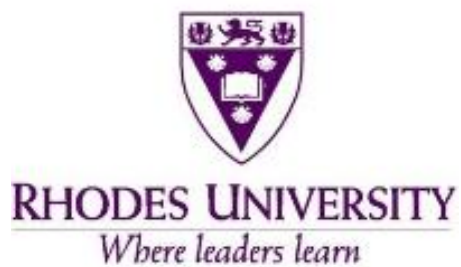

The extent of urban Green Collar employment, its contribution to poverty alleviation and potential for growth in the Eastern Cape, South Africa

Full dissertation submitted for fulfilment of
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List of abbreviations

CWP	Community Works Programme
EC	Eastern Cape
ECSECC	Eastern Cape Socio-Economic Review and Outlook
Env	Environmental
EPWP	Expanded Public Works Programme
GC	Green Collar
GDP	Gross Domestic Product
GI	Green Infrastructure
GS	Green Space
GIS	Geographical information system
IDP	Integrated Development Plan
km ²	kilometres squared
LED	Local Economic Development
m	metres
m a.s.l.	metres above sea level
mm	millimetres
NDP	National Development Plan
p	calculated statistical probability value
PDP	Provincial Development Plan
PoW	Place of worship
R	South African Rands
R ²	coefficient of determination
RDP	Reconstruction and Development Programme
Rec	Recreation
SA	South Africa
WfW	Working for Water
WoF	Working on Fires
yr	year
°C	degrees Celsius
\$	American/United States dollars

Sample towns

AN	Aliwal North
BD	Burgersdorp
EL	East London
GT	Grahamstown
KW	Kirkwood
LG	Lady Grey
MC	Maclear
PD	Peddie
PA	Port Alfred
PJ	Port St. Johns
QN	Queenstown
TK	Tarkastad

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Abstract

The aim of this research was to investigate the job provisioning benefits of urban green space (GS), the ability of these jobs to alleviate poverty amongst poor urban households, as well as the potential to increase the number of Green Collar (GC) jobs. According to Lal et al. (2010), Roy et al. (2012) and others, environmental employment or GC jobs, represent the very synergy between social, economic and environmental resilience and sustainability, and have the ability to provide an additional range of goods and services. Data was collected from 12 towns and cities in the Eastern Cape of South Africa, all varying in population, town size and geographic location. Structured employer, employee and resident interviews were used to collect data, which pertained to a number of employment characteristics and employee living conditions. Throughout the sample, 19 different types of jobs were identified, and a total of 17 429 GC employees were counted, sharing a total of approximately R503 million in annual wages. Some GC employees were found to still be in a position of poverty despite employment, while others enjoyed a higher standard of living as a result, although this was largely dependent on the extent of wages and other household and employment attributes. Using lessons learnt from previous chapters, a number of data sources and a creative approach, the potential for growth and improvement in the urban GC sector was discussed, and the way forward involves private, public, informal and civil sector participation and innovation; which will not only enhance environmental and social ecosystem services, but also provide meaningful employment opportunities to the otherwise impoverished. Urban GC jobs should be widely viewed as a useful tool in achieving social, environmental and economic prosperity in urban landscapes (Bowen and Kuralbayeva, 2015).

CHAPTER 1

Literature review, Aims and Objectives

1.1 Introduction

1.1.1 Urbanisation and urban expansion

In 2008, the number of people globally living in urban areas surpassed those living in rural areas for the first time in history (Haaland and van den Bosch, 2015). Urban growth occurs through urbanisation, which is the process of people moving from rural areas or the countryside, to urban environments, as well as through internal urban population growth, development and spatial expansion. Urbanisation often occurs as people search for employment opportunities and a higher standard of living, generally associated with greater access to goods and services (Balbi et al., 2019). At the turn of the twentieth century, just 16 cities across the globe contained over a million people, and by 2013 that number increased to approximately 500 cities (Jim, 2013). According to Rogerson (2018), cities are the focal points of employment and economic growth, but are also centres of modern-day living, where labour force participation for women, and indicators of health, well-being, literacy and social mobility are typically highest. The vast majority of the world's population growth over the next 20 years is expected to occur in developing countries; and in Sub-Saharan Africa, population growth and urbanisation are expected to occur at much faster rates than developed countries. This will result in increased pressure being placed on local economic capacity and the natural and built environments (Cobbinah et al., 2015). According to Hardman et al. (2018) most urban growth in Sub-Saharan Africa is, and will occur in small and medium-sized towns and cities with populations of less than half a million people. Therefore, it goes without saying that the well-being of humankind now, and in the future, is dependent on an improved understanding of urban environments (Angelidou et al., 2018).

As the world's towns and cities continue to expand, managing them becomes increasingly difficult and complex (Cobbinah et al., 2015; Cilliers et al., 2018). Rapid rates of urbanisation and urban sprawl present a number of challenges to the sustainability, liveability and resilience of cities, and therefore the well-being of their inhabitants (Jim, 2013). According to Rogerson (2018), the sheer speed and scale of the transformation of urban environments brings severe challenges. In particular, pressure increases on the immediate and surrounding environment and natural resources, resulting in increased threats to socio-economic stability, cohesion, and health conditions. The rapid increase in urbanisation and the risks it brings are intensified by changing climate dynamics and create a host of new challenges to cities. Therefore, the need for sustainable development is vital, as cities will have to cope with constantly evolving climatic, socio-economic, structural and urban dynamics (Breuste et al., 2013). In cases where urbanisation and urban expansion are rapid and unplanned, the social and environmental well-being of citizens may be compromised – especially the urban poor. This is a common issue throughout much of the developing world, which results in unplanned informal settlements on undeveloped or open land, with low standards of living (Shackleton et al., 2014). In

industrialised cities, however, like Stockholm and Rotterdam for example, urban planners and managers use an ecosystem service approach to new urban developments, which enhances socio-economic resilience and ecosystem functioning (Kaczorowska, 2014). This form of urban planning aims to optimise urban green space (GS) structure, functionality, connectivity and resilience in an attempt to maximise and enhance the benefits humans obtain from nature. It is clear that with sufficient budgets and government capacity, current urban areas can be enhanced and strategic, well-planned developments can be created to ensure better levels of social and ecological functionality, adaptability, prosperity and sustainability (Angelidou et al., 2018).

Since 1990 and the end of the Apartheid era in South Africa, the urban population has increased from 52% to 64% and continues to grow, resulting in unplanned and informal urban sprawl in and around many towns (Gwedla and Shackleton, 2015). The repeal of Apartheid laws that restricted where Black Africans could live and work led to an enormous influx of people moving to urban areas for employment opportunities and a higher standard of living (Wilkinson, 1998; Rogerson, 2014). The Apartheid legacy is very much evident in South Africa 25 years later, and is illustrated in the structure and composition of urban environments of all shapes and sizes. Land ownership and occupation were segregated on racial grounds which led to the establishment of so-called townships and informal settlements, where Black Africans were restricted to live (McConnachie and Shackleton, 2010). Townships were poorly serviced, occurred in unfavourable environments, and were dominated by small, high density housing (Wilkinson, 1998); and according to Irvine (2012), still are. White South Africans on the other hand, lived in suburbs characterised by low density, wooded and leafy neighbourhoods, with larger houses, wealthier inhabitants and adequate infrastructure. Urban environments, in South Africa in particular, present complex and inequitable socio-economic and ecological systems, constantly influenced by urbanisation, development and economic activity.

1.1.2 Green space and urban sustainability

Breuste et al. (2013) define urban GS as areas that are permeable and green, have soil, grass, trees and shrubs; and can be privately owned (like golf courses, residential gardens, or company premises) or publicly owned, including public parks, commonages, squares, greenbelts or government school grounds. Another definition, from Kabisch et al. (2015), defines GS as any vegetation in the urban environment, including parks, open spaces, residential or roadside gardens, and trees. The action of urban greening though, according to SA Forestry (2014), is an integrated approach to the planting, care and management of vegetation in cities, towns, townships and peri-urban areas; which is proven to offer a wide number of ecosystem goods and services to urban dwellers, namely provisioning, supporting, regulating and cultural goods and services (Childers et al., 2014). Some important provisioning services offered by urban GS are firewood, edible products, construction material and medicines, while some of the intangible benefits include the absorption of atmospheric pollutants,

carbon sequestration and reduced soil erosion, along with relieving psychological stress, encouraging social interaction and enhancing aesthetics (Shackleton et al., 2015). According to Mincey et al. (2013) and Balbi et al. (2019), the benefits, values and meanings of GS to residents may vary with time, property rights and socio-economic level. The majority of international literature on urban GS emanates from developed countries, where households make little use of provisioning ecosystem services (Roy et al., 2012; Shackleton, 2012). In developed countries much of the research has focussed on the ecological and social benefits of urban GS; while in developing countries, poorer communities make use of many plant species and often depend on GS to improve their livelihoods (Kaoma and Shackleton, 2015). Consumptive plant and tree products can also provide valuable income for marginalised urban dwellers through trade (Hardman et al., 2018; Balbi et al., 2019). Therefore it is evident that urban GS has complex and multi-scaled dimensions which are experienced and valued differently depending on the socio-economic context.

Green space is comprised of green infrastructure (GI), which according to Kambites and Owen (2006) refers to the connected network of multifunctional, predominantly undeveloped space that supports ecological systems and processes. Green infrastructure includes all vegetation and is found in abundance throughout private and public gardens, parks, riparian zones, undeveloped spaces and community gardens (Kambites and Owen, 2006; du Toit et al., 2018). According to du Toit et al. (2018), some people regard GI to refer to engineered structures that are designed to be environmentally friendly, such as water treatment facilities and green roofs; while some authors and urban officials view GI as a planning approach. For example, according to Hansen and Pauleit (2014), the European Union's environmental policy promotes GI as essential to urban planning, and aims to mainstream it into spatial planning and thus maximise the benefits humans obtain from urban nature. Lindley et al. (2018) view GI as a tool to reduce greenhouse gas emissions, moderate urban temperatures and mitigate the urban heat island effect. For the purpose of this study, GI will refer to the smaller units that comprise GS, and that singularly or collectively provide and conserve vital urban ecosystem services and functioning. According to Kaczorowska (2014), in the past decade, the role of GI in contributing to urban development has gained increased acceptance; and thus highlighted an urgent need to ensure sustainable cities using GI to create resilient and adaptive urban areas. Green space can contribute substantially to this by providing habitat for wildlife, mitigation of air pollution and the heat island effect, as well as storm water and flood control, along with many additional social, economic and ecological benefits (Hansen and Pauleit, 2014).

To mitigate and prepare for climate change, cities must be sustainable and resilient to the range of stresses and disturbances brought on by the natural and human world (Kaczorowska, 2014; Lindley et al., 2018). In Sweden, urban ecosystem services are promoted in planning and designing sustainable cities that are resilient to climate, socio-economic and environmental changes (Kaczorowska, 2014). Climate change brings a host of uncertainties, including an increased frequency and risk of natural

disasters and hazardous events. As a result, the need for strategically planned and established urban GS is necessary. Such occurrences are a major threat to human well-being, especially in towns and cities that are not adapted and resilient to economic and environmental shocks (Jim, 2013). Therefore, there is a need for strategic planning centred on an ecosystem services approach that uses GI and GS to provide vital functions which help mitigate the imminent stresses experienced in urban environments (Balbi et al., 2019). According to Frantzeskaki and Tilie (2014), socio-economic and ecological resilience and adaption must be integrated into policy and urban development to reduce the level of risk and vulnerability. According to Lindley et al. (2018) and Cilliers (2019), despite rapid population growth, poverty, weak planning regimes and seemingly chaotic urban development, there are tremendous opportunities for the use of GI as a planning and sustainable development tool.

Urban GS is capable of providing a number of benefits to humans at many different levels (Kambites and Owen, 2006). At an individual level, GS offers psychological and spiritual benefits, whereas at a community level it offers opportunities for social interaction and contact, as well as contributes significantly to a sense of place (Peters et al., 2010; Hardman et al., 2018). Economic benefits can be experienced across both individual and community scales, while ecological benefits also occur on multiple scales, ranging from habitat for fauna in a single tree, to carbon sequestration and oxygen production on a greater scale (Young, 2010; Cilliers et al., 2018). Shackleton and Blair (2013) examined the perceived importance of public green space in Fort Beaufort and Port Alfred in South Africa, and found that roughly 29% of residents perceived the recreational benefits of public GS, while around 18% mentioned the provision of job opportunities. Environmental benefits were deemed most important by 14% of residents, and enhancing human well-being by 4%. Not only did residents from affluent and poorer suburbs within Fort Beaufort and Port Alfred value GS differently, but also residents across the two sample towns. This suggests urban GS and ecosystem services, especially in developing countries, present variable and context specific characteristics which are dependent on a wide range of internal and external factors (Peters et al., 2010).

In South Africa, Apartheid resulted in the emergence of two types of suburbs, namely high-income, low density, leafy and attractive suburbs, commonly home to White South Africans; and low-income townships, which were home to Black Africans and were characterised by high density housing, minimal GS, and high levels of poverty (Wilkinson, 1998; Irvine, 2012; Shackleton et al., 2018). To address these racially defined backlogs of housing, the post-Apartheid democratic government implemented a national programme termed the Reconstruction and Development Programme (RDP) (Wilkinson, 1998). This programme involves the construction of low-cost housing units, usually single storey houses on a 40 m² foundation, which are given to poor, previously disadvantaged and indigent people (Shackleton et al., 2014). According to Shackleton et al. (2014) however, the development policies for urban housing did not, and still do not adequately address the necessity for GI and GS, and ecosystem functioning and resilience as a means to underpin sustainability. The

nature of the RDP housing programme offers government an opportunity to adopt best international practice in low-cost housing provision, by enhancing liveability and sustainability using diverse and quality GS (Shackleton et al., 2014). The recent South African National Development Plan (NDP) has argued that new urban housing developments should not be just about providing shelter or housing, but also about creating liveable, attractive and healthy suburbs (National Planning Commission, 2011). Urbanisation and urban expansion must be strategically planned and designed not only to offset challenges of increasing population, demand for services and infrastructure, but also to improve environmental quality and resilience to climate change (Kaczorowska, 2014; Cilliers, 2019). A common issue in many South African municipalities which hampers the quality of the urban environment, according to Gwedla and Shackleton (2015), is the inability of town planning and development to keep up with high rates of population growth and demand for basic service delivery, as well as to provide working opportunities for the vast number of urban dwellers. Therefore, rapid urbanisation, partnered with population growth and an increase in demand for basic services severely affects the ability of municipalities to introduce and maintain any GS, which leaves new urban developments exposed to a number of stresses. These stresses manifest themselves in the form of floods, droughts, soil erosion, landslides, heat island effect, temperature increases and rising sea level (Kaczorowska, 2014).

City planners and managers must work towards adaptive, inclusive, sustainable and resilient cities, to help cope with the stresses of increased urbanisation, service delivery backlogs, unemployment, and poverty, especially in developing countries (Shackleton et al., 2014) – and an urban ecosystem service approach can greatly assist on this quest. The South African urban environment, as a whole, requires greater attention from a sustainability and equality perspective, with a focus on strategic and resilient development, partnered with quality GS and high ecosystem functioning. According to Shackleton et al. (2018) smaller municipalities in South Africa make fewer provisions for GS due to financial constraints and lack of expertise, which increases the vulnerability of such socio-economic and environmental systems. The RDP makes few provisions for GS, and thus ecosystem integrity and functioning are inhibited in such housing developments. Gwedla and Shackleton (2015) and Cilliers (2019) argue that urban planners and municipal managers have considerable influence on the liveability and environmental sustainability of urban areas, and must incorporate extensive and strategic GS to provide the suite of vital goods and services required and enjoyed by society. According to Angelidou et al. (2018) it is essential to ensure that ecosystem sustainability and resilience are strategically built into the most vulnerable and exposed urban areas. The ability of ecosystem services to contribute to urban liveability and quality of life requires more attention by both the private and public sector for their positive effects on the sustainability of towns and cities.

1.1.3 Urban poverty in the developing world

Urban poverty is a worldwide challenge, although most prevalent and intense throughout the developing world (Roy et al., 2012; Mansour et al., 2017). As the world's urban population increases, so does the number and size of its towns and cities around the world, and much of this population growth is projected to occur in developing nations (Arrossi et al., 2014). Urban residency does not always guarantee a higher standard of living, and in some areas quality of life can often be worse. Problems of over-crowding, high death rates, disease, crime, violence, pollution and entrenched poverty can make some city or neighbourhood environments very unfavourable places to live (Provitolo, 2015). The need for quick and effective solutions has become vital to secure the well-being of humankind, now and in the future. Despite this, there is little research and literature regarding the problems of urban poverty, and very little attention is given to how it may be addressed (Arrossi et al., 2014). Challenges in the developing world include efforts to increase economic production, develop human resources, create employment opportunities, and improve governance and societal well-being (Mansour et al., 2017).

According to Uddin (2006), developing countries lag far behind the industrialised Global North regarding many aspects of human well-being, quality of life and socio-economic conditions. The Gini coefficient is used to depict the level of income inequality in a country, and the higher the coefficient, the greater the income inequality. Global North countries like Denmark and Sweden have a Gini coefficient of around 25, while much of Sub-Saharan Africa measures above 50 (World Bank, 2015). The Gini coefficient in South Africa is second highest to Lesotho, and lies at 62.5. Additionally, poverty rates significantly differ between developing and developed countries. In the United Kingdom and United States, poverty rates lie at around 15%, and in South Africa at approximately 36%, while in countries like Nigeria, Sierra Leone and Swaziland, poverty rates are closer to 70% (World Bank, 2015). Unemployment rates also vary greatly between low, middle and high-income countries. The United Kingdom and United States have unemployment rates around 4%, while more than 20% of the working force are unemployed in the Sub-Saharan countries of South Africa, Botswana, Lesotho and Swaziland (World Bank, 2015). Another contrast between developed and developing countries, according to Jim (2013), is that people value and perceive urban GS differently. In developed countries, people value the spiritual, psychological, ecological, and social benefits of urban GS, while those in developing countries place higher value on the provisioning and cultural services, as well as the economic benefits (Roy et al., 2012).

Common across developing nations are high rates of poverty and unemployment, as well as social, economic and environmental inequality (Jim, 2013); but basic service provision backlogs and a lack of financial, infrastructural and intellectual capital are also common issues and create a number of barriers to poverty alleviation. In the city of Dhaka in Bangladesh for example, approximately 5.58

million people live in slums and underserved areas, and about 60% of them rely solely on firewood for cooking (Uddin, 2006) – illustrating severe poverty backlogs. Low citizen mobility is another issue, as many cities in developing countries have inadequate public infrastructure and transport, not to mention inadequate public education and healthcare (Roy et al., 2012). Also typical of many developing nations is weak environmental planning (Ruwanza and Shackleton, 2015). According to Cobbinah et al. (2015), weak environmental governance in developing urban areas is often due to the inability of urban planners and agencies to keep up with rapid urbanisation and basic infrastructure development, which takes up the majority of municipal budgets and capacity. Although most governments in developing countries prioritise housing and basic service delivery, high poverty and unemployment rates continuously present setbacks to socio-economic resilience and urban sustainability (Uddin, 2006). According to Cohen (2006), residents of small towns in developing countries are especially underserved with respect to basic services, including piped water, electricity, education and waste disposal. These towns often lack the budget and capacity to provide basic services and infrastructure to the poor, while the bigger metropolises are more capable of this through greater tax bases, personnel and expertise (Gwedla and Shackleton, 2015). Furthermore, poverty rates are often notably higher in smaller cities with low levels of commercial, institutional and industrial activity (Cohen, 2006; Rogerson, 2018). Considering the role small cities will play in accommodating future population growth, it is clear that the need for improved short and long-term governance, basic service delivery and structural urban sustainability, partnered with socio-economic and environmental resilience is both urgent and vital to human well-being (Jim 2013).

Poverty, according to Hagenaars (2014), is considered as the condition where people's basic needs, like food, clothing and shelter, are not met, and ultimately where people cannot obtain basic goods and services. Most current definitions of poverty however extend well beyond basic needs, and include security and safety, inclusiveness, opportunity and a voice in society (Hagenaars, 2014). To alleviate poverty is to reduce the vulnerable life situations of the poor through empowerment, security, opportunity and the provision of resources (Uddin, 2006). Originally, the majority of poverty was associated with rural areas and livelihoods, yet recently, as levels of urbanisation have increased, the focus has moved to poverty in the urban profile. In the city of Dhaka in Bangladesh, for example, 55% of the population live below the poverty line (Uddin, 2006). This makes the majority of the population extremely vulnerable to any sort of environmental, social or economic shock. In both South Africa and Bangladesh, and other developing countries alike, different forms of poverty present many complex challenges to governments, and requires urgent attention, investment and innovation to improve the well-being of impoverished urban men and women (Cilliers et al., 2018).

Poverty is a more severe problem in countries where urban planning, infrastructure, service delivery and employment creation are unable to match rates of urbanisation, and thus a large proportion of

urban dwellers remain impoverished, and continue to live below the poverty line. In South Africa, according to StatsSA (2013), over 65% of the population live in towns and cities, and the extreme and moderate poverty rates are 20% and 46%, respectively; while the unemployment rate persists at approximately 27%. Therefore, one in four working-aged adults are without work and a regular source of cash income, and therefore exposed and vulnerable to a host of stresses. According to Kazungu and Magigi (2012) and Rogerson (2018), local economic development in the form of job creation is a way of not only growing local economies, but also an effective approach that can be used to alleviate poverty. In South Africa, the largest presence of urban poverty exists in informal settlements in the metropolises; however it is in the small towns and secondary cities where poverty and hardship is most severe (Cohen, 2006; Rogerson, 2018). According to Cohen (2006) there is a significant gap between the access to goods and services between small and large cities, with larger cities at more of an advantage due to greater budgets, inventory and institutional capacity. Furthermore, local municipalities in small towns have inadequate capacity to alleviate, let alone overcome urban poverty. For example, in Cote d'Ivoire, the proportion of residents estimated to be below the poverty line was consistently lower in Abidjan, the country's urban centre, than in the other smaller cities, even after macroeconomic deterioration caused the poverty rates to rise (Cohen, 2006). The same is evident in South Africa where poverty rates are significantly higher in small towns in the eastern portion of the Eastern Cape, relative to cities like East London and Port Elizabeth (ECSECC, 2017). This is mainly as a result of inadequate infrastructure and economic activity, but also local municipalities with inadequate financial capacity and expertise (Hamann and Tuinder, 2012)

There is an urgent need for research into all avenues that create much needed jobs to alleviate poverty, as well as the provision of invaluable social and environmental benefits. Although South Africa is the most industrialised country in Africa, it is plagued by high rates of unemployment and poverty, and the standard of living for millions of people lies well below the standard poverty line (StatsSA, 2013). This emphasises the importance of strategic and effective tools and mechanisms to alleviate poverty and reduce the vulnerability of the urban poor. According to Uddin (2006), the greatest asset for the poor is their capacity for labour and employment, and therefore policy and action can lead to poverty alleviation through assistance to poor communities. Employment generation, according to UNEP (2008), is one of the major strategies for alleviating poverty throughout the developing world, and it is the role of the government to invest in public employment programmes as a means to reduce urban poverty, as well as create enabling environments for small and medium-sized enterprises. Such programmes, if properly designed, can contribute to economic, social and environmental development throughout urban environments (Forstater, 2006; Aronson et al., 2017).

1.1.4 Contribution of green space to poverty alleviation

Urban green space can play a role in alleviating poverty through many direct and indirect ways, ranging from the provision of useful goods and employment, to the regulation of vital ecosystem services (Livesley et al., 2016). Kaoma and Shackleton (2015) for example, found that urban residents in parts of South Africa collect a wide variety of tree products, including firewood, fruits, medicines and construction materials, which contribute approximately 20% of household income (cash and non-cash). Although this project will look at the ability of Green Collar (GC) jobs to alleviate poverty, and not the actual GS itself, Davenport et al. (2011) found that at least 70% of poor households in three small South African towns collected at least one tree product for a number of reasons. Moreover, Dalu and Shackleton (2018) showed the importance of provisioning goods, collected from urban green spaces, as safety in times of shock, such as after floods. These examples illustrate the importance of urban GS to provide a variety of benefits that may contribute to poverty alleviation through cash saving and safety nets, and not just job opportunities.

Because a large majority of literature on urban GS and GI originates from developed nations, where poverty and unemployment are of less significance, it is understandable that little research has looked at the ability of urban GS to provide and create jobs to alleviate poverty, which is a pressing issue in much of Africa and the developing world (Shackleton, 2012). In a developing country like South Africa, where economics is the policy of politics, incentivising urban greening and ecosystem service provision from an economic perspective may encourage and promote more productive and effective greening strategies. This would give rise to projects in both the public and private sectors, and therefore more aesthetically pleasing, sustainable and adaptive cities, as well as the added benefit of enhanced social and economic resilience (Haaland and van den Bosch, 2015). Around the world, the success of projects and policies are measured in economic terms, and generating financial benefits or returns on investments is a major focus (Pinderhughes, 2007). Such returns on investment can be trickle-down employment and tourism benefits, a higher transfer of goods and services, or enhanced community cohesion and well-being. In developing countries, economic growth and employment opportunities are greatly sought after, and therefore incentivising GS provision from a monetary perspective may be appealing to governments. Policies and reforms that create job opportunities and economic benefits are most desirable in that they aim to provide a source of income to poor people and those with low formal education and skills. According to Aronson et al. (2017), properly designed GC jobs have the potential to contribute substantially to employment and environmental sustainability and functionality.

Schaffler and Swilling (2013) looked at the importance of urban GS in Johannesburg (South Africa) to ecological processes, the provision of social benefits, as well as its contribution to creating a sustainable city. However, they did not examine the ability of GS to provide economic benefits in the

form of income and wage opportunities. Scully-Russ (2018) advocates the multiple benefits of urban GS, which include enhanced aesthetic value and ecological benefits, but most importantly economic development in the form of jobs and increased economic activity. There is little understanding of the ability of urban GS to alleviate poverty through the provision of jobs, as well as useful frameworks or guidelines. Exceptions include Uddin (2006), Pinderhughes (2007), Kazungu and Magigi (2012) and Kazungu et al. (2014), who showed that GC jobs enabled employees to access basic services and human needs, such as food, water, shelter and clothing. Kazungu and Magigi (2012), who looked at the importance of nursery jobs to employment in Tanzania, found that such urban environmental jobs have significant potential to contribute to economic growth, employment creation, poverty alleviation and socio-economic development. They found that 68% of nurserymen and women in the sample had experienced an improvement in food security and 76% in health status since the nursery income. Half of the respondents also agreed that the nursery income enabled their children to get a better education and access other goods and services. Kazungu et al. (2014) also looked at the importance of nursery gardens to alleviating poverty, and found that 65% of the respondents were assured of three meals per day, while 55% of respondents owned their own houses. Pinderhughes (2007) considered the ability of GC jobs to provide quality employment in Berkeley in the US. It was found that 85% of green businesses employ low-skilled workers with minimal experience, and on top of this, 86% of these businesses are growing. Employee benefits commonly include medical and dental healthcare, training and transport.

Pinderhughes (2007) uses the term GC jobs which refers to manual labour employment in businesses whose products and services directly improve environmental quality. According to Pinderhughes (2007), there are 22 different sectors of the United States economy that provide GC jobs, ranging from green building construction to renewable energy installation. Green Collar jobs in the Global North often relate to renewable energy, resource efficiency, recycling, and green building, whereas definitions from the developing world tend to relate more to biodiversity, tourism and ecosystem restoration (Scully-Russ, 2018). According to Forstater (2006), jobs are green when they contribute to reducing negative environmental impact, leading to social, economic and environmental benefits. More precisely, green jobs are those that improve energy and raw material efficiency, limit greenhouse gas emissions, minimise waste and pollution, protect and restore ecosystems, and mitigate the effects of climate change (Bowen and Kuralbayeva, 2015). For the purpose of this study, urban GC jobs are a subsector of the greater green economy, and will be considered as jobs which involve interactions with urban GS, ranging from growing, monitoring, evaluation, landscaping, maintenance, composting and clearing.

There is growing evidence that protecting the environment generates employment, while some identify considerable employment-generating opportunities from sustainable development (Forstater, 2006; Pinderhughes, 2007; Bowen et al., 2018). The common paradigm of job creation leading to

environment degradation needs to be replaced with one that merges the two, which will address the complex issues regarding sustainable economic and environmental prosperity (Aronson et al. 2017). In a developing country context for example, it makes more sense to use labour-intensive methods as opposed to more capital-intensive or technological methods, even if they are available (Hagenaars, 2014). In much of the developing world, the abundance of labour and shortage of expertise and technology makes labour-intensive jobs an effective way of creating employment and improving environmental quality. By using the jobs-and-the-environment approach, society can get closer to achieving urban economic and environmental sustainability. Governments must appreciate that many opportunities for economic growth lie in environmental protection and enhancement, and that there is no need for trade-offs between job creation and environmental well-being (Bowen et al., 2018). The development, maintenance and creation of GS not only improves environmental quality and sustainability of towns and cities, but also creates jobs, thereby reducing unemployment rates and alleviating poverty to some extent (Breuste et al., 2013). With sufficient budgets, expertise and capacity, urban GC jobs can be strategically created to provide valuable income opportunities for the urban poor, whilst contributing a number of environmental and social benefits (Pinderhughes, 2007; Kazungu et al., 2014).

The current global economic and environmental crises are spurring a change in thinking concerning employment and the environment, and the role of the government and policy (Lal et al., 2010). There is a need for policy innovations and programmes that increase social and economic resilience, but also improve environmental quality, which will require increased investment in urban natural-resource management and the environment (Forstater, 2006; Childers et al., 2014). Green collar jobs may contribute to enhancing social, economic and ecological integrity and prosperity. Policy innovations in certain developing countries illustrate the value of employment-generating environmental activities, like South Africa's Working for Water (WfW) initiative (Lal et al., 2010); which began in 1995 and employs low-income and unemployed workers to, amongst other things, clear invasive alien species. Not only has this resulted in increased stream-flows and water availability, but also improvements in land productivity, increased biodiversity, greater resilience to fire, and of course the provision of a valuable source of income for the poor (Lal et al., 2010). The programme has created around 180 000 permanent job opportunities, of which roughly 52% are held by women. The WfW programme has also led to the creation of initiatives like Working on Fire and Working for Wetlands, to name a few. Similarly, in the eThekweni metropole in South Africa, 60 part-time jobs were created in 2013 to plant approximately 615 000 trees, and a further 341 jobs were created for the control of alien invasive species (eThekweni Municipality, 2015). Additionally, since 2005, more than 4 000 permanent and part-time jobs have been created in KwaZulu-Natal to assist with the control of invasive species, which has contributed substantially to economic development in small towns in the province.

According to Pinderhughes (2007) and Kazungu et al. (2014), the target population for GC jobs should be men and women with barriers to employment, a lack of education or skills, and those previously disadvantaged; and therefore the ability of these jobs to alleviate poverty is potentially high. In South Africa, the forestry industry employs more than 166 000 people, of which the majority are employed in the commercial forestry sector and not in urban areas. Importantly however, around 30 000 small-scale growers receive income, of which most are marginalised women (SA Forestry, 2014). This highlights the potential benefits of small-scale growing facilities for employment, economic activity and poverty alleviation. The ability of urban and rural GC jobs to alleviate poverty relates directly to these jobs being available to impoverished citizens, giving them the opportunity to earn a wage and improve their well-being (Uddin, 2006). In most local municipalities in South Africa, GS and GI provision is not a priority, as basic services are in high demand, and therefore environmental budgets and jobs are not sufficient to implement change (Shackleton et al., 2014; Gwedla and Shackleton, 2015). Furthermore, according to Shackleton et al. (2014), current urban development policies do not adequately consider the necessity for GS and ecosystem service provision, leaving large gaps. With appropriate policy, planning, budget and coordination by municipalities, urban GS can be enhanced to greatly improve the social and ecological services that it provides, as well as optimise the provisioning of jobs (Roy et al., 2012; Aronson et al., 2017) – forming a positive and complementary feedback loop.

1.5 Motivation for this study

The motivation for this research is to identify and quantify GC employment in towns and cities, and bring to light their importance in GS quantity and quality – and therefore their ability to make urban areas more socially and environmentally friendly. Economic evaluation of GC jobs is perhaps the most effective way of measuring their magnitude, contribution to local economies, employment, livelihood provision, as well as peoples' willingness to pay and the extent to which they value GS.

1.2 Aim and objectives

Aim - To investigate the extent of urban green collar employment associated with urban GS and its contribution to poverty alleviation and potential for growth in towns and cities of the Eastern Cape.

This aim was divided into three primary objectives which focus on further understanding the presence of urban GC jobs, their ability to reduce poverty and the potential to increase the number of jobs.

1. To determine the number of urban Green Collar jobs in sample towns.
2. To determine the ability of urban Green Collar jobs to alleviate poverty.
3. To investigate the opportunities for towns to increase the number of urban Green Collar jobs.

CHAPTER 2

Study Area and Methodology

2.1 Study Area

2.1.1 The Eastern Cape

This study took place 12 towns (Figure 2.1) in the Eastern Cape province of South Africa, which is amongst the poorest and most impoverished in the country. It was established in 1994 out of the eastern portion of the old Cape Province and the old Xhosa homelands of Ciskei and Transkei – which were declared independent Black states under the Apartheid regime. These old homelands were epitomised by low levels of infrastructure and economic activity, and inhabitants relied mostly on agricultural practices like livestock keeping and subsistence farming for their livelihoods (Hamann and Tuinder, 2012). The Eastern Cape is also home to two of South Africa's eight metropolitan municipalities, namely Nelson Mandela Bay and Buffalo City (Figure 2.2). It has a wealth of scenic diversity and an abundance of open, agricultural and undeveloped land. From an ecosystem perspective, the dominant vegetation types are Grassland, Savanna, Nama Karoo and Albany thicket, and the Eastern Cape is the only province to possess all of South Africa's biomes (Hamann and Tuinder, 2012). Rainfall in the eastern half of the province is approximately 900 mm per year, while the west is dominated by arid and semi-arid landscapes that receive around only 300 mm per year. The population of the Eastern Cape is just short of seven million people (approximately 16% of South Africa's total population), of which the rural population is around four million (Eastern Cape PDP, 2014). The population is 87.6% African, 7.5% Coloured, 4.7% White and less than 0.3% Asian (Hamann and Tuinder, 2012).

The Eastern Cape has a severe lack of infrastructure and economic activity, and its inhabitants continue to experience amongst the highest levels of poverty and unemployment in the country. The gross domestic product (GDP) is around R232 billion per annum while the GDP per capita is the lowest of South Africa's nine provinces (R30 250 per person per year) (ECSECC, 2017). The government, finance and trade sectors are the three largest industries, contributing over 60% of the total provincial GDP. Other notable contributors are manufacturing (14%) and transport (9%), whilst the agricultural sector only contributes around 2% and consists mainly of forestry, citrus, sheep, cattle, dairy and pineapple farming. The expanded unemployment rate in the province is roughly 44%, which in turn negatively impacts the trade and manufacturing sectors through decreased expenditure and economic activity (ECSECC, 2017). Communities in the north-eastern region of the province (predominantly the old Transkei) have little to no access to piped water and still rely heavily on wood and paraffin as a source of energy (Hamann and Tuinder, 2012). Environmental threats in the Eastern Cape include the degradation of river and estuary ecosystems (more so in the eastern section of the province); over-population and urban sprawl; land-use change; over-grazing; wildfires; drought; and alien species invasions (Hamann and Tuinder, 2012). According to the Eastern Cape PDP (2014), groundwater is under-utilised throughout most of the province excluding in and around

the Fish and Sundays River regions. There are however a wide variety of socio-economic problems in the Eastern Cape, which together with the environmental threats pose severe challenges to local, provincial and national government (ECSECC, 2017).

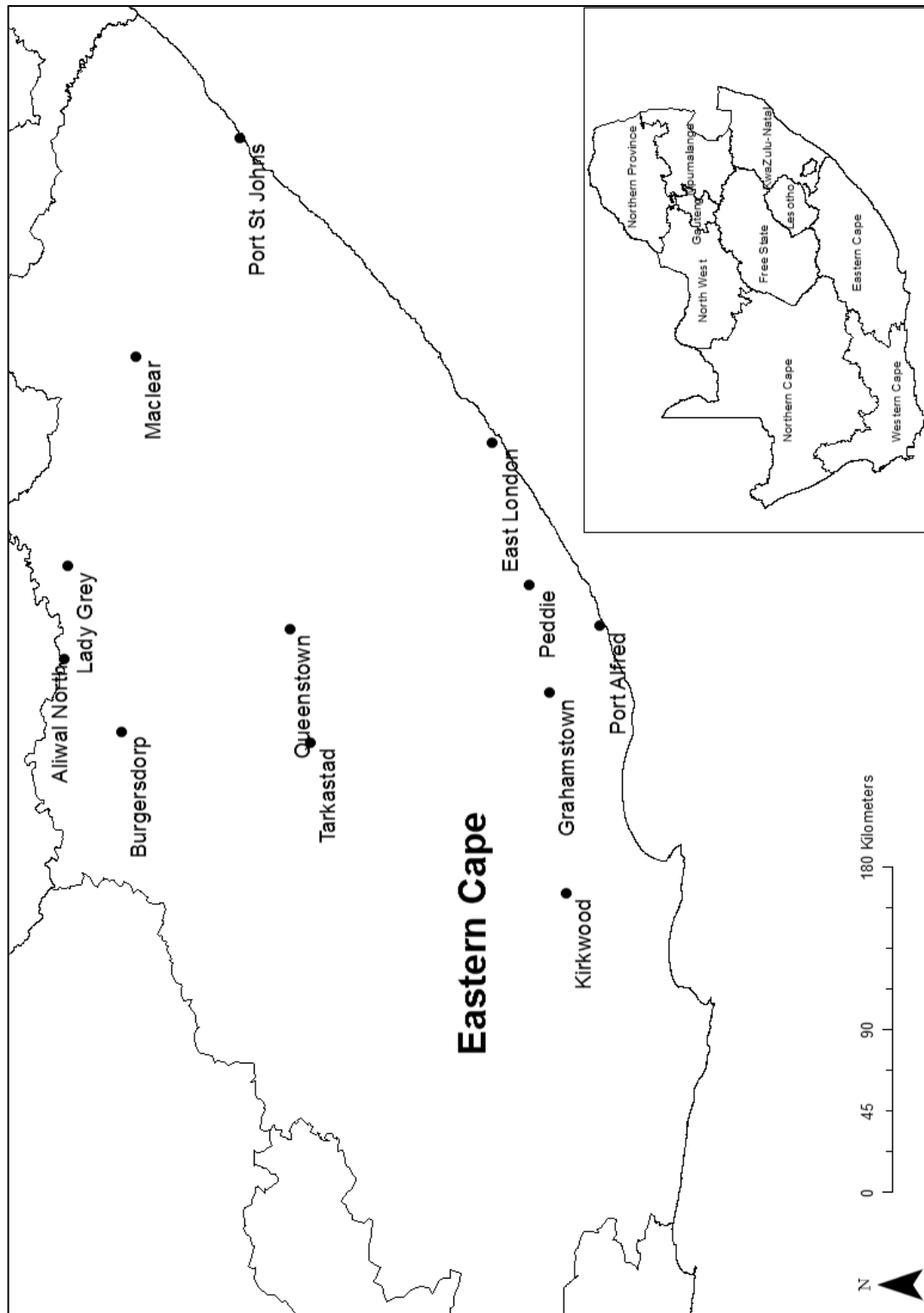


Figure 2.1: The 12 sample towns in the Eastern Cape



Figure 2.2: The district and local municipalities of the Eastern Cape (Eastern Cape PDP, 2014)

2.1.2 Sample towns

There are a number of aspects to consider within and between the study areas which give a sound representation of the physical, social, economic and environmental characteristics of each town or city (Hamann and Tuinder, 2012) – of which the majority are listed in Table 2.1. These characteristics have been selected because of their relevance to the urban GC sector and the influence they have on a local scale. To properly understand the GC sector it is vital to analyse the place and context-specific variables that ultimately shape the local environment, and those that distinguish certain urban areas from others.

2.1.2.1 Population and town size

The most populated and largest town or city in the sample is East London with a population of just less than half a million and a size exceeding 120 km². It is followed by Queenstown and Grahamstown with populations of approximately 105 000 and 90 000, respectively, and are both only 20 km² in size (ECSECC, 2017). East London is the tenth largest city in South Africa, and in the Eastern Cape, is only exceeded by Port Elizabeth with regards to population and size. The three smallest towns in the sample are Tarkastad (2.9 km²), Port St. Johns (3.4 km²) and Peddie (3.5 km²); and all have varying populations. Population density is inversely proportional to the size of these towns, with Lady Grey having the lowest population density in the sample (~540/km²). Burgersdorp, Kirkwood and Maclear have similar populations ranging between 10 000 and 12 500; however Burgersdorp is more than 2 km² larger in size (StatsSA, 2016b). Aliwal North and Port Alfred are good examples of medium-sized towns with areas of 9 km² and 13 km², respectively. The population in Aliwal North exceeds that of Port Alfred by approximately 19 000 and therefore has a significantly higher population density (StatsSA, 2016b).

2.1.2.2 Local economic activity

Local economic activity and the contribution to district and provincial GDP are often positively linked to population and town size, but not always amongst smaller-sized towns. East London comprises the majority of the Buffalo City metropolitan area and contributes approximately 20% (R41 billion per year) to provincial GDP (ECSECC, 2017). It is also home to the fifth most frequented airport in the country. Peddie on the other hand is amongst the poorest towns in the sample with low levels of economic activity, contributing around 5% to the Amathole district GDP – which, in turn, contributes only 7% to provincial GDP (ECSECC, 2017). Peddie is located in a previous homeland (Ciskei) while Port St. Johns lies in the old Transkei homeland (Hamann and Tuinder, 2012). These areas were severely deprived of public goods and services under the Apartheid regime, and as a result have a lack of economic activity, development, institutions and infrastructure; however Port St. Johns receives significant revenue from tourism, being at the centre of Wild Coast tourism (Hamann and Tuinder, 2012). Other relatively poor towns in the sample with a low transfer of goods and services are Burgersdorp, Kirkwood, Lady Grey, Maclear and Tarkastad, either contributing little to their district's GDP or being situated in districts with little economic output (ECSECC, 2017). Aliwal North, on the other hand, despite lying in the poorest district in the province, has the largest and most diverse economy in the region, producing 41% of the Joe Gqabi district GDP. Grahamstown, Port Alfred and Queenstown are small towns that possess relatively diverse and strong economies, contributing 1.8%, 1.3% and 1.7% respectively to provincial GDP (ECSECC, 2017).

2.1.2.3 Poverty and unemployment

There are a number of ways to look at poverty on a local scale, of which unemployment is one of the most important and has a significant effect on the urban GC sector. The lowest unemployment rate in the sample is in Kirkwood (6%) (StatsSA, 2016a), mainly due to the 120 000 km² of citrus orchards, generating approximately R500 million per year in foreign revenue and providing employment to a number of Kirkwood's citizens (Sarah Baartman Municipality IDP, 2018). Unemployment is highest in Grahamstown (41%) and Queenstown (40%) primarily due to large populations in relation to employment opportunities (StatsSA, 2016a). Unemployment in Peddie (39%) and Tarkastad (40%) is also significant, and stems from a lack of economic activity and a low transfer of local goods and services. Throughout the remaining sample towns, unemployment ranges between 20 and 30%; the primary reasons for this being large populations exceeding local economic capacity and a lack of commercial, institutional, industrial and residential activity (Eastern Cape PDP, 2014).

The socio-economic index, obtained from the Eastern Cape PDP (2014), offers insight into the overall social and economic climate of a town or city by integrating census data for education, income and unemployment and presenting a weighted score on a scale of 0 to 100. A high score indicates higher levels of deprivation and socio-economic underdevelopment. The basic services index accounts for

access to water, sanitation and electricity usage, and also produces a weighted score between 0 and 100. With regards to both indices, Port St. Johns is the worst off in the sample, followed by Peddie, Maclear and Tarkastad; while East London has the lowest socio-economic and basic service index scores. Aliwal North, Queenstown, Grahamstown and Port Alfred have the next lowest combined index scores, indicating a higher level of socio-economic development and basic service provision in larger towns with more economic activity; although Burgersdorp and Kirkwood are not far off (Eastern Cape PDP, 2014). The poverty headcount (%), like the index scores, is lowest in East London (3%) and highest in Port St. Johns (28%); and does not reflect a positive or negative relationship with population or town size. Poverty backlogs are significant in both Maclear (25%) and Lady Grey (15%), and surprisingly low in Peddie (14%), although the provision of RDP housing and social grants is high (ECSECC, 2017).

2.1.2.4 Climate and urban green space

There is a range of environmental and climatic variables that were analysed and compared which differ between the sample towns. The percentage of urban GS ranges between 63% in Queenstown to 82% in Port St. Johns, and the average GS across the sample is 73%; however between the five largest and most populated towns, the average is only 67%, while that of the five least populated towns is 77% - indicating a negative relationship between population and town size, and the percentage of urban GS. With regards to urban GS, average rainfall and temperature values were looked at across the sample; with more rain and higher temperatures underpinning greater vegetative productivity and thus a potentially greater need for management and maintenance. The lowest and highest annual rainfall is experienced in Kirkwood (333 mm) and Port St. Johns (1 096 mm), respectively, where average temperatures are also the highest (19°C and 20.3°C, respectively) (Eastern Cape PDP, 2014). Kirkwood, on the one hand, lies in the western, arid portion of the province, while Port St. Johns is situated in the tropical east. East London, which is also situated in a tropical climate zone, experiences both good annual rainfall and high average temperatures (882 mm and 18.2°C). Queenstown (526 mm) and Tarkastad (455 mm), situated in reasonably close proximity to one another, receive higher rainfall than the more westerly town of Kirkwood, but lower average temperatures – mainly due to a higher altitude. The coastal towns (East London, Port Alfred and Port St. Johns) and the partially inland towns (Grahamstown, Kirkwood and Peddie) evidently have the highest average temperatures and variable annual rainfall (range of 763 mm); while the more inland towns at higher altitude have significantly lower average temperatures and reasonably similar annual rainfall (range of 331 mm) (Eastern Cape PDP, 2014). These factors all contribute to the presence, type, quantity and quality of urban GS, which then influences the number and type of GC employees.

Table 2.1: The selected characteristics of the 12 sample towns in the Eastern Cape

Sample towns	Population	Town size (km ²)	Socio-Economic Index (0-100)*	Basic Services Index (0-100)*	Percentage green space	Mean rainfall per year (mm)	Average annual temperature (°C)	Poverty headcount (%)	Local municipality unemployment rate (%)
Aliwal North	44 436	9.0	30	15	67	550	15.3	8	30
Burgersdorp	12 548	6.9	45	25	70	482	15.1	9	30
East London	478 676	121.0	20	15	67	882	18.2	3	22
Grahamstown	91 548	21.1	30	20	68	683	16.8	5	41
Kirkwood	10 148	4.2	45	25	78	333	19.0	6	6
Lady Grey	2 046	3.8	45	30	76	679	13.6	15	36
Maclear	12 556	4.7	45	60	80	786	15.2	25	20
Peddie	6 833	3.5	55	50	79	598	17.8	14	39
Port Alfred	25 858	13.2	25	35	72	570	18.4	7	25
Port St. Johns	5 939	3.4	60	70	82	1 096	20.3	28	26
Queenstown	105 309	19.4	30	20	63	526	16.6	7	40
Tarkastad	2 353	2.9	55	30	71	455	14.5	13	40

* Index scores are ranked between zero and 100; where zero indicates the highest socio-economic status/level and access to basic services, while 100 is the lowest (figures obtained from Eastern Cape PDP, 2014).

2.2 Methodology

Data were collected from 12 towns which were randomly selected from a list of 24 sampled by Gwedla and Shackleton (2015). The towns were organised in descending order of population size and thereafter arranged into quartiles of six towns each. In order to sample a diversity of towns, three towns were randomly selected from each quartile. As discussed, the concept of GC jobs ranges across multiple sectors, some basic and labour-intensive, and others more advanced and capital-intensive (Bowen and Kuralbayeva, 2015). This study focused solely on the former and considered jobs that are directly involved in urban GS and GI. Table 2.2 illustrates the eight categories of urban GC jobs that are of relevance. These jobs are involved in growing, landscaping or general maintenance of GS, as well as the composting or clearing thereof. Furthermore, to gain a better understanding of the characteristics of the sample towns, a series of independent variables were recorded using online resources and government documents and publications, and are presented in Table 2.1. Town size and the percentage of GS were calculated using geographical information system (GIS) software, which is explained in more detail below.

Table 2.2: The dimensions of urban Green Collar jobs

Category of urban Green Collar job	Places of work
Accommodation	Hotel; bed & breakfast; self-catering; lodge; campsite
Commercial	Office; factory; mall; shop; fuel station; warehouse; car dealership; bank; airport; restaurant/fast-food outlet
Green Products	Plant, tree or seedling nursery; composter; lawn company
Green Services	Garden service; tree-felling service; landscaping company
Municipal/ Public Institutional	Public school, college, hospital, museum, library, fire or police station; court of law; street sweepers; Parks, Recreation or Environmental Services Department; airport/airstrip
Private Institutional	Private school, hospital, library, museum or tertiary education/training facility; place of worship; boarding house/facility
Recreational	Golf course; driving range; bowling/croquet green; spa or health suite; sports club/field; gym
Residential	Private residential property; retirement homes/centres; residential estate or complex; block of flats

2.2.1 Town size and percentage of urban green space

ArcMap GIS was used to calculate the percentage of green and grey space per town or city to gain a better understanding of the physical environment. This was done by calculating the total area (km²) using polygon overlays around the towns and dropping random pins within the polygon; in the small and medium-sized towns, approximately 150 and 600 pins were used, whilst 1 300 pins were used in East London. Each pin was assigned as one of private GS, public GS, or grey infrastructure, and thereafter the respective proportions were calculated to give approximate percentage values. Grey infrastructure was defined as houses, malls, roads or buildings; while GI was separated into private and public GS, including greenbelts, private gardens, sports fields, parks, commonages, road side verges and street trees. Using the independent variables from Table 2.1, a multiple regression analysis was conducted to identify the significance of these variables in influencing the number of GC jobs (the dependent variable) – this was done using the Statistica 64 programme.

2.2.2 Determining the number of people employed in urban Green Collar jobs

Data collection included structured interviews with urban GC employers and employees in each study town. Applicable green businesses, municipal officials, institutions, and other businesses or places where GC workers are employed were identified using online websites, directories, tourism departments, direct observation, and consultation with local residents and workers.

2.2.2.1 Private and Public sector

For each entity, business, department or division that employs urban GC workers, the number of workers employed and their respective wage rates were determined via structured employer and employee surveys (Appendices A and B). These data were organised per town such that the total number of GC employees and the total annual wages paid to these employees could be calculated (total annual wages = no. of employees X annual wage rate). The average annual employee wage rate per town was calculated thereafter. To determine an approximate number of GC business owners, or managers and supervisors of GC employees, a simple approach was taken. Various businesses and institutions employ a range of employees with variable wages and skill levels who coordinate different activities. Garden and tree-felling services, private schools, nurseries, estates and old age homes, golf courses, bowling greens, private landscapers, as well as municipal departments, consist of different levels of employment, such as labourers, shop attendants, assistants, cashiers, managers, head grounds men or women, and curators. With this information, it was possible to determine an approximate number of so-called higher-income GC employees and business owners per town. Through consultation and conversation with these employees, the average annual earnings, wages or salary for the range of higher-income GC employees and employers was calculated. To provide further insight into the composition of GC jobs within and between towns, the extent of the

private, public and informal sectors were calculated; jobs were also grouped into eight GC categories (Table 2.2), and their respective percentage contribution to total employment in a given town or city was calculated.

2.2.2.2 Informal sector

To fully gauge the extent of urban GC employment, it was necessary to investigate private household employment or the informal sector, which was done using structured household interviews (Appendix C). This required a different methodology involving random sampling and extrapolation of results to calculate the approximate number of residential property gardeners per town or city. Using ArcMap GIS, middle to high-income neighbourhoods and suburbs were delineated as polygons. Middle to high-income suburbs were identified by observing the size of properties and dwellings, the density of GS, housing density, and local knowledge and consultation. Over each polygon, fishnets or grids (20m x 20m) were projected, and thereafter 5% of the total number of blocks (within the fishnets) were randomly selected using the software. The households situated closest to the top right hand side of the randomly assigned blocks were selected for sampling. At each household, a structured interview took place, to determine whether a private gardener(s) was employed to service GS on the property. Additional information captured included the number of days worked per week, the daily wage rate, as well as those private gardeners without other work. This data was recorded in Microsoft Excel 2010, and total and mean values were calculated.

In order to calculate the number of household GC workers per town or city, it was necessary to determine the total number of middle to high-income households. This was done by calculating housing density using ArcMap GIS. Blocks (500m x 500m) within the polygons were randomly selected, and the total number of homesteads or plots were tallied. This was then extrapolated to represent the total area of the polygon and thus the approximate number of middle-to-high-income households per town or city. Using the number of households, and the mean values obtained from the private household interviews, it was possible to calculate the total number of gardeners per town or city, as well as the total wages paid per week, month and year.

2.2.2.3 Secondary economic benefits

The trickle-down economic benefits of the urban GC sector include the total sum of money spent by local residents at nurseries and on tree-felling services; as well as that spent purchasing landscaping and garden maintenance equipment, tools and supplies. Additional data collected from household interviews pertained to the amount of money spent annually by households at nurseries, on garden supplies and equipment, and tree-felling services; along with the total number of households, made it possible to calculate an approximate amount spent on urban green products and services per town or

city. This was done by multiplying the average annual amount spent per household (per green product and service) by the total number of middle to high-income households.

2.2.3 Determine the ability of urban Green Collar jobs to alleviate poverty

To investigate the ability of urban GC jobs to alleviate poverty, it was necessary to analyse and compare the overall working and living conditions across the different forms of employment. Wage rates, hours worked, length of employment, grade achieved and the proportion of female employees were used to analyse employment attributes; while frequency of meat consumption, electricity expenditure, the number of people per household and bedroom, and the number of people employed per household were used to indicate standard of living. Employment attributes illustrate the quality of work, and the ability of GC jobs to employ low skilled workers lacking formal education and who often find themselves marginalised and impoverished due to lack of working opportunities. Standard of living attributes indicate employee and household well-being, as well as access to basic goods and services like food and electricity. At each GC business or entity, a minimum of two employees were interviewed, and upon availability, the employer or owner.

Quantitative data analysis looked at a number of variables such as daily and monthly wage rates and compared them to national and international standards and norms, as well as other forms of employment in private, public and informal sectors. According to the World Bank (2015), to be in a position of poverty is to be living on less than approximately R17 per day. In South Africa, the food poverty line (the rand value below which one cannot purchase enough food to meet minimum personal energy intake requirements) lies at R30.50 per day (StatsSA, 2016a). Hours worked, length of employment, job satisfaction and the level of employee education were also considered relevant to poverty alleviation. Qualitative data were organised into frequency tables and scales, and respondents were asked, amongst other questions, to agree or disagree with certain statements regarding the nature of employment and the benefits it provides. Qualitative analysis involved looking at employee perspectives, skills and training, ability to work other jobs, and previous forms of employment. Qualitative and quantitative data were merged to identify the relationship between employee wage rates and levels of satisfaction (positivity score) per GC job. Positivity scores were deduced by calculating the proportion of positive responses from employees pertaining to quality of life and work attributes (i.e. the proportion of yes responses from statements one to seven, and no responses for statement eight).

2.2.4 The ability to increase the number of urban Green Collar jobs

To investigate the ability of towns to expand and enhance GC employment, a mixed-approach was followed. Creating part-time employment opportunities is effective in the short-term, but permanent jobs have a far greater positive effect on local economies and households. Town beautification

projects and the removal of alien invasive species are areas where part-time employment has been created, however the crux of this objective is to identify areas for improvement, best practice techniques and methods, and innovative and creative approaches to growing and improving the urban GC sector to ultimately maximise the diverse benefits. Results from objectives one and two contribute valuable insights regarding the dynamics of urban GC jobs in relation to local employment, poverty alleviation and certain town and GS characteristics; which are supplemented by empirical knowledge, relevant case studies and job creation programmes or projects.

The results from the multiple regression are of relevance to this chapter, as they contribute to understanding which independent variables are significant and insignificant with regards to the number of urban GC jobs; and thus plan policy and development accordingly. The dependent and independent variables were also be used to create linear models, which visually illustrate the nature of relationships and whether a town or city falls behind the model with regards to total population and town size. Additionally, using the total population, number of GC workers and the area of GS per town or city; the number of GC workers per capita and the approximate area of GS per GC worker were calculated. To gain further insight into the sector, the proportion of private, public and informal jobs were compared individually to the number of GC jobs to determine how these values change as the number of jobs increase. The structure and roles of municipal GC departments responsible for urban GS was analysed and avenues for improvement were identified. Additional consideration was given to GC public works programmes, urban expansion and local economic development (LED), resident perspectives on GC jobs, and their methods or uses of garden refuse removal.

CHAPTER 3

The number of urban Green Collar jobs in the sample towns and cities

3.1 Introduction

There are many characteristics common across most towns and cities in the developing world, including a lack of job opportunities, weak economies, and degradation and loss of natural capital (Mansour et al., 2017). Problems such as a lack of financial resources and high levels of poverty and inequality prove significant challenges in developing countries, where basic service delivery often takes preference over environmental considerations (Haaland and van den Bosch, 2015; Ruwanza and Shackleton, 2016). Urban GC jobs can be a suitable and effective way of not only contributing to local economies, but simultaneously enhancing environmental quality and ecosystem service provision within urban environments. Mincey et al. (2013) advocate environmental jobs as a way to improve ecosystem quality and functioning, and also provide a number of additional social and economic benefits. Empirical evidence shows that investing in, restoring, and maintaining GS in urban environments is not only ecologically and socially desirable, but also economically advantageous (Elmqvist et al., 2015). These investments can contribute significantly to reducing unemployment rates and increasing economic activity, especially in developing countries. Such jobs should be viewed as an easy and effective way of improving socio-economic prosperity and environmental quality on a local level (Uddin, 2006). Additional benefits of quality urban nature include increased recreational and outdoor activities, tourism, sense of place and high aesthetic value (Jim, 2013). With the variety of benefits to obtain, towns and cities in the developing world have the opportunity to adopt an adaptive and multidimensional ecosystems approach to cater for rapid urbanisation and the demand for employment and quality living space.

In the developed world, GC jobs are primarily centred on technology and capital-intensive programmes, such as renewable energy, fossil fuel and emission reduction, and carbon economy projects. This differs from the developing world which tends to exhibit more labour-intensive GS employment. As a result, the majority of global literature is focused around the former (Connolly et al., 2016). In developing countries (like South Africa), due to a lack of resources, expertise, research and infrastructure, green jobs are more centred around urban permaculture, ecosystem restoration, removal of invasive species, and the basic maintenance and provision of cultural, economic and recreational ecosystem services (Roy et al., 2012). This research looks at lower-end jobs that relate to the maintenance and other physical interactions with GS or GI. Whilst some of these jobs promote urban biodiversity, others maintain and provide the suite of ecosystem services regularly enjoyed by urban dwellers. According to Jim (2013), social, economic and ecological dynamics in towns and cities display some similarities between developed and developing countries, but are largely worlds apart. The majority of the world's population growth and urbanisation over the next 20 years, however, is expected to occur in developing countries, and therefore increased pressure will be placed on the social, economic and ecological well-being of such countries (Cobbinah et al., 2015). Therefore it is necessary to preserve, invest in and enhance urban GS by analysing current GC jobs,

their functions and purposes, and the best way to provide socio-economic and ecological prosperity in urban environments. This can contribute and lead to economic development, primarily through job creation, increased tourism, investment, property values and societal well-being (Elmqvist et al., 2015).

The South African urban environment displays a complex socio-economic and ecological climate, characterised by historical racial divides and inequalities, and high unemployment and poverty rates (Irvine, 2012). To offset these injustices, the post-1994 democratic government has adopted a local economic development (LED) approach (Rogerson, 2018). LED is emphasised throughout the country as a tool to achieve local economic well-being, resilience and sustainability, and is assisted by public works projects such as the Extended Public Works Programme (EPWP), Community Works Programme (CWP), and others like WfW and Working On Fires (WoF), to name but a few (Carnie, 2016). These initiatives create employment opportunities and work experience for low-skilled labour through work that improves rural and urban social and environmental conditions (Gumede, 2018). In 2015 alone, WfW provided 39 000 temporary working opportunities for unemployed people (Killian, 2015). South Africa possesses rich ecological and geographical diversity, and at the recent launch of the Biodiversity Economy Operation Phakisa, the President of South Africa, Cyril Ramaphosa, spoke of a new National Biodiversity Economy Strategy as a means to harness the country's bountiful biodiversity and to promote it (Mitchley, 2018). According to Ramaphosa, through the development of the biodiversity economy, an additional 162 000 jobs and around R47 billion in revenue can be generated by 2030. This is based on the growth of South Africa's biodiversity, bio trade and commerce, entrepreneurship and ecotourism (Mitchley, 2018). If properly planned and applied this strategy has the potential to help preserve the country's biodiversity, whilst simultaneously maintaining biodiversity hotspots and high quality GS in urban areas. The commitment from national government to creating employment opportunities in the green sector will not only contribute to protection of South Africa's ecosystems, but also build and develop local economies.

The widespread benefits of urban GS and GI in and around the work and learning place, at home, outside shops and malls, and of course in parks and open spaces are well documented (Jim, 2013; Madureira et al., 2015). These include decreased levels of stress and conflict and increased levels of productivity, satisfaction, recreational and social activities, and generally a healthier and more aesthetically pleasant environment (Livesley et al., 2016). Roy et al. (2012) present additional advantages such as more productive corporate and commercial activity, higher student pass rates, faster healing times for sick patients, and decreased levels of crime and drug use. Urban GS takes a number of different forms, and in South Africa in particular, it ranges from privately owned residential, recreational, institutional or commercial space, as well as publically owned parks, commonages, greenbelts, institutions, roadside and additional state owned urban land (Lubbe et al., 2010). However, the presence and maintenance of urban GS comes with a series of expenses in the

form of equipment, supplies and tools, but more importantly the need for labour and creation of job opportunities. The maintenance, upkeep and care of urban GS requires financial resources, expertise, equipment and labour, whether it is private residential and recreational areas, or government owned schools and public spaces (McDonnell et al., 2008). Additionally, with an established population of middle to high-income residents, comes the existence of private plant nurseries and landscaping companies which provide valuable employment opportunities. These jobs help decrease levels of unemployment, as well as strengthen and enhance local economies (Cohen, 2006; Uddin, 2006; Kazungu and Magigi, 2012; Kazungu et al., 2014; McClure et al., 2017; Rogerson, 2018). In a developing country context, where weak economies, high levels of unemployment and environmental degradation often prevail, investing in green employment in the urban setting can provide multiple benefits (Pinderhughes, 2007). Shackleton and Blair (2013) examined the perceived benefits of GS in both Fort Beaufort and Port Alfred, in the Eastern Cape of South Africa. The results showed varied findings between and within the sample towns – however, the recreational and job provisioning benefits were perceived most commonly by residents in both towns. According to Bowen and Kuralbayeva (2015), there is a clear lack of real-world macroeconomic data on green jobs and characteristics of green employees and employment. With this in mind, this chapter aims to provide an estimate the type, number and wage levels of GC jobs associated with environmental care and maintenance, and green goods and services.

The benefits of job creation accrue to local and regional economies, as increased economic activity and the transfer of goods and services leads to development (Uddin, 2006). High population growth and urbanisation in Sub-Saharan Africa underpins the need for more jobs (Maria et al., 2015). According to Rogerson (2018), achieving LED has become a core function of local municipalities, attempting to overcome the challenge of developing sustainable urban settlements which will meet the employment and basic needs of local communities and enhance their standard of living, whilst simultaneously contributing to local economic growth (Eastern Cape Provincial Development Plan, 2014). The term LED relates to the on-going process of enhancing the economy's capacity to create wealth for local residents (Rogerson, 2014). This can be done by enhancing the local business environment, building skills and institutions, encouraging collaboration between private, public and civil society sectors and fostering job creation. According to Rogerson (2018), the best way to encourage LED is through job creation and employment opportunities, which in turn strengthens the asset base of poor urban communities. Furthermore, it increases the transfer of goods and services on a local and regional scale, which should lead to economic and infrastructural development, and a greater fiscal and monetary base.

This chapter determines the extent of urban GS employment and its characteristics, as well as the overarching and local variables that influence the sector. Forstater (2006) advocates the need to understand and monitor green jobs in an effort to improve and enhance their functionality and

effectiveness – paving the way for the provision of additional and trickle-down benefits to follow. According to Bowen and Kuralbayeva (2015), in 2010 the United States Government discontinued the measuring of all green jobs due to budget cuts and with it, the opportunity to enhance the sector. A number of authors like Vandermeulen et al. (2011), Furchtgott-Roth (2012), Maria et al. (2015), Mansour et al. (2017), and even Schaffler and Swilling (2013) and Cilliers et al. (2018) in South Africa have used economic valuation as a means of measuring nature and GS related investments and benefits; but not the job provisioning benefits. Therefore, the aim of this chapter is to dissect urban GC employment, measure and compare compositions and magnitudes and contributions to local economies.

3.2 Results

3.2.1 Urban green space

The relative extent of private, public and grey infrastructure between the sample towns are presented in Figure 3.1. Throughout most of the sample towns (notable exceptions being Aliwal North and Maclear), public GI comprises the majority of the urban land cover, averaging 42% (± 6) across the sample; while the average private GI and grey infrastructure compositions are 31% (± 5) and 27% (± 6), respectively. The total urban GS ranges between 63% in Queenstown to 82% in Port St. Johns. East London, Grahamstown, Queenstown and Tarkastad are the only sample towns where the cover of grey infrastructure exceeds private GI. In Aliwal North and Maclear, the cover of private GI exceeds both public GI and grey infrastructure. It is also evident that the public GI has a negative ($R^2=0.917$), yet statistically insignificant ($p>0.1$), relationship with grey infrastructure, such that spikes in the proportion of public GI are often mirrored by a dip in grey infrastructure. This is especially so in Kirkwood, Port Alfred, Port St. Johns, Queenstown and Tarkastad. In East London, Grahamstown and Peddie, however, they share a positive relationship.

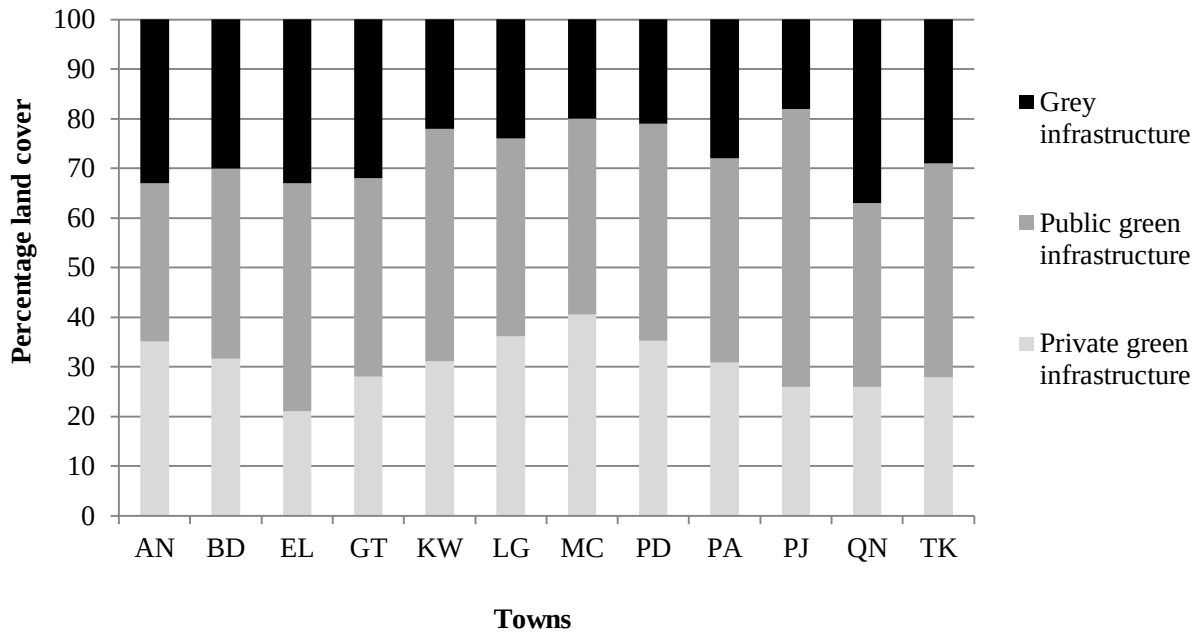


Figure 3.1: The physical characteristics of the 12 study towns and cities

3.2.2 Urban Green Collar employment

The multiple regression analysis results looking at the significance of the independent variables in determining the total number of GC jobs are presented in Table 3.1. Town size is the only significant factor in determining the total number of GC jobs ($p=0.0197$), and is also significant in determining the number of public ($p=0.027$) and informal GC jobs ($p=0.030$). The coefficients indicate the change in the dependent variable for a unit increase in an independent variable; and in the case of a unit increase in town size (one km^2), total GC employment increases by approximately 133, and public and informal employment increase by five and 111 jobs, respectively. The majority of these jobs, however, are part-time employment opportunities in the informal sector. None of the independent variables are deemed statistically significant in determining the number of private GC jobs. The adjusted R^2 value for the regression is 0.6638, and thus approximately 66% of the variation seen in the number of GC jobs is explained by the independent variables. The residual output from the regression indicates the difference between the actual number of GC jobs and that predicted by the model. The model significantly overestimates GC employment in Burgersdorp (residual = -245) and Maclear (-110), and underestimates in Lady Grey (148) and Peddie (112). Although the percentage of GS is not a significant variable ($p>0.1$), the coefficient indicates a negative relationship with the number of GC jobs, such that towns with an additional 1% of GS tend to have 14 fewer GC jobs. This is mainly due to proportionately more GS in smaller towns with lower levels of development and fewer GC jobs. With regards to the determination of the number of *GC jobs per km^2* , the socio-economic index ($p=0.038$) is significantly disproportional ($p=0.038$ and coefficient = -2) and average annual temperature is positively significant ($p=0.048$ and coefficient = 12).

Table 3.1: The multiple regression (a) and residual (b) analysis results: statistical significance of the independent variables in determining the number of GC jobs

(a)

Variables	Coefficients	Std. Error	t-stat	P-value
Population	-0.01	0.007	-1.084	0.358
Town size (km ²)	133.36	29.256	4.558	**0.020
Socio-Economic Index	-2.62	10.912	-0.240	0.826
Basic Services Index	-9.63	14.676	-0.656	0.558
% Total Green Space	-13.91	14.498	-0.959	0.408
Mean rainfall per year (mm)	-105	1.044	-1.002	0.390
Average annual temperature (C°)	61.26	70.619	0.868	0.450
Altitude (m a.s.l.)	58.41	53.944	1.083	0.358
Local Municipality unemployment rate (%)	-0.38	8.388	-0.045	0.967

(b)

Sample towns	Predicted number of GC jobs	Residuals
Aliwal North	523	82.739
Burgersdorp	427	-245.218
East London	11 704	19.054
Grahamstown	1 488	-110.704
Kirkwood	203	34.101
Lady Grey	13	148.175
Maclear	284	-110.271
Peddie	-42	111.793
Port Alfred	1 089	31.894
Port St. Johns	159	19.778
Queenstown	1 494	-5.395
Tarkastad	105	5.121

A total of 17 429 GC jobs were found in the 12 study towns, receiving approximately R503 million in wages per year (Table 3.2). Low-income employment made up 97.3% of the total GC jobs, while 97.6% of the wages are paid to these employees. East London, the smaller of the two metropolitan municipalities in the Eastern Cape, has 11 473 low-income and approximately 250 higher-income GC employees and employers – 67.3% of the total number of jobs in the sample (Table 3.2). The total wages, or the annual green economy in East London, is R308 million, more than six times greater than in Grahamstown (>R50 million) and Queenstown (>R43 million), which are ranked second and third, respectively. Although the green economies in Grahamstown and Queenstown are similar, there are 137 more GC employees in Queenstown. Due to higher average annual wage rates and more high-income GC employees, the green economy in Grahamstown is larger. The least number of GC jobs is in Peddie, where the total annual wages are R4.8 million and there only are seven higher-income and 63 low-income GC employees. In Tarkastad, there are 110 GC employees, yet the annual

green economy is R4.9 million, despite the presence of 40 more jobs than Peddie. One of the smaller towns in the sample, Kirkwood, ranks fifth with regards to its green economy and the number of jobs (R8.5 million per year and 237 jobs). The number of jobs in Burgersdorp, Lady Grey, Maclear and Port St. Johns are similar, but it is evident (due to the composition of GC employment) that the number of higher-income employees and employers in Port St. Johns is greater than the others, which suggests a more advanced and diverse GC job sector.

Table 3.2: The number of high and low-income urban Green Collar jobs and the total annual wages

Towns	Number of high-income employees	Total wages (R/yr)	Number of low-income employees	Total wages (R/yr)	Total Green Economy (R/yr)	Ratio of high to low-income GC employees
AN	21	5 040 000	585	13 620 271	18 660 271	0.036:1
BD	7	1 680 000	175	4 895 130	6 575 130	0.040:1
EL	250	60 000 000	11 473	248 267 159	308 267 159	0.022:1
GT	60	14 400 000	1 317	35 835 715	50 235 715	0.046:1
KW	10	2 400 000	227	6 175 224	8 575 224	0.044:1
LG	8	1 920 000	153	4 278 750	6 198 750	0.052:1
MC	9	2 160 000	165	5 339 941	7 499 941	0.055:1
PD	7	1 680 000	63	3 134 961	4 814 961	0.111:1
PA	40	9 600 000	1 081	23 962 165	33 562 165	0.037:1
PJ	18	4 320 000	161	5 251 039	9 571 039	0.112:1
QN	35	8 400 000	1 454	35 457 370	43 857 370	0.024:1
TK	8	1 920 000	102	3 050 328	4 970 328	0.078:1
Total	473	113 520 000	16 956	389 268 053	502 788 053	0.028:1

3.2.3 Composition of employment

A total of 19 different types of GC employment were identified and differed from town to town in relation to the presence and number of jobs (Table 3.3). Some types of GC jobs are present in all of the towns, namely private household and municipal ‘gardeners’ who are responsible for servicing private residential and public GS, respectively. Some of the towns had all of the types of GC jobs identified, while others had only a few of them. Unsurprisingly, the larger towns displayed not only significantly more jobs than their smaller-sized counterparts, but also a greater variety of jobs. Port Alfred is the only town where all 19 forms of employment were present, while in East London and Queenstown the only GC jobs absent are those at a court of law. In both of these towns, the magistrate’s court lies in the heart of the central business district (CBD), where there is no GI present

and therefore nobody employed. In Grahamstown there are noticeably no golf course employees. The old golf course (situated on the urban periphery) was closed down in 2016 and a new privately owned course was opened 10 km outside of town down the Belmont Valley. This course was deemed to be situated out of the urban area and thus not considered as an urban GC employer.

3.2.3.1 Green Collar employment by sector

The composition of jobs between and within towns varied with regards to the public, private and informal sectors (Table 3.3). The most significant contributor to the total number of jobs is the informal sector, employing approximately 62% of GC employees throughout the sample towns, ranging between 82% in East London and 35% in Peddie. The public sector comprises an average of 18.3% of total employment. The contribution of the public sector in the five largest towns (Aliwal North, East London, Grahamstown, Port Alfred and Queenstown) ranges from only 5-8.5% of total GC employment, while the average amongst the remaining seven towns averages 26%; indicating a negative, yet insignificant relationship ($p > 0.1$ and $R^2 = 0.1281$) between town size and the proportion of the public sector, mainly due to an more significant informal sector. Public sector contributions in Burgersdorp, Lady Grey, Maclear and Port St. Johns are very similar, while the notable outlier is Peddie, where public employment comprises 59%. Kirkwood, which is a small agricultural town, comprises of only 11.6% public GC employment, and seems to be a unique case with well-developed informal and private sectors. The average contribution of the private sector to GC jobs is approximately 19%, ranging between 40% in Port St. Johns and 6% in Peddie.

The informal sector contributes the majority of the GC jobs, mainly in maintenance of gardens in wealthier suburbs. The number of private gardeners employed displays a positive, and significant relationship ($p = 0.08$ and $R^2 = 0.999$) with the number of middle to high-income households, where the greater the number of households, the greater the number of gardeners employed (Table 3.5). In East London, the informal sector contributes up to R140 million in annual wages. With a number of well-established neighbourhoods and suburbs, it is no surprise that East London has more private gardeners employed than the other 11 sample sites combined. It is also noted that the percentage of residents who employ gardeners is greatest in the larger towns (Table 3.4). The proportion of residents who employ a private gardener in the five largest sample towns ranges between 65 and 68%; while in the three towns with the least number of middle to high-income households (Peddie, Port St. Johns and Tarkastad), 30, 50 and 50% of residents, respectively, employ a private gardener. The lowest daily wages in the sample (Table 3.5) are earned by private gardeners in Lady Grey (R92.65), Peddie (R91.67) and Maclear (R84.44). The highest wages are paid in Port Alfred (R133.19) and East London (R131.64). As can be seen in Table 3.5, there is variation in the percentage of private gardeners who are without other work, which can be used as an indicator for the general working environment. The values range from 33% in Port Alfred to 78% in Maclear, and give a reasonable

idea of the varied demand for and supply of working opportunities. With respect to the annual contribution of the informal sector throughout the sample, the minimum and maximum values were R96 800 (Peddie) and R139 million (East London).

Table 3.3: The number and composition of low-income Green Collar jobs per town

¹ Government/Municipal jobs; ² Private jobs; ³ Informal jobs

Types of urban GC jobs	Towns											
	AN	BD	EL	GT	KW	LG	MC	PD	PA	PJ	QT	TK
Accommodation ²	30	10	264	52	10	12	12	2	112	29	64	5
Bowling club ²	2	1	16	2	1				6		4	1
Church/PoW ²	5	2	28	15	1	2	2	1	4	1	6	1
Commercial/Corporate ²	6	2	89	8	4		3	1	16	2	21	
Compost ^{1 2}	3		12	4					6	3	4	
Estate/Old age home ²	7	3	43	18	2				22	2	11	
Garden service ²	11		148	49	12	2	4		62	9	39	
Golf club/course ²	4	2	35		4		2		13	3	6	
Hospital ^{1 2}	2		12	11	1	2	2	4	2	1	4	1
Landscaper ²			105	19					13		3	
Municipal ¹	5	3	27	21	2	4	5	9	14	5	14	1
- Magistrates court	1			1		1	2	3	2			
- Municipal buildings	3	1	12	3		3	1	3	3	2	3	1
- Municipal nursery			8	8					4		7	
- Museum/Library		1	4	11			1	3	2		1	
- Police station/centre	1	1	3	1	2		1		1	3	6	
Nursery ^{1 2}	4		109	8	2				8	6	6	
Other ²	1		11	59					13		5	3
Parks & Rec./Env. Services/ Amenities/Sports fields ¹	12	9	425	41	8	14	12	12	15	12	63	18
Private gardeners ³	453	121	9408	876	154	97	98	22	727	60	1101	53
School ^{1 2}	17	10	595	108	8	10	8		12	4	66	8
Street sweeper ¹	11	4	50	8	6	5	6	6	10	10	10	5
Stormwater ways ¹	10	8	50	8	6	5	6	6	8	4	10	6
Tree-felling ²	2		46	10	6		6		11	8	7	
Total	585	175	11473	1320	227	153	165	63	1081	161	1454	102
% Private sector	15.1	11.5	11.9	25.1	20.6	15.0	20.6	6.4	27.7	39.7	16.5	17.1
% Public sector	7.5	19.4	6.1	8.5	11.6	21.6	20.0	58.7	5.0	23.0	7.8	30.9
% Informal sector	77.4	69.1	82.0	66.4	67.8	63.4	59.4	34.9	67.3	37.3	75.7	52.0

Table 3.4: The profile of employment of gardeners by private households

Towns	Sample households	% with a gardener	Average days worked/ week	Average wage/day (R)	Average wage/month (R)	% of employees without other work
AN	32	65.6	3.0	109.05	1 330	76.2
BD	27	59.3	3.2	100.00	1 218	68.8
EL	189	67.2	2.3	131.64	1 234	40.5
GT	51	67.9	2.3	124.05	1 171	41.7
KW	28	60.7	2.8	123.53	1 374	64.7
LG	30	56.7	2.8	92.65	961	70.6
MC	31	58.1	3.7	84.44	1 244	77.8
PD	20	30.0	1.0	91.67	367	66.7
PA	53	67.9	2.2	133.19	1 167	33.3
PJ	22	50.0	2.5	115.45	1 276	63.6
QT	50	68.0	3.0	123.24	1 459	55.9
TK	24	50.0	2.6	117.50	1 190	66.7
Total/Mean	557	58.4 ± 11	2.6 ± 1	112.20 ± 17	1 166 ± 420	60.5 ± 15

Table 3.5: The total private household gardener wages per year

Sample towns	~ Total households	~ Total gardeners	Total wages paid per month (R)	Total wages paid per year (R)
AN	690	453	602 273	7 227 276
BD	205	121	147 318	1 767 816
EL	14 000	9 408	11 605 709	139 268 508
GT	1 290	876	1 025 630	12 307 560
KW	267	154	211 614	2 539 368
LG	171	97	93 234	1 118 808
MC	168	98	121 955	1 463 460
PD	86	22	8 067	96 804
PA	1 070	727	848 169	10 178 028
PJ	120	60	76 582	918 984
QT	1 620	1 101	1 606 161	19 273 932
TK	106	53	63 070	756 840
Total	19 793	13 170	16 409 782	196 917 384

3.2.3.2 Green Collar employment by category

Table 3.6 presents the composition of GC jobs within the sample towns by looking at the contribution of each urban GC category (Table 2.2). Of the eight categories, seven are comprised of private and informal sector jobs and only one represents the public sector. Residential GC jobs, which include private household gardeners, make up the majority of employment, ranging between 60 and 85%. In Tarkastad however, residential jobs make up approximately 52% of the total number of jobs; while in Peddie and Port St. Johns, residential jobs comprise only 35% and 39%, respectively (the lowest in the sample). In East London, residential jobs make up the greatest of the sample at 83%, which may be due to the large population and the relatively high abundance of residential areas. The next most significant contributor to the total number of jobs is the public sector, including municipal, government and public institutional GC employment. In Peddie, municipal jobs make up the greatest in the sample at 59% of the total; the next greatest, Tarkastad, state employment makes up 31%. In Port Alfred however, these jobs make up just less than 5%, the lowest in the sample. The greatest variability is seen in the proportion of residential jobs per town; and that of municipal and governmental jobs. Accommodation is a fairly consistent contributor to the total number of jobs and ranges from 2% in East London to 18% in the tourism hub of Port St. Johns. The proportion of commercial GC jobs is consistent throughout the sample and makes less than 2% contribution to total jobs per town. Notably however, there are no commercial GC jobs in both Lady Grey and Tarkastad. Proportions of these jobs in the towns where they are present range from 0.6% in Grahamstown to 1.8% in Maclear.

Green products and, more so, green services, make good contributions to the number of jobs – however in many of the smaller towns they are absent, such as Burgersdorp, Peddie and Tarkastad, while in Lady Grey only one garden service was identified. Similarly, there is a clear absence of recreational GS and therefore recreational GC jobs in both Lady Grey and Peddie. East London, the only metropolitan municipality in the sample, displays the lowest proportion of recreational jobs (0.4%), while Grahamstown comprises less than 1% of recreational GC jobs. It must be noted that although the proportion of recreational employment in East London is the lowest in the sample, due to its large population and size the number of GC recreational jobs is still higher than the sum of those in the smaller 11 towns and cities. In the smaller towns with weaker economies, such as Kirkwood (2.2%) and Tarkastad (3.9%), recreational GC employment comprises more of the total number of jobs than is found in the larger towns. Port Alfred however, ranked fourth with regards to total number of jobs, displays amongst the highest proportion of recreational employment in the sample at 2.6%, supported by holiday-goers, tourists and retirees. Private institutional jobs, including private schools and hospitals, places of worship, and private museums or libraries, show clear variations throughout the sample and vary between 1% in Burgersdorp to 11% in Grahamstown. In

Grahamstown, Rhodes University, and the abundance of private schools, governing bodies and other institutions collectively contribute to this figure.

Table 3.6: The composition of Green Collar jobs per towns as a percentage of total jobs

	Towns												
	AN	BD	EL	GT	KW	LG	MC	PD	PA	PJ	QN	TK	Mean
Accommodation	5.1	5.7	2.3	3.9	4.4	7.8	7.3	3.2	10.4	18.0	4.4	4.9	6.5 ± 4.3
Commercial	1.0	1.1	0.8	0.6	1.8	0.0	1.8	1.6	1.5	1.2	1.4	0.0	1.3 ± 0.6
Green products	1.2	0.0	1.0	0.9	0.9	0.0	0.0	0.0	1.3	5.6	0.6	0.0	1.7 ± 1.6
Green services	2.3	0.0	2.6	5.9	8.0	1.3	6.0	0.0	8.0	10.6	3.4	0.0	5.3 ± 3.6
Municipal/ Public institutional	7.5	19.4	6.1	8.5	11.6	21.6	20.0	58.7	5.0	23.0	7.8	30.9	18.3 ± 15.1
Private institutional	3.2	1.1	4.1	11.4	1.8	5.9	4.2	1.6	2.0	1.2	4.5	8.8	4.2 ± 3.2
Recreational	1.0	1.7	0.4	1.0	2.2	0.0	1.2	0.0	2.6	1.9	1.3	3.9	1.7 ± 1.1
Residential	78.6	70.9	82.6	67.7	69.3	63.4	59.4	34.9	69.3	38.5	76.5	51.5	63.6 ± 15.1

3.2.4 Secondary sectors and employment

3.2.4.1 Garden nurseries

Of the 12 towns, seven had at least one garden nursery, while the only large-scale growing facility was found in East London (Table 3.7). The proportion of local residents who visited and purchased items from garden nurseries ranged from 44% in Kirkwood to 65% in Port Alfred. Naturally, East London, due to the size of its population, has the largest nursery economy (R9 744 280) per annum and outweighs the other towns by more than a factor of 10. Port Alfred (R803 720) and Queenstown (R765 683) show similar nursery economies, while significantly less is spent in Grahamstown (R574 184). The average amount spent by residents (per year) was highest in Port Alfred (R1 150), and the least was in Kirkwood (~R573 per year). In Aliwal North, a well-established town with a medium-sized nursery economy, approximately R285 480 is spent by residents at nurseries per year. Kirkwood (R69 288) and Port St. Johns (R61 912), towns with similar annual green economies, also

show similar nursery economies. Throughout the sample a total of approximately R12.3 million is spent per year by residents at garden nurseries, contributing significantly to local employment. These figures are based solely on local residents' purchases at nurseries and exclude any local businesses, institutions, residential estates and visitors to the town – therefore they are underestimates.

Table 3.7: The estimated nursery economy in the 12 sample towns

Towns	No. of households (sample)	No. of households (total)	Residents who visit nurseries annually (%)	Average amount spent per resident per year (R)	Nursery Economy (R/year)
Aliwal North	32	690	57.4	721	285 480
Burgersdorp	27	205	0.0	0	0
East London	189	14 000	59.8	696	9 744 280
Grahamstown	51	1 290	61.8	720	574 184
Kirkwood	28	267	44.4	584	69 288
Lady Grey	30	171	0.0	0	0
Maclear	31	168	0.0	0	0
Peddie	20	86	0.0	0	0
Port St. Johns	53	120	63.6	811	61 912
Port Alfred	22	1 070	65.2	1 153	803 720
Queenstown	50	1 620	52.0	909	765 683
Tarkastad	24	106	0.0	0	0
Total/Mean	557	19 793	33.7 ± 30	466 ± 434	12 304 547

3.2.4.2 Tree-felling

The structured surveys investigated the proportion of local residents who use tree-felling services on their property, as well as how often, and how much (Table 3.8). The only town in the sample where residents do not make use of such services was in Peddie, while in the rest of the towns and cities the proportion ranged between approximately 7% and 43%. In public GS, the responsibility for tree-felling lies in the hands of the municipality, which is either done by municipal GC employees or offered to private tree-fellers via contracts. It is not uncommon to see tree-felling and garden maintenance at public institutions done by private companies – which also offers valuable employment opportunities. The tree-felling economy in East London is approximately R2 820 538 per year and the highest in the sample; more than a factor of seven times larger than that in Aliwal North, Grahamstown, Port Alfred and Queenstown, where the annual tree-felling economy ranges from R129 375 to R371 846. The remaining tree-felling economies in the six small towns are clustered into two groups which range from R5 298 to R12 515 in Burgersdorp, Lady Grey and

Tarkastad; and R28 501 to R47 148 in Kirkwood, Maclear and Port St. Johns. Throughout the sample, just over R4 million is spent per year by residents on tree-felling services.

Table 3.8: The estimated tree-felling economy in the 12 sample towns

Sample towns	No. of households (sample)	No. of households (total)	Residents who use tree-felling services (%)	Average amount spent per resident per year (R)	Tree-felling Economy (R/year)
Aliwal North	32	690	25.0	750	129 375
Burgersdorp	27	205	7.4	825	12 515
East London	189	14 000	33.9	595	2 820 538
Grahamstown	51	1 290	43.1	668	371 846
Kirkwood	28	267	30.7	575	47 148
Lady Grey	30	171	6.7	800	9 125
Maclear	31	168	25.0	678	28 501
Peddie	20	86	0.0	0	0
Port Alfred	53	1070	39.6	686	290 696
Port St Johns	22	120	40.9	714	35 046
Queenstown	50	1 620	30.0	656	318 816
Tarkastad	24	106	8.3	600	5 298
Total/Mean	557	19 793	24.2 ± 15	629 ± 213	3 781 974

3.2.4.3 Garden Tools/Supplies Expenditure

To maintain and enhance GS, equipment and tools are required – grass-cutting tools are perhaps the most common piece of equipment. Table 3.9 shows the magnitude of local residents' expenses on garden tools, supplies and equipment per year (excluding private nursery goods). The two major outliers are East London and Peddie, where R4 123 351 and R4 214 per year, respectively, is spent at local outlets and suppliers. Queenstown (R620 640) and Grahamstown (R419 901) round off the top three, while less than R10 000 is spent in Tarkastad. Interestingly, the proportion of residents who purchase tools and supplies does not vary greatly in the sample, and ranges from 32% (Kirkwood) to 48% (Queenstown). There is however variation in the average amount spent by residents per year. Residents in Port St. Johns spend the most while those in Peddie, the least. These figures only account for local resident's expenditure on green goods and services, and not local institutions, businesses and municipal demand for these goods and services, which is expected to increase these amounts. It is therefore safe to say that these figures are minimum estimates of the actual amount spent per year.

Table 3.9: The estimated annual expenditure on tools/supplies/equipment in the 12 sample towns

Towns	No. of households (sample)	No. of households (total)	Residents who purchase gardening tools/supplies (%)	Average amount spent per resident per year (R)	Garden tools/supplies Economy (R/year)
Aliwal North	32	690	43.8	689	208 317
Burgersdorp	27	205	41.7	317	26 949
East London	189	14 000	43.9	671	4 123 351
Grahamstown	51	1 290	45.1	722	419 901
Kirkwood	28	267	32.1	333	28 569
Lady Grey	30	171	46.7	288	22 988
Maclear	31	168	36.7	309	19 057
Peddie	20	86	35.0	140	4 214
Port Alfred	53	1 070	43.4	665	308 915
Port St Johns	22	120	40.9	822	40 355
Queenstown	50	1 620	48.0	775	602 640
Tarkastad	24	106	41.7	221	9 769
Total/Mean	557	19 793	41.6 ± 5	496 ± 247	5 815 025

3.3 Discussion

3.3.1 Urban Green Collar employment in the Eastern Cape

The structure of urban GC employment is variable across different contexts which are largely dependent on the local socio-economic and structural environment. Not all of the jobs are created to enhance urban environmental quality or with job creation in mind, but are rather driven by social and economic aspects. For some GC jobs, the motive is to provide and enhance the benefits and services obtained from GS, like many green goods and services. For others, like for most public GC jobs, it is to prevent the imminent disservices associated with urban GS, such as overgrowth and encroachment, alien species invasions, damage to infrastructure, societal health risks, and faunal pests (Speak et al., 2018). Although urban environments are defined as built-up and developed areas with high population and building densities, there is much GI spread in and between grey infrastructure (Jim, 2013). In most cases, with exceptions, the proportion of urban GS is directly related to the level of development and therefore land-use change (Dunn, 2010), mainly because the construction of grey infrastructure, like buildings, roads and sidewalks, requires the clearing of GS and therefore the loss of natural land and the corresponding ecosystem services they provide (Hostetler et al., 2011). The sample towns, however, all possess more GS (private and public) than grey infrastructure by just less than a factor of four, although it is evident that there are towns where grey infrastructure exceeds

private GI, and others where private GI is most prevalent. Although the sample average indicates that public GS outweighs private GS, there are significantly more private GC employees, especially in residential areas. Not only is the quality and diversity of private GS higher than public GS, but also the ecosystem service provision (Shackleton et al., 2018); and therefore no surprise that on average two-thirds of GC employees are private household gardeners. Private GS plays an important role in increasing urban environmental quality and providing a host of valuable ecosystem services and contributing substantially to local biodiversity (Speak et al., 2018). However, the presence of grey infrastructure and public GS, and the negative relationship between the two, requires constant addressing and a green development or environmentally friendly approach to offset the clearing of natural land.

Town size proves to be the only statistically significant determinant of the number of GC jobs, and the extent of the public and informal sectors. Surprisingly neither population size, percentage of GS, or annual average rainfall and temperature are statistically significant. This may be due to towns in the sample which make these variables insignificant in determining the number of GC jobs. There are towns in the sample with more GC jobs despite having smaller population and/or town size, and the same is evident for the percentage of GS, annual rainfall and temperature. Using GC jobs per km² as a measure looks at the sample towns on the scale; yet the only significant variables are the socio-economic ($p=0.001$ and $R^2=0.624$) and basic service ($p=0.003$ and $R^2=0.544$) index scores. Higher index scores, associated with more deprivation, lead to fewer GC jobs per km². With regards to town size, the model predicts that larger towns have exponentially more informal GC jobs, while there are approximately five public GC employees per km². The high residual scores for Burgersdorp, Lady Grey, Maclear and Peddie can perhaps best be explained by their relatively large or small town size, complemented by inconsistent population densities (i.e. population/town size). Using the town size coefficient, it is possible to calculate the number of GC jobs in towns or cities with a known size. For example, Port Elizabeth (251 km²), according to the model, is expected to have approximately 33 300 GC jobs, while it is expected that there are around 53 200 in the greater Cape Town region (400 km²) and 218 800 in Johannesburg (1 645 km²). Additionally, the regression model and independent variables predict only two-thirds (adjusted R^2 value) of the variation in the number of GC jobs; and therefore there are a number of other significant determinants of urban GC employment (e.g. household wealth, property values, local GDP, demographics).

3.3.1.1 Private sector

Private GS and GC employment provides not only valuable work opportunities, but also plays an important role in the provision of a number of social, economic and environmental ecosystem services to urban dwellers (Maria et al., 2015). Over half of the types of jobs found in the sample are private GC jobs, and their motive and purpose is to make profit by offering their respective goods and

services; like plant nurseries, garden and tree-felling services, and landscapers. There are however exceptions, like accommodation, places of worship, hospital and estate gardeners, where the premise is to increase the aesthetic and other intangible benefits of GS, and provide visitors and residents with high quality GS as part of their business model. Other GC jobs, like those at golf courses, bowling greens and private schools, are more specialised and require a suite of equipment, machinery and expertise. These types of urban GSs (and thus GC jobs) are strongly influenced by social demands and cater for a variety of simple and more advanced recreational activities for the local population or tourists. Private GC employment, like most private sector entities, relies on a relatively large (working and wealthy) population and an established and stable residential sector (McKague et al., 2015). With this comes a host of institutions, like schools and hospitals, businesses and commercial activity; and of course green product and service providers. The urban population has a direct effect on local economic activity by supplying workers with different skill levels who demand further goods and services; which leads to a greater transfer of private goods and services which creates local wealth, employment and development (Rogerson, 2018). With regards to private GC goods and services however, it is the demand for them that dictates their presence in towns and cities.

The highest proportion of private GC jobs is found in Port St. Johns, where private employment outweighs both public and informal employment – the only town where this was observed. This may be attributed to a well-established accommodation sector reliant on tourists (Port St. Johns IDP, 2017), but also well-supported by a golf course and a number of green product and service providers and their relative extent compared to the public and informal sectors. Private GC employment in Grahamstown and Port Alfred, which also attract tourists, is a significant contributor to the total number of jobs, with approximately one in four GC employees working in the private sector in both towns. Although the sectorial composition of jobs is very similar between the two, there are distinct differences in the make-up of their respective private sectors. For example, the number of GC employees working in accommodation is more than double in Port Alfred than in Grahamstown, while the number of school gardeners in the former is only 10% of the number found in the latter – due to Grahamstown's large educational and institutional sector. Evidently, despite a smaller population and significantly fewer private institutions, Port Alfred has a greater accommodation sector and a local GDP 0.5% lower than Grahamstown (ECSECC, 2017). There are, however, a number of similarities between these two towns. The number of GC employees working in estates and retirement villages and for garden, tree-felling and landscaping services is very similar between the two towns, even though Grahamstown is significantly larger in population and town size, and also a marginally greater economic output (ECSECC, 2017). With regards to Peddie though, more so than the other sample towns, there is a clear lack of private GC employment which is mainly due to a severe lack of economic stimulus, employment and local wealth in the area, and is depicted by low levels of business, industrial, commercial and institutional activity (Hamann and Tuinder, 2012).

Although there are clearly differences in the number and diversity of private GC jobs throughout the sample towns, the range of the private sector's contributions to total local employment is significantly smaller (6% and 40%) than that of public (5% and 59%) and informal (37% and 82%) sector contributions; indicating that the proportion of the private GC sector is relatively more consistent throughout the sample, and in fact decreases slightly in bigger towns with exponentially larger informal sectors (e.g. East London and Queenstown).

3.3.1.2 Public sector

Public GC employment plays an important role in shaping urban environments and GS. In most of the towns, the proportion of public GS is greater than private GS and the responsibility of maintenance and preservation of this space falls to municipal officials (Eastern Cape PDP, 2014). Common forms of public GS are roadside verges and trees, public parks and commonages, greenbelts, and of course GS at public hospitals, museums and schools (Gwedla and Shackleton, 2015). Eastern Cape local municipalities are structured to include a number of public and community service departments and visions, namely environmental services, solid waste management, parks and recreation, sports fields, and amenities. These departments however do not include GC employees working at public schools, hospitals, police stations and other state-owned institutions. These workers are employed by the respective provincial departments; i.e. school gardeners are employed by the Eastern Cape Department of Education, hospital gardeners fall under the Dept. of Health, and those at museums are linked to the Dept. of Arts and Culture. At government schools, the Dept. of Education provides only one GC employee per school, while the more established public schools, with private governing bodies, often employ additional GC labour – and therefore it is not uncommon to find public and private GC employees working alongside one another at public schools. It is the poorer public schools where a lack of labour, financial resources and expertise lead to a low quantity and quality of GS. A number of provincial and local municipal departments outsource GC work to private businesses. For example, in East London, the cutting of road verges on the R72 road is done by a private garden service via a tender offered by the Dept. of Roads (Buffalo City Municipality IDP, 2018). The Depts. of Health and Arts and Culture frequently outsource GC workers to service public GS throughout the province; one example is Grahamstown, where private garden services are responsible for GS maintenance at Settlers Hospital and the National English Literary Museum – which offers valuable employment to local entrepreneurs.

There are two important factors that determine the need for public GC employees in urban environments – these are the different forms of public GS and the vegetative productivity of GS. The primary responsibility of municipal departments is to maintain roadside grass, trees and open space in order to prevent ecosystem disservices. Although their mandate is fairly simple, vegetative productivity determines the frequency of maintenance required. For example, there is no need for GS

maintenance in Lady Grey during winter, according to a local resident, because of the lack of rainfall and extremely low temperatures. Warmer and moister environments will require more maintenance, such as East London and Port St. Johns. Common disservices that public GC employees aim to prevent are damage to roads and power lines, excessive growth, pest or alien species invasions, and unpleasant urban aesthetics (Speak et al., 2018). Natural and indigenous urban vegetation, on the other hand, is self-regulating but can create problems like encroachment and damage to infrastructure (Broussard et al., 2008). Most GS found in urban environments, however, has been transformed in some way and therefore requires consistent monitoring and preservation (Speak et al., 2018). Peri-urban areas and roads that connect towns also require maintenance of GS to prevent bush and grass encroachment. Public urban GS provides a number of goods and services to local citizens, and the benefits outweigh the costs borne by municipalities (Davenport et al., 2011). It is also evident that urban GS maintenance prevents a number of social and environmental disservices, but also economic disservices associated with damage to public infrastructure like power lines, roads and buildings, blocked drains, and additional negative effects on tourism and economic activity.

3.3.1.3 Informal sector

The informal, or household sector, provides significant employment opportunities, and the number of jobs present is directly proportional to the number of residential households in a town or city. Private gardening jobs are deemed informal because they are seldom contractual or require registration, and the method of recruiting and frequency of work are unstructured and informal. In South Africa, and most of the world, quality and aesthetically-pleasing private and domestic gardens are directly related to the socio-economic status of residents (Lubbe et al., 2010; Shackleton et al., 2018) – where the ability to invest in and enhance private GS is a luxury good. In most towns in South Africa, clear distinctions can be made between high, middle and low-income residential areas by observing the size of properties, household density and very noticeably the inequality of GS distribution (McConnachie and Shackleton, 2010; Irvine, 2012). In low-income suburbs, typically termed townships in South Africa, there is less private GS due to small property sizes and high household densities (McConnachie and Shackleton, 2010), and therefore unsurprisingly the majority of residential gardening jobs occur in middle to high-income suburbs. This was confirmed by the results in Peddie, dominated by low-income, social grant-receiving residents, where approximately 22 private gardeners are employed, working an average of only one day per week. Even in low-income areas, there is GS present in the form of grass, which inevitably requires some maintenance. Households that can afford grass cutting services procure these, while others take on the responsibility themselves. In contrast, in East London alone there are approximately 9 400 people who work in the informal GC sector and are employed by private residents for the purpose of GS maintenance, generating around R140 million per year in wages. This not only contributes significantly to LED and employment (Rogerson, 2018), but also high quality residential GS and a host of associated benefits such as increased biodiversity,

aesthetic appeal, property values, sense of place, recreational activities and resident well-being (Maria et al., 2015). As long as residents place value on and are willing to invest in residential gardens, there will always be employment and working opportunities for other urban citizens.

The results illustrate a positive, although weak, relationship between town size and the percentage of residents who employ a GC worker ($p > 0.1$ and $R^2 = 0.1348$) and the daily wage rate ($p > 0.1$ and $R^2 = 0.2146$). This is mainly due to the existence of old, well-established, wealthy and moderately wealthy suburbs with maintained and manicured gardens (Shackleton et al., 2018), where residents have a high demand for green goods and services. The demand for GC services amongst households can be assigned a monetary value by analysing wage data. Throughout the sample, residents spend approximately R292 per week on garden maintenance, suggesting that most urban residents value, or at least maintain GI on their properties, and either perceive or subconsciously value the benefits. Willingness-to-pay (WTP) valuation methods are a popular way of attaching a monetary value to ecosystem services (Iranah et al., 2018; Sylla et al., 2019); and in the case of middle to high-income residents in the Eastern Cape, the average WTP for private GS maintenance is approximately R1 170 per month. Residents WTP for private GS is significantly higher than that for public GS. According to Shackleton et al. (2018), on average only 34% of affluent residents in Fort Beaufort and Port Alfred (in the Eastern Cape) are willing to pay for the establishment or maintenance of local public GS. Additionally, in the same towns, between 80 and 100% of RDP and township residents are willing to work for urban greening in their suburb (Shackleton et al., 2018). Not all residents, however, are willing to pay for private GS. In this study, approximately 42% of residents do not employ garden maintenance workers, citing reasons of affordability, lack of private GS, and also the enjoyment of doing garden maintenance oneself – and therefore are willing to pay via opportunity cost.

3.3.1.4 Categories of Green Collar jobs

The categorisation of urban GC jobs provides a more place-relevant insight into the composition and motive for these jobs, compared to the sectorial breakdown. In each of the eight categories the jobs are based on or around GS, but the type of GI, and often the level of maintenance and expertise required, varies. Some jobs involve the cutting of grass or trees, while more altered GS, like bowling and putting greens, or cricket pitches, require not only additional expertise and practices, but also equipment and supplies. Although it is clear that the form of work differs across categories, the overarching premise of these jobs is to continuously maintain urban GS to suit local inhabitants and users, and to provide the desired ecosystem services and prevent associated disservices (Speak et al., 2018). In some cases, such as the accommodation and commercial categories, GS is often used as a strategy to attract consumers and increase incomes. Examples include attractive and sometimes lavish gardens at hotels and lodges, or at car dealerships and even petrol stations, which contribute to a more pleasant urban environment (Hostetler et al., 2011). Green products on the other hand are unique as

they are the only form of GC employment where GI is grown, maintained or composted, and then exchanged for money as a so-called ‘green product’. Seven of the 12 sample towns had GC jobs in all of the categories, while in the smaller towns, green product jobs are absent due to a lack of local demand. Town size shares a statistically significant relationship with only the residential GC category ($p=0.046$ and $R^2=0.312$), and overall, the number of GC entities increases by approximately 1.25 for a one km² increase in town size. Formal green service jobs are non-existent in three of the study towns, where there is clearly an insufficient demand for GS maintenance to run a profitable business (mainly due to household wealth). Commercial activity in the smaller sample towns is low and therefore very few commercial GC jobs, and in fact none in both Lady Grey and Tarkastad. The lack of commercial activity stems mainly from the shortage of primary, secondary and tertiary production and services (Haaland and van den Bosch, 2015). It must also be said, however, that the presence of commercial space does not guarantee corresponding GS and GC employment – which depends more on the size, wealth, location and marketing strategy of commercial entities (McKague et al., 2015). In Kirkwood for example, where there is little formal commercial activity, a large, and seemingly successful, citrus packing facility employs a number of GC workers who are responsible for the maintenance of the factory and office gardens. The same is seen frequently in East London at restaurants, fuel stations, business parks and offices; in an attempt to attract customers, improve aesthetic and environmental quality, and create pleasant and productive work places (Haaland and van den Bosch, 2015; Maria et al., 2015).

The results show that the majority of urban GC workers are employed as private gardeners by local residents, and therefore the number of hours worked, and the total annual wages paid are most significant in the residential category. High-income residential areas play an important role in urban GS preservation, and domestic gardens provide ecosystem services on a local and regional scale (Maria et al., 2015). The quality of GS and the level of garden maintenance in residential areas depends on a number of factors, like income-level, resident preferences and even climate variables (temperature and rainfall) (du Toit et al., 2018). Urban GS requires regular maintenance ranging from basic grass-cutting to higher-end maintenance, yet the motive for both is to make these areas habitable and to attain the ecosystem benefits, as well as manage disservices (Speak et al., 2018). In some cases, especially lower-income areas, few residents employ a GC worker and rather take on the responsibility of GS maintenance themselves, while in some extreme cases there is no GI in the homestead space. The majority of public GS is made up of open and natural land, roadside verges, trees and shrubs, and of course public parks and sports fields, where biodiversity, ecosystem service provision and vegetative productivity are often lower than more diverse and varied GS (Davenport et al., 2011), and therefore a lower level of maintenance required by municipal/public institutional category. According to Chishaleshale et al. (2015), the management and maintenance of public GS is ineffective by municipal departments mainly due to a lack of human and financial resource capacity.

Despite public GS often being more prevalent than private GS in the sample towns, the residential GC category is far more significant than the municipal category which indicates a greater supply of employment opportunities. Other meaningful categories are accommodation and private institutional, although heavily reliant on town and population size, local wealth and the level of tourism and business activity (McKague et al., 2015). Ultimately though, the composition of GC employment from a categorical perspective depends largely on the nature of the relevant town and its local economy. Tourism and holiday-goers support accommodation, commercial and recreational GC categories; while middle to high-income residents support green products and services, private institutions, residential and also commercial categories. Municipal and public institutional GC employment is primarily dependent on the size of towns, where more urban GS and a greater variety (e.g. rivers, beaches, stadiums, greenbelts or railways) requires more employees and municipal divisions.

3.3.2 Inter-town analysis

An endless number of comparisons can be conducted between sample towns with regard to the extent of the green economy, number of GC jobs and the composition of jobs. However, it is the fundamental differences between towns and the associated reasons for these differences that should be considered. In East London and Peddie for example, the number of GC jobs differs by more than a factor of 165, while their respective green economies differs by a factor of 77% - although these differences can be attributed mainly to the vast contrast in town size (the only statistically significant variable) and levels of development. Grahamstown and Queenstown, on the other hand, share a number of structural characteristics like population and town size, and also the number of GC jobs and local green economy. It is, however, their composition which differs, indicating that although towns may share physical and economic characteristics, there are internal and context-specific factors that determine the make-up of the local urban GC sector. Grahamstown's composition, for example, can be attributed to the education and institutional sectors, with more than 90 private GC jobs than Queenstown, where there are more than 220 residential GC workers due to 400 more middle to high-income households. Although towns may seem similar from a structural (population and town size) and climatic (rainfall and temperature) perspective, and even index scores, poverty and unemployment rates, the composition of employment depends on a number of additional factors such as the number of middle and high-income working class citizens and households, the extent of local production and consumption, and the transfer of goods and services (Rogerson, 2018). According to Maria et al. (2015), economies depend on and are governed by the local culture, history, geography and the presence of natural resource, but also levels of infrastructure, development, investment and tourism. Analysis of urban GC employment between Aliwal North (9 km²) and Port Alfred (13 km²) emphasises the significance of town size in determining the number of GC jobs more so than the size of the local population. Port Alfred has amongst the most GC employees per km² (85) and highest

proportion of private GC employment (28%). When compared to Aliwal North though, Port Alfred has more middle to high-income households but Port Alfred and Aliwal North's contributions to provincial GDP are both approximately 1.3% (ECSECC, 2017). It is safe to deduce that although towns may share significant characteristics such as town size and economic output, the nature of their respective local economies are heterogeneous from a primary, secondary and tertiary sector perspective.

Rather than highlighting all the similarities and contrasts between the sample towns, the approach of this study is to isolate the underlying factors that influence GC employment in different settings. Using the residual results, it is possible to identify sample towns with fewer jobs than the regression model predicts (and why) using the independent variables. These are Burgersdorp, Grahamstown and Maclear; where the predicted number of GC jobs is inflated by the respective town sizes, and according to the regression model, these three towns have fewer jobs than their local social, economic and environmental attributes suggest. Burgersdorp and Maclear have amongst the least GC workers per km² in the sample. In order to fit the regression model, these towns require an additional 35 and 23 GC (permanent and part-time) jobs per km², respectively; while Grahamstown is only five GC workers per km² short. Generally though, town size has a positive impact on the extent and diversity of local economies and employment numbers, as does the number and quality of tourist attractions, infrastructure, private and public institutions, and commercial and recreational activities (Maria et al., 2015; Rogerson, 2016). The GC sector is influenced and shaped by these elements of urban life, and is a clear indication of the nature of local economies, residents and human-environmental relationships. In Port St. Johns for example, just less than one in five GC workers are employed in the accommodation sector, servicing GS at bed and breakfasts, hotels, campsites and lodges, which, according to Maria et al. (2015), not only preserves high quality urban GS but increases business and guest satisfaction. In Grahamstown, however, more than one in 10 GC employees work at private institutions – which can be linked to the town's many schools, colleges, institutes and the university, who value and ensure quality GS. In East London, on the other hand, it is the residential sector that overshadows the rest due its vast population, accounting for eight in 10 GC employees. Context and place-specific variables play the greatest role in determining the extent and composition of the local economy (McKague et al., 2015), and thus urban GC employment – especially towns of similar sizes and with shared characteristics.

3.3.3 Contribution to local employment and economic activity

Employment in South Africa, and especially in the Eastern Cape, is difficult to find for both low and high-level employees, and the high unemployment rate does not bode well for the provincial or national economy (ECSECC, 2017). To create sustainable local wealth, an important component is middle to high-income working citizens, who demand a host of goods and services, private, public

and informal (Rogerson, 2018). This contributes to a diverse local economy with a range of goods and services, employment and income opportunities (McKague et al., 2015). The urban GC sector employs both high and low-income employees (on average 28 higher-income employees per 1 000 low-income) and provides employment for urban citizens across a socio-economic spectrum, thereby contributing to diversifying local economies. The primary contribution of the GC sector is the provision of employment and income. Throughout the sample towns, an average of 55 urban GC employees are present per km² (~2.7% of the average population per km²), earning a total of approximately R1.45 million in wages per year. A larger working population leads to greater local spending and a higher transfer of goods and services, as well as LED (Maria et al., 2015; Rogerson, 2016). The full benefits of job creation can be understood using the example of private garden grass cutting - a middle-to-high income resident employs a GC worker to service GS on their property and, in doing, so creates a job for one or more days per week. The GC worker earns an income which allows him or her to pay for local goods and services and perhaps even someone to service the GS on their property; and thus further economic benefits accrue to the urban population as a whole.

The job creation and income provisioning qualities of GC jobs are not the only economic benefits of the urban GC sector. The respective nursery, tree-felling and garden supplies/tools economies highlight the secondary or downstream benefits of the GC sector. These benefits are not only in the form of local expenditure, but also additional employment, a greater transfer of money, and trickle-down benefits to primary producers and suppliers of garden products (e.g. hosepipes, pots, lawnmowers, chainsaws, etc.). Economic benefits accrue on a household, local, regional and provincial scale through increased household income and local expenditure, and a greater transfer of goods and services regionally and provincially (Pinderhughes, 2007; Kazungu et al., 2014). Fields (2009) looked at the economic benefits of Alabama's green industry, of which plant nurseries form a component. Total sales at retail plant nurseries in Alabama (population of 4.8 million) in the US were \$843 million in 2007, but the benefits of these sales were evidently distributed across a number of associated sectors, like so-called hard goods (e.g. pots), seed distributors, and growers of bedding plants, trees and shrubs (Fields, 2009). The extrapolated Eastern Cape nursery economy (i.e. total annual expenditure) is approximately R100 million per year (0.04% of provincial GDP), and the total number of employees in this sector is estimated at around 1 000 – compared to 9 200 in Alabama (Fields, 2009). This research, however, did not consider non-urban plant nurseries or growing facilities, which also have the potential to contribute significantly to employment and LED (Kazungu et al., 2014). With regard to the provincial expenditure on tree-felling services, approximately R40 million is spent per year, which measures approximately 0.02% of provincial GDP (ECSECC, 2017). There are more economic benefits centred on garden tools and machinery such as business for local lawnmower or chainsaw repair shops, hardware stores, and large-scale companies who supply garden maintenance machinery to commercial and industrial organisations. Large-scale tractor lawnmowers

cost between R50 000 and R150 000, and are essential for most large school and urban premises. Therefore, through the maintenance and alteration of GS and the demand for tools, supplies and machinery, a range of entities on different scales import, export, produce, trade or service various items. In doing so, they provide employment and incomes, generate profit and contribute to economic activity. By adding the total GC wages and the secondary economic benefits, it is evident that the overall GC sector generates a minimum of R1.63 billion in annual wages and expenses (approximately 0.71% of total provincial GDP (ECSECC, 2017)). Without the presence of urban nature and GS, thousands of people, directly and indirectly linked to GS, would be without work. Unemployment rates would be higher, economies weaker, and living, learning, playing and working environments would be less pleasant and hospitable (Maria et al., 2015).

3.3.4 Comparisons to other sectors

The urban GC sector, although significant, does not compete with other common urban sectors like retail, wholesale, general business, real estate and construction with regards to employment numbers and contributions to LED (ECSECC, 2017). Environmental enhancement and conservation in towns and cities, especially in developing countries, is not a main priority for governments and low-income inhabitants, and is often overshadowed by issues of underdevelopment, service delivery, weak economies and poverty (Young, 2010; Gwedla and Shackleton, 2015). In the 12 sample towns, around 17 000 jobs and R503 million per annum in wages were counted. Extrapolated to a provincial level, this indicates that approximately 60 000 employees work in the urban GC sector, earning approximately R1.73 billion in annual wages. In 2016, out of a labour force of just over two million, 1.44 million are employed, and the total provincial output was measured at approximately R230 billion in 2015 (ECSECC, 2017). The tertiary sector in the province is the main employment contributor (912 000 employees), of which the majority of jobs are involved in community, social and personal services. The primary sector provides only 102 000 jobs and contributes R4.3 billion to provincial GDP per year (ECSECC, 2017). Of the total number of people employed in the Eastern Cape, approximately 4% are GC employers or employees, with the majority of those jobs in the informal sector. Essentially, one in 25 jobs in the province are involved in the maintenance, preservation, care or trade of urban GI, and stretch across the primary, secondary and tertiary sectors. The estimated total GC wages in the Eastern Cape makes up only 0.63% of provincial GDP; however the functionality and importance of these jobs should not be measured solely by economic output, but rather more complex and intangible benefits such as livelihood provisioning, extent of poverty alleviation, and the social and environmental ecosystem services received as a result.

In the Buffalo City municipality, home to East London, there are approximately 286 674 people employed of which just under 12 000 are GC employees, making up around 4% of total employment (EC Provincial Profile, 2011). In the Makana local municipality, albeit in 2011, 9% of the 19 234

people employed are Grahamstown GC workers. Green Collar employment in Queenstown comprises just 3.5% of total employment in the Enoch Mgijima local municipality, whilst in the poverty stricken Ngqushwa region (home to Peddie), only 6 344 people (47%) are employed (ECSECC, 2017), of whom only 1% are GC employees. In the Port St. Johns municipal region, the GC sector contributes only 2% of total jobs (EC Provincial Profile, 2011). Although the number of GC workers across various towns may be similar, their relative extent compared to other urban sectors and total employment is variable, and depends on a range of local, provincial and national influences (McKague et al., 2015). The citrus sector, which is believed to be the largest employer in the agricultural sector in South Africa, employs around 85 200 workers throughout the country (EC Provincial Profile, 2011). The urban GC sector employs roughly 60 000 people in the Eastern Cape alone, and therefore the provincial GC sector is more significant in terms of employment numbers and total annual wages; although the citrus sector contributes to food security and South Africa's export market (R500 million per year in foreign revenue) (ECSECC, 2017). Again, it is difficult to compare the GC sector to other urban and rural sectors, simply because its domain is mainly guided by resident and household wealth, community and public services, as opposed to the basic fundamentals of economics - namely profit, growing investments, production and output maximisation (Vandermeulen et al., 2011).

3.3.5 Importance of Urban Green Collar jobs

There are a number of different ways to value and analyse the GC sector, such as using wage rates, employment numbers, costs, and even the benefits or functions of employment. Also, there are a number of different aspects to consider when analysing the importance of urban GC jobs, which are from an economic, social or environmental viewpoint. The economic benefits have been discussed substantially and therefore the social and environmental benefits are discussed below.

3.3.5.1 Social importance

The social benefits of urban GC employment are vast, context specific and accrue in different ways. A living wage is of great social value to a GC employee, but the jobs they are involved in provide and help preserve a number of social ecosystem services. These range from improved urban liveability and sense of place, to increased levels of recreation and social cohesion, improved education and healthcare sectors, and complex cultural and spiritual values urbanites assign to GS (Peters et al., 2010). Commonly perceived benefits of urban gardens and GS are the aesthetic, recreational and spiritual values (Shackleton and Blair, 2013; Peters et al., 2010), all collectively contributing to social well-being. Other social benefits include decreased stress levels, increased productivity, recreational and social activities, and human well-being (Mansour et al., 2017).

3.3.5.2 Environmental importance

The environmental benefits of the GC sector are also widespread and naturally differ between land-use types (Lubbe et al., 2010). According to du Toit et al. (2018), GS in residential areas display amongst the highest levels of biodiversity and ecosystem services compared to other urban land-uses (Broussard et al., 2008). In a town or city dominated by grey infrastructure, patches of public and private GS provide valuable ecosystem services such as increased biodiversity, carbon sequestration, reducing the heat island effect, and water, soil and nutrient retention (Maria et al., 2015). Plant nurseries, landscapers and composting facilities also contribute substantially to GS quality, quantity and diversity in residential, commercial and institutional urban areas by providing green goods and services (Fields, 2009). Furthermore, greenbelts, open spaces and patches of indigenous GS provides niche habitats for a variety of birds, insects, bats, and in some cases antelope and other small mammals – especially on large golf courses and urban nature reserves. These environmental benefits contribute substantially to the quality of towns and cities and ensure valuable regulating and supporting ecosystem services (Leichenko and Silva, 2014).

3.4 Conclusion

Measuring and analysing GC employment in and between towns is one way of gauging the extent and level of environmental care and the different preferences and functionalities of urban GS. Despite the dramatic land-use change and development common in urban areas, GS, natural or human-made, is commonly found in a number of different settings such as places of work, learning or recreation, and perhaps in most abundance, where people live (Dunn, 2010). Although informal or household GC employment is the main contributor to the overall sector, private and public sectors also provide essential job opportunities as well as valuable green goods and services. With regard to the categorical composition of the GC sector, the main categories (in descending order) are residential, municipal, private institutional and accommodation – all of which are present in each of the sample towns. Not surprisingly, due to the unique characteristics of the different sample towns, GC job numbers, compositions and local green economies vary; although it is evident that the sector contributes approximately 3-10% of total urban employment. It is found that through the paying of wages, the GC sector stimulates local economic activity in urban areas, and assists in LED (Rogerson, 2018). Although the motive or premise for GC employment is not based solely on job creation and wage provision, it is certainly an additional benefit of urban GS, where the economic well-being of hundreds of people depends on GS. The social and environmental benefits that GC jobs maintain and enhance provide additional incentive and justification for their existence. When considering urban GC employment, it is important to take into account the local social, economic and ecological conditions that dictate GS structure, variety and functionality; and which ultimately influence the urban environments people live in and will continue to live for many years to come (Jim, 2013).

CHAPTER 4

The ability of urban Green Collar jobs to contribute to poverty alleviation

4.1 Introduction

Urban poverty has become one of the most severe threats to global well-being, especially in Sub-Saharan Africa, where population growth and climate change will prove to be additional challenges (Leichenko and Silva, 2014). Millions of people worldwide, through a lack of income, access to goods and services, and social and environmental deprivation, find themselves living in poverty (Gordon, 2005). In many developing countries, public service backlogs, weak economies and high unemployment provide major challenges to establishing a sustainable and healthy urban livelihood. Although many urban dwellers in developing countries have diverse livelihood strategies, it is vital for the well-being of most households that some members have employment and earn a wage or salary (Jim, 2013). A cash income allows urban citizens to purchase valuable goods and services that improve and enhance their livelihoods, whereas rural communities have a greater reliability on natural resources and agriculture (Salami, 2013). Basic goods and services in urban environments such as electricity, transport, food, clothing and toiletries, as well as many urban services, all require financial resources to access. Without a wage or salary, people are at great risk of a low quality of life – and ultimately a position of poverty. According to StatsSA (2018), there are three national poverty lines in SA. These are the food, lower-bound and upper-bound poverty lines, which are monthly amounts of R547, R785 and R1 183, respectively (April 2018 prices). The poverty lines represent the minimum amount per individual per month needed to afford the required daily energy intake and additional non-food items. In the US, however, the poverty line income amounts to approximately R6 900 per person per month (US 2010 prices), illustrating the contrasting economic and poverty climates. The World Bank's daily poverty line of \$1.90 (~R28) per day person, or roughly R840 per month. These are the monetary means required to purchase a sufficient amount of food for the *minimum* energy intake (World Bank, 2015). Urban dwellers without a meaningful cash income are prone to life below these poverty lines, and therefore are more likely to experience malnutrition, a lack of transport, education, clothing and other everyday essentials.

Poverty in South Africa, and especially in the Eastern Cape, is widespread and its intensity varies depending on a number of variables such as level of economic activity, development, population size, access to goods and services, and historical context (ECSECC, 2017). In the eastern portion of the Eastern Cape, for example, the poverty headcount is substantially higher than the central and western portions. This can be attributed to the factors listed above (StatsSA, 2018), and especially the historical context of the eastern side being mostly former homelands. The poverty headcounts in the Eastern Cape vary substantially and range from 1% - 66% of citizens per municipality. These figures include urban and rural populations, with the latter making up the majority of the province's population (StatsSA, 2018). According to Eastern Cape PDP (2014) and Hamann and Tuinder (2012), there are a number of factors that contribute to poverty in the Eastern Cape. Unemployment is the most severe, followed by education levels – these two factors together contribute 50% of the

weighted poverty indicators (StatsSA, 2018). These two factors are recognised as major issues that challenge socio-economic well-being and lead to societal deprivation and poverty. Overcoming the challenge of poor education is a medium to long-term project which requires significant investment aimed at the strengthening of educational institutions. This will begin to pay off by producing a more educated, skilled, efficient and happier population (Salami, 2013). Hamann and Tuinder (2012), StatsSA (2018), Eastern Cape PDP (2014) and ECSECC (2017), all cite low levels of education and a lack of working opportunities as the most severe threats to the socio-economic well-being of the Eastern Cape population, resulting in a large uneducated and unemployed population characterised by marginalisation and poverty. Environmental degradation in the province is also a major threat to societal and ecological resilience (Hamann and Tuinder, 2012). This gives rise to an opportunity to create a variety of green or environmental jobs with low barriers to entry, minimal skills and training required, and the ability to employ labour across the age and gender spectrum. Green or environmental jobs could potentially decrease unemployment, improve environmental quality, and importantly, alleviate poverty amongst the poor and marginalised by providing meaningful and rewarding working opportunities (Pinderhughes, 2007).

In urban environments of different shapes and sizes all around the world, people are reliant on an income, wage, salary or cash earnings of some kind (Gordon, 2005); and rapid rates of urbanisation, population growth and migrations from rural to urban settings challenge the capacity of local economies to provide sufficient employment to combat poverty backlogs (Rogerson, 2016). An important poverty alleviation tool used throughout urban and rural SA is the provision of state grants, such as for the elderly and disabled, and also child support grants (Gumede, 2018). These grants allow non-working or unemployed citizens (and their households) to access basic goods and services. The magnitude of the grants vary by category, ranging from R360 per child (<18 years old) to R1 600 per person over the age of 60 (both per month) (Hochfeld et al., 2017). Supplementary forms of income, whether part-time or permanent, are therefore essential to those living between or near the poverty lines. Another poverty alleviation tool used by the state are the Expanded Public Works and Community Works programmes, which provide part-time employment for thousands of urban and rural South Africans throughout a number of community service departments (Mohapi, 2016; ECSECC, 2017). For these programmes, daily wages are approximately R90 for an eight or nine hour working day, equating to roughly R1 800 per month. For a household of four people sharing one income and receiving no social grants, this would equate to R450 per person per month. It is clear that earning an income is imperative to providing a livelihood for urban dwellers free of poverty and hardship, where people can accumulate financial, infrastructural and intellectual capital, and ultimately enhance their day-to-day standard of living (Leichenko and Silva, 2014).

There is no doubt that a higher level of education, skills and training gives a job seeker a greater chance of not only finding employment, but also higher-paying jobs with potentially more benefits

and a greater quality of life (Falxa-Raymond et al. 2013). This also applies to green jobs. Consider a plant nursery as an example: there are many different levels of employment (owner, manager, cashier(s), customer assistant, plant carers/curators and manual jobs), each of which have different and varying barriers to entry and requirements, as well as remuneration. It follows that those who have a lower level of education or qualifications are more prone to poverty than those who have some form of tertiary education or formal training, and therefore the ability of GC jobs to employ unskilled, marginalised labour potentially plays a pivotal role in alleviating poverty (Uddin, 2006, Falxa-Raymond et al. 2013; McClure et al. 2017). It must also be acknowledged, however, that higher-paying, more skilled GC jobs can also contribute to improving local livelihoods by creating additional economic benefits like household employment and local expenditure. Providing jobs across the skills and qualifications spectra is critical to creating and growing sustainable local economies in small and medium-sized towns and large-scale cities (Rogerson, 2016).

Another important element of GC employment is the working environment, concerning the quality, quantity and intensity of work, as well as employee satisfaction and perspectives. Jobs with more desirable characteristics, from an employee's perspective, lead to higher job satisfaction, security, efficiency, state of mind, and probably a greater standard of living and livelihood (Kazungu and Magigi, 2012). More desirable and beneficial job traits contribute positively to employee well-being and thus poverty alleviation. Living conditions and household characteristics are important indicators of poverty and provide insight into the quality of day-to-day life, along with household resilience and well-being. The number of people per bedroom, household diet, access to electricity or energy, category and ownership of dwelling, and the accumulation of assets are all relevant to the standard of living and poverty status of urban dwellers (StatsSA, 2018; ECSECC, 2017). Urban GC incomes contribute to alleviating urban poverty and improving household well-being, but the job and working conditions and employee's perspectives play an important role in the well-being of GC employees (Uddin, 2006).

The provision of wages may be the most significant benefit of GC jobs (from a livelihood provisioning perspective), but there are many other ways in which the work of GC employees can contribute to local economies and decreasing poverty (Dunn, 2010). Institutions like Rhodes University in Grahamstown, for example, bring in a number of tourists attracted by the aesthetic and scenic beauty of the campus. Golf courses also increase local revenue and expenditure by attracting visitors, bringing benefits to a host of sectors such as entertainment, retail and accommodation (Haydu et al., 2008). In a free market economy like South Africa's, job creation, economic growth, entrepreneurship, innovation, tourism, and the necessary support and intervention from the state, must be viewed as potential tools to decrease urban poverty and ultimately lead to socio-economic prosperity. Unemployment in South Africa is as a result of a number of compounding social, economic, political and even environmental issues (Rogerson, 2016). A range of unemployment types

(cyclical, structural and frictional unemployment) are evident in South Africa as a result of economic downturns, inflated wages, unwillingness to work, and a large uneducated and unqualified population (Hochfeld et al., 2017). Thousands of people in the Eastern Cape are without work and prone to poverty, relying heavily on monthly social grants for their livelihood and well-being (ECSECC, 2017). This chapter examines the potential of GC employment to alleviate poverty, allowing participants to access invaluable goods and services whilst simultaneously involved in meaningful work.

4.2 Results

The following results analyse working and living attributes of GC employees and the ability of their employment to improve the quality of life of employees, and to alleviate urban poverty. The majority of the results consist of quantitative data, but the qualitative data provides valuable assistance to the overall analysis gauging employee perspectives. Nineteen different job types within eight categories of GC employment are individually and collectively analysed using the various job, employee living and household attributes. Although it can be argued that higher-end GC employment (i.e. managers, cashiers or supervisors) also contributes to alleviating poverty by providing income to households, it is the lower-level jobs that contribute more significantly to decreasing poverty by employing low skilled, marginalised and often uneducated urban labour; whereas higher-end jobs often require more training and skills and also pay higher wages (~R20 000 per month).

4.2.1 Urban Green Collar employment attributes

Of the 19 different types of GC jobs, all contribute to paying wages and improving livelihoods, but some more than others. The three highest paying jobs are found in the public sector (municipal, parks and environmental services, street sweepers and stormwater ways) and pay daily wages ranging between R343 and R387 (Table 4.1). The average length of employment in the two former sectors is also amongst the longest in the sample, while that of street sweepers and clearers of stormwater ways is notably less. Green collar workers employed at hospitals and schools have the longest length of employment in the sample, and can either be privately or publically employed. Their daily wage rate is around R250 per day – with public wages being higher than private sector wages. The highest paying wages in the private sector are earned in landscaping jobs, which require additional skills and training. On the other hand, the lowest daily wages in the sample are earned by private residential gardeners (~R116), who also work the least number of hours (28.5) per week.

With regard to the employment of females, nine of the 19 different types of GC jobs employ women, and the proportion of female employees varies between them. The highest proportion of women are employed as municipal street sweepers (97%) and at plant nurseries (71%). Other notable employers of women are private landscapers and municipal stormwater ways. Approximately 1% of private

gardeners are female, the lowest in the sample – besides the 10 forms of GC jobs that do not employ women at all.

There is a statistically significant variation in the mean schooling grade achieved by GC workers across the different jobs ($p=0.0022$); especially place of worship and household gardeners (5.5 and 5.8, respectively). The general observation is that the average GC employee has not completed a high school education and seldom makes it to grade 10 and beyond. The proportion of those previously unemployed also varies across GC jobs, ranging from 0% (church or PoW gardeners) to 43% (accommodation gardeners). These numbers indicate that GC jobs frequently employ those who were previously unemployed, and it is not uncommon to find up to 40% of GC employees either working their first job or being employed after an extended period of unemployment.

Table 4.1: The employment attributes of different Green Collar jobs in Eastern Cape towns

Types of Green Collar jobs	Mean daily wage (R)	Mean hours worked per week	% Female employees	Mean length of employment (years)	Mean grade achieved	% of employees previously unemployed
Accommodation	129	34.8	0.0	7.5	8.5	43.5
Bowling club	142	41.7	0.0	6.9	7.6	13.3
Church/Worship	125	23.9	9.1	6.6	5.5	0.0
Commercial/Corporate	139	42.3	0.0	4.9	9.4	40.0
Compost	160	39.7	0.0	7.1	8.0	10.0
Estate/Old age home	155	43.0	0.0	7.0	8.7	27.3
Garden service	133	40.2	0.0	5.6	9.2	33.3
Golf club/course	146	44.4	0.0	7.5	7.9	15.4
Hospital	256	42.5	0.0	10.5	8.3	26.7
Landscaper	189	43.1	20.0	5.1	9.7	20.0
Municipal	368	42.7	5.9	9.9	9.1	14.7
Nursery	143	40.7	71.4	5.5	9.2	23.8
Other	142	35.2	0.0	3.2	9.0	33.3
Parks, Rec., Env. Serv.	378	42.9	6.7	9.1	8.1	28.6
Residential gardens	117	28.5	1.1	6.5	5.8	33.7
School	252	42.2	6.0	9.6	9.6	20.0
Street sweeper	344	42.8	96.7	6.8	9.7	20.0
Stormwater ways	386	43.4	39.1	7.0	8.4	13.0
Tree-felling	145	36.8	0.0	4.5	9.8	41.7
Mean	203 ± 94	39.5 ± 5	13.5 ± 2.7	6.9 ± 2	8.5 ± 1	24.1 ± 12

Analysing employment from a GC category perspective gives a different viewpoint into the GC sector and its dynamics. Table 4.2 illustrates employment attributes across the eight categories of GC jobs and gives further insight into the contribution of each to poverty alleviation. The highest wages are earned in the municipal/public institutional sub-sector (Table 4.2), amounting to R6 976 per month – more than double that earned in all of the other seven categories. Recreational GC employment pays

the next highest monthly average wages (R3 145), while the rest range between R2 000 and R2 800. The lowest monthly wages are earned in the residential sub-sector, inevitably skewed by low wages and low frequency of work for gardeners at private dwellings. Five of the eight categories employ female workers, however in the green services and residential sub-sectors only 3.3% and 0.6% of the employees respectively are women. The green products sub-sector leads the way with regards to female employment, with well over two-thirds of GC workers in this category being female. In the private institutional category, approximately 5% of employees are women. The higher paying job categories seem to have a lower proportion of previously unemployed labour, aside from green services, which has low barriers to entry and a high proportion of previously unemployed. Private institutional employment is unique for a number of reasons - namely the comparatively low monthly wage rate relative to the low proportion of previously unemployed labour, and the longest length of employment in the sample. In the more stable categories such as accommodation, municipal, private institutional and residential, the average length of employment is higher than the rest – although the residential sub-sector is characterised by a higher turnover of labour leading to a shorter length of employment.

Table 4.2: The employment attributes of the different categories of Green Collar jobs

Categories of Green Collar jobs	Mean monthly wage rate (R)	% of female employees	Mean length of employment (years)	% of employees previously unemployed
Accommodation	2 561 ± 979	0.0	7.5 ± 0	43.5
Commercial	2 330 ± 1 414	0.0	4.9 ± 0	40.0
Green products	2 761 ± 597	71.4	6.3 ± 1.1	16.9
Green services	2 752 ± 427	3.3	5.1 ± 0.56	31.7
Municipal/Public institutional	6 977 ± 1 659	37.0	8.8 ± 1.47	19.1
Private institutional	2 662 ± 1 423	5.0	8.9 ± 2.86	15.6
Recreational	3 145 ± 889	0.0	5.9 ± 0.48	20.7
Residential	2 067 ± 435	0.6	6.8 ± 0.32	30.5
Mean	3 157 ± 1 576	14.7 ± 26	6.8 ± 2	27.3 ± 11

Figure 4.1 depicts the percentage of GC employees and their previous form of employment. The jobs in Figure 4.1 (a) are more common than those in Figure 4.1 (b), but for the purpose of illustrating the range of previous forms of employment amongst GC workers, both have been included. The most

frequent form of past employment was as a gardener of some type, where over 25% of employees were in the GC sector prior to their current employment. This was followed by farm workers, cleaners, security guards and construction workers. With a few exceptions, such as drivers, policemen and carpenters, most of the jobs are low-wage paying jobs and do not require extensive training, skills, education and qualifications.

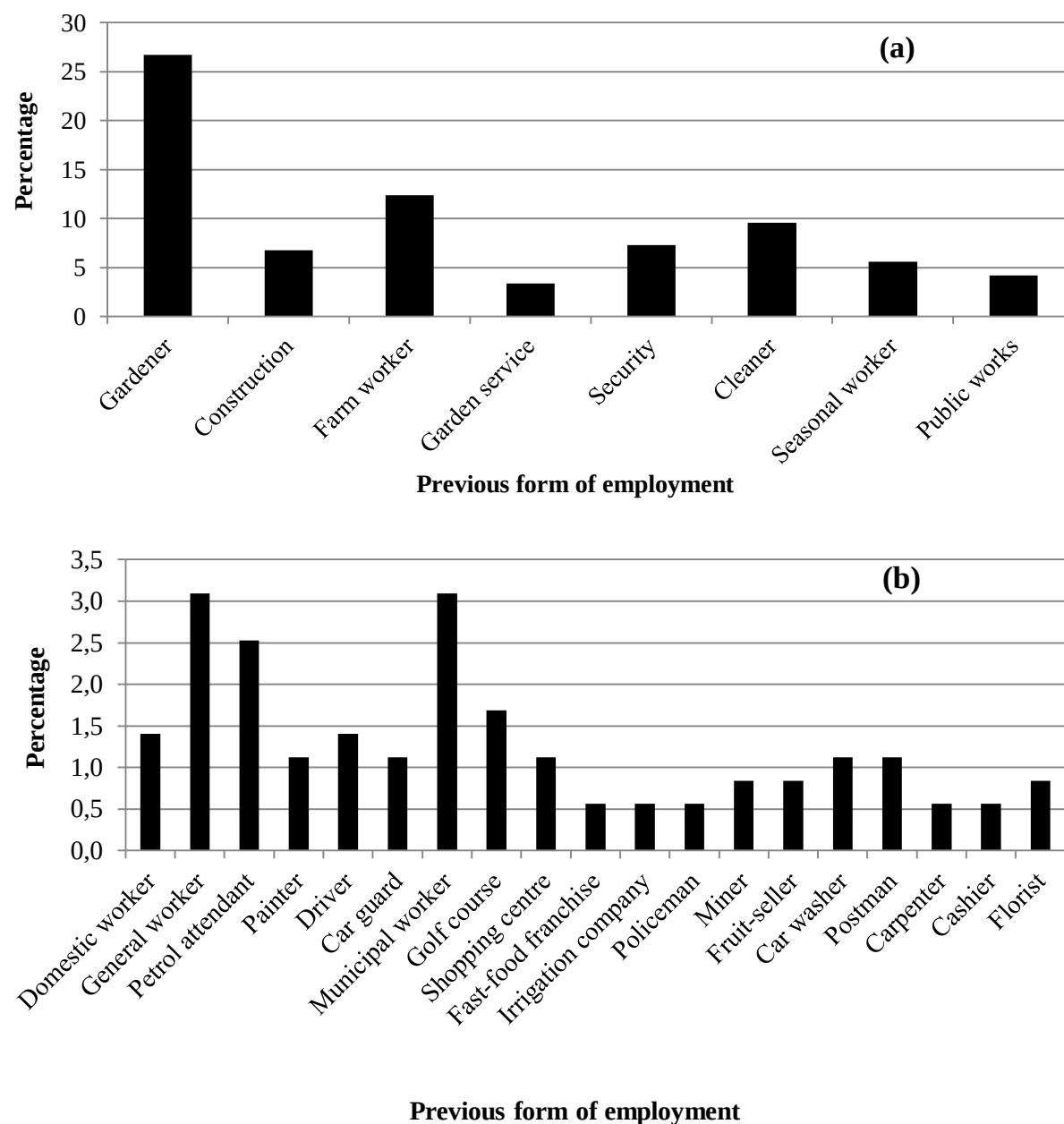


Figure 4.1: The proportion of employees and the *more* (a) and *less* (b) frequent forms of previous employment

4.2.2 Urban Green Collar employee satisfaction and quality of life/household attributes

Table 4.3 presents some indicators of employee and household well-being of GC workers. A strong positive and statistically significant, relationship ($R^2=0.629$ and $p>0.001$) exists between the frequency of meat consumption and monthly electricity expenditure, with the highest values for both attributed to parks and recreation, and environmental service employees from the public sector. Of the 19 forms of GC employment, employees from only six of them consume meat more than twice per week, coupled with higher electricity expenditure. The lowest values for both variables are found amongst church (or PoW) and private residential gardeners who, on average, consume meat only 1.3 times per week and spend approximately R150 on electricity per month. The number of people per household varies from 3.2 to 6.2, and similarly the number of people per bedroom per household ranges from 1.3 to 2.7. Importantly however, the number of adults employed per household averages only 1.5 throughout the sample, meaning it is uncommon to find a household with two wage-earning adults. The average number of people per household is 5.1 while the number of people per bedrooms averages 2.2. The mean age of GC employees in the sample is 41.5 years, ranging from 34 (tree-felling) to 47 (commercial/corporate). Four of the jobs display an average age around 35, namely garden, landscaping and tree-felling services, and ‘other’ – which includes universities, garden refuse removal and privately owned sports clubs. The lower average age may be due to the laborious nature of the work; whereas most other GC employees are between of 40 and 50 years.

Using the monthly wage rate per GC category, the number of people per household and employed per household, an approximate household income was calculated and is represented in Table 4.3. The average household (of which GC wages comprise an average of 75% of total income) earns approximately R1 168 per person per month, R15 less than the upper-bound poverty line; while the range across the sample is R1 760 per person per month between municipal employees and household gardeners. Of the 19 types of jobs, only residential household gardeners’ household lie below all three poverty lines (R489 per person per month), while another five lie between the food and lower-bound poverty lines (R547-785). The households of public sector, and school and hospital GC employees all lie above the upper-bound and range from R1 245 to R2 249 per person per month. Although it is clear that the majority of GC households live above the food and lower-bound poverty lines, there are some who live below or narrowly above the lower poverty lines.

Table 4.3: The quality of life attributes across households supported by different Green Collar jobs

***Bold** indicates income per person below the lower-bound poverty line (R785 per person per month)

Types of Green Collar jobs	Freq. of meat consumption/ week	Electr. expenditure/ month (R)	Per Household				Mean age (yrs)
			No. of people	No. of people per bedroom	No. of people employed	Income per person per month (R)	
Accommodation	1.46	228	5.1	2.7	1.5	741	41.1
Bowling club	1.80	202	5.4	2.0	1.8	978	41.7
Church/PoW	1.27	152	3.2	1.9	1.4	723	40.1
Commercial/ Corporate	1.50	290	4.8	1.9	1.9	1 148	47.4
Compost	1.33	295	4.8	1.3	1.4	1 132	42.3
Estate/ Old age home	1.64	282	4.7	2.7	1.4	820	42.2
Garden service	1.63	181	4.1	2.4	1.3	746	35.8
Golf club/course	1.64	252	4.8	2.6	1.2	675	40.9
Hospital	2.15	363	5.9	1.9	1.5	1 347	46.3
Landscaper	1.67	285	4.9	2.4	1.7	1 143	35.1
Municipal	2.28	327	5.5	2.2	1.4	1 878	44.7
Nursery	1.98	299	6.2	2.4	1.7	780	41.5
Other	1.14	197	5.6	2.0	1.7	847	35.8
Parks & Rec./Env. Services/Amenities	2.73	493	4.8	2.1	1.4	2 249	45.1
Residential gardens	1.42	156	4.8	2.4	1.5	489	45.8
School	2.34	257	5.8	2.1	1.6	1 245	43.1
Street sweeper	2.63	430	5.8	2.4	1.6	1 835	41.4
Stormwater ways	2.44	466	5.0	2.0	1.4	2 197	43.5
Tree-felling	1.46	317	5.6	2.2	1.9	878	34.1
Mean	1.81 ± 0.48	288 ± 97	5.1 ± 0.7	2.2 ± 0.3	1.5 ± 0.2	1 168 ± 525	41.5 ± 3.9

Figure 4.2 illustrates the proportion of employees who rent or own their dwelling, or live with a family member. Municipal employees, across the range of public sector jobs, show the highest proportion of home owners (>50%); except street sweepers, where only 30% of employees own their home. It is worth mentioning again that over 96% of street sweepers are female. No homeowners were identified between commercial and corporate gardeners, tree-fellers, and employees in the ‘other’ category. Most of the jobs display a fairly even distribution, yet the majority of GC employees

(41%) live with a family member, often their parents or grandparents. More than one-third of the total employees (35%) in the sample own their home, most of which are public GC workers. There also exists a statistically significant ($p=0.001$) relationship between the length of employment and home ownership.

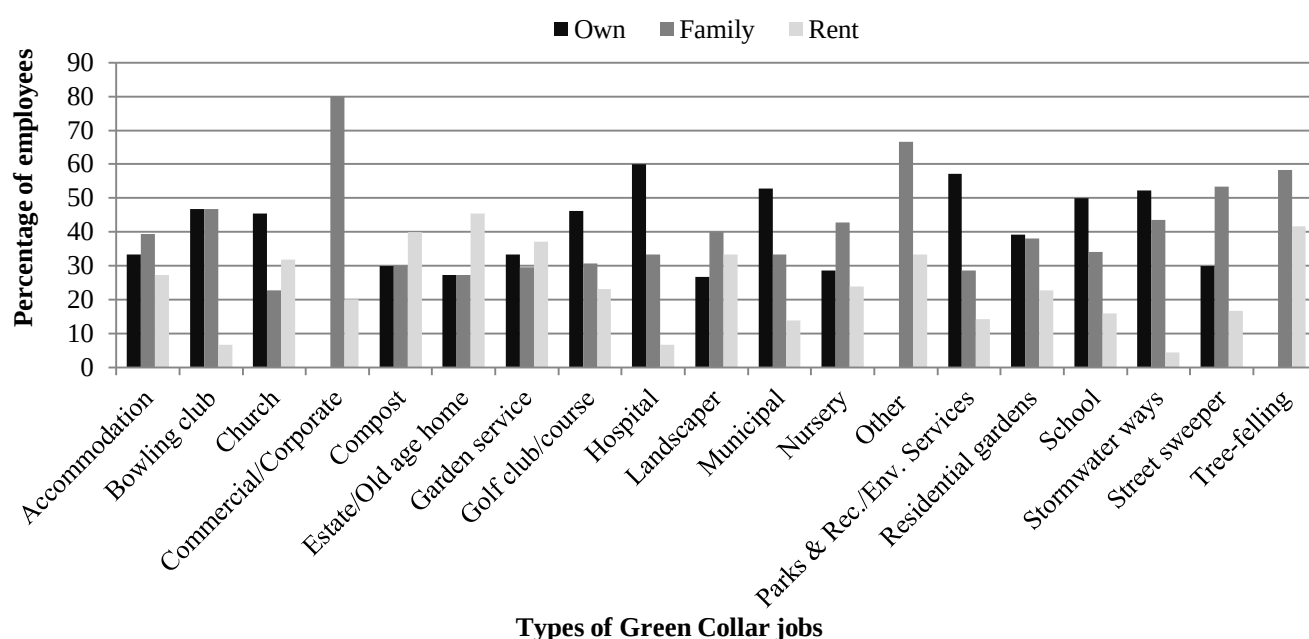


Figure 4.2: The proportion of employees and the status of their living quarters across the different Green Collar jobs

Employee satisfaction was measured and the proportions of responses across the GC job types are presented in Table 4.4. With regard to the ability to provide sufficient food for oneself or household, the results confirm that the higher paid public sector employees are more satisfied. Nursery employees are the third most satisfied in terms of their ability to buy sufficient food, despite having only the twelfth highest daily wage in the sample. On the other hand, 50-60% of employees from five different types of jobs felt their wages were not enough to put sufficient food on the table. On average, 45% of all GC employees felt they could buy enough food, while 37% felt the opposite. With regards to other needs, like transport, education, clothing and toiletries, the majority of employees, according to them, could not afford these goods and services. Across the jobs, the proportion of employees who cannot afford transport and education (b), and clothing and toiletries (c) ranges between 7-70% and 7-73%, respectively. In most cases it is evident that GC employees from the public sector have a greater quality of life, confirmed by an average positivity score of 63%, relative to a private sector score of 47% (informal sector = 37%).

Green collar work often, if not always, takes place outdoors and in or around GS. An average of 56% of employees enjoy working outdoors, but the proportions ranged between 13 and 100%.

Composters, street sweepers and clearers of stormwater ways had the lowest level of place of work enjoyment, while between 85 and 100% of GC workers employed at golf courses, bowling clubs and plant nurseries enjoyed working with nature, GS and outdoors. Employees who work as street sweepers and clearers of stormwater ways had low levels of enjoyment working outdoors, which may be because the majority of their work place is dominated by grey infrastructure. Responses to whether employment had improved employee well-being confirm an element of poverty alleviation in GC employment, with 75% of workers agreeing that their current job had improved their well-being, and only 5% disagreed. Around 80 to 100% of public GC employees agreed.

Although GC jobs do not require high levels of skill and training, some employees acquire skills or receive training during employment – in some types of jobs more so than others. An average of 48% of workers felt they had acquired skills and/or received training, while 37% did not – and the remaining 15% were neutral. Around 80-100% of employees at bowling and golf clubs, composters, landscapers, nurserymen and women, and tree-fellers agreed they had gained skills or received training during employment, while employees involved in basic GS maintenance at homes, offices and estates disagreed. On average, only 1% of workers were found not to value their job, while 82% did and a further 17% were on the fence. When asked if they would prefer another job, the distribution of responses was relatively even, with 37% and 36% answering yes and no, respectively. The remaining 27% were uncertain if they would prefer another job, perhaps due to the low supply of working opportunities. The majority of government employees answered no (50% - 80%), whilst around 70% of church and corporate/commercial gardeners, and garden service employees would prefer another job. Nursery employees not only gain the most satisfaction and skills from employment, but also have the lowest proportion of employees who would prefer another job (5%).

The same questions were organised to represent employee perspectives across the different sample towns (Table 4.5). With regard to the ability of GC workers to afford food, clothing, transport and toiletries, the towns of Aliwal North, Lady Grey and Queenstown fare worse than the others. On the contrary, those in Grahamstown and Kirkwood are more satisfied with their ability to purchase common goods and services. Green collar employees in Aliwal North, Grahamstown and Port St. Johns gain the highest level of enjoyment from their place of work, and those in Grahamstown gain more skills and training. Those in Maclear and Port St. Johns perceive the greatest improvement in their well-being as a result of employment, while the same is evident for the value employees place on their employment. The highest proportion of employees who would prefer another job, however, are those in Maclear. Table 4.5 represent the overall socio-economic score per sample town, which accounts for local unemployment, poverty, socio-economic prosperity and basic service provision. The higher the score, the more difficult is the local socio-economic environment. Scores are highest in Port St. Johns (46%), Peddie (40%) and Maclear (38%), and lowest in East London (15%).

Table 4.4: The proportion of responses by employees regarding quality of life and employment attributes across different Green Collar jobs

Types of Green Collar jobs	a) My job allows me to put sufficient food on the table for me (and my household).			b) My job allows me to access basic services like transport and education.			c) My job allows me to afford items like clothing and toiletries.			d) I enjoy working with and in nature/ green space/ outdoors.			e) This job has improved my well-being			f) My current job has allowed me acquire valuable skills and training.			g) I value my current job			h) I would prefer to have another job			Overall positivity score
<i>N=no; M=maybe; Y=yes</i>	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	%
Accommodation	43	23	33	40	43	17	73	13	13	13	27	60	10	37	53	60	27	17	3	33	63	17	20	63	34
Bowling club	53	7	40	40	40	20	47	33	20	7	7	87	7	27	67	0	0	100	0	0	100	47	27	27	60
Church/PoW	41	27	32	55	27	18	64	27	9	18	41	41	23	45	32	77	18	5	5	50	45	9	23	68	24
Commercial/Corporate	43	29	29	57	43	0	57	43	0	29	29	43	0	43	57	71	0	29	0	43	57	14	14	71	29
Compost	50	10	40	50	30	20	40	20	40	40	30	30	0	60	40	0	20	80	0	30	70	20	30	50	43
Estate/Old age home	45	9	45	55	27	18	64	27	9	9	18	73	0	9	91	64	9	27	0	18	82	45	27	27	49
Garden service	59	19	22	70	19	11	63	26	11	33	37	30	4	26	70	44	22	33	0	30	70	7	26	67	32
Golf club/course	46	15	38	46	23	31	62	23	15	8	8	85	0	15	85	8	0	92	0	8	92	31	23	46	59
Hospital	20	33	47	33	27	40	40	27	33	7	13	80	0	0	93	40	33	33	0	0	100	60	27	13	61
Landscaper	60	7	33	60	33	7	67	20	13	7	20	73	7	27	67	0	13	87	7	20	73	20	33	47	47
Municipal	12	20	52	20	24	40	16	36	36	8	16	60	0	4	80	20	20	44	0	4	80	52	24	8	56
Nursery	24	14	62	38	38	24	43	24	33	0	0	100	0	10	90	0	0	100	0	5	95	86	10	5	74
Other	53	20	27	47	27	27	67	20	13	27	27	47	20	7	73	47	20	33	0	20	80	13	27	60	39
Parks, Rec., Env. Services	14	29	57	21	21	57	21	21	57	7	29	64	0	0	100	21	36	43	0	0	100	64	21	14	68
Residential gardens	48	16	36	51	28	21	61	21	18	13	27	60	13	28	59	68	17	14	9	22	70	21	25	54	37
School	34	18	48	42	20	38	50	24	26	8	22	70	2	6	92	26	16	58	0	8	92	42	24	34	58
Street sweeper	4	17	78	9	26	65	4	43	52	52	26	22	0	4	96	48	30	22	0	0	100	52	35	13	61
Stormwater ways	7	17	77	7	27	67	7	30	63	70	17	13	0	3	97	100	0	0	0	0	100	60	30	10	60
Tree-felling	42	8	50	42	17	42	42	33	25	33	33	33	0	25	75	0	0	100	0	17	83	17	58	25	53
Mean	37	18	45	41	28	30	47	27	26	20	22	56	5	20	75	37	15	48	1	16	82	36	27	37	50
Standard deviation	±18	±8	±16	±17	±8	±19	±21	±8	±18	±18	±11	±24	±7	±17	±20	±31	±12	±34	±3	±15	±16	±23	±10	±23	±14

Table 4.5: The proportion of responses by employees regarding quality of life and employment attributes across the sample towns/cities

Sample towns	a) My job allows me to put sufficient food on the table for me (and my household).			b) My job allows me to access basic services like transport and education.			c) My job allows me to afford items like clothing and toiletries.			d) I enjoy working with and in nature/ green space/ outdoors.			e) This job has improved my well-being			f) My current job has allowed me acquire valuable skills and training.			g) I value my current job			h) I would prefer to have another job			Overall socio-economic score
<i>N=no; M=maybe; Y=yes</i>	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	N	M	Y	%
AN	47	8	47	61	16	24	61	8	32	18	5	76	5	13	82	45	18	37	3	11	89	47	26	26	21
BD	44	0	56	44	15	41	52	11	37	4	33	63	4	22	74	48	33	22	0	11	89	44	26	30	27
EL	36	20	44	38	36	26	50	29	21	28	23	49	7	21	73	40	19	41	4	21	75	32	28	40	15
GT	30	16	54	33	18	49	36	26	38	11	20	69	10	16	72	31	18	52	3	21	75	34	23	43	24
KW	22	26	52	15	33	52	30	26	44	22	15	63	4	11	85	48	19	33	0	11	89	44	22	33	21
LG	43	13	43	77	10	13	70	17	17	23	23	53	7	33	60	63	13	23	7	20	73	20	30	50	32
MC	40	10	50	43	37	20	33	40	23	17	27	57	3	7	90	57	17	27	3	7	90	23	20	57	38
PD	28	39	33	28	39	33	39	33	28	44	17	39	6	11	83	56	17	28	0	17	83	56	6	39	40
PA	46	19	35	50	28	22	54	22	24	17	24	56	6	17	74	44	13	39	4	13	81	26	24	46	23
PJ	26	22	52	48	43	9	43	43	13	9	26	65	0	13	87	48	17	35	0	4	96	30	39	30	46
QN	46	22	33	52	28	20	63	24	13	33	22	46	9	26	65	48	9	43	7	24	70	33	20	48	24
TK	32	24	44	24	24	52	48	36	16	24	32	48	4	16	80	64	8	32	0	16	84	32	24	44	35
Mean	37	18	45	43	27	30	48	26	26	21	22	57	5	17	77	49	17	34	3	15	83	35	24	41	29
Standard deviation	±9	±10	±8	±17	±11	±15	±13	±11	±10	±11	±8	±11	±3	±7	±9	±9	±6	±9	±3	±6	±8	±11	±8	±9	±9

Figure 4.3 illustrates the linear relationship between the daily wage rate per GC job and the corresponding positivity score from the employee responses and perspectives. This creates a link between employee income and job satisfaction and perspectives. They share a positive, yet statistically insignificant, relationship ($R^2=0.3179$ and $p>0.1$). Green Collar jobs with a greater variance are those at nurseries, bowling and golf clubs (**rectangular** cluster) with daily wage rates of approximately R142 and positivity scores of 74, 60 and 59%, respectively. Jobs with daily wage rates below R142 all have positivity scores below 40% (**square** cluster), while those that pay above R250 per day have positivity scores in excess of 56% - it is however evident that the highest positivity score is associated with the 12th highest paying job (at plant nurseries). Public GC jobs are highlighted with a **circle**, and have the greatest wages and amongst the highest positivity scores in the sample. The two jobs within the **triangle** are those at private and public hospitals and schools, and despite daily wages being lower than mainstream public GC jobs, the positivity scores are similar. An increase in the daily wage of R50 is associated with an increase of approximately 4% in positivity scores.

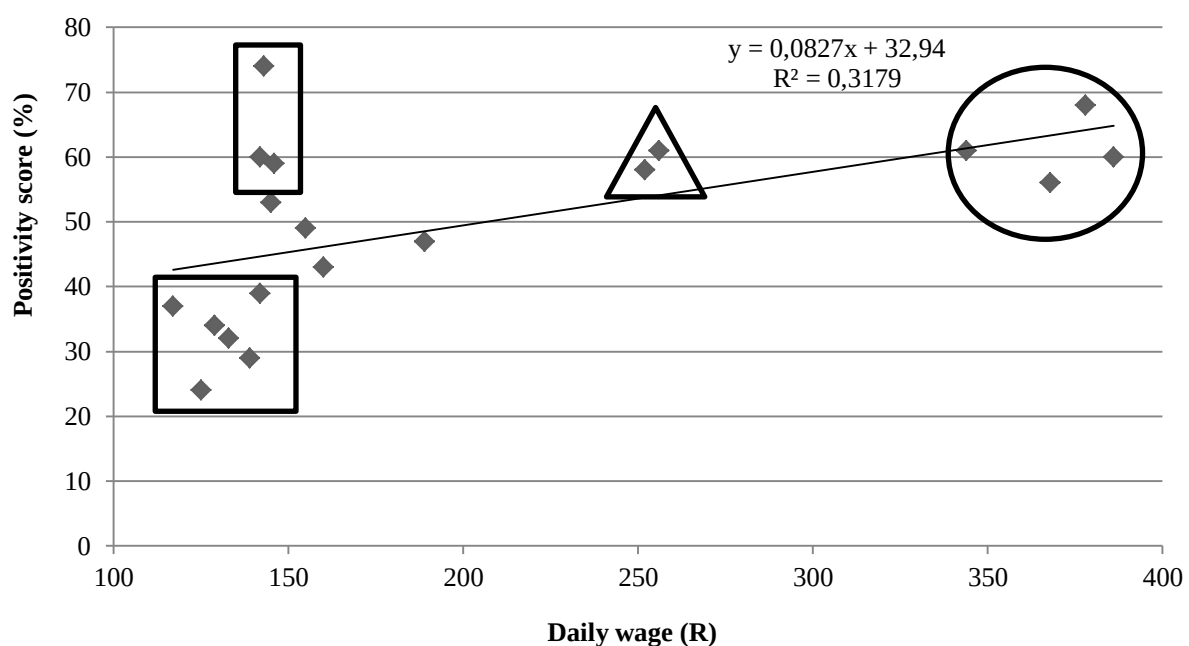


Figure 4.3: The linear relationship between the daily wage and corresponding positivity score

4.3 Discussion

There are various areas in which GC jobs can contribute to poverty alleviation. An important consideration is whether the jobs provide sufficient wages for workers to have adequate livelihoods and quality of life. In poorer, developing countries especially, employment does not always guarantee a life free of poverty, and therefore it is important to also analyse the standard of living of GC employees. Additionally, it is necessary to look at the nature of the GC job market, the working

environment and a number of employee characteristics such as level of education. Taking all of these factors into consideration gives a dynamic and multi-faceted perspective on the ability of GC jobs to alleviate urban poverty.

4.3.1 Livelihood provisioning

Enhancing livelihoods through income provision is the overarching benefit of job creation and is the most effective tool to alleviate poverty, especially urban poverty (Mansour et al. 2017). Large social and economic inequalities exist in South Africa, where affluent families live in households with multiple bedrooms, can afford electricity and consume meat regularly, largely due to relatively higher levels of education and employment (Irvine, 2012). Many poorer families, on the other hand, live below and between the poverty lines. Those without an income are often impoverished and find themselves not only living in poor conditions, but also without access to essential goods and services like transport, food, electricity and other essentials. GC employees earn an average income of just over R200 per day for around eight hours of work, which is 25% more than the new SA national minimum wage of R20 per hour (Gumede, 2018). This income affords them and their households the benefit of consuming meat once or twice a week, as well as electricity to the value of around R300 per month. The latter utility is very important when one considers that 27% of Eastern Cape households, mostly in rural areas (ECSECC, 2017), are completely without electricity. A further point of reference can be made in that Bendall (2015) points out that approximately 40% of households in informal urban areas do not have access to electricity, while only 7% of employees in this sample are without electricity.

Although it is evident that a GC income ensures access to goods and services such as meat and electricity, it certainly does not guarantee access to some so-called ‘luxury’ goods and services, like home ownership, transport, clothing and toiletries, which are important elements of urban life and human well-being. Compared to a study on nursery jobs in Tanzania, where 55% of employees owned their own houses (Kazungu et al. 2014), only 37% of GC employees in SA (and 35% of nurserymen and women) in the sample are homeowners, whilst a further 23% can afford to rent a dwelling. For a single parent of two young children, for example, a GC income of around R4 000 per month (mean value), as well as two child grants amounts to a total household income of R4 720; or R1 573 per person per month, which is R52 per person per day – well above the upper-bound poverty line and almost double the minimum required daily amount (~R28) defined by the World Bank (World Bank, 2015). On the face of it, some GC jobs certainly alleviate poverty, specifically amongst the most marginalised urban households. However, most of them do not necessarily provide workers with the ability to continuously enhance and improve their livelihoods via savings and asset accumulation, but rather to maintain a livelihood narrowly above the poverty lines.

4.3.2 Job market

Analysing and discussing the nature and dynamics of the GC sector and job market is a key component to understanding the overall poverty alleviation ability of GC jobs. Access to decent work is an important consideration in people's lives and includes fair levels of income, working hours and conditions, social security, security in the workplace and freedom of speech and expression (Mansour et al. 2017). Green collar jobs in towns and cities do indeed afford marginalised urban citizens this social and economic security through meaningful and worthwhile employment. However, the results indicate that GC jobs are not homogenous and their nature varies depending on the place and type of work. Most urban industries and sectors require significant capital, expertise, licenses or qualifications, but have jobs on different levels (e.g. owners, managers, supervisors and labourers) and therefore employ people with different skills and education levels – some with more significant barriers to entry than others (Falxa-Raymond et al. 2013). The urban GC sector is similar, and due to the heterogeneous and diverse nature of the different forms of employment, there are variations in the level of skills or training required (McClure et al. 2017). Landscapers and nurserymen and women need to be knowledgeable in plant care and design and management, whilst garden service or private gardeners require experience with grass-cutting equipment, or at least prior training. Employees at schools, bowling greens and golf courses often gain knowledge in composting, fertiliser methods and green/pitch preparation. Some jobs do not require excessive physical labour and as a result are able to employ women (e.g. raking, sweeping, watering, growing, pruning jobs). Female employment is an indicator of societal well-being and is argued to contribute more significantly to poverty alleviation than male employment because income is used towards children and family – often more so than men (Bendall, 2015). In this sample, the average school grade achieved by the female employees is 9.6 while that of males is only 8.0, illustrating a higher level of education amongst females and further validating the benefits of female employment. In the US, the GC sector is comprised of approximately 76% males (Falxa-Raymond et al. 2013), compared to approximately 84% in this study.

With regard to barriers to entry into the urban GC sector, there are few. A mere 8% of the sample has received matric or grade 12, and the average employee has not achieved a grade nine education. This indicates a marginalised and low skilled workforce in the GC sector, where employees have very few employment options in towns and cities. This is reiterated by a relatively high proportion (25%) of employees who were previously unemployed. It becomes clear that the GC sector is capable and able of employing low skilled, unemployed urban dwellers, providing valuable income to the poor and impoverished. Another important aspect to consider is the length of employment. A longer period of employment not only shows a higher level of job security, but also the accumulation of additional benefits and wage increases, and naturally employee efficiency and job knowledge (Bowen and Kuralbayeva, 2015). In terms of the employment of marginalised labour, similar urban job markets

are building and construction, household and domestic workers, petrol attendants and the like (ECSECC, 2017). These sectors have minimal barriers to entry and often require few or no qualifications, and therefore employ people with fewer job options. The nature and dynamics of the GC job market make it accessible for poor, uneducated and unskilled urban labour, which contributes substantially to alleviating employee and household poverty and hardships.

4.3.3 Work and working environment

The quality of the working environment and the work itself play a big role in employee well-being and job satisfaction, which contextualises poverty alleviation (Salami, 2013; Mansour et al. 2017). Most empirical evidence indicates that working in, with and around GS is a positive aspect of employment, where employees gain satisfaction working in attractive, natural landscapes whilst improving environmental quality (Bowen and Kuralbayeva, 2015; Mansour et al. 2017). In this study, the actual enjoyment or satisfaction that GC employees perceive from employment is place and context-specific - with clear distinctions between the different types, nature and place of work, and employee responses. Kazungu and Magigi (2012) also found a greater level of employee satisfaction in nursery jobs compared to other types of jobs such as grass-cutting and composting. The acquiring of skills and training prior to or during employment is another important consideration which increases an employee's work and intellectual capacity, and skills base (Salami, 2013). Some GC jobs require more expertise and knowledge than others, and although all work is involved in and around GS, the premise and nature of the work differs. Acquired skills can substantially increase a person's employability, contribute valuable work experience and ultimately enhance overall job satisfaction (Bowen and Kuralbayeva, 2015). Although 48% of GC workers agreed they had acquired skills or received training during employment, there is a difference in the perception of skills acquired by employees in the public sector (33%) versus the private sector (57%). This can be attributed to the diverse nature of the private sector and the array of goods and services offered, as well as the fact that most public GC employment involves basic GS maintenance (e.g. grass-cutting).

The quality of the overall work and working environment has a number of components, of which only a few have been mentioned above. Working hours are a key factor and in South Africa, the Basic Conditions of Employment Act stipulates a maximum of 45 hours standard employment for a five day week (i.e. nine hours per day) (Gumede, 2018). There were employees identified in the sample who work more than nine hours per day and some work more than 45 hours per week, especially nursery and school employees who often work on weekends. Work in excess of the standard hours is compensated as overtime. From a wage perspective, although GC employees in South Africa are paid relatively low wages compared to less laborious jobs, their wages are more than those in other African countries. As of June 2018 in South Africa, the minimum wage per month was designated at R3 500, while the minima in Egypt and Nigeria are R945 and R691 (adjusted for 2018 prices and exchange

rates), respectively (Hochfeld et al., 2017). This indicates a substantial contrast between the working environments in Africa's three strongest economies. It is also evident that a number of GC workers in the private and informal sectors are paid less than the minimum wage of R20 per hour. While some private and informal GC employees are underpaid, public sector employees receive more than double the national minimum wage. This does not translate into an acceptable quality of public GS and GS provision in poor suburbs – which are generally low and leave opportunities for growth in the urban green sector throughout informal and RDP areas (McConnachie and Shackleton; 2010; Shackleton et al. 2014).

4.3.4 Inter-town analysis

The Eastern Cape has approximately 140 small, medium and large-sized towns with varied physical, economic, demographic and climatic characteristics (Hamann and Tuinder, 2012). This leads to a number of contrasts and similarities between different towns, not only with regard to sector employment numbers and composition, but also job and quality of life attributes, and employee perspectives and livelihoods. Unemployment and poverty rates also differ across different towns due to varying local education and healthcare levels, infrastructure, governance, capital and investment, and other factors like demographics and geography (Salami, 2013; ECSECC, 2017). Variation in these factors leads to variation in local economic activity, employment, the culture of the job market and the nature of the work environment (McKague et al. 2015; Mansour et al. 2017); and therefore the contribution of the urban GC sector to poverty alleviation is context-specific.

Although poverty is more prevalent and widespread in larger towns and cities, according to Gordon (2005), it is more intense in small towns which typically have weak economies, insufficient budgets, and a lack of private and public capacity. With this in mind, the contribution of GC jobs to poverty alleviation is arguably higher in small towns with high unemployment and poverty rates, and low socio-economic and basic service levels. By combining the unemployment and poverty rates, and the socio-economic and basic service indices from Table 2.2, the local socio-economic climate within the study towns was identified. The combined socio-economic status is lowest in the five sample towns with the least number of GC jobs (Lady Grey, Maclear, Peddie, Port St. Johns and Peddie); highlighting the relatively higher value of GC employment in poor areas with few job opportunities. There is also a negative and statistically significant relationship between the overall socio-economic score and the number of GC jobs per km². This means, keeping town size constant, that poorer towns have fewer jobs and because the number of GC jobs per km² is less, the value perceived is higher – mainly due to a lack of other employment opportunities.

It is difficult to analyse the qualitative data across the sample, as employee perspectives are largely context specific and relate to factors like household numbers, incomes, social grants, assets, past and present quality of life, and even employee personality. Variation in these factors leads to contrasting

perspectives on the same thing, especially in different urban settings. This was confirmed by Kazungu and Magigi (2012) and Uddin (2006) who found clear distinctions between employee perspectives across a spatial scale. In Lady Grey for example, despite GC workers earning the highest wages, the proportion of employees who perceive an improvement in well-being is the lowest, and correspondingly, a high proportion of employees would prefer another job. The same is true for employee satisfaction from working in and around GS, where a higher proportion of urban GS does not lead to greater employee work satisfaction – indicating the importance of context. In Peddie, one of the poorer sample towns where urban GS is comprised of mostly natural land and grass, GC employees are openly dissatisfied working outdoors and in and around GS. Ultimately though, employee perspectives vary in space, and it is difficult to observe patterns across towns and cities where peoples' perceptions are based on a number of internal and external factors. The quality, type and place of work, wage rates and hours worked are all relevant to how an employee perceives their job. In addition, factors such as family size, the number of people employed in a household, the relative trade-off of no employment, and the ability to prevent hardships also play a big role.

4.3.5 Contribution to poverty alleviation

The potential contribution of GC employment to urban poverty alleviation is complex, as there are a number of factors to consider. On the surface, GC jobs provide an income to urban dwellers which allow many to maintain a livelihood above national poverty lines; however this income can only support a limited number of people. A number of studies concur that green jobs can indeed enhance livelihoods and alleviate (and not eradicate) urban and rural poverty (Uddin, 2006; Pinderhughes, 2007; Kazungu and Magigi, 2012; Falxa-Raymond et al. 2013; Bowen and Kuralbayeva, 2015; Mansour et al. 2017; McClure et al. 2017). It is safe to assume that GC employees who live alone or without children are able to use the same income to build a better livelihood, compared to employees who have a number of dependents. To accurately gauge if a GC worker is living in poverty, one must consider the number of people and income sources per household, household characteristics and acquired capital (Gordon, 2005), such as a house, car or livestock. This will give a clear indication of household income per person, their living standards, and the presence of financial assets which enhance household resilience. An average household of two adults and two children sharing a singular income require a minimum monthly income of R4 700 to live above the poverty lines (excluding two child grants approximating R720 per month). The average household in the sample has over five inhabitants who share an income and a half, and therefore its touch and go whether these households and their members live above the poverty lines.

The premise of this research, however, is not to identify whether GC employees and their households are free of poverty, but rather the contribution of their income to alleviating everyday hardships and struggles. While some GC employees earn the minimum wage, others make almost double, and

therefore have greater purchasing power and access to goods and services. Ultimately a higher income has greater potential to alleviate poverty, but for employees earning minimum wage, social grants and additional income are essential to ensuring an employee and their household are not impoverished (ECSECC, 2017). For a marginalised, low skilled, unemployed and poor urban dweller, GC employment can provide an opportunity to drastically increase their standard of living and quality of life (Maria et al. 2015), especially those without social or state aid, and with inadequate living conditions and food resources. GC wages, as evident from this study, allows many workers to rent a home, purchase meat and electricity, access transport, afford clothing, and importantly allows the opportunity to accumulate savings and capital – which is widely viewed as one of the most significant poverty alleviation tools (Gordon, 2005).

Public sector wages are higher than private and informal sector wages; and therefore in towns with a greater proportion of public GC jobs have relatively higher average wages rates. The main reason private sector wages are lower is because private entities are governed by market conditions and profit maximisation (McKague et al. 2015); meaning private firms determine the price, input and output levels that lead to the greatest profit. In contexts of high labour supply, this leads to lower wage rates which are constantly in conflict with national minimum wage benchmarks and can compromise a worker's well-being (Gumede, 2018). Nonetheless however, the private sector provides valuable working opportunities and job training, and certain private GC entities (e.g. nurseries and landscapers) are able to absorb female employees and provide work experience to previously unemployed. According to McKague et al. (2015) and Salami (2013), despite the often unstable, flexible, unregulated and highly competitive nature of the private sector, workers (especially those who are marginalised and low skilled) can greatly benefit from opportunities for advancement, experience and skills development.

Although earning an income is the most meaningful way in which GC jobs alleviate poverty, there are other important components to consider which can create a more pleasant and beneficial work environment, from an employee perspective. A greater level of enjoyment and satisfaction in employment contributes positively to employee well-being and overall quality of life (Mansour et al. 2017), and it is clear from the results that place of work plays a big role in this. Employees at golf courses, bowling greens, schools and nurseries have a higher level of job satisfaction than those who sweep street leaves and clear gutters and stormwater ways. This, in turn, heavily influences the extent to which an employee values their job or whether they would prefer a different job. From the results, it is evident that higher-earning GC employees not only perceive a greater improvement in their well-being, but also value their jobs more than lower-earners; mainly due to a higher purchasing power. A pleasant working environment with stimulating and enjoyable work also goes a long way in improving an employee's well-being, job security and overall happiness (Salami, 2013), which in a small way contribute to poverty alleviation. Low skilled and uneducated urban men and women have

very few employment options, and commonly seek labour orientated employment or basic security and cleaning jobs with low barriers to entry (McKague et al., 2015). Green collar jobs provide these employment seekers with a relatively more desirable urban income, where employees can work with, in and around urban GS; and in doing so, bring a host of benefits to others (Pinderhughes, 2007).

4.4 Conclusion

There is no doubt that GC employment improves the livelihoods of employees and their households by providing an income (Bowen and Kuralbayeva, 2015), but overall household well-being depends on a number of additional factors. One of the primary poverty alleviation functions of GC jobs is to employ marginalised men and women with few other job options, and even first-time or previously unemployed workers (Uddin, 2006; Kazunugu and Magigi, 2012). The GC sector provides invaluable income to impoverished urban dwellers, giving them the opportunity to access goods and services such as food, toiletries, transport and clothing. This enhances their well-being and also their ability to accumulate savings and capital (Salami, 2013). Although a GC income goes a long way to improving urban livelihoods, it is not sufficient to support an average household of five people. This is where additional household income and social grants are needed to supplement a GC income, ensuring not only an employee free of poverty, but also their household. Higher incomes clearly lead to a greater quality of life for GC employees and their households; but ultimately for GC jobs to effectively contribute to poverty alleviation, it is important for the employee's income to enhance the lives of their children and family members, in the short, medium and long-term (McClure et al. 2017). This will drastically increase the benefits obtained from GC incomes and can lead to more extensive and multidimensional urban poverty alleviation.

CHAPTER 5

The ability of towns and cities to increase the number of urban Green Collar jobs

5.1 Introduction

Job creation is a major priority for local, provincial and national government in South Africa, but it can be a challenging exercise in developing countries, especially in times of recession, shock and significant service delivery backlogs (Salami, 2013). It requires long-term, strategic planning, allocated funds, a primary function, willing and coordinated employees, and some form of structure and formality. Levels of education, political and private sector conditions, and rates of urbanisation and population growth are also important factors influencing urban employment opportunities (Bowen and Kuralbayeva, 2015; Mansour et al., 2017). South Africa, since the birth of its democracy in 1994, has had a strong job creation and LED focus in small, medium and large towns, and even in rural settings; but there are still millions without work and some marginalised municipalities are on the brink of collapse, especially in the Eastern Cape (Hamann and Tuinder, 2012). Growing acknowledgment of the consequences of climate change should also spark action from private, public and civil sectors to build resilience, adaptability and mitigation strategies using urban GS planning and employment (McClure et al., 2017). Green collar jobs have the ability to enhance urban environments by providing a host of benefits and safety nets to town dwellers, and for this reason, these jobs are viewed as the synergy between socio-economic and environmental prosperity (Pinderhughes, 2007). With a well-planned and sustainable vision, the private, public and civil sectors can all contribute to increasing and improving the GC sector (McKague et al., 2015), in the Eastern Cape and South Africa. This chapter uses the insight on current GC employment obtained from chapters three and four to identify broad and local phenomena that influence the GC sector, as well as small-scale changes and ventures with the ability to increase employment numbers.

5.1.1 The Eastern Cape Provincial Development Plan and the Integrated Development Plans

A number of government documents, on a provincial, district and local scale, provide useful information and data that is place and context specific. These documents supplement and guide government pledges, commitments and development plans, and are enforced by the 2002 Municipal Systems Act. This Act obliges municipalities, on an annual basis, to review their plan and take stock of where they are on the development trajectory (Eastern Cape PDP, 2014). The most recent Provincial Development Plan (PDP) was released in 2014 and provides the Eastern Cape government's vision for 2030. It has links with the NDP and shares similar themes and visions for a more inclusive, wealthy, fair and equal society, as well as socio-economic and environmental prosperity (Eastern Cape PDP, 2014). The municipal Integrated Development Plans (IDPs) have the same focus, and are also the primary strategic planning instrument for district and local municipalities, guiding and informing planning processes, budgeting, management and decision making; and ultimately influencing the provision of basic goods and services, infrastructure, sport and recreation, parks and open spaces, economic activity and employment (Sundays River Valley Municipality IDP, 2018). It is the mandate of district and local municipalities to create pleasant and

liveable environments, sufficient working opportunities for inhabitants and to ensure LED – which includes environmental and green employment (Pinderhughes, 2007; Rogerson, 2016). Not only are socio-economic and environmental concerns emphasised at local and provincial levels, but also by President Cyril Ramaphosa and Minister Nomvula Mokonyane on a national scale (Mitchley, 2018); and on an international scale at the 2018 G20 summit and through the United Nations Sustainable Development Goals. Two of the greatest global challenges facing humankind are poverty and environmental degradation, which leads to socio-economic and ecological vulnerability (Jim, 2013). As a result, public, private and civil sectors around the world are seeking to create greener, healthier and more prosperous towns and cities for all (McKague et al., 2015). Each IDP states the objective of pursuing socio-economic development through job creation, which can be significantly bolstered by an urban GC sector.

5.1.2 State employment programmes as the driving force

The different government employment programmes perform their primary tasks of providing temporary working opportunities for thousands of low skilled and unemployed people, although their functions and job dynamics differ somewhat. Programmes such as Working for Water, Wetlands and Forests, and Working on Fire contribute to environmental sector employment, while small portions of EPWP and CWP employees can be classified as GC or environmental workers. There has, however, been some criticism of these programmes, such as the part-time nature of employment, low wages and a lack of management, monitoring and data recording (Gumede, 2018). According to Carnie (2016), some of the major challenges undermining the success of the Working for Water programme (and others alike) are political interference and bureaucracy. Furthermore, due to a lack of clear management strategies and monitoring, the programme has underachieved with regards to successfully curtailing invasive species in critical ecosystems - trading short-term job creation for long-term environmental protection, which according to Carnie (2016), would be needed to underpin future economic activity, and arguably protect many more jobs. Despite this criticism, however, if the EPWP were to be suddenly discontinued, it would leave thousands without work and income, and exacerbate unemployment and poverty across different spatial scales.

The way forward for the EPWP and similar projects is to emphasise the need for continuous evaluation, precise management and monitoring, clear and beneficial strategies, and constant collaboration between academics, private sector, state officials, public works employees, management, and international institutions and structures (Gumede, 2018). A positive aspect of the current public works programmes is their ability to employ previously unemployed women, confirmed by a sample of GC EPWP and CWP employees, of whom 58% were female, 73% previously unemployed, and the average age was 35. Better management and monitoring of public works programmes is required and a strategic and well-planned approach is needed to ensure

sustainable socio-economic and environmental benefits (Mansour et al., 2017). By implementing measurable and manageable goals that account for short and long-term considerations, public works programmes are guaranteed far more ecological success, as opposed to merely focusing on employment numbers and short-term poverty alleviation (Vandermeulen et al., 2011). There is the possibility of transforming South Africa's public works programmes into a division of the public sector that is adaptive, diverse, sustainable and strategic, and one that employs a vast range of professionals, managers, administrators, statisticians, policy makers and labourers, filling gaps in community and infrastructural sectors, but also environmental.

5.1.3 Urban green space and Green Collar potential

There are a number of factors that can influence urban GS potential and areas for improvement, some of which were considered in this study. These include private GS patterns, town size, urban GS and GC characteristics, and the composition of the respective GC sectors by sector and category. These factors directly affect urban GS quality, quantity and diversity, and therefore the GC sector. It is imperative to understand the social, economic and environmental aspects of urban GS before identifying areas for growth or improvement in the GC sector (Leichenko and Silva, 2014). Although it is simple to suggest increasing part-time employment or GC budgets as a means of increasing the number of jobs, the aim of this chapter is to identify real, context and place-specific potential for not only growth in the number of GC jobs, but also increased GS quality, quantity, diversity and equity. This will be led by greater job efficiency, collaboration between sectors, as well as innovative and sustainable approaches. With a better understanding of urban GS and the GC sector, coupled with strategic and community-orientated initiatives from the private, public and civil sectors, the socio-economic and ecological conditions in urban environments can be improved to create towns and cities where people can prosper (Mansour et al., 2017).

According to Rogerson (2014), one of the major challenges to socio-economic development in South Africa is the necessity to understand and adjust planning in response to the dynamic and complex nature of local conditions. Overcoming this challenge is the first step to unlocking urban GS potential, as well as increasing and improving local GC sectors. The renewable energy sector in South Africa is reasonably underdeveloped with roughly 16% of total energy derived from renewables (Rogerson, 2018), and therefore has significant potential to contribute to the overall urban GC sector. Although the jobs looked at in this study are centred on GS and are based in towns and cities, the GC sector is vast and includes many sub-sectors, of which many are technology and capital intensive (Connolly et al., 2016), as opposed to the labour intensive nature of the GC focused on in this research. Therefore, the potential for growth in the Eastern Cape and South African GC sector is high, and has the ability to provide numerous employment opportunities and enhanced environmental care and sustainability (Hamann and Tuinder, 2012). The licence to implement environmental and

green change has come from national government and it is now the responsibility of all urban sectors to mobilise and implement long-term green programmes that influence socio-economic and infrastructural development (Smith, 2019).

5.2 Approach

This chapter integrates various aspects of urban GC dynamics by using and comparing datasets from chapters two, three and four, and a number of additional tables and figures. The results illustrate how a number of GC variables change across towns and cities with different physical characteristics, as well as in relation to varying population sizes and densities, GS characteristics, sectorial compositions, household characteristics, resident perspectives and GS/GC per capita measurements. This emphasises the need for context-specific approaches that consider local climates and respond accordingly, whilst simultaneously encouraging and implementing innovative green ideas. There are various strategies, initiatives, projects and approaches that apply to the private, public and civil sector, which have the potential to grow and improve the urban GC sector.

5.3 Results

Although scatter plots and linear relationships do not imply statistical significance, they do indicate the nature of the relationship between two variables and how the relationship changes as the two variables change. Figure 5.1 illustrates the relationship between the number of GC jobs and town size. A strong positive relationship exists, and for a unit increase in town size, GC employment increases by 97 jobs. The outlier (East London) provides evidence of how GC jobs increase as towns grow into bigger cities, although there is a significant gap between the smaller cities (Grahamstown and Queenstown) and metropolitan East London in relation to town size. East London is one of the smaller metropolitan areas in South Africa, but allows for the estimation of GC employment in cities with a known town size. The Eastern Cape is characterised by an abundance of rural villages and small to medium-sized towns (Hamann and Tuinder, 2012). It has only two major cities, Port Elizabeth and East London, and very few urban settings exceeding 25 km² in size. Port Elizabeth, a city of approximately 251 km², is expected to have around 24 000 GC jobs and an estimated green economy of R530 million per year. It is evident that GC employment is directly related to town size, but depends largely on the particular land-use and the level of local economic activity, wealth and education – where the type of GC jobs provided relies on the nature of the immediate or surrounding area (e.g. low or high-income residential, institutional, industrial, commercial or recreational).

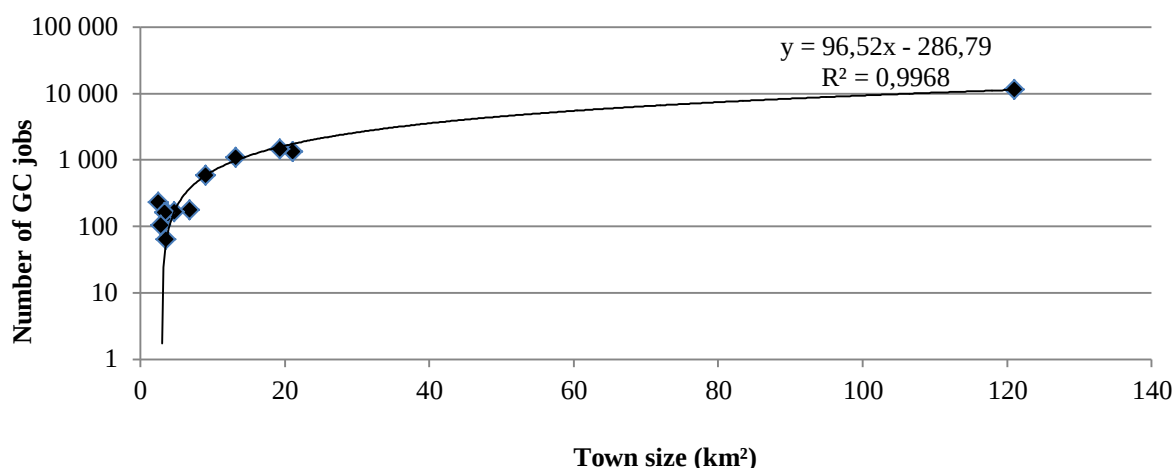


Figure 5.1: The logarithmic relationship between the number of Green Collar jobs and town size and area of green space

Table 5.1 indicates the ratio of GC employees to the total population, the total area of all GS per GC employee, the population density, and the population relative to urban GS (per sample town). Relative to population size, Lady Grey has the highest proportion of GC workers per person (79 employees per one thousand people), followed by Port Alfred (43) and Port St. Johns (30). Six of the sample towns have approximately 14 or 15 GC workers per one thousand people – ranging across all different population and town sizes. Peddie has the lowest number of GC workers per capita, less than half the sample average – which is 25 GC workers per one thousand people. As with the number of jobs and green economies, East London and Peddie have the minimum and maximum values in the sample regarding the amount of GS per GC worker (7 m² and 44 m², respectively). These values may seem low but include nursery, landscaping and composting employees, street sweepers and clearers of waterways, who do not necessarily work in urban GS; as well as part-time household gardeners. Population density shares negative, and significant relationships with the number of GC per capita ($p=0.047$ and $R^2=0.312$), and the area of GS per GC employee capita ($p=0.021$ and $R^2=0.396$); and a positive relationship with population per km² of GS capita ($p=0.001$ and $R^2=0.967$). This supports the multiple regression results in that population size is not a significant determinant of GC employment, as larger populations often lead to higher population densities, lower GS per capita and fewer GC workers per capita; and often less GS per GC employee.

Table 5.1: Green space, Green Collar and population characteristics

Towns	Green Collar jobs per capita	Green space per GC employee (m²)	Population per km²	Population per km² green space
Aliwal North	0.014	10	4 926	7 369
Burgersdorp	0.015	28	1 829	2 598
East London	0.024	7	3 957	5 904
Grahamstown	0.015	11	4 337	6 381
Kirkwood	0.023	14	4 027	3 098
Lady Grey	0.079	19	541	708
Maclear	0.014	23	2 649	3 339
Peddie	0.010	44	1 941	2 471
Port Alfred	0.043	9	1 956	2 721
Port St. Johns	0.030	17	1 752	2 130
Queenstown	0.014	8	5 440	8 616
Tarkastad	0.014	20	823	1 143
Mean	0.025 ± 0.019	18 ± 10	2 848 ± 1 629	3 873 ± 2 549

Figure 5.2 illustrates the relative extent of the private, public and informal sectors. Sample towns are arranged in descending order of the magnitude of the local green economy (data from chapter three). The greatest variation is in the public and informal sectors, which increase and decrease, respectively, as the green economy decreases. Between East London and Peddie, there are significant contrasts in the public and informal sector contributions, while the respective private sectors contribute similar proportions to overall GC employment. The tourism nature of the GC sector in Port St. Johns shows a slightly more substantial private GC sector compared to the informal sector, and also sets it apart from Tarkastad and Peddie – sample towns with similar numbers of public GC jobs. Across the first six sample towns and cities, the relative contributions of the sectors are reasonably consistent and evidently start to show more complex relationships across the smaller towns with fewer GC jobs and smaller green economies.

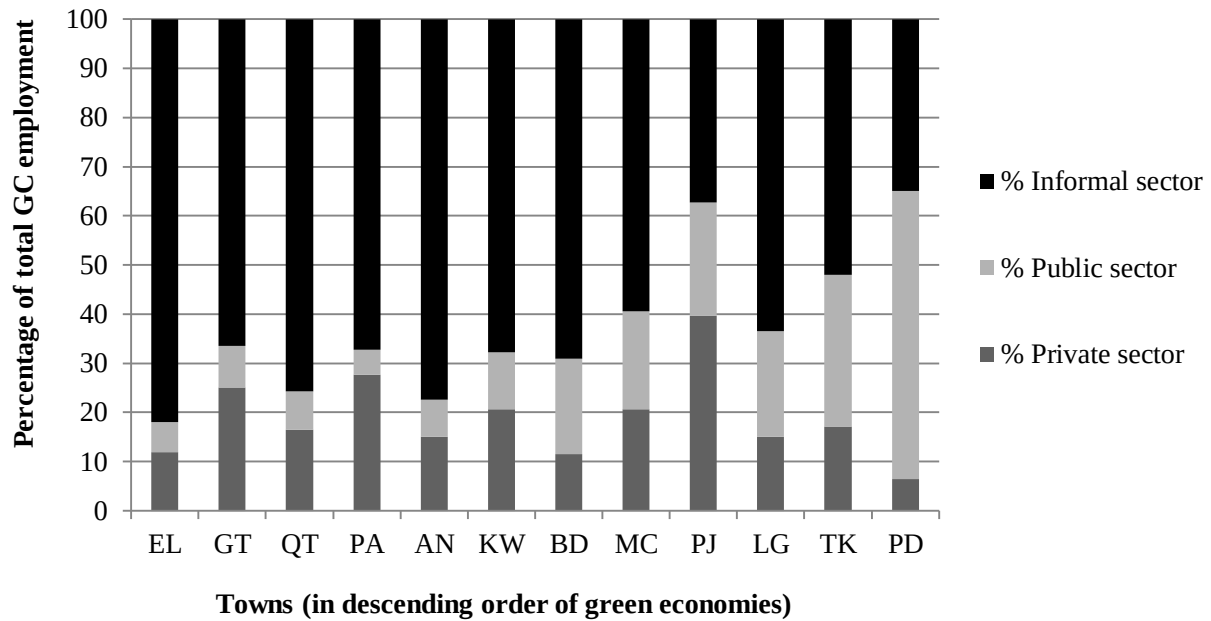


Figure 5.2: The contribution of the private, public and informal sectors to total Green Collar employment throughout the sample towns

Figure 5.3 illustrates the variance of the GC categories across the sample towns, indicating how far the relative contribution of each category is from the mean value – the purpose of which is to identify the potential for growth in the urban GC sector. In the six highest ranking sample towns, with regard to GC employment, municipal and public GC jobs are below average by between 7% and 12%; whilst in Peddie, Port St. Johns and Tarkastad, residential GC employment is between 12% and 28% below average. There are small opportunities for growth in green products and more-so green services in Burgersdorp, Lady Grey, Peddie and Tarkastad; however these require sufficient local demand. Some categories do not indicate significant variances, such as the accommodation, commercial, green products and recreational GC sectors. The greatest variance from the average category composition is in Peddie, where six of the eight categories are below the sample average. The composition of GC jobs in Maclear, on the other hand, is the closest representation of the average despite having no green product jobs. Categories that indicate above average percentage compositions can also be viewed as opportunities for growth and can often be attributed to local features.

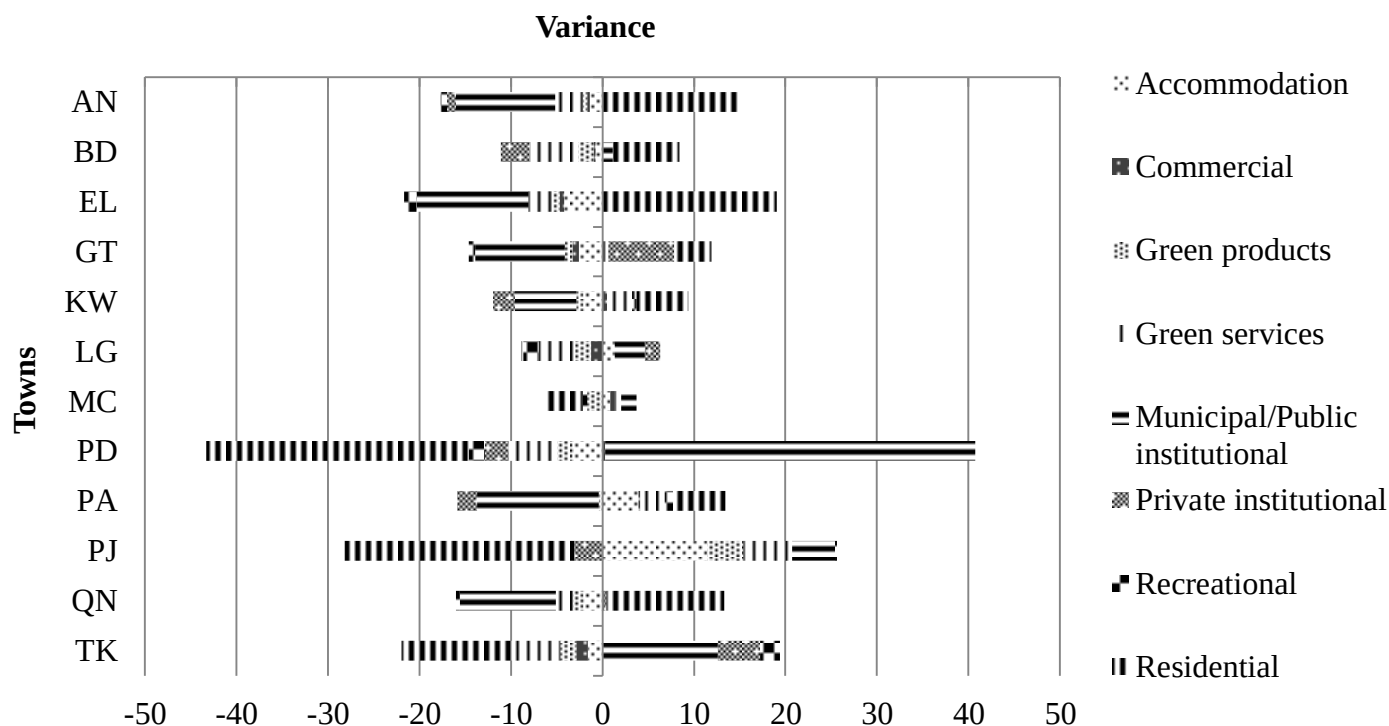


Figure 5.3: The extent to which each Green Collar category differs from the mean throughout the sample towns

Most local municipalities in the Eastern Cape have structured environmental or GC divisions which fall under the Community or Public Services department (Eastern Cape PDP, 2014), and these are illustrated in Figure 5.4. The parks, recreation, amenities and cemeteries division oversee the maintenance and management of public parks, sports fields, commonages, street verges and trees, cemeteries and other municipal amenities (e.g. some churches and community gardens). The environmental services division is responsible for nature conservation in urban reserves and beaches, environmental health and law compliance, and implementation of environmental projects (Sarah Baartman Municipality IDP, 2018). The solid waste divisions manage urban refuse and waste collection and disposal, illegal dumping, clearing of waterways, and cleansing in the form of street sweeping. In East London, the Buffalo City Metropolitan municipality has an Integrated Environmental Department which, according to the Buffalo City Municipality IDP (2018), is responsible for the protection and management of the natural environment in Buffalo City, with a focus on biological diversity, cultural and conservation landscapes, and ecological processes.

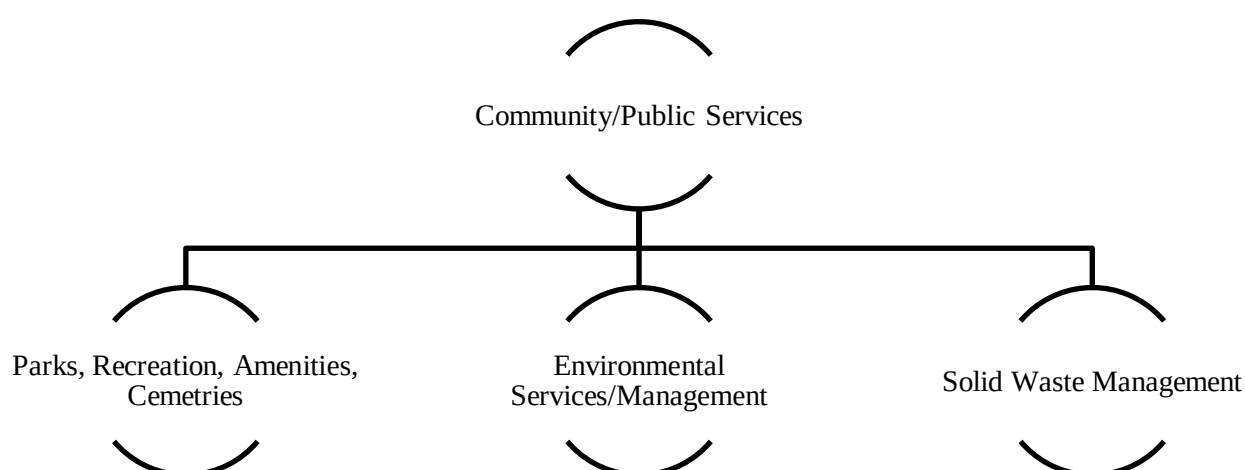


Figure 5.4: The structure of the public sector Green Collar divisions

Informal GC employment at private (middle to high-income) households is a major employer in the urban GC sector, providing working opportunities for the majority of GC employees in the sample. The resident interviews covered what inhabitants do with their garden refuse and the results are presented in Table 5.2 (bearing in mind residents often follow more than one method/usage). The most common methods of garden refuse disposal or use are household composting, municipal rubbish removal, and firewood (kindling), respectively. A relatively high proportion (35%) of residents in East London have their garden refuse removed by private refuse removal companies and garden services. In the other 11 sample towns, no garden refuse removal businesses were identified – therefore the residents who have their garden refuse removed use private garden maintenance services. Another unique use of garden products is ornaments, with approximately 3% of sample making ornaments to sell or for personal use. In Port St. Johns, quite unlike any other town in the sample, over 60% of households use their garden refuse for firewood. When contrasted with Peddie (also situated in a previous homeland), this number declines to 10% – almost certainly due to the contrast in wooded vegetation. In Peddie, around 35% of households have no garden refuse, followed by Lady Grey at 10%. In the same two towns, approximately 25% and 23%, respectively do not participate in garden maintenance at all (i.e. do nothing).

Table 5.2: The means of disposal or usage of garden refuse by residents across the sample towns (by percentage)

	AN	BD	EL	GT	KW	LG	MC	PD	PA	PJ	QT	TK	Mean
Compost	39	41	29	39	35	27	42	18	43	55	46	29	37 ±10
Dump	2	19	7	4	6	0	6	0	8	9	6	0	6 ±5
Firewood	25	33	15	12	14	13	29	10	4	64	10	19	21 ±16
None	3	7	3	0	7	10	3	35	0	5	0	8	7 ±9
Nothing	13	11	7	4	11	23	13	25	4	18	8	18	13 ±7
Ornaments	0	1	2	1	1	3	3	10	0	14	1	4	3 ±4
Removed	10	0	35	12	8	5	6	2	17	9	15	0	10 ±10
Rubbish	45	30	23	35	43	20	29	20	49	27	45	42	34 ±11

Compost: involves compost heap/bin
Dump: transported to local dump site/depot
Firewood: used as fuelwood
None: no garden refuse
Nothing: nothing is done with garden refuse
Ornaments: used to make items of personal/financial value
Removed: garden refuse removed by private business
Rubbish: removed by municipal refuse service

Figure 5.5 illustrates the four methods of household gardener recruitment captured by residential interviews. The most common form of recruitment was residents approached by gardeners (39%) offering their service, usually within a short time period after moving to the area. Direct recommendations by family members, past homeowners, friends and neighbours, and even current gardeners (32%) was also a significant form of recruitment; followed by responses to formal and informal adverts (17%) in mailboxes, internet sources and shopping centres. Finally, 12% of residents recruited their gardeners through word of mouth (12%), which involves hearing of someone in need of work and taking action to employ that person thereafter. The forms of recruitment evident illustrate the informal nature of the household GC sector.

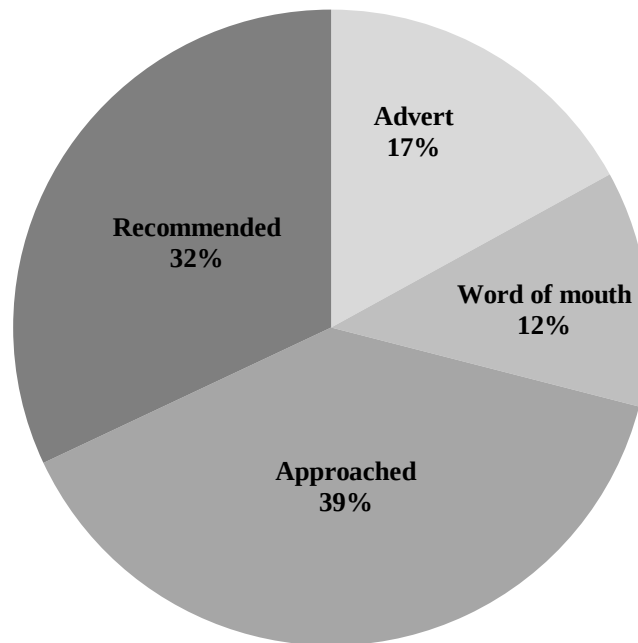


Figure 5.5: The forms and proportions of private household residential gardener recruitment

Figure 5.6 represents data pertaining to residents' perspectives on urban GC jobs by illustrating the proportion of residents who mentioned the economic, environmental and/or social benefits of GC jobs. The overall responses showed significant support for GC jobs as a means to decrease urban poverty, with 80% to 100% of respondents agreeing that these jobs are an effective poverty alleviation tool. The vast majority of residents justified their belief in GC jobs on an economic basis (50%), emphasising the job and employment opportunities that the urban green sector holds, as well as the local economic benefits like tourism and investment. When private residents in the sample were asked about the benefits of GC jobs, the environmental benefits were mentioned least frequently (only one in four mentioning them), whilst the social, economic and socio-economic benefits of urban GC jobs were perceived most highly by them, with an average of just under half of respondents mentioning them. Evidently, the benefits of GC employment mentioned by residents show heterogeneous patterns across the sample towns, mainly due to varying household, local and regional factors.

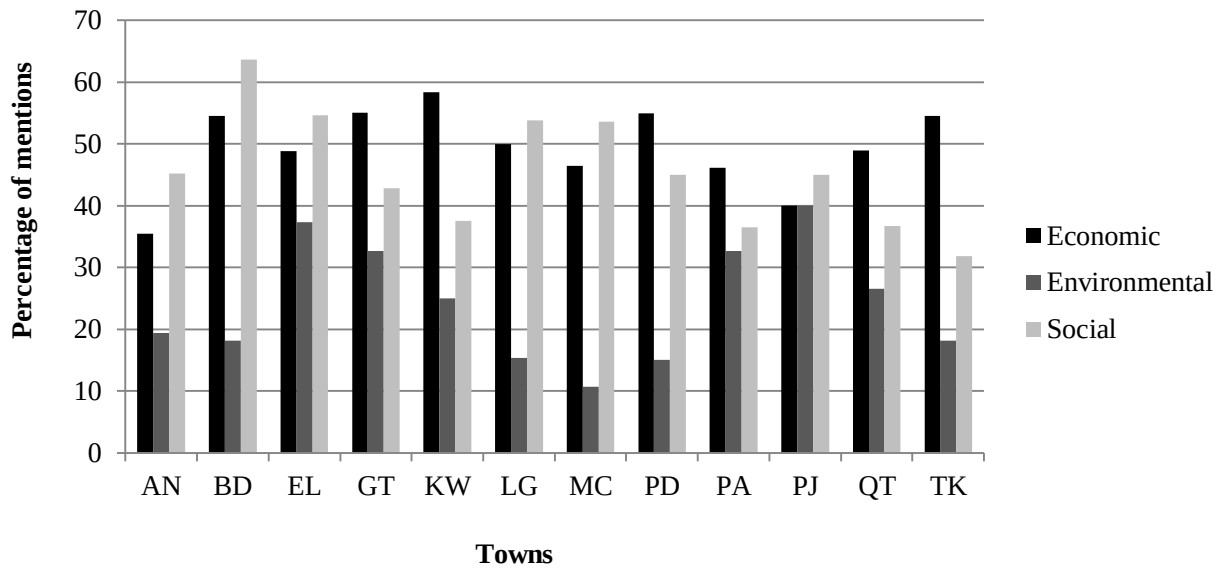


Figure 5.6: The proportion of responses and justifications (by theme) by residents supporting Green Collar employment

5.4 Discussion

5.4.1 Urbanisation, economic development and urban expansion

Urbanisation, whereby people move from rural to urban environments, often in search for job opportunities, is a widespread phenomenon (Jim, 2013). Economic and structural development is often coupled with urbanisation, however increased poverty and unemployment can also take place, which proves challenging for local governments (McKague et al., 2015). Development leads to urban expansion, be it residential, industrial or commercial, and this is where additional jobs, across multiple sectors, can be created (Bowen and Kuralbayeva, 2015). It is clear from the results that the extent, diversity and magnitude of the urban GC sector shares a positive relationship with town size, and therefore development and expansion can be viewed as a means of increasing GC employment and LED (Rogerson, 2016). Urban expansion, as opposed to densification, has the ability to decrease population densities, and by adopting a green development approach, it is possible to increase GS and GC jobs per capita. More than half of the Eastern Cape's population live in rural areas (especially in the eastern portion). The potentially negative effects of rapid population influxes can be addressed through strategic and well-planned urban expansion, partnered with economic and green development (Maria et al. 2015). This can bring about urban areas with high levels of economic and employment activity and also liveable, sustainable and resilient residential areas with optimal GS provision, GC job opportunities and population densities. If the necessary priority and attention is not given to the current socio-economic and environmental challenges facing towns and cities in the developing world, high rates of urbanisation and unplanned urban sprawl will significantly exacerbate these challenges (Dunn, 2010). The GC sector has the potential to contribute to residential, industrial,

commercial, recreational and institutional development by promoting adequate GS provision, ecosystem functioning, employment opportunities and more pleasant and sustainable urban areas, for both current and incoming populations.

There is no set formula to transform poor or degraded urban environments into flourishing, attractive and sustainable towns and cities (Rogerson, 2016). Context is indeed a crucial factor to consider, and although there may be similarities between certain towns or cities, they are each guaranteed to be heterogeneous in nature. Having said this, there are certain measures that can be applied across urban environments, regardless of size, and others which can be adopted from one town and applied in another. The Reconstruction and Development Programme is a national, state-funded social housing project which coordinates the construction of so-called ‘RDP’ houses, and essentially new urban suburbs. It is in these newly created residential areas where government has failed to provide adequate GS (McConnachie and Shackleton, 2010; Shackleton et al., 2014) and ignore the opportunity to implement best GS practices, as well as create a host of GC jobs in low-income and underprivileged areas. This does, however, require greater environmental budgets and expertise, which are often in short supply in developing countries (Dunn, 2010), including South Africa (Chishaleshale et al., 2015; Ruwanza and Shackleton, 2016). It is possible to create a standard or adaptable blueprint that local government structures (with the help of provincial and national government) can apply to ‘RDP’ areas. Such a blueprint can include part-time and permanent job opportunities around planting, growing and watering, monitoring, clearing and general maintenance, and can be applied across ‘RDP’ neighbourhoods of different magnitudes. Lessons or success stories from certain towns or cities can be applied to others in an attempt to create more employment opportunities. The private household garden refuse removal businesses that operate in East London provide an essential service to middle to high-income residents, as well as valuable local jobs. Where there is a sufficient middle to high-income residential presence in a town to support a garden refuse removal unit, such a business should be operational and can grow in proportion to demand for the service. Another lesson to follow, highlighted in the Port St. Johns case, is the importance and highly beneficial nature of tourism (McKague et al., 2015; Rogerson, 2016). A large portion of GC employment in Port St. Johns is due to the tourism sector which contributes substantially to local GDP and economic activity; as opposed to Peddie where tourism and commercial activity are limited. Towns can also identify priority areas where urban expansion or transformation is required owing to high population densities, inadequate GS availability or GC employment. On the other hand, there is empirical research that has argued bigger, more densely populated cities are more environmentally friendly and energy efficient, and also have greater budgets per capita and service delivery (Florida, 2012; Meyer, 2013); however these ideas are based on confining and containing human impact on the environment through larger numbers of people living in small areas. Once again, this highlights the need to overcome GS and GC employment shortages in densely populated small towns or

neighbourhoods, and also to develop quality urban areas that can cater for incoming and constantly evolving populations.

A paradoxical relationship exists between creating and increasing local wealth on the one hand, and urbanisation, development and urban expansion on the other. People tend to follow money, and money tends to follow people (Ahern et al., 2014) - therefore towns and cities that increase in population size and surface area without the necessary infrastructural, economic and environmental capacity are at risk of creating pockets of urban poverty and state dependence (Marais and Cloete, 2017). Urbanisation often happens in response to the desire for employment opportunities and a better quality of life, leading to an influx of people to developing towns and cities with growing and functioning economies (McKague et al., 2015). This brings major challenges as the local population surges, putting pressure on municipal officials, basic service provision and the job market, creating infrastructure backlogs, high unemployment rates, and potentially social unrest (McKague et al., 2015). Peddie provides a good example of a case where urbanisation and urban expansion occurred without economic development and thus the high rates of unemployment and social grant dependency; and consequently very few GC jobs. It also lacks the presence of an established middle to high-income class which inhibits local household employment and commercial activity. Grahamstown, on the other hand, has a dynamic economy and an efficient private sector, complemented by a substantial informal sector supported by working, middle to high-income residents. As mentioned though, there is no particular way to go about urban expansion and economic development; and furthermore, high population influxes can be expected in response to economic and infrastructural growth, as people are attracted by the ability to find work and a better life (Marais and Cloete, 2017). The best way to go about these urban processes is with a sustainable approach, taking into account the need for economic and environmental capacity building and stability. It is essential to ensure sufficient physical infrastructure, social institutions, energy and water for expanding towns and cities, as well as diverse employment opportunities to support the working population (Childers et al., 2014). It is also important to ensure an urban environment conducive to business, innovation and creativity, complemented by the necessary state intervention. Government departments must allocate sufficient resources towards enhancing urban sustainability (Marais and Cloete, 2017), especially in low-income and RDP suburbs, with socio-economic and environmental sustainability, adaptability and overall prosperity at the forefront.

5.4.2 Urban green space potential

In South Africa, there is significant urban GS inequality between low and high-income residential areas (McConnachie and Shackleton, 2010; Kuruneri-Chitepo and Shackleton, 2011; Irvine, 2012). Low-income and RDP suburbs have a severe lack of public GS and consequently the potential for beautification and greening initiatives, and GC employment, is high. Middle to high-income

residential areas in South African towns and cities have an abundance of GS on private properties and lining the streets (Schaffler and Swilling, 2013). These contrasting urban environments lead to different perceptions of GS amongst low and high-income residents (Shackleton and Blair, 2013), not to mention the contrasts in ecosystem service provision. So-called affluent suburbs are blessed with an array of ecosystem services, and value these services to the extent where residents are willing to spend approximately R400-R500 per month on their upkeep and maintenance. It was evident from this study that residents in low-income suburbs are also willing to pay for GS maintenance, although it often involves paying a small fee to local ‘entrepreneurs’ for grass-cutting (usually once a month or income dependent). Inhabitants across all income brackets, however, have positive attitudes towards urban GS, while low-income residents view public GS as a potential job creator (Shackleton and Blair, 2013). With the right framework, driven by the public sector, residential GS inequalities can be offset to create towns and cities with interconnected and functioning ecosystems, instead of pockets of GS abundance and diversity in mostly high-income residential areas (Kabisch et al., 2015).

The varied relationships residents share with urban GS are best illustrated by Table 5.2, where eight different methods of garden refuse removal or use are evident. On-site composting is the most popular method of processing garden refuse, and is perhaps the most environmentally friendly. It removes the need for pollution-heavy inputs like trucks, fuel and transport costs, plastic bins and bags, as well putting pressure on local refuse facilities (Saheri et al., 2017). Composting also ensures that all energy and nutrients remain on-site, and can contribute to vegetative productivity (Saheri et al., 2017). Doing nothing with one’s garden and its refuse, although unusual, is also a good way to maintain local nutrient levels and allow nature to take its course (McDonnell and MacGregor-Fors, 2016). Residents who were found to ‘do nothing’ in their gardens and its refuse, did so out of a lack of interest or financial capacity, and also because there was no need to – especially in towns with low vegetative productivity (i.e. low rainfall, temperatures and frost). Other positive ways of using some garden refuse are firewood and ornaments – although the latter was identified less frequently. Some garden refuse makes good firewood or kindling, and can save residents purchasing firewood elsewhere (Kaoma and Shackleton, 2015); while making ornaments creates products with added value, financial or spiritual (Kabisch et al., 2015). The undesirable methods of refuse removal are adding it to household refuse or rubbish collection, taking it to a local dump or having it removed by a private company – although this method creates employment opportunities and supports large-scale urban composting. Adding garden refuse to municipal refuse removal puts additional pressure on waste and refuse departments, while taking it to a local dump also pressurises overall urban waste capacity, and requires fuel and transport costs. With regard to the urban environment and nature, priorities must be centred on two main guidelines: overcoming urban GS inequality, and improving or implementing sustainable and beneficial GS practices – both of which require financial and human capital inputs (Leichenko and Silva, 2014).

5.4.3 Urban Green Collar potential

There is undoubtedly major potential for growth in the urban GC sector, specifically in the case of Eastern Cape towns and cities. The ability to create more GC jobs in the private, public and informal sectors is high, but requires a more environmentally friendly and ecosystem service approach. The private sector (in a free market economy) follows and adjusts to the demand for goods and services, and the pursuit of profit (McKague et al., 2015); and therefore GC jobs in the private sector cannot be spontaneously created in poor towns and cities. Public GC jobs, however, are based on budget allocations, designated wage rates and the services performed by municipal, provincial and national government departments. Informal GC employment, like the private sector, responds to local economic conditions and relies heavily on the presence of middle to high-income residents who support GC employment. It is impossible to apply one strategy to the challenge of increasing private, public and informal GC jobs, and therefore each sector requires its own approach – which ultimately brings about a situation where the growth of each sector complements the growth of the others.

5.4.3.1 Private sector

The private GC sector is the most diverse in relation to the different types of jobs (Table 3.3), and as a result, has great potential for growth and expansion. Despite its diversity, the private sector relies heavily on local economic activity and a sufficient demand for goods or services. It is more diverse in larger towns and cities than in smaller, poorer towns; although the proportion of private GC jobs does not vary greatly between the sample towns (Figure 5.3). One of the primary principles of private sector business and corporations (on any scale) is profit maximisation, which governs their size, number of employees, and ultimately their success and existence (Santini, 2017). Entrepreneurs and investors are attracted by the ability to earn profits and increase investments, which is why the private sector is more diverse in large towns and cities with a higher transfer of goods and services and a bigger market. Green goods and services (provided by the private sector) are commonly viewed as luxury goods, tend to make life more pleasant rather than being a necessity. It follows, therefore, that the demand for such products is low in poor and underprivileged areas and towns (McKague et al., 2015; Schwarz et al., 2015). Lady Grey, Peddie and Tarkastad are key examples of towns with low levels of economic activity and a resulting absence of a number of private GC categories (Figure 5.4). Port Alfred, on the other hand, has a diverse and fruitful local economy (supported by tourism), but more importantly an abundance of middle to high-income residents who demand a host of basic and luxury goods and services – the same is evident in East London, Grahamstown, Queenstown, and even Aliwal North. This leads to a number of employment opportunities for poor urban residents and increases local expenditure, which contributes positively to the economy (Rogerson, 2016).

There are a number of possibilities for private GC job creation in small towns, especially through accommodation, institutions and recreational facilities with high quality GS and ecosystem service

provisioning. According to Rogerson (2016), the most urgent need for capacity building and development in South Africa is in the large group of poor local municipalities, where there is often a lack of commercial and business activity, private investment and a low transfer of goods and services. The key to attracting local wealth and investment is by creating a conducive social, economic and environmental climate (McKague et al., 2015), where professionals and entrepreneurs can establish businesses and find work. Education and healthcare institutions, even if they are public, also support private sector development by increasing local employment and expenditure, and also creating more desirable and better functioning towns. Therefore increasing GC employment and activity depends on developing local economies, increasing the demand for goods and services and encouraging entrepreneurship. According to Schwarz et al. (2015), one of the most significant factors that determines urban tree-cover is household income; and therefore as local residential wealth increases, so will the need for green goods and services, and recreational and institutional facilities. Other GC job categories such as accommodation, commercial and recreational rely on tourism and holiday-goers, and therefore it is imperative for the private sector (in collaboration with the public sector) in towns and cities to enhance local tourism by improving and promoting local attractions and natural assets, and by creating attractive and accommodating environments (Rogerson, 2018).

5.4.3.2 Public sector

Public sector GC jobs play an important role in the provision and maintenance of urban ecosystem services, and occur throughout different types of public GS. Not only do municipal forests, parks, recreation and amenities departments employ GC workers, but also provincial departments like Arts and Culture, Education, Roads and Healthcare departments – highlighting the widespread nature of public urban GS (McConnachie and Shackleton, 2010). It is evident from the results that the relative contribution of the public sector to overall GC employment is greater in smaller, less economically active towns, while the opposite applies to the informal sector (Figure 5.3). There are a number of different approaches to increasing public GC employment such as restructuring departments, implementing new jobs, enhancing current public GS or adopting an innovative ecosystem service approach. Ecosystem services and the benefits of GS are also misunderstood and underrated by municipal officials (Gwedla and Shackleton, 2015), which together with strained budgets provide barriers to urban ecosystem service provision. Measures therefore need to be taken across all levels of government in an effort to enhance urban ecosystem services and offset GS inequality, while simultaneously maximising employment opportunities.

South Africa's Minister of Water and Environmental Affairs has said that the country is running out of time to implement practical solutions for a green economy. Minister Nomvula Mokonyane emphasised that any decisions or actions by the government must be based on scientific evidence, and hence the need for investment in research and the embracing of innovation and creativity (Smith,

2019). Furthermore, according to Minister Mokonyane, creating a green economy will lead to economic development, the creation of jobs and alleviation of poverty, but also provide a host of benefits that can and must be enjoyed by all. A South African green economy will be based on nurturing the interdependence between economic growth, social protection and natural ecosystems, which should ensure a host of short and long-term benefits (Maria et al., 2015). Therefore, it is vital to implement effective and collaborative top-down and bottom-up initiatives, from a government perspective, which will improve the flow of information and resources, and action taken on a so-called ground or grass-roots level. National and provincial governments need to develop urban GS frameworks and strategies that can be adapted and applied at a municipal level, and mechanisms for information to flow back to higher levels of government. Increasing environmental budgets and investments is also a key aspect to growing the GC sector, along with the need for monitoring and adaptive management (Ahern et al., 2014).

Local municipalities have the capacity to make a difference, by overseeing functioning and productive municipal nurseries and tree-planting programmes. They can also restructure their environmental departments to increase employment, efficiency and effectiveness (Franklin, 2016), especially in larger towns where private and informal GC employment start to outweigh public (Figures 5.2 and 5.3). Instead of using the usual parks, recreation, amenities, solid waste and environmental services divisions (Figure 5.4), municipalities can structure their departments to fill urban GS gaps and areas for improvement, as well as continue the maintenance and upkeep of current GS and urban ecosystem services (Franklin, 2016) – as illustrated in Figure 5.7.

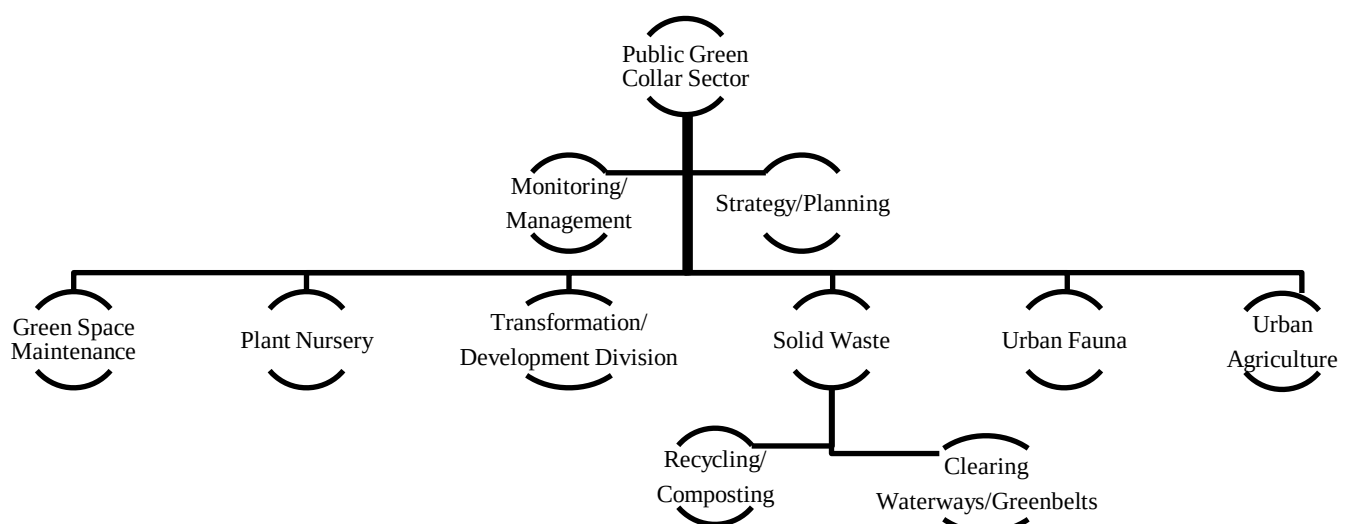


Figure 5.7: The proposed local municipality Green Collar sector

One of the more general but still vitally important requirements of municipalities is grass-cutting on roadside verges, commonages, public parks and other open spaces; and therefore this chapter validates

for a grass-cutting division, whose domain is purely maintaining public urban grass. Another similar division should be centred on the maintenance of trees, shrubs and garden beds on public property (i.e. tree-felling, bush thinning), as well as greenbelts or bodies of water. Local municipal plant nurseries are also an essential division, increasing employment and providing indigenous flora for urban use (Kazungu and Magigi, 2012). With regard to offsetting urban GS inequalities and filling gaps in ecosystem service provision, a separate GS transformation division is required. The primary function of this division is to identify residential, commercial and industrial zones in need of GS, and in collaboration with municipal nurseries and shareholders, conduct beautification and greening projects with the goals of creating aesthetically pleasing urban environments to supply ecosystem services. Another division that can be enhanced is solid waste, which is a significant element of urban GC jobs. The waste management division should be separated into recycling, garden refuse and composting, solid waste and clearing of litter and stormwater ways. In London (United Kingdom), there are additional environmental services which include urban fauna, recreational GS, urban agricultural, peri-urban vegetation and bush encroachment (Sallis et al., 2016); which also have potential for growth in the Eastern Cape and South Africa. With sufficient budgets, capacity and expertise, local municipalities can structure and mould their GC departments to suit local conditions and cater for a range of services, and in the process increase employment and enhance socio-economic and environmental aspects of urban life.

The proposed local municipality GC sector has great ability to increase employment while simultaneously safeguarding urban environmental assets; however GS at government institutions is under the domain of provincial governments. These provincial departments have a major role to play in the presence and maintenance of public institutional GS, and there is much room for improvement. The respective departments have the responsibility of employing and ensuring quality GS (Eastern Cape PDP, 2014) at state institutions like schools, hospitals and museums. Although at most of these institutions there is often at least one state GC worker employed, at the majority of government institutions there is a severe lack of GS, both in the form of both quality sports fields and lawns and also trees and other vegetation types. This chapter recommends a provincially employed task team per local (or district) municipality that is responsible for ensuring that local state institutions have high quality GS that provides the necessary ecosystem services to students, patients, tourists and the greater population – which is a commitment made by provincial and local governments (Eastern Cape PDP, 2014; ECSECC, 2017). Low-income government schools must be a priority for ecosystem transformation in an effort to create environments conducive to working and playing. This will create a number of part-time and permanent job opportunities, on top of a host of vital social and environmental benefits on a local scale. Another way provincial departments can contribute to increasing urban GC employment is by outsourcing work to local entrepreneurs and businesses – leading to positive economic effects. There are clearly a number of ways in which national,

provincial and local governments can contribute towards increasing public GC employment, and requires not only greater budgets and resource allocations, but also the relevant expertise and capacity.

5.4.3.3 Informal sector

Informal GC employment is the most significant employer throughout the urban GC sector, providing thousands of marginalised workers with informal work. It does, however, show the most variation (Figure 5.3). The number of private household gardeners employed is significant, and positively related to the number of middle to high-income households ($p=0.0001$ and $R^2=0.999$) and town size ($p=0.0001$ and $R^2=0.986$). Additionally, the proportion of households who employ a gardener has a positive and significant relationship with the number of middle to high-income residents – which indicates household wealth plays an important role in residential GC employment, but also the benefits of GC jobs that residents perceive. There is a positive, statistically significant relationship ($p=0.0001$ and $R^2=0.805$), between the socio-economic index (Table 2.2) and the proportion of residents who perceive the economic benefits of GC employment. There is also a positive and significant ($p=0.001$ and $R^2=0.933$), relationship that exists between the average wage rate per town and the perception of the environmental benefits of GC jobs. Quality and diverse private GS is a luxury good afforded by middle to high-income residents, whose presence attracts unemployed and unskilled urban dwellers seeking to participate in the informal GC sector; and can also increase rates of urbanisation (Cherry, 2013). It is clear that informal GC employment is minimal in Peddie and Port St. Johns – both originally part of the homelands where economic and commercial activity, and the presence and quality of infrastructure is low (Hamann and Tuinder, 2012). Although the road to building a substantial informal GC sector in these towns will be long and arduous, it is possible. Through local economic development, middle and high-income employment can be created, thus attracting professionals, businessmen and commercial activity; this, in turn, creates lower-income employment and attracts traders, vendors and commodity outlets. The key is therefore to create, either through tourism, industry or institutional development, a host of low, middle and high-income jobs. This will lead to a dynamic, sustainable and well-rounded economy with a range of employees, goods and services (McKague et al., 2015).

There are other ways to increase and enhance the informal GC sector besides growing local economies and employment. Certain private, public and civil sector initiatives have the potential to facilitate informal GC employment by creating communication and information portals, support structures, transport and infrastructure requirements, and even uniforms or overalls for private gardeners. Over 80% of private gardeners obtain work through informal means, like approaching residents, being recommended or simply word of mouth (Figure 5.4), indicating the unstructured and informal nature of the most significant GC sector. To assist the process of recruitment, local

government or non-governmental organisations can create a database of residential households and their preferred form of garden maintenance, and urban dwellers seeking informal GC employment. This will improve the understanding of the demand for residential gardeners as well as the supply of labour. Not only will this enable more people to obtain employment, but it will allow even the most marginalised and low skilled urban citizens to earn an income. Throughout the sample, an average 42% of residents do not employ a private gardener at all – identifying these households will be to identify potential for growth in the informal GC sector, even if only part-time. To further increase residential GC jobs, general portals can be formed where residents looking for grass-cutting, tree-felling, planting or general gardening services can locate people looking for work. In such an informal scenario though, it is vital to ensure that minimum wage rates are adhered to, workers are not mistreated or exploited, and that there are safety measures in place to prevent irregular outcomes (ECSECC, 2017). In addition to increasing household GC employment, street nurseries (run by local entrepreneurs) can provide employment and income opportunities, as well as environmental and social benefits – it is worth noting that no street or informal nurseries were identified in the sample towns. The private and public sectors can assist unemployed citizens with the capacity, materials and expertise to grow, nurture and sell indigenous and exotic plants to local residents and tourists (McKague et al., 2015; Rogerson, 2016).

5.4.4 Innovative approaches

Although it has been discussed how each sector can be enhanced and the number of jobs increased, there are certain approaches and innovations that can be followed and applied by both private and public sectors, but also informal and civil sectors. One of the first steps is to change mind-sets and perspectives on urban GS, and educate people on the widespread benefits (Broussard et al., 2008). It is argued by McKague et al. (2015) that, especially in developing countries, the private sector and financial markets have a greater role to play in growing local economies, providing employment and alleviating urban poverty. The public sector can also contribute substantially by facilitating and enabling economic and infrastructural growth, providing support to private and civil sectors, and creating a culture of collaboration between academics and researchers, government agencies, private businesses and corporations, and the general public (Broussard et al., 2008; Kabisch et al., 2015). Perhaps the most important aspects that lead to innovation are creativity and ingenuity, which are themes emphasised by SA's Minister of Water and Environmental Affairs with regards to the way forward.

5.4.4.1 Urban green space lifecycle approach

The lifecycle approach with regards to urban GS is an idea that refers to urban GI in all its forms, from cradle-to-grave, and has five different stages or processes (Figure 5.8). This approach to urban GS management will not only have positive effects on the transfer and quality of GS, but also the

urban GC sector – where a number of jobs can be created across the spectrum. This approach can be adopted by the private and public sector to serve both middle to high-income suburbs, and low-income, degraded and underprivileged areas.

The five phases of the urban GC lifecycle approach (Figure 5.8) are composting; germinating, growing and propagating; planting; monitoring & maintenance; and clearing. Each has the potential to provide a range of employment. With regard to the private sector and more woody and leafy suburbs, it is unlikely to find a business specialising in all of the phases, and therefore it is important that urban composters, seed distributors, growing facilities, plant nurseries, landscapers and garden maintenance services work in collaboration with one another, which can create a mutually beneficial and co-dependent relationship. In this way, urban GI remains in a partially closed continuous system with employment and profit-making opportunities along the way. The same approach can be applied to the public sector, although it is likely to fall under a single department – nonetheless, municipal environmental departments should be structured to include all the phases of the cradle-to-grave approach, instead of focusing primarily on maintenance and clearing. There is an abundance of public urban GS in Eastern Cape towns and cities with endless job creation possibilities. Therefore local governments can apply this approach as the first step to transforming poor residential areas, public institutions, commercial and business districts, and industrial zones, whilst simultaneously monitoring and maintaining current urban GS.

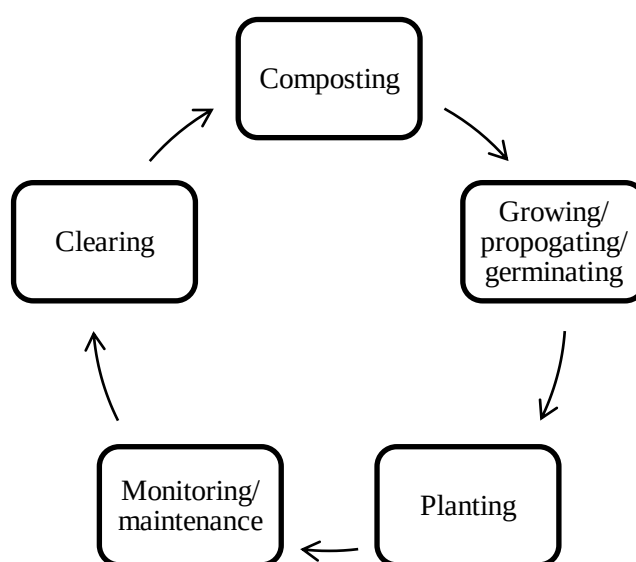


Figure 5.8: The urban green space lifecycle approach

5.4.4.2 Green initiatives

There are virtually limitless environmental or green initiatives that can be implemented in urban areas – however, there are some important factors that determine what initiatives are possible and how relevant or effective they may be. Key factors worth considering in South Africa are levels of

inequality, extent of public funding available, community participation, expertise and capacity, public service backlogs, variable climates and a collection of complex economic and socio-political influences (Rogerson, 2014). It is also useful to refer to relevant lessons from developing and middle-income countries, as well as projects and programmes that have been implemented with success. Makhzoumi (2016), for example, argues for a holistic approach to urban greening and beautification projects in poor areas, which contributes to infrastructural and socio-economic development goals whilst simultaneously responding to local environmental or ecosystem constraints. Hardman et al. (2018), on the other hand, suggest that urban green initiatives should be centred on livelihood and provisioning ecosystem services, which have the potential to revitalise degraded urban spaces by adding character and diversity to the landscape, creating greener more productive cities, and also providing valuable food and other resources (Kaoma and Shackleton, 2015). Green initiatives, however, are not solely based on GI, and can include green development, environmental education, renewable energy, or sustainable electricity and water use practices (Pinderhughes, 2007). The theme of this dissertation, however, is jobs involved in and with urban GS, so the priority and focus is on initiatives that can increase urban GC employment, as well as provide trickle-down economic, social and environmental benefits.

Franklin (2016) looked at green programmes that targeted low-income communities living in degraded and unhealthy environments, and found the key is placing socio-economic and environmental agendas at the forefront of sustainable and community development initiatives; and even design climate mitigation strategies that also contribute to overcoming local economic or racial inequalities. Sallis et al. (2016) brings to light another vital aspect of a successful GC job initiative, which is the use of science, experts, researchers and academics to provide insights into environmental and ecosystem degradation and its solutions. The most effective programme therefore has to be collaborative and adaptive in nature, widely beneficial, strategically designed to overcome a range of local issues, and a sustainable and long-term approach. Using these overarching principles, and the message from the South African Minister of Water and Environmental Affairs, urban GC job programmes can be optimally designed using creative and innovative approaches. A division of the urban GC sector that has great potential for innovation, is that of community plant nurseries – where any member of the community has the ability to harvest indigenous and exotic plant seeds, germinate, grow and eventually sell their mature trees and shrubs for a profit (Kazungu and Magigi, 2012). Such an initiative would initially need to be driven by the private and public sectors, which can run educational workshops, provide pots, compost and other tools, as well as supporting the nurseries with business, contracts or government tenders. Haque et al. (2008), in Bangladesh, found that plant nurseries were profitable ventures, making between 143% and 219% profit on the sale of woody plants, fruits, flowers and ornamentals – with the benefits accruing to poor community members.

Although indigenous and exotic plant species are generally good for the urban landscape by providing a number of benefits, fruit trees, vegetables and medicinal plant species have the ability to provide a host of additional goods and services (Uddin, 2006; Haque et al., 2008). Functioning and sustainable community nurseries not only create a number of informal jobs and livelihood strategies, but also contribute to biodiversity conservation, food security, tourism, environmental ethics, climate change mitigation, local ecological knowledge and the general quantity and quality of urban GS (Haque et al., 2008; Kazungu et al., 2014). Reliance on urban natural resources and commonages in the Eastern Cape is high amongst poor communities, who make use of wood for fuel and construction, wild food and fruits, and medicinal plants (Davenport et al., 2011). Therefore, in cases where poor towns have an insufficient demand for nursery products, municipal nurseries can lead the way in providing indigenous, exotic, fruit and medicinal plant species to under-privileged areas, which can be used for personal use and trade.

One of the urban green divisions with great potential for growth is that which is responsible for monitoring and managing urban flora and fauna, heat island effect hotspots, invasive species, and greenbelts or waterways (Sallis et al., 2016). This can be publically coordinated or outsourced to private companies, but ultimately involves a task team of urban planners, environmental professionals, ground-staff and labourers for a town or city – proportional to its size. A number of different variables can be measured and monitored, such as species abundance and diversity of public trees, approximate age and lifespan, animal diversity, non-timber forest products, rates of bush and grass encroachment, invasive species abundance, and river flow and quality variables (Bowen and Kuralbayeva, 2015). By measuring these variables, databases, maps and GIS images can be created, upon which strategic and responsive plans can be formulated – which are, in turn, carried out by trained and equipped ground units. Significant funds in the form of foreign and private sector investments or increased municipal budgets would be required to sustainably run such a division. However, the short, medium and long-term benefits would far outweigh the costs. Using the databases, maps for public distribution can be created which indicate bird hotspots, endemic species, the presence of provisional goods, water resources, mature trees and urban nature walks and paths. Such an initiative can contribute positively to tourism, local investment, infrastructural and economic development, and social cohesion (Franklin, 2016; Rogerson, 2016).

5.5 Conclusion

There are a number of ways to increase the number of urban GC jobs and the green economy, which can be prompted by national, provincial or local government, private sector businesses, and civil society (Vandermeulen et al., 2011). These measures can be large-scale public employment programmes or changes triggered by the Environmental Affairs Department, but can also include small-scale, local changes. It stands to reason that the most effective way to grow the urban green

economy and sector is by growing local household wealth and national GDP per capita. This would need to follow a mainly development-led growth approach - but because this is a long-term vision referred to as LED (Rogerson, 2014), it is perhaps better to make-use of a number of variable-scale, multi-sectorial, diverse and complementary approaches. When evaluating prospective initiatives, the most important elements to consider are project and job sustainability, budget, local socio-economic and environmental concerns, and effective project designs. Interventions most likely to make a lasting impact would arise from creative and innovative ideas capable of solving a number of widespread urban problems, providing an array of goods and services to multiple beneficiaries, and of course more permanent employment opportunities (Mitchley, 2018; Smith, 2019).

CHAPTER 6

Synthesis

6.1 Research objectives

This research comprised of three objectives, of which the first set out to identify the presence, extent and composition of GC employment in 12 towns in the Eastern Cape, in order to give an indicative picture of the GC sector in one of South Africa's poorest provinces. Green Collar jobs were identified in all sample towns, however, the number, type and extent varied. The second objective was to determine whether GC jobs contribute to local poverty alleviation amongst employees and their households. Some types of GC jobs proved more effective than others at alleviating poverty due to higher wages, levels of employee satisfaction and more desirable employment conditions. The final objective aimed to identify the potential to increase GC employment, and evidently, there is great potential for growth. This potential lies in the private, public, civil and informal sectors, and should be led by budget increases, significant government action, economic development and innovative green initiatives and approaches.

6.2 Core findings

6.2.1 The number of urban Green Collar jobs in the sample towns

Not only were a large number of GC jobs identified throughout the sample towns, but also the nature of employment and the composition of jobs. The number of GC jobs ranged from 70 in Peddie, to 11 723 in East London, contributing approximately R4.8 and R308 million per year in wages, respectively. The nature and types of jobs differ, mainly due to town size, but also a range of other local influences that shape the urban environment and day-to-day living, and therefore economic activity (McKague et al., 2015; Mansour et al., 2017). Green Collar jobs cater for a number of local private and public needs, which are well illustrated by the eight unique GC categories, stretching across a range of economic sectors. These needs are either basic GS maintenance, often to prevent ecosystem disservices, or more advanced GS alterations or GI interactions, to provide quality services. Variables that positively influence urban GS and vegetative productivity, such as the percentage of GS, and average annual rainfall and temperature, proved insignificant in determining the number of private, public and informal jobs; however, this may be due to other local aspects that influence negatively on GC employment (e.g. poverty, unemployment, low economic activity). Urban GS does not require daily maintenance, and the part-time nature of most GC work benefits green services and the informal sector. It was made apparent in conversation with a garden service owner that in order to remain profitable, a minimum of 40 to 50 households are required; however, the number of employees and frequency of work can be altered.

Overall, however, the contribution of GC jobs to total employment and GDP per town ranges between two and 12%. It adds approximately 60 000 jobs to total provincial employment and around R1.73 billion in wages per year – although over half of these jobs occur in the Port Elizabeth and East

London metropolises. Green collar jobs make up around 4.3% of total provincial employment, of which informal employment comprises approximately 63%. The size of a town significantly influences the extent and composition of GC employment, where larger towns have a greater number and variety of jobs. Additionally, however, the level of local wealth, development and economic activity also plays a role in the extent and composition of jobs (Aronson et al., 2017). The informal GC sector, for example, depends largely on the presence of middle to high-income households and residents who enjoy private GS and can afford its maintenance; and is therefore more prevalent in larger towns and cities. Commercial, green goods and services, and private institutional and recreational GC jobs also rely on local wealth and economic activity (Maria et al., 2015). There are additional, secondary economic benefits of the urban GC sector, which mainly accrue to local outlets trading green products and services, tools, supplies and equipment. In seven of the 12 sample towns, at least one plant nursery was identified, eight had a minimum of one tree-felling service, and all of the towns had local suppliers of garden equipment, tools and supplies – providing additional local economic stimulation as a result of the urban GC sector.

6.2.2 The ability of urban Green Collar jobs to alleviate urban poverty

The urban GC jobs identified and analysed in this study contribute significantly to poverty alleviation by increasing household income and absorbing low skilled job seekers. Green Collar wages contribute the majority of household income and are often the main livelihood source (Haque et al., 2008; Kazungu et al., 2014). The extent of wages, however, is a significant determinant of household income per person, as well as hours worked per week, overall employee job satisfaction and other household characteristics (e.g. assets, social grants). Public GC employees and their households, due to higher wages, live above the national poverty lines, while many private GC employees live between the food and upper-bound poverty lines (R531-1 138 per person per month). Most, informal, or household GC employees, and their households, live below all three poverty lines, which is primarily due to a combination of low wages and the part-time nature of work (average of 29 hours per week). For some, the hourly rate of pay is above the nationally stipulated minimum wage, but they do not have fulltime employment. Informal GC employees also have the lowest positivity scores regarding employment and living attributes, despite these jobs being the most common and providing valuable urban livelihood strategies for the marginalised with few barriers to entry (Rogerson, 2016). Not all GC jobs contribute evenly to alleviating poverty, with some GC households living on R489 per person per month and others as much as R2 249. The overall quality of work, from an employee perspective, also depends on income, place and type of work, training or acquired skills, and job mobility (Uddin, 2006; Kazungu and Magigi, 2012; Salami, 2013). Scores are high for jobs at bowling, croquet and golf clubs, and garden nurseries, although their average incomes rank 14th, 11th and 13th, respectively; which is due to high skills acquisition and employee mobility associated with these jobs.

Another important factor to consider is the local socio-economic climate (Jim, 2013), which influences the GC sector and employee perspectives, leading to variations in the number and type of GC jobs, and jobs per km², but also the perceived value of employment and overall contribution to poverty alleviation. In larger towns there are not just more working opportunities, but a greater range of work, which significantly influences unemployment and poverty rates, and the socio-economic and basic service indices. Therefore, the relative ability of GC jobs to alleviate poverty must be considered in the context of the local socio-economic environment, which includes job opportunities, levels of education, access to services, and other infrastructural and institutional characteristics. Unsurprisingly, the socio-economic environment (in this study) is most deprived in towns situated in the old homelands, and most prosperous in metropolitan areas (EC Provincial Profile, 2011; Hamann and Tuinder, 2012; ECSECC, 2017). The local socio-economic characteristics therefore influence not only the extent and composition of GC employment, but also the poverty alleviation benefits of these jobs, and the relative contribution they make to household well-being. For example, the contribution to poverty alleviation of public GC employment is higher in Peddie, where it comprises 59% of total employment, than in East London, where it only comprises 6%.

6.2.3 The ability to increase the number of urban Green Collar jobs

Due to the unfamiliar and untapped nature of the urban GC sector in the Eastern Cape and South Africa, there is much potential for research and growth. Identifying the magnitude and composition of GC employment in different towns provided the basis for understanding the nature of urban GC sector, which gave insights into gaps and potential areas for growth – with the overarching aim to create more job and income-earning opportunities. Certain aspects of the public sector can be restructured to support more and a greater variety of urban GC jobs which perform more green tasks more effectively; but this relies on greater expertise and environmental budgets to support a larger workforce and greater expertise (Furchtgott-Roth, 2012). Despite the sentiments of the South African President and Minister of Environmental Affairs (Mitchley, 2018; Smith, 2019), it may be unlikely for government environmental budgets to increase due to the weak macro-economic in the country, providing opportunity for the private sector to lead the way. The extent of the private GC sector rests on local demand for green goods and services, but growth can be encouraged by the state, by ensuring conducive conditions for businesses and entrepreneurs, as well as attracting wealth, development and investment (McKague et al., 2015). This has the potential to lead to infrastructural, institutional and economic development, urban expansion, and a variety of additional GC jobs. The informal GC sector is the most responsive to local conditions, and relies heavily on the presence of middle and high-income households with a demand for GS maintenance. There are, however, measures that can be taken by the civil and public sectors to facilitate informal GC employment and enhance recruiting processes; and also other local and context-specific informal GC aspects that can be introduced or improved. Community plant nurseries for example, under the ownership of previously unemployed,

low skilled and marginalised citizens, have great potential to grow the informal GC sector and provide additional benefits. One also needs to remember the provisioning and safety benefits of sufficient and diverse GS, especially for the poor (Kaoma and Shackleton, 2015; Dalu and Shackleton, 2018).

Overall, greater attention needs to be given to urban GS and its countless benefits in different urban areas, which can be prompted by an ecosystem service approach (Jim, 2013) – like the urban GS lifecycle approach. This will inevitably lead to a host of additional employment opportunities across different sectors for a variety of employees, professionals and manual workers (Pinderhughes, 2007). Instead of merely a luxury good for wealthy residents, businesses and institutions, GS (and GC employment) should become a foundation for urban development – where the creation of GC jobs is required in all forms of urban transformation or expansion, especially residential, but also commercial, recreational, industrial and institutional spaces. Public schools and hospitals have high potential for more and higher quality GS, which requires greater funds and relevant expertise; however, the long-term benefits will far outweigh the costs. These benefits will be in the form of high quality and abundant GS at public institutions, serving low-income and often impoverished urban citizens in dire need of ecosystem services. These gaps, however, have started to be filled by NGO's like GreenPop, Food and Trees for Africa, and the Worldwide Wildlife Foundation, and some other private sector entities, who are implementing tree-planting and other environmental projects at underprivileged schools and communities. This has the potential to contribute to offsetting some of the many inequalities present in South African towns and cities (Irvine, 2012), and provide employment opportunities which are in high demand.

6.3 Bringing it together

According to Florida (2012), Meyer (2013) and Mansour et al. (2017), cities are the growth engines of the future, offering populations greater opportunities for education, employment and prosperity. However, the effects of their growth often result in significant negative impacts like pollution, environmental degradation, resource depletion, and contribute to climate change, and high levels of unemployment and poverty. This calls for research, policy and action in all avenues that counter these impacts. Greening cities through GI, ecosystem services, efficient urban processes, and socio-economic and ecological connectivity are useful tools to overcome these impacts (Jim, 2013; Leichenko and Silva, 2014; Aronson et al. 2017; McClure et al., 2017); and green or environmental jobs provide a means of combatting social, economic and environmental challenges (Uddin, 2006; Pinderhughes, 2007; Kazungu et al., 2014; Bowen and Kuraylbayeva, 2015; Mansour et al., 2017). There is clear evidence in this study that GC jobs exist in a number of facets of urban life (some more than others) and improve the well-being of employees and contribute to poverty alleviation. The potential to grow the GC sector, however, is complex and occurs on many scales across different sectors and categories, and is dependent on local aspects. The informal GC sector, like most other

informal sectors, displays characteristics like low wages, easy of entry, reliance on local resources, and an unregulated and competitive nature (Rogerson, 2016). The public GC sector, on the other hand, is less heterogeneous than the private and informal sectors, and, evident by the relatively higher wages, is more free of market conditions, and more rigid. The average public GC worker per km² of public GS throughout the sample towns is approximately 18 (± 6), which sets a possible provincial benchmark for towns to strive for – although more research in other provinces and within different urban zones is required. Increasing public GC jobs, however, is reliant on budget increases from national treasury, which may be unlikely in the current South African economic environment.

Although the urban GC sector is widespread and diverse, it has been neglected in development and urban GS literature, and therefore absent in urban policy, especially in developing countries. Instead of being a foundational component for development in urban areas, GC entities and employment respond more to local demand, especially the private and informal sectors. The job creation benefits of urban GS have received little to no attention, despite their ability to provide a host of benefits and contribute to offsetting environmental decay, climate change and economic hardships (Maria et al., 2014). Identifying the presence and premise of GC jobs, as well as the poverty alleviation benefits, were the first steps in understanding the sector and its potential for growth. The composition of GC jobs is highly variable between towns and reflects the extent and diversity of economic sectors present. Because of the broad nature of GC jobs, building and developing private and public institutions, and other entities, can provide additional employment; as well as private, public and civil sector green initiatives. Prioritising and providing GC employment in towns and cities has the ability to improve societal well-being by creating working opportunities that can support impoverished households, whilst simultaneously enhancing accommodation, commercial, institutional, recreational and residential sectors, and maintaining and improving urban environmental structure, quality and functions (Vandermeulen et al., 2011; McClure et al., 2017). The focus, however, should not be centred on short-term job creation, but rather on a long-term, sustainable development approach; and thus meaningful and permanent employment opportunities that also bring a variety of benefits to others, and allow employees to acquire skills and job mobility (Bowen and Kuralbayeva, 2015). Attention should also be given to the informal GC sector, which provides approximately two-thirds of the total number of jobs in the GC sector, and also because these workers live most frequently below the poverty lines – compared to other GC jobs analysed in this study. Green Collar jobs should aim to merge social, economic and environmental aspects to create a mutually beneficial socio-economic and environmental system, which forms part of the greater urban GC sector.

Green or environmental priorities and transformations should be led by the public sector with regards to advocating urban ecosystem service approaches and green economy projects, facilitating and enabling business activity and innovation, and subsidising small-scale entities (Furchtgott-Roth, 2012; Kazungu et al., 2014; Rogerson, 2016). This has slowly begun with the South African President and

Minister of Environmental Affairs emphasising biodiversity and green economy initiatives to boost employment and protect natural resources and assets; however significant investments are required (Mitchley, 2018); which as a result of government cuts on spending is not likely. The urban GC sector forms a part of the greater green or environmental sector, and not only has potential for growth, but can also help promote sustainable, functioning and resilient ecosystems in towns and cities (Pinderhughes, 2007). The dire need for employment in the Eastern Cape, South Africa, and other developing nations, motivates further for the expansion of green economies. The expansion of green economies, and more specifically urban GC sectors, requires national benchmarks, protocols and standards to guide GS planning and GC employment in towns and cities (Furchtgott-Roth, 2012). These guidelines can apply to municipalities and private and civil sectors by informing and optimising ecosystem benefits and urban structure and by ensuring budgets account for the need for GC employment. This has the potential to contribute substantially to enhancing local economic activity, and societal and natural well-being. The persistence of poverty, unemployment, environmental degradation and low levels of development in developing nations requires immediate action and policy change (Eastern Cape PDP 2014; ECSECC, 2017; Mitchley, 2018). Green Collar jobs in urban areas can contribute in a number of ways to LED, poverty alleviation and environmental quality, and should be viewed as an important component in the pursuit of an all-round prosperous and sustainable society, now and in the future.

6.4 Limitations and recommendations

There were a few limitations to this study which provided challenges to planning and data collection processes. The first limitation was the lack of global empirical knowledge on the prevalence of GC jobs and their ability to contribute to poverty alleviation, and very few publications originating from developing towns and cities. This hampered the ability to compare to other studies, plan accordingly and prepare a possible scope of jobs to expect. Another challenge was identifying entities with GC employees, especially those at small office spaces, petrol stations, shops and restaurants, where it was not immediately clear if a GC worker was employed. One of the other limitations was capturing employee numbers and wage rates, mainly in the public sector, where municipal officials did not have immediate access to these data. There were also a few private sector entities that refused to provide certain details of employment or allow employees to be interviewed, however, this was overcome through data extrapolation.

There are certain recommendations for future research on urban GC employment that will enhance understanding of the sector and its role-players. This research did not extensively analyse GC employment in major cities, as East London only gave a glimpse of the magnitude and composition of a metropolitan GC sector. There is also a significant gap between the first and second ranked sample towns in this study (relative to size), leaving room for research on GC employment in large towns

between 30 and 100 km² - like Jeffrey's Bay, Mthatha or Uitenhage in the Eastern Cape. To capture additional data, the structure of the employer and employee interviews can be altered. Work and living attributes can include more variables to help gain a better understanding of employee well-being (e.g. employee perks, household public grants and asset base), or the social and environmental benefits of GC jobs can be isolated and analysed. Another recommendation is to broaden the scope of GC jobs to include green sectors like renewable energy, recycling, waste and water management, urban agriculture and fauna, and green development – although it is thought these occur more in large, developed cities, but also provide valuable environmental benefits prevalent from research originating from the Global North. Furthermore, higher-income and more specialised GC jobs were not a major focus of this study, and analysing their characteristics will also offer more insight into the GC sector. More specialised GC jobs are also thought to be closely linked with the more advanced green sectors that require more expertise, financial and physical capital (Pinderhughes, 2007; Bowen and Kuralbayeva, 2015). The final recommendation for future research is to further investigate the nature and dynamics of the household gardener sub-sector. This is a major component of the urban GC sector and provides informal employment to millions of people in developing countries, and requires more extensive research which can, amongst other things, accurately gauge residential GC employment across a socio-economic gradient. There is also the possibility different types of informal GC jobs exist in large cities like Cape Town, Durban and Johannesburg (e.g. roadside nurseries, informal tree-fellers, small-scale growers or citizens involved in urban agriculture).

Limits to which this study can apply to urban GC sectors in the Eastern Cape, South Africa and other developing towns and cities, will depend on additional research in other provinces. It is possible, however, to estimate the number of GC jobs in towns by considering local characteristics and attributes like private and public institutions, accommodation venues, commercial, recreational and public spaces, green product and service providers, government structures, and the nature and extent of local residents and residential areas. Therefore, predicting the number of jobs in a given town does not require extensive research but can be done as a desktop analysis with the use of GIS, internet and other resources; although this method may not apply to megacities or urban environments in developed nations. This research, however, not only proved that GC jobs do alleviate urban household poverty in the Eastern Cape, but also identified what jobs are present, and where, why and how they function, which lays a foundation for similar studies or plans in the future. A final recommendation is that urban entities, public and private, who can afford and have the capacity to provide GC employment should not hesitate, as this has the potential to enhance the sector and more importantly, urban environments, in a number of beneficial and multidimensional ways.

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Appendices

Appendix A: Employer survey

RHODES UNIVERSITY

MASTERS THESIS

ANDREW KING

Employer survey

1. What goods and/or services do you provide?

2. Please complete the table below pertaining to your different employees.

Type of job	No. of permanent employees	No. of men employed	No. of women employed	Monthly wage (R)	Skills required	Hours worked per week

3. Do you employ employees with low levels of skill and education, and those previously disadvantaged or unemployed?

Yes_____ No_____

Please explain your answer.

4. Do you provide your employees with any training/education or do they acquire any skills during employment? Yes_____ No_____

Please stipulate

5. Would you allow me to interview a few of your employees? Yes_____ No_____

Appendix B: Employee survey

RHODES UNIVERSITY

MASTERS THESIS

ANDREW KING

Employee survey

1. What job are you involved in?

2. How many hours a week do you work at this job? _____

3. Are you employed full or part-time? _____

4. If you do not work full-time, do you work any other job/activity to earn income? If yes, what?

5. How long have you been employed at your current job? _____

6. Were you employed at another job before this one? If so, please stipulate.

7. Select one of the following ranging from 'Strongly disagree – Strongly agree' for statements a-g below:

- a) My job allows me to put sufficient food on the table for me (and my household).

No	Neutral	Yes
----	---------	-----

- b) My job allows me to access basic services like transport and education.

No	Neutral	Yes
----	---------	-----

- c) My job allows me to afford items like clothing and toiletries.

No	Neutral	Yes
----	---------	-----

d) I enjoy working with and in nature/green space/outdoors.

No	Neutral	Yes
----	---------	-----

e) This job has improved my well-being.

No	Neutral	Yes
----	---------	-----

f) My current job has allowed me acquire valuable skills and training.

No	Neutral	Yes
----	---------	-----

g) I value my current job

No	Neutral	Yes
----	---------	-----

h) I would prefer to have another job

No	Neutral	Yes
----	---------	-----

8. Do you own your house, rent, or live with a family member?

Owner	Rent	Family Member
-------	------	---------------

9. Have you received training/education or acquired any skills during employment?

Yes_____ No_____

Please explain

10. How many people live in your household?

Adults (>18 years) _____ Children (<18 years) _____

11. How many rooms are in your house? _____

12. How many adults in your household have a job? _____

13. How often do you eat meat? _____

14. How much do you spend on electricity per month? _____

15. Are you willing to say how much you are paid per month in your job?

16. Are you willing to state your highest level of education? _____

17. Please fill out the information below:

Age: _____

Gender: _____

Appendix C: Private resident survey

RHODES UNIVERSITY

MASTERS THESIS

ANDREW KING

Private resident survey

1. Do you have a garden or green space on your property? (mark with an X) Yes_____ No_____

2. a.) If yes, do you employ a gardener(s) or garden service?

Private gardener(s)_____ Private garden service_____ Both_____

b.) If no, would you consider employing a private gardener or garden service? Yes ____ No ____

c.) Why or why not?

3. a.) If you use a private gardener, how many do employ? 1_____ 2_____ 3_____ 4_____

b.) To the best of your knowledge, does your private gardener(s) service more than one household?

Yes _____ No _____

c.) Do you offer your private gardener additional benefits (e.g. food, transport, clothes)?

Yes _____ No _____

If yes, please specify.

d.) What gender is your gardener(s)? _____

e.) Did s/he have prior gardening experience? Yes _____ No _____

f.) How did you recruit him/her?

Advert_____ Word of mouth _____ I was approached_____ Recommended_____

4. How many hours per week does your private gardener or garden service work in your garden/green space? _____
5. a.) Do you ever visit and purchase items from a local nursery? Yes _____ No _____
- b.) If yes, how frequently?
- Weekly_____ Bi-monthly _____ Monthly_____
- Once every few months_____ Biannually_____ Annually_____
- c.) Approximately how much do you spend per month/year? _____
6. a.) Do you ever use a tree-felling service on your property? Yes _____ No _____
- b.) If yes, how frequently?
- Monthly_____ Once every few months_____ Biannually_____
- Annually_____ Once every two years_____ Once every five years _____
- c.) Approximately how much do you spend per month/year? _____
7. What do you do with your garden refuse?
- _____
- _____
8. Do you purchase garden equipment and essentials from a supplier in town? If yes, what do you buy, how often, and how much does it cost?
- _____
- _____
9. Would you support green jobs in this town as a means to create employment and alleviate poverty? Yes _____ No _____
- Why or why not?
- _____
- _____
10. Are you willing to allow me to interview your gardener(s)? Yes _____ No _____