such as the Indian Institute of Science, which was established in 1909. This paved the way for technology institutes and industries in the city, and eventually, the liberalisation of economic policies coupled with an increase in foreign direct investment into the city led to a large Information Technology hub in Bengaluru in the 1990's. This period saw the increasing dominance of a growing middle-class population. The mid 1970's saw the prominence of low density, low-rise housing and plotted developments. New residential layouts such as Jayanagar and Rajajinagar that came about from Western planning principles were characterized by wider boulevards flanked by large trees on either side, as well as public community spaces and parks for recreation.[67] Nair even mentions a "lingering nostalgia for the bungalow and the compound" that remained in the public imagination as an ideal during this time. Educational campuses, parks and some cemeteries were actively greened and biodiversity in flora and fauna was prevalent in these

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[62] Bangalore City Corporation Act [1949-1976]

[63] Nagendra, *Nature in the City*.

[64] Singh, *Bangalore; an Urban Survey*.

[65] Hasan, *Bangalore Through the Centuries*.

[66] Hasan.

[67] Nagendra and Gopal, "Tree Diversity, Distribution, History and Change in Urban Parks."

spaces. A new ant species was even discovered in the Indian Institute of Science Campus in the year 2006, and given the name Dilobocondyla Bangalorica.[68]

Simultaneously, however, the city continued to expand haphazardly into peripheral zones, converting important ecological zones into grey, urban areas. By the late 1970s, private builders came into the real estate market, building denser and larger apartment complexes that became increasingly more appealing and desirable for the middle and even upper class. Such complexes, still a very prominent housing model in Indian cities, promise a certain privileged lifestyle and a respite from the chaos of urban public space. It was in such gated communities, clubs, hotels and farmhouses that nature became privatized, cordoned off from the outside by tall compound walls and security personnel.[69] These private builders competed with slum dwellers to build on urban commons such as lake beds, orchards, wetlands and grazing areas.[70]

Changes in governance and policy etc. have often reflected the unidimensional interests of more powerful actors and have prioritized neither the preservation of the natural environment nor the social groups that have depended on these environments for their livelihoods. This trend greatly affected urban public commons, such as sacred groves and lakes in and around Bengaluru. The shift from autonomous community management to state management deprioritized the interests of communities of fishermen, fodder collectors, and farmers who traditionally maintained the lakes.[71] By 1985, the contamination of these lakes with sewage and industrial run-off was so extensive that they could not be used anymore. Bathing, washing vessels, and other domestic uses were ceased.[72] In the case of wooded groves, the complex governance structures within the management system led to poor funding and negligence of these spaces, ultimately giving way to their dilapidation and declining environmental value. These groves fall into the peri-urban landscape of the city.

Ecologists Mundoli et. al. have expressed the importance of nurturing these urban commons to build social and environmental resilience in the city.[73] Barricading of urban commons and creating exclusivity is an increasing trend in Bengaluru as well as other Indian cities. It tends to prioritize the recreational needs of wealthier urban residents over the needs of the urban poor which are rooted in social, cultural, and lifestyle dependencies and relationships with nature. Traditional activities and livelihoods such as pastoralism and brick making, and laundering of clothes, that were once associated with these lakes, have now been distanced from them.[74] Policies and planning practices derived from models of urban planning that are based on either Western ideals or the interests of more powerful actors unwittingly alienate a significant population from these natural resources. They do not reflect a comprehensive understanding of the city's cultural and demographical history.

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[68] Thresiamma Varghese, "A New Species of the Ant Genus Dilobocondyla (Hymenoptera: Formicidae) from India, with Notes on Its Nesting Behaviour," *Oriental Insects - ORIENT INSECT* 40 (January 1, 2006): 23–32, https://doi.org/10.1080/00305316.2006.10417454.

[69] Nair, Janaki, *The Promise of the Metropolis*.

[70] Mundoli, Manjunatha, and Nagendra, "Commons That Provide."

[71] R. D'Souza and H. Nagendra, "Changes in Public Commons as a Consequence of Urbanization: The Agara Lake in Bangalore, India," *Environmental Management* 47, no. 5 (May 1, 2011): 840–50, https://doi.org/10.1007/s00267-011-9658-8.

[72] Hita Unnikrishnan, Seema Mundoli, and Harini Nagendra, "Making Water Flow in Bengaluru: Planning for the Resilience of Water Supply in a Semi-Arid City," *Journal of Sustainable Urbanization, Planning and Progress* 2 (May 19, 2017), https://doi.org/10.18063/JSUPP.2017.01.002.

[73] Mundoli, Manjunatha, and Nagendra, "Commons That Provide."

[74] Unnikrishnan, Mundoli, and Nagendra, "Making Water Flow in Bengaluru."

Yet, remnants of rural lifestyles still remain in the city in the present day. Urban festivals such as the annual kadlekai parishe, i.e., the groundnut fair that takes place annually on Bull Temple Road, are ways in which people pay homage to and connect with the presence of nature in the city. Nair has discussed these unplanned uses of urban social space as a reflection of citizenship and democracy, while Nagendra has described these practices, amongst others, as the ways in which nature shows meaningful resilience in peoples' collective imaginary. In her ecological accounts of the city, she has documented the presence of nature in the form of terrace gardens, slum vegetation and *kattes,* platforms on top of which sacred plants or trees are planted, located in homes, temples, and other public spaces around the city.

Conclusion

While the ongoing ecological crisis is a worldwide phenomenon and needs to be addressed at a global scale, in Indian cities such as Bengaluru, it is found that the crisis is a combination of the pressure of developmental goals of the country and ideas of nature imposed upon it from the colonial period. In Indian metropolises such as Bengaluru, one can clearly see this conflict manifested in the physical environment. The Bengaluru of today is a chaotic and nearly saturated boom-town that has evolved as a product of the nation, the region, and globalized capital flows, with a wide demographic range.

Nature has always been a deep-rooted part of Indian cultural and political history, as can be seen in Indian philosophical texts and reflections of these ideologies in urban and rural social spaces across the city. However, during the colonial period, different sections of the city that took shape, be it through systematic planning or organic evolution, reflect differing attitudes towards urban nature. Remnants of the Garden City aesthetics that emerged in some parts during the colonial period intermesh with native elements of nature regarded as sacred in temples, as a source of livelihood in urban peripheries, or as spaces for recreation for the bourgeoisie. It appears that several ideologies of nature co-exist in the city which are multifaceted and often self-contradictory. However, the sacred beliefs about nature held in traditional Indian philosophy, while contributing to the preservation of some isolated groves and species, have not translated into effective action in terms of conservation, for a multitude of reasons. One of the major causes of this disconnect is the failure to incorporate the needs of groups whose livelihoods have been deeply rooted in a strong connection to nature, resulting in their alienation and subsequent disconnection from these spaces. A major challenge in adaptive management and planning practices of the city is that local knowledge has not been integrated, and systems have not been put in place to do so since colonial times.

It can be said that the diminishing natural environment in Bengaluru is symptomatic of a more complex cultural phenomenon. Therefore, tackling these issues must go beyond multidisciplinary action and include an approach that involves the participation of multiple actors across social groups.

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