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**Socio-Spatial Disparities in Environmental Health in the City of
Johannesburg**

By

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Research Report

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DECLARATION

I, Zizipho Nyangule, declare that this research report is my work. It is being submitted for the degree of Master of Management in Governance at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Znyangule

28 February 2024

DEDICATION

I dedicate this research to my parents (**Mr. Adviser Nyangule and Mrs. Zuzeka Nyangule**). Thank you for nurturing a passion for learning and instilling discipline and the importance of education.

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ABSTRACT

This research explored socio-spatial disparities in environmental health within the urban context of Johannesburg, specifically focusing on access to environmental health services in both low-income and high-income neighborhoods. The study aimed to comprehend how disparities in access to essential services impact residents' environmental health experiences. Employing a qualitative research methodology, data was collected from two focus groups as part of the Sustainable, Healthy, Learning Cities and Neighborhoods (SHLC) project. A hybrid thematic analysis approach was utilized to examine secondary data from focus groups conducted in both low-income and high-income neighborhoods, illuminating the unique challenges faced by residents in each socio-economic context. The findings reveal shared challenges in both low and high-income areas, encompassing access to sanitation, clean air, healthcare, and civic engagement. However, the manifestations of these challenges differ; low-income neighborhoods experience more acute impacts on basic health and well-being, while high-income neighborhoods may grapple with issues related to the preservation of quality of life and efficient governance. This study contributes to the understanding of environmental health disparities and highlights areas for improvement in enhancing the overall well-being of residents in diverse urban settings. The research findings underscore the importance of targeted interventions tailored to the specific socio-economic context of neighborhoods in the City of Johannesburg. Additionally, the study emphasizes the relevance of Environmental Justice and Social Justice perspectives in addressing these disparities, thereby offering a comprehensive framework for future interventions.

Table of Contents

DECLARATION.....	ii
DEDICATION.....	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT.....	iv
CHAPTER 1 INTRODUCTION & BACKGROUND	1
Introduction.....	1
Historical background of spatial and environmental disparity in Johannesburg	3
Problem Statement	5
Purpose of Study	6
Research Questions	7
Theoretical Framework.....	8
Environmental & Social Justice	8
Access.....	10
CHAPTER 2 LITERATURE REVIEW	12
Literature Review	12
Race and Income Disparity in South Africa.....	12
Socio-Spatial Inequality and Environmental Health.....	15
Gated communities and neoliberalism	16
Low-income neighborhoods.....	19
Environmental health and access	20
Water, Air, and Sanitation access	22
CHAPTER 3 RESEARCH METHODOLOGY.....	25
Research Methodology	25
Philosophical approach	25
Method of Collecting Data.....	27
Evaluation of the dataset	27
Data Analysis.....	29
Sampling Technique	30
Positionality.....	34
Validity, reliability, and dependability.....	34

<i>Validity</i>	34
<i>Reliability</i>	35
<i>Dependability</i>	35
Limitations of the study.....	35
CHAPTER 4 FINDINGS	37
Research Question 1: To what extent does socio-spatial inequality exist in access to environmental health services within the City of Johannesburg, specifically comparing high-income and low-income neighborhoods?	37
Sanitation	37
Access to clean air	39
Research Question 2: How does differing access to essential environmental health services across high-income and low-income neighborhoods within the City of Johannesburg impact the lived experiences and environmental health perception of residents?	42
Effective Government and Civic Engagement.....	45
Access to Healthcare	48
CHAPTER 5 DISCUSSION	50
Sanitation.....	50
Access to clean air	54
Effective Government and Civic Engagement.....	57
Access to Healthcare	59
CHAPTER 6 CONCLUSION	63
Summary of Findings	63
Bridging the Gap: Where Governance Meets Environmental Health Disparities:	64
Broken Trust, Unequal Burden:	64
A Governance Agenda for Change:.....	64
Policy Recommendations:	65
Beyond the Report, Towards a Just and Sustainable Future:	66
REFERENCE LIST	67

List of Figures

Figure 1: Three residential types in Gauteng.....	19
Figure 2: Change in access to basic services between 2015 and 2018	21
Figure 3: Households experiencing environmental problems (2019).....	21
Figure 4: Rabie Ridge Map.....	31
Figure 5: Kaalfontein Map.....	32
Figure 6: Mayibuye SP Map	32
Figure 7: Weltevreden Park Map	32
Figure 8: Windsor Glen Map	33
Figure 9: Blairgowrie Map.....	33

CHAPTER 1 INTRODUCTION & BACKGROUND

Introduction

Environmental health is a field within public health that focuses on safeguarding against the harmful effects of environmental hazards that negatively impact both human health and the ecological balance necessary for overall well-being (Frumkin, 2016). The environment encompasses factors that are external to individuals, such as the physical and social surroundings that significantly influence the health of individuals and communities, as opposed to internal factors like genetic makeup (Friis, 2018). The physical environment refers to the external conditions and surroundings that affect the quality of life for humans, animals, and plants, encompassing elements such as air, water, and land, on the other hand, the social environment includes aspects like housing, transportation, urban development, and land use (Friis, 2018).

For the context of this study, environmental health services refer to a range of services that aim to protect and improve public health by addressing environmental factors that can adversely affect health outcomes (Agenbag, Human, & Schutte, 2022). These services include access to clean water and sanitation, waste management, air quality management, and the provision of green spaces, which are essential for promoting physical and mental well-being (Agenbag, Human, & Schutte, 2022). The investigation of differing access to environmental health services is informed by existing literature on environmental justice and socio-spatial inequality, which highlights the importance of equitable access to these services as a fundamental aspect of social justice (Ballard & Hamann, 2021; Everatt & Ebrahim, 2020; Maharaj, 2020; Venter et al., 2020). Recognizing this intricate relationship between the environment and health, environmental health services play a critical role in protecting public health by addressing various environmental risks and promoting a healthy living environment (Agenbag, Human, & Schutte, 2022).

Health outcome disparities have not emerged independently; rather, they have been recognized as interconnected within a complex network of issues stemming from unequal access to essential services, this access to fundamental services on a city-wide scale has, in turn, been influenced by specific institutional actions such as urban planning (Ouma, 2021). Additionally, discrepancies in socioeconomic status, whether assessed through income, educational attainment, or occupation, correlate with significant gaps in health outcomes (Fiscella & Williams, 2004). The issues

surrounding urban health and the impacts of environmental inequalities on health disparities within cities have become significant focal points, both the features of the built environment and the socioeconomic composition of individuals or neighborhoods are key factors in illustrating the disparities in environmental health across communities (Schüle, Gabriel & Bolte, 2017).

The relationship between the spatial dynamics and social aspects of urban society is robust, as cities serve as platforms for the spatial manifestation of human social and economic endeavors (Hamann & Horn, 2022). This interplay often results in the segmentation of urban areas into advantaged and disadvantaged segments (Hamann & Horn, 2015). These dynamics are further complicated by the intricate interactions between residents and their surroundings, placing strain on urban administrations as they contend with diverse and often conflicting demands stemming from population growth (Hamann & Horn, 2022). Consequently, the prevailing characteristics of South African urban landscapes encompass imbalanced spatial arrangements, deficient public transport infrastructure, unequal access to economic and social prospects, and poorly situated lower-income communities (Du Plessis & Boonzaaier, 2015).

Research across multiple disciplines using various methods and data has consistently found that living in disadvantaged neighborhoods has negative effects on health and well-being (Sellström & Bremberg, 2006; Opačić, 2021; Vyncke, et al., 2013). Disadvantaged neighborhoods, which are typically inhabited by low-income and minority populations, tend to be exposed to more environmental hazards than those inhabited by higher-income and advantaged neighborhoods this exposure to adverse neighborhood conditions helps to explain the socioeconomic and racial inequalities observed in health outcomes (Banzhaf, Ma, & Timmins, 2019; Brazil, 2022).

Previous studies have examined the influence of race and class on environmental health impacts within disadvantaged communities, particularly in the context of environmental health inequality (Brown, 1995; Cutter, 1995; Margai, 2013; Sexton, 2000). While environmental health and spatial inequalities are prevalent throughout South Africa and other developing regions, this study aims to contribute to knowledge by focusing on the conditions within the City of Johannesburg. The city is known for exhibiting notable spatial and environmental health inequalities, particularly concerning issues such as sanitation, access to clean water, green spaces, and air quality (Beall, Crankshaw, & Parnell, 2002; Chauke, 2017; Mathee, & von Schirnding, 2003; Khanyile, & Fatti, 2022).

Historical background of spatial and environmental disparity in Johannesburg

Colonial City

Until the mid-19th century in colonial society, there was minimal actual segregation based on race or ethnicity, except for distinctions in housing styles due to wealth (Christopher, 1893). While there were racial undertones within the free society, there was no enforced segregation in residential areas, mainly because the European population held uncontested political and economic power in towns (Christopher, 1893). The rise of segregation in the late 19th and early 20th century in South Africa was driven by concerns about the spread of diseases, the concept of "sanitation syndrome" emerged during this period, attributing racial segregation to a combination of moral panic, racial hysteria, poverty, and disease (Wood, 2019). This European phobia served as a metaphor that shaped perceptions and influenced behavior, ultimately justifying the implementation of spatial divisions based on race, the outbreak of the Bubonic Plague in South African cities between 1901 and 1904 further fueled these sentiments, leading to the forced relocation of Africans residing in urban areas (Wood, 2019). The concerns among the European population about the transmission of contagious diseases, particularly due to the proximity of "native locations" to sewage farms and refuse dumps, played a crucial role in promoting official segregation by municipalities (Lemon, 2021).

In Johannesburg, the outbreak of the plague was seized upon by local authorities as a justification to relocate individuals from the inner-city "Coolie Location" to the newly established township of Klipspruit (Maylam, 1995). The influenza epidemic of 1918 and the significant issue of tuberculosis prompted the introduction of the Public Health Act in 1919, which enabled centralized state control over the conditions in certain areas such as slums (Maharaj, 2020). However, despite efforts to clear slums, conditions in the new settlement areas persisted due to limited resources and the added burden of increased transportation costs, Africans living in peripheral locations experienced even worse living conditions compared to those experienced in slums (Maharaj, 2020). Among other legislations put in place to enforce segregation in South Africa's urban areas, Johannesburg was one of the first cities to adopt the Natives (Urban Areas) Act of 1923 which had significant consequences in terms of service provision, property ownership, administrative participation, and the physical layout of African townships (Lemon, 2021). This legislation granted local authorities the authority, although not the obligation, to designate segregated areas of land

for urban Africans, establish housing for them, and require their employers to do the same, additionally, it facilitated the implementation of a basic system of controlling the influx of African populations (Lemon, 2021).

The Apartheid City

The structure of the apartheid city was not solely defined by the typical binary division between white/European and black/native/African populations, the division between citizens and subjects, or the distinction between the colonial rulers and the colonized, rather, it was characterized by a system of statutory racial classification that also separated populations of Coloured and Indian descent (Seekings, 2011). This complex classification system created distinct categories within the racial hierarchy, introducing additional divisions and complexities to the apartheid city (Seekings, 2011).

The National Party's rise to power in 1948 marked the beginning of the apartheid era in South Africa, characterized by a series of race-based legislations, one of the key laws enacted during this time was the Population Registration Act of 1950, which classified South Africans into four racial groups: Africans, Whites, Coloureds, and Indians, the principles of segregation were further solidified through the implementation of the Group Areas Act (GAA) in 1950 (Maharaj, 2020). The Group Areas Act was a comprehensive embodiment of apartheid on an urban scale, granting the state significant control over the use, occupation, and ownership of land and buildings based on racial distinctions. It emphasized the creation of separate residential areas, educational services, and other amenities for each racial group (Maharaj, 2020). The allocation of land, based on racial groups did not typically align with population sizes, and the planning of Group Areas had been influenced by existing limitations on land ownership and economic disparities among distinct groups (Davies, 1981). In "Non-White" Group Areas, private land ownership was permitted for Indians, Chinese, and Coloureds, but was prohibited for Africans, consequently, there were significant housing shortages for all black racial groups, leading to either overcrowding in existing housing or the emergence of informal settlements on the outskirts of metropolitan areas (Davies, 1981). The exclusion of black South Africans from residing in cities due to apartheid policies led to the creation of underdeveloped and overcrowded areas, contributing to income and spatial inequalities within cities and regions (Everatt & Ebrahim, 2020). The spatial planning under apartheid resulted in environmentally unsustainable cities characterized by stark disparities in the

allocation of municipal resources (Murcott, 2015). This phenomenon is further explored in Venter et al. (2020), who discuss the concept of "green apartheid," which refers to the unequal distribution of urban green infrastructure across different racial and income geographies in South Africa, their research highlights how historical injustices and contemporary planning practices continue to marginalize low-income communities, particularly those of African descent, from accessing green spaces and environmental benefits. This ongoing disparity not only reflects the legacies of apartheid but also exacerbates social inequalities and environmental health disparities in urban areas Venter et al. (2020).

Problem Statement

Since 1994, there has been a notable escalation in class and social segregation, with low-income communities often located far from viable economic opportunities, (Pieterse, 2019). Although some strides have been made toward reducing racial disparities in middle and high-class neighborhoods, clear spatial distinctions based on socioeconomic status persist throughout the country (Todes, 2012). The stringent planning policies under South Africa's apartheid regime significantly influenced the nation's spatial landscape, this systematic segregation has resulted in many South African cities having spatial configurations ill-equipped to accommodate their expanding urban populations (Phosho, Gumbo, & Makoni, 2021). Furthermore, the sprawling urban layout established during apartheid exacerbated environmental consequences for low-income communities (Pieterse, 2019).

Households with the lowest income levels in South Africa, typically reside in housing that offers minimal health protection, with restricted access to clean water, sanitation facilities, waste disposal services, and safe energy sources (Mathee & Wright, 2013). These households are frequently at a higher risk of exposure to both indoor and outdoor pollution, stemming from factors such as traffic emissions and operations of formal and informal industries (Mathee & Wright, 2013). Additionally, they often face challenges related to food insecurity and malnutrition, amplifying their susceptibility to adverse health effects caused by environmental hazards (Mathee & Wright, 2013). Since 1994, the post-apartheid government has made it a priority to ensure the provision of essential services, including sanitation, to regions historically marginalized under apartheid rule, it has developed strategies aimed at delivering and enhancing access to sanitation facilities (Manga, Bartram, & Evans, 2020). While significant strides have been taken in extending

sanitation services to all citizens in South Africa since 1994, the objective outlined in the Strategic Framework for Water Services and The National Sanitation Policy, which aimed to provide at least a basic sanitation service to all (The National Sanitation Policy, 2016; South African Government, 2003). Still, it falls short (Van Ryneveld, Fourie, & Palmer (2016).

Johannesburg stands out as one of the most diverse cities on the African continent, despite its urban cosmopolitanism, the city remains deeply affected by alarming levels of inequality, influenced by its spatial layout (Abrahams & Everatt, 2019). The apartheid-era urban planning has resulted in Johannesburg being labeled as the most unequal city globally, situated within the most unequal country in the world (Abrahams & Everatt, 2019). Johannesburg has since embraced a spatial transformation strategy to tackle issues like inequality, injustice, and social alienation within the city (Phosho et al., 2021). Despite the introduction of multiple initiatives, legislative measures, and policies such as the Spatial Development Framework 2040 (2016), the spatial layout of the city remains significantly fragmented (Phosho et al., 2021).

In the context of a modern urban planning paradigm that stresses spatial fairness and equality, the enactment of the National Spatial Planning and Land Use Management Act (SPLUMA, Act 16 of 2013) establishes a legal framework for ensuring equitable distribution of green infrastructure. Similarly, the City of Johannesburg's integrated Environmental Management Policy aimed at addressing environmental justice concerns (Venter et al. (2020). However, there has been a lack of national assessment regarding access to urban environmental infrastructure, as noted by Venter et al. (2020). This gap is particularly evident in numerous social housing developments constructed by the post-apartheid government, where issues related to environmental justice, sustainability, and quality of life have been overlooked, despite existing policy recommendations advocating otherwise (Chishaleshale et al., 2015).

Purpose of Study

The purpose of this study is to investigate socio-spatial inequality in high-income and low-income neighborhoods, particularly examining variations in access to environmental health services in the City of Johannesburg. To understand the impact of differing access to environmental health services on resident's environmental health experiences. By analyzing data obtained from focus group discussions conducted in different neighborhoods, namely Rabie Ridge, Kaalfontein, Mayibuywe SP (representing low-income neighborhoods), as well as Weltevreden Park, Windsor

Glen, and Blairgowrie (representing high-income neighborhoods), the study sheds light on the differences in access to environmental health services between these contrasting socioeconomic contexts.

The identification of these neighborhoods was based on several criteria, including household income levels, employment status, and access to basic services. For the purpose of this study, low-income neighborhoods were defined as those with reported household incomes ranging from R1,001 to R7,500 per month, reflecting economic challenges and limited financial resources. In contrast, high-income neighborhoods were characterized by household incomes ranging from R25,001 to R50,000 per month, indicating a more affluent socioeconomic status. Additionally, the selection of these areas considered factors such as the availability of infrastructure, access to healthcare services, and overall living conditions. The neighborhoods were chosen to represent a spectrum of socioeconomic realities within the City of Johannesburg, allowing for a comprehensive analysis of how these disparities impact residents' access to environmental health services.

By examining the impact of differing access levels on residents' environmental health experiences, the study contributes to the understanding of the broader social and environmental justice issues within the city. The research contributes to a better understanding of the relationship between access to essential resources and environmental health outcomes, intending to inform policy and interventions aimed at promoting equitable access to a healthy and sustainable living environment in Johannesburg.

Research Questions

The research questions that the study is concerned with are:

1. To what extent does socio-spatial inequality exist in access to environmental health services within the City of Johannesburg, specifically comparing high-income and low-income neighborhoods?
2. How does differing access to essential environmental health services across high-income and low-income neighborhoods within the City of Johannesburg impact the lived experiences and environmental health perception of residents?

Theoretical Framework

Environmental & Social Justice

Accessibility of basic public facilities has garnered attention from researchers, particularly in understanding spatial disparities, accessibility serves as a vital tool for evaluating spatial equity and directing policy initiatives (Li, et al., 2021). It refers to the ease of reaching essential services, it is influenced by factors such as geographic distribution and socioeconomic characteristics; by assessing accessibility, policymakers can identify areas where interventions are needed to ensure fair access to services, thereby promoting spatial equity and social inclusion. (Li, et al., 2021).

Accessibility is a complex concept, as noted by Curtis and Scheurer (2010), encompassing various dimensions. It is closely tied to the spatial aspect of social exclusion and raises questions about the significance of place and location concerning poverty, as highlighted by Farrington (2007). Nonetheless, the precise role of space in social exclusion remains ambiguous and subject to ongoing debate, as discussed by Hodgson and Turner (2003). Another important consideration regarding accessibility concerns is that it represents just one facet of social exclusion, merely having prominent levels of accessibility does not automatically guarantee that individuals can reap its benefits, it is crucial to acknowledge that accessibility is integral to social justice (Martens, Golub, & Robinson, 2012). Restricted access impedes the pursuit of social justice, making it more challenging to achieve, accessibility serves as a prerequisite for social inclusion, which in turn is essential for fostering social justice, fairness, and spatial justice (Martens, Golub, & Robinson, 2012; Soja, 2013). Incorporating an accessibility viewpoint is integral to the endeavor of explicitly integrating the concept of space into the comprehension of social justice, as articulated by Farrington and Farrington (2005).

According to John Rawls, social justice can be understood as fairness in the way that social institutions distribute fundamental rights, responsibilities, and benefits resulting from social cooperation (Rawls, 2020). The concept of social justice emphasizes the idea that a society's well-being is enhanced when the allocation of valued resources and opportunities is done fairly and equitably (Rawls, 2020). This investigation centers around various issues, including disparities in wealth, historical and current zoning practices, decision-making structures that may indirectly impact siting decisions, and housing and employment discrimination, the use of the "social justice"

framework is beneficial as it signifies a comprehensive examination of these topics (Kaswan, 2002).

Environmental justice was conceptualized in the United States during the 1980s as a grassroots movement aimed at tackling the unequal burden of environmental risks and contamination borne by marginalized communities, central to environmental justice is the principle that every individual, irrespective of race, ethnicity, income, or social standing, is entitled to live in a clean and safe environment conducive to good health (Holifield, Chakraborty, & Walker, 2017). Schlosberg, (2007) emphasizes that environmental justice is not only about the equitable distribution of environmental benefits and burdens but also involves recognizing the importance of procedural justice, which ensures that all individuals have a voice in environmental decision-making processes. Walker (2012) expands on these ideas by providing a thorough examination of environmental justice concepts, particularly the role of procedural justice, which calls for inclusive governance and active participation of affected communities in environmental decision-making processes.

Over time, the notion of environmental justice has expanded to encompass various facets of fairness, this includes distributive justice, which concerns the equitable allocation of environmental advantages and disadvantages, and procedural and participatory justice (Holifield, Chakraborty, & Gordon Walker, 2017). Environmental justice encompasses the fair distribution of environmental hazards and public amenities, alongside collaborative decision-making processes to determine their placement (Rigolon, Browning, and Jennings, 2018). The scope of environmental justice research has broadened to assess whether aspects of the built environment that promote health are distributed equitably among communities of diverse socioeconomic statuses and racial compositions (Hughey, Walsemann, Child, Powers, Reed & Kaczynski, 2016).

Environmental justice represents a subset of the larger movement within environmental health and for several factors, certain populations may be particularly susceptible to the detrimental health consequences resulting from exposure to environmental hazards (Frumkin, 2016). The presence of environmental factors such as water quality, and air quality can significantly impact our overall health and well-being and can contribute to the emergence of diseases and health disparities, particularly in areas where people reside, work, learn, and engage in recreational activities are burdened by social inequities (National Institute of Environmental Health Sciences, 2018). These

social inequities, commonly known as social determinants of health, encompass variations in individual behaviors, cultural influences, access to healthcare services, economic status, and literacy levels (National Institute of Environmental Health Sciences, 2018). The concept of environmental justice aligns with the goals of public health by aiming to address inequalities in economic opportunities, environmental exposures, and health outcomes, it emphasizes that environmental health encompasses not only the management of hazardous exposures but also the promotion of human rights and fairness (Frumkin, 2016).

Environmental management practices in South Africa mirror those of developed nations, overlooking the social dimensions of development and the requirements of marginalized populations (Scott & Oelofse, 2005). Within South African cities, achieving environmental and social justice entails confronting challenges related to poverty, social disparity, and marginalized communities (Scott & Oelofse, 2005). To tackle these obstacles, it is essential to integrate principles of social and environmental justice into policies and actions, this involves actively engaging marginalized communities in decision-making, fostering fairness in the allocation of resources, and ensuring that environmental policies and initiatives consider the social circumstances and requirements of all inhabitants, particularly those most susceptible to environmental and social challenges (Scott & Oelofse, 2005). When discussing environmental justice, the primary focus is on analyzing the equitable distribution of environmental costs and benefits. This involves recognizing that disadvantaged individuals often disproportionately bear the burden of environmental health impacts, which underscores the importance of considering the distributive aspect (Fan, 2016; Corburn, 2017). Utilizing the concepts of social justice and environmental justice provides a framework for comprehending the environmental health disparities that exist between low and high-income neighborhoods.

Access

Access can be categorized into several dimensions: physical access, economic access, informational access, and social access.

Physical access refers to the ability of individuals to reach essential services and resources, such as clean water, healthcare, and public transportation. This dimension is significantly influenced by infrastructure quality and geographic distribution, which can create disparities between affluent and marginalized communities (Li et al., 2021). For instance, neighborhoods with inadequate

transportation options may hinder residents' ability to access healthcare facilities, thereby exacerbating health inequities (Curtis & Scheurer, 2010).

Economic access encompasses the financial means required to obtain goods and services, including the affordability of basic necessities and the availability of employment opportunities. Economic access is crucial for understanding how environmental and social injustices manifest, particularly in low-income neighborhoods where residents may face barriers to accessing clean air and safe living conditions (Pan, Armitage & van Ryneveld, 2018). The lack of economic resources can limit individuals' ability to invest in healthier living conditions, perpetuating cycles of disadvantage (Mohai et al., 2009).

Informational access pertains to the availability and dissemination of information regarding environmental policies, health risks, and community resources. Informed communities are better equipped to advocate for their rights and engage in decision-making processes. However, disparities in educational resources and digital literacy can hinder access to vital information, further entrenching social inequities (Walker, 2012). Access to information is essential for empowering residents to participate in governance and advocate for environmental justice.

Social access involves the networks and relationships that facilitate community engagement and participation in governance. This dimension highlights the importance of social capital in empowering residents to voice their concerns and influence local decision-making (Soja, 2013).

In the context of this study, access is not merely about the availability of resources but also about the equitable distribution of benefits and burdens across different communities. It is essential to recognize that access is shaped by systemic factors, including historical injustices, socio-economic disparities, and governance structures (Rawls, 2020). By examining these dimensions of access, this study aims to provide a comprehensive understanding of the barriers faced by marginalized communities and the pathways toward achieving environmental and social justice. This exploration will enhance the theoretical framework by emphasizing the multifaceted nature of access and its critical role in addressing environmental and social disparities.

CHAPTER 2 LITERATURE REVIEW

Literature Review

In this section, I will review literature and discussions on the relationship between race and income inequality, discourses around gated communities and their impacts on spatial inequality, low-income neighborhoods and their differing access to environmental health, environmental disparities, and the realities of access to air, water, and sanitation in the South African context.

Race and Income Disparity in South Africa

During the era of British colonial rule (approximately 1806 to 1910) and subsequently under apartheid (1948 to 1994), racial discrimination played a significant role in distributing the benefits of economic growth based on racial distinctions, this division along racial lines formed the basis for subsequent patterns of development and privilege in a society that was deeply stratified by race (Van der Berg, 2011). The Group Areas Act of 1950 and the Black Labour Act of 1964 placed stringent limitations on the types of employment and working environments accessible to black South Africans, alongside the establishment of segregated residential areas in urban centers (Festusa, Kasongo, Mosesb & Yu, 2016). While legal grounds for racial segregation have been abolished, changing actual patterns of racial segregation is challenging due to various forms of socioeconomic stratification and segregation (Ballard & Hamann, 2021a).

Furthermore, Maharaj (2020) contends that economic segregation has supplanted or perpetuated racial segregation in the post-apartheid era, thereby exacerbating imbalanced development, racial and socio-spatial inequalities, and the fragmentations characteristic of the apartheid regime. Additionally, Ballard, Hamann, and Mkhize (2021) highlight that the lower income brackets in South Africa are occupied by black individuals, while white individuals are overrepresented in higher income categories. Van Eeden (2015) highlights that non-white individuals residing in highly segregated communities experience lower incomes compared to their counterparts in more integrated areas, this segregation leads to limited access to services and employment opportunities, as well as reduced chances for social interaction, which disproportionately affects non-white communities.

It is also worth indicating that in post-apartheid South Africa, the correlation between race and income in terms of residential location is no longer absolute (Ballard, Hamann & Mkhize, 2021).

This implies that individuals from African, Indian, and Coloured communities can reside in formerly white areas, including affluent suburbs and the inner city (Ballard, Hamann & Mkhize, 2021). In South Africa, affluent neighborhoods with expensive properties are often predominantly occupied by white individuals due to their greater purchasing power, however, considering that the white population accounts for only 12% of Johannesburg's total population, there is limited demand from this group (Ballard & Hamann, 2021b). As a result, many black, Indian, and Coloured residents, who also possess significant purchasing power, can occupy these spaces, particularly due to the removal of job reservation policies, these laws, enacted during the apartheid era, restricted certain jobs and professions to white individuals only, effectively barring black, Indian, and Coloured South Africans from accessing many employment opportunities and maintaining white economic dominance and privilege (Ballard & Hamann, 2021b). However, the processes of racial diversification within former white suburbs can potentially contribute to the continuation of socio-economic segregation patterns on a broader scale (Ballard & Hamann, 2021b).

While racial discrimination was the underlying factor behind the fragmented and unequal nature of the apartheid city, the post-apartheid city is now characterized by fragmentation and inequality influenced by neo-liberalism and class dynamics (Seekings, 2011). The shift from a racially segregated city to a post-apartheid city has seen the emergence of neo-liberal ideologies and class-based divisions as the primary drivers of the ongoing fragmentation and inequality within urban areas (Seekings, 2011). Leibbrandt, Woolard, Finn & Argent, (2010) further argue that from a policy perspective, it is crucial to highlight that inequality and poverty within the African population have become increasingly prominent factors shaping overall inequality and poverty levels in South Africa.

Under neoliberalism, the attainment of safer living environments increasingly relies on market mechanisms (Brenner, Peck, & Theodore, 2010). This trend often results in essential services such as housing, water, and sanitation being subjected to market forces, and privatization of urban services and infrastructure becomes prevalent, linking access to one's financial capacity (Park, 2020). Furthermore, neoliberal policies advocating for privatization and deregulation have reshaped housing into a financial commodity rather than a social necessity, contributing to urban segregation (Chapados, 2020). While neoliberal policies prioritize efficiency and economic

growth, they also worsen existing social and economic disparities, by favoring market mechanisms over government intervention, urban development strategies under neoliberalism reinforce spatial divisions and deepen inequality (Baffoe, 2023).

These policies disproportionately affect low-income communities, which are often marginalized and excluded from the formal economy. Such communities face inadequate access to essential services and increased exposure to environmental risks, as highlighted by Brehm and Pellow (2022). Privatization and market-driven approaches further widen gaps in resource access and opportunities, contributing to fragmented cities where affluent areas coexist alongside marginalized neighborhoods marked by poor living conditions (Chiu-Shee, Ryan, & Vale, 2023). The rise of a more varied middle class and some integration within affluent neighborhoods in South Africa suggests a shift towards class-based stratification rather than solely racial divisions (Hamann & Horn, 2022). Though racial segregation persists, the evolving socioeconomic environment and shifting population dynamics suggest a move towards class-based segregation as a key determinant in shaping neighborhood demographics and socioeconomic inequalities (Hamann & Horn, 2022).

The effectiveness of race-based redistribution as a policy approach may diminish over time compared to strategies that specifically target the growing inequality within each racial group, particularly within the African community, addressing these intra-African disparities becomes imperative to effectively tackle the widening inequality in the country (Leibbrandt, et al., 2010). In Johannesburg, profound economic inequality is evident, marked by significant disparities between affluent and impoverished communities. Income distribution in South Africa, notably in Johannesburg, is severely skewed, with Gini coefficients surpassing 0.60, indicating substantial economic disparities (Abrahams & Everatt, 2019). This metric underscores the considerable imbalance in wealth distribution within the region. Affluent areas are characterized by a concentration of wealth and resources, starkly contrasting with the economic deprivation experienced by marginalized communities (Abrahams & Everatt, 2019). This perpetuates a cycle of inequality and exclusion, the economic disparities not only affect people's ability to access fundamental needs and opportunities for progress but also pose challenges to achieving sustainable urban development and contribute to social fragmentation (Abrahams & Everatt, 2019). Tackling this entrenched economic inequality necessitates holistic approaches that prioritize fair distribution

of resources, inclusive economic expansion, and initiatives promoting social empowerment, these efforts aim to narrow the gap and cultivate a fairer and more prosperous society for all residents (Abrahams & Everatt, 2019).

Socio-Spatial Inequality and Environmental Health

Socio-spatial disparity refers to the uneven distribution of social resources, services, and opportunities across different geographic areas, leading to inequalities in social, economic, and environmental outcomes (Soja, 2010; Massey & Denton, 1993). This concept captures how social inequalities are reflected and reinforced through the spatial organization of cities, neighborhoods, and regions, for instance, marginalized groups often experience worse outcomes in housing, education, healthcare, employment, and environmental quality due to their geographic location (Soja, 2010; Massey & Denton, 1993). Within governance discussions, there has been increasing attention to urban spatial inequality, particularly in Africa, where concerns revolve around urban planning and policies that perpetuate spatial disparities (Adama, 2012). Since 1994, there have been substantial changes to the policy framework for spatial planning in South Africa aimed at mitigating spatial inequality (Du Plessis and Boonzaaier, 2015). Starting with the Reconstruction and Development Programme (RDP), the African National Congress (ANC) aimed to foster comprehensive development throughout South Africa, encompassing various sectors such as housing, infrastructure, education, water and sanitation, healthcare, transportation, employment, and agrarian reform (Zimbalist, 2017).

Following the adoption of the 1996 Constitution, every household was granted the right to essential services, regardless of their location, considering the resources available to the state and the practicality of service provision (Todes & Turok, 2018). Consequently, the nature of each service could vary depending on whether the population was concentrated in urban areas or dispersed in scattered settlements (Todes & Turok, 2018). The allocation of public funds towards social grants and the provision of essential goods and services has been instrumental in alleviating poverty and vulnerability in historically marginalized regions (David, Guilbert, Hamaguchi, Higashi, Hino, Leibbrandt, & Shifa, 2018). Nonetheless, significant, and enduring inequalities, particularly in terms of spatial distribution, continue to pose major obstacles in the pursuit of an inclusive society in South Africa (David, et al., 2018).

Black South Africans continue to face significant environmental injustice, as they lack access to essential services such as drinking water, waste removal, sanitation facilities, adequate housing, and electricity, this situation poses hazards to both human health and the natural environment within townships (Murcott, 2015). Unequal exposure to numerous environmental stressors and advantages, along with their uneven distribution among a population with diverse vulnerabilities, can significantly contribute to disparities in health outcomes (Shrestha, Flacke, Martinez & Van Maarseveen, 2016). Zwickl, Ash, and Boyce (2014) contend that living in impoverished neighborhoods and being non-white are key indicators of disproportionate environmental vulnerability. As a result, the impact is often most severe in low-income, non-white communities, with the racial and ethnic exposure gap potentially diminishing as income levels rise. Social vulnerability refers to the way different structural elements establish the social context wherein individuals and groups exhibit varying levels of susceptibility to environmental risks, this, in turn, influences their capacity to handle, adapt, or respond differently when confronted with the same environmental hazards (Shrestha, et al., 2016).

Gated communities and neoliberalism

There are several types of gated communities in South Africa, namely enclosed neighborhoods, security villages/estates, gated townhouse complexes, and gated apartment blocks (Landman, 2020). In South African urban areas, particularly in major metropolitan areas like Johannesburg and Pretoria, addressing crime often involves implementing road closures and access control measures, residents in these areas believe that living within enclosed neighborhoods, known as "enclosed neighborhoods," offers a solution to crime and enhances their overall quality of life (Landman, 2004). These neighborhoods, which already exist, are secured through gates and barriers placed across roads, with fences or walls surrounding them, and only a limited number of controlled entrances and exits, sometimes monitored by security personnel, nonetheless, local government remains responsible for providing public services within these areas (Landman, 2004).

These neighborhoods involve existing residential areas retrofitted with access control measures like boom gates, typically managed by residents' associations, this sets them apart from estates or townhouse complexes which encompass a wider range of planned developments (Landman, 2020). Within the context of South Africa, two distinct models of boomed-off residential areas exist the public and private approaches. In Johannesburg, the public approach, as delineated by Landman

& Badenhorst (2014), is the only permissible model. Under this approach, local government retains ownership and responsibility for maintaining roads, parks, and walkways within these areas, this stands in contrast to the private model, where residents' associations assume ownership and maintenance responsibilities (Landman & Badenhorst, 2014). Gated communities are increasingly fostering socio-spatial fragmentation, attracting new middle and upper-middle classes seeking security, community, and a sense of belonging within controlled environments, this trend further accentuates class distinctions and social inequalities (Sarpong, 2017). The presence of gated communities introduces an additional layer to spatial inequality, as the fixed spatial boundaries within these enclaves perpetuate social disparities (Sarpong, 2017). Gated communities are intricately tied to the politics of space, reflecting unequal access to rights, resources, and influence within society, the constructed environment within gated communities mirrors and reinforces existing power dynamics and hierarchies within the broader societal context (Sarpong, 2017). Wu, He, Chen, Lin, and Wang (2020) suggest that gated communities are perceived to exacerbate class divisions, thereby exacerbating significant social inequalities, they are a source of contention and are viewed as posing a potential threat to social cohesion.

Gated communities have emerged as a prominent manifestation of spatial division and segregation in South Africa, with their prevalence benefiting only a select few in most urban areas (Monama, Mokoale & Mokgotho, 2022). Their establishment in post-apartheid South Africa was justified under the pretext of enhancing security and addressing crime concerns, although today, they underscore a deeper sense of social marginalization and segregation within the framework of urban development under democracy (Ramoroka & Tsheola, 2014). According to Bandaiko, Arku, and Nyantakyi-Frimpong (2002), the development of gated communities is propelled by factors such as investment speculation in urban real estate markets and the increasing globalization of real estate development activities. Additionally, the adoption of diverse urban lifestyles, security apprehensions, fear of crime, and government shortcomings in providing essential services like security and infrastructure maintenance are cited as contributing factors (Bandaiko, Arku, and Nyantakyi-Frimpong, 2002).

Contrary to prevailing beliefs, Spocter (2012) argues that the proximity of gated communities to impoverished areas does not lead to social segregation but rather facilitates the integration of people from diverse socioeconomic backgrounds. Additionally, in terms of employment

opportunities and the growth of small businesses, residents of underprivileged communities have welcomed the presence of gated developments (Spocker, 2012). However, while market-driven urban redevelopment has boosted the value of urban real estate, it has simultaneously exacerbated socio-spatial disparities and contributed to heightened land disputes in various cities worldwide (Jiang et al., 2024; Samara, 2010; Uitermark, Hochstenbach, & Groot, 2023). In the South African context, the focus on market-driven urban redevelopment has led to an increase in the value of urban real estate and spurred economic growth (Smith, 2022). However, this emphasis on the private sector as the primary driver of economic progress has significantly altered post-apartheid urban planning, resulting in adverse outcomes for the city's impoverished population, who face limited access to housing, water, sanitation, and other essential services (Smith, 2022). Ramoroka & Tsheola (2014) contend that gated community planning exacerbates social divisions by negatively impacting the provision of public amenities, including law enforcement, emergency services, municipal responsibilities, waste management, water and electricity services, and overall quality of life for the majority of urban poor residents. Landman (2002) introduces the concept of spatial democracy, which advocates for the fair distribution of services and amenities such as infrastructure, sanitation, and water across all urban areas, this ensures that urban development policies do not prioritize the needs of one group over another. The author argues for positive institutional reforms and strategies in urban areas to promote sustainable urban and environmental justice.

Three residential types in Gauteng

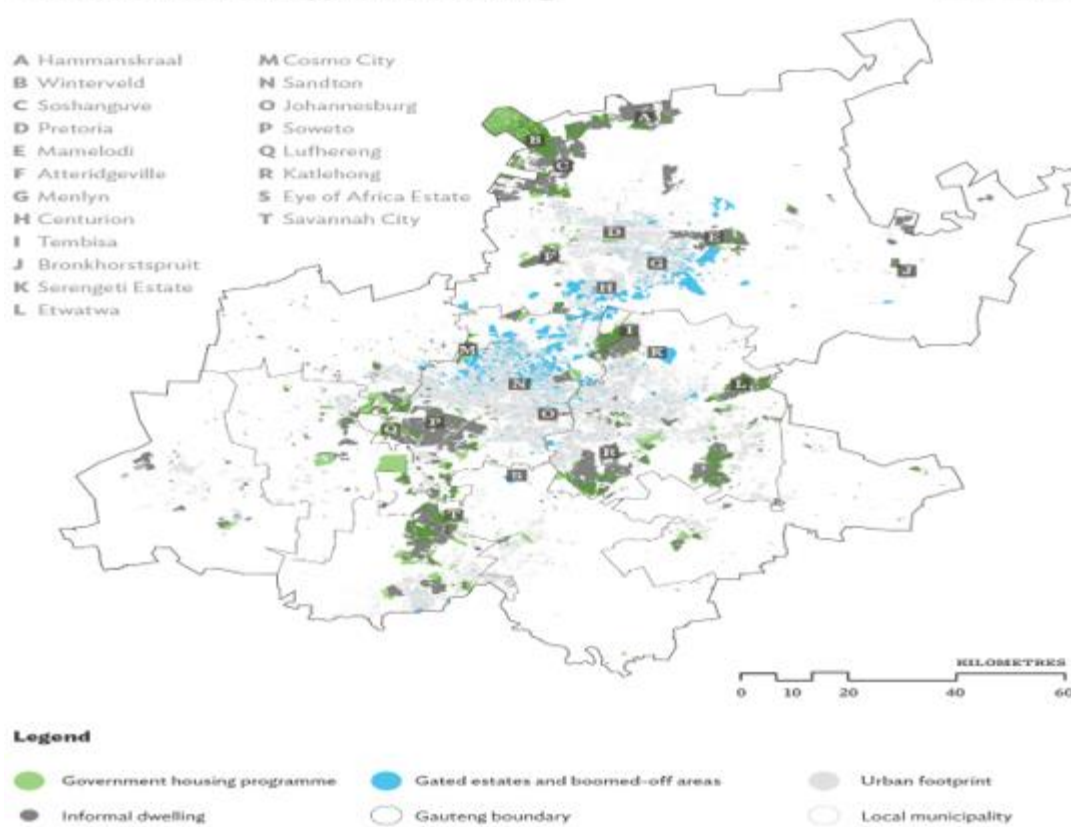


Figure 1: Three residential types in Gauteng

Source: Hamann, Ballard, and Naidoo (2020)

Low-income neighborhoods

Low-income neighborhoods are areas that often face issues of overcrowding and are characterized by dilapidated facilities, substandard buildings, inadequate environmental amenities, and poor sanitation (Addo, 2016). These negative perceptions, both internal and external, can worsen discrimination and hinder participation in the labor market, as well as limit social interactions and access to valuable networks outside the community (Otero, Volker, & Rozer, 2022). The wide-ranging effects of neoliberal policies and their unequal distribution of resources in urban areas are seen as contributing factors to crime and violence among the urban poor (Otero, Volker, & Rozer, 2022).

Residents of low-income neighborhoods often face unequal exposure to environmental health disparities, particularly concerning access to green spaces and their associated health advantages, limited access to green spaces in these areas can negatively affect both physical and mental well-

being (Jennings, Johnson, & Gaither, 2015). Moreover, low-income populations residing in areas with fewer green spaces may be at increased risk of heat-related illnesses and other health hazards linked to environmental conditions, the disparity in the distribution and quality of green spaces may arise from insufficient resources and funding in low-income neighborhoods, as highlighted by Jennings and Johnson Gaither (2015). Impoverished areas, experience a notable deficiency in sanitation facilities, including proper toilets and waste disposal systems, this absence of adequate sanitation infrastructure heightens the susceptibility to diarrheal diseases and other infections, particularly impacting the health of the most marginalized communities (Mathee & Wright, 2013). Additionally, limited access to sanitation facilities hampers personal hygiene practices and overall health outcomes, perpetuating a cycle of illness and poverty (Mathee & Wright, 2013).

Significant economic disparity is evident when contrasting impoverished neighborhoods with affluent ones, in poor neighborhoods, residents are at a higher risk of encountering social stressors, crime, and physical hazards stemming from deteriorating infrastructure, these areas frequently lack essential social, political, and economic resources that benefit inhabitants of wealthier neighborhoods (Ailshire & García, 2018). Disparities in economic opportunities, exposure to environmental hazards, and rates of violence are evident across different neighborhoods, particularly in low-income areas, this discrepancy underscores how communities with lower incomes, bear a disproportionate burden of environmental risks compared to wealthier and predominantly white neighborhoods (Galster & Sharkey, 2017). Safety apprehensions can result in psychological strain, decreased physical activity, poorer health outcomes, and an elevated likelihood of functional decline among individuals residing in these settings (Ailshire & García, 2018). It is important to address the underlying structural and systemic factors contributing to prominent levels of violent crime in low-income neighborhoods, there is also a necessity for comprehensive and inclusive strategies aimed at tackling the root causes of violence and enhancing the safety and well-being of all residents in these communities. (Galster & Sharkey, 2017).

Environmental health and access

Johannesburg, with a population of approximately 5.5 million, is the largest metropolitan area in South Africa, known as the economic and financial center of the country, the city was home to nearly 10% of South Africa's total population in 2018 (City of Johannesburg, n.d., Profile and analysis; district development model). The rapid population growth in Johannesburg has

significantly altered the city's urban structure, resulting in heightened population density and considerable strain on essential services and infrastructure (Everatt, Abrahams & Lynge, 2020). With consistently high growth rates ranging from 2.63% to 3.24% per year in recent times, there has been a noticeable rise in population density from 2,055 people per km² to 3,281 people per km² between 2002 and 2017 (Everatt, Abrahams & Lynge, 2020). This increase underscores the significant pressure Johannesburg faces due to the influx of individuals seeking opportunities and residency, the population surge has compounded existing challenges related to accessing basic resources and maintaining environmental health (Everatt, Abrahams & Lynge, 2020).

	BCM	CPT	EKU	ETH	JHB	MAN	NMB	TSH
Electricity	↓0.3%	↓0.1%	↑5.5%	↑0.9%	↑1.7%	↑0.3%	↑0.3%	↑2.0%
Sanitation	↑4.2%	↑0.6%	↑2.5%	↓0.1%	↓0.3%	↓1.7%	↑2.4%	↑1.8%
Water supply	↓3.3%	↓0.1%	↑1.3%	↑5.4%	↓0.1%	↓10.7%	↓0.4%	↓0.9%
Weekly refuse removal	↓3.0%	↑0.5%	↑0.6%	↓0.3%	↓2.0%	↓13.0%	↑30.4%	↑0.5%

Figure 2: Change in access to basic services between 2015 and 2018

Source: Source: (South African City Networks, 2021)

	AIR POLLUTION	WATER POLLUTION	WASTE REMOVAL & LITTERING	LAND DEGRADATION
BCM	35.2%	24.6%	48.4%	52.3%
CPT	7.5%	7.7%	24.1%	10.5%
EKU	22.4%	11.7%	22.1%	16.5%
ETH	19.3%	18.9%	46.8%	21.2%
JHB	21.6%	24.7%	46.8%	23.5%
MAN	30.7%	24.9%	68.2%	52.9%
NMB	15.2%	5.9%	42.0%	2.7%
TSH	15.5%	14.5%	31.1%	27.3%

Figure 3: Households experiencing environmental problems (2019)

Source: (South African City Networks, 2021)

Figure 2 and 3 above further outline disparities in access to basic services essential for environmental health across South African municipalities.

South African cities still grapple with the enduring impacts of spatial planning from the apartheid era, resulting in entrenched discrepancies in accessing essential services and exposure to

environmental risks (Mathee & Wright, 2013). The historical segregation of communities based on race has solidified disparities in living conditions, with marginalized populations disproportionately situated in areas characterized by poor environmental quality and limited access to necessary resources (Mathee & Wright, 2013). This unequal availability of basic services poses significant health hazards, particularly in terms of water and sanitation. The lack of consistent access to clean water increases susceptibility to waterborne diseases such as diarrhea, cholera, and typhoid, with contaminated water sources exacerbating health challenges, especially among vulnerable demographics like children and individuals with compromised immune systems (Mathee & Wright, 2013).

Many South Africans face health risks due to exposure to environmental hazards (Mathee, 2011; Norman et al., 2010). These hazards encompass inadequate access to fundamental services such as water, electricity, sewage, sanitation, and waste management (Statistics South Africa, 2016). Despite some improvements, Johannesburg hosts approximately 181 informal settlements, accommodating an estimated 180,000 households and over 500,000 residents (City of Johannesburg, n.d). This places additional strain on the city's capacity to provide essential services like electricity, water, sanitation, and waste disposal, as well as housing, roads, and other infrastructure (City of Johannesburg, n.d). Unsafe water and sanitation, indoor and outdoor air pollution, as well as lead exposure, significantly contribute to the disease burden in South Africa (Norman et al., 2010).

Water, Air, and Sanitation access

South Africa has been unable to meet the Millennium Development Goal to halve the proportion of the population without access to improved sanitation (Pan, Armitage & van Ryneveld, 2018). This failure is attributed to the uneven distribution of services between different population groups and regions, leading to prominent levels of dissatisfaction and widespread service delivery protests (Pan, Armitage & van Ryneveld, 2018). Other scholars argue that despite some progress in improving access to water and sanitation services in South Africa, significant deficits remain, especially in the case of sanitation, access to flush sanitation still appears to depend on household socio-economic status (Rhodes & McKenzie, 2018). The human dimension of poor water and sanitation services, including the social loss of personal hygiene, disease protection, and dignity highlights the staggering impact of lack of access to these services particularly for the poorest and

most vulnerable groups (Rhodes & McKenzie, 2018). The connection between the challenge of meeting service delivery backlogs, uneven distribution of services, and dissatisfaction with sanitation services in informal settlements warrants a deeper exploration of equity (Pan, Armitage & van Ryneveld, 2018).

Hemson, (2016) presents data on the levels of access to sanitation in South Africa, indicating that while there has been progress in the post-apartheid period, there has also been unevenness in the delivery of water services. The author mentions that the country has met the Millennium Development Goal (MDG) target in water delivery but not in sanitation (Hemson, 2016). While a sizable proportion of households have access to flush toilets, there are still households with unimproved privies or no sanitation facilities at all, and substantial numbers of the unserved population still have to access potentially contaminated natural water sources and suffer higher rates of waterborne disease (Hemson, 2016). This points to the ongoing challenges in providing adequate sanitation services to certain segments of the population, leading to health risks associated with poor sanitation.

Matandirotya, Moletsane, Matandirotya and Burger, (2022) identify solid fuel combustion as a major source of ambient emissions in low-income settlements. The use of "dirty fuels" such as coal, wood, paraffin, and biomass burning is prevalent for cooking, heating, and providing warmth, which leads to long periods of exposure to harmful pollutants. This prolonged exposure significantly increases the risk of respiratory diseases, cardiovascular issues, and other health problems associated with indoor air pollution impacting human health. Matandirotya, et al., (2022) discuss the influence of meteorological factors on air quality, noting that air masses from distant sources can transport pollutants in informal settlements. This highlights the interconnectedness of air quality with regional and global atmospheric dynamics, the study underscores the socioeconomic characteristics of low-income settlements, including high unemployment rates and the lack of income-generating sources, these factors contribute to the use of solid fuels and the resulting impact on indoor thermal comfort and ambient air quality (Matandirotya, et al., 2022).

Jafta, Barregard, Jeena and Naidoo, (2017) identified primary cooking fuel (paraffin, gel, or wood) as a potential source of indoor air pollution in a significant percentage of homes, additionally, the occasional use of these fuels as secondary cooking fuels and the permission of indoor smoking in a substantial proportion of homes contribute to elevated indoor air pollutant levels. The study

identified that the type and size of the home, indoor smoking, type of cooking fuel, and the cold season were important predictors of indoor concentrations of particulates, nitrogen dioxide, and sulfur dioxide, furthermore, proximity to a major road was an important predictor for nitrogen dioxide concentrations (Jafta, et al., 2017). The study underscores the potential health implications of elevated levels of indoor air pollutants in low- and middle-income urban households, with about half of the homes exceeding the World Health Organization guideline for PM10 levels, the study highlights the need for increased awareness of the health risks associated with indoor air pollution and the importance of prioritizing interventions to improve indoor air quality in these settings (Jafta, et al., 2017).

This study utilizes an Environmental and Social Justice framework to examine how socio-spatial inequality manifests in the context of environmental health access within the City of Johannesburg. It is also important to note that for this study equity is used as a foundation for the distribution and access to environmental health services. In recent years, there has been significant discourse surrounding equity in the distribution of public services (Li, et al., 2021). The definition of equity that the study employed is defined as encompassing ethical principles that pertain to ideas of social justice, fairness, and the protection of human rights (Pan, Armitage & van Ryneveld, 2018). The study contends that significant disparities exist in access to environmental health services between high-income and low-income neighborhoods, leading to contrasting lived experiences and environmental health perceptions among residents. Building upon findings from the literature review, which highlighted the interconnectedness of access, income, socio-spatial inequality, and environmental health, I employ a hybrid thematic analysis approach to analyze data from secondary data conducted in low-income and high-income neighborhoods. Through this analysis, I aim to reveal the specific mechanisms of spatial inequality that hinder access to crucial environmental health services, contributing to a comprehensive understanding of the lived experiences and environmental health realities faced by residents across the City of Johannesburg.

CHAPTER 3 RESEARCH METHODOLOGY

Research Methodology

Qualitative research is a methodological approach that delves into social or human issues through an inquiry-based understanding, this type of study takes place in real-life settings where researchers construct a thorough and holistic understanding, analyzing language, gathering in-depth perspectives from participants, and summarizing their findings (Creswell, 1998). Qualitative research provides valuable tools for in-depth investigation, offering insights into the processes or reasons behind a particular phenomenon (Srivastava & Thomson, 2009).

The purpose of this study is to investigate socio-spatial inequality in high-income and low-income neighborhoods, particularly examining variations in access to environmental health services in the City of Johannesburg. To understand the impact of differing access to environmental health services on residents' environmental health experiences. Aligned with the purpose of this study, a qualitative inquiry facilitates the provision of rich and detailed insights into the intricate factors that shape access to environmental health services, along with the environmental health experiences of individuals within low- and high-income communities. This approach proves valuable in acquiring contextual information about neighborhood dynamics and environmental conditions influencing residents' health experiences. Utilizing qualitative methods allows for the exploration of social, economic, and environmental factors influencing access to environmental health services, as well as the impact of such access on residents' environmental health experiences.

Philosophical approach

For this study, I will adopt critical realism as my philosophical approach, which is an all-inclusive philosophy of science. Critical realism integrates aspects from both positivist and constructivist perspectives to offer a comprehensive understanding of ontology and epistemology.

Ontologically, critical realism posits that reality consists of multiple layers or strata, comprising The Real, the Actual, and the Empirical domains (Lawani, 2021). Firstly, the domain of the Real encompasses the underlying structures of objects or entities, which are physical, social, and internally related (Lawani, 2021). These are deep-rooted causes of spatial inequalities, such as historical legacies of apartheid-era spatial planning, socio-economic disparities, and infrastructural

inadequacies, which form part of this domain. Secondly, the domain of the Actual comprises events that occur when the causal powers of structures and objects are enacted, irrespective of whether they are observable (Lawani, 2021). This encompasses disparities in access to clean water, sanitation, waste management, and green spaces across different neighborhoods in the City of Johannesburg. Despite these disparities being enacted through various mechanisms, their existence is not solely determined by what is observable but also by the underlying causal powers inherent in the socio-spatial fabric of the city. Lastly, the domain of the Empirical encompasses events that are experienced or observable through perception or measurement (Lawani, 2021). In this study, the empirical domain encapsulates the tangible experiences and observations of residents living within different spatial contexts in the City of Johannesburg. This includes perceptions of environmental quality, health outcomes, and access to essential resources, all of which contribute to the empirical understanding of socio-spatial disparities in environmental health.

According to Lawani (2021) the epistemological aim of critical realism is to elucidate and clarify the connection between observed experiences, events, and mechanisms, critical realists prioritize acquiring knowledge about underlying causal mechanisms to explain how phenomena operate. Although focus group discussions offer valuable insights into the lived experiences and perceptions of neighborhoods affected by environmental health effects due to spatial inequality, they may not completely capture the underlying causal mechanisms and structures driving these phenomena. This method aims to assess the underlying causal connections between social occurrences, particularly socioeconomic intricacies related to access and environmental health in the City of Johannesburg. By doing so, it strives to gain a deeper comprehension of these issues and propose strategic recommendations to address social challenges (Fletcher, 2017). Throughout the research process, significant attention was devoted to understanding the socio-economic, historical, and political context of the City of Johannesburg in understanding spatial disparities in environmental health. Critical realism underscores the significance of context in shaping social phenomena, and I intend to contextualize the findings within the broader framework of apartheid legacies, post-apartheid transitions, and ongoing social, environmental, and economic transformations in the city.

Method of Collecting Data

Secondary data refers to existing information that has been previously collected by others and is accessible for researchers to utilize, it differs from primary data, which is collected firsthand by the researcher (Clark, 2013). Secondary data analysis was employed in the study, utilizing data derived from focus groups. Secondary data analysis involves analyzing an existing dataset to address a different research question (Johnston, 2014). A focus group is a form of group interview that involves in-depth discussions among participants, characterized by specific objectives, size, composition, and interview methods, the primary focus of analysis in a focus group is the dynamics and interaction that occur within the group (Mishra, 2016). However, there are some limitations to secondary data analysis. Incomplete or missing data poses a common challenge in secondary datasets, potentially introducing bias to results and impacting the applicability of findings, researchers must grasp the dataset's representation of the phenomena under investigation and devise strategies to address any data gaps (Cole & Trinh, 2017).

Data was collected from existing focus groups conducted in the City of Johannesburg as part of the Sustainable and Healthy and Learning Cities and Neighborhoods (SHLC) project. The SHLC is focused on enhancing its ability to tackle the urban, health, and education challenges prevalent in rapidly expanding cities throughout Africa and Asia (Sustainable and Healthy and Learning Cities and Neighborhoods, n.d). Their research initiatives and efforts to enhance capacity are aimed at aiding and contributing to the attainment of the United Nations Sustainable Development Goals, with a particular emphasis on Sustainable Cities and Communities, Good Health and Wellbeing, and Quality Education (Sustainable and Healthy and Learning Cities and Neighborhoods, n.d).

Evaluation of the dataset

To ensure transparency within the study, a comprehensive overview of the dataset employed will be provided. The study draws upon data obtained from two focus groups as part of the Sustainable, Healthy, Learning Cities (SHLC) Neighbourhoods Focus Group Discussion Research Project. The project had two components, a quantitative and a qualitative component. The qualitative aspect of the project involved conducting ten focus group discussions in various neighborhoods within Johannesburg and Cape Town. Access was granted to utilize information on the data collection for this project.

The quantitative aspect aimed to identify the socio-economic and demographic characteristics of the neighborhood population, including housing tenure and preferences, living conditions, asset and property ownership, as well as attitudes towards education, access to learning opportunities, and current skills and literacy levels. The qualitative component of the project aimed to examine urban change and cities through a qualitative lens, focusing on neighborhoods in developing country cities. Its purpose was to delve into the experiences and perspectives of residents residing in diverse neighborhoods, supplementing the themes addressed in the household survey, and gaining deeper insights into the characteristics of their neighborhoods, daily routines, and sources of livelihood (Abrahams, 2022). However, in this instance, secondary data analysis is employed, allowing the examination of existing datasets to address a distinct research question; in this case what extent does socio-spatial inequality exist in access to environmental health services within the City of Johannesburg, specifically comparing high-income and low-income neighborhoods? How does differing access to essential environmental health services across high-income and low-income neighborhoods within the City of Johannesburg impact the lived experiences and environmental health perception of residents? While both studies involve exploring residents' experiences and their environment, the specific focus and scope differ. The focus of this study is narrowed down to low-income and high-income neighborhoods in the City of Johannesburg, specifically examining access to environmental health services.

The primary research team kept detailed documentation and provided evidence for data collection. The selection of these neighborhoods was based on a range of income levels ranging from low, medium to high income, participants were selected through random sampling within neighborhoods by a survey company (Abrahams, 2022). The focus groups consisted of 8-10 individuals, encompassing a diverse mix of demographic criteria such as age, gender, and race (Abrahams, 2022). The discussions within these groups revolved around describing the neighborhood across various dimensions, including health, environment, education, income opportunities, and governance, as the discussions progressed, participants provided more detailed insights, expressing sentiments regarding the facilities, amenities, and opportunities available in these areas (Abrahams, 2022).

Data Analysis

For this study, I employed a hybrid thematic analysis approach to analyze the secondary data. In secondary data analysis, researchers have the option to utilize both deductive and inductive approaches. Deductive coding entails applying predefined codes based on established theories or concepts, whereas inductive coding involves identifying patterns and themes in the data without predetermined categories (Swain, 2018). Researchers employing deductive approaches typically adopt a theory-driven perspective, while those utilizing inductive approaches focus on deriving insights directly from the data (Swain, 2018). A hybrid thematic analysis approach may entail amalgamating components of different thematic analysis frameworks, integrating qualitative and quantitative data, or employing a combination of deductive and inductive coding strategies (Swain, 2018).

To illuminate the significant environmental health disparities among the City of Johannesburg's neighborhoods, I embarked on a hybrid research journey. Initially, I employed a deductive approach, crafting a coding framework based on health, environment, governance, facilities, and amenities from secondary data. A deductive approach is a process that begins with a general theory or hypothesis and then tests it through specific observations or data collection. This method is often characterized by the formulation of hypotheses based on existing theories, which are then examined through empirical research (Creswell, 2021). The deductive approach is particularly useful in qualitative research when the aim is to explore how well existing theories apply to specific contexts or populations. It allows researchers to systematically analyze data by applying predefined codes derived from theoretical frameworks, thereby facilitating a structured examination of the data (Swain, 2018). This framework facilitated a comprehensive analysis of qualitative data, allowing for an examination of how broader theoretical perspectives and systemic factors resonated with residents' environmental health experiences as captured in transcripts and recordings. Subsequently, I delved deeper into the data using an inductive approach, meticulously reading and coding to uncover key themes such as sanitation, healthcare, civic engagement, and access to clean air. This inductive phase provided a vivid portrayal of residents' access to environmental health services. By seamlessly integrating these two approaches, I transcended mere description; my analysis laid bare Johannesburg's divided landscape, calling for systemic change and equitable environmental health solutions. Finally, key findings from the secondary data

analysis were summarized in a clear and organized manner to generate meaningful insights and conclusions.

Sampling Technique

In qualitative research, sampling is guided by two main principles: appropriateness and adequacy. Selecting a suitable sample is essential to ensure that the research questions are effectively addressed, to achieve appropriateness, qualitative research employs purposeful sampling methods (Luciani, Campbell, Tschirhart, Ausili & Jack, 2019). It involves purposefully choosing participants and sites for data collection because they will inform understanding of the research problem and phenomenon under study (Luciani, et al., 2019). The study draws data from two focus groups from the Sustainable, Healthy, Learning Cities (SHLC) Neighborhoods Focus Group Discussion Research Project, only focus group discussions conducted in Johannesburg are used in the study, one from a low-income and the other from a high-income neighborhood, only focus groups 8 and 9 were employed in the study.

- **Focus Group 6:** This group was composed of participants from upper middle-income neighborhoods, specifically recruited from Paulshof and Jackal Creek Golf Estate. These areas are characterized as estates or townhouse complexes that encompass a wider range of planned developments, where issues are typically managed by estate managers. While this group provided insights into the experiences of residents in more affluent, privately managed environments, the focus of this study was to contrast the experiences of residents in boomed-off residential areas, where local government retains ownership and responsibility for maintaining public spaces.
- **Focus Group 7:** Participants in this group were recruited from the southern, predominantly formally Coloured townships of Klipspruit Wes, Noodgesig, and Eldorado Park, representing a middle-income township category. While this group offered valuable perspectives on the challenges faced by residents in middle-income areas, the study aimed to highlight the extremes of socioeconomic disparity by focusing on the most pronounced differences between low and high-income neighborhoods.
- **Focus Group 10:** This group included residents from established African township neighborhoods in Orlando West, part of the larger Soweto area, representing the lower middle-income category. Although this group provided important insights into the

experiences of lower middle-income residents, the study specifically sought to examine the contrasting experiences of those in the lowest income bracket (Group 8) against those in the highest income bracket (Group 9).

The selection of focus groups 8 (Rabie Ridge, Kaalfontein, Mayibuywe SP) and 9 (Weltevreden Park, Windsor Glen, and Blairgowrie) was intentional, as it allowed for a direct comparison between the most economically disadvantaged and the most economically advantaged neighborhoods in Johannesburg. This focus was crucial for understanding the extent of spatial inequality in access to environmental health services and the impact of these disparities on residents' lived experiences. By concentrating on these two groups, the study aimed to illuminate the unique challenges faced by residents in each socioeconomic context, thereby contributing to a more nuanced understanding of environmental health disparities in urban settings.

To enhance the understanding of the spatial context of the study, maps illustrating the geographical locations of the selected neighborhoods for each focus group will be included. These maps will provide visual representations of the areas under investigation



Figure 4: Rabie Ridge Map

Source: Google Maps



Figure 5: Kaalfontein Map

Source: Google Maps



Figure 6: Mayibuye SP Map

Source: Statistics South Africa

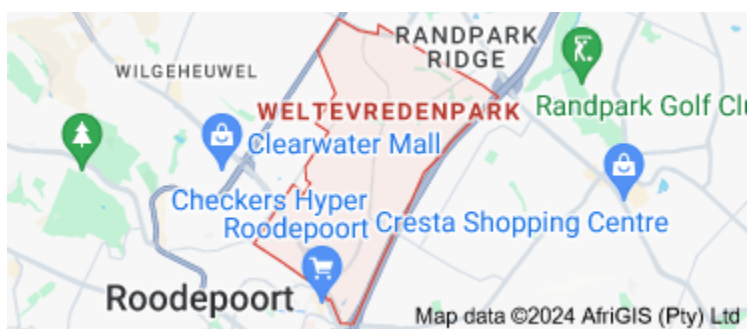


Figure 7: Weltevreden Park Map

Source: Google Maps



Figure 8: Windsor Glen Map

Source: Google Maps



Figure 9: Blairgowrie Map

Source: Google Maps

This selection allows for a comparison between neighborhoods' different socioeconomic characteristics, providing insights into the disparities in access to environmental health. The reported household income ranges in both low-income and high-income neighborhoods demonstrate a significant contrast. Group 8, representing the low-income neighborhood, reported household incomes ranging from R1001 to R7 500, indicating economic challenges and limited financial resources. In contrast, Group 9, representing the high-income neighborhood, reported household incomes ranging from R25 001 to R50 000 per month, indicating a more affluent socioeconomic status. It is also important to note that the data was gathered during the Corona Virus Disease 2019 pandemic, a period that revealed significant variations in how neighborhoods experienced and coped with the pandemic's economic consequences, societal adaptability, and the enduring consequences it had on aspects such as family life, education, the economy, and social interactions. (Abrahams, 2022). The income bands used, such as R1001 to R7,500 for low-income and R25,001 to R50,000 for high-income, provide a simplified representation of income levels.

South Africa's income inequality is pronounced, and these bands may not capture the full range of economic diversity within each neighborhood. For example, one could earn about R25 000 but might not necessarily be pronounced as affluent, another factor to consider could be that the financial needs of a household can vary depending on the number of dependents, such as children or elderly family members. R25,000 may support a single individual or a small family, but it might be insufficient for a larger family with more financial responsibilities.

The participants' employment status in each focus group further highlights the economic disparities between the neighborhoods. In the low-income neighborhood focus group (Group 8), most participants were unemployed, potentially reflecting the impact of the pandemic at the time. However, participants in the high-income neighborhood focus group (Group 9) were employed in sales, financial, or social services sectors, indicating a higher level of economic stability and employment opportunities, finally, they are geographically distinct areas within the city. By focusing on neighborhoods from different geographical locations, the study can capture variations in environmental health conditions, which can influence access to environmental health services.

Positionality

The concept of positionality encompasses two aspects: an individual's worldview and the stance they take regarding a research task and its social and political context (Holmes, 2020). The individual's worldview, often referred to as "where the researcher is coming from," includes their ontological assumptions about the nature of social reality and what can be known about the world, their epistemological assumptions about the nature of knowledge, and their beliefs about human nature and agency, which pertain to how we interact with and relate to our environment (Holmes, 2020). I maintained objectivity when conducting a secondary analysis study to be able to detach my views during the data collection process. This can be accomplished by taking care not to influence the information that will be acquired from secondary data used in the study.

Validity, reliability, and dependability

Validity

When assessing the degree to which a study effectively captures its intended measurements or the accuracy of test findings, validity is a critical factor to consider (Golafshani, 2003). The research question has been carefully formulated to specifically address the differences in access to environmental health services between low-income and high-income neighborhoods in the City of

Johannesburg and their impact on residents' environmental health experiences. This clear focus ensures the study's relevance and alignment with the intended research purpose.

Reliability

When findings can be replicated using a comparable technique or approach, it enhances the robustness or reliability of the research instrument (Golafshani, 2003). This refers to the degree of consistency in results over time and their accurate representation of the entire population under study (Golafshani, 2003). To maintain consistency in code interpretations, reviewers must ensure that the themes identified during data collection are clearly articulated by publishing these codes. This step can bolster the study's reliability (Rose and Johnson, 2020).

Dependability

To tackle concerns regarding dependability, the reviewer should thoroughly document all aspects of the research project, allowing future scholars to replicate the work without necessarily aiming for identical outcomes (Shenton, 2004). I ensured a detailed methodology, clearly documenting the steps followed in the study. I also included information on the primary dataset and the project's data collection procedures, sampling techniques, and analysis methods employed. By providing a transparent account of the research process, future researchers can replicate and verify the study's findings, thereby enhancing dependability.

Limitations of the study

Sampling Bias: While the primary research team employed random sampling techniques within neighborhoods, there may still be inherent sampling biases that could affect the generalizability of the findings. Certain demographic groups or individuals with specific characteristics may be overrepresented or underrepresented in the focus groups, potentially skewing the perspectives shared. For example, the lower-income neighborhood focus group had predominantly female participants, with only one male member present. This imbalance in gender representation could potentially bias the perspectives and experiences shared within the focus groups. The focus group transcripts may reflect the perspectives and experiences of specific participant groups, leading to potential biases in the data.

Geographical Scope: The primary study's geographical scope was limited to specific neighborhoods in the northern periphery of Johannesburg for both lower-income and higher-income groups. While this allowed for in-depth exploration of environmental health disparities

within these areas, it may not capture the full extent of spatial disparities across the city. The exclusion of neighborhoods from other regions of the City of Johannesburg could limit the applicability of the findings to the city.

Limited Contextual Understanding: The study relies on existing data and may lack the depth of understanding that could be gained through direct observation or participant interaction. This might have limited my ability to fully contextualize the findings within the socio-economic and environmental realities of the City of Johannesburg.

Future Directions: The study may provide valuable insights into spatial disparities in environmental health in the City of Johannesburg, but it may also highlight areas for future research and methodological improvements. For example, future studies could consider incorporating mixed methods approaches or longitudinal data collection to address some of the limitations identified in the current study.

CHAPTER 4 FINDINGS

Spatial disparities in environmental health access plague Johannesburg, impacting residents across diverse neighborhoods. This research delves into these inequalities, utilizing qualitative data from focus groups and hybrid thematic analysis. By incorporating supplementary data like graphs on air quality and survey results on public service satisfaction, I aim to paint a vivid picture of how access to crucial environmental health services varies in low-income and high-income neighborhoods. This research seeks to not only illuminate the challenges faced by different communities but also inform policy recommendations that promote environmental and social justice and equitable access to health services, bridging the gap in Johannesburg's urban landscape.

Research Question 1: To what extent does socio-spatial inequality exist in access to environmental health services within the City of Johannesburg, specifically comparing high-income and low-income neighborhoods?

Sanitation

The findings underscore the multifaceted impact of sanitation issues, linking environmental health concerns with broader public health implications and highlighting the need for comprehensive interventions. I will first address the challenges faced by low-income neighborhoods, followed by an examination of the issues encountered in high-income neighborhoods.

Low-Income Neighborhoods

Participants shed light on the inadequate conditions of their neighborhoods, focusing on public toilets and emphasizing the lack of proper flushing systems, they also expressed concerns about the challenging living conditions, including waste, lack of a proper drainage system, and dumping impacting their overall health.

- **Participant 6** “Those public toilets, the ones that you don't flush.”
- **Participant 1** “There is a lot of waste, and you are surrounded by shacks. And the drainage system, there is not much of a drainage system. Like the floods we had last week Friday, everything is still the same. And then she is going to throw her nappies there and she is going to her things there.”

Participants also voiced their concerns about parks, intended for recreation, and how they have become unfortunate dumping grounds, leading to a disheartening cycle where their cleaning efforts seem futile.

- **Participant 8** “You can clean today, and then tomorrow it is the same.” They also note that enforcement is lacking, and illegal dumping on both parks and streets, allowing dumping to persist.

This persistence further underscores the link between such activities and the troubling prevalence of rodent infestations, causing both health apprehensions and damage to properties. Expressing a sense of resignation, some participants regarded the presence of rats as a distressing but normalized aspect of their living conditions, particularly in informal settlements where sanitation challenges are exacerbated.

- **Participant 1** “Something like that could be seen as normal.”
- **Participant 3** “Even if you see the fines. There are “No dumping fines.” But they don’t look at that.”

The nexus between indiscriminate dumping and the resultant rodent infestation emerged as a critical concern among participants, impacting both public health and property integrity.

- **Participant 4** “They do a lot of damage. Like in our room, especially in my house, I don’t know who is bringing the rats or where they come from, but at night you can hear them making a noise in the wardrobe.”

The psychological toll of living with the fear and discomfort induced by the presence of rats was a recurring theme in the discussions.

- **Participant 8** “They eat everything. They are too big.”
- **Participant 5** “The smell.”
- **Participant 1** “They create damage.”

High-Income Neighborhoods

In contrast, high-income neighborhoods grapple with their own set of sanitation challenges, particularly in terms of the environmental impact on health, with a notable focus on sewage

problems. Participants in these affluent communities highlight a pressing drainage issue, where the olfactory assault of sewage water disrupts the otherwise pristine surroundings.

- **Participant 4** "So, their drainage problem is a big issue because you will be driving in the street and all of a sudden you will get this smell, and it is not drain water, it is sewage water."
- **Participant 6** "And even if you do not see the sewage water, you smell it. It is like hanging in the air."
- **Participant 4** "You can wait for up to three months for them to come sort your sewage out. I know a place there in Claremont, it has been like that now, I am not exaggerating when I say, four months. Every time you drive in that street, I don't even go there anymore because you get that smell, and it shoots all over your car and you have to wash your car."
- **Participant 4** "Yes, and it is disgusting. And you know there are little kids running around there. It is so unhealthy."

Despite the financial advantages of their community, residents express the need for cleaner streets, suggesting the implementation of campaigns or fines to deter littering.

- **Participant 1** "Keep the streets cleaner."
- **Participant 4** "So basically the people that drive and throw everything out of their window. Must get a fine."

This underscores the shared concern for maintaining a sanitary environment, albeit within the context of different challenges, in higher-income neighborhoods.

Access to clean air

Access to clean air is essential for maintaining public health and well-being, as poor air quality can lead to a range of health issues. This section will first explore the challenges related to air quality in low-income neighborhoods, followed by an analysis of the air quality issues faced in high-income neighborhoods. The findings underscore the significant impact of air pollution on residents' health, linking environmental health concerns with broader public health implications and emphasizing the need for targeted interventions to improve air quality across different socioeconomic contexts.

Low-income neighborhoods

In low-income neighborhoods, residents face a multitude of challenges related to access to clean air that intersects with issues of infrastructure and economic strain. Participants mention that electricity issues, such as frequent power outages and transformer problems, not only disrupt daily life but also impose a significant financial burden on them.

- **Participant 5** “Yes. The Councillors. What I don’t like about my area right now – we had a situation with our power in our city for about 3 months now. The other ones, part of our area, it has been a year where they don’t have electricity because of the transformers. So, we have one transformer where the others have 5 transformers. We had a meeting yesterday and she never said anything – she just said that we would take our money.”

The unreliability of electricity services compounds the difficulties faced by residents already contending with limited financial resources, creating a cycle of economic strain.

- **Participant 5** “For the Eskom guys to come and fix it. (laughing) I just disliked it because we cannot afford, not all of us can afford it. We can’t just take R6000 to pay. Like I am going to pay you, I am reaching when I don’t have money to buy electricity. You are the Councilor, so what are you doing about it? These are the things that we are also facing and then it makes things worse. It is like “These Councillors,” man.”

Another critical concern in these communities is the prevalence of practices contributing to air pollution and respiratory health issues. Burning materials, including Mtwana dust and the use of fires and paraffin for cooking, significantly contribute to the deterioration of air quality. Participants in the study highlight the detrimental impact of these practices on respiratory health, underscoring the urgent need for interventions to address these environmental health risks caused by infrastructural issues mentioned above.

- **Participant 5** “Yes. And now that we don't have electricity, it is even worse. At my house, we do have make fires to cook because there is no electricity and if there is electricity, then it is an illegal pay line, you can’t own electrical appliances in the house, so we have to go and make the fire so that we can cook because we can’t always buy paraffin. Paraffin really affects my chest, it makes it tight, so I have to leave or go light a fire.”

Moreover, the absence of tar roads exacerbates health challenges in low-income neighborhoods. The prevalence of unpaved roads leads to the generation of dust, further compromising air quality and contributing to respiratory issues among residents. The lack of infrastructure not only affects mobility but also magnifies the environmental health risks associated with prolonged exposure to dust.

- **Participant 4** “Some of us do not have tar roads.”

High-income neighborhoods

In high-income neighborhoods, residents confront distinctive environmental challenges that intersect with concerns about air quality and urban infrastructure. Participants in the study highlight air pollution as a notable environmental factor affecting health.

- **Participant 8** vividly describes the experience, stating, "You drive at night, and it is like all the smoke or whatever it is, it is not mist. All you see is pollution."

This firsthand account underscores the visible and perceptible impact of air pollution, raising awareness about the potential health consequences for residents.

Moreover, the discussion extends beyond direct exposure to pollution, addressing broader neighborhood challenges. Participants identify traffic congestion as a noteworthy issue, shedding light on the intersection between transportation problems and environmental health. The acknowledgment of traffic congestion as a neighborhood challenge suggests that high-income areas are not immune to the indirect effects of urban development on air quality. While residential areas are often located near transportation routes for accessibility, the presence of congested traffic zones can lead to higher levels of air pollution, which poses health risks to residents. This situation underscores the need for urban planning that prioritizes efficient public transport systems. By enhancing public transportation options, we can reduce the number of cars on the road, thereby decreasing air pollution from fossil fuel emissions and improving environmental well-being for all residents.

Research Question 2: How does differing access to essential environmental health services across high-income and low-income neighborhoods within the City of Johannesburg impact the lived experiences and environmental health perception of residents?

This section presents findings related to the impact of differing access to essential environmental health services on the lived experiences and perceptions of residents in both high-income and low-income neighborhoods in Johannesburg. The analysis reveals that residents in low-income areas face significant challenges, including inadequate sanitation, poor waste management, and limited access to clean air and healthcare services, which contribute to a heightened sense of vulnerability and health risks. In contrast, while high-income neighborhoods may have better access to these services, residents still experience concerns related to air quality and civic engagement. The disparities in access to environmental health services not only affect the physical health of residents but also shape their overall perceptions of safety, well-being, and trust in local governance.

Low-Income Neighborhoods

The challenging living conditions articulated by participants in the study have palpable ramifications for their environmental health experiences. The presence of waste and the lack of drainage systems collectively contribute to an environment conducive to health hazards. The accumulation of waste as a result not only poses an immediate threat in terms of unhygienic living conditions but also becomes a breeding ground for pests and potential vectors of disease. The mud, a consequence of lacking infrastructure such as tar roads hampers mobility, and the lack of tar roads also introduces elements that contribute to respiratory issues. Consequently, these aspects of living conditions intertwine, creating a compounding effect that adversely affects the overall environmental health of the community. Furthermore, the inadequate infrastructure, specifically the absence of tar roads, amplifies the challenges residents face, extending beyond mere inconveniences to impacting their health directly. The participants' complaints about mud and dust highlight a clear connection between the lack of proper infrastructure and environmental health issues. Moreover, the difficulty in maintaining cleanliness in such conditions may facilitate the spread of diseases, emphasizing the intimate link between infrastructure and the environmental health experiences of residents.

Public toilet conditions emerge as another critical sub-topic affecting environmental health experiences. The unsatisfactory state of public toilets, characterized by the absence of flushing systems, signifies a breakdown in sanitation infrastructure. This deficiency not only compromises personal hygiene but also poses a public health risk by potentially becoming a source of cross-infection. In this context, the availability and quality of sanitation facilities directly impact the environmental health of the community, emphasizing the need for comprehensive measures to address infrastructure shortcomings.

Air pollution emerges as a substantial concern, particularly regarding the burning of materials for cooking and the exacerbation of pollutants due to the absence of electricity. The participants' remarks underscore how these practices contribute to compromised air quality, with direct implications for respiratory health. The reliance on alternative, potentially harmful methods such as burning materials further underscores the interconnectedness of energy sources, air quality, and overall environmental health. Paraffin use for cooking is highlighted as an additional factor impacting respiratory health, with participants reporting chest tightness. This underscores the intricate relationship between cooking practices, indoor air quality, and the health of residents. In the absence of proper cooking facilities or alternative energy sources, the reliance on paraffin becomes not only a matter of convenience but also a determinant of environmental health outcomes for the neighborhoods.

Parks being used as dumping grounds present a multifaceted environmental health challenge. The frustration expressed by participants regarding the perpetual cycle of cleaning and dumping indicates a systemic issue in waste management. The improper disposal of waste in public spaces not only compromises the aesthetic quality of the environment but also poses a direct threat to the health of residents. The degradation of parks as communal spaces further underscores the far-reaching consequences of inadequate waste management on the overall environmental health experiences of the community. Despite the existence of anti-dumping measures, challenges in enforcement persist, as noted by participants. This sheds light on the governance and regulatory aspects of environmental health. The gap between policy intent and effective implementation allows illegal dumping to persist, undermining community efforts to maintain a healthy environment. This emphasizes the importance of not only establishing but also enforcing measures to safeguard environmental health effectively.

The connection between dumping and rodent infestation introduces yet another layer to the multifaceted impact of living conditions on environmental health. Improper waste disposal attracts rodents, leading to health concerns and property damage. The participants' observations regarding the rodents' size and their ability to consume everything highlight the severity of the issue. This aspect of environmental health extends beyond immediate health risks to encompass broader implications for the quality of life and well-being of residents.

Psychological impacts, specifically fear and discomfort caused by rats, contribute to a nuanced understanding of environmental health experiences. The fear of rodents is not merely a psychological concern but also a reflection of the tangible consequences of poor environmental conditions on mental well-being. The intersection of physical and mental health underscores the holistic nature of environmental health experiences and the need for comprehensive interventions. The resignation of residents to the presence of rats as a norm signifies a dangerous normalization of adverse living conditions. When such conditions are considered commonplace, the urgency for addressing environmental health issues may diminish. This normalization perpetuates a cycle where residents may become desensitized to the environmental risks they face, hindering collective efforts to improve living conditions and overall health.

High-Income Neighborhoods

In high-income neighborhoods, residents express genuine concerns about both water quality and traffic congestion, highlighting the intricate relationship between urban living and environmental well-being. The study reveals that water quality is perceived as a significant component of environmental health in these communities, with a recent rumor about water contamination underscoring the role of misinformation in shaping residents' perceptions. In response to this perceived threat, residents employ behavioral responses like boiling water as a precautionary measure, reflecting their attempts to mitigate environmental health risks. The discussion further extends to the rapid pace of urban development in these areas, acknowledged as a potential contributor to environmental challenges, including water quality concerns. The ongoing urbanization may inadvertently affect water sources and infrastructure, intersecting with residents' overall experiences of environmental health.

Residents' coping strategies, such as boiling water, indicate the tangible impact of perceived environmental issues on daily routines. The fear of water contamination contributes to heightened

psychological stress and health anxiety among residents, adding a crucial psychological dimension to their environmental health experiences. In crafting policies for high-income neighborhoods, there is a call for a holistic approach that addresses water quality alongside other environmental factors like air pollution and urban development. Ensuring a swift and transparent response to residents' concerns is emphasized, highlighting the importance of timely communication and information dissemination to alleviate unnecessary anxiety and foster community trust.

Effective Government and Civic Engagement

This section explores the dynamics of government and civic engagement in Johannesburg, focusing on how these interactions influence residents' perceptions and experiences of environmental health services. Effective governance and active civic participation are crucial for addressing community needs and fostering trust between residents and local authorities. The findings highlight the varying levels of engagement in high-income versus low-income neighborhoods, revealing that while residents in affluent areas may have more avenues for communication with local government, they still express frustrations regarding responsiveness. Conversely, residents in low-income neighborhoods often feel marginalized and skeptical about the effectiveness of community forums and local governance

Low-Income Neighborhoods

Participants in the study expressed cynicism towards community forums, perceiving them as tools used to offer false hope about addressing community issues.

- **Participant 5** "Just to give you hope about this electricity thing."

Highlighting the sentiment that these forums serve to appease residents without delivering concrete solutions. This raises concerns about transparency and accountability within local governance structures. The perception of community forums as platforms for empty promises can erode trust in authorities and discourage residents from engaging in participatory processes aimed at improving their communities. Participants expressed skepticism about the effectiveness of protests in their neighborhoods, questioning the benefits and outcomes of such actions.

- **Participant 1** "Tell me what you get out of doing that. And then they just come when there is a burst pipe with open roads"

This illustrates the frustration and disillusionment felt by residents towards protest as a means for change. This also highlights the need for alternative strategies for community engagement and advocacy. Traditional forms of protest may not be effective in achieving desired outcomes, prompting the exploration of more innovative and targeted approaches for addressing community concerns.

While participants mentioned reporting community issues directly to local councilors, they expressed frustration with the slow response times and lack of resolution.

- **Participant 1** “Sewage floods, it will take a day or two to fix it. But don’t forget, to request that it is not a matter where it will get done overnight.”

Showcasing the perceived inefficiency of this reporting system. This highlights the need for improved communication and collaboration between residents and local authorities. Streamlining reporting processes, providing timely updates, and demonstrating tangible progress on issue resolution are crucial for regaining residents' trust and ensuring effective governance.

Participants expressed significant frustration with the time it takes for authorities to address urgent community issues, such as burst pipes and sewage problems.

- **Participant 1** "Yes. In the end, you would have to go to them" reveals a sense of helplessness and dependence on authorities who are perceived as unresponsive and inefficient.

This underscores the need for improved service delivery and a more proactive approach to addressing critical infrastructure problems. Delaying repairs can have profound consequences for residents' health and well-being, emphasizing the urgency of addressing these issues.

The experiences of residents in low-income neighborhoods highlight the interconnection between environmental health and community empowerment. Ineffective communication, lack of trust in authorities, and delayed responses to urgent issues can exacerbate existing environmental health problems and hinder overall community development.

High-Income Neighborhoods

Conversely, high-income neighborhoods grapple with different challenges related to governance and civic engagement. Participants in these areas express frustration with the inefficiency of local

government communication, highlighting the need for improved responsiveness from authorities. The study found that residents in high-income neighborhoods primarily rely on reporting infrastructure issues directly to authorities, with frequent use of platforms like X, formerly Twitter and Hello Peter (an online review platform). This suggests a proactive approach by residents towards addressing community concerns. However, participants also expressed frustration with the lack of responsiveness and communication from local government channels.

- **Participant 2** notes that "You have to physically find somebody prepared to look at your case" and "If you send an email, you get no reply."

Highlighting the perceived inefficiency and lack of transparency in official communication systems. The intricacies of reporting infrastructure issues and the frustration with local government communication underscore the crucial role of transparent and responsive governance in addressing environmental challenges.

Despite their frustrations with traditional reporting methods, participants acknowledged the effectiveness of social media platforms like Twitter in eliciting rapid responses from authorities.

- **Participant 5** "Tweet and you will get a response within ten minutes."
- **Participant 7** "Nobody wants to look bad on social media."

Revealing an understanding of the power of social media to hold officials accountable and prompt action. This suggests that social media can play a crucial role in bridging the communication gap between residents and local governance, potentially improving responsiveness and service delivery. These findings suggest that even in high-income neighborhoods, where resources may be more abundant, the quality of governance and civic engagement remains pivotal for fostering a sense of security and well-being among residents.

The results of government and civic engagement in both low and high-income neighborhoods uncover distinct challenges that influence residents' perceptions and experiences. In low-income neighborhoods, the lack of government accountability and skepticism about political influence contribute to a pervasive sense of disappointment and distrust, emphasizing the universal importance of transparent governance and civic engagement in shaping residents' trust and well-being.

Access to Healthcare

This section examines the disparities in access to healthcare services experienced by residents in both low and high-income neighborhoods of the City of Johannesburg. It begins by detailing the significant challenges faced by individuals in low-income areas, including overcrowded clinics, long waiting times, and limited availability of specialized medical services. Following this, the discussion shifts to the experiences of residents in high-income neighborhoods, highlighting the advantages enjoyed by those with medical aid, such as quicker access to care and better healthcare outcomes. The section also addresses the concerns regarding the quality of care and professionalism within healthcare facilities across different neighborhoods. By comparing these experiences, the findings illustrate how socioeconomic status profoundly influences healthcare access and outcomes, ultimately impacting the overall health and well-being of residents in the City of Johannesburg.

Low-Income Neighborhoods

Participants in the study highlighted significant challenges regarding access to healthcare in low-income neighborhoods.

- Quotes such as "Overpopulated clinics," "long waiting times," and "limited staff"

Paint a picture of overburdened healthcare facilities struggling to cater to the needs of the community. This can lead to individuals avoiding or delaying medical care, potentially exacerbating health problems and compromising their well-being.

Participants noted the limited availability of hospitals in their communities, with some discrepancies in the reported number of hospitals. This lack of options can create barriers to accessing specialized care, especially for individuals with complex medical needs. Additionally, concerns regarding delays in ambulance response times raise questions about the efficiency of emergency medical services and the potential for staff motivation issues within these systems. Discussions among participants touched upon the importance of healthcare professionals upholding their oaths and responsibilities. While acknowledging the dedication of some individuals, there were concerns about the professionalism and ethical conduct of others. This highlights the need for improved training and oversight to ensure that all healthcare professionals

provide compassionate and competent care to all patients, regardless of their background or socioeconomic status.

The challenges faced by residents in accessing affordable and efficient healthcare have significant implications for environmental health and community well-being. Limited access to preventative care, delayed diagnoses, and inadequate treatment can exacerbate environmental health risks and contribute to the spread of infectious diseases.

High-Income Neighborhoods

Participants in the study highlighted the significant challenge of long waiting times in public healthcare facilities, particularly for individuals without medical aid.

- **Participant 1** notes "If you have medical aid, you are fine but if you do not you have to sit at the clinic since 6 o'clock in the morning" and "Hospitals are the same. If you do not have medical aid you sit in the queue"

Vividly illustrates the unequal access to timely healthcare faced by those relying on public services. These findings raise critical concerns about the equitable distribution of healthcare resources within high-income neighborhoods. Long waiting times can lead to delayed diagnoses, inadequate treatment, and frustration among patients. This contributes to a disparity in health outcomes between individuals with and without medical aid, perpetuating existing inequalities in access to healthcare.

Participants also expressed safety concerns at public health clinics, sharing an incident where a clinic was robbed and questioning the motives behind such occurrences. Highlight the anxieties and fears associated with utilizing public healthcare facilities. These concerns underscore the need for improved security measures and a more secure environment within clinics. The fear of crime and violence can deter individuals from seeking necessary medical attention, potentially leading to exacerbation of health conditions and increased vulnerability to environmental health risks. Addressing safety concerns is crucial for promoting equitable access to healthcare and ensuring the well-being of all residents.

CHAPTER 5 DISCUSSION

This chapter discusses the findings of the research, focusing on the socio-spatial disparities in access to environmental health services in the City of Johannesburg. The research questions guiding this inquiry were:

1. To what extent does socio-spatial inequality exist in access to environmental health services within the City of Johannesburg, specifically comparing high-income and low-income neighborhoods?
2. How does differing access to essential environmental health services across high-income and low-income neighborhoods within Johannesburg impact the lived experiences and environmental health perception of residents?

In addressing these questions, the discussion is structured around four key themes: access to sanitation, clean air, healthcare, and civic engagement. Each theme will illustrate how the findings relate to the research objectives, highlighting the disparities faced by different socioeconomic groups.

In both low-income and high-income neighborhoods, there are shared challenges related to access to sanitation, clean air, health care, and civic engagement. However, the specific manifestations of these challenges differ based on the socioeconomic context. In low-income neighborhoods, issues are often more acute, impacting basic health and well-being. In high-income neighborhoods, concerns may be more related to the preservation of a certain quality of life and efficient governance. The lens through which these challenges are examined is rooted in an Environmental and Social Justice framework, which emphasizes the unequal distribution of environmental burdens and benefits across diverse communities

Sanitation

Low-Income Neighborhoods

The findings from this research highlight significant sanitation challenges faced by residents in low-income neighborhoods of the City of Johannesburg, which are closely linked to broader environmental health issues. Participants in the focus groups emphasized the inadequacies of public sanitation facilities, particularly the absence of proper flushing systems. This situation not only compromises personal hygiene but also poses substantial public health risks, as noted by

Mathee (2011), who discusses the critical role of sanitation in preventing disease outbreaks in urban settings. The lack of adequate sanitation facilities can lead to the proliferation of waterborne diseases, which disproportionately affect vulnerable populations, further exacerbating health disparities.

Residents articulated their daily struggles with unsanitary conditions, where waste accumulation and poor drainage systems create an environment conducive to health risks. For instance, one participant remarked, “There is a lot of waste, and you are surrounded by shacks. And the drainage system, there is not much of a drainage system.” This aligns with the findings of Margai (2013), who argues that inadequate sanitation facilities disproportionately affect marginalized communities, exacerbating health vulnerabilities and contributing to a cycle of poverty and poor health outcomes. The qualitative data collected in this study reveal a cascading effect of sanitation issues, where poor waste management not only breeds disease but also hinders residents' overall quality of life.

Moreover, the emotional and psychological toll of living in unhygienic conditions cannot be overlooked. The frustration expressed by participants regarding the state of public toilets and waste management reflects a broader sense of neglect and disenfranchisement. This resonates with the work of Ballard and Hamann (2021), who highlight how systemic inequities in service provision led to feelings of helplessness among residents in low-income areas. The literature suggests that addressing sanitation issues requires not only infrastructural improvements but also a recognition of the social and psychological dimensions of environmental health. The anxiety surrounding sanitation facilities can lead to a diminished sense of community and trust in local governance, further isolating residents from potential support systems.

Flooding is another critical issue that exacerbates the challenges faced by low-income communities in the City of Johannesburg. The narratives shared by residents highlighted the vulnerability of their neighborhoods to environmental hazards, particularly during heavy rains. One participant noted, “Like the floods we had last week Friday, everything is still the same,” indicating the persistent nature of flooding and its aftermath. The accumulation of waste and inadequate drainage systems further compounds the impacts of flooding, leading to heightened health risks and deteriorating living conditions.

The link between illegal dumping and rodent infestations is particularly concerning. Participants reported that the presence of dumping grounds attracts rodents, which pose significant health risks, especially to children and vulnerable populations. As noted in the literature, rodents can transmit a range of diseases, including leptospirosis, hantavirus, and salmonella (Meerburg et al., 2009). The psychological impact of living with rodent infestations adds another layer of distress for residents, who expressed fears about health risks and property damage. One participant remarked, “They eat everything. They are too big,” illustrating the pervasive anxiety surrounding these infestations.

The intersection of sanitation and environmental justice is crucial in understanding the disparities faced by low-income communities. As noted in the Literature Review, the legacy of apartheid has resulted in enduring patterns of spatial inequality, where marginalized populations continue to bear the brunt of environmental burdens, including inadequate sanitation services (Van der Berg, 2011; Maharaj, 2020). This systemic inequity underscores the need for targeted interventions that address the unique challenges faced by these communities. Mavhungu and Mathee (2020) advocate for policies that promote equitable access to sanitation and environmental health services, emphasizing that improvements in sanitation infrastructure must be accompanied by community engagement and education to ensure sustainable outcomes.

Furthermore, the findings of this research suggest that sanitation issues are not merely technical problems but are deeply intertwined with social justice. The lack of access to clean and safe sanitation facilities can perpetuate cycles of poverty and marginalization, as residents are forced to navigate unsafe and unsanitary conditions. This aligns with the arguments made by Martinez-Alier (2003), who posits that environmental injustices are often rooted in socio-economic disparities, necessitating a holistic approach to policy-making that considers the lived experiences of affected communities.

The sanitation challenges faced by low-income neighborhoods in Johannesburg are emblematic of broader environmental health disparities. The findings of this research underscore the urgent need for comprehensive approaches that not only improve physical infrastructure but also consider the social, emotional, and psychological impacts on residents. By grounding these discussions in the existing literature, we can advocate for policies that promote equitable access to sanitation services and enhance the overall well-being of marginalized communities. Addressing these issues through

a lens of environmental and social justice will be essential in bridging the gap in access to essential services and fostering healthier urban environments.

High-Income Neighborhoods

The findings from this research reveal that while high-income neighborhoods in the City of Johannesburg generally enjoy better sanitation services compared to their low-income counterparts, significant challenges persist that warrant attention. Residents in these affluent areas express concerns about sanitation issues, which, despite their financial advantages, impact their quality of life and community well-being.

Participants from high-income neighborhoods reported issues related to waste management and sanitation, including the presence of litter and inadequate drainage systems. For instance, residents noted that even in affluent areas, the accumulation of waste can lead to unpleasant odors and unsanitary conditions. This aligns with the findings of Ballard, Hamann, and Mkhize (2021), who highlight that even communities with greater resources are not immune to sanitation challenges, suggesting that socioeconomic status does not entirely shield residents from environmental health issues.

Interestingly, the discussions revealed a strong sense of community responsibility among residents regarding sanitation. Participants expressed a desire for cleaner streets and proposed measures such as fines for littering to promote accountability. This reflects a broader trend identified by Cutter (1993), who argues that fostering individual environmental stewardship is essential for achieving long-term sustainability within communities. The proactive stance taken by residents in high-income neighborhoods indicates a recognition of their role in maintaining their environment, which contrasts sharply with the feelings of helplessness often reported in low-income areas.

Despite the financial advantages of high-income neighborhoods, residents expressed frustration with local government responsiveness regarding sanitation issues. Participants reported delays in addressing sanitation problems, such as sewage backups and litter management. This dissatisfaction echoes the sentiments expressed by Walker (2012), who emphasizes the importance of fair and responsive governance in environmental matters. The disconnect between residents and local authorities can lead to a decline in trust and engagement, ultimately undermining community efforts to address sanitation challenges.

When comparing sanitation issues in high-income neighborhoods to those in low-income areas, it becomes evident that while the manifestations of these challenges differ, the underlying themes of frustration and the need for effective governance are consistent. In low-income neighborhoods, residents face more acute sanitation challenges, such as inadequate waste disposal systems and public health risks associated with illegal dumping. However, the frustrations expressed by high-income residents regarding service delivery highlight that sanitation is a critical issue across the socioeconomic spectrum.

The discussion of sanitation in high-income neighborhoods reveals that while these areas may have better resources and infrastructure, they are not free from sanitation challenges. The findings underscore the importance of community engagement, effective governance, and the need for ongoing dialogue between residents and local authorities to address sanitation issues. By drawing on existing literature and integrating these insights into the discussion, this research highlights the complexities of sanitation in urban environments and the necessity for inclusive, equitable solutions that consider the needs of all residents, regardless of socioeconomic status.

Access to clean air

Low-Income Neighborhoods

In low-income neighborhoods, access to clean air is inextricably linked to a complex web of environmental and economic struggles, highlighting the intersectionality of these issues within the framework of Environmental and Social Justice. The frequent power outages and transformer problems documented in these communities not only disrupt daily life but also impose a substantial financial burden on residents, vividly illustrating the intertwined nature of environmental and economic disparities (Pulido, 2010; Mohai, et al., 2009). This unequal access to reliable electricity services and the resulting economic strain contribute to a cycle of environmental injustice, where marginalized communities disproportionately bear the burden of inadequate infrastructure and services.

The unreliability of electricity services not only poses immediate economic challenges but also signifies deeper issues of procedural injustice. Walker (2012) emphasizes the importance of fair and responsive governance in environmental matters, highlighting the crucial role of public participation and decision-making processes. The frustration expressed by residents at the prolonged periods without electricity reveals a disconnect between local authorities and decision-

makers, bringing attention to the broader implications of inadequate services beyond economic hardships. This underscores the urgent need for political representation that is responsive to the environmental concerns of marginalized communities, aligning with the core principles of Environmental and Social Justice.

In low-income communities, the pervasive issue of air pollution stands as a stark reminder of the complex interplay between poverty, environmental degradation, and public health. Residents' vivid descriptions of the detrimental effects of burning materials, using fires and paraffin for cooking, and living in areas with unpaved roads paint a picture of a community struggling to breathe clean air. This aligns with the central tenets of environmental justice, which recognizes the disproportionate burden placed on marginalized communities due to their exposure to environmental hazards (Mohai, et al., 2009). The consequences of air pollution in these communities extend far beyond immediate respiratory problems. Research suggests that prolonged exposure to air pollutants can lead to a range of chronic health conditions, including cardiovascular diseases, cancer, and cognitive decline (Landrigan et al., 2022). This highlights the need for comprehensive interventions that address not only the immediate symptoms but also the long-term health impacts on residents.

The absence of paved roads and the reliance on burning materials for cooking and heating are not merely personal choices; they are symptoms of deeper systemic issues. These communities often lack access to affordable clean energy sources and basic infrastructure, highlighting the need for policies and interventions that address the root causes of environmental disparities (Pulido, 2010). This includes promoting access to clean energy solutions, investing in infrastructure development, and addressing the socioeconomic factors that contribute to environmental vulnerabilities. Addressing air pollution in low-income communities requires a shift from a top-down approach to one that empowers residents and leverages local knowledge. Community-based initiatives that promote clean energy solutions, raise awareness about environmental health risks, and advocate for policy change can play a crucial role in creating long-term solutions. This includes supporting community gardens, promoting energy efficiency programs, and providing educational resources about air quality and health.

The findings from low-income neighborhoods underscore the urgency of addressing the interconnected challenges of environmental and economic disparities within the theoretical

framework of Environmental and Social Justice. Comprehensive interventions are needed to rectify both immediate concerns and systemic issues, fostering a more equitable distribution of resources and services that aligns with the principles of justice and fairness.

High-Income Neighborhoods

While discussions on environmental justice often focus on marginalized communities disproportionately burdened by pollution, the experiences of residents in high-income neighborhoods reveal a nuanced and often overlooked dimension of the issue. This study sheds light on the concerns of residents who, despite their economic advantages, face distinct challenges related to air quality and urban infrastructure within the framework of Environmental and Social Justice. Participants in the study highlight air pollution as a significant environmental factor impacting their health and well-being. One participant's vivid description of driving through a haze of pollution at night not only paints a stark picture of the environmental reality but also underscores the tangible and perceptible effects of air pollution, even in affluent communities. This firsthand account resonates with the broader discourse on environmental justice, challenging the perception that economic prosperity automatically translates to environmental privilege and highlighting the potential health risks faced by residents regardless of their socioeconomic status (Pulido, 2010).

Furthermore, concerns about urban infrastructure emerge as another key theme in the study. Residents express frustrations with issues such as inadequate waste management and inefficient public transportation systems, highlighting the interconnectedness of environmental challenges and the need for a holistic approach to environmental justice. This aligns with research emphasizing the importance of addressing systemic issues beyond pollution, including infrastructural deficiencies that can exacerbate environmental health risks and contribute to broader social inequalities (Walker, 2012).

While concerns about air quality are at the forefront of residents' environmental worries, the discussion in this study extends beyond direct exposure to pollution, revealing broader neighborhood challenges that intersect with environmental health. Residents' identification of traffic congestion as a significant issue sheds light on the intricate relationship between transportation problems and environmental well-being. The acknowledgment of traffic congestion as a neighborhood challenge highlights the fact that affluent areas are not exempt from the indirect effects of urban development on air quality. The proximity of residential areas to congested traffic

zones may inadvertently expose residents to elevated pollution levels, even if they are not directly located near industrial sources. This underscores the crucial role of urban planning and infrastructure development in shaping environmental outcomes, aligning with research by Agyeman (2016) on the concept of "just sustainabilities," which emphasizes the need for equitable and environmentally responsible urban planning practices.

The findings in high-income neighborhoods challenge the perception that economic affluence shields communities from environmental challenges. Instead, they highlight the need for a comprehensive understanding of the multifaceted interactions between urban development, transportation, and air quality. Within the theoretical framework of Environmental and Social Justice, these challenges underscore the importance of equitable distribution of environmental benefits and burdens, ensuring that even in high-income areas, environmental well-being is prioritized for all residents (Bullard, 2000; Schlosberg, 2007). Comprehensive interventions and urban planning strategies that consider the environmental implications of development are crucial to fostering sustainable and just communities, irrespective of economic standing.

Effective Government and Civic Engagement

Low-income Neighborhoods

These findings resonate with the literature on civic engagement and governance in marginalized communities. As highlighted by Hamann, Ballard, and Naidoo (2020), low-income residents often experience systemic barriers that hinder their ability to engage effectively with local governance structures. The participants' sentiments reflect a broader trend identified by Walker (2012), who argues that disenfranchisement and lack of accountability in local governance can exacerbate social inequalities and hinder community development.

Moreover, the participants' experiences underscore the importance of transparency and responsiveness in governance. The frustration expressed regarding slow response times to community issues, such as sewage floods, aligns with the findings of Mavhungu and Mathee (2020), who emphasize that inadequate service delivery can lead to a breakdown of trust between residents and local authorities. This lack of trust can discourage residents from participating in civic engagement initiatives, perpetuating a cycle of disengagement and disillusionment.

Participants perceived community forums as platforms for offering "false hope" rather than tangible solutions to community issues. This perception stems from a lack of transparency and accountability within local governance structures (Cornwall, 2008; Hickey & Mohan, 2004). This cynicism can undermine trust in authorities and discourage residents from engaging in participatory processes aimed at improving their communities. Issues around governance and civic engagement echo a palpable dissatisfaction with local leadership, emphasizing the need for increased transparency and accountability.

Residents expressed skepticism towards the effectiveness of protests as a means for achieving change. This stems from a perceived lack of tangible benefits and outcomes from such actions. This highlights the need for alternative strategies for community engagement and advocacy tailored to the specific needs and concerns of low-income communities. Exploring innovative approaches such as social media campaigns, community organizations, and targeted lobbying efforts can empower residents and encourage more effective environmental health advocacy. Participants reported frustrations with the slow response times and lack of resolution when reporting community issues directly to local councilors. This perceived inefficiency can lead to feelings of helplessness and disillusionment. Streamlining reporting processes, providing timely updates, and demonstrating tangible progress on issue resolution is crucial for regaining residents' trust and ensuring effective governance (Munsamy & Visser, 2018).

The study highlights the link between ineffective communication, lack of trust in authorities, and delayed responses to urgent issues, and their detrimental impact on environmental health within low-income neighborhoods. Empowering communities through improved communication, active engagement, and transparent governance is crucial for addressing environmental health challenges effectively.

High-Income Neighborhoods

Residents in high-income neighborhoods expressed significant dissatisfaction with the perceived inefficiency of local government communication (Hickey & Mohan, 2004). The study found that participants primarily relied on platforms like Twitter and Hello Peter to report issues directly, indicating a proactive approach. However, the frustration with slow response times, lack of communication, and difficulty reaching authorities reveals a perceived lack of responsiveness and transparency in official channels (Cornwall, 2008). This highlights the need for local government

to improve communication systems, ensuring timely updates, clear information dissemination, and readily accessible avenues for residents to voice their concerns (World Bank, 2020).

The findings emphasize the crucial role of transparent and responsive governance in fostering a sense of security and well-being even in resource-rich communities. Residents in high-income neighborhoods actively seek solutions but face a system perceived as inefficient and lacking in transparency. This underscores the importance of promoting active civic engagement through various channels, fostering trust between residents and authorities, and implementing transparent decision-making processes (Hickey & Mohan, 2004; Cornwall, 2008).

While the study identified distinct challenges in both low and high-income neighborhoods, it is crucial to recognize that solutions may need to be tailored to specific contexts. While the focus in low-income areas might be on resource allocation and addressing basic needs, high-income communities may require strategies aimed at improving communication systems, promoting meaningful participation in decision-making processes, and fostering trust in local government.

Access to Healthcare

Low-Income Neighborhoods

Overcrowded Clinics and Long Waiting Times Studies indicate that clinics in low-income neighborhoods are often under-resourced and overburdened, leading to long waiting times and limited access to specialists (Adhikari et al., 2021). When individuals lack access to timely and affordable healthcare, environmental health problems often go undetected and untreated (Kaba, 2020). This can lead to the worsening of existing conditions, such as respiratory illnesses caused by air pollution (Mavhungu & Mathee, 2020) or waterborne diseases due to inadequate sanitation (Dlamini & Nkambule, 2020).

The excessive cost of healthcare services, including medication and consultations, presents a significant challenge for low-income families. This can lead individuals to choose between paying for essential needs than seeking medical attention, potentially jeopardizing their health (Collins et al., 2020). Many low-income communities lack sufficient access to hospitals, particularly those that specialize in complex medical conditions. This can force residents to travel long distances for specialized care, increasing costs and creating logistical barriers (Kruk et al., 2018).

There are concerns about the professionalism and ethical conduct of some healthcare professionals in low-income neighborhoods. This can further erode trust in the healthcare system and discourage individuals from seeking care (El-Jardali et al., 2020). Lack of trust in government agencies and environmental organizations can further hinder efforts to raise environmental health awareness and implement preventive measures. This distrust may be rooted in past experiences of environmental injustice or a lack of transparency and communication from authorities. Inefficient ambulance response times and concerns about staff motivation within emergency medical services can compromise critical care in low-income neighborhoods. This can have devastating consequences for individuals experiencing medical emergencies (Devereaux et al., 2019).

High-Income Neighborhoods

The study's findings highlight the stark contrast in access to healthcare faced by residents of high-income neighborhoods based on their medical aid status. Participants' experiences and quotes vividly illustrate the unfair advantage enjoyed by those with medical aid, who can access timely care, while those reliant on public healthcare face lengthy waiting times, often exceeding several hours. This disparity is a significant cause for concern, as it contributes to unequal health outcomes and perpetuates existing inequalities in access to healthcare (Braveman & Gottlieb, 2014). Long waiting times can be frustrating and demoralizing for patients, leading to dissatisfaction with the healthcare system and potentially discouraging future utilization of public services (Adhikari et al., 2021)

The study also raises important concerns about safety and security at public healthcare facilities. Participants' narratives regarding a robbery incident highlight the real fear and anxiety associated with utilizing these facilities. This apprehension can act as a significant barrier to accessing necessary medical care, particularly for vulnerable populations (World Health Organization, 2020). Ensuring a safe and secure environment can foster trust in the healthcare system and encourage individuals to utilize public services without fear, addressing safety concerns can remove a significant barrier to care, particularly for vulnerable populations who may be hesitant to access public services due to fear (El-Jardali et al., 2020; Collins et al., 2020).

The findings of this study align with and extend the existing literature on spatial disparities in environmental health, particularly within the context of Johannesburg. Previous studies, such as those by Mathee & Wright (2013) and Norman et al. (2010), have highlighted the persistent

inequalities in environmental health across South African cities, with a focus on access to essential services such as sanitation and clean air. These studies emphasize the disproportionate exposure to environmental risks faced by residents in low-income neighborhoods, a trend that this study corroborates.

However, while the broad trends identified in the literature are confirmed by this research, the study offers a more nuanced understanding of how these disparities manifest differently across socioeconomic contexts. For instance, both low-income and high-income neighborhoods in Johannesburg face challenges related to sanitation, yet the nature of these challenges varies significantly. In low-income neighborhoods, the lack of adequate sanitation facilities directly impacts basic health and well-being, whereas, in high-income neighborhoods, the challenges are more related to the efficiency and governance of service provision, affecting the quality of life rather than survival.

Moreover, this study diverges from existing literature by highlighting the resilience and coping mechanisms that residents in low-income neighborhoods employ. While Otero, Volker, & Rozer (2022) suggest that limited access to environmental resources exacerbates social exclusion, this research found that communities often develop robust strategies to mitigate these challenges. These strategies include community-based initiatives for waste management and local advocacy for improved air quality, which suggest a level of agency and resilience not widely recognized in previous studies.

Methodological Considerations

The methodological approach of this study, particularly the use of qualitative inquiry and hybrid thematic analysis played a crucial role in uncovering the layered complexities of spatial inequality in the City of Johannesburg. The choice to employ focus groups as part of the Sustainable, Healthy, Learning Cities (SHLC) project allowed for in-depth discussions that illuminated the lived experiences of residents in both low income and high-income neighborhoods. This approach provided a richer, more nuanced understanding of environmental health disparities than might have been possible with a purely quantitative method.

In contrast to survey-based research, such as that conducted by Shrestha, Flacke, Martinez, & Van Maarseveen (2016), the focus group methodology enabled a deeper exploration of the subjective

experiences and perceptions of participants. The interactive nature of the focus groups facilitated discussions that revealed how residents perceive and respond to environmental health challenges, providing insights into the social dynamics that influence these perceptions. For example, participants were able to discuss not only their immediate experiences but also their long-term concerns and coping strategies, offering a more comprehensive view of the impact of spatial inequalities.

Furthermore, the adoption of a critical realist philosophical approach provided a robust framework for analyzing the data. This approach emphasizes the importance of understanding the underlying structures and mechanisms that drive observed phenomena. In the context of this study, it allowed for a deeper exploration of how historical legacies, such as apartheid-era spatial planning, continue to shape current disparities in environmental health. By linking the empirical findings with these broader theoretical insights, the study not only highlights the symptoms of inequality but also explores their root causes.

This research not only confirms many of the trends identified in existing studies but also introduces new dimensions to the discussion of environmental health disparities in urban settings. By integrating a critical realist approach with a detailed qualitative analysis, the study offers a comprehensive and multifaceted understanding of the challenges and opportunities associated with spatial inequality in the City of Johannesburg. These insights have important implications for future research and policy development, particularly in the areas of urban planning, environmental justice, and public health.

CHAPTER 6 CONCLUSION

This study investigated spatial disparities in environmental health in the City of Johannesburg in high-income and low-income neighborhoods with stark differences in access, infrastructure, and environmental health experiences. Guided by the lens of environmental and social justice, it aimed to understand inequities in access to essential environmental health services (sanitation, clean air, clean water) and their impact on residents' environmental health experiences. By employing a critical realist approach and using secondary data from focus group discussions, the study unearthed significant findings that warrant reflection on broader theoretical and conceptual issues. The qualitative nature of the study provides valuable insights but warrants further investigation through quantitative data and a broader geographical scope.

Summary of Findings

The City of Johannesburg's residents face starkly different realities when it comes to environmental health. In low-income neighborhoods, a cascading effect of challenges paints a grim picture: poor waste management breeds disease, inadequate infrastructure hinders mobility and respiratory health, limited green spaces highlight the need for improved infrastructure and service delivery, and limited access to healthcare which creates a triple threat of inaccessibility, financial barriers, and eroded trust. Residents feel trapped in a cycle of unhygienic living conditions, with anxieties around safety and frustration at systemic failures. While seemingly better off, high-income communities also face concerns. Air pollution, anxieties about safety in public healthcare facilities. They, however, exhibit greater civic engagement and seek solutions to improve community well-being. Even with resources, trust issues and concerns about government responsiveness linger. These findings expose a divided city, where access to environmental health services and healthcare differs vastly, both communities grapple with anxieties and frustrations, underscoring the need for systemic change and a renewed focus on inclusive, equitable solutions.

The analysis provides insights into the areas where improvements are needed to enhance the environmental health and overall well-being of residents in both low-income and high-income neighborhoods in Johannesburg. In both low-income and high-income neighborhoods, there are shared challenges related to access to environmental health services access. However, the specific manifestations of these challenges differ based on the socioeconomic context. In low-income neighborhoods, issues are often more acute, impacting basic health and well-being. In high-income

neighborhoods, concerns may be more related to the preservation of quality of life and efficient governance. Addressing these challenges requires targeted interventions that consider the unique needs and contexts of each neighborhood.

The question of access was initially approached as the physical availability of resources. However, delving into the realities of the City of Johannesburg's residents revealed its multifaceted nature, demanding deeper questioning. By problematizing access and recognizing its complex layers, I pave the way for meaningful social and environmental justice interventions. It is not just about increasing the presence of resources but addressing the systemic issues that shape access across all its dimensions. Only then can we build a city where all residents truly thrive in a healthy and equitable environment.

Bridging the Gap: Where Governance Meets Environmental Health Disparities:

This research has exposed the profound impact of governance choices on the environmental health experiences of Johannesburg residents. The stark disparities between low-income and high-income neighborhoods cannot be attributed solely to economic differences; they reveal deeply embedded issues of governance that demand critical attention.

Broken Trust, Unequal Burden:

The findings unveil a crisis of trust in governance. Concerns about professionalism in healthcare, anxieties around safety at public facilities, and skepticism towards government communication highlight a disconnect between residents and local government. This lack of trust exacerbates existing inequities, limiting access to essential services, and hindering meaningful engagement in decision-making processes.

A Governance Agenda for Change:

This research serves as a powerful call to action for more inclusive governance. It is an urgent invitation to reimagine and implement governance practices that prioritize:

- **Transparency and accountability:** Clear communication, responsiveness to community concerns, and open decision-making processes are crucial in rebuilding trust and fostering collaboration.

- **Equitable resource allocation:** Prioritizing infrastructure development, healthcare investment, and environmental solutions in underserved communities to demonstrate the government's commitment to addressing historical injustices and promoting social justice.
- **Participatory governance:** Empowering residents through inclusive platforms for dialogue, and decision-making, and ensuring accountability to ensure their voices are heard and reflected in policies.
- **Culturally sensitive communication:** Recognizing and respecting diverse needs and perspectives through culturally sensitive communication to foster trust and ensure inclusivity in governance processes.

Policy Recommendations:

The policy recommendations presented below are grounded in the comprehensive findings of the research, which highlighted the significant disparities in access to environmental health services across different neighborhoods in the City of Johannesburg. These recommendations emerged from a thorough analysis of the qualitative data collected from focus groups, which revealed the specific challenges faced by residents in both low-income and high-income areas.

- Invest in infrastructure development, including proper waste management systems, tarred roads, and improved sanitation facilities.
- Foster trust and communication between residents and authorities.
- Investment in accessible, affordable, and quality healthcare, ensuring equitable access and addressing trust concerns through ethical practices and improved communication.
- Empowering communities through participatory governance, fostering trust, and ensuring a voice for all in shaping their environment.
- Building transparent and responsive local government, addressing concerns about inefficiency and lack of communication to rebuild trust and encourage civic engagement.
- Promoting community-driven solutions through collaborative initiatives and addressing resident-identified priorities.

Beyond the Report, Towards a Just and Sustainable Future:

This research is not just an academic exercise; it is a stepping stone towards a more just and equitable Johannesburg. By acknowledging the critical role of governance in shaping environmental health outcomes, the City of Johannesburg can be a driving force for change. By embracing the recommendations above, it can contribute to building a city where all residents thrive in a healthy, sustainable, and just environment.

By acknowledging the unequal burdens borne by different communities due to lack of infrastructure and prioritizing equitable access, we can pave the way for a sustainable Johannesburg where all residents can thrive in a healthy environment. This requires not only policy changes but also a collective commitment to environmental and social justice. By moving beyond mere access and focusing on trust, empowerment, and equity, we can pave the way for a more sustainable Johannesburg. One where all residents, regardless of income, can thrive in a healthy and secure environment. This necessitates not only policy changes but also a collective commitment to environmental and social justice, recognizing that true well-being cannot be achieved in isolation.

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