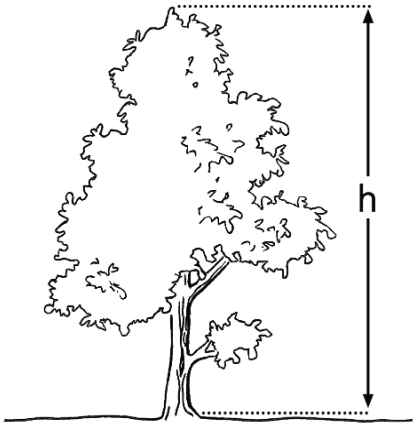

PLANTING TREES, PLANTING HOPE

AN ANALYSIS OF THE ROLE OF URBAN FORESTRY IN ADDRESSING ENVIRONMENTAL INEQUALITY IN CAPE TOWN

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GLDZOE001

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COMPULSORY DECLARATION: This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature: Date: 12 May 2015

ABSTRACT

The presence of trees in urban spaces has been identified as providing numerous environmental, psychosocial, and economic benefits. However, rather than being an equally distributed resource which all city residents share, tree cover in Cape Town, South Africa tends to be a marker of environmental inequality and racism, with trees being significantly more prevalent in wealthy, predominantly white, areas as opposed to poor, predominantly black, ones. The present study aims to analyse the potential for urban forestry to address this inequality. In order to gain in-depth understanding, a case study of an urban forestry project at the Lathi-Tha School of Skills in Khayelitsha is conducted. Within this framework, semi-structured and photoelicitation interviews are undertaken with 5 learners and 4 staff members in order to determine participants' experiences and perceptions of their urban forestry project. The findings suggest that urban forestry does have the ability to redistribute the environmental, economic, and psychosocial benefits of tree cover to poor communities. Additionally, participation in urban forestry in South Africa is shown to have the capacity to tackle social inequalities that continue to recreate green-space inequality.

ACKNOWLEDGEMENTS

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Zoë Gauld

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CHAPTER ONE

INTRODUCTION

"After a seven days' march through woodland, the traveller directed toward Baucis cannot see the city and yet he has arrived. The slender stilts that rise from the ground at a great distance from one another and are lost above the clouds support the city. You climb them with ladders. On the ground the inhabitants rarely show themselves: having already everything they need up there, they prefer not to come down. Nothing of the city touches the earth except those long flamingo legs on which it rests and, when the days are sunny, a pierced, angular shadow that falls on the foliage.

There are three hypotheses about the inhabitants of Baucis: that they hate the earth; that they respect it so much they avoid all contact; and that they love it as it was before they existed and with spyglasses and telescopes aimed downward they never tire of examining it, leaf by leaf, stone by stone, ant by ant, contemplating with fascination their own absence."

(Calvino, 1978)

Since the rise of the industrial revolution, an increasing and accelerating movement away from the countryside and towards the city has been evident. Today, for the first time in history, the majority of the world's population lives in cities, and urbanisation, as well as urban population growth, is showing no signs of slowing. In the year 2000, it was predicted that the global urban population would double by 2030 (UNFPA, 2007), and that 60% of all people, almost 5 billion, would reside in towns and cities (United Nations, 2012). To date, this prediction appears accurate if not slightly conservative.

While urbanisation is often associated with the industrial centres of the global north, this phenomenon is no longer contained within the developed world. In fact, Africa and Asia currently demonstrate the steepest gradient of urban population growth (see Figure 1) and it is estimated that by the year 2030, 81% of the world's urban population will reside in developing countries (UNFPA, 2007).

Catalysts for the current trend of urbanisation are numerous and diverse. However, particularly in developing countries, an individual's decision to relocate to the urban space is often largely aspirational (Cohen, 2005). If effectively run, cities offer significant opportunities for economic development and serve as centres of innovation, production, and paid employment. Urban areas are seen as hubs of modern living where indicators of quality of life, including health, literacy, gender equality, and social mobility, tend to be highest. Access to health care and basic public services, including sanitation, clean water, and electricity, are also enjoyed by high numbers of urban dwellers in comparison to their rural counterparts. Additionally, cities most often serve as educational centres as they house academic and cultural institutions, such as museums, libraries, and universities.

In the 1960s, French social theorist Michel Foucault (1967: 24) conceptualised the notion of utopias; sites that "present society itself in a perfected form" and, although related to the real space of society, are fundamentally imagined. Although firmly rooted within the discourse of modernism, this concept, and the desire to actualize such ideal spaces through technology and design, constitutes a precursor to urbanisation and city development in the contemporary moment. Drawing on this idea, it is clear that for many migrants, the urban space is seen as one of unmatched opportunity where dreams have the potential to become reality (UNFPA, 2007).

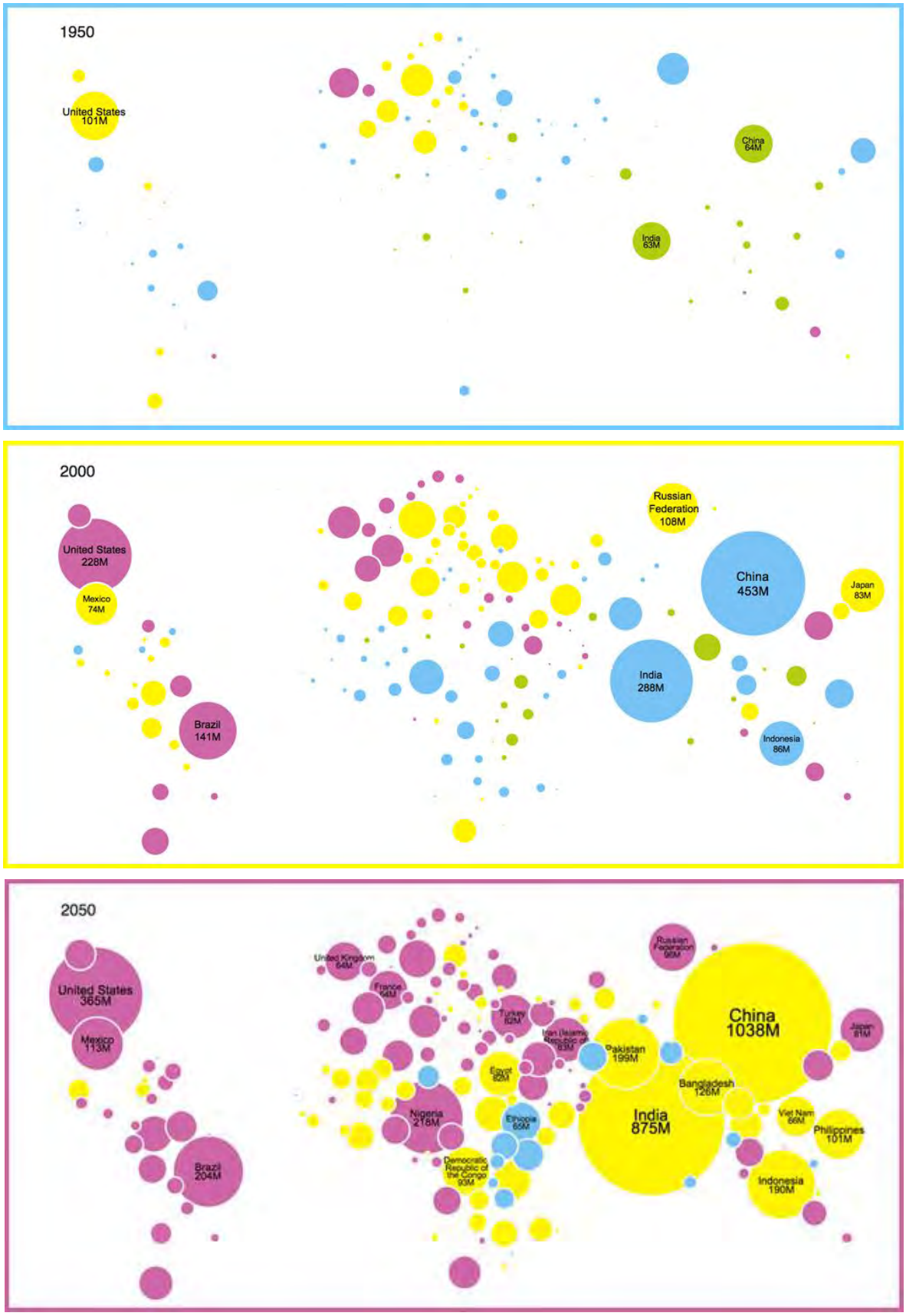

Figure 1: World map of urban population growth from 1950 to 2050 colour-coded to indicate percentage of total national population (Green = <25%, Blue = 25%-50%, Yellow = 50%-75%, Pink = >75%). Circles are scaled in proportion to urban population size (UNICEF, 2012).

However, as cities expand, managing them becomes increasingly complex. Within the context of a growing influx of residents to city centres, the benefits of urban life described above are often unequally distributed and, at times, inaccessible to marginalized groups (UNFPA, 2007). In addition to unequal distribution of benefits, various social and environmental burdens have also been associated with the expanding sprawl of metropolises. These include: poverty, unemployment, and "slumification"; air, water, and soil pollution; and the loss of species, habitats, and ecosystems through increased encroachment into previously green spaces (UNFPA, 2007). Although many migrants bear the brunt of these issues, the perceived benefits of residing in the urban space still tend to be seen as outweighing the costs (UNFPA, 2007). Thus, the current challenge for researchers and policy makers working in the field of urban development is not necessarily to reduce the size of city populations, but rather to increase the liveability of metropolitan areas for all current and future inhabitants (Konijnendijk et al., 2004). A particular strategy within this field, and the focus of this research, is the direct incorporation of nature into the urban space.

1.1. Environmental Injustice, Spatial Inequality, and the Tree Cover Mismatch

"I believe that the anxiety of our era has to do fundamentally with space"
(Foucault, 1967).

When discussing nature, particularly in relation to development, it is essential to consider the concept of political ecology. This field is based on the notion that nature is not simply a scientifically and objectively defined entity with which individuals interact, but rather a social construction that is conceptualised in different ways, in different temporal and geographical locations, to serve different political purposes (Robins, 2004; Proctor, 1998). Within this discourse, nature can no longer be seen as purely natural, but also social.

During the 1980s in the United States, theorists working within the field of political ecology conceptualised the notion of environmental justice; taken very broadly to indicate the fair distribution of environmental benefits and burdens (Schlosberg, 2007).

While this concept has been practically applied on a global scale in relation to issues such as climate change and large scale pollution, it is also valuable in conceptualising inequality on a smaller scale; that of the city or even of individual neighbourhoods. Within many urban areas it is clear that environmental benefits and burdens are not equally distributed in a spatial sense. In fact, a higher prevalence of pollution, poorly maintained housing and sanitation infrastructure, and a lack of green space have come to be seen as the hallmarks of urban poverty.

However, these conditions do not arise in a vacuum. Drawing on notions of political ecology, radical geographer Nikolas Heynen (2003: 980) states that "the social production of urban environments explicitly leads to uneven urban environments and environmental injustice." In other words, cities are spaces of marked inequality resulting from intentional, complex, and interrelated political, economic, and cultural processes (Harvey, 1973; Harvey, 1996; Hughes, 2000; Swyngedouw, 1999). Those who have access to resources and control the means of production and consumption tend to construct spaces that favour their lifestyles while those who do not have this control are left on the margins and suffer a lower quality of life (Low & Gleeson, 1998). This divide is often seen spatially in urban areas with the environmental conditions of wealthier and poorer neighbourhoods standing in stark contrast. As Tickamyer (2000: 806) states, "relations of power, structures of inequality, and practices of domination and subordination are embedded in spatial design and relations. Thus spatial arrangements are both products and sources of other forms of inequality." The unequal spatial distribution of green spaces, and trees specifically, within the urban environment, as well as the ways in which these arrangements produce and are produced by other forms of inequality, constitute central concerns within this study.

The presence of trees in urban spaces has been identified as providing numerous environmental, psychosocial, and economic benefits (further discussed in Chapter 3). Thus, it would seem that all residents of a utopic metropolis would ideally have access to urban green space in regions where it is ecologically possible and appropriate. However, rather than being an equally distributed resource which all city residents share, in reality tree cover tends to be a marker of inequality, with trees being significantly more prevalent in wealthy areas as opposed to poor ones (Heynen, 2006; Iverson & Cook,

2000). This phenomenon can be seen both internationally (see Figure 2) and in a local South African context (see Figure 3) and points to a widespread lack of environmental justice. As such, there has recently been an international movement towards the development of urban green spaces, and particularly urban forestry, as a strategy for combating this injustice, mitigating the environmental consequences of urbanisation, and improving quality of life for city residents (Elmendorf, 2008).

Wealthy Neighbourhoods	**Poor Neighbourhoods**
Zona Sul, Rio de Janeiro	Rocinha, Rio de Janeiro
	
Belgravia, London	Newham, London
	
Beverly Hills, Los Angeles	South Los Angeles
	

Figure 2: International Urban Tree Cover Mismatch

Wealthy Neighbourhoods	Poor Neighbourhoods
Constantia, Cape Town	Khayelitsha, Cape Town
	
Westville, Durban	Umlazi, Durban
	
Sandton, Johannesburg	Soweto, Johannesburg
	

Figure 3: Tree Cover Mismatch in South African Cities

Tickamyer (2000: 812) states, "a sociology of inequality must direct its scrutiny to […] struggles for space and the spatial dimensions of […] social hierarchies." In other words, when conceptualising inequality in the urban sphere, it is imperative to consider this inequality in relation to the spatial organisation of cities and neighbourhoods. This perspective is particularly useful when considering environmental injustice in South Africa, a nation still attempting to recover from a history of legislated spatial segregation and inequality (further discussed in Chapter 2). Given the Apartheid legacy of tree cover mismatch in South African cities, what role might the redistribution of trees through urban forestry play in reducing environmental injustice?

1.2. DEFINING URBAN FORESTRY

Prior to discussing the status of urban forestry in South Africa, one must first define the term. While there is some debate surrounding the concept of urban forestry (Shackleton, 2006), it is commonly defined as "the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits that trees provide society" (Konijnendijk et al., 2006: 2). Interestingly, this definition does not recognise the environmental benefits of trees such as reduced energy consumption from shading, improved air quality, and reduced storm water run-off. As such, this research will utilise the South African definition of urban forestry presented in the Department of Water Affairs and Forestry (DWAF, 2005: 3) which gives recognition to these environmental dimensions and defines urban forestry as "an integrated approach to the planting, care and management of trees in urban and peri-urban areas to secure economic, environmental and social benefits for urban dwellers." While all trees planted in urban spaces, including private gardens, fall within this definition, this study will focus solely on urban forestry in public spaces.

1.3. THE STATUS OF URBAN FORESTRY IN SOUTH AFRICA

South Africa has seen a rise in urban forestry projects in recent decades. These efforts have taken numerous forms and have been conducted at various levels by groups of individuals, NGOs, and local and national government departments. At face value, one might conclude that South African urban forestry has seen notable success as millions of trees have been planted and Johannesburg has even been deemed to house the largest urban human-made forest in the world (Johannesburg City Parks, 2011).

However, in the words of Kitchen (2012: 2), "urban forest contexts vary — trees are planted for reasons other than carbon capture and their aesthetic, cultural and landscape value — people perceive trees and forests in differing ways." Based on this logic, some theorists have argued that the planting of trees in urban areas in South Africa, while widely practiced, has not been situated within a systematic conceptual framework or supported by sufficient research within the local context. In 1997, the National Forestry Action Programme (NFAP) suggested that, due to a lack of research and strategy, South

African urban forestry was largely uncoordinated and haphazard. Almost ten years later, Shackleton (2006) echoed this point in his editorial in the *South African Forestry Journal* entitled, 'Urban Forestry – A cinderella science in South Africa?' In this critical piece, Shackleton (2006) suggests that a conceptual framework must be created and systematic context-specific research conducted in order to optimise approaches and outcomes to urban forestry, provide support for a cohesive and adequately funded urban forestry strategy, and create a basis for urban forestry advocacy. This study aims to provide an example of such research.

1.4. Research Questions

This study was driven by two related research questions. Firstly, within the context of an urban forestry project in an informal settlement in Cape Town, how do individuals who participate in tree planting perceive and experience urban forestry? And secondly, what do these perceptions and experiences tell us about the role of urban forestry in addressing environmental inequality in Cape Town?

1.5. Aims and Objectives

Based on these research questions, this study aimed to investigate urban forestry in South Africa where a case study provided insight into the perceptions and experiences of participants of one urban forestry project.

The objectives were to:

1. Situate South African urban forestry within the conceptual framework of political ecology;
2. Outline the research on urban forestry and the ways in which it is currently practiced in South Africa;
3. Conduct a case study of one urban forestry project in Cape Town to determine participants' experiences and perceptions of the project;

4. Based on the findings of the case study, provide a discussion of the role of urban forestry in addressing environmental inequality in Cape Town.

1.6. Limitations of the Study

Through the implementation of case study methodology, this study aimed to focus inquiry on one urban forestry project which employed a participatory approach. As such, the results presented here may not be generalizable to all urban forestry projects in Cape Town or South Africa, particularly those which operate in a different way. However, as the present study aimed to provide a thick description of the experiences and perspectives of a purposive sample, it may be possible for the reader to apply findings within similar urban forestry contexts.

1.7. A Note on 'Nature'

As a researcher working broadly with the notion of 'nature', it is necessary to acknowledge the debate surrounding the use of this term. While that which is 'natural' and that which is human or 'man-made' have historically been conceptualised as distinctly dichotomous, social constructivists such as Bennett and Chaloupka (1993) have problematised this assumption and argued that ideas of what constitutes 'nature' and 'wilderness' are, in fact, socially constructed. Thus, within the context of this research, although 'nature' is used in its more colloquial sense to denote the non-human natural world, the conceptually problematic exclusion of humans from nature is recognised.

1.8. Outline of Chapters

Chapter one has provided an introduction to the spatial mismatch of tree cover in South African cities and outlined the research questions, aims, and objectives of this study.

In chapter two, the environmental inequality present in Cape Town is conceptualised within the framework of political ecology. A history of the social geography of the city is

provided with a focus on the way in which racial inequality has informed the unequal spatial distribution of the city, particularly in terms of nature.

In chapter three, the environmental, psychosocial, and economic benefits of urban forestry are elucidated. Subsequently, the current state of South African urban forestry in research and practice is discussed and the potential for urban forestry to address the underlying social causes of geographical inequality is presented.

Chapter four outlines the research methodology that was utilised. The study is conceptualised, methods of data collection and analysis are explained, and ethics are evaluated.

Subsequently, in chapter five and six the findings of the urban forestry case study are presented and discussed. In chapter seven the study is concluded and, based on the mechanisms utilised for conducting urban forestry within this case study, urban forestry is presented as a potential solution to, not only urban tree cover mismatch, but also the social causes of this inequality.

CHAPTER TWO

CONCEPTUALISING ENVIRONMENTAL INEQUALITY IN CAPE TOWN

With its pristine beaches, rolling green vineyards, and the majestic Table Mountain watching over the city, it is no wonder that Cape Town was recently recognised as one of the most desirable tourist destinations in the world. However, once one departs from the state of the art international airport and journeys towards the city centre on the township-flanked N2 highway, it is impossible to ignore the stark social and economic differences that divide the city between the green areas and the grey areas. It is clear that the beautiful environment that draws nature lovers from around the world is not accessible to a large segment of people who call Cape Town home.

Of course, this situation has not come to pass through coincidence. In order to contextualise the current study, this chapter aims firstly, to further elucidate the field of political ecology; secondly, to introduce the notions of environmental justice and environmental racism; and thirdly, to provide a history of the social geography of Cape Town with a focus on the way in which racial inequality has informed the unequal spatial distribution of the city, particularly in terms of nature.

2.1. THE FIELD OF POLITICAL ECOLOGY

> *"The tree which moves some to tears of joy is in the eyes of others only a green thing that stands in the way. Some see Nature all ridicule and deformity... and some scarce see Nature at all. But, to the eyes of the man of imagination, Nature is imagination itself."*
>
> *(Blake, 1799)*

The concept of political ecology rejects the notion that human interaction with the environment may be considered insignificant in any sense. Rather, they base their

assumptions on the notion that "any tug on the strands of the global web of human-environment linkages reverberates throughout the system as a whole" (Robins, 2004: 13). Within this framework, it is clear that human conceptualisations of, and interactions with, nature are inherently political and substantial and must be understood as such in order for meaningful progress to be made. The field of political ecology is notably interdisciplinary with scholars hailing from a broad range of fields in the physical, social, and behavioural sciences. It is not uncommon to see experts in forestry, geography, history, fine art, and sociology all working within this paradigm to challenge current environmental conditions. The underpinning ideology that brings them all together is the acceptance of ecology as inherently political and an opposition to the more traditional framework of apolitical ecology. In the words of Robins (2004:13),

> […] this is the difference between identifying broader systems rather than blaming proximate and local forces; between viewing ecological systems as power-laden rather than politically inert; and between taking an explicitly normative approach rather than one that claims the objectivity of disinterest.

As such, studies in political ecology tend to present theses that may be considered as alternatives to traditional ways of seeing. Research tends to reveal winners and losers, hidden costs, and the differential power that produces social and environmental outcomes; including that which is influenced by discourses surrounding race, class, and gender.

According to Bryant and Bailey (1997: 28-29), political ecology can be summarised as having three key assumptions:

1. the costs and benefits of environmental change tend to be unevenly distributed;
2. this unequal distribution tends to reinforce existing social and environmental inequalities;
3. this reinforcement holds political implications for power relations between individuals and groups.

Bearing these assumptions in mind, the concepts of environmental justice and environmental racism will now be further discussed.

2.2. Defining Environmental Justice and Environmental Racism

As previously introduced, environmental justice sits within the arena of political ecology and is taken very broadly to indicate the fair distribution of environmental benefits and burdens (Schlosberg, 2007). Early conceptualisations of environmental justice hinged primarily on confronting the unequal distribution of environmental risk impacting individuals; for example, the proximity of particular neighbourhoods to smog-producing factories or the dumping of toxic waste in poor communities. Over the last two decades, however, the discourse of environmental justice has been expanding far beyond its initial applications to encompass a broader range of issues (Schlosberg, 2013), as well as a growing consciousness of the global nature of environmental injustices (Sze & London, 2008; Walker, 2009). In the words of Schlosberg (2013: 51),

> In its latest incarnation, environmental justice is now also about the material relationships between human disadvantage and vulnerability and the condition of the environment and natural world in which that experience is immersed. Like all iterations of environmental justice over the years, this focus has much to offer communities – both human and non-human.

Closely related to the concept of environmental justice is the idea of environmental racism; a lack of environmental justice which falls along racial lines. As Ruiters (2001) explains, environmental benefits and burdens are not only unequally distributed, but this distribution tends to neglect the needs of communities that have already been marginalised as a result of racial or class prejudice. The ways by which environmental injustice and racism have come to pass in Cape Town will now be discussed.

2.3. Cape Town: A City Divided

As Goldberg (1993) argues, racism does not depend on racist laws. While it may seem fitting to place the blame for current geographical inequality in Cape Town squarely on the shoulders of apartheid, urban segregation in South Africa actually predates legislated

racial separation and forms part of a long history of elitist political discourses around establishing control, limiting property rights, and maintaining urban order, health, and safety (for example see Swanson, 1977). For decades, the white minority in South Africa utilised these discourses of difference and modernisation to legitimise an unequal distribution of resources and power. White communities claimed the most environmentally desirable land in both urban and rural areas, avoided the harmful side effects of industrialisation, and enjoyed a comparatively high quality of life. Simultaneously, the black population was left disenfranchised, dispossessed, and disproportionately burdened by environmental ills (Seekings, 2008).

The 1913 Land Act set the stage for legislated apartheid by leaving 87% of land under white control and millions of black people expelled from their homes (Ruiters, 2001). Over the next several decades, many of these people would come to reside in peri-urban informal settlements which positioned them just close enough to the city to provide cheap labour but far enough away to ensure continued racial division. Aptly summarising the colonial underpinnings of this geographical inequality, political ecologist Gregory Ruiters (2001: 98) states, "segregated townships as institutions epitomised a racially engineered built environment and were seen by apartheid's opponents as geographical expressions of 'colonialism of a special type'."

Today, more than 20 years after the fall of apartheid, the affluence of neighbourhoods still tends to be coloured by race (Seekings, 2008). In spite of legislations addressing land reform and redistribution, the scale of redress in terms of land has been woefully limited. Additionally, a large segment of the black population still resides in excluded, under-serviced, and environmentally inferior townships where unemployment, gangsterism, inadequate shelter and sanitation, and a lack of green public space are all but quotidian challenges. Residing in such poor environmental conditions has the potential to inflict not only physical harm, such as health issues, but social costs, such as stigmatisation and social exclusion. Writing specifically about South African townships, Ruiters (2001:99) states,

> In these spaces, racial inequality and difference is re-affirmed as lived experience. The people who are trapped in these dangerous, unsanitary 'third world' spaces

> are too easily stigmatized as the dangerous Other, as inferior, as an 'unproductive underclass' and potential dangerous layer and as recalcitrants caught up in a 'culture of non-payment'.

In other words, experiences and perceptions of space are not merely physical, but also fortify damaging ideological constructs of race and difference.

On the other side of the colour line, South Africa's white population remains in a position of relative privilege. With wide tree-lined roads, high security walls, and low crime rates, predominantly white neighbourhoods tend to see rising property values and increased mobility, while black individuals, who constitute the demographic majority in township communities, face negative equity, redlining by banks, and financial stagnation (Ruiters, 2001). Legislated segregation is no longer present in post-apartheid South Africa, but it would seem that racial division is still firmly rooted in perceptions and felt experiences of space.

While social inequality in Cape Town tends to be coloured in black and white, it can also be seen in grey and green. As previously stated, tree cover tends to be a marker of inequality, with trees being significantly more prevalent in wealthy areas as opposed to poorer ones. Thus, it is not surprising that, in Cape Town, historically excluded and poor Black neighbourhoods tend to have markedly fewer trees than more affluent white neighbourhoods. Figure 4 provides a concise visualisation of the distinct separation between affluent green spaces and the penurious grey spaces. Drawing on the ideological relationships between perceptions of space, race, and difference outlined above, one may argue that the unequal distribution of green space depicted in Figure 4 is a clear indication of the environmental racism evident in Cape Town more than two decades after the fall of apartheid.

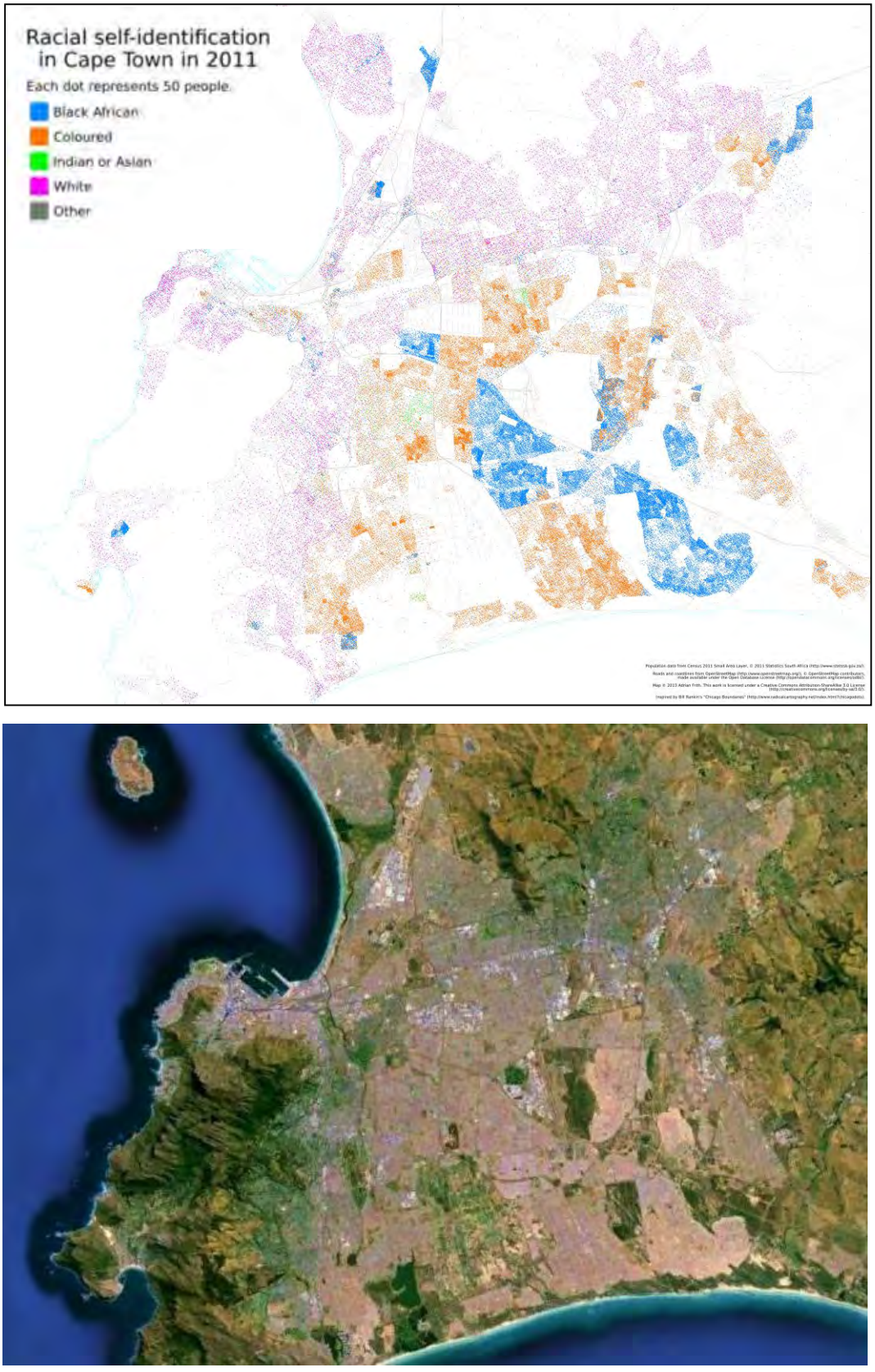

Figure 4: Distribution of self-identified racial groups (top) (Frith, 2013) in comparison to distribution of tree cover seen from above in Cape Town (bottom) (Google Earth, 2015).

2.4. Bridging the Divide: A Note on Priorities

Admittedly, unequal distribution of tree cover is only one of many environmental injustices embedded within Cape Town's geography. As such, for some, the presence or absence of trees may be seen as inconsequential in comparison to other social problems. As McDonald (2002: 10) writes, "the lack of basic services like sewage and sanitation for millions of urban South Africans is arguably the most pressing environmental justice problem in the country today." Certainly, given the magnitude of social struggles facing South Africa at the present moment, it is fair to pose the question – why focus on green space?

It cannot be disputed that infrastructural issues and a lack of basic services in South Africa are of great consequence and should be addressed with proportionate urgency. However, this does not mean that issues of green space inequality cannot, or should not, be tackled simultaneously. In the developing world, urban forestry has been identified as having an important role to play in ensuring sustainable development. In fact, as a means of addressing poverty and ensuring sustainable livelihoods, the Food and Agriculture Organisation of the United Nations has recently developed a programme for the promotion of urban and peri-urban forestry in developing countries (FAO, 2002). As Konijnendijk et al. (2004: 70) state:

> Experiences and research during recent years have shown that urban green structures are more than just "icing on the cake." Far from being luxury goods, they deliver a range of goods and services to justifiably include them as part of the basic urban infrastructure.

In other words, rather than being seen as merely embellishment, urban green space has come to be recognised as a necessity which should be equally distributed among all city residents. Following this argument, this study was conducted as an exploration of the role of urban forestry in addressing environmental inequality in Cape Town. After further elucidating the benefits of urban forestry that have been identified in the literature, the following chapter will examine the role of urban forestry in contemporary South Africa.

CHAPTER THREE

URBAN FORESTRY IN THEORY AND PRACTICE

"The best time to plant a tree was 20 years ago. The next best time is now."

(African Proverb)

In an effort to more closely engage with the theoretical and practical aspects of tree planting, the purpose of this chapter is twofold. Firstly, it aims to further elucidate the environmental, psychosocial, and economic benefits of urban forestry that have been identified in the literature. Secondly, it puts forward a discussion on the current status urban forestry in South Africa in general, and in Cape Town in particular, as well as the potential for urban forestry to address the underlying social causes of geographical inequality.

3.1. THE BENEFITS OF URBAN FORESTRY

The direct and indirect benefits of urban forestry have been well documented within a wide range of disciplines, and fall generally within three categories: environmental, psychosocial, and economic.

3.1.1. ENVIRONMENTAL BENEFITS

As previously mentioned, urban trees have been linked to various environmental advantages. By providing shade for roads and rooftops, trees reduce the warming of urban environments and help to combat the urban heat island effect (Shashua-Bar & Hoffman, 2000; Cregg & Dix, 2001). Similarly, by regulating urban temperature fluctuations, trees contribute to reduced energy use and heating and cooling costs (Akbari, 2002; Akbari, Pomerantz, & Taha, 2001; McPherson & Simpson, 2003). In fact, in

managing energy usage, planting trees has been found to often be more cost effective than building new power plants (Simpson, 1998; McPherson, 2005).

In terms of air quality, trees act as biological filters to remove particulate pollutants such as smoke, dust, ash, and pollen (Scott, McPherson, & Simpson, 1998) as well as gaseous pollutants (Nowak, Crane, & Stevens, 2006) from the urban atmosphere. Of particular importance is the ability of trees to sequester CO_2 and store it as wood biomass as they grow thereby slowing the effects of climate change (Nowak & Crane, 2006). Through natural water absorption and filtration, trees have the ability to drastically reduce water quality problems (Matteo, Randhir, & Bloniarz, 2006). Additionally, by intercepting and storing rainfall through their leaves, branches, and roots trees reduce volumes of stormwater runoff, decrease erosion, and improve soil quality (Jagger & Pender, 2003; Xiao et al., 1998). Lastly, urban trees have been shown to reduce noise pollution (Fang & Ling, 2003) and provide habitats for urban wildlife (Johnson, Barker, & Johnson, 1990; Leston & Rodewald, 2006).

3.1.2. Psychosocial Benefits

The presence of urban forests also has notable psychosocial benefits. Individuals' perceptions of the beauty of their neighbourhoods, pleasure in their surroundings, and pride in their community have been shown to be closely related to features of the urban forest (Austin & Kaplan, 2003; Konijnendijk et al., 2004; Lohr, Pearson-Mims, Tarnai, & Dillman, 2004). They provide accentuation of architectural elements, offer relief from the monotony of pavement and masonry that make up the concrete jungle, make for inviting play areas, and unify visually chaotic scenes (Gormon, 2004). Additionally, urban trees provide important spiritual and emotional experiences and play a significant role in providing residents with a sense of place, community, and home (Chenoweth and Gobster, 1990; Elmendorf, 2008). The presence of urban trees has been linked with a perceived increase in safety and civility (Kuo, 2003), as well as a reduction in crime (Kuo & Sullivan, 2001).

Having a view of nature and trees, even through a window, has been shown to provide substantial psychological benefits including increased job satisfaction, reduced stress, and improvements in moods and physical health (Kaplan, 1993). In fact, patients with views of green spaces out of their hospital windows have even exhibited faster recovery times and fewer complications than individuals who did not have such views (Ulrich, 1984). In children and teens, living in a green urban environment has been shown to be directly related to improvements in both behaviour and learning (Taylor, Kuo, & Sullivan, 2001; Taylor, Kuo, & Sullivan, 2002).

3.1.3. Economic Benefits

Although trees do cost a significant amount of money to plant and maintain, the value of the ecosystem system services which they provide (discussed above) is generally between two and four times greater than the cost of tree planting and maintenance (McPherson, 2007; Soares et al, 2011). Trees have also been associated with increased property values (Evamy, 2005; Laverne & Winson-Geideman, 2003). Additionally, through multi-functional urban land use, urban fruit trees have the potential to improve food security and create alternative livelihoods for city residents (Konijnendijk & Gauthier, 2006).

3.1.4. A Note on Scale

It is clear that the benefits of including trees in the urban space are numerous and occur on different levels; ranging from the individual, to the local community, to the global community (see Table 1). However, it is important to note that programmes focused on addressing needs at one level may not necessarily result in benefits on all levels (Heynen, 2003). To elucidate, if one's aim is to increase residents' pride in their neighbourhood, a programme that focuses on the redistribution of trees by planting one tree in every front yard would likely be very efficient. However, if the aim is to create an urban carbon sink to combat climate change on a larger scale, it would generally be much more efficient to plant a dense group of trees on an empty plot of land. Thus, the format in which trees are

planted directly implicates the level of environmental injustice that those trees will be able to successfully address. In the words of Heynen (2003: 990),

Table 1: Benefits of Urban Trees

	Individual	Local	Global
Environmental Benefits:	• Reduced radiation exposure	• Improved air quality • Reduced stormwater runoff • Water filtration • Decreased erosion • Improved soil quality • Reduced noise pollution • Habitat for urban wildlife • Cooling of urban heat island	• CO_2 sequestration • Slowed climate change
Psychosocial Benefits:	• Perceived to increase neighbourhood beauty • Increase pride of place • Provide residents with a sense of place, community, and home • Increased job satisfaction • Reduced stress • Improved physical health • Faster patient recover times • Improvements in child behaviour and learning	• Increased safety and civility • Reduced crime • Community empowerment	
Economic Benefits:	• Reduced heating and cooling costs • Improved food security • Creation of alternative livelihoods	• Reduced energy use • Increased property values • Economic value of ecosystem services	

Ultimately, this scenario entails either seeking a just distribution of urban trees, so that all have the benefits at a local scale, or designing reforestation efforts that seek to maximize the long-term ecological efficiency of the urban forest, thus contributing more toward global sustainability.

While it may not be necessary to adhere to this strict either/or paradigm, it is important to consider the levels at which the benefits of urban forestry projects are experienced. With this issue of scale in mind, one may consider the various urban forestry projects taking place in South Africa at present.

3.2. South African Urban Forestry in Practice

As previously stated, although they are not as widely practiced as in industrialised countries, urban forestry initiatives aimed at increasing the number of trees in public spaces are being implemented in the developing world (Shackleton, 2006). Often subsumed under the titles "urban greening" or "tree planting", South African urban forestry programmes involve a variety of stakeholders and participants.

One of the most widely recognised programmes in South Africa is National Arbour Week. The initiative is organised by the Department of Water Affairs and Forestry and aims to both educate the public about the benefits of trees and highlight organisations which are conducting urban greening (Guthrie & Shackleton, 2006). Another significant countrywide project is the South African National Biodiversity Institute's Greening of the Nation Project. Started in 2004, the initiative aims to green impoverished areas while simultaneously addressing job creation and poverty alleviation. The programme targets community public spaces such as schools, parks, hospitals, clinics, and police stations where indigenous water-wise school gardens are developed and vegetable gardens and fruit trees are planted. In addition to creating more aesthetically attractive environments, these projects also provide food and opportunities for environmental education.

On a more local level, most municipalities put a portion of their budgets toward planting trees in public spaces such as parks and roadsides. However, local government in urban areas tends to prioritise housing, potable water, sanitation, and other basic services, leaving limited financial resources available for urban greening, and urban forestry in particular (Gwedla & Shackleton, 2015). As such, the majority of tree planting in public urban areas tends to be orchestrated by NGOs in specific regions. For example, the Millennium Tree Planting Programme in Grahamstown, run through Rhodes University, promotes tree planting and urban greening within their municipality. Based in Johannesburg, Food and Trees for Africa is a social enterprise working towards greening communities across South Africa. With a focus on large-scale tree distribution, this organisation has planted 4.2 million trees in the last 14 years. In addition to its reforestation projects, Cape Town based social enterprise Greenpop runs an urban greening programme on the Cape Flats with a focus on environmental education, skills development, and social bridging. Since its inception in 2010, Greenpop has planted over ten thousand trees during facilitated workshops at almost 300 schools, clinics, and community centres. For the purposes of this research, one of Greenpop's beneficiaries was utilised as a case study. In order to fully contextualise the results of the case study, it is necessary to first consider the organisation's urban greening strategy.

3.3. GREENPOP'S URBAN FORESTRY

In their own words, "Greenpop is a social enterprise on a mission to (re)connect people with the planet" (Greenpop, 2011). Their main projects include small-scale reforestation events in the Platbos (Western Cape) and Hogsback (Eastern Cape) forests, as well as urban forestry projects in under-greened and impoverished areas of Cape Town, South Africa and Livingstone, Zambia.

While this organisation does receive funding from corporate and individual donors, a large percentage of their budget is self-generated through the sale of various tree-planting experiences. In Cape Town, these include facilitated group tree planting days at schools, clinics, community centres, and other similar beneficiaries, that form an important part of their urban greening programme on the Cape Flats.

In terms of beneficiary selection, Greenpop relies on a nomination and application process to ensure that recipient organisations initiate their projects. After a potential beneficiary applies and the site is assessed for suitability, a planting day is arranged. These days bring together local community members and a group of external paying volunteers (usually a corporate team or international tour group) and aim to educate all participants about environmental action and facilitate social bridging through the act of planting a small number of trees (usually between 10 and 30 at one site).

After the planting day, Greenpop runs a two-year monitoring and education programme with each of their beneficiaries. This programme includes multiple site visits, workshops for groundskeepers and teachers, and various online resources to help keep beneficiaries inspired about their project and informed about various aspects of urban forestry. At present, Greenpop's Cape Town urban greening programme boasts a 78% tree survival rate. This percentage may be considered quite high given that a recent study of street tree survival in 11 small towns in the Eastern Cape indicated an average survival rate of 58% (Richardson & Shackleton, 2014).

As evidenced by their numerous provincial and national awards and accolades, it is clear that Greenpop is well respected within the arena of environmental action. However, as their projects are not based on context specific research, various questions are raised. Do community members who participate in their initiatives perceive or experience similar benefits to those identified in the urban forestry literature? Are there, perhaps, other costs or benefits of urban forestry which are specific to Cape Town or Greenpop's methodology? And, drawing on these questions, what role does Greenpop's urban greening programme play in addressing the environmental inequality present in Cape Town?

3.4. Suggesting a Theoretical Framework for South African Urban Forestry

From an environmental justice perspective, one might argue that, within a context of persistent race-based environmental inequality, solutions must address the cause of this inequality – social segregation – as well as the symptoms. In terms of the symptom, urban

forestry does have the potential to address tree cover mismatch and contribute towards environmental justice. It is, of course, possible to plant trees in under-greened communities. Eventually, it may be possible to turn grey areas green and erase a lack of trees as an indicator of poverty. Additionally, it is likely that the presence of trees will have various benefits for the communities in which they are planted.

However, I would like to suggest that the role of South African urban forestry should not only be to equally distribute trees, but rather to address the social structures that cause the original unequal distribution. In order to determine the extent to which this is possible this study examined one of Greenpop's urban forestry projects at the Lathi-Tha School of Skills in the township of Khayelitsha. Prior to discussing the results of this study, it is necessary to further elucidate the specifics of the research methodology.

CHAPTER FOUR

RESEARCH METHODOLOGY

> *"The naturalistic inquirer soon becomes accustomed to hearing charges that naturalistic studies are undisciplined; that he or she is guilty of 'sloppy' research, engaging in 'merely subjective' observations, responding indiscriminately to the 'loudest bangs or brightest lights'. Rigor, it is asserted, is not the hallmark of naturalism."*
>
> *(Lincoln & Guba, 1985)*

When conducting research, it is essential that one is clear in both describing and rationalising one's chosen research methodology. This chapter aims to provide such clarification.

4.1. CONCEPTUALISATION

With an aim to examine the role of urban forestry in addressing environmental inequality in Cape Town, this research was concerned with gathering the experiences and perceptions of individuals involved in an urban forestry project. In order to discover the character of these subjective concepts, this study employed a qualitative methodology that, ideally, ensures the collection of naturalistic data, describes subjective experience, may be challenged by participants, and requires the researcher's recognition of their own role in the creation of meaning.

Within the qualitative paradigm, this research utilised a case study methodology that focused on one of Greenpop's urban forestry projects at the Lathi-Tha School of Skills in Khayelitsha. The case study included semi-structured and photo-elicitation interviews

that were conducted in order to gain an understanding of the perceptions and experiences of those who participated in the urban forestry project.

4.2. Sampling and Access

The Lathi-Tha School of Skills was identified as a case study through a multi-stage process. Stage one included a process of mapping urban forestry organisations in South Africa (discussed in section 3.2). Once this task was completed, for ease access, the list was narrowed to those organisations that conducted projects in Cape Town. At this point, Greenpop was approached and was found to be willing to take part in this study.

In order to gather information on the role of urban forestry in addressing environmental injustice, it was necessary to identify a project that took place in a marginalised area of Cape Town. As such, out of all of the urban greening projects which Greenpop runs, a list of those taking place in Khayelitsha – one of the most under-serviced townships in Cape Town – was compiled. From this list, Lathi-Tha was selected as a possible case, Greenpop's point of contact at the school was contacted, and permission to conduct research at the school was granted.

At Lathi-Tha, the sample consisted of two groups of individuals. Firstly, it included one administrator, one teacher, and five learners who worked closely with Greenpop throughout the urban greening project and were directly involved in the continual maintenance of the trees. Secondly, the sample included two teachers who were not directly involved in the urban greening project. Throughout the interview process, the researcher attempted to gain 'both sides of the story;' the perspectives of those individuals who were very familiar with the project, as well as those who were not.

4.3. BACKGROUND TO THE CASE STUDY

Prior to discussing the methods of data collection used in this study it is necessary to provide further context with regards to the case. The Lathi-Tha School of Skills is a special needs school which provides education to children between 14 and 18 years old who have been found to struggle within a traditional school environment. Generally, these children do not suffer from serious physical or learning disabilities but have fallen behind in terms of their age cohort due to either behaviour problems or an inability to maintain the pace of the mainstream curriculum. With an aim to equip learners with marketable skills as they enter the job market after completing their education, Lathi-Tha teaches a basic academic curriculum that is supplemented with a substantial focus on technical skills, such as bricklaying, sewing, and hairdressing.

Greenpop's urban forestry project began at Lathi-Tha in March of 2013. On their first plant day, learners from the school, the participating teacher, and the administrator joined a French tour group to plant 40 trees on the school grounds. In addition to facilitating the planting of the trees, Greenpop ran their usual programme on the day, which included basic environmental education and games that encouraged the learners and the tour group members to interact and work as a team. In October of 2013, Greenpop returned to Lathi-Tha to monitor the survival of the trees and discuss the challenges that the school was facing. On finding that all of the trees had survived, a second plant day was scheduled at the site. This day, which took place in November of 2013, was attended by learners from Camps Bay High School and followed the same format to the first plant day. With an understanding of the background of the urban

forestry project at Lathi-Tha, the data collection methods that the current study employed will now be further discussed.

4.4. DATA COLLECTION

The research procedure included two data collection processes: individual semi-structured interviews and photo-elicitation interviews.

4.4.1. INDIVIDUAL SEMI-STRUCTURED INTERVIEWS

Individual semi-structured interviews were utilised with participants at Lathi-Tha who either worked closely with Greenpop to bring about the urban greening project or were directly involved in the continual maintenance of the trees. During these interviews, participants were asked to discuss various topics such as their role in the project, their perceptions of the project's impact on the community, and their perceptions of the project's sustainability.

4.4.2. PHOTO-ELICITATION INTERVIEWS

In order to avoid language barriers, photo-elicitation interviews were performed with the five learners who struggled with English. Within this methodology, the researcher provided participants with disposable digital cameras and asked them to identify aspects of the school of which they felt proud. These photographs were then used as prompts within semi-structured interviews so as to allow the participants the opportunity to first discuss aspects of their communities which they felt to be most important without assuming that these were related to the urban forestry project in question. This methodology allowed participants to more freely identify their priorities and assisted with maintaining conversation in spite of language difficulties.

4.5. A NOTE ON REFLEXIVITY

In the words of Willig (2001: 10), reflexivity constitutes "an acknowledgement of the impossibility of remaining 'outside of' one's subject matter." In other words, while operating within a qualitative paradigm, it is critical that the researcher remain aware of their own role in the co-construction of knowledge and meaning, and also of the influence of their personal and social identity on the participants' responses.

In terms of the current research, one feature that may have influenced the relationship between researcher and participant must be acknowledged. As the researcher made contact with the participants through Greenpop, it must be acknowledged that the participants may have assumed a professional connection between the researcher and Greenpop. This type of assumption could have potentially limited participants' responses, prevented them from disclosing any 'hard truths' which they may perceive, or prompted them to over-emphasise benefits with an aim of being provided with more trees. To prevent these types of assumptions, the researcher clarified her role as an independent academic researcher both verbally and within the informed consent form, prior to beginning all interviews.

4.6. QUALITATIVE DATA ANALYSIS PROCEDURE

As this study utilised qualitative interviewing and photo-elicitation methodology, data consisted of tape recordings and transcriptions of the interviews, notes taken during the course of the research, and photographs taken by participants.

To ensure a systematic analytical procedure, this study relied upon the Miles and Huberman (1994) approach to qualitative data analysis. This approach, which has been praised for encouraging rigorous qualitative research, has various features that will be demonstrated in the following description of the analytical method for the current study.

Step 1: Initial Reading of the Data

In keeping with the Miles and Huberman (1994) approach to systematic qualitative data analysis, the analytical process began with a close reading and re-reading of the interview transcripts in their entirety. This step allowed for the researcher to get a feel for the issues arising from data, identify counterintuitive perspectives, and draw tentative conclusions before imposing codes.

Step 2: Broad First Level Coding

After reading the text, broad first level coding was conducted. Coding is a process of categorisation, data fragmentation (Dey, 1993), and data reduction (Fielding & Lee, 1998) that entails assigning labels to pieces of data. This procedure was essential to data analysis as it facilitated identification and organisation of pieces of data, and the emergence of themes. Miles and Huberman (1994) identify first level coding as a descriptive process in which data is labelled and classified into purely descriptive categories or codes. These descriptive codes can be divided into broad codes that give one a general sense of the data, and fine codes that provide a more detailed description (Wengraf, 2001).

In terms of creating codes, prior to beginning data analysis the researcher created a provisional "start list" of broad codes. This list included codes such as Perceived Benefits of Urban Forestry and Experienced Challenges of Urban Forestry, and was drawn from wider conceptual framework of the study. Such a list serves to ensure that data analysis is mindful of the purpose of the study and is necessarily selective (Miles and Huberman, 1994). Using this "start list" of codes, free nodes were created in NVivo and the data was coded. After completing initial broad first level coding, the researcher refined the definitions of the codes and removed any which no longer appeared to be applicable.

In addition to coding, Miles and Huberman (1994) identify memoing as an essential aspect of data analysis. As the data was coded, memos provided by the NVivo software were also utilised to record thoughts and questions that surfaced. This process allowed

for the researcher to refer back to these thoughts at later stages of analysis as a means by which to verify the validity of conclusions.

Step 3: Fine First Level Coding

At this point, in order to further reduce the data and refine and organise the descriptive codes, the researcher moved from broad codes to fine codes and from free nodes to tree nodes in NVivo. The use of tree nodes facilitated hierarchical categorisation and served as a form of data display; which is critical in qualitative data analysis (Miles & Huberman, 1994).

Step 4: Second Level Coding

After completing first level coding, the researcher began second level inferential coding. This process involved identifying patterns and relationships in the data, and served as a further means of data reduction (Miles and Huberman, 1994).

Utilising the NVivo software, the researcher browsed the quotations from each of the first level codes and drew themes, patterns, and relationships from the data. Subsequently, a tree of inferential codes in NVivo was created as a means of data display, and each of these codes was defined. When the evidence of findings was available in this format, conclusions could be drawn.

4.7. ACCURACY OF DATA

Within the framework of qualitative research, four standards of data accuracy must be addressed in order to ensure trustworthiness of the data; credibility, dependability, transferability, and confirmability (Babbie & Mouton, 2009).

4.7.1. CREDIBILITY AND DEPENDABILITY

The standard of credibility focuses on whether congruency exists between the participants constructed realities and those that the researcher attributes to them

(Babbie & Mouton, 2009). In other words, are conclusions true reflections of reality? Similarly, dependability refers to the extent to which similar conclusions would be reached if the study were to be repeated (Babbie & Mouton, 2009). In terms of the present study, triangulation and member checks were utilised to help ensure the credibility and dependability of results.

4.7.2. TRANSFERABILITY

Transferability refers to the extent to which the reader is able to apply findings to other individuals or contexts (Babbie & Mouton, 2009). As the present study aimed to provide a thick description of the experiences and perspectives of a purposive sample, it may be possible for the reader to apply findings within similar alternative contexts.

4.7.3. CONFIRMABILITY

Confirmability refers to the extent to which findings are the product of the focus of inquiry and not the personal biases of the researcher (Babbie & Mouton, 2009). As reflexivity was taken into account, the risk of researcher bias should be reduced.

4.8. ETHICAL CONSIDERATIONS

When conducting research, one must remain mindful of the ethical standards surrounding utilised research methodologies (Babbie & Mouton, 2009). As the present study utilised qualitative interviewing techniques, primary ethical concerns were those of informed consent and the interviewees' rights to privacy.

4.8.1. INFORMED CONSENT

In order to ensure voluntary participation and absence of harm to participants, interviewees were informed of the purpose of the study and asked to sign an informed consent form prior to their interviews. This document informed them that information which they disclosed would be used for educational purposes, that they were able

withdraw from the study at any time, and that all information disclosed would be treated with confidentiality and autonomy.

4.8.2. RIGHT TO PRIVACY

To maintain participants' privacy, disclosed information was treated with confidentiality and anonymity. In order to ensure confidentiality, the researcher had sole access to all data recordings and transcriptions, and reported said data exclusively within the academic realm of this study. Although complete anonymity is incompatible with interview techniques, in terms of data reporting, names were changed in order to protect interviewees' privacy.

CHAPTER FIVE

PLANTING TREES: REDISTRIBUTING TREE COVER BENEFITS THROUGH URBAN FORESTRY

"Planting trees is good for our country." (Lubabalo, Lathi-Tha Learner)

As previously discussed, tree cover tends to be a marker of social inequality in Cape Town, with trees being significantly more prevalent in wealthy, predominantly white, areas as opposed to poorer, predominantly black, ones. As such, from an environmental justice perspective, the role of urban forestry in this context is twofold. Firstly, it should address the unequal distribution of tree-related benefits by focusing on planting in areas that lack tree cover. Secondly, it should be conducted in such a way that attempts to tackle those social inequalities that continue to recreate green-space inequality.

The purpose of this chapter is to present and discuss the findings of this study which pertain to the first responsibility of urban forestry; redistribution of tree cover benefits (the second responsibility will be further discussed in Chapter 6). Drawing on the three primary categories of benefits that run throughout the literature, the environmental, economic, and psychosocial benefits that were perceived and experienced by the participants of this study at the Lathi-Tha School of Skills will now be discussed.

5.1. ENVIRONMENTAL BENEFITS

Within the urban forestry literature, urban trees have been linked to various environmental benefits, including reduction in urban temperature, energy use, volumes of stormwater runoff, and noise pollution; as well as improvements in air, water, and soil quality, sequestration of CO_2, and provision of habitat for urban wildlife. While the participants of this study identified some of these benefits, others were not mentioned.

5.1.1. Increased Access to Shade

Figure 5: Lathi-Tha School of Skills Courtyard (Photograph by Vuyo – Lathi-Tha Learner)

As part of the broader Cape Flats region, the Lathi-Tha School of Skills faces harsh environmental conditions. Of particular concern is the extreme heat experienced in the area during the summer. During these months, learners were often seen spending their break times, which they are required to spend outdoors, leaning against the walls of the school in order to avoid the sun. As such, it is no surprise that the promise of shade was one of the most frequently mentioned environmental benefits of having trees on the school grounds. In the words of Vuyo, a Lathi-Tha learner,

> *"I like the trees because they give us a place to hide from the sun."*

It is interesting to note that this benefit was frequently identified in spite of the fact that the trees were, at the time of this study, still far too small to provide any shelter. Although not experienced at the time, the benefit of shade was perceived to be inevitable and something that would increase with time. As Thabiso, a Lathi-Tha learner explained:

"You see this tree here is small but when it's getting older it's going to do this [branching out gesture]. It's what trees do."

This notion of continuously increasing benefits was a strong theme running throughout the discussions with participants, as will become clear in the following sections.

5.1.2. IMPROVED AIR QUALITY

The second frequently mentioned environmental benefit of trees was improved air quality. Although none of the respondents spoke specifically about particular pollutants, most mentioned the ability of trees to clean the air and recognised that this had implications for human health. For example, Thabiso stated,

"Trees also bring us the air, fresh air, always bring us to breathe healthy."

5.1.3. COMBATING CLIMATE CHANGE

On a broader scale, some respondents also mentioned, in general terms, the ability of trees to combat climate change. For example when he was asked why he decided to participate in the urban forestry project, Xholani, a Lathi-Tha learner, stated,

"I think it [planting trees] is important because there's a problem; climate change."

While it was clear that the details of the scientific link between trees and global climatic were generally unknown, several respondents included the term "climate change" within their answers which indicates the broad reach of environmental awareness discourse.

It is interesting to note, however, that Greenpop staff members did not mirror these notions of macro environmental benefits of urban forestry. For example, when discussing the perceived benefits Paul, a Greenpop employee, stated,

"On an environmental scale they talk about carbon sequestration and stuff like that, which, I think, on the big scheme of things is totally insignificant."

While the potential for the 40 trees planted at Lathi-Tha to sequester any notable amount of CO_2 is unlikely, recognition of the link between trees and climate change on behalf of the Lathi-Tha learners demonstrated their connection with the broader environmental awareness movement.

5.1.4. GOING GREEN

While the respondents from Lathi-Tha did not discuss any other specific environmental benefits, when asked about the rationale behind the urban forestry project, generalised statements about the value of planting trees as part of environmentally conscious action were common. For example, Mr Walters, a Lathi-Tha administrator, explained,

> *"The principle […] steered the school [towards] greenery, in other words making the school green, promoting a green spirit. It was part of his vision."*

It will be several years before concrete environmental benefits may be seen from the trees planted at Lathi-Tha, but, at present, it is clear that staff and learners see this project as an environmental investment.

5.2. ECONOMIC BENEFITS

In addition to environmental benefits, respondents also identified two primary economic benefits of planting trees.

5.2.1. FOOD SECURITY

Firstly, the promise of harvesting fruit that could be consumed by staff and learners was identified as a significant benefit. Although the sandy soil and high winds of the Cape Flats are not ideal for growing fruit trees, Greenpop has had some success in growing peaches and apples at other projects in the area. Although these benefits had not yet been seen at Lathi-Tha, many respondents were excited about the anticipated improvements in food security that they would bring. For example, when discussing the most recently planted group of trees, Vuyo, a Lathi-Tha learner, stated,

"The trees will give us fruit to eat to be healthy in our bodies."

While food security in general is not a significant problem at Lathi-Tha or in the surrounding community, nutritious foods do tend to be quite expensive. Thus, the presence of productive fruit trees at this school has the potential to lead to dietary improvements.

5.2.2. ENTERPRISE DEVELOPMENT

In addition to providing fruit to learners and staff, Mr Walters, a Lathi-Tha administrator spoke of his plan to eventually distribute or sell fruit to the wider community:

> *"That [fruit] will directly benefit some of our learners, and maybe some of members of our community. We as a community will decide when the time comes how we will utilise the fruit of those trees."*

It must be noted that cultivating a productive fruit tree is quite a complex task. However, given the success at other Greenpop projects, it is not unrealistic to suggest that the trees at Lathi-Tha might eventually produce fruit for consumption by staff, learners, and the surrounding community.

5.3. PSYCHOSOCIAL BENEFITS

Like many schools on the Cape Flats, Lathi-Tha faces significant social challenges. In discussions with staff and learners, various issues facing the school and broader community were identified. These included high dropout rates, teenage pregnancy, and substance abuse. However, perhaps the most emphasised problem facing this area was the issue of crime. As Mr Gaba, a Lathi-Tha teacher who was not directly involved in the tree planting project, lamented,

> *"Khayelitsha is one of the places that has a high crime rate. […] You read the papers, watch the news, it's always 'Khayelitsha do that…', 'Khayelitsha do that…'*

While petty crimes were mentioned on numerous occasions, the issues of more organised crime and gangsterism were also discussed. One teacher, in particular, discussed the way in which gangsters came to be seen as role models for young people who find themselves out of school and unemployed:

> *"People get arrested and then they come back to this society. They come around and maybe they have some tattoos and the kids think that is cool. Some people go around and steal, or armed robbery, or bank heist and so on and they buy cars and young people who are sitting around doing nothing they think that what so-and-so has done is cool and so they follow that." (Mr Marapula, Lathi-Tha staff member not directly involved in the tree planting project)*

As previously discussed, research suggests that the presence of urban trees does have the power to reduce crime rates by increasing pride within communities (Kuo & Sullivan, 2001). It remains unclear whether the negative correlation between trees and crime is, in fact, indicative of a causal relationship, however, at Lathi-Tha the presence of trees was perceived as being linked to increased community pride.

5.3.1. PRIDE OF PLACE

When discussing the benefits of planting trees at Lathi-Tha, staff and learners put significant emphasis on the way in which the presence of trees would impact the way the surrounding community viewed the school. For example, Mr Marapula, explained,

> *"Our school is going to be one of the greenest in Khayelitsha. [It will] look green and clean and that will then influence the community, the people around the school if they see, 'Oh, the school is clean' and then they will also want to plant trees, you know, in their yards as well."*

Thus, trees were seen as a catalyst for further community improvement. Additionally, incorporated within this notion of pride of place, was the idea of trees enhancing the beauty of the area. As Thabiso explained while looking at one of the photographs he took,

"This is our school. I like this picture. You see how beautiful it is? So trees can make things beautiful."

Figure 6: Lathi-Tha School of Skills Grounds (Photograph by Thabiso – Lathi-Tha Learner)

In addition to increasing the beauty of the space, Mr Marapula praised the tree-planting project as he saw a clear correlation between the presence of trees and racial difference:

"I'm very happy with whoever out there saw the need to come and plant tree in our school because I'm very unhappy by the fact that you don't see trees in these townships. […] If you go to a white area you will find a lot of trees, whereas in Khayelitsha you do not find trees." (Mr Marapula, Lathi-Tha Staff)

While it will remain to be seen whether the trees planted at Lathi-Tha have the power to reduce social issues such as crime rates, it is clear that the staff and learners of this school are significantly more proud of their space since the initiation of the urban forestry project.

5.4. CONCLUSION

In conclusion, although the trees have yet to reach maturity, the urban forestry project at the Lathi-Tha School of Skills was perceived to bring environmental, economic and psychosocial benefits. In addition to an awareness of immediate benefits such as community upliftment through greening and beautification, the majority of perceived benefits, such as increased shade, food security, enterprise development, and increased pride of place, were anticipated to play out in the longer term. Additionally, the potential for the introduction of trees in previously grey areas was perceived to have a balancing effect in terms of creating more equal environmental aesthetics and experiences between affluent and underprivileged areas in Cape Town. Thus, it is clear that one of the primary roles of urban forestry in Cape Town, and South Africa in general should be to redistribute the benefits of trees in the urban space.

CHAPTER SIX

PLANTING HOPE: ADDRESSING SOCIAL INEQUALITY THROUGH PARTICIPATORY URBAN FORESTRY

In Chapter 5 the findings of this study that pertained to the first responsibility of urban forestry – the redistribution of tree cover benefits – were presented. The purpose of the current chapter is to present and discuss the second responsibility; that is, that South African urban forestry should be conducted in such a way as to attempt to tackle those social inequalities that continue to recreate green-space inequality. Drawing on the perceptions and experiences of the individuals who participated in the urban forestry project at the Lathi-Tha School of Skills, three tenets of urban forestry which have the potential to promote social justice will be presented; community empowerment, skills development and education, and purposeful social bridging.

6.1. A NOTE ON PARTICIPATION

Prior to discussing the three tenets of urban forestry that have the potential to address social justice, it is necessary to closely consider the role and necessity of community members' participation in urban greening initiatives. In the developed world, participation is widely encouraged when dealing with environmental issues (Bond and Thompson-Fawcett, 2007), and a degree of positive correlation between the level of participation and urban greening success (Baycant-Levent and Nijkamp, 2009) as well as evidence of community empowerment outcomes have been noted (Summit & Sommer, 1998; Westphal, 2003). While there is little doubt of similar benefits in developing countries, the methods, tools, and approaches employed in order to engender and coordinate participation are usually different to those typically employed in the developed world (Shackleton, 2012). In South Africa, urban greening programmes, including those run by Greenpop, do tend to encourage and rely on community participation; however, the significance of participation remains largely speculative as its

relevance in the success of urban greening initiatives has not been based on context specific research. As such, there has been a broad scope for research into local approaches to participation in urban forestry.

Throughout the course of conducting this research, it has become clear that, in South Africa, participation is not only necessary for successful urban greening but is required for social justice. Simply put, if one aims to address the social inequalities which continue to re-inscribe spatial difference, community participation is imperative. Given this insight, this chapter will discuss three of Greenpop's participatory approaches to urban forestry which, when taken together, have the ability to not only redistribute trees, but also to redistribute justice.

6.2. COMMUNITY EMPOWERMENT

The first participatory approach to urban forestry focuses on community empowerment. As Botes and van Rensburg (2000: 53) argue in their article entitled, 'Community Participation in Development: Nine Plagues and Twelve Commandments,' development practitioners dealing with community participation should, "become good facilitators and catalysts of development that assist and stimulate community based initiatives and challenge practices which hinder people releasing their own initiatives and realizing their own ideals." In other words, development projects, including urban forestry, should actively encourage community empowerment.

In order to support community based initiatives, it is first necessary to have a clear understanding of the specific context in which one is working as defined by community members. In terms of the current study, when asked to describe Khayelitsha, respondents tended to frame this area as a place of opportunity in spite of significant challenges. In many ways, Khayelitsha was described as a place of development, progress, and permanence. For example, in discussing Khayelitsha, Mr Walters stated,

> *"I would say Khayelitsha is a place of opportunities. It is a place where things are happening, it's only that it is not yet known to many people who are staying outside.*

It is filled with people who […] have hope and who make things happen. There is a great entrepreneurial spirit. […] There is development. There is progress."

With this context in mind, the discussion will now turn to the various ways in which community empowerment is facilitated through participation in urban forestry.

6.2.1. EMPOWERING THE INSPIRED

By requiring that potential beneficiaries apply to be part of their Cape Town Urban Greening Programme, Greenpop aims to provide opportunities and resources to those who are already eager for development; to empower those who are already inspired.

"I always think about finding that, 'eco-hero.' It's usually a principle, teacher, or a groundsman. At most of our flagship schools I can pinpoint one person who drives the project and has got the kids motivated and filled them with inspiration about this garden they now have. If you don't have that, if you can't find that inspirational person, then it's very hard." (Lisa, Greenpop Staff)

As Lisa explains, without a dedicated individual at a school who has chosen to take responsibility for the project, it is likely to fail. As such, by requiring that projects be initiated by active community members themselves, Greenpop is able to assume a facilitatory role to assist schools in reaching their own goals with regards to their green spaces. Rather than imposing development from the outside, they are further empowering those individuals who are already practicing community development.

6.2.2. REMOVING FINANCIAL CONSTRAINTS

In addition to promoting locally initiated projects, Greenpop also provides financial and human resources and support. In a discussion surrounding the reactions they have encountered from schools regarding Greenpop's assistance Lisa stated,

> *"For the most part people are really, really enthusiastic, and keen, and happy to get their kids outside doing something and learning something and also happy that we're running the whole thing and we're not making them do it."*

In other words, by removing the burden of sourcing skilled facilitators and funding, Greenpop makes it possible for under-resourced schools to complete urban forestry projects.

In terms of financial resources, the assistance provided by Greenpop as an external organisation was also seen as essential. At Lathi-Tha, Mr Marapula identified the fact that the school might have faced scrutiny from the community over the misuse of funds had they funded the tree planting project themselves:

> *"We like the support of the foreigners to assist us because […] I know these trees are not falling from the sky. Somebody, somewhere, is paying, you know, for these trees to be planted here. If it was me, I wouldn't see a need for this as an urgent thing, because there are a thousand things that are urgent here in the school. And maybe if it was coming out of the school's money, there would be a debate around it, "No, no man, you can't buy trees, it's better that we buy this and that" [laughs] but now that it comes with outsiders and it's not coming out of the school's money, then it's a good idea in that fashion. Nobody will be blaming our school that "No, you misused the fund of the school" as if it's a major thing. So it's good that it's handled by outsiders. We like the fact that these guys are donating the trees and we are not paying a cent. That's a good thing. So our part is just to look after these trees." (Mr. Marapula, Lathi-Tha Staff)*

While this comment may be read as though the local community did not consider this urban forestry project worthwhile, it is important to consider the context in which the project is taking place. Within a space of poverty, investment in long term projects is uncommon and immediate benefits, even those of ultimately less value, tend to be favoured. As such, Mr. Marapula's endorsement of the project based on its financing structure is significant. Not only did the funds which Greenpop provided make the urban

forestry project at Lathi-Tha possible, but the fact that the money was not drawn from the schools own funds made the project more acceptable to the local community.

6.2.3. COMBATING EXCLUSION

Through assisting schools to conduct their own urban forestry projects, Greenpop also combats the exclusion of under-resourced communities from participating in significant environmental action.

At Lathi-Tha, despite the educational and future economic advantages of their technical skills development programme, learners face a number of challenges, one of the most significant being the issue of stigma attached to attending the school. As Mr Walters explains,

> *"The mindset of the parents and members of the community is to see the school as a place where learners go to who can do nothing, who can achieve nothing, who are intellectually disabled. […] It causes a stigma that causes learners not to want to come here, or to be ashamed to be here, or to hide from people that they are here." (Mr. Walters, Lathi-Tha Staff)*

In order to combat stigma such as this, Greenpop focuses on making learners feel involved in a global environmental movement. As Megan, one of Greenpop's education facilitators, explains,

> *"I see kids reacting to being part of something bigger, the idea of connecting with the wider community. I always tell people involved that we've planted at over 250 locations and we've planted trees in Zambia. People, organizations like us, people like us all around the world are all planting trees like we are part of something really big like a big positive movement."*

At Lathi-Tha, the scale of the project was found to be inspiring for the learners:

> *"For me it was a big thing because it was my first time to do something big at school; like to take something and do it for the school." (Lubabalo, Lathi-Tha Learner)*

Through Greenpop's linking of the Lathi-Tha urban greening project to the wider environmental movement, learners were made to feel that they were involved in a global collective movement, and as such, that they were worthy of contribution on a large scale.

6.2.4. SUPPORTING SUSTAINABLE DEVELOPMENT

In addition to the short term benefits associated with participation in the Lathi-Tha tree planting project, respondents also showed a strong focus on sustainability and extended benefits. For example, Mr Marapula discussed the difference between tree planting and more short term development or aid interventions:

> *"These strangers that are coming here, they are not coming to take anything from us but they are bringing us something. And these trees are not something [...] like you came here and you bought be a glass of coke and then I drink it and it's finito, but you plant a tree here and then it's going to be here sometimes for 50 years." (Mr. Marapula, Lathi-Tha Staff)*

As Mr Marapula explained, the benefits of tree planting would only increase in years to come. This theme was also sounded clearly by the Lathi-Tha learners, as they recognised that their participation would benefit, not only their generation, but future generations. For example, when he was asked what he learned by taking part in the urban forestry project, Thabiso stated,

> *"A good thing that I learned that day planting the trees is that something that I do, it's not that I do it for myself but for others. Someday, the trees will help others not just me only. Yes, that I learned that day."*

In this way, the trees came to be seen as a reminder of where learners came from, a marker of history, or a permanent link to the school:

> *"Those trees, they will bring back my memories, where I came from. So if, maybe someday I'm old and I see those trees, I will say. 'That was me. I planted those trees*

because I care about my school.' I will come here and they are already there, that shows the history of someone." (Thabiso, Lathi-Tha Learner)

In addition to future classes of learners enjoying the benefits of the trees, there was a general sense that these learners should also participate in the tree planting project and it should become an annual event. Thus, through providing assistance and facilitation, Greenpop was able to empower the Lathi-Tha community to sustain their urban forestry project year after year.

6.3. SKILLS DEVELOPMENT AND EDUCATION

Greenpop's second participatory approach to urban forestry focuses on skills development and education through interactive and practical education.

6.3.1. INTERACTIVE ENVIRONMENTAL EDUCATION

Utilising interactive games, Greenpop conducts environmental education that includes theoretical and practical lessons about planting trees as well as lessons on climate change, deforestation, and ecosystem services. In the words of Lisa:

"It gets people physically learning something in a practical way. The lesson on how to plant a tree is a really important lesson environmentally and doing it is so much better than learning it from diagrams in a textbook." (Lisa, Greenpop Staff)

Lathi-Tha staff also identified the benefits of experiential learning. For example, when he was asked about participating in the urban greening project, Mr Walters stated,

"It was nice for learners to give them an opportunity to learn, to do things, to make mistakes, and to experience first-hand the importance of having trees, planting them, taking care of them." (Mr Walters, Lathi-Tha Staff)

Summit & Sommer (1995) argue that the more social the environmental intervention the greater its effectiveness in producing pro-environmental behaviour. Thus, in addition to learning about the environment while planting trees, the very act of enjoying the day with

other people may increase the likelihood of the learners caring for the trees afterwards. Drawing on this idea, Greenpop has constructed their planting days to be memorable and entertaining. In Thabiso's words,

> *"Joining in was fun, singing, dancing, just making fun of jokes about anything."*

In addition to the education experienced by learners and staff on the planting day, many respondents discussed the possibility of the trees being incorporated into the school curriculum. As Mr Walters states,

> *"The presence of the trees helps us to link our lessons in a practical manner to the environment and environmental affairs. […] When learners have practical projects as far as environment is concerned, we have trees available right here, teachers take the learners out, teach them guide them and assist."*

Thus, both the participation in the tree planting day and the fact that the trees existed on the school grounds were seen as being educationally beneficial for the school.

6.3.2. PRACTICAL SKILLS DEVELOPMENT

At Lathi-Tha, both staff and learners alike frequently commended the focus on skills as opposed to a traditional academic curriculum. Some learners, who previously had significant difficulties at school, identified the discovery of their abilities in the arena of skills as a turning point in their lives. For example,

> *"I cannot read, that is the thing that I was just asking God for many years why I cannot read but all my friends can read. This [learning skills] is something that helped me. I like to want to read but God did not give me that thing to read, he gave me something to do with my hands." (Vuyo, Lathi-Tha Learner)*

With this focus already in place, several respondents mentioned the possibility that learners and the groundsmen who participated in the tree planting day would be able to utilise the practical skill of how to plant a tree at a later stage in their lives.

6.3.3. LESSONS IN CARING

Figure 7: Lathi-Tha Learner Tending to a Tree (Photograph by Thabiso - Lathi-Tha Learner)

In addition to learning about the practicalities and environmental benefits of planting trees, respondents also discussed the way in which being involved in the project teaches one to care and nurture a vulnerable living thing. For example, Lisa stated:

> *"If you're planting in urban spaces I think one of the reasons is pride – lessons of caring for something, like when you get a baby pet when you're young, if you have to nurture it and look after it, that's like a personal welfare lesson for people so caring a for a tree or trees in your environment is a very important thing for us as a social society. […] To nurture a tree from baby to big is a really important human lesson, I think. When the trees are bigger and older we'll be able to assess the values of having the trees, for now it's just caring for them."*

From the discussions with Lathi-Tha learners, it was clear that they had begun to make a conceptual leap from caring for the trees to caring for each other. When asked what he had learned from participating in the urban forestry project, Thabiso stated,

"If I take care of the tree, it means I can take care of someone."

This statement, while brief, has profound implications. If caring for a tree at school is able to give a teenager the confidence to care for his family or community, the benefits of urban forestry could have a much further reach than previously considered. In the words of Mr. Marapula,

"The gospel will start from school and it will spread out to the community at large."

6.4. SOCIAL BRIDGING

Greenpop's third participatory approach to urban forestry focuses on purposive social bridging. Through encouraging interactions between individuals from different social, economic, and racial backgrounds, divisions can be lessened.

6.4.1. HIGHLIGHTING HUMAN SIMILARITIES

A benefit that was often associated with the tree-planting day was the creation of cooperative connections between people from all walks of life. For the Lathi-Tha staff and learners the act of coming together with individuals from different places to plant a tree tended to highlight human similarities:

> *"[…] the fact that outsiders are joining us, it shows that, no man, we do exist in Khayelitsha. We might be in Khayelitsha but we are still part of that big world. So these guys that are coming here are our brothers and sisters but just from the other side of the river [laughs] where things are done differently." (Mr. Marapula, Lathi-Tha Staff)*

As Mr Marapula notes, the collective activity of tree planting generated a sense of the common humanity of all participants, regardless of nationality.

6.4.2. Crossing Racial Boundaries

Having the opportunity to cross the racial boundaries was seen as being particularly beneficial:

> *"Meeting the foreigners […] it was good for the learners. Many of them do not meet other races especially in such a friendly environment, so it was a great opportunity for them to have that interaction and to do […] the tree-planting thing. Everybody planted with them, irrespective. They were coming from overseas, having professional careers, and yet they were willing to be there for the kids and share that activity." (Mr. Walters, Lathi-Tha Staff)*

One learner in particular seemed to be profoundly influenced by the social interaction he experienced on the planting day:

> *"I like to work with them [the volunteers from France] because I learn something like I'm a black person but you don't, like, hate somebody you don't know, you see? And you must have that relationship not, like, to hate and to be ashamed, you see? You must love them, give them that love, trust people, and do everything with them. Everything they can trust you with." (Vuyo, Lathi-Tha Learner)*

Although it is not possible to say whether a similar feeling of unity would have been achieved if the guests to the school had been from another African country rather than Europe, the feeling of camaraderie regardless of race that the experience generated in the participants points once again to a shared sense of humanity that the collective planting of trees evoked.

6.4.3. Trees as Symbols of Unity

After the planting day, those trees came to be signifiers of the unity that had been formed:

> *"These trees is a sign of that we are united, that we are close. So I love these trees ever since that day […] and even now I'm a defender of these trees. I'm like that because trees also want us to be together." (Thabiso, Lathi-Tha Learner)*

As can be gleaned from Thabiso's account of his relationship with the trees, the participatory and collective process of planting enabled the bridging of social divides such as race, language, and nationality, in a way that fostered mutual respect and understanding. As such, for Thabiso, the trees were not simply trees, but symbols of this ethos of unity.

6.5. CONCLUSION

In conclusion, in addition to distributing the benefits of trees to grey areas, South African urban forestry has the potential to address those social inequalities that continue to recreate green-space inequality. As can be seen from the perceptions and experiences of the individuals who participated in the urban forestry project at the Lathi-Tha School of Skills in Cape Town, urban forestry, when conducted with this goal in mind, does have the ability to promote social justice through community empowerment, skills development and education, and purposeful social bridging.

CHAPTER SEVEN

CONCLUSIONS

Although legislated segregation came to an end with the fall of Apartheid, it would seem that racial division in South Africa is still firmly rooted in space. In Cape Town in particular, social inequality still tends to be coloured in black and white as well as in grey and green with historically excluded and poor black neighbourhoods tending to have markedly fewer trees than more affluent white neighbourhoods. This unequal distribution of green space is a clear indication of the environmental racism evident in Cape Town more than two decades after the fall of apartheid. However, as can be seen in the perceptions of respondents at the Lathi-Tha School of Skills, it is possible to create more equal environmental aesthetics and experiences between affluent and underprivileged areas in Cape Town through an act as simple as planting a tree.

From an environmental justice perspective, this study has two significant findings. Firstly, the results suggest that urban forestry has the ability to redistribute the environmental, economic, and psychosocial benefits of tree cover to poor communities. At Lathi-Tha, although their trees had yet to reach maturity, the urban forestry project was perceived to bring a myriad of benefits. In addition to an awareness of immediate benefits such as community upliftment through greening and beautification, respondents anticipated the majority of perceived benefits, such as increased shade, food security, enterprise development, and increased pride of place to come with time. The extent to which these benefits will materialise over time remains to be seen through further research. However, it is clear that one of the primary roles of urban forestry in Cape Town, and South Africa in general, should be to redistribute trees, and the benefits that they are perceived and experienced to bring, throughout the urban space.

Secondly, the results of this study suggest that participatory urban forestry in South Africa has the ability to tackle those social inequalities, based on notions of race and difference, which continue to recreate green-space inequality. As can be seen from the

perceptions and experiences of the respondents of this study, well-structured participation in planting trees does have the ability to promote justice through community empowerment, skills development and education, and purposeful social bridging. In particular, this case highlighted the capacity of participation to empower inspired individuals, encourage the traversing of racial boundaries, and teach lessons in caring. Thus, it is clear that, in South Africa, participation is not only necessary for successful urban greening but is required for social justice.

In conclusion, the findings suggest that the role urban forestry in addressing environmental inequality in Cape Town is twofold. Not only does participatory urban forestry have the ability to provide the benefits of tree cover to marginalised communities, it also has the capacity to begin reducing their marginalisation. Thus, through the creation and implementation of effective participatory projects, urban forestry projects can facilitate planting trees as well as hope.

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