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Bangalore: Urban Development and Environmental Injustice

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ABSTRACT

This thesis bridges the transnational discourses on environmental justice and urban social inequality through an in-depth analysis of Bangalore, India. I define environmental justice as the meaningful participation in the development of the environment and the fair access to that environment across peoples regardless of difference. Although gaining traction in other global cities, environmental justice has not been considered in Indian cities because the conceptualization of the “environment” is pragmatically restricted to rural areas. I ground this thesis in three core arguments: (1) the natural environment and built environment exist in a hybrid form in both cities and rural areas; (2) by ascribing agency to both the natural and the built components of hybrid environments, it is possible to qualify their nexus as it impacts the human experience; (3) problems that are commonly understood as social injustices are shaped by this natural-built environment (NBE) nexus, and must therefore be reconstructed as environmental injustices. By studying Bangalore’s development using the NBE nexus framework, I am able to understand the city’s dichotomies on a deeper level, as inextricably linked to its environment in both causes and solutions. Chapter 1 places Bangalore in a global context, establishing it as a relevant and useful case study for understanding urban environments and injustice worldwide. In Chapter 2 and 3, I analyze the history of Bangalore’s urban and rural NBE nexuses, respectively, in order to understand the injustices that have persisted through today. In Chapter 4, I analyze Ejipura Slum, a dramatic example of how Bangalore’s NBE nexus creates a negative urban experience for poor people. I conclude with a case-study-based exploration of potential strategies for mitigating environmental injustice and reimagining the NBE nexus to be sustainable and just for all.
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EXECUTIVE SUMMARY

Bangalore has emerged as the hub of a high-tech boom in India’s southern state of Karnataka. Yet, its economic prosperity has come at the price of environmental and social degradation. Its population and footprint have doubled in the past ten years, as job opportunities and economic growth have lured people from across the region to seek employment. As India’s third largest city, Bangalore faces enormous challenges managing its urban environment and developing infrastructure to accommodate an influx of low-income rural migrants. The city’s development plan is neither equitable nor sustainable and is leading to widespread environmental degradation and social injustice. Despite the city’s success as a global trade center, almost 20% of its ten million residents are part of the underclass, living in informal settlements and left disenfranchised by development and vulnerable to its negative impacts: water and air pollution, forced evictions, and loss of environmental amenities. Inequalities like these are typically construed as social injustices in the transnational discourse on urban development. The purpose of this thesis is to bridge the transnational discourses on environmental justice and urban social inequality, in an effort to analyze and offer solutions for injustice in Bangalore. I do this by offering the natural-built environment nexus as a new framework for understanding the relationship between development and nature and its implications for justice.

There are three personal beliefs underpinning the arguments I make in this thesis. First, I believe that individuals and communities – regardless of class, racial, ethnic, and economic differences – have the right to a healthy and productive environment. Second, there is a fundamental relationship between human and environmental health. Third, social injustices are products of larger systemic issues that are physically linked to environmental degradation. It is my hope that this thesis will contribute to a new way of studying global cities, one that takes seriously and connects issues of justice, environmental degradation, and the importance of the built environment.

Chapter 1 places Bangalore in a global context, establishing it as a relevant and useful case study for understanding urban environments and injustice worldwide. I attribute the widening gap between India’s rich and poor to unsustainable development practices, which prioritize gross domestic product (GDP) over human lives and the environment. I argue that this prioritization of economic growth drives a new class of megalopolis: the global city, which is not only the node of economic and political power within a country but internationally, as well. Global cities are emerging in developing countries today because they offer cheaper and more accessible natural resources and labor that fuel Western economies. The emergence of such cities is a transnational form of environmental injustice. By importing

goods extracted and manufactured in developing countries and offloading waste back to them, Western nations are able to externalize the social and environmental costs associated with Western consumerism. I define environmental justice as the meaningful participation in the development of the environment and the fair access to that environment across peoples regardless of difference. Although gaining traction in other global cities, environmental justice has not been considered in Indian cities because the “environment” is a concept generally restricted to rural areas. To properly consider environmental justice in Bangalore, this “environment” must be re-envisioned to allow the rural and urban, the built and natural environments, to be seen as pieces of the larger, connected environment.

It is here that I introduce the natural-built environment nexus (or NBE nexus) as a framework for understanding environmental justice across the rural-urban continuum. The NBE nexus pushes against first- and second- nature conceptualizations of the environment, which I argue adhere to false binaries. It also discredits hybridity – the idea that the environment is composed of inseparable layers of technological and natural forces – which I argue accepts environmental change and ignores its justice implications. The NBE nexus is a framework for understanding both the physical and experiential spaces wherein the natural environment and built environment connect.

The physical nexus of the natural and built environments is often more visible than the experiential one: it happens where rain meets the gutter, where cultivated gardens attract insects, and where pit latrines produce biogas. Almost everywhere we look, the physical landscape has been shaped both through human design and natural processes. The experiential space within the NBE nexus happens where farmers no longer have access to irrigation water and must make difficult decisions that will affect their economic and social wellbeing, where choosing to earn a wage in the city means living in unsafe, unsanitary, and inadequate housing; or where people endure the local environmental consequences of the social and economic decisions made globally. The experiential space can be assessed using multiple metrics: cultural, social, ecological, and economic, to name a few. Using these metrics, it is possible to qualify the experience of the NBE nexus for stakeholders with different priorities. The experiential space of the nexus cannot be reduced to a simple binary of “positive” or “negative” because the metrics within which the experience is based are complex. I argue that justice and equity are essential metrics to use in qualifying the experiential space of the NBE nexus in Bangalore and other global cities.

In Chapters 2, 3, and 4 of this thesis, I am particularly concerned with the relationship between ecological degradation and the experience of marginalized peoples as seen through the NBE nexus. Chapter 2 follows the different political and economic regimes that have contributed to Bangalore’s socio-environmental history. I argue that city planning since Bangalore’s inception established exclusivity and hierarchical access to resources. Beginning with the Petah (walled village with an adjoining fort) under Vijayanagara rule, I describe the drive of the city’s elite to control natural resources and shape the NBE nexus to satisfy their needs. The arrival of the British in the late eighteenth century marked a shift in Bangalore’s

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NBE nexus. The British Cantonment and the old city grew side-by-side for one hundred and fifty years, each adhering to different paradigms of urban development that created an unequal urban experience. The manifest injustice between the poor and the British and elite Indians was a reality throughout India and led to Indians’ claiming independence in 1947. The third stage of Bangalore’s NBE nexus began after independence, when development became unrestricted and Bangalore faced infrastructural challenges as a result of an influx of people and resources. Economic liberalization in 1991 only increased the disparities within the NBE nexus. Today, huge industrial parks are scattered around the city, degrading the region by releasing pollution and restricting access to environmental resources for those communities that were living on the site before development and all those who currently live around it.

In Chapter 3, I analyze how environmental injustices in Bangalore’s hinterland contribute to rural-to-urban transition. I delve into the history of Bangalore’s villages, looking at the ways in which the rural and the urban were interdependent; people of the hinterland had supplied Bangaloreans with food, labor, and natural resources since the city was founded in 1537. Yet the city and its hinterland were physically and culturally distinct until economic liberalization in 1991 when industry began to sprawl beyond the city limits, blurring the distinction between urban and rural and drawing villagers into urban informal settlements. I argue that while other factors such as rural housing insecurity, promise of employment in the city, chain migration, appeal of urban culture, and the lack of resources, facilities, and education in rural areas are undoubtedly factors, the unjust NBE nexus in rural areas is an important driver of rural-to-urban transition and is fueling the growth of the urban underclass.

In Chapter 4, I investigate the dichotomy that exists between the I.T. elite class and underclass in Ejipura, the most publically acknowledged and contentious site of injustice in Bangalore. I push against conceptualizations of informal settlements as containers of social injustices and reinforce the connection between Bangalore’s urban development strategy, the NBE nexus, environmental degradation, and environmental injustice. I describe the political processes that shaped the dichotomy of social classes in Ejipura and that ultimately resulted in the overnight displacement of 5,000 people in January of 2013. Ejipura was the product of failed policies, bad governance, corruption, inappropriate regulation, dysfunctional land markets, public-private partnerships, and a fundamental lack of political will to address these injustices. The informal settlement has degraded further because of flooding and erosion of Ejipura’s terrain, the contamination of its water supply and loss of public open space, the shoddily built tenements, and the solid waste and air pollution from the consumptive lifestyles of middle- and upper class Bangloreans. This chapter makes apparent the underlying shift that is needed to re-imagine the NBE nexus in Bangalore to be sustainable and just for all.

In Chapter 5, I scale back to look at global cities, in an effort to identify ways of redressing the NBE nexus in Bangalore. Using success stories from interventions in three other global cities (Curitiba, Brazil; Karachi, Pakistan; and Ahmedabad, India) where the NBE nexus consisted of unhealthy dichotomies between those who benefited from the natural-built environment and those who faced its consequences, I propose a series of solutions for Ejipura, and Bangalore at large. Curitiba, with its top-down approach to city planning, has received international praise for its integration of land use planning,
transportation infrastructure, and environmental sustainability efforts. The Orangi Pilot Project in Karachi was a successful example of grassroots community organizing, in which NGOs led the community in building an affordable sanitation system for the treatment of its sewage. Ahmedabad’s Slum Networking Project is in many ways a hybrid of the top-down and bottom-up approaches, successfully engaging multiple stakeholders in participatory and decentralized revitalization projects of informal settlements. While none of the interventions completely eradicated environmental injustice, they offer a range of place-specific strategies that can contribute to dialogue around solutions in other global cities.

This thesis emphasizes environmental justice in Bangalore, specifically, because it is an example of a class of cities that are and will increasingly play an enormous role in global environmental and social sustainability. The number of people who make up the underclass in Bangalore’s degraded environments is overwhelming and their numbers will only continue to grow—and their living environments will continue to worsen—unless a paradigm shift occurs in the way the NBE nexus is viewed. The question of how this paradigm shift is achieved, however, is complex and place-specific. Recognizing the innate differences in scale, history, cultures, and geographies of global cities is important, and once acknowledged, can open up a productive dialogue around solutions. My vision is that by working towards environmental justice in global cities, our interconnected communities, states, nations, and ultimately our entire planet will become more resilient, more inclusive, and more enriching for everyone.
INTRODUCTION

In all of human history, some of the most profound economic, social, and technological changes in human history have occurred in the past thirty years. The personal computer, Internet, cell phone, regenerative medicine, and countless other scientific and technological advancements have changed the way we interact, do business, and live our lives. The global scale at which these changes have materialized is both exciting—as they have in many cases facilitated connectivity, opportunity, and freedom—and also troubling. Many scholars and activists say that the global hegemony of multi-national corporations and the ‘development’ of the third world through technological advancements and economic liberalization are critical in eliminating poverty and advancing societies. Yet more people live in poverty today than ever before.

Because gross domestic product (GDP) is the most accepted method of measuring a country’s prosperity and development status, the overall goal of both developing countries and international organizations is to increase national production and consumption. India increased its GDP through a series of neoliberal economic reforms in 1991, when the International Monetary Fund (IMF) bailed out the national government whose socialist policies had accrued substantial debt. As part of its bailout agreement with the IMF, India opened itself up to international trade, privatization, and deregulation. In the last twenty-three

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years, the country’s GDP has increased an astonishing 700% (see Figure 1). By all standard metrics, this should be an indicator that poverty has decreased. So why has the number of people living in poverty in India increased from 35% in the early 1990s to 40% today? Competitive consumption, environmental degradation, and poverty are directly correlated. The model of development that prioritizes GDP has arisen in conjunction with scientific and technological advancements. While it has produced many social gains, it depends heavily on human and resource exploitation.

To fully understand the challenges of economic and social development, we must turn to the role cities play in these processes. Cities are the physical manifestation of social, economic and environmental forces, the coalescence of flows of people, money, and goods. Cities are growing rapidly and the gap between rich and poor is in many places visibly increasing. Urban development is most rapid and unplanned in developing countries like India, where cities cumulatively gain an average of five million residents every month. This rapid, unplanned growth stresses infrastructure and brings about environmental injustices. In many of these cities, almost half of the urban population resides in informal settlements with little or no access to shelter, water, and sanitation. According to Yvonne Rydin at the UCL Environment Institute,

“We live in an increasingly urbanized world. By 2030, 60% of the global population will live in cities. By 2015 there will be 23 cities with a population of more than 10

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12 Gary Hustwit, “Urbanized,” (Swiss Dots Ltd., 2011), Film.
million people… Examining the sustainability of these megalopolises is therefore
highly pertinent.”

Researching the causes and consequences of unsustainable and unjust urban development will
be critical in directing future policy and activism.

Bangalore is an emerging metropolis in India’s southern state of Karnataka with a
population of over 10 million people (see Figure 2). Often referred to as the ‘Silicon Valley of
the East’, Bangalore has a burgeoning information technology (I.T.) industry, and has seen its
population and footprint double in the past ten years, as job opportunities and economic
growth have lured people from across the nation to seek employment.15 But as the fastest
growing city in South Asia, Bangalore is not sustainable and its development is inequitable.16
Despite its success as a global city, 20% of Bangalore’s residents live in informal settlements
and lack access to basic social and environmental resources.17 Lack of proper infrastructure
and policies that allow rampant and unjust development contribute to these pressing human
rights* violations.

Bangalore serves as a useful case study for examining environmental injustices in
global cities. While its culture, history, and geography make it unique, the environmental
factors that drive rural populations into the Bangalore and the environmental conditions that
the urban poor are exposed to are similar to those of rapidly growing metropolises in other
developing countries. In this chapter, I will contextualize Bangalore in a class of global cities

* Human rights are based on the 1948 UN Universal Declaration of Human Rights. Rights violated in Bangalore include those
under Article 7: right to equal protection under the law, Article 17: the right to not be arbitrarily deprived of his property,
Article 22: the right to social security, and Article 25: the right to a standard of living adequate for the health and well-being
of himself and of his family, including food, clothing, housing and medical care and necessary social services.
Figure 1. India’s GDP has increased 700% over the last 23 years, owing to the series of economic reforms that happened in 1991 (1,000,000 INR = 16,500 USD; graph adjusted for inflation).


Figure 2. Map of Bangalore’s location within Karnataka State and greater India. Source: ‘Karnataka, India’, ed. by WikiProject India Maps (Wikimedia Commons, 2008), Web.
and introduce the natural-built environment nexus as a powerful framework for explaining and addressing environmental injustice.

BANGALORE AS A GLOBAL CITY

Scholars have been voicing their concern about the rate of industrialized urban growth and its effects on people and the environment since the first Industrial Revolution. Henry George, a prominent American political economist in the nineteenth century, was one of the first to theorize around the socio-environmental impacts of industrialized economies in cities. In “Progress and Poverty”, a treatise he wrote in 1879 on urban inequality, he proclaims,

“Where the conditions to which material progress everywhere tends are the most fully realized—that is to say, where population is densest, wealth greatest, and the machinery of production and exchange most highly developed — we find the deepest poverty, the sharpest struggle for existence, and the most of enforced idleness.”18

George credits the evolving inequalities in cities of nineteenth-century America to the political hierarchies governing natural resource distribution and land tenure. He played a significant role in underlining the changing relationship between man and nature in an era of unprecedented urban growth. His philosophy helped shape the utopian movement of the late-nineteenth and early-twentieth century, led by Lewis Mumford, Ebenezer Howard, Frank Lloyd Wright, Le Corbusier, and Patrick Geddes, among others.19

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18 Henry George, and James L. Busey, Progress and Poverty (E. Cole, 1921).
19 Robert Fishman, Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright, and Le Corbusier (MIT Press, 1982).
Lewis Mumford, an American historian and urban sociologist, expanded upon George’s critique of industrial capitalism. In his “Regional Framework of Civilization” (1926) he writes,

“Cities are becoming too big; as they grow they fall behind in the barest decencies of housing; they become more expensive to operate, more difficult to police, more burdensome to work in, and more impossible to escape from even in the hours of leisure that we achieve.”

Mumford believed dense urban development patterns were tied too closely to free-market development and that planning did not integrate regional considerations. He developed a utopian-like solution to American sprawl called regional planning. Unlike urban planning, which focuses on developing the city at the expense of the larger environment, regional planning reconsiders cities’ growth as part of the rural-urban continuum.

This thought manifested in the utopian designs of Ebenezer Howard, Frank Lloyd Wright, and Le Corbusier. These men wanted to make cities more logical and efficient, more congruent with their hinterlands, and more equitable. Ebenezer Howard, a British reporter, writer, and theorist, devised a regional planning model called ‘The Garden City’ in 1898, which was particularly representative of the utopian plans of the time. Howard’s city ideal emphasized organized, geometric forms and harmony between people and nature. Having witnessed the overcrowding and deterioration of London at the turn of the twentieth century

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in conjunction with the Industrial Revolution, Howard sought to provide the working class a suburban alternative to these unhealthy urban areas.\textsuperscript{22}

Urban theorists have criticized the utopian imaginings of Howard, Wright, and Le Corbusier for their lack of place-specificity, opposition to urban culture and history, and unfeasibility. Jane Jacobs condemned ‘The Garden City’ plans for being “mindless”, “static”, and “not a way to solve the problems of real cities, but rather a way to allow urban problems to fester unsolved by providing an impractical alternative.”\textsuperscript{23} The critiques of these regional plans, aside, they signify the presence of a social consciousness at the onset of industrialized urban growth that modern economies were stimulating unsustainable and unjust urban growth. While utopian visions were largely only realized in suburbs of the West, they were an important catalyst for scholars, politicians, and activists to consider the unimaginable effects of twenty-first century urban growth and plans for addressing injustice.

An important focus emerged out of these early conversations on urban development and regional planning: the relationship between globalization and the built environment. There seemed to be a growing correlation between the concentration of international business and a city’s size. Patrick Geddes, a biologist, sociologist, and regional planner, was one of the first to recognize that as production dispersed worldwide, services would increasingly concentrate into the most competitive trading cities.\textsuperscript{24} In the early twentieth century, these included cities like New York, Chicago, Detroit, and London, which were all centers of

\textsuperscript{22} Ibid.
industrial production and trade.  

Geddes christened these “the world cities”, an idea that would become more intensely studied in the mid- to late-twentieth century.

In 1966, English urbanist Peter Hall published an essay on world cities, in which he more explicitly defined them and developed a set of criteria for ranking them:

“World cities are centres of political power, both national and international, and of the organizations related to government; centres of national and international trade, acting as entrepôts for their countries and sometimes for neighboring countries also; hence, centres for banking, insurance and related financial services; centres of advancing professional activity of all kinds, in medicine, in law, in the higher learning, and the application of scientific knowledge to technology; centres of information gathering and diffusion, through publishing and the mass media; centres of conspicuous consumption, both of luxury goods for the minority and mass-produced goods for the multitude; centres of art, culture and entertainment, and of the ancillary activities that catered for them.”

Hall’s early definition largely emphasizes the amenities that world cities offer and overlooks the conditions that emerge as a result of the city’s economic processes. Political power is also a core tenet of his definition; most of the world cities in the twentieth century existed in developed and politically powerful countries.

In the last twenty years, the term “global city” has come to replace the traditional “world city” concept that Geddes, Hall, and others were operating with. The use of the “global city” as opposed to the “world city” was popularized in 1991 by Saskia Sassen’s book,

25 Patrick Geddes, City Development: A Study of Parks, Gardens, and Culture Institutes; a Report to the Carnegie Dunfermline Trust (Geddes and Company, 1904).

The Global City: New York, London, Tokyo. Sassen saw a need to differentiate between the class of cities that had historically risen to power because of industrial or political power and the cities that were emerging in the late-twentieth century as a result of global information systems. In a paper she published more recently:

“The global city has emerged as a site for new claims: by global capital, which uses the city as an organizational commodity, but also by disadvantaged sectors of the urban population, frequently as internationalized a presence in large cities as capital. The de-nationalizing of urban space and the formation of new claims centered in transnational actors and involving contestation constitute the global city as a frontier zone for a new type of engagement.”

Sassen characterizes a global city as being hyper-mobile, housing a complex system of production chains, and involving a shift in the conceptualization of the environment from local to global as well as to digital. This new understanding of the global power structures at work in cities – as well as the impacts these cities have on the global economy and environment – is fundamental in the re-conceptualization of the urban landscape.

From the seminal work of Peter Hall in the 1960s to the wide-ranging analyses of Sassen, Budd, Scott, and Short, the central facet of the global city literature has been to rank cities according to their disproportionate geo-economic power in the world-system.

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28 Ibid.
29 Leslie Budd and Sam Whimster, Global Finance and Urban Living: A Study of Metropolitan Change (Taylor & Francis, 1992).
31 John R. Short, and Yeong-Hyun Kim, Globalization and the City (Longman Harlow, 1999).
Cities desire the “global city” label because it denotes economic power (separate from political power) and prestige. Businesses want to invest in and consumers want to live in “global cities” because their legacies guarantee profitability and high quality of life (for those who can afford it). Tokyo, Jakarta, Shanghai, Seoul, Delhi, Mexico City, Karachi, Manila, New York, Sao Paulo, Mumbai, Los Angeles, Beijing, Moscow, Cairo, Kolkata, Buenos Aires, Istanbul, and London are just a few on the roster of “global cities”, determined by the Globalization and World Cities Research Network in 1998 (see Figure 3). These cities were ranked based on their relative connectivity through accountancy, advertising, finance, and law. They also, coincidentally, are the most populous cities in the world, each with as many as 45 million inhabitants. The correlation between a city’s population and economy is no coincidence. People and resources fuel economic growth and when either are depleted or outcompeted by those of another city, urban growth falters. Many of the world cities of the nineteenth and early-twentieth centuries are shrinking because they have been outcompeted by global cities in developing countries, which are now linked to the larger global economy and offer cheaper and more accessible resources and labor.

In addition to international stake in the growth of global cities, the countries in which global cities emerge are coming to depend almost entirely on their urban economies for national growth. Urbanization has long been considered a crucial step in countries’ development and many see urban migration as the only viable way of ensuring that people’s

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35 Ibid.
needs are met. In the last thirty years, close to a billion people in developing countries have migrated into global cities, lured by the bright lights, or driven from the countryside by political and economic turmoil, population pressures, and ecological breakdown. In many countries, cities are the only viable conduits for accessing clean water, sanitation, schools, and transport. Yet few municipal governments in the developing world have the power, resources, and trained staff to provide their rapidly growing populations with the land, services, and facilities needed for an adequate human life.* This results in burgeoning informal settlements with primitive facilities, overcrowding, and rampant disease linked to an unhealthy environment. Because these global cities serve as buoys for developing nations, their social and environmental conditions largely determine the fate of their countries and of the rest of the world.

There are both global and local incentives for ensuring that global cities develop sustainably. Air pollution, for example, is a two-fold concern. It has dramatic health consequences for people living in the city and in its hinterland. This is particularly affecting poor people living in informal settlements, who spend more time on the streets and in poorly ventilated indoor spaces. Local pollution contributes to the urban heat island effect, which can increase local temperatures and precipitation. Air pollution in global cities also drives global climate change, as 75% of global carbon dioxide emissions come from urban areas. Intensified consumption habits among the “consumer class” in global cities also have both local and global consequences. Higher rates of consumption strain cities’ resources, and

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39 Ibid.
* I define an adequate human life as one in which food, clothing, housing, medical, and social needs are met.
41 Ibid.
increase energy use and solid waste outputs. Globally, finite natural resources are becoming depleted, which impacts the sustainability of economies worldwide. Locally, consumer culture in cities manifests in the unequal exposure to solid waste, water pollution, and disease.

It is not difficult to see the ways that cities in developing countries negatively impact societies and the environment. A vast body of literature calls for more ‘sustainable development’ in cities in developing countries. The UN, the World Commission on the Environment, and countless scholars have published reports and recommendations for the future management of global cities. Most of this literature does not focus on the inherent injustice that underlies the existence of these cities. Environmental and social problems may be pervasive in places like Bangalore but there is no way they can be addressed if we fail to recognize the imperialistic and unjust processes that contribute to them.

Rob Nixon, a South African professor of English, believes that the environmental crises in developing countries have transnational causes. In *Slow Violence and the Environmentalism of the Poor*, Nixon writes about how the social consequences of global-scale environmental problems like climate change, deforestation, and toxic drift need to be understood as forms of “slow violence”. He defines “slow violence” as:

“A violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all… a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales.”

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43 Nixon, p. 2.
Slow violence, Nixon argues, has its roots in imperialist and neocolonialist global relations. Because it is so commonly ignored in our capitalist system, slow violence exacerbates the vulnerability of ecosystems and of people who are poor, disempowered, and often involuntarily displaced.\textsuperscript{44} If we were to look at how his framework applied to global cities, we would understand that the injustices happening in urban centers like Bangalore are global acts of slow violence by Western nations. Global cities are emerging in developing countries in the twenty-first century because Western economies capitalize on the poorest and most resource- and human-capital-rich regions of the world. By importing goods extracted and manufactured in developing countries and offloading waste back to them, Western nations are able to externalize the social and environmental costs associated with modern consumerism. While Nixon applies his concept of slow violence to rural areas, global cities are the sites of the most intense forms of slow violence. Understanding informal settlements, disease, and air pollution, not only as products of local mismanagement, but as products of transnational environmental injustice is critical: it offers new possibilities for the way we attribute responsibility for problems and recommend solutions.

Nixon’s concept of slow violence represents one of the first scholarly attempts to develop the theory of environmental justice transnationally. “Environmental justice” has emerged as a framework over the last thirty years to reconcile social justice and environmentalism. It is both an academic and pragmatic pursuit, which has only recently been considered in the context of rapidly developing, postcolonial global cities like Bangalore. As Nixon explains, marginalized people (in developing countries) experience the negative environmental externalities imposed by the dominant group (in developed countries). By

\textsuperscript{44} Ibid.
studying how environmental justice emerged as a framework in the United States and how it has evolved as an appropriate structure within which to consider the presence of inequity and corruption in rapidly growing cities of developing countries, I will have a stronger framework to analyze Bangalore.

APPLYING THE ‘ENVIRONMENTAL JUSTICE’ FRAMEWORK TO BANGALORE

Built upon the Civil Rights Movement in the United States, environmental justice emerged as a concept in the 1980s to challenge the unfair distribution of toxic waste sites that were disproportionately concentrated in low-income communities of color. Robert Bullard argues that the movement began in Warren County, North Carolina, where an African American community demonstrated against a landfill.45 While their protests were unsuccessful, they brought attention to the nationwide pattern of environmental pollution imposed upon communities of color. As Charles Lee recounts, the environmental justice framework was formally developed at the first National People of Color Environmental Leadership Summit in 1991, when African Americans and Native Americans congregated for the first time to talk about the environment.46

“According to the environmental justice movement, all Americans, regardless of whether they are white or black, rich or poor, are entitled to equal protection under the law. Environmental justice advocates for quality education, employment, and housing,

45 Robert Bullard. The Quest for Environmental Justice (Sierra Club Books, 2005).

as well as the health of physical environments in which individuals, families and
groups live."\(^\text{47}\)

The 1990s saw an outpouring of literature, organizations, and legislation that further
developed the environmental justice framework in the United States, including El Pueblo para
el Aire y Agua Limpio v. County of Kings; Robert Bullard’s book, Dumping in Dixie; Bill
Clinton’s 1994 Executive Order, “Federal Actions to Address Environmental Justice in
Minority Populations and Low-Income Populations;” and the Environmental Justice Resource
Center’s “1997 Healthy and Sustainable Communities Conference”, which made
Environmental Justice an international issue.\(^\text{48}\) In 1999, the United States, through the
Environmental Protection Agency, was the first nation in the world to adopt a national
environmental justice policy, recognizing the unquestionable issues of race and class that
were tied to environmental decision-making in the West:

“Environmental Justice is the fair treatment and meaningful involvement of all people
regardless of race, color, national origin, or income with respect to the development,
implementation, and enforcement of environmental laws, regulations, and policies. It
will be achieved when everyone enjoys the same degree of protection from
environmental and health hazards and equal access to the decision-making process to
have a healthy environment in which to live, learn, and work.\(^\text{49}\)

The emergence of the environmental justice movement signified the start of the
reconciliation between the environmental and various social justice movements in the United


\(^{49}\) EPA Homepage (2013), Web.
States. Environmentalism in the nineteenth and early twentieth century focused primarily on wilderness preservation and resource management. The twentieth century marked a shift in environmental concerns as the United States became a more global imperialist power and began bumping up against new environments. Toxicity and the effects of environmental pollution on people became a huge concern: Rachel Carson’s *Silent Spring*, the Clean Air Act, and the Clean Water Act all signal this shift in the conceptualization of the environment and how humans could be affected by it. According to Bullard, the dominant environmental paradigm that existed prior to environmental justice sought to manage, regulate, and distribute risks. Because of this, the United States sacrificed human health for profit, legitimized human exposure to harmful substances, exploited the vulnerability of disenfranchised communities, and delayed cleanup actions.

Some of the environmental organizations we admire most for their influence on environmental policy, including the National Audubon Society and National Wildlife Fund, oppressed marginalized people for the sake of preserving environments. This was done, as almost all “environmental protection” initiatives were, without permission, participation, and recognition of the people occupying the affected environment. The efforts of the environmental justice movement differ from those of the environmental movement because at its heart are issues of racism and socio-economic injustice. Environmental justice builds upon the philosophy and pragmatism of environmentalism by emphasizing the way in which adversely impacting the environment can in turn adversely impact specific populations of that environment.

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52 Bullard, 1992.
Bridging the environmental and social justice movements in the United States was crucial, both for the popularization of environmental concerns, and for the political and social impetus to address civil rights violations. The issues emphasized by the environmental movement in the twentieth century – population growth, toxicity, deforestation, among others – did not consider race, class, gender, and geographic inequality. Social movements have taught us repeatedly the importance of diversifying the group of stakeholders in an issue. The women’s movement, for example, was unable to work across class, race, and gender lines; it therefore struggled for a long time to create the systemic change it sought. Similarly, environmentalism long overlooked social issues, including racism and classism, which play out in our environments. Leaders of the early environmental justice movement believed that a paradigm shift in the conceptualization of “environment” and “justice” was necessary to merge the conversations at the table.

The early definition of environmental justice was tied to the unequal distribution of environmental risk. David Schlosberg and Gordon Walker contend that focusing only on the inequality of environmental risk was not enough. Geography is uneven, they argued, and environmental justice needs to address the unequal distribution process of risk, and resources. This unequal process is based largely on the discrimination and marginalization of people of color. Native American communities, historically devalued and disenfranchised, face higher rates of poverty and are denied agency in environmental decision-making. The injustice African American communities face is similarly based on race. Benjamin Chavez developed the idea of environmental racism as a way to express the persistence of racial inequality.

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across landscapes. Yet environmental justice is not only about inequity. According to David Pellow, justice has to do with the politics of recognition and participation. Without political recognition, communities of color could not participate in the decision-making process, consequently being denied a seat at the table in environmental risk management. The conceptualization of “justice” in the context of the environment has shaped the way American society views civil rights. Justice has come to be understood as pluralistic, encompassing equity, recognition, and participation.

As the definition of “justice” in the context of the environment has become broader, so has the definition of “environment”. David Schlosberg argues that the environment must include all areas where we live, work, and play. Urban environmentalism (specifically inner-city environmentalism) has often been underemphasized, as environmentalists have focused on issues and spaces that the most politically powerful groups (the white, middle- and upper-class) are concerned with. The broadening of “environment” faced some resistance from the environmental movement, as environmentalists were concerned that a shift to inner-city and fringe environments would cause society to ignore the broader conception of “nature”. However, we know from the earliest definitions of environmental justice that the framework acknowledges nature as a form that does exist separately from humans. The first principle of environmental justice drafted at the National People of Color Environmental Leadership Summit in 1991 states:

57 Ibid.
“Environmental justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.”

Clearly, in broadening the definition of “environment”, the consideration of even the environments where disenfranchised groups live becomes a priority.

With the expansion of the concepts of “justice” and “environment” over the last thirty years comes the extension of environmental justice as a whole to be about more than just risk. The discourse has expanded in the realization that the environment is not merely a symptom of social injustice; working environments are in fact a condition of justice itself. Bullard’s work, which was once so focused on toxicity and pollution, has expanded into issues of public transit, distribution of food, green space, and other environmental amenities. Additionally, scholars now recognize that environmental injustice is not merely a problem for minority and poor communities; when injustice exists, it disrupts the function and progress of the greater society. In the long-term, economies are based on the health of the environment and society that sustains them. It is therefore in cities’, states’, and countries’ best interests to prioritize environmental justice for its minority communities.

In addition to the expansion of discourse on environmental justice to include recognition and participation of minorities, injustice in urban environments, and distribution of environmental risks and goods, the discourse has also extended beyond the United States. Scholars are applying the environmental justice framework to issues across the globe; Gorden

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Walker lists no fewer than 37 countries in which the framework has been used. David Pellow has broadened his research to focus on the global toxics trade, looking at entire countries that bare the brunt of the “injustice” of global capitalism. Daniel Faber studies the affect the growing consumer class will have on poor communities, primarily in Africa. David Carruthers examines the globalization of the environmental justice framework in Latin America, looking specifically at northern Mexico. Julian Agyeman has published extensively on environmental justice movements and urban environmental justice globally. Rob Nixon’s concept of slow violence is also a transnational extension of the American environmental justice framework. Perhaps most notable is Robyn Leichenko and William Solecki’s recent work on environmental justice and the making of new metropolitan landscapes in developing countries. Their research on suburbanization in São Paulo, Brazil and Jakarta, Indonesia shows that decentralized development fosters inequities in both exposure to environmental hazards and in access to environmental amenities. While their work does not address problems in India’s inner-cities, they are among the first to apply the environmental justice framework to issues pertaining to global cities.

In India, there are various ways in which the post-imperial experience shapes and constrains opportunities for pursuing the western model of environmental justice. Glyn Williams and Emma Mawdsley contend that the western model becomes especially

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65 Agyeman, 77.
problematic in its faith in a deliberative, inclusive democracy and in its expectation that state action to manage the environment is the most effective approach to addressing environmental problems.68 In India, there is a longstanding and deeply ingrained cultural legacy of social (caste) inequality, which various forms of environmental management and control have only fed. In their book, This Fissured Land, Madhav Gadgil and Ramachandra Guha explain that, “postcolonial India, like its colonial precursor, privileges the national over the local, the urban over the rural, and the modern over the traditional”.69 The postcolonial state has been consistently willing to sacrifice both the poor and the environment for a vision of industrial modernity and commercial growth. The most marginalized groups of society (scheduled castes and tribes) disproportionately bear the costs of India’s development projects. According to Pramode Parajuli, tribal people account for 40% of those displaced by development projects since Independence.70 While the response to such inequalities has been ever-present, it largely has not acknowledged the link between social injustice and environmental degradation. Furthermore, the conceptualization of injustice differs widely between rural and urban areas.

Most Indian social movements that seek to address social inequality are split between the rural and the urban, which prevent the concept of environmental injustice from reaching cities. Environmental problems are seen to afflict rural areas, where marginalized communities bear the brunt of resource extraction, industrial pollution, and corporate land acquisition. According to Guha, recognizing the connection between the exploitation of the poor and of the environment has been instrumental in implementing laws and the success of

70 Williams, 2006.
rural social movements like Chipko. The Indian Constitution is one of the few in the world to make an explicit commitment to a healthy environment: the 42nd Constitutional Amendment, for example, made environmental protection a fundamental duty for both the state and its citizens. However, the conceptualization of “environment” in this context is pragmatically restricted to rural areas.

Understanding the relationship between rural and urban areas both politically and in terms of physical geography is a necessary precursor to applying the concept of environmental justice to urban areas and to achieving urban equality. The process of urban sprawl changes the physical and political relationship between urban and rural communities, blending them in a way that requires us to expand the definition of “environment”. One of the biggest obstacles to achieving this is that urban inequalities are typically construed as social justice issues, denying the reality of the presence of the environment in the urban landscape. Access to land and resources in an urban context has been placed under the umbrella of social goods, even though rural justice movements in India would characterize them as environmental goods. Injustice in cities like Bangalore is often more glaring than in rural contexts because environmental inputs and outputs occur within a smaller area; society is simply not conditioned to see them as environmentally related. Professor Karen Lucas argues that water, energy, and green space must be construed as more than social goods, in order to establish their existence as part of a greater urban environment. Given that Bangalore is an altered environment, where machinery, pollution, and people have shaped natural processes, social justice issues must be re-construed to fit within a larger environmental justice context.

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72 Williams, 2006.
BANGALORE’S NATURAL-BUILT ENVIRONMENT NEXUS

To contextualize social justice in Bangalore’s environment, in an effort to understand it as environmental justice, it is important to first understand the components of Bangalore’s physical environment. Are the environmental resources that marginalized communities lack access to—namely clean water, air, and open space—inherently natural? In the age of sprawling global cities, urban boundaries are conceptualized as the line where nature ends and where technology begins. Cities are considered constructed, unnatural environments even though they are built from natural resources, produce and receive environmental flows, are the habitats for plants and animals, and have become the chief nodes in the commodification of nature. Bangalore—with its vast parks, lakes, and complex microclimates—is no exception. Nature exists in this city, as it does in every global city, and the way in which we conceptualize its relationship to the built environment has implications for environmental justice.

Agency is a central question in the discussion of the natural and built environments in global cities. I define agency as the capacity of a human or nonhuman entity to act or react to other agents within a larger system. In the traditional understanding of urban development, people are seen as the dominant agents. Human control is something we both crave and lament; the standard western binary sees the city as a controlled built landscape and nature as “wilderness”, lacking human control. We have a long legacy of conceptualizing wilderness as void of human influence, where nature has absolute agency. In many parts of the world and

for much of human history, people have seen nature as dangerous and untamed. New England transcendentalism, which emerged in the mid-nineteenth century with writers like Henry David Thoreau, is a noteworthy reconsideration of the “wild” as something desirable. Those who had access sought peace and respite outside of their urban habitats; trying to reestablish an understanding of a bond with nature they felt mankind had forgotten in its search for independence and success in the New World. However, this new appreciation for the natural world still adhered to the natural-built binary, defining nature as pure and distinct from the built world. The irony here is that both in our efforts to triumph over the untamed wild and to preserve it, we are asserting our power as human agents.

Natural-versus-built and nature-versus-human agency constitute false binaries and are insufficient in understanding the complexities of agency. It is impossible to find a wild environment today that has not been altered by humans. Humans—for subsistence or commercial use—have shaped forests, grasslands, wetlands, and estuaries for thousands of years. In the western United States, many of the forests that have been preserved inside national parks in the last hundred years were – for thousands of years prior – burned on a regular basis by Native Americans. Even the act of preserving our hinterlands blurs the distinction between human and natural agency.

Climate change is a useful way of understanding this complication of the nature-human agency binary. Humans, through their consumption of fossil fuels, are the agents of global climate change. However, there is substantial uncertainty around the ways and degree to which global warming will affect environmental systems. This uncertainty is rooted in the

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fact that nature also has agency. The complexity of agency around the issue of climate change reveals the deficiencies of the nature-human binary. On a local scale, the environmental problems in global cities like Bangalore also cannot be attributed entirely to the actions of people or to the environment.

Many scholars have developed frameworks to describe the relationship between the natural and the built components of cities. Among them, William Cronon, a prominent American environmental historian, looks at the fundamental interconnectedness between city and country and how cities emerge as conduits for the flow of goods and people. He uses “first” (natural) nature and “second” (human-constructed) nature to understand complexity in cities, essentially describing “second nature” as built on and improved “first nature”. But Cronon’s framework, while useful in describing a certain class of cities during the first period of their development, adheres to the natural-built binary and does not acknowledge the intersections and dynamics at play between these two realms. His framework applies less to global cities, whose resource flows become much more layered and complex. Additionally, first and second nature refer to infrastructure rather than people; there is no cultural or social dimension to his analysis, which makes this framework inadequate in analyzing environmental injustice in cities.

Recognizing that people and nature have acted upon all landscapes, scholars have recently developed a new framework to move beyond the natural-built binary: hybridity. Paul Sutter, Mark Fiege, Richard White, and Jenny Price are among those who emphasize hybrid environments over the wild, rural, and urban environments that were once treated as pure types. According to White:

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“Hybrid landscapes demonstrate that the sometimes hysterical arguments that a cultural turn will lead environmental history from its roots in material “nature” (itself a cultural concept) into more and more abstract and ethereal realms is unlikely to be true. Hybrid landscapes strike many as dangerous because they speak to a loss of purity that informed Bill McKibben’s best selling The End of Nature. But hybrid landscapes are where we spend our lives, and, as much to the point, where most wild creatures spend theirs.”78

White argues that “nature” in itself is a cultural construct and that we must be critical about reducing our environments to such simple terms.

In separating ourselves from what is inherently “natural” and refusing to see nature in urban environments, we cannot fully understand or be held accountable for our interactions with the natural world. Sutter argues that both cultures and nature have agency over the evolution of landscapes.79 One example of a hybrid environment is southern Idaho’s largely agricultural Snake River Valley. Fiege’s Irrigated Eden on irrigation in the Snake River Valley describes the complex interplay of human and natural systems in creating a hybrid agricultural landscape. For two hundred years, pioneers developed farms, dams, canals, and invested vast quantities of labor to turning the valley into a productive landscape. But at each step, nature rebounded to threaten the intended agricultural order.80 Today, a richly textured, hybrid landscape composed of inseparable layers of technological and natural forces exists.

The Snake River Valley is only one example where the pure and efficient landscape of our cultural imagination could not be stripped of nature’s agency.

Similarly, urban landscapes, which many see as purely human, are never void of nature. Jenny Price’s writings on nature in Los Angeles help us understand the ways in which nature and culture have interacted to form an indistinguishable hybrid form.\(^{81}\) Price argues that we allow our cities to become polluted, unhealthy environments when we deny nature’s inevitable presence.\(^{82}\) Her writing focuses on the L.A. River, which has borne the negative impacts of a social refusal of nature in the city. She explains,

“(The L.A. River) is the central artery of the major watershed that L.A. inhabits. If we create cities out of nature, not apart from nature, then however a city uses and inhabits its basic natural facts will shape the city profoundly.”\(^{83}\)

Price’s writing evidences that by recognizing the urban and rural as realms along a hybrid natural-built spectrum, we allow space for human-nature interactions to manifest positively.

One problem with hybridity as a framework for analyzing global cities is that it accepts environmental change. This is particularly problematic in rapidly emerging cities where poor people are facing the brunt of negative environmental externalities associated with urban development. For scholars studying hybridity, ecological change is neither good nor bad but neutral; Sutter explains how scholars have a much more nuanced and less absolute understanding of the human-nature relationship.\(^{84}\) This explanation ignores the justice


\(^{82}\) Ibid.

\(^{83}\) Price, 553.

\(^{84}\) Sutter, p. 29.
dimensions of hybrid landscapes because when an environment changes so that it can no longer satisfy the needs of a marginalized group, it is no longer a neutral landscape.

Global cities like Bangalore are hybrid landscapes. Middle-class Bangaloreans consider the loss of parks and lakes in Bangalore as the end of nature in the city, while the loss of urban ecosystems has a profound effect on livability, both for people and for other species, it in no way signifies the end of nature’s agency. Floods, urban heat island effect, rodent infestations, disease – these are just some of the ways in which nature reacts to ecologically insensitive technological development. The relationship between humans and nature is important, and often deleterious. It is brought about by an imbalance of social power, and contributes to environmental injustice. Hybridity does not consider the human experience within changed landscapes and is therefore not conducive to studying environmental justice in global cities like Bangalore. A new analytical framework that builds upon hybridity and also considers justice in the experiences of the urban environment is necessary. Throughout my thesis, I will call this framework the natural-built environment nexus or the NBE nexus. Like hybridity, the NBE nexus recognizes that both humans and nature have agency but also that the nexus of their interlinked processes determines the urban experience.

The NBE nexus is a framework for understanding both the physical space and experiential space where the natural environment and built environment connect. While the NBE nexus does not have its own agency, its existence acknowledges that the agency of both humans and nature interact in complex ways to produce the physical and experiential spaces around us. The physical nexus of the natural and built environments is often more visible than the experiential one. It happens where rain meets the gutter, where cultivated gardens attract

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insects, and where pit latrines produce biogas. Almost everywhere we look, the physical space has been shaped both through human design and natural processes. These hybrid environments showcase the give and take, action and reaction of both humans and nature.

The experiential space within the NBE nexus happens where farmers no longer have access to irrigation water and must make difficult decisions that will affect their economic and social wellbeing, where choosing to earn a wage in the city means living in unsafe, unsanitary, and inadequate housing; or where people endure the local environmental consequences of the social and economic decisions made globally. The experiential space where the natural and built environments meet can be assessed using multiple metrics: cultural, social, ecological, and economic, to name a few. Using these metrics, it is possible to qualify the experience of the NBE nexus for stakeholders with different priorities. The experiential space of the nexus cannot be reduced to a simple binary of “positive” or “negative” because the metrics within which the experience is based are complex. For example, the NBE nexus can be economically positive by incurring few monetary costs and generating profit for one group, but simultaneously have negative ecological impacts and social repercussions for another group. It can be ecologically positive, where humans restore a natural wetland to its “historic” condition, but simultaneously both economically and socially negative, costing money and compromising human habitats. Describing the NBE nexus in positive or negative terms depends largely on one’s position and values.

Many middle-class Bangaloreans would undoubtedly describe the NBE nexus in parts of their city as positive, both culturally and ecologically. Many of Bangalore’s environments produce positive ecosystem gains and reflect historic cultural values. Driving out of the Bangalore International Airport, one can see long stretches of manicured gardens and
rainwater catchment ponds, which cultivates this sense that Bangalore truly is the ‘Garden City’ it was once heralded to be in the nineteenth and twentieth centuries. While the landscaping of Bangalore’s International Airport, as well as that of many of its tech parks and shopping malls is ecologically sustainable, it is in fact built around a model of excess and is only accessible to the elite. Most of the two million people living in poverty in Bangalore do not drive along Airport Road on their way home from a weekend getaway in Goa (India’s vacation state) and most will never see the inside of a mall or tech park. I argue that justice and equity are important metrics to use in qualifying the experiential space of the NBE nexus in Bangalore and other global cities. By narrowing my analysis of Bangalore’s NBE nexus to understand its justice implications, it becomes a useful framework for understanding environmental injustice.

In this thesis, I am particularly concerned with the correlation between ecological degradation and the negative experience of marginalized peoples through the NBE nexus. The NBE nexus can be environmentally degrading and unjust, where marginalized people and other species are forced to live in contaminated, isolated, or otherwise dangerous hybrid environments. Global cities like Bangalore—where corporate profit, luxury lifestyles, and catering to global supply chains are prioritized—often incur an unjust NBE nexus through their development. To hearken back to Rob Nixon’s concept of slow violence, an unjust NBE nexus is often difficult to recognize because its processes are slow (a garbage patch doesn’t fill up overnight) and the people being impacted often lack recognition and avenues for recourse. Especially in Bangalore, where flooding, informal settlements, and garbage fields are often out of sight, the injustice of the NBE nexus is dispersed across space and time and is often not recognized as injustice at all, let alone environmental injustice.
By applying the NBE nexus as an analytical framework to Bangalore, we can better understand the complexities of urban environments in global cities and relate named social injustices, like inadequate sanitation, to environmental problems. The NBE nexus framework allows us to see people and nature as agents and social justice issues as issues inherently of environmental justice. Furthermore, it allows us to characterize a city as either environmentally just or unjust. This enables us to be optimistic about the future of Bangalore and other global cities by imagining ways in which the paradigm of development could be shifted to create a just NBE nexus.

APPROACHING THE STUDY OF BANGALORE

In the following four chapters, I will use the NBE nexus as an analytical framework to understand the environmental injustices inherent in Bangalore and its hinterland. I will begin in Chapter 2 by examining the three major stages of Bangalore’s development and explain how the NBE nexus contained environmental injustices throughout Bangalore’s history. After providing a short environmental history of urban Bangalore, I will transition into Chapter 3 to look at how an unjust NBE nexus in Bangalore’s hinterland is fueling rural-to-urban transition and the growth of the urban underclass. Having analyzed the effects of Bangalore’s development history on the rural environment and the implications of current rural-to-urban transition, I will investigate the environmental injustices experienced by the urban underclass in Bangalore today. In Chapter 4, I will study Ejipura Slum, the most publically acknowledged and contentious site of environmental injustice in the city. In Chapter 5, I will step back to look at global cities, in an effort to identify ways of optimizing the NBE nexus in Bangalore. By examining approaches used in Curitiba, Brazil, Karachi, Pakistan, and
Ahmedabad, India to bring about a positive NBE nexus, I will propose a series of solutions for Ejipura and Bangalore at large.

It is my hope that this thesis will inspire a new way of studying global cities, one that takes issues of justice, environmental degradation, and the importance of the built environment seriously. While Bangalore is unique in its history, culture, and geography, it has a great deal in common with cities around the world that in one way or another, we can all identify with. While the next one hundred pages contain some incredibly depressing and disheartening content, they will also reveal stories of nature’s resilience and the strength of the human spirit. I also hope that wherever you are in the world when you read this, you can recognize the global causes and implications of this omnipresent injustice, the transnational slow violence that is so driven by western consumption and corporate hunger for profit, and manifests in the development of an unjust natural-built environment nexus. These unjust NBE nexuses do not only exist in the Bangalores of the world; environmental injustices are happening in your own backyard, in the neighborhood across the tracks of your hometown, and in the indigenous reservations that border our national parks. Environmental injustice is becoming increasingly endemic as our economies and societies globalize. Concurrently, as our field of relations expands and our world becomes smaller, we have the possibility to learn, grow, and shift the paradigm of development to be more just and sustainable.
CHAPTER 2

An Environmental History of Bangalore

INTRODUCTION

Scholars chronicle the development of cities using a variety of metrics that focus on spatial transformations: changes in architectural style and typology, population density, and land use, to name a few. As the physical footprint of the city expands because of political, social, economic, and environmental pressures, the social and environmental structures respond. Using an environmental lens, I will chronicle the development of a city by tracing the evolution in the relationships between man-made entities and natural processes. It is through this lens that the NBE nexus can been seen, encompassing both the physical spaces where the natural and built environments meet as well as the experiential (social, ecological, economic, and cultural) quality of the two physical spaces.

Like any city, Bangalore is a composition of designed spaces that have evolved within a larger environmental system. The birth of its NBE nexus dates to when indigenous residents concentrated themselves in the southern Deccan Plateau to pursue subsistence opportunities. Over time, with population growth and inflow, uses for the environment changed, and a metropolis emerged. Bangalore’s urban space has served both economic production and social reproduction and because these activities scaled up in a way that did not consider environmental sustainability or human rights, they have generated environmental injustice. As cited in Dolores Hayden’s The Power of Place: Urban Landscapes as Public History, American historian Patricia Nelson Limerick explains,
“Workers, often minority workers, provided the essential labor for urban environmental change, and members of minority groups often absorbed a disproportionate share of environmental impacts… yet environmental history and sociopolitical history have been very separate enterprises.”

Bangalore has a rich and layered history; with humble beginnings, it has become the I.T. center of the world, changing hands multiple times over the last four hundred years. The dominant groups that have shaped the NBE nexus have contributed to the city’s (and its people’s) success. However, to ignore the changes in the NBE nexus over time is to ignore the injustices that have come about as a result of those changes. One cannot tell the complete story of Bangalore without considering its people and environment.

Urban social historians such as Janaki Nair, H.S. Sudhira, and Narendar Pani typically narrate Bangalore’s history through the lenses of politics and economics, barely scratching the surface of the role nature had in shaping the city’s NBE nexus. In Bangaluru, Bangalore, Bangaluru, Narendar Pani examines the social identity and urban imaginations—collective psyche and interpretation—among dominant groups at different points in the city’s history. As new groups assumed power in the city, the imaginations of the city’s past has changed. While Pani’s analysis sheds light on the priorities of those shaping the NBE nexus, he ignores many of the social and environmental externalities associated with economic development.

In their historic analyses, Nair and Sudhira are slightly more skeptical of Bangalore’s advancing economy and criticize its political system, which fails to address the social externalities of development. Nair discusses the weakening of the city’s urban fabric as

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87 Narendar Pani, p. 10.
development has flourished with “the promise of a metropolis.”

Sudhira challenges assertions of Bangalore representing the ideal global city. He argues that over the twentieth century it failed to systematically address governance and infrastructure problems. In these historical approaches, the importance of ‘place’ in Bangalore is well articulated, as is the palpable social inequality that has both resulted from and fed development through Bangalore’s history. However, Nair and Sudhira undervalue the environmental externalities of development and their correlation with social justice issues. They fail to recognize how those injustices are rooted in place and in the lack of access to natural resources.

Whether scholars sensationalize the folklore of Bangalore’s humble beginnings, cast British interventions in the city’s organization as much-needed progress, or herald Bangalore’s liberalized economic growth as a sign of freedom and global progress, one thing is always underplayed: the relationship between the natural and built environment and the role it had in shaping peoples’ unequal urban experience. From feudal dynasties to imperialist occupation to multinational corporate ownership, the politics and economics of Bangalore’s development in the context of broader India has shaped the histories told of it. In this chapter, I will reexamine the three major stages of Bangalore’s urban growth and explain how the NBE nexus is inherently environmentally unjust. With each stage, I will examine the analyses of historians like Nair, Sudhira, and Pani to reconsider economics, politics, and social imagination in the context of environmental transformation. I will also consider who experiences the positive outcomes of environmental transformation and who is faced with environmental injustice.

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A CASE FOR ENVIRONMENTAL HISTORIOGRAPHY

Exploring the environmental history of Bangalore takes its obvious complex of social injustices and connects it to larger theories of urban environmentalism. A long precedent in environmental historiography examines the connections between urban and rural activity as a way of understanding urban growth. William Cronon’s book, *Nature’s Metropolis*, is an example of this type of analysis: the rise of Chicago is explained in terms of environmental inputs and outputs, which links the city to its hinterland. While this model of environmental historiography is useful and will be deployed later on in Chapter 3, it does not address the environmental inequalities that are inherent in any type of landscape where environments are commodified.

In my analysis of the environmental justice framework and its applicability to the case of Bangalore in Chapter 1, I explained the value in marrying environmentalism with the social justice movement. Extending environmentalism to consider the way race and class are spatially determined is essential to fully understanding the causes and consequences of environmental degradation. In the same way, as I begin to weave an alternative story of Bangalore, the environmental history of the city must be married to its social history. This amended framework will help explain how the NBE nexus came about and shaped peoples’ experiences in unequal ways.

While most urban environmental histories do not focus on injustice, Andrew Hurley’s, *Environmental Inequalities*, is one book that does. Hurley uses Gary, Indiana, one of the most polluted cities in the United States, to demonstrate how divisions of race, class, and other social typologies were instrumental in creating patterns of environmental inequality in recent
urban history. Hurley considers the environment as contested terrain, where industries vie with residents and policy makers to achieve their respective goals. In Gary, steel production flourished through the first half of the twentieth century, as it encountered little opposition in setting the city’s environmental priorities. Gary’s political system was run by middle- and upper class white men who saw no negative impacts in giving industry privileged access to urban land and condoning heavy air and water pollution.

In the 1950s and 1960s, with the second Great Migration of African Americans into Northern cities, the restructuring of the environmental movement to consider health and pollution, and the Civil Rights Movement at its apex, the conversation in Gary changed drastically. Increasing numbers of low-income African Americans were moving into Gary to work in the steel mill industry. They lived in the most polluted parts of town and were consequentially exposed to higher levels of toxins at home and at work. At the same time, blue-collar whites were moving into suburbs, away from the pollution around the steel mills. Hurley examines the three strains of environmentalism that emerged from these industrial and residential shifts. He looks in turn at the white middle class that wanted to protect social amenities and suburban neighborhoods, the white working class that focused on pollution as a product of corporate exploitation in the workplace, and the African American community that recognized the racial inequalities that underpinned pollution in their workplaces and their homes. These three groups all viewed environmentalism – and consequentially activism – differently, as each group experienced the effects of pollution in Gary in a different way. White environmental groups had more political power while African American groups had the force of the Civil Rights Movement behind them. The conversations that emerged eventually led to restrictions on air and water pollution from the steel mills.
After analyzing the different environmental perspectives and their interactions, Hurley examines the unexpected outcomes of environmental activism in Gary in the social landscape that emerged in 1980. Restrictions on air and water pollution led to increased land pollution, as mills began putting toxic waste in landfills. The transfer of pollution from one channel to another meant increased environmental injustice, as the landfills were concentrated in low-income African American neighborhoods. Hurley ends with the grim conclusion that, “By 1980, the distribution of environmental burdens starkly mirrored divisions of race and class.”

Because the three activist groups approached the issue of pollution in such different ways, with white interest groups not understanding the inequalities of environmental exposure that correlated with race and class, local campaigning was not all that effective. It was public policy on the federal level (the Clean Air Act, 1970 and the Clean Water Act, 1972) that contributed to the gradual improvement of Gary’s air and water.

Looking at Gary’s history through an environmental lens allows us to see patterns of exclusion, marginalization, and destructive environmental habits that were incomplete with only the traditional sociopolitical narrative. The same is true for Bangalore. In examining the history of Bangalore through an environmental-social lens, the injustice in access to environmental amenities and exposure to pollution becomes incredibly important. There are many parallels between the narrative Hurley weaves and the one I am about to tell. The influx of low-income African American migrants, mostly from rural areas, is similar to the rural-to-urban transition of low-caste village laborers that fueled Bangalore’s economic growth. In both cases, the groups moved into the city and entered the labor force assuming the most menial jobs. They ended up living and working in the least desirable urban spaces, with

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Building off of and reinterpreting the historical narratives told by Nair, Sudhira, Benjamin, and others to reflect the central role nature had in Bangalore’s development, to be more in line Hurley’s approach, will strengthen our understanding of the city’s unjust NBE nexus today.

AN ENVIRONMENTAL HISTORY OF BANGALORE: PRE-DEVELOPMENT

It would be difficult to weave a compelling environmental history of a city without first understanding the natural environment from which it emerged. The southern Deccan Plateau on which Bangalore now lies looked much different in the sixteenth century. Today, vast areas of the plateau serve as grazing and farmland and corporate-owned areas are planted with eucalyptus (deforestation and changes in Bangalore’s hinterland will be discussed more in Chapter 3). Geographers described the southern Deccan Plateau as a trapezoidal high ground framed by the Vindhya Mountains to the north, the Eastern and Western Ghats that parallel the two coasts, and the Nilgiri Hills to the south (see Figure 4). The first English depictions of the landscape were written in the early 1600s by European travelers to the region. While I am using their observations to paint a picture of the pre-Bangalorean landscape, it is important to understand their bias in approaching a new and exotic environment with people that Western Europeans considered to be savage.

“We traversed those tremendous mountain-passes [of the Western Ghats]…winding upwards among immense rocks and precipices…at one time completely overshadowed

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by dark groves of teak-trees, and at another…[passing] beside impenetrable jungles, the habitation of jackals and tigers…[then] the landscape dramatically opened up to vast flatlands on which a sprinkling of small settlements were faintly distinguishable.”92

The vegetation of the plateau was and is still highly influenced by climate. The tall Western Ghats intercept moisture from the southwest monsoon, preventing the center of the plateau from receiving significant rainfall (annual rainfall historically ranges from 90-150 cm).93 Soils would have been shallow and rocky and dry deciduous teak and sandalwood forests would have transitioned into thorn scrub towards the (drier) Eastern Ghats.

There is no data on the exact population demographics of the region around pre-Bangalore. However, we know that many South Indian castes were semi-nomadic and herded livestock across the great plateau.94 Other castes practiced subsistence living in small villages, cultivating finger millet, legumes, and vegetables.95 Archeological evidence shows that many great dynasties ruled over the Deccan Plateau since the first century AD.96 Burial mounds, weapons, and relief sculptures found across Karnataka reveal the presence of South India’s earliest empires: the Satavahana, Kadamba, and Chalukya.97 Dynastic chieftains managed small kingdoms on the plateau, in a system that the British initially mistook for European feudalism.98 While kings ruled supreme, villages and nomadic groups were autonomous; their

93 WWF Homepage (2013), Web.
94 Christopher V. Hill, South Asia: An Environmental History (ABC-CLIO, 2008).
95 Ibid.
96 M. Fazlul Hasan, Bangalore Through the Centuries (Historical Publications, 1970).
Figure 3. Map showing the distribution of GaWC-ranked global cities. Source: ‘The World According to GaWC’, ed. by WikiProject Maps (Wikimedia Commons, 2013), Web.

use and management of their natural resources was not controlled by the ruling caste. Small populations and community-managed resource use kept resource exploitation minimal through the sixteenth and seventeenth centuries.

The earliest histories of Bangalore rely on myth, which detracts from our understanding of how the environment largely determined the city’s inception. Its founding is widely credited to a Hoysala King, Veera Ballala, who lost his way in the area of present-day Bangalore on a hunting trip in 1120 AD. As the story goes, he fortuitously met an old woman in the forest who took him in and fed him boiled beans. As a token of gratitude, King Veera Ballala vowed to return and transform this woman’s village into a great town: Benda Kaluru, meaning ‘town of boiled beans’. According to Professor Suryana Kamath, this folktale has no historic evidence and it is more likely that ‘Bangalore’ was named after a culturally significant tree, ‘benga’ or Indian Kino Tree. The large deciduous tree was once prolific in the southern Deccan Plateau and had many significant medicinal uses: for diabetes, dysentery, and inflammation. This naming is significant in the context of the pre-Bangalore NBE nexus because it shows peoples’ traditional uses for and deep appreciation of their natural environment (although the fact that Bangalore’s traditional meaning is no longer popularly acknowledged suggests a lack of environmental literacy).

AN ENVIRONMENTAL HISTORY OF BANGALORE: THE PETAH (1537-1857)

Although the NBE nexus existed as far back as people inhabited the Deccan Plateau, the construction of the Petah (walled village with an adjoining fort) in 1537 was the first time the

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NBE nexus was unjust. In his account of Bangalore’s beginnings, Narendar Pani explains that the Petah was built primarily to serve the political interests of the Vijayanagara Empire (see Figure 5). At the time, chieftains across South India were scattered and the Vijayanagara hoped to consolidate their distributed power and overtake the Gangaraja Empire. While Narendar Pani and others name military power as the driving reason for territorial acquisition, control of natural resources and land ownership were arguably the underlying drivers.

Kempe Gowda, a chieftain leading the campaign against Gangaraja in the southern Deccan Plateau, located the Petah so as to take advantage of the area’s favorable environmental conditions and resources. While much of the Deccan Plateau was dry and lacked stable sources of water, the area on which Bangalore now sits boasted several large lakes. Often believed to be natural today, the lakes were actually manmade agricultural tanks built by farmers prior to the construction of the Petah, who needed a stable water source during the dry season. The site was on high ground, which was ideal for the military, and networks of natural resource trade with Mysore (to the south) were already well established.

Perhaps most important was the site’s proximity to salt, gold, copper, iron ore, and sand deposits. The earliest British cartographers observed huge tracts of sabboo, red salts, deposited in the Chitaldrug Hills northwest of Bangalore. Dr. Heyne, quoted in “Non-Gem Minerals in Pre-Modern India”, described seeing villagers recover the resource through a process of lixiviation and evaporation and found it sold in most village markets, including in the Petah, at the turn of the eighteenth century. The Vijayanagara Empire also craved sovereignty over the gold fields in Kolar, the hills northeast of Bangalore. Today, these gold

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mines account for almost 84% of India’s annual gold extraction; the gold fields are vast and Kempe Gowda recognized their economic potential. Copper and iron ore were also important metal deposits throughout the southern Deccan Plateau and have been found in temples and artifacts as early as the second century, CE. Additionally, sand mines and clay from lakebeds and steppes of the Western Ghats were abundant and easily extractable natural resources, simplifying the construction of the Petah. Dynasties had been using these natural resources for centuries but the growth of their economies through them was limited by their technological incapacity to access subterranean deposits. Still, control over resource-rich sites was politically strategic and Kempe Gowda under the Vijayanagara Empire knew the location of the Petah would secure his jurisdiction over the deposits.

City planning since Bangalore’s inception established exclusivity and hierarchical access to resources, as evident in the design of the Petah. The village was approximately three miles in circumference and protected by a mud wall, a deep belt of thorn and cactus, and a small ditch (see Figure 6). Two main roads transected it, providing four points of entry to the outside network of smaller settlements, forests, shrines, and fields. The oval stone military fort to the south was smaller, with 26 towers placed at intervals along the rampart (see Figure 7). Military personal and the ruling class resided in the smaller fort and all tradesmen, priests, and peasants lived in the walled village, separated by caste into dense neighborhoods. Drawings depict one central water tank between the village and the fort,

106 Ibid.
Figure 5. The extent of the Vijayanagara Empire, which ruled South India from 1336-1646. Source: 'Vijayanagara Empire Map', ed. by WikiProject India Maps (Wikimedia Commons, 2007), Web.

Figure 6. Plan of Bangalore taken by the English Army under the command of the Earl Cornwallis March 22 1791. Source: Robert Home, ‘The Fort of Bangalore’, (British Library, 1790), Web.
which all Bangaloreans would have had access to (see Figure 8). An intricate system of canals drew water from surrounding tanks into the settlement. The walls of the Petah enclosed this resource, denying access to those outside the settlement. The organized plan of the Petah reveals the desire even then for human control of the NBE nexus and the inequality it spurred.

The Petah was never expected to develop into a large city, in part because it was far from Mysore and coastal ports, so it remained something of a backwater for the following two centuries. It was not until the Mughal General Hyder Ali and his son Tipu Sultan deposed the ruling Wodeyar Dynasty and assumed power of Mysore Kingdom in 1760 that the Petah was rediscovered as a conduit for economic growth (see Figure 9). Tipu Sultan saw potential in Bangalore’s hinterland to increase extraction and agricultural production. Under Mughal rule, Bangalore and its hinterland became connected to an international system of trade with Western Europe and East Asia. Gold and copper were its primary exports, creating substantial wealth for the ruling class. Soon, the Petah became a commercial capital in South India, although population growth stayed contained within the walls of the village.

In addition to extracting natural resources from Bangalore’s hinterland, Hyder Ali and Tipu Sultan shaped the natural environment around the Petah to execute their vision for control and stability. In 1760, the royal family built Lal Bagh directly south of the walled fort, 45 acres of private gardens exclusively for the king’s enjoyment and spiritual retreat (see Figure 10). Based on the design principals of the Mughal gardens that were gaining popularity at the time, Lal Bagh represented the idea of earthly paradise (see Figure 11). The garden

112 De, p. 67.
Figure 7. The south entrance to the fort inside the city of Bangalore. Originally constructed in the sixteenth century out of mud-bricks, the fort was rebuilt in stone by Hyder Ali in 1761. Source: James Hunter, 'The South Entrance into Bangalore Fort', (British Library, 1804), Web.

Figure 8. View of the fort from the Petah with the community tank in the bottom right; watercolor, 1790. Source: Robert Home, 'The Fort of Bangalore', (British Library, 1790), Web.
Figure 9. Bangalore was the center of the Mysore Kingdom at the end of the eighteenth century. 
*Source:* James Rennell, 'Map of Mysore', (British Museum, 1772), Web.
was enclosed by a tall mud wall and incorporated imported trees to shade paths from the sun. A complex underground irrigation system fed the collection of exotic plants and diverted water to central fountains.\textsuperscript{116} This garden earmarked parts of the urban environment for the upper castes. Its rectilinear geometry and contrived composition of rare plants showcased Tipu Sultan’s command over the natural environment.

As the Mughal Empire was expanding across the Deccan Plateau, Great Britain, a distant but powerful island nation, was carrying out far more dramatic conquests in Australia, North America, and the Orient. A key driver of Britain’s imperialist ventures was its desire for domination of people and natural resources.\textsuperscript{117} Guided by entrepreneurial spirit and a complex of paternalism and prejudice, the British (along with the Portuguese and the French) sought to make India’s wilderness productive, as God wished.\textsuperscript{118} Historians are quick to point out that the British were the last of many imperial powers to have a hand in the management and mismanagement of India’s environment. The Aryans, Persians, Macedonians, Mauryans, Cholas, Hoysalas, Mysoreans, and Mughals are just some of the empires that shaped and re-shaped the Indian NBE nexus. Some of these colonists did exploit the natural environment, but at a scale that had hardly any consequence. Most rulers in India’s history also practiced laissez-faire feudalism, allowing communities like those on the Deccan Plateau to maintain their local cultures. British imperialists did not follow this model of colonization because they respected neither India’s people nor its environment.\textsuperscript{119} Beginning in the early eighteenth

\textsuperscript{116} Ibid.
\textsuperscript{118} Grove, Op. cit.
century, merchants and militias poured onto the continent, guided by an ethic that saw people and nature merely as commodities.

Anuradha Mathur and Dilip da Cunha are arguably the only scholars who recognize the central role of environmental literacy in the East India Trading Company’s occupation of Bangalore. By the late eighteenth century, the Company had been active in the sub-continent for almost one hundred years. British imperialists rarely ventured into the interior, in part because of the Eastern and Western Ghats blockading their passage and also because tradesmen assumed that only port cities were ‘rich in treasure’. But new knowledge in the mid-1750s of gold, copper, and other valuable natural resources on the southern Deccan Plateau beckoned them in. Mathur and da Cunha explain that suddenly, understanding and gaining control of the interior became a political strategy for the Company to defeat Tipu Sultan and gain ultimate control over South India’s natural bounty. Mapmakers began to survey the Deccan Plateau, relaying important information about its terrain and natural resources to the Company, in preparation for its conquest. After three attempts at capturing Bangalore in the Anglo-Mysore Wars, Lord Cornwallis overthrew Tipu Sultan on March 7, 1791, changing the fate of the NBE nexus forever.

COLONIAL LEGACY ON BANGALORE’S PEOPLE AND ENVIRONMENT (1791-1947)

It would be inaccurate to say that histories describing British colonization of Bangalore have entirely ignored the role of nature; British accounts of their arrival in Bangalore are satiated

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121 Ibid.
with depictions of Bangalore’s “mild and salacious climate.” Yet with the exception of acknowledging Bangalore’s climate as a wonderful perk of establishing a base in the city, the natural environment is hardly talked of in the histories of British colonization. Nair, Kaika, and Mathur address the changes in the Bangalore’s built environment during colonization; in the way British architecture and urban planning affected social structures and patterns of exclusion. Under the British, the NBE nexus changed. The British intended to use their control over the NBE nexus to bring about order and establish a social hierarchy.

With the defeat of Tipu Sultan, the British became the foremost power in South India and Bangalore – because of its economically promising environment – became their ‘capital’. They reinstated the Wodeyar kings, rulers from a past dynasty, as the puppet government for the British Empire and tore down the mud walls of the Petah to take full control over the city. However, the British would never live in the old part of the city, as it was far too primitive, organic, and close to the “natives”. They chose an area to the east of the old city, separated by a large strip of land on which they cultivated parks and orchards, to build the Cantonment. According to Maya Jayapal,

“The origin of the word ‘Cantonment’ is from the French canton, meaning corner or district. It has become, through usage, an Anglo-Indian word and is applied to military stations in India, built usually on a plan, which was originally that of a standing camp. Each cantonment is a clearly demarcated unit of territory set apart for the quartering and administering of troops”.

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124 Maya Jayapal, p. 11
The site they chose to develop was ideal, as engineers had constructed a system of water tanks to irrigate farmland around the Petah. The area was also flat and therefore more conducive to organized development than the site of the old city.

The removal of the Petah’s walls was a pivotal moment in the NBE nexus as growth outwards began in an unplanned fashion, with high-density, mixed use neighborhoods concentrated around vital lifelines: the water tanks. The influx of British soldiers, missionaries, and gentiles put pressure on Bangalore’s hinterland, upping agricultural production and resource extraction, and drawing more people into the city to support the growing economy. The population of the city doubled over the next fifty years, growing to be 142,513 people by 1861.\textsuperscript{125} While they often worked in or indirectly served the Cantonment, most migrants lived in the old city. Uday Vagale described the old city as a pedestrian precinct:

“The streets and squares formed outdoor rooms where people performed their daily chores. They were channels of communication and interaction, which held the city together. Where two streets intersected they opened up to form temple or market squares and these acted as nodes. The [old] city itself was divided into districts based on trade and caste each having a unique character.”\textsuperscript{126}

In the old city, urban development was largely organized around existing facets of the NBE nexus such as tanks. This model of development was less planned and gave nature more agency because the built environment responded to the limits defined by the natural environment. Because new buildings were not integrated into a larger urban plan, their sites,

\textsuperscript{125} M. Fazlul Hasan, \textit{Bangalore through the Centuries} (Historical Publications, 1970).
\textsuperscript{126} Vagale, p. 37.
material components, and programs were chosen based on the availability of undeveloped spaces and natural resources (see Figure 12). In many ways this type of development was ideal, as it put less pressure on natural processes in the city and its hinterland. But lack of urban planning would eventually make it harder for the old city to adapt to new technologies, like automobiles. In this process, an opportunity to shape social ideals (of green space, equal access to resources, etc.) in the physical space was lost.

In contrast with the organic and unplanned growth of the old city, the British used city planning as a way to establish order and social hierarchies, and tame nature (see Figure 13). While the streets running through the Petah were narrow and meandering, the Cantonment developed with wide tree-lined avenues and spacious bungalows. Large campuses for British institutions, industry, military grounds, and government buildings sprawled across the Cantonment’s landscape, with parks connecting them to residential areas.127 These spaces were developed purely for the benefit of British colonists, turning the Cantonment into an exclusive urban retreat that was distinct from the old city.128 According to Sastry, this archaic urban vision established a leapfrog and infill pattern of development, preventing the city from expanding properly.129 While the economic effects of this type of planning are well understood by historians, the social justice and environmental implications are less apparent. In fact, many people credit the planners of the British Cantonment with providing the city ‘much-needed lungs’ and ‘increasing property values’,130 ignoring the fact that these aesthetic

128 Da Cunha, p. 80.
Figure 11. The gate into Lal Bagh, the royal retreat built by Hyder Ali and Tipu Sultan, who stocked it with many rare and exotic varieties of plants and trees brought from Persia, Afghanistan and France. *Source:* James Hunter, 'Garden Gate, Lal Bagh', (British Library, 1804), Web.

Figure 12. The old city, circa 1870. *Source:* 'Shivaji Nagar', (British Library, 1890), Web.
Figure 13. Map showing the parks and zones within the Cantonment and the expansion of the Petah in the bottom left. *Source:* 'Bangalore Map', ed. by WikiProject Maps (Wikimedia Commons, 1924), Web.
advancements came with forced evictions and the slow removal of Bangalore’s vast system of storage-water tanks.

Scholars of British South India do not recognize the environmental injustices the British Cantonment produced; the depletion of water tanks and privatization of urban green spaces are two environmental injustices of imperialist NBE nexus. Water tanks, as described earlier, were important cultural features of the old city. In the wet season, they provided residents with a place to do their washing, collect drinking water, and feed livestock. When the water level sank, they harvested clay and silt, which they used for building, vessels, and fertilizer. During the dry seasons, they served as informal gathering places and when the rains came, they provided residents with a place to do their washing, collect drinking water, and feed livestock. According to Anuradha Mathur, these tank systems were too complex for the NBE nexus within the British Cantonment so houses, stadiums, depots, and lakes slowly replaced them. This rejection of important natural features in Bangalore for technological and designed environments created environmental injustice.

As both formal and cultural boundaries emerged around and replaced tanks and surrounding open spaces, poorer residents in the city faced challenges in accessing water and disposing of waste. The British implemented a system of water pipes across the Cantonment to supply freshwater and remove sewage from households that could afford plumbing. However, unplanned areas that emerged as part of the leapfrog and infill pattern of development left much of Bangalore, particularly in the old city, without proper drainage for

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132 Ibid.
As a result of unequal prioritization in urban planning, Bangalore as a whole became more susceptible to disease; in 1898, the Bubonic Plague swept through both the old city and the Cantonment, killing thousands of people. According to the Plague Commission Report released in 1899, almost twice as many people died in the old city than in the Cantonment; 6,058 deaths in old city (where all victims were poor Indians) compared to 3,321 deaths in the Cantonment (where a majority of the victims were British). This data speaks to the injustice present within NBE nexus of the imperialist era.

The Cantonment and old city grew side-by-side for over one hundred and fifty years, adhering to different paradigms of urban development and remaining culturally and politically distinct. Eventually, the visible inequality between the British and elite Indians and the common people sparked collective resistance against British institutions and companies. The feeling in Bangalore was echoed throughout India and led to the independence movement.

POST-INDEPENDENCE URBAN DEVELOPMENT (1947-PRESENT)

Scholars consider the post-independence era as a new chapter in Bangalore’s history because of the political, economic, and physical changes that took place. It was also a new chapter for the NBE nexus. Bangalore’s urban boundary was largely kept in check during British occupation because the British restricted Indian-owned industry. The emphasis on cash crops and the exportation of many of the hinterland’s natural resources resulted in a loss of self-sufficiency for villagers outside of the city and food insecurity among Bangalore’s urban poor.

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in the late 1800s. The British had never allowed Bangalore’s economy to bloom outside their jurisdiction, thus keeping population relatively stable during the last hundred years of their occupation.

It was not until after independence in 1947, when Bangalore became the state capital, that economic (and consequentially physical) growth became unobstructed. In 1900, there were 228,000 people living within the urban boundary. By 1951 there were 991,000 people and Bangalore had become the sixth largest city in India. The economy boomed and the city became the national center of textile, machinery, and electrical equipment industry and was the home of state administration, universities and institutions. Working-class laborers were desperately needed to run factories and serve the middle- and upper-classes who were leading the economic changes. Many people in scheduled castes and tribes (identified as the lowest castes) from Northern Karnataka, Tamil Nadu, and Andhra Pradesh entered Bangalore to find work in the formal or informal sector. Faced with housing shortages, the number of people living in informal settlements began to grow rapidly.

As Bangalore redefined itself spatially after years of an oppressive imperialist regime, an interesting mixture of imperialist and nationalist ideology shaped its NBE nexus. Just as the British had held a tight grip on the development of the Cantonment, the post-independence municipal government assumed all the power in city planning decisions. Architecturally, many of the British Garden City ideals continued to inform development. Wide boulevards, leapfrog and infill patterned development, and a conflicted sense of public architectural style characterized late-twentieth century urban growth (see Figure 15). Janaki Nair notes that,

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138 Ibid.
Figure 14. Government buildings like this one in the Cantonment consumed vast areas of land in the city’s center. *Source: 'The Public Offices, Bangalore',* (British Library, 1890), Web.

Figure 15. Open Town Hall Circle showcases a mixture of modernist- and colonialist-style buildings. *Source: 'Town Hall',* (Discover Bangalore, 1950), Web.
“A markedly nationalist aesthetic has over time given way to an aesthetic founded on an ideal of beauty that nostalgically recalls the colonial period while incorporating modern monumentalism.”  

The Vidhana Soudha, Karnataka’s state house, and the Visvesvaraya Towers, a corporate trade center, epitomize this tension between imperialist nostalgia and modernism. The Vidhana Soudha was built in 1952 to house the Karnataka state legislature and recalls the Greco-Roman influence of the British colonists (see Figure 16). The Visvesvaraya Tower on the other hand is a modernist concrete structure, entirely devoid of cultural features, and promotes the ideal of Bangalore’s economic rise to power (see Figure 17). The search for spatial identity as evidenced by these buildings was happening within Bangalore’s most elite circles. As the country’s wealthiest citizens poured into the city to buy up old British bungalows and acquire stock in its emerging markets, more working-class people were needed as laborers. Even with an obvious need for more affordable housing and prioritization of economically weaker sections, I have found no publications highlighting governmental initiatives to create just experiences for the urban poor. The lack of accountability to and recognition of economically weaker sections in this phase of Bangalore’s development indicates the fundamental injustice of its NBE nexus.

The large, self-contained, high-tech and industrial parks that sprung up around the city in the late twentieth century encapsulate the change in the NBE nexus. While these massive parks symbolize modernist ideals, they still adhere to the leapfrog and infill pattern of

140 Ibid.
141 Ibid.
Figure 16. Vidhana Souda, home of Bangalore’s state legislature. Source: Priyanka Varma, 'Vidhana Soudha - Bangalore's Architectural Beauty', (Bangalore Captured, 2001), Web.

Figure 17. Visvesvaraya Tower in Vasanth Nagar, Bangalore. Source: Raghu Veer, 'Sir M Visvesvaraya Tower Bangalore', (Panoramio, 2013), Web.
development that was institutionalized during British colonization. Dozens of tech parks are scattered around the city, each with a massive footprint (of up to 110-acres) within Bangalore’s urban boundary. Operating under the model of “work-live-play”, almost all tech parks offer office spaces, residential condominiums, malls, parks, and other built amenities. Buildings are constructed unsustainably out of glass, steel, and concrete and draw huge amounts of power from the city’s overstressed energy grid (see Figure 18). Access to these spaces is restricted to those living and working on the premises; therein lies the injustice. Massive tracks of open space, water, and other environmental amenities are blocked off and consumed by Bangalore’s elite at the expense of communities living on the site before and all those who live around it. Despite these social and environmental ramifications, the city continues to pipeline the tech park developments because they earn over 20 times more money through multinational corporate investors than through annual property taxes.

CONCLUSION

In the last several years, sociologists and urban theorists have attempted to understand the political and social ramifications of economic and urban growth in the mid- to late twentieth century. Heitzman has credited the growth of Bangalore with the emergence of the information society, often overlooking in his analysis the social and environmental

145 Ibid.
146 Ibid.
Figure 18. Oracle India Pvt. Ltd., Kalyani Magnum Infotech Park Office is a newly constructed software company in JP Nagar, Bangalore. Source: Joydeep Bhattacharya, 'Infotech Park Office', (Oracle India Pvt. Ltd., 2013), Web.
externalities the industry has had. He highlights economic liberalization of India in 1991 as a key turning point in the urban experience, as multinational corporations rushed to set up base in the city. By the end of the twentieth century, Bangalore had firmly established itself as the Silicon Valley of Asia, bringing prosperity to South India. This influx of global capital is touted to have brought incredible advancements to the urban landscape and culture of Bangalore. A new international airport, skyscrapers, top-notch bar scene, and the popularization of Karnataka culture (including jasmine wreaths, bharatanatayam dance, and classical music) on a global scale are just some of the named benefits of rapid globalization and growth of the city over the last twenty years. However, this paradigm of urban growth, particularly since 1991, has had severe consequences for marginalized people who are more vulnerable to the changes in Bangalore’s urban and rural environments.

Bangalore’s history is complex and the environmental injustices that emerged through different eras and degrees of environmental exploitation are difficult to depict in full. The legacies left by different elite groups – in the form of buildings, parks, and economic practices – have informed Bangalore’s NBE nexus today. In Chapter 4, I will use this framework to examine Ejipura, a public-housing-site-turned-informal-settlement in the city’s southeast. The need for public housing for economically weaker sections emerged after economic liberalization in 1991, when an influx of people from Bangalore’s hinterland put pressure on urban infrastructure. To understand why people are being forced from villages into Bangalore, it is important to analyze the ways in which Bangalore’s development has shaped the NBE nexus of its hinterland. Chapter 3 will examine the history of Bangalore’s hinterland, as it changed through each phase of the city’s growth. I will address rural environmental push

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148 Ibid.
factors, which are a crucial component in analyzing the complexity around rural-to-urban transition.
INTRODUCTION

“The soul of India lives in its villages.”

—Mahatma Gandhi149

Almost everyone I’ve met in India can trace his heritage back to a village. Even if a man has spent his entire life in a high-rise apartment in Bangalore, he will still identify a place in rural India where his parents or grandparents or second cousins reside, which is naturally his ‘ganv’ (town or hometown), as well. The relationship that the upper- and middle-class members of Bangalorean society have to the village in abstract terms is indicative of the rapidly evolving nature of the city with respect to its hinterland. These people dream of weekend escapes from the hustle and bustle of urban life. They seek solace in the fresh air of their extended families’ farms and the seeming simplicity of village culture. The romanticizing of village life has a long history in India, which is dually a case for its preservation and allows society to turn a blind eye to the environmental injustices present within its NBE nexus.

Leaving Bangalore’s city limits to experience village culture is no easy feat these days. As an intern at Global Citizens for Sustainable Development in Visthar, a neighborhood five miles from Bangalore’s central business district, I had to commute three hours every week to our rural school in Kallinaikanahalli, a village only thirty miles north of the city. Just to get to the bus that would take me out of the city, I had to take two or three city buses. If I wasn’t lucky enough to be picked up by the 293-B or 295-A buses, which passed irregularly by my

apartment building, I had to walk 1.5 miles to get to the Guppi Cross bus stop and wait for the 414 Bus. Waiting could take between five and thirty minutes, depending on congestion in the inner city, where the bus originated. Bus 414 would then transport me to Nagawara Junction, where I would hop on the 500 Bus, which circumnavigated Bangalore on Outer Ring Road. After twenty minutes, I would get off at the junction of Bellary Road and walk along the edge of the highway to the informal Hebbal Bus Stop. I would look for a red bus with white Kannada lettering on it and floral garlands hanging in the window. For a mere 90 rupees ($1.50), this bus would drive the remaining two hours it took to go the thirty miles to Kallinaikanahalli.

Travelling north from Hebbal Bus Stop on Bellary Road was a like comprehensive historical tour of Bangalore’s urban sprawl over the last twenty years. As soon as we crossed Outer Ring Road, the original city lines, we would pass by block after block of sprawling concrete housing layouts. As we travelled farther north, they spread apart and began to look more luxurious. Then we drove through Yelahanka, the first of the satellite towns that uncannily resemble Ebenezer Howard’s ‘Garden City’ utopian plan. The next ten miles covered a jumble of eucalyptus plantations, modernized villages, and lavish apartment buildings. At mile 19, Doddaballapur was the last peri-urban town we passed through. After that, the road became more sinuous and the landscape opened to a view of the Deccan Plateau. Aside from the infrequent patches of eucalyptus trees, the landscape has been widely deforested; fields fade into rocky hillsides for as far as the eye could see. As we continued driving, the gated properties of companies like Monsanto and Synefra Engineering came into view. The presence of companies like these explained the newly paved road we were driving on; money is being poured into rural infrastructure to support development initiatives.
The TCW ACC Cement factory was my landmark queue for getting off the bus. I had reached Thondebhavi, the village and bus stop just a mile north of Kallinaikanahalli. Usually a staff member at the school would pick me up and drive me the rest of the way. The side road that leads to Kallinaikanahalli is not even on the map; nevertheless it serves as the main artery for this three-hundred-person village. Smiling children would rush up to our motorbike to shake my hand and mothers washing clothes on the steps of their shacks would look up at me inquisitively. We would drive past men herding sheep and carting fresh produce, then past agricultural laborers in the fields behind the village until we finally reached the school. While I was always excited to be back in Kallinaikanahalli, I couldn’t imagine how city-dwellers could romanticize it as a place of peace and simplicity. The politics between companies, the government, and villagers, as well as the villagers’ struggle for everyday subsistence was palpable in the cultural landscape of Kallinaikanahalli. Furthermore, the environment of this village and others has been visibly degraded to support Bangalore’s emerging economy and expanding development. How has the village responded to Bangalore’s urban growth over the years and to what extent are environmental injustices impacting the rural poor in places like Kallinaikanahalli?

The relationship between Bangalore and the villages in its hinterland has always been critical in fueling the city’s urban growth. People of the hinterland supplied Bangaloreans with food, labor, and natural resources at a relatively constant rate since the city was founded in 1537.150 The city and its hinterland were physically and culturally distinct until recent years when industry began to sprawl beyond the city limits. This blurred the distinction between urban and rural, and drew villagers into city life with the promise of jobs, secure housing, and

cultural resources. Nature is a significant actor in the rural-to-urban transition that fuels the growth of the urban underclass. The rural poor increasingly loses sovereignty over ancestral lands, faces depleting resource stocks, and struggles to adapt to climate change; natural processes that are both attributed to and feedback loops in Bangalore’s NBE nexus. This chapter will examine the evolving relationship between the city and its hinterland to contextualize the discussion of urban environmental injustice in Chapter 4.

The most pivotal event to shape rural life in India’s recent history is the economic reform of 1991, when the government liberalized and allowed multinational corporations access to its markets, social capital, and most importantly its environment. The first half of this chapter will delve into the eras of rural development that led up to 1991, namely pre-independence, characterized by the Gandhian village movement, and post-independence, characterized by socialized industrialization. In the decades leading up to 1991, government shaped the NBE nexus, emphasizing national growth and totalitarian ecological conservation over the rights of marginalized peoples’. The second half of this chapter will analyze the state of the rural poor and the environment since 1991, in an effort to describe the recent phenomenon of rural-to-urban transition. Post-1991 rural development has garnered attention from academics across all disciplines, being described as “bringing significant changes in rural Karnataka,”¹⁵¹ and as “contributing to the instability of the livelihood systems of the poorer sections of rural households.”¹⁵² Through an analysis of economic, political, and social changes since independence, it will become clear that the rural poor in Karnataka have been victims of an unjust NBE nexus.

THE PRE-INDEPENDENCE NATURAL-BUILT ENVIRONMENT NEXUS

It is important to understand that environmental injustices existed in rural India long before British colonization and the growth of global cities; caste and income have always played a deciding role in how the NBE nexus is experienced. Access to fresh drinking water, for example, has been a power struggle for centuries. Munshi Premchand, a famous late-nineteenth century Indian writer wrote a short story called “Thakur ka Kuan” (“Thakur’s Well”) in which he offered a terse narration of water access in villages under the traditional feudalist system. In the anecdote, an untouchable woman tries unsuccessfully to steal water from the village leader’s well for her sick husband, as she and her husband only have access to unclean water.

Social inequality and political marginalization have historically been manifested in the distribution of and access to natural resources and environments. Environmental injustice is not a product of recent industrialization or globalization; it has been socially enforced in Indian society for generations. Furthermore, the built environment has been designed even on a village level to marginalize certain groups and deny them access to important natural resources.

Despite its visible inequalities, Indian people widely romanticized rural life prior to Indian independence as culturally important and the source of opposition to British imperialism. The British Raj took away panchayat (village council) power, emphasizing state-

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level governance and controlled economic growth.\textsuperscript{155} Most British cultural and infrastructural interventions happened in Indian cities, with the exception of the building of extensive rural irrigation systems, which provided an impetus for growing cash crops for export, especially jute, cotton, sugarcane, coffee and tea.\textsuperscript{156} The commercialization of agriculture with a focus on trade resulted in decreased production of food crops, mass impoverishment and destitution of farmers, and numerous famines.\textsuperscript{157} The British Raj viewed farmers and village laborers as instrumental in supporting the British economy, yet it did not prioritize their upward social mobility. Both the Indian economy and total population grew 1\% per year from 1880 to 1920, which kept 91.3\% of India’s population in rural areas and 45\% in poverty.\textsuperscript{158} The condition of the rural poor was closely linked to British policies that allowed for the exploitation of the rural environment and disenfranchised panchayats. The traditional idea of the ‘village’ thus became an important symbol to hold onto for Indian people.

National movement leaders emphasized the importance of the village and supported the “return to the health of village life with its beauty of surroundings and its contact with nature.”\textsuperscript{159} In his civil disobedience movement, Mahatma Gandhi advocated for the preservation of village life and nature. He denounced western culture and the imperial forces that ravaged the landscape and took power from villagers.\textsuperscript{160} Other independence leaders, including Rajendra Prasad (the first president of independent India), also emphasized the

\textsuperscript{156} Tomlinson, p. 336.
importance of village sovereignty and re-popularized the handicraft and handloom trades.\textsuperscript{161}

The idea of bringing power back to the village and valuing the relationship between the natural and built environment in a rural setting was a pivotal moment in environmental consciousness and the NBE nexus. It was a driving force in the Indian independence movement and helped the country break free from British rule in 1947.

THE POST-INDEPENDENCE NATURAL-BUILT ENVIRONMENT NEXUS

Between independence in 1947 and the 1970s, the emphasis on creating a just NBE nexus in rural India was put on the backburner. In an attempt to catch up with the developed world, socialized economic programs propelled Indian cities into a period of industrialization and expansion. For anti-imperial leaders like Prime Minister Jawaharlal Nehru, who was in office from 1947-1964, the only road to ending poverty lay in India’s achievement of the same economic and technological superiority that had worked so well for its imperial counterparts.\textsuperscript{162} As populations in cities like Bangalore and the country as a whole exploded, so too did agricultural production and manufacturing.

The effects of population growth and socialized production in the post-independence era were quickly evident in rural environments of Karnataka. Population in Karnataka increased from 19.4 million in 1951 to 29.3 million in 1971.\textsuperscript{163} Bangalore itself saw unprecedented growth; with only 406,760 people in 1941, it grew to 1.7 million by 1971.\textsuperscript{164} Population growth fueled industrialization, which profoundly effected Karnataka’s hinterland. Forest

\begin{footnotesize}
\begin{enumerate}
\item Guha, p. 33.
\item 'Census of India', ed. by Government of India (New Delhi: 2011).
\item Vagale, p. 36.
\end{enumerate}
\end{footnotesize}
cover decreased from 32% of the state in 1971 to 20% by 1979, largely because of conversion of forests into coffee plantations and farmland. Not surprisingly, such rates of environmental destruction also had enormous consequences for the rural poor. Between 1951 and 1971, the population of rural people under the poverty line in India as a whole increased by five million annually. The solution to end such poverty, as India entered the 1970s, was an emphasis on greater agricultural yields and introduction of Green Revolution technology.

The state and federal programs that instituted agricultural reforms in the 1970s were intended to facilitate growth, which unavoidably impacted rural groups like agricultural laborers and tribal people through the destruction of the rural environment. Recognizing the importance of agriculture as the leading source of income in Karnataka, government programs incentivized a switch to high-yielding cash crops, farm machinery, lift irrigation, and fertilizers. The High Yielding Varieties Program (HYVP), Integrated Rural Development Program (IRDP), and the National Seed Project were all started around this time, often with support from international aid organizations like the World Bank. Maize and sugarcane were favored cash crops in these government programs above traditional crops like ragi (finger millet), jowar (sorghum), and cotton (see Figure 19). This is significant because maize and sugarcane required more intensive processing and could not support the subsistence of farmers the way that ragi, cotton, and jowar did. Ragi is a nutrient-rich grain

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that is incredibly effective at reducing malnutrition in poverty-stricken areas.\textsuperscript{170} Cotton was critical in supporting small-scale village garment industries and sorghum was historically used as fodder for livestock. Moreover, the transition to a cash-crop agricultural economy favored large monoculture farms over small, diverse, subsistence-oriented farms.

While the Green Revolution served the middle- and upper classes in cities like Bangalore in securing access to food staples, the rural hinterland, which was still culturally and physically separated, struggled to adjust to economic and environmental stressors. Growing high-yielding cash crops on a limited diet of chemical fertilizers like nitrogen and phosphorus caused nutrient drain in the soil and eventually led to decline in agricultural yields.\textsuperscript{171} Between 1975 and 1983 alone, the area dedicated to agricultural production grew by 1.28 % per year while yield actually decreased by -0.27% per year (see Figure 20).\textsuperscript{172} A recent study published in the National Academy of Sciences journal supports these figures, adding that, “policies that promoted staple crop production, such as fertilizer and credit subsidies, price supports, and irrigation infrastructure, tended to crowd out the production of traditional non-staple crops, such as pulses and legumes”.\textsuperscript{173}

Decreasing yields and an emphasis on monoculture affected small farmers in Karnataka the most, as agribusiness and incentive programs often lured them into investing in Green Revolution technology without having the financial security to protect themselves against potential loss.\textsuperscript{174} The number of landless laborers in proportion to the rural population grew

\textsuperscript{170} Pani, p. 74.
\textsuperscript{171} Rao, p. 97.

during this period to constitute about 78% of the rural poor. This had resounding effects on the demand for labor in other sectors of the rural economy and on food security. The data shows that 49% of the rural population in Karnataka lived in poverty by 1975 (as compared to 35% in 1963), demonstrating the lack of wage labor and decline in viability of small-farm holdings. Agricultural instability also increased the dependence of the rural poor on foraging and natural resources for basic subsistence, incurring a host of environmental problems that will be discussed later in this chapter.

By the early 1980s, the justice implications of the Green Revolution for the NBE nexus in rural Karnataka had become widely visible and activist groups emerged to lobby for systemic change. Water levels in tanks were perhaps the most noticeable result of upped agricultural production. Water consumption for use in monoculture crops doubled between 1971 and 1991 and the use of tank irrigation shifted to deep borewell irrigation, further raising the cost of water. The consumption of water was outpacing the recharge, demonstrated by the fact that 10% of the borewells dug in the latter half of the 1970s were dry within a decade. Farmers saw large seed companies as responsible for these worsening environmental conditions and gathered to oppose large-scale and state-sponsored agribusinesses. Perhaps most notable was the Karnataka State Farmer’s Association (KRRS). Founded in 1980 by a group of middle- and upper-income farmers, the KRRS sought to take back economic and social power from the hands of the State and multinational seed

176 Ahluwalia, p. 298.
178 Ibid.
companies. Yet the KRRS was comprised of farmers with larger landholdings who had not been as vulnerable to the environmental degradation of the land as smaller farmers and rural laborers. Because the organizations responding to environmental problems in the 1970s did not consider the systemic inequalities of the rural NBE nexus, the conditions of the rural poor continued to be overlooked.

The Indian government was not apathetic to the emerging environmental challenges of socialized industrialization; several government programs were introduced in the late 1970s to conserve natural resources. In collaboration with World Wildlife Fund and the International Union for the Conservation of Nature, the Government of India announced the launching of “Project Tiger” in 1973. Human population growth, expansion of cultivation at the expense of forests, and recreational hunting had brought the total population of the country’s national animal down to 2000 in less than a century. Project Tiger set aside large areas for national parks where human activities would be strictly regulated. This state-led initiative happened concurrently to a publication called “A Charter of the Land” by B.B. Vohra, an official in the Ministry of Agriculture. The paper was an appeal to the national government to deal with widespread deforestation, soil erosion, and water contamination in the country. Still operating under the imperialist paradigm of state-based solutions, the Government of India instituted several policies and programs in subsequent years to remediate deforestation, air and water pollution, and wildlife preservation. By 1980, 3% of all land in India and 10% of forested land in Karnataka was protected. This had unintended and dramatic consequences

179 Pani, p. 74.
181 Ibid.
for the rural poor, who through the concomitant processes of economic expansion and state-mandated conservation were facing horrendous environmental injustices.

Government programs in the 1970s that sought to mend the rural NBE nexus were not based on a holistic understanding of the relationship between the natural and the built components of the rural environment. They were ad hoc, enforced with police-like ferocity, and did not consider the needs of historically marginalized rural people because of their preservationist approach. Aside from the Chipko Movement in 1974, the famous gathering of peasant women in Uttarakhand to reclaim their forest rights that the Forest Department had assumed, wealthy lobbying groups like the KRRS and the national and state government dominated the environmental movement until the 1980s. The system in place allowed the government to give preferential treatment to agents of resource intensification; namely the same agribusinesses and manufacturing companies that had been exploiting villagers and rural environments since independence.

The empowerment of the rural poor to reshape the rural NBE nexus saw some signs of hope in 1984, when a collective of villagers in Northern Karnataka protested a corporate-state agreement that was degrading ecosystems. Harihar Polyfibers, a rayon-producing unit owned by the Birla family, entered into a 40-year land-leasing agreement with the State of Karnataka and became Karnataka Pulpwoods Limited (KPL). The government identified 30,000 hectares of common land (technically state-owned because the British system had determined any land not under contract as state property) for KPL to develop. This had huge implications for villagers, who relied on the natural resources of those lands for fuel, fodder,

185 Guha, p. 7.
and building materials. Soon other companies began seeking similar agreements with the Karnataka government, which put the sovereignty of entire villages in the state at risk. Panchayats, with the support of social workers, passed resolutions asking the government to cancel the KPL agreement and by 1990, the company was forced to close. This was the first time in modern Karnatakan history that the rural poor mobilized to overcome environmental injustice.

Other local nature-based conflicts emerged in the late 1980s, ultimately in a struggle to return control over the NBE nexus to the local people. The state and national government had been dictating urban and rural growth over the past forty years and panchayats were beginning to fight back.\textsuperscript{186} At the heart of these movements were the rural poor, who were more heavily dependent on natural resources for subsistence. The result of resource exploitation to service an expanding commercial-industrial economy had resulted in the visible dispossession of communities. Poor farmers had lost their lands and women and children were forced to stray farther from the enclaves of their villages in search of clean water, fodder, and firewood.\textsuperscript{187} Opposition to environmental inequalities gave birth to the Panchayat Reforms and reconfiguring of state politics that decentralized urban and rural planning. By the early 1990s, it seemed as if rural development that prioritized the needs of the poor could finally commence. Then on July 24, 1991, India faced a catastrophic fiscal crisis that shaped the way its growth and economy would operate forever.

\textsuperscript{186} Kadekodi, p. 651.
\textsuperscript{187} Nandini, p. 98.
THE PIVOTAL MOMENT FOR THE NATURAL-BUILT ENVIRONMENT

The period of socialized industrialization that shaped the Indian economy and NBE nexus between 1947-1990 tended towards protectionism, import substitution, and state intervention. Mining, machinery production, hydroelectricity, and all other industries were essentially nationalized.\(^{188}\) India’s attempts at closing itself off to the outside world and relying on internal markets for development were generated by a mixture of socialism and the experience of imperial exploitation.\(^{189}\) But high fiscal deficits, loss of confidence in the government, and currency depreciation forced India to pledge tons of gold to international banks as part of a bailout deal with the IMF.\(^{190}\) India was required to undertake a series of economic forms and liberalize its economy, which would allow multinational corporations access to India’s markets, social capital, and most importantly its environment.

Jagdish Bhagwati, one of the world's leading economists, described the economic reforms of 1991 has having “ushered in a new era of growth for India that has reduced poverty and improved the overall standard of living in India.”\(^ {191}\) Many academics hold the same view, approaching transformative moment through a lens of politics and economics. While economic liberalism might have pulled 200 million people out of poverty across the subcontinent, the consequences of heavy industrialization and globalization for rural communities are much more nuanced.\(^ {192}\) It is important to study what has happened since

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\(^{189}\) Staley, p. 47


1991 through an environmental lens, in order to understand the true impact of neoliberal policies on rural environments and traditionally marginalized people.

THE NATURAL-BUILT ENVIRONMENT IN A POST-LIBERALIZED ECONOMY

Since 1991, liberalized urban and rural growth in Karnataka has changed the way land, natural resources, and the role of the rural poor is conceptualized. Although Bangalore was dependent on its hinterland for food, fuel, and virgin resources throughout the twentieth century, it was not until economic liberalization that environmental injustices actually forced massive internal migration. Powerful international economic forces have driven urban growth in Bangalore and the effects have been experienced unequally in the city’s hinterland. The public eye is on the degradation of the urban, where smog, polluted streams, and sewage are all but visible (though still not equally experienced). Rural areas in Karnataka today do not get press for the environmental injustices happening within their NBE nexuses. Search results for ‘water access’, ‘Bangalore’, and ‘justice’ yielded over 6,000 hits in the Google Scholar database; conversely, ‘water access’, ‘rural Karnataka’, and ‘justice’ yielded fewer than 60 results. This might come as a surprise until we consider how removed the urban consciousness is from the reality of rural areas. As discussed at the beginning of this chapter, the romanticization of village life in India allows society to turn a blind eye to the environmental injustices present within it. However, the injustice rooted within the rural NBE nexus today can no longer be ignored, as there is an unprecedented level of marginalization and forced displacement of rural people.

Rural-to-urban transition is fueling the growth of the urban underclass and of informal settlements like never before and rural environmental injustice is a significant cause. Since
1991, total population in Karnataka has increased by more than 16.3 million people, most of which has occurred not in rural areas but in Bangalore, itself (see Figure 21).\textsuperscript{193} Natural growth as a component of this urban population growth has decreased from 60% in 1991 to 45% in 2011, while rural-to-urban migration increased from 20% in 1991 to 25% (see Figure 22).\textsuperscript{194} Even when rural people aren’t actively migrating into Bangalore, urban sprawl and rural transformation account for 30% of Bangalore’s population growth. Since economic liberalization, the rural-to-urban transition, whether through migration or assumption and reallocation of rural land as urban land, has become a significant factor in urban growth. These trends are escalating as the inequality of the NBE nexus in rural Karnataka intensifies.

Economists, political scientists, and urban theorists have presented a number of ways to explain the demographic transition occurring in Karnataka. The most commonly cited is the promise of employment and a better wage in Bangalore. The transformation of the agricultural sector, which was historically the largest rural employer (employing over 75% of the population until the mid-1990s), has severely decreased the availability of jobs for rural people.\textsuperscript{195} Large agribusinesses require fewer laborers to grow equivalent tonnages of food and are easily able to outcompete small-scale farmers.\textsuperscript{196} The emergence of supermarkets has fueled this problem. Evidence from other developing countries indicates that supermarkets are pivotal change-agents that recompose patterns of agricultural ownership and market


\textsuperscript{195} P. Venkatesh, “Recent Trends in Rural Employment and Wages in India: Has the Growth Benefitted the Agricultural Labours?” \textit{Agricultural Economics Research Review}, 26 (2013), p. 13


Figure 22. Rural to urban migration has increased to contribute 25% to urban population growth since 1961 and is expected to increase more in the next decade. Source: 'Census of India', ed. by Government of India (New Delhi: 2011).
linkage. The fate of small farmers has been increasingly linked to their abilities to participate in these large-scale supply chains.

Poor farmers in Karnataka are quickly losing their land and are struggling to find alternative employment in the rural sector. The construction sector has grown as newly landless farmers seek viable employment and now accounts for 11.4% of the non-farm employment sector. Nevertheless, economists predict that rural-to-urban migration will continue as long as urban wages remain higher than rural wages. This is likely, considering that the booming informal sector in Bangalore is projected to create jobs well into the future.

Other factors also contribute to rural-to-urban migration in Karnataka, including lack of resources, facilities, and education in rural areas, housing insecurity, chain migration (where people move to be with family already established in the city), and the appeal of urban culture. While these are undoubtedly factors, understanding the role of the unjust NBE nexus in rural areas can help inform our approach to addressing rural problems. The next section will examine how the post-1991 rural NBE nexus is being shaped by two population groups: (1) the rural poor, and (2) the wealthy, which includes both local and global actors. Theorists throughout the twentieth century tended to place more blame on the rural poor for environmental destruction. While it is important to acknowledge the environmental feedback loops associated with rural poverty, the rural poor cannot be scapegoats of a problem for which larger national and global community is ultimately responsible.

200 Mitra, p. 47.
ENVIRONMENTAL INJUSTICE IN A POST-LIBERALIZED ECONOMY

The rural poor have negatively shaped the NBE nexus because they are forced to overuse environmental resources for their day-to-day survival; their impoverishment of their environment further impoverishes them and spurs rural-to-urban transition. Twenty-two percent of Karnataka’s rural population lives in poverty; a shocking 74.8% of the total poor in Karnataka.201 Eighty-nine percent of poor rural households live proximate to forests and other commons, from which they have incentive to take natural resources.202 This is because the rural poor experience lower financial costs and penal risks harvesting from the commons than middle- and upper-income groups do. Their subsistence also depends on their extraction from the commons so they discount potential environmental damage. This phenomenon can be observed in Karnataka with herders, whose grazing lands have shrunk from 7.6% of total land area to 4.2% since 1991.203 As existing croplands and water sources become exhausted, herders do two things: they replace their cattle with goats, which are highly destructive of the environment; and they begin to use forests as grazing land.204 Increasing numbers of people are falling into poverty every year in Karnataka, leading to increased deterioration of open access and common property land and forest resources. However, the poor can only access a small share of the state’s resources and should not be held entirely accountable for their depletion.

202 Battacharya, p. 45.
204 Agarwal, p. 362.
As wealth masses in Bangalore and local and global consumerism filters down supply chains, the rural poor in Karnataka experience significant environmental injustices, pushing them into Bangalore. There are several activities that have enforced the unequally experienced NBE nexus in rural Karnataka. Special economic zones for industry, mining, plantation forests, fishing, and agribusiness are all contributing to rapid environmental degradation. The Karnataka State Government defines special economic zones (SEZs) as the following:

The Government of India has announced the concept of Special Economic Zones (SEZs) in the year 2000 through a revision in the EXIM Policy 1997-2002 with a view to providing an internationally competitive and hassle free environment for production of goods and services for exports. These SEZs are virtually deemed to be a foreign territory within the Country, free from all the rules and regulations governing the import and export. The SEZs are specifically treated as duty free enclaves for the purpose of industrial, service and trade operations with exemption from customs duties and a more liberal regime on levies, foreign investment and other transactions. The domestic regulations, restrictions and infrastructure inadequacies are sought to be removed for creating an investor and industry friendly environment. The SEZs would be islands of excellence and efficiency.\(^\text{205}\)

Today there are 86 operational and six planned SEZs in Karnataka State, alone.\(^\text{206}\) These SEZs have allowed corporations to bypass environmental regulations relating to pollution, natural resource stocks, and compensation of damages to local communities. The rural poor

\(^{205}\) “State Policy for Special Economic Zones,” ed. by Government of Karnataka (Bangalore: 2009).

\(^{206}\) “List of SEZs in Karnataka,” in Right to Information, ed. by CSEZ (Ministry of Commerce & Industry, Govt. of India, 2013), Web.
are most affected by the environmental degradation these institutions inevitably bring about for the sake of progress and development.

Manufacturing industries in Karnataka are notorious for their lack of responsibility for environmental cleanup, which leads to air, soil and water pollution that is most experienced by the rural poor. Most manufacturers do not have treatment plants or if they do, choose not to run them to save energy.\(^\text{207}\) Government bribes ensure that these activities go unnoticed by the Water and Air Pollution Control Act. One example of this is Bhadravati, a major industrial center in Karnataka, where two industrial units generate pollution. Located on opposite banks of the Bhadra River, Visvesvaraya Iron and Steel and Mysore Paper Mill produce unsanctioned levels of air and water pollution.\(^\text{208}\) The Indian Central Pollution Control Board did a study in 2009 measuring air, water, and soil pollution around Bhadravati. Their results were based on the Comprehensive Environmental Pollutant Index, where a site with an aggregated CEPI score of 60 or greater is considered critically polluted. Bhadravati’s CEPI score was 72.33.\(^\text{209}\) Despite this data and a long record of hospitalizations due to poisoned water and lung disease, the Bhadravati factories have not been forced to comply with industry regulations.

Heavy mining over the last two decades has also had tremendous environmental impacts in Karnataka. The mining industry contributes to deforestation, air and water pollution, silting of reservoirs, tanks, and rivers, and landslides.\(^\text{210}\) Mining companies often store toxic wastes in improper storage sites, inevitably causing leakage and contamination of

\(^\text{207}\) Ecological Economics Unit, p. 2735.
\(^\text{208}\) Ibid.
\(^\text{210}\) Ibid.
soils and water. A recent study of groundwater from Nuggihalli Mining Company showed elevated levels of arsenic, which was seeping into wells across the neighboring valley. The study found that 79% of samples tested had toxic levels of arsenic, which were afflicting hundreds of thousands of people in the area.\textsuperscript{211} Not only is fast-paced mining activity draining Karnataka’s stock of non-renewable natural resources, it is also a profound environmental justice issue.

Destruction and reallocation of Karnataka’s forest resources into the hands of urban and industrial India has contributed to the social, cultural and economic destruction of the rural poor. Although forest cover has increased to 21% of Karnataka’s geographical area since 1995, the state has seen a decline in dense forest cover since 1995.\textsuperscript{212} This is due to the emergence of plantation forests on corporate owned land, which was assumed, in many cases illegally, with government support from village and tribal people after 1991.\textsuperscript{213} Corporations commonly plant eucalyptus on newly assumed land, agricultural or otherwise. The World Bank and the Forest Department have declared eucalyptus plantations to be an important solution in improving Karnataka’s total forest cover, as it is fast growing and produces pulp wood for industry. Another uncommonly sighted reason for eucalyptus’s popularity among foresters and developers is it prevents squatters and herders from encroaching on private property.\textsuperscript{214} Eucalyptus forests generate no usable biomass for local foragers, which is taking away the rural poor’s ability to meet its basic needs.

\textsuperscript{213} Sarma, p. 17.
\textsuperscript{214} Agarwal, p. 361.
The privatization of forests in conjunction with stricter anti-felling laws has had an adverse impact on the daily lives of the rural poor. Biomass has traditionally provided food, fuel, fodder, fertilizers, building materials, herbs, and clothing to people who subsisted without wages.\textsuperscript{215} About 45% of the livestock owning households fully depend on forest for grazing their livestock and 90% of cooking fuel in Karnataka is from biomass.\textsuperscript{216} Reforestation with eucalyptus is also having disastrous effects on small farms. Soil erosion and nutrient loss are outcomes of eucalyptus plantations. Interestingly, with a shortage of firewood, villagers begin using cow dung for fuel instead of applying it to soils as manure. This in turn compromises soil health and promotes the application of more expensive and harmful synthetic fertilizers. Economic liberalization has prevented headway in the state’s devolution of control of common pool resources to local communities. Rural people need to be able to access basic resources to emerge from poverty and prevent further environmental degradation; they need to be given agency in positively shaping their NBE nexuses.

Special economic zones devoted to large agribusinesses are also having tremendous consequences for local environments and people as they overwhelmingly follow the same practices that were introduced with the Green Revolution in the 1970s. Expansion of monoculture-based agriculture has contributed to deforestation, further decreasing locals’ access to biomass.\textsuperscript{217} Intensive agricultural production is also draining aquifers, which inhibits villagers’ ability to access safe drinking and irrigation water. Monoculture, in combination with application of synthetic fertilizers and tilling, is destroying topsoil, decreasing crop diversity and resilience, and contributing to eutrophication in surrounding water bodies.

\textsuperscript{215} Ecological Economics Unit, p. 2735.
\textsuperscript{216} Nelson, p. 13.
\textsuperscript{217} Nelson, p. 11.
Furthermore, as small-scale farms are outcompeted by these special economic zones, traditional and more ecologically sound agricultural practices are lost.\textsuperscript{218} Environmental degradation through agriculture is unequally experienced by the rural poor and is contributing to the rural-to-urban transition.

Climate change is another important factor in rural-to-urban transition, for which blame is less easily placed on local actors. Poor villagers are incredibly sensitive to local climate – particularly to drought and flooding, episodes of which have become more severe in recent years.\textsuperscript{219} Farmers I spoke with in Tumkur District, northwest of Bangalore, observed more variability in the arrival of the monsoon and total rainfall during monsoon season in their lifetimes. They explained that this was making their growing seasons less reliable and was incentive for some to consider selling their land to eager corporate buyers.\textsuperscript{220} A 2011 climate report confirms these observations. Based on a time series taken between 1951-2004, there has been a 6\% decrease in precipitation rates across Karnataka State and an 85\% increase in variability (see Figures 23 and 24). In Kallinaikanahalli Village, the problem of irregular rainfall is made more acute by the shortage of groundwater because of the activities of DuPont, a seed company that neighbors the village. Farmers around our school all noted that they had to re-bore their wells at least once in the last three years because of a shortage in groundwater supply.\textsuperscript{221} With the depletion of aquifers by encroaching industry and the loss of nutrient-rich manure (which is now being used as a fuel substitute for diminishing firewood),

\textsuperscript{219} Rao, p. 91.
\textsuperscript{221} Anugraha John, “Relationship with DuPont,” ed. by Mayrah Udvardi (Kallinaikanahalli, India: 2013).
Figure 23. District-wise Coefficient of Variation (C.V.) of southwest monsoon season (June-September) rainfall computed using data for the period 1971-2005. Units are in percentage. Source: 'Karnataka Climate Change Action Plan', (Bangalore: Bangalore Climate Change Initiative - Karnataka, 2011).
Figure 24. Spatial pattern of mean southwest monsoon seasonal rainfall expressed as percentage departure from long-term mean. Source: 'Karnataka Climate Change Action Plan', (Bangalore: Bangalore Climate Change Initiative - Karnataka, 2011).
farmland is not able to yield enough food to sustain small-scale agricultural businesses.\textsuperscript{222} This has led several farmers around the school in Kallinaikanahalli to sell their land and seek employment in the informal labor sector.

Increased variability in rainfall brought on by climate change throughout Karnataka has also led to an increase in episodes of flooding, which has had dramatic consequences for the rural poor. Low-income people are most affected by intense episodes of flooding because their houses are made of mud and brick and are typically located in flood-prone areas.\textsuperscript{223} While records of flooding are not well documented, interviews with local people in Tumkur District revealed its significance in forcing migration out of villages.\textsuperscript{224} A 2012 study of three villages in Northern Karnataka that had been damaged by monsoon floods found that,

“Recouping the losses of the floods emerged as one of the key reasons for migration for those who had lost their household items during the flood in all the three study villages. This was closely linked to the perception that opportunity to recuperate if they stayed in the village was limited.”\textsuperscript{225}

This text provides yet another example of how poor, low-caste people experience the NBE nexus unequally and are forced into leaving their ancestral villages for a better life in the city. Unless steps are taken to improve infrastructure and access to safe, affordable housing in villages, the rural poor will continue to be affected by increasingly harsh climate conditions.

In discussing the ways in which the wealthy inflict environmental injustices on the poor, it is important to acknowledge the government’s unresponsiveness in solving these

\begin{itemize}
\item \textsuperscript{222} Nelson, p. 13.
\item \textsuperscript{223} Naveen I. Thomas, “Vulnerability to Floods a Study of Disaster Recovery in Rural Karnataka,” (2012), p. 64.
\item \textsuperscript{224} Kallinaikanahalli Farmers, Op. cit.
\item \textsuperscript{225} Naveen, p. 65.
\end{itemize}
problems. The rural poor lack basic infrastructure services that would provide them access to clean water, sanitation, and transportation.\textsuperscript{226} Increased public provision of basic services will improve villagers’ resilience to environmental changes and prevent them from further degrading their commons. Larger scale efficiency programs are also necessary. Forty-five percent of agricultural lands in Karnataka have the potential to receive irrigation water, while the extent of irrigation today is only 26\%.\textsuperscript{227} By restricting SEZs and enforcing industry standards, while at the same time providing local governments with the resources to implement efficiency programs, the government can work to redress the injustices incurred through the NBE nexus of the last two decades.

CONCLUSION

This chapter has addressed the rural NBE nexus as it has evolved alongside Bangalore since independence. Between 1947-1991, the government shaped the NBE nexus, prioritizing national growth and totalitarian ecological conservation over the rights of the rural poor. After 1991, state control succumbed to corporate control, which has led to the most transformational period in India’s environmental history. Since 1991, multiple actors have shaped the NBE nexus. As the rural poor become increasingly marginalized, they play a small role in the degradation of their commons. However, the causes for environmental degradation and ultimately environmental injustice, who are often under-represented, are consumers, corporations, and the government. These groups predominantly prioritize profit, comfort, and


\textsuperscript{227} Rao, p. 90.
development over the sustainability of the natural-built environment and the wellbeing of underserved rural people.

This raises the question about intentionality with respect to environmental injustice. Middle- and upper-income Bangaloreans and even people around the world who are benefiting from products sourced in Karnataka are not purposefully trying to contribute to an unjust NBE nexus. For the most part, people see the development that has happened in India since 1991 as uplifting. It is undeniable that rural development schemes, including SEZs, have produced millions of jobs and pulled hundreds of thousands of people out of poverty. Yet economic liberalization has concurrently fueled population growth, consumer habits, and global supply chains, putting burdens on the NBE nexuses of rural areas through resource extraction, environmental degradation, and climate change. Acknowledging the effects this has had on the rural poor is difficult, as it requires us to admit to the legacies of caste, imperialism, and neocolonialism as antecedents of today’s inequality.

The evolving relationship between Bangalore and rural Karnataka is also a useful context in which to discuss environmental injustice. Most cities and their hinterlands operate around a flow of natural resources into the city and capital back out into the hinterland. This type of model is described in works like William Cronon’s *Nature’s Metropolis*, which explains how Chicago emerged as an infrastructural response to natural resource flows from the hinterland. Historically, Bangalore also functioned in this way. Rural Karnataka has been a constant source of natural resources for Bangalore since it was founded. However, economic liberalization has complicated this relationship to also include the flow of people from rural Karnataka into the city. Urban expansion and labor demands are drawing people into Bangalore at unprecedented rates.
What is more worrisome is the forced displacement of low-income people from their rural ancestral homes, because the NBE nexus has proven so unfavorable to them. It is not a situation most people imagine when they think of the Indian village. The farms and woods where Bangalore’s CEOs once played have been replaced with sprawling fields of monoculture crops, industrial zones, and eucalyptus. As these environments continue to deteriorate, so too does the village culture that propelled India’s identity through independence. The ultimate outcome of this is environmental injustice. Even if Bangaloreans do not witness it firsthand in their hinterland, they can see it in the number of laborers pouring into the city every year in search for opportunity. As we will see in Chapter 4, that opportunity is hard to find when environmental injustice pervades urban life, as well.
INTRODUCTION

Picture a twenty-first century Indian city whose hazy, sprawling skyline is punctuated by towering malls, office parks, and apartment buildings; testaments to its post-liberalization growth. Bangalore today is the third-largest city in India, behind Mumbai and New Delhi, and was recently voted as the cleanest and most livable in the country.\(^{228}\) At first glance, Bangalore seems to represent everything the West had hoped for India to become. International news stories highlight it as “the poster child of India's globalization,”\(^{229}\) “where the country's I.T. industry began its dramatic success story,”\(^{230}\) and “home to some of the best international and domestic technology companies, which are creating millions of jobs”.\(^{231}\) Many scholars credit the I.T. industry for the rapid growth of Bangalore’s economy, population, and landscape. Furthermore, there seems to be a common consensus amongst Bangaloreans and foreigners alike that recent urban development has begot wholly positive social outcomes.\(^{232}\) If one were to rely solely on international news or even first impressions of the city from the seat of a luxury taxi, the profound social and environmental injustices that exist within its limits would be easily overlooked.

I have argued in Chapters 2 and 3 that the environment in which Bangalore was built and hinterland from which it draws social and environmental capital fueled its growth through

\(^{230}\) Ibid.
the end of the twentieth century. This trend continues today. The elite spaces of Bangalore – Cubbon Park, the Cantonment, and more recently UB City and Whitefield, to name a few – were developed and thrive not only because of, but at the expense of surrounding environments and people. To say that outcomes of recent development have been largely successful for Bangalorion society is nearsighted. When 20% of Bangalore’s residents reside in informal shelters and lack access to basic environmental resources such as water, clean air, and solid waste management,233 we must question whether the city’s NBE nexus has been wholly positive.

Bangalore’s current urban development plan is neither equitable nor sustainable and leads to widespread environmental degradation and injustices. Population has increased from 5.6 million people in 2001 to over 10 million today as job opportunities and economic growth (as well as the rural environmental injustices discussed in Chapter 3) have lured people from across the region to seek employment.234 The Bangalore Development Authority has been exceptional at allocating housing and environmental amenities to middle- and upper class members of society. City limits have expanded by 328% in the last ten years to cater to the growing demand for housing and commercial spaces.235 Construction sites activate every vacant corner of the city, calling for laborers and temporary settlements. Unlike Mumbai and New Delhi, where massive informal settlements have become fixed and often politically recognized entities of the urban landscape, informal settlements in Bangalore emerge on a much smaller scale.236 Social rights groups documented over 823 informal settlements in 2013,

233 Sudhira, p. 23.
accounting for 20% of the city’s population. They exist where there is employment and can disappear at the drop of a hat, whether by forced eviction or the completion of a development project.

Contrary to common perception, the underclass residing in informal settlements is not merely a passive product of Bangalore’s technocratic regime. Members of the underclass provide cheap labor, are often bribed to vote for politicians who may not act in their best interests, and without political and financial power can be easily dispossessed from urban spaces. They have few avenues for recourse; hence focusing on participatory democracy alone cannot solve the problem. The existence of informal settlements helps further the development of Bangalore’s elite spaces, engaging both poles of society in allowing inequality and environmental injustice to persist in the NBE nexus. I will elaborate on the complexities that surround the persistence of informal settlements later in this chapter. Acknowledging these complexities early on, however, is essential to the discussion of environmental justice. The impact citizens on both poles of society have in fueling injustice is substantial: low-income people fuel it with their susceptibility to bribes and short-term-based decisions, and middle- and upper classes fuel it with their consumer habits. Although this situation has been a concern for scholars, most see injustice as an unavoidable consequence of urban development. Using the environmental justice framework, I argue that the underclass does not merely face social inequalities as a byproduct of development; it is dealing with the avoidable consequences of environmental mismanagement, resource commodification, and a system of social, economic, and political oppression.

238 Aneel Karnani, “Romanticizing the Poor Harms the Poor.” Whitehead J. Dipl. & Int'l Rel., 9 (2008), p. 57.
Although the visible inequality between the middle- and upper class and underclass in Bangalore is not as stark as that in cities like Mumbai and New Delhi (see Figures 25 and 26), it is still spatially, economically, and culturally expressed. Spatially, the underclass tends to reside along sidewalks, under overpasses, and in other small “negative” (or undeveloped) spaces in the city. As discussed in Chapter 2, the network of parks and elite institutions in the urban core has pushed the underclass towards the city’s periphery or into undesirable environments like landfills and former water tanks.\(^{239}\) Bangalore’s middle- and upper classes tend to reside in more planned sections of the city, either in the urban core or in more modern developments outside city limits. The underclass provides key services in these elite spaces: as guards, cooks, cleaners, nannies, and street-peddlers. Both poles of society are culturally distinct, as well, attending different temples, buying produce from different vendors, and leaning towards western and traditional lifestyles, respectively.\(^{240}\) This visible polarity between social classes is fueled by the unequal distribution of environmental amenities and pollution.

The polarity between classes is arguably the most glaring in Ejipura, Koramangala, where over 1,500 families have been struggling to subsist for the last 20 years next to the National Games Village Complex.\(^{241}\) Ejipura was initially a housing project for economically weaker sections of Bangalore. Today, through a corrupt and unjust development process, tenants are now homeless on the sidewalks of the neighborhood, lacking safe drinking water, and exposed to solid waste and air pollution. Surrounding these homeless families are high-rise luxury apartments, whose occupants reap the benefits of unjustly distributed

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\(^{239}\) Nair, Op. cit.  
\(^{240}\) Sanjukta Mukherjee, “The Bangalore Brand: Uneven Geographies of India’s Hi-Tech Boom.” (University of Toronto, 2008).  
\(^{241}\) Vinay Srinivasa and Isaac Selva, Governance by Denial. People’s Union for Civil Liberties, Karnataka (June 2013), p. 5.

environmental amenities and degradation. The evictions and reallocation of land in Ejipura (for the construction of a mall, no less) has attracted a flurry of activist and scholarly writings.

The literature that analyzes the unjust conditions of Ejipura — and Bangalore more broadly — relies on traditional theories of social justice to frame the failures of the government and municipal planning approach. There is unsurprisingly little discussion of the environmental components of the injustice in Ejipura, which limits our understanding of how environmental degradation and social injustice are interrelated. This chapter considers the history and politics of Ejipura through an environmental lens. I will examine the conditions and recent history of Ejipura and the politics regarding its future. To conclude, I will discuss the traditional theories and explanations for informal settlements and injustice in Ejipura and Bangalore at large. I will argue that re-conceptualizing the urban environment as an NBE nexus allows us to better understand environmental justices, and is also imperative for citywide development policies that are sensitive to environmental health and social equality.

EXPERIENCING EJIPURA

Identifying the unjust experiential spaces of the NBE nexuses in Bangalore can be challenging as a newcomer to the city. The city’s streets are so alive with traffic, color, and advertisements that driving through, one can easily overlook the corners and alleyways overcrowded with tents and shanties. Taking the bus to Koramangala, the area south of Ejipura, from the northern suburb of Visthar was an overwhelming two-hour journey through a pluralistic landscape (See Figure 27). After winding down a mile of quiet, back-country streets, the bus would spurt out across four lanes of newly paved asphalt onto Hennur Bagalur Road, one of the radiating arteries out of Bangalore’s center. We would drive through Kothanur, an old
village-turned-satellite-town where vendors’ stores haphazardly competed for street-front access. Open flatland along a dry riverbed would then appear, which one might assume was an important ecological corridor until a window opened and the stench of sewage and landfill revealed the site’s true purpose. As we approached Hennur and passed Outer Ring Road, the city’s landscape changed dramatically. Slapdash and piecemeal mixed-use buildings made way for more substantial commercial spaces along the main road, overpasses, and progressively more trees. Passing Outer Ring Road, it seemed that we had entered a planned urban area. Only if one looked with scrutinizing eyes through the façade of the seemingly modern city, would the informal settlements that filled the its undeveloped crevices come into view. Underneath billboards that heralded new jewelry collections and luxury apartment layouts were the subtle workings of Bangalore’s informal economy and network of informal settlements.

As the bus continued on its journey towards the city center, it passed several neighborhoods that were remnants of the British Cantonment. Old trees, wide and organized street layouts, and colonialist architecture defined the landscapes of Richards Town, Cook Town, Frazer Town, and Benson Town, where Bangalore’s Muslim community was now concentrated. We would pass the Cantonment Railway and bypass the chaotic Shivaji Nagar, one of the city’s oldest neighborhoods that had escaped the influence of Imperialist city planners, continuing down Queens Road to the network of parks and gardens in the city center. Here, along Mahatma Gandhi Road, the congestion became almost unbearable and masked traffic police swarmed, directing buses, motorbikes, auto-rickshaws, and cars through intersections. It seemed like the inner city had claimed every last square foot of space to serve its commercial interests. Yet even in the chaos of one of India’s busiest business districts
there were corners (underneath overpasses, lining construction sites, and behind railroad tracks) where people were living under the shelter of blue tarps, breathing in the pollution our buses were emitting.

Most of the 823 alleged informal settlements in Bangalore exist in small fragments, wedged between dense developments that have slowly been squeezing them out.  

Perhaps that is why they go unnoticed by residents and tourists alike. However, there are larger settlements, where poor living conditions and eviction do not go unnoticed. Just southeast of the city center, past the affluent Richmond Town, expansive Rashtriya Military School, and the National Dairy Research Institute lie Koramangala, the National Games Village Complex, and Ejipura (see Figure 28). Today, these are highly sought after commercial and residential areas with wide tree-lined boulevards and a mix of luxury apartments, commercial structures, and posh bungalows. Over the past twenty years, Ejipura has witnessed profound social, political, and environmental changes as the ‘millennial city’ model has taken hold of Bangalore. Now, large glass-walled office buildings and high-rise concrete apartment complexes welcome western-dressed Bangaloreans around the last remaining plot of vacant land, recently earmarked for the development of another mall. This land, which was once home to 1,500 low-income families, was cleared and fenced off in January of 2013. Now, the evictees are living on the sidewalk, staring into the future of this global city.

Ejipura is the epitome of the failed NBE nexus in Bangalore, as 5,000 people have been surviving on the streets without access to water, secure tenure of land, or sanitation infrastructure since they were evicted from their already dilapidated homes. What brought

Figure 27. Bus route from my NGO in Visthar to Ejipura, Koramangala. Source: Google Maps (2014), Web.

Figure 28. Map of major landmarks in Ejipura. Source: Google Maps (2014), Web.
this informal settlement to the public’s attention above other sites of injustice across the city were its size, history, and the shatteringly violent eviction and demolition of houses, which violated multiple human rights (see Figure 29 and 30). According to a staff reporter at The Hindu (a national newspaper), “thousands who had been evicted from the economically weaker section quarters in Ejipura continue to languish on the pavements skirting the 15 acres of land, where their homes once stood.” The events happening recently in Ejipura have captured the public’s interest, putting into question the city’s development priorities. However, as per usual in urban environments, the response questions only the ‘social injustices’ of the eviction. Scholars and activists have not considered the larger picture of environmental degradation and how ‘social’ inequality is actually based on the access to and distribution of environmental risk and resources in Ejipura. Studying environmental justice in Ejipura will present a useful perspective for understanding injustice in Bangalore more broadly and how it relates to environmental degradation.

In the mid-1980s, Ejipura became the site of the city’s first subsidized housing quarters for economically weaker sections, representing a major breakthrough in the implicit political acknowledgment of years of spatial oppression. The Bruhat Bangalore Mahanagara Palike (BBMP), responsible for providing infrastructure and services in the Greater Bangalore Metropolitan area, had a legal obligation to cater to the housing needs of economically weaker sections, as per the Karnataka Municipal Corporations Act of 1976. With assistance from the Housing and Urban Development Corporation (HUDCO), BBMP was given city money to build 1,512 affordable housing units in 42 blocks. Today, it seems almost irrational for the

245 Ibid.
Figure 29. Residents of Ejipura slum pick through what remains of their demolition site.

Figure 30. Evictees with nowhere else to turn are forced onto the sidewalks outside of the site. *Source*: Mark Bergen, 'Bangalore Families, Evicted to Make Way for a Mall, Refuse to Leave Homes', Next City, (2013), Web.
city to develop a housing project for economically weaker sections on 15 acres of central real estate, merely three kilometers from the city center. However, this project happened prior to economic liberalization in 1991 and Bangalore’s urban growth had not yet exceeded today’s Outer Ring Road (see Figure 31). Settlement was still sparse in Koramangala and the commodification of land had not yet reached a point where public-private partnerships would be prioritized above social and environmental rights.

The housing BBMP built was of very poor structural quality and lacked basic services such as water plumbing, sewage lines, and electricity. Yet for most of the people who had applied to live in Ejipura, it was the first time they had ever owned their own homes. It is important to realize that the government had encouraged these people to live in Ejipura; they were never squatters and had property rights. Yet the government didn’t even consider access to basic environmental amenities when building the housing. Women residents interviewed on site commented that they had to wake up at 3:00 am every morning and walk two kilometers to buy water. Shireen, a 44-year-old woman who was one of the original residents in project explained,

“In the quarters there was no water. Those days we used to buy four pots of water for one rupee from the houses in L.R. Nagar, which had water. Much later, we all struggled and got a few wells dug in the quarters. But there was still no electricity.”

As discussed in Chapter 2, the system of tanks that had once dotted Bangalore’s landscape had slowly been filled or privatized during the nineteenth and twentieth century, impacting economically weaker sections most intensely. Such was the case in Ejipura, and residents could not afford infrastructure, as wealthier citizens in neighboring Koramangala could, to

248 Ibid.
Figure 31. Temporal land use changes in Greater Bangalore showing expansion beyond the Outer Ring Road. Source: T. V. Ramachandra, and Pradeep P. Mujumdar, 'Urban Floods: Case Study of Bangalore', Disaster and Development, (2009).
pump water. The unequal distribution of infrastructure to access water, an environmental resource, constitutes an environmental injustice.

In 1996, five years after India’s economic reform and upped urban growth in Bangalore, the National Games Village Complex was slated for development near the housing project in Ejipura. The Village campus was designed to include arenas and housing for the eleven-day sports event and would then be resold to upper class I.T. professionals (who were short housing since the rise of Electronic City). Koramangala Tank, one of the largest remaining tanks in southeast Bangalore, was drained to make way for the village. This had profound affects on the area’s ecology and social space. Residents in Ejipura had used the tank recreationally, to wash, and to shepherd livestock. The channels draining out of the tank were also the only pathways for residents to dispose of their sewage. Local community-based organizations (CBOs) organized residents at the time in protest. Community activist Leo Saldanha, with 150 Lakes (a Karnataka-based NGO advocating for water conservation) produced a manifesto asking,

“Why are (BBMP’s) scarce resources not being invested instead in re-building poor people's flats at Ejipura that are on the verge of collapse?”

The tank was still filled in with soil and the Village built, as millions of rupees were invested in the project and it was accruing massive national attention for Bangalore. BBMP, the municipal corporation that had only ten years earlier been an alleged champion for the rights of economically weaker sections, had suddenly shifted to align itself with powerful commercial interests. As a result, Ejipura experiences annual flooding because of the changed

hydrology of the area. A few years later, the Deccan Herald published an article highlighting the severity of anthropogenic stormwater problems, particularly in Ejipura:

“Take the case of Ejipura, a low lying area where flooding is an annual, predictable eventuality. The area has an unsolved gradient problem, and that is precisely why the stormwater drain and the sanitary pipelines do not let water and sewage flow with gravity. Experts reiterate that the rain havoc is mainly man-made, with poor civic sense among the public and an equally bad rain crisis management by the civic agencies. They find it appalling that the State government is sitting on reports of numerous committees on how to manage things better. Urban planning experts have made innumerable recommendations, but the response is either half-hearted or nothing at all.”

Neither this article nor any other publication at the time focused on the disproportionate effects of the tank’s disappearance on the community in Ejipura. Flooding intensified, and residents no longer had a free place to go to wash, collect drinking water, and feed livestock. But BBMP’s changed politics would only have additional consequences for Ejipura’s environmental quality and subsequently the unequal distribution of environmental risks and resources.

In 2002, as a result of Koramangala’s tank being filled, the stormwater drain overflowed and flooded Ejipura, which had become the lowest point in the area since the buildup of the Village site. For several days, water and filth stagnated in the tenements, afflicting property loss and breeding disease. BBMP was forced to spend exorbitant amounts

of money building an outlet drain to relieve households, which ran through Ejipura and emptied in the Bellandur wetlands to the east (as of June, 2013 these wetlands are being filled to make way for a mixed-use development project, which will not bode well for the regions techno-hydrological system\textsuperscript{255}).\textsuperscript{256} Because of flooding and the poor quality of construction, one of the buildings in the community collapsed on 9 November 2003, killing three people and displacing 36 families.\textsuperscript{257} After conducting an investigation revealing serious flaws in the building’s construction, BBMP announced that the EWS buildings would be torn down and rebuilt with a better drainage system.

Around the same time, without any consultation with the residents, BBMP decided to develop commercial and residential buildings on the 15-acre plot on which the quarters stood through a public-private partnership with Maverick Holdings. A public-private partnership is:

“A partnership between a public sector entity (sponsoring authority) and a private sector entity (a legal entity in which 51% or more of equity is with the private partner/s) for the creation and/or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system.”\textsuperscript{258}

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\textsuperscript{256} Ramachandra, Op. cit.


They emerged in cities around India after economic liberalization in 1991 as a way to finance the needed urban infrastructural advancements with upped economic productivity.\textsuperscript{259}

According to Ramdas Rao, a Peoples’ Union for Civil Liberties member,

“The residents were kept in the dark about the public-private partnership. No consultations or public hearing was held with them before they were evicted. In addition, eviction is against India’s national and international legal obligations and commitments.”\textsuperscript{260}

The actions of BBMP and Maverick Holdings defy the key tenets of the public-private partnership: “development for public purpose” and a “transparent and open procurement system on the part of the private partner.” The partnership reinforced what was already implicitly apparent of the people living in Ejipura: their lack of recognition by the municipal government and consequently their inability to participate politically. Even though the public-private partnership violated their property rights and led to increased privatization and commodification of the area’s environment, residents were disenfranchised and disempowered to challenge it. This was an obvious example of environmental injustice, as the community faced the brunt of the area’s environmental degradation and was powerless to protest.

Feigning their promises to reconstruct housing for the economically weaker sections, BBMP demolished the tenements on 5 April 2004 and constructed temporary tin sheds on a small corner of the site to accommodate those displaced. The city promised to allot residents

\textsuperscript{259} Mahalingam, 2013.

\textsuperscript{260} “NGOs Claim BBMP’s Agreement with Maverick Holdings Illegal,” \textit{Deccan Herald} (2013).
new houses and Rs. 5000 ($81) for eviction expenses, but did not follow through.\textsuperscript{261} Years passed and the families continued to live in tin sheds in grossly inadequate conditions, without any basic services including water supply, toilets, sanitation, or electricity. The BBMP’s fulfillment of its promise to rebuild housing for economically weaker sections had been stalled because of a reevaluation of the municipal public-private partnership framework.\textsuperscript{262} On 2 February 2012, BBMP and Maverick Holdings entered into a Concession Agreement stating that,

“Of the 50\% of the built-up area, Maverick Holding becomes the absolute owner of 3.82 acres, while it is permitted to commercially exploit the remaining 3.82 acres for a period of 32 years, which is extendable for a further period [Article 2.1 B of Concession Agreement between BBMP and Maverick Holdings].”\textsuperscript{263}

That August, with the help of local NGOs, residents filed case in the High Court against the injustice of the Concession Agreement. The court ruled in favor of BBMP and Maverick Holdings, stipulating that Maverick pay Rs. 30,000 (approximately 540 USD) to the 1,512 original allottees still living in the quarters as compensation and that BBMP provide alternative housing elsewhere.\textsuperscript{264} The court authorized BBMP to evict all occupants from the site and to use police force if necessary.\textsuperscript{265} Although these proceedings affected the rights of the residents in Ejipura, they were not told of the passing of the order. It therefore came as a

\textsuperscript{262} Ibid.
\textsuperscript{263} Ibid.
\textsuperscript{264} Ibid.
\textsuperscript{265} Sudipto Mondal, “Ejipura Residents May Be Allowed to Stay on Till Academic Year-End,” \textit{The Hindu} (2013).
surprise on 18 January 2013 when an army of bulldozers and 500 policemen came to
demolish homes and tanks, rendering 5,000 people homeless overnight.266

While Ejipura’s recent history is an obvious violation of civil rights, it also indicates
environmental injustice happening as a result of several municipal actors’ actions. The
eviction highlights the growing willingness to sacrifice economically weaker sections in favor
of public-private partnerships and capital growth across the city. According to Isaac Selva, a
Peoples’ Union for Civil Liberties member,

“There is no available information of any of the concerned agencies conducting
impact assessments on the social, economic or environmental dimensions of the
eviction. It does not seem that the government paid attention to exploring alternatives
to the eviction or to finding options to minimize harm and displacement.”267

Under the neoliberal economic paradigm of development and urbanization, the market has
assumed primacy over normative human rights and Bangalore has become an unjust NBE
nexus.268 The conditions Ejipura evictees are faced with, which receive consistent coverage in
state news publications (41 results in newspapers alone since January 2013), are realities for
people across Bangalore. While I.T. companies are building the best infrastructural facilities
and services on their campuses around the city, the urban poor continues to have limited
access to basic natural resources such as water, clean air, and stable land.269 Despite the
privileges already enjoyed by the I.T. sector, it continues to lobby for more facilities,
including malls, office space, and more competitive residential real estate. This puts pressure

269 Ibid.
on public-private partnerships and agencies like the BBMP to degrade urban ecosystems at the expense of economically weaker sections, fueling environmental injustice.

EXPERIENCING THE ENVIRONMENT IN EJIPURA AND GREATER BANGALORE

The injustices evictees in Ejipura are experiencing today revolve around a lack of access to environmental resources, the unequal experience of environmental degradation, and a lack of political recognition and participation. Labeling concerns such as lack of access to clean water, land, and exposure to air pollution as environmental injustices can be grounds for legal action against agencies and corporations – promoting environmental conservation and sustainable urban development through a human rights lens.

Access to clean water continues to be an enormous problem for Ejipura evictees and people living in informal settlements around the city. “There are no proper water facilities available to them,” the Times of India quotes Dr. Sylvia Karpagam saying, a woman who has been working with the homeless since the eviction.270 It is estimated that in Bangalore almost one third of the population has partial or no access to piped water.271 Poor groups in the central neighborhoods of Bangalore, like Ejipura, face particularly serious problems. One recent study estimated that more than half of Bangalore’s population depends upon public fountains, many of which supply contaminated water because of poor maintenance and broken pipes.272 Depletion of the groundwater table indicates that water shortage and disparity in access will worsen if political action isn’t taken to address unsustainable resource consumption. A survey released in January 2014, conducted by the city’s groundwater

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272 Ibid.
directorate that monitors groundwater resources every year before and after the monsoon, has revealed that the water table has been depleted an additional two feet compared to previous years.273

The existing legal framework concerning water does not call for direct conservation of water resources. However, Indian courts have recognized a human right to water, as stated in the constitution:

“Water is the basic need for the survival of the human beings and is part of right of life and human rights as enshrined in Article 21 of the Constitution of India.”

Those rendered homeless in Ejipura have been struggling with increased exposure to environmental pollution, particularly air pollution. 30-year-old Manjula reported that:

“I am suffering from allergy and rash from the dust and pollution from living out in the open after the demolition. We get free tests done at the PHC but treatment is not free. My husband has blood cancer and I cannot afford treatment for his cure. He is not able to work and I have to support both him and my daughter.”274

Interestingly, although economically weaker sections likely experience air pollution more intensely because they spend more time on the streets, it is also a concern for all people living in Bangalore. A recent study by the Energy and Resources Institute found that residents of Bangalore are five times more prone to airborne disease than residents of rural areas.275 Air pollution level in the city has reached all-time high and pollution levels in some of the busiest

locations in the city is 4.7 times more than the national average prescribed level.\textsuperscript{276} Because the effects of air pollution are distributed to people of all castes and income levels, there is more imperative for action to prevent pollution. Additionally, in Subhash Kumar v. State of Bihar, the Supreme Court recognized that the right to life “includes the right of enjoyment of pollution free water and air for full enjoyment of life”. Therefore, air pollution and other environmental degradation resulting from unsustainable urban development can be opposed on the basis of environmental injustice and human right to life. By branding the air and water problem as environmental injustices and human rights issues, we will come to recognize the wrongdoings against marginalized groups, which is the first step in their empowerment and political recognition. With recognition and understanding of the injustices being done to economically weaker sections comes increased political participation and in due process, justice.

CONCLUSION

The literature on informal settlements in Bangalore overwhelmingly theorizes that the plight of the economically weaker sections of society is a social justice issue, relating to unequal distribution of social goods. James De Witt, Janaki Nair, Sanjukta Mukherjee, Anirudh Krishna, and Solomon Benjamin, all downplay the undeniable connection between Bangalore’s urban development strategy, the NBE nexus, and injustice. As the conditions in Ejipura depict, the underclass is left unrecognized and disenfranchised by Bangalore’s development process. This makes them more vulnerable to the negative environmental externalities of development: water and air pollution, geological instability, and loss of public

\textsuperscript{276} Ibid.
environmental amenities. The people facing these environmental injustices have almost no avenues for recourse. They are not recognized as valuable players in the path to urban development and can therefore play no productive role in the democratic system. Furthermore, people in any given settlement are often demographically dissimilar, making unions and collective uprisings challenging. Other strategies are necessary to reform the development process and ensure that the NBE nexus is just.

Mitigating environmental injustice in cities as a way of solving urban development issues that is not currently considered in the literature on global cities. In my final chapter, I will scale back to look at environmental injustice in other global cities, in an effort to identify ways of redefining the NBE nexus in Bangalore. Using success stories from Curitiba, Karachi, and Ahmedabad, where the urban environment produced unhealthy dichotomies between those who benefited from the natural-built environment and those who faced its consequences, I will propose a series of solutions for Ejipura and Bangalore at large.
CHAPTER 5
Paradigm Shift in Natural-Built Environment Nexus

INTRODUCTION

In the time it took you to read the last four chapters, 1700 acres of rainforest were deforested,277 energy-related carbon dioxide emissions topped 233,000 tons,278 and three species became extinct.279 In the same time, 1700 people were displaced by economic development,280 3300 people moved into urban informal settlements,281 194 people died of a water-related disease,282 and 400 people died of air pollution.283 While listing these numbers reveals nothing about the individual lives destroyed, the hardship and injustices endured by their families, or the system of exploitation that has enabled others to live better lives by sacrificing those of the underclass, it does speak to the magnitude and scale of our social and environmental problems. Robert Nixon’s concept of “slow violence”, which I introduced in Chapter 1, is not as slow as we may think.

This thesis has offered a glimpse into the history and politics of a global city – one example of the paradigm of interactions between natural and built systems that bring about an unjust urban and rural environment. This type of analysis is particularly significant today, as globally we are on the cusp of a new way of approaching and resolving urban environmental

justice. As our daily interactions become more globalized, our global society is realizing that environmental interdependence extends beyond national boundaries. We are also beginning to recognize the implicit relationship between human rights and sustainability and are searching for ways to address both as we advance through the Anthropocene. The stories of Ejipura evictees and others who have been marginalized through Bangalore’s development process mean much more in the context of global environmental and social strife. While Bangalore is unique in its history and culture, it is tied into a global economic system that is shaping other cities in developing countries in similar ways.

In Chapter 1 of my thesis, I addressed Bangalore’s place in this changing global order. I discussed the ways in which the post-Industrial Revolution economy fueled inequality and environmental exploitation and how this played out in cities. People were not apathetic to the externalities of these largely beneficial technical and economic advancements; scholars and activists alike recognized and challenged urban development patterns. Lewis Mumford, Ebenezer Howard, Frank Lloyd Wright, and Le Corbusier conceived of regional-planning solutions that emphasized utopian-like order, where humans would entirely reconstruct the way they interacted with each other and with nature. These scholars foreshadowed that if business-as-usual industrialized growth continued, then urban centers would expand to become huge megalopolises. By the early twentieth century, a new class of cities had emerged: world cities. Characterized by size, and industrial and political power, these cities were concentrated in wealthy countries and included New York, Chicago, Detroit, and London. Today, the world’s largest cities are no longer the nodes of political power, but rather of the global economic system. These global cities began emerging in the late twentieth
century, often in the poorest countries recuperating from colonialist regimes, which were turning to industrialization and economic liberalization as a path to development.

Discussing the emergence of global cities in the context of transnational environmental degradation and human rights was important for this thesis, as it applied our understanding of environmental justice to the making of new metropolitan landscapes in developing countries. Towards the end of Chapter 1, I introduced the NBE nexus as a powerful framework to approach environmental justice in cities. My definition of the NBE nexus pushes against hybridity to describe environments in negative or positive terms based on their justice implications. The NBE nexus recognizes that both humans and nature have agency and that the nexus of their interlinked processes shapes the urban experience. I explained how through this lens, we can better understand how the urban development processes in global cities brings about environmental benefits for upper classes and environmental injustice for lower classes. Although the impact of global cities’ unjust NBE nexus is most perceptible today because of their scale and attention from international media, environmental injustices did not emerge overnight. In the case of Bangalore, the injustices that afflict the urban poor did not just emerge in the period of economic liberalization that has reshaped the city’s skyline in the last twenty years; paradigms of city planning since Bangalore’s inception have established and protracted an unjust NBE nexus.

In Chapter 2, I examined the three major stages of Bangalore’s urban growth through a socio-environmental lens to explain how the nexus between natural and social systems evolved through different political and economic transformations. At the start of my historiography, I was quick to dispel any misunderstanding of the pre-Bangalore Deccan Plateau as entirely “pure”, “wild”, or “untouched”. Although limited in scale, humans were
actors in the environment and through this the NBE nexus was conceived, although it was still more controlled by natural systems than it was by humans. I described the environmental assets that drew the region’s rulers to the site on which they built the Petah and the way they shaped the environment to execute their vision for control and stability. The site’s geography was ideal as a military base and center for extraction and trade of salt, gold, copper, iron ore, and sand deposits. However, these environmental assets would ultimately benefit only the ruling class and military in the Petah.

The arrival of the British in the late eighteenth century marked the beginning of Bangalore’s second stage of urban growth. The British Cantonment and the old city (once the Petah) grew side-by-side for one hundred and fifty years, each adhering to different paradigms of urban development that created an unequal NBE nexus. In contrast with the organic and unplanned growth of the Petah, the British used city planning as a way to establish order and social hierarchies, and tame the natural environment. The visible injustice between the lower- and middle class and the British and elite Indians was a reality throughout the subcontinent and led to Indian’s rising up and claiming independence in 1947. Its last stage of growth began after independence, when economic and physical development became unobstructed and Bangalore faced infrastructural challenges dealing with an influx of people and resources. Economic liberalization in 1991 only increased the disparity that the NBE nexus had created before. Today, huge industrial parks are scattered through and around the city, consuming and blocking massive tracks of open space, water, and other environmental amenities from communities living on the site before and all those who live around it.

In Chapter 3, I analyzed how environmental injustices in Bangalore’s hinterland contribute to the rural-to-urban transition, which is intensifying the unjust experience of urban
Bangalore’s NBE nexus. I delved into the history of Bangalore’s villages, looking at the interdependence between the rural and the urban: people of the hinterland supplied Bangaloreans with food, labor, and natural resources at a relatively constant rate since the city was founded in 1537. Yet the city and its hinterland were physically and culturally distinct until economic liberalization in 1991, when industry began to sprawl beyond the city limits, which blurred the distinction between urban and rural. Thus, villagers were drawn into urban informal settlements. I argued that while other factors such as rural housing insecurity, promise of employment in the city, chain migration, appeal of urban culture, and the lack of resources, facilities, and education in rural areas are undoubtedly factors, the role of the unjust NBE nexus in rural areas is an important driver of rural-to-urban transition and is fueling the growth of the urban underclass.

I was critical in Chapter 3 of placing excess blame on the rural poor, who are often scapegoats for environmental degradation: they are forced to overuse environmental resources for their day-to-day survival. Rather, the story of rural Bangalore is fraught with injustice. Manufacturing industries and special economic zones for agribusiness in Karnataka are notorious for their lack of responsibility for environmental cleanup, which leads to air, soil and water pollution that is most experienced by the rural poor. Heavy mining and the destruction, reallocation, and privatization of Karnataka’s common pool resources over the last two decades have also had tremendous environmental and social impacts. Proximate causes of environmental injustice are only exacerbated by the government’s unresponsiveness in solving these problems. Examples of transnational environmental injustice, or “slow violence”, include climate change, which has increased variability in rainfall and prolonged periods of drought, and western consumer culture, which has placed manufacturing and
extraction burdens on Karnataka’s environments and people. The disregard for the sustainability of Bangalore’s hinterland and health of its people shows clear nearsightedness on the part of the state government and corporations: Bangalore cannot function without its rural inputs, which rural communities provide. The defilation of Bangalore’s hinterland quickens the rate of unplanned urbanization, leading to increased urban problems.

In my last chapter, I investigated the dichotomy that exists between the I.T. elite class and underclass in Ejipura, the most publically realized and contentious site of injustice in Bangalore. I push against scholar’s conceptualizations of informal settlements as merely social justice issues and reinforce the connection between Bangalore’s urban development strategy, the NBE nexus, environmental degradation, and injustice. I described the political processes that shaped the dichotomy of living in Koramangala and that climaxed with the overnight displacement of 5,000 in January of 2013. Ejipura was the product of failed policies, bad governance, corruption, inappropriate regulation, dysfunctional land markets, public-private partnerships, and a fundamental lack of political will. The unjust NBE nexus has played out in the flooding and erosion of Ejipura’s terrain, the contamination of its water supply and loss of public open space, the shoddily built tenements (which the sun’s heat only rendered more unlivable), and the solid waste and air pollution from the consumptive lifestyles of middle- and upper class Bangaloreans. This chapter makes apparent the underlying shift that is needed to re-imagine the NBE nexus in Bangalore to be sustainable and just for all.

As the conditions in Ejipura depict, the underclass is left unrecognized and disenfranchised by the development process around them. This makes them more vulnerable to the environmental externalities of development, including water and air pollution,
geological instability, and loss of public environmental amenities. The people facing these environmental injustices have almost no avenues for recourse. They are not recognized as players in the path to urban development and can therefore play no productive role in the democratic system. Furthermore, people in any given settlement are often demographically and thus culturally dissimilar, making unions and collective uprisings challenging. Other strategies are necessary to reform the unjust system of urban development and prevent environmental degradation.

I began this final chapter with a sweeping quantification of the accumulation of injustice worldwide, of which Ejipura is only a small piece. The imperative of addressing environmental justice in global cities is enormous and not merely a matter of ending injustice. My vision is that by working towards environmental justice, our communities, cities, states, nations, and ultimately our entire planet will become more resilient, more inclusive, and more enriching for everyone, regardless of difference. This thesis emphasizes environmental justice in Bangalore, specifically, because it is an example of a class of cities that are and will increasingly play an enormous role in environmental and social sustainability. The number of people who make up the underclass in Bangalore is large and their numbers will only continue to grow—and their living environments will continue to worsen—unless a paradigm shift occurs in the way the NBE nexus is conceived. The question of how this paradigm shift is achieved, however, is complex and place-specific. Recognizing the innate differences in scale, history, cultures, and geographies of global cities is important, and once acknowledged, can open up a productive dialogue around method sharing across cities.

In this final conclusion, I will scale back to look at global cities, in an effort to identify ways of redressing the NBE nexus in Bangalore. Using success stories from interventions in
three other global cities (Curitiba, Brazil; Karachi, Pakistan; and Ahmedabad, India) where
the urban environment had produced unhealthy dichotomies between those who benefited
from the natural-built environment and those who faced its consequences, I will propose a
series of solutions for Ejipura, and Bangalore at large. These case studies do not contain the
panacea for urban problems; none of the interventions completely eradicated injustice or
environmental problems. They also do not address the international and rural dimensions of
injustice, which Chapter 1 and Chapter 3, respectively, emphasize as integral parts of an
integrated solution.

Nevertheless, the approaches these cities take to address injustice through the re-
structuring of the urban NBE nexus are helpful. Curitiba, with its top-down approach to city
planning, has received international praise for its integration of land use planning,
transportation infrastructure, and environmental sustainability efforts. The Orangi Pilot
Project in Karachi was a successful example of grassroots community organizing, where
NGOs led the community in building an affordable sanitation system for the treatment of its
sewage. Ahmedabad’s Slum Networking Project is in many ways a hybrid of the top-down
and bottom-up approaches, successfully engaging multiple stakeholders in participatory and
decentralized revitalization projects in informal settlements. The following pages summarize
the cities’ strategies for addressing environmental and social problems, and their potential
applicability in Bangalore.

MASTER PLANNING IN CURITIBA, BRAZIL

Curitiba, the capital of Brazil’s southern state of Paraná, is one of the fastest growing cities in
South America, with its population increasing tenfold to 3.7 million in the last sixty years (see
Much like Bangalore, Curitiba was founded because of its ideal location for trade in the 1700s and grew through an expanding logging and agriculture economy in the eighteenth and nineteenth centuries. In the 1850s, waves of European immigrants began arriving in Curitiba and by the 1940s, the city was faced with increasing demands for housing, transportation, and other built infrastructure. In response to obvious shortcomings, the municipal government hired planners in 1943 to devise a comprehensive development plan that would accommodate increased car traffic. This plan was never fully implemented and by the 1960s, when population was growing exponentially, it became clear that a new plan was needed.

Developed in 1964, the “Curitiba Master Plan” provided a planning framework and principles that continue to guide the city today. The master plan emphasizes the relationship between integrated urban transportation, appropriate land uses, and environmental preservation. Under the plan, a high-capacity bus system was established, which over 70% of residents now rely on (see Figure 33). Curitiba’s well-known and expansive park system serves a vital role in controlling flooding, protecting biodiversity and water quality, and mitigating carbon emissions in the city, unlike Bangalore’s gardens. Parkland comprises nearly one-fifth of the city, with over 580 square feet of green space per inhabitant. The third tenet of the master plan is Curitiba’s recycling program, which diverts 70% of the city’s trash to recycling centers. The municipal government incentivizes recycling by charging for

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285 Macedo, p. 545.
286 Ibid.
289 Gustafsson, p. 20.
Figure 32. View of Curitiba from park. Source: 'Cities', The Future We Want, (2014), Web.

Figure 33. The famous Public Transportation System in Curitiba. Source: Jan Gehl, 'Curitiba Revisited', Cities for People (Gehl Architects, 2010).
garbage collection and providing free curbside pickup for recycling. They also subsidize low-income persons to collect garbage and recyclables from favelas in and around Curitiba.²⁹⁰ The growth and attempted integration of low-income people in Curitiba’s urban plan has become particularly important in recent years.

Over the last twenty years, the municipal government has taken largely unsuccessful measures to address the influx of low-income rural people who – displaced by evictions and environmental degradation – come to live in squatter settlements.²⁹¹ In 1990, it created the Municipal Housing Fund to partner with private companies and manage all low-income housing and related services, including sewerage and electricity.²⁹² However, the government has been unable to keep up with the increasing demand for housing and services. Fifteen percent of Curitiba’s population lives below the poverty line and is unable to afford decent housing.²⁹³ According to Joseli Macedo, an American professor of urban planning, “The increasing number of unplanned settlements in Curitiba and surrounding areas, as well as the resulting environmental degradation, may be attributed to a simple lack of political will to address these issues.”²⁹⁴ Curitiba’s ascension to international fame for its other environmental and social initiatives may be part of the problem, as it has put blinders on people’s understanding and acceptance of an all-but-perfect urban master plan.

While there are many elements in Curitiba’s master plan that could serve Bangalore well, the nature of its top-down strategy has caused Curitiba to develop an unjust NBE nexus, characteristic of Bangalore’s. There are several ways in which such a top-down approach

²⁹⁰ Gustaffson, p. 21.
²⁹³ Ibid.
would fail in Bangalore. Like in Curitiba, Bangalore’s urban growth is so dramatic that it consistently surpasses even the most insightful planners’ visions for it. Macro-level projects consistently underestimate or ignore the needs of the poor. Additionally, Bangalore’s public-private partnerships have forced power out of the hands of municipal governments, already rife with corruption, and into the hands of corporations.\textsuperscript{295} Despite Curitiba’s many successes, it has not been able to fully eradicate environmental injustice, as evidenced by the widespread favelas.

Its top-down approach to improving the NBE nexus operates with a different set of stakeholders and relationships. Bangalore’s municipal government has less control over the land and constituencies within its jurisdiction. This is in part because of the public-private partnerships that fund development, but tend to usurp government and individuals’ power through bribes and coercion.\textsuperscript{296} Bangaloreans are also much more diverse than the predominantly Portuguese-speaking residents of Curitiba. Language and cultural barriers often prevent the municipal government in Bangalore from uniting communities under improvement initiatives. Therefore, while Curitiba’s successful projects should be applauded and considered in Bangalore, Curitiba’s slum improvement initiatives have been unsuccessful and would not be applicable in the context of Bangalore.

\textsuperscript{296} Srinivasa and Selva, Op. cit.
ORANGI PILOT PROJECT IN KARACHI, PAKISTAN

Karachi is Pakistan’s main seaport and largest city. With over 15,000 industries polluting the city’s air and water and 60% of its 23 million inhabitants living in informal settlements, Karachi is an example of a global city whose NBE nexus has failed the urban poor (see Figure 34). Lack of and ad hoc government response to injustice dates back to the independence of Pakistan and partitioning of India in 1947. As Muslims relocated to Karachi, the city’s population swelled to one million people, overwhelming the government. Government officials allowed refugees to settle in vacated spaces of the city, which quickly grew to become informal settlements. The Green Revolution of the 1960s and a series of regional wars produced an influx of rural Pakistanis and refugees from Afghanistan, Iran, Bangladesh, and the Soviet Union. The number of people living in informal settlements in the late 1970s was estimated at around two million people; most of these settlements were positioned far from the city center, and were thus disconnected from important urban services. Furthermore, the government lacked the capacity to fully address access to decent housing, sewage treatment, clean water, electricity, and other social and environmental amenities.

The Orangi Pilot Project started in 1980 in Orangi Town, Karachi’s largest squatter community with a population of 1.2 million. The community faced several environmental injustices, including a lack of sanitation services, for which recourse through government aid was impossible because of its “unofficial” status. Led by Dr. Hameed Khan, Pakistan’s best-known development worker, the OPP evolved in just five years to be a self-funded, self-

299 Ibid.
300 Ibid.
301 Wateraid (2013), Web.
administered, and self-maintained grassroots movement that was entirely funded and maintained by its residents, using local labor and materials to build underground sewers. In 1988, the OPP expanded to become four autonomous NGOs, spreading its participatory development model to different parts of Karachi and focusing more broadly on low-cost sanitation, housing, health, education, and micro crediting. While the municipal government’s involvement remains limited, it has facilitated the advancement of these programs through the liberal allocation of land tenure in settlements, which gives residents more ownership and stake in the improvement of their community. The OPP has uplifted Orangi and other communities in very tangible ways: by 2001, almost 90% of residents had access to sanitation services and the infant mortality rate had fallen by more than 60%. Many other social benefits go unnamed, perhaps most important being that, in contrast to most development schemes where poor communities are treated as passive objects of development, Orangi marks the first successful example of a large-scale infrastructural project led by the urban poor themselves (see Figure 35).

Is the OPP model for grassroots development applicable in a city like Bangalore? Despite its success, the strategy has received international criticism for being inimitable on any serious scale outside of Karachi. The OPP was resolute in its refusal of any outside funds, condemning INGOs for losing their integrity by channeling government or private grants. This has spurred substantial controversy, as squatter communities worldwide lack

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303 Ibid.
306 Ibid.
307 Ibid.
Figure 34. Karachi skyline. *Source:* 'Biggest Cities in the World', in List 10 (2013), Web.

land rights and the sense of ownership over their homes, which comes with land ownership. Squatter communities thus lack the ability to invest their time and limited earnings into community upgrading. Furthermore, informal settlements in Bangalore and other global cities house heterogeneous groups of people, with divisions between incomes and assets, ethnicity, religion and gender, and between employers and workers and between tenants and owners. These divisions often hinder “community” unity and engagement. Others argue that even with increased communication among residents and collaboration with governments and businesses, NGOs are too temporary to fight the widening gap between the rich and the poor in global cities. So while NGOs and grassroots development approaches may support the underclass in its own upliftment, they are not holding responsible parties accountable for environmental injustice and cannot single-handedly bring about a paradigm shift in Bangalore’s NBE nexus.

SLUM NETWORKING PROJECT IN AHMEDABAD, INDIA

With a population of 6.3 million, Ahmedabad is the largest city in the State of Gujarat and the sixth largest city in India. It emerged during British rule as the center for India’s textile industry and was consequently the center of the Indian independence movement. The textiles industry continued to be an important driver of the city’s economic growth and a major source of employment until the 1980s when textiles mills closed and caused widespread

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Population growth fueled by economic liberalization in the 1990s, violent clashes between castes over affirmative action legislation and religious differences, and a massive earthquake in 2001 left the city unable to address the basic services needs of the urban poor. Approximately 41% of the city’s population lives in informal settlements and 75% of the working population is employed in the informal sector (see Figure 36). The government has tried several different schemes to tackle housing and resource insecurity. It has been largely ineffective in meeting the basic needs of the poor and in understanding and addressing the systemic causes of environmental injustice.

The Ahmedabad Parivartan (also known as the Slum Networking Project) is one of the few government schemes that have the potential to be scalable to greater Ahmedabad and applied broadly to other communities. In 1995, the Ahmedabad Municipal Corporation launched the project in five informal settlements, partnering with the target communities, local non-governmental organizations, the private sector, the World Bank and the UNDP. Through these collaborations informal settlements were outfitted with basic infrastructural services in a more affordable and sustainable way (see Figure 37). Private partners who owned shares of surrounding properties invested capital to fund sanitation and water-related projects, which NGOs coordinated in collaboration with the city. Residents of the settlements themselves were consulted to determine the optimal location for toilets, stormwater drains, street lighting, and waste disposal sights. They were then paid to

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313 Ibid.
314 Ibid.
315 Ibid.
316 Ibid.
Figure 36. Slum in Ahmedabad. Source: Marv Gillibrand, 'Ahmedabad City Slums', in Flickr (2008), Web.

implement these changes. This project was successful in part because it moved away from historic distrust of the underclass by recognizing residents’ role as active partners in the development process.\textsuperscript{317} After so many of its resettlement and rehabilitation approaches failed, the government also became willing to provide land tenure to residents in informal settlements, thus giving them sovereignty over their communities.\textsuperscript{318}

The Slum Networking Project in Ahmedabad is in many ways a hybrid of the approaches taken in Curitiba and Karachi. While its focus is still narrowly on improving informal settlements, rather than addressing the underlying injustices of the NBE nexus, the project is in its early phases and has the potential to be scaled up to generate systemic change. While many scholars are skeptical of this type of centralized participatory development,\textsuperscript{319} it takes a much-needed and more transparent approach through its multi-stakeholder partnerships. Of the three case studies discussed, this project is the most applicable to Bangalore. Because both cities share a similar history, have a nearly identical composition of stakeholders, and face comparable challenges with their NBE nexuses, the Slum Networking Project could be feasibly implemented in Bangalore. While scaling up to generate permanent citywide changes will still be a challenge, leveraging mass participation and ensuring transparency under one common vision is optimistically achievable.


CONCLUSION

Many will argue that localized interventions that focus on informal settlement improvements – or even citywide infrastructure improvements – will not be enough to achieve a paradigm shift in Bangalore’s NBE nexus. They are patches, some say, for proximate causes and will not approach the roots of environmental injustice such as capitalism, paternalism, racism, classism, consumerism, sexism, and all other types of –isms that are perpetuated on a global scale. Realistically, problems need to be addressed at all levels: in the General Assembly of the UN, through the bills passed by congresses and the lobbies for corporate social and environmental responsibility, through new investments in green technology and affordable housing, through grassroots organizations and municipal programs, in the classroom, at home, and within ourselves.

Researching and writing this thesis over the past year has allowed me to apply my knowledge of architecture and environmental studies in a constructive and pragmatic way. Together, these disciplines have offered me the lenses through which to view intersections and complexity in Bangalore’s urban environment. I have been critical in my narration of Bangalore’s history and current condition, pushing back against its often-naïve or incomplete depictions as the “Garden City”, “Silicon Valley”, and “Pensioner’s Paradise” of the East. Yet, despite the incredibly heartrending topics of injustice, exploitation, environmental destruction, and human dominion, I do not wish to conclude with a message of gloom and doom. Chapter 5 shows not only how Bangalore’s problems are global, but also how the movement to solve these problems is vast. There are countless examples in cities around the world of individuals

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who question the status quo coming together to design new ways of thinking, living, and interacting, thus remaking the world for the better. If this thesis did anything to contribute to this momentum, I hope that it was through its re-conceptualization of the relationship between the natural and built environments as the basis for a just and stable planet. We must move forward as scholars, activists, designers, and leaders, knowing deep within ourselves that changing this relationship has the power to improve lives, foster harmony and connectivity, and enrich the human experience.
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