



A CRITICAL ANALYSIS OF THE ENVIRONMENTAL AND SOCIAL IMPACTS OF HUMAN SETTLEMENT DEVELOPMENT PROJECTS IN GAUTENG, SOUTH AFRICA: A STUDY OF CITY OF EKURHULENI

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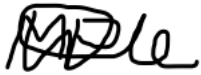
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DECLARATION

I, Mkatoko Hlongo Marilele, declare that I herewith submit the entirety of this thesis for the degree of Doctor of Philosophy at the University of Witwatersrand as my own original work, conducted under the supervision of Dr Nzalalemba Serge Kubanza. I confirm that this thesis has not been previously submitted in its entirety, or in part, to any other institution for the purpose of obtaining any qualification.



.....

Mkatoko Hlongo Marilele

Date: 10 May 2025

DEDICATION

I would like to dedicate this thesis to my beloved family:

My parents (Hasani and Mbhazima) and siblings (Rhulani, Delisiwe, Zandile, and Zwelithini) for instilling a strong work ethic and always believing in me.

My husband for the understanding, support and motivation. My children (Ndzalama and Malwandla), may you appreciate the value of putting your dreams into practice.

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LIST OF ABBREVIATIONS

AU	African Union
CBA	Critical Biodiversity Areas
CBD	Central Business District
CoE	City of Ekurhuleni
CoT	City of Tshwane
DEAT	Department of Environmental Affairs and Tourism
DHS	Department of Human Settlement
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners' Association of South Africa
ECO	Environmental Control Officer
ECSA	Engineering Council of South Africa
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
FGD	Focus Group Discussion
GDARD	Gauteng Department of Agriculture and Rural Development
HIV	Human Immune Virus
I&AP	Interested and Affected Parties
IAIA	International Association for Impact Assessment
IDP	Integrated Development Planning
NEMA	National Environmental Management Act
NEPA	National Environmental Policy Act
NGOs	Non-Governmental Organisations
NNR	National Nuclear Regulation
RDP	Reconciliation and Development Programme
RSA	Republic of South Africa
SA	South Africa
SDF	Spatial Developmental Framework
SDGs	Sustainable Development Goals

SEMA	Specific Environmental Management Act
SIA	Social Impact Assessment
SoER	State of the Environment Report
SPLUMA	Spatial Planning and Land Use Management Act
SPSS	Statistical Package for Social Science
SSA	Sub-Saharan Africa
ToR	Terms of Reference
UN	United Nations
USA	United States of America
WCED	World Commission on Environment and Development

ABSTRACT

With the proliferation of emerging urban human settlement development projects, there is an increasing urban socio-environmental impact that is considered a global challenge facing cities in developing countries. The most affected are the vulnerable urban dwellers whose livelihood is negatively affected by environmental and social challenges.

Using the City of Ekurhuleni (CoE), Gauteng, South Africa, as a point of departure, this study critically analysed the environmental and social impacts of human settlement development projects emanating from communities established by the government. The study used a mixed-method research strategy to collect and analyse the data. Phase One focused on interviewing community members residing around the five (5) selected human settlement development projects that were constructed between 2020 to 2023. Phase Two focused on interviewing government officials (CoE and Gauteng Department of Agriculture and Rural Development (GDARD) as well as non-government officials (environmental consulting firms). Phase Three consisted of a Focus Group Discussion (FGD) held with a group of environmental specialists from government and non-governmental organisations. The last phase of data collection focused on a review of Environmental Impact Assessment (EIA) reports of the five selected human settlement development projects that were purposively sampled to provide information about the effectiveness of EIA and Social Impact Assessment (SIA) in mitigating environmental and social impacts. The review package designed by Lee and Colley (1999) was utilised in grading performance symbols on the quality of projects' EIA reports in terms of impact identification and mitigation measures. The collected data was analysed to produce the study results. Qualitative data was subjected to a thematic analysis to arrange data into themes. In contrast, quantitative data was analysed using the Statistical Package for the Social Sciences (SPSS) version 22 and Microsoft Excel simple descriptive analysis to generate percentages and frequencies.

The study revealed that the population increase in Gauteng, South Africa, has contributed to a high demand for housing development projects, which further contributed to the continued expansion of residential areas in the CoE. The study revealed that SA government through the ministry of Environmental Affairs, has developed good policies and regulations for EIA processes where SIA is also included as one of the specialist studies to be conducted in the EIA process. A major challenge is the lack of standardised and detailed legislated procedures on EIA regulations that guide how social issues must be assessed in the context of the EIA process.

The results further revealed that the current existing environmental policies are insufficient to tackle environmental and social impacts encountered during the operational phase of the housing developments. Of particular concern is the absence of project monitoring once the construction of houses is completed and residents have taken occupation. A major challenge is the lack of standardised and detailed legislated procedures on EIA regulations that guide how social issues must be assessed in the context of the EIA process. The results also emphasised that without the proper implementation of housing developmental programmes, poor vulnerable people will utilise open spaces to establish slums closer to working areas even though they are situated in a sensitive environment. The findings highlighted the urgent need to understand the complex interplay between the sustainability of human settlements and spatial equality. Finally, the study results recommended the need to raise awareness among stakeholders to mitigate the environmental and social impacts of human settlement development projects in the CoE.

Keywords: *Environmental Impact Assessment, Human settlement development projects, Project life cycle, social impact assessment, Sustainable development, Urbanisation.*

CHAPTER ONE

FRAME OF REFERENCE

1.1 Background to the Study

Worldwide, the development of human settlements is undertaken on the environment with the main aim of providing shelter for the inhabitants (UN-Habitat I, 1976). In urban areas, human settlement development projects are associated with the construction and upgrading of infrastructure for housing, roads, stormwater management, the provision of water and sanitation, sewage treatment plants, waste landfill sites, and other commercial facilities (Ogra and Onatu, 2013; Massey and Stevens, 2022). Bonner and Nieftagodien (2008) indicate other social infrastructures that characterise sustainable urban settlements is the presences of schools, clinics, police stations, sport facilities amongst others. Environmental and social impacts are bound to arise from the interventions associated with the establishment of settlements (Li *et al.*, 2014). Human settlement developments that are poorly planned and managed pose a detrimental impact on the environment and affect human well-being (Tibaijuka, 2008; Gidey and Mhangara, 2023).

Negative environmental and social impacts associated with settlement developments manifest in the form of, among others, ecological degradation, air and water pollution, poor waste management, and poor service delivery that affect the well-being of the communities (Shikwambana and Tsoeleng, 2022). Li *et al.* (2014) argue that the expansion of urban human settlements is of extreme social and economic importance owing to its association with poverty-alleviation, the provision of shelter, and the proximity to economic hubs.

In South Africa (SA), Pillay (1995) argues that apartheid urban spatial planning policies contributed to the configuration of human settlements where most black African citizens have traditionally been considered rural settlers with limited access to highly controlled urban areas (Pillay, 1995; Le Roux and Augustinj, 2017). The dawn of democracy, which is known as the post-apartheid regime, changed the status quo where a large number of black Africans were permanently observed in urban areas owing to the mass migration of former rural settlers to urban areas (Geyer and Quin, 2018). Urbanisation increased rapidly after 1994 because of the abolishment of restrictions on the movement of the people when SA became a democratic country (Le Roux and Augustinj, 2017). Waste and high pollution levels, poor health and safety, together with poor service delivery are directly linked to unprecedented rapid population

growth (DEA, 2011a). Massey and Stevens (2022) argue that prior to democracy in SA, for example, urban areas were not overpopulated, the environment was cleaner, and basic social services were delivered effectively.

In areas where population growth outstrips the infrastructure for waste management, sewage and wastewater treatment plants, roads and stormwater management, education, health, and other facilities tend to violate the social well-being of the communities owing to poor service delivery (McCold and Saulsbury, 1996; Moraba, 2013).

The success of the government in promoting sustainable human settlement is influenced by the availability and maintenance of infrastructures such as water reservoirs and existing pipelines (Weimann *et al.*, 2020). In Gauteng, poor maintenance and a lack of upgrades to existing stormwater management infrastructures to accommodate urban expansion cause flooding and fertile soil erosion (Moraba, 2013). This has been reported in recently developed areas around Centurion in the City of Tshwane (CoT annual report, 2020). The impact of flooding directly affects the social well-being of citizens owing to loss of life and property (DEA, 2011; Moraba, 2013). Thus, citizens' personal, property and economic rights are negatively affected and experience personal disadvantage that violates their human rights. The consequences of topsoil erosion affect the ability of agricultural land to produce food for the citizens that depend on substantial farming for food security (Culwick and Patel, 2020).

The increase in urban settlements contributes to air pollution in the area because as the population increases, the use of transportation also increases and causes pollution owing to the emission of carbon monoxide from vehicles (Hasan and Rahman, 2017). This pollution affects the health of the surrounding residents in return (Shikwambana and Tsoeleng, 2022). Shikwambana and Tsoeleng (2022) further indicate that continuous exposure to carbon monoxide affects respiratory capacity and contributes to anaemia, uncontrollable weight loss as well as kidney and brain damage. Noise is another environmental and social challenge experienced in urban settlements where there is a high number of people and background noise is experienced owing to the movements of vehicles, loud music, and voices (Turok and Borel-Saladin, 2014).

The expansion of human settlement developments in a particular area increases the number of criminal and vandalism cases and reduces the safety and security levels of the residents (Weimann *et al.*, 2020). Geyer and Quin (2018), in the study conducted on social diversity and strategic mixed land-use development in SA, note that urban residents have fears and

aspirations about their safety as well as the future of the communities. Their fears are in relation to property monetary value as residential units are perceived to be investments for the future but fear that challenges surrounding their neighbourhood might reduce the property's market value.

Regardless of the negative impacts associated with human settlement developments, there are also benefits associated with these developments, for instance, their proximity to workplaces, health facilities, and educational facilities (Culwick and Patel, 2020). In addition, community members benefit from settlement developments through the provision of informal jobs such as gardening and domestic work. During the construction phase, the provision of skilled and unskilled labour is evident in jobs such as project construction managers, general workers, and informal food traders (Smith and Brown 2019; Culwick and Patel, 2020).

The political system surrounding African countries is that government recognises urban human settlements as centres for business production that contribute to economic prosperity for rural emigrants (Ahmed and Dinye, 2011). Fuseini and Kemp (2015) indicate that this notion has contributed to poor willingness by States to strengthen their country's planning policies that incorporate spatial, economic environmental, and social aspects of human settlement developments because urbanisation is perceived as poverty alleviation mechanism. In SA, there are laws and policies - such as the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) and National Environmental Management Act 107 of 1998 (NEMA) that aim to promote public participation and stakeholders' involvement in decision-making related to developments. However, the effectiveness of the implementation of such policies remains merely a tick-box exercise because of political influence and poor professional ethics (Maphanga *et al.*, 2023). Therefore, this affects social cohesion as communities feel unempowered to make decisions on matters that affect their well-being.

The challenge in creating sustainable human settlements is that it should go beyond the provision of housing and consider the needs of both current and future generations (Peberdy and Crush, 2017). Sustainable settlements consider factors such as protection of ecological features where people work and play, the availability of basic municipal services and access to amenities required to improve their quality of life and (Du Plessis, 2015; DHS, 2019). While the SA government has employed several programmes and strategies to redress the human settlement and spatial challenges of the past through the intensive development of residential areas, it was deemed necessary to investigate the link between the rapid expansion of urban areas and its impacts on the environment and social well-being of the people.

1.2 Thematic Considerations

Human settlement developments contribute to significant environmental impacts and the social well-being of the communities while, on the other hand, these are perceived as part of economic growth where they are situated (Shikwambana and Tsoeleng, 2022). Human settlement development projects are associated with the construction and upgrading of infrastructure for housing, roads, stormwater management, water provision and sanitation, sewage treatment plants, waste landfill sites, and other commercial facilities (Ogra and Onatu, 2013; Massey and Stevens, 2022). Prior to the approval of human settlement development projects by Competent authorities, the provision and availability of infrastructures for services was one of the decision-making criteria in terms of the NEMA EIA regulation of 2017. Massey and Stevens (2022) agree with Nhamo *et al.* (2021) that service delivery levels drop mainly in areas experiencing continuous urban human settlement expansion as the government and private sectors (businesses and housing developers) usually struggle to match services with the population growth. Poor services affect residents owing to a lack of proper sanitation due to continuous sewage spillages resulting from pipeline ruptures (Culwick and Patel, 2020). Delayed waste collection by municipalities and overflowing landfills are typical examples of poor service delivery associated with human settlement developments (Ogra and Onatu, 2013). In SA, particularly Gauteng, these issues present challenges to governments, private sectors, and residents with a much-required effort to create better living conditions for citizens (Tippett *et al.*, 2007).

Environmental and social issues manifest through ecological degradation where during the construction phase of human settlement development, the clearing of indigenous vegetation destroys the habitat for indigenous flora and fauna and takes up space for agricultural practice (Nhamo *et al.*, 2021). Poor waste management is seen through littering illegal dumping on the streets and delayed waste collection by municipal service providers. This results in some of the waste ending up in water resources (Ogra and Onatu, 2013). In addition, water pollution results from the impending diverting of watercourses by using building rubble to fill in wetlands and flood lines as a method of extending and stabilising developable areas (Tippette *et al.*, 2007). Seepage of hydrocarbons such as heavy oils, petrol, diesel, and heavy, lubricants from residential areas end up in water resources that in turn affect aquatic life (Nhamo *et al.*, 2021).

This study is geographically confined to Gauteng, the economic hub of South Africa. Gauteng is the smallest province land-wise, occupying only 1.5% of the country's land area, but it is home to 26% of the country's population (Kleynhans *et al.*, 2012). Over the last two decades, Gauteng has experienced a rapid population increase and a notable number of human settlement development projects that contributed to the increased environmental and social impacts (Ogra and Onatu, 2013; Gauteng SOER, 2021). Some of these impacts are directly linked to the disruption of farming activities because of the loss of land for agricultural purposes (Culwick and Patel, 2020). Known old agricultural arid lands are now re-zoned to urban human settlements, taking away space previously used for substantial farming by old residents adjacent to newly developed areas (Culwick and Patel, 2020). Old residents who previously depended on agricultural lost land to human settlement development.

Environmental and social impacts of human settlement in Gauteng can also be found on the water cycle as an example in urban settlement. Nhamo *et al.* (2021) indicate that human settlements reduced evaporation from 40 to 30%, reduced infiltration of water to underground aquifers from 50 to 15%, and increased run-off from 10 to 55%. This in turn increased the stormwater run-off and downstream flooding. Furthermore, urban human settlement places high demands on non-renewable resources, water, and energy needs (Massey and Stevens, 2022). As a case in point, the Gauteng State of the Environment Report (2018) reported that many of the water resources within the province are under stress from increased demand for human and commercial water consumption, coupled with poor management of water quality and degradation of river and wetland ecosystems.

Building sustainable cities has been a major focus of government in post-apartheid urban SA. While successes can be noted, there is growing concern regarding how the social and environmental factors are incorporated during the planning and implementation of human settlement developments (Culwick and Patel, 2020). Based on the above, a critical analysis of the environmental and social impacts associated with human settlement projects was deemed necessary to shed light on the challenges associated with the implementation of environmental and social impact assessment tools to promote sustainable human settlements in SA urban areas.

1.2.1 Research Questions

In view of the above considerations, the following questions guided the entire research process:

- (a) In what ways do human settlement development projects impact the environment and social well-being of residents in Ekurhuleni, Gauteng?
- (b) What challenges and factors exist in managing the environmental and social impacts of human settlement developments in Ekurhuleni, Gauteng?
- (c) How effective are the environmental and social impact assessment tools in addressing human settlement development impacts in Ekurhuleni, Gauteng?
- (d) How can the environmental and social impacts of human settlement development in Ekurhuleni, Gauteng, be best mitigated?

1.3 Aim and Objectives of the Study

The aim of this research is to investigate the consequences of human settlement development projects on the environment and social well-being and factors accounting for failures in the management of environmental and social impacts of human settlement projects. It is also to undertake a comprehensive research study on environmental and social injustice associated with the continuous expansion of urban human settlement developments in the Boksburg area, under the CoE, Gauteng, SA. In doing so, the study contributed to the scientific body of knowledge on urban environmental and social problems.

In view of this, the objectives of the study are to:

- (a) Assess the impacts and consequences of human settlement development projects on the environment and social well-being in Ekurhuleni, Gauteng.
- (b) Analyse challenges and factors contributing to failures in managing the environmental and social impacts of human settlements development in Ekurhuleni, Gauteng.
- (c) Examine the effectiveness of the environmental and social impact assessment tools in addressing human settlement development impacts.
- (d) Propose alternative solutions to mitigate the environmental and social impacts of human settlements development.

1.4 Significance of the Study

Scholarly research on the environmental and social impacts of human settlement development in urban areas of SA is limited. Academic studies on the subject have concentrated on energy

generation and mining projects, such as a recent study in Xolobeni, Eastern Cape, (Maphanga *et al.*, 2023). The extent to which continuous expansion of urban human settlements affects the environment and social well-being, as well as challenges associated with the implementation of EIA and SIA on human settlement development, remains poorly understood.

This study explored the human settlement forms and theories in a global context, Sub-Saharan Africa (SSA) and SA. In this exploration, the focus was on the conceptual and theoretical issues that helped to understand urban spatial planning as well as its contribution to environmental and social management systems. In this regard, the emphasis was on settlement theories forms that included normative and neo-classical theories which are applied globally, regionally, and locally. These theories assisted in revealing some of the root causes of environmental and social challenges of human settlement developmental designs. Of major importance was the concept of urban sustainable human settlements, together with its relevancy to SSA cities following the historic urban spatial dilemmas nexus as well as the advantages, and disadvantages of residing in urban suburbs. The discussion of the different theories on settlement forms was meant to facilitate and conceptualise environmental and social dilemmas that exist in SA urban areas. This method resonated well with the study as it provided a trans-disciplinary approach that focused on available decision-making tools such as environmental and social impact assessment processes that are conducted prior to authorising applications for proposed human settlement development projects. The Sustainable Cities and Management of Urban Human Settlement Development Framework for SSA is also included within the theoretical scope of the study and assisted in exploring the factors and dilemmas experienced by the Boksburg-CoE (Gauteng) citizens in accessing basic services.

Academically, the study will provide contemporary insights into the management of environmental and social impacts associated with urbanisation, land-use management, and environmental policy challenges. The study highlights the political power challenges that exist in the implementation of government housing projects. Thus, the study will generate essential knowledge that will help to ascertain the seriousness of impacts associated with historic spatial injustice in SA.

1.5 Methodological Underpinnings

The philosophical positionality underlying this study came from interpretivism/constructionism which is also known as post-positivist (Blaikie, 1997). The positivist approach adheres to the view that only accurate knowledge gained through

observations and measurements is trustworthy (Blaikie, 1997). Meanwhile, in the adopted interpretive research approach no predefined dependent and independent variables are determined. The focus is on how humans make sense of emerging situations (Kaplan and Maxwell, 1994). Thus, the interpretive approach involves the researcher interpreting elements of the study by integrating human interests and feelings around the matter (Blaikie, 1997; Venkatesh *et al.*, 2013). Consequently, the epistemological stance on interpretive position is that access to reality (given or socially constructed) is through social constructions of shared meaning, consciousness, and experience of life (Dudovskiy, 2016).

Post-positivism is considered a meta-theoretical philosophical position seeking to advance some assumptions made on positivism (Blaikie, 1993; Dudovskiy, 2016). In post-positivism, human knowledge is not only based on solid unchallengeable doctrines but is a result of the amalgamation of different conjectures (Dudovskiy, 2016). Ideally and practically, the adoption of this philosophical position is the perception that in the social world, sense and meanings are constructed over time through experience in different situations. Using the interpretive perspective provided knowledge about the environmental and social impacts of human settlement developments in Gauteng.

1.5.1. Research Design

This study adopted a mixed-method strategy for data collection and analysis for primary and secondary data as well as case studies. Both quantitative and qualitative data were collected through semi-structured interviews, case studies, field observations, and document analysis (Driscoll *et al.*, 2007). For this study, a combination of primary, and secondary data and case studies was deemed fit to gather information relevant to meeting the research aims, and objectives and answering the research questions.

Data was collected through semi-structured interviews in the Boksburg area on community members who reside around the selected project areas as indicated in Table 4.2. Their daily observations about the environmental and social impacts associated with the continuous expansion of urban areas assisted the researcher in describing and understanding the extent to which residents are affected socially. Interviews were conducted with GDARD officials as a competent authority responsible for assessing and issuing environmental authorisations for human settlement development proposal applications. Interviews were also conducted with CoE officials (project managers) responsible for human settlements' project planning, construction, and the implementation of housing projects. These participants provided in-depth

information about project designs, consideration of sustainable settlement objectives, and the management of impacts during the construction and operation of the settlement projects. In addition, interviews were conducted with CoE officials (town planners) who are responsible for assessing and proclaiming the establishment of townships within the CoE's jurisdiction. These participants provided information on the consideration of land-uses, spatial development designs, and future development planning.

Furthermore, the interviews were conducted with environmental consulting companies that have environmental assessment practitioners responsible for evaluating and proposing mitigation measures to address the environmental and social impacts of human settlement development projects. Participants provided in-depth on ranking the consequences of identified impacts and the effectiveness of the EIA process in mitigating environmental and social impacts emanating from the continuous expansion of urban settlements. FGD was conducted with a group of environmental assessment practitioners who are considered subject experts in the field of environmental and social issues. These participants assisted in sharing information on the policies and regulations challenges associated with the management of environmental and social impacts of developments.

To gather information on the lived experience, community members residing around the study areas were interviewed. Lastly, environmental impact assessment reports of the selected five projects were reviewed to determine the cumulative impacts of projects, the consideration of stakeholders' comments in decision-making as well as the inclusion of social issues in the EIA reports.

1.5.2. Population and Data Collection Tools

The target population included residents around the sampled urban human settlement development projects and those adjacent to the developments as indicated in Table 4.2. A total of 50 questionnaires were administered to the community members (see questionnaires in Appendix 12). Residents were targeted to provide information on challenges and implications of residential developments on their environment and social well-being, thus responding to objective a). A total number of five interviews were conducted with GDARD environmental specialists (see questionnaires in Appendix 14). This population group was targeted as officials responsible for the approval of environmental impact assessment applications for human settlement development projects, thus responding to objectives b) to d).

Five interviews were conducted with town planners from the Department of City Planning (CoE) who are responsible for approving applications for the township and residential establishment in terms of municipal spatial planning and land-use management by-laws. This population group was targeted to provide information on institutional and policy challenges involved in spatial development framework and approvals of township establishments thus responding to objectives b) and d).

Five interviews were also conducted with project managers and engineers from the Department of Human Settlement (CoE) who are responsible for the incorporation of environmental and social issues into human settlement development projects' planning and implementation development. This population group was targeted to provide information on strategies and management plans that are implemented by the municipality in the management of the environmental and social impacts of residential development projects, thus responding to objectives a) and b).

Five interviews were conducted with environmental assessment practitioners (EAPs) from five different private environmental consulting firms that are responsible for conducting EIA processes for proposed human settlement development projects (see questionnaires in Appendix 15). This population group was targeted to provide information on contributing factors to the failure of integration of existing impact assessment tools and how the public concerns are incorporated into decision-making, thus responding to objectives a) to d).

Lastly, FGD was conducted with EAPs who are responsible for conducting EIA processes (see discussion questionnaires in Appendix 16). The FGD assisted in gathering information about the challenges associated with the implementation of EIA policies and regulations together with its effectiveness in mitigating environmental and social impacts of the project, thus responding to objectives b) to d).

Ethical clearance was obtained from University of Witwatersrand ethics clearance committee before investigating the issues raised in the research objectives (Appendix 1), the permission letters from the Provincial Government of GDARD responsible for the environment (Appendix 6), the permission letter from local government, COE responsible for town planning and the implementation of human settlement development projects (Appendix 5), permission letter from EIA consulting firms (Appendices 7 - 11). Lastly, informed consent from the participants was also obtained before data collection. All the participants were provided with consent forms to complete before the data collection process (Appendices 17 - 19).

1.6 The Scope of the Study

The scope of the study defines what a study will or will not do. In this case, the geographical scope of this study was limited to the CoE, in particular, the Boksburg area, and not the entire city or Gauteng. The reasons accounting for this were time and financial constraints because the study was self-funded. Within this geographical setting, the thematic focus was on the environmental and social impacts of human settlements, the effectiveness of environmental and social impacts assessment tools, challenges of urban land-use change, challenges associated with minimising socio-environmental impacts, and concepts of urban human settlement, sustainability, and indicators of healthy urban livelihoods.

1.7 Keywords and Definitions

To understand the common terminology used in this study better, Table 1.1 explains such terms in the context of this thesis:

Table 1.1: Key terms and definitions

Terms	Definitions
Cumulative Impact Assessment	An assessment of environmental and social impacts that occur because of adding more impacts from one or more activities into the past and present challenges and responding by proposing reasonable future actions to mitigate such impacts (Neri <i>et al.</i> , 2016).
Environment	The (i) physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival; (ii) the aggregate of social and cultural conditions that influence the life of an individual or community (Ford and King, 2015).
Environmental impact assessment	A planning process whereby biophysical, social, and other relevant factors associated with a proposed development or project activities are identified, impacts are established, evaluated, and mitigated prior to project commencement (Sadler <i>et al.</i> , 2004).

Human settlement	A holistic functionality of the human community - whether a village, town, or city - with all its cultural and spiritual elements, social materials, and organisational structures that sustain it (UN-Habitat I, 1976).
Integrated development-planning	A planning approach that aims to involve the community and the municipality to find the best solutions for the socio-economic demands of a specific area (Visser, 2002).
Life cycle assessment	An analysis of the environmental impacts of products and services throughout its life cycle (Finnveden <i>et al.</i> , 2009).
Project	A set of tasks, activities, proposals, and plans that must be completed to achieve a particular goal or outcome. These tasks, activities, or proposals significantly bring changes through undertaking the construction of infrastructure, change in land use, and the alteration of the environment. These changes may not be implemented without a permit, licence, consent, or approval from an authorising agency and other key relevant stakeholders (Davidson, 2000).
Project life cycle	Is the order of activities and phases that a project undergoes from the beginning to the end, it assists managers and planners in organising work packages as well as achieving the objectives and goals of the project within the stipulated timeframe and cost (Davidson, 2000).
Social	The interaction of the individual and the group, or the welfare of human beings as members of society (Aucamp, 2003).
Social Impact Assessment	A predictive study that assesses the social issues that are likely to be posed by a projected development or project. Such issues include cultural consequences that affect the way people conduct themselves, work and relate with one another, organise

	themselves to meet their daily needs, and how they cope with development in general (Burdge and Vanclay, 1996).
Spatial Development Planning	The coordination and application of methods and approaches by the public and private sectors to influence the distribution of developmental activities in spaces of various scales (Karam <i>et al.</i> , 2016).
Sustainable development	“A process of change in which utilisation of natural resources associated with technological improvement, the direction of investments, and changes in institutions are integrated to enhance human needs and aspirations for the current and future generation (Waas <i>et al.</i> , 2011).
Sustainable urban settlement	A settlement that can meet the needs arising from current and mounting challenges of urbanisation without compromising the future generation to meet their own needs (UN-Habitat II, 1996; Tibaijuka, 2008).
Urbanisation	A process by which rural dwellers migrate to urban areas for economic development and industrialisation opportunities (Brelsford <i>et al.</i> , 2016).

Source: The Researcher’s own synthesis (2023)

1.8. Structure of the thesis

The thesis is developed and organised into seven chapters. After this introductory chapter, the succeeding chapters are outlined as follows:

Chapter Two: Conceptual Analysis Consideration of human settlement developments theories in a global context. The focus of this chapter is on human settlement theories and their contribution to urban spatial planning. The chapter also discusses the impacts of human settlement development projects on the environment and social well-being. Analyses are conducted about the effectiveness of the application of EIA and SIA tools in urban human settlement development projects from global contexts.

Chapter Three: Theoretical perspectives on human settlement developments in Sub-Saharan Africa and South Africa context outlines human settlement theories that contributed to environmental and social injustice in SSA countries. The chapter further explores and examines the sustainable cities concepts and management frameworks as well as their applicability in African cities. The chapter drills down to analyse the SA Apartheid urban spatial patterns and their contribution to current environmental challenges. In addition, the project life cycle and management of environmental and social impacts on each phase are discussed. Lastly, the application and limitations of current approaches in assessing the environmental and social impacts of urban settlements are addressed. Additional impact assessment tools that could be integrated into mitigating environmental and social impacts are also deliberated.

Chapter Four: Research methodology and design focuses on the research methods and designs considered in answering the research questions and addressing specific aims and objectives. In general, the chapter justifies the methodological consideration and procedures followed by the researcher in data collection and analysis.

Chapter 5: Empirical Evidence. presents the findings of the environmental and social impacts of human settlement development projects that mostly affect the study area. Secondly, the chapter presents the interview findings from the research participants. Lastly, the chapter presents the findings from the reviewed EIA reports of the sampled five human settlement development projects.

Chapter 6: Results Analysis and Discussions. This chapter analyses the key findings of the research. It outlines how the previously published literature relates to the study findings. Research findings from the research participants are discussed first and this is followed by findings from the review of five sampled human settlement development EIA reports.

Chapter 7: Conclusion and Recommendations presents the conclusion of the study by summarising the key findings and proffering recommendations in relation to the management of environmental and social impacts of urban human settlement development projects while making recommendations for future research.

CHAPTER TWO

CONCEPTUAL ANALYSIS AND LITERATURE REVIEW

2.1 Introduction

This chapter contextualises the study within the analysis of environmental and social impacts associated with human settlement development in urban areas, with particular emphasis on challenges associated with urbanisation, urban sustainable development approaches, the effectiveness of EIA and SIA in addressing socio-economic and environmental impacts, institutional challenges that exist in the management of the impacts and contribution of community members in decision-making.

Thematic categories of relevant literature are outlined as follows in this chapter: human settlement origins and theories, advantages of urban and rural settlements, the interrelationship of the biophysical environment with settlements, common environmental and social impacts of urban human settlements in a global context, management of environmental and social challenges through the implementation of impacts assessment tools. The above thematic topics were deemed fit and interesting for addressing the research aim and objectives and answering the research questions for this study.

2.2 Development and Origins of Human Settlement Developments

The human settlement concept advanced over the years as a global shelter strategy that incorporates both social and economic developments (Nkambule, 2012). There is a global consensus that human settlement developments are not only about housing infrastructure and spatial aspects but also about the physical manifestation of social and economic activities (Moobela *et al.*, 2007). Human settlements are an essential basis to promote social and economic development as “places, where people can live, learn and work in conditions of safety, comfort, and efficiency, are a fundamental and elementary need” (UN-Habitat I 1976: 8).

Considering the above observations, the human settlement was defined as the holistic functionality of the human community - whether a village, town, or city - with its cultural and spiritual elements, social materials, and organisational structures that sustain it (UN-Habitat I, 1976). The UN-Habitat I (1976) further indicates that the human settlement fabric consists of three fundamental elements (physical, social services, and infrastructure). Matamamba (2019)

alludes to the fact that physical elements refer to manmade shelters that vary in size, type, and composition, built with the intention of providing dwellers with protection, privacy, safety, and security. While social services elements are facilities for education, health, employment, nutrition, and recreation required to sustain the community's well-being (Moreno *et al.*, 2016; Matanamba, 2019). Lastly, 'infrastructure elements' refer to designed complex networks aimed at delivering goods and services to the shelters (Moreno *et al.*, 2016; Matanamba, 2019).

The first recognised human settlement development was launched in 1944 by the United Nations after the Second World War (Weissmann, 1978: 228 - 229). The introduction of this development was to offer community shelter, services, and facilities (Weissmann, 1978). Since then, human settlement and housing have been linked to socio-economic development while most less-developed global southern countries face challenges with the integration of these elements, especially in urban areas (Weissmann, 1978; Aribigbola, 2004; UN-Habitat, 2014).

Owing to challenges associated with the integration of human settlement development elements, the United Nations (UN) recommended that states form agencies and set objectives for the proper management of urban human settlement developments (Sarkar, 2010). Rapid urbanisation, especially in underdeveloped countries, posed more challenges that needed a holistic approach to address housing and settlement dynamics in conjunction with social, environmental, economic, and spatial development planning dynamics for settlement development (Todes *et al.*, 2010; Adegun, 2018).

In 1955, the United States programme on environmental planning extended its scope to include strategies to manage urbanisation and general planning for national social and economic development (UN-Habitat I, 1976). In this regime, priority was given to social aspects of housing, community-planning and the mobilisation of self-help innovation (Weissmann, 1978). In 1964, the UN officially approved the formation of its Centre for Housing, building, and Planning (Weissmann, 1978). This was the beginning of restructuring institutions for the management of human settlement developments, which led to the first UN Habitat 1 Conference that held in 1976 in Vancouver (Weissmann, 1978). At this conference, the concept of human settlement was invented in a way that incorporated various development elements that were not linked previously (Sarkar, 2010).

In 1996, 20 years after the UN-Habitat I conference delegates from countries and organisations all over the world met in Turkey at a conference (Habitat II), which is also known as a city summit (Sarkar, 2010). One of the aims of the conference was to draft global action plans on

achieving sustainable human settlements and highlight the ongoing deterioration of shelter conditions globally. The same conference also insisted on the establishment of principles of partnership through real estate developers and encouraged decentralisation through democratic local governments while noting the ongoing need to mobilise resources for housing (UN-Habitat II, 1996). The UN-Habitat II (1996) encouraged the countries to increase housing provision by allowing private real estate developers markets to operate in an environmentally and socially acceptable manner while assisting those who cannot be beneficiaries of traditional government housing schemes (Sarkar, 2010; Todes, 2012).

In 2016, the UN Habitat III conference was held in Quito City, Ecuador. Approximately 30,000 delegates from 167 different countries attended. The conference was entitled “Housing and Sustainable Urban Developments”. One of the outcomes of the conference was the adoption of the New Urban Agenda as a vision for sustainable urban development for the future (Habitat III, 2016; Adegun, 2018). The New Urban Agenda represents a vision and strategies for building better urban human settlement developments through considering urban culture and heritage, safer neighbourhood, urban ecology and resilience, urban spatial strategies (spatial planning and designs) as well as an increase in urban population owing to migration and refugees who requires residential units (Habitat III, 2016; Todes, 2012).

2.3. Human Settlement Hierarchy

‘Settlement hierarchy’ refers to the order according to which a settlement is arranged because of its population, number of services, functions, and physical footprint (Poom *et al.*, 2014). Human settlement hierarchy is usually considered according to the isolated dwelling (considered the lowest order) up to the conurbation (considered the highest). However, there is no common global agreement on the minimum population size, number of services, and functions that could clearly define a specific settlement (Owusu-Adade and Adom-Asamoah, 2014; Seto *et al.*, 2014). Most scholars indicate that ordering settlement hierarchy becomes a contextual task that is dependent on several local factors, for instance, the population is not always the best-determining factor of the settlement hierarchy (Song *et al.*, 2021). This fact has been proved by Owusu-Adade and Adom-Asamoah (2014) in Ghana via two case studies (Obausi and Mampong settlements) where Obausi has a population of approximately 180 000 people with services that do not match the population while Mampong has a high number of services with a small population of approximately 50 000 people (Inkoom *et al.*, 2022).

Based on the above, human settlement hierarchy is contextualised based on one of the following criteria: (a) area and population (size of the settlement); (b) a number of the facilities and services within the settlement; (c) relative spheres of influence of the settlement (areas serviced by such settlement such as schools and labour recruits) (Poom *et al.*, 2014).

Figure 2.1 presents the human settlement hierarchy in a pyramid shape depending on the size, functions, and services they provide. The first bottom three settlements (isolated dwellings, hamlets, and villages) are referred to as rural settlements and are usually managed and led by traditional leaders – ‘chiefs - in African countries. The last four settlements (small town, large town, city, and conurbation) are often referred to as urban settlements usually managed by City Councils, private property developers, or real estate (Roberts *et al.*, 2016). Roberts *et al.* (2016) further indicate that rural settlements are usually dependent on and supported by primary activities such as agriculture, fishing, and mining.

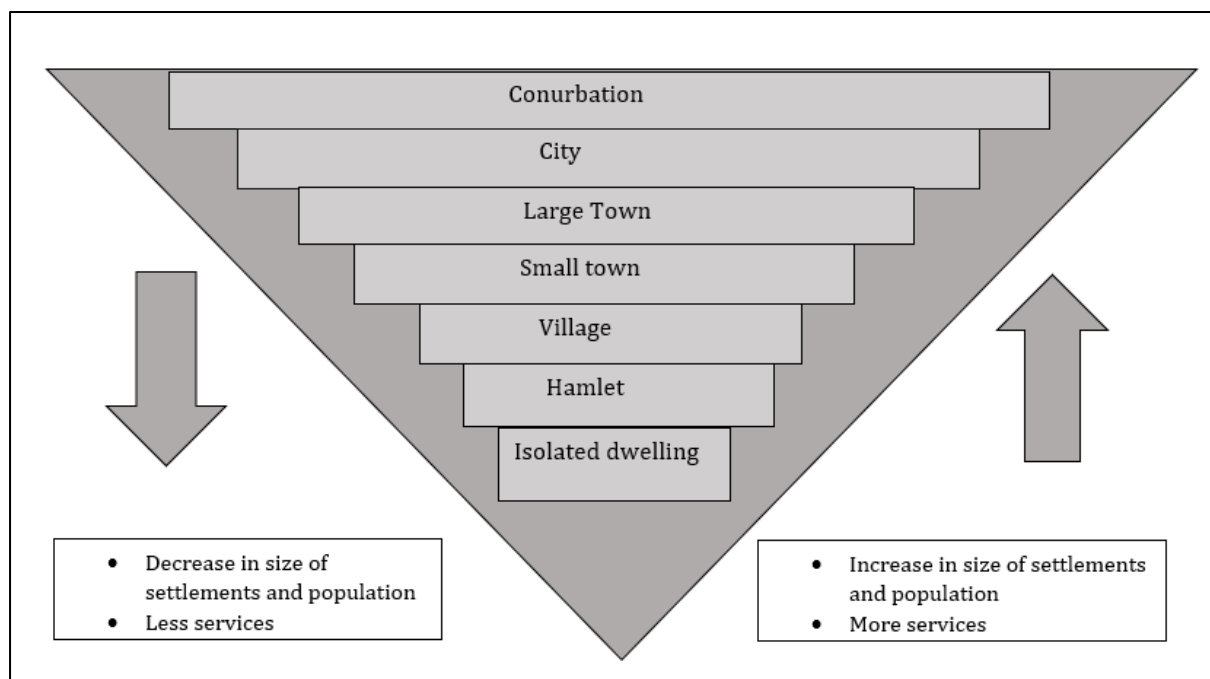


Figure 2.1: Human settlement hierarchy

Source: Modified from Neil and Navata (2019)

The below table explains each settlement and its characteristics as indicated in Figure 2.1.

Table 2.1. Human settlement characteristics

Settlement type	Settlement characteristics
Isolated dwelling	This is the most basic settlement consisting of a stand-alone dwelling, which might be a farmhouse on a ranch. Usually, there are no services in the form of shops and schools that support isolated dwellings. The population ranges from 1 to 10 people (Wessels, 2012; Roberts <i>et al.</i> ,2016).
Hamlet	This settlement usually consists of a small cluster of houses with no defined services and functions. However, a post box is likely to be found in this settlement. Population size ranges between 11 to 100 people (Wessels, 2012; Roberts <i>et al.</i> ,2016).
Village	The ‘village’ is defined as any settlement with a population of 101 to 2 000 people. The village will usually have services such as a shop (groceries), post office, church, village hall, school, sports ground, and basic health care clinic (Wessels, 2012; Roberts <i>et al.</i> ,2016).
Small town	The small town is on the lowest rank of urban settlements with a population range between 2 001 to 10 000 people. A small town is characterised by all the services found in the village. However, the population threshold for town determination varies from one country to the other (Roberts <i>et al.</i> , 2016). In Australia, a small town will have a population size between 1 000 to 19 999 people. In African countries like Ghana small towns are urban areas with a population size between 5 000 to 1 999 (Inkoom <i>et al.</i> , 2022). In South Africa, a small town in any urban area with a population that is less than 50,000 people (Matamanda and Chirisa 2018).
Large town	A large town has a population between 1001 to 1 00 000 people and may have a railway station, hospitals and clinics, sports centres, and many secondary schools (Roberts <i>et al.</i> , 2016).

City	Following the large town is the city which is a complex urban area with a population ranging between 100 001 to 1 000 000 (Wessels, 2012; Matamanda and Chirisa, 2018). The land use in the city tends to be diverse and with mixed land uses (Roberts <i>et al.</i> ,2016). A typical example of an African city with mixed and diverse land use is Cairo, the capital city of Egypt which is anchored on transportation services, construction, wholesale and retail, tourism attraction, health facilities, higher education, and public administration sectors (El Nakeeb and Barakat, 2018).
Conurbation	Lastly, the conurbation is a continuous urban region owing to the outward growth and expansion of cities that engulf towns and villages to form a bigger urban region (Roberts <i>et al.</i> ,2016; Matamanda and Chirisa, 2018). A perfect example is the Gauteng provincial region which includes Johannesburg, Pretoria, Midrand, Boksburg, Krugersdorp, and various towns under the region with a population size of approximately 15 000 000 people (Gauteng City-Region Observatory, 2018).

Source: The Researcher's own synthesis (2023)

Human settlements consist of the built-up areas where people live their everyday lives hence its size and population are determined by the distribution of socio-economic facilities and services. The settlement type and size have a direct relationship with the state of the receiving environment. This study contests that human settlement developments should be planned according to the local socio-economic factors and land use management frameworks that are linked with environmental planning policies.

2.4. Theories of Human Settlement

Salats *et al.* (2011) acknowledge that various scholars formulate different theories for human settlement. However, there is no single theory that sufficiently defines settlement that addresses all the changes associated with human settlement development and urbanisation. This is the case as human settlements are complex and always evolving making it difficult to understand their dynamics (Short, 2006; Jamal,2017). The section below deliberates on theories that have

direct positive and negative impacts on how environmental and social impacts are managed on human settlement developments.

2.4.1. Classical theories on settlement forms

The first theory to understand were founded on sociological influences. In this regard, people's behaviour influences the city's patterns. Under the classical group, two theories relate to this study: (i) the Concentric zone model and (iii) the ekistics theory.

(i) Concentric zone model

In early 20s, EW Burgess developed the concentric zone model that became known as the Burgess Model (Hall 1996; Meyer 2000). The Burgess Model is among the early urban descriptions that Chicago City followed during its establishment (Meyer, 2000). This model divides the city into five zones that characterise the spatial and development arrangement. These zones are presented in a ring format as indicated in Figure 2.2.

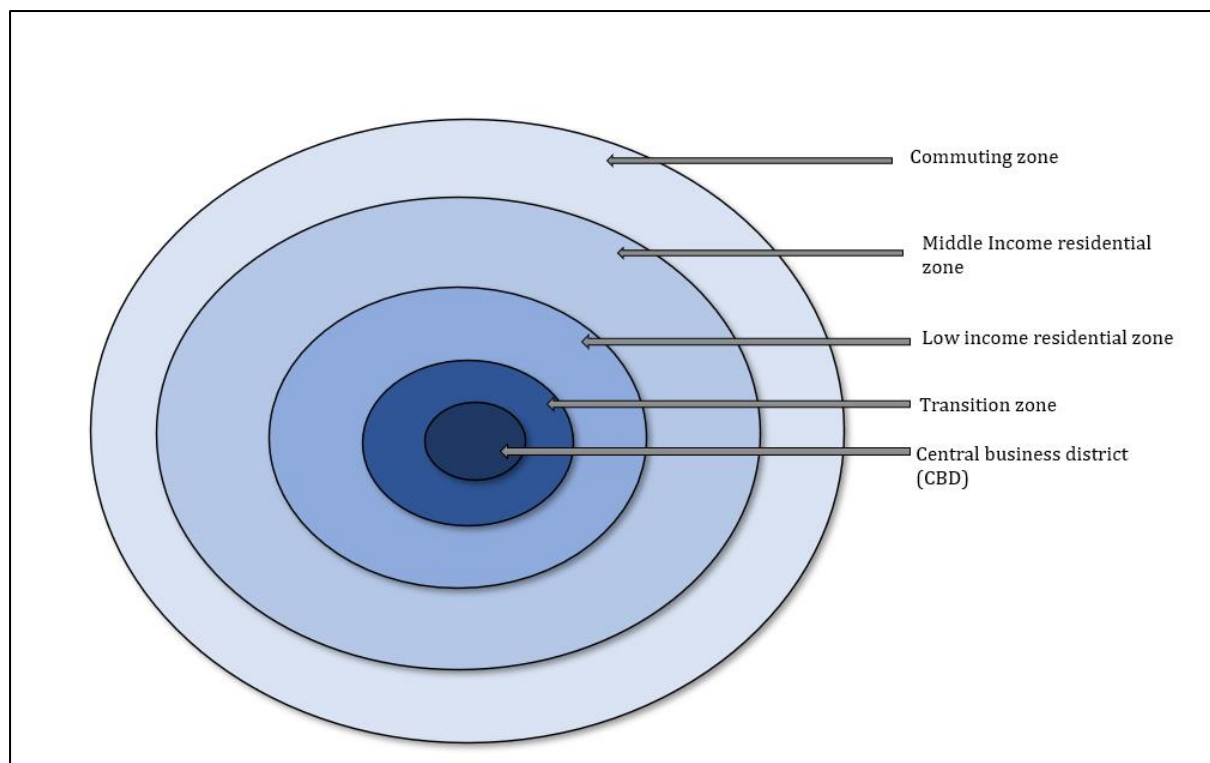


Figure 2.2: The concentric zone model

Source: Modified from Jamal (2017)

The first zone at the core represents the Central Business District (CBD) which is the hub of the city's commercial activities (Burgess, 1925; Wu and Yang 2010). The second zone, known

as the transition zone, represents the factories and industries. Tian *et al.* (2010) indicate that this zone also represents the poor social groups of new immigrants situated in mixed residential areas. In many global southern countries, this zone has recently been classified as dilapidated abandoned buildings that have lost property value (Jamal, 2017). The third zone is known as the low-income housing zone within the inner-city suburbs with limited access to amenities, the working-class residential homes are found especially for independent males (Jamal, 2017). The fourth zone is known as the middle-income city suburbs housing zone found in the outer city suburbs where middle-salary-earners reside in better housing with better quality of life (Tian *et al.*, 2010; Jamal, 2017). The last zone is known as a commuting zone that is found beyond the city's built-up areas where high-income earners reside in large and open residential units enjoying a good quality of life (Tian *et al.*, 2010; Jamal, 2017).

This model suggests that land uses, and urban human residential units occur in rings around the centre of the city and the residential status increases from the city to its periphery (Shane, 2005; Jamal, 2017). However, this theory has been criticised by contemporary urban geographers who indicate that the model does not work well for cities outside the US, especially those developed under historical circumstances such as South Africa where most urban areas were developed during the apartheid regime and segregated poor black people from residing in formal urban areas (Shane, 2005; Todes, 2011). Moreover, this model has been further criticised that even in the US, owing to changes recent changes in transportation advancement, global economic transformation, and information technology cities are no longer organised in this fashion as some industrial areas are found in the outskirts of the cities with available rail-subway transportation (Jamal, 2017).

This theory has both negative and positive socio-environmental impacts based on the arrangement of urban zones. For instance, the transitional zone has the potential to cause ambient air pollution emanating from factories and industries affecting low-class groups consisting of people with health problems that reside nearby. However, transitional zone dwellers have the benefit of residing close to the workplace. Some studies such as those conducted by Huchezermeyer (2019) suggest that informal settlements are introduced in the transitional zone owing to the vicinity of factories and industries that present economic opportunities for economically disadvantaged people. Most informal settlements are illegally established out of approved spatial development framework plans. Hence there are no infrastructure services for waste collection and sanitation which further contributes to environmental negative impacts. Conversely, residents from the middle-income zone spend

more time travelling to work, while most prefer to commute individually in their own car which tends to contribute to air pollution as carbon gases are emitted from vehicles (Turok and Borel-Saladin, 2014).

This theory is not always accurate, especially in Global North Countries such as Paris where wealthy Citizens live in areas surrounding the CBD with older houses that continue to have high property values. Those citizens have easy access to the market areas as compared to global South Countries (Lersch, 2013). In a South African context, owing to the apartheid era that segregated poor black people from socio-economic amenities associated with the CBD, many white people resided in the middle-class zone while the transitional zone was used for township developments for black urban dwellers (Huchezermyer, 2019; Todes 2019). This study does not support this theory because it has the potential to contribute to environmental and social imbalance as township dwellers travel long distances to work, hence they resort to establishing informal settlements near factories and CBD that later affect the environment owing to a lack of basic services such as waste collection and sanitation for illegal “squatter camps”. Lastly, this theory expands the urban footprint that affects ecological support, critical biodiversity areas and agricultural land as the commuting zone promotes the clearing of arable land to make way for human settlement development for the wealthy citizens that affords big stands which results in the occupation of big geographical areas with a small population (Gidey *et al.*, 2023).

(ii) Ekistics theory

In 1942, a Greek architect and urban planner called Constantinos A Doxiadis conceptualised the science of human settlements which is known as Ekistics theory (Zarmakoupi, 2015). Doxiadis (1970) argues that there was a need for a systematic approach that would specifically outline human settlement principles for development. The need arose from the notion that urban human settlements were no longer satisfactory for residents owing to multiple problems experienced in the cities (Doxiadis, 1970; Zarmakoupi, 2015). The identified problems, among others, included land-use zoning, imbalance in transportation and traffic, communication, environmental degradation, and urban sprawling that have contributed to indefinable sufferings experienced by dwellers in most global cities (Pollalis *et al.*, 2014; Zarmakoupi, 2015).

Ekistics theory introduced fundamental principles for human settlement designs that aimed to promote socio-economic and environmental sustainability of the new urban areas (Pollalis *et al.*, 2014). Human settlement developments are considered to be a biological complex system that is dependent on different patterns. Thus, the theory has five fundamental principles that

guide developers in shaping the settlements (Doxiadis, 1965: 41- 42; Doxiadis, 1970: 393 - 394). Table and Figure 2.2. below outline the development principles of Ekistics theory.

Table 2.2. Human settlement development principles of Ekistics theory

Development elements	Development principles
Nature	The first principle is that residential units should promote the maximisation of man's potential contact with nature such as water, trees, and animals with other people, and other man-made environments such as roads, and buildings.
Society	The second principle is the minimisation of the effort required for the achievement of man's actual and potential contact.
Shells	The third principle is the optimisation of man's protective space, which means the selection of such a distance from other persons, animals, or objects that can keep contact with them (first principle) without any kind of sensory or psychological discomfort. This is because man tries to maintain a certain distance from other individuals, animals, or objects that may threaten their safety.
Network	The fourth principle is the optimisation of the quality of man's relationship with his environment, which consists of nature, society, shells (buildings and houses of all sorts) as well as networks (ranging from roads to telecommunication). This principle aims to promote order which leads to physiological and aesthetics that influence the architecture of the urban forms.
Culture	The fifth principle is that man organises his settlement in an attempt to achieve an optimum synthesis of the other four principles. This optimisation is dependent on time and space, actual conditions, and man's ability to create a synthesis.

Source: The Researcher's own synthesis (2023)

Figure 2.3 outlines the aspects that satisfy urban residents in relation to their human settlement development-planning:

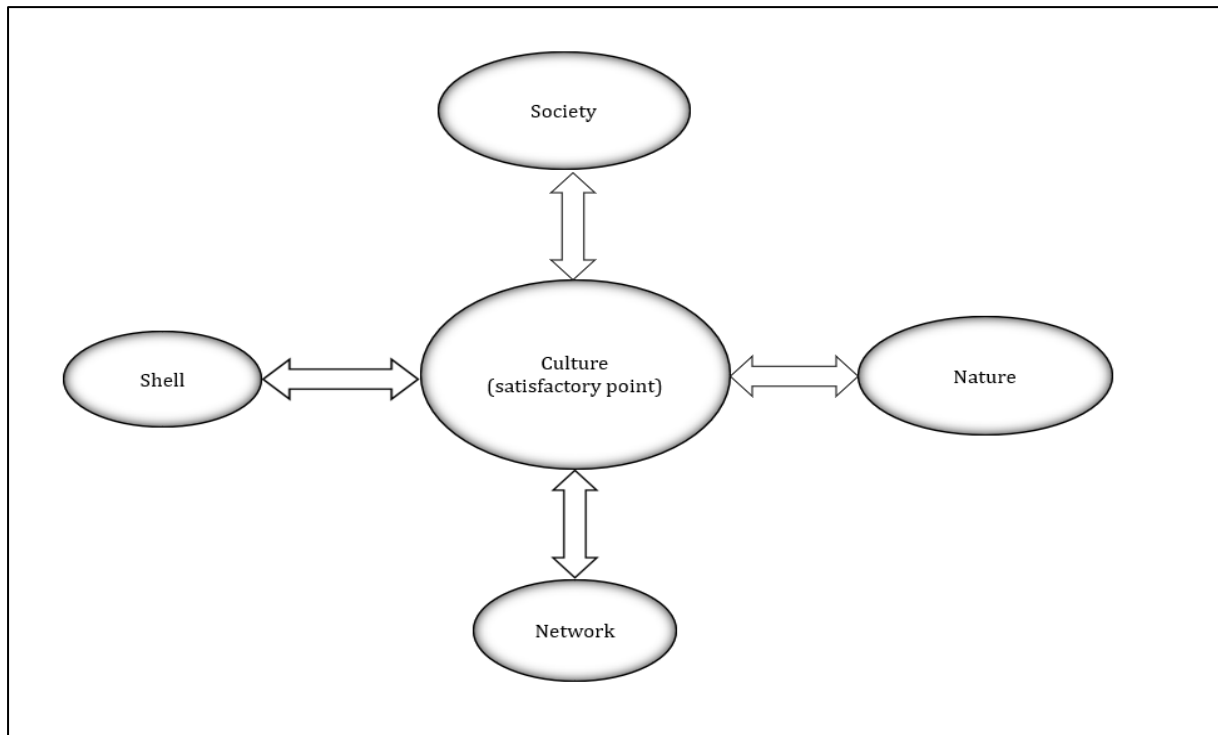


Figure 2.3 Development principles of Ekistic theory

Source: Modified from CA. Dixiadis(1968:55)

This study supports the application of Ekistics theory's principles as it is deemed significant in understanding the environmental and social impacts of urban human settlement developments based on the dilemmas of accessing services such as water, sanitation, waste management, safe neighbourhood, access to suitable road infrastructures, healthy and clean environment. The effectiveness of this theory is conceived as a knowledge-based framework for analysing the social and environmental impacts associated with the continuous expansion of urban human settlement development projects experienced by most cities (Psomopoulos and Perovic, 2005:40; Theodosis, 2015).

Consequently, Ekistics theory responds to the totality of human needs in their settlements in a holistic manner. In addition, the theory is interdisciplinary in the sense that it cuts through different scientific fields such as geography, sociology, architecture, town and regional planning, economics, together with public health. Hence this could explore human settlement dynamics (Pollalis *et al.*, 2014).

2.4.2. Neo-classical theories on Settlement Forms

The neo-classical theories sought to address the shortcomings presented by the classical theories on urban human settlement forms. Two theories relate to this study: (i) new urbanism and (ii) smart growth.

(i) New urbanism

The new urbanism is an urban planning and design movement that began in the early 1980s in the United States. It is the idea of new urbanism gained acceptance from the building of a community which is known as Seaside in Florida USA (Brooke, 1995; Talen, 2002). The movement aims to promote environmentally friendly habits through the creation of walkable neighbourhoods with a densely packed array of housing that is located close to jobs and commercial sites (Talen, 2002; Davies and Townshend, 2015).

In recent decades, new urbanism strategies have encouraged the new urban neighbourhood by advocating for designs based on finding classical architecture from historic towns that worked well in developing functional urban communities (Davies and Townshend, 2015). Hall and Tewder-Jones (2011) criticise the new urbanism design strategies by indicating that they promote dense terrace houses facing out onto the grid patterns of the streets while enjoying access to public transportation and other commercial sites. Additionally, new urbanism favours architectural designs that promote mixed land use, walkability, and adequate public open spaces (Rahnama *et al.*, 2012). The new urbanism has nine basic principles for development as outlined by Rahnama *et al.* (2012: 198 - 199). Table 2.3 explains the basic principles of new urbanism.

Table 2.3. Basic principles of New Urbanism

Elements	Basic Principles of New Urbanism
Sustainability	Promotes environmentally friendly technologies that aim to reduce the use of fossil fuels via solar traffic lights and the reduction of driving and encouraging more walking.
Increased density	The urban residential units must be developed in a way that it is easy to access service facilities via walking.

Quality of life	Developments should enhance human well-being by bringing services closer to homes.
Smart Transportation	Developments should bring transport systems that promote mass-transit transportation.
Mixed housing	Develop housing units that are in close proximity to each other but differ in size, cost and type, for example, multi-story and semi-detached residents within the same location.
Connectivity	Human settlement developments need to connect paths and road hierarchies that ensure that all functions and services in urban areas are easily accessible without much effort.
Walkability	Developments should be designed in a strategic way that will encourage residents to walk in urban spaces that are safe, comfortable, and convenient.
Mixed land use and diversity	Developments should encourage diverse land uses rather than having residential units that are far away from commercial units.
Quality of architecture and urban design	The urban areas should be designed in a more appealing way that emphasises aesthetics, beauty, and order of the neighbourhoods.

Source: Adopted from Rahnamma *et al.* (2012:198 - 199).

In view of the above table, it can be argued that the new urbanism movement is instrumental in addressing urban sprawl through a rebuilding of neighbourhoods within the suburbs (Bohl, 2002). Scott (2014) supports Bohl (2002) who states that this movement synthesises the entire spatial range that is not only concerned with spatial urban designs but also considers other crucial aspects of developments such as environmental protection, urban growth management, and urban revitalisation. Therefore, the conceptions of new urbanism principles are very useful in understanding the forms of current urban residential units that are densely populated within a small geographic area.

(ii) Smart growth

The smart growth theory emerged, during the mid-1990s in America, as a land development concept in acknowledging that urban growth and development will continue to occur. Such urban nexus requires proper strategies to be employed in finding the balance (Sykes and Robinson, 2014; Mohammed *et al.*, 2016). The theory of smart growth aims to address challenges that are fuelled by an increase in the population such as access to employment, traffic congestion, environmental degradation, as well as poor health and safety around urban neighbourhoods (Dong and Thomas, 2015). The main assumption of the smart growth concept is that it would address challenges that are increasing and becoming endemic to the growth and development of urban areas in the world (Wey and Hsu, 2014). This theory has been praised owing to its ability to challenge the old traditional urban planning that advocated for urban low-density developments and single-zone land uses, thereby bringing changes to improve the health and well-being of the ageing population (Chapin, 2012).

The smart growth principle is directed at developing sustainable communities that provide easy access to multiple transportation options as well as housing choices through the prioritisation of infill and redevelopment within the existing communities as opposed to opting to develop in greenfield such as farmlands and natural lands (Mohammed *et al.*, 2016).

In addition, this theory recommends that new neighbourhoods or residential units should be directed closer to the existing developments to spend less finances on bulk infrastructure development and the provision of service delivery through the installation of new infrastructures (Dong and Thomas, 2015; Mohammed *et al.*, 2016). The smart growth theory has ten principles as outlined by Sykes and Robinson (2014:168). Table 2.4 outlines the ten principles of urban smart growth.

Table 2.4. Principles of Smart Growth

Basic element	Development principles
Mix land uses	The practice of placing balanced residential and commercial facilities, with other recreational amenities, within a certain proximity. This balanced combination promotes developments that are healthy and vibrant. Sykes and Robinson (2014) argue that mixed land use benefits communities in a few ways such as environmental-reducing urban sprawl, the use of individual cars and the preservation of open spaces

	and undeveloped lands; promoting a culture of walking and biking around the neighbourhoods that has physical health benefits; promoting a clear connection between the shops and walkable distance to residential units that benefit communities on saving cost for travel around town.
Take advantage of compact building design	The smart growth promotes building on a smaller footprint by growing up rather than out. This principle aims to preserve more green space and protect water bodies and save costs on the construction of service delivery bulk infrastructures.
Create a range of housing opportunities and choices	Urban communities are filled with single-family homes and clusters of high-density apartments, which appear like a forest with only two types of plants. This principle promotes of multi-design of houses within one complex to cater to the so-called “missing middle”.
Create walkable neighbourhood	Human settlement developments should consider walkable distances of approximately 250 m from the residential units to other amenities such as shops, restaurants and other entertainment facilities. These amenities are clustered together within a specific compact design that makes it convenient and safe to walk on those network streets.
Foster district communities with a strong sense of purpose	Smart growth encourages planners to design and craft visions that are unique for that specific community. Set developmental standards that will respect and value the culture of the area where people would be proud to call it home. Smart growth emphasises that developments should blend with the historic attributes of the area and preserve its uniqueness.
Preserve open spaces	Developments should protect the undeveloped land that is a habitat for wildlife. Preservation of undeveloped land has the following benefits: (i) Improves the local biodiversity by protecting endangered species. (ii) Access to greenspaces by urban residents improves physical and mental health. (iii) Undeveloped areas near water courses play a role in improving water quality and reducing the risks of property flooding, and

	(iv). Undeveloped areas that are used as parks, open spaces, and farms strengthen the local economy.
Direct development towards existing communities	The smart growth principle is that human settlement should fill and redevelop the existing communities to mitigate sprawl. This approach improves the quality of the existing and the new residents as it provides closer proximity to jobs and services, as well as increased efficiency because the services will be delivered via the existing infrastructure.
Provide a variety of transportation choices	A successful urban human settlement should consider a multi-modal approach that embraces diverse transport options for residents, such as walking, public transport, individual driving, and bicycles. These patterns should easily link to the main roads.
Make development decisions that are predictable, fair, and cost-effective	In advocating for smart growth, it is vital to understand the perspectives and roles that assist communities to accommodate urban growth. Stakeholders - such as developers, governing bodies, and citizens - can better advocate for smart growth from their perspectives. There are community barriers associated with mixed-use developments and missing middle housing types that promote smart growth. This principle suggests three steps that the affected communities can take to ensure that the decisions are predictable, fair, and cost-effective: (i) Community members must develop a vision for future growth; (ii) Create processes that make decisions faster and more predictable through outlining development objectives that protect natural and cultural resources of the areas, (iii) Make the development process transparent and fair by providing centralised and accessible information.
Encourage community and stakeholder collaboration.	The need for growth in any city or urban area can be best defined by people who live, work, and play there every day. Through public meetings and workshops, communities are engaged by their local government and developers.

Source: Sykes and Robinson (2014:168)

2.4.3. Normative theories of settlement form

The normative theories aim to describe what is characterised as a good settlement form. The theories and principles in this category seek to link human values with their settlement form. The main aim is to identify what settlement ought to be in order to be recognised as optimal. Below are values that are characterised by a settlement as suitable for human values (Watson, 2004).

Theory of Good City Form

The theory of good city form searches for universal rules that comprehensively consider human interaction with the settlement form (Lynch, 1981). Lynch (1981) indicates that instead of focusing on a city as a static form, attention should be given to planning the development and its management. The theory of good city form is premised on five dimensions of settlement performance; (i) Vitality, (ii) Sense (iii) Fit, (iv) Access, (v) Control (Lynch, 1981).

(i) Vitality

Vitality considers the degree to which human settlement provides and supports a healthy environment that promotes human well-being. The focus is on human settlement to promote the health and biological functioning of individuals (Lynch, 1981). The focus is on settlement aspects that encourage liveability; however, liveability is context-based hence it is difficult to identify and measure the level of vitality. Ford (1999) argues that vitality in settlements is mainly espoused by the provision of basic services such as water, sanitation, waste collection, and electricity. Another aspect of vitality, as elaborated by Ford (1999), refers to how settlements are safe from certain hazards such as accidents, violence, crime, and diseases.

(ii) Sense

A good sense of settlement is identifiable (Lynch, 1981). Identity is one of the complex factors of settlement. El Nachar and Abdel-Hadi (2018) argue that the identity of the settlement means the extent to which residents feel comfortable calling such a place home. Residents ought to be aware of where and how they access their basic services such as water and sanitation facilities, bus stops, shops, and schools. El Nachar and Abdel-Haidi (2018) further indicate that the time it takes residents to access resources plays a role in how they define the place. Ford (1999) alludes to the fact that a good settlement development should strive to ensure that land uses co-exist in an orderly manner that avoids nuisances. For example, the functionality of sanitation

and waste collection must be in such a way that they do not cause public health nuisances through the pollution of groundwater and offensive odours.

(iii) Fit

In this regard, 'fit' refers to the extent to which the settlement's spatial patterns align with the citizens' sociocultural behaviour (Lynch, 1981). According to Lynch (1981), there are two critical questions to be answered in determining the fitness of a settlement: would the settlement be able to support human well-being and ensure that residents engage in their day-to-day lives without compromising their safety and health and to what extent does the settlement accomplish its intended purpose as per their planning standards? A suitable human settlement should perform the exact functions that it was intended to (Ben-Joseph, 2005).

(iv) Access

According to Talen and Ellis (2002), 'access' means the ability and degree to which residents who are within a certain settlement - can reach certain services. The emphasis in this regard is on establishing the access systems and controls of such systems, for instance, how residents commute to work, and how children access schools, together with the entire road and pathways network (Lynch, 1981). In addition, access in this regard refers to the availability of municipal bulk services infrastructures that residents should access with minimum effort.

(v) Control

Good settlement control - as explained by Lynch (1981) - is characterised by the certainty and responsibilities of the users (current and future generations) when it comes to controlling the development and management of human settlements. Lynch (1981) alludes to the fact that those who control the place should have good motives, relevant information, and the power to do so. The importance of information in facilitating control of settlements is related to the systems analysis approach through which information regarding the system should be made available in order to inform the decision (Castells, 2010; Cirolia and Berrisford, 2017). In human settlement developments, information that relates to urban and regional planning - and geospatial - is crucial as it helps the municipalities to make informed decisions regarding approvals of land-use planning, management, and improvement of service delivery (Musakwa, 2017).

2.5. Importance and Types of Human Settlement

Humans are striving to adapt to their environment every day, both biologically and non-biologically. In addition, humans require shelter as one of the major elements for survival (Moobela *et al.*, 2007). Throughout history, humans have displayed many ways in which to shelter themselves. From historical caves and tent dwellings to castles and log cabins, there remains a rich diversity of dwelling spaces that people use today (Nkambule, 2012).

According to Habitat I (1976), humans have historically arranged their homes in what is known as human settlements where they exist as an organised group of individuals inhabiting a particular area. These organised groups have the propensity to focus on aspects of human life such as economics, service and living standards, communications, education, entertainment, and other recreational activities (Habitat I, 1967; Roberts *et al.*, 2016). Among other factors, architectural styles, availability of opportunities, community culture and needs determine the layout of the settlement (Todes, 2011). Typically, human settlements are divided into two major categories: rural and urban areas (Owusu-Adede and Adom-Asamoah, 2014). This section discusses their functions and characteristics.

2.5.1. Rural Settlements

Rural human settlements usually have significant sections of wild natural land surrounding the settlements. They are often segregated from each other (Neil and Navata, 2015). These settlements are usually referred to as villages, small towns, and hamlets as indicated in Figure 2.1, and are characterised by having a smaller population with an economy usually based on trade and the utilization of natural resources (i.e., farming, fishing, tourism, and timber) (Brelsford *et al.*, 2016). Brelsford *et al.* (2016) further explain that rural dwellers usually have households that are lower salary-earners on the socio-economic scale as compared to their urban counterparts.

(i) Disadvantages of rural settlements

Poor access to opportunities is strongly associated with rural settlements (Aribigbola, 2004). Before investors consider rural areas for infrastructure development, they first ask to what extent would getting the infrastructure to the rural area cost in terms of distance from the other developed regions, how many people would utilise the service, and check if there would be a return on their investments. Brelsford *et al.* (2016) argue that most infrastructure developments in rural areas do not usually incur high profits for developers as the population to be serviced

is relatively small. Socio-economic, which is a characteristic of rural areas, has a strong relationship with the high rate of unemployment (Roberts *et al.*, 2016; Brelsford *et al.*, 2016). In most cases, the lower-income group of people live in rural areas with reduced access to services and employment opportunities (Brelsford *et al.*, 2016). Owing to a decrease in access to services, old age, and unemployment rates tend to increase with low household income.

A lack of adequate infrastructure hinders access to markets for rural dwellers (Neil and Navata, 2015). In rural areas, most infrastructure is funded by private sources that directly charge users for the services (Neil and Navata, 2015). Thus, businesses determine infrastructure needs based on the willingness of people to pay for it, which is also dependent on how the people value such services and how they can access such infrastructure.

Nkambule (2012) suggests that these cases lead to a lack of investment in socio-economically disadvantaged rural areas. Attracting and retaining skilled and professional employees remains a problem for rural areas. A study conducted in Australia by Brelsford *et al.* (2016) suggests that there is no career growth or opportunities that attract and retain professionals to offer their skills and knowledge owing to low economic productivity in rural areas. In addition, Brelsford *et al.* (2016) point to the lack of adequate housing, services, and infrastructure as a major contributor to the failure to attract and retain skilled workers. It is therefore important that government and other stakeholders ensure that remote locations and rural areas are liveable by establishing innovative strategies that will attract and retain a productive workforce.

(ii) Advantages of Rural Settlement

In rural settlements, the environment is peaceful with less noise owing to fewer vehicles and a lower population. Brelsford *et al.* (2016) suggest that old, aged people and pensioners enjoy staying in remote areas as compared to urban busy life. Rural settlers are privy to abundant opportunities to enjoy the gifts of nature as most areas are less developed and easier to access outdoor activities (Owusu-Adele and Adom-Asamoah, 2014). The areas have more greenery with the presence of wildlife that are good attractions for tourism making the tourism business flourish (Brelsford *et al.*, 2016).

Shikwambana (2019) researched air quality around Gauteng cities and compared it with rural areas. The findings of the study indicate that people living in villages breathe pure air owing to the lack of heavy industrial factories and traffic that emit carbon substances. Therefore, there is a minimum rate of lung diseases that are associated with dust and smoke as compared to

urban areas that are overpopulated and exposed to air pollution (Turok and Borel-Saladin, 2014; Shikwambane, 2019).

Rural dwellers are healthier, more active, and display simpler habits as opposed to the people living in towns (Roberts *et al.*, 2016, 2014; Brelsford *et al.*, 2016). Rural life establishes better physical health and strength because of minimal access to transportation as individuals have walking habits from one place to the other (Brelsford *et al.*, 2016). In addition, rural areas are associated with quietness and peace owing to the lack of industries and minimal vehicles that provide opportunities for uninterrupted thought which is rare to experience in urban busy life (Weimann *et al.*, 2020; Massey and Denoon-Stevens, 2022).

Rural life is assumed to be more affordable as houses are cheaper to build, buy, and rent in comparison to the big cities (Adegun, 2018). Rural areas offer bigger houses and more open spaces that promote the growth of organic fresh food for household consumption (Culwick and Patel, 2020). Lower crime rates, especially in hijacking and house-breaking, are recorded to be low in rural areas (Weimann *et al.*, 2020). It is suggested that people are more friendly and homogenous people. They share similar values, language, and cultural values which make it easy to live in peace and harmony (Freire *et al.*, 2014).

2.5.2. Urban Settlements

When resources are abundant in a specific location and human settlements are positioned in an advantageous pattern. Those areas take on an urban set-up such as towns and cities (Todes, 2011), where a large human population permanently settles in a small area. Eventually, this leads to the development of structures that accommodate larger numbers of people, such as skyscrapers, apartment buildings, and densely packed houses, which make up urban human settlements (Adegun, 2018). Urban human settlements tend to provide better services such as health care, information distribution, and education, as well as other essentials needed for survival such as food, water, and shelter (Freire *et al.*, 2014). Freire *et al.* (2014) indicate that urban services act as incentives for individuals to leave rural areas for urban areas. However, the increase in urban population influences other factors such as the crime rate, the economy, and the government's capability to provide services. Hence without proper planning, an increase in population might lead to an increase in the poverty rate and pollution (Freire *et al.*, 2014; Todes, 2011). It is for this reason that urbanisation often requires considerable planning that will eventually promote good quality of life (Adegun, 2018; Todes, 2011).

(i) Advantages of Urban Settlements

Urban human settlements have various advantages for individuals, families, and companies that are recipients. The most important benefit of living in urban areas is convenient access to goods and services such as better public health, good education, work opportunities, potable water, proper sanitation, reliable transportation, and better waste management (Brelsford *et al.*, 2016). Urban areas provide labour productivity that plays a role in solving society's social problems (Brelsford *et al.*, 2016; Culwick and Patel, 2020). Most urban dwellers tend to earn salaries because of the availability of more jobs as compared to rural areas. Owing to the availability of jobs and business opportunities, rural dwellers migrate to urban areas to explore more possibilities to have an income by either obtaining jobs in business or by being close to their customers (Freire *et al.*, 2014; Smith and Brown, 2019). The tight grouping of people in urban areas allows social and cultural integration that is not available in rural areas (Weimann *et al.*, 2020).

Technology improves at a faster rate as compared to rural areas because an increase in the population attracts investments by international companies that need to speed up the communication and marketing of their goods and services (Brelsford *et al.*, 2016; Massey and Denoon-Stevens, 2022). Most urban areas have good infrastructures which is another factor that reduces transportation of goods and services to the users. Companies would have shorter distances to reach their customers as urban settlers are usually densely populated in small areas (Sumari *et al.*, 2020; Massey and Stevens, 2022). Urban areas play a vital role in the creation and dissemination of knowledge despite living in an increasingly interconnected world, the geographical proximity of individuals in a city facilitates the propagation of ideas (Brelsford *et al.*, 2016).

(ii) Disadvantages of Urban Settlements

According to a World Health Organisation (WHO) study conducted in 2020, more than 80% of people living in urban areas are exposed to increased levels of pollution as compared to their rural counterparts (Massey and Stevens, 2022). Pollution in urban areas is higher owing to heavy traffic. Poor waste collection is frequently seen in cities as often exceed the natural capacity to handle waste which harms human health (Sumari *et al.*, 2020). Cities experience a demand for land, water, and other natural resources that are disproportionately higher than the surface they occupy owing to high consumption and the large population size (Holden and Otsuka, 2014).

The high prices of homes and food are a usual occurrence for urban dwellers as compared to the counter rural dwellers (Adegun, 2018). City life is deemed to be expensive. The cost of houses and food prices are directly proportionate to the willingness of citizens to pay (Neil and Navata, 2015). However, a notable number of scholars indicate that urban areas are not immune to poverty. Owing to great inequalities that exist in cities, poor urban dwellers tend to live in informal settlements called “squatter camps” and are exposed to poor living conditions because of a failure to afford the cost of proper housing (Huchzermeyer, 2019).

Urban areas are extensive areas covered by concrete which makes it difficult for rainwater to infiltrate the soil (Nhamo *et al.*, 2021). Owing to extensive surface paving, heavy rain causes a large accumulation of water so that rain gutters are unable to absorb it. Floods invade residential properties, public buildings, and other infrastructure (Nhamo *et al.*, 2021). Overpopulation in urban areas puts a strain on infrastructure such as roads, bridges, sewer pipelines, and waste landfill sites (Sumari *et al.*, 2020; Massey and Stevens, 2022). Conversely, poor maintenance of this infrastructure compromises the good quality of life for the citizens.

Urban areas have less arable land (Adegun, 2018) because as the population increases, there is a need for land to build houses and factories thus reducing the land for agricultural activities. Culwick and Patel (2020) indicate that the small portions of land left for agriculture in urban areas usually use fertilisers to ensure an increase in food production and so devaluing the quality of agricultural land.

Even though urban settlements are associated with job and business opportunities, human trafficking and prostitution have been associated with urban settlements (Weimann *et al.*, 2020). The more an area opens to the world and new cultures human trafficking and prostitution are evident (Brelsford *et al.*, 2016; Weimann *et al.*, 2020). In other instances, people are trafficked to cities with a promise of good jobs and other opportunities only to end up in prostitution and slavery.

2.6. The Concept of Urban Settlement Developments

The concept of urban originates way back to the seventeenth century. ‘Urban’ is derived from the Latin word *Urbanus* meaning ‘city dweller’ (McGranahan and Satterthwaite, 2014). The concept of urban has evolved yet its meaning remains ambiguous and vague. Numerous synonyms such as town, city, and metropolitan are often used interchangeably when speaking about the urban (OECD-CDRF, 2009).

Urban is further referred to as a place-based characteristic that integrates factors of population density, socio-economic organisations, and the transformation of the biophysical environment into the built environment (Weeks, 2010). However, Weber (1966) argues that urban should be defined based on various factors that dominate the land uses and economy of the area. Thus, ‘urban’ refers to settlements where most of the dwellers are engaged in industrialised activities rather than agricultural practices (Lushaba, 2009; McGranahna and Satterthwaite, 2014).

Brelsford *et al.* (2016) define ‘urban settlement’ as an area that is densely populated as compared to its surroundings. Urban areas emanate from the concept of ‘urbanisation’, which is defined as a process by which rural dwellers migrate to urban areas for economic development and industrialisation opportunities (Chirisa *et al.*, 2014). Demographically, ‘urbanisation’ refers to the redistribution of rural population to urban settlements over time (Chirisa *et al.*, 2014). Regardless of whether the positive or negative outcomes of urbanisation are emphasised, there is a need to have a scientific understanding of planning sustainable urban settlements (Chirisa *et al.*, 2014; Brelsford *et al.*, 2016). To fill this gap, the focus is on how urban settlement developments should be planned, urban settlement typologies as well as sustainable urban settlement concepts.

2.6.1. Urban Settlement Development Planning

Several examples guide urban planning contexts that are future-oriented (Adegun, 2018). At an international level, Sustainable Development Goal (SDG) number 11 of 2015 has indicators and targets that should be considered when implementing human settlement development projects (Desa, 2016). The United Kingdom launched the Foresight Future of Cities project in 2013, which focuses on how urban form, economic activities, and infrastructure provisions should be developed and evolved by 2065 (Wilson, 2016). The Foresight Future Cities project outlines the desired outcome of the country towards having sustainable human settlements across the cities by 2065.

The city of Detroit in Michigan has a similar project that was launched in 2010, to provide planning strategies through a reimagination of the future city that is improved (City of Detroit, 2013). It is confirmed through these initiatives that future urban planning is at the forefront of any urban development and planning professionals should be more futuristic-orientated (Dalton *et al.*, 2001; Wilson, 2016). However, urban planners tend to focus on the present generation by losing sight of the priorities of the future (Todes, 2011; Freestone, 2012).

Freestone (2012) thus provides a set of ethical planning questions that should guide urban future judgments. These questions are summarised in Table 2.5.

Table 2.5. Ethical Future urban planning judgments questions.

Ethical consideration	Questions
Justice	Who will benefit and not benefit from this urban settlement? Are the benefits equally based on socio-economic and family status, race, and physical ability?
Well-being	Is this urban place good for human settlement? Are safety and aesthetic features adequate for the beneficiaries?
Legitimacy	Who is responsible for decision-making about the settlement? How are decisions taken? Are the decisions inclusive, ethical, transparent, and collaborative?
Sustainability	How are social, environmental, and economic benefits integrated?

Source: Adopted from Freestone (2012)

In view of Table 2.5, the ethical planning questions as suggested by Freestone (2012) should determine the development's desirability. Developers, together with urban and regional planners, should be ethical when planning for settlements, ensure that all ethical questions are interlinked, and all questions are answered satisfactorily with no biases (Wilson, 2016). During the planning phase of urban developments, ethical questions should be employed as a decision-making criterion to judge if certain developments are vital and have equal benefits to all citizens.

2.6.2 Urban Private Residential Developments and Real Estates

The notion of private residential development has existed since late 1960 in the USA. Its establishment was done through the promulgation of the Housing and Urban Development Act of 1968 which was promulgated by former US President Lyndon Johnson (Todes 2019). The Act turned from public housing, a government-run programme that started in the 1930s, to private-sector housing for both profit and non-profit companies (Klug *et al.*, 2013; Todes 2019).

Since the inception of the USA Act during the 1970s on housing and urban development, several countries around the world adopted the idea of urban private residential development (Ademiluyi and Raji, 2009). Furthermore, the Act helped to popularise the idea of “public-private partnership”, a collaboration of government agencies with non-government organisations including private-profit companies in the development of social and urban improvements (Todes, 2011).

Globally, more people now live in urban areas as opposed to rural areas (Todes, 2011). Urban populations are also expected to continue to grow with projections that by 2050 approximately two-thirds of the world's population will be urban (Charlton, 2017). With rapid urbanisation, cities frequently face challenges with housing; hence, the provision of shelter in urban areas has been a concern for government-public developers and individuals-private developers (Ademiluyi and Raji, 2008; Charlton, 2017). Addressing this challenge, government and private sector businesses, strive to balance the gap in supply and demand of housing (Ademiluyi and Raji, 2008; Todes, 2011).

Charlton (2017) indicates that following the increase in population experienced by the cities, political liberals and the government support the idea of private enterprises playing a role in providing housing for middle-class citizens at an affordable price, especially those that are not favoured by the low-income public housing programme. Most private developers provide housing in the form of real estate developments or clustered residential units with stringent loan conditions from mortgage banks for both the developer and the buyer (Ademiluyi and Raji, 2008; Charlton, 2017).

Mosselson (2018) shows that private residential developments are commonly supported by the municipality's urban planners owing to their contribution to the collection of revenue and the upliftment of local economic growth regardless of the negative impacts which are associated with those developments. Several scholars such as Mosselson (2018) and Todes (2019) contend that new developments are supposed to be consistent with municipal service delivery objectives and reflect a collaborative approach between urban planners and developers in addressing the housing needs and reshaping the urban areas. However, a criticism of private housing developments is their establishment at a rate that exceeds the municipal capacity to deliver services. These damage the natural environment and compromise the social welfare of the citizens (Mosselson, 2018).

Todes (2019) agrees with Cox (2016) that local municipalities have significant autonomy regarding the outcome of private residential development approvals owing to the dependency on local property-based revenues. Thus, local government is forced to be entrepreneurial and promote property developments as a significant source of revenue (Lauermann, 2018). Cox (2016) argues that this concern also reflects the USA context where promoting urban property development is significant for urbanisation and economic growth. Secondly, access to land by private developers is one of the constraints that affects the delivery of houses. This is because the government does not always provide infrastructural facilities such as water, roads, and electricity connectivity in isolated areas. Hence, developers want land that is already in an existing suburb (Ademiluyi and Raji, 2008; Todes, 2011).

2.7. Sustainability and Sustainable Development in the Context of Urban Residential Development Projects

2.7.1. A Concise History of Sustainable Development

During the 20th century, many nations realised that there was a huge environmental price to pay for developments which are poorly implemented (Swilling and Annecke, 2012). The price is in the form of depletion of non-renewable resources that the economy is heavily dependent on and through the destruction of the environmental balance that creates conditions that support human survival on the planet (Swilling and Annecke, 2012). The 1950s great crippling smog in large cities such as Mexico City, Istanbul, Delhi, and Los Angeles; the worldwide pollution of rivers and aquifers; the depletion of the ozone layer; deforestation and desertification around the world large cities contributed to the final realisation that human activities are contributing to global climate change (Yokohama, 1994; Du Plessis, 2002). The environmental disasters illustrated by Yokohama (1994) paved the way for developments not to continue “business as usual” without paying attention to the detrimental effects it poses on the biophysical support system (Yokohama, 1994; O’Riordan *et al.*, 2020). Eventually, the recognition of the interdependency of ecosystem health and human well-being provided the foundation for the current view of sustainable development (Du Plessis, 2002; Loorbach, 2010).

During the late 1980s, the UN-funded World Commission on Environment and Development (WCED), which was headed by Gro Harlem Brundtland, called to realign institutional instruments at global, national, and local levels to stimulate economic development which would ensure the protection of natural resources and promote the well-being of the people (WCED 1987).

The WCED published a report in 1987 called “The Brundtland Report”, which is also known as “Our Common Future”. This was a starting point for the discussion of the sustainable development concept and brought a strategic approach to the institutions, government, political, and business sectors towards the social and environmental aspects of human settlement developments. The concept of sustainable development has received increased attention in recent years at the international, national, and local levels (Loorbach, 2010; O’Riordan *et al.*, 2020). Most academic researchers have different opinions about the sustainable development concept that it is vague and ambiguous with a lack of consensus (Mebratu, 1998; Hopwood *et al.*, 2005).

2.7.2. Sustainable Development Pillars in the Context of Human Settlement Development

The WCED commission gave a widely cited definition of sustainable development that meets the needs of the current generation without depriving the future generation of meeting their desired needs (Swilling and Annecke, 2012). Similarly, UN-habitat II defines ‘sustainable human settlement’ as a development that can meet the needs arising from current and mounting urbanisation challenges without impeding the future generation to meet their own needs (Tibaijuka, 2008).

However, there are a number of conceptual challenges that are associated with the sustainable development definition. Several scholars argue that the concept is undefinable hence there are more than 70 definitions put forward and used by different entities worldwide (Moobela *et al.*, 2007, Swilling and Annecke, 2012).

Regarding many sustainable development definitions, all have the following in common:

- i. *Seeks to benefit both current and future generations.*
- ii. *Promotes the social well-being of the people through the protection of their fundamental human rights to good health, shelter, safety, food, and proper income.*
- iii. *Aims to promote balance between socio-economic activities with a biophysical environment where natural resources are not utilised beyond ecological limits.*

Based on the above commonalities, sustainability can be achieved by finding the balance between socio-economic and ecological goals (O’Riordan *et al.*, 2020). In this regard, human settlement development projects are the central constituents of the built environment and play a paramount role in addressing socio-economic aspects while negatively affecting the biophysical environment (Matamanda, 2019). The notion of sustainable human settlement development is invariably perceived as an integration of the three pillars widely known as the

“triple-bottom-line approach”: economic, social, and ecological goals (Goodland and Daly, 1996; O’Riordan *et al.*, 2020). Figure 2.4 is a modified version of the “three pillars of sustainable human settlement development” and their objectives.

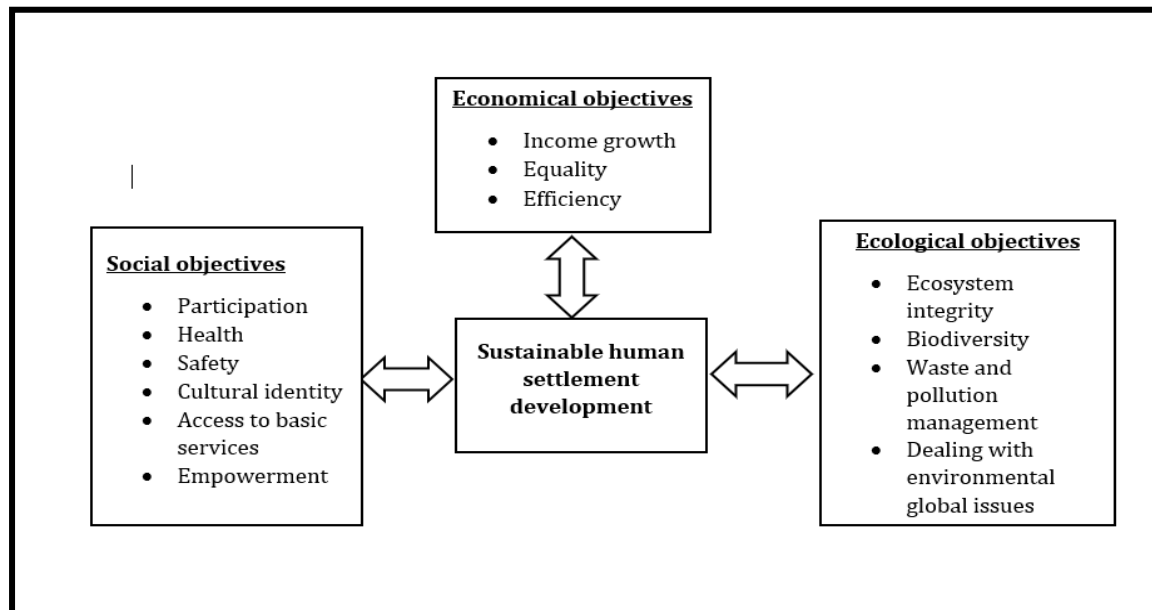


Figure 2.4: The three human settlement development sustainability objectives

Source: Modified from Goodland and Daly (1996).

The UN-Habitat II declaration of 1996 at the Istanbul conference further alludes to the fact that for human settlement developments to be sustainable these should integrate socio-economic aspects with environmental protection and fully respect all human rights as well as their fundamental freedoms (UN-Habitat II 1996). Similarly, the declaration has been marked as an international turning point to promote socially and environmentally sustainable cities (UN-Habitat, 2001). Furthermore, the South African government released Breaking New Ground (BNG) in 2004 as a comprehensive plan to provide an extended explanation of sustainable human settlement development as “well-managed entities in which economic growth and social development are in balance with the carrying capacity of the natural systems on which they depend on for their existence and result in sustainable development, wealth creation, poverty alleviation, and equity” (DHS, 2019; Culwick and Patel, 2020).

Human settlement project planning, designing, implementation, and on-going management are the key interventions through which the developmental objectives are outlined and achieved, thus promoting Sustainable Development Goals (Bresfold *et al.*, 2016; Peberdy and Crush, 2017). These elements consider the re-distribution of land, access to shelter and network services (roads, sanitation, water, and electricity) and social services (safety, security, sports,

health care, education, recreation, and government services) that should be distributed in consideration of the ecological aspects (Li and Liu, 2021).

Globally, most nations have committed to solving the severe urban human settlement challenges of sustainability by 2030 by eradicating poverty and providing access to basic services as well as halting environmental degradation and pollution (Li and Liu, 2021). However, rapid urbanisation and population increase remain a major challenge that presents a blockage to urban human settlement developments being sustainable. Hall and Pfeiffer (2000) suggested seven essential dimensions to urban sustainable human settlement:

- A settlement that provides and promotes work and wealth.
- Urban society with social coherence and solidarity.
- Provides decent shelter and affordable housing for all.
- Urban environment with a stable natural ecosystem.
- Democracy through an empowered citizenry.
- Liveable settlement with access to basic services.
- Access to areas of interest through resource-conserving mobility.

There are many tensions and debates on how to achieve sustainable settlements. The tensions emanate from the concerns of the developed world (The global north) and the developing/underdeveloped world (The global south) (Klug *et al.*, 2013). Thus, this provides a question of who should formulate the urban sustainable human settlement development models: should it be the global north which is well-developed and invested interest in economic benefits, or the global south which traditionally has the more value-orientated, community-based notion of development (Du Plessis, 2002; Klug *et al.*, 2013).

2.7.3. Determinants of Quality of Life in Urban Settlement Development Context

The concept of sustainable development has expanded from simply meeting the basic needs as stipulated in the Brundtland (WCED) definition but going beyond to embracing and meeting the entire hierarchy of basic human needs (Du Plessis, 2002). Most scholars argue that quality-of-life determinants cannot be dependent on one aspect but on a combined range of factors (Li and Liu, 2021). Certain key quality-of-life determinants and indicators that are specifically linked to the human settlement have been derived from the UNSDG goals of 2015 and Habitat Agenda's definition of sustainable human settlement definition as providing "all people with equal opportunities for a healthy, safe and productive life in harmony with nature and their cultural heritage and spiritual values". Table 2.6. outlines the determinants and indicators of sustainable human settlement developments.

Table 2.6. Determinants and Indicators of Sustainable Settlements

Issues	Determinants	Examples of Indicators
Health	Adequate sanitation	• Percentage of people with access to proper sanitation. • Percentage of people affected by gastro-intestinal and other sanitation-related diseases.
	Clean water	• Percentage of people with access to clean water: piped water on site or inside the house. • Reliability of services. • Percentage of people affected by waterborne diseases.
	Clean air	• Level of indoor air pollution in connection with the type of methods used for cooking and heating. • Quality of ambient air, the percentage of people affected by air pollution. • Percentage of people affected by respiratory disease. • Utilisation of clean energy sources.
	Absence of disease vectors	• Percentage of people with adequate refuse removal. • Proximity of waste disposal sites to the settlement. • Percentage of people affected by diseases caused by poor waste management.
	Access to healthcare	• Proximity and a number of health facilities (clinics and hospitals) near the settlement.
Safety	Reduced threat to man-made disasters	• Proximity and number of hazardous industries to the settlement.
	A secure living environment	• Crime index (type and number). • Level of fear of crime by the community members.

Shelter	Adequate, affordable housing	• Price of houses in the areas. • Level and cost of service delivery. • Quality and design of houses provided.
Productive life	Access to means of living	• Spatial distribution of employment opportunities. • Proximity to industrial and commercial areas.
	Access to education	• Spatial distribution of educational facilities (primary, secondary, and tertiary schools).
	Mobility	• Spatial distribution to public transport, functional and affordability. • Access to transport routes. • Percentage of cars per 1,000 people.
Self-determination	Access to information	• Proximity and number of libraries around the settlement. • Accessibility to local government information. • Proximity to the municipal offices.
	Participation and democracy	• Participation approach on decision-making and local developments. • Level of participation in a democratic system.
Quality of the built environment	Natural heritage	• Number of protected natural heritage resources. • Percentage of open green land.
	Urban decay	• Maintenance of infrastructure. • Urban greening initiatives. • Percentage of derelict areas in urban areas.
Spirituality	Supporting community	• Number and diversity of cultural facilities (churches, mosques, theatres, and art galleries).

		• Number and proximity of entertainment facilities and sports grounds.
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Source: Du Plesis and Landman (2002); Li and Liu (2021).

2.8. Understanding the Meaning of “Environment” and “Environmental Impacts”

2.8.1. Understanding the Meaning of “Environment”

The concept of “environment” has been defined by several books and scholars. The Oxford Dictionary defines the term as “the surroundings or conditions in which a person, animal, or plant lives or operates”. Tyler, in his book published in 1995, defines a ‘biophysical environment’ as a biotic and abiotic that surrounds the population or organisms and has an influence on their survival, development, and evolution. Further, the term is defined as the (i) complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival; (ii) the aggregate of social and cultural conditions that influence the life of an individual or community (Ford and King, 2015).

From the definition above, the concept of environment is focused on the interaction and interrelationship between people and their entire surroundings and how they strive for survival.

2.8.2. Environmental Impacts and Human-Environment Interaction

Humans depend on nature to provide their basic needs such as food and shelter. Hence interaction with nature is fundamental and promotes economic growth through anthropogenic activities such as mining, agriculture, and human settlements (Glasser *et al.*, 2008). Fischlin *et al.* (2009) argue that a human can't survive without conducting anthropogenic activities on the environment and when such activities are conducted to bring changes to the environment. Such challenges are referred to as environmental impacts.

An ‘environmental impact’ is defined as “any change to the environment, whether adverse or beneficial, resulting from a facility’s activities, products, or services” (Glasser *et al.*, 2008; Fischlin *et al.*, 2009). An environmental impact is an effect that people's actions have on the environment that is either positive or negative. For example, when residential units are built in a way that harms the natural resources beyond their limit of recovery such development is causing negative impacts to the environment. However, when a development is conducted in a

way that promotes the protection of natural resources and human well-being through the provision of basic needs, such development has positive impacts.

2.8.3. The Biophysical Environment and Human Settlement Interrelationship

To live in any given physical environment, a human develops spatial organisation patterns that take advantage of positive impacts and avoid or minimises negative impacts and restrictions on human settlement (Napier, 2009). Napier (2009) further notes that the biophysical environment in turn poses potential threats to the settlements and residents through natural and man-made disasters. In addition, the environment places limitations on human settlement developments in situations where there is a lack of or poor critical resources such as water supply and arable land (Gidey *et al.*, 2023). Moreover, a dysfunctional biophysical environment has the potential to reduce the quality of life for its inhabitants severely (Du Plessis and Napier, 2001; Gidey *et al.*, 2023). Figure 2.5 illustrates the interrelationship between the biophysical environment and human settlement.

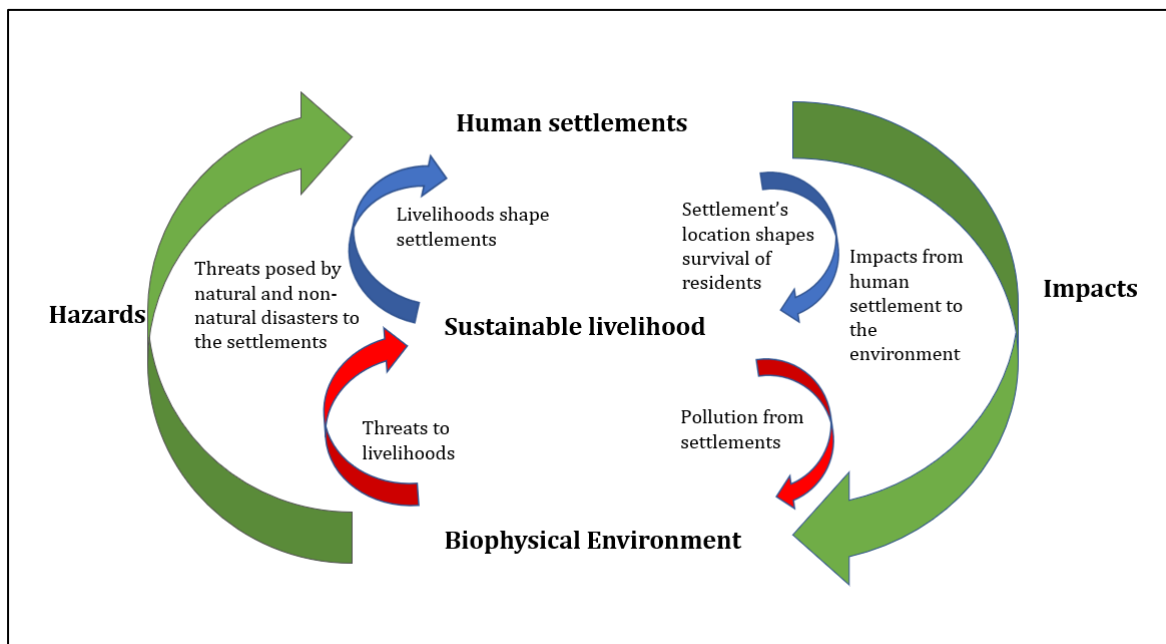


Figure 2.5: Interrelationship between human settlements and the biophysical environment

Source (Napier, 2009)

In view of the above interrelationship, ecologically responsible settlement would therefore minimise pollution and waste, as well as the consumption of resources such as water, energy, and arable land. At the same time, it would take active steps to ensure the protection of ecologically sensitive sites such as wetlands, areas of high biodiversity, areas crucial to the

maintenance of the global life support systems such as forests, the habitats of endangered species, as well as sites of heritage importance.

2.8.4. Impacts of Urban Human Settlement Development Projects on the Environment and Social Well-Being

Since time immemorial, urban human settlement developments have been an important part of human existence associated with various activities such as the construction of housing, roads, stormwater management channels, waste landfill sites, and other relevant economic amenities (Nuissl and Siedentop, 2021). The use of cities' lands for the expansion of urban areas has been part of the development of human civilisation and urbanisation (Akubia and Bruns, 2019). Recently, a notable number of scholars such as Le Roux and Augustinj (2017) and Zoomers *et al.* (2017) agreed that urbanisation, rapid population growth, and urban extension are triggering massive urban environmental challenges worldwide, with far-reaching consequences on urban residents. Inevitably, the expansion of human settlement in a small geographical area has had life-changing effects on urban residents and their livelihoods particularly on nature conservation parks, land for substantial agricultural food production and security (Wang *et al.* 2015; Zoomers *et al.*, 2017).

In some Asian countries like north-east China, Wang *et al.* (2015) indicate that there is a mismatch between the size of an urban area and the geometric increase in the urban population that results in ecosystem malfunctions owing to changes in land cover and land use on the ecosystem. The report by Wang *et al.* (2015) states that in the Nenjiang River Basin to the north east of China, an important foodstuff base and the eco-environmental fragile area has been negatively affected because of the rapid increase in human settlement areas that contributed to induced changes in land cover and the drying up of the river which decreased the supply of water for most cultivating purposes. On a global scale, there are significant changes to the urban landscape to accommodate human settlement developments and these changes have created major problems requiring attention as the world's urban population keeps growing and cities continue to suffer rapidly (Wang *et al.*, 2015; Bilozor and Cieślak 2021). About a 90% increase in urban population is projected to take place in most Asian cities by 2050, and this estimation would require more human settlement developments that in turn will contribute to environmental degradation and affect the social well-being of the citizens if not managed properly (UN, 2018).

Alcocer and Escobar (2023) investigated the environmental and social impacts of human settlement development in the city of Mexico. The results of his study revealed that water contamination by household drainage systems and household spillage of chemical fluids end up seeping into the rivers, lakes, and beaches of Mexico. In addition, air pollution was revealed as a problem emanating from the increase in the use of automobiles for transportation as more citizens prefer to drive their own vehicles (Hasan and Rahman, 2017). Air pollution affects respiratory capacity and contributes to the accumulation of heavy chemicals such as lead, which can lead to anaemia, uncontrollable weight loss, as well as kidney and brain damage (Shikwambana and Tsoeleng, 2022).

Cahya *et al.* (2018) report on the environmental and social impacts of human settlement development in urban areas in Indonesia, where solid waste from urban residential areas, has become a pressure point for most cities. According to the UNDP (2017), more than 55% of Indonesians live in cities and it is estimated that by 2030 more than 73% will be city residents. Based on this, Indonesia has been encountering problems regarding urban municipal solid waste management. For example, in Jakarta City, use a major landfill located at Bantargebang in the suburban town of Bekasi, which is only able to absorb approximately 6 tonne of waste per day (Christy *et al.*, 2021). Christy *et al.*, (2021) indicate that Bantargebang's landfill caring capacity is almost full, after 31 years of operation receiving waste from the region. As the capacity of urban landfills decreases over time because of unprecedented population growth, local governments are confronted with a reconceptualisation of a strategy that will incorporate the expansion of human settlement development projects with the participation of urban citizens in the management of municipal solid waste (Kubanza, 2021).

Most of the environmental and social impacts of human settlement developments are because of the mismatch between the size of an urban area, the geometric increase in the urban population, and the ability of local government infrastructures to promote sustainable service delivery for the citizens (Biłozor and Cieślak, 2021). Suffice it to say that there are other contributing factors to poor environmental and social impacts of urban human settlements which include economic, demographic, political, and institutional arrangements and policy formulations (Zhang, 2016; Hasan and Rahman, 2017; Bilozor and Cieślak, 2021). The following section outlines the environmental impacts associated with urban human settlement. It should be noted that the effects discussed in this study are not exhaustive and there are other impacts associated with human settlement development that are not covered.

(a) Nuisance From Air Pollution

Urban residents' exposure to dust may result in poor health, while road-based sprawl increases in air emissions (Turok and Borel-Saladin, 2014). The growth in the population within an area has a direct relationship with the air quality owing to the intensive burning of fossil fuels from houses that release carbon gases into the atmosphere (Shikwambana and Tsoeleng, 2022).

(b) Nuisance from Noise

Noise is regarded as a pollutant that has negative impacts on humans (Kantová, 2017). Kantova (2017) further indicates that during the construction phase of settlement projects, where civil works are conducted, noise emanates from machines and equipment as well as voices from the workers. During the operational phase of human settlement developments, noise emanates from traffic, music, and the voice in the background annoys the residents and affects their ability to relax and reduces the level of concentration on tasks that are performed in their homes (Ryu and Jeon, 2011).

(c) Visual Intrusion owing to New Infrastructures and Change in the Sense of Place

The inability to see far into the future and new permanent structures affects the well-being of both the old and new residents nearby. Innovative developments bring changes to the original features of the place that affect the old residents (McCold and Saulsbury, 1996). The change in landscapes affects both local tourism businesses and second homeowners (holiday homeowners) as tourists are likely to enjoy areas that are less developed (Hoogendoorn and Long, 2013).

(d) Disruption of farming activities due to loss of land for agricultural purposes.

Urban citizens who depend on substantial agricultural practices lose land to human settlement development (Culwick and Patel, 2020). The acquisition of large-scale agricultural land for human settlement development and other industrialisation activities impacts households whose land is expropriated (Nhamo *et al.*, 2021). Expropriation of the land affects the owners in many ways, among others economically, socially, and culturally. In areas that are far from agricultural land residents tend to suffer the high cost of buying fruits and vegetables as compared to those residing near agricultural land because fruits and vegetables that are brought from far places will cost more than locally produced products (Culwick and Patel, 2020).

(e) Disruption to Existing Infrastructure and Services

Government needs to match the increase in population with the increase in infrastructure for service delivery (Sumari *et al.*, 2020; Massey and Stevens, 2022). The ability of the municipality to provide basic services primarily depends on the availability of infrastructure (Shao *et al.*, 2021). For instance, good sanitation would be fully dependent on the functionality of the sewer pipelines and sewage treatment plants (Sassen, 2009).

To improve the quality of life of citizens, local governments are required to provide sufficient social services such as waste management and sanitation services. It is for this reason that urban municipalities are mandated to confirm the availability of infrastructure to cater to any proposed human settlement development projects during the planning phase that is earmarked to take place within its jurisdiction (Shao *et al.*, 2021). In addition, Shao *et al.* (2021) show that the lack of basic infrastructure and services related to sanitation, stormwater management, and waste management services continues to be observed in urban areas where the population has recently increased. The municipality is chasing the capacity to cater to the new developments. Thus, the urban municipality's objectiveness is questionable when it comes to the confirmation of the availability of infrastructure as these are the same institutions that generate revenue through the payment of rates and taxes from residents of the new development (Ademiluyi and Raji, 2008; Todes, 2011).

(f) Storm-Water Management

The change in stormwater run-off patterns owing to human settlement developments is obvious in most urban areas because as the land cover changes it also changes the flow and volume of the storm water (Burke and Mayer, 2009). In undeveloped land, the surface water run-off is minimal as most of the rainwater infiltrates into the soil, but once human activities are introduced into an area it causes rainwater to run off the land immediately on a sharp peak (McCold and Saulsbury, 1996). Therefore, it is vital for stormwater channels to be designed, constructed, and maintained properly especially where urban expansion is taking place (McCold and Saulsbury, 1996; Sumari *et al.*, 2020). Poor management of the storm water has the potential to damage private properties and roads owing to flooding. Such damages have financial implications for affected parties as they are expected to bear the cost of fixing their damaged properties.

(g) Impact on Habitat for Animals

Change in land cover is a major contributor to habitat loss that detrimentally affects the distribution of wildlife (Billah *et al.*, 2021). During the clearing of vegetation for construction, most of the animals are bound to migrate to other regions, some will even die owing to failure to adapt to the new environment (Nhamo *et al.*, 2021). The continuous expansion of human settlement areas has a negative social impact on community members, more specifically those who enjoy relating to animals (Nhamo *et al.*, 2021).

(h) Impact on Threatened Plants and Natural Indigenous Vegetation.

The rapid increase in human population and the establishment of human settlements is a major contributor to land degradation (Billah *et al.*, 2021). During the construction phase of development projects, plants (herbs and medicinal and others) are lost owing to the clearing of the land to make way for the development (Billah *et al.*, 2021). Nhamo *et al.* (2021) report that community members who depend on medicinal plants for healing ailments are financially affected as they will have to visit professional medical practitioners for treatment instead of using indigenous knowledge and applying traditional herbs.

(i) Impact on Wetlands and Other Water Bodies

Human settlement developments have the potential to distract and contaminate waterbodies through littering and the spillage of hydrocarbons from residential areas (Sassen, 2009). During the construction phase, diverting and impending watercourses are likely to take place where such development is in proximity to pans, rivers, and dams (Nhamo *et al.*, 2021). In terms of bioregional plans, declared ecological support areas are impacted and gradually losing their ecosystem functionality because of contaminations (Sassen, 2009). Nhamo *et al.* (2021) agree with Sassen (2009) that poor functionality of the wetlands and other waterbodies owing to contamination directly affects the availability of fish, plants, and animals found in a particular region.

(j) Waste Management

Increased human settlement development contributes to an increase in waste generation, thus requiring proper management by the government, residents, and other relevant stakeholders (Nhamo *et al.*, 2021; Kubanza, 2021). Urban areas are significant producers of solid waste that poses major public health threats in urban cities. This requires regular removal and disposal by the local government (Ako *et al.*, 2013; Kubanza, 2021).

The solid waste generated from human settlements requires disposal in landfill sites while most city landfill sites have reached their carrying capacities. The rate at which new landfill sites are established is relatively slow (Leonard, 2013; Christy *et al.*, 2021). Christy *et al.*, (2021) argue that despite the effort that local municipalities put into the collection and disposal of solid waste from residential areas, the waste remains very visible on the streets near human settlements. The poor or delayed collections of waste by municipalities owing to capacity constraints (insufficient fleet) suffered by the institutions have been pointed out as one of the major contributors to poor waste management (Culwick and Putel, 2020).

In addition, the lack of public waste containers on urban streets contributes to high littering because of the high movement of people who are unable to carry general waste as they walk until they reach their homes. Thus, they are bound to litter unwillingly (Christy *et al.*, 2021). Kubanza (2021) also points out that the lack of participation by community members contributes to the visibility of waste in urban cities.

(k) Wastewater and Sanitation Management

Poor access to quality sanitation services has environmental and social impacts, which affects residents (Weimann *et al.*, 2020). In urban areas where continuous spillage is linked to the increase in population and the incapability of local government to provide services causes health hazards for the citizens through direct exposure to spilling sewer near their homes and ingesting products fertilised by wastewater (Sassen, 2009). The consequences of consuming products from unclean water led to intestinal worm diseases such as diarrhoea (Sassen, 2009).

(l) Energy Consumption

The higher the population in an area, the higher the demand for energy for human consumption (Culwick *et al.*, 2017). Furthermore, the construction of human settlement buildings consumes a significant amount of energy, for example by using inappropriate equipment (Nhamo *et al.*, 2021).

2.8. 5. Impacts Exposure and Responses Relationship (Consequences)

The science of toxicology has set a foundation for discussions around the relationship between a toxic reaction (the response) and the amount of poison received by the organism (Makanan, 2010). The toxicology concept has influenced the relationship between environmental impact (exposure) and its severity (response and consequences). The important assumption in this relationship is twofold: (a) There is always exposure below to which no response occurs or can

be measured; (b) There is always high exposure in which a response occurs and is harmful. Thus, Makanan (2010) elaborates that the impact exposure-response relationship is the cause and effect of the impact exposure and its consequences. Exposure to impacts can be intentional and unintentional. Its effects vary owing to the amount of exposure and duration. Below is the table showing a relationship between environmental and social impacts together with the consequences.

Table 2.7: Environmental and Social Impacts of Urban Human Settlements Development Projects

Environmental Impacts	Interrelation between the Impacts and the Consequences
Air pollution and noise	Urban residents' exposure to dust and noise may result in poor health while road-based sprawl increases air emissions (Turok and Borel-Saladin, 2014).
Visual intrusion	The inability to see far into the future and new permanent structures affect the well-being of both the old and new residents nearby. New developments bring changes to the original features of the place and might affect the old residents (McCold and Saulsbury, 1996).
Spread of diseases	Overpopulation within a small space and the introduction of new people in an area might spread disease owing to the high interaction (Weimann <i>et al.</i> , 2020; Massey and Denoon-Stevens, 2022)
Traffic congestion and road damages	The increased population within an area increases transportation and damages the road infrastructure that people travel on. It increases the carbon emissions from vehicles (Turok and Borel-Saladin, 2014).
Disruption of farming	Old residents that depended on subsistence agricultural practice lost land to human settlement development (Culwick and Patel; 2020; Gidey <i>et al.</i> , 2023).

Local informal trading	Whenever there is an increase in population, there is an opportunity for small businesses, mainly street vendors (Culwick and Patel; 2020).
Job creation	Human settlement developments provide informal jobs such as gardening and domestic work during operations (Culwick and Patel, 2020). Community members also benefit from the construction phase by providing skilled and unskilled labour (Smith and Brown, 2019).
Decreased tourism	If the developments are not managed properly, it might affect people traveling to such areas for leisure which would therefore bring down the local economy (Long and Hoogendoorn, 2013).
Safety and security risks	An increase in population in an area might give rise to an increase in crime and security (Weimann <i>et al.</i> , 2020).
Overwhelming the existing infrastructure and services	Government needs to match the increase in population with the increase in infrastructure for service delivery (Sumari <i>et al.</i> , 2020; Massey and Stevens, 2022).
Stormwater management	Stormwater channels need to be designed, constructed, and maintained properly to cater to the load of new developments (McCold and Saulsbury, 1996).
Impact on historical and cultural sites (e.g., archaeological sites, historical sites, graves and cemeteries)	Human settlement development projects might be earmarked on land or sites that are considered to have archaeological importance for the old residents (Campana and Dabas, 2011).
Loss of animals	Animals are lost owing to settlement projects while some residents enjoy seeing animals from the comfort of their homes (Nhamo <i>et al.</i> , 2021).

Pollution of water bodies	Human settlement developments have the potential to distract and contaminate waterbodies through littering and spillage of hydrocarbons from residential areas. Furthermore, during the construction phase, diverting and impeding watercourses are likely to take place where such development is in proximity (Nhamo <i>et al.</i> , 2021).
Poor waste management	Increased human settlement development contributes to an increase in waste generation and thus needs proper management by the government and residents (Nhamo <i>et al.</i> , 2021, Kubanza, 2021).
Change in land-use	Human settlement development projects are permanent structures that completely change land use and zoning (Nhamo <i>et al.</i> , 2021).
Energy consumption	The higher the population in an area, the higher the demand for energy for human consumption (Culwick <i>et al.</i> , 2017). Furthermore, the construction of human settlement buildings consumes a significant amount of energy, for example, because of using inappropriate equipment (Nhamo <i>et al.</i> , 2021).
Poor management of wastewater and sanitation	In urban areas where continuous spillage is linked to the increase in population and the incapability of local government to provide services causes health hazards for the citizens through direct exposure to spilling sewer near their homes and the ingestion of products fertilised by wastewater (Nhamo <i>et al.</i> , 2021). The consequences of consuming products from unclean water lead to intestinal worm diseases such as diarrhoea (Nhamo <i>et al.</i> , 2021).

Source: The Researcher's own synthesis (2023)

2.9. Application of Environmental Impact Assessment tool in Managing Impacts associated with Urban Residential Development Projects

The concept of EIA was first introduced by the United States of America (USA) in the National Environmental Policy Act of 1969 (NEPA) as a legislative response to environmental degradation emanating from developmental activities (Hoffman, 2007). Its primary purpose was to ensure that developmental activities are conducted in a way that promotes a clean environment for the benefit of the current generation without compromising the ability of the future generation to enjoy a clean environment (Jay *et al.*, 2007). Over time, many countries adopted the EIA and promulgated its process into their legal framework (Hoffman, 2007).

2.9.1 Definitions of Environmental Impact Assessment

The Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention of 1999, defines ‘EIA’ as an evaluation procedure followed on developmental projects to assess impacts that will harm the environment. According to Principle 17 of the Rio Convention of 1991, ‘EIA’ is defined as a tool to assess proposed developmental activities that have the potential to pose a significant impact on the receiving environment. Such assessments are subjected to competent authorities for decision-making (Hildebrant and Sandham, 2014; Rantlo, 2015). Wood (1999) further indicates that EIAs are also referred to as an integrative process for evaluating the impacts of the development activities on the environment before such development commences. From the above definitions, the EIA process puts more emphasis on assessing impacts during planning for compliance during the construction of the projects with not many details provided on environmental compliance once the projects are in the implementation phase.

Retief (2010) defines ‘EIA’ on a narrow scale by indicating it is a process that interlinks the other developmental disciplines with environmental protection, for example, as a decision-making tool for project planners, engineers, and other relevant authorities. Lastly, Sadler *et al.* (2004) defines ‘EIA’ as a planning process whereby biophysical, social, and other relevant factors associated with proposed project activities are identified, impacts are predicated, evaluated, and mitigated prior to project commencement.

From the definition proposed by Sadler *et al.* (2004), it is interesting that EIA also includes the assessment of social impacts associated with the proposed development. Hence social impacts are secondary studies to EIA for proposed developments in most countries (Aucamp *et al.*, 2011) especially in South Africa where social well-being is stipulated on the S24 (b)(iii) of the

Constitution of 1996, as everyone is given the right to the environment that is not harmful to their well-being and developments should be sustainable while using natural resources in a way that promotes justifiable and social development.

2.9.2 Challenges and Benefits of Environmental Impact Assessment on Urban Residential Development Projects

(i) Challenges Associated with the Use of the EIA Tool: Global Examples

Baker and Westman (2018) outline challenges associated with EIA approaches that are used to assess the environmental and social impacts of developments in Canada. The authors revealed that less attention is given to cultural changes as developments are understood from a sense of economic growth. In addition, development consulting firms and EIA practice continue to contribute to devaluing traditional natural features in particular land-use but continue to promote a specific type of future landscape which is a built environment (Baker and Westman, 2018; Soria-Lara *et al.*, 2020). It has been argued that project proponents and consultants underwrite this perception with offers of future benefits of housing, and proximity to economic amenities (Soria-Lara *et al.*, 2020). It is undoubtful that EIAs in Canada include traditional land-use assessments, but the evaluation is usually overridden by the National Economic Policies based on the desirability of such development that have little consideration of human-environmental relations.

In European countries - such as Italy, Portugal, and Spain - EIAs are legislated to include the social aspects of proposed developments (Loro *et al.*, 2014). Therefore, the SIA is considered to be a subset of the EIA that does not have its own distinct legislative mandate (Soria-Lara *et al.*, 2020). Soria-Lara *et al.* (2020) investigated EIA effectiveness in Italy, Portugal, and Spain. The results of the study revealed a lack of clarity on how to integrate the results of “public debate” into the EIA process because national laws about EIA also recognise “public inquiry” as a participation instrument, which so far has been weakly implemented and is considered “consultative in nature and low in power”.

Furthermore, Soria-Lara *et al.* (2020) revealed a lack of clear professional requirements in terms of certifying the accuracy of assessments as well as the role of environmental assessment practitioners (EAPs) in assessing the social concerns of developmental projects. Sadler (1996) assessed the views of EAPs and environmental managers regarding the effectiveness of the EIA process in promoting the socio-economic issues of proposed developments in Australia, North America, and New Zealand. The results showed a "poor" performance of EIAs in

promoting environmental and social issues coupled with the lack of reflection on public concerns in Environmental Authorisations (EAs) issued by the authorities (Sadler, 1996; Motte *et al.*, 2020).

In the Netherlands, Amsterdam as a capital city conducted SIA for metro transport projects in 2020 outside the normal legislated EIA, Motte *et al.* (2020) report that social challenges were adequately addressed as the process was not a mere “tick on the box exercise”. Motte *et al.* (2020) advocate that the approach of conducting a social impact assessment of proposed development out of EIA requirements could assist in mitigating the impacts associated with developmental projects. This could be the approach for all the urban human settlement development projects.

In Pakistan, for example, Khan *et al.* (2022) are of the view that the effectiveness of the EIA in comprehensively addressing environmental and social aspects is threatened owing to low financial commitments from developers, incompetent consultants leading the process, and a lack of public awareness of the role they should play during the assessment process. In countries like Greenland, the SIA is a legal requirement for all proposed oil and mining-related projects (Hansen *et al.*, 2016). The assessment is carried out at all phases of the project life cycle, i.e. the inception, planning, exploration, and operation phases of the development (Hansen *et al.*, 2016). Based on Greenland’s strategy, this is the one that South Africa could adopt for all urban human settlement development projects.

(ii) EIA Benefits

It is evident from the EIA definitions outlined above that its main objective is to assess the potential impacts of the proposed development and propose mitigation measures to be implemented in order to avoid potential impacts from harming the people and the environment. It is suggested that conducting EIA assists in considering environmental issues at every phase of the project life cycle (Retief, 2010). Glasson *et al.* (2005) indicate that EIA, which is properly conducted, helps the competent authorities and other organs of states to make an informed decision on whether to grant or refuse the application for human settlement developments.

EIA reports that are of good quality provide crucial and reliable information and assist government officials in decision-making (Sandham *et al.*, 2013). Where EIA has been conducted at a pre-feasibility stage of the project and alternatives are still feasible and open, EIA would allow for non-biases as developers would have not invested more money in advancing the project (Glasson *et al.*, 2012). For instance, in proposed human settlement

projects, EIA should be conducted prior to the conclusion of property sales and detailed engineering designs. Thus, EIA should be undertaken at a very early stage of the project-planning before any major decisions and work is done in the advancement of the project.

As EIA is defined as a process rather than a once-off event, its benefits would be more visible if it extends throughout the phases of the project life cycle and not be considered as a means to produce a final report that will result in a positive outcome of environmental authorisation (Rantlo, 2015). Thus, EIA would be more beneficial if is not only seen as a mechanism to obtain environmental authorisation before a project can go ahead.

Maphanga *et al.* (2023) argue that EIA which is conducted properly with integrity assists in improving the relationship between the affected communities and developers, more specifically when the community members are engaged during the public participation process and their concerns are integrated into decision-making. Community members or the public have local indigenous knowledge that might not be known by the appointed EAPs, for example, community members might know animals' behaviour around their area and the indigenous plants that are nearing extinction while such information is not recorded in any formal or scientific databases (Rantlo, 2015).

Furthermore, properly conducted EIA public participation assists developers in determining the community's positive and negative opinions surrounding the developments. Such information then assists the developer in managing their expectations (Maphanga *et al.*, 2023). It can be said that EIA ensures the decision-makers take into consideration the environmental and social concerns associated with human settlement development projects and, where possible avoid, mitigate, or reduce the impacts of such identified concerns. Successful EIA promotes the preservation of ecological resources and promotes the well-being of the people.

2.10. Application of Social Impact Assessment Tool on the Management of Urban Residential Development Projects

It has been argued that SIA existed along with EIA during the early 1970s as a way to achieve the requirement of NEPA (1969) in the USA. However, the assessment of social impact was conducted a long time before NEPA (Esteves *et al.*, 2012). SIA is widely practiced all over the world as a predictive study that forms part of the processes to be followed for infrastructure project authorisations (Esteves *et al.*, 2012). Some organisations and companies have executed social processes that are ongoing to address social issues as part of corporate social

responsibility initiatives and as a way to obtain a “social licence to operate” (Jijelava and Vanclay, 2017).

2.10.1 Definitions of Social Impact Assessment

‘SIA’ is defined as a predictive study that assesses the social issues that are likely to be posed by a proposed development. Such issues include cultural consequences that affect the way people conduct themselves, work and relate with one another, organise themselves to meet their daily needs, and how they cope with the development in general (Burdge and Vanclay, 1996). In many cases, an SIA study forms part of the process to be followed for infrastructure project authorisations (Burdge and Vanclay, 1996; Esteves *et al.*, 2012). Roberts *et al.* (2016) define ‘SIA’ as a process that aims at determining the impacts of peoples’ day-to-day quality of life when their environment is likely to be affected by the proposed development. The authors propose ways to minimise or eliminate them by ensuring that they are considered in decision-making.

According to the International Association for Impact Assessment (IAIA) (2003:1), SIA “includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programmes, plans, projects) as well as any social change processes invoked by these interventions”. IAIA (2003) further indicates that the main purpose of SIA is to create a more sustainable and equitable biophysical and human environment. Esteves *et al.* (2012:34) define ‘SIA’ as an interdisciplinary and/or transdisciplinary social science study that incorporates fields such as “sociology, anthropology, demography, development studies, gender studies, social and cultural geography, economics, political science and human rights, community, and environmental psychology, social research methods and environmental law”. Esteves and Vanclay (2009) define ‘SIA’ as a study that assesses how people interact with their physical environment, socio-cultural and economic aspects. Esteves and Vanclay (2009) further emphasise that SIA aims to manage the social aspects of development such as human rights, community power, gender balance, culture, justice, peace, and sustainable livelihood.

2.10.2 Fundamental Core Values of Social Impact Assessment in Development

According to IAIA (2003:5), the core values of an SIA are divided into two: “fundamental human rights” and “fundamental principles for development”. These values are interlinked. Table 2.8 below outlines the core values of SIA.

Table 2.8: Fundamental Core Values of SIA in Development

Fundamental Human Rights	Fundamental Principles for Development
Human rights are shaped and shared equally by all citizens, across cultures, and between all genders. The rights should be protected by law at all costs, with justice applied equally and fairly to all. These rights are available to all.	Respect for human rights should underpin all actions. Promoting equity and democracy should be the major driver of development-planning. Developmental impacts should not cause the citizens to be worse off. Decision-making should be fair and transparent. The decision-makers should be accountable for their decisions.
Everyone has a right to live and work in an environment that is favourable and promotes the right to good health and quality of life.	The existence of diversity between cultures, within cultures, and the diversity of stakeholder interests need to be recognised and valued.
People have a right to be involved in the decision-making about planned interventions that will affect their lives.	Development projects should be broadly acceptable to the members of those communities likely to benefit from or be affected by the planned intervention. The opinions and views of developers and practitioners should not be the only consideration in decision-making about proposed developments.

Source: IAIA (2003)

2.10.3. Challenges and Benefits of Social Impact Assessment in Urban Residential Development Projects

(i) SIA Challenges

In practice, SIA is a subsidiary of the EIA process and is considered to be another specialist study during the EIA process, with its brief determined during the scoping phase (Pope *et al.*, 2013). Aucamp and Woodborne (2019) argue that SIA in this process does not contribute to project decision-making because the decision to proceed with the project is already taken as the EIA process is conducted during the feasibility phase. The stringent timeframe stipulated by EIA legislation to compile and submit the report to the decision-makers makes the SIA

study narrow and does not cover all the relevant social issues (Smyth and Vanclay, 2017). Thus, the EIA legislated timeframe has the potential to undermine the integrity of the SIA process and reduce it to just a mere tick-on-box exercise that does not achieve its intended objectives (Esteves *et al.*, 2012). Conducting SIA as a subsidiary study into EIA processes contributes to the superficial treatment of the socio-economic aspects of a project as the norm for decision-making on whether to decline or grant the environmental authorisation is usually centred around environmental protection and conducted by environmental specialists (Du Pisani, 2005; Hildebrandt, 2012; Matlakala, 2021).

Coakes and Anagnostaras (2024) indicates that social scientists face difficult challenges in conducting correct SIAs for developmental projects owing to a lack of internationally agreed social indicators for which data must be collected. Coakes and Anagnostaras (2024) further explains that most SIAs lack basic information such as methodologies employed for data collection, thus recommending that regulators should assist in formulating terms of reference (ToR) or scope of work for conducting SIA within the EIA process.

SIA is perceived as a “grudge purchase” by the human settlement developers as they believe their project always leads to improved well-being and good quality of life (Aucamp and Woodborne, 2019). This notion has contributed to the failure to conduct SIA in all phases of the project as developers usually do not see any social consequences associated with their developments. Hence most are reluctant to hire especially skilled personnel to assess social impacts (Burdge and Vanlay, 1998; Aucamp and Woodborne, 2019).

SIA is equated to EIA’s public participation process (Roberts *et al.*, 2016), while public participation is merely a small component or another step to be fulfilled during the EIA process. This is because even some administrators (decision makers) and EAPs tend to believe that public participation alone meets and fulfils the requirement of SIA (Aucamp *et al.*, 2011; Hildebrandt, 2012). Acceptance of this practice influences decision-makers to fail to gauge public opinion about human settlement developments.

(ii) Benefits of SIA

Practically, SIA creates a participatory process to facilitate a community discussion about their desired future and developers can identify the community’s needs and aspirations (Jijelava and Vanclay, 2017). Aucamp (2003) alludes to the fact that SIA assists in scoping the actual social problems of the community and examines options to avoid or mitigate potential negative impacts and maximise positive opportunities associated with human settlement developments.

SIA that is properly conducted collects information from the affected people and allows them to share their indigenous knowledge (Burdge, 2003; Pope *et al.*, 2013). Momtaz (2003) refers to a case of a Bangladesh drainage rehabilitation project indicating that the utilisation of local knowledge and experience makes it possible to conduct an impressive and meaningful SIA and incorporate issues raised by the community into decision-making.

Esteves *et al.* (2012) indicate that conducting a proper SIA provides the developer with greater certainty for project investments and increases the chance of project success. Potential environmental and social risks are avoided and reduced when community opinions are considered in decision-making (Hansen *et al.*, 2016). Companies that conduct SIA properly increase their competitive advantage and corporate reputation. They have better chances to obtain funding for future projects (Jijelava and Vanclay, 2017). In addition, SIA provides a positive legacy beyond the construction of the project because it develops a monitoring plan to inform the management of change throughout the life cycle of the project (Esteves *et al.*, 2012). Lastly, conducting SIA thoroughly assists in improving planning for socio-economic and physical infrastructure by involving the internal and external stakeholders of the development (Burge, 2003).

2.11. Conclusion

This chapter focused on human settlements in the context of environmental and social impacts, drawing from selected literature reviews from both developing and developed countries. First, the chapter discussed the human settlement hierarchy, types, and importance. Secondly, the chapter highlighted that human settlement development planning is a contested discipline that is guided by different theories such as classical, neo-classical, and normative. All these different theories guide the development of urban human settlement to promote sustainability that integrates economic, environmental, and human well-being factors. A discussion is also presented on the interrelationship of human settlements with the biophysical environment and humans which seeks to address the need for proper management of social and environmental impacts such as, among others, waste management, air pollution water, and sanitation, safety, and health. Lastly, the chapter highlighted the effectiveness and challenges of EIA and SIA tools in their role in mitigating human settlement impacts. The next chapter will focus on the urban human settlement development theories that are adopted in the Sub-Saharan Africa region, the concept of sustainability in African cities, SA's urban dilemmas emanating from its urbanisation history and its role in shaping the current urban spatial development-planning.

CHAPTER THREE

HUMAN SETTLEMENT DEVELOPMENT IN SUB-SAHARAN AFRICA AND SOUTH AFRICA

3.1. Introduction

This chapter contextualises the study within the human settlement developments in Sub-Saharan Africa as well as their impacts on the environment and social well-being. Emphasis is on the history of human settlements, the sector of urban-planning theory applied to designing African countries during the colonial era. The chapter critiques sector-planning theory as its contribution to racial, class, economic segregation, and environmental pollution. Relevant literature themes are outlined in this chapter as follows: African Sustainable Cities management framework, the applicability of the global sustainable cities concept in Sub-Saharan African countries, common environmental and social impacts in urban residential areas, challenges associated with the use of EIA tool in the assessment of the impacts. The chapter further narrows down to South African Urban human settlement development spatial patterns prior to, and post, the apartheid era, alignment for urban residential projects life cycle with the management of impacts on each project phase. The chapter concludes with additional impact assessment tools relevant to complement the EIA tool in minimising impacts associated with urban residential development projects. The above thematic topics were important in addressing the study's aim, objectives, and questions.

3.2. Human Settlement Development in Sub-Saharan Africa

The origin and evolution of human settlements in Africa can be traced back to the caves where people gathered after hunting for protection against natural disasters such as storms (Mellars, 2006; Home, 2021). The first settlements built with stones began to appear about 14,000 years ago in modern-day Israel and Jordan (Klein, 2001). Oftentimes about 10,000 years ago, the inhabitants transitioned from hunting to farming (Klein, 2001; Mellars, 2006). The earliest farmers put their roots down along the riverbanks and other watercourses (Allison, 2009). Farming activities opened the door to stable food supplies and led hunter-gatherers to build permanent dwellings that eventually transformed into complex societies in many parts of the continent (Klein, 2001; Home, 2021). From that time, people settled down in different

regions following socio-economic amenities (Allison, 2009). Table 3.1 shows the stages and formation of Human settlement in the Sub-Saharan Africa context.

Table 3.1. Stages and Formation of Human Settlements in Sub-Saharan Africa

Stages	Settlement Formation
Stage 1 Primitive Non-Organised Human Settlement	(i) Primitive Man People lived in treetops, holes, and caves. This stage is called Old Stone Age also known as Paleolithic (Home, 2021).
	(ii) Nomad People lived in temporary shelters, huts were built with mammoth bones, woods, straws, and rocks. This stage is called the Middle Stone Age also known as Mesolithic (Home, 2021).
Stage 2 Primitive Organised Human Settlement	(i) Farmers Villages were formed as permanent shelters. Houses were built with mud, and roofs were usually made from timber beams with reed thatch coverings. This stage is called the New Stone Age and is also known as the Neolithic (Home, 2021).
	(ii) Conflict between Man-Winner became the “King” Towns were formed. People started migrating to small town centres for better wages and employment. This stage is called the Bronze Age (Home, 2021).
Stage 3 Static Urban Settlements or Cities	(i) Migration Owing to excessive migration from villages and towns, larger cities were formed. At this stage, developments come forefront to accommodate more people. This gave rise to bigger settlements and this stage is called Iron Age (Home, 2021).

Source: The Researcher’s own synthesis (2023)

Table 3.1 provides a summary of the history of human settlement development in Sub-Saharan Africa. It is evident that settlement patterns follow socio-economic amenities and services. From the Old Stone Age, settlement in the caves was because of food hunting. In the Middle and New Stone Ages, settlements were primitively organised as villages and small towns which followed patterns of watercourses and other natural resources suitable for man's survival. Lastly, in the iron age, settlements were informed by the migration of rural village dwellers to urban cities in search of good wages and employment. This study is of the view that environmental pollution and social challenges increase as the population increases. For instance, in Stage 1 ecological degradation was minimal because a small geographical area was cleared for the establishment of settlements as compared to Stage 3 where a large population requires a significant geographic area for the establishment of settlements.

Sub-Saharan Africa has long witnessed human movement across Africa, with circular migration either from rural to urban areas or from urban-to-urban migration as well as the urban absorption of traditionally peri-urban by the physical expansion of cities (Ademiluyi and Raji, 2008). Until recently, African cities were generally small, low in population density, and associated with insignificant economic influence (Potts, 2010; Angelopulo, 2021). However, Parnell and Simon (2014) emphasise the importance of considering the notable exceptions of Cairo (Egypt), Lagos (Nigeria), and Johannesburg (South Africa) as they have a longtime significant economic influence as compared to other African cities. Even though Africa is considered the least urbanised continent, the fast-growing character of its urban areas remains a concern (Angelopulo, 2021). By 2050, Africa is predicted to have a high number of people living in cities (1.2 billion) as compared to Europe and North America (UN-Habitat, 2015). Unmistakably, it is clear that the proportion of people living in urban areas is not only dependent on migration but also on the natural growth of the existing urban population (Ademiluyi and Raji, 2008). Thus, African urban areas are then seen as concomitant to economic growth and development.

In most African cities, human settlement infrastructure and housing types that help to define an urban area are usually non-existent because of an increase in the population with little appropriate infrastructure development such as water and sanitation facilities (Parnell and Simon, 2014). Even though recently there has been a notable number of high-profile international publications providing a synthesis of settlement development types and

infrastructure service levels in Africa, there is still no uniform official statement that outlines an ideal African sustainable urban settlement (Angelopulo, 2021).

3.2.1. Urban Human Settlements Development Theories in Sub-Saharan Africa

Watson (2004) emphasises that existing normative theories of urban human settlement-planning such as the communicative planning theory presented by Healey (1999), the Just City approach by Fainstein (2000) as well as theories concerned with the recognition of diversity and cultural difference by Sandercock (2004) are of great interest for Sub-Saharan Africa's future settlement-planning. Matunhu (2011) shares the same sentiment as Watson (2004) that when dealing with settlement distribution in the region, consideration should be on redressing historic inequality, division, and social breakdowns that were introduced during the colonial regime. Thus, Watson (2004) and Liaros (2019) argue that there is no application of a single settlement theory that is continentally applicable or acceptable to redress all colonial spatial legacy at once. Consideration of settlement theories is bound to differ from one geographical space to the other, depending on the socio-economic opportunities presented by the region (Watson, 2004; Liaros, 2019).

Generally, Sub-Saharan African cities adopted the settlement forms from their colonisers (Matunhu, 2011). The colonisers self-mandated themselves to transform Africa to take the shape of their home states during the modernisation and industrialisation processes (Matunhu, 2011). Thus, countries such as South Africa, Zimbabwe, and Botswana which were colonised by Britain have been influenced by sector model theory in most cities established during the colonial era (Matamanda and Chirisa, 2018). This theory was deemed fit for the purpose of this study as it contributes to environmental, social, and spatial injustice suffered by poor citizens residing in urban areas. The below section explains the sector model theory that was commonly applied in Africa for urban human settlement.

3.2.1.1. Sector Model Theory

The Sector Model Theory was developed in 1939 by Homer Hoyt as a classic model that helped to plan urban spatial forms for most European countries (Herbert, 1972:72). The model applied to numerous British cities (Herbert, 1972), hence African countries that were colonised by European states followed this model during the colonial era (Matunhu, 2011). For instance, when the British Cecil John Rhodes, who was also known as a “fortune hunter and land grabbing settler”, arrived in Zimbabwe in 1895 his mission was to modernise and transform African land to take the shape of his own native state (Matunhu, 2011; Matamanda and Chirisa,

2018). The model was favoured because it located the low-class residents near the factories and reduced the travel time to work, which increased production for the factories established by colonisers (Matamanda, 2019). High-class residents who usually occupied high positions in the factories were located far from their work areas and travelled with individual vehicles (Tian *et al.*, 2010). Below is Figure 3.1 which outlines the sector model theory.

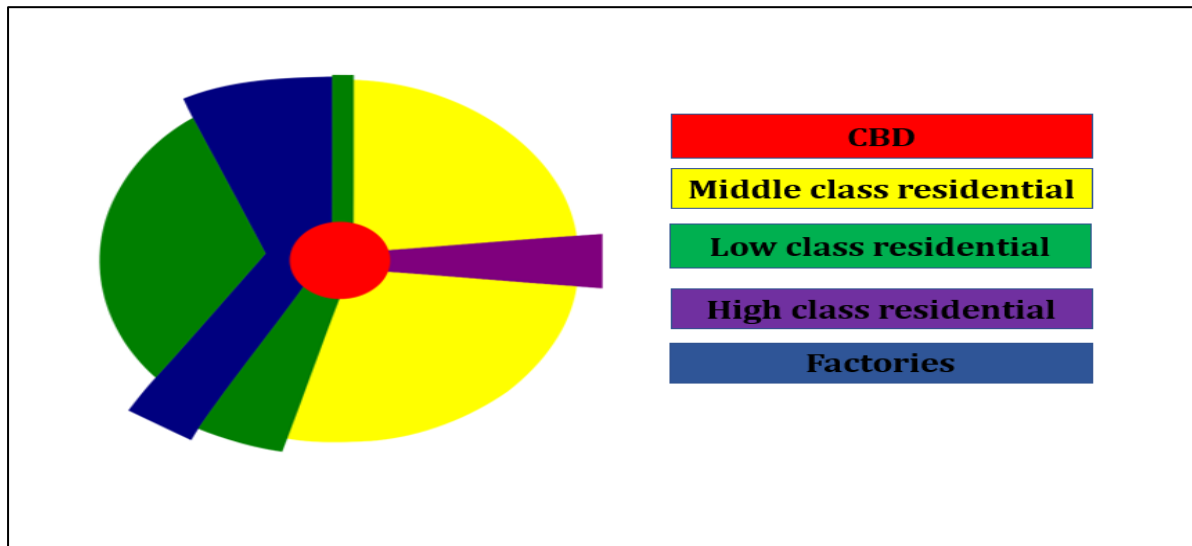


Figure 3.1: Sector Model Theory

Modified from Matamanda (2019)

The model suggests that land-uses develop from the centre to the fringe in a wedge-like fashion (Tian *et al.*, 2010). When the mixed land-uses become diverse, the city grows outward from the CBD and follows the public transport routes to the low-class residential areas (Tian *et al.*, 2010). Hoyt (1939) posits that lower-income households will be concentrated along transport routes bordering the industries as they are heavily dependent on public transport.

Middle- and higher-income households are located far from the industry because of the traffic, noise, pollution, and poor waste management associated with staying near the industry and public transportation routes (Tiane *et al.*, 2010; Matamanda 2019). The Sector Model tends to reveal social injustice in waste collection and management in African cities (i.e., Kinshasa, DRC) where high-class residential areas appear to be cleaner than low- and middle-class residential areas (Kubanza, 2014). Consequently, this study is of the view that the sector model laid a foundation for clear spatial injustice through the introduction of physical segregation between the rich and the poor in Sub-Saharan African cities.

3.2.1.2. Critiques of Sector Model Theory

The sector model theory was associated with an economic theory known as modernisation that is rooted in capitalism (Tiane *et al.*, 2010; Matunhu, 2011). Thus, the sector model incorporates the full spectrum of transition and drastic transformation that traditional African societies had to undergo to become modern by working and residing in the cities which was uncommon for traditional African rural settlers (Matamanda, 2019).

The theory is based on early 20th-century rail transport networks with no allowances to make use of private cars that enable commuting from cheaper land outside city boundaries (Smith, 1962). Therefore, the lack of consideration for public transport routes to connect poor settlers (semi-rural areas) that are at the urban periphery with the industrial areas has contributed to the establishment of informal settlements near industries in most African countries. Ellis and Biggs (2001) and Matunhu (2011) are of the opinion that the theory contributed to the exploitation of African cheap labour with less consideration of people's living conditions for as long as they are contributing to economic stability and growth of the region.

In addition, the theory also does not consider the new concepts of edge cities and boom-burbs (large rapidly growing suburbs), which began to emerge in the 1980s (Watson, 2004; Tian *et al.*, 2010). Watson (2004) emphasises that created cities that followed the sector model are less relevant because the CBD has diminished in its importance as many retail and office buildings are gradually moving out of the city to the suburbs. Furthermore, the emerging normative human settlement planning theories - such as communicative and Just City approach theories - are concerned with the recognition of diversity and cultural differences that advocate for developments which are sustainable and centralised (Fainstein, 2000; Sandercock, 2004).

3.3. Sustainable Cities and Management of Human Settlement Development

Cities and towns in post-colonial Africa are often perceived as the scene of socio-economic and ecological problems (Eyita-Okon, 2022). Towns and cities have played a role in drawing attention to endemic poverty and social degradation which could remain buried in rural areas, rather than contributing to meaningful sustainable developments (Mabogunje, 2015). The irregular increase of urban informal settlements and slums partially accounts for this problem. Bocquier (2008) argues that as the urban population grows, the cost of living or obtaining housing in urban areas increases. Thus, individuals - especially those within the low-to-no-skilled categories - are forced to live adjacent to the formal settlements of urban areas where

they set up informal settlements. Those informal settlements rarely have access to basic social amenities like clean water, electricity, and good infrastructure (Bocquier, 2008). Thus, the separation between rich and poor aggravates violence and crime so further undermining human security and hampers to attempt to achieve urban sustainability.

Considering that urbanisation is unavoidable, post-colonial African countries must be proactive in addressing urban challenges to achieve sustainable economic development (Eyita-Okon, 2022). In recognition of the challenges witnessed in urban areas, the United Nations Sustainable Development Goals (SDGs) - as a blueprint for the transition to a sustainable future outline African challenges – are as follows: (i) poverty, (ii) climate change, (iii) environmental degradation, (iv) inequality, (v) peace, (vi) security, and (vii) injustice (United Nations, 2019). Goal 1 of global SDGs outlines a commitment to make all cities and human settlements more sustainable, resilient, safe, and inclusive by 2030 (United Nations, 2019). Target 1.5 clearly states: *“By 2020, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters”* (UN; 2019; 17).

By 2030, the UN imagines that all cities across the globe will have access to adequate, safe, and affordable housing and basic services together with upgraded informal human settlements, improved and affordable transport for the poor citizens, integrated and sustainable human settlement-planning and management (UN, 2019; Eyita-Okon, 2022). On a continental level, the African Union’s Agenda 2063 and Programme Infrastructure Development for Africa - among others - are instruments aligned to the objectives of goal 1 of the SDGs (AU, 2021; Eyita-Okon, 2022). The AU Agenda 2063 promises to have a prosperous Africa based on inclusive growth and sustainable development (AU, 2021). Among the seven goals outlined in the African Agenda 2063, the most relevant one to sustainable human settlement development includes: *“A high standard of living, quality of life and well-being for all citizens; well-educated citizens and skills revolution underpinned by Science, Technology, and Innovation; Healthy and well-nourished citizens; transformed economies; modern agriculture for increased productivity and production; blue/ocean economy for accelerated economic growth; and environmentally sustainable and climate resilient economies and communities”* (African Union, 2021:7).

Thus, the African Union states had a major role to play in attaining both the global and continental agenda as stated above (UN, 2019:17; AU, 2021:7). It should be noted that this study is of the view that most African countries are still far from achieving the 2030 UN

Agenda. Hence the AU Agenda 2063 has increased the timeframes for its target keeping in mind the concept of “think globally-act locally”. Adeniran (2021) through a study conducted for Nigeria and South Africa provides a framework to achieve sustainable and inclusive cities in post-colonial Africa while creating an enabling environment for other stakeholders such as the private sector and civil society to be role players. Figure 3.2 shows the sustainable human settlements framework for Sub-Saharan Africa.

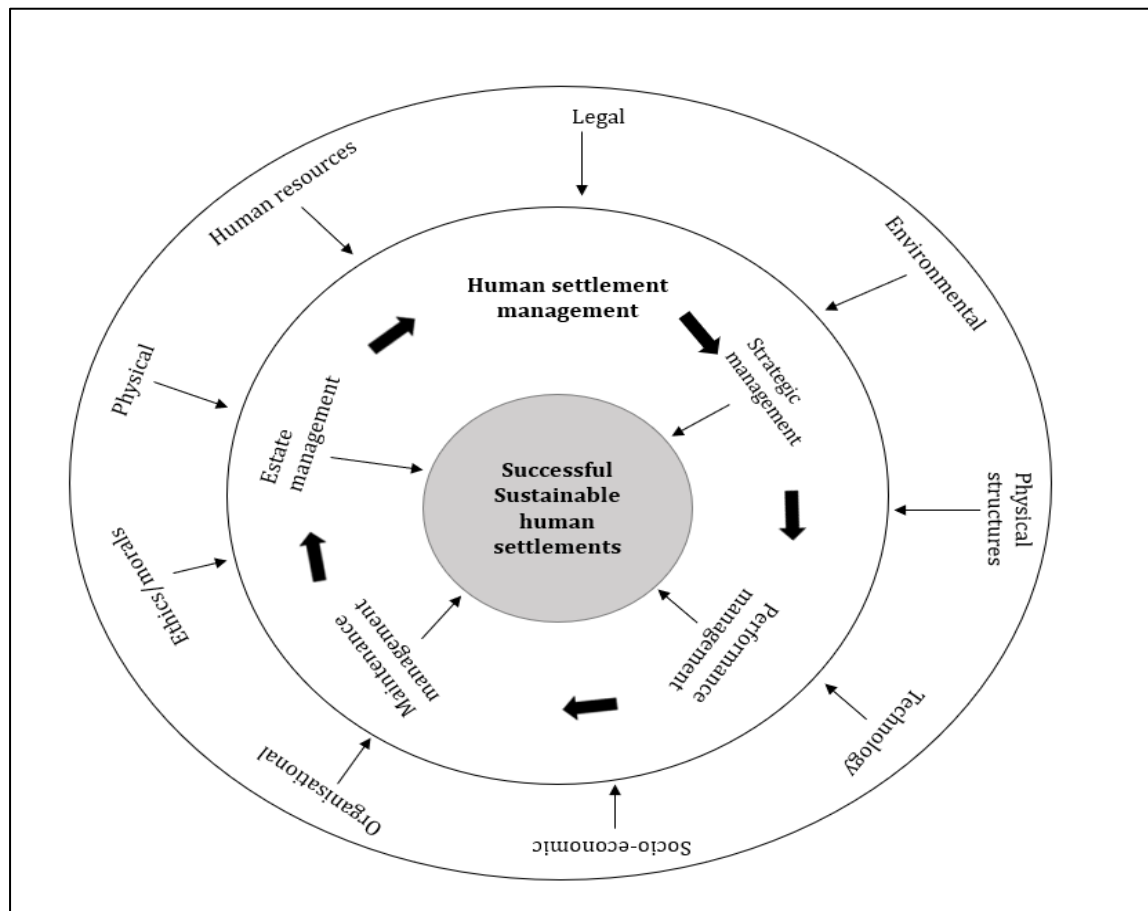


Figure 3.2: Sustainable Human Settlement Framework for Sub-Saharan African

Source: Adeniran (2021)

The framework shows the interrelationship of elements that are essential for the sustainable management of human settlement developments in Sub-Saharan Africa. The structure presents three layers that expand from the centre of the circle and are considered to be a “successful sustainable human settlement” (Adeniran, 2021). The middle circle shows that the success of human settlement development sustainability is influenced by (i) infrastructure maintenance management; (ii) estate management; (iii) performance management and (iv) strategic

management (Adeniran, 2021). The last circle shows that a successful sustainable human settlement is influenced by considering factors such as legal compliance; political policies; socio-economic; technology, ethical morals, natural environment; Human Resources (workforce skills), and the built environment (Chiu, 2003; Belle, 2017; Bryman, 2017; Adeniran, 2021).

It is worth noting that regardless of the proposed framework, the key challenges to achieving urban sustainability in post-colonial Africa are the lack of coordination and gaps in policy implementation across continental, regional, and national levels (Olajide, 2017; Adeniran, 2021). Olajide (2017) and Adeniran (2021) further emphasise that opportunities to have a successful sustainable human settlement in post-colonial Africa lie in the ability to prioritise challenges of urban pollution and ecological degradation as a high (instead of low) planning issue and rethinking developments approach from business interest driven to people centred.

3.4. Application of Sustainable Cities Concept to Sub-Saharan Africa

By 2030, there may be 770 million Africans living in cities, “more than the total number of city dwellers in the entire Western Hemisphere today” (Fourchard, 2011). In addition, urban land cover in Sub-Saharan Africa is expected to increase more than 12-fold by 2050 (Angel *et al.*, 2011). An understanding of urban heterogeneity and sustainability must consider the drivers impacting not only the northern hemisphere but also factors influencing current development patterns in the southern hemisphere (Grimm *et al.*, 2008; Fourchard, 2011; Adeniran, 2021).

Based on the above dilemma, urban planners need to expand their comparative developmental models to encompass the developing world, including Sub-Saharan Africa (McHale *et al.*, 2013). This broader focus will advance urban ecological and social systems, as well as provide for more sustainable and environmentally friendly settlements (McHale *et al.*, 2013; Adeniran, 2021). To improve the status quo of cities and towns in the African post-colonial era, Agenda 2063 aims to achieve sustainable, resilient, and inclusive urban areas (AU, 2019). However, this vision can only be achieved if the regional and national policies of all AU member states are aligned with this goal (Adeniran, 2021). Mchale *et al.* (2013) indicate that some AU member states are against the sustainability concept advocating that their regions and settlements are still underdeveloped with no major contribution to environmental degradation but have positive socio-economic benefits. Every national policy and decision have a spillover

effect on the region and the continent at large. Thus, credibility in commitment to building sustainable, resilient, safe, and inclusive cities and towns in post-colonial Africa is crucial for all the Sub-Saharan African countries (Mchale *et al.*, 2013; Adeniran, 2021).

The three pillars of sustainability - the environment, society, and economy - (Goodland and Daly, 1996; Partridge, 2005) need consideration as cities worldwide face crises such as an exploding population, inadequate infrastructure, as well as economic and environmental disruptions (Tacoli, 2017).

In the northern hemisphere, most cities that were polluted and unhealthy “Industrial Cities” in the 19th century have been structured and managed as clean “Sanitary Cities” (Melosi, 2000). Melosi (2000) reports that North American cities - such as Hamilton Park in New York City - are some of the examples of the northern hemisphere cities that were previously polluted but through successful implementation of sustainability strategies, the city is considered satisfactory in managing sanitation. Thus, this study is of the view that the concept of sustainable cities is very applicable in African cities that have gone through modernisation and industrialisation. As such cities are equally suffering from the consequences of rapid urbanisation associated with poor service delivery and spatial planning that reveals consequences associated with environmental degradation that affects the humans’ well-being.

3.5. Environmental and Social Impacts of Urban Residential Development

Urbanisation and human settlement developments are among the most impactful human activities across the world affecting the quality of urban life and its sustainable development (Todes *et al.*, 2017). In Africa’s urban areas, demand for housing can be attributed to unprecedented population growth and rapid population in the search for a better life in the cities (Fuseini and Kemp, 2015; Mweemba and Monde, 2018; Van Leeuwen *et al.*, 2018). The increase in the development of housing in African cities has consequently led to socio-economic discrepancies between environmental protection and well-being of the urban dwellers (Le Roux and Augustinj, 2017; Van Leeuwen *et al.*, 2018). Table 3.2 outlines different types of environmental impacts while Table 3.3 outlines social impacts which confront Sub-Saharan African countries regarding urban settlements and sustainability.

3.5.1. Environmental Impacts

Table 3.2: Environmental Impacts of Urban Human Settlement Developments

Environmental Impacts	Description
Loss of Biodiversity	Urban human settlement developments contribute to the horizontal expansion of urban edges (Van Leeuwen <i>et al.</i> , 2018). When developmental projects are earmarked in areas that are declared ecological support and critical biodiversity corridors this has a negative impact on plants and animals (Holden and Otsuka, 2014; Van Leeuwen <i>et al.</i> , 2018). Musenga <i>et al.</i> , (2018) argue that many instances of deforestation can be traced back to the establishment of settlements.
Loss of Agriculture Land	Acquisition of large-scale agricultural land for the purpose of human settlement development and other industrialisation activities has an impact on arable land (Tuan, 2021). The disruption of arable land has undeniably affected urban residents' food provision (Holden and Otsuka, 2014). The decline in scrub and bushland, coastal vegetation, and mangroves is owing to the emergence of residential developments (Holden and Otsuka, 2014; Alemayehu, 2016).
Air Pollution	The city's residents suffer from air pollution emanating from industries located nearby (Marim <i>et al.</i> , 2016). Omdurman City's residents, in Sudan, continue to witness air pollution from factories located on western banks adjacent to their homes because of poor spatial framework and land-use management (Marim <i>et al.</i> , 2016). Another source of air pollution is the usage of vehicles through the emission of carbon (Turok and Borel-Saladi, 2014; Tsheola and Makhudu, 2019).
Poor Waste Management	Increased human settlement development contributes to an increase in waste generation, thus needing proper management

		by the government and residents (Nhamo <i>et al.</i>, 2021; Kubanza, 2021). Delayed waste collection by municipalities and overflowing landfills are typical examples of poor waste management in urban settlements (Ogra and Onatu, 2013). Major landfills that service urban areas exceed carrying capacities while governments are unable to match the increase in urban population (Christy <i>et al.</i>, 2021). As the capacity of urban landfills decreases over time because of unprecedented population growth, local governments are confronted with a need to reconceptualise a strategy that will incorporate the expansion of human settlement development projects with the participation of urban citizens in the management of municipal solid waste (Kubanza, 2021). Bilozor and Cieslak (2021) argue that the mismatch between the size of an urban area, the geometric increase in the urban population, and the ability of local government infrastructures to promote sustainable service delivery for the citizens is the main course of poor waste management.
Poor Management	Sewage	Sumari <i>et al.</i> (2020) argue that urbanisation and urban population growth rates are faster than the cities' ability to maintain municipal infrastructure for sewage treatment plants. Poor maintenance of infrastructures for bulk service transportation by the government creates pressure to provide a clean environment owing to continuous sewage spillage that contaminates water courses (Anarfi <i>et al.</i>, 2021). Parnell and Simon (2014) argue that urban development favour areas that already have services to avoid financial costs but municipalities are experiencing financial burdens to maintain infrastructure developments in emerging settlements.
Water Pollution		Human settlement developments have the potential to distract and contaminate waterbodies through littering and spillage of hydrocarbons from the residential areas that affect water quality

	and subsequently pose a risk to aquatic life (Anarfi <i>et al.</i> , 2021; Nhamo <i>et al.</i> , 2021). Site locations, layout, and engineering designs of urban settlements contribute to diverting and impending watercourses when located near flood lines, pans, and wetlands (Nhamo <i>et al.</i> , 2021). In addition, water pollution results from the infill of wetlands and flood lines with building rubbles as a method to extend and stabilize developable areas (Tippette <i>et al.</i> , 2007).
Change of Sense of Place	Historical and cultural sites (e.g., archaeological sites, historical sites, graves, and cemeteries) are impacted by settlement development because housing projects are permanent infrastructures (Campana and Dabas, 2011).

Source: The Researcher's own synthesis (2023)

The above table outlines the most common environmental challenges associated with urban human settlement developments. These impacts can be attributed to an uncontrollable increase in urban population size that results in poor distribution of socio-economic facilities and services. Poor land-use management and spatial development framework implementation are also major contributors to ecological disturbance. Thus, this study contests that human settlement developments should be planned and implemented according to the local socio-economic factors and land-use management frameworks that are linked with environmental planning policies.

3.5.2. Social Impacts

Table 3.3: Social Impacts of Urban Human Settlement Developments

Social Impacts	Description
Health and Disease	Deterioration in good-quality air causes disease (Turok and Borel-Saladin, 2014). Urban residents' exposure to dust and noise may result in poor health (Turok and Borel-Saladin, 2014). Overpopulation within a small geographic area and the introduction of new people spread disease owing to the high

	interaction of individuals (Weimann <i>et al.</i> , 2020; Massey and Denoon-Stevens, 2022).
An Increase in Crime	An increase in population in an area might give rise to an increase in crime and the need for increased security (Weimann <i>et al.</i> , 2020). Hamanna (2022) argues that Sub-Saharan African cities that have a legacy of segregation are confronted by a social mixing approach to urban housing development. Old residents are fearful to accommodate the new settlers considered low-salary earners owing to the notion that they are a security risk (Hamanna, 2022).
Access to Sanitation and Clean Water	Poor access to quality sanitation and clean water services affects citizens, Access to good-quality sanitation services is important to human dignity (Massey and Stevens, 2022).
Job Creation and Poverty Reduction	Urbanisation is perceived as a means to end poverty, rural settlers migrate to cities for better economic exposure (Brenner and Schmid, 2015). In addition, human settlement developments provide informal jobs such as gardening and domestic work during operations (Culwick and Patel, 2020). Community members also benefit from the construction phase by providing skilled and unskilled labour (Smith and Brown, 2019).
Justice and Fairness	Urban settlements have the potential to be unjust in terms of what the citizens deserve versus what they receive (Freestone, 2012). In the case of the urban social mixing housing approach, the development does not equally benefit the residents based on their family status, race and physical abilities, as well as socio-economic standards (Todes, 2011). Old residents suffer financial losses as upmarket houses lose monetary value owing to their proximity to low-earner houses (Freestone, 2012; Todes, 2011).
Access to Education	The spatial distribution of human settlement developments impacts how children access educational facilities such as

	primary, secondary, and tertiary schools (Du Plessis, 2002; Li and Liu, 2021). An acceptable quality of life is when children have a good education at an affordable cost, however, urban dwellers are confronted by spending much money on privately owned schools owing to the failure of the government to provide enough facilities to cater for urban expansion (Li and Liu, 2021).
Spirituality	Sustainable settlements are considered to provide diverse community support structures such as churches, mosques, theatres, art galleries, and other entertainment facilities (Dunker, 2000). As the urban expands with population growth, most development projects neglect spiritual aspects and mainly focus on providing houses with no proper integration to other amenities (Li and Liu, 2021).

Source: The Researcher's own synthesis (2023)

The above table outlines the most common social challenges associated with urban human settlement developments. Urban dwellers are confronted by these challenges in their day-to-day lives. In the context of this study, sources of social challenges are mostly linked to environmental challenges. For instance, poor waste and sanitation management have negative consequences on human health and well-being. Thus, this study contests that successful management of environmental challenges has direct benefits on people's health and well-being.

3.6. Challenges to the Use of Environmental Impact Assessment for Human Settlement Projects in Sub-Saharan Africa

The general perception within the EIA context, social and environmental issues are interrelated, thus social issues should be treated equally as environmental issues (Stolp, 2006). This is further stipulated in most legal frameworks of EIA where project proponents are expected to assess the impacts of planned interventions on the physical, cultural, and human environments (Stolp, 2006). Although EIA practice has improved in recent years in Sub-Saharan Africa, the tool still has areas of concern such as the lack of legislated guidelines on how social impacts should be assessed within the EIA context (Ali, 2007; Ahmed and Dinyei, 2011).

EIA was introduced in Africa in response to the increasing impacts of developmental activities on the environment (Ahmed and Dinye, 2011; Idriss *et al.*, 2016). The existence of EIA is to predict the impacts prior to the implementation of projects (Idriss *et al.*, 2016). However, in some instances, the process is conducted parallel to the construction phase so reducing the process to just a “tick-on-box” exercise with no major contribution to minimising developmental impacts (Ahmed and Dinye, 2011; Idriss *et al.*, 2016).

The EIA regulations require that the process be carried out by accredited specialists in the field (Gohary and Armanious, 2017). In many African countries EIA regulations, project proponents are expected to appoint independent EAPs to carry on the studies (Marara *et al.*, 2011). Owing to different sub-fields of specialists in environmental science - such as biodiversity, air quality, and hydrological impacts assessments - appointed EAPs are expected to source subject experts on the specific specialist studies (Marara *et al.*, 2011). Rebelo and Guerreiro (2017) reveal that there is an unwillingness to outsource specialist studies by the main appointed EAPs. Thus, reinforcement of capacity-building action regarding the qualification of personnel involved in EIA systems is deemed critical (Rebelo and Guerreiro, 2017).

East African countries usually face difficulties in integrating socio-economic challenges with environmental protection owing to overpopulation and poverty in urban areas (Marara *et al.*, 2011; Gohary and Armanious, 2017). This situation further hinders EIA’s effectiveness in assessing the impacts of urban human settlement development projects since urban expansion is perceived as a way to address socio-economic challenges (Rebelo and Guerreiro, 2017; Rweyendela and Mwegoba, 2022). Thus, most African developing countries are more interested in development as the only means to end poverty and promote social well-being (Angel *et al.*, 2011).

Different role players have different perceptions of the EIA process. Spheres of government, EIA practitioners, project proponents, and communities have different attitudes, values, attitudes, and beliefs about its aim and objectives (Rweyendela and Mwegoba, 2022). These differences contribute to the notion of labelling EIA as “an add-on process” to cause further delays in proposed urban settlement applications (Rweyendela and Mwegoba, 2022). A key point in the EIA process is the independency of EAP conducting the process (Balsam and Wood, 2003). When impacts are assessed in-house with no independently appointed EAP this may lead to biases as project proponents are likely to rank high environmental risk hazards as low risks (Balsam and Wood, 2003; Gohary and Armanious, 2017). The EIA procedures in some African countries (i.e. Kenya, Mozambique, and Angola) are complex and not legally

mandatory for the process to be conducted by independent EAPs (Rweyendela and Mwegoba, 2022). Rweyendela and Mwegoba (2022) further indicate that discrepancies in African EIA processes cause difficulties in successful implementation as compared to the European Union (EU).

Citizens are not informed about the EIA process and the role they should play during the assessment, especially in African rural areas (Gohary and Armanious, 2017; Maphanga *et al.*, 2023). However, Rweyendela and Mwegoba (2022) indicate that citizens residing in cities are usually clued up about their public participation rights, the challenge is access to information. Even though most urban citizens can read, immediate communities do not understand the negative environmental and social impacts of developments as proponents and environmental consultants do not offer detailed information that is easy to understand (Gohary and Armanious, 2017).

Poor monitoring of issued environmental authorisation for developments by competent authorities remains a challenge (Gwimbi, 2014). Community members are not involved in monitoring compliance during the implementation of human settlement projects, involvement only takes place during the planning phase of the projects (Rantlo, 2015). However, it is contended that once human settlement projects are completed, especially for low-cost government projects (with the exception of gated developments and real estate developments) the municipalities should ensure continuous maintenance management through the implementation and enforcement of by-laws (Gwimbi, 2014; Rantlo, 2015).

3.7. Urban Human Settlement Developments in South Africa

South Africa provides a particular context to the human settlements field of study, which contributes to the difficulties of promoting urban sustainability (Van Huyssteen *et al.*, 2010; Todes *et al.*, 2017). South African history has not only left negative socio-economic impacts on its Citizens but also a particular urban spatial legacy (Van Huyssteen *et al.*, 2010). The multi-dimensional problems associated with apartheid urban settlements include, among others, diversity in cultures, and socio-economic and biophysical environments (Strauss, 2019). Thus, challenges associated with the current state of human settlements cannot be reflected in isolation without a basic understanding of the past and link to the citizen's projections for the future (Strauss, 2019). Owing to South Africa's unique urban history, the 20th century witnessed accelerated changes with large-scale migration from rural areas and increased urbanisation, so bridging the gap of separated developments, extensive suburbanisation, and peripheral growth

(Todes *et al.*, 2017). However, at the core of the revolution laid out by the apartheid regime with the aim to separate development and control that ruled the country for over 40 years, urban segregation took a specific form that the country is currently redressing (Van Huyssteen *et al.*, 2010). The below section outlines the urban human settlement developments during apartheid and the post-apartheid eras.

3.7.1. Urban Settlement Development Projects in the Apartheid Era

The introduction of separate development, which is known as apartheid, was not the beginning of geographic and socio-economic separation (Strauss, 2019). Segregation had already been institutionalised and became a policy when apartheid was introduced in 1948 at a national level (Strauss, 2019). Since colonial times, many different forces have shaped human settlements that resulting in the large exclusion of major sections of the population from the economic, social, and environmental benefits of vibrant, integrated, sustainable urban development (Todes *et al.*, 2019).

It is believed that South Africa's historic patterns consist of three main parts that contributed to the urban settlement spatial setup from 1652 until 1990 (Van Wyk, 2012; Hendler, 2015). Part 1 (1652 - 1910) is the period of colonial roots of the spatial control and segregation of residential arrangements in the earliest towns (Van Wyke, 2012; Strauss, 2019). Part 2 (1910 - 1948) is the period of post-union also known as a pre-apartheid regime that used laws as an instrument to advance the systematic dispossession and spatial segregation, political control, and socio-economic exclusion of the majority black population (Van Wyke, 2012; Strauss, 2019). Part 3 (1948 - 1990) is the period where most urban settlement developments were introduced with spatial controls that segregated the poor black majority, with the minor spatial restructuring of urban areas that accommodated only a few black privileges (Van Wyke, 2012; Strauss, 2019). These patterns resulted in wide-ranging spatial, socio-economic, and environmental issues that left South Africa with cities that entrenched inequality which is currently occurring to date (Todes *et al.*, 2019). Dewar (1992) identifies three spatial characteristics that shaped typical apartheid South African cities (i) low-density sprawl, (ii) fragmentation, and (iii) separation.

(i) Low-density sprawl

Dewar (1992) shows that low-density sprawl manifested in three processes that determined the pattern of growth within the cities. The first process was speculative sprawl where wealthier white citizens seeking to privatise amenities became a target group for developers who would

target beautiful places in the cities to build their private country estates (Dewar, 1992; Huchezermeyer, 2019). The second process was the development of low-cost housing by government schemes on the urban peripheries that accommodated most black citizens (Strauss, 2019). Lastly, was the process of illegal squatting that accommodated people who could not find designated housing areas or were not beneficiaries of low-cost housing, and yet did not have legal rights to reside within the “white South African community”, while needed locations closer to their places of work (Huchezermeyer, 2019).

(ii) Fragmentation

Fragmentation in South African cities reflected a cellular development pattern where developments were conducted in relatively discrete pockets or cells, which were frequently bounded by freeways and/or buffers of open spaces (Dewar, 1992). The main aim of fragmentation was to create the “neighbourhood unit” and “urban village”. The isolated pockets of human settlement development are linked primarily by freeways and other limited access forms of movement which created restrictions to opportunities in an urban structural sense (Dewar, 1992; Napier, 2009).

(ii) Separation

The separation in urban areas included separation in terms of land-uses, races and income groups, places of work, and residential areas which eventually contributed to the separation of entire urban development management (Napier, 2009; Huchezermeyer, 2019). This separation resembled a “homogenous” land-use that was dominated by a certain group of people and only connected through long transportation routes (Napier, 2009). In addition, this separation increased the number of poor people settling at the urban edges as they were left far from urban opportunities or settled illegally in the urban areas at the “squatter camps” known as informal settlements (Huchezermeyer, 2019). Figure 3.3 shows the spatial formation of the South African cities during the apartheid regime.

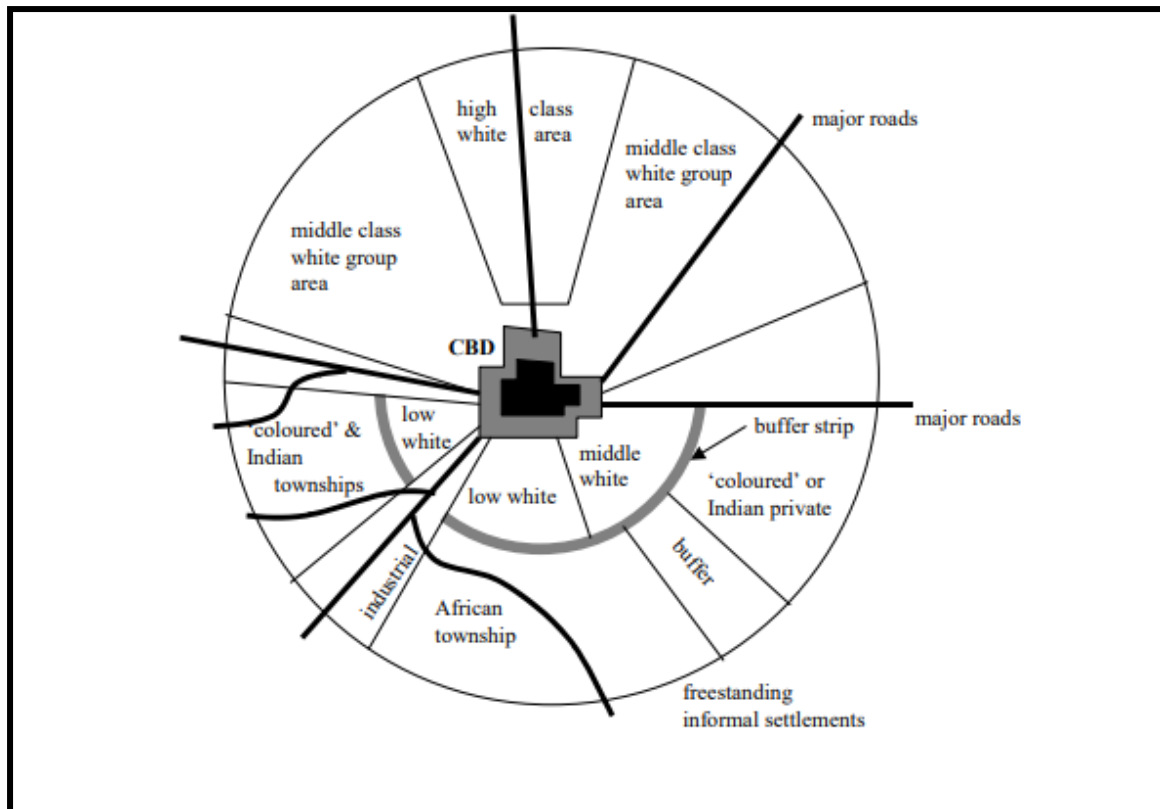


Figure 3.3: The spatial formation of the South African city

Source: Napier (2009).

The cumulative impact of the above city spatial patterns was characterised by cities with a large range of inequity (Strauss, 2019). Todes *et al* (2019) and Huchzermeyer (2019) emphasise that this apartheid urban-planning approach contributed to urban settlements that are distorted, fragmented, unequal, incoherent, and inefficient. The current urban environmental and social impacts associated with human settlements in SA are because of the spatial planning that occurred over 40 years back (Klug *et al.*, 2013). Despite the attempts by government and private developers to close the gap through developments that are within the current existing urban suburbs, overcrowded areas overwhelm the service delivery infrastructures affecting the quality of life for urban settlers.

3.7. 2. Urban Settlement Development Projects in the Post-Apartheid Era

Since the dawn of democracy in 1994, South Africa has witnessed high and increasing rates of urbanisation (Klug *et al.*, 2013), with about 65% of its 55.9 million people being urbanised. According to the Stats SA (2016), the annual average growth rate for cities and larger towns is estimated at 2.8%. The urban population continues to grow faster than the population growth in general. It is estimated that 71.3% of South African citizens would be living in urban areas,

with a projection of 80% by 2050 (Todes and Harrison, 2015; Strauss, 2019). According to the study completed for Integrated Urban Development Framework (2015), this increase in urbanisation continues to impact major metropolitan areas as most people are concentrated in Gauteng, eThekweni, and Cape Town.

It is widely known that under apartheid, several pieces of legislation applied to urban land and planning demarcated and controlled the black people from being part of “white urban South Africa” (Todes and Harrison, 2015). After the first democratic election, the current South African government was initially confronted by two major challenges regarding sustainable human settlement development in urban areas. Du Plessis and Landman (2002) outline these major challenges as (i) delivering the number of houses in urban areas for black people and (ii) overcoming the legacy of apartheid racially based spatial separation.

Subsequent to the identification of the major challenges, the SA government adopted a reconstruction and development programme (RDP) with the primary aim to redress the aspiration of the black population to participate in urban socio-economic activities (Du Plessis and Landman, 2002; Kallis and Nthite, 2007). Central to the RDP mandate was the articulation of housing as a human right stipulated in the white paper of 1994 entitled “A New Housing Policy and Strategy for South Africa” as well as the protection of the environment as a human right in terms of section 24 of the Constitution (RSA, 1996; Kallis and Nthite, 2007).

It is, however, important to note that in terms of the Housing White Paper of 1994 and housing policy, the government allocates housing subsidies to households earning less than R3.500 per month. Thus, is not the entire population of South Africa that are beneficiaries (Callinicos, 1996; Department of Housing, 2004; Kallis and Nthite, 2007). Given this alarming circumstance, middle-class (salary-earners) urban populations with a desire to participate in socio-economic activities are left with no option but to buy or rent houses in urban areas (Adegun, 2018). This circumstance has been a concern for both government and businesses to close a housing gap in urban areas, thus private property developers play a vital role in the provision of houses that are either bonded via the banks or individually rented through real estate (Ademiluyi and Raji, 2008; Charlton, 2017). Regarding the urban human settlement development projects in post-apartheid, the key concern is whether developments interlink the sustainability pillars through the promotion of environmental, social, and economic values.

3.7. 3. Enhancing Urban Concentration and Compaction

Arguments around compact urban forms have been endorsed by several international agencies such as the World Bank (2010), United Nations Habitat (2009), and the Organisation for Economic Co-operation and Development (OECD, 2012), with its guidance for achieving urban sustainability and resilience strategies contained in the New Urban Agenda of 2016 (Natava, 2015; Todes 2019). Simply put, urban compaction on these international agendas simply implies the redevelopment that aims to reach medium to high population densities and build forms (Natava, 2015). Some scholars argue that urban compaction and concentration go beyond quantitative elements of densification and promote a diverse and mixed-use environment that favours social inclusion through the provision of housing opportunities (UN-Habitat, 2009; Peberdy and Crush, 2017; Li and Liu, 2021).

Compact cities are believed to provide lower costs for providing public infrastructure for service delivery as well as easier access to places of work by providing cheaper public transport (Boyko and Cooper, 2011). Boyko and Cooper (2011) advocate that urban concentration reduces the environmental impacts as it enables the preservation of farmlands and natural resources by preventing urban outward growth. Glaeser and Joshi-Ghani (2013) support Boyko and Cooper (2011) that compact cities have more economic benefits as they support the agglomeration of urban productivity.

However, several criticisms are brought forward against the claimed benefits arguing that higher density contributes to congestion, environmental pollution, and crime (safety and security). It puts more into the cities' remaining open spaces and natural resources (Li and Liu, 2021). In situations where cities are poorly managed with inadequate infrastructure for service delivery, as in most African countries, the urban compaction may end up undermining the economic potential associated with density (Bertaud, 2015).

In a South African situation regarding urban compaction, Culwick and Patel (2020) reveal that compacting cities pushes up the cost of land and houses which contributes to the reduction of access to urban areas owing to affordability challenges. Culwick and Patel (2020) further indicate that urban dwellers usually have small spaces and participants revealed a desire for more spaces that could be used for household backyard farming.

3.7.4. Impacts of Urban Residential Development Projects on the Environment and Social Well-Being

In South Africa, like other countries, the increase in urban population has resulted in major environmental and social impacts (Shikwambana and Tsoeleng, 2022). Geyer *et al.* (2012) argue that the development of South Africa's largest cities, owing to urban expansion, has significantly reduced urban agricultural land and the ecological footprint to make way for human settlement projects as well as commercial and industrial land use. High poverty rates and unemployment experienced by rural areas have left many black citizens migrating to the cities in search of better socio-economic exposure (Du Plessis, 2015). Weimann *et al.* (2020), for example, revealed that the migration of rural settlers to urban areas has significantly contributed to the establishment of informal human settlements in Cape Town that in turn share the same municipal services with the adjacent formal urban settlements. While the success of the government in providing reliable service delivery such as basic water supply and waste management facilities is influenced by environmental, social, and political factors and the integration of other urbanisation factors (Du Plessis, 2015; Weimann *et al.*, 2020).

The continuous development of human settlements contributes to urban air pollution (Turok and Borel-Saladin, 2014). Shikwambana and Tsoeleng (2022) analysed the impact of increase in population and consequences of land use on air in South Africa (the towns of Tshwane, Rustenburg, and Emalahleni). Turok and Borel-Saladin (2014) reveal that the continuous burning of fossil fuels by dwellers releases black carbon and carbon monoxide which contributes to the deterioration in air quality in these areas.

Additional common socio-environmental impacts associated with urban human settlement development, specifically in Gauteng, are poor access to quality sanitation services, particularly in northern Kempton Park where continuous sewage spillage is linked to an increase in new residential areas that local government should service via the provision and maintenance of infrastructure (Weimann *et al.*, 2020; Gauteng SOER, 2021). The rapid increase in population in South African suburbs surpasses the rate at which the government responds in delivering sustainable services (Massey and Stevens, 2022). Access to good-quality sanitation services is important to human dignity and reduces the potential impact on water resources (DEAT, 2011).

Culwick and Patel (2020) advocate that housing developments should seek to recognise larger spectrum instead of viewing housing as a mere provision of houses. Emphasis should be on

provision of basic services such as access to goods, services, work opportunities, and income-generation options. In addition, Culwick and Patel (2020) further raise an environmental concern regarding increasing densities with a reduction of potential land for agriculture owing to the expansion of urban edge through human settlement developments where small-scale farming - that provides low-income communities with locally grown food - is negatively affected. Nhamo *et al.* (2021) reveal that an increase in the built environment and the subsequent changes in the urban landscape significantly reduced the ecological landscape between 2011 and 2018. Waterbodies were reduced by almost 14% and vegetated land was reduced by over 10% during the same period. Thus, this challenge affects the areas recognised as critical biodiversity and ecological support zones which in turn affects the indigenous flora and fauna of the region.

In 2019, Department of Human Settlement reported that the protection of environmentally sensitive and ecological support areas takes priority over human settlement projects. In addition, DHS (2019) records that there is hardly any formal human settlement development project that is authorised within ecologically sensitive areas as planning of such developments is integrated into environmental legislation. Saidi (2010) and Maphanga *et al.* (2023) argue that the potential harm to the environment and people does not emanate from a single human settlement project but rather from cumulative factors existing in areas where such developments are implemented. Several scholars such as Du Plessis (2000), Sandham and Van der Walt (2004) and Maphanga *et al.* (2023) note that South African environmental laws, specifically the National Environmental Management Act No. 107 of 1998 (NEMA) regulations have completely changed planning approaches and processes as the Act. Chapter 5 provides for integrated impact assessment tools to assess socio-environmental issues of development activities.

3.7. 5. Application of Environmental Impact Assessment and Social Impact Assessment to Urban Residential Development Projects

In South Africa, environmental and social impacts for human settlement developments are assessed using the EIA which is legally mandated and enforced by the National Environmental Management Act (NEMA 107 of 1998) (Sandham *et al.*, 2013; Maphanga *et al.*, 2023). In practice, NEMA EIA regulations provide two different approaches to the process: a basic assessment process (for simple projects with minor socio-environmental impacts) and a scoping full environmental impact assessment process (for complex projects with major socio-environmental impacts) (Murombo, 2008). The current EIA regulations of April 2017 have

three Government Notices (GNR 327, 325, and 324) that list developments that should undergo the EIA process before approval is granted. Most of the human settlement development projects are listed and thus are required to undergo the process in case the project scope meets the prescribed regulation's threshold (Du Pisani and Sandham, 2006; Maphanga *et al.*, 2023).

EIAs for human settlement developments are typically conducted at a feasibility phase which is a later stage of the project life cycle (Aucamp, 2015). Meanwhile, according to EIA regulation S16, applications are required to be submitted to competent authorities with the engineering designs and other site layout plans that are at an advanced stage and the developer has incurred some financial cost for the work (EIA regulation, 2014; Aucamp, 2015). This implies that by the time Developers appoint independent EAPs to conduct EIA, which also involves stakeholders' engagement through the public participation process, the conceptual and pre-feasibility studies are already concluded without incorporation of the public concerns (Aucamp *et al.*, 2011; Hildebrant and Sandham, 2014; Ali, 2017). Marara *et al.* (2011) and Soria-Lala *et al.* (2022) argue that public concerns raised during the EIA public participation process are hardly considered when deciding to proceed and authorise the proposed development as the project has advanced on its life cycle.

EIA is legally conducted per project specifications. Site specifications with no compulsory requirement to consider other cumulative existing environmental and social cumulative factors affecting the entire region (Hildebrant and Sandham, 2014). Petts (2007) criticises the fact that the EIA listing of activities that require environmental authorisation poses another challenge, as the lists are perceived to blind competent authorities from focusing on novel non-listed activities that may have more cumulative significant impacts than those listed on the government notices. Gwimbi (2014) and Maphanga *et al.* (2023) state that potential harm to the environment and people is not only emanating from a single listed project but cumulative factors existing in an area for development.

The appointed EAP determines whether the project should undergo a basic assessment or full scoping EIA and what type of additional specialist studies need to be conducted (Murombo, 2008). According to section 43 of EIA regulations (2017), EAP circulates the impact report to registered interested and affected parties for comments. Comments must be incorporated into the final EIA reports and be considered by competent authorities when making a decision (Maphanga *et al.*, 2023). Section 7 of EIA regulations (2017) states that a competent authority and EAP are required to consult with any organ of the state that administers any law relating to the matter affecting the environment relevant to such human settlement developmental

activities before a decision is taken. This consultation further assists in identifying additional types of specialist studies to be conducted, such as a geotechnical assessment, traffic assessment, biodiversity assessment, heritage assessment, and social assessment (sections 7 and 15 of EIA regulations, 2017). Therefore, during the EIA process, relevant sector departments and stakeholders must be consulted and comments prior to authorising such development by the competent authorities.

Once the EIA application and assessment reports for human settlement development projects have been successfully submitted to the competent authority, a decision to grant or decline such development is taken by the designated Head of the Department of Agriculture, Rural Development and Environment (SADC Environmental Legislation Handbook, 2012). Any decision taken on EIA for human settlement developments can be appealed to the Member of the Executive Committee who is responsible for environmental management in the province, within the stipulated timeframe (SADC Environmental Legislation Handbook, 2012). In the case where the development has been granted approval and the appeal timeframe lapsed without any objection, the developer may legally commence with the construction of such a project (Chapter 2 of the National Appeals Regulations, 2014).

Environmental authorisations for human settlement development projects are issued with specific conditions that must be complied with during the construction and implementation phases of such developments (Gwimbi, 2014). The competent authority is further mandated to monitor such authorised human settlement development and enforce any detected non-compliance associated with the development (Section 31 - 34 of NEMA, 107 of 1998 as amended). However, a notable number of scholars argue that poor monitoring of authorised developments during implementation remains a challenge that contributes to the ineffectiveness of EIA and SIA in addressing environmental and social impacts (Marara *et al.*, 2011; Gwimbi, 2014; Soria-Lala *et al.*, 2022). Section 31B of NEMA makes provision for the appointment of environmental management inspectors (EMIs). The EMIs are mandated to monitor and enforce compliance with the environmental legislation, including the monitoring of environmental authorisations for human settlement development projects.

The MEC for the provincial department responsible for the environmental management department may designate - as EMIs - any member of staff from their respective departments to be an EMI upon completion of the required training in terms of NEMA S31 C (NEMA, 2002). Designated EMIs are mandated to monitor and enforce compliance with environmental authorisations issued by such departments in terms of NEMA S31G(a)(NEMA, 2002). In the

case of Gauteng, environmental authorisations are issued by the Department of Agriculture, Rural Development and the Environment (GDARD) (NEMA, 2002). Therefore, this implies that monitoring developmental projects is not only carried out by the developers but also the government is mandated to ensure compliance with the specific conditions of the issued environmental authorisation. NEMA S31(4) gives the community members the responsibility to lodge complaints to the competent authority about non-compliance with the issued EA and any other activities that might cause environmental degradation and affect the social well-being of the citizens (NEMA, 2002).

3.7.6 Limitations of Current Approaches in Assessing Environmental and Social Impacts of Urban Human Settlement Projects

3.7.6.1. Lack of Statutory Requirement for Conducting SIA in the Environmental Impact Assessment Context

In South Africa, NEMA was enacted over 20 years ago but there are still no clear legislative requirements for conducting SIA in the context of EIA (Matlakala, 2021). This challenge has led SIA to be seen as an “orphan” or “little sister” of impact assessments to EIA (Du Pisani and Sandham, 2006; Hildebrandt and Sandham, 2014). Aucamp *et al.* (2011) indicate that EIA is considered at a later stage in projects, which means social issues are also assessed at about the same time as a secondary assessment to obtain the environmental authorisation. Du Pisani and Sandham (2006) supported by Kruger *et al.* (2020) are of the view that in SA there is no uniform approach to how social issues should be addressed. This can be attributed to the fact that SIA is usually conducted by EAPs with no adequate qualifications in social science. The lack of professional bodies for SIA practitioners, as compared to EAPs, has further contributed to the poor consideration of social issues during the EIA process. Hence it is equated to the EIA public participation process (Hildebrandt, 2012; Hildebrandt and Sandham, 2014; Kruger *et al.*, 2020).

3.7.6.2. Environmental Impact Assessment Considered as a Single-Event Assessment

Assessing the environmental and social impacts associated with human elements is usually conducted as a once-off, single event that is mainly considered for approval purposes with the slight potential of mitigating identified impacts (Gwimbi, 2014; Maphanga *et al.*, 2023). Petts (2007) shows that environmental and social impacts sometimes do not emanate from a single project but rather from many projects that are similar in their characteristics. Cuppen *et al.* (2012) share the same view as Petts (2007) that one single isolated assessment from the current

existing socio-environmental challenges experienced in an area would not have the desired outcome. Cuppen *et al.* (2012) share a belief that SIA, together with public participation processes in EIA, are merely conducted for the project to be accepted and supported, as well as a tick box pro-forma exercise where public concerns are not incorporated into decision-making. In addition, several scholars in the environmental field argue that for as long as a project can be proven to have economic viabilities and benefits, the environmental and social aspects are usually overlooked (Du Pisani and Sandham, 2006; Gohary and Armanius, 2017; Soria- Lara *et al.*, 2020).

3.7.6.3. Environmental Impact Assessment Relationship with Overall Project Delivery

The integration of environmental and social issues with overall project delivery remains a concern. The 2013 discussion paper on the environmental and social impacts of developmental projects shows that ESIA's are perceived as roadblocks by the developers (EIANZ, 2013). This perception hinders the developers from seeing the need to integrate social and environmental considerations in all phases of the projects. According to Vanclay *et al.* (2020), developers fail to manage environmental and social impacts in all phases owing to inadequately trained personnel, financial constraints, and proper guidance on what deliverables should be achieved per project phase (Ali, 2017; Vanclay *et al.*, 2020). EIANZ (2013) presents opportunities that can be employed by the government to manage socio-environmental impacts such as the promulgation of the developer's regulations that would outline deliverables to be achieved at each stage of the project and failure to comply should be considered as a criminal offense that should be prosecuted before the court of law.

In addition, South African EIA is usually conducted at a later stage of the project (feasibility phase) in terms of the 2014 EIA regulation (as amended in 2017). This means that fatal flaws that should have been considered at the conceptual phase of the projects are overlooked as the proponent has decided to proceed to feasibility studies where costs have been incurred related to the projects (Aucamp *et al.*, 2011; Hildebrant and Sandham 2014; Ali, 2017). Furthermore, the assessment and monitoring of compliance with environmental and social deliverables should be conducted in all phases of the project life cycle because its basis goes beyond simply satisfying legal requirements (Hansen *et al.*, 2015).

3.7.6.4. Failure to Use Local Knowledge and Experience

Local values and knowledge should not be dismissed when conducting an impact assessment associated with urban developments, especially in an affected community that is diverse ethnically (Saidi, 2010; Maphanga *et al.*, 2023). According to the Interorganizational Committee (1994:144), “anthropological data on ethnically and racially diverse communities are best for understanding the cultural context of the impacted community”. Aucamp *et al.* (2011) share the view that in South Africa, with a multi-cultural urban area, it is vital to obtain local knowledge because indigenous cultural values gradually are lost as the population increases and becomes heterogenic.

Maphanga *et al.* (2023) provide evidence that most community members are not thoroughly aware of their rights when it comes to sharing their knowledge. Maphanga *et al.* (2023) further reveal that EAPs limit public participation in the placement of public notices as well as public hearing meetings without intensively engaging with the locals. Based on this, there is a need for public awareness of the importance of EIA to equip community members on the role they could play in sharing their local knowledge.

3.7.6.5. Poor and Lack of Project Monitoring

Poor or no monitoring of compliance with the legislation that governs environmental and social management remains a challenge (Gwimbi, 2014). In addition, the enforcement and successful prosecution of environmental-related crimes are not very visible hence developers hardly see convictions where penalties are imposed, senior managers are prosecuted personally owing to violating citizens’ environmental human rights (Elliott, 2012). The monitoring of human settlement projects during the implementation after construction is complete should be made compulsory regardless of whether EIA was conducted or not. Vanclay *et al.* (2020) recommend the establishment of monitoring committees that should consist of community members (IAPs) who must conduct audits regularly and report to the government ministry mandated to protect the environment and social well-being of the people.

3.7.6.6. Lack of Recognised Professional Body for Social Impact Assessment Practitioners

In SA, the lack of recognised professional body for SIA practitioners also appears as a challenge to managing the impacts of human settlement developments (Esteves *et al.*, 2012; Aucamp *et al.*, 2011)

). Even though an assessment of social challenges may be conducted by a qualified social scientist, their ToRs are determined by the EAPs in projects that require EIA and competent authority officials that grant or refuse environmental authorisations are also qualified natural scientists employed by departments responsible for environmental management (Du Pisani and Sandham 2006; Audouin and Hattingh, 2008). Unlike EAPs that are required to be registered with the Environmental Assessment Practitioner Association of South Africa (EAPASA) as of 8 August 2022 in terms of section H of registration authority regulations of NEMA. It is the view of the researcher that SIA registration could fit very well under the EAPASA as an affiliate body. This approach will discourage over-ambitious practitioners from claiming to be subject experts on the assessment of social impacts associated with human settlement developments.

It is based on the above challenges that despite conducting and implementing EIA and SIA processes by the government, developers, and other relevant stakeholders to address identified impacts in South Africa. Human settlement developments continue to contribute to environmental degradation and affect the social well-being of citizens (Schetke *et al.*, 2010; Aucamp, 2015).

3.8. Reviewing of Environmental Impact Assessment and Social Impact Assessment Report for Human Settlement Development Projects

Sandham *et al.* (2013) are of the view that EIA reports are the crucial deliverables that are considered in decision-making and, therefore, are better suited to deal with an element of the EIA's project's effectiveness in addressing identified environmental and social impacts. The overall success of a project's EIA process, among others, depends on the quality of the EIA reports produced by the EAPs (Lee and Colley, 1992:1). In the field of environmental management, it has been a general belief that EIA reports would cover all environmental and social aspects assessed during the EIA process. This belief is supported by the notion that decisions to grant environmental authorisations are mainly based on the information submitted on EIA reports (Pinho *et al.*, 2007). It is further believed that conditions of issued EA are formulated from the submitted EIA reports. Therefore, the monitoring of compliance is also guided by the context or information contained in EIA reports.

Morrison-Saunders *et al.* (2007) indicate that the findings of the EIA process are critical in informing competent authorities about the potential impacts associated with human settlement developments and their proposed mitigation measures. The approval of proposed projects is on

the basis that the promises made on the EIA report will be fulfilled during the implementation phase of the project. It is therefore that the quality level of the EIA report submitted to the competent authorities is expected to reflect the effectiveness of the entire EIA process and thereby contribute to mitigating the impacts. Glasson *et al.* (2012) indicate that good-quality EIA reports are deemed to contribute to a good-quality decision by the competent authorities and in return mitigate the identified environmental and social negative impacts.

Based on the above, a question must be asked: what is a good-quality EIA report? A school of thought perceives quality as the process standards against its output where the quality of a process should be able to hold its owner accountable for non-compliance (Sandham *et al.*, 2013). For instance, non-government organisations (NGOs) should be able to hold decision-makers (competent authorities and developers) to account for their actions. Therefore, this is directly linked to the notion that the quality of the EIA report and its ability to identify and address all potential environmental and social impacts will determine its effectiveness in mitigating impacts. It is for this reason that this research seeks to establish whether the human settlement development projects with environmental authorisation have their EIA reports covering all the critical aspects of the project impacts.

3.9. Management of Environmental and Social Impacts in the Project Life Cycle

The environmental and social impact assessments should be conducted throughout all the phases of the project life cycle to ensure that the project is addressing social and environmental impacts at all stages (Vanclay, 2003). Where the environmental and social impact assessment is process-orientated, it assists the community members to cope with the development's unforeseen changes around their area as well as impact assessments that are conducted throughout the entire life span of the project assist in managing negative impacts emanating from human settlement development projects (Aucamp, 2003; Sandham, 2014).

EAPs and proponents of projects usually focus their assessment on feasibility studies with less focus on mitigating impacts during the post-project construction phase (Vanclay, 2003; Gwimbi, 2014). Conducting environmental and social impact assessment during the pre-feasibility/conceptual stage has the benefit of developing project-specific baseline plans that can be implemented and measured throughout the life cycle of the project (Labuschagne, 2004). Labuschagne (2004) shows that impacts may not be identified during the conceptual phase but arise as the project progresses to the next phases. Hence the biggest challenge with EIA is that

most are conducted in only one phase as a mere once-off exercise merely to obtain environmental authorisation (Gwimbi, 2014). Impacts associated with human settlement development projects follow every phase of the project, even though they are different in terms of their significance, likelihood, and desirability (Dong and Thomas, 2015). According to the Interorganizational Committee (1994: III), a developmental project's impacts differ with their scale of occurrence. Some are considered short term where ecological disruption can quickly recover and return to a state of normal once the disruption is removed, while others may last a lifetime such as the introduction of permanent residential units.

For projects with a long-life span such as human settlement development projects, it is vital to integrate the pre-project/conceptual impact assessments with post-project/implementation impact assessments (Aucamp, 2023; Gwimbi, 2014; Hildebrant and Sandham, 2014). One of the major challenges in integrated environmental management is the absence of, or poor, monitoring of projects post-EIA process where the actual impacts occurring during the implementation of the project can be assessed against predicted identified impacts during the planning phase (Gwimbi, 2014). Bezuidenhout (2009); Hildebrant and Sandham (2014) allude to the fact that EIA in its current form is known to be only a process that must be legally followed only if the scope of the project meets the legislated prescribed threshold, with no obligation to assess the environmental and social impacts voluntarily. The researcher is of the view that environmental and social impact assessments should be conducted and incorporated into all phases of the project life cycle and be conducted for all the human settlement development projects in urban areas regardless of whether the scope of projects legally requires or not but as a means of self-regulation instituted by companies' business operating model.

3.9.1. Project Life Cycle of Urban Residential Developments

Larson and Gray (2015) indicate that each project has its own characteristics that are determined by their unique risks and impacts. Most organisations that are involved with developmental projects usually divide their projects into phases to manage and control the work packages adequately. Those phases are referred to as the project life cycle (Davidson, 2000). This cycle is defined as the order of activities and phases that a project undergoes from the beginning to the end. It assists managers and planners to organise work packages and achieve the objectives and goals of the project within the stipulated timeframe and cost (Davidson, 2000).

Thus, most organisations follow a project sequence from initiation to closure (Beauchemin, 1999; Davidson, 2000). Several scholars in the project management field such as Beauchemin (1999), Davidson (2000) and Enshassin *et al.* (2016) - agree that a project should undergo at least five phases which are discussed in detail in the following section. Most human settlement development projects are also subjected to these phases where environmental and social impacts should be clearly addressed.

3.9.1.1. Concept and Initiation Phase

Once a need for a human settlement development project is established, the feasibility of the project is investigated to determine the flaws that would decide the future of such a project (Enshassin *et al.*, 2016). Once there are no environmental and social flaws, the project proceeds to the next phase.

Rumours and speculations about a project proposal might cause social impacts in the communities involved as members will start to be more concerned about issues. Hence it is important to involve them during this phase (Labuschagne, 2004; Araujo *et al.*, 2022). In a biophysical environment, impacts do not exist until physical alteration takes place (Kartam, 1996). However, in a social environment, impacts begin to exist the moment rumours about the project are witnessed. That changes the social conditions of the community owing to the stress that is introduced (Aucamp, 2015). Thus, community members respond to project rumours through the formation of interest groups. Local politicians align themselves with project developers and sponsors to plot votes from the community involved. Investors start to buy properties (Estevees *et al.*, 2012). All these affect the stress level of the community members owing to social, economic, and environmental uncertainties. In some communities, the rage will increase owing to negative previous experiences from similar human settlement development projects (Vanclay, 1999).

At this phase, impacts that are anticipated owing to the project concept are called “pre-developmental impacts”. These impacts mainly revolve around social challenges as opposed to environmental challenges as communities are only responding to information received regardless of whether the information is true or false (Araujo *et al.*, 2022). It is for this reason that social issues should be addressed at this stage to manage the anxiety suffered by the communities involved. Even though for environmental issues there is no physical alteration on the ground as yet, factors such as site selections and cumulative environmental issues should be considered at this stage prior to proceeding to project designs.

3.9.1.2. The Design and Development Phase

In this phase, feasibility study reports' recommendations are used for the development of project designs, schedules, baselines, and plans that should be followed and complied with during the implementation of the project (Enshassin *et al.*, 2016). Financial and human resources are forecasted depending on the intensiveness of the work to be performed. Even though social impacts started to occur during the concept phase, the day the rumours started to spread about the proposed human settlement development. The reality of the project and acknowledgment of the project increased at this phase (Interorganizational Committee, 1994:18).

From an environmental issues point of view, at this phase, the developer appoints the EAP to conduct the EIA process (NEMA EIA, 2017). According to SA EIA regulations, EIA applications should be submitted to the competent authorities with engineering designs that are at least 80% complete. Furthermore, EIA applications should be submitted with site and design alternatives. The challenge with this set-up is that public participation is also conducted during the EIA process in that designs are roughly estimated to be 80% complete before the inputs of the interested and affected parties (I &APs). Moreover, the site location or alternative will not mean the complete relocation of the project as the developer has already bought the site to establish urban settlements. It is the opinion of the researcher that EIA for human settlement development projects should be conducted by the State Agent/Agency with no ownership attached to the developer and the site or property be on sale with the already issued EA and the conditions of the development set prior to the deal. Once - in terms of the municipality spatial development framework - an area is suitable for human settlement development projects, the government should introduce the Urban Environmental Impact Assessment Agency that will conduct EIAs for human settlement development projects for properties earmarked for such development.

In terms of 2017 EIA regulations, at this phase of the project, the environmental authorisation is issued by the competent authority after reviewing the environmental impact assessment reports submitted by the appointed EAP. The EA is issued with specific environmental and social conditions that the project should comply with during the construction phase.

3.9.1.3. The Implementation/Construction Phase

During the construction and implementation phase, the project is at an advanced stage where the project management team executes the planned activities as guided by the approved

management plans, baselines, and engineering designs that were developed in the previous phase (Davidson, 2000; Enshassin *et al.*, 2016). According to the EIA regulations, the developer must comply with the environmental and social conditions stipulated in the issued environmental authorisation. Environmental impacts start to be physically noticed as the clearing of vegetation and the establishment of permanent residential units start to take place. Furthermore, at this stage impacts such as the contamination of soil, water pollution, and noise are experienced (Enshassin *et al.*, 2016).

At this phase, environmental officers or environmental management inspectors (EMIs) are mandated to conduct compliance-monitoring audits to ensure compliance with the conditions of the issued EA (NEMA, section 24; 31). Furthermore, developers are also legally required to appoint an independent environmental control officer (ECO) who will conduct monthly or quarterly compliance audits against the issued EA and submit the compliance status report to the competent authorities. The ECO is also mandated to advise the developer on best practices in the management of environmental and social impacts during the construction phase. The challenge with ECO monitoring is that the developer is responsible for their payments and informing the competent authority about non-compliance that might jeopardise their future appointment with that developer (Gwimbi, 2014).

Designated EMIs are mandated in terms of NEMA sections 24 and 31 to conduct regular compliance monitoring of all the human settlement projects issued with EA. However, the challenge is that they are not usually visible on the ground to a high volume of projects that require regular monitoring (Gwimbi, 2014; Rantlo, 2015). Furthermore, Maphanga *et al.* (2023) indicate that community members are also not thoroughly equipped to play a role in monitoring compliance related to developmental activities. However, community members have the right to report any activities that have the potential to have a detrimental impact on the environment and people. They should be protected as whistle-blowers (NEMA, S31(4)).

During the construction phase, many positive and negative social issues are also witnessed. Positive social impacts are associated with the appointment of skilled and unskilled labour that reduces the level of unemployed within those areas (Smith and Brown, 2019; Culwick and Patel, 2020). In addition, the introduction of informal traders that are selling fruit and cooked meals is seen. This plays a role in uplifting the local economy (Chirisa, 2013). However, the negative social impact is the significant influx of people from different areas as well as the introduction of new cultures and values in that area (Massey and Denoon-Stevens, 2022). Vanclay (1999) shows that during this phase of the project, most workers are far from their

families and abuse alcohol and drugs as a coping mechanism. Karma (1996) shows that during construction, local accommodation facilities are overwhelmed as there is a need to accommodate additional people even though it contributes to short-term tourism opportunities. Clashes between indigenous community members and the construction workers may occur. Old residents become uncertain about their safety and security issues as they are surrounded by new people with different cultures and core values (Interorganisational Committee, 1994).

3.9.1.4. The Commissioning and Handover Phase

During this phase, the project has been executed, and the construction phase is completed successfully. Upon completion of construction, the project is handed over to the developers, and residential units that have been sold are occupied by the residents (Enshassin *et al.*, 2016). During this phase, there are fewer workers on the development site as compared to during construction phase (Chirisa, 2013). Workers are mainly domestic and garden workers who are servicing the residents (Smith and Brown, 2019). On another hand, the residents that are beneficiaries of the settlement projects are excited to occupy their homes and start to enjoy the services rendered by the project.

In the case of human settlement, development projects that are considered to have long-term environmental and social impacts, expectations of positive effects such as quality infrastructure and environmental as well as social well-being can be realised (Interorganizational Committee, 1994). Furthermore, at this phase, proper implementation of the initially proposed mitigation measures and monitoring compliance to the initially proposed mitigation measures assist in minimising or managing negative environmental and social impacts (Vanclay, 1999; Gwimbi, 2014).

At this stage, the old community members are likely to have adapted to the new reality of their lives (Enshassin *et al.*, 2016). From an environmental impact point of view, at this stage, the human settlement development projects are generating waste from the household and adding load to the currently existing infrastructures. Sanitation and sewage facilities are also experiencing an increase in volume from the new human development projects (Sumari *et al.*, 2020; Massey and Stevens. 2022). Traffic also increases around the areas, so contributing to the increase of the carbon monoxide released around the area (Turok and Borel-Saladin, 2014). Furthermore, oil spillages are also experienced from equipment and vehicles owned by the

residents that are likely to seep through into the water resources if not managed properly (Nhamo *et al.*, 2021).

At this phase, the developers do not usually have any contract with any environmental control officers to conduct monitoring audits for projects unlike mining and processing plants (Labuscharge, 2004; Dong and Thomas, 2015). Designated EMIs are not visible enough to conduct compliance monitoring routine audits for human settlement development since issued EAs usually do not have conditions to be complied with as well (Gwimbi, 2014).

The only time where government officials attend to environmental pollution is through complaints that are lodged to the Department for any incident or activities that have the potential to damage the environment and social well-being (section 28 NEMA directive - duty of care). The challenge with this approach is that community members are not trained or well-equipped to raise concerns about environmental pollution that affects their well-being and are not even aware of what procedures to follow in registering complaints (Dong and Thomas, 2015). The second challenge is that this approach is a reactive action where the environment and the people should suffer first before an issue can be addressed (S28, NEMA). This study is of the view that all the urban human settlement development projects, monitored by both Government and community members, should be ongoing as long as such development stands. This will assist in mitigating environmental and social impacts.

3.9.1.5. The closing and Rehabilitation Phase

This phase does not usually occur in human settlement development projects as they are naturally considered permanent structures (Enshassin *et al.*, 2016). This phase only takes place when the need for project services or products no longer exists and the project is permanently terminated (Beauchemin, 1999; Davidson, 2000). However, rehabilitation activities for human settlement development occur in the form of backfilling, cleaning up construction waste, and the removal of construction types of equipment (Kartam, 1996).

The focus of EIA is only on one phase of the project and minor monitoring during the implementation of the project (Gwimbi, 2014). Moreover, SIA is conducted as a secondary study to EIA, only as a once-off exercise as well because of its lack of legal statutory requirement status that can be enforceable (Aucamp, 2015). EIA and SIA should be conducted along with other useful IEM tools as discussed in Section 3.10 and be implemented in different phases of the project life cycle. EIA is traditionally not used out of legal context as an assessment tool to mitigate environmental and social impacts. This has the potential of

neglecting other significant impacts that occur very early or late in the project life cycle (Burdge, 2002; Matlakala, 2021). Thus, the assessment of environmental and social impacts should not be a static process but be considered throughout the life cycle of the project.

3.9.2. Should Social Impact Assessment be Conducted with Environmental Impact Assessment as a Secondary Study?

In SA, Social Impact Assessments (SIAs) are conducted as part of EIA. This is because NEMA's definition of the word "environment" means the surroundings where people live, refereeing to biophysical, aesthetic, heritage resources, and other conditions that affect human health and well-being (SA, NEMA 107 of 1998:8; SA Constitution of 1996). This notion of the "environment" definition puts people as major components and integrates their health and well-being based on activities taking place in their surroundings. This is why social well-being is directly linked to the activities affecting the environment. Therefore, the SIA tool in SA is regarded as an integral part of EIA (Pisani and Sandham, 2006) and appears to be an orphan of an assessment process that was not fully adopted into decision-making for proposed human settlement development projects (Budrge, 2003; Pisani and Sandham 2006). Aucamp (2015) emphasises that there is a lack of consensus on what SIA means and its relationship with the EIA process, especially with proposed developments. Burdge (2002) and Matlakala (2021) identified SIA challenges as emanating from the fact that on its own is not legally mandated to be conducted for any proposed developmental projects. It is not even compulsory to conduct the assessment on each phase of the development. Thus, developers are likely to not conduct an impact assessment that is not legally mandatory.

Du Pisani and Sandham (2006) are adamant that the separation of environmental issues from social issues would not be easily achieved, especially in developing countries like SA where development is perceived as a major positive contributor to socio-economic benefits. Momtaz (2003) has set the tone for developing countries in conducting SIA that since socio-economic aspects are interconnected with biophysical aspects of the environment, their impact assessments and processes should not be separated but rather be interlinked. SIA is not widely considered in EIA owing to a lack of distinct separation between both assessments, hence conducting SIA is even attempted by overambitious EAPs that think they are well-learned to carry out the study (Hildebrandt, 2012; Aucamp, 2015). Hildebrandt (2012) and Aucamp (2015) agree with Barrow (1997) that SIA and EIA should be considered as opposite ends of the spectrum even though they tend to overlap they should be treated as separate assessments.

SIA should confirm that communities affected by the development will continuously form part and be involved in decision-making that affects their well-being.

Hilderbrandt (2012) notes that social issues are different from environmental issues because social issues are based on individual expectations owing to the change that developments bring. Many times, such expectations are not real as the community demands are likely to exceed what the developers could provide, especially with the absence of local municipality interventions (Hilderbrandt, 2012). Owing to a lack of knowledge and expectations from the developers, communities also demand services and benefits that are mandated to be delivered by the local government (Aucamp and Woodborne, 2020). Aucamp and Woodborne (2020) are adamant that EIA is not effective in addressing social issues of developmental projects. SIA does not belong to environmental management. Aucamp *et al.* (2015) suggest that the social impacts of proposed developments could fit comfortably into social development frameworks that are legally mandated to be carried out by the National Department of Social Development and evaluated by qualified social practitioners.

3.10. Additional Tools for the Assessment of Environmental and Social Impacts Management of Urban Residential Development Projects

3.10.1. Introduction

Some environmental assessment and management tools work independently from EIA but are built upon the "think before you act" principle and engage the inputs of the stakeholders or I&APs in the planning, design, and implementation of the development activity or project. These instruments could be considered separately or integrated with EIA for human settlement development projects. The tools would further assist, especially where projects do not legally require EIA but have the potential to cause environmental and social impacts as add-ons to the currently existing challenges experienced by the community. This section discusses some of the possible tools that could be proposed as alternatives to an EIA but does not exclude that there might be other more suitable tools.

3.10.2. Integrated Development Planning

Integrated Development-Planning (IDP) is a planning approach that aims to involve the community and the municipality to find the best solutions for the socio-economic demands of a specific area (Visser, 2002). IDP is a planning tool provided for in the Municipal System Act 32 of 2000 that is intended to outline an overall framework for developments that extend over

a period of five years (Madzivhandila and Asha, 2012). Owing to its legal status, it supersedes all other development plans that guide the local government (Visser, 2002). The aim of the IDP is to coordinate the proposed work or developments that local and other spheres of government wish to implement as a response to improving the quality of life for all the people in each area (Madzivhandila and Asha, 2012). The municipal IDP should consider the existing conditions within an area and respond through the provision of resources to improve service delivery (Ruwanza and Shackleton, 2016).

The most important part of the IDP process is to connect development plans to the municipal budget such as the allocation of internal and external funding to the identified projects, the mobilisation of the resources and capacity to achieve service delivery for the municipality effectively and sustainably (Madzivhandila and Asha, 2012; Ruwanza and Shackleton, 2016). In addition, the IDP includes the municipality's operational strategies which may also identify services that may be provided through an external mechanism (Phago, 2009). Phago (2009) shows that when the developed plan is followed, it assists the municipalities with the expansion and upgrading of the municipal infrastructures that should be able to cater to the human settlement development projects.

Madzivhandila and Asha (2012) argue that despite the goodness that comes with the integrated development-planning process, most municipalities fail to conduct the process regardless of its legal statutory requirements. The major challenge for municipalities not to conduct the IDP is the integration of community participation and how to prioritise the most people's felt service delivery needs (Ruwanza and Shackleton, 2016). In addition, Madzivhandila and Asha (2012) and Ruwanza and Shackleton (2016) indicate that municipalities would usually approve housing developments while their IDP does not have any strategic plans to upgrade infrastructure, i.e., the sewage treatment plants and waste management facilities that should accommodate the urban expansion. This identified challenge requires the formulation of a clear strategy that will promote public involvement and link their inputs into the integrated development-planning processes.

3.10.3. Spatial Development Planning

The core of spatial-planning tools is the spatial development framework (SDF) provided for in the Spatial Planning and Land Use Management Act (SPLUMA 16 of 2013) that are intended to produce more equitable urban forms (Odendaal and McCann, 2016). SDFs are intended to complement the municipality IDPs and business plans in determining and planning for the

socio-economic future development plans (Todes, 2008). Spatial planning can be considered an interdisciplinary field in the engineering, environmental, and social sciences that deals with the regional spatial arrangement and development of living, working, and environmental conditions (Karam *et al.*, 2016). The spatial levels range from the smallest to the largest component of developments, i.e., the built environment and residential quarters, urban district, the city, the region, the state and federal levels, and international levels. At all levels, different professionals from urban development, housing, traffic, landscaping, infrastructure, and legal framework are considered in spatial planning (Van Huyssteen *et al.*, 2010).

The primary task of spatial planning at the municipal level is to analyse different socio-economic demands, conflicts, and opportunities of such demands, and then identify concepts, solutions, and strategies for planning and design implementation to meet such demands (Musvoto *et al.*, 2016). Musvoto *et al.* (2016) further indicate that during spatial-planning, current and future challenges are dealt with in a forward-looking manner to promote sustainable and equitable development within the region. Spatial planning considers the effects of demographic change on the housing market, infrastructure demand as well as aspects of migration and urban development, the consequences of environmental pollution, and environmental risks (Odendaal and McCann, 2016).

In the case of the application of a proposed urban human settlement development project, the SDP is a critical plan to be considered by the local authorities before a project is approved (Van Huyssteen *et al.*, 2010). However, Musvoto *et al.* (2016) show that most human settlements are given the go-ahead by the municipalities with a compromised consideration of the approved urban development line, main road corridor connections, various investment nodes, and future land uses within the municipalities. In addition, most municipalities' urban development lines show that new human settlement developments are promoted to combat urban sprawl through well-located areas with high density (Musvoto *et al.*, 2016). Based on the above, there is a mismatch in terms of the approved spatial development frameworks and human settlement development projects. In a situation where approved SDF is followed, it could assist in minimising environmental and social impacts.

3.10.4. Cumulative Impact Assessment

Cumulative impact assessment (CIA) is a tool that aims to assess the environmental and social impacts that occur because of adding more impacts from one or more activities into the past and present challenges and respond by proposing reasonable future actions to mitigate such

impacts (Neri *et al.*, 2016). This method is used to examine impacts over the larger spatial area, i.e., town or region, and fills a gap between the business-as-usual EIA approach that is only focused on environmental and social impacts from a single project (Saidi, 2010; Maphanga *et al.*, 2023). CIA aims to extend the scope of social and environmental impact assessments to consider multiple interactions such as those caused by historical land-use as well as socio-economic and environmental challenges (Athayde *et al.*, 2019). In the case of human settlement development project activities, a single development might not cause the impacts but because it is interlinked with other existing developments, collectively they impact the environment (Saidi, 2010).

Many methods for assessing cumulative impacts have been developed, however, there is no common universally accepted method to be employed by land managers, scientists, and environmental assessment practitioners that can be considered for decision-making (Athayde *et al.*, 2019; Stockbridge *et al.*, 2020).

The cumulative impacts of urban settlement have been neglected in planning and policy development (Blakley *et al.*, 2021). In SA, even though EIA is conducted as a tool to inform decisions-making for urban settlements, it does not give enough evidence that cumulative impacts are considered during the assessment process (Mitchell, 2001; Saidi, 2010; Maphanga *et al.*, 2023). Thus, the cumulative impacts of urban settlements require the establishment of regulations and policies that must govern all the proposed projects regardless of whether they legally require environmental authorizations through EIA or not.

3.10.5. Life Cycle Assessment

Life cycle assessment (LCA) is a methodology used to assess environmental impacts occurring in all phases of the life cycle of a product or service (Finnveden *et al.*, 2009). During the manufacturing of a product, environmental impacts are identified and assessed from the sourcing of raw material, processing of the product, its distribution to customers, and its use up to the final disposal of its material composition (Hellweg *et al.*, 2014). Hauschild *et al.* (2018) indicate that LCA is a technique used to determine the ecological footprint of a specific product through analysis of its system input and outputs continuously for as long as the production is taking place. For instance, Guinee *et al.* (2001) show that LCA addresses the stress imposed on the receiving environment by human conduct by accounting for the energy and resources consumed at each stage of the process that results in pollutants and waste (Guinee *et al.*, 2001). In addition, Guinee *et al.* (2001) show that the environmental assessment of the

product life cycle covers aspects of water pollution, land-use, and emissions of pollutants into the atmosphere.

As indicated above, the LCA is commonly used and applied in the manufacturing industries, but poorly practised on infrastructure developments. Thus, the approach of managing environmental and social impacts throughout the project life cycle is not commonly practised. However, the challenge that exists with human development settlements is that they become permanent structures and are permanently operational, hence there is a need for the continuous management of impacts throughout their lifespan.

3.10.6. Bioregional Plans

Bioregional plans are one of the management tools provided for in the National Environmental Management: Biodiversity Act (NEMBA 10 of 2004) that can be used to manage the conservation of biodiversity priority areas that are found outside of the declared protected area (Mathipa, 2021). According to Pierce *et al.* (2005), the main two components of bioregional plans are the critical biodiversity areas (CBA) and land-use management guidelines that intend to feed into multi-sectoral planning and decision-making. Bioregional plans can assist and inform decision-making during the EIA process and land-use management (Mathipa, 2021).

EIA regulations listing notice 3 of 2017, as published in terms of NEMA, indicates that some or certain activities will be subjected to EIA if located in areas declared as CBA. It is for this reason that information contained in bioregional plans informs the decision-making (Vromans *et al.*, 2020). In the same way, the information contained in the bioregional plans contributes to the development of spatial development frameworks (SDFs) (Mathipa, 2021).

The bioregional plans are presented in the form of a map with biodiversity priority areas that are designed to avoid developmental conflicts with existing approved IDPs, EMFs, and SDFs in the region by indicating sites that are not - or at least - conflicting with other land-uses (Pierce *et al.*, 2005). A bioregional map indicates critical biodiversity areas that outline aquatic and terrestrial features which are critical for maintaining the functionality of the ecosystem and that should remain in their natural state. (Vromans *et al.*, 2020).

Mathipa (2021) agrees with Vromans *et al.* (2020) that although bioregional plans are legally gazetted in terms of NEMBA, they remain only a decision-support tool without decision-making powers. For instance, in the case where a human settlement development project is proposed, it will only indicate the sensitivities around the area as it is just a biodiversity sector's input into assessment processes. The challenge with the application of this tool in human

settlement development projects is that if the project activity by itself does not require undertaking the EIA process, developers would rarely consider it in their decision-making planning if its outcome does not lead to an authorisation or licence to operate. It is for this reason that the application of bioregional plans in urban areas should be stricter. Once an area is declared a critical biodiversity area, it should mean a “no-go area” or an environmental fatal flaw. This approach will promote the conservation of the small remaining portions of land parcels that will continue to support ecological functions.

3.10.7. Duty of Care

Environmental duty of care is considered a precautional approach (Greiner *et al.*, 2008) that imposes a duty on the developers to act cautiously in order to prevent, minimise, and prevent environmental pollution where possible. From SA’s environmental legal perspective, section 28 of NEMA gave effect to the duty of care. This section states that any “person who causes or has caused or may cause significant environmental pollution or degradation to take every reasonable measure to prevent such pollution or degradation from occurring, continuing and recurring”. Rantlo (2015) refers to the duty of care as an omnipresent tool that is generally applicable to address all activities that have the potential to harm the environment and cause pollution and contravene citizen’s human right to an environment that is protected and not harmful to their well-being. In terms of NEMA section 28, delegated public servants who are responsible for environmental management in the province and local municipality are mandated to issue directives to the developers and instruct them to take reasonable measures to manage the impacts. The duty of care is another tool that can be used to hold developers responsible for environmental and social impacts emanating from their developments.

3.10.8. Combination of Tools

Although it has been established that an EIA is the most used tool, it is not always ideal for all developmental projects because it is used to assess the predicted environmental and social impacts of a proposed project that must be listed in terms of EIA regulations of 2017. Hence the National Environmental Ministry in 2014 advocated for the advancement of other environmental management tools that must supplement and complement one another to provide information that will contribute to decision-making by developers and the Government (DEA, 2014).

Furthermore, some tools outlined above can be modified to address the identified challenges in the management of environmental and social impacts of human settlement development

projects. As EIA is the only tool that has an environmental authorisation outcome and is legally mandatory for listed activities, the above tools can be considered and followed for all human settlement development projects even those that do not legally require EIA.

3.11. Conclusion

This chapter focused on urban human settlements in the context of environmental and social impacts, drawing selected literature reviews from Sub-Saharan African countries. First, the chapter discussed the theory of human settlement applied in most Sub-Saharan African countries during the colonial era, its advantages, and disadvantages. Secondly, the chapter highlighted the concept of sustainable cities and the management of urban settlements. Thirdly, a discussion is also presented on types of social and environmental impacts associated with settlement developments in Sub-Saharan African cities and South Africa in particular. Management of environmental and social impacts on the human settlement project life cycle was discussed, and challenges associated with its application. Lastly, the chapter highlighted the effectiveness of EIA challenges associated with its application on settlement developments, as well as additional impact assessment tools recommended for settlement development projects. The next chapter will focus on the methodology with particular emphasis on case study areas, methods used to source research participants, data collection techniques, and analysis.

CHAPTER FOUR

METHODOLOGICAL CONSIDERATIONS

4.1 Introduction

The chapter aims to frame the research design and methods adopted for this study in the collection and analysis of data to meet the research objectives outlined in Chapter 1. The chapter begins by presenting the research philosophy adopted and the justification for the interpretivist approach. Next, the research design used in this study is discussed as well as the motivation for the selection of qualitative and quantitative approaches. The chapter then presents the data sources and the description of the study areas, explaining the reasons for the choice of case studies and the procedure for dialogue with research participants in the case of environmental and social impacts of development projects in urban human settlements. The chapter continues to outline the sampling techniques adopted to obtain primary and secondary data. Semi-structured key informant interviews of sampled participants for government and non-government officials, and questionnaire surveys of sampled residents of the selected case studies formed the primary data sources. Official documents; EIA reports for selected case studies; policies; global, sub-Saharan Africa, and local literature on human settlement developmental impacts on the environment and social well-being formed the basis of secondary data sources. The data sources and sampling techniques discussions are then followed by the section outlining methods employed for analysing both qualitative and quantitative data collected. Finally, this chapter addresses the ethical conduct considered by the researcher and methodological limitations that potentially constrained the study.

4.2. Research Philosophy

This section introduces the philosophical assumption of this research and how it influenced the procedures for collecting and analysing data to address the research aim, and objectives and answer research questions (Creswell, 2012). Philosophical assumptions are called ‘paradigms’ such as positivism and post-positivism, postmodernism, social constructivism, and feminism (Blaikie, 1993). A paradigm is a worldview and philosophical orientation which defines how a

group of researchers within a particular field of study conceptualise the research methodology to be adopted for a particular research project (Creswell, 2012). Creswell (2012) further gives meaning to the term “research paradigm” as a worldview that refers to a general philosophical orientation about the nature of a research project that is brought to the field of study. Philosophers such as Blaikie (1993), Tracy (2013) and Creswell (2012) acknowledge the ambiguities and vagueness in defining research paradigms. However, share the same sentiment that research paradigms guide the researcher in paving the way to identifying the type of data to be collected. Creswell (2012) indicates that research paradigm helps to set a tone for establishing theoretical assumptions that are rational and applicable within the field of the study.

4.2.1. Research Positionality

Blaikie (1993) indicates that research positionality is defined as interpretivism and positivism. The positivist approach adheres to the view that only accurate knowledge gained through observations and measurements is trustworthy (Blaikie, 1993; Venkatesh *et al.*, 2013). Meanwhile, the interpretive approach involves the researcher interpreting elements of the study by integrating human interests and feelings around the matter (Blaikie, 1993; Venkatesh *et al.*, 2013).

This section only addresses the most suitable research paradigm for this research. The philosophical positionality underlying this study came from interpretivism. In the adopted interpretive research approach, no predefined dependent and independent variables are determined. The focus is on how humans make sense of emerging situations (Kaplan and Maxwell, 1994; Venkatesh *et al.*, 2013). Consequently, the epistemological stance on the interpretive position is that access to reality (given or socially constructed) is through social constructions of shared meaning, consciousness, and experience of life (Dudovskiy, 2016).

Interpretivism is considered a meta-theoretical philosophical position seeking to advance some assumptions made on positivism (Blaikie, 1993; Dudovskiy, 2016). In the interpretivist approach, human knowledge is not only based on solid unchallengeable doctrines but is a result of an amalgamation of different conjectures (Dudovskiy, 2016). Ideally and practically, the adoption of this philosophical position is the perception that in the social world, sense and meanings are constructed over time through experience in different situations. Using the interpretive perspective, provided knowledge about the environmental and social impacts of human settlement developments in Boksburg, Gauteng.

4.2.2. Justification of Interpretive Approach

The rationale behind the adoption of the interpretive paradigm is that there are multiple ways of understanding a phenomenon. Reality is socially constructed and focuses on meanings as alluded to by the research participants (Schwartz-Shea and Yanow, 2013; Dudovskiy, 2016). The interpretivism paradigm further allows an understanding of what is currently happening about the particular research project rather than merely focusing on the measurement of the past phenomenon (Tracy, 2013; Dudovskiy, 2016).

In this research, the interpretivism paradigm assisted the researcher in discovering and understanding the real world (Boksburg area) through the lived experiences and perceptions of the sampled participants which included residents living adjacent to the sampled residential case studies. Furthermore, the examination of the environmental and social impacts of human settlement development projects was made possible by accommodating multiple perceptions of truths from different sources, such as local government human settlement development project managers, city planning experts, environmental officials from the provincial government, and independent EAPs (Schwartz-Shea and Yanow, 2013; Dudovskiy, 2016).

Eventually, the researcher was able to document the lived experience of residents in the Boksburg area about their dilemmas in receiving the best service delivery and exposure to environmental pollution and degradation, sanitation, public road safety, and security. Such experiences are socially constructed and best understood through the interaction with the research sampled participants which are key informants and residents. Lastly, the interpretivist paradigm is premised on the belief that truth is obtained from human lived experience, hence dependable information is attained from participants' told stories which plays a major role in edifying academic knowledge.

4.3 Research Design

The 'research design' is defined as a detailed plan to be followed by the researcher to address the study's aim and questions (McGrath, 2007). Bryman (2004) indicates that research design provides the framework for both data collection and analysis. Hence, Creswell (2012) refers to 'research design' as an overall map of the study. Research can either be qualitative, quantitative, or mixed method depending on the nature and scope of the study (Driscoll *et al.*, 2007; Creswell, 2012; Creswell and Clark, 2017).

This study has been informed by a mixed method research design where both qualitative and quantitative approaches were adopted simultaneously to achieve the aim of the study (Driscoll *et al.*, 2007). The motive behind selecting the mixed-method approach was that it can use case studies, interviews and field observations (Creswell and Clark, 2017). Thus, Driscoll *et al.* (2007;25) define ‘mixed method’ research design as the “utilisation of different methods for answering different questions in a single research or study”. In this mixed-methods approach, the researcher conducted semi- structured interviews with the Participants, field observation in the affected case study areas and focus group discussion.

4.3.1. Quantitative Research Approach

Quantitative research can be conducted using survey questionnaires administered by the relevant selected participants and document reviews (Sadler, 1996). This study collected the data using interviews and reviews of EIA reports. Most researchers in the field of environmental and social science have favoured the quantitative approach as a rational method to investigate the effectiveness of measures outlined in the EIA reports and add up how many participants confirm or infirm certain aspects of the problem under investigation (Jay *et al.*, 2007; Gwimbi, 2014).

Furthermore, Cashmore *et al.* (2004) suggest that competent authorities and decision-makers usually base their conclusions on the magnitude of people affected by developments. A quantitative approach is sometimes criticised by researchers indicating that it focuses on plurality and fails to acknowledge the merits of issues raised by minorities (Morgan, 2012). Bryman (2004) and Morgan (2012) argue that the quantitative approach tends to undermine the isolated opinion of the participants.

Based on the above, the qualitative approach was also adopted for the study to compensate for the disadvantages of the quantitative method. Human settlement development projects consist of scientific information from natural and social sciences. Thus, context plays a major role in determining uncompromised reality which will eventually generate new knowledge or edify existing knowledge (Morgan, 2012). Addressing the environmental and social impacts of human settlement development projects will be meaningless if is not guided by the socio-economic, geopolitics, and cultural context of the countries under investigation (Gwimbi, 2014). Hence, this study adopted both approaches to ground all aspects of truth so contributing to the research problem statement.

4.3.2. Qualitative Research Approach

As an alternative strategy to the quantitative research approach, this study has adopted a qualitative research approach (Driscoll *et al.*, 2007; Rhodes, 2012). Qualitative research puts more emphasis on discourse rather than quantification of data collection and analysis (Bryman, 2004). Qualitative strategy emphasizes processes of discovering social meanings with the study being conducted and the relationship between the researcher and the topic under investigation (Bryman, 2004).

The qualitative research approach was adopted for this study as it was deemed suitable for examining and understanding the effectiveness of EIA in mitigating environmental and social impacts of human settlement development projects by using internationally adopted guidelines to eliminate biases in grading performance scores generated by the EIA review package developed by Lee and Cooley in 1999 (Gwimbi, 2014; Cashmore *et al.*, 2008). In addition, qualitative research involves analysing data from existing documents such as policy statements and reports that inform decision-making (Cashmore *et al.*, 2008).

Thus, it is owing to the above-mentioned reasons that both quantitative and qualitative research approaches were adopted in this study. The mixed-method research was deemed the most appropriate approach that offered relevant data suitable to address the study's aim and questions. In this regard, the collected qualitative data provided an overview and understanding of the research problem while quantitative data collected, and its analysis provided statistical results through examination of the survey participants views. Figure 4.1 provides an explicit figure of the research map outlining the research paradigm and design employed for this study:

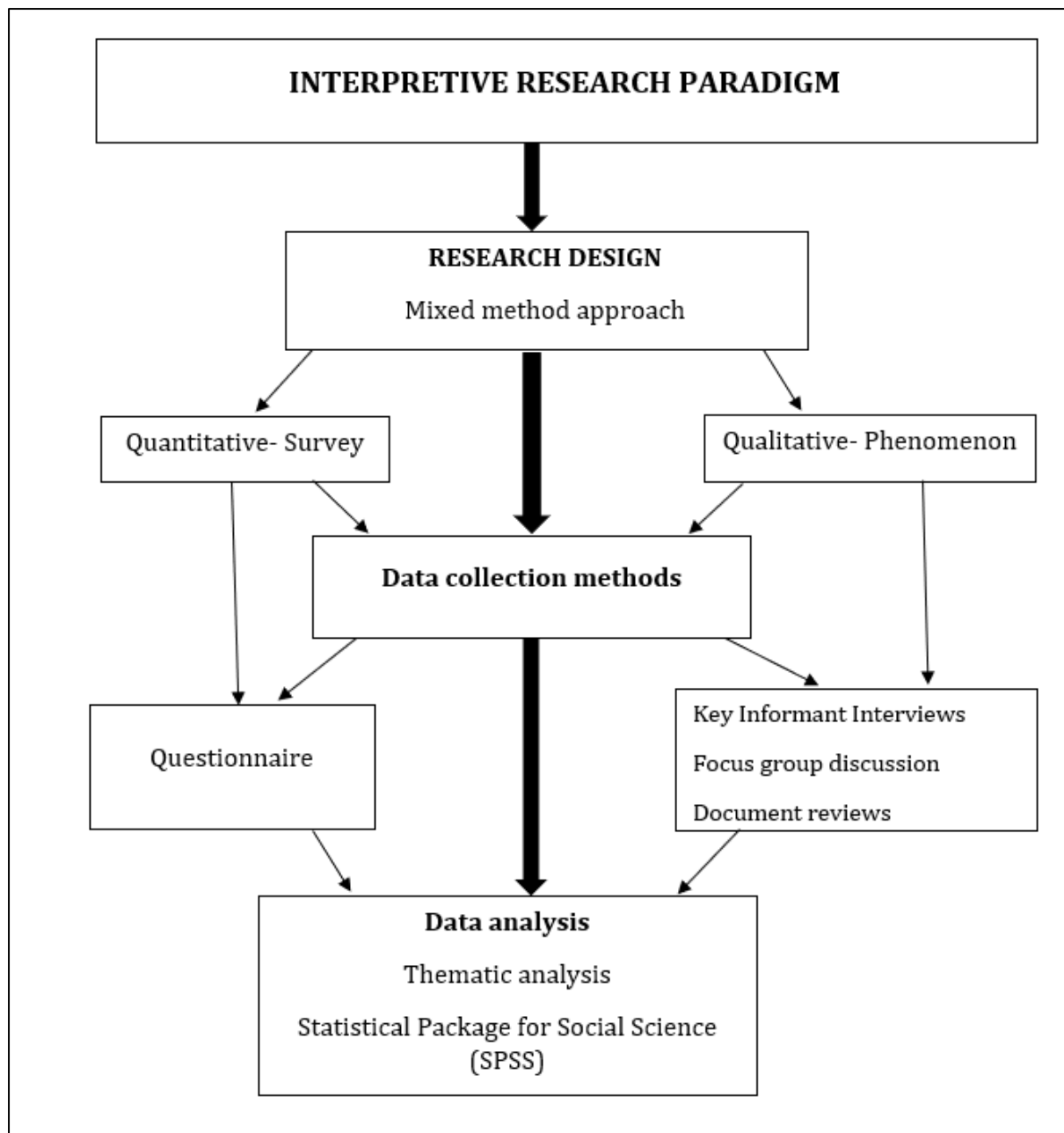


Figure 4.1: Research map showing the research design and methods

Source: The Researcher's own synthesis (2023)

4.3.4. Justification of the Research Designs and Methods

The researcher adopted the interpretive paradigm in designing this study which sought to explore and acquire an in-depth understanding of the environmental and social impacts associated with continuous expansion of human settlement developments in Boksburg. The study gained insights into the experiences and challenges experienced by residents in accessing water, sanitation, waste collections, safety, and security fears, as well as their involvement in decision-making. The study gained perceptions on the factors that contribute to institutional

challenges in mitigating environmental and social impacts. These challenges hinder the effectiveness of the EIA tool in thoroughly addressing the impacts associated with human settlement development projects in urban areas. The interpretive paradigm involved meaningful social interaction with participants to acquire interpretations and analysis of social realities which helped in obtaining more insights into the study research problem. Tracy (2013) and Dudovskiy (2016) posit that true meanings are often gained through interpretive paradigms.

Subsequently, the researcher employed a mixed-method research approach which adopts both quantitative and qualitative research designs. Firstly, data was collected through semi-structured interviews in the Boksburg area for community members who are residing around the sampled selected project areas. Their daily observations about the environmental and social impacts - associated with the continuous expansion of urban areas assisted the researcher in describing and understanding the extent to which residents are affected socially. The participants were purposively selected through Convenience/purposive sampling techniques.

Expert purposive sampling technique was utilised as a selective criterion for participants from various institutions (government and non-government organisations) that were relevant to the study and subsequently interviewed. Expert Participants that were selected for interviews were those officials who had directly worked in the field of environmental and social impacts associated with human settlement developments for more than three years. This selective criterion benefited the study in saving time and financial resources since interviews were only with participants who possessed the requisite knowledge.

Data was collected through interviews in Johannesburg at GDARD with government officials as a competent authority responsible for assessing and issuing EAs for human settlement development proposal applications. Thirdly, interviews were conducted in Benoni CoEs' offices (Department of Human Settlements) with project managers responsible for planning, construction, and implementation of housing projects. These participants provided in-depth information about project designs, consideration of sustainable human settlement objectives, and management of impacts during the construction and operation of the projects. Fourthly, interviews were conducted in Germiston at the CoE's offices (Department of Town Planning) for town planners responsible for assessing and proclaiming the establishment of townships within the municipality's jurisdiction. These participants provided information on the consideration of land-uses, spatial development designs, and future development-planning.

The last interviews were conducted around different areas of Gauteng (Pretoria, Centurion, Midrand, Bedfordview) for environmental consulting companies with EAPs responsible for evaluating and proposing mitigation measures to address the environmental and social impacts of human settlement development projects. These participants provided in-depth information on ranking the consequences of identified impacts and the effectiveness of the EIA process in mitigating environmental and social impacts emanating from the continuous expansion of urban settlements.

After the conducted interviews, one FGD was conducted in Boksburg with a group of six EAPs who are considered subject experts in the field of EIA. These participants assisted in sharing information on the policies and regulations challenges associated with the management of environmental and social impacts of developments. Lastly, EIA reports of the selected five projects were reviewed to determine the consideration of cumulative impacts of projects, consideration of stakeholders' comments in decision-making and the inclusion of social issues in the EIA reports.

Drawing on the mixed-method research design, the researcher analysed the phenomena intensively that were relevant to this study. The research was expected to collect and analyse the data on: (i) the impacts and consequences of human settlement development projects on the environment and social well-being, (ii) challenges and factors contributing to failures in managing the environmental and social impacts of human settlements development, (iii) the effectiveness of the environmental and social impact assessment tools in addressing human settlement development impacts and (iv) alternative solutions to mitigate the environmental and social impacts of human settlements development. Views of the government environmental officials, private independent EAPs, local municipality officials, and members of the local communities in the sampled case study areas provided insight and information on the impacts of human settlement development projects on the environment and people's well-being. Neither qualitative nor quantitative methods alone were sufficient to capture the data required to meet the research aim and answer the research questions. Thus, the mixed-method research which combined the qualitative, quantitative, and case studies complemented the weaknesses of the other and allowed for a more rational analysis of the research problem. Figure 4.2. shows the research framework based on the four study objectives and questions illustrated:

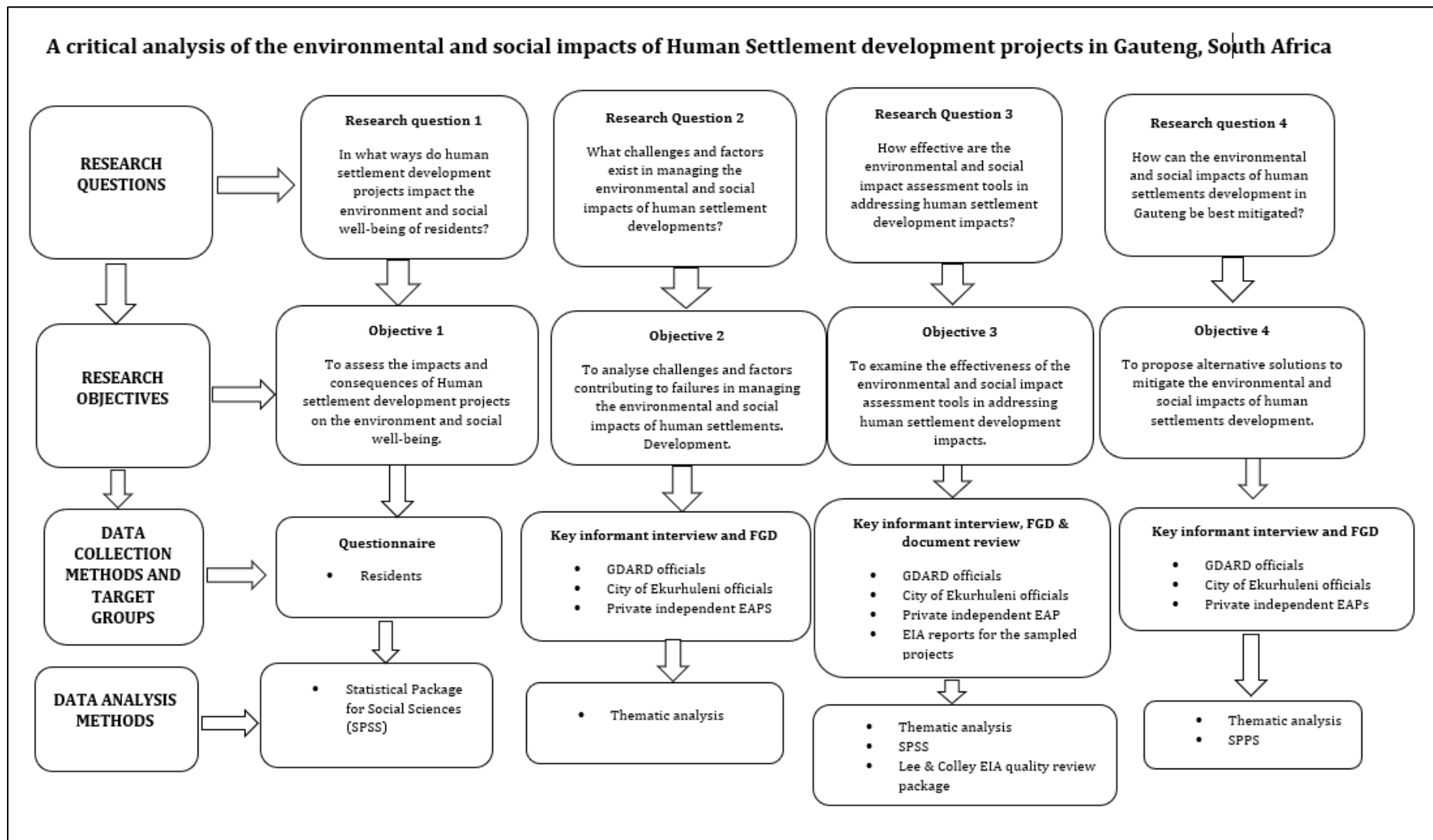


Figure 4.2: The research framework

Source: The researcher's own synthesis (2023)

4.4. Data Sources

Data that informed the study was drawn from both primary and secondary sources. The primary data were sourced from environmental officials from government departments, EAPs from private independent environmental consulting firms, project managers, and town planners from the CoE as well as members of the local communities residing around the selected case study areas.

The secondary data was sourced from EIA reports of the selected case studies of human settlement development projects around Boksburg. The criteria for the selection were based on the economic, and socio-environmental factors that each project experienced based on the topic under investigation. For instance, their proximity to the economic industrial sites and agricultural land, waste management issues, traffic congestion and all are clustered residential developments with high populations in a small area. A review of the EIA reports was conducted to establish the credibility of the information considered in decision-making by the competent authority, the consequences of the identified environmental and social challenges assessed during the EIA process, and the proposed mitigation measures therein.

In addition to EIA reports, another source of secondary data was an academic literature review sourced from global, Sub-Saharan African, and local scholars, policies, and government-gazetted guidelines that were deemed relevant to the study. Literature of major interest amongst others, was on the origins of human settlement developments, types and hierarchy of settlements, theories on settlement forms, transition toward sustainable human settlements, smart city movement, history of human settlement development in SSA and SA, impacts of settlement projects on the environment and social well-being of the people, the effectiveness of EIA and SIA in mitigating the impacts and consideration of alternative tools in assessing impacts. Table 4.1 provides a summary of data sources and their descriptions:

Table 4.1. Data sources

Data Sources	Description of Sources
Primary Data	
Government environmental specialists	Responsible for reviewing EIA applications for proposed projects and deciding on approval or decline of the development.
Non-Government environmental assessment practitioners	Responsible for independently conducting the EIA process on behalf of the applicant, assessing the identified impacts and proposing mitigation measures, conducting public participation process and other scientific specialist studies.
Members of the local communities	Interested and affected parties. Their interests are affected by human settlement developments.
Project managers for human settlement for local government	Responsible for project-planning, engineering designs, construction, and implementation of the environmental management plans.
Town planners for the CoE	Responsible for spatial development, town-planning, and land-use management, approval of township development establishment.
Secondary Data	
EIA documents	EIA reports for selected case studies of human settlement development projects commenced between 2021 and 2023.

Academic literature review, policies, and government gazetted guidelines.	See list of references
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Source: The Researcher's own synthesis (2023)

The primary and secondary data sources were essential sources of information used to gain in-depth knowledge on the impacts associated with the continuous expansion of urban human settlement developments.

4.4.1. Study Area

This study is geographically confined to Gauteng. Administratively, the province is divided into three metropolitan municipalities and two district municipalities (Madumo, 2017). For this study, the CoE was selected as the study area with a specific focus on the Boksburg area. The CoE is highly urbanised with 99.4% of the population living in urban settlements that includes informal settlements and elite urban residential suburbs (Marutlulle, 2017). The city is highly urbanised but rich in wetlands, pans, streams, and rivers with the northern part housing high-potential agricultural land (Makhubu, 2021). The municipality's land covers an area of 1.975 km² and houses approximately 2 million people as per 2021 estimations (Stats SA, 2021). Physical features and human aspects of Boksburg area are outlined below.

(i) Physical features

- Climate

The climate in Boksburg is warm and temperate, with the level of precipitation during summers being higher as compared to winter (Engelbrecht, 2010). According to Köppen and Geiger, Boksburg climate is classified as Cwb, which represent dry winter and warm summer. The mean yearly temperature recorded in Boksburg is 16.1 °C | 60.9 °F, with the annual precipitation recording of approximately 755 mm | 29.7 inches. The beginning of summer is usually observed in December, while winter commences around May (Engelbrecht, 2010).

- Vegetation

According to Low and Rabelo classification of 1996, Boksburg area falls within the Grassland biome. Grassland is the second largest biome in SA, covering approximately 24% of the country's footprint (Low & Rebelo, 1996). Grassland biome is mainly found in highveld areas where rainfalls are experienced in summer and frost in winter (Low & Rebelo, 1996). This

biome is regarded third richest in plant species diversity, but trees are usually absent while abundance of geophytes occurs (Mucina and Rutherford, 2006).

Boksburg area is located within the Soweto Highveld 18 Grassland vegetation type, this vegetation type occurs in gently to moderately undulating landscapes on the Highveld plateau (Mucina & Rutherford, 2006). The natural Soweto highveld 18 grassland vegetation consists mainly a mix of grasses, with scattered shrubs and small trees, particularly in areas where the soil is well-drained and less disturbed. Urban development, industrial activities, and mining have significantly altered the natural vegetation cover. Large portions of the area have been transformed into residential, commercial, and industrial land uses, leading to fragmentation of natural habitats (Mucina & Rutherford, 2006).

- Biodiversity

The biodiversity of Boksburg illustrates the area's status as a transitional area between natural habitats and urban development (EMM,2019). The vegetation in the area is characteristic of the highveld, with grasses, bushes, and sporadic trees like aloes and acacias (Mucina & Rutherford,2006). A combination of native animal remains and species that have adapted to urban environments define the fauna of the entire region (Compaan *et al.*, 2017). Larger mammals are becoming less common because of urbanization, yet common animals include birds like the Cape Sparrow and several species of insects (Compaan *et al.*,2017). According to Ekurhuleni Biodiversity and Open Space Strategy (EBOSS) of 2019, amidst increasing urban pressures, CoE has conservation initiatives and green areas identified to protect and improve the region's biodiversity.

- Hydrology

The Boksburg area lies in quaternary catchment C22B, which drains to the Natalspruit, the Klip River and to the Vaal River systems (DWAF,2015). The area is located in the Vaal Water Management Area (WMA) and the Highveld ecoregion (DWAF, 2015). The hydrology of the area is shaped by several key watercourses, including the Elsburgspruit River, a non-perennial river that flows primarily during the rainy season, providing an important drainage system for the area (DWS, 2021). Additionally, Boksburg is influenced by the Vaal River System, a primary water source for the wider Ekurhuleni region, although the Vaal River itself is not directly located in Boksburg (DWS,2021). Wetlands, including those near Germiston and Boksburg lakes, serve as natural filtration systems, supporting the region's watercourses and playing a role in stormwater management. The watercourses around the area have been

impacted by industrial and mining activities, leading to water quality concerns such as contamination by heavy metals and other pollutants (DWS, 2021).

- **Geology and Soil**

The 1: 250 000 scale Geological Map, Sheet 2626 East Rand, indicates that Boksburg area is located on colluvial soils of the Quaternary stage, which overlies dolomite and chert of the Witwatersrand supergroup, Transvaal Sequence (Mellor, 1915; Mahlahlane, 2019). The underlying geology of the area is primarily characterized by the presence quartzite, shale, and conglomerate, which are significant in the region's mining history (Mahlahlane, 2019). The soils are generally characterized by clay textures, which are prone to compaction and poor drainage (Stoltz, 2015). These soils are often shallow, with underlying rock close to the surface, particularly in areas with significant mining activities (Stoltz, 2015; Mahlahlane, 2019).

- **Topography**

Boksburg is situated on the highveld, a plateau with an average elevation of around 1700 metres (5,600 feet) in altitude above sea level (asl) (Marutlulle, 2017). The topography of the area is relatively flat with gentle slopes, which is typical of the highveld region (EMM, 2019). The area is characterized by its grassy, rolling plains and occasional low hills (Compaan *et al.*, 2017). The landscape is featuring a mix of urban development with a small patch of open spaces (EMM, 2019).

(ii) Human factors

- **Population Demographics**

Boksburg is part of the larger CoE, which had an estimated population of over 2 million people according to the 2021 Census. However, Boksburg itself has a population of around 520 980 people (Stats SA, 2021). The population is predominantly youthful, with a large proportion of individuals under the age of 35 years (Makhubu, 2021). Makhubu (2021) further indicate that approximately 60% of the population falls within the working-age category (15-64 years). The youthful demographic is largely influenced by migration patterns, where younger individuals move to urban centres for employment and education opportunities (Marutlulle, 2017). The majority of residents are Black African, followed by smaller groups of Coloured, Indian/Asian, and White communities (Stats SA, 2021).

- Socio-Economic

The local economy of Boksburg is driven by industrial activity, with employment opportunities in manufacturing, logistics, and mining (Stats SA, 2021). However, unemployment remains high, with Stats SA 2021 reporting an unemployment rate of around 35% in the broader Ekurhuleni area. The average household size in the area is around 3.2 individuals, with a mix of formal and informal housing present.

The Boksburg region was chosen because the area has experienced significant urban human settlement development projects in the past decade (Gauteng SOER, 2021). In Boksburg, the current housing projects are characterised by high community expectations about land size, level of services, political expectations, especially from ward councillors, land scarcity, noise levels, waste management, unavailable land for agricultural practices, and traffic congestion (Ogra and Onatu, 2013). Boksburg has witnessed human settlement development pressure owing to its proximity to OR Tambo International Airport hub together with other industrial and commercial facilities (Madumo, 2017). Figure 4.3. represents the map of Gauteng showing the CoE (Boksburg and the selected study areas).

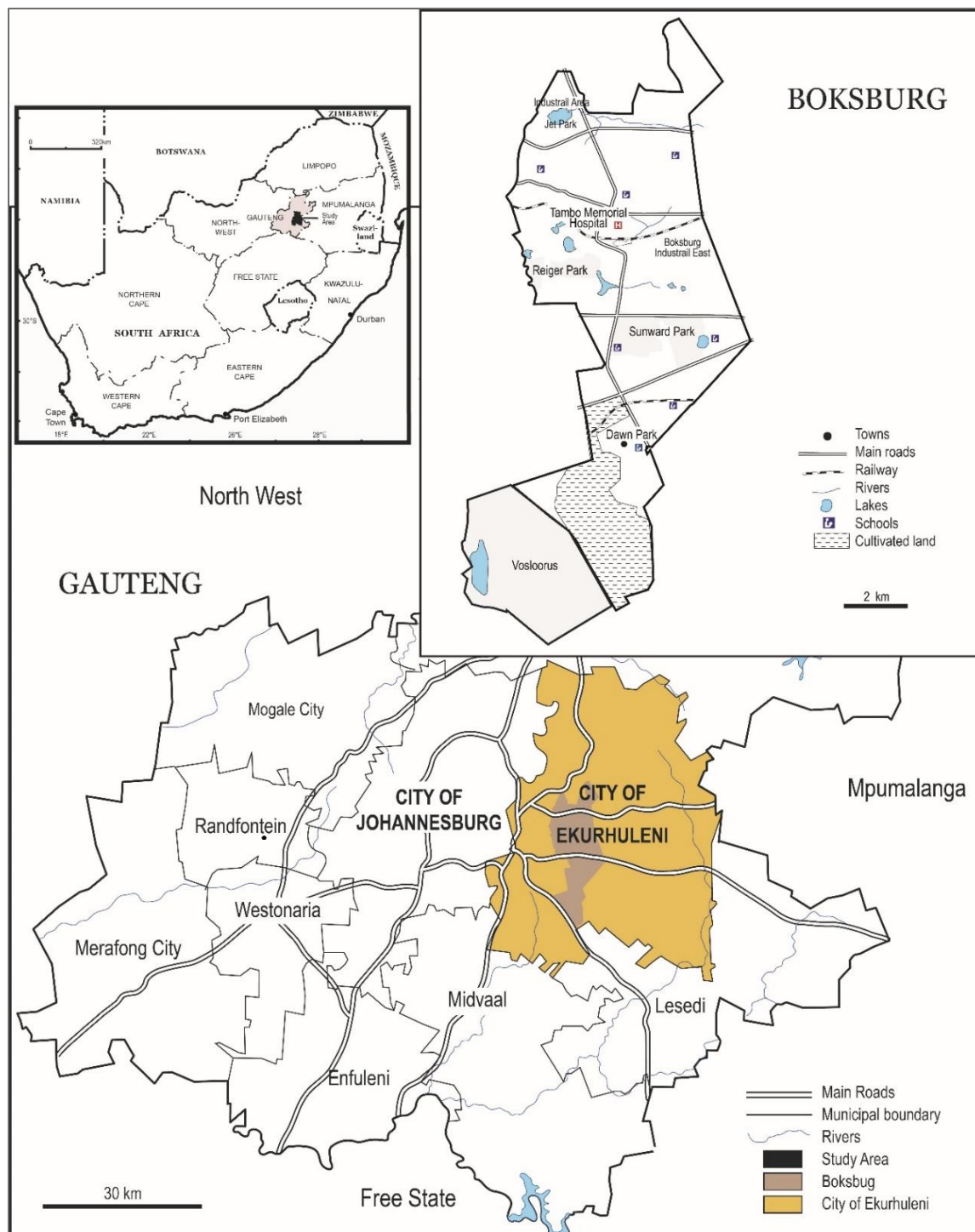


Figure 4.3: Location of the study area

Source: The Researcher's own synthesis (2023)

For this study, five human settlement development projects constructed between 2020 and 2023 were selected as case studies (See Table 4.2). The criteria for the selection were based on the economic, and environmental factors that each project experienced based on the topic under

investigation. For instance, their proximity to the economic industrial sites and agricultural land, waste management issues and traffic congestion are clustered residential developments with high populations in a small area. In addition, the five developments are established by the CoE as the proponent. It is believed that government projects will give a broader understanding of the management of environmental and social impacts as the custodians responsible for service delivery while ensuring that the environmental human rights of the citizens are protected in terms of section 24 of the SA Constitution of 1996.

4.4.2. Case Studies

Another alternative strategy for data sources adopted in this study was the case study (Yin, 2003; Driscoll *et al.*, 2007). Multiple definitions of the term ‘case study’ have been offered by several scholars with common terms such as detailed, exhaustive, comprehensive intense, or in-depth investigation of situations in real life (Bryman, 2004; Driscoll *et al.*, 2007). Yin (2003:13 - 14) provides a thorough definition of a case study as *“an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident ... [It also] copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple courses of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical proposition to guide data collection and analysis.”*

Data collected from the case study was based on five purposefully selected human settlement development projects, where EIA studies were conducted for such projects. The case study approach enabled an in-depth understanding of the environmental and social impacts of human settlement developments. This assisted in diagnosing the problem and making general recommendations for the research. Table 4.2 below provides a detailed explanation of the selected case studies:

Table 4.2: Description of case studies

Project description (size, design, infrastructure).	Location and GPS coordinates	GDARD EIA’s reference	Year of development
Development of a residential area on portion 51 and the remaining extent of the	Boksburg (Reiger Park)	Gaut: 002/16-17/0217	2021

farm Leeuwpoort 113 IR. The development covers 37 ha and comprises 1.764 residential units. Associated infrastructure of internal water supply, sewer reticulation, internal roads, and stormwater infrastructure.	-26.226823, 28.247179		
Development of a residential area situated on the remaining extent of portion 4 of the farm Klippoortjie no. 112 IR. The development covers approximately 37.4244 ha and comprises 2 559 duplex residential units. The associated infrastructure of internal water reticulation, sewer reticulations, internal roads, stormwater infrastructure, taxi ranks, conservation area, and open public space for playground.	Boksburg (Reiger Park) -26.282684, 28.200064	Gaut: 002/13-14/0131	2022
Development of residential area situated on the remaining extent of the farm Leeuwpoort no. 113 IR south which covers 134,8141 ha. This development comprises approximately 1 601 units of the total development of extension 24 to 29 which is approximately 17 661 residential units in total. The associated infrastructure of water supply, sewer connection, internal roads, stormwater infrastructure, parking spaces, and play fields.	Boksburg (Sunward Park) -26.30343, 28.26142	Gaut: 002/08-09/0257	2020
Development of residential area situated on the remainder of erven 18383, 18382, and 6519 of Vosloorus extension 9. The development covers 10 ha and comprises 4 - 10 storeys of residential buildings with 1	Boksburg (Vosloorus) -26.34332, 28.22002	Gaut: 002/16-17/0144	Construction underway as of 2023

856 dwelling units. Associated infrastructure of water supply, sewer connection, electricity connection, internal roads, stormwater infrastructure, parking bays, and children's play area.			
Establishment of a residential area situated on the remainder of the farm Villa Liza no. 675 IR. The development covers 74.6478 ha and comprises duplex buildings with 3 635 dwelling units. Associated infrastructure of water supply, sewer connection, electricity connection, internal roads, stormwater infrastructure, municipal and public open space.	Boksburg (Dawn Park) -26.29727, 28.24335	Gaut: 002/13-14/E0132	2021

Source: The Researcher's own synthesis (2023)

4.5. Sampling Techniques

'Sampling' is defined as a process of selecting a small portion of the research target population (Robson *et al.*, 2006; Acharya *et al.*, 2013). Sampling is vital in researching as it is impossible to investigate the entire population without narrowing it down to its core (Robson *et al.*, 2006; McKinney, 2011, Acharya *et al.*, 2013). Acharya *et al.* (2013) broadly classify sampling methods as either probability or non-probability.

4.5.1. Probability Sampling

Probability samples are the "gold standard in sampling methodology that ensures generalisability of the study results to the target population" (Acharya *et al.*, 2013:330). In probability sampling, each member of the population has a known and equal chance of participating in the study (McKinney, 2011 and Acharya *et al.*, 2013). This sampling method is also known as random sampling and aims to ensure that the selected sample is a true representation of the entire population under investigation (Nongkynrih, 2012). According to Acharya *et al.* (2013), probability sampling is further classified into six different types of sampling: (a) simple random, (b) systematic random, (c) stratified random, (d) cluster, (e)

multiphase and (f) multistage. However, only the relevant sampling methods deemed relevant for this study are discussed in the next subsections.

(a) Simple random sampling

Simple random sampling is the method where every individual has an equal chance of being selected to participate in the study (Acharya *et al.*, 2013). This method requires a sampling frame and individuals in the population study need to be enumerated (Nongkynrih, 2012). For this study, in the case of Sunward Park Ext 29, the list of all participants that make up the available population (25 houses) was adjacent to the project and only 10 participants were randomly selected based on their house numbers. A similar approach was adopted for the other sampled projects.

(b) Stratified random sampling

Stratified random sampling is a method where data is divided into various sub-groups (strata) sharing common characteristics such as age, sex, race, income, education, and ethnicity. A random sample is taken from each stratum (Acharya *et al.*, 2013). stratified random sampling was adopted to sample the government officials where participants' level of education and positions in the organisation was considered in data collection. The stratified random sampling was considered because it assures the representation of all groups in the population needed.

(c) Cluster sampling

Cluster sampling is a sampling method in which the entire population is divided into clusters and groups - usually geographic areas - or districts such as villages, schools, wards, and blocks (McKinney, 2011; Acharya *et al.*, 2013). This method is very useful when the population is widely scattered and it is not practical to select a representative sample of all the elements (Acharya *et al.*, 2013). This method was adopted for the study in sampling the community members that are residing adjacent to projects under investigation. In areas where more than 10 houses are adjacent to the projects, only 10 participants were required.

4.5.2. Non-probability sampling

Non-probability is a sampling method where sample group members are not selected randomly (Acharya *et al.*, 2013) but only certain members of the population have a chance of participating in the research (McKinney, 2011). According to Acharya *et al.* (2013), non-probability sampling is further classified into three different types of sampling: (a) convenience/purposive sampling, (b) snowball sampling, and (c) quota sampling.

(a) Convenience/purposive sampling

Convenience/purposive sampling is the most commonly used method where the sample is chosen based on the convenience of the researcher (Acharya *et al.*, 2013). In the convenience sampling method, the participants are often selected because they are at the right place at the right time. In addition, the method is considered less expensive with no requirement of a list of all the population elements (Acharya *et al.*, 2013). Purposive sampling is also known as a judgemental or subjective or selective sampling method (Patton, 2002). This sampling method is widely used for qualitative research in identifying and selecting information-rich cases with limited resources but is most effective in addressing the study's aim and objectives (Pinnegar and Daynes, 2007). This type of sampling method can be very useful in a situation where the researcher wants to reach the targeted sample group quickly, while sampling for proportionality is not a concern (Pinnegar and Daynes 2007; Tracy 2013:134). The purposive sampling process is informed by the non-probability approach because certain information can be obtained from specific participants which makes it possible to explain matters relevant to the study (Patton, 2002; Tracy, 2013). Purposive sampling was used to select individuals who participated in the interviews.

(b) Snowball sampling

Snowball sampling is also known as chain-referral sampling where the selection of participants is based on the referral from the participants who are currently engaged in the research (Pinnegar and Daynes 2007; Tracy 2013:134). Tracy (2013) further indicates that snowball sampling can be used for selecting participants who are subject experts in a particular topic under investigation whereby a research participant can refer another expert deemed appropriate for data collection. Snowball sampling was used to select individuals who participated in the in-depth interviews. The same sampling method was also employed to recruit expert participants who participated in the FGD.

(c) Quota sampling

Quota sampling ensures that a certain characteristic of the population sample will be presented to the extent as per the researcher's desires (Acharya *et al.*, 2013). This sampling method divides the population into categories and subjects are selected from each divided category (Pinnegar and Daynes 2007; Tracy 2013; Acharya *et al.*, 2013). Acharyna *et al.* (2013) provide an excellent example of the quota sample if a researcher wishes to have 60% females and 40%

males in the sample. The researcher will stop sampling once 60 women and 40 men have been fully recruited.

For this study, there was no single preferred sampling method, thus non-probability sampling technique was also adopted to sample some participants. Convenience/purposive sampling was adopted for the community members that reside adjacent to the selected case study residential complexes because they were deemed to be in the right place and relevant for the investigation (Acharya *et al.*, 2013). Snowball sampling was adopted for the government officials GDARD, CoE project managers, town planners, and EAPs, additional participants were chosen based on referrals or information obtained from the previous participants (Tracy, 2013; Acharya *et al.*, 2013).

4.5.3. Target Population and Sample Size

‘Population’ in research is defined as an “entire group of items or individuals that allows data to be collected and investigated” (Schindler, 2010:88). Participants were sampled from various institutions as key role players in the field of human settlement development projects, town, and regional planning and EIA studies. The selected groups were regarded as a population-based on shared factors such as employer (working for the same organisation), similar educational background, work experiences, and belonging to similar professional bodies such as EAPASA (Creswell and Clark, 2017). Community members were regarded as a population because they are from the same location and share similar interests in the topic under investigation. Table 4.3 shows the population and sizes of participants who participated in the study for data collection.

Table 4.3: The size of participants

Population	Size of sample of the participants
GDARD officials	5
CoE human settlement project managers	5
CoE town planners	5
EAPs	5

Local community members	50 (10 participants from each selected 5 case studies)
Total number of participants	70

Source: The Researcher's own synthesis (2023)

As described above, a total number of 70 participants successfully participated in the interviews and completed the questionnaires, representing a 100% response rate.

4.6. Data Collection Methods

This section of the research methodology presents the data collection techniques which were employed in collecting the data. Both primary and secondary data collection techniques were used in various stages of the study as explained in the following sub-sections.

4.6.1. Primary Data Collection

'Primary data' is defined as an original piece of information collected for specific research aims and objectives (Hox and Boeiji, 2005). Collis and Hussey (2003) as well as Hox and Boeije (2005) allude to the fact that primary data collection is a process where the researcher gathers first-hand information from participants. The primary data is usually raw and needs to be analysed and processed to make sense (Hox and Boeije, 2005). Creswell (2012) explains that the collection of primary data is vital for any type of study because it allows the researcher to gather information that has not been influenced by the analysis of any previous researcher. The judgments and conclusions that the researcher draws are based on their own analysis and assumptions (Creswell, 2012). Primary data may be collected via several methods such as the administration of questionnaires to/by participants, focus group discussions, interviews, field surveys, and observations (Hox and Boeije, 2005). For this study, primary data collection was collected through in-depth interviews with key informants, questionnaires, and interviews with community members and one FGD with key informants.

4.6.1.1. Questionnaires

A 'questionnaire' can be referred to as a set of written questions with a choice of answers designed to collect information about a study (Saunders *et al.*, 2012). Questionnaires distributed to community members assisted the research in understanding the environmental and socio-economic impacts of human settlement projects and how the members are involved in decision-making that seeks to promote the sustainable development of local communities

and the right to an environment that is not harmful (RSA Constitution, 1996; O’Riordan *et al.*, 2020).

A set of questionnaires was used to collect the data from members of the local communities where the sampled human settlement development projects are located. Questionnaires for members of the local communities were administered by the researcher and answers were also audio recorded. The completed forms and audio recordings were immediately acknowledged by the participants after the face-to-face interaction. The contents of the consent form were read out to the participants prior to the commencement of the research questionnaires to ask for permission to proceed. In instances where participants were not very proficient in English, the questions were paraphrased and asked in the local language. Answers were recorded in English. Each interaction took up to 20 minutes. Participants provided information on the role they played in decision-making prior to the authorisation of the development, the challenges faced with service delivery owing to urban expansion of human settlement developments, and how environmental pollution affects their well-being.

4.6.1.2. Key Informants’ Interviews

In relation to the interpretive paradigm adopted for this study, interviewing key informants was used as another data collection method. This approach was proffered as the best knowledge creation by Edwards and Holland (2013:17):

“As human interaction and negotiation are seen as the basis for the creation and understanding of social life in interpretive approaches, it is the interaction of the participants in the interview situation – the researcher and the researched – that creates knowledge.”

One-on-one, face-to-face interviews were conducted with various key informants. Interviews were in-depth and interactive conversations where the researcher made sure that the participants understood the aim and purpose of the study and did not feel coerced to give specific answers to the questions (Creswell, 2012). Interviews are vital owing to the nature of information they produce which is socially and scientifically situated (Tracy, 2013), hence it was applicable and adopted for this study.

During the interviews, both notes and audio recordings were made by the researcher to capture all the information during the conversation. Each interview was conducted for approximately 45 minutes. These participants provided vital information regarding the environmental and social impacts of human settlements, challenges associated with spatial planning and land-use management; EIA’s and SIA’s role in mitigating the identified impacts; urban dilemmas with

regard to accessing proper waste management, clean water, sanitation, road safety; protection of plants and animals, safety and security. The interviews started by first obtaining permission to audio record the sessions. As a researcher, it was very important to listen attentively with no interruption and remain guided by Edward and Holland (2013) that productive interviews are a product of listening more and talking less as the interviewer. By doing so as a researcher, it was viable to extract information from the interviewee with a high degree of accuracy.

4.6.1.3. Focus Group Discussion

Facilitated FGD with subject experts are qualitative data collection methods that help to validate data collected by researchers. The use of facilitated group discussion produces evidence-based policy, especially in the domain of public health (Slunge *et al.*, 2017). The method of facilitated focus group discussion has been adopted in another different fields of study such as addressing environmental, wastewater, waste, and nature conversation problems, as well as climate change wilderness preservation problems (McDaniels and Roessler 1998; Slunge *et al.*, 2017). The focus group discussions can take from half a day to several days depending on the subject under discussion or the topic being investigated, time, and financial resources (Slunge *et al.*, 2017).

The FGD method was adopted by Davies and Sherriff (2010) to supplement information provided by the key informant interviews in their study which focused on environmental health in urban areas. The study adopted this approach as it enabled the researcher to triangulate the information that was initially collected from individual interviews with key informants. The FGD further enabled the researcher to explore the differences and similarities of different views on the effectiveness of environmental and social impact assessment tools and guided best practices to promote the protection of natural resources and social justice in the Boksburg areas. The FGD consisted of the same environmental specialists (EAPs and GDARD) who participated in the interviews. The FGD was well managed and successfully conducted in three hours on 25 May 2023 at Boksburg, in the Afrique Boutique Hotel boardroom.

4.6.2. Secondary Data Collection

‘Secondary data’ refers to information that researchers do not directly collect from participants but has been collected previously by other researchers, as well as private and government institutions. Such data has been documented (Hox and Boejie, 2005; Mogalakwe, 2006). Secondary data is found in academic textbooks, journal articles, published and unpublished

theses, government policies, laws and regulations, development plans, and reports (Mogalakwe, 2006).

4.6.2.1. Document Review of Selected Case Studies (Projects' Environmental Impact Assessment Reports)

The researcher undertook a document review to gain an in-depth understanding of the environmental and social impacts of human settlement development projects, spatial development-planning, land-use management, human settlement forms, EIA policies, together with citizens' role in decision-making, access to basic municipal services as documented in various academic texts and government policy documents. For this study, the CoE's development plans and policies, human settlement development policies, EIA and SIA policies, EIA reports for the selected human settlement projects (case studies), legislative instruments, and statutes were reviewed to determine the extent they promote and influence urban sustainable human settlement developments. The review of the documents assisted in addressing the research aim and objective that sought to understand the challenges contributing to the management of the project's environmental and social impacts in the Boksburg area, CoE, Gauteng.

In addition to reviewing the above documents, EIA projects' reports formed the basis of understanding the quality of the reports and their influence in decision-making for approving the developmental project applications. The reports further provide an understanding of the identification of environmental and social impacts and evaluation together with their proposed mitigation measures. In addition, the reports provide data on how environmental compliance monitoring and enforcement should be handled during the project phases (planning, construction, implementation, and close-out/rehabilitation). The identified impacts and mitigation measures of each project documented in the environmental management plans and programmes were carefully recorded in the Lee and Colley (1999) amended EIA quality review package form (Appendix 20). This assisted in ranking the effectiveness of the proposed mitigation measures of the identified environmental and social impacts of the selected case studies.

4.7. Data Analysis Techniques

Data analysis is the process of arranging and synthesising collected raw data to tell meaningful stories (Freeman, 2017). Freeman (2017:4) further elaborates that data analysis is a method

that helps the researcher to “describe facts, detect patterns, develop explanations and test hypothesis”. For this study, which adopted a mixed-method design, data analysis was conducted qualitatively and quantitatively. The iterative analysis technique was adopted, as developed by Tracy (2013), where data analysis was conducted as an ongoing process once data had been collected. The strategy outlined by Tracy (2013) was also confirmed by Creswell (2012) who argues that the data analysis in qualitative research proceeds hand in hand with other developing parts of the research. Thus, the researcher deemed it fit to refer constantly to the previous interviews, academic literature, and human settlement theories which assisted in formulating more meaningful questions in an attempt to understand the impacts of continuous urban expansion on the environment and social well-being of the people in the Boksburg area.

Analysis of the collected data was conducted using descriptive statistics test of Statistical Package for the Social Sciences (SPSS) Version 22. Meanwhile, analysis of the EIA reports review was done according to the Lee and Colley package (See Figure 4.2) and grading symbols (See Table 4.4). The review package was established in the United Kingdom (UK), and it has been adopted internationally as a precise method to evaluate the effectiveness of EIA reports in mitigating identified impacts associated with proposed developments (Lee et al., 1998; Sandham et al., 2008). The package focuses on the below review areas as per Figure 4.4:

“(i) *Description of the development project, the local environment, and the baseline*

Conditions,

(ii) Identification and evaluation of key impacts,

(iii) Alternatives and mitigation; and

(iv) Communication of results.”

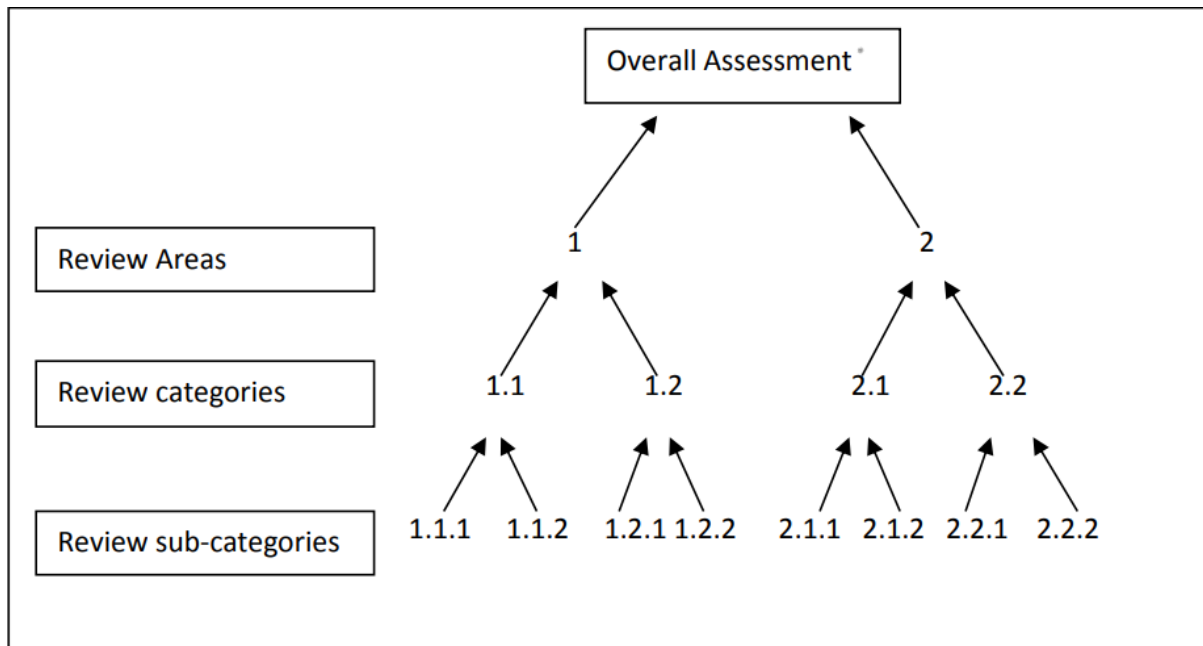


Figure 4.4: Lee and Colley review package

Source: Lee et al. (2009)

The researcher tailored a model specifically for urban human settlement development EIAs to review the quality of environmental and social impact mitigation measures of the sampled five EIA projects' reports. The review of the EIA reports was guided by the notion that the reports are generally expected to cover all identified impacts and their consequences as the information contained in the reports forms the basis for granting environmental authorisation (Sandham *et al.*, 2008). Thus, for this study, an indication that the EIA process is effective in mitigating environmental and social impacts of the proposed human settlement development projects is based on the assessment of cumulative impacts resulting in similar projects within the region. The identified impacts and proposed mitigation measures from the sample of EIA reports were recorded and graded according to their quality as outlined in Table 4.4.

The review procedure of the mitigation measures is recorded and graded through the allocation of scores ranging from low level (F) to high level (A). The grading indicates how well the identified impacts and mitigation measures are completed in the EIA report. The results of the reviews were then recorded.

Table 4.4: Quality grading symbols for EIA reports: assessed impacts

Symbols	Meanings
A	“Generally well performed, no important tasks left incomplete”
B	“Generally satisfactory and complete, only minor omissions and inadequacies”
C	“Can be considered just satisfactory despite omissions and inadequacies”
D	“Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies”
E	“Not satisfactory, significant omissions or inadequacies”
F	“Not satisfactory, important task(s) poorly done or not completed”

Source: Lee and Colley (1999)

The below section explains the analysis of qualitative and quantitative data collected from different sources.

4.7.1. Qualitative Analysis

The qualitative data gathered was voluminous and had to be analysed systematically to acquire meanings that would eventually contribute to the body of knowledge. Thus, the analysis of qualitative data was guided by an iterative analysis process as outlined by Tracy (2013). Firstly, the raw data collected was organised via capturing and transcription where audio recordings were made. Organising data was done in chronological order based on data type and sources. Secondly, data was coded and labelled while chunking out sections and grouping them (Tracy, 2013). For example, responses that focused on EIA tool effectiveness were coded effectiveness while some data focused on environmental and social challenges.

Thirdly, a process of data immersion was conducted, as described by Tracy (2013:188), as a phase where a researcher discusses a focus group to hear views and perspectives from experts in the field of study. It was at this point that the focus group discussion enabled the researcher to add multiple perspectives to the data collected and analysed. The questions and comments raised during the discussion revealed some loopholes in the consequences of urban human

settlement projects and the effectiveness of the EIA tool which the researcher had to analyse to make the study conclusion and recommendations.

4.7.2. Quantitative Analysis

The quantitative data collected was analysed using the Statistical Package Software for the Social Sciences (SPSS) Version 22. The responses from the interviews were recorded and captured in an excel spreadsheet software. Upon completion of data capturing, the data was then analysed using the SPSS and excel spreadsheet software which allowed the researcher to create summary reports in the form of graphs, pie charts, and tables presented in Chapter 5 (empirical evidence). Both SPSS and excel spreadsheet software were utilised based on their strengths. For instance, SPSS is more advanced with powerful built-in data manipulation tool such as transforming variables and perform complex descriptive analysis. Meanwhile Excel allowed for easy data capturing and recording as and when data was collected. In this regard, both software enabled the researcher to analyse the results in a logical manner such as categorising participants according to gender and educational level.

4.8. Ethical Considerations

Three months was required to obtain ethical clearance approval from the University of the Witwatersrand's Ethics Review Committee and permission letters from GDARD, CoE and Private Consulting firms. The importance of ethical consideration when conducting research is outlined by Orb *et al.* (2000), where concerns raised involve participation voluntarily. Participants should remain anonymous, confidential, and not suffer any harm (Orb *et al.*, 2000). This study considered the ethical standards as outlined below:

- Ethical clearance certificate issued by the University of Witwatersrand's Research Ethics Committee (Appendix 1).
- Approval letters were required and obtained from GDARD, COE, and environmental consulting firms (Appendix 5-11).
- Before the commencement of interviews, aim and objectives of the study were explained to all participants through an information sheet (appendices 2 - 4). For the residents who were unable to read English, aim and objectives were explained verbally in their home language before data collection.
- All participants signed consent forms before collecting data, this was done as an agreement to participate in the study (appendices 17 - 19).

Anonymity and confidentiality on the interviews together with the responses were protected by the researcher from public disclosure by ensuring that documents were stored in an access-controlled environment.

4.9. Methodological Limitations

Regardless of clearly outlining the research methodology that guided the study, few issues remained beyond the control of the researcher during the duration of the study. The researcher was confronted by institutional bureaucracy where the need to conduct in-depth interviews with key role players was a daunting task that was interlocked with institutional red tape. Some government senior officials were reluctant to participate in the interviews and offered the researcher documents to read through while others referred the researcher to junior staff for interviews. However, obtaining the ethical clearance certificate from the university ethical committee and permission letters from the head of department (HOD) of GDARD and the City Manager of CoE were very helpful in overcoming the institutional bureaucracy.

This study also acknowledges that to have a more conclusive and diverse set of results, private human settlement development projects such as case studies would be needed. However, one of the main limitations was the unwillingness of the private developers to participate in the research. Thus, the interpretation of the data collected for this study may therefore have some limitations as conclusions are drawn only from the government human settlement development projects implemented by the CoE. If similar studies were to be carried out, it would be best to do so by comparing the private and public human settlement development projects and the management of the identified environmental and social impacts therein.

Lastly, the study also acknowledges that the review of EIA report quality is subjective. Hence Lee *et al.* (1999) recommends that to reduce bias, two reviewers conduct the score grading together and then compare the results while discussing the gaps in-between the scores before assigning the final score. However, to minimise biases, the researcher repeatedly reviewed the five EIA reports at a daily interval and compared the results to the previous ones, like the approach followed by Matrunola, (2007) and Mohamed (2009). In previous studies conducted by Matrunola (2007) and Mohamed (2009), the EIA reports score grading of the single reviewers was found to be similar to those reviewed by more than one, hence this study deemed it fit to adopt the single reviewer approach.

4.10. Conclusion

This chapter presented methods adopted in conducting this study. The focus was on the description of the research methods and designs, data used and its sources, sample selection and sizes, data collection, and analysis. The chapter further clearly described the documents reviewed, questionnaire survey, interviews, and FGDs. Both Statistical Package for the Social Sciences (SPSS) Version 22 and thematic analysis techniques were applied in data analysis. Ethical standards considered in gathering data were discussed. Lastly, research methodological limitations were also outlined, and strategies were employed to overcome them. Chapter 5 (empirical evidence) presents the objectives and research findings.

CHAPTER FIVE

PRESENTATION OF STUDY FINDINGS

5.1 Introduction

This chapter presents the results of research on the environmental and social impact assessment of human settlement development projects in Boksburg, CoE, Gauteng, South Africa. The researcher administered questionnaires, interviews, focus group discussions, and EIA reports to the sampled projects to generate these results. Qualitative data is presented in the form of stories. This method was favoured because it involves highlighting important aspects of participants' individual stories and finding common patterns across the dataset (Azungah, 2018). Quantitative data is presented in the form of tables, graphs, and pie charts.

5.2. Demographic information of Participants

This section presents the demographic information of the participants. Interviewees included people working in the municipality's human settlements and planning department, environmental specialists from the provincial ministry and private environmental consulting companies, as well as members of the community. Information collected includes gender, age, employment status, highest degree obtained, professional registrations, and distribution of community members per their residential areas.

5.2.1. Participants' Gender

The study included a total of 70 participants, including 71.4% residents around the sampled settlement projects and 28.5% key informants from the area of environmental specialisations, project management, and town planning. Of the 70 participants, 61% were women and 39% were men. Results indicate that 61% of women, the majority (69%), were community members with a minority of 30.2% being key informants. In contrast, 39% of men, (the majority of male participants being 74%) were community members with a minority of key informants being 26%. The study further revealed that CoE's key informants consisted of a majority of women (70%) and a minority of men (30%), while GDARD was made up of a majority of men (60%) with a minority of women (40%). Private consulting companies were made up of a majority of women (80%) and a minority of men (20%).

The results of this study suggest that the professions of environmental studies, project management, and urban planning are predominantly female-dominated fields. The study further found that there were more women (69%) available in their homes for interviews than men. The results suggest that more men were at their respective workplaces when most of the interviews were conducted. Figure 5.1. presents the participants' gender:

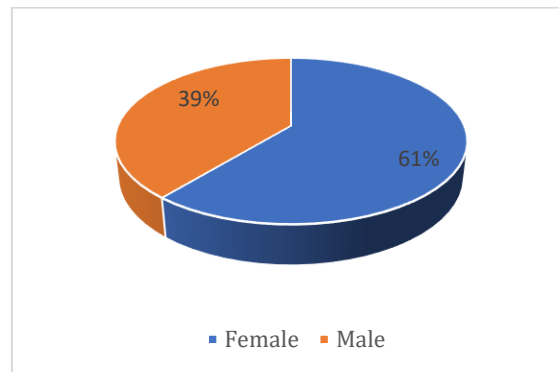


Figure 5.1: Participants' gender

Source: Field data (2023)

5.2.2. Participants' Age

Participants' ages at last birthday ranged from under 20 to over 50. The highest (51.6%) were aged 41 to 50 and the lowest (4.2%) were between 21 and 30. The study found that no participant under the age of 20 participated. The study further indicated that 10% aged over 50 were community members while only (1.4%) were a key informant and founders of an environmental consulting company. Of the minority (4.2%) of participants aged 21 to 30, all were members of the community. Having (100%) key informants aged 30 and above provides insight into participants' age and maturity level to provide in-depth knowledge on the impacts of human settlement development projects on the environment and humans. Figure 5.2 shows the age of participants on their last birthday:

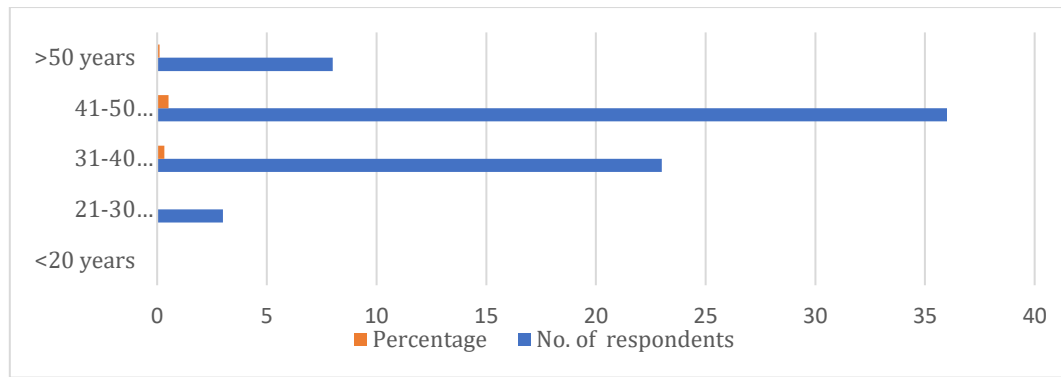


Figure 5.2: Participants' age as at last birthday

Source: Field data (2023)

5.2.3. Participants' Employment Status

The study had the highest representation (54%) of employed participants, with 26% being unemployed and the lowest representation of 20% being self-employed. The research results show that 26% of the unemployed and 20% of the employed were all community members. Of the 54% of employed participants, 52% were key informants from GDRARD, CoE, and private environmental consulting companies who were considered employed by professional institutions. Meanwhile, of the employed community members most were working at retail shops and factories around Anderbolt in Boksburg, Wadeville in Germiston), OR Tambo International Airport, and government departments.

Self-employed community members were in business ranging from car washes, shop owners, and mechanic workshops to formal entrepreneurs involved in construction and manufacturing industries. An overall employment status of 54% revealed that the majority of participants, whether community members or key informants, were employed and had an acceptable level of understanding about the topic under investigation with the ability to articulate their point of view. Figure 5.3 presents the participant's employment status:

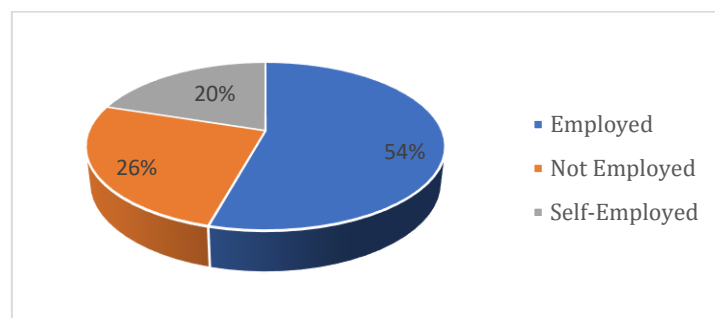


Figure 5.3: Employment status of the participants

Source: Field data (2023)

5.2.4 Participants' Work Positions in their Organisations

The research findings show that of key informants, 55%, were mid-career professionals while only 15% were in entry-level positions and 30% were in senior management (Figure 5.4a). Out of 30% of participants who were in senior management, 83% were all working for environmental consulting firms (Figure 5.4a). Having 100% of independent EAPs in senior management positions provides insights into the depth of their exposure to management of the impacts associated with land-use developments and the application of suitable impact assessment tools for human settlement development projects.

A total of 48% of the participants represent employed community members. The results further show that 78% were at entry level while 22% were at middle management level, with 0% of community members occupying senior positions (Figure 5.4.b). Having 0% of community members occupying senior positions and the majority at 78% at entry levels suggests that an increase in population and development of new human settlement projects are earmarked in areas occupied by low-income earners. Figures 5.4(a) and (b) present the participants' positions in their organisations:

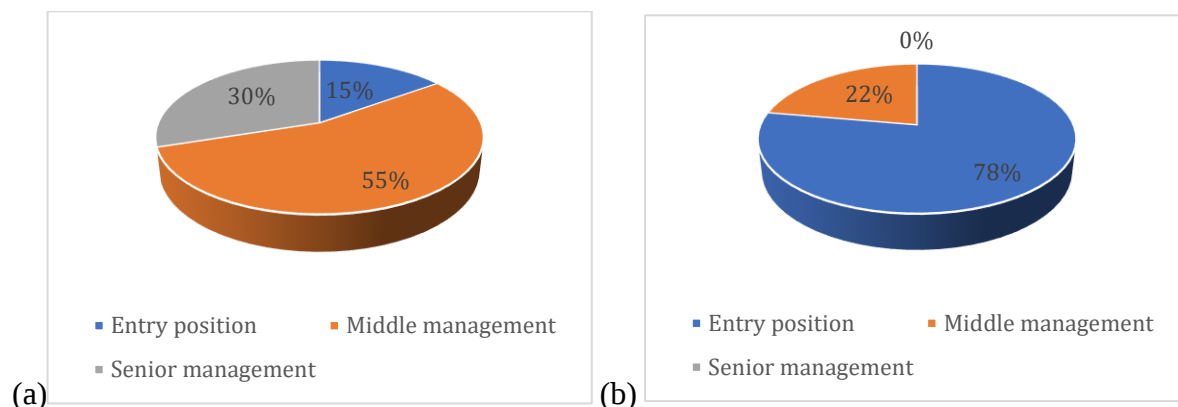


Figure 5.4a and b: Participants' positions in their organisations

Source: Field data (2023)

5.2.5. Participants' number of years in their organisations

Most participants (37%) have worked for five to eight years, with evidence showing that 13% are all independent EAPs who have been with their environmental consulting firms for more than five years. These results suggest that most of these participants have a lot of experience and knowledge on the topic with the ability to share the effectiveness of the EIA tool in addressing the social and environmental impacts of proposed developmental activities. In addition, this group has established and founded most environmental consulting firms and

climbed the management ladder to provide different vantage points. This could also explain why so many of the participants are in management as they have been doing the same work for so long.

The second majority of the employed participants (29%) have worked for between eight and 10 years. Out of 29%, 54% were employed by the CoE. Having 54% of participants being employed by the CoE in the field of project management under the Human Settlement Department, town and regional planning under the City Planning Department have presented almost well-balanced data. The much-needed data reflects the level of how well spatial-planning and land-use management tools such as approved Spatial Development Framework (SDF), integrated development plans (IDP), environmental management framework (EMF), and other developmental-planning tools are considered to address the historic apartheid spatial injustice.

The smallest portion of 5% was recorded as participants who worked less than one year. This study had equal representation where, in terms of the participant who worked for less than one year, 50% were key informants from GDARD while the other 50% were community members. These findings suggest that this group, especially the key informants from GDARD, did not add much value in providing significant information as they had just joined the Department, but has been working on environmental impact assessment field with knowledge of environmental policies.

Despite the 50% of key informants from GDARD who worked for less than a year, this shortcoming was beaten because out of 13% who worked more than 10 years, 60% were key informants from GDARD. These results suggest that participants who have been longer in the department could have been exposed to several EIA applications of human settlement development projects from the CoE, well informed about existing legislation, and institutional and political challenges associated with proper addressing of identified major environmental and social impacts of human settlement development projects. Figure 5.5 presents the participants' number of years of employment:

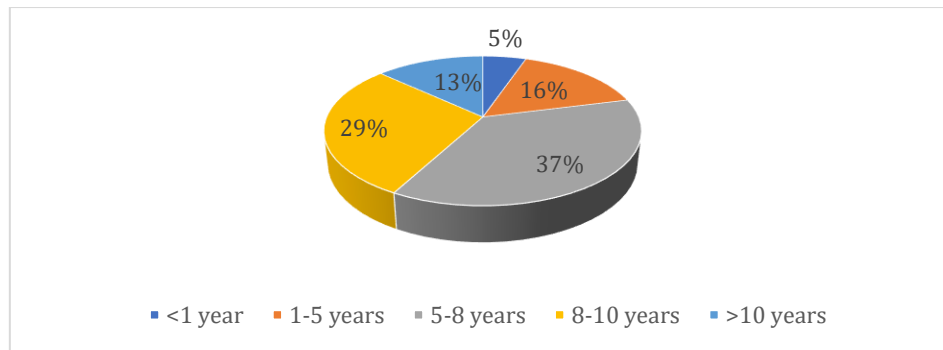


Figure 5.5: Number of years employed

Source: Field data (2023)

5.2.6. Participants' Highest Level of Qualifications

The largest portion of participants, 34% who were recorded as community members, had matric as their highest qualification, while 10% did not have a matric. These findings suggest that the views of these groups could have been based on basic general knowledge of their exposure to safety and health hazards associated with their living conditions. Even though most of them have been residing in the study area for a longer period, it is very unlikely that their views about environmental and social impacts could be guided by academic understanding.

Meanwhile, the second-largest majority - 24% - had the highest specialist qualification (honours degree) with the smallest portion 10% having a master's degree. Of the community members, none (0%) had obtained a master's degree as their highest qualification but 5.8% of community members had obtained an honours degree and were recorded as self-employed (businessmen).

Overall, community participants were people with minimal exposure to university education, which suggests that the study area is occupied by less educated individuals and their perception of the topic under investigation was based on stories of their lived experience. Meanwhile, of the 10% of master's degree holders, 57% were key informants recorded as EAPs from consulting firms, with 28% being key informants recorded with equal distribution of 50% Project Managers and (50%) Town Planners from COE while (14%) key informant recorded as an environmental specialist from GDARD. These findings suggest that environmental specialists who work for independent environmental consulting companies have the highest academic qualifications to tackle the environmental and social impacts of human settlement development from an academic point of analysis as compared to those working for the local and provincial governments. Figure 5.6 presents the participants' highest level of educational qualifications:

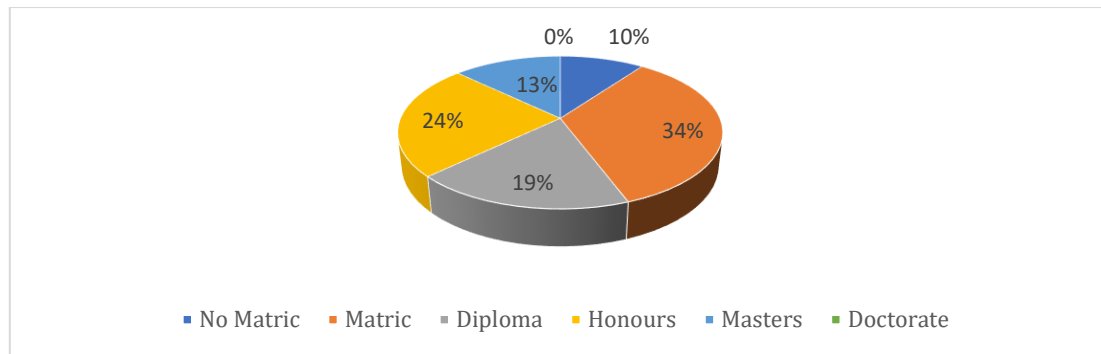


Figure 5.6: Participants' highest qualifications

Source: Field data (2023)

5.2.7. Participants' Professional Body Registration

Study results reveal that key informant's majority with a representation of 33%, were registered with the South African Council for Natural Scientific Professions (SACNASP). Out of 33%, 72% were recorded as environmental specialists from private environmental consulting firms, while 28% were recorded as environmental specialists from GDARD. These findings suggest that most environmental specialists from private companies are certified and recognised by the Independent Statutory Council to perform scientific roles in the management of natural resources as compared to environmental specialists employed by the Gauteng Provincial Government (GDARD).

In addition to SACNASP registration, key informants were requested to indicate their professional registration with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Thus 29% of the key informants consisted of environmental specialists from private environmental consulting companies with none employed by GDARD. These findings indicate that in the environmental and social impact assessment roles, environmental specialists from private companies are likely to be certified as EAPs. These results further suggest that an excellent code of practice in identifying and proposing mitigation measures of environmental and social impacts associated with human settlement development is likely to be well understood by professionally and recognised EAPs.

According to the results, 10% of the key informants were registered with the South African Council for Planners (SACPLAN) and recorded as town planners employed by the CoE. Town planners accredited by the South African Statutory Council are believed to possess in-depth skills and knowledge required in spatial-planning and land-use management. Thus, this group shared information on the challenges associated with the integration of other developmental-

planning tools such as conservation plans and environmental management frameworks when processing town-planning applications and selecting suitable sites for human settlement developments.

The smallest representation of 9% was registered with the Engineering Council of South Africa (ECSA) and recorded as project managers employed by the CoE. These results indicate that 40% of the project managers were also accredited as professional engineers. It is evident, through their accreditation, that they possess knowledge of design criteria that promote sustainable settlements that integrate economic desirability with basic social services and environmental justice.

Lastly, 19% were registered with the South African Council for Project and Construction Management Professions (SACPCMP) and recorded as project managers employed by the CoE. Having 19% being registered with SACPCMP, which represents 80% of project managers, suggests that this group provided valuable facts about best practices for establishing human settlement development projects that meet the needs of the current generation without depriving the future generation of inherent sustainable infrastructure and a healthy environment. Figure 5.7 presents participants' professional body registrations:

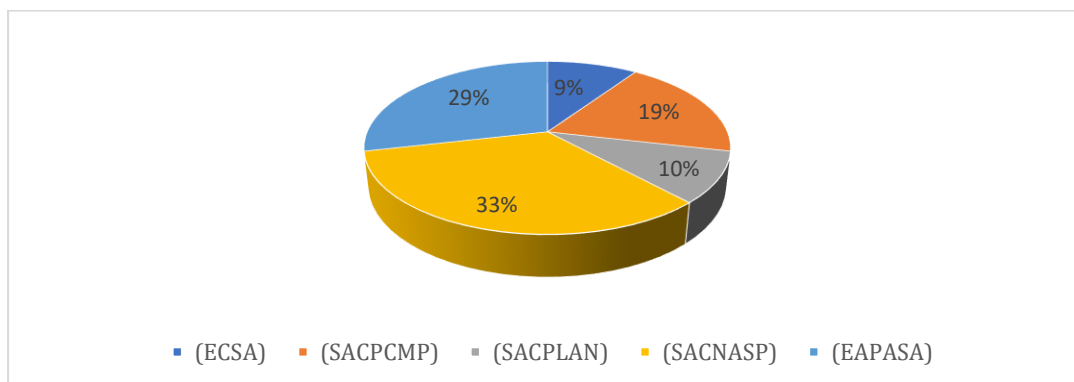


Figure 5.7: Participants' Professional Body Registration

Source: Field data (2023)

5.3. Drivers of Environmental and Social Impacts Associated with Urban Human Settlement Developments

Regarding the causes of the environmental and social impact of human settlement development in Boksburg, 75% cited unprecedented urban population growth and urbanisation (Figure 5.8). From the responses, there is poor land-use management in the Boksburg region where the

planners only planned for a small population based on the old town plans. However, recently the population has rapidly increased with a mismatch of infrastructure to provide basic social service delivery.

A notable percentage of 64% cited the growing need for housing requiring land as another factor contributing to environmental degradation (Figure 5.8). The availability and sustainable use of land becomes a sensitive matter whenever a particular space is earmarked for government housing projects. Many residents emphasised that available open spaces should be used by the government to build houses to restore humans' dignity. Without proper homes, people will utilise those open spaces to establish slums even though they are in a sensitive environment. Once land is required for houses, the activities to be undertaken are thus perceived as only beneficial and contributing positively to humans. Human rights to housing are deemed essential for human survival and dignity as compared to human rights to a clean and healthy environment.

Surprising results (92%) indicate that migration from rural areas to urban areas - and semi-rural suburbs since the dawn of democracy in SA - has contributed to disorganised and unsanitary suburbs of Boksburg, particularly Sunward Park (Figure 5.8). Many people have left villages and farms with the hope of finding a better life in the cities but, in fact, those without proper education and jobs are living in poverty. Buying food and getting basic social services such as sanitation is expensive in the city as compared to rural areas. In the villages, there is enough land for everyone to produce own food from subsistence farming and sanitation services are still traditional and aboriginal. Some of the key informants indicated that in South African rural areas there is no economic development and there is too much focus on urban development.

Poor service delivery and infrastructure maintenance have a majority of 81% among drivers for environmental pollution and social challenges (Figure 5.8). Most residents alluded to the fact that human settlement projects should come with significant infrastructure developments. Residents raised concerns that the more residential developments are established, the more they are exposed to impassable roads during the rainy season owing to blocked drainage systems. In addition, residents alluded that some roads were built more than 10 years ago but the government has never come back to upgrade the roads to cater for the population growth. Other residents indicated that poor maintenance of sewer pipelines has contributed to the unclean environment because raw sewer overflow on the streets has burst pipes.

Most participants (85%) indicated that economic and developmental growth plays a major role in increasing the environmental and social challenges of the settlements (Figure 5.8). Key informants cited that failure to follow municipality by-laws and other developmental regulations when establishing local trading areas has resulted in unsustainable settlements. The fact that on every corner street, there is a spaza shop, mechanic workshops, and car wash that generate nuisance to socially unacceptable standards which is getting worse. Local business development initiatives are mainly not conforming to the approved township layout plans.

A total of 74% of participants indicated that unethical professional conduct by key role players in urban residential-planning and the issuing of licences (permits and authorisations) for developments have contributed to the poor management of social and environmental impacts of settlement development (Figure 5.8). These results suggest that environmental specialists, town planners, project managers, and other decision makers are predisposed to favour developments while dealing with proposed residential developments. Key informants noted the absence of strict consequences management to deal with corrupt officials from the municipality indicating EIAs and SIA service contracts are usually awarded to incompetent EAPs which are directly linked to project management for “kickback” monetary benefits. According to residents, corruption also hinders the proper allocation of resources that are aimed at mitigating environmental impacts. Of major concern was the unavailability of sufficient municipality trucks for garbage collection within the Leewpoort residential area.

The lowest proportion (54%) indicated that poor environmental and developmental policy frameworks contribute to the impacts that settlement projects have on the environment and humans. A notable majority showed a lack of knowledge of the availability of environmental and developmental policies governing human settlement development. While the key informants revealed that current existing environmental policies are not sufficient to tackle environmental and social impacts encountered during the operational phase. Of concern, the absence of monitoring of projects once the construction of houses is completed and residents have occupied their homes. Perceptions from some key informants came as a comparison of human settlement development projects to private industrial and other commercial facilities, it was mentioned that throughout the industrial project life cycle, environmental management inspectors (EMI) conduct audits to monitor compliance with conditions of the issued permits, authorisations, and licences. Figure 5.8 presents drivers of environmental and social impacts associated with urban human settlement development projects:

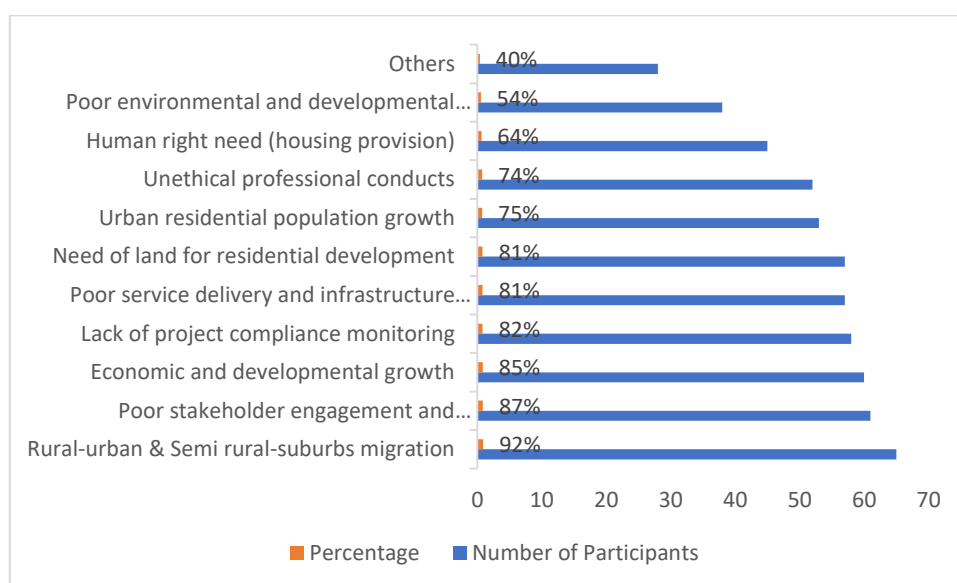


Figure 5:8 Drivers of environmental and social impacts of human settlement development

Source: Field data (2023)

5.3.1 Frequency of Complaints about Environmental and Social Problems by Residents to the Competent Authorities

The study results revealed that 73% of participants are of the view that the government “very often” receives complaints about environmental pollution and social challenges caused by increased colonisation projects (Figure 5.9). Residents pointed out that their complaints to the municipality and other competent authorities emanate from the infilling of wetlands with building rubbles, diverting and impeding of watercourses in preparation of land for residential developments. Residents further indicated that the continuous cutting of trees is gradually contributing to indigenous plant species extinction in the Boksburg region. Key informants from GDARD reported that very often the department receives complaints about illegal dumping emanating adjacent to residential areas owing to a lack of proper waste management. The findings of the results suggest that urban residents are usually troubled by their living conditions and seek interventions from the competent authorities to address the challenges. Figure 5.9 presents the frequency of complaints by residents:

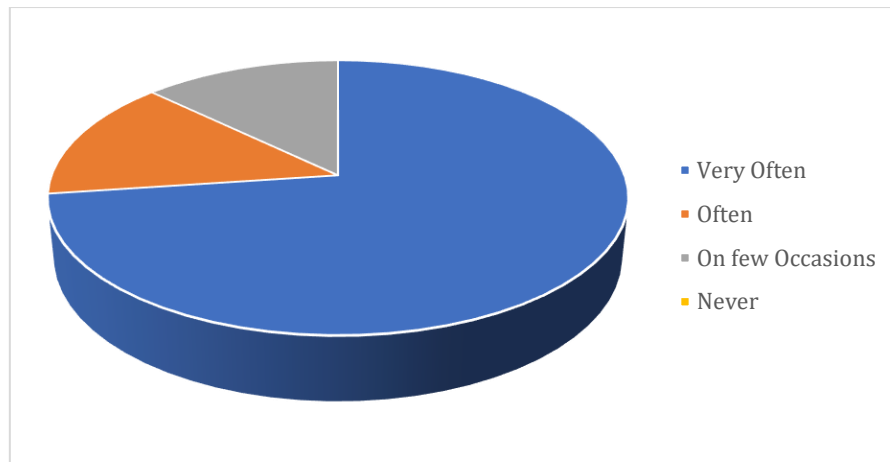


Figure 5.9: Frequency of complaints by residents

Source: Field data (2023)

5.4 Negative Social Impacts of Human Settlement Development Projects

According to the result of the study, the negative social impacts of urban human settlement development projects with the most effects on residents, among others, were:

Noise pollution: A participant indicated that noise pollution increases in areas with uncontrolled population growth (Figure 5.10). Residents pointed out that during the construction phase of the project, noise levels are very high emanating from heavy-duty machines. However, it is bearable because it is short term and disappears once the construction phase is completed. Of major concern is the noise generated during the operational phase where residents' vehicles hoot from the streets, music plays until the early hours of the morning, and background voices affect the ability to rest properly at home. Key informants explained that noise levels are not only emanating from residents but industries as well that are adjacent to settlement developments are major contributors.

Safety and security: A notable proportion of 78% of participants reported reduced safety and security emanating from previously disadvantaged citizen “blacks” that are colonising previously “white”-dominated suburbs (Figure 5.10). Residents lamented that the level of crimes is high in their area with some areas such as Reiger Park because a lot of people are roaming on the streets, unemployed. When new houses are constructed for eligible SA citizens, undocumented foreigners also find access to rent the properties when they commit crimes, they are never traceable.

Spreading of diseases: According to participants (72%), living in overpopulated communities contributes to poor human health when public health facilities are under-equipped (Figure

5.10). Residents expressed poor access to public clinics owing to a high number of patients emanating from newly developed residential areas. Key informants also added that because of high human interaction, contagious diseases such as measles, COVID-19, and human immune virus (HIV) spread quickly in overpopulated urban areas as compared to rural scattered areas.

Traffic congestion: Participants complained that traffic congestion impedes and decreases the economic productivity of the Boksburg area. Approximately 80% of participants reported that community members spend more productive hours stuck in traffic as many residents prefer using their own cars instead of public transportation (Figure 5.10). Key informants highlighted that traffic impact assessments (TIA) are required and conducted for proposed human settlement development projects as part of the EIA process. The challenge is implementing the mitigation measures proposed in the TIA reports. Hence, after the establishment of some residential developments, roads, and traffic lights are usually not upgraded to cater to the increase in population.

Disruption to excellent existing infrastructure services: The majority of participants (84%) were adamant that new developments strain the available resources (Figure 5.10). In Dawn Park, residents complained that very often there is a poor supply of water for domestic consumption. The residents further alluded to the fact that water is usually rationed during peak hours or when it is available the pressure is very low. These findings suggest that new pipelines for bulk water supply for the Villa Liza Extension 4 residential project have been connected to the old pipelines without the proper determination of water availability to match expansion.

Loss of agricultural land: The smallest proportion of participants (58%) indicated that new human settlement development negatively affects urban residents that practice subsistence farming activities owing to the non-availability of arable land (Figure 5.10). Key informants cited land expropriation being brutally implemented whenever privately cultivated land is now re-zoned and earmarked for human settlement development. Key informants continued to indicate that land compensation is unjustifiable because the government claims the privately owned land against the wishes of the owners ostensibly to be used for the benefit of the overall public. Figure 5.10 presents the negative social impacts with the most effects on residents.

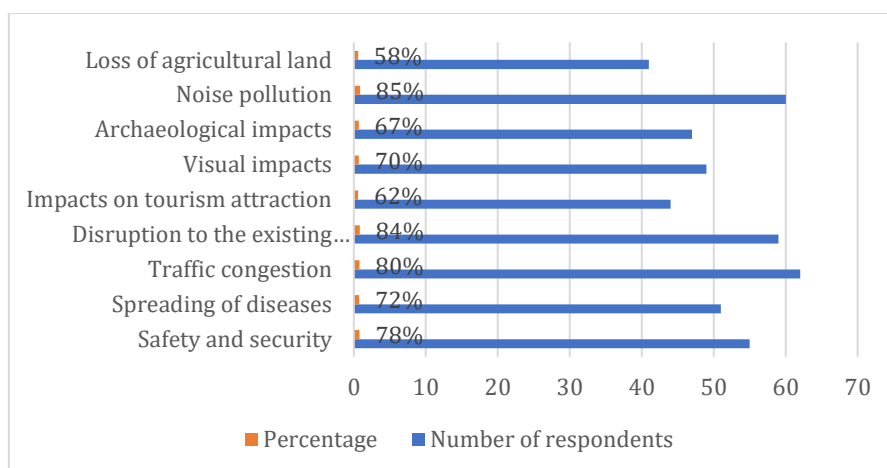


Figure 5.10: Social impact with the most effects on residents

Source: Field data (2023)

5.5 Negative Environmental Impacts of Urban Human Settlement Development Projects

According to the findings of the study, the negative environmental impacts of urban human settlement development projects with the most effects on residents were:

Poor waste management: The majority of participants (94%) were of the view that waste generation levels are directly proportional to the population of the area (Figure 5.11). Residents complained about the lack and delayed collection of garbage in their homes coupled with the absence of public waste skips on the streets that caused their living environment to be unfriendly. Key informants elaborated that poor waste management goes beyond the parameters of failure to collect waste from households as the CoE is confronted with the challenge of the availability of well-functional landfill sites. The key informants further elaborated that currently there is only one operational landfill (Simmer and Jacks) situated in Germiston which receives waste from the entire Boksburg, Germiston, Edenvale, and Bedfordview regions. Simmer and Jack's landfill lifespan has been shortened owing to the high load of waste being received, waste weighbridges and compression machines were reported to be of poor quality and perform badly. Thus, GDARD has issued compliance notices in terms of section 31L of the National Environmental Management Act 107 of 1998 (NEMA) owing to failure to comply with conditions of issued waste management permit.

Water pollution: Participants (91%) indicated that littering and spillage of hydrocarbons from human settlements pollute both ground and surface waterbodies (Figure 5.11). Residents raised concerns about spillages of sewage into water streams, citing that the CoE takes much time to attend to complaints about drainage blockage. Hence sewers end up polluting the streams (Photo 5.1). Key participants were concerned about the impeding, and diverting, of watercourses in preparation for land to be developed. In addition, Key participants indicated that diverting and impeding watercourses contributes to poor river health and contributes to areas being prone to flooding.

Increased air pollution: A total of 85% of participants are of the view that the usage of more vehicles contributes to air pollution levels in the surrounding environment (Figure 5.11). Residents explained that cars that are not regularly serviced emit smoke through their exhausts. Key informants indicated that human settlement developments that are established closer to hazardous factories that emit toxic chemicals beyond the regulated emission levels tend to reduce the quality of fresh air that people breathe. Furthermore, key informants remarked about the stench that emanates from stagnant waters whenever stormwater channels are blocked by littered waste that is washed into the draining systems.

Ecological degradation and loss of biodiversity: The study findings revealed that 64% of participants were concerned about ecological degradation, while 90% were concerned about the loss of indigenous flora and fauna around the Boksburg area (Figure 5.11). Residents remarked about the absence of medicinal herbs in their areas owing to the cutting down of trees whenever there were development activities taking place. Key informants reported that any land-use activities conducted in any space are bound to change the topographical characteristics of the area. Key informants explained that following developmental restrictions as regulated by conservation plans and environmental management frameworks could be a major contributor to reducing ecological loss. Key informants further elaborated that the biodiversity offset mechanism should be clearly defined and forcibly followed for all urban human settlement development projects.

Permanent land-use change: A notable proportion of 87% of participants are of the view that human settlement projects completely change the historic scenery of the area (Figure 5.11). Key informants applauded the positive impacts that are associated with constructing houses in sustainable settlements, stating that future generation stands a chance to inherit housing infrastructures. A small portion of residents (20%) complained that new developments have more negative visual impacts because most of these are high-rise buildings that obstruct their

ability to see into the distance. Figure 5.11 presents the environmental impacts with the most effects on residents:

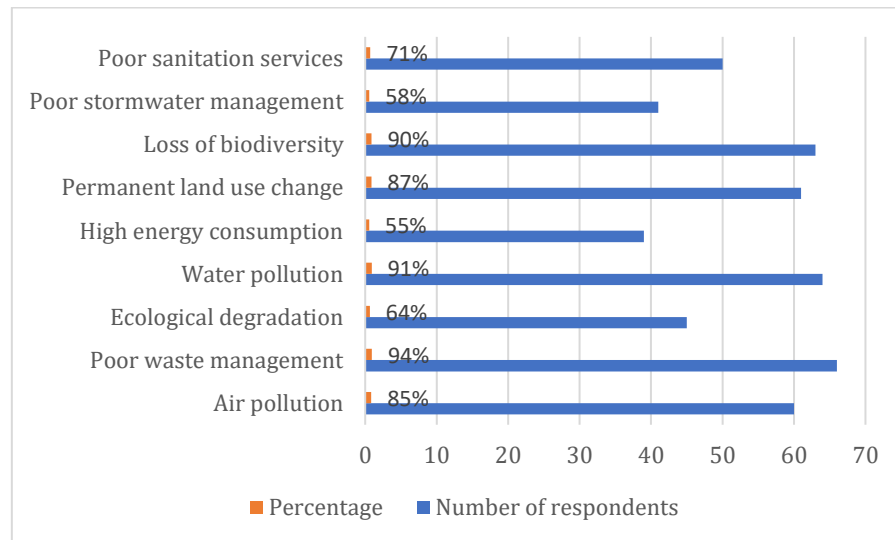


Figure 5.11: Environmental impacts with the most effects on residents

Source: Field data (May 2023).

Figure 5.12 below shows the permanent land-use change with visual impacts and vegetation cleared so contributing to the loss of biodiversity species in Vosloorus Ext. 9 government housing development.



Figure 5.12. Environmental impacts of human settlement development

Source: Field data (2023)

Further exploring the environmental and social impacts associated with urban human settlements development projects, various themes were generated from the recorded responses. Responses ranged from failure to consider concerns raised by key stakeholders in decision-making to the poor consideration of cumulative impacts during the project-planning phase,

environmental and social human rights, unethical professional conduct by key stakeholders, political influence on government housing projects, poor integration of developmental planning tools as well as the effectiveness of EIA and SIA processes in addressing identified impacts. The following subsections describe emerging themes.

5.5.1. Lack of Consideration of Public Concerns in Decision-Making

Interviewees reiterated the role and importance of stakeholder involvement and participation at all stages of residential developments and urbanisation processes. They echoed the need to include key stakeholders in the decision-making process and incorporate concerns raised during the process of public participation. According to key informants, consideration of public concerns will guarantee that environmental clearances (permits and licences issued by relevant authorities) reflect the needs and opportunities of everyone involved.

The research further aimed to obtain an in-depth understanding of whether residents adjacent to sites earmarked for new residential development are aware of the potential land-use change in the area. It is widely accepted that local people have indigenous knowledge about their region, knowledge that might not be acquired through scientific experiments. According to the results, 68% of the residents indicated that they had not been consulted and notified about the developments under investigation, answered “NO”. The lack of public involvement was mainly stressed particularly for Leewpoort Park Extension 19. Figure 5: 13 presents community involvement during project-planning:

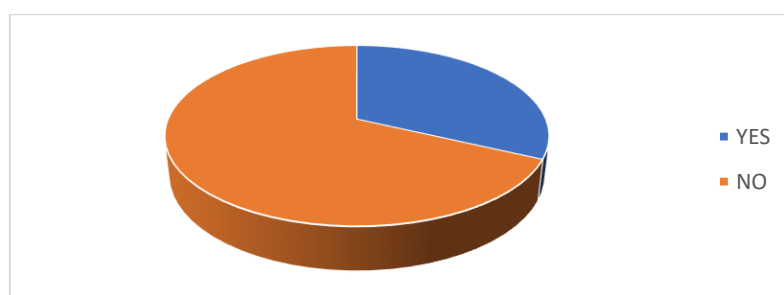


Figure 5:13: Community involvement during project-planning

Source: Field data (2023)

Regarding responses on community involvement, the remaining 32% of residents who were aware of projects around their neighbourhood indicated that they were only consulted during the construction phase, answered “YES” (Figure 5.13). Thus, residents are of the view that consultation was conducted when the decision to proceed with the projects had already been

taken, and community meetings were seen as information-sharing sessions or a “box-ticking exercise”.

When asked about EIA and the public participation process, the majority of residents (68%) indicated that they knew nothing about "EIA" and had never seen public participation notices in their areas. The minority (32%) reported that ward councillors informed them during community meetings held in community halls. One participant who attended the meeting said:

“At the community meeting, our ward councillor and community liaison officers came with people from the municipal office to tell us about the new apartments here in Villalisa. The people from the offices showed us the reports with the technical designs, but “Mina” I did not understand the technical language of the documents. We were all allowed to voice our concerns during the meetings, although after the meetings there was no guarantee that our concerns would be addressed by decision-makers” (Unemployed, male, Dawn Park).

“We have serious problems in this community ... we only see excavation of trenches done by people we do not know. It is unknown when were the tenders awarded, while our company profiles are submitted to the municipality for sub-contract jobs. I wonder if local economic development (LED) initiatives comply with developments brought to our communities (Self-employed, male, Sunward Park).

According to GDARD environmental specialists, interested and affected parties (I&APs) are registered during the EIA process in terms of section 42(a) of EIA regulations no.982 of 2014 which states that:

“A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of - (a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP”.

It is thus, a common belief that EIA reports should paint a clear picture of the community members in support of, or opposition to, the proposed residential development. Key participants added that:

“Stakeholder engagement and public participation are requirements for the EIA process, but it is the competent authority’s discretion to consider all the concerns raised during public participation in decision-making. Some concerns are personal and

individualised while others are beneficial to the entire community, hence the competent authority evaluates the significance of concerns and the benefits therein” (Environmental specialists, male, GDARD).

“... too much involvement of community members hinders project progress and causes unnecessary tedious paperwork. Most of the municipal projects get funding from financial institutions such as the Development Bank of Southern Africa (DPSA), and there are timeframes related to project execution. If too much time and resources are wasted in ever-ending engagements with the community members, the municipality will never see any development taking place” (Project manager, female, CoE).

5.5.2. Housing Challenges and Economic Struggles

Using land for the establishment of human settlements in urban areas is usually associated with improving communities’ livelihood and providing economic freedom. According to residents, access to essential amenities (proper housing, water, and sanitation) has been a continuous challenge to several households. Some residents reported that living space in urban houses is very small because immigrants from rural villages follow their relatives to urban areas and share houses while still looking for better job opportunities. Therefore, the government should continue to build RDPs and low-cost houses for the qualifying citizens. Residents also cited as a major challenge, the decentralisation of economic activities into rural areas to offload the burden carried by cities:

“Life in the city appears good when you are outside, but in fact, it is a struggle. I, sometimes wish to live in the village. However, jobs are in Gauteng. Yes, the cost of living is high because everyone wants to live in town. Food is expensive by the retail grocery shops, hence for fruits and veggies, we depend on the street vendors. Natural resources in the city are already damaged, there is nothing left to be protected. People want houses near factories where they work. A clean environment does not give us money to support our families” (Unemployed, Male, Vosloorus).

“Rentals are expensive around far north of Boksburg, prices keep on increasing. Any area near OR International Airport is a “no-go” area if you are like me with no good paying job ... In our area right now, rental is less but hygiene is very poor - more than four families are living in this house, using only one ablution facility. With my salary scale, the only way to have a better living condition is to qualify for a low-cost house that is subsidised by the government.” (Employed, Female-Vosloorus).

Key informants alluded to the fact that local government's housing projects are affiliated with political service delivery. Mostly vulnerable citizens, who rely on the government to build affordable residential houses for them, are the most victims of the environmental and social impact of such developments. Residents are blindfolded by the notion that the provision of shelter is always beneficial, and the impacts are only positive:

“In many project stakeholder engagement meetings I have attended in my career, community members are mostly concerned about the expected dates of delivering the projects. Environmental and social challenges are usually considered as by the way matters. This is evident in settlement projects that promote the “smart city agenda”. Because their primary aims are to create settlements that are inclusive of economic opportunities, health, and safety amenities and redress spatial historic legality of apartheid where homes were demarcated based on race” (Project manager, Male, CoE).

“It is important to indicate that urbanisation has positive and negative impacts socially, economically, and environmentally. People migrate from rural areas to urban areas to seek employment opportunities and other amenities. This has resulted in the creation of informal settlements as migrants need shelter to house themselves. In most cases, people reside in areas that are environmentally sensitive and/or degrade the quality of the natural environment. Urbanisation also perpetuates poverty, because of scarce employment opportunities and the result is an abuse of substances and criminality, thus through the provision of proper houses government is eliminating illegal establishment of informal settlements” (Environmental specialist, Female, Environmental consulting firm).

5.5.3. Environmental and Social Human Rights

Key informants reported that urbanisation and an unprecedented increase in population have led to the decline of environmental quality around the entire CoE. They lamented that human settlement development projects breed environmental degradation such as contamination of water resources, air pollution (CO₂ emanating from vehicles and reliance on fossil fuels such as coal for domestic use), soil erosion, noise pollution, and destruction of natural resources. Residents expressed their concern over the violation of their human rights in terms of the Constitution. Section 24 of the Constitution of the Republic of South Africa (Act 108 of 1996) states that “Everyone has the right to:

- (a) An environment that is not harmful to their health or well-being.
- (b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and environmental degradation”.

Residents expressed their concerns as follows:

“Construction of more residential houses has led to an increase in air pollution, in the evening there is heavy smoke everywhere because people burn coal for energy generation to cook and keep warm. With the electricity load-shedding problem, people in the farms and villages are much better than us because their homes are scattered, even when they use fire for energy generation, at least smoke from woods does not smell like burning coal. Here in the cities, it is difficult to breathe fresh air, especially at night”. (Employed, Female, Klipportjie).

“In relation to my area, most streets are dirty because of the rubbish bins that are not collected on time. Residents do not take back bins to their homes when not emptied. Rats are all over the place, jumping up and down and digging for food in the bins. The smell of rotten stuff emanating from uncollected bins is unbearable, for more than 10 days stuck with household waste is unacceptable ... People who reside in private upmarket residential estates are in better condition. Because through their body corporate levies, they can hire private waste collector to dispose of their waste straight to the registered landfill sites. Environmental injustice is realistic for the poor and less privileged while the rich can buy clean environment” (Unemployed, Female, Vosloorus).

“There have been a lot of informal mechanical engineers fixing vehicles at most street corners. Oil spillages are observed on bare soils, during the rainfall season, water run-off transports oil particles into watercourses through drainage channels. Our water pans around here do not even have a mere frog, because the water is heavily polluted. Unemployed youth open informal car wash businesses near the wetlands with patches of surface water. Water is extracted illegally for washing cars. During the process of cleaning, washing detergents with heavy chemicals are used. Throughout the cleaning process, dirty water is discharged back to the wetland to cause more pollution” (Self-employed, Male, Dawn Park).

“During weekends, noise from loud music is unbearable. All night long until early hours of morning such as 02:00 am, radios will be still on full blasts accompanied by background voices from drunk people. Mmmm, these new developments have brought a

young energetic generation to disturb the little peace we had in this area” (Unemployed, Female, Sunward Park).

‘Honestly, our property value is diminishing daily because of the unclean environment we live in. Who would want to buy property for investment in an area with dirty streets? When potential buyers come to view houses, they do not come to buy. It takes more than a good 12 months for a house on the market to be sold’ (Self-employed, Female, Sunward Park).

Key informants shared the same sentiment on the violation of human rights through anthropogenic activities associated with residential establishments in urban areas:

“Human settlement developments, by their nature, necessarily have an impact on the environment, but the degree to which these impacts are managed determines and justifies a violation of human rights. Cities are not supposed to be static; developments are a necessity that favours human life. It is for this reason that legislations and policies that stem from NEMA chapter 5 guides best practices that promote principles of sustainable development which allows the current generation to have the environment protected without depriving the future generation of enjoying the beauty of natural resources” (Independent EAP, Female, Environmental consulting firm).

5.5.4. Ecological Degradation and Loss of Biodiversity

According to participants, the continuous expansion of urban areas affects critical biodiversity areas that support the functionality of the ecosystem. Residents reported that a drastic change in green spaces and community parks had been observed over the past decade. Their non-existence contributes to the lack of animals around our communities. One of the residents' explanations was recorded as follows:

“Our neighbourhood is no longer good for animals to survive; we can’t even see small rabbits “bunnies” running around like we used to enjoy them back in the day. Over there, some years back there was a small bush that was a habitat for small animals, but now we only see rats coming from that direction due to garbage that takes more than a week before CoE Municipality comes for collection” (Employed, Male, Klipportjie).

According to key informants, management and conservation of biological diversity are key in decision-making relating to proposed developments. National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) section 40 gives powers to the Minister of Environmental Affairs to gazette and determine a geographic region as a bioregion, based on

the characteristics of its landforms, vegetation cover, human culture, and history. Some key Informants explanations were recorded as follows:

“When the Department receives EIA applications for proposed residential development from the CoE, the city’s bioregional plan of 2020 (as amended) is utilised as a spatial tool to determine the suitability of the site for such development. Areas designated as Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) are approached with cautions when assessing the applications” (Environmental Specialist, Male, GDARD).

“The desirability of the land-use is further informed by Gauteng Provincial Environmental Management Framework, 2020 (GPEMF), wherein development zones are classified, for example, zone 1 aims to streamline urban development activities to promote infill and densification while zone 2 is considered a high controlled zone and developments are limited due to the sensitivities of the receiving environment” (Environmental specialist, Female, Environmental consulting firm).

5.5.5. Traffic Congestion and Poor Road Infrastructure

Residents recorded that overpopulation within a small geographical area has resulted in traffic jams and poor road infrastructure. According to residents, Boksburg has a high number of traffic lights that are malfunctioning and roads that are closed owing to sinkholes. Residents further alluded to the fact that traffic jams have also increased crime rates, and “smash and grab” is common in morning and evening drives. When drivers are stuck in traffic, criminals use the opportunity to attack stagnant cars and run in the opposite direction, taking advantage of women because it is rare that they will fight back or chase the perpetrators. One of the interviewed residents shared evidence of an incident that explains the significance of crime that residents suffer owing to traffic jams (See figure 5.14). According to the resident, figure 5.14 below illustrates the “smash and grab” incident that took place 1 km away from Leeuwpoot Park Ext. 19 (Reigter Park) newly developed settlement on 11 May 2023 (17:30) and was posted on the Boksburg community media platform.

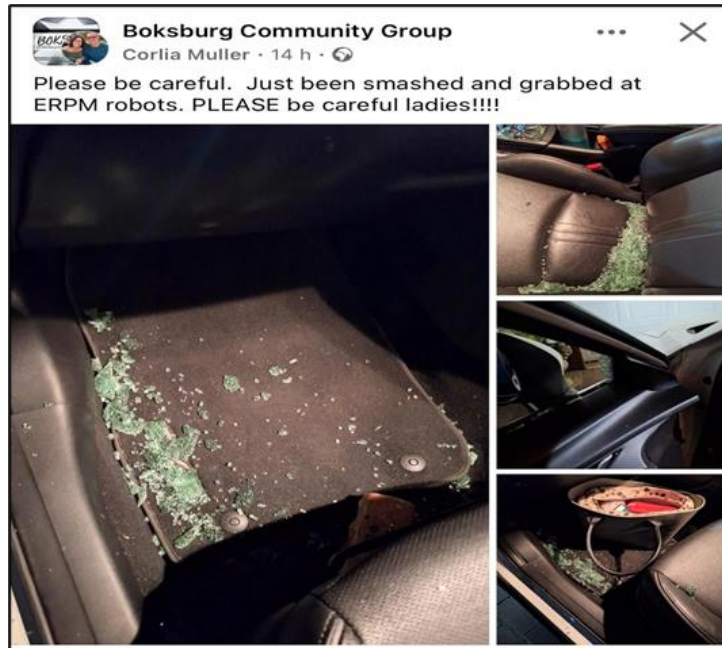


Figure 5:14. Crime incident at Boksburg ERPM robots

Source: Source: Field data (2023)

Adding to crimes taking place during traffic congestion, residents are scared to drive at night because of poor road conditions that are considered safety hazards. The resident's words were recorded and presented:

“With the emergence of residential developments like Klippoortjie Park Ext. 25, the traffic in this place will be worse. Currently, we face challenges with the R21 road being closed for over eight months due to a sinkhole. Since the closure of that road, we are forced to divert and drive past the informal settlement of Angelo and Makawusi squatter camps. There is no sign of fixing the road ever since it collapsed last year. When travelling to and from work, we drive around the informal settlements at 0 - 5km per hour around early morning (6:30am) or evenings (18:30pm) due to traffic jams and it is scary. Because informal settlement dwellers are usually unemployed stricken by poverty individuals, hence cars are mugged frequently to grab cell phones and laptops for quick cash sales” (Employed, female, Leeuwpoort).

Residents also complained that continued urban expansion, not complemented by improved road infrastructure, threatens their peace of mind. In sharing their frustration, some of the residents' explanation was recorded as:

“Imagine, we are always experiencing tyre punctures due to potholes. When doing our monthly family budgets, we must include the cost of fixing tyres because our roads are

so bad. During rainy seasons, roads are flooded with water. You can swim much better than in the swimming pool. Rainwater is not flowing properly because the drains are closed with plastics and grasses, and the municipality is not maintaining the roads and stormwater infrastructures. Why is that government does not solve the current problems before bringing more people to live here” (Employed, Male, Vosloorus).

5.5.6. Health, Safety and Security

Urban environments shape and determine the health and well-being of urban dwellers. Residents reported reduced health, safety, and security among challenges associated with continued urban expansion, rural-urban migration, and unprecedented population growth. Elderly residents pointed out that is heart-breaking to be surrounded by high-rise buildings where many people reside in a small place, a place where nobody knows anybody. Residents further reported that every month they are sure to see new faces walking aimlessly on the streets and some of them are drunk. Residents have also expressed concerns about the introduction of more informal traders selling cigarettes and sweets on the streets adjacent to their homes. Teenagers (13 - 20 years) are usually seen on street corners smoking, and it is suspected that after taking drugs they are no longer cautious and could easily commit burglaries. Some of the residents' concerns were recorded as follows:

“The Boksburg we know is gone; this town used to be a safe place to raise children without any fear of crime. Now the place is full of undocumented immigrants from Malawi, Mozambique, and Zimbabwe who could easily commit crimes without any trace. We used to walk to the parks and come back without suspecting that someone would grab our phones and disappear into these tall buildings. Nowadays as an old lady without a car, I cannot even walk to the grocery shop I must wait for my married children to bring me groceries over the weekends” (Unemployed, Female, Leewpoort).

“Here, nobody cares about anybody, every man for himself. One needs to find a way to protect oneself, when you run to the police station to report a crime you just feel like you are the wrong one. We stay very close to the informal settlements, Angelo squatter camps, every second month there is housebreaking, TVs and other household furniture are stolen by informal settlers who came to urban areas looking for jobs” (Employed, Male, Reiger Park).

Residents also cited as a major challenge being the transmission of diseases owing to poor public health:

“Shopping malls, restaurants, schools, and other essential amenities are always full of people. Overpopulated places increase the risk of exposure to transmissible diseases. During the Covid-19 pandemic, urban overpopulated areas recorded a high number of cases as compared to rural areas. Life span expectancy for urban dwellers is much smaller as compared to rural dwellers because of high chances of being sick to death or hijacked and be killed” (Employed, Female, Sunward Park).

5.5.7. Environmental Developmental Planning Tools

The use of developmental and environmental-planning tools determines the reasons to consider when approving or declining both EIA and town-planning applications for proposed land-use activities. Key informants reported, as a major challenge, understanding and integrating all the tools where the other one is not favoured over the other:

“When deciding to grant or reject residential development EIA projects, the information provided by planning instruments, inter alia, the following: Geographic Information System (GIS), Gauteng Conservation Plan Version 3.3, Gauteng Pollution Buffer Zone guideline, (2017), Gauteng Provincial Environmental Management Framework (GPEMF, 2021) guide providing the grounds for decision-making. Even though, at some times, Political Heads of the Department as the final signatories have a final ruling”. (Environmental specialist, Female, GDARD).

“The CoE’s internal Department of Environmental Resources and Waste Management has environmental assessment practitioners responsible for comments on the land-use and town-planning applications. Their expertise is of great help in decision-making. Municipal planning tribunals have been handling very few appeals related to residential developmental issues because of consideration of environmental policies and regulations when dealing with town-planning and land-use management applications” (Town planner, Female, CoE).

“Urban-planning instruments that regulate economic and geographical spaces are somehow not aligned in addressing key social dynamics confronting urban dwellers. For instance, when human settlement developmental corridors are earmarked in areas where there is poor connection for public transportation but promotes ecological emancipation, it tackles town planners on best ways to promote spatial justice” (Town planner, Male, CoE).

“According to Chapter 2 of the South African Spatial Planning and Land Use Management Act, 2013 (SPLUMA), amongst others, the Act aims to promote social and economic inclusion in land-use management. Its preface supports a relationship between spatial planning and land-use management systems with other kinds of planning tools. On EIA public participation registers for interested and affected parties (IandAP) for projects associated with redressing spatial injustice, comments are usually about what kind of people are beneficiaries of the proposed housing developments. The great concern is the objections emanating from old “white” suburbs dwellers whenever a government residential project is planned to take place within their space” (Environmental specialist, Male, Environmental consulting firm).

5.5.8. Professional Conduct of Key Role Players/ Independent Environmental Assessment Practitioners

According to key informants, environmental ethical conduct goes beyond the call of duty. It is about the love of life, respect for humankind, and constitutional rights. SA has developed world-class legislation, such as NEMA (No. 108 of 1998), to manage environmental and social impacts. It is thus the responsibility of the key role players to observe and promote the principles in terms of Section 2 (4)(a)(vii) and (viii) when performing professional duties of assessing the identified impacts associated with the proposed development. Impacts need to be ranked in an unbiased manner. Some independent environmental specialists reported that:

“In carrying out my environmental assessment practitioners’ functions, I always keep in mind that the principles of sustainable development require me to adopt a cautious approach and to consider the consequences of actions informed by my current knowledge. Negative impacts on the environment and humans need to be anticipated and prevented, and where they cannot be completely avoided, the implementation of mitigation measures should play a reduction role. My duty is not just to get paid, but to do the right thing even when no one sees it” (Environmental specialist, Female, Environmental consulting firm).

“Proponents are made aware of the terms and conditions of the appointment of the service provider before the contractual agreement. Whether the EIA application’s decision is positive or negative, the full service would have been provided in full. Payment of invoice has nothing to do with the outcome of the application” (Environmental specialist, Female, Environmental consulting firm).

There is a legislative inadequacy on the appointment of EAPs in terms of section 12(1) of EIA regulations No. 982 of 2014 which states that: “A proponent or applicant must appoint an EAP at own cost to manage the application”. A key informant explained the shortcoming of EIA regulations:

“Appointment of EAP at the own cost of the developer creates a legal vacuum for biases in assessment, where the identified risks are likely to be ranked low for the environmental authorisations to be issued. Because some applicants might blame it on the appointed independent EAPs when the outcome of an application is negative. Meanwhile, on the other hand, independent EAPs might associate negative decisions with poor performance that jeopardise future appointments. A feasible solution could be to amend the regulations and consider the appointment of EAPs for human settlement development projects to be done by independent non-governmental organisations” (Environmental Specialist, Female, GDARD).

5.5.9. Poor Infrastructure Development for Service Delivery

Residents emphasised that continuous urban expansion has brought massive disruption to service delivery. Services such as access to public health-care facilities, educational facilities, poor solid waste management, poor water supply, and quality sanitation were among the cited challenges. Residents bitterly complained about the economic challenge brought by urban expansion as it contributes to an increase in the cost of living. Some residents had this to say about the situation:

“Public clinics and hospitals are always full, for people to quickly get medical attention, they must pay the private doctors. In urban areas, it has become a necessity to have medical aid because public health facilities are usually short of medications. The day you get sick you might not have hard cash available to pay for prescribed medications. The same struggle is experienced with the availability of space in public schools, it is chaos for our children to get admission for grades 1 and 8 due to the high volume of enrolment applications. According to the Gauteng Department of Education application system (2018), learners are admitted at schools that are within a 5km radius of their residential area. Once local schools are full, learners cannot be accepted beyond the stipulated radius. We are left with no option, but to enroll our children at expensive private schools closer to home. Demand for public educational facilities is

high, while supply is low to cater to the population size. In the cities, there is no benefit of our tax that we pay the government monthly” (Employed, Male, Dawn Park).

“In the Boksburg region, there are too many and there are a lot of undocumented foreigners which equally benefits from government services that are financed by people who are not even getting value for their money. Traffic keeps on getting more and worse year in and year out, especially with this new residential development around Sunward Park Ext 29, there are a lot of car accidents and traffic jams by the robots. The new road constructed last year is already damaged because motorists have created a gravel road to make it a double lane road so they can be quick when stuck in traffic” (Employed, female, Sunward Park).

5.5.10. Loss of Cultural Importance and Heritage Disruption

Residents complained that Boksburg suburb dwellers have lost their sense of belonging. Most features that were unique to the area have been modified, if not removed, to make way for new settlement developments. Residents also shared their frustration about the urban rising population and rapid urbanisation that brought a shift in cultural behaviour and landscape disruption. Some residents who lived in the area during the SA apartheid regime mourned that cultural and value dynamics brought by inclusive human settlement developments have diluted their children’s behaviour.

Furthermore, residents displayed concerns about structural erosion of important features that were unique to the region. In sharing their frustration, they alluded to the fact that Boksburg flea markets (Bokkie Park and Rondebult-Veggie land) are now overcrowded by foreigners and the products in the markets no longer represent their heritage and culture. Other residents had a different view and indicated that the city’s smart growth agenda has transformed the old lifeless suburbs through the elimination of dilapidated structures that were derelict. Another resident reported that embracing “our own white culture” in a new democratic SA is old-fashioned and anti-developmental. Views shared by residents are recorded as follows:

“We have lost who we are in our area, my grandchildren are learning all the funny dances, Amapiano moves from friends at school. Those dance moves are for drunk people by the taverns, and children are now associated with such things that will motivate them to take alcohol” (Employed, Female, Sunward Park).

“It is so beautiful to see how SA has transitioned in developing inclusive cities, the establishment of new residential developments in old suburbs areas symbolises the

'rainbow nation'. This promotes the spirit of 'Ubuntu', wherein people live in harmony regardless of their language and cultural background (Unemployed, Male, Vosloorus).

"Our culture is diluted now; our children are now speaking disrespectful languages that they learn down the streets. Children used to greet elders formally, like "Good morning, sir or mam ... Nowadays, it is "heita" and "holla". (Unemployed, Female, Reiger Park).

"Nowadays nothing is interesting about Boksburg anymore, even tourists are no longer interested in visiting our heritage sites. For instance, we have two important heritage sites in Boksburg, Christ Hani museum house situated in Dawn Park (the house of a former leader of the SA Communist Party and Chief staff of 'Umkhotso we Sizwe' who was assassinated in 1993 while fighting for SA democracy) and Oliver Reginald (OR) Tambo grave situated in Boksburg East in Wattville (OR Tambo was a South African anti-apartheid politician and activist who served as a president of African National Congress (ANC) from 1967 to 1991). These sites were declared as national heritage sites in terms of National Heritage Act No. 25 of 1999. There has been a decline in the number of tourists visiting these areas because it has become a struggle for them to enjoy while the scenery is no longer as clean and welcoming as it used to be" (Town Planner, Male, CoE).

5.5.11. Cumulative Impacts Consideration

Residents complained that historically known challenges experienced in their areas are hardly contemplated by decision-makers when bringing new developments. New developments are authorised on their own merits with minor consideration to challenges posed by current existing residential developments found in the surrounding areas. According to residents, cumulative impacts are outlined as follows:

"We are always having challenges with sewage spillages around this area, it has become part of our everyday life. It is very undignified to be exposed to sewer smells as we walk down the streets. Bringing more people to live in this area is like adding paraffin to a burning fire. Is it difficult for the municipality to first increase the capacity for the predictable increase in population?" (Employed, Female, Dawn Park).

Part of the EIA report requirements is that cumulative impacts be assessed in terms of sections 2(d) and 3(j) of Appendix 1 of NEMA EIA regulation No. 982 of 2017 (as amended). Some key informants reported the following:

“Most declined EIA applications for residential developments declined due to cumulative impacts not only because of conditions that exist on the project footprint. If cumulative impacts were never considered in decision-making, then all the applications submitted to competent authorities would be approved, even environmental legislation would not be necessary in this country” (Environmental Specialist, Female, GDARD).

Cumulative impact assessments, as prescribed by EIA regulations, are contemplated only when the proposed development falls within the thresholds of legislated listed activities. In sharing challenges, some key informants commented as follows:

“Since EIA-listed activities apply to projects that exceed the legal pre-determined thresholds guided by developmental baseline conditions such as site location and size. Therefore, not all residential developmental projects are required to undergo the EIA process depending on the magnitude, severity, and likelihood of the impacts. For instance, several different developers establish small residential units individually in a certain geographic area, but when all combined such developments have the potential to pose significant impacts that might have been not assessed as it was not legally required to do so at the time of the development” (Environmental specialist, Female, Environmental consulting firm).

5.5.12. Socio-Environmental Impacts consideration Throughout all Phases of the Project Life Cycle

According to key informants, environmental and social impacts are addressed during the inception and planning phase to get buy-in from financial institutions and residents, but poorly managed during the operational phase. Residents reported that private developers are better off on impact management as compared to government projects. Private property owners consider sustainable development initiatives through excellent structural engineering designs such as the installation of solar panels and energy-saving bulbs. In addition, private developers endeavour to observe and avoid river buffers, riparian zones, and other watercourses to protect their properties from floods which results in monetary losses. Regarding the management of impacts throughout the project life cycle, some key informants had the following to say:

“Upon construction completion of public residential developments, projects are handed over to the municipality for operational phase and provision of service delivery (such as clean water, sanitation, waste collection, and road maintenance). Conditions of issued environmental authorisations are intensive for the construction phase and

monitored by environmental management inspectors (EMI) and independent environmental control officers (ECO). Once construction is completed, the only EA condition applicable is for rehabilitation of affected landscapes, through soil backfilling, re-vegetation, and the removal of all the building rubbles. (Environmental specialist, Female, GDARD).

Consideration of impacts during the conceptual phase tends to derail projects, especially when certain individuals influence others to be negative towards developments. A key informant from the CoE reported that:

“Selfish community members just oppose urban expansion projects because of NIMBYSM (Not in My Back Yard) Syndrome, without a touchable reason. Hence it is somehow difficult to consider all the social and environmental impacts during the conceptual phase of the project” (Project manager, Male, CoE).

5.5.13. Municipal Performance Challenges in Addressing Environmental and Social Impacts associated with Human Settlement Developments

‘Town planners referred to the CoE as one of the municipalities with excellent policies, by-laws, and operational systems on paper. They mentioned that even other African municipalities benchmark their strategic visions and objectives on the CoE. However, its challenge lies in the implementation of the standards it set for itself as an institution:

“The City faces several infrastructure management challenges, which encompass issues apropos budgeting, planning and supply chain management processes, technical staff shortage, succession-planning and retention of highly skilled professionals. Senior management non-involvement and commitment in addressing environmental and social impacts as prescribed by their institutional standards. Interference of political leaders such as members of the Mayoral Committee (MMC) on administration duties contributes to negligent enviro-socio challenges. MMCs should only provide political direction and advocate for the protection of citizens’ constitutional human rights instead of being overambitious and claiming to understand environmental and social sciences” (Project manager, Male, CoE).

“For instance, the CoE has an impressive bioregional plan that is accurate in providing guidance on which areas are classified as critical biodiversity areas (CBA) and ecological support areas (ESA) that should be approached with caution when assessing town-planning applications. Biases and unprofessional conducts sometimes dent personnel values, wherein

town establishment proposals for the municipality are supported even though the receiving environment is not desirable for such land use just because certain land-use is aligned with certain political party manifesto” (Town planner, female, CoE).

“... Project managers are worried about the unavailability of land for residential development. A trend of non-compliance with sustainable development principles has been observed around the Germiston region, where the area has historic mining challenges. For instance, in less than six months the CoE has received three declines of applications’ approvals for human settlement development projects from competent authorities such as GDARD, the National Nuclear Regulator (NNR), and the Department of Mineral Resources and Energy (DMRE). It is disturbing to learn that with all the available impact assessment tools and skilled resources, the Council deemed it fit to support and wish to develop areas with environmental and safety hazards. Common grounds of negative decisions by the competent authorities revolved around, among others, the availability of radioactive particles which - according to radiological clearance and dose impact assessment - are highly toxic and could not be mitigated to the level of satisfaction for human inhabitants. The site has near-surface holes dug by informal artisan miners, clearance certificate refusal by the South African NNR, proposed developmental site situated in zone 2 which is classified as a high control zone and undesirable due to health risks and hazards in terms of Gauteng Provincial Environmental Management Framework (GPEMF), the proposed mitigation measures contained in EIA reports could not be considered as attainable. Proximity of proposed sites with the mining slime dams and mine dumps” (Town planner, Female, CoE).

“The City, through the Department of Environmental Resources and Waste Management (ERWM), has an organisational structure that provides environmental development legal services, impact assessment and management, compliance monitoring, and enforcement. The challenge is that advice that is provided by environmental specialists to town planners and project managers are discarded when developments are not supported, especially projects that are politically affiliated with the potential of corruption practices” (Town planner, Male, CoE).

“Municipal projects have a low-cost estimation for project environmental compliance. This is because there is no standardised guidance on environmental cost and budgeting. The Human Settlement Department only issues instructions to perform work where

there is a need for EIA and other assessments that will result in required permits, licences, and authorisations in terms of legal requirements for such projects. For projects that do not legally require authorisations, it is very unlikely that external environmental specialists will be needed, only municipal environmental policy will provide guidance” (Project Manager, Female, CoE).

5.5.14. Institutional Politics and Legal Policy Framework Challenges

Project managers reported that the Municipality - as an institution - is led by both politicians and administrators. The service delivery performance of political heads of the Human Settlement Department (MMC) is measured based on the number of houses delivered to citizens during their office term. While work performance of the head of department (HOD) and divisional head (DH) is measured based on the quality and sustainability of human settlement projects delivered. Some of the CoE’s project managers were vocal about the fact that disagreement between political heads and technical staff contributes to the establishment of residential settlements that are likely to cause social and environmental negative impacts:

“When politicians canvas to be elected as leaders, their service delivery manifesto starts by promising citizens new houses. However, the politician does not consider that the Council does not have much available land suitable for human inhabitation. When engineers, project managers, environmental specialists, and town planners advise on the professional constraints of development, they are perceived as not aligned with the institutional strategic objectives. Such officials who oppose a development will be summoned to late evening meetings and be subjected to non-stop calls from political heads of departments” (Project Manager, Male, CoE).

A competent authority office also has its own institutional politics. Environmental specialists from GDARD explained that according to administration procedures, the heads of departments are designated as the last signatories to grant or refuse environmental authorisations for human settlement development projects applications. Environmental specialists’ functions are to provide technical and scientific comments on the application. GDARD specialists complained that some local government human settlement projects’ applications are permitted to proceed while it was never recommended by the specialists, and had this to say:

“...Specialists and technical reports - such as biodiversity, social impact assessments, traffic impact assessment, integrated waste management plans, and service agreements - are assessed by us as junior staff. When we are not satisfied with the mitigation

measures outlined in the Environmental Management Plan (EMP) and Environmental Management Programme Report (EMPR), we reject those reports and request additional information from the proponents. When project files are routed for a final decision, HOD approves those applications with conditions to provide additional specialist studies prior to the commencement of the construction. However, these conditions are usually not complied with as the monitoring of authorised human projects is not conducted very often” (Environmental Specialist, Female, GDARD).

5.5.15. Hope for the Future

Some key informants expressed optimism for the future, indicating that urban human settlement developments are sustainable with long-term benefits. Settlement developments offer the current generation shelter and employment opportunities. Future generations stand to benefit from housing infrastructures that are rightfully located in the commercial harbour. Municipality project managers reported:

“Settlement developments are accompanied by shopping malls, schools, and other amenities; however, every project is implemented in phases and follows a sequential schedule. Hence it appears as if the Municipality built houses with no other supporting structures. It should be noted that certain infrastructures are installed before construction, i.e. underground bulk pipes for electricity, water supply, and sanitation. On a spatial-planning level, there are portion patches within the development footprints zoned as open spaces for parks, churches, and public transport routes that are not immediately developed. It will only make sense a few years down the line when the block puzzles are connected. In some areas, there is a delay in completing and upgrading supporting infrastructures which should render services to new developments. Perhaps the council should adopt a strategy of upgrading and building for the future, not to be reactive once a problem has arisen” (Project manager, Male, CoE).

“Newly constructed flats are sustainable because they make Boksburg look alive and vibrant. Now, this place is home to young couples who are at their fertile stage to bear children and grow the population. The future is bright here, it cannot be that a place as good as Boksburg situated near OR International Airport and other economic amenities could only house old-age people” (Employed, Female, Sunward Park).

“Prevention is better than cure! There is a need for all key stakeholders to strive to promote smart city growth which aims to integrate all the pillars of sustainable development through protection of natural resources while rendering developments that redress spatial apartheid legacy” (Environmental specialist, Female, Environmental consulting firm).

“Forward town and regional planning should be conducted to ensure that future developments do not bring disruption to the current service delivery, carrying capacity owe to be continuously increased to equally cater for the increase in population” (Town planner, Female, CoE).

5.6. Effectiveness of Environmental Impacts Assessment Tool in Addressing Environmental and Social Impacts of Urban Human Settlement Development Projects

The study sought to explore whether the EIA process is effective in addressing the environmental and social impacts of urban human settlement development projects. In deliberating on the positive contribution of the EIA process, the view of most participants (61%) is that EIA itself - without proper incorporation with other developmental-planning and administration enforcement tools is ‘poor’ to ‘very poor’ in addressing the impacts (Figure 5.15). The countervailing view of the large minority (39%) of the participants is that EIA itself is satisfactory in addressing the impacts. However, they cited as a challenge, misconduct, and misusing of powers vested in decision markers. Figure 5.15 presents the effectiveness of the EIA tool in addressing the environmental and social impacts of human settlement developments:

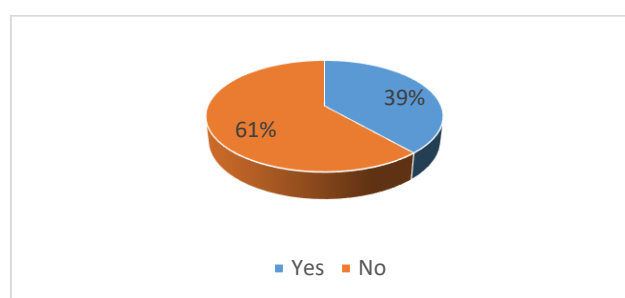


Figure 5.15: Effectiveness of EIA tool

Source: Field data (2023)

5.6.1. Inclusion of Social Impact Mitigation Measures during the Environmental Impact Assessment Process

Project managers from the CoE reported that the EIA study alone is unable to cover all social aspects of settlement development projects. Project managers pointed out that during the EIA process, ecological attributes seem to carry more weight as compared to social issues:

“Social negative impacts hardly ever occur, so there is not much need for in-depth social impact assessment when planning for human settlement projects, as compared to environmental impacts that always occur with any proposed development” (Project manager, Male, CoE).

Environmental specialists from GDARD reported that environmental and social aspects are intertwined. Project proponents and independent EAPs should pay equal attention to both disciplines in the context of EIA practice. From the results of this study, some environmental specialists from GDARD are of the view that the CoE does not consider the ecological impacts to be at the same level of importance as social impacts during the EIA process:

“In most EIA reports, social impacts are not exhaustively assessed and reported on. Some EIA reports do not have a fully compiled SIA report as an annexure. Social issues are just highlighted in random paragraphs without much emphasis. A major institutional challenge is that our department does not have social practitioners who are mandated to ensure social challenges are effectively addressed during the EIA process. There is an inadequacy in balancing the three pillars of sustainable development (social, economic, and environmental) because all these aspects revolve around integrating three different sciences” (Environmental Specialist, Female, GDARD).

Some of the residents who attended public meetings reported that promises were made during the EIA public participation process that local businesses would be afforded opportunities to work in construction, and jobs would be created for the local labourers to improve community livelihoods. If SIA was done to better the lives of residents, social commitments pronounced during the meetings would be honoured because compliance monitoring would be conducted by designated SIA practitioners from competent authorities:

“We were promised business opportunities that, during construction of the house, preference will be given to local entrepreneurs as sub-contractors for non-technical works. It was surprising that the Municipality brought companies that are not local to

our area. Even general work was given to foreigners during construction” (Self-employed, Female, Reiger Park).

5.6.2. SIA Process as a Secondary Specialist Study to the Environmental Impact Assessment Process

Section 24 of the South African Constitution of 1996 gives humans a right to a clean environment. Subsequently, the National Environmental Management Act 107 of 1998 (NEMA) principles as outlined in section 2 (2) states that: “Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably”. Hence in the South African context, SIA is an integral part of EIA for any proposed developmental projects.

Environmental specialists from both GDARD and environmental consulting firms were further asked to explain and justify if SIA should be conducted separately or together with EIA processes for proposed urban human settlement development projects. Approximately 70% (n=7) of environmental specialists agree that SIA should be conducted separately from the EIA process and reported the following:

“Social Impact Assessment and Environmental Impact Assessment are two different processes with their own theoretical sciences but can be conducted parallel in the same location for the same project. The inclusion of social impact assessment as an integral process of EIA may lead to the superficial treatment of the socio-economic aspects of a project. Especially for urban human settlement projects, a social impact assessment should be compulsory regardless of whether the project legally needs to obtain environmental authorisation or not” (Environmental Specialist, Female, GDARD).

“It is accorded that in South Africa, SIA for proposed settlement developments is not a separate assessment to EIA. But to promote sustainable settlements, SIA should be done for any plan, project, or policy that could have impacts on the human environment. In Gauteng province, there is a need to conduct SIA for all urban proposed settlement projects regardless of whether the project specifications are below the threshold of listed activities of NEMA EIA Regulations (R982, R983, R984 and R985 of 2024)” (Environmental Specialist, Male, GDARD).

“Social issues related to human settlement projects are poorly incorporated in decision-making since environmental authorisations are issued by competent authorities that are primarily mandated to promote nature conservation and physical

environmental management. In order to mitigate possible social impacts of proposed developments, competent authorities (national and provincial departments responsible for environmental functions) should consider the possibility of establishing specialised units that would be mandated to review and monitor social aspects in the EIA context. Alternatively, SIA for proposed developments will be reviewed by Department of Social Development where social issues that confront the public are afforded much-needed attention by experts on social sciences” (Environmental specialist, Male, environmental consulting firm).

In the contrary, 30% (n=3) of the environmental specialists are of the view that SIA should not be separated from the EIA processes. This group shared the notion that separating these processes would lead to “more red taping and reporting”:

“Separating SIA from EIA would further aggravate delays in authorising projects and developments. It will further result in less effective decision-making and bureaucracy. Greater integration of these two interlinked processes would assess social aspects more effectively. The shortage of SIA practitioners in SA has led to a perception that any environmental specialist can assess social impacts. The challenge identified here is not only the shortage of SIA practitioners, but also competent practitioners with strong academic backgrounds, solid research skills, the ability to engage with diverse stakeholders, and analytical in report-writing” (Environmental specialist, Female, Private consulting firm).

5.6.3. Providing Clear Information on Environmental Impact Assessment Reports to Decision Makers

The EIA process has a crucial role to play as one of the integrated environmental managements (IEM) tools in terms of Chapter 5 of the National Environmental Management Act 108 of 1999 (NEMA), which informs decision-making for human settlement development project application. A decision to grant or refuse environmental authorisation lies in the context of the EIA report as a final deliverable of the process.

To obtain an indication of whether EIA reports are a true reflection of the site projects’ basic conditions of the receiving environment that identified potential environmental and social impacts and mitigation measures therein. Participants were asked to rank the level of success of EIA reports in providing clear information for decision-makers. In the comments that follow,

scoring number 1 means “not successful”, 2 means “marginally successful”, 3 means “moderately successful”, 4 means successful” and 5 means “very successful”.

This study shows that a small majority (34%) are of the view that EIA reports are “marginally successful”, while a minority (3%) indicated “very successful” in providing clear information for decision-makers on the potential environmental and social impacts of projects. Figure 5.16 presents the level of EIA report success in providing clear information for decision-makers:

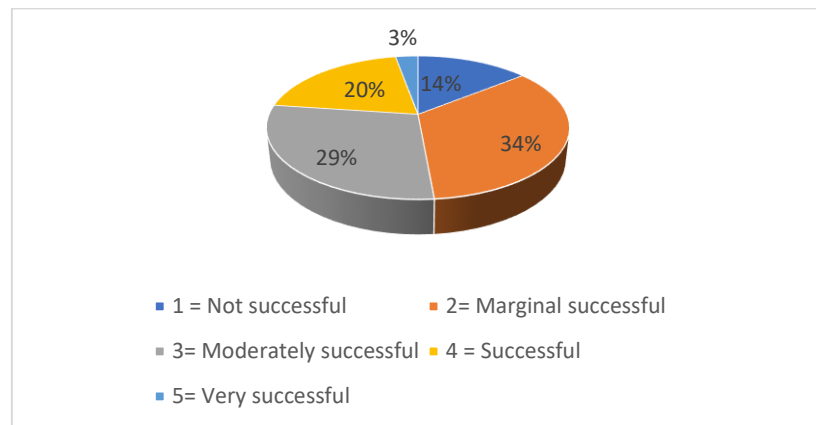


Figure 5.16: Level of success for EIA reports

Source: Fieldwork (2023)

5.6.4. Integration of the Environmental Impact Assessment Process with Other Developmental Planning and enforcement Tools

Key informants emphasised the importance of integration by explaining that developmental-planning tools such as spatial developmental frameworks (SDFs), integrated developmental plans (IDPs), and bioregional plans are vital tools that provide information to stakeholders during the EIA process for proposed human settlement projects. Environmental specialists from GDARD further express their dissatisfaction with the inadequate integration of approved SDF and bioregional plans when compiling EIA reports. Regardless of environmental and social fatal flaws surrounding the sites earmarked for township establishments, as suggested by assessment tools, the CoE allocates funds for specialist studies and engineering designs to be conducted for projects that would not be authorized owing to their unsustainability nature:

“GDARD has declined a few EIA applications for proposed residential development where the CoE is a proponent. Some of the projects are proposed in areas not supported for human inhabitation due to historic mining challenges. It is staggering that the state’s funds are utilised in a wasteful manner through the appointment of service

providers (environmental consultants, consulting engineers, town planners) to conduct studies that will not bear touchable fruits for the citizens. Wasteful expenditures of this nature could be avoided through compliance with approved bioregional conservation plans and environmental management framework during the conceptual phase of the project” (Environmental specialist, male, GDARD).

Key informants further outlined that environmental administrative enforcement tools - such as NEMA section 31L compliance notices, NEMA section 28 directive (duty of care) notice, and National Water Act 26 of 1998 (NWA) section 19 - which aim at prevention and remedying effects of pollution play a role in mitigating impacts of human settlement developments on the environment and humans:

“Compliance and directive notices issued by environmental management inspectors (EMIs) from the competent authorities to the city manager have resulted in minimising socio-environmental impacts. During the operational phase of settlement development projects, some sewer pipelines spill due to overflow caused by malfunctioning sewer pumpstations’ technical electric panels that are very old. Because administrative enforcement tools direct/demand the municipality to take corrective actions. Repairs of old equipment are usually done after receipt of notices. Failure to comply with issued notices is a criminal offense that could be handed over to the National Prosecuting Authority (NPA). Municipal managers in their capacity could be prosecuted for committing environmental crimes and be sentenced to prison for a period of 10 years in terms of NEMA Chapter 7, section 34” (Project manager, Female, CoE).

5.7. Results of Environmental Impact Assessment Reports Review

To complement the results of interviews, questionnaire surveys, and focus group discussions, a sample of five CoE EIA reports of the selected study projects were critically reviewed. Table 5.4 provides a summary of a review using the review grading symbols conceptualised by Lee and Colley (1999). In the comments that follow, Grades A and B combined mean “satisfactory”, C and D means “marginal”, E and F mean “not satisfactory” (See Table 4.4).

5.7.1. Overall Quality of the Reviewed Environmental Impact Assessment Reports

Table 5.2 gives a summary of results from a review of a sample of EIA reports using the Lee and Colley review package. According to the results, the overall quality of the EIAs reports indicates that 60% had a satisfactory rating (grades A to B). Of the three EIA reports with a

satisfactory rating, one (20%) was rated as well performed (A), and two (40%) were rated as satisfactory with minor omissions and/or inadequacy (B). Two (40%) of the reports were found to be marginal (grade D), considered merely unsatisfactory because of omission or inadequacies in addressing important assessment tasks. Out of all the five reviewed EIA reports, none were found to be E (significant omissions or inadequacies) or F (poorly done or not completed).

The overall EIA report evaluation revealed that the average grade was C (just satisfactory despite the omissions and inadequacies). Results further indicated that 80% of the projects' EIA reports were satisfactory, while none of the EIA reports were recorded to be poorly complied with or with omissions of important tasks (Table 5.2). Based on this evidence, it can be acknowledged that EIA reports submitted to the competent authority (GDARD) on behalf of the CoE are generally of satisfactory quality. However, the level of compliance with mitigation measures proposed in the EIA reports remains a challenge. Table 5.1 illustrates the overall performance of the reviewed sample of EIA reports on review areas.

Table 5.1: Overall performance of the reviewed sample of EIA reports on review areas.

Review areas	Summary of review area grading	A	B	C	D	E	F	A - C %	A - B %	C - D %	E - F %
1	Description of the development and the environment	1	2	1	1	0	0	80%	60%	40%	0%
2	Identification and evaluation of key impacts	1	2	1	1	0	0	80%	60%	40%	0%
3	Alternatives and mitigation	2	1	1	1	0	0	80%	60%	40%	0%
4	Communication of results	0	1	2	2	0	0	60%	20%	80%	0%
Overall EIA report grading performance		1	1	2	1	0	0	80%	40%	60%	0%

Source: Field data (2023)

5.7.2. Quality of Review Areas

(a) Review Area 1 - Description of the development, the local environment, and baseline conditions

This review area provides an overview of the proposed development against the current conditions of the receiving environment. Its focus is on predicting and assessing the potential impacts associated with the proposed project. This review area has five review categories as indicated in Figure 5.15. Areas of review were: (a) description of the development, (b) site description, (c) waste management, (d) environmental descriptions, and (e) baseline conditions.

The review revealed that all five sample EIA reports (100%) were at a satisfactory level (A - C). The majority of the reports (60%) scored “A to B” (generally satisfactory) while 40% scored “C” (just satisfactory) despite omission and inadequacies. Under this review area, none of the reports were scored “E to F” (not satisfactory). Satisfactory despite minor omission (Grade C) was the most scored grade. and all the review categories scored satisfactory grades. Description of the proposed development was one of the review categories that scored 80%. Two EIA reports scored a “not satisfactory” grade (D) under the site description and baseline conditions of the receiving environment. Figure 5.17 presents the results of review area 1.

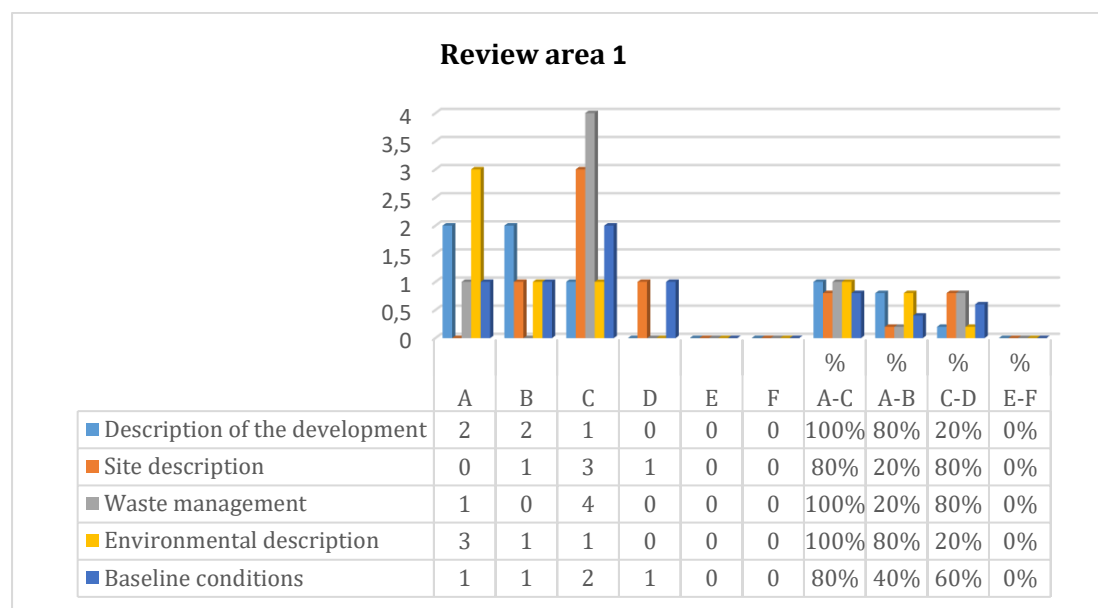


Figure 5.17 Description of the development, the local environment, and baseline conditions

Source: Field data (2023)

(b) Review Area 2: Identification and evaluation of key environmental and social impacts

This review area describes the rate at which (how well) the environmental and social impact are identified and assessed. This review area is viewed as the main purpose for conducting the EIA process for the proposed development since the decision to authorise projects depends entirely on the nature of impacts and proposed mitigation measures therein. Areas of review

were: (a) definition of impacts, (b) identification of impacts, (c) scoping, (d) prediction of impacts severity, and (e) assessment of impacts severity (Figure 5.18).

Similarly, review area 2 was awarded satisfactory performance of between A to C in all the five sampled EIA reports. A total of 60% of the sampled reports were graded A to B, while 40% received satisfactory Grade C of just satisfactory despite omissions. None of the reviewed EIA reports were scored between D to F meaning that no report was unsatisfactory (D), not satisfactory (E), and not satisfactory or impact tasks poorly done or not completed. Figure 5.18 presents the results of review area 2:

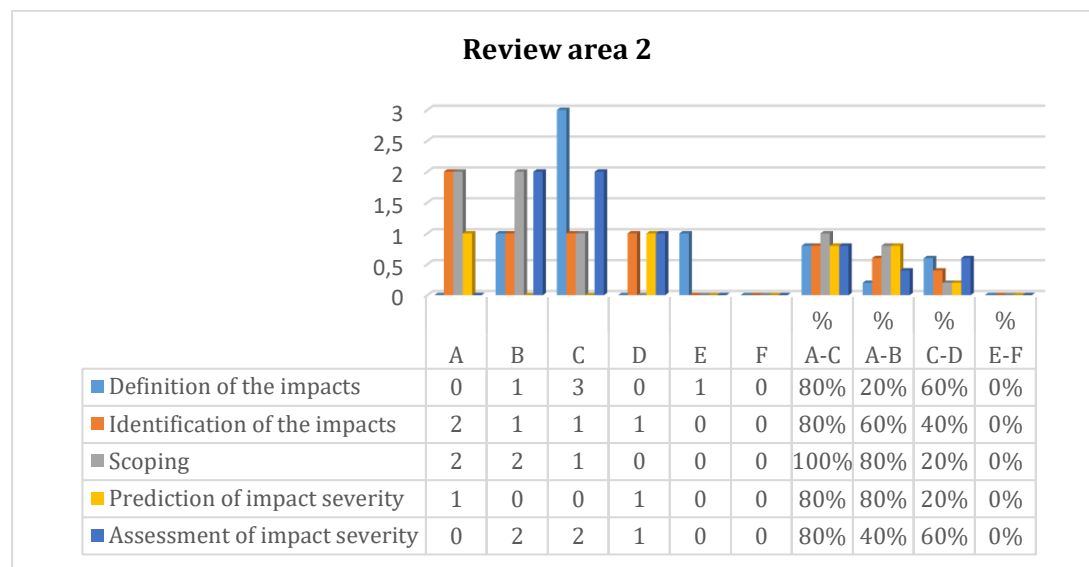


Figure 5:18: Identification and evaluation of environmental and social impacts

Source: Field data (2023)

(c) Review Area 3: Alternatives and mitigation

This review area evaluates the level at which the EIA report describes the proposed mitigation measures and alternatives of the identified potential impacts. Impact mitigation measures and alternatives are a fundamental part of the EIA process (Pretorius, 2006; Maphanga *et al.*, 2023). The consideration of impact alternatives gives assurance that measures to prevent or manage environmental and social impacts are in place. Review areas were: (a) consideration of feasible alternatives as well as (b) scope and effectiveness of mitigation measures.

Figure 5.18 reveals that 60% of the sampled EIA reports were of satisfactory grades of between A to C under the description of possible feasible alternatives and mitigation. Meanwhile, 40% of the sampled reports were graded A - B, and another 40% obtained grading of between C and D. 40% of the sampled EIA reports scored unsatisfactory grades of between E to F. This data

indicates that alternatives and mitigation review area is the least attempted review areas for all the reviewed EIA reports.

The review category of “definition of impact” was not thoroughly addressed. This could be detected from the limited number of proposed feasible alternatives, inadequate assessment of cumulative impacts, and lack of consideration for no-go areas in most sampled EIA reports. The limited number of proposed alternatives could be attributed to the fact that most developments are already at the advanced stage (project-planning and design feasibility stages almost complete) when the EIA process is conducted just before implementation of the project could commence. Thus, the consideration of alternative sites and mitigation measures were not addressed satisfactorily. This phenomenon is common in most developing countries where EIA reports are compiled and submitted to competent authorities after the project site has been acquired solely to conduct that specific development (Woods, 1999; Enshassin *et al.*, 2016).

Figure 5.19 presents the results of review area 3:

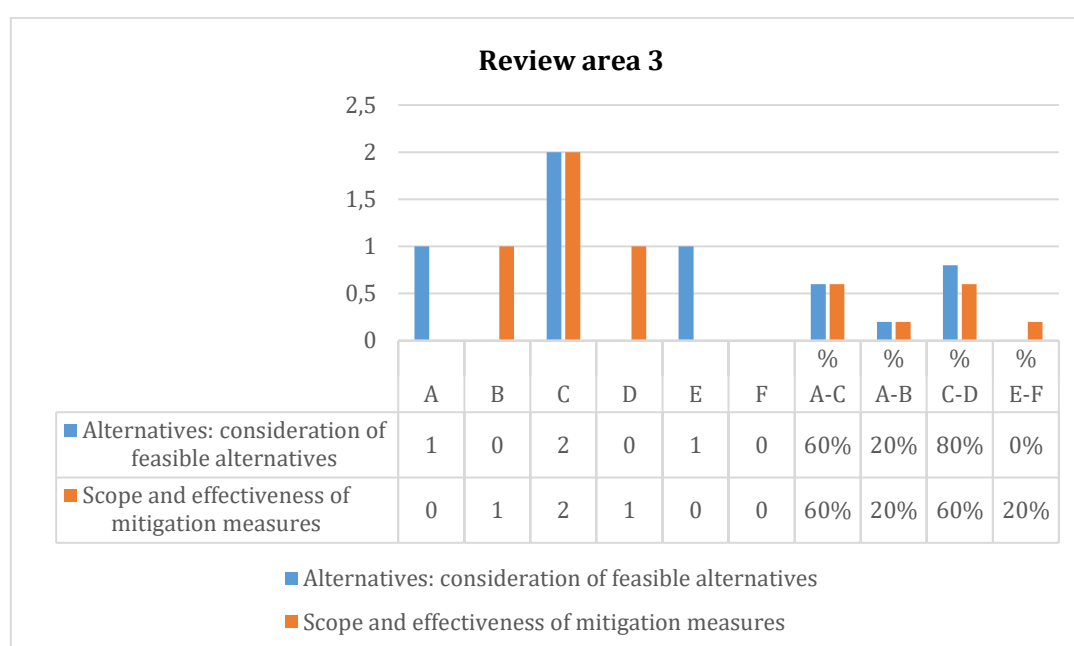


Figure 5.19: Alternatives and mitigations

Source: Field data (2023)

(d) Review Area 4: Communication of results

This review area describes how EIA findings are documented and communicated through the reports. It is of the utmost importance that EIA reports are a true reflection environmental and social impacts of projects and are well communicated to critical stakeholders such as competent authorities responsible for decision-making and ensuring environmental authorisations.

Review areas were: (a) layout of the statements, (b) presentation, (c) emphasis, and (d) executive (non-technical) summary (Figure 5.18).

Figure 5.18 reveals that 80% of the reviewed reports obtained satisfactory grades (A-C). This shows that the tasks under this review area were performed satisfactorily. However, 20% of the reports had omissions and deficiencies in this review area which was deemed unsatisfactory with a grading of E. Figure 5.20 presents the results of review area 4:

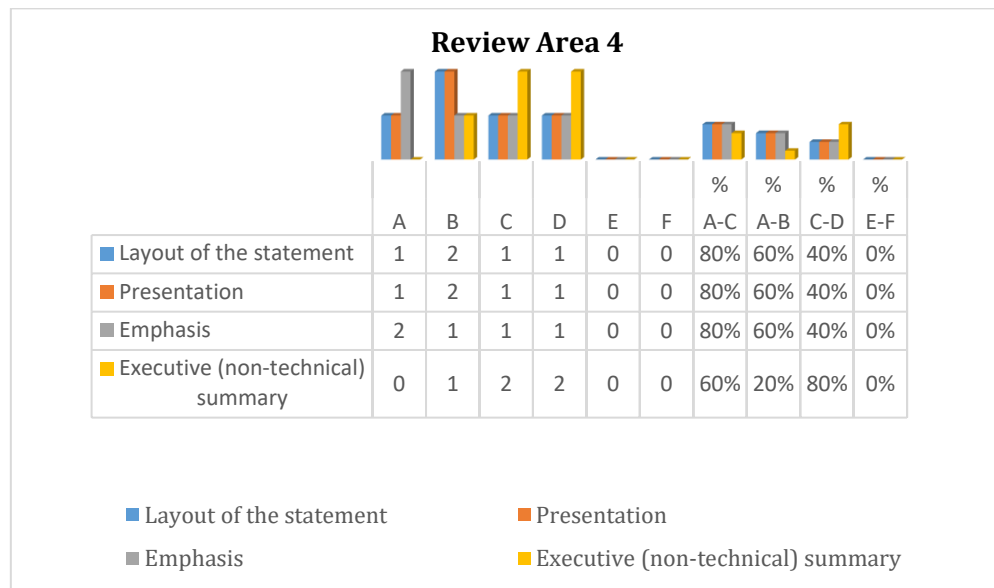


Figure 5:20: Communication of results

Source: Field data (2023)

5.8. Discussion on Environmental Specialists' Perceptions of the Management of Environmental and Social Impacts of Human Settlement Development Projects

A focus group discussion (FGD) consisted of the same key participants, environmental specialists (EAPs), and GDARD who participated in interviews. The participants consisted of six environmental specialists (two from GDARD and four from private environmental consulting firms). The FGD was well managed and successfully conducted with six EAPs, and took three hours on the 25 May 2023 in Boksburg, Afrique Boutique Hotel boardroom. Figure 5.21 provides a sketch of the set-up. Participants refused to be photographed for confidentiality purposes:

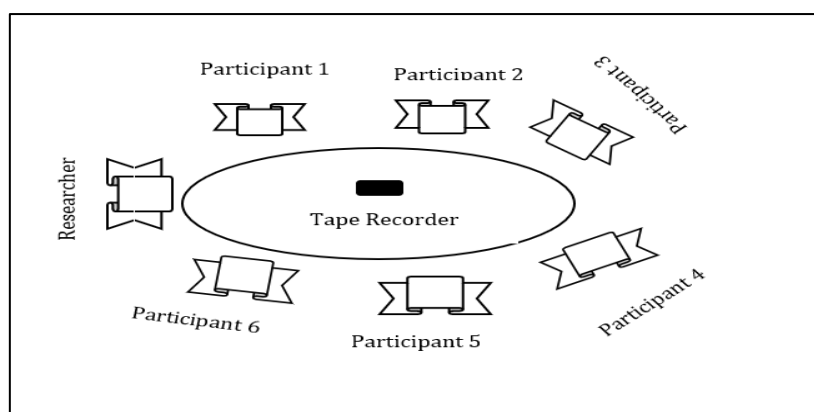


Figure 5.21: Focus group set-up

Source: Field data (2023)

In this regard, participants responded as discussion questions were posed by the researcher. When asked questions, answers were recorded as follows:

(a) Participants were asked if they think the CoE municipality can manage the environmental and social impacts associated with continuous urban expansion. Those who answered “yes” argued that:

“Municipality only addresses waste and sanitation and other service delivery challenges toward the voting/election season. Their involvement is seasonal, the politicians only use the citizens to gain power and not care much about their well-being.”

Another participant who answered “No” added:

“In developments where the municipality is a proponent, environmental protection is not equally valued as much as socio-economic benefits. Municipality always gets buy-ins from the citizens, especially on RDP-related housing projects where access to shelter is deemed more beneficial than any other service delivery programmes”.

(b) Participants were asked if EIA and SIA tools are sufficient to address the socio-environmental impacts of the proposed developments.

One participant who worked for GDARD for more than 10 years and later opened a private environmental consulting firm responded:

“South African government through the Ministry of Environmental Affairs has developed good policies and regulations for EIA processes, wherein SIA is also included as one of the specialist studies to be conducted in the process. The challenge is the lack of proper implementation of policies and professional ethical conduct of the

key role players. Again, there are no standardised legislated procedures on EIA regulations that guide how social issues must be assessed.”

Another participant who works for GDARD suggested that:

“National Department of Human Settlement should develop a framework to assess social impacts of proposed government housing projects that will be implemented out of the confinement of EIA context.”

(c) Participants were asked if they would consider projects that do not legally require EIA to be contributing to environmental and social challenges faced by the communities. One participant who is a founder of a private environmental consulting firm responded as follows:

“Our firm is usually approached by private property developers to develop environmental management plans as a precautional measure in a case where their development is below the legal threshold for EIA requirement. With local government projects, it has never happened that our firm is appointed outside of the legal requirement scope of EIA.”

Another participant from the GDARD counter responded that:

“Municipalities usually employ their environmental specialists who are responsible for advising the council with environmental legal compliance requirements for their proposed township establishment project. Thus, they would not depend on independent EAPs as compared to private property developers who rarely have environmental specialists in their organisations.”

(d) Independent environmental specialists were asked what measures they use to ensure that they are not biased in their assessments when evaluating impacts and proposing mitigation measures as well as what selection criteria are in place to assist them in determining a need for specialist studies.

One responded as follows:

“First and foremost, the individual conduct is shaped by the love of fellow citizens, followed by the core values that everyone follows due to spiritual beliefs, and lastly informed by field professional code of conduct. Registrations with professional bodies such as SACNASP and EAPASA are of major importance in shaping the conduct of practitioners. The use of other impact assessment and environmental compliance tools - such as geographic information systems (GIS), bylaws, and environmental

management frameworks (EMPs) are also utilised in everyday work to act as instruments employed for making a fair judgment.”

Another one added that:

“Project description and the nature of the receiving environment are a critical piece of information that is utilised to determine the magnitude of assessment required. Should the proposed human settlement development project undergo a basic assessment (BA) or a full scoping environmental impact assessment (SEIA)? Again, work experience in the field also determines the quality of reports that a specialist will produce.”

(e) All environmental specialists were asked about the role they play in ensuring that public concerns form part of decision-making and decisions are communicated.

GDARD specialist responded:

“From a competent authority’s point of view, EIA reports are submitted with a public participation process report that documents issues raised and how the independent EAPs addressed the concerns. Recommendations to authorise or reject the applications are aligned with public concerns. In terms of Chapter 2 of National Appeal Regulations, 2024, interested and affected parties have the rights to lodge objections and appeal the decision that competent authorities take within stipulated timeframes in the issued decision.”

Another GDARD environmental specialist added:

“On a few occasions, I randomly pick one registered interested and affected person to verify if they exist and whether their concerns are registered the same way they appear on the comments register. This exercise is very vital because not all community members can read and understand the contexts of draft EIA reports that are circulated for their comments before final submission.”

Independent EAPs added:

“Our contracts with our clients for the EIA process end when the appeal period has lapsed. If no member of the public lodges an appeal until the allowed period has lapsed, then our professional services are deemed as completed. However, in a case where the appeal is lodged, it is the responsibility of the EAP to assist in dealing with such an appeal until the matter is resolved.

“When an application decision is taken, positive or negative. In terms of NEMA EIA regulations, copies of the decision are circulated to all the registered interested and affected parties of the project, this is done to show transparency.”

(f) Another point of discussion was how often independent EAPs are appointed to monitor compliance with the conditions of issued EA as well as what common non-compliance is observed during the audits.

The majority of the independent EAPs argued that:

“Their appointment to conduct compliance-monitoring is determined by how well they conducted the EIA process of the project. For instance, the appointment of ECO is not as strict as for the EIA process, hence most projects for the municipalities are monitored by less qualified environmental specialists from private consulting firms that are not well established. Most EA conditions of local government human settlement projects are for during the construction phase. For the operational phase, such projects are handed over to the Municipality to ensure service delivery is rendered.”

Another independent EAP added:

“Most non-compliance to conditions of issued EA is related to failure to comply with approved site layout plans, infilling of watercourses, and poor management of building rubbles and stockpiling. However, impacts such as poor waste collection by the Municipality, sewage blockage, and poor road infrastructure are witnessed during the operational phase of the development.”

5.9. Conclusion

The research results from primary and secondary sources have been presented in this chapter. The results provided an in-depth understanding of the environmental and social impacts associated with urban human settlement development projects, the effectiveness of the EIA system in reducing environmental and social impacts, as well as institutional challenges, and the use of other developmental assessment tools in contribution to achieving sustainable human settlements. The results presented in this chapter will be analysed and discussed in Chapter 6.

CHAPTER SIX

ANALYSIS AND DISCUSSION OF STUDY FINDINGS

6.1 Introduction

This chapter presents an analysis and discussion of the findings of this study on the environmental and social impacts of human settlement development projects in Boksburg, CoE, Gauteng, South Africa. The aim and objectives guided the analysis and discussion of the study findings. The chapter begins with a discussion of the participant's demographic information, followed by an analysis and discussion of the findings of the study objectives.

6.2. Participants' Demographic Information

Demographic information was vital in identifying gaps, similarities, patterns, and trends across all categories of this study. It further provided an in-depth understanding of the residents' historical, socio- economic, and cultural values (Saunders *et al.*, 2012). Failure to understand participants' value settings can result in the incorrect target population, study findings, and interpretation. This section of the analysis presents the background of the participants, including people working in the Municipality's human settlements and planning departments, environmental specialists from the provincial ministry and private ecological consulting companies, as well as members of the community. The information analysed and discussed includes gender, age, employment status, highest degree obtained, professional registrations, and distribution of community members per their residential areas.

6.2.1. Participants' Gender

The gender of the participants formed part of the demographic information collected for this study. In assessing the environmental and social impact of urban human settlement development projects, it was extremely important to recognise how many males and females participated in the study. An indication of gender representation was crucial because of its indispensable mediatorship in understanding human perception of interaction with their environment (Xiao and McCright, 2017). Participants' gender equally provided a representation of the study population of urban residents who live in the same location which is affected by environmental and social impacts emanating from continuous urban expansion.

In addition, gender representation in a research study has a vital role when developing policy intervention hence obtaining views from both genders when conducting a study is crucial. This

study had a representation of 61% female and 39% male which is deemed to be statistically sound. According to Stats SA (2022), SA has a population of 60.14 million people of which approximately 30.75 million (51.1%) are female while 29.29 million (48.9%) are male. This justifies the slightly higher percentage of female participants in this study because females seem to be more in a community than males. Thus, 39% of males were sound statistically. This further entails a lack of inherent gender issues in the resulting perspectives since there was a statistically justifiable distribution of gender. Men and women view the physical environment and the associated impacts differently (Monde, 2023). Women tend to be more concerned about the evolving urban pollution and their health and well-being as compared to men even though both genders co-exist in the same locality (Xiao and McCright, 2017). This component is the core reason to justify the importance of sound statistical distribution of both genders.

6.2.2. Participants' Age

In recognition of the different age groups that made up the participants of this study, the participants' age was recorded. Xiao and McCright (2017) point out that consideration of different age groups within the study sample is essential as people relate to their environment based on their age. Age groups also correlate with the work experience and knowledge acquired by key informants on the field of socio-environmental impacts associated with urban human settlement development (Todaro and Smith, 2020).

According to the results presented in Chapter 5, it is worth noting that the majority of participants (over 50%) were young, middle-aged, or over 40 years old. These results reflect an indication of fair population distribution in the study. Different age groups possess different perceptions, awareness, and appreciation of their environmental conditions. Hence a study needs to have a justifiable presentation of different age groups (Saunders *et al.*, 2012). For instance, it can be argued that the older the participant is, the more environmental and social impacts they have observed throughout their lives and in their field of work. It was thus important for this study to record participants' ages to ensure that the environmental and social impacts associated with urban human settlement development projects are shared by people who worked longer in the field and community members who lived longer in the study area

6.2.3. Participants' Employment Status

The study collected data on participants' employment status to determine their major source of income at the time of the study. The participant's employment status was crucial to this study as it is intertwined with urbanisation processes and spatial expansion patterns in the Boksburg

area. Furthermore, employment status has a direct influence on people's overall social and health well-being (Todaro and Smith, 2020). Thus, this forms the basis of social impact assessment for the proposed developments earmarked in a certain locality. Todaro and Smith (2020) point out that people's employment status affects their mental stability and how daily life crises are analysed. Most importantly, the employment status data of the community members provides an in-depth understanding of what measures should be tailored to address the environmental crisis associated with urban expansion (Saunders *et al.*, 2021).

According to the results presented in Chapter 5, it is worth noting that the study had the highest representation (54%) of employed participants, with 26% being unemployed (community members) and the lowest representation of 20% of self-employed individuals. These results reflect an indication of fair distribution of employment status. Community members were represented by groups that ranged from employed, non-employed, and self-employed businesspeople. Meanwhile, the key informants' participants were all working as their contribution was required based on their nature of work in addressing the environmental and social impacts of human settlement development projects.

6.2.4. Participants' Work Positions in their Organisations

An assessment of key informants' work positions in their organisations is crucial to determine who is aware of what. Data was collected from upper management to lower employees for all participants to provide knowledge on how urban human settlement development projects are implemented sustainably. Having 100% of independent EAPs in senior management positions provides insights into the depth of their exposure to management of the impacts associated with land-use developments and the application of suitable impact assessment tools for human settlement development projects. According to the study results, there was 0% of community members who occupied senior positions and the majority (78%) were at entry levels. These results suggest that an increase in population and development of new urban human settlement projects are earmarked in areas occupied by people of low to middle profile in terms of occupation status.

6.2.5. Participants' Number of Years in their Organisations

The study collected data on the number of years that the key informants have been employed by the current organisations to determine the depth of their knowledge of the matter under investigation. Most key informants (37%) have worked for five to eight years, which suggests that most of these participants have a lot of experience and knowledge on the topic with the

ability to share the effectiveness of the EIA tool in addressing the social and environmental impacts of proposed developmental activities. In addition, this group has established most environmental consulting firms and climbed the management ladder to provide different vantage points. This could also explain why so many of the participants are in management.

According to the results of the study, the smallest portion of participants (5%) was recorded as key informants who worked for GDARD for less than one year, with less than five years of overall work experience in the field of processing EIA applications for proposed developments. These results suggest that this group did not add much value in providing significant information about institutional challenges associated with poor management of the environmental and social impact of human settlement developments.

6.2.6. Participants' Highest Level of Qualifications

An assessment of participants' education levels for key informants helped this study to recognise the quality of in-depth knowledge shared by experts in the field of environmental and social impact management of urban developments (Saunders *et al.*, 2021). According to the results presented in Chapter 5, it is worth noting that the study's participants consisted of 10% of master's degree holders, 57% were key informants recorded as EAPs from consulting firms, 28% were key informants recorded with equal distribution of 50% project managers and 50% town planners from the CoE. A total of 14% of key informants were recorded as environmental specialists from GDARD. These findings of the study suggest that environmental specialists who work for independent environmental consulting companies have the highest academic qualifications to tackle the environmental and social impacts of human settlement development from an academic point of analysis as compared to those working for the local and provincial governments.

In addition, an assessment of residents' highest educational levels helped this study to recognise disparities in social justice and class divisions among the citizens of the study area. An understanding of the overview of residents' highest level of education contributes to the formation of urban policies that might promote sustainable settlements and inclusive urban livelihoods (Todaro and Smith 2020). Residences' education is directly proportional to the influence of urban human settlement development trends and the management of impacts associated with those developments. Highly educated people are more likely to advocate for sustainable urban developments that promote a cleaner and healthier environment.

According to the study results, as recorded in Chapter 5, 34% of residents had a matric, while 10% had no matric. These findings suggest that the views of these groups could have been based on basic general knowledge of their exposure to safety and health hazards associated with their living conditions. Even though most of them have been residing in the study area for a longer period, it is very unlikely that their views about environmental and social impacts could be guided by academic understanding. Hence, they are unable to advocate properly for sustainable urban communities.

6.2.7. Participants' Professional Body Registration

The study collected data on the key informants' registration with any professional registration councils and associations in South Africa. The key informants' professional registration was recorded, according to their field, as follows: environmental specialists (EAPASA and SACNASP), town planners (SACPLAN) and construction engineers/project managers (ECSA and SACPCMP). The registration information helped to assess the competence of the participants in their various fields of study. Moreover, the professional bodies have their own code of practices that informs individuals' consciousness when executing their day-to-day work in mitigating the environmental and social impacts of urban human settlement projects. An individual affiliation with a professional body or council is mainly directly linked to their competency (Gliklich *et al.*, 2014).

According to the results of the study, 73% of the key informants were environmental specialists registered with SACNASP and working for private consulting companies. These findings suggest that most environmental specialists from private companies are certified and recognised by the Independent Statutory Council to perform scientific roles in the management of natural resources as compared to environmental specialists employed by the Gauteng Provincial Government (GDARD). In addition to SACNASP registration, environmental specialists were requested to indicate their registration with EAPASA. A total of 100% registration with EAPASA represented all environmental specialists from private consulting companies, with none from the government. These results further suggest that an excellent code of practice in identifying and proposing mitigation measures of environmental and social impacts associated with human settlement development is likely to be well understood by professionally and recognised EAPs.

A sample of the professional registration of town planners' registration with SACPLAN was collected for this study. According to the results, 10% of town planners from the CoE were

affiliated with SACPLAN. These findings suggest that this group is competent in addressing challenges associated with the integration of other developmental-planning tools such as conservation plans and environmental management frameworks when processing town planning applications and selecting suitable sites for human settlement developments. The smallest representation of project managers from the CoE (9%) was registered with ECSA. These results suggest that very few project managers within the CoE are competent or knowledgeable on design criteria that promote sustainable settlements that integrate economic desirability with basic social services and environmental justice. Lastly, 19% of the project managers were registered with SACPCMP. Having 19% being registered with SACPCMP, which represents 80% of project managers, suggested an in-depth understanding of best practices for establishing human settlement development projects that meet the needs of the current generation without depriving the future generation of inherent sustainable infrastructure and a healthy environment.

6.3. Drivers of Environmental and Social Impacts Associated with Urban Human Settlement Developments

As the main aim of this study was to analyse the environmental and social impacts of human settlement development in Boksburg, CoE, it was important for the study to establish - from the participants' perspectives - the drivers of environmental and social impacts. To achieve this, participants were asked what they viewed to be drivers of socio-environmental impacts within the context of urban human settlement development projects. This question was relevant in the context of this study as it provided a rich understanding surrounding the causes of the identified socio-environmental impacts that affect urban livelihoods.

Regarding the causes of the environmental and social impact of human settlement development in Boksburg, the results of this study cited unprecedented urban population growth and urbanisation. A rapid increase in population associated with a mismatch of infrastructure to provide basic social service delivery has unfortunately resulted in unsanitary and inhabitable living conditions in areas that have recently developed. This is similar to what was observed by Todes *et al.* (2017) as well as Chigudu and Chavunduka (2021) in South Africa and Zambia.

Rapid population growth and urbanisation have led to difficulties in creating urban sustainable settlements which negatively impact the quality of urban poor and vulnerable groups. Wang *et*

al. (2015) outlines the principle of urban design and emphasised that care should be given to avoid the tendency to have no respect for nature while constructing houses to accommodate the increase in cities' population. This study is of the view that urban planning and human settlement development should be tailored to have a unique harmony of the natural environment, regardless of the increase in population in the area. This view is similar to those held by Dixiadis (1968), the founder of Ekistic theory on principles of development. Weak consideration of nature, culture, shells, and networks while designing cities disadvantages the urban dwellers whose environment and well-being are continuously impacted. This study calls for an urgent need for decision-makers to prioritise spatial and land-use development which will address the increase in population parallel to respect for nature. Good urban design and management of environmental and social impacts are prerequisites to urban sustainable settlement particularly in developing countries like South Africa.

According to the results of this study, the growing need for housing requiring land in urban areas has contributed to environmental degradation. The availability and sustainable use of land become a sensitive matter whenever a particular space is earmarked for government housing projects in an urban space. This is because access to accommodation is deemed essential for human survival and dignity as compared to access to other services. Evidence on the ground suggested that once a certain piece of land is earmarked for government housing development, such activities are perceived to be beneficial regardless of the potential impacts that could be associated with the project. This scenario is a clear indication that most city's loss of biodiversity and ecosystem imbalance is aggravated by housing developments.

Besides that, old urban dwellers who practiced subsistence farming are left landless whenever land is expropriated by the government for housing projects. These results are undeniable facts as noted by Culwick and Patel (2020) and Nhamo *et al.* (2021) in their research work conducted in Gauteng cities that an increase in demand for land for residential developments has significantly changed the urban landscape by reducing ecological sustainability. Between 2011 and 2018, waterbodies were reduced by almost 14% and vegetated land by over 10% during the same period. Thus, this challenge affects the critical biodiversity area and ecological support areas that in turn affect the indigenous flora and fauna of the region.

The results presented in Chapter five point out that migration from rural areas to urban areas and semi-rural suburbs since the dawn of democracy in SA has contributed to the dirty and dirty suburbs of Boksburg, particularly Sunward Park. As the urban population grows owing

to this emigration, the demand for urban residential houses grows. To supply the housing demand, the government is triggered to utilise city's open spaces to establish dwelling units. For instance, the construction of houses, access roads, sewage pipelines, and water bulk supply services results in a loss of biodiversity and various forms of pollution (air, solid and liquid waste, noise, etc). As argued by Bilozor and Cieslak (2021) and Nhamo *et al.* (2021), emigration from other rural and semi-rural to urban areas in search of job opportunities continues to be among the drivers contributing to environmental and social impacts.

During the early 1970s, the sector model theory developed by Homes Hoyt (1939) helped the cities plan urban spatial forms in most European countries and other African countries colonised by the European states (Matamanda, 2019). The model suggests that land-use should follow sector patterns, i.e. factories, office parks, middle- and low-class residential areas that are grouped according to their characteristics. According to this model, middle- and higher-income households are far from the industries (See Figure 3.1). However, lower-income residential areas are concentrated along transport routes bordering the industries. This study is of the view that the sector theory makes a major contribution to environmental and social injustice suffered by poor vulnerable urban dwellers, particularly in Boksburg Klippoortjie Park areas which are close to Wadeville industrial areas.

As posted by Tian *et al.* (2010), low-class residential areas are subjected to heavy traffic jams, noise, pollution, and poor waste management associated with staying near the factories and public transportation routes. As a coping strategy, decentralisation of social and economic development of rural areas could play a vital role in reducing pollution faced by most cities' human settlements as outlined in the study conducted by Dubnevysh and Dorosh's (2019). A weakness of sector theory is the lack of consideration for public transport routes to connect poor settlers (semi-rural areas) that are at the urban periphery with the industrial areas. This shortcoming has contributed to the establishment of informal settlements near industries in most African countries, particularly South Africa. Ellis and Biggs (2001) and Matunhu (2011) note that sector theory contributed to the exploitation of African inexpensive labour with less consideration of people's living conditions for as long as they are contributing to the economic stability and growth of the region.

From the responses gathered, it was evident that poor service delivery and infrastructure maintenance have been recorded as a major driver of urban pollution. Anarfi *et al.* (2021) argue that poor maintenance of sewer pipelines, stormwater, road, and waste management facilities

contributes to urban social and environmental impacts. This study is of the view that service delivery infrastructures is not static. As such, continuous urban expansion should be matched with the upgrading of bulk service infrastructures. This is imperative for cities to move towards achieving global initiatives of “smart cities” that aim to promote sustainable urban livelihood. From the neo-classical new urbanism theory perspective, it is important to understand that poor bulk service infrastructure development hinders the sustainability of urban settlements such as the Boksburg areas (Davies and Townshed, 2015).

As noted by Rahnema *et al.* (2012), on the basic principles for development in new urbanism theory, developments should enhance human well-being by bringing social services closer to home. The study also revealed in Chapter 5 that Boksburg is experiencing continuous sewage spillages into the streets and watercourses. This implies that as Boksburg land-uses changes to establish more residential areas, the more failure of infrastructures to deliver basic social services to the communities. As noted by Nhamo *et al.* (2021), cities in Gauteng grow faster than the government’s ability to maintain municipal infrastructure for sewage treatment plants, stormwater channels, and waste management.

Economic and developmental growth that fail to follow regulated municipality by-laws and other developmental laws, according to the results of this study presented in Chapter Five has contributed to socio-environmental negative impacts associated with human settlement development projects. At the core of economic and developmental growth, there is an establishment of informal trades in the Boksburg area. For instance, human settlement developments are followed by informal supermarkets (“spaza shops”), car wash bays, and mechanic workshops which usually generate public nuisance when poorly regulated. The findings of this study demonstrate a complex interconnection of economic and developmental growth with socio-environmental impacts.

As noted by Simatele *et al.* (2012); Teixeira *et al.* (2014), urban economic activities have a direct impact on human well-being and urban livelihood, especially when practiced unlawfully. From the SSA framework developed on principles of urban sustainable settlement by Adeniran (2021) (See Figure 3.2), legal compliance with laws and regulations when establishing settlements plays a vital role in creating an environment that is not harmful to the people. It is, however, worth noting that regardless of the proposed framework tailored for the SSA region, the key challenges to achieving urban sustainability in post-colonial Africa are the lack of

coordination and gaps in policy implementation. This is in tandem with the findings of the study conducted in different countries of SSA by Adeniran (2021).

According to the findings of this study, 73% of the key informants belonged to professional bodies. Meanwhile, 74% of the participants recorded that unethical professional conduct by the key role players in urban residential-planning and issuing of licences (permits and authorisations) for developments have contributed to the poor management of social and environmental impacts of settlement development. These results suggest that environmental specialists, town planners, project managers, and other decision makers are predisposed to favour project approvals while dealing with proposed residential developments regardless of their professional affiliation. The problem, as indicated by the participants, is unethical conduct during the EIA process where key role players responsible for assessing the impacts of proposed human settlement project applications are influenced by external forces such as corruption and political parties' alignment.

Drivers of environmental and social impacts include a lack of implementation of policy frameworks governing human settlement development. The concern was the poor monitoring of projects once the construction phase was complete. According to NEMA and the EIA regulations of 2017, projects that are issued with EA by competent authorities should be monitored throughout their life cycle. This is further alluded to by scholars such as Vanclay (2003), Gwimbi (2014), and Maphanga *et al.* (2023) that EAPs and proponents usually focus their assessment on feasibility studies with less focus on mitigating impacts during the post-project construction phase. Perceptions from some key informants came as a comparison of human settlement development projects to private industrial and other commercial facilities. It was mentioned that throughout the industrial project life cycle, environmental management inspectors (EMI) conduct audits to monitor compliance with the conditions of the issued permits, authorisations, and licences. Thus, these results imply that government housing projects are left unmonitored by competent authorities once the houses are handed over to the occupants. It is further evident that residents adjacent to government houses often complain about noise levels and pollution with no environmental by-laws being enforced.

Regarding the frequency of complaints about environmental and social problems by residents to the competent authorities. Participants alluded to the fact that “very often” the CoE residents complain to the government about poor service delivery, which contributes to public nuisances.

These results suggest that urban residents are usually troubled by their living conditions and seek interventions from the government to address the challenges. Vulnerable citizens are in constant negotiation to exercise their power to ensure their neighbourhood is liveable. Notable complaints included water pollution owing to sewage spillage, reduced security, increased noise levels, poor waste collection, and illegal dumping. The study also revealed in Chapter 5 that Boksburg traffic jams owing to poor maintenance of roads around the Boksburg Comet area contribute to social impacts experienced by the residents. Several petitions have been submitted to the CoE and other government departments for the R21 Rondebult road to be fixed after it has been closed in 2022. This implies that Boksburg residents lose economic productive hours while ‘stuck’ in traffic jams. As noted by Turok and Borel-Saladin (2014), the increase in population contributes to an increase in environmental and social challenges that push the citizens to take power and fight for their constitutional human right to an environment that is clean and not harmful to their well-being.

6.4. Negative Social Impacts of the Human Settlement Development Project

Urbanisation and human settlement developments are among the most impactful human activities across the world affecting the quality of life and social welfare of urban people (Todes *et al.*, 2017). For instance, an increase in urban population and expansion of residential areas results in negative social impacts. From the responses gathered urban residents are impacted on aspects such as noise pollution, safety, and security, spreading of disease, traffic congestion, disruption to excellent existing infrastructure services, and loss of agricultural land among others.

i. Noise Pollution

Noise is regarded as a pollutant that has negative social impacts on humans (Kantova, 2017). Kantova (2017) further indicates that during the construction and implementation phase of settlement projects, noise is generated but differs on the tolerance level by the receptors. During the construction phase, noise levels generated by construction equipment are very high but exposure duration is minimal as compared to when the residents are occupying the houses (Ryu and Jeon, 2011).

As the findings of this study indicate, Boksburg has become very loud as there are more residential areas associated with churches and drinking places placed everywhere within the city. Of major concern, residents are annoyed by the noise emanating from increased vehicles

within the area, music until the early hours of the morning, and singing voices in the background from churches. According to the old- aged residents, these high noise levels impede the ability of residents to relax and be peaceful in their homes. Kantova (2017) equally argues that business-minded people see new human settlement development as an economic fertile ground to open taverns and modern churches to make money while contributing to noise levels without adhering to local government noise bylaws. Furthermore, it is worth noting that human settlement developments that are surrounded by noisy churches and taverns do not bring any productivity to the residents as compared to those surrounded by noisy factories which provide job opportunities.

Urban residents, such as Boksburg dwellers, find themselves in a human settlement hierarchy characterised as a “city” according to settlement arrangement theory by Poom *et al.* (2014). Chapter 2 (Table 2.1) indicates that land-use in the city tends to be diverse with a range of economic amenities, shopping malls, commercial and industrial sites, theatres, and - in some instances - airports. Hamlets and villages are characterised by isolated land-uses, small population sizes, and low economic activities, This implies that noise pollution in the Cities is higher than in the Hamlets and villages, which is consistent with the findings of Ryu and Jeon (2011) that isolated dwellings are more likely to be quiet, and peaceful because of the absence of loud music and background voices emanating from the neighbourhood.

ii. Safety and Security

The findings of the study as presented in Chapter 5 indicate that most of the old residents have a problem with the social mixing approach to urban housing developments. Low-class black residents, who are the main beneficiaries of the government housing projects, are perceived as security threats to the neighbourhood. The current study found that there is a problem in Gauteng of renting out government houses to undocumented foreigners (Culwick and Patel, 2020). The argument advanced is that individual rooms and bed spaces are further subdivided to create more money in one apartment. Meanwhile, the occupants are undocumented so when they commit crimes there is no criminal justice because South African police officers (from SAPS) are unable to trace the perpetrators of crime.

As a coping strategy, old suburb dweller who believes their safety is threatened, group and segregate themselves by fencing off their neighbourhood and introducing highly controlled boom-gated communities with strict security access. The notion of securing properties through the introduction of a boomed gated community further deprives other community members of

access to public natural resources and parks that were designated to the enjoyed by everyone. This mechanism aligns well with the notion shared by Hamanna (2022) that when rich-to-middle-class suburbs are densified to accommodate low-income earners' families, there is usually an automatically reduced security and safety within the area.

The determinants of quality of life and indicators in urban settlements - as derived from the 2015 UNSDG goals and habitat agenda (See Table 2.6, Chapter 2) advocates that “all people should have equal opportunities for a healthy, safe and productive life in harmony with nature and their cultural heritage and spiritual values”. The researcher is of the view that urban dwellers’ desire to have a secure living environment - where the crime index is low – owing to safety dynamics community members employ coping mechanisms in response to a fear of crime. The coping mechanism has, in turn, deprived others of an opportunity to live in harmony with their nature and cultural heritage as gated communities are enclosed with cultural features inside their newly barricaded neighbourhood. However, other scholars disagree that the absence of one or more factors does not necessarily mean that the settlement is not sustainable or promotes an acceptable quality of life (Du Plessis, 2002; Li and Liu, 2021). Meaning, a high crime index in a region does not automatically imply that the quality of life is compromised completely.

iii. Spreading of Diseases

As noted by Tukok and Borel-Saladin (2014), overpopulation within a small geographic area and the introduction of new people spread disease owing to high interaction. This is further aggravated by the deterioration of good quality of air that leads to disease (Weimann *et al.*, 2020). From the responses gathered, participants linked overpopulation in Boksburg shopping malls, schools, restaurants, and other essential amenities to an increase in the establishment of residential areas within the area. As Massey and Denoon-Stevens (2022) put it, during the COVID-19 pandemic urban overpopulated areas recorded a high number of virus transmissions as compared to rural areas. In this instance, the lifespan expectancy for urban dwellers is much lower as compared to rural dwellers.

According to the emerging normative human settlement-planning theories such as communicative and just city approach theories are concerned with the recognition of diversity and cultural differences that advocate for developments that are inclusive and centralised (Healey, 1999; Fainstein, 2000; Sandercock, 2004). However, this theory has contributed to the spreading of various diseases around the urban areas owing to the promotion of the concept

of development at edge cities and boom-burbs (large rapidly growing suburbs), which began to emerge in the 1980s (Watson, 2004; Tian *et al.*, 2010). From the sector model theory perception, population growth and urbanisation activities were consequently not directly linked as residential areas were isolated from retail and industrial areas as well as the human settlement expansion was city outward. The unfortunate part is that these spatial expansions do not consider cultural mixing and mixed land-use approaches. The study is of the view that cities which followed the sector model are less relevant in the spreading of disease as many retail, office buildings, and shopping malls were grouped separate from the residential areas which were further segregated.

iv. Traffic Congestion

The establishment of human settlement developments in urban areas has furthermore contributed to increased motorisation, which leads to traffic congestion when road infrastructure is not upgraded and maintained regularly (Turok and Borel-Saladin, 2014; Monde, 2023). The findings of this study indicate that being caught in traffic increases the chances of smash and grabs while vehicles are waiting by the malfunctioning traffic control lights.

Traffic congestion is prevalent in most medium to high-density community areas. Similar observations were documented in African cities such as Zambia (Lusaka), and Nigeria (Lagos). To avoid traffic congestion, Boksburg residents with money have relocated to more secure and scattered residential gated communities such as Serengeti Country Estate. The urban poor and vulnerable who cannot afford to relocate to the upmarket estates have resorted to waking up so early for work and leaving work late in the evenings to avoid spending productive hours being stuck in traffic congestion. After a thorough analysis, this study is of the view that Boksburg settlements have become unsustainable owing to traffic congestion which negatively impacts productively in the region. In their study, Li and Liu (2021) confirmed that sustainable human settlement developments are the ones that provide access to areas of interest through resource-conserving mobility.

v. Disruption to Excellent Existing Infrastructure Services

The researcher is of the view that expansion of the human settlement development footprints, particularly where there is no upgrade of the old functional infrastructure and social services delivery, contributes to social impacts as revealed by the residents through the study findings. This is the reason why most of the urban vulnerable residents are unhappy with their

neighbourhood that is uninhabitable owing to poor access to excellent infrastructures and basic social services. Furthermore, Boksburg is characterised by the urban divide, the “haves” and “have nots”, the rich receive excellent services as compared to the poor but within the same geographical area. For instance, those who live in gated communities and estates can afford to appoint service providers to collect their waste whenever the municipality delays waste collection services. In addition, through the participants, the findings of this study revealed that stormwater management channels are blocked with uncollected plastic waste from residential areas. Whenever there is rainfall, most areas are flooded owing to poor stormwater channelling. Meanwhile, other participants alluded to road damage with potholes and poor sewage pipeline management. This finding of the study is directly linked to the notion by Shao *et al.* (2021) that a lack of basic infrastructure and services related to sanitation, stormwater management, and waste management services continues to be observed in urban areas where the population has recently increased, and the municipality is chasing the capacity to cater the new developments. Thus, the government is confronted with a forward-thinking planning approach, where infrastructure is firstly expanded for the future proposed human settlement development project.

vi. Loss of Agricultural Land

According to the findings of this study in Chapter 5, food security for poor urban dwellers has been identified as a key social challenge, an assertion shared by Tuan (2021). The acquisition of large-scale agricultural land for human settlement development and other industrialisation activities has impacts on arable land (Holden and Otsuka, 2014; Alemayehu, 2016). The conversion of urban land from agricultural to the built-up environment for instance, denies the old urban dwellers access to land for farming purposes.

This study is of the view that urban food security is currently threatened by the increasing demand for land for human settlement developments. These findings are consistent with other studies conducted by Geyer *et al.* (2021) in South Africa (Cape Town), and Simatele *et al.* (2012). Simatele *et al.* (2012) further confirm that the lack of agricultural land in urban areas has a negative financial impact on the dwellers. In their study, the authors argue that prices for fruit and vegetables have greatly increased at the local supermarkets. This increase is because street traders are discouraged from selling fruit and vegetables. Stock prices of these are high as these are produced far from the cities. This dilemma calls for a reconceptualization strategy that whenever the government (GDARD) approves EIA applications for proposed human

settlement development projects should consider the utilisation of urban land sustainably to prevent the threat to urban food security from escalating any further than the current state.

6.5. Negative Environmental Impacts of Urban Human Settlement Development Projects

The fact that the population in urban areas is usually elevated generates the demand for accommodation that requires the construction of residential houses. Meeting the demand for residential houses presents urban areas with environmental negative impacts when the developments are not sustainable (Van Leeuwen *et al.*, 2018). This eventually affects the quality of the urban ecosystem and human life. From the responses gathered, the environmental impacts of urban human settlement development projects range from poor waste management, water and air pollution, ecological degradation as well as loss of biodiversity, and permanent land use change amongst others.

i. Poor Waste Management

A notable source of urban poor waste management emanates from a mismatch of resources such as the government's availability of a waste collection fleet to cater to the increased population. The study revealed that there is a delay in waste collection as the CoE usually has a collection backlog. Boksburg suburbs with social mixing housing projects tend to generate more waste because in one house more occupants are owing to the subdivision of the house to make space for more bed. This implies that where high-rise apartments are constructed, more people tend to live in a small footprint. This particularly means waste collection trucks can be fully loaded at one stop instead of covering a bigger footprint. As noted by Nhamo *et al.* (2021) and Kubanza (2021), local government and urban residents are confronted with need to reconceptualise the minimisation of waste at a source point to avoid overloading landfill sites by disposing of waste that could be reused or recycled.

As indicated in Chapter 5, poor waste management goes beyond the parameters of poor waste collection as the CoE is further faced with the challenge of waste landfill sites that have exceeded their carrying capacities. For instance, Simmer and Jack's landfill site is filled with waste on the ground level because the waste burial cells are full. Christy *et al.*, (2021); Bilozor and Cieslak (2021) have, in their respective studies, pointed out that major landfills that service urban areas exceed carrying capacities while governments are unable to match the increase in urban population.

Studies conducted in SA on the formation of cities during apartheid by Napier (2009) point out that spatial formation, which separated black and white communities, contributed to the disorganised suburbs experienced to date in Boksburg (See Figure 3.3). This study shares the views of Todes *et al.* (2019) and Huchzermeyer (2019) that the SA government's attempts to overcome the legacy of apartheid racially based spatial separation by social mixing developments has recently left old suburbs overcrowded and overwhelming the resources designated to improve the quality of life for urban settlers. Some scholars such as Joshi-Ghani (2013); Boyko and Cooper (2011); and Peberdy and Crush (2017) argue that urban compaction and concertation provide bulk infrastructure services at a lower cost and have more economic benefits as they support the agglomeration of urban productivity. It is however worth noting that, in this study findings, it was found that there is a mismatch in the availability of resources and the ability to render proper waste management.

ii. Water Pollution

With an increase in the establishment of human settlement development projects has come an increase in water pollution. As revealed by Anarfi *et al.* (2021); Nhamo *et al.* (2021), the increase in water pollution forces urban dwellers to live in an ecologically unsustainable environment. Results presented in Chapter 5 indicate that some of the residential areas are continuously experiencing the discharge of sewers into surface waterbodies. For instance, Parkdene Ext. 9 and Klipportjie Park Ext. 25 witnessed high levels of surface water pollution through littering and spillage of hydrocarbons from the residential areas that affect water quality which subsequently pose a risk to aquatic life.

Furthermore, it is the demand for developable land that contributes to the diverting and impending watercourses which affect the health of waterbodies. According to the results of this study, wetlands, flood lines, and other waterbodies located adjacent to proposed areas for residential developments are pruned by infilling with building rubbles to expand the developable footprint (Nhamo *et al.*, 2021).

iii. Increased Air Pollution

The consensus from the participants is that sources of air pollution associated with urban human settlement development projects are owing to the intensive domestic burning of fossil fuels and emissions from car exhausts that release carbon gases into the atmosphere. However, residents who have historically been residing in the study areas had complained about sewer spillages which are not cleaned up on time whenever they lodge complaints to the local

government. This finding implies that failure to maintain basic social service infrastructure within an area has a direct relationship with the air quality of the surrounding environment (Shikwambana and Tsoeleng, 2022). However, efforts that local governments often put in to maintain sewer outfall pipelines do not eliminate air quality associated with settlement development. This notion was because another source of air pollution emanates from the burning of general household waste which irritates residents whenever there are delays in waste collection.

iv. Ecological Degradation and Loss of Biodiversity

Billah *et al.* (2021) confirm that the establishment of human settlements brings changes in land cover which contributes to habitat loss that detrimentally affects the distribution of wildlife. Billah *et al.* (2021) also argue that during the clearing of vegetation for construction, most of the animals are bound to migrate to other regions, and some will even die owing to failure to adapt to the new environment. According to the results of this study, it is worth noting that residents complained about the absence of medicinal herbs in their areas owing to cutting down of trees whenever developmental activities take place in the area.

These criticisms affirm the findings of the studies conducted by Culwick and Patel (2020) in Gauteng that high-density communities contribute to the depletion of urban natural resources and deprive natural resources to flourish in urban areas. In situations where most cities' open spaces are occupied with buildings, it negatively impacts people's health owing to the non-availability of indigenous herbs to treat known illnesses (Bertaud, 2015). The researcher is of the view that poorly managed compacted urban areas deprive the citizens' right to an environment that is beneficial to their health and social well-being.

v. Permanent Changes in Land-Use and Sense of Place

Living in urban areas presents massive visual impacts to the people (Campana and Dabas, 2011). As presented in Chapter 5, residing adjacent to high-rised apartments deprives residents' freedom to enjoy beautiful natural landscape sceneries. This is inconsistent with key informants' opinions as reported in the result chapter that they applauded the positive legacy impacts of sustainable settlement development projects. The future generation stands a chance to inherit housing infrastructures. Furthermore, key informants are adamant that urban areas are bound to obstruct natural landscape sceneries due to the nature of urbanisation characteristics. This study is of the view that to protect a sense of place, human settlement development projects should consider the protection of historical and cultural sites (e.g.,

archaeological sites, monuments, graves, and cemeteries) as stipulated by the South African National Heritage Resources Act (NHRA) No. 25 of 1999). Even though, arguments around compact urban forms have been endorsed by several international agencies - such as the World Bank (2010), United Nations Habitat (2009), and Organisation for Economic Co-operation and Development (OECD, 2012) - with its guidance for achieving urban sustainability. It is, however, a bitter reality to accept that it is associated with permanent changes to the sense of places and alters the heritage resources.

Exploring the environmental and social impacts associated with urban human settlements development projects, various themes were generated from the recorded responses. Responses ranged from failure to consider concerns raised by key stakeholders in decision-making to the poor consideration of cumulative impacts during the project-planning phase, environmental and social human rights, political influence on government housing projects, and the effectiveness of EIA and SIA processes in addressing identified impacts. The following subsections describe the analysis of the result emanating from emerging themes.

6.5.1. Lack of Consideration of Public Concerns in Decision-Making

A primary premise for this study is that the public participation process should be more than merely a “consulting” exercise and review of official documents by community members. Maphanga *et al.* (2023), provide evidence that most community members are not thoroughly clued up about their rights when it comes to sharing their knowledge about impacts that are associated with proposed developments.

The findings of the study presented in Chapter 5 indicate that the incorporation of public concerns in decision-making guarantees that environmental clearance (permits and licences issued by competent authorities) reflects the needs and opportunities of the interested and affected parties. Results of the study, as summarised in Figure 5.12, reveal that most community participants were dissatisfied that they were not consulted during the planning stage of the projects where decisions to go ahead with projects are taken. These concerns are similar to what was noted by other studies conducted in SA by Freestone (2012) and Todes (2019) that urban settlements have the potential to be unjust in terms of what the citizens deserve versus what they receive. In the case of the urban social mixing housing approach, Freestone (2012) and Todes (2019) indicate that developments do not equally benefit the residents based on their family status, race and physical abilities, and socio-economic standards. Old residents suffer

financial losses as once-considered upmarket houses lose monetary value owing to the proximity to low-cost and earners houses (Todes, 2011).

With proposed human settlement projects that undergo the EIA process, one of the reasons for the public to be consulted late in the planning phase is that the EIA process is not conducted during the pre-feasible studies of the project. According to the 2014 SA EIA regulations (as amended in 2017), public participation only takes place after the designs and project sites have been approved during the concept and initiation phase of the project. Hence, this study is of the view that the public is consulted as a “tick-box” exercise merely to complete the EIA process. Public concerns are raised very late in the project stage; hence, it is practically impossible to investigate thoroughly and incorporate their concerns into decision-making.

6.5.2. Housing Challenges and Economic Struggles

As indicated in Chapter 5, using urban land for the establishment of human settlement is usually perceived as improving communities’ livelihood and providing economic freedom. Various studies conducted equally confirm that providing housing to the urban poor and vulnerable citizens has a positive life-changing effect owing to easy access to economic amenities (Simooaya, 2012; Rudel, 2013; Meyfroidt *et al.*, 2013; Brenner and Schmid, 2015; Monde 2023). While some poor residents have indicated that owning a house in urban areas is a privilege regardless of the environmental pollution exposure. As noted by Simooaya (2012) and Brenner and Schmid (2015), there is a need for environmentally informed citizens who will be conscious of the cleanliness of their neighbourhood in their quest for urban human settlement development projects. This will ensure a sustainable Boksburg (and elsewhere) where urban land-use is socio-economically aligned and upholds the environmental rights of all urban residents. These are prerequisites to the achievement of compact cities and densification concepts which aim to go beyond quantitative elements of housing provision but favour social inclusions in urban areas (UN-Habitat, 2009; Peberdy and Crush, 2017; Li and Liu, 2021).

Some residents have welcomed the continuous expansion of urban areas for housing development purposes, indicating that Boksburg requires some young and fresh blood to keep the city alive and vibrant. As a coping mechanism, they have adjusted their lifestyle. Results presented in Chapter 5 indicated that urban residents have opted to start working early in the morning and return home early afternoons to avoid traffic congestion. Some old residents in Sunward Park have resorted to avoiding being on the street very late at night for safety and security reasons. This resonates well with Davies and Townshend (2015), Brenner and Schmid

(2015), and Li and Liu (2021) regarding the criticism of the new urbanism settlement theory whose argument is that unprecedented urban population growth and shifts in urban land-use have life-altering effects, particularly on old urban dwellers who are used to certain patterns of lives.

6.5.3. Environmental and Social Human Rights

Various studies have indicated that human settlement development, by its nature, is bound to impact ecological landscapes. However, the degree to which such impacts are managed determines whether it violates section 24's right to an environment that is clean and not harmful to their social well-being (RSA Constitution, Act 108 of 1996). As much as some residents have acknowledged that human settlement developments provide the poorest and most vulnerable citizens with homes, it must be noted from the findings of this study that in most scenarios, some residents are adamant that the continuous expansion of suburbs violates their basic human rights to a clean environment.

The right to housing is also enshrined in section 26 of the Constitution, which states that "Everyone has a right to have access to adequate housing" and "the state must take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right" (RSA Constitution, 108 of 1996). Some residents lack the understanding that no human right is superior to the other. Those who are beneficiaries of the government housing programmes felt that their access to housing is more fundamental than living in a clean and healthy environment.

Meanwhile, some old urban dwellers are adamant that their human right to a healthy environment is a priority. This then acts as a barrier to access a clean environment for the old urban dwellers, a barrier to access adequate houses for the poor vulnerable urban citizens who are property-less. This finding implies that the government must enhance the provision of quality services that will reduce environmental pollution related to human settlement development projects. The researcher is of the view that with government effort and policies, such as BNG in providing houses to the previously disadvantaged groups in suburban areas, their social dignity has been restored through property ownership that will be transferred to their future generation.

6.5.4. Socio-Environmental Impacts Consideration throughout all Phases of the Project Life Cycle

Vanclay (2003) and Aucamp (2025) suggest that an assessment of environmental and social impact should be conducted through all phases of the project life cycle. Interested and affected

parties' consensus should be a point of departure in the conceptual phase of human settlement projects. Throughout the life cycle of the project, people's values and inspiration about their livelihood should shape mitigation measures to identify impacts.

According to Chapter 5, environmental and social impacts are well addressed during the inception and planning phase to acquire buy-in from financial institutions and residents but are poorly managed during the operational phase. Some residents complained that once the construction phase of the project is complete, the government does not come back to monitor living and environmental conditions after residential units have been occupied. This finding is aligned with the notion by Vanclay (2003) and Gwimbi (2014) that EAPs and proponents usually focus their assessment on feasibility studies with less focus on mitigating impacts during the post-project construction phase.

In addition, in the SA context, environmental and social impact assessments are usually conducted when a project legally requires obtaining environmental authorisation through the EIA process. This implies that for housing projects where the scope of work is below the threshold of EIA requirement, the assessment of environmental and social impacts is likely to be neglected throughout the project life cycle. This finding further implies that the assessment of the cumulative impacts of urban settlements which are not legally required to undergo the EIA process has been neglected in planning and policy development (Blakley *et al.*, 2021). These concerns are similar to what was noted by Aucamp *et al.* (2011), Hildebrant and Sandham (2014) and Ali (2017) that the assessment and monitoring of compliance with environmental and social deliverables should be conducted in all phases of the project life cycle and goes beyond simply satisfying legal requirements.

6.5.5. Institutional Politics and Legal Policy Framework Challenges

Political drivers of the provision of houses for poor urban citizens include a lack of environmental policy implementations by project managers, poor compliance monitoring of the government housing projects during construction, and a lack of political will to promote sustainable development objectives. As revealed through the literature and findings of this study in Chapter 5, SA has impressive environmental laws such as NEMA (107 of 1998) and other SEMAs (Specific Environmental Management Acts). The problem, as identified by participants, is the lack of policy implementation, unethical professional conduct by key role players, and the lack of political will to mitigate environmental and social impacts throughout all the project stages of settlement development projects. Most of the environmental problems

emanating from government projects are driven by institutional politics and poor policy implementation (Maphanga *et al.*, 2023).

This agrees with the findings of Hildebrant and Sandham (2014) and Maphanga *et al.* (2023) that SA's legal framework, EIA regulations, and SDF are well crafted but distorted by political influences. Similar trends have been observed elsewhere in SSA by Gwimbi (2014) and Mubanga (2019) that African governments have - for a long time - suffered from complying with the legal frameworks they set for themselves. Unfortunately, compliance with environmental legislation when developing government houses has been abused through political and administrative powers by those who wield power over urban poor and vulnerable people.

6.5.6. Hope for the Future

Settlement developments offer the current generation shelter and employment opportunities, while future generations stand to benefit from housing infrastructure that are rightfully located in commercial harbours (Alemayehu, 2016). Environmentally and developmentally aware citizens advocate for sustainable settlements and the opposite is true. The researcher is of the view that citizens' awareness of the sustainable development concept must be encouraged, not as a coping mechanism but as a long-term solution to most rivals caused by environmental crises suffered in urban areas. This can be enhanced through the monitoring of human settlement projects during the construction and operational phase by community forums as well as deliberate environmental advocacy programmes such as "NIMBY".

As pointed out by Davies and Townshend (2015) as well as Mekara (2020) on neo-classical theories of settlement form in Chapter 2 of this study, cities expand inwards into already existing urban spaces with available bulk service infrastructures. Hence, there is a need for communities to be mobilised and advocate for developments that are sustainable while redressing the legacy of socio-economic exclusion in Boksburg urban areas. The community's shared sense of belonging will enable residents can live in harmony with one another and cope together with spatial and land-use changes that are currently shaping the future cities of most SSA countries.

6.6. Effectiveness of Environmental Impact Assessment Tool in Addressing Environmental and Social Impacts of Urban Human Settlement Development Projects

The study sought to explore whether the EIA process is effective in addressing the environmental and social impacts of urban human settlement development projects. In deliberating on the positive contribution of the EIA process, the view of most participants (61%) as shown in Figure 5.13 - recorded that EIA is poor to very poor in addressing the environmental and social impacts of the proposed development. The below section analyses the results that contribute to the incapability of EIA processes.

6.6.1. Inclusion of Social Impact Mitigation Measures during the Environmental Impact Assessment Process

According to the results of the study in Chapter 5, most of the key informants mentioned that the EIA study alone is unable to cover all social aspects of the proposed settlement development projects. These results are not surprising because EIA processes are conducted by EAPs that are often from natural science fields of study. Esteves *et al.* (2012) indicate that the assessment of social issues is a field of its own that should not be secondary to EIA. The assessment of social issues is a field of study that manages social aspects of proposed developments in relation to human rights, gender equality, cultural diversity, justice, community power, place, and sustainable livelihoods (Esteves *et al.*, 2012). Thus, EAPs who conduct EIA should be apprised of, or considered well trained, in the fields of sociology, developmental studies, community and environmental psychology, demography, and anthropology. However, even though - by nature - the assessment of social issues should be conducted by SIA practitioners, their terms of reference are determined by the EAPs who usually principal contractors are to conduct the EIA process with most EAPs being qualified natural and environmental scientists (Audouin and Hattingh, 2008).

6.6.2. Social Impact Assessment Process as a Secondary Specialist Study to the Environmental Impact Assessment Process

An intertwining of social and environmental aspects is generally understood. Decision makers should afford them an equal level of importance in the context of the EIA process (Stolp, 2006; Hildebrand and Sandham; 2014). From the results of this study, most of the environmental specialists (environmental firms) are of the view that during the CoE's EIA process, social

impacts are not at the same level of importance as compared to the ecological ones. Given these inadequacies in balancing the socio-economic issues with the environmental during the EIA practice, the objective of EIA in incorporating three pillars of sustainable development suffers. These results imply that environmental specialists from environmental firms advocate for SIA to be conducted separately from the EIA process because they are two different processes with their theoretical sciences even though they are conducted parallel in the same location for the same project. This concurs with the work of Aucamp (2003) who posits that “SIA does not belong to the environmental management field and suggests that it could fit very well and comfortably within a social development framework” that could be used by the Department of Social Development. Therefore, this area should be improved to promote socially sustainable development goals for human settlements.

The minority of the environmental specialists (government), who viewed that social issues are well addressed during the EIA process, indicated that separating these processes would lead to more red taping and reporting. These results imply that the government is adamant that SIA is well situated to EIA for assessing the impacts of the proposed development. This notion is further supported by the findings of a study that EIA regulations need to be modified to provide more legislated procedures of how to conduct SIA within the context of EIA without biases (Matlakala., 2021).

6.6.3. Providing Clear Information on Environmental Impact Assessment Reports to Decision Makers

The literature points out that the EIA report has a crucial role to play as the final deliverable of the EIA process that guides decision-maker on whether to grant or refuse environmental authorisations of the proposed developments (Glasson *et al.*, 1999; Hildebrand and Sandham, 2014). The results of this study revealed that most of the participants, especially the environmental specialists from consulting firms, were of the view that EIA reports are marginally successful and “much better” in providing clear information for decision makers. They cited as a challenge that decision makers are usually influenced by political interference while assessing scientific studies' findings. This interference is suspected to be rooted in an uncontrolled economic appetite emanating from a desire to bridge the gap left by historic spatial segregations in urban areas. Environmental specialists from the government were, however, biased on this matter. Thus, this area needs attention for future research.

6.6.4. Integration of the Environmental Impact Assessment Process with Other Developmental Planning and Enforcement Tools

The results of this study revealed that EIA itself without the proper incorporation with other developmental-planning tools is “poor” to “very poor” in addressing the impacts. These results are not surprising as these are aligned with the observations by Mathipa (2021) and Vromans *et al.* (2020) that developers do not follow other assessment tools and processes such as duty of care, bioregional plans, life cycle assessment, and cumulative impacts assessment. This is because they are considered only decision-making supporting tools with no decision-making powers like EIA which ends with the issuing of licence to operate or environmental authorisations.

Some key informants indicated that EIA tools are complemented using environmental enforcement administrative tools such as Compliance notice-S31L of NEMA and Directive notice-S28 of NEMA where environmental violations are detected during the operational phase of human settlement development projects. In instances where the CoE has been issued with directive notices for sewer spillages owing to the inability of the sewer infrastructure to cater to the increased capacity caused by new development, corrective actions such as the upgrading of sewer outfalls and unblocking of the sewer pipelines. These have been implemented to prevent the entity’s exposure to environmental crimes liabilities.

6.7. Results of Environmental Impact Assessment Reports Review

According to results recorded in Chapter 5, sampled EIA reports of the human settlement development projects revealed that the majority were of satisfactory quality. Other studies conducted on the review of the quality of EIA reports in South Africa (Sandham *et al.*, 2008; Aucamp, 2015) also revealed that most reports are of the appropriate quality thus far. For this study, the overall scores for review areas were much higher than those of the review categories. It was noted that some categories were not addressed satisfactorily but this could not be reflected in the final score of the review area. These results suggest that review areas tend to be better addressed as compared to the categories. Hence a good score was obtained as it worked on aggregates. High scores of satisfactory performances in review areas were obtained in review area 1 (description of the development, the local environment, and baseline conditions) and review area 4 (communication of results) as compared to the other review areas.

Review area 3 (alternatives and mitigation) was poorly addressed because of the limited number of proposed alternatives that could be attributed to the fact that most developments were already at the advanced stage (project-planning and design feasibility stages being almost complete) when the EIA process was conducted. The results of this study share some similarities with previous studies on quality review of EIA reports as a consideration of alternatives was found to be inadequate. The results agree with the observations of Sandham *et al.* (2008) and Maphanga *et al.* (2023) that the consideration of project alternatives is generally poor in EIAs for developing countries. Of particular interest, the “no-action” alternative for proposed development is not often regarded as a viable option in developing countries where poverty and access to basic social service delivery are predominant challenges (Sandham *et al.*, 2008).

The Commission of the European Communities report (2019) also outlines poor consideration of project alternatives as an area that requires improvements during the EIA process. To improve the effectiveness of EIA in mitigating environmental and social impacts of proposed developments, the quality of EIA reports needs to be improved in covering impact prediction and alternatives (Sandham *et al.*, 2008; Maphanga *et al.*, 2023).

As discussed in Chapter 3, it is evident that good-quality EIA reports usually reflect the overall effectiveness of the entire project’s impact management plans (Sandham *et al.*, 2008). Regardless of the above-mentioned weakness, the quality of the EIA reports submitted to GDARD by the CoE for proposed human settlement development projects was found to be generally satisfactory. These results further imply that EIA reports influence informed decisions which are vital for the mitigation of socio-environmental impacts and promote sustainable human settlement developments.

6.8. Discussion on Environmental Specialists’ Perceptions on the Management of Environmental and Social Impacts of Human Settlement Development Projects

(a) The ability of the City of Ekurhuleni to manage the environmental and social impacts of urban human settlements

It emerged that the CoE only addresses basic service challenges when approaching the political heads' election sessions. The provision of proper waste and sanitation services is usually

temporary. The politicians only use the citizens to gain power and later neglect matters that promote residents' well-being. This result implies that political unwillingness to advocate consistently for excellent service delivery out of the election session contributes to environmental impacts observed in the communities. This may be explained by the fact that politicians can hold administrative officials to deploy resources and allocate funds to improve service delivery. This study noted through the discussion session that raw sewage discharge - through the sewer outfalls - is usually the order of most streets that are adjacent to the newly developed areas. These results suggest that the CoE is unable to match the infrastructure demands with the increased population in the areas that experienced additional residential developments. This result favours the argument made by Parnell and Simon (2014) that residential urban development prefers areas that already have services to avoid financial costs, but municipalities are experiencing financial burdens to maintain infrastructure developments in emerging settlements.

Key informants further alluded to the fact that for projects where the local government is a proponent for proposed human settlement developments, the promotion of environmental protection is not equally valued as much as socio-economic benefits. The challenge is that the Municipality often gets buy-in from the beneficiaries of government housing programmes where access to shelter is deemed more beneficial than any other service delivery programmes.

(b) Environmental Impact Assessment and Social Impact Assessment tools' insufficiency in addressing the socio-environmental impacts of the proposed developments

The results of the study, through the engagement with environmental specialists, revealed that the South African government through the Ministry of Environmental Affairs has developed good policies and regulations for EIA processes where SIA is also included as one of the specialist studies to be conducted in the process. A major challenge is the lack of standardised and detailed legislated procedures on EIA regulations that guide how social issues must be assessed in the context of the EIA process.

These results suggest that during the EIA process, social issues are not afforded equal attention as environmental issues when assessing applications for proposed human settlement development projects as alluded by Aucamp *et al.* (2011) and Hildebrand and Sandham (2014).

It emerged, during the discussion with a key informant who is an environmental specialist, that the National Department of Human Settlement - together with the Social Development Department - should develop a framework to assess the social impacts of proposed government

housing projects that will be implemented out in the confinement of EIA context. These results imply that social development would promote human well-being and simultaneously promote economic developments associated with government housing projects.

(c) Are Ekurhuleni City settlement development projects, that are not legally subject to an Environmental Impact Assessment process, contributing to the environmental and social impacts faced by communities?

The results of the study revealed that CoE does not appoint environmental consultants to assess the environmental and social impacts of projects that do not legally require EIA. This implies that the cumulative impacts of small projects are hardly considered as projects' impacts are identified and addressed separately from the regional historic challenges. These results favour the arguments made by Gwimbi (2014) and Maphanga *et al.* (2023) that assessing the environmental and social impacts associated with human elements is usually conducted as a once-off and single events that are mainly considered for approval purposes with the minor potential of mitigating identified impacts. These results further support the notion raised by Petts (2007) that EIA listing activities that require environmental authorisation tend to blind competent authorities and developers from focusing on novel non-listed activities that may have more cumulative significant impacts than those listed on the government-gazetted notices.

(d) Measures to address institutional and professional biases when conducting the Environmental Impact Assessment process.

During the FGD, environmental specialists indicated that their respect for the profession plays a vital role in eliminating biases when addressing environmental and social impacts during the EIA process. These results suggest that personal values in every profession are crucial where the desire to do good even when no one is available to witness, is key a key factor. Registration with the professional regulatory bodies (EAPASA) was cited as another measure because a registered EAP is obligated to abide by the professional ethical code of practice. Failure might lead to suspension from the community of practice. These results support the legislated requirements that as of 8 August 2022, in terms of section H of registration authority regulations of NEMA, all the environmental specialists (government or private consulting firms) practicing in the EIA field are required to be registered with Environmental Assessment Practitioner Association of South Africa (EAPASA). It is the view of this research that this approach will discourage ruthless, unambitious practitioners from being biased when assessing social and environmental impacts associated with human settlement developments.

(e) The role of the environmental specialist is to ensure that public concerns are incorporated into decision-making

Regarding the consideration of public concerns in decision-making, the results revealed that competent authorities depend on the PPP report that provides contact of the I&AP and records the issues raised during the process. During the processing of the application by government environmental specialists, registered I&AP are randomly contacted telephonically to confirm if indeed they exist, and their concerns are clearly recorded. It was, however, indicated that this exercise is not feasible owing to the magnitude of the application received. These results imply that failure to contact all the I&AP registered for the project is thus covered by the provision of appeal procedures. According to Chapter 2 of National Appeal Regulations, 2024, I&APs have the right to lodge objections and appeal the decision that competent authorities take within stipulated timeframes in the issued decision in case their raised concerns are inadequately addressed when issuing decisions for proposed human settlement development projects.

(f) Appointment frequency of Environmental Assessment Practitioner to conduct monitoring of issued environmental authorisations

According to the study results in Chapter 5, the appointment of environmental control officers (ECO) by the developers before the commencement of the construction of the authorised projects is compulsory. The appointed ECO submits compliance monitoring/audit reports to the competent authorities regularly (monthly or quarterly) depending on the EA conditions. These results imply that the developers fulfil compliance requirements, however, the competent authorities are unable to conduct compliance-monitoring for all the projects issued with EA because of staff shortage. For instance, the number of environmental specialists required to assess EIAs is much more than the number of environmental management inspectors (EMIs) required to perform compliance auditing. Moreover, the auditing of the compliance is a continuous process for as long as the project is being executed. Meanwhile, the process of assessing the EIA application and issuing the decision is a once-off event in the life of the project cycle. These results suggest that the imbalance of staff complements within the competent authorities' departments has contributed to the failure of EIA effectiveness to address the environmental and social impacts alone.

6.9. Conclusion

Discussion and analysis of the results of this study have provided an in-depth understanding of the nature and significance of the socio-environmental impacts posed by human settlement development projects to the residents of the study area. The extent to which environmental and social impacts are addressed has been discussed and analysed. The study results on the effectiveness of EIA in addressing the environmental and social impacts of human settlement have been analysed. Based on the discussions and analyses of the results, institutional and policy challenges contribute to hindering the promotion of sustainable urban human settlements. The results findings, discussion, and analysis presented in both chapters 5 and 6 are thus considered as a basis of the conclusion and recommendations to be discussed in detail in Chapter 7.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

Poorly managed urban human settlement development projects continue to contribute to environmental and social impacts experienced by urban dwellers. This research gap highlights the need to understand the types of socio-environmental impacts associated with human settlement development projects and how it affects the people's well-being. In addressing these issues in SA, Gauteng Province under COE, the first part of this research focused on assessing the impacts and consequences associated with government housing development projects. This data assisted in gaining in-depth knowledge on how people are affected by environmental pollution and social negative impact emanating from using land for human settlements. In understanding the types of environmental and social impacts of human settlement development projects, the subsequent segment of the study concentrated mainly on challenges and factors contributing to failures in management of the government residential projects. The study further examined the effectiveness of EIA and SIA tools and their role in minimizing the identified impacts of proposed human settlement development projects throughout the project life cycle. The findings and analysis of the study are found in chapter 5 (Results) and 6 (discussions). Thus, this chapter focuses on providing a synthesis of the work done on this study and reflect on how the aim and objectives of the study were achieved. In concluding the chapter, future research avenues are discussed.

7.2 Summary of Key Findings and Conclusion

This study critically analysed the environmental and social impacts of human settlement development projects in the Boksburg area, COE, Gauteng, SA. This section presents the summary of the findings and the objectives which guided the study. The four objectives of the study were as follows:

- (a) To assess the impacts and consequences of human settlement development projects on the environment and social well-being in Ekurhuleni, Gauteng.
- (b) To analyse challenges and factors contributing to failures in managing the environmental and social impacts of human settlements development in Ekurhuleni, Gauteng.

- (c) To examine the effectiveness of the environmental and social impact assessment tools in addressing human settlement development impacts.
- (d) To propose alternative solutions to mitigate the environmental and social impacts of human settlements development.

The conceptual framework that guided the study, based on the objectives referred to the impacts of urban human settlement development projects on the environment and social well-being of the people, the effectiveness of EIA and SIA tools, and their influence on decision-making, compliance monitoring on the management of impacts throughout the project life cycle, challenges associated with creating urban sustainable settlements.

Chapter Two summarised the most important literature published by researchers in the field of human settlement, emphasising the theories guiding settlement forms and socio-environmental factors associated with specific theories. Based on review of academic articles, it was found that literature on human settlement forms and theories in general is abundant. Meanwhile, environmental and social impacts associated with urbanisation and population growth have not been the subject of many research studies as the literature review revealed.

Chapter Three summarised literature published on human settlement theories that contributed to environmental and social injustice in both SSA countries and SA. The literature revealed that global sustainable cities concepts and their applicability in African cities bear challenges emanating from redressing the spatial injustice imposed by African colonists during the colonial regime. However, the findings from the literature revealed that blending national government laws with developmental impact assessment tools such as EIA, SIA, the duty of care, bioregional plans, project life cycle, cumulative impact assessments, and integrated development planning could minimise the socio-environmental impact associated with urban human settlement development projects. Based on the review of the relevant literature, the drivers and types of environmental and social impacts were explained. This gave an in-depth knowledge of undercurrents contributing to failures in managing the environmental and social impacts of human settlements development in Gauteng urban areas so making specific reference to CoE.

The selected research strategy used was mixed methods and focused on the use of both qualitative and quantitative data. Answers to the posed research questions were administered in three different phases to different participants. In the first phase, data was collected from community members residing around selected projects to gather information on the type and

significance of the impacts emanating from continuous urban expansion. In the second phase, data was collected from key informants who worked for governments and non-governmental organisations responsible for environmental management, project implementation, and town planning. In the third phase, data was collected from only environmental specialists who worked for both government and non-government organisations through FGD to discuss environmental policies and institutional challenges contributing to poor management of socio-environmental issues emanating from urban settlements. Lastly, to analyse the effectiveness of EIA and SIA tools in minimising environmental and social impacts, five EIA reports of selected projects were evaluated using the Lee and Colley (1999) EIA quality review package form to rank the effectiveness of proposed mitigation measures of identified impacts.

This study has revealed that the main impacts associated with construction on the urban environment were interference with the ecosystem, increase in various types of pollution, safety, and security. A primary premise of this study was that community members could play a vital role in identifying cumulative impacts of their region. However public participation and stakeholders' engagement is not effective due to reducing it to mere "consultation" and technical document review. Views of the community members in response to their involvement during human settlement development project-planning have revealed that they are partially informed about the government's mandate to redress the spatial injustice of urban areas.

Chapter 5 presented the findings of the study answering the first research objective with the question as follows: "In what ways do human settlement development projects impact the environment and social well-being of the residents in Gauteng?" The research findings revealed that government housing developments are a necessity to redress historic urban socio-economic exclusion. However, the construction of houses is associated with environmental and social problems when infrastructures are not upgraded and expanded to cater to the urban population growth. The findings revealed that socio-environmental problems are generally related to, amongst others, traffic congestion, safety and security, water contamination, sanitation, and poor waste management. These socio-environmental impacts are compounded by a desire for SA to have a reflection of a "rainbow nation" in urban areas which will promote the spirit of "ubuntu" in a democratic country. Over three decades, there has still been reluctance from the old urban dwellers to accept the just transition to sustainable cities concept that redress spatial injustice.

It has been revealed in this study that poor management of solid waste in Boksburg areas has increased owing to delayed collection by the CoE. There is now growing evidence to link poor

service delivery with unprecedented population growth in a small geographical area. This has caused rivalry among urban dwellers, i.e. who causes pollution and who suffers from pollution? The same question goes to who causes crime and noise as well as who suffers. The results of this study suggested that poor black urban dwellers residing in government houses are perceived to be the catalysts of socio-economic challenges witnessed in urban areas.

Chapter 5 presented the findings of the study answering the second research objective regarding the challenges and factors that exist in managing the environmental and social impacts of human settlement developments in Gauteng. The study revealed that environmental practitioners, town planners, project managers, and officials from local and provincial governments have a clear understanding of how to translate old spatial patterns and create sustainable urban settlements. With a clear understanding and knowledge of the key role players, it is not surprising that stakeholder engagement (public involvement) is poorly conducted because there is usually reluctance from old urban dwellers to support government housing development taking place adjacent to their upmarket residential areas. In recent years, urban houses that were owned by white people during the apartheid regime have been vacated while some are rented by foreign nationals.

The findings of the study in Chapter 5 provided answers to the second and third objectives regarding the challenges in managing impacts associated with human settlement development projects and the effectiveness of EIA and SIA tools in reducing environmental and social impacts of proposed developments. According to the findings of this study, approximately 70% of environmental specialists indicated that the SIA of proposed human settlement projects should be conducted separately from the EIA process during the planning phase. The environmental specialists further alluded to the fact that SIA should be conducted out of the legal statutory requirement of the EIA process but as part of social corporate responsibility.

The EIA process conducted for CoE projects only meets few requirements in terms of the outlined evaluation criteria, especially with determination of whether the EIA reports provide clear information for decision makers on a project's basic conditions of the receiving environment, identified potential environmental and social impacts, as well as mitigation measures. The study revealed in Chapter 5 (Figure 5.14) that a small majority (34%) of environmental specialists are of the view that EIA reports are “marginally successful”, while a minority (3%) indicated “very successful” in providing clear information for decision-makers on the potential environmental and social impacts of projects. This challenge has been acknowledged by authors such as Sandham *et al.* (2008) and Maphanga *et al.* (2023) that EIA

reports are compiled satisfactorily but a lack of compliance-monitoring to the issued EA confronts the system.

The findings of the study in Chapter 5 provided answers to the third objective regarding the EIA's effectiveness in proposing mitigation measures to identify impacts. The research findings indicated that all five sample EIA reports (100%) were at a satisfactory level. The majority of the reports (60%) scored “generally satisfactory”, while 40% scored “just satisfactory” despite omission and inadequacies. Under this review area, none of the reports was scored “not satisfactory”. “Satisfactory” was the most scored grade, despite minor omission on the reports.

All the review categories scored satisfactory grades. Description of the proposed development was one of the review categories that scored 80%. Two EIA reports scored a “not satisfactory” under the site description and baseline conditions of the receiving environment. Below is a summary of findings from review of EIAs reports conducted by the CoE:

- (a) Negative social impacts are not fully included during the EIA application process of government houses in urban areas. Mainly positive social impacts are documented in the EIA reports. Thus, the process is poor on balancing the pillars of sustainable development principles which aims to integrate economic factors with environmental and social.
- (b) SIA is reduced to EIAs’ public participation process with lack of proper identification of key social challenges confronting the community. Thus, detailed SIA is not conducted for all the proposed human settlement development projects.
- (c) The appointed Independent EAPs responsible for EIA process on the selected projects was satisfactory. It was noted that for all the five reviewed EIA reports, were compiled by EAPs affiliated with EAPASA which were deemed to be professional and ethical.
- (d) Cumulative impacts are poorly or not assessed during the EIA process.

FGD outcomes, views of environmental specialists and community members confirmed that implementation of some of the identified mitigation measures proposed in EIA reports is poor and results in detrimental environmental and social impacts. All the environmental specialists confirmed that mitigation measures proposed for implementation by the project proponent (CoE) during project execution are hardly complied with. It was further confirmed that monitoring of projects’ compliance with EA is not often conducted by competent authorities, thus resulting in environmental pollution which negatively impacts the well-being of the citizens.

7.3. Recommendations

In analysing the findings of this study and considering the limitations highlighted on the above section 7.2, several recommendations were suggested as follows:

- (a) Lack of public engagement at the early planning phase of the human settlement development projects has been observed as an obstacle to documenting negative socio-environmental impacts that affect the public. This study recommends that sensitisation on stakeholder engagement and public consultation must be prioritised during the inception phase of the housing developments. Various key role players (i.e. old urban dwellers) are to be made aware of the sustainable city practices that have been developed by the UN and other global organisations to ensure that the various projects being carried out in the country are sustainable.

It is noted that efforts to redress urban historic spatial injustice should not be imposed without following proper public participation processes, which ensures concerns raised by I&APs are considered in decision-making. Thus, it is recommended that local municipalities (CoE) develop a framework to be followed when assessing socio-environmental impacts in the context of redressing the spatial injustice legacy. Such a framework should show its commitment in adopting sustainable cities principles and initiatives to be considered to ensure that everyone's rights are not violated. Incorporating diverse perspectives and expertise, the government can ensure that breaking new ground policy strategies are racially inclusive, and culturally appropriate so leading to more successful livelihoods. Furthermore, engaging with local community members and incorporating their traditional indigenous knowledge can enhance the effectiveness of sustainable human settlement initiatives. Thus, there is need of a transfer of knowledge to the old urban white residents to understand government initiatives on redressing the legacy of spatial injustice through implementation of government housing projects.

- (b) Findings of this study have further revealed a mismatch of proper bulk service infrastructure for provision of basic social services to cater for population growth. It is therefore suggested that when selecting a project site for housing development, the government should have an integrative approach that considers aspects of infrastructure, upgrading that will cater to future population growth. This integration of

bulk services infrastructure with population growth will ensure sustainability and long-term positive benefits. By doing this, the government housing developments in the CoE can develop into a new lucrative spatial legacy that helps to ensure the viability of the area. According to surveyed community members, a considerable proportion indicated poor collection and management of waste. The CoE should place much financial effort into increasing the lifespan of the current existing landfill sites and increasing the fleet for waste collection around the Boksburg area.

- (c) SA laws have a strong legal framework to manage environmental and social issues. This emanates from section 24 of the Constitution (RSA, 1996) which outlines the principles of sustainable development. Moreover, the promulgation of NEMA (Act No. 107 of 1998) (RSA, 1998) put into context the regulations that should be complied with in addressing the environmental impacts of proposed developments. However, there is no statutory requirement for conducting SIA for proposed developments in the context of environmental management. This study recommends that SIA should have its own statutory requirements as other environmental assessment tools. This could be achieved through amendment of EIA regulations in order to specify the aspects which should be covered in the reports, and to require that the assessment be conducted by independent qualified practitioners within the social sciences field of study. In addition, SIA reports should be reviewed and evaluated by qualified social scientists who are appointed by the competent authorities. In instances where the proposed projects are not legally required to undergo EIA but have the potential to impact the community's livelihood negatively, the planning process should provide the required information to be obtained through the SIA process.
- (d) Improvement in the strategic planning relating to proposed human settlement developments is required in urban local governance to promote the establishment of sustainable settlements. The CoE should be firm on the engagement of all relevant stakeholders regarding the City's vision and spatial plans, instead of allowing politicians to override decisions taken by subjects' experts on the management of environmental and social issues related to human settlements.
- (e) Government's effort to promote the constitutional rights of poor citizens through the provision of houses should not violate human right to healthy and clean environment. Thus, it is imperative to embrace an approach which promotes the integration of all

constitutional rights without compromising the other. Instead of recognizing access to housing as the only major constitutional human right that overrides the right to an environment that is protected and not harmful to the people's well-being.

7.4 Future Research Avenues

After a thoroughly literature review and findings of this study, future research avenues in the context of minimising socio-environmental impacts could focus on the following:

- Political influence on the establishment of government houses in urban areas with historic apartheid spatial injustice regarding environmental protection.
- Examine the capability of urban local governments in the provision of basic social services to match population growth increase in emerging human settlements.
- Exploring sustainable opportunities to fund local governments' infrastructure development projects in Gauteng.
- Findings of this study are based on an investigation of government human settlement development projects of one region in one municipality, i.e. Boksburg under the COE, with limitation of coverage of the entire municipality and province. It is thus important to investigate the entire Gauteng province, as the province is considered one of the major SA economic harbours with a high population rate and demand for human settlement development projects. In addition, this study was limited to government housing projects; therefore, there is no pertinence of this results into private residential developments. Future investigation could focus on assessing socio-environmental impacts associated with establishment of residential units by private property developers.
- Lastly, the findings of this study further revealed poor incorporation of social issues when decisions to authorise human settlement development projects are taken, especially in the contexts of the EIA application process. It is therefore recommended that future research should investigate the possibility to establish a specialised section within the Environmental Impact Management Directorate in the GDARD that would review SIA reports and monitor implementation of social initiatives within EIA frameworks. Alternatively, the SIA reports compiled during EIA process for proposed human settlement development projects should be made available for review by the Department of Social Development before a decision to authorise construction is taken.

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Appendices

Appendix 1: Ethical Clearance Certificate



Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Marilele

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: H23/01/14

PROJECT TITLE

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa

INVESTIGATOR(S)

Ms M Marilele

SCHOOL/DEPARTMENT

Geography, Archeology and Environmental Studies/

DATE CONSIDERED

27 January 2023

DECISION OF THE COMMITTEE

Approved
Risk Level: Low

EXPIRY DATE

19 February 2026

DATE

14 March 2023

CHAIRPERSON

(Professor J Watermeyer)

cc: Supervisor : Prof S Kubanza

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **A SIGNED COPY** returned to the Secretary electronically. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I/we agree to completion of a regular progress report. For Minimal and Low Risk studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

Signature

14 / 03 / 2023
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Appendix 2: Key informant's information sheets for interviews



School of Geography, Archaeology and Environmental Studies

Private bag 3, Wits 2050

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa

Dear sir/madam

I am Mkatoko Patricia Marilele, I am an Environmental Studies PhD student at the University of Witwatersrand. My supervisor is Dr. Serge Kubanza. I am conducting a research study about environmental and social impacts. The study title is "A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa".

I am inviting you to take part in an interview. If you decide to take part, your participation in this research study will last about 20 minutes. The interview will be in person, it will be conducted at your working place(office) during the working hours, from 13:00pm-13: 20pm. With your permission, I would like to audio record the interview. This data will be stored in my private personal phone (iCloud) where it will be access by myself through secured ID. The data will be stored for 5 years and be deleted once the studies have been completed (2028).|

The interview will be confidential and anonymous, when I share the results of the research study, I will not include your name or anything else that could identify you. If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions

if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits, or rights you would normally have if you decided not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study. The risks for this research study are no more than what happens in everyday life

This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

Researcher

Mkateko Marilele, 1591737@students.wits.ac.za, 0605694095

Appendix 3: Key informant's information sheets for focus group discussion



School of Geography, Archaeology and Environmental Studies

Private bag 3, Wits 2050

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa

Dear sir/madam

I am Mkatoko Patricia Marilele, I am an Environmental Studies PhD student at the University of Witwatersrand. My supervisor is Dr. Serge Kubanza. I am conducting a research study about environmental and social impacts. The study title is "A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa".

I am inviting you to take part in a focus group discussion. If you decide to take part, your participation in this research study will last about 1 hour. The focus group will be in person, it will be conducted at the conference room (hotel) around Boksburg at 17:00 on the 30 March 2023, after working hours. With your permission, I would like to audio record the focus group discussion. This data will be stored in my private personal phone (iCloud) where it will be access by myself through secured ID. The data will be stored for 5 years and be deleted once the studies have been completed (2028).

The focus group discussion will be confidential and anonymous, when I share the results of the research study, I will not include your name or anything else that could identify you.

If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits, or rights you would normally have if you decided not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study. Your travel/data costs to attend the focus group discussion will be reimbursed to a maximum of R150.

The risks for this research study are no more than what happens in everyday life. This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

Researcher

Mkateko Marilele, 1591737@students.wits.ac.za, 0605694095

Supervisor

Dr. Nzalalemba Serge Kubanza, serge.kubanza@wits.ac.za, 011 717 6515

Appendix 4: Participants' information sheet for community members



School of Geography, Archaeology and Environmental Studies

Private bag 3, Wits 2050

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa

Dear sir/madam

I am Mkatoko Patricia Marilele, I am an Environmental Studies PhD student at the University of Witwatersrand. My supervisor is Dr. Serge Kubanza. I am conducting a research study about environmental and social impacts. The study title is "A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa".

I am inviting you to take part in answering questionnaire. If you decide to take part, your participation in this research study will last about 1 hour. The questionnaire is in person, it will be conducted at your home around Boksburg at 17:00 on the 9 March 2023, after working hours. With your permission. The original documents will be kept in a self-storage facility at my home, soft copies will be scanned and stored and a personal laptop where it will be access by myself through secured ID. The data will be stored for 5 years and be deleted once the studies have been completed (2028).

The questionnaires will be confidential and anonymous, when I share the results of the research study, I will not include your name or anything else that could identify you. If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits, or rights you would normally have if you decided not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study. The risks for this research study are no more than what happens in everyday life

This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

Researcher

Mkateko Marilele, 1591737@students.wits.ac.za, 0605694095

Supervisor

Dr. Nzalalemba Serge Kubanza, serge.kubanza@wits.ac.za, 011 717 6515

Appendix 5: Permission letter from the COE

OFFICE OF THE CITY MANAGER

To: Ms Mkateto Marilele

Enq: Thabo Nzoyi
Thabo.nzoyi@ekurhuleni.gov.za
(011) 999 – 0796

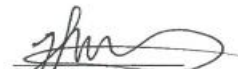


APPROVAL FOR THE REQUEST TO CONDUCT RESEARCH A CRITICAL ANALYSING OF THE ENVIRONMENTAL AND SOCIAL IMPACTS OF HUMAN SETTLEMENT DEVELOPMENT PROJECTS IN GAUTENG.

The City of Ekurhuleni acknowledges receipt of your request to conduct research a critical analysis of the environmental and social impacts of human settlement development projects in Gauteng.

Permission to conduct research in the Human Settlements Department is granted, subject that it does not interfere with assigned responsibilities. The Intergovernmental Relations Unit will in conjunction with the Strategy Department provide the necessary administrative and logistical support you may require.

Yours sincerely,


Dr Imogen Mashazi
CITY MANAGER ACTING

01/03/2023
DATE

Appendix 6: Permission letter from GDARD



GAUTENG PROVINCE

AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Enquiries: Riaan Beukes
Office of the Head of Department: GDARDE
Tel: +27 (0)11 240 2807
riaan.beukes@gauteng.gov.za

Ms. MP Marilele
Student, Doctor of Philosophy
University of Witwatersrand

Dear Ms Marilele

PERMISSION TO CONDUCT RESEARCH FOR YOUR DOCTOR OF PHILOSOPHY DEGREE STUDIES

The Gauteng Department of Agriculture, Rural Development and Environment has reviewed your request to conduct research for your studies.

You are granted permission to conduct research by interviewing employees within the Directorate, Impact Management and to utilize secondary data from Environmental Impact Assessment reports.

The commencement of your research is dependent on adherence to the Protection of Personal Information Act 4 of 2013.

Note: Execution of this research is dependent on the adherence to the Protection of Personal Information Act (**POPIA**).

To interview relevant officials and to get information pertaining to reports, please contact the Director: Impact Management on 011 240 2573 or steven.mukhoia@gauteng.gov.za.

The Department wishes you all the best in the research.

Kind regards,


Ms. Matilda Gasela
HOD: AGRICULTURE, RURAL DEVELOPMENT AND ENVIRONMENT

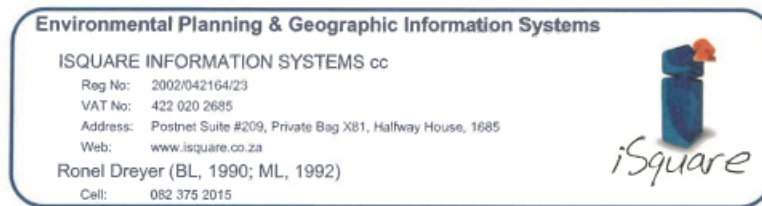
Date:

09 March 2023

Department of Agriculture and Rural Development, 56 Durr Street, Uninetha House, Johannesburg, 2001. PO Box X 4099, Johannesburg, 2000 Tel: (011) 240-2800
Website: www.gauteng.gov.za

Tel: (011) 240 2500 F: Fax: 085 420 1000
56 Durr Street Uninetha House, Johannesburg, 2001 F: PO Box 3768, Johannesburg, 2100
www.gauteng.gov.za | Hotline: 0800 11000

Annexure 7: Permission letter from I-square Information system



February 2023

Mkateko Marilele
09 Oakland Golf Estate
Main Reef and Comet Street
Boksburg
1459
1591737@students.wits.ac.za

Dear Ms. Mkateko Marilele
Cc. Dr Serge Kubanza

Re: Request for permission to collect data at Isquare Environmental Planning & GIS

Your email of request for permission to collect data at Isquare Environmental Planning & GIS on "A critical analysis of the environmental and social impacts of human settlement development projects in Gauteng, South Africa" is acknowledged.

We duly note the conditions of the study for strict academic purposes, the results of the study will be confidential and that anonymity for both respondents and the organisation are guaranteed. Should you or the University of Witwatersrand want to publish the study in any other manner than the final thesis, permission should be further obtained from Isquare Environmental Planning & GIS to do so.

Based on the above conditions, your request to collect data is granted. We are looking forward to the outcomes and recommendations of your study and the positive contributions towards the socio-economic and environmental management field.

Yours sincerely

Ronel Dreyer
Reg EAP (EAPASA)

Date: 27 February 2023

Annexure 8: Permission letter from Lokisa Environmental Consulting



March 2023
Mkateko Marilele
09 Oakland Golf Estate
Main Reef and Comet Street
Boksburg
1459
1591737@students.wits.ac.za

Dear Ms. Mkateko Marilele
Cc. Dr Serge Kubanza

Re: Request for permission to collect data at Lokisa Environmental Consulting CC

Your email of request for permission to collect data at Lokisa Environmental Consulting CC on "*A critical analysis of the environmental and social impacts of human settlement development projects in Gauteng, South Africa*" is acknowledged.

We duly note the conditions of the study for strict academic purposes, the results of the study will be confidential and that anonymity for both respondents and the organisation are guaranteed. Should you or the University of Witwatersrand want to publish the study in any other manner than the final thesis, permission should be further obtained from Lokisa Environmental Consulting CC to do so.

Based on the above conditions, your request to collect data from Lokisa Environmental Consulting CC is granted. We are looking forward to the outcomes and recommendations of your study and the positive contributions towards the socio-economic and environmental management field.

Yours sincerely

Delia de Lange
Lokisa Environmental Consulting CC
03 March 2023

LOKISA ENVIRONMENTAL CONSULTING CC
REG NO: 2006/217680/23
72 HERBERT BAKER STREET, GROENBOOF, PRETORIA,
P.O. BOX 219 GROENKLOOF 0027
TEL (012) 346 7655/460 0159/460 0163 FAX (012) 346 6074 lokisa@lokisa.co.za/elaine@lokisa.co.za
DIRECTOR: E MINNAAR
www.lokisa.co.za

Appendix 9: Permission letter from Manyabe Environmental Consulting

Corner Paul Smith Street and 10th Avenue
Unit 269, Block F, Ravenswood Mews
Boksburg North, 1459
Cell: 072 361 9527
Tel: 011 863 1079
Fax: 086 605 5488
Email Address: mpho@manyabeconsultancy.com



February 2023
Mkateko Marilele
09 Oakland Golf Estate
Main Reef and Comet Street
Boksburg
1459
1591737@students.wits.ac.za

Dear Ms. Mkateko Marilele

Re: Request for permission to collect data at Manyabe Consultancy

Your email of request for permission to collect data at Manyabe Consultancy on "*A critical analysis of the environmental and social impacts of human settlement development projects in Gauteng, South Africa*" is acknowledged.

We duly note the conditions of the study for strict academic purposes, the results of the study will be confidential and that anonymity for both respondents and the organisation are guaranteed. Should you or the University of Witwatersrand want to publish the study in any other manner than the final thesis, Manyabe consultancy will be approached for permission to do so.

Based on the above conditions, your request to conduct the research study in Manyabe Consultancy is granted. We are looking forward to the outcomes and recommendations of your study and the positive contributions towards the environmental and social impact management field.

Yours sincerely

Mpho Manyabe
Managing Director
Date: 22 February 2023

MANAGING DIRECTOR: MPHO MANYABE
COMPANY REG: 2014/063679/07

Appendix 10: Permission letter from Nali sustainable Solutions

Nali

Sustainability Solutions (Pty) Ltd

Environmental and Development Consultants

Mkateko Marilele
09 Oakland Golf Estate
Main Reef and Comet Street
Boksburg
1459

Ref: Mkateko

Dear Ms. Mkateko Marilele

Re: Request for permission to collect data at Nali Sustainability Solutions

Your letter of request for permission to collect data at Nali Sustainability Solutions as part of your study titled "A critical analysis of the environmental and social impacts of human settlement development projects in Gauteng, South Africa" is acknowledged.

We take note of the conditions of the study, that this will strictly be for academic purposes, that the results of the study will be confidential and that anonymity for both respondents and the organisation is guaranteed. Should you or the University of Witwatersrand want to publish the study in any other manner than the final thesis, permission should be further obtained from this company.

Based on the above conditions, your request to collect data from Nali Sustainability Solutions is granted. We are looking forward to the outcomes and recommendations of your study and the positive contributions towards the environmental impact management field.

Yours sincerely



Pirate Ncube
Director/Founder
Date: 24 February 2023

t: 012 676 8315 c: 0824517120 f: 086 694 1178 e: pirate.ncube@mail.com web: nalisustainabilitysolutions.co.za
P.O. Box: P. Bag XI, Stand 1829, Irene Farm Villages, VrR, 0045 Address: 65 Country Club Way, Irene Farm Villages, Centurion, 0045
Reg# 2012/180460/07 | VAT# 4290263229

Appendix 11: Permission letter from Nsovo Environmental Consulting



02 March 2023

Mkateko Marilele
09 Oakland Golf Estate
Main Reef and Comet Street
Boksburg, 1459

Dear Ms Mkateko Marilele

Re: Request for permission to collect data at Nsovo Environmental Consulting

The above subject matter refers.

I acknowledge receipt of your letter requesting permission to undertake research in connection with your proposed research "A critical analysis of the environmental and social impacts of human settlement development projects in Gauteng, South Africa".

The purpose of this letter is to grant Mkateko Marilele at the University of Witwatersrand in the school of Environmental Studies, Archaeology and Geography permission to conduct research at Nsovo Environmental Consulting. The permission includes interviewing staff and participating in a focus group discussion.

Should you wish to publish the study in any manner other than the final thesis, you are therefore required to obtain permission from this company to do so.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Munyadziwa Rikhotso', is written over a horizontal line.

Munyadziwa Rikhotso
Executive Director

CK2007/252005/23
Address: 40 Lyncon Road, Carlswald, Midrand, 1684
T: 087 803 9294 C: 071 602 2369 F: 086 602 8821
E-mail: admin@nsovo.co.za Website: www.nsovo.co.za

Appendix 12: Questions for community members

ENVIRONMENTAL AND SOCIAL IMPACTS OF HUMAN SETTLEMENT DEVELOPMENT PROJECTS

Interviewer	
Date of data collection	
Start and finish time	

Response codes

No	Status	(√)
1	Completed	
2	Respondent not available	
3	Reschedules	
4	Unwilling	
5	Other reason (specify)	

1. Questionnaire for community members (In and around selected human settlement development projects in Boksburg)

This survey is in partial fulfilment of the PhD degree requirements with the University of the Witwatersrand, Johannesburg, South Africa. The study aims to investigate environmental and social impacts associated with human settlement developments, under the COE in Boksburg and the factors contributing to poor management of such impacts. Your participation is voluntarily, and your responses are confidential. Your co-operation will be highly appreciated.

You are requested to select the suitable answer by placing a mark (√). Please the answer that best describe your experience and observations.

Section A: Personal details of the participants**1. Gender**

Female	1
Male	2

2. Age group

18-20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years
1	2	3	4	5	6

3. What is your highest level of education?

No	Highest education	(√)
1	Matric	
2	Diploma	
3	Honours	
4	Masters	
5	Doctorate	

4. How long have you been residing around this area?

< 5 years	5-10 years	10-20 years	>20 years
1	2	3	4

Section B: Environmental and social impacts associated with human settlement development projects, consideration of public concerns during planning phase of the projects.

1. Are you aware of some of the human settlement development projects taking place in your residential areas? If yes, what are some of the projects that you know?

Name of human settlement development projects

No	Name of Human settlement development project	Tick ((√))	Participant status (resident/adjacent)
1	Leeuwpoot Park Ext 19		
2	Klipportjie Park Ext 25		
3	Sunward Park Ext 29		
4	Parkdene Ext 9		
5	Dawn Park Ext 4		

2. Are you aware of the environmental and social issues associated with human settlement development projects taking place in your residential area?

No	0
Yes	1

If answered yes, what are some of the environmental and social impacts you know of, associated with human settlements development projects?

No:	
1.	
2.	
3.	
4.	
5.	

3. Do you think human settlement development projects affect loss of plants and animals within your areas?

No	Loss of biodiversity	(√)
1	Low impact	
2	Medium impact	
3	High impact	

4. How would you rate the loss of land for agricultural purposes around your area resulting from human settlement development projects?

No	Loss of land for agricultural purposes	(√)
1	Low impact	
2	Medium impact	
3	High impact	

5. To what extent do you think human settlement development projects contribute to air pollution around your area (dust and smell)?

No	Air pollution	(√)
1	Low impact	
2	Medium impact	
3	High impact	

6. Based on your observation, how would you rate visual impacts resulting from residential development infrastructures and change on sense of place?

No	Visual Impacts	(√)
1	Low impact	
2	Medium impact	

7. How would you rate noise pollution associated with construction and operational phase of the human settlement projects around your area?

No	Noise impacts	(√)
1	Low impact	
2	Medium impact	
3	High impact	

8. What are some of the diseases associated with human settlement development projects?

No	
1	
2	
3	
4	
5	

9. Do you think human settlement development projects contributes to potential markets for informal trading around your area?

No	Potential markets for informal trading	(√)
1	Low impact	
2	Medium impact	
3	High impact	

10. Have human settlement development projects contribute to employment/job creation around your area?

No	Employment creation	(√)
1	Low impact	
2	Medium impact	
3	High impact	

11. Based on your observation, do you see tourism and eco-tourism being affected by human settlement development projects around your area?

No	Potential effect on tourism and eco-tourism	(√)
1	Low impact	
2	Medium impact	
3	High impact	

12. Are continuous expansion of urban areas poses a risk to safety and security around your area?

No	Impacts on the safety and security of neighbouring/surrounding settlements.	(√)
1	Low impact	
2	Medium impact	
3	High impact	

13. To what level do human settlement development projects contribute to disruption of the existing infrastructure and services around your area (i.e., Waste management collection)?

No	Disruption to the existing infrastructure and services	(√)
----	--	-----

1	High impact	
2	Medium impact	
3	Low impact	

Do you suffer any disruption of waste collection around the area?

No	1	2
(tick) (✓)	Yes	No

14. How would you rate the impact of human settlement development projects on management of stormwater and sanitation in your neighbourhood?

No	Impact of storm water management and sanitation	(✓)
1	High impact	
2	Medium impact	
3	Low impact	

Do you suffer any disruption of storm water and sewage spillages within the area?

No	1	2
(tick) (✓)	Yes	No

15. Based on your observation around your area, how would you rate the extent on which human settlement developments wetlands and other watercourses (dam, rivers, pans and etc)?

No	Impact on wetlands and other water bodies.	(✓)
1	High impact	
2	Medium impact	

3	Low impact	
---	------------	--

17. To what extent do you think human settlement development projects contribute to energy consumption?

No	Energy consumption	(√)
1	Low impact	
2	Medium impact	
3	High impact	

18. How is the traffic flow affected by human settlement development projects within your area?

No	Traffic congestion	(√)
1	Low impact	
2	Medium impact	
3	High impact	

19. Have you ever suffered any loss to property due to flooding around your area?

No	0
Yes	1

If answered yes, how did the loss affect you financially?.....|

20. Do you feel like your human rights to environment that is not harmful to your wellbeing being violated by continuous human expansion around your area?

No	0
Yes	1

If answered yes, kindly explain how?.....

21. How would you rate the Developer's performance on addressing the following aspects around your area?

No	Aspect	Not successful	Marginally successful	Moderately successful	Successful	Very successful
21.1.	Consideration of ecological importance into their development plans and implementation.	1	2	3	4	5
21.2.	Reducing social impacts by improving community's livelihood and wellbeing.	1	2	3	4	5
21.3.	Identifying appropriate measures to mitigate crime and safety challenges into their spatial designs.	1	2	3	4	5
21.4.	Submitting clear and unbiased information to competent authorities (decision makers) on the identified potential environmental and social impacts associated with human settlement projects.	1	2	3	4	5

21.5	Considering disruption to existing infrastructure for service delivery	1	2	3	4	5
------	--	---	---	---	---	---

22. Stakeholders' engagement

Were you registered as an interested and affected party of the public participation process during the planning phase of the project under investigation?

No	0
Yes	1

23. Please rate your level of satisfaction about the following.

No	Aspects	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
23.1.	Do you think Developers give sufficient time to the public for comments and submission of their concerns?	1	2	3	4	5
23.2.	Do you think community members are consulted as early as possible about the planning and designing phases of the project?	1	2	3	4	5

23.3	Are residents equally considered and participate on developments taking place around the area?	1	2	3	4	5
23.4	Are public meetings for human settlement development stakeholders' engagement held at accessible venues?	1	2	3	4	5
23.5	Are public notice for the human settlement projects displayed on an open and accessible areas?	1	2	3	4	5
23.6	Are community members allowed to share their honest views with no fear of victimisation?	1	2	3	4	5
23.7	Do you think environmental authorisation conditions incorporate issues raised during the public participation?	1	2	3	4	5

24. In your own opinion, how can environmental and social issues associated with human settlement development projects be best managed in your area?

.....
.....

25. Do you have any further comments or questions regarding what was discussed above?

.....
.....

Thank you for your time and assistance

Appendix 13: Questions for CoE officials

This interview is in partial fulfilment of the PhD degree requirements with the University of the Witwatersrand, Johannesburg, South Africa. The study aims to investigate environmental and social impacts associated with human settlement developments, under the COE in Boksburg and the factors contributing to poor management of such impacts. Your participation is voluntarily, and your responses are confidential. Your co-operation will be highly appreciated.

Interviewer	
Date of data Collection	
Start and finish time	

Response codes

No	Interview Status	(√)
1	Completed	
2	No respondent available	
3	Postponed	
4	Refused	
5	Other reason (specify)	

Section A: Personal details of the respondent

1. What is your gender?

No	Gender	(√)
----	--------	-----

1	Female	
2	Male	

2. Age group

18-20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years
1	2	3	4	5	6

3. What is your highest level of education?

No	Highest education	(√)
1	Matric	
2	Diploma	
3	Honours	
4	Masters	
5	Doctorate	

4. How long have you been working for this Organisation?

< 2 years	2-5 years	5-8 years	8-10 years	>10 years
1	2	3	4	5

5. Position in the Organisation/Company?

Entry position	Middle management	Senior Management
1	2	3

6. Professional body registration? (Please mark the appropriate answer with (√))

Engineering Council of South Africa (ECSA)	The South African Council for the project and Construction management professions (SACPCMP)	Other professional body registration (specify)
--	---	--

7. Name of human settlement development projects implemented.

No	Name of Human settlement development project	Tick ((√))
1	Leeuwpoort Park Ext 19	
2	Klippoortjie Park Ext 25	
3	Sunward Park Ext 29	
4	Parkdene Ext 9	
5	Dawn Park Ext 4	

Section B: Perception on consideration of environmental and social impacts in all phases of project life cycle.

1. Does your Organisation have environmental and social management policies and plans?

If Yes (....), proceed to question 2

If No (....), proceed to question 3

2. How does your Organisation ensure that Organisational policies and plans are implemented in all phases of the project life cycle?

.....

3. What other measures does your Organisation has in place to ensure that environmental and social impacts associated with residential developments are mitigated?.....

.....

4. What is your understanding on environmental and social impacts associated with urbanisation?.....

.....

5. At what phase of the project life cycle do you think stakeholder engagement or public participation should be conducted?

.....

6. What selection criteria does your Organisation use to identify areas suitable for residential developments?.....

.....

7. In your project cost estimation, what percentage is allocated for compliance with environmental and social requirements?.....

8. How often are your developments monitored for compliance with environmental and social authorisations and licences by the Competent authorities?

.....

9. Has your Organisation ever received any rejection from the Competent authorities (Environmental Department or Municipality City Planning) regarding proposed residential development project?

Yes (...) Please state reasons for rejection.....

No (...|)

10. Has your Organisation ever received any appeal from the interested and affected parties with relation to human settlement development projects that was authorised by the Competent authority?

Yes (....) Please state the reasons for appeal and how it was resolved.....

No (....)

11. Does your Organisation have internal personnel responsible for environmental and social management?

Yes (....) What role do they play in identification of environmental and social impacts of the proposed project?.....

No (....) Who is responsible for environmental and social management within the Organisation?

.....

12. Does your Organisation have Corporate social responsibility initiatives?

Yes (....) How are they applied?.....

.....

No (....)

14. What other international standards does your organization conforms to related to best practise on environmental and social aspects?.....

.....

15. How often do your Organisation receive complaints from residents and adjacent residents about safety, noise, security and noise from the residential properties under your management?

Never	On few occasions	Often	Very often
1	2	3	4

16. What would you consider as a fatal flaw for a human settlement development project to not go ahead and at what phase of the project life cycle would this be considered?

.....

.....

.....

17. Have you ever appointed specialist to conduct environmental and social impacts assessment for proposed human settlement development project, but out of the requirement of the legal obligations?

Yes (....)

Why?.....

.....

No (....) Why

.....

.....

18. Would you like to make any further comments or ask any question regarding what we have just discussed?

.....

.....

Thank you so much for your contribution.

Appendix 14: Questions For GDARD Officials

This interview is in partial fulfilment of the PhD degree requirements with the University of Witwatersrand, Johannesburg, South Africa. The study aims to investigate environmental and social impacts associated with human settlement developments, under the COE in Boksburg and the factors contributing to poor management of such impacts. Your participation is voluntarily, and your responses are confidential. Your co-operation will be highly appreciated.

Interviewer	
Date of data collection	
Start and finish time	

Response codes

No	Status	(√)
1	Completed	
2	No respondent available	
3	Postponed	
4	Refused	
5	Other (specify)	

Section A: Personal details of the respondent

1. What is your gender?

No	Gender	(√)
----	--------	-----

1	Female	
2	Male	

2. Age group

18-20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years
1	2	3	4	5	6

3. What is your highest level of education?

No	Highest education	(√)
1	Matric	
2	Diploma	
3	Honours	
4	Masters	
5	Doctorate	

4. How long have you been working for this Organisation?

< 2 years	2-5 years	5-8 years	8-10 years	>10 years
1	2	3	4	5

5. Position in the Organisation?

Entry position	Middle management	Senior Management
1	2	3



Section B: Environmental and social impacts associated with human settlement development projects, challenges associated with management of the impacts, institutional challenges, policy challenges and monitoring of the authorised projects.

1. Do you think environmental and social impacts are well addressed during planning and operation phase of the human settlement development projects?

.....

2. To what extent does human settlement development projects' approvals consider the concerns raised by the interested and affected parties?

.....

3. What barriers and institutional challenges exist in managing/ mitigating environmental and social impacts of human settlement development projects?

.....

4. To what extent do you think property Developers incorporate their companies' social corporate initiatives into managing social impacts of development?

.....

5. What would you consider to be the most environmental and social aspects that has high risk and be prioritise with regard to human settlement project? and why?

.....

6. Based on your job experience, would you consider EIA tool sufficient in addressing social impacts of human settlement project? Why?

.....

.....

7. Have you ever recommended approval of human settlement development project application without SIA reports, service agreement reports, biodiversity reports., waste management plan and etc as annexures? Why?

.....
.....

8. To what extent do you consider the spatial framework and land use management factors surrounding the areas proposed for human settlement development projects in your decision making?

.....
.....

9. Is your department/municipality responsible for ensuring that cumulative impacts associated with the human settlement development projects are considered before approvals?

(Yes) (....) what measures are in place to ensure this?.....

(No) (...) what do you think should be done?.....

10. What factors should be considered for human settlement development projects that does not legally required to undergo EIA process but have potential to harm the environment and affect wellbeing of the people?

.....
.....

11. In your opinion, do you think EIA/SIA processes are sufficient in addressing environmental and social impacts of human settlement project? Kindly motivate your answer.

.....
.....

12. Do you think monitoring of authorised human settlement development project is conducted efficiently during operational phase of the project?

Yes(...)

Motivate.....

.....

No(...)

Motivate.....

.....

13. How often do communities complain to government (your institution) about poor services related to water supply, sanitation, stormwater poor management, sewage spillage, poor waste management, security and safety issues?

Never	On few occasions	Often	Very often
1	2	3	4

14. Would you like to make any further comments or ask any question regarding what we have just discussed?

.....

.....

Thank you so much for your contribution.

Appendix 15: Questions for environmental assessment practitioners

This interview is in partial fulfilment of the PhD degree requirements with the University of the Witwatersrand, Johannesburg, South Africa. The study aims to investigate environmental and social impacts associated with human settlement developments, under the COE in Boksburg and the factors contributing to poor management of such impacts. Your participation is voluntarily, and your responses are confidential. Your co-operation will be highly appreciated.

Interviewer	
Date of data Collection	
Start and finish time	

Response codes

No	Interview Status	(√)
1	Completed	
2	No respondent available	
3	Postponed	
4	Refused	
5	Other reason (specify)	

Section A: Personal details of the respondent

1. What is your gender?

No	Gender	(√)
----	--------	-----

1	Female	
2	Male	

2. Age group

18-20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years
1	2	3	4	5	6

3. What is your highest level of education?

No	Highest education	(√)
1	Matric	
2	Diploma	
3	Honours	
4	Masters	
5	Doctorate	

4. How long have you been working for this Organisation?

< 2 years	2-5 year	5-8 years	8-10 years	>10 years
1	2	3	4	5

5. Position in the Organisation/Company?

Entry position	Middle management	Senior Management
----------------	-------------------	-------------------

1	2	3
---	---	---

6. Professional body registration? (Please mark the appropriate answer with (✓))

South African Council of Professional Natural Scientists (SACNASP)	Environmental Assessment Practitioners Association of South Africa (EAPASA)	Other professional body registration (specify)

Section B: Perception on environmental and social impacts associated with human settlement developments in Gauteng province, institutional and legal framework challenges, and recommendations on best practices.

1. To what extent do you think human settlement development projects possess detrimental harm to the environmental and social well-being of the Citizens?

.....

2. How would you rate the following environmental and social issues in relation to human settlement developments in Gauteng province? Using the scale below

Low impacts	Medium impacts	High impacts
1	2	3

No	Environmental impacts	1,2 or 3
1	Air pollution	
2	Poor waste management (collection and disposal)	

3	Soil erosion	
4	Ecological degradation (expansion of development footprint)	
5	Loss of land for agricultural purposes	
7	Water pollution (disruption of wetland, streams, pans and dams)	
11	Permanent changes to land use	
12	Energy consumption	
13.	Loss to plants	
14.	Loss to animals	
15.	Stormwater management	
16.	sanitation	
No	Social impacts	1,2,3
1.	Safety and security risks	
2.	Impacts on tourism attraction	
3.	Noise pollution	
4	Spreading of diseases	
5.	Traffic congestion	
6.	Disruption to the existing infrastructures and services	
7.	Visual impacts	
8.	Archaeological impacts	
9.	Job creation	

3. Do you think Developers play a role in mitigating environmental and social impacts associated with residential developments?

.....
.....

4. Is EIA and SIA tools sufficient to address all the environmental and social impacts associated with human settlement developments?

.....
.....

5. Would you consider projects that does not legally require EIA and SIA to be contributing to environmental and social challenges faced by the communities?

.....
.....

6. In your practice, what measures do you have in place to ensure that you are independent and not bias in your assessment of identified environmental and social impacts of the projects?

.....
.....

7. What selection criteria do you use to determine the need for additional specialist studies required before decision making?

.....|

8. Have you ever been appointed to conduct impact assessments for environmental and social issues out of EIA/SIA legal requirements?

Yes (....) what were the motive behind the appointment?.....

No (...).

9. How do you ensure public concerns raised during the public participation process are incorporated in decision making?

.....
.....

10. Have you ever been appointed as Environmental Control Officer to monitor compliance to environmental authorisation issued by the Competent authority for human settlement development projects?

Yes (....) what were the common non-compliances for both during construction and operational phase of the project?

.....
.....

No (...)

11. What do you think are the major service delivery challenges that affect environment and wellbeing of the Citizens?

.....
.....

12. What do you think are the environmental, social and spatial legal framework challenges that exists and contributes to the failures of proper management of impacts associated with human settlement development projects?

.....

13. Would you like to make any further comments or ask any question regarding what we have just discussed?

.....|

Thank you so much for your contribution.

Appendix 16: Questions for focus group discussion

This interview is in partial fulfilment of the PhD degree requirements with the University of the Witwatersrand, Johannesburg, South Africa. The study aims to investigate environmental and social impacts associated with human settlement developments, under the COE in Boksburg and the factors contributing to poor management of such impacts. Your participation is voluntarily, and your responses are confidential. Your co-operation will be highly appreciated.

Interviewer	
Date of data Collection	
Venue	
Start and finish time	
Number of attendees	

1. To what extent do you think human settlement development projects possess detrimental harm to the environmental and social well-being of the Citizens?

.....

2. How would you rate the following environmental and social issues in relation to human settlement developments in Gauteng province? Using the scale below

Low impacts	Medium impacts	High impacts
1	2	3

No	Environmental impacts	1,2 or 3
1	Air pollution	

2	Poor waste management (collection and disposal)	
3	Soil erosion	
4	Ecological degradation (expansion of development footprint)	
5	Loss of land for agricultural purposes	
7	Water pollution (disruption of wetland, streams, pans and dams)	
11	Permanent changes to land use	
12	Energy consumption	
13.	Loss to plants	
14.	Loss to animals	
15.	Stormwater management	
16.	sanitation	
No	Social impacts	1,2,3
1.	Safety and security risks	
2.	Impacts on tourism attraction	
3.	Noise pollution	
4	Spreading of diseases	
5.	Traffic congestion	
6.	Disruption to the existing infrastructures and services	

7.	Visual impacts	
8.	Archaeological impacts	
9.	Job creation	
10.	Loss to property due to vandalism (crime) and flooding	



3. Do you think Developers play a role in mitigating environmental and social impacts associated with residential developments?

.....

4. Is EIA and SIA tools sufficient to address all the environmental and social impacts associated with human settlement developments?

.....

5. Would you consider projects that does not legally require EIA and SIA to be contributing to environmental and social challenges faced by the communities?

.....

6. In your practice, what measures do you have in place to ensure that you are independent and not bias in your assessment of identified environmental and social impacts of the projects?

.....

7. What selection criteria do you use to determine the need for additional specialist studies required before decision making?

.....

8. Have you ever been appointed to conduct impact assessments for environmental and social issues out of EIA/SIA legal requirements?

Yes (....) what were the motive behind the appointment?.....

No (...).

9. How do you ensure public concerns raised during the public participation process are incorporated in decision?

.....

10. Have you ever been appointed as Environmental Control Officer to monitor compliance to environmental authorisation issued by the Competent authority for human settlement development projects?

Yes (....) what were the common non-compliances for both during construction and operational phase of the project?

.....

No (....)

11. What do you think are the major service delivery challenges that affect environment and wellbeing of the people?

.....

12. What do you think are the environmental, social and spatial legal framework challenges that exists and contributes to the failures of proper management of human settlement development projects?

.....

13. Would you like to make any further comments or ask any question regarding what we have just discussed?

.....

Thank you so much for your contribution.

Appendix 17: Consent forms for interviews with key informants

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa.

Name of the Researcher: Mkatoko Marilele

I agree to participate in this research project.

I agree to the following:

The research study was explained to me. I understand what this study is about. YES NO

I understand that I can volunteer to take part in the study YES NO

I agree that the interview may be audio recorded YES NO

I agree that direct quotations from my interview may be used by the researcher in their research report. YES NO

I agree that other researchers may use the information I provide in my interview (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on. YES NO

By signing below, I am indicating that I agree to participate in the research.

Participant signature.....|

Participant Name.....

Date.....

Researcher's signature.....

Researcher's name.....

Date.....

Appendix 18: Consent Forms for FGD

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa.

Name of the Researcher: Mkatoko Marilele

I agree to participate in this research project.

I agree to the following:

The research study was explained to me. I understand what this study is about. YES NO

I understand that I can volunteer to take part in the study YES NO

I agree that my answers to the Focus Group Discussion may be documented YES NO

I agree that my answers to the Focus Group Discussion may be used by the researcher in their research report. YES NO

I agree that other researchers may use the information I provide in the Focus Group Discussion (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on. YES NO

By signing below, I am indicating that I agree to participate in the research.

Participant signature.....|

Participant Name.....

Date.....

Researcher's signature.....

Researcher's name.....

Date.....

Appendix 19: Consent Forms for Community Members

A critical analysis of the environmental and social impacts of Human Settlement development projects in Gauteng, South Africa.

Name of the Researcher: Mkatoko Marilele

I agree to participate in this research project.

I agree to the following:

The research study was explained to me. I understand what this study is about. YES NO

I understand that I can volunteer to take part in the study YES NO

I agree that my answers to the questionnaires may be documented YES NO

I agree that my answers to the questionnaires may be used by the researcher in their research report. YES NO

I agree that other researchers may use the information I provide in the questionnaires (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on YES NO

By signing below, I am indicating that I agree to participate in the research.

Participant signature.....

Participant Name.....

Date.....

Researcher's signature.....

Researcher's name.....

Date.....

Appendix 20: Review form for EIA Reports with Lee and Colley (1999) Package

Review area 1: Description of the development, the local environment, and baseline conditions	Review Category	
Indicator 1.4.1: (a) Has the EIA report outline the description of the proposed development, environment features, cumulative challenges currently experienced in the region?	Grading symbols	explanations
	A	Generally well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies.
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
	F	Not satisfactory, important task(s) poorly done or not completed
(b) Has the EIA report outlined the current state of the project site description and key factors to be considered on serving the project site?	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
	F	Not satisfactory, important task(s) poorly done or not completed.

(c) Does the EIA report outlined key factors to be considered on waste management, air pollution, water pollution and other impacts associated with human settlement development projects?	Grading symbols	Explanations
	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must, <u>as a whole</u> , be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
(a) Has the EIA report clearly identified and define the impacts associated with the proposed development.	F	Not satisfactory, important task(s) poorly done or not completed.
	Review area 2: Identification and evaluation of key environmental and social impacts	
	Review Category	
	Grading symbols	Explanations
	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must, <u>as a whole</u> , be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
	F	Not satisfactory, important task(s) poorly done or not completed.

(b) Does the outlined impacts indicate the severity of exposure, assessment of social factors such as access to education, health, cultural and religious, sanitation, waste collection, safety and security, and other social activities.	Grading symbols	Explanations
	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must, <u>as a whole</u> , be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.

Review 3: Alternatives and mitigation	Review Category	
(a) Has the report indicated the feasible alternatives considered, such as site location, design alternatives and <u>etc?</u>	Grading symbols	Explanations
	A	Generally well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies.
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must, <u>as a whole</u> , be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
	F	Not satisfactory, important task(s) poorly done or not completed

b) Has the report outlined the mitigation measures, and how the proponent and competent authority will ensure compliance to the mitigation measures.	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies.
	F	Not satisfactory, important task(s) poorly done or not completed.
Review 4: Communication of results	Review Category	
(a)Has the report present the true reflection of the environment, EIA findings, addressed the concerns raised by the community members, and other key information that will assist decision makers to issue the EA?	A	Generally, well performed, no important tasks left incomplete
	B	Generally satisfactory and complete, only minor omissions and inadequacies
	C	Can be considered just satisfactory despite omissions and/or inadequacies
	D	Parts are well attempted but must be considered just unsatisfactory because of omissions or inadequacies
	E	Not satisfactory, significant omissions or inadequacies
	F	Not satisfactory, important task(s) poorly done or not completed.

Source: (Modified from EIA report review package of Lee and Colley grading symbols of 1999)