

**AN EVALUATION OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)
AS A TOOL FOR PROMOTING SUSTAINABLE DEVELOPMENT IN SOUTH
AFRICA**

by

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Declaration

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Abstract

The Strategic Environmental Assessment (SEA) has been developed as an Environmental Assessment (EA) tool for strategic decision-making and development planning. It is not intended to replace an Environmental Impact Assessment (EIA), but to complement it. The European Union (EU) SEA Directive 2001/42/EC informs all member states to include SEA into their own national regulations. This ensures the mainstreaming of environmental issues that threaten the livelihoods of individuals, economies, and the environment by integrating them into the development of policies, plans and programmes (PPPs).

The aim of this study was to evaluate whether SEA is an effective tool for promoting Sustainable Development (SD) in South Africa (SA), through an analysis of SEA case studies. The objectives were:

- (i) Use published literature to provide a theoretical framework for evaluation of whether SEA is effective in promoting sustainable development;
- (ii) Identify and explain the significant strengths and weaknesses for SEA;
- (iii) Provide the legislative framework and policies that promote sustainability and sustainable development in South Africa;
- (iv) Identify appropriate case studies where SEA was applied in South Africa, and
- (v) Evaluate the case studies and use the analysis to determine whether SEA is an effective tool for promoting environmentally sustainable development in SA.

The methodology for this study was based on a non-empirical research design and entailed a literature review and case study approach. The case studies were five SEAs conducted in SA, which were evaluated against five SEA performance criteria developed by the International Association for Impact Assessment (IAIA) for evaluation of good quality of SEA, and six Sustainable Development Goals (SDGs) adopted by United Nations (UN) members states in 2015. The five case studies were:

- (i) Square Kilometre Array (SKA) SEA;
- (ii) iLembe environmental management framework (EMF);
- (iii) Greater Saldanha Bay EMF;
- (iv) Drakenstein Municipal Area EMF, and
- (v) Sandveld EMF.

Direct observation was exercised when evaluating all these case studies. Three measurement descriptors, namely, “strong”, “medium” and “weak” were applied to describe the performance. The findings revealed that SEA can, indeed, promote SD effectively in South Africa, as evidenced by the fact that there was no evaluated case study that rated as “weak.” The overall scale of

evaluation against both SEA performance criteria and SDGs was “strong”, and “medium” secondarily.

The recommendations were centered on the findings of this study. These are:

- (i) Public participation must be fully considered during decision-making and the planning process, to allow stakeholders to participate and ensure that both decision-making and planning processes are robust, transparent and sealed. This includes integrating the three key pillars of sustainability, namely social, economic, and environmental dimensions, to fully promote SD and not only focus on some aspects and ignore others.
- (ii) The SDGs need to be fully incorporated into the earliest stage of planning of an SEA/EMF to help reduce the environmental issues in the mainstream, and combat climate change and its impacts for present and future generations.
- (iii) There is a need for decision-makers to consider implementation when formulating an SEA/EMF, so that the expected outcomes of the proposed projects can be monitored during implementation and post-implementation of the project. This can be accomplished through a well-prepared Strategic Environmental Management Plan (SEMP) or Integrated Environmental Management Plan (IEMP) that will promote and encourage sustainability in South Africa.

Permission to conduct this study was sought from Stellenbosch University and approved by its Ethics Committee.

Opsomming

Die Strategiese Omgewingsassessering (SEA) is ontwikkel as 'n Omgewingsassessering (EA)-instrument vir strategiese besluitneming en ontwikkelingsbeplanning. Dit is nie bedoel om 'n Omgewingsimpakassessering (EIA) te vervang nie, maar om dit te komplementeer. Die Europese Unie (*EU*) *SEA Directive 2001/42/EC* verwittig alle ledestate dat hulle SEA by hul eie nasionale regulasies moet insluit. Dit verseker dat omgewingsake wat die lewensbestaan van individue, die ekonomie en die omgewing bedreig die hoofstroom vorm deur dit by die ontwikkeling van beleide, planne en programme (PPP's) te integreer.

Die doel van hierdie studie was om te evalueer of SEA 'n doeltreffende instrument vir die bevordering van Volhoubare Ontwikkeling (SD) in Suid-Afrika (SA) is deur 'n ontleding van SEA-gevallestudies. Die doelstellings was:

- (i) Gebruik gepubliseerde literatuur om 'n teoretiese raamwerk te verskaf vir die evaluering van of SEA doeltreffend met die bevordering van volhoubare ontwikkeling is;
- (ii) Identifiseer en verduidelik die betekenisvolle sterktes en swakhede vir SEA;
- (iii) Voorsien die wetgewende raamwerk en beleide wat volhoubaarheid en volhoubare ontwikkeling in Suid-Afrika bevorder;
- (iv) Identifiseer toepaslike gevallestudies waar SEA in Suid-Afrika toegepas is; en
- (v) Evalueer die gevallestudies en gebruik die ontleding om te bepaal of SEA 'n effektiewe instrument vir die bevordering van omgewingsvolhoubare ontwikkeling in SA is.

Die metodologie vir hierdie studie is gegrond op 'n nie-empiriese navorsingsontwerp en het 'n literatuuroorsig en gevallestudie-benadering behels. Die gevallestudies was vyf SEA's wat in SA uitgevoer is, wat geëvalueer is teenoor vyf SEA-voldoeningskriteria wat ontwikkel is deur die *International Association for Impact Assessment (IAIA)* vir die evaluering van goeie gehalte SEA, en ses Volhoubare Ontwikkelingsdoelstellings (SDG's) wat in 2015 deur die Verenigde Nasies (VN)-ledestate aanvaar is. Die vyf gevallestudies was:

- (i) *Square Kilometre Array (SKA)* SEA;
- (ii) iLembe Omgewingsbestuursraamwerk (EMF);
- (iii) Groter Saldanhabaai EMF;
- (iv) Drakenstein Munisipale Area EMF; en
- (v) Sandveld EMF.

Regstreekse waarneming is toegepas met die evaluering van al hierdie gevallestudies. Drie

metingsbeskrywings, naamlik “sterk”, “medium” en “swak”, is toegepas om die voldoening te beskryf.

Die bevindings het getoon dat SEA, inderdaad, SD doeltreffend kan bevorder in Suid-Afrika, soos aangetoon word deur die feit dat daar geen geëvalueerde gevallestudie was wat tydens die omvattende skaal van evaluering as “swak” getakseer is nie teenoor sowel SEA-prestasiekriteria en SDG’s wat “sterk” en sekondêr “medium” was.

Die aanbevelings was gesentreer op die bevindings van hierdie studie. Dit is:

- (i) Openbare deelname moet tydens besluitneming en die beplanningsproses volledig oorweeg word, om belanghebbendes toe te laat om deel te neem en te verseker dat besluitneming sowel as die beplanningsproses kragtig, deursigtig en ’n verseëlde proses is. Dit sluit die integrering van die drie sleutelpilare van volhoubaarheid, naamlik sosiale, ekonomiese en omgewingsdimensies, in om SD volledig te bevorder en nie net op party aspekte te konsentreer en ander te ignoreer nie.
- (ii) Die SDG’s moet volledig by die vroegste stadium van beplanning van ’n SEA/EMF geïnkorporeer word om die omgewingsake in die hoofstroom te help verminder, en klimaatsverandering en die aanslae daarvan vir huidige en toekomstige geslagte te bestry.
- (iii) Dit is nodig dat besluitnemers implementering oorweeg wanneer ’n SEA/EMF geformuleer word, sodat die verwagte uitkomst van die voorgestelde projekte tydens implementering en na implementering van die projek gemoniteer kan word. Dit kan bereik word deur ’n goed voorbereide Strategiese Omgewingsbestuursplan (SEMP) of Geïntegreerde Omgewingsbestuursplan (IEMP) wat volhoubaarheid in Suid-Afrika sal bevorder en aanmoedig.

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List of Acronyms and Abbreviations

CSIR	Council for Scientific and Industrial Research
DAEA	Department of Agriculture and Environmental Affairs
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EA	Environmental Assessment
EAPs	Environmental Assessment Practitioners
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMZ	Environmental Management Zone
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information Systems
IAIA	International Association for Impact Assessment
IEM	Integrated Environmental Management
IEMP	Integrated Environmental Management Plan
I&APs	Interested and Affected Parties
IPCC	International Panel on Climate Change
IRSDP	iLembe Regional Spatial Development Plan
IWMP	Integrated Waste Management Plan
LGMSA	Local Government Municipal Systems Act
MSA	Municipal Systems Act
NCCAS	National Climate Change Adaptation Strategy
NCCRP	National Climate Change Response Policy
NCCRS	National Climate Change Response Strategy

NDP	National Development Plan
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEPA	National Environmental Policy Act
NMBM	Nelson Mandela Bay Municipality
NSGRP	National Strategy for Growth and Reduction of Poverty
NSSD	National Strategy on Sustainable Development
OECD	Organisation for Economic Co-operation and Development
PPPs	Policies, Plans and Programmes
PRS	Poverty Reduction Strategy
SA	South Africa
SD	Sustainable Development
SDF	Spatial Development Framework
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SKA	Square Kilometre Array
SoER	State of the Environment Report
SPLUMA	Spatial Planning and Land Use Management Act
TBL	Triple Bottom Line
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Conference on Sustainable Development
UNECE	United Nations Economic Commissions for Europe
UNEP	United Nations Environmental Programme
UNWCED	United Nations World Commission on Environment and Development
WB	World Bank

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

The strategic environmental assessment (SEA) is a tool that was formulated after the establishment of environmental impact assessments (EIA), to assist with strategic decision-making and development planning (Josimović *et al.*, 2021:1-13; Noble & Nwanekezie, 2017:165-173; Unalan & Cowell, 2019:1-42). SEA is not intended to replace EIA but to complement it (Alshuwaikhat, 2005:307-317), by helping to identify major environmental constraints and opportunities for development. SEA ensures that aspects of sustainability are considered in policies, plans and programmes (PPPs) (Fischer & González, 2021:1-9; Glasson & Thérivel, 2019:3-30; Shepherd & Ortolano, 1996:321-335).

It's estimated that some 60 developed and developing countries implement the tool for their main projects (Noble & Nwanekezie, 2017:165-173; Polido *et al.*, 2018:46-58). Due to increased attention to environmental issues, caused by economic development across the globe (Bentley, 2013:108-115), the European Union (EU) SEA Directive 2001/42/EC, amongst others, informs all member states to include SEA into their own national regulations (Josimović *et al.*, 2021:1-13; Polido *et al.*, 2014:138-148; Polido *et al.*, 2018:46-58). This is to be done in order to evaluate the potential environmental consequences (Momtaz, 2002:163-179) of PPPs, as well as to ensure that SEA is integrated into processes of PPPs.

Even though environmental issues such as environmental degradation, pollution and climate change have received more attention worldwide, and monitored by regulatory authorities for decades (Wang, 2004:161-169), there is still a huge demand for knowledge and understanding of an environmental assessment (EA) tool that can assist to reduce or minimise negative environmental impacts during the development of projects (Joseph *et al.*, 2015:238-254; Noble & Nwanekezie, 2017:165-173). The tool can also play a key role in evaluating and assessing development strategies that assist in promoting sustainable development (SD) (Alshuwaikhat & Abubakar, 2008:1777-1785).

In South Africa (SA), the SEA tool is applied to projects in the energy, agriculture, transport, industry, land use, town planning, waste and water management sectors (Fischer *et al.*, 2020:28-38; Josimović *et al.*, 2021:1-13). To ensure sustainability, there is a need first to consider whether the project is necessary or not. This is the first step in the mitigation strategy – to help conserve, control, manage and prevent any damage to the environment, as well as to promote future development in SA.

1.2 Problem Statement

The mainstreaming of environmental issues such as climate change, pollution and environmental degradation, caused by economic development, continues to threaten the life of individuals, the existence of economies, as well as the environment, all over the world (Bentley, 2013:108-115). Poor people living in developing countries are mostly affected by these issues when natural resources are scarce or damaged (Barnett & Morse, 2013:1-64). About 56% live in poverty in SA, and 28% in extreme poverty (Chakona & Shackleton, 2019:87-94). Some of these individuals encounter health problems that at times lead to death. This particularly is the case with poor people living in rural areas of SA (Landrigan *et al.*, 2016:10-19; Munawer, 2018:87-96; Zhengfu *et al.*, 2010:215-223). Deteriorating ecosystems also lead to degradation of plant and animal habitats. To reduce these environmental issues, there is a need for proper strategic planning and management of natural resources.

There are policies and a legislative framework in place that contribute to reducing negative environmental impacts in SA (Lumby, 2005:65-82), but more development is needed of an EA tool that can assist in development planning and decision-making process (White & Noble, 2013:60-66). The SEA assists with strategic decision-making and to address cumulative effects of development decisions (Alshuwaikhat, 2005:307-317; Kabir *et al.*, 2020:368-381), assisting decision-makers and stakeholders to think more clearly about the “consequences of their actions” with regard to the environment (Momtaz, 2002:163-179).

Therefore, this study provides more understanding about the importance of SEA as an effective tool that promotes SD in SA.

1.3 Research Question

This study will investigate whether the SEA tool contributes effectively to promote sustainable development in South Africa.

1.4 Research Aim

The aim of this study is to evaluate strategic environmental assessment case studies and use the analysis to determine whether SEA is an effective tool for promoting SD in SA.

1.5 Specific Objectives

- Use published literature to provide a theoretical framework for evaluation of whether SEA is effective in promoting sustainable development;
- Identify and explain the significant strengths and weaknesses for SEA;

- Provide the legislative framework and policies that promote sustainability and sustainable development in South Africa;
- Identify appropriate case studies where SEA was applied in South Africa and
- Evaluate the case studies and use the analysis to determine whether SEA is an effective tool for promoting environmentally sustainable development in SA.

1.6 Research Methodology

1.6.1 Overview

This study will be a non-empirical research design, a component design achieved without conducting any experiments or collecting primary data (Mouton *et al.*, 2006:574-587). Literature reviews will be used to evaluate existing data related to SEA and SD, in order to understand the linkage between the two concepts and gain more understanding of how SEA can be effective in promoting SD in SA.

Literature reviews are systematic, reproducible, and an explicit method used to identify, synthesise and evaluate existing, completed or recorded data produced by scholars, researchers and EA practitioners (Fink, 2019:1-58). This provides solid information to the reader about the advantages and disadvantages regarding this topic. Research tools such as e-journals, books from the library, articles, reports, dissertations, databases, case studies and internet will be used as a primary data source that can help to answer the research question for this study.

Content analysis will be employed to organise and produce constructive meaning, and draw conclusions from the data. Content analysis is “a research method that provides a systematic and objective means to make valid inferences from verbal, visual, or written data in order to describe and quantify specific phenomena. Data are presented in words and themes, which makes it possible to draw some interpretation of the results” (Bengtsson, 2016:8-14; White & Marsh, 2006:22-45). Krippendorff (2018:1-45) defines content analysis as “a research technique for making replicable and valid inferences from texts to the contexts of their use”. This method is unique as it focuses mostly on both qualitative and quantitative methodologies (Lune & Berg, 2017:1-218; Neuendorf, 2002:1-34), and can be applied in a deductive or an inductive way (Bengtsson, 2016:8-14). For the purposes of achieving this study, only qualitative content analysis method will be employed. This method produces deep, voluminous and rich data information. It is a valuable method which is normally used in research that involves large amounts of text (Mouton, 2001).

Findings and results obtained from the content analysis of different types of SEA case studies conducted in the public and private sectors in various years and in different provinces of SA, will inform conclusions and recommendations.

Case studies research has been considered to be an effective and suitable strategy for evaluating performance (Retief, 2007:84-100). This approach arose from social sciences for using qualitative data to derive information, theory and to offer an explanation. It provides deep insights into the strengths and weaknesses of studies (Partidário, 1996:31-55; Retief, 2007:84-100). This is due to case studies being capable of dealing with real-life details, as well as the complexities related to the study – they also provide exploratory opportunities to triangulate more sources of data.

1.6.2 Data Analysis

The researcher chose evaluation criteria relevant to the context of the study. These were:

- Five out of six SEA performance criteria developed by the International Association for Impact Assessment (IAIA) for evaluation of quality of SEA, namely, integratedness, sustainability-led, focused, accountable and participative (IAIA, 1999, 2002:1-1). These criteria were found to be the most suitable for evaluating firstly, the soundness (efficiency and effectiveness) of the SEA process employed in the particular case study, and secondly, whether the outcomes from the SEA promoted SD in South Africa. For the complete set of SEA criteria, see Appendix A.
- Six out of the 17 Sustainable Development Goals (SDGs).

By using the selected criteria for evaluation of the case studies, it will be clear if SEA indeed can promote SD. For the list of the six SEA performance criteria, see Appendix A, and Appendix B for the list of all 17 SDGs. Each case study will be evaluated to determine if all criteria were also included during development and planning. The 6 out of 17 SDGs were selected by the researcher because they were most suitable for the scope of this study, which is to determine whether the SEA as an instrument, properly done, promotes SD in South Africa.

1.6.3 Measurement Tool

Direct observation will be used when evaluating each case study document. Three descriptors, namely “strong”, “moderate” and “weak” will be utilised to describe the performance. “Strong” indicates that it meets evaluation standard criteria, “moderate” means it partly meets standard criteria and “weak” means it does not meet standard criteria. The evaluation by the researcher of

SEA quality is based on these criteria.

1.6.4 Selection of Case Study

Selected case studies will be those available online, retrieved using a web search engine with the keyword “strategic environmental assessment”. To provide more generality, five different types of SEA will be identified and evaluated, in the public and private sector in various years and in different provinces of SA, assessing cumulative impacts and promoting SD. Case studies will vary according to location (province), type (sector), duration, scale (local/regional/national) and tier (policy/plan/programme). Each case study will be an SEA or EMF, which is a type of SEA in SA. For validation and accuracy of case studies, all SEA case studies documentation will be approved by the designated supervisor before analysis of results.

Although the case studies differ from each other, what is crucial is that they all share a common goal of promoting SD. The researcher will acquire practical and theoretical perspectives from the case studies that will help inform perspectives on planning and analysis for future developments.

The following are the five identified different types of SEA case studies to be evaluated:

- (i) The Square Kilometre Array (SKA) SEA in the Northern Cape Province;
- (ii) The iLembe EMF/SEA in KwaZulu Natal (KZN) Province;
- (iii) The Greater Saldanha Bay EMF in the Western Cape Province;
- (iv) The Drakenstein Municipal Area EMF in the Western Cape Province and
- (v) The Sandveld EMF in the Western Cape Province.

Having the case studies differ from each other helps to provide a broad-ranging evaluation of techniques, procedures and scope, and significant strengths and weaknesses for SEA. Although the approaches differ in each case study, the evaluation will highlight how effective they are as an assessment tool

1.7 Importance of the Study

This study aims to bridge gaps identified in the literature relative to the current study. The researcher believes that the gap is the lack of in-depth knowledge to new stakeholders about SEA as a tool in SA (DEA, 2014:19-221; Musil & Smutný, 2019:199-209). Recommendations from this study will be of value to decision-makers, policy-makers, practitioners, as well as stakeholders new to this field.

The research will assess whether there are any further opportunities for SEA in SA, for instance, strengthening projects to promote SDGs and the NDP in SA. At a personal level, the researcher will learn and improve the understanding of this topic, through exploring the complexities associated with it. The researcher would also like to see more SEA projects being implemented in SA, as well as in other developing countries.

Research significance, limitations, originality and practical feasibility will be the guiding criteria for this study.

1.8 Limitations of the Study

Only five SEA case studies will be evaluated, but the diversity of case studies will build value. This research will be a desktop study, and constraints such as finances and time will not be a significant limitation.

1.9 Definition of Key Terms

Key terms are defined below; any additional descriptions are highlighted where they are first used in the chapters that follow.

- Environmental Assessment (EA) is the identification and evaluation of environmental impacts related to proposed and existing projects by undertaking environmental examinations, and to propose mitigation of negative effects where these cannot be avoided, and enhancement of positive effects, before making commitments or any decisions (Balaman, 2018:1-101).
- Environmental Impact Assessment (EIA) is “the process of identifying, assessing and mitigating the negative biophysical effects, including physical and ecological effects, social effects and other relevant effects of development proposals before fundamental decisions are taken and commitments made” (IAIA, 1999; Partidário, 2015:1550015).
- Environmental Management Framework (EMF) is a South African environmental management tool conceptualised in 1989, legislated in 2006 and updated in 2010 (Cilliers & Retief, 2017:283-300; Marais, 2015:1-19). This tool allows for the compilation of maps specifying the interrelation, sensitivity, extent and significance of particular environmental attributes in particular geographic areas. It supports the EIA process for the review and evaluation of development applications, and decision-making on land-use planning applications. The EMF is defined as “the study of the biophysical and socio-cultural systems of a geographically defined area to reveal where specific land

uses may best be practiced and to offer performance standards for maintaining appropriate use of such land” (DEA, 2010:3-38). The EMF as a strategic environmental instrument applies SEA principles, and is therefore a type of SEA. Some of the case studies in this paper are EMFs.

- Sustainability is defined as a mechanism or process that helps to achieve sustainable development (Olawumi & Chan, 2018:231-250), whilst Dovers and Handmer (1992:1-15) define sustainability as “the ability of a human, natural or mixed system to withstand or adapt to endogenous or exogenous change indefinitely”.
- Sustainable Development (SD) is a multi-dimensional and complex concept. The most-cited definition for it is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UNWCED, 1987).
- Strategic environmental assessment (SEA) refers to “evaluating the environmental impacts of policies, plans and programmes (PPPs) and their alternatives” (Thérivel *et al.*, 1992:1-181), whilst Sadler and Verheem (1996) define SEA as “a systematic process for evaluating the environmental consequences of a proposed policy, plan or programme”.

1.10 Outline of the Chapters

This study consists of 7 chapters.

Chapter 1 offers a background overview of the study with the main goal of providing an in-depth rationale for why this research is to be conducted. A brief outline of the problem statement, research aim and objectives is formulated in this chapter.

Research methodology, design, data analysis and different types of SEA case studies to evaluate the application of SEA are identified. Also, the importance of the study, its limitation, definition of key terms and the outline of the chapters are discussed in this chapter.

Chapter 2 provides a substantive literature overview related to the study. This chapter begins with the explanation of the concepts of sustainability and SD that will be mentioned interchangeably during this paper. It then explains in detail the history of SEA and continues with its origin in South Africa. The chapter ends by defining the concept of SEA and providing a good description on why the tool will help to promote SD in SA. The importance and benefits of the tool are also highlighted. In addition, strengths, and weaknesses of SEA, as well as the practical application of this tool are explored. The SEA performance criteria and SDGs are

considered.

Chapter 3 focuses on the legislative framework – the policies and frameworks that direct SD in SA. The chapter starts by exploring the Constitution of the Republic of South Africa of 1996, National Environmental Management Act (NEMA) 107 of 1998, National Environmental Management: Biodiversity Act (NEMBA) 10 of 2004, Local Government: Municipal Systems Act (LGMSA) 32 of 2000, Spatial Planning and Land Use Management Act (SPLUMA) 16 of 2013, National Development Plan (NDP) Vision for 2030, National Strategy for Sustainable Development (NSSD) of 2011-2014, National Climate Change Adaptation Strategy (NCCAS) of 2018 and ends with a description of the National Climate Change Response Strategy (NCCRS) of 2004.

Chapter 4 presents the case study application. It reviews the five types of SEA case studies conducted in various years, and in different provinces of SA, namely:

- The Square Kilometre Array (SKA) SEA in the Northern Cape Province;
- The iLembe EMF/SEA in KwaZulu Natal (KZN) Province;
- The Greater Saldanha Bay EMF in the Western Cape Province;
- The Drakenstein Municipal Area EMF in the Western Cape Province and
- The Sandveld EMF, of the agricultural area known as the Sandveld in Agter-Cederberg in the Western Cape Province.

Chapter 5 focuses on the findings and analysis of results – after evaluation of the case studies – by applying the five SEA performance criteria adapted from the IAIA for evaluation of good quality SEA, and the subset of six out of 17 Sustainable Development Goals (SDGs) developed by the United Nations (UN) General Assembly in 2015. This chapter assists in answering whether the SEA tool can effectively promote sustainable development in South Africa.

Chapter 6 concentrates on the discussion of case studies evaluated in chapter 5. It clarifies in detail whether and where the five SEA performance criteria and the six SDGs were incorporated into the proposed project. Also, all cases which are evaluated to determine effectiveness, utilise the same three descriptors, namely “strong”, “moderate” and “weak”.

Chapter 7 provides the conclusions and recommendations of the study.

CHAPTER 2: LITERATURE OVERVIEW

2.1 Introduction

This chapter explores the two concepts of sustainability and sustainable development (SD), and how they are incorporated in environmental assessment (EA) tools such as SEA. The history of the SEA and its origin in South Africa (SA) will be explored, and a description on why the tool is needed to assist in promoting SD in SA. This will include its importance and benefits, and its strengths and weaknesses. The practical application of SEA will be outlined, as well as its practice in SA. The SEA performance criteria selected will be described; lastly, the Sustainable Development Goals (SDGs) will be discussed.

2.2 Sustainability and Sustainable Development

Sustainability and SD concepts have been discussed internationally (Pope *et al.*, 2017:205-215). These two concepts were part of the agenda and discussed in the United Nations (UN) Conference on the Human Environment held in Stockholm in 1972 (Swilling & Annecke, 2012:27-28; UNWCED, 1987:43). These concepts are frequently used as a buzzword or spin (Muller, 2006:1027-1064), though they are not the same, and they vary when it comes to their interpretations and definitions (Mensah & Casadevall, 2019:1653531; Polido *et al.*, 2014:138-148). Sustainability is defined as a process or mechanism that helps to achieve SD in order to avoid depletion of natural resources, while SD maintains sustainability (Pope *et al.*, 2017:205-215). Also, sustainability strongly focuses on the present generation by protecting events above a specific level, whilst SD concentrates highly on a long-term idea (Emas, 2015:1-3). SD integrates the two concepts of “sustain” and “develop” (Lindeque, 2003:1-72), which SEA uses to protect the natural environment, as well as achieving the Sustainable Development Goals (SDGs) and the National Development Plan (NDP) Vision 2030.

2.2.1 Sustainability

The concept of sustainability is developed from the SD concept (Foliaki, 2020:1-132), and it has been a global topic for some time. Stoddart (2011:4-124) describes sustainability as an equitable allocation or efficient use of natural resources, for inter- and intra-generations, by considering good management of socio-economic aspects (Spijkers, 2018:3836; Summers & Smith, 2014:718-728). Most researchers and environmental assessment practitioners (EAPs) practically apply this concept, in order to improve and to sustain a healthy economic, social and ecological system for human development (Kuhlman & Farrington, 2010:3436-3448; Mensah & Casadevall, 2019:1653531). This is because sustainability focuses much on controlling human activities in

order to satisfy both wants and needs of human beings, without damaging or depleting any valuable resources at the end (Thomas, 2015:1-258). In this regard, to preserve ecological resources and human development, individuals should manage their social and economic lives respectively.

The Environmental Protection Agency (EPA) of 1970 defines sustainability as “everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permits fulfilling the social, economic and other requirements of present and future generations. Sustainability is important to ensure that we have – and will continue to have – the water, materials and resources to protect human health and our environment” (NRC, 2011:1-13; UNWCED, 1987:43). This Agency was established in the United States to focus on environmental protection and natural resources. Practically, when conducting EA, or undertaking projects relating to either energy, waste or water, there is a need to consider natural environment and social well-being of people first – not only considering economic aspects. This enhances the protection of the environment for present and future generations.

Sustainability definitions endorse the idea of cross-generational equity (Mensah & Casadevall, 2019:1653531). Cross-generational equity is considered as an important approach, but it is difficult to justify (Mensah & Casadevall, 2019:1653531), as future generational needs are not easy to determine or define (Carmody, 2012:65-92). Sustainability, as a concept, strives for or focuses on the integration of environmental, economic, and social models. These models help to address human issues in a way that will also benefit people (Hussain *et al.*, 2014:519-525; Summers & Smith, 2014:718-728). The environmental model pays more attention to conserving the ecological integrity and biodiversity, whilst the economic model dwells much on the use and accumulation of natural resources, as well as sustainable use of financial capital. The social model seeks to improve political, health, religion, culture and education in order to improve human well-being and dignity (Mensah & Casadevall, 2019:1653531). It can be said that sustainability urges politics, people, the public and private sectors to make long-term decisions that will help to achieve SD rather than to focus on short-term decisions.

There are two types of sustainability, namely, strong and weak sustainability (Baker *et al.*, 2005:1-209; Hediger, 2006:359-394). Strong sustainability embraces environmental protection as essential for economic growth, whilst weak sustainability embraces that economic growth is essential for environmental protection (Baker *et al.*, 2005:1-209; Berglund & Gericke,

2018:2738). Strong sustainability helps to preserve productive environmental assets by encouraging local communities to participate in the decision-making process (Hediger, 2006:359-394), while weak sustainability regards environment as a measurable resource since it reduces environmental problems to managerial problems (Baker *et al.*, 2005:1-209). It is important to encourage strong sustainability to continue preserving the natural assets that people rely on for future generations (Emas, 2015:1-3, Stoddart, 2011:4-124).

Sustainability is centered on the capital approach (Atkinson, 2008:241-247; Emas, 2015:1-3; Kuhlman & Farrington, 2010:3436-3448). Capital is regarded as input that is required to create materials and services for economic production (Emas, 2015:1-3), on the assumption that if only necessary capital is available, then economic operations will continue to move forward (Stern, 1997:145-174). This approach includes man-made, social, and natural capital.

Weak sustainability justifies that only the aggregate level of the capital counts, such as manufactured or man-made capital (Emas, 2015:1-3), because it calculates the aggregate value of capital stock then assumes an ideal alternative between artificial and natural capital (Dietz & Neumayer, 2007:617-626; Tietenberg & Lewis, 2009:98-104). Natural capital can then be traded off in order to increase development in artificial capital.

Strong sustainability, on the other hand, acknowledges the unique aspects of natural resources/natural capital that cannot be reinstated by manufactured capital (Emas, 2015:1-3; Hediger, 2006:359-394; Kuhlman & Farrington, 2010:3436-3448). This is because strong sustainability mostly focuses on preserving natural resources, as it maintains stocks of both artificial and natural capital. It does not substitute or replace any capital since its purpose is to conserve the natural environment in the long term.

Economists consider weak sustainability as acceptable (Wackernagel & Rees, 1996:1-50), when society is sustainable because the aggregate stock of natural and manufactured assets is not decreasing (Atkinson, 2008:241-247; Muller, 2006:1027-1064; Pearce & Atkinson, 1993:103-108). It acknowledges the substitution of man-made capital for depleted natural capital (Wackernagel & Rees, 1996:1-50), but this means that there is no special respect/care for the environment (Atkinson, 2008:241-247).

Strong sustainability, however, values the life-support functions and unaccounted ecological services performed by various forms of natural capital (Hopwood *et al.*, 2005:38-52; Wackernagel & Rees, 1996:1-50), as it considers risk in relation to irreversible loss. It can be said that strong sustainability demands that natural capital stocks be held constant, independent of man-made capital. Strong sustainability dwells strongly on reducing dangerous risks that can

cause negative impacts to the environment (Stern & Stern, 2007:1-126). For instance, research conducted by Stern and Stern (2007:1-126) that reviewed “the economics of climate change” has reported that emissions caused by economic activity, such as burning of fossil fuels just for energy, are the fundamental reason that is causing climate change on the earth’s surface (Atkinson, 2008:241-247). Therefore, a sound knowledge related to “the economics of climate change” is required to provide solutions for this critical issue. That is why an EA tool such as SEA is important in this regard in order to integrate such issues into the decision-making process when undertaking proposed policies, plans and programmes (PPPs).

Sustainability is incorporated in SEA at the early stages of the development cycle and planning (Polido *et al.*, 2014:138-148; Polido *et al.*, 2018:46-58), where not only are the environmental, social, and economic aspects considered, but also the political aspect which is related to institutional, participatory and governance, whilst physical aspects deal with infrastructure, technology and built environment. To transform our global economy, society and environment to one which is sustainable has been the most difficult issue that the world is currently encountering (Hák *et al.*, 2016:565-573). This is because everything is done in the context of one planet. Therefore, to manage the realities, the World Bank (2017) called for innovative approaches that could assist to achieve sustainability objectives, to ensure balance between environment, economy and society in order to continue protecting the environment for future generations (UNDESA, 2017). That is why sustainability must be taken into consideration when conducting EA in developed and developing countries, particularly in SA.

2.2.2 Sustainable Development

For decades, SD has been the key concept used by policymakers and researchers globally (Stoddart, 2011:4-124), even though the concept is multi-dimensional and complex and requires in-depth understanding (Morrison-Saunders *et al.*, 2014:38-45). The most cited definition was adopted from the Brundtland “Our Common Future” Report of 1987, established by the World Commission on Environment and Development (WCED) (Brundtland, 1987:43; Holden *et al.*, 2014:130-139). This report outlines SD as “development that meets the needs of present generations without compromising future generation’s abilities to meet their own needs” (Baker *et al.*, 2005:1-209; Brundtland, 1987:43). The report also provides in-depth explanation on how to successfully achieve SD (Brundtland, 1987:43). This concept is also addressed in the UN Conference on Sustainability Development (UNCSD) Rio+20 by the Rio Summit held in Rio de Janeiro in 2012, with the main goal of outlining practical and clear measures associated with the implementation of SD (Holden *et al.*, 2014:130-139). The outcomes of this conference were

the agreements between member states to establish the SDGs, regarded as effective tools to achieve SD. The concept of SD is also discussed in Agenda 21 with the key objective of developing strategic actions that will help to reduce environmental issues worldwide (Braun, 2008:19-39; Polido *et al.*, 2014:138-148).

The main aims of SD are maintaining economic development, while conserving long-term environmental value, and to provide a framework for developing strategies and integration of environmental policies (Brundtland, 1987:43; Emas, 2015:1-3; UNEP, 2009:3-52). In practice, this concept is achievable only by recognising and integrating the three key pillars of sustainability, namely, economic, social and environmental, during the strategic decision-making process and integrated planning (Emas, 2015:1-3; Muller, 2006:1027-1064). Considering these three pillars will ensure that development is more effective and successfully achieved whilst making certain that there is not any detrimental damage to the environment for present and future generations (Muller, 2006:1027-1064). These pillars are supported by the National Development Plan (NDP) Vision 2030 and Sustainable Development Goals (SDG's) with the main objectives of eradicating poverty and reducing inequality (NPC, 2013:236; Sebestyén *et al.*, 2019:126-135). Also, integrating these 3-D dimensions or pillars through strategic decision-making processes will help “to move towards development that is” extremely sustainable (Bond *et al.*, 2012:53-62; Emas, 2015:1-3; Sebestyén *et al.*, 2019:126-135).

The move towards sustainability is considered to be a social challenge (UN, 2013:1-157), since it involves the cooperation of national and international law, governance, management and planning, local and individual, in order to achieve SD (Messerli *et al.*, 2019:1-215). To live more sustainably within societies, transformation is required, but this can be achieved only by including sustainable projects associated with green infrastructure, recycling, re-use, sustainable agriculture, eco-municipalities and eco-villages, applying science to build green technologies and renewable energy (Allen & You, 2002:1-248; Oertwig *et al.*, 2017:175-200). It is more beneficial to design systems that are flexible and sustainable, since it helps to preserve natural resources by limiting environmental pollution and over-exploitation of the special resources (Oertwig *et al.*, 2017:175-200). Elkington (1999:18-21) said that, in order to achieve SD, there is a need to consider the triple bottom line (*TBL*) approach such as the people, planet and profit when undertaking projects (Atkinson, 2008:241-247; Elkington, 1999:18-21; Elkington *et al.*, 2004; Holden *et al.*, 2014:130-139; Lee *et al.*, 2012:173-182). He mentions that considering this approach will help the public and private sector to evaluate or assess their negative environmental impact (Elkington, 2018:2-5) – not only focus on profit or finance (Lee *et al.*, 2012:173-182). The *TBL* is an essential tool that can assist in maintaining sustainability goals (UNWCED,

1987:43), and it is fully supported by governments at local, provincial and national levels (Holden *et al.*, 2014:130-139). This is because it is considered to be useful and practised mostly by policymakers and businesses. Allen (2001:152-173) mentions that though *TBL* is considered a fundamental component of SD, measures related to technology, built environment, institution and governance aspects are also deemed to be key elements of SD.

The concept of SD goes beyond social, economic and environmental boundaries. This is because the socio-cultural approach is defined as the maintenance of cultural and social systems (Rogers *et al.*, 2008). In this regard, SD is regarded as a dynamic process that consist of four dimensions, namely: environmental, economic, social and institutional. These dimensions focus on conserving nature's "intrinsic value", encouraging public participation and protection of the environment, as well as improvements in standard of living (Holden *et al.*, 2014:130-139). That is why sustainability and SD need an integrated approach that consists of social, economic, ecological, political and cultural dimensions to fully achieve the protection of the environment. For instance, the Intergovernmental Panel on Climate Change (IPCC) assessment report (AR4) shows that a great change is needed in regard to the reduction of carbon dioxide (CO₂) emissions to prevent harmful impacts and maintain the earth's temperature below 2°C (Mitigation, 2011:1-26; Pachauri & Reisinger, 2007:1-17).

It can be said that SD is a holistic approach to maintain sustainability and achieve the SDGs (Pope *et al.*, 2017:205-215). This approach assists to minimise major environmental issues that developed and which developing countries are currently encountering by providing a solution to the problem. For instance, poverty, climate change, environmental degradation, pollution, inequality and food insecurity (Swilling & Annecke, 2012:27-28). Therefore, sustainability and SD concepts will be mentioned interchangeably during this research.

2.3 History of SEA

SEA is a tool developed over years, with its main purpose being that of integrating environmental considerations into proposed policies, plans and programmes (PPPs) (Dalal-Clayton & Sadler, 2017:257-267; Glasson & Thérivel, 2019:3-30). This tool had its genesis in the National Environmental Protection Act (NEPA) of 1969 in the United States (Dalal-Clayton & Sadler, 2017:257-267), where the intention to evaluate any major federal actions that might potentially have detrimental effects on the environment was intended to include PPPs (Sadler & Verheem, 1996). This Act was the basis for the EIA project tool (Tetlow & Hanusch, 2012:15-24). Since the promulgation of this Act, developed and developing countries adopted EA tools when undertaking their projects (Fischer & González, 2021:1-13; Noble & Nwanekezie,

2017:165-173; Polido *et al.*, 2018:46-58).

The SEA tool has been formalised in the European Union (EU) SEA Directive 2001/42/EC and United Nations Economic Commission for Europe (UNECE) Protocol on SEA 2003 (CSIR, 2007; DEAT, 2004:1-16; EC, 2003:1-63; Polido *et al.*, 2018:46-58). This Directive requires member states to establish EA procedures for specific plans and programmes (Polido *et al.*, 2014:138-148; Polido *et al.*, 2018:46-58). In this Directive, article 1 states the main objective of the Directive which is to:

“Provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting SD, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment” (EC, 2003:1-63).

The NEPA failed to distinguish between PPPs and projects (Polido *et al.*, 2014:138-148; Thérivel, 2012:1-30), only specifying *actions*. This situation led to no actual distinctions between project and strategic levels, with focus on project development, ignoring broader projects and strategic plans (Bina, 2007:585-606). This practice continued to grow as the EIA “project-level” tool (Govender, 2005:1-85). Different countries started to introduce the legislation that obliged them to conduct an EA (Noble & Nwanekezie, 2017:165-173; Polido *et al.*, 2018:46-58; Wu & Ma, 2018:1-11). Currently, several countries have already established detailed procedures for land use planning (Govender, 2005:1-85), and made amendments to existing policies and systems just to incorporate the EIA.

It took time for SA to incorporate or develop appropriate EIA procedures (Sowman *et al.*, 1995:45-67), but the Environmental Conservation Act (Act 73 of 1989) performed a huge role with provisions that formulated environmental policy which helped to support decision-making in SA (DEAT, 2004:1-22). These provisions also required EIA practice to be included in this policy. In 1989, “Integrated Environmental Management (IEM)” was published, to promote the practice of EIA in SA and to guide the decision-making process – applicable to plans, policies, programmes and projects. This document was selected to act as an accurate guide for considering the integration of environmental issues across each stage of planning process and development cycle (DEAT, 2004:1-22; Lobos & Partidário, 2014:34-66), and applicable to plans, policies, programmes and projects (Sowman *et al.*, 1995:45-67). In 1992, the Department of Environmental Affairs (DEAT) published several guideline documents. These IEM documents centered particularly on the development of the EIA phase (DEAT, 2004:1-22), but scant

consideration was provided to the environmental management side and monitoring the process during and after the implementation of the project (DEAT, 2004:1-22).

Due to the attention and focus on the EIA as a project-level tool, new EA tools to assist the assessment of plans, as well as programmes (DEAT, 2004:1-22; Govender, 2005:1-85) were developed. It became evident that without a planning and policy framework, it was difficult to assess significant impacts related to specific projects (DEAT, 2004:1-22; Govender, 2005:1-85). So, a new EA approach was developed specifically to focus on the environmental constraints and opportunities for development and to integrate sustainability aspects into the decision-making process (Govender, 2005:1-85; Partidário *et al.*, 2008:219-22; Polido *et al.*, 2014:138-148). While the EIA focuses particularly on the effects that development have on the environment, SEA considers the effects that the environment has on the development of projects. It can be said that SEA pays more attention to the integration of sustainability aspects at the earliest stages of the development cycle and planning process. In brief, this tool incorporates the principles of SD into the planning process at the earliest stages.

Considering the abovementioned information, SEA is not needed only to resolve project-level EIA challenges, but also to support development planning and policy and to consider cumulative effects for promoting SD (Partidário, 2015:1550015).

2.4 Definition of SEA

There is more than one definition pertaining to SEA worldwide (CSIR, 2007:1-25), but Thérivel *et al* (1992:1-181) define SEA as a process that is used to assess environmental issues of PPPs (Sadler & Verheem, 1996). However, the OECD (2006:17-158) defines SEA as “a range of analytical and participatory approaches that aim to integrate environmental considerations into policies, plans and programmes and evaluate the inter linkages with economic and social considerations”. This is because its purpose is to increase integration of economic, alongside social and environmental concerns into strategic decision-making process (Islam & Zhang, 2019:137-153; Loayza, 2012:1-160; Susilowardhani, 2014:3-9) – its emphasis is based on providing full integration of economic, social and environmental aspects into a holistic and sustainability assessment (OECD, 2006:17-158).

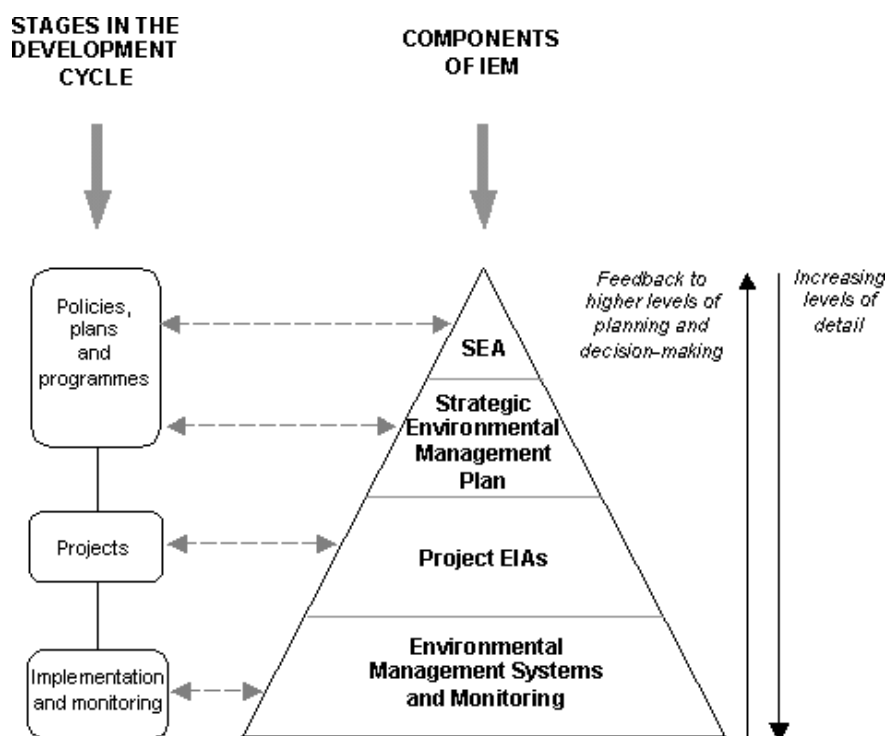
SEA is practically employed in the early stage of decision-making to assist formulate the PPPs and assess development potential and sustainability (OECD, 2006:17-158; Glasson & Thérivel, 2019:3-30). That is why it differs from traditional EA tools, such as EIA, as proven to address the opportunities and environmental threats of special projects, but less applied to PPPs. It can be said that an SEA tool is not established to substitute, but to complement EIA, as well as other

EA tools.

2.5 Why do we need SEA?

SEA is needed to respond to some of the EIA “project-level” limitations and to promote SD (Fischer *et al.*, 2020:28-38; Thérivel & Partidário, 2013:2013:3-21). This is because EIA considers impacts of different options at the project level rather than at a strategic level, whilst SEA chooses options at strategic level (Rehhausen *et al.*, 2018:41-59; Wood & Dejeddour, 1992:3-22). SEA identifies environmental constraints and opportunities for development (Partidário *et al.*, 2008:219-22; Polido *et al.*, 2014:138-148), while EIA conversely identifies the impacts of development on the environment. The need for SEA is specifically to inform the process of decision-making from its foundation (Thérivel, 2012:1-30). EIA is applied after strategic decisions have already been made, so SEA is a framework to describe the efficacy of EIA (Sadler & Dalal-Clayton, 2012:1-406). It assists decision-makers to understand better and be confident in their plans, as well as learning more about sustainability aspects (Thérivel, 2012:1-30), and how they are integrated into the decision-making process. These also include assistance concerning technical, political, financial and other issues. These are some of the most important reasons why SEA needs to undertake an EA in SA.

The SEA tool is needed to influence the decision-making process through encouraging a participatory approach (Wu & Ma, 2018:1-11) by involving the public in SEA consultation meetings (Monteiro & Partidário, 2017:125-138). This helps to avoid legal actions of the interested and affected parties (I&APs) (Wu & Ma, 2018:1-11). At the meeting, all stakeholders that are/who will be negatively or positively affected by the proposed PPPs are encouraged to communicate their perspectives regarding the proposed development (Wu & Ma, 2018:1-11). It is important to also involve traditional leaders, since they respect, value and have knowledge and understanding of certain plants and animals in rural areas (CSIR, 2007:1-25). Traditional/local knowledge is most useful in this regard since it helps to promote environmental “conservation and management of natural resources for future generations” (CSIR, 2007:1-25). All participants are important as they provide useful information that will assist during the implementation process of proposed development and to avoid delays (Wu & Ma, 2018:1-11). This helps to build consistency information about the strategies, aims, plans, policies and programmes. That is why this tool is needed in order to increase environmental quality in SA.

Figure 1: Tiered Approach to EIA and SEA

Source: DEAT & CSIR (2000)

The concept of the tiered approach is more related to SEA and the EIA “project level” tool and is accepted in SA (DEAT, 2004:1-16), due to SEA being regarded as a high-level approach for undertaking EA and environmental management, and providing context for EIA (see Figure 1). The SEA must deliver the necessary information for planning at an accurate time to integrate sustainability pillars into the decision-making process (Rehhausen *et al.*, 2018:41-59; Rossouw *et al.*, 2000:217-223), because SEA is part of the IEM component and applies to plans, policies and programme stages in the development cycle. The logic behind this approach is that – if this tool is conducted appropriately – it may possibly increase low level detail of planning and implementation more efficiently and deliver input to higher levels of planning and decision-making (Rossouw *et al.*, 2000:217-223). So, it can be said that the nature of this tool depends on how the process is practically applied – this includes the interaction and outcomes of it.

2.6 Origin of SEA in South Africa

In SA, there is no legislation that prescribes a procedure for SEA (Partidário, 2012:7-58; Rega & Baldizzone, 2015:105-115); however, the Minister responsible for Environmental Affairs, or an MEC with the concurrence of the Minister, may prescribe such a procedure in terms of section 24(5)(bA)(ii) of Chapter 5 of the National Management Act (NEMA) (Act 107 of 1998), where

it is defined as an environmental management instrument (RSA, 1998a). The key purpose of this chapter is to promote the application of EA tools. It guarantees the integrated environmental management (IEM) of any controlled activities (DEAT, 2004:1-16; RSA, 1998a:1-108). In SA, IEM has been an effective framework that is utilised mostly for management of the environment and integration of sustainability aspects (DEAT, 2004:1-16), into decision-making processes (Polido *et al.*, 2014:138-148; Thérivel, 2012:1-30). SEA should be regarded as the most important tool that promotes SD in SA, and to complement EIA, not to replace it.

SEA started in SA in the 1990s (Bina, 2007:585-606; CSIR, 2007:1-25; DEAT, 2004:1-16). The Council for Scientific and Industrial Research (CSIR) published the SEA Primer in 1996 (CSIR, 1996; Govender, 2005:1-85; Rossouw *et al.*, 2000:217-223). The main purpose was to introduce the tool, with its benefits, and its suitability for EA, particularly in SA. It emphasised the importance of SEA in environmental management and environmental planning, and its efficiency in promoting SD (Rossouw *et al.*, 2000:217-223). It highlighted the limitations of the EIA “project level” tool and the importance of integrating environmental issues in a proposed PPP (DEAT, 2004:1-22). A clear methodology of SEA was not incorporated (Rossouw *et al.*, 2000:217-223). This Primer was followed by a few different types of SEAs in the following years in different provinces of SA from 1996 to 2003 (Retief *et al.*, 2007:44-54).

The guideline document for SEA was published by DEAT in 2000 in SA (Mitchell, 2001:1-60). The main aims of this document were to provide a proactive environmental management mechanism that would help to integrate environmental issues into PPPs (Lobos & Partidário, 2014:34-66; Mitchell, 2001:1-60). This is because it predicted that the process of SEA would provide a core foundation for integration of biophysical, economic and social concerns in order to fully achieve sustainability.

As previously mentioned, SEAs being undertaken in SA are not governed by a “one size fits all” set of prescribed procedures.

2.7 Importance of SEA

The importance of SEA is evidenced by its wide support from international agencies that promote development cooperation (Dalal-Clayton & Sadler, 2017:257-267; Noble & Nwanekezie, 2017:165-173; OECD, 2006:17-158; Sadler & Dalal-Clayton, 2012:1-406). This is because it integrates biophysical, economic and social aspects into PPPs in order to promote SD (Noble & Storey, 2001:483-508; Tetlow & Hanusch, 2012:15-24), and provide data that will help decision-makers to make appropriate decisions when conducting EA (Wu & Ma, 2018:1-11), in order to ensure that the information is integrated into the process of decision-making and

that it is accurate and reliable. This tool helps to improve more sustainable strategies and PPPs (Alshuwaikhat, 2005:307-317) by encouraging environmental protection and ensuring integration of environmental considerations during the decision-making process (Glasson & Thérivel, 2019:3-30).

For instance, SEA can be practically applied in order to define or determine if poverty reduction strategies (PRSs) will produce sustainable outcomes, as poor individuals living in developing countries, mostly rely on natural resources for their survival (CSIR, 2007:1-25). In this regard a good strategy that relates to the management of natural resources for the reduction of poverty could be obtaining access to land use that would allow individuals to farm and have access to safe drinking water. That is why this tool is so important in SA as it does not only focus on one aspect, but also integrates all sustainability aspects into the decision-making process.

SEA is important because it is intended to deliver the required information at an appropriate time in order to integrate sustainability concepts into decision-making (Tshibangu & Montaña, 2019:334-343; White & Noble, 2013:60-66), at the earliest stages of decision-making processes. It informs and raises the awareness of decision-makers, affects the public and planners regarding the importance of strategic decisions, thereby ensuring credibility and democratic decisions (IAIA, 2002:1-1). This is because I&APs help by providing their perceptions about the project in defining, identifying the problem and addressing critical aspects of the project, to have the focus right for strategic assessment before the final decision is undertaken. Openness is important for guiding the implementation processes related to SEA (Mitchell, 2001:1-60; Sadler & Dalal-Clayton, 2012:1-406). It helps to build public trust by ensuring decision-makers consider stakeholder opinions at the earliest stage of planning (Sadler & Dalal-Clayton, 2012:1-406), when planning strategies and policy options need high levels of flexibility and openness.

2.8 Benefits of SEA

The benefits of SEA discussed in this section are:

- Certainty for Good Management;
- Systematic Approach;
- Integration of Social, Economic and Environmental Links in Strategies;
- Safeguard the Environment and Natural Ecosystems;
- Large-scale Projects.

2.8.1 Certainty for Good Management

SEA provides certainty for good management of the natural resources while maintaining sustainable economic growth in order to sustain political stability (OECD, 2006:17-158) by supporting the integration related to the environment, as well as development (Glasson & Thérivel, 2019:3-30). SEA can assist to build stakeholder engagement to improve governance by encouraging stakeholders to participate in decision-making (Monteiro & Partidário, 2017: 125-138). It increases accountability, openness and transparency in decision-making of natural resources by facilitating transboundary cooperation and preventing conflict (Monteiro & Partidário, 2017:125-138; OECD, 2006:17-158; Sadler & Dalal-Clayton, 2012:1-406). It can help to streamline and strengthen the EIA “project-level” tool (Sadler & Dalal-Clayton, 2012:1-406). This tool clarifies institutional liabilities between the local, provincial and national levels of government.

2.8.2 Systematic Approach

Practically, if this tool is well-applied in a development plan and programme, it can help to provide a systematic approach that will assist in minimising or avoiding any detrimental impacts on the environment such as climate change, pollution, environmental degradation and depletion of natural resources (OECD, 2006:17-158). This is due to the fact that applying SEA to cooperative development offers great benefits for development outcomes and decision-making processes by promoting development options and a systematic method to a proposed plan or programme.

2.8.3 Integration of Social, Economic and Environmental Links in Strategies

SEA helps to preserve environmental assets, or natural resources and opportunities, on which most individuals depend, specifically poor people living in developing countries (OECD, 2006:17-158), by reducing poverty and promoting SD. This tool is a valuable method for integrating social, economic and environmental links in strategies to reduce poverty by ensuring that those strategies are more sustainable. For instance, SEA was included in Tanzania’s second strategy aiming to reduce poverty in that country (URT, 2005:1-73). The strategy is called the poverty reduction strategy (PRS) – this strategy was developed by the National Strategy for Growth and Reduction of Poverty (NSGRP) in Tanzania in 2005. The major benefits were that the NSGRP designed a specific objective to reach targets of 14% directly on the natural resources and the environment, as well as environmental sustainability (URT, 2005:1-73). Other benefits include health, governance and growth. It can be said that this tool is designed for

strategic planning and management of natural resources.

2.8.4 Safeguard the Environment and Natural Ecosystems

Since most people in rural areas are strongly dependent on natural resources for survival, both for income generation and subsistence. SEA helps to safeguard the environment and natural ecosystems that are deemed fundamental to the livelihood of humans and their health (Alshuwaikhat, 2005:307-317; OECD, 2006:17-158). However, environmental assets of poor individuals continue to be under serious stress. But when SEA is applied in a proposed plan, policy or programme development, it provides a systematic process to increase opportunities and minimise or avoid harmful impacts to the environment. It is important to consider environmental sustainability since it acts as a foundation strategy for poverty reduction, by avoiding degradation or depletion of natural resources for a long-term period.

2.8.5 Large-scale Projects

In SA, SEA was also incorporated in the water use strategy of Mhlathuze Catchment located in KwaZulu Natal (KZN) in 2000 until 2004 (DWAF, 2001; Pienaar, 2003; Steyl *et al.*, 2000). This study was supported by the Department of Water Affairs and Forestry (DWAF) and the Department for International Development (DFID) (OECD, 2006:17-158). It was achieved because the Mhlathuze Catchment was facing a problem of water crisis, and this led to a limited supply to new water users. The main issue was concentrated on inequality concerning water allocation amongst community and commercial sectors, though 80% of the population who dwell in this catchment are categorised to be rural community (Pienaar, 2003). SEA was extended to the Usutu-Mhlathuze Water Management Area (WMA) (Pienaar, 2003). The SEA tool is embraced by the DWAF as a tool for management of catchment and planning (DWAF, 2001). It has been proven that this tool can address large scale projects such as catchment scale and sectoral issues. SEA is a valued tool that supported the implementation of the National Water Act (NWA) (No. 36 of 1998). Individuals were encouraged to participate in these catchment issues and were linked together with decision-makers and other water users to assist with assessing and data analysis (DWAF, 2001; Lobos & Partidário, 2014:34-66). These individuals help by providing reliable data concerning the catchment to decision-makers in order to create informed decisions. This is because the NWA placed public interest first by promoting efficient, beneficial and sustainable use of water resources.

2.9 Strengths and Weaknesses of SEA

This section highlights and discusses strengths and weaknesses of SEA for promoting SD in SA.

2.9.1 Strengths of SEA

One of the key strengths of the SEA tool is to strengthen and improve the project-level EIA (Partidário, 2015:1550015; Sadler & Dalal-Clayton, 2012:1-406) by reducing negative environmental impacts and providing positive solutions to the problem (Fischer & González, 2021:1-9) at a strategic level. It does not substitute for the EIA “project-level” tool (Thérivel *et al.*, 1992:1-181; Thérivel *et al.*, 2013:19-31), but acts as a “road-map” to achieve SD (Alshuwaikhat, 2005:307-317). Further strengths discussed below are:

- Large Scale and Cumulative Impacts
- Proactive Tool
- Strategic Level
- Wide-ranging Options
- Increase Stakeholder Engagement
- Early Stage of Development Cycle
- Diverse Sectors

2.9.1.1 Large Scale and Cumulative Impacts

SEA addresses large scale and cumulative impacts (Alshuwaikhat, 2005:307-317; Kabir *et al.*, 2020:368-381; Thérivel *et al.*, 2013:19-31) by considering cumulative environmental impacts caused by local, regional, and national projects. This, compared to EIA being reactive to large scale projects, and of limited scope and inability to direct cumulative effects (Kabir *et al.*, 2020:368-381; Polido *et al.*, 2014:138-148). It is marked as a sustainable decision-making instrument used during the formulation of spatial and sectoral policies, plans and programmes in developed and developing countries (Fischer & González, 2021:1-9) incorporating sustainable aspects into the “inner circles” of decision-making (Rossouw *et al.*, 2000:217-223; Sadler & Verheem, 1996).

2.9.1.2 Proactive Tool

SEA is a proactive tool that focuses on identifying alternative opportunities and goals that assists to achieve the anticipated outcomes (Alshuwaikhat, 2005:307-317; Bina, 2007:585-606; Noble & Nwanekezie, 2017:165-173). SEA examines a range of alternatives, then chooses the desired alternative to attain the goal. In this regard, the effectiveness and success concerning this tool

are determined by the availability and accessibility of proper information that promotes SD (Alshuwaikhat, 2005:307-317; Tshibangu & Montaña, 2019:334-343). Therefore, it is important to select a broad range of sustainability aspects in the environmental, social, and economic dimensions in order to determine the effectiveness of SEA in achieving sustainability (Partidário, 1996:31-55; Polido *et al.*, 2014:138-148; Tshibangu & Montaña, 2019:334-343). This tool is not intended only to focus on the environmental impact of proposed PPPs (Govender, 2005:33), but also to focus on what the environment offers PPPs. That is why this it is deemed as proactive, as it addresses the environmental aspects of plans and policies (CSIR, 1996).

2.9.1.3 Strategic Level

SEA is carried out at a strategic level (Rehhausen *et al.*, 2018:41-59) whereas EIA is undertaken at a specific project level (Mitchell, 2001:1-60; Nooteboom, 2000:151-160; Thérivel *et al.*, 2013:19-31). This is the main difference between EIA and SEA, also the practice of these two tools differ. SEA, at a strategic level, is undertaken early before identification of the main objectives of the proposed project (Polido *et al.*, 2018:46-58; Rehhausen *et al.*, 2018:41-59) as a pre-feasibility instrument. This helps to achieve the specific objective of SEA.

2.9.1.4 Wide-ranging Options

Another strength of SEA is that it considers wide-ranging options (Partidário *et al.*, 2008:219-22). These include constraints and opportunities that are identified to have a broader scope. For instance, SEA is considered as a broader scope only if the environment that will be impacted is wider. This means that only sustainable projects will be considered in order to prevent any harmful impacts to the precious environment. That is why this tool is proven to have an appropriate capacity of defining the quality of the environment that would like or desire to be attained for present and future generations. This is because SEA can prevent any specific causes of impacts that are related to the environment more accurately than just to mitigate them.

2.9.1.5 Increase Stakeholder Engagement

The SEA tool can increase public participation, as well as stakeholder engagement (DEAT, 2007). Public participation and stakeholder engagement occur mostly at a strategic level (Thérivel, 2012:1-30). This is to ensure that stakeholder participation is actively considered during policy-making and planning process. SEA does not only consider public involvement in the strategic decision-making, but it also pays much attention to the time that the public will be involved in the decision-making process. This is to guarantee that a planning and decision-making process is more robust, transparent and a sealed one (Khosravi & Jha-Thakur, 2019:979-1000; Sadler & Dalal-Clayton, 2012:1-406; Thérivel, 2012:1-30), because making transparent

decisions is most critical as it helps to boost sustainability. It helps auditors and inspectors to quickly approve the project if the proposed PPP is robust and transparent (Monteiro & Partidário, 2017:125-138). This tool ensures that strategic decisions are effectively implemented by making sure that no unintended environmental impacts arise from the strategic level (Thérivel, 2012:1-30). So, to make the process effectual and have effective decisions that promote SD, this tool avoids repeated planning and duplication information by providing an opportunity to only focus on the main agenda and timeframes of the proposed project.

2.9.1.6 Early Stage of Development Cycle

SEA takes place at the earliest stage of the development cycle (Thérivel, 2012:1-30) in order to allow it to guide the type of proposed project that is required to be implemented. Since, EIA has been reactive in nature – it only has the influence after strategic action and significant planning have already been determined (Kabir *et al.*, 2020:368-381). The SEA tool is effectual because it focuses much more on the environmental issues of proposed PPPs than EIA that focuses on the environmental impacts at the project level (Lobos & Partidário, 2014:34-66). The idea that SEA focuses on large impacts and environmental issues can easily mean that it could play a huge role in identifying environmental impacts and issues that are extensive in nature.

2.9.1.7 Diverse Sectors

It can be said that SEA is the only valuable tool for conducting an EA, but the practice of it is regarded as effective in other expertise areas as well. This tool is considered as useful since it can be applied to diverse sectors, that is why SEA is deemed as more flexible (Alshuwaikat, 2005:307-317; Tshibangu & Montaña, 2019:334-343) and valuable when compared to EIA. But its flexibility depends on the decision-making process and the nature of the proposed PPPs.

2.9.2 Weaknesses of SEA

The SEA concept has been discussed internationally (Dalal-Clayton & Sadler, 2017:257-267; Sadler & Dalal-Clayton *et al.*, 2012:3-176). The weaknesses of SEA discussed below are:

- No consensus on methodology;
- No clear definition; not mandated by law;
- SEA is a new process;
- Decisions at different levels;
- SEA needs more resources and time, as well as

- Restrictions on participation.

2.9.2.1 *No Consensus on Methodology*

One of the greatest weaknesses of the SEA tool is that there is a lack of consensus building with regard to the proper methodology to achieve the outcomes of the SEA (Noble & Storey, 2001:483-508; Noble *et al.*, 2012:139-147; Thérivel & Partidário, 2013:3-21). This can act as a barrier to the implementation process of SEA, because of inadequate knowledge and understanding (Alshuwaikhat, 2005:307-317; Finnveden *et al.*, 2003:91-123; Runhaar *et al.*, 2019:113-119). Also, since the process of SEA is not mandated by law, it leads to a need for direction and guidance to ensure more understanding about the implementation process (Noble *et al.*, 2012:139-147; Partidário, 1996:31-55). For instance, research conducted by Wiseman (2000:155-166) that reviewed “the state-of-the-art of SEA in the South African context” has reported that the most significant challenges for SEA are the lack of agreement on the approach to the application of SEA (Noble & Storey, 2001:483-508). So, there is a need to establish an appropriate analytical tools and methods guide that will inform the application of SEA (Acharibasam & Noble, 2014:177-187; Partidário, 1996:31-55; Retief, 2007:84-100).

2.9.2.2 *No Clear Definition*

There is a lack of agreement on a clear definition for SEA (Mitchell, 2001:1-60) and there are numerous definitions that describe it worldwide. This creates confusion about how to interpret its principles and to apply SEA (Govender, 2005:1-85). Evidence has shown that this tool is a most effective one that functions more in a diverse and complex context of decision-making processes, compared to other EA tools such as EIA (Retief, 2007:84-100). A publication on strategic environmental assessment, status, challenges and future directions defines SEA as a “systematic process for evaluating the environmental consequences of proposed policy, plan or programme initiatives in order to ensure they are fully included and appropriately addressed at the earliest appropriate stage of decision-making on par with economic and social considerations in decision-making” (Sadler & Dalal-Clayton, 2012:1-406; Sadler & Verheem, 1996). A book published by Thérivel *et al.*, (1992) that focuses on SEA, defines it as a tool for “evaluating the environmental impacts of PPPs and their alternatives” (Alshuwaikhat, 2005:307-317; Shepherd & Ortolano, 1996:321-335; Von Seht, 1999:1-14). It can be said that the majority of SEA definitions in SA are related or different to the abovementioned stipulated definitions. For instance, the White Paper on Environment Policy for SA defines SEA as “a [ex post] process to assess the environmental implications of a proposed strategic decision, policy, plan, programme, piece of legislation or major plan” (RSA, 1998c:169), whilst DEAT and CSIR (2000:1-18)

describe SEA as “a [*ex ante*] process of integrating the concept of sustainability into strategic decision-making”.

Thus, there is a need to standardise the terminologies and understating of SEA in order to make possible refinement concerning this concept (Retief *et al.*, 2004:24-34). This will allow specialists who do not specialise with EA aspects – such as the public and politicians – to understand this concept much better. The absence of clear definition is not the only challenge when it comes to SEA tools, but also the lack of clear legislated procedures for SEA in SA (Fischer & Seaton, 2002:31-44; Noble, 2000:203-224). The European Union (EU) Directive 2001/42/EC is considered as the EU’s legislation for SEA.

2.9.2.3 Not Mandated by Law

The SEA tool is not mandatory by law in South Africa (Partidário, 2012:7-58; Rega & Baldizzone, 2015:105-115), but it is specified as an environmental instrument in section 24(5)(bA)(ii) of the National Environment Management Act (NEMA) 107 of 1998 (RSA, 1998a:1-108). The provision of the SEA framework depends basically on the nature of the decision-making process and the political culture in place (Partidário, 1996:31-55).

Even though there is no legislation framework, SA has established its own principles, definitions and guidelines on SEA procedures that indicate the application of SEA, or how it should be applied to plans and programmes (Davidovic, 2014:1-42; DEAT, 2000:15-16). However, the approach and practices of SEA in SA vary from other countries (Davidovic, 2014:1-42). This is due to the fact that in SA, SEA focuses on identifying major constraints and opportunities of the environmental development on PPPs, rather than focusing on the consequences or impact of plans and programmes on the environment. The constraints and opportunities are utilised to guide the PPPs’ formulation in SA.

2.9.2.4 SEA is a New Process

SEA is considered a new process as compared to the process of EIA (Fischer *et al.*, 2020:28-38; Thérivel, 2012:1-30) as EIA was launched first and has had regulations over a long period of time. If stakeholders are not involved in SEA meetings, this can negatively affect their accessibility with regard to baseline information of a proposed development – so data may not be easily available in order to make well-informed decisions (Thérivel, 2012:1-30; Wu & Ma, 2018:1-11). This may affect the quality of planning and decisions made at that time, as well as mechanisms for public participation. It is important for stakeholders and planners to engage with the proposed PPPs, and, if necessary, both stakeholders and planners must pass through the training or learning curve in order to participate meaningfully. Also, before SEA can be classified

as fully established – similar to EIA – it needs to provide a wide range of reliable and spatial information on the environmental effects of proposed PPPs that are easily accessible in order to assist in making more informed decisions and with development planning. Information is very significant as it determines the quality of SEA.

2.9.2.5 Decisions at Different Levels

The SEA tool focuses on making appropriate decisions at various levels of the development cycle and manages broader scale projects (Thérivel, 2012:1-30) as compared to EIA being reactive to projects. Large projects can survive for several years, but with related uncertainties on what may transpire throughout that time, for instance, drought possibility and technical changes (Thérivel, 2012:1-30), and many new variables could have an impact. In these variables there could be some that are uncontrollable and can result in causing unnecessary delays with regard to time. As previously mentioned, the process of SEA is robust and transparent (Khosravi & Jha-Thakur, 2019:979-1000; Monteiro & Partidário, 2017:125-138; Sadler & Dalal-Clayton, 2012:1-406), but by the time these variables arise, it will be the responsibilities of decision-makers to act fast and make uninformed rulings or decisions on these specific issues. This means that the tool needs to be flexible and responsive in order to adapt to any changes and cope with broader scale projects.

2.9.2.6 SEA needs more Resources and Time

SEA requires more resources and it takes time to finalise (Thérivel, 2012:1-30). Resources and time needed depends mostly on the strategic level and just how effectively SEA is conducted. Also, if this tool is improperly undertaken, or undertaken late without its results informing the decision-making process, this may incur cost but without any benefits.

2.9.2.7 Restrictions on Participations

There are restrictions concerning individuals who contribute to the process of SEA. These limits also incorporate planners and experts who direct or guide the process of SEA. Since SEA is a new process (Fischer *et al.*, 2020:28-38) not yet advanced from EIA, individuals from communities feel that their views differ during the process of participation. This can be solved by creating a good environment that will allow any individuals in the SEA process to be satisfied. This transformation can play an enormous role in assisting communities to be well-informed on the aims and objectives of SEA, and how SEA can help to promote SD.

Despite the abovementioned – compared to other environmental assessment tools – SEA is deemed to be the most significant tool for conducting environmental assessment in developed,

as well as developing countries (Bonde & Cherp, 2000:99-110).

2.10 Practical Application of SEA

The practical applications of SEA discussed in this section are:

- Integrates Environmental Considerations into PPPs;
- Strategic Levels of Activity;
- Spatial Planning.

2.10.1 Integrates Environmental Considerations into PPPs

Evidence has shown that SEA is widely applied and supported as a tool that integrates environmental considerations into PPPs (Mitchell, 2001:1-60; Tetlow & Hanusch, 2012:15-24). SEA application is widely preferable because it identifies broad alternatives for PPPs and assists to streamline the EIA “project-level” tool by strengthening EIA to be more significant (Bina, 2007:585-606). SEA practically applies to plans and programme stages of the development cycle (Mitchell, 2001:1-60). Its objective is to establish a set of measurable requirements, as it consists of a “mix of a project-level focus and more strategic-thinking” (Mitchell, 2001:1-60). That is why it can consider cumulative effects related to a large-scale development, such as transport infrastructure and dams (Kabir *et al.*, 2020:368-381), and also focus on small-scale projects such as improving and realignment of roads (Rehhausen *et al.*, 2018:41-59). SEA can find ways to incorporate environmental considerations and objectives into economic decision-making. In this regard, it can be said that the underlining purpose of SEA falls under three key categories, namely: address large-scale and cumulative effects, strengthen EIA and advance sustainability (Kabir *et al.*, 2020:368-381; Mitchell, 2001:1-60; Polido *et al.*, 2014:138-148).

International organisations such as the European Union (EU) and World Bank (WB) have shown a significant contribution to EA tools that support SD, such as SEA (Mitchell, 2001:1-60; World Bank, 2017). Currently, formal guidelines and provision for conducting SEA are largely confined to developed countries. Countries such as the Netherlands, Australia, New Zealand, America, Canada and the United Kingdom (Mitchell, 2001:1-60; Retief *et al.*, 2004:24-30) associate this tool with sustainability objectives. Mitchell (2001:1-60) stated that “sustainability issues are used as benchmarks against which objectives and criteria in SEA can be measured, or as a strong policy that helps shape new forms of decision-making in support of SD” (Dalal-Clayton & Sadler, 2017:257-267). It can help to influence the decision-making process and design more sustainable strategies and policies that promote SD.

2.10.2 Strategic Levels of Activity

The SEA tool is mainly applied at various strategic levels of activity, such as plans, policies, programmes and legislation globally (Rehhausen *et al.*, 2018:41-59; Tetlow & Hanusch, 2012:15-24) and also to promote SD. In general, this tool can be practically applied frequently at local, regional and national levels (Tetlow & Hanusch, 2012:15-24). However, the application of SEA in each country depends specifically on the specific tool they utilise to conduct their EA and types of PPPs (DEAT, 2004:1-16; Tetlow & Hanusch, 2012:15-24). At policy level this includes government policies and transboundary agreements, plans which focus much on spatial and land use plans, while programmes deal specifically with regional development (CSIR, 2007:1-25). For instance, SEA can be applied to energy, forestry, agriculture, tourism, industry, fisheries, mining and the water/waste management sector (CSIR, 2007:1-25; Fischer *et al.*, 2020:28-38; Wu & Ma, 2018:1-11), or to offer solutions for mainstreaming issues such as climate change poverty, and inequality. All these sectors and issues are also incorporated in the South African National Development Plan (NDP) Vision 2030 (NPC, 2011:1-484). The main goal of this plan is to “eliminate poverty and reduce inequality by 2030” by ensuring that there are no actions that threaten or cause damage to the environment (NPC, 2011:1-484). Therefore, it can be said that the NDP Vision is also supported by the SDGs.

2.10.3 Spatial Planning

The most effective SEA application sector is considered to be spatial planning (RSA, 2013:2-72; Tetlow & Hanusch, 2012:15-24). This is because of the greater availability of spatial plans globally, and the requirement of the tool for land use plans under the European Union (EU) SEA Directive 2001/42/EC and United Nations Economic Commission for Europe (UNECE) Protocol on SEA 2003 (EC, 2003:1-63; Polido *et al.*, 2018:46-58). It is also mentioned under the Spatial Planning and Land Use Management Act (SPLUMA) 16 of 2013 to help provide a framework for land use management (LUM) and spatial planning at various spheres of government, including local, provincial and national (RSA, 2013:1-72). Sectors that also have a greater number of SEA applications is water management (Gao *et al.*, 2017:363-371; Rehhausen *et al.*, 2018:41-59), transport and mining. But because of competition in the energy sector, it can be said that this sector is increasingly using SEA in the development of renewable energy resources such as wind, biomass and solar projects (White & Noble, 2012:284-295; Wu & Ma, 2018:1-11).

Research has shown that the most important part of conducting SEA is to inform the decision-making process (Gao *et al.*, 2017:363-371; Glasson & Thérivel, 2019:3-30). This is to ensure that a high-level of environmental conservation is finally achieved. That is the main reason why SEA is considered “a systematic process” used to evaluate the environmental impacts of the proposed

PPPs (Gao *et al.*, 2017:363-371). Moreover, to guarantee that the impacts are completely explained in order to properly focus on them in the early stage (Polido *et al.*, 2018:46-58). But when applying SEA to PPPs, not just environmental issues are considered in the application, but socio-economic issues are also considered (Gao *et al.*, 2017:363-371). This is to ensure that it is not just environmental issues that require more attention, but sustainability also requires full attention.

2.11 Application of SEA in South Africa

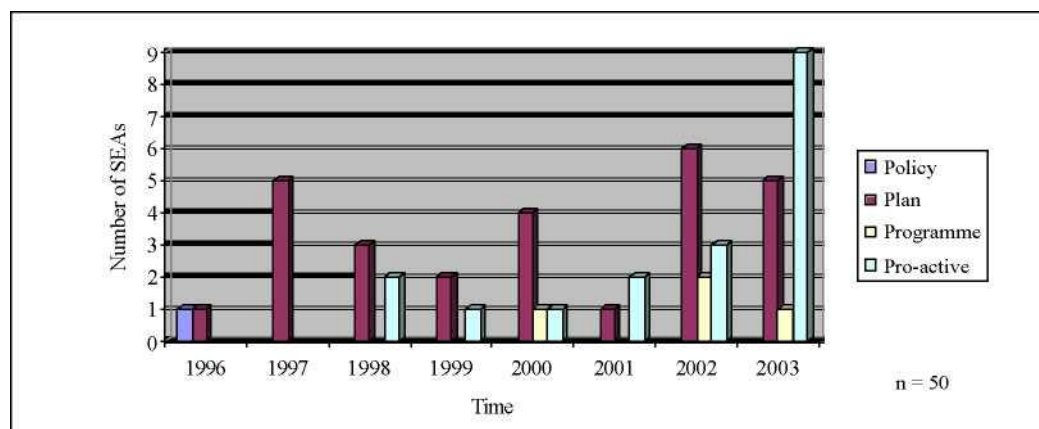
Even though the practice of SEA is new in SA as compared to EIA, SA is also willing to gain more knowledge and understanding of international practice (Mitchell, 2001:1-60). Most academics, politicians and professionals in SA are interested in understanding the practical application of the tool and why it is primarily needed in undertaking EA (Mitchell, 2001:1-60). It is important to note that the application of SEA from each country varies as it depends on the guidelines and processes they execute. When it comes to the practice of SEA, SA has become one of the leaders in practising the tool (Davidovic, 2014:1-42) compared to other developing countries (Fischer *et al.*, 2020:28-38; Retief *et al.*, 2007:44-54). It is considered to be at a top level when it comes to the development of EA, particularly in the African regions. Though there are no statistics on the actual numbers of different types of SEA projects being conducted in other developing countries, SA still has much experience in regard to the application of this tool. This was due to SA starting voluntary assessments in the 1990s. At that time proposals were made to incorporate SEA into the planning process (Retief *et al.*, 2007:44-54).

Figure 2 shows an increase of different types of SEA projects that have been conducted since 1996 to 2003 in SA, and the tool should continue to be used to promote SD. This will help to reduce some environmental issues and encourage other developing countries to also start conducting more SEAs.

Comparing the practical application of SEA in developed countries, studies have shown that in the Netherlands only 40 strategic environmental impact assessments were undertaken in 1987-2000 (Retief *et al.*, 2004:24-30), and in Australia only seven environmental impact statements, related to PPPs, were conducted from 1974 to 2000 (Retief *et al.*, 2004:24-30). In developing countries, SA conducted 50 SEAs between 1996 and 2003, but there are limited data concerning how many SEAs have been conducted in other developing countries. The findings of the study conducted by the international institute for environment and development show that until now SA is considered to be the only developing country that has so far conducted a large number of SEAs as compared to other developing countries (Retief *et al.*, 2004:24-30). It can be said that

SA is leading when it comes to the practice of SEA.

Figure 2: Statistic of SEAs conducted in SA from 1996-2003



Source: Retief *et al.* (2004:24-30)

Figure 2 illustrates the numbers of different types of SEAs undertaken in SA per tier from 1996 to 2003 (Retief *et al.*, 2004:24-30). This figure indicates that SEA can indeed be practically applied at each tier. Only a single case study was undertaken in SA in 1996 that focused on assessment at the policy level, but there was no progress from 1996 to 2003 (Retief *et al.*, 2004:24-30). While the first SEA programme was undertaken in 2000, it remains limited. It can be said that the practice of SEA with regard to plan has been very effective since 1996 until 2003; this incorporates the spatial and land use plans (Bonifazi *et al.*, 2011:9-37; CSIR, 2007:1-25; Fischer *et al.*, 2020:28-38).

2.11.1 SEA Conducted in South Africa

The application of SEA in SA is progressing (Mitchell, 2001:1-60), but there is still no formalised methodology and best framework that defines the application of SEA in SA (Noble *et al.*, 2012:139-147; Thérivel & Partidário, 2013:3-21). Even though there are limitations, there are a variety of case studies being conducted over several years and in different provinces of SA. These case studies vary according to location, type, year, scale and tier. Most case studies aim to promote SD by simply integrating sustainability aspects such as biophysical, social and economic dimensions into the PPPs formulation (Polido *et al.*, 2014:138-148) also by ensuring that major environmental issues are considered in the proposed PPPs. Integrating these aspects and issues help to manage and conserve the environment in a long term. Considering these at the earliest stages of the decision-making process and planning, aid in promoting the SDGs and the NDP in SA.

Table 1 shows examples of different types of SEA case studies being conducted in SA.

Table 1: SEA studies conducted in SA

SEA Case Studies	Tier	Scale	Aim of the Project
CAPE Action Plan for the Environment (CAPE). This project was launched in 1998 and completed in 2000 in the Eastern Cape, Northern Cape and Western Cape Provinces, South Africa.	Plan	National Provincial Local	The aim of this project was to develop an action plan and a long-term strategy that may assist in conserving and managing the Cape Floristic Region's (CFR) biodiversity, which also covered three provinces and included different levels of government and non-governmental (Lochner <i>et al.</i> , 2003:29-43).
Klipgat SEA Rural Infrastructure Development Programmes (RIDP's). This study was conducted in 2002 in the North West Province of South Africa	Programme	Local	The aim was to develop and upgrade infrastructure related to water, electricity and sewerage for the Klipgat rural community. Also, to identify major strategic environmental issues and ensure that they are taken into account when EIA "project-level" is undertaken (Baker <i>et al.</i> , 2005:1-209).
SEA for the North West Spatial Development Framework (NWSDF). This case was undertaken in the North West Province in 2003, South Africa	Plan	Provincial	The project aim was to compile a Spatial Development Framework (SDF) and to develop systems for decision-making and integrated planning. SEA was incorporated in this regard in order to inform and integrate sustainability concepts such as biophysical, economic and social aspects together with the function of the land use planning for the province (Baker <i>et al.</i> , 2005:1-209).

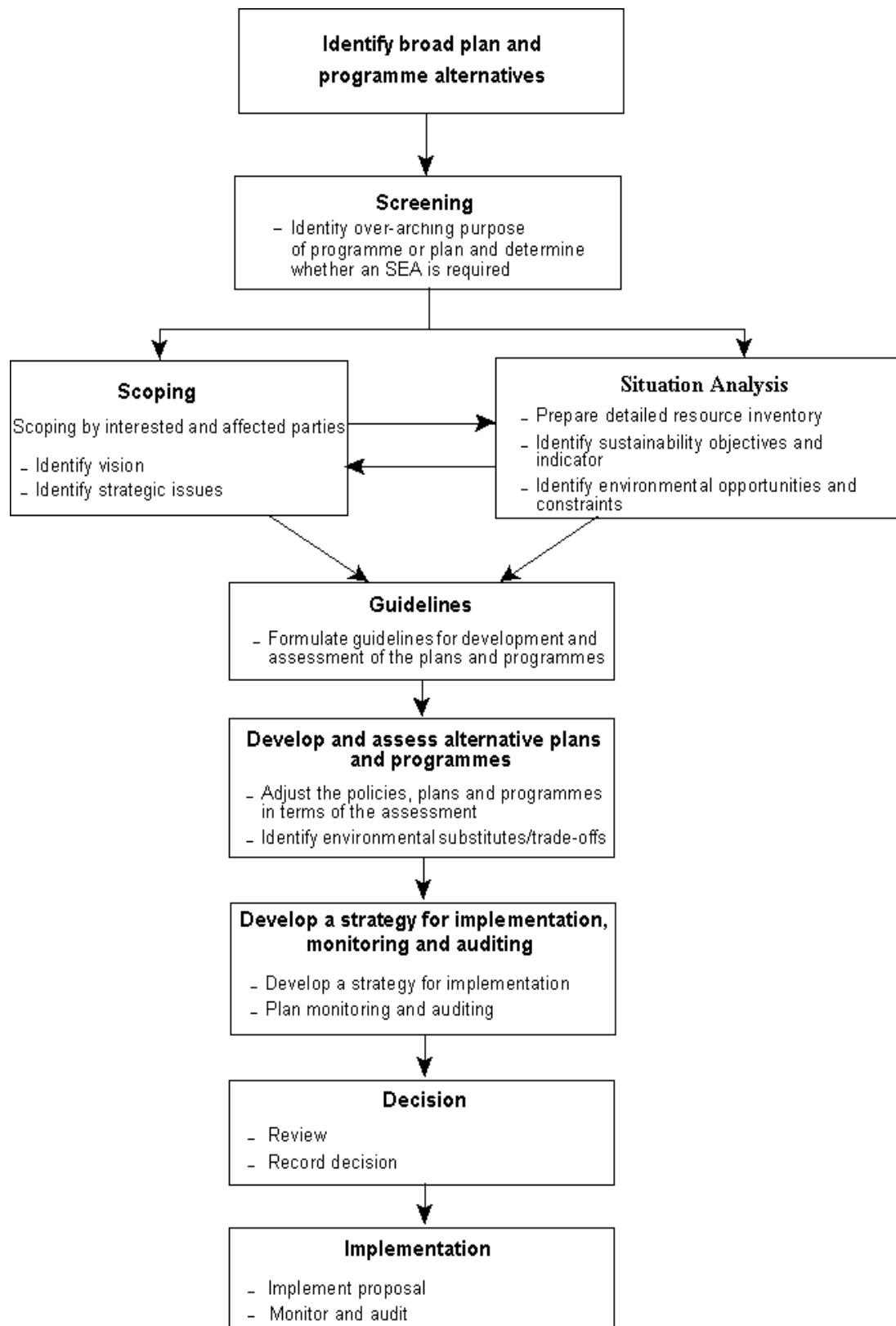
Source: Author

2.11.2 How SEA is applied in South Africa

When utilising the SEA tool in SA, the approaches and methods applied in the decision-making process of the PPPs would clearly differ (CSIR, 2007:1-25), but it would be important to apply the principles of SEA (see Appendix C) to all spheres of Government in order to achieve SD. If SEA principles are applied, it can make the process more flexible and efficient (Tshibangu & Montaña, 2019:334-343), as SEA covers assessments of policies, plans, and programmes that have spatial and physical dimensions (CSIR, 2007:1-25). This means that if the scope covered is wide, one issue can easily become more apparent. Since SEA is conducted at the earliest stages of PPPs before proposals of specific project are developed, it is easy to control the issues. SEA is underpinned by the sustainability principle (Rossouw *et al.*, 2000:217-223). This is deemed the main vision that allows and promotes more development of SEA-related projects to be undertaken in SA. This vision takes account of sustainable-led, flexible and integrated approach (Tshibangu & Montaña, 2019:334-343), as it helps SEA to adapt to the broad scope and diverse conditions. The SEA tool focuses on proactive integration of sustainability aspects into plans and programmes more willingly than to address the shortcomings of EIA “project-level” (Kabir *et al.*, 2020:368-381; Lobos & Partidário, 2014:34-66). For instance, an integrated approach enables the development of context-specific aspects of sustainability and formulation, as well as achieving implementation strategies for SEA. The intention of this is to prevent/avoid duplication processes, that is why the integrated approach should be considered when undertaking EA. Also, this approach concentrates on adding more value to SEA processes as it promotes efficient use of natural resources. So, it is significant in SA, when undertaking EA, to integrate a broad range of biophysical, economic, social, administrative and legislative conditions during implementation of SEA in order to efficiently conserve the environment and promote SD.

The following is the process of SEA that is normally used in South Africa (DEAT, 2000:18):

Figure 3: The process of SEA in SA



Source: DEAT (2000:18)

In SA, SEA approach has been guided by the sustainability concept for a long period of time (DEAT, 2004:1-16) because it regulates the decision-making process and integrates sustainability concepts into the objectives and outcomes of plans and programmes

(Alshuwaikhat, 2005:307-317; Rossouw *et al.*, 2000:217-223). That is why the SEA approach is included in the South African Guidelines for SEA and consists of the following fundamental elements as shown in figure 3 (DEAT, 2000:18): Identify broad plan and programme alternatives, screening, scoping, situation assessment, formulate sustainability parameters for the development of the plan or programme, develop and assess alternative plans and programmes, decision-making, develop a plan for monitoring and auditing and implementation (DEAT, 2004:1-16). It is suggested in the SEA Guidelines, established by DEAT and the CSIR in 2000, that the stipulated elements are integrated into the processes of plans and programmes formulation in order to avoid duplication (CSIR, 2007:1-25). Also, these stipulated elements are identified in order to guide development related to the processes of context specific (Rossouw *et al.*, 2000:217-223) as it strengthens plans and programmes by incorporating a holistic evaluation throughout the entire processes in order to ensure sustainable outcomes.

2.12 SEA Performance Criteria

The purpose for SEA performance criteria is to provide “guidance on how to build effective new SEA processes and evaluate the effectiveness of existing SEA processes” (IAIA, 2002:1-1). A good quality SEA process will inform decision-makers, affected public and planners on the sustainability of strategic decisions. It will promote a democratic decision-making process by facilitating the evaluation of alternative proposals.

The following six SEA performance criteria were developed in 2002 by the IAIA. These are:

- Integrated;
- Sustainability-led;
- Focused;
- Accountable;
- Participative and iterative.

2.12.1 Integrated

This criterion addresses the interrelationship of economic, social and biophysical aspects. It expects that all sustainability aspects are integrated early into decision-making process (IAIA, 1999; Wu & Ma, 2018) so that strategic decisions promote SD.

2.12.2 Sustainability-led

This helps to identify development options and sustainable proposals (IAIA,2002:1-1), and ensures that sustainability aspects are fully included into the SEA processes.

2.12.3 Focused

This criterion expects the SEA process to concentrate on major environmental effects and issues that need to be considered by decision makers, so that reliable, usable and sufficient information on key issues associated with SD is appropriate for decision making and development planning (IAIA, 2002:1-1).

2.12.4 Accountable

This criterion expects that lead agencies are responsible for any strategic decision undertaken during SEA processes, and accountable for independent verification and checks. This will ensure that decision making is carried-out with fairness, professionalism, balance, impartiality and rigor. Relevant documents are important to ensure that sustainability issues were considered during the decision-making process (IAIA, 2002:1-1).

2.12.5 Participative

This criterion expects that Interested and Affected Parties (I&APs) are well-informed and involved in the decision-making process (IAIA, 2002:1-1). This is to provide an opportunity to the public for them to address their concerns and inputs about the project (Rega & Baldizzone, 2015:105-115), with their inputs addressed in the decision making and documentation (IAIA, 1999).

2.12.6 Iterative

This criterion expects assessment results to be available early to help guide the decision-making process and encourage future planning (IAIA, 2002:1-1). The SEA process must provide enough information about the actual impacts of implementing a strategic decision. This is to assess whether the decision is suitable to be amended or not.

2.13 Sustainable Development Goals

The 17 SDGs were developed by the United Nations General Assembly in 2015 to help “end poverty in all its forms everywhere, without leaving no one behind” (UN, 2015:1-35). These aimed to achieve SD and combat poverty by 2030 (UN, 2015:1-35). It is significant to understand that these goals only offer a framework, it is therefore up to businesses, civil society and

governments for them to take action now before it is too late to ensure that they are all accomplished by 2030. A full description of the 17 SDGs is given in Appendix B.

The 17 SDGs are:

1. No poverty;
2. Zero hunger;
3. Good health and well-being;
4. Quality education;
5. Gender equality;
6. Clean water and sanitation;
7. Affordable and clean energy;
8. Decent work and economic growth;
9. Industry, innovation and infrastructure;
10. Reduced inequalities;
11. Sustainable cities and communities;
12. Responsible consumption and production;
13. Climate change;
14. Life below water;
15. Life on land;
16. Peace, justice and strong institutions;
17. Partnerships for the goals.

Developed and developing countries were urged to meet their commitment by incorporating the SDGs into their national PPPs to help achieve the global SDGs by 2030 (UN, 2015:1-35). This could be done by reviewing the procedures/processes in which sustainability aspects such as economic, environmental and social dynamics are integrated into the PPPs, and help determine appropriate/ effective tools to achieve the 169 SDGs targets. In this regard, the SEA process has been considered an appropriate tool for both developed and developing countries to move towards achieving the SDGs. This tool acts as a “road map” to attain SD and to move towards a more sustainable future (Alshuwaikhat, 2005:307-317).

2.14 Chapter Summary

This chapter presented in detail the SEA tool and the two concepts of sustainability and SD. Since these two concepts are widely debated and understood in a different way by diverse groups and many individuals, it is important to focus on each concept separately. To fully achieve these two

concepts, there is a need to consider an integrated approach that consists of social, economic, ecological, political and cultural dimensions, and not only focus on three aspects of sustainability.

This chapter concentrated on the literature review pertaining to SEA. It builds on the historical background of SEA, but also focuses on its origin and how it is carried out from developed to developing countries. The definition of SEA was provided in detail, why we need the tool to promote SD and why this tool is important in the management, as well as protection of the natural or precious resources in SA. The importance of SEA was highlighted and discussed, including its key benefits. This is to provide strong evidence to the reader on how efficacious the tool is when appropriately used for EA in SA. Strengths and weaknesses of SEA are also identified and discussed in detail in this chapter, including the practical application of it from developed and developing countries. This was also achieved by reviewing its practical application in the South African context. The SEA performance criteria and the SDGs were considered.

The chapter that follows explores the legislative framework that supports sustainability and SD, as well as the EA tools in SA.

CHAPTER 3: LEGISLATIVE FRAMEWORK

3.1 Introduction

This section focuses on the legislative framework and policies that promote sustainability and sustainable development (SD) in South Africa (SA).

The National Environmental Management Act, 107 of 1998 states that SD “requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations” (RSA, 1998a:1-108), and that this refers to “development that aims to meet the needs of the present, without compromising the ability of future generations to meet their own needs” (Brundtland, 1987:43; Emas, 2015:1-3). Although policies and a legislative framework in place contribute to reducing negative environmental impacts in SA (Lumby, 2005:65-82), more development is needed of an environmental assessment (EA) tool that can assist in the development planning and decision-making process (White & Noble, 2013:60-66). This study will show that SEA is needed to assist with strategic decision-making and to address cumulative effects in SA.

The policies and legislative framework share a common goal of achieving Sustainable Development Goals (SDGs) and a National Development Plan (NDP) in SA. The SDGs were published in “Transforming our world: the 2030 Agenda for Sustainable Development” by the United Nations (UN) in 2015 (UN, 2015:1-35). In this Agenda there are 17 SDGs and 169 targets approved, with the purpose of taking into account and achieving the three SD dimensions which are social, environmental, and economic in order to improve the livelihood of individuals and to protect the environment for future generations by 2030. The SDGs incorporate a wide range of SD issues such as eradicating poverty, ending hunger, improving healthy living and learning, improving water and sanitation, reducing inequality, establishing sustainable cities, combating climate change and its impacts, and preserving the oceans and marine ecosystems (UN, 2015:1-35).

Environmental legislation on management of the environment and planning that will be discussed in this chapter are:

- The Constitution of the Republic of South Africa of 1996;
- National Environmental Management Act 107 of 1998;
- National Biodiversity Act 10 of 2004;
- Local Government: Municipal Systems Act 32 of 2000;

- Spatial Planning and Land Use Management Act 16 of 2013;
- National Development Plan: Vision for 2030;
- National Strategy for Sustainable Development of 2011-2014;
- National Climate Change Adaptation Strategy of 2018, as well as
- National Climate Change Response Strategy of 2004.

Only these selected legislations and policies will be considered to strongly fit the scope of this paper. These are the supreme laws that foster, guide and promote SD in SA.

3.2 National Legislation

This section focuses on the South African National Legislation. Only the legislations associated to this study are recognised.

3.2.1 Constitution of the Republic of South Africa Act

The Constitution of the Republic of South Africa (previously referred to as Act 108 of 1996) was promulgated in 1996 in SA (RSA, 1996:1-147). This Constitution was introduced after the transition of the democratic election of 1994 in SA. Chapter two of this Constitution covers the Bill of Rights. It influences the law that the South African state or government must promote, protect, fulfil and respect the rights that are stipulated in the Bill of Rights (RSA, 1996:1-147) of which five sections in this chapter are very important and should be taken into consideration, namely, section 9, 24, 26, 27 and 31 (RSA, 1996:1-147).

Section 9 deals specifically with equality, section 24 concentrates on the environment, section 26 focuses on housing, while section 27 concentrates on the health care, food, water and social security and section 31 concentrates on cultural, religious, and linguistic communities. Section 9, 26, 27 and 31 align with the pillar of social sustainability (Morrison-Saunders & Retief, 2012:34-41), while section 24 is aligned with the pillar of environmental sustainability, stating that

“Everyone has the right -

- a. to an environment that is not harmful to their health or well-being and
- b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
 - (i) prevent pollution and ecological degradation;
 - (ii) promote conservation and

- (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development” (Morrison-Saunders & Retief, 2012:34-41; RSA, 1996:1-147).

It plays an integral part in ensuring that the South African environment is protected and conserved for present and future generations.

The responsibility and roles of different spheres of government are set out in this Constitution (RSA, 1996:1-147). The local sphere focuses on municipal councils, whilst the provincial sphere deals with provincial legislatures, and the national sphere speaks to parliament. These spheres are very important in this study, particularly the local sphere, as it deals with the municipal councils where different types of SEA case studies that support SD and planning are mostly undertaken and implemented in the local area, district and metropolitan Spatial Development Frameworks (SDFs) – up to the provincial level. The local sphere promotes a healthy and safe environment by encouraging organisation and community involvement in the issues of local government (Rossouw & Wiseman, 2004:131-140; Van Wyk, 2007:57-79). Municipalities promote economic and social development within the community – within national and provincial programmes.

3.2.2 National Environmental Management Act, 107 of 1998

The National Environmental Management Act (NEMA) of 107 was promulgated in 1998 (RSA, 1998a:1-108). This Act is an overarching framework to regulate environmental management in SA. In this Act there are principles, procedures, regulations, objectives and goals that need to be followed in order to achieve SD and to fully protect the environment in a long-term. The aim of this Act is to promote cooperative governance, coordinate procedures and ensure integration amongst government departments with regard to how to sustainably manage and fully protect the environment (RSA, 1998a:1-108).

The NEMA has empowering provisions for predicting, identifying, mitigating and evaluating negative environmental impacts of a proposed development (Bond *et al.*, 2012:53-62; RSA, 1998:1-108), and integrating environmental, economic and social factors into planning, decision-making and implementation process to help achieve SD (RSA, 1998a:1-108).

Chapter 5 is about integrated environmental management (IEM) (DEAT, 2004:1-16). Section 24(2) makes provision for listed activities that are deemed to cause detrimental effects to the environment (RSA, 1998a:1-108) that require environmental authorisation from a competent authority. The key procedures on how to acquire environmental authorisation to perform any activity that may cause a detrimental effect on the environment, are in the EIA regulations.

In SA, IEM is regarded as a fundamental instrument of the NEMA (DEAT, 2004:1-16). It includes quite a number of EA tools that are often utilised at different levels of the decision-making processes. Some of recognised tools that promote SD and management of the environment include the EIA and SEA, as well as other decision-making tools. The IEM plays a major role by guiding all society sectors to adapt the move towards sustainability. Also, it can provide an approach that can be utilised to strengthen an EIA stand-alone tool to be integrated into other complementary tools such as SEA.

The regulations for EIA “project-level” are based on activities, and not on “the receiving environment” (Mitchell, 2001:1-60); they do not provide any reference to large scale impact or assessment and links to other framework such as the development and planning framework. It is critical to link with other planning frameworks in order to successfully achieve a holistic approach with regard to land use development (Gardener, 2014:1-110; Van Wyk, 2007:57-79). That is why the implementation of SEA is needed for SDFs and to promote SD in SA.

3.2.3 National Environmental Management Biodiversity Act, 10 of 2004

The National Environmental Management Biodiversity Act (NEMBA) 10 of 2004 was introduced in 2004 (RSA, 2004:1-52) to promote conservation and management of biodiversity in SA. The NEMBA was established to allow for biodiversity management as well as bioregional management plans (Retief *et al.*, 2004:24-30; Retief *et al.*, 2007:44-54). This Act affirms that these stipulated plans should be aligned with the SDFs (Retief *et al.*, 2007:44-54) to fully manage South African biodiversity. In this regard the SEA tool could be completely exercised as an effective tool to inform these stipulated plans through SDFs.

This Act also protects the ecosystems and species that demand national protection (RSA, 2004:1-52). For instance, there is a need for protection of indigenous biological resources and sustainable use of natural resources in SA. Section 53 of this Act states that any activity or process that is considered as a threat needs environmental authorisation through conducting a full EIA (RSA, 2004:1-52). It is important to value and protect areas that are deemed and identified to be high in biodiversity and if some indigenous plants require to be removed, there is an urgent need to first request authorisation or permission to obtain access for removal of the plants. This will help to achieve the protection and sustainable use of indigenous species for future generations in SA.

3.2.4 Local Government: Municipal Systems Act, 32 of 2000

Chapter 1 of the Local Government: Municipal Systems Act (LGMSA) 32 of 2000 describes development as “sustainable development, and includes integrated social, economic,

environmental, spatial, infrastructural, institutional, organisational and human resources upliftment of a community aimed at- (a) improving the quality of life of its members with specific reference to the poor and other disadvantaged sections of the community; and (b) ensuring that development serves present and future generations” (RSA, 2000:1-85).

This Act seeks to:

- a. “Provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all;
- b. Define the legal nature of a municipality as including the local community within the municipal area, working in partnership with the municipality's political and administrative structures;
- c. Provide for the manner in which municipal powers and functions are exercised and performed; to provide for community participation;
- d. Establish a simple and enabling framework for the core processes of planning, performance management, resource mobilisation and organisational change which underpin the notion of developmental local government;
- e. Provide a framework for local public administration and human resource development;
- f. Empower the poor and ensure that municipalities put in place service tariffs and credit control policies that take their needs into account by providing a framework for the provision of services, service delivery agreements and municipal service districts and
- g. Establish a framework for support, monitoring and standard setting by other spheres of government in order to progressively build local government into an efficient, frontline development agency capable of integrating the activities of all spheres of government for the overall social and economic upliftment of communities in harmony with their local natural environment” (RSA, 2000:1-85).

Chapter 5 of this Act deals with integrated development planning (RSA, 2000:1-85) and section 24 in this chapter focuses on co-operative government (RSA, 2000:1-85). It ensures that municipal planning is aligned and complements development strategies and plans of other organs of state, as well as affected municipalities. This is to render effect with regard to the co-operative government principles enclosed in section 41 of the Constitution of the Republic of South Africa. It requires each municipality to participate in provincial and national development programmes as stipulated in section 153 of the Constitution of the Republic of South Africa.

Section 25 requires each local municipality council to adopt an integrated development (IDP) and strategic plan (RSA, 2000:1-85) to ensure development of the municipality. This is because it helps to integrate, co-ordinates, links plans and considers proposals that assist to support the development of the municipality – by helping municipalities to implement its plan.

Section 26 describes the fundamentals of the IDP (RSA, 2000:1-85). It requires the municipal council to develop strategies that align with the national/ provincial sectoral plans and planning. Also, to develop a spatial development framework (SDF) that will incorporate elementary guidelines related to the land use management system (LUMS) for each municipality. This includes operational strategies, disaster management plans (DMPs), financial plans, performance targets and key performance indicators. Section 37 deals with regulations and guidelines of the LGMSA (RSA, 2000:1-85). This requires all municipalities to implement their IDPs and abide by this Act when it comes to planning, adoption, review and drafting of the plans.

3.2.5 Spatial Planning and Land Use Management Act, 16 of 2013

The Spatial Planning and Land Use Management Act (SPLUMA) 16 of 2013 aims to:

- a. “Provide a framework for spatial planning and land use management in the Republic;
- b. Specify the relationship between the spatial planning and the land use management system and other kinds of planning;
- c. Provide for the inclusive, developmental, equitable and efficient spatial planning at different spheres of government;
- d. Provide a framework for the monitoring, coordination and review of the spatial planning and land use management system;
- e. Provide a framework for policies, principles, norms and standards for spatial development planning and land use management;
- f. Address past spatial and regulatory imbalances;
- g. Promote greater consistency and uniformity in the application procedures and decision-making by authorities responsible for land use decisions and development applications;
- h. Provide for the establishment, functions, and operations of Municipal Planning Tribunals and
- i. Provide for the facilitation and enforcement of land use and development measures” (RSA, 2013:1-72).

Chapter four deals with spatial development frameworks (SDFs) (RSA, 2013:1-72), as it provides detailed information about how different spheres of government, such as national, provincial and all municipalities, prepare SDFs in SA. It is of major importance for all spheres of government to participate in spatial planning and land use management (LUM) procedures that impact each other in order to guarantee that the programmes and plans are consistent and coordinated.

The national SDF provide spatial expression mostly to the national development plans and policies emanating from different sectors of the national sphere, and might include any regional SDFs (RSA, 2013:1-72). A national SDF takes into consideration the PPPs of private and public bodies that impact on land use management, land development and spatial planning. It deals with any issue related to coordination, as it can integrate and coordinate provincial, as well as municipal SDFs (RSA, 2013:1-72). For instance, it enhances spatial coordination of land use management and land development activities at national level. This is because it recognises any environmental management tool adopted by the relevant authority.

The provincial SDFs provide provincial development policies and give spatial expression to plans and policies emanating from different sectors of national and provincial spheres (RSA, 2013:1-72) at provincial level. A provincial SDF aligns, coordinates, and integrates the provincial plans and developmental strategies with the policies of the national sphere (RSA, 2013:1-72). It integrates and coordinates policies, plans and developmental strategies related to municipalities and provincial departments. Also, it integrates and coordinates spatial expression relevant to sectoral plans of provincial departments, by offering a framework that can be used to coordinate municipal SDFs with provincial SDFs and any regional SDFs. It incorporates any spatial aspects related to the national development strategies, as well as programmes. This is to ensure that all the provincial development projects, programmes and plans are consistent and transparent with regard to the provincial SDF.

Municipal SDFs assist in aligning, coordinating, and integrating development plans and policies emanating from different sectors of government (RSA, 2013:1-72), as applied in the municipal area. The municipal SDF is a five-year spatial form relevant to the municipality, “prepared as part of a municipality’s integrated development plan in accordance with the provisions of the Municipal Systems Act (MSA). It includes a longer-term spatial development vision statement for the municipal area which indicates a desired spatial growth and development patterns for the next 10 to 20 years” (RSA, 2013:1-72). It can quantify, identify, and offer, a geographic location suitable to build engineering infrastructure for present and future development for the next five or more years. It includes a strategic assessment related to the environmental opportunities and

pressures within the municipal area, as well as the spatial location of environmental sensitivities and high potentials of agricultural land. It provides the spatial expression of integration, alignment, and coordination of sectoral policies relevant to every municipal department by including an implementation plan, targets, dates, as well as monitoring indicators.

Chapter five of this Act deals with land use management. It lends effect to municipal SDFs, as well as integrated development plans (RSA, 2013:1-72) by promoting the efficient implementation of provincial and national policies. Also, it promotes economic growth, social inclusion, efficient land development and slight impact on public health, natural resources and the environment. Public participation process is important in this regard as it ensures that all interested and affected parties (I&APs) are granted the opportunity to object, appeal the decision and make representations (RSA, 2013:1-72). This is because for the SD of land it calls for the integration of environmental, economic and social considerations in both planning and land use management to guarantee that land development serves present and future generations.

3.3 National Plans

The National plans that speak to this study are highlighted in this section.

3.3.1 National Development Plan: Vision 2030

The National Development Plan (NDP): Vision 2030 of South Africa was established in 2011 (NPC, 2011:1-484) and was formulated by the National Planning Commission (NPC). The NDP presents a long-term vision of South African development. The main reason for the development of this plan was to improve, eliminate and reduce some of the development challenges that SA is encountering, such as inequality, poverty, unemployment and infrastructure (NPC, 2011:1-484) that urgently needs to be addressed to fully achieve the SD. SA as a country has seen that there is a need to develop approaches that will assist to decouple the economy from the environment, and break down the linkages of economic activity, carbon emission and environmental degradation. There is a need for SA as a country to find systems or techniques that will be used to manage the environmental resources and to sustain an economy that meets societal needs. That is why it was most important for SA to introduce this plan to assist solving these problems and to promote SD.

This plan seeks to eliminate poverty and reduce inequality within South African society before 2030 (NPC, 2011:1-484) by promoting economic development and delivering environmental protection. It mainly concentrates on strategies required to build the country and an inclusive economy by involving all citizens to participate in community development plans and

programmes in order for them to show their capabilities and potential. This includes opportunities for them to fully participate in social, economic, political and spatial governance. The purpose of the Plan is to ensure that each domestic household in SA secures a better standard of livelihood including income, productivity and employment. This is due to a shortage of employment (NPC, 2011:1-484) and a need to improve employment openings. The Plan estimates an unemployment decrease by 6% before it reaches 2030 (NPC, 2011:1-484) which means that some 11 million jobs need to be created and the total employment number increase from 13 million to 24 million by 2030. To achieve this goal, the economy must grow each year by 5.4% (NPC, 2011:1-484).

The Plan aims to provide each South African citizen with good quality environments and greater access to services through improved infrastructure and spatial planning by 2030 (NPC, 2011:1-484) and to build sustainable and flexible human settlements. It also aims to improve education, transport, innovation capacity and training, and to transform the current South African economy by ensuring that there is carbon free or zero carbon emission by 2030 (NPC, 2011:1-484). This development plan intends to improve health care and maintain ecosystem integrity within the communities, while managing the environment, environmental issues and safeguarding communities.

Chapter five of the Plan deals with environmental sustainability, climate change resilience and transition to a low-carbon economy to promote SD (NPC, 2011:1-484). One of the key objectives states that “public investment in new agricultural technologies and the development of resilient and environmentally sustainable strategies and support services for small-scale and rural farmers, ensures the protection of rural livelihoods and the concurrent expansion of commercial agriculture, so South Africa remains a net exporter of agricultural produce” (NPC, 2011:1-484). For instance, developing industries related to tourism, fisheries, small enterprises and agro-processing/agricultural development can create new jobs in the rural communities. This includes systems approach, innovation, transformation, adaptation and building resilience, especially with regard to mainstreaming issues such as climate change and its effects on poor communities.

The main approach concerning this plan “revolves around citizens being active in development, a capable and developmental state able to intervene to correct our historical inequities, and strong leadership throughout society working together to solve our problems” (NPC, 2011:1-484). This plan addresses an essential need to improve the capabilities of individuals within communities to ensure a better standard of living for all, particularly poor people living in rural communities of SA. Major aspects that are included in this NDP, and need to be taken into consideration, include sustainability, environmental factors, financial resources, helping the poor, sharing resources,

increasing development and involving the community to participate in the strategic decision-making process.

Although neither EIA or SEA, or environmental assessment in general, are explicitly mentioned in the NDP, they are implicitly catered for as follows:

- In the Overview section, one of the three measures to protect the country's natural resources is "an environmental management framework." (p. 48)
- In Chapter 5, "Ensuring environmental sustainability and an equitable transition to a low-carbon economy", one of the elements of Vision 2030 is "Policy and regulatory frameworks are created for land use, to determine the environmental and social costs of new developments and ensure the conservation and restoration of protected areas." (p. 199)
- In Chapter 5, "Guiding principles" include strategic planning with a systematic approach responsive to emerging risk and opportunity, and which identifies and manages trade-offs; sound policy-making and a regional approach for collaboration on mitigation and adaptation. (p. 200)
- In Chapter 5, "Steps towards the vision", one of the steps for promoting biodiversity and the conservation and rehabilitation of natural assets is a strategy for assessing the environmental impact of new developments as an important component of overall development and spatial planning. (p. 201)

SEAs reduce regulatory problems in EIAs and offer incentives particularly to green economic actions (NPC, 2011:1-484). They help decision-makers with informed decisions when undertaking an EA for proposed PPPs and strengthens EIA as a stand-alone tool. It can be safely stated that EIA can effectively work in conjunction with the SEA tool to improve development in SA and to assist implementing the NDP vision.

3.3.2 National Strategy for Sustainable Development, 2011-2014

The National Strategy for Sustainable Development (NSSD) and Action Plan was approved by the South African government in 2011 (DEA, 2011:1-42). As a proactive strategy, it considers SD a long-term obligation. It addresses the key pillars of sustainability, namely: social equity, economic efficiency and environmental protection, linked to the South African values and vision. This strategy is an action plan that effectively guides the implementation of sustainability and SD. The strategic objectives of this strategy are to enhance systems for integrated planning and implementation, sustain ecosystems and use natural resources efficiently, move towards a green

economy, build sustainable communities and to respond effectively to climate change (DEA, 2011:1-42). These are regarded as the five key priorities of this strategy. To achieve SD in SA there is a need to also concentrate on innovative technology, science, institutional arrangements and governance.

This document presents sustainability indicators and an action plan on how to sustainably implement the strategy (DEA, 2011:1-42). It integrates the principles of sustainability into policies, plans and decision-making processes at different spheres of government, such as local, provincial and national levels (DEA, 2011:1-42) by ensuring effective system integration, as well as collaboration throughout all sectors and functions. It increases understanding and awareness with regard to the importance of the ecosystem to human well-being as socio-economic systems are embedded and dependent on the ecosystems. It can help to evaluate, report performance and monitor the progress to achieve ecological sustainability. So, it is critical for protection of the environmental assets for future generations. Transition towards efficient use of natural resources can deeply act as a stepping stone to help lower carbon (CO₂) emissions, eradicate poverty and reduce inequality through implementing the NSSD.

3.3.3 National Climate Change Adaptation Strategy, 2018

The National Climate Change Adaptation Strategy (NCCAS) was established in 2018 in SA (DEA, 2018:1-84). The NCCAS is a key strategy for SA and was developed to provide a common vision of the transition to climate change resilience and adaptation for South Africa. It outlines priority areas in support of achieving the vision (DEA, 2018:1-84) which follow an SD path guided by climate change adaptation to help achieve development goals. The strategic vision draws on the South African national development plan (NDP) Vision 2030 (NPC, 2011:1-484), the national determined contributions (NDC) and the national climate change response policy (NCCRP) (DEA, 2011:1-49), including the sector, local and provincial government adaptation plans. This strategy is important in SA because it:

- a. “Acts as a common reference point for adaptation efforts in the short to medium-term, providing guidance across all levels of government, sectors and stakeholders affected by climate variability and change;
- b. Provides a policy instrument through which national adaptation objectives can be articulated to provide overarching guidance to all sectors of the economy;

- c. Facilitates the degree to which development initiatives at different levels of government and business integrate and reflect critical adaptation priorities, thus informing resource allocation by the various stakeholders towards climate change resilience;
- d. Guides stronger coherence and coordination on adaptation activities between different institutions and levels of government and
- e. Supports South Africa in meeting its international obligations by defining the country's vulnerabilities and plans to reduce such vulnerabilities and leverage opportunities, outlining the required resources for such action, whilst demonstrating progress on adaptation" (DEA, 2018:1-84).

The strategy serves as a South African national adaptation plan because it helps to fulfil the South African country's commitment (DEA, 2018:1-84) to its international obligations as outlined in the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). This strategy is a ten-year plan and is reviewed every five years. The document consists of strategic objectives, interventions and outcomes in conjunction with related actions. It does not only speak to national government, but is also directed to the whole of South Africa, incorporating sectoral institutions, local and provincial governments, as well as non-governmental, together with the private sector, civic society and research community.

Developing the strategy is considered a fundamental key to achieving the NCCRP objective, which focuses on effective management of the impacts of climate change throughout interventions that sustain and build South African environmental, economic and social resilience and offer full emergency response to the problem (DEA, 2018:1-84). That is why SA as a country is critically looking at immediate actions in planning and responding to the impacts of climate change – such as an increase in temperatures, which affects communities and ecosystems and management of water resources. Planning for possible impact on the agricultural sector must ensure that local governments are capable of foreseeing or predicting and reducing all risk of extreme events related to droughts and floods on human settlements in SA. SEA can play a huge role in identifying the constraints and opportunities that the environment places on formulation of programmes and plans. It can act as a guiding tool during the plans and programme formulation.

There is a strong recognition worldwide that sustainable socio-economic development can play a tremendous role in ensuring resilience and reducing climate change (DEA, 2018:1-84). That is why adaptation to climate change offers SA enormous opportunity to strengthen the social and spatial fabric, as well as transform the economy and build up a climate resilient society.

3.3.4 National Climate Change Response Strategy, 2004

The National Climate Change Response Strategy (NCCRS) was developed in 2004 in SA. The main objective of the NCCRS focuses on supporting the principles and policies set in the Government White Paper on Integrated Pollution and Waste Management (DEA, 2004:1-36), and national policies, more especially those policies associated with water, energy and agriculture. The purpose of this strategy is focused on the achievements of the national and SD objectives, while simultaneously critically responding to climate change.

Climate change is a cross-cutting issue that can extremely affect the total economy of SA, including sectors such as transport, forestry, health, energy, agriculture and water management, as well as provision of water services (DEA, 2004:1-36). The NCHRS promotes integration of programmes of different government departments drawn in to maximise benefits – particularly in the entire country – whilst minimising the negative impacts. This strategic action can possibly act as an important factor to boost social development and sustainable economy. It is also designed to support the key objectives of the South African government, which is based on alleviating poverty and jobs creation.

3.4 Chapter Summary

This chapter provided in-depth descriptions of the policies, legislation and plans that support sustainability and SD in SA. South Africa as a country has established its own legislative frameworks towards achieving SD, as a guide to implementation of EA tools. All South African legislative frameworks must serve a common goal of fulfilling and serving as a regulatory tool to reach their specific objectives and to achieve the sustainable development goals (SDGs).

This chapter started by highlighting the Constitution of the Republic of South Africa 108 of 1996 and ended by providing a full explanation of other relevant framework pertaining to SD and EA tools in SA. A detailed description of the Constitution of the Republic of South Africa was highlighted in this chapter as it is known to support SD and environmental protection by influencing the law that the South African state, or government, must promote, protect, fulfil and respect. It integrates all three key pillars of sustainability, namely environmental, social and economic dimensions. The National Environmental Management Act, 107 of 1998 promotes the principles of SD through implementation of the listed activities that may have a negative or positive effect on the environment, and promotes IEM instruments such as EIA “project-level” and a strategic decision-making tool such as SEA.

Other legislation such as the National Biodiversity Act (NEBA) and the Spatial Planning and

Land Use Management Act (SPLUMA) are also highlighted in this chapter. These promote, guide and foster SD in SA. The NEBA seeks to provide conservation and management of biodiversity, while the SPLUMA provides a framework for spatial planning and land use management by providing in-depth information on how different spheres of government – such as national, provincial, and municipal – must prepare their spatial development frameworks (SDFs) to help with land use development and decisions regarding plans, policies and programmes (PPPs).

The national plans explored in this chapter include the National Strategy for Sustainable Development (NSSD1), the National Climate Change Adaptation Strategy (NCCAS) and the National Climate Change Response Strategy (NCCRS). They all support the implementation of sustainability and SD in SA. The NSSD also seeks to support the key pillars of sustainability, such as social equity, economic efficiency and environmental protection. This plan increases systems for integrated planning and implementation by supporting the move towards a green economy, building sustainable communities, sustaining ecosystems, adapting to and responding effectively to climate change. It presents sustainability indicators and action plans on how to sustainably implement this strategy.

Lastly, the National Development Plan (NDP) Vision 2030 has been considered as a main strategy that presents a long-term vision for SA development, as it strives to eliminate poverty and reduce inequality by 2030. It promotes good quality environments and greater access to services through improved infrastructure and spatial planning (NPC, 2011:1-484) to build sustainable and flexible human settlements. This includes systems approach, innovation, transformation, adaptation and building resilience, especially to the mainstreaming issue such as climate change and its effects on poor communities. An EA tool such as SEA is needed to support the implementation of these legislative frameworks and to fully achieve SD in SA.

The chapter that follows reviews case studies that support the implementation of SEA and promote SD in SA.

CHAPTER 4: DIFFERENT TYPES OF SEA CASE STUDIES

4.1 Introduction

This chapter focuses on reviews of five types of SEA conducted in different years and in various provinces of South Africa (SA), and intended to support decision-making for sustainability, or sustainable development (SD), over the long term. These are:

- Square Kilometre Array (SKA) SEA in the Northern Cape;
- iLembe EMF/SEA in KwaZulu Natal (KZN);
- Greater Saldanha Bay EMF in the Western Cape;
- Drakenstein Municipal Area EMF in the Western Cape and
- Sandveld EMF, the agricultural area known as the Sandveld in Agter-Cedarberg in the Western Cape.

4.2 Square Kilometre Array (SKA) SEA

The Council for Scientific and Industrial Research (CSIR) was appointed by the Department of Environmental Affairs (DEA) to conduct the Strategic Environmental Assessment (SEA) for Strategic Integrated Project (SIP) 16 (CSIR, 2016:1-80). This project focused on Phase 1 of the South African mid-frequency array of the Square Kilometre Array (SKA), known as SKA1_MID. This project was introduced by the Presidential Infrastructure Coordination Commission (PICC) to support the MeerKAT (Karoo Array Telescope) and development of the SKA, and to provide opportunities in South Africa and Africa for participation in global innovative science projects (CSIR, 2016:1-80). The mission of the SEA was to coordinate data collection and research within the projected development area of the SKA1_MID (CSIR, 2016:1-80) and to integrate the process of environmental authorisation to ensure that environmental principles and factors are implemented – specifically at the strategic planning level.

The SKA1_MID is deemed a large-scale project because it covers more than 200,000 hectares (CSIR, 2016:1-80). Because of its strategic nature, SEA was considered an appropriate EA tool for evaluating constraints and opportunities associated with development, mainly on a regional scale.

4.2.1 Rationale for the SEA

The SEA provides an evidence-based knowledge set upon which strategic decisions can be made with respect to:

- “The identification of no-go areas and assessment of key potential impacts of SKA1_MID;
- Mitigation measures and management actions to be implemented during the design, construction and operation phases of SKA1_MID and
- Long-term research and monitoring programmes to be implemented on the land owned by the National Research Foundation during the lifetime of the SKA project” (CSIR, 2016:1-80).

It enables a systematic and strategic approach to stakeholder participation, as well as management among various sectors that incorporates three different spheres of government, public and private sectors and the wider public. Stakeholder participation is important in a proposed development as it seeks to share updates and available information with various groups of I&APs. Stakeholders will have concerns, inputs, comments and local knowledge related to SKA activities that can reduce potential negative and enhance potential positive impacts.

The approval, implementation and planning of the strategic infrastructure developments related to the proposed SKA project are in the context of “a business unusual approach and the strategic integrated projects (SIPs) as recommended by the chairperson of the National Planning Commission (NPC), Mr Trevor Manuel, in order to facilitate efficient implementation” (CSIR, 2016:1-80). That is why the DEA supported the effective implementation of the NDP through SEAs integrating regulatory requirements for SIPs whilst safeguarding the natural environment. SIPs are identified as large-scale infrastructure projects aimed at unlocking the development potential of SA as a country, located within all nine provinces, namely the Western Cape, Eastern Cape, Northern Cape, North West, Free State, KwaZulu-Natal, Gauteng, and Limpopo.

The location of the study area is in the Northern Cape Province as shown in Figure 4 below.

The SKA Phase 1 area includes the Karoo region, which extends across two district municipalities, Namakwa (NDM) and Pixley Ka Seme (PKSDM). Within NDM are Karoo Hoogland local and Hantam local municipalities. Kareeberg and Siyathemba local municipalities within the PKSDM also hosted this project, but with a very small-scale portion.

4.2.2 Principles Underlying the SEA

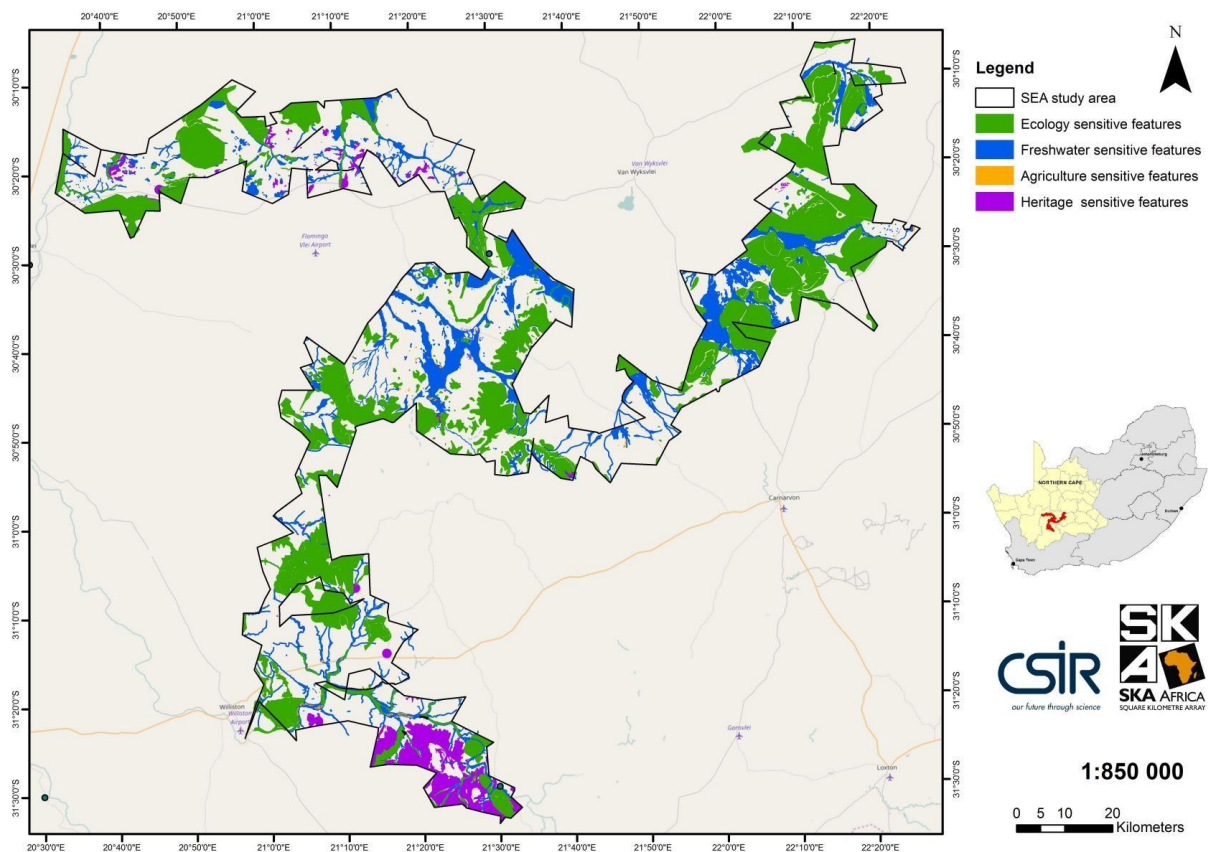
The principles that reinforce the SKA1_MID SEA were specified in detail in chapter four of the IEMP that was a result of the SEA. Three environmental principles were outlined:

- The physical, ecological integrity and biodiversity attributes of the Karoo area

should be used sustainably and protected. High level of environmental awareness is needed by all I&APs;

- Actions need to be taken to help build resilience and mitigate climate change impacts. There is a need to encourage public awareness and training, particularly regarding climate change and its effects on natural resources and
- Promote contributing to the United Nations SDGs (CSIR, 2016:1-80).

Figure 4: Location of High Environmental Sensitivity Areas



Source: CSRI (2016:1-80)

4.2.3 Stakeholder Engagement

Stakeholder engagement was undertaken during the SKA1_MID. Consultations from the local and provincial government were considered. This also included focus group meetings.

Announcements concerning the initial phase of SEA were circulated in six newspapers (CSIR, 2016:1-80). These gave the background regarding the launch of the SEA. Stakeholders invited to participate in the SEA process were registered in a project database. Posters were placed in the towns of Brandvlei, Van Wyksvlei, Carnarvon and Williston, and there was a notice/advertisement on the project website as well.

4.2.4 Screening Phase

Environmental attributes were spatially mapped during consultations with other provinces, as well as district municipalities, local municipalities and project partners (CSIR, 2016:1-80). The screening phase helped identify potential key issues, as well as sensitivities of the proposed development and to identify any needs for future research, including data collection, and to assist with specialist studies that will inform environmental sensitivity mapping.

4.2.5 Scoping Phase

Confirmation about the study area's strategic issues to define terms of reference related to socio-economic assessment and spatial planning documents for municipalities, such as the IDP and SDF. Key spatial information was obtained from the SDF, district SDF and IDP (CSIR, 2016:1-80). Specialist scoping phase (pre-assessment) reports were prepared for heritage, agriculture, biodiversity and terrestrial ecology, which included socio-economic aspects for avifauna and aquatic ecosystems (CSIR, 2016:1-80). Other studies undertaken were surveys on endangered species and screening potential sensitivities associated with the existence of bats in the area, as well as screening risks related to on-site diesel storage in the proposed study area. Also, sensitivities associated with water use, mining, waste management, defence, aviation, weather services, traffic and noise effects, and telecommunication were examined during the SEA in the form of consultations with relevant stakeholders and the authorities.

Specialist reports were revised by independent professionals who contributed and delivered input to improve the results of the scoping phase. Details of reviewers and specialists who conducted fieldwork and prepared specialist scoping phase (pre-assessment), were incorporated in the SEA Report. Identified no-go and sensitive areas were linked and utilised to revise preliminary configuration of the SKA1_MID to help preserve areas that are potentially unsuitable for development.

4.2.6 Specialist Assessments

The specialist assessment reports were heritage, landscape and agriculture, aquatic and terrestrial biodiversity, bats and birds, including socio-economic sensitivities (CSIR, 2016:1-80). Sensitivities in terms of defence, aviation, weather services, mining and telecommunication were established during consultation with relevant authorities. Sensitivity maps were provided for all but the socio-economic assessments. The results were utilised to build on chapter three of the IEMP "State of the Environment" and chapter four "draft SKA1_MID EMPr" (CSIR, 2016:1-80). Specialists' findings were used to inform further licenses and permit requirements as defined

in chapter two of the IEMP “Project Scope”, and Environmental Guidelines were incorporated in chapter five of the IEMP (CSIR, 2016:1-80).

The strategic socio-economic assessment was undertaken by SKA SA and DST. It was undertaken as part of the SEA of SKA Phase 1. Only three socio-economic objectives were identified (CSIR, 2016:1-80). Firstly, to describe and analyse the existing socio-economic aspects of regional and local level of the study area. Secondly, to analyse and identify potential indirect and direct negative and positive socio-economic impacts concerning the SKA phase 1 project, as well as potential macro-economic and local economic impacts. Lastly, to determine potential indirect and direct negative and positive socio-economic impacts of the Draft AGA Regulations of regional and local level of the study area, specifically restrictions related to the voice usage and data of telecommunication devices were established.

4.2.7 Findings of the SEA

The findings or outcomes of this SEA were compiled in two reports, namely the Integrated Environmental Management Plan (IEMP) and the Strategic Environmental Assessment (SEA) report (CSIR, 2016:1-80). The IEMP establishes minimum requirements needed for the construction and operation phases of the SKA1_MID, control activities and environmental monitoring, environmental principles and long-term research, monitoring programmes to be implemented within the SKA site. The SEA report includes information regarding the analysis, activities, timeframes and stakeholder participation, as well as the specialist studies undertaken during SEA process. The output of the SKA SEA was the IEMP, which was adopted as an environmental instrument, so that EIAs were not required.

Environmental sensitivity and mapping were centered on the inputs from consulting relevant local, provincial, and national authorities and conservation organisations, as well as the SKA SA (CSIR, 2016:1-80). Social and environmental sensitivities, as shown in Figure 4, were classified into areas not appropriate for development of SKA Phase 1 and with no available mitigation measures, areas sensitive to the development of SKA Phase 1, but with the availability of mitigation measures, and areas that show no sensitivity, but suitable for development of SKA Phase 1.

4.2.8 SKA Environmental Management Programme

The SKA Environmental Management Programme (EMPr) was needed to make sure that necessary management actions and mitigation measures were carried out and performed during the construction, as well as the operation stages of the proposed development (CSIR, 2016:1-80).

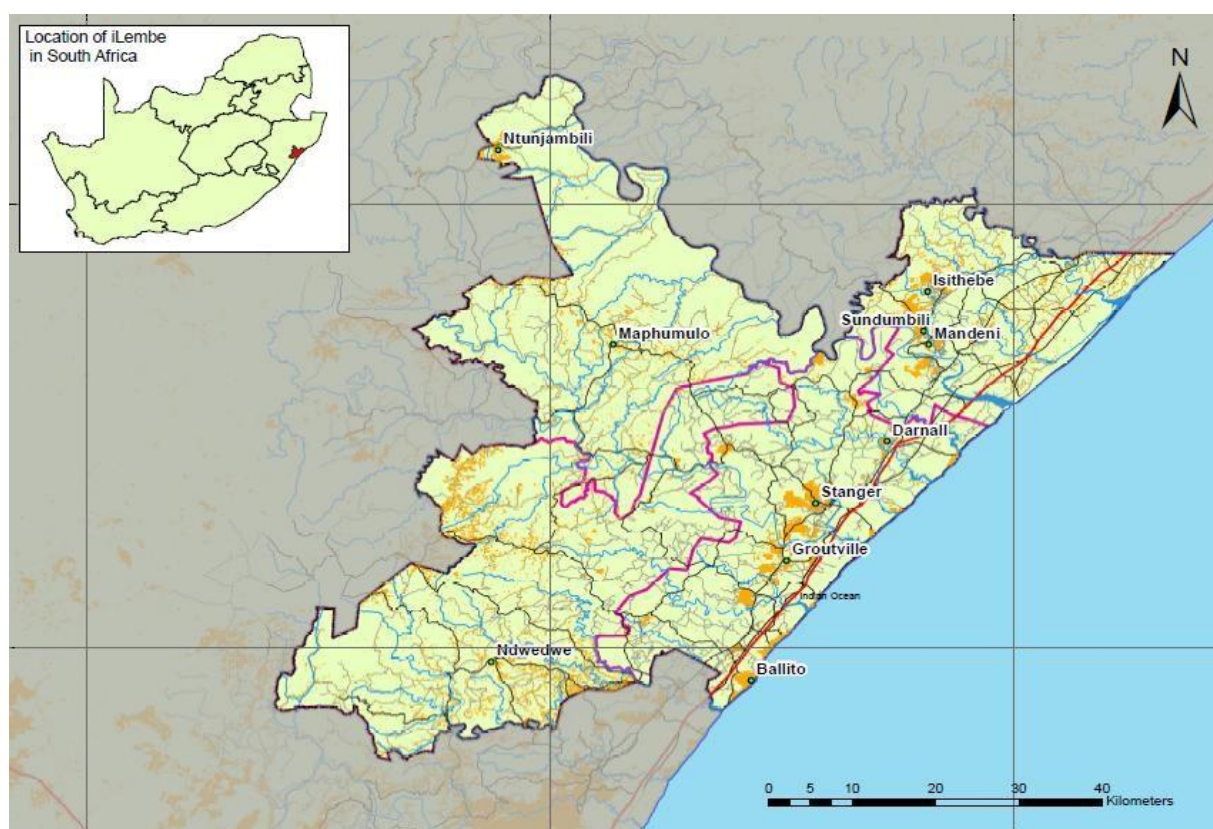
It consists of four phases: final design, construction, operation and decommissioning phases. Chapter four of the IEMP covers the draft of the EMP of SKA1_MID and related infrastructure (CSIR, 2016:1-80). The EMP guides implementation of continued environmental practices throughout the project life cycle. It fulfills requirements stipulated in Section 24N of NEMA.

4.2.9 Integrated Environmental Management Plan

The Integrated Environmental Management Plan (IEMP) is the environmental management instrument for legal implementation of SEA output and strategic decision-making process (CSIR, 2016:1-80). This IEMP consists of four chapters. The SEA report is considered a separate report that “does not form part of the legal implementation of the SEA” (CSIR, 2016:1-80). The IEMP provides detailed information to assist all interested and affected parties (I&APs) or stakeholders on how objectives and significant milestones are attained, and engagement of I&APs. It includes comments and responses achieved during participation of the I&APs.

4.3 iLembe EMF/SEA

iLembe is a district municipality north of the eThekweni Metro and King Shaka International Airport in KwaZulu-Natal (KZN) (DAEA, 2013:1-75). It is rich with natural environmental aspects ranging from dune to coastal areas, with river valleys, diverse topography and natural coastal flats vegetation (DAEA, 2013:1-75). Because of these abundant natural resources, it has potential both as a tourism hotspot and development area. This is why there was a need to formulate the Environmental Management Framework (EMF) and the Strategic Environmental Management Plan (SEMP) in 2013 to properly manage this area shown in figure 5.

Figure 5: Location of iLembe EMF and SEMP Study Area

Source: DAEA (2013:1-75).

The regulatory authority for management of the environment in KZN is the Department of Agriculture and Environmental Affairs (DAEA), which provided guidance on developing the EMF. The aim of the EMP is to provide environmental support to the municipality's decision makers (DAEA, 2013:1-75), and to provide a framework that will assist to inform both the SDF and IDP in the iLembe district by:

- “Providing definite criteria for decision-making;
- Providing an objective environmental sensitivity overview;
- Defining and categorising of environmental, social and heritage resources, economic and institutional aspects;
- Identifying sensitive areas spatially and
- Formulating management guidelines” (DAEA, 2013:1-75).

The iLembe Regional Spatial Development Plan (IRSDP) informed the development of the iLembe EMF (DAEA, 2013:1-75). The EMF focused on identifying areas of ecological sensitivity, natural resources and transformation pressures (DAEA, 2013:1-75) to help formulate

a spatial environmental plan that will guide spatial development plans (SDPs) and decision-making processes. The EMF has to guide development and is focused more on important backlogs in infrastructure, housing and on other service provisions that do not compromise environmental resilience.

The legislative framework for this EMF was the Constitution of the Republic of SA Act 108 of 1996 and the National Environmental Management Act 107 of 1998, including the EMF regulations (see Appendix D). The EMF consisted of four phases, namely the status quo assessment, desired state analysis, management zone identification and the strategic environmental management plan (SEMP), as well as a final EMF compilation (DAEA, 2013:1-75). All these phases build “on the findings of its predecessor” and inputs received from different stakeholders, as well as a project steering committee (DAEA, 2013:1-75). The final EMF contains a key finding that is relevant to the status quo assessment, environmental management guidelines for all identified environmental management zones and strategic interventions.

A complete EMF is a final phase with environmental zone identification and SEMP compilation, of which the purpose was to apply understanding of environmental requirements and development trends and map management zones that form the basis for proactive environmental management of the area. A variety of management zones were utilised to determine how and where specific development activities should take place. This is because environmental management zones are considered an essential first stage and a crucial input during the development of an environmental framework, as well as the SEMP. Whereas the EMF zones form the main framework, and the SEMP offers guidance, particularly for environmental decision-making and land use planning.

The methodology used to describe the environmental management plans and management zones for iLembe included the following:

- Summary of SEA based on key findings related to the status quo assessment, as well as a desired state sustainability framework;
- Analysis of the strategic assessment to identify the spatial and land-use conflict;
- Compilation of environmental management zones framework;
- Set of strategic environmental management guidelines for each identified environmental management zone and
- Guidance on related strategic interventions, for example proclamation of

protected areas to help promote conservation of natural resources and interface with other regulatory processes (DAEA, 2013:1-75).

4.3.1 Status Quo Assessment

The status quo report, as well as desired state phases of this project, generated a baseline explanation for the study area in terms of sustainability framework (DAEA, 2013:1-75).

4.3.2 Desired Sustainability Framework

The sustainability framework described all environmental features in relation to the policy and legal requirements, status, management objectives and environmental constraints and opportunities. Based on this sustainability framework, different constraints and opportunities for iLembe were clearly identified. These constraints and opportunities were summarised to support findings from mapping. The identified policy and legal parameters were used for environmental control and management zones (DAEA, 2013:1-75) to guide different requirements for reporting, compliance and decision-making aspects.

The identified opportunities in this EMF originated from the desired state to strengthen the findings from each feature class. Management consideration in this regard incorporates indicators, determining aspects or factors to influence the outcomes of the identified opportunity. This consideration helps to inform the process associated with the identification of environmental management zones and management guidelines for specific features or zones of the iLembe district municipality. Features considered during the development of this EMF included socio-economics, heritage resources, biodiversity, water resources, agriculture, coastal management, estuaries, air quality, waste management and mining.

The constraints were also derived from the desired state, as with the opportunities, but fewer constraints were outlined. Management considerations were mentioned against each constraint (DAEA, 2013:1-75) to inform the process of identifying of conflicts among environmental, developmental, and environmental features, and also consolidation of environmental management zones.

4.3.3 Strategic Assessment

The strategic assessment was built on the description “of environmental features of desired state report under the environmental indicator analysis” (DAEA, 2013:1-75). This assessment was visual because it relied strongly on maps and Geographical Information Systems (GIS) that were produced from different layers of available data. This was done by demonstrating all constraints

and opportunities visually, conflicts and convergences amongst areas of constraint and opportunity for all features.

The sensitivity analysis map showed constraints and opportunities (DAEA, 2013:1-75) and areas of different land use activities. The outcomes of this analysis serve as preliminary management classes grounded in the ability to maintain ecological functioning and livelihood.

Environmental convergence was outlined. To map diverse environmental management zones, specific environmental resources were identified and prioritised according to where they were, and if they are reinforced by developmental objectives that came to light during the sustainability framework (desired state) analysis. Only three key areas of convergence were identified, namely environmental sensitivity and conservation value, agriculture and environmental support areas, and areas suitable for human habitation. The maps combined aspects of the status quo, desired state spatial outputs and fed into the development of environmental management zones. This process is an iterative process, where the desired state layer builds on the status quo layer and the SEMP layer builds on desired state layer.

Environmental conflicts were considered, particularly in areas where pollution activities are extant, or features and biophysical processes cause environmental risks (DAEA, 2013:1-75). Also, areas where there are infrastructure or other significant features. This was achieved to guarantee and promote the environmental quality of iLembe.

Environmental management zones incorporated in this EMF include legal requirements, terrestrial biodiversity, rural support, commercial agriculture, stewardship and agricultural transition, coastal management, urban settlement, industrial and manufacturing activity, infrastructure and development corridors (DAEA, 2013:1-75).

4.3.4 Strategic Environmental Management Guidelines

The SEMP is the reference for appropriate guidance for environmental decision-making and for land use planning (DAEA, 2013:1-75). This is because the actual implementation of the EMF is in the SEMP, which consists of appropriate guidance informed by the desired state and status quo analysis, and intervention strategies to achieve efficient implementation in regard to the environmental management zones.

The objectives of this SEMP are to steer the iLembe development towards the identified desired state parameters. It comprises two management levels, which are “guidelines for universal application and guidelines for the different management zones” (DAEA, 2013:1-75). The environmental management zones are those in the EMF, described previously. The universal

application aspects include milling and mining, topographic risks, renewable energy, basic service provision and heritage.

4.3.5 Strategic Interventions

The iLembe Regional Spatial Development Plan (IRSDP) offers an economic sustainability approach, especially for development in the iLembe area, where the EMF offers the insight relevant to opportunities and challenges that exist within the iLembe area, namely pollution, resource use, land use, ecosystems and environmental hazards (DAEA, 2013:1-75). There is a need to integrate these two plans to ensure proper planning that will provide extreme long-term benefits.

The ISRDP encompasses five objectives, namely diverse and growing economy, livable area, living in harmony with nature, equitable access, as well as promoting social well-being. These objectives will help to guide the iLembe area towards a development that is more sustainable and healthier by 2050 (DAEA, 2013:1-75). There is a need to formulate a phased approach or short-term goals to make progress towards an economic and sustainable competitive region by 2050 (DAEA, 2013:1-75). It is significant for each phase to consider the status quo in the region from all sustainability aspects such as environmental, economic, social, cooperative governance and infrastructure.

IDP is developed according to a timeframe of five years, so the proposed phased approach needs to take appreciation of this planning and reporting timeframe (DAEA, 2013:1-75). The IDP can be utilised as a continuous stepping stone to achieve the desired state and to ensure that the proper path is followed for the iLembe region. There is a need to review the EMF within a similar timeframe in order to ensure that appropriate and updated information is shared among processes and allow informed decision-making.

The proposed SDGs for iLembe municipality centred on the findings attained from the status quo phase and the proposed objectives by the ISRDP. These focused on “thriving lives and livelihoods, sustainable food security, secure sustainable water resources, universal clean energy, healthy and productive ecosystems, governance for sustainable societies” (DAEA, 2013:1-75). These outlined objectives were categorised according to focus areas such as climate change, poverty, job creation, environmental quality, spatial, institutional systems and vulnerability.

To adopt, implement and applicate the iLembe EMF, the EMF must be approved by the KZN DAEA, submitted to the Member of the Executive Council (MEC) of KZN responsible for Environmental Affairs (DAEA, 2013:1-75). The MEC will adopt the iLembe EMF with

concurrence from the National Minister of Water and Environmental Affairs. The adoption of this EMF will therefore enforce the obligation of considering it throughout the EIA evaluation process for decision-making authorities.

It is recommended that the revision of the EMF is aligned so that its environmental inputs can inform the SDF and IDP planning phases. With the conservation planning procedure in place in KZN province, its framework can refine the identified environmental management zones of this EMF. This means that the EMF revision must be adaptive in a way that it responds to any changes of certain indicators or weak performance before an issue becomes uncontrollable. Also, it is important to monitor all environmental features during SDF/IDP and KZN DAEA reporting phases and compare them with the recommendations and findings of this EMF. This will help to inform any changes to the manner in which recommendations are implemented.

4.4 Greater Saldanha Bay EMF

Saldanha Bay is situated on the West Coast of the Western Cape (DEA&DP, 2017:1-210), some 140 km north of the City of Cape Town. It is renowned for its natural beauty, the coastline, spring flowers, Berg River estuary and Langebaan lagoon, one of 18 Ramsar wetlands in South Africa. This region is rich with essential cultural resources, such as archaeological and paleontological features, which require good management and protection to prevent degradation and depletion of natural resources.

The Greater Saldanha Bay EMF covers Saldanha Bay municipality and part of the Bergrivier local municipality (DEA&DP, 2017:1-210). It was envisioned that the proposed EMF would cover the Saldanha Bay municipality area, but because it is on the southern bank of the Berg River (DEA&DP, 2017:1-210), the study area was extended to include both the eastern system and the river in an environmental planning domain. Both municipalities fall under the West Coast district municipality.

The rural nodes, towns and settlements that are situated within this study “include Vredenburg, Saldanha, Paternoster, Hopefield, St Helena Bay, Langebaan, Jacobsbaai, Green Village, Koperfontein and Velddrif” (DEA&DP, 2017:1-210). Vredenburg, Langebaan and Saldanha are regarded as the most developed and populated. The Port of Saldanha Bay deals with the export and import of bulk materials including iron ore and oil, and is the core of the Saldanha Bay Industrial Development Zone (SBIDZ). These materials are well-known to be key economic drivers within this region. Saldanha and St Helena Bay are renowned for fishing in the area. In recent years, tourism has been a key economic sector, and this is centered particularly on the cultural and natural resources in this region.

The proposed EMF project for Greater Saldanha Bay was initiated by the Western Cape's DEA&DP in 2017 (DEA&DP, 2017:1-210). The national DEA also supported this proposed project. As mentioned previously, it was decided that the Bergrivier local municipality be included in this EMF. The decision for including this municipality was made after consulting related municipalities, the DEA and DEA&DP.

This EMF is expected to provide information that can be utilised by relevant authorities to help support the decision-making process, by protecting and preventing degradation of environmental resources, while addressing development to sustain social needs.

During the initiation of this EMF three parts were envisaged:

- Environmental status quo;
- Strategic assessment and
- Strategic environmental management plan (SEMP) (DEA&DP, 2017:1-210).

This speaks to the requirements of the EMF regulations of 2010, according to regulations 3 (3) that state that “an EMF must include the status quo of the environment, the desired state of the environment and the actions necessary to achieve the desired state” (DEA&DP, 2017:1-210).

4.4.1 Environmental Status Quo

To finalise this EMF a broad range of spatial data and documentation was reviewed (DEA&DP, 2017:1-210). This includes spatial information from non-government GIS databases, including important areas for birds, heritage resources and marine areas. Also, discussions/ meetings with various organisations or stakeholders with local knowledge provided valuable data. Responses of I&APs were analysed – those from questionnaires, presentations, workshops and comments about the document. Comments related to any available information about biodiversity, planning and land use, heritage, and spatial groundwater were incorporated.

Environmental attributes considered were those to maintain economic, human well-being and issues that cause detrimental effects to development such as flood and erosion (DEA&DP, 2017:1-210). It focuses mostly on the key indicators, as well as its interaction. The identified environmental attributes are water, biodiversity, agriculture, heritage and cultural resources.

Socio-economic conditions included poverty and employment levels, skills and education, housing, infrastructure and services and economic development of the area.

4.4.2 Strategic Assessment

The strategic assessment speaks to alignment with local, provincial and national environmental policy. National policy provides appropriate EMF information that helps to promote SD. The National Framework for Sustainable Development was adopted in 2008 (DEA&DP, 2017:1-210) and recognises the connection between natural resources, SD, ecosystems including South Africa's biodiversity together with natural systems.

Sector specific policies and strategies such as climate change, greening economy, natural resources, provincial policy and municipal plans and policies were included to cover different aspects relevant to sustainability (DEA&DP, 2017:1-210). The National Climate Change Respond Strategy and NSSD are the strategies for climate change.

The provincial policy includes the provincial strategic plan from 2014 to 2019. It describes "the Western Cape Province's policy agenda and the roadmap for execution" (DEA&DP, 2017:1-210), which led to the Western Cape provincial government introducing five strategic goals, as well as "game changers".

Municipal policies and plans include municipal IDPs as primary strategic plan. The Local Economic Development Strategy, Integrated Waste Management Plan (IWMP) and SDF fall under IDP (DEA&DP, 2017:1-210). The EMF included strategic information from the Bergrivier and Saldanha Bay IDPs.

Analysis of key trends, concerns and opportunities were based on the situation assessment. Key trends and pressures include the availability of water resources, coastal development, disturbance and degradation of terrestrial and aquatic ecosystems, marine pollution and pollution risks, disturbance and degradation of coastal and marine ecosystems, climate change and anticipated effects, air quality, poverty and unemployment levels, inadequate infrastructure, loss of settlement character and identity.

4.4.3 Strategic Environmental Management Plan

The Strategic Environmental Management Plan (SEMP) performs a crucial role in the EMF as it offers guidance to environmental decision-making when managing significant natural resources of the Saldanha region (DEA&DP, 2017:1-210). The SEMF entails managing the implementation of the EMF, namely responsibilities and roles, decision-making, monitoring and evaluation framework, updating/revision of the EMF; and IDP/SDF integration. A range of parties play a significant role in achieving the EMF's implementation. These entail authorities such as "competent authority in respect of environmental authorisations under section 24 of NEMA" (DEA&DP, 2017:1-210), commenting authorities, natural resources management, environmental

assessment practitioners and applicants.

The implementation of decisions is associated with the control or management of the development of a specific area or site. It is significant that decisions on a site-specific level must align with the strategy of the area (DEA&DP, 2017:1-210) and if decisions are not aligned, they have the possibility of weakening the strategy, as well as its goals and vision. Also, “the desired future state” cannot be achieved if decisions are not aligned (DEA&DP, 2017:1-210). Considering the fact that a sustainable future is highly recognised and considered necessary, decisions regarding economic growth and development need to take into account the principles of sustainability.

The EMF focuses on the specific environmental attributes of each Environmental Management Zone (EMZ) and offers the Environmental Management Zones’ (EMZ’s) limits-of-acceptable change in regard to the management objectives (DEA&DP, 2017:1-210). That is why the EMF has been deemed to have a pro-active approach to environmental management in terms of regulating development, mostly to zones that may possibly encourage such development by attempting to prevent or avoid negative effects and enhance possible benefits.

It is vital that the environmental attributes are evaluated and monitored in terms of the management objectives, “and that negative trends are brought to the attention of the municipality, other responsible authorities and the public” (DEA&DP, 2017:1-210). If these are achieved, then the EMF can be deemed effective. The Inter-Governmental Task Team of Greater Saldanha Bay offers all related authorities of this zone a discussion platform to enable affected stakeholders and communities to lend input and participate in decisions during the meetings. This will ensure transparency – mainly with the public – and enhance the effectiveness of EMF implementation. Therefore, it is recommended that monitoring and evaluation in terms of these environmental attributes must be a focus of the municipality’s IWMP, State of the Environment Report (SoER) and Air Quality Management Plan of related water user associations, or catchment management agency, and of monitoring with regard to biodiversity plans.

The Greater Saldanha Bay EMF will be updated every five years (DEA&DP, 2017:1-210). In terms of the revision phase, this EMF will be integrated and synchronised with the SDF/IDP revision. This phase will be directed by the DEA&DP together with related municipalities/municipality. DEA&DP must inform the National Department of Environmental Affairs about the revision process of the EMF for concurrence, as well as other related authorities such as local, provincial and national about the revision phase of the EMF (DEA&DP, 2017:1-210), so that all authorities are able to also contribute or provide constructive information.

4.5 Drakenstein Municipal Area EMF

The Drakenstein municipality is one of five municipalities in the Cape Winelands District in the Western Cape (DEA&DP, 2015:1-158). It is about 1 541km² and extends from Simondium in the southern area to Saron located on the northern boundary (DEA&DP, 2015:1-158). The eastern side is well-defined by the Limiet, Klein Drakenstein and the Saron Mountains. The western boundary of this municipality is rich in agricultural fields.

Drakenstein has been identified as the second largest municipality in the Western Cape (DEA&DP, 2015:1-158), with the City of Cape Town as the largest when it comes to population density. Wellington and Paarl are the key urban centres of the Drakenstein municipality. The majority of the population resides within these two areas, where most economic activities are undertaken. Agricultural practice is the backbone of the Cape Winelands and the Drakenstein municipality is considered to be the agriculture centre of fruit and wine. In this municipality there are forward and backward linkages in the local economy to viticulture, especially in the manufacturing sector for instance, agro-processing, machinery, packaging and fertilisers.

The DEA&DP initiated this EMF in 2015 (DEA&DP, 2015:1-158). The key objective of the EMF is to help encourage the environmental decision-making process. The EMF does not only support decision-making of environmental authorities, but also environmental decisions of other authorities. NEMA, as a framework that supports the environmental right of the Constitution, plays a huge role.

The purpose of the EMF is to promote sustainability, securing environmental protection and to promote cooperative environmental government (DEA&DP, 2015:1-158). It is important for an EMF to include the environmental status quo, strategic assessment and SEMP; these elements were also incorporated in the Greater Saldanha Bay EMF. The linkages between elements made up this EMF. Also, relationships between the EMF, SDF and IDP were outlined.

Situation analysis, which is the environmental status quo report, comprises information associated with land use, some key trends and environmental issues (DEA&DP, 2015:1-158). This informs maps illustrating cultural and social or natural resources and attributes/characteristics where resources can be located, as well as how important or sensitive, they are.

Strategy includes the strategic environmental assessment (SEA) to identify priorities, constraints and opportunities (DEA&DP, 2015:1-158). Achieving this will assist in setting out goals, sustainability objectives, or vision, as well as indicators and criteria for the future. It also incorporates analysis of environmental management zones centered on the situation analysis and

considering the strategy, specifically the objectives which indicate the desired future of the study area.

The SEMP provides the action plan in order to attain the strategy. This plan covers recommendations related “to the integration of the EMF with planning instruments such as IDP/SDF, environmental initiatives and land use” (DEA&DP, 2015:1-158). Recommendations are also made about reporting, monitoring and evaluation framework.

4.5.1 Situation Analysis

Collation and collection of baseline data information during the development of this EMF was strongly concentrated on spatial data that were available in existing studies, reports and GIS format (DEA&DP, 2015:1-158). For the purpose of achieving this EMF, all relevant documents on policies, and research information, statistics and scientific data were sourced. Also, primary research was conducted, including mapping and identifying wetlands. Information related to wetlands was significant during the development of this EMF as wetlands play a key role to assist in maintaining water resources. Information concerning heritage resources was included as heritage resources are a valuable feature within the Drakenstein area.

The reviewed reports and documents during the compilation of this EMF included the studies conducted on the Berg River, the state of environment report and IDP and SDF for the municipality area (DEA&DP, 2015:1-158). Also, reference was made to related legislation.

Specialist research was conducted as this EMF is grounded primarily on existing or available information (DEA&DP, 2015:1-158). That is why specialist studies were conducted to address information gaps. There was a lack of heritage data and a wide range, as well as reliable information relevant to wetlands. All this information is vital in identifying any environmental attributes in the Drakenstein municipal area.

Spatial information available was encompassed in hard copy format and included in a GIS database (DEA&DP, 2015:1-158). A study conducted by Ninham Shand – it focused on the Berg River – showed that wetlands are an important element in the hydrological system of the Drakenstein area. There was a lack of available information regarding the ecological status of wetlands and location, but there was spatial information concerning farm dams and natural wetlands including man-made structures.

Spatial GIS information was sourced in order to develop maps that demonstrate environmental attributes, as well as EMZs (DEA&DP, 2015:1-158). Information related to GIS was sourced from the DEA&DP, the Drakenstein municipality, the South African National Biodiversity

Institute (SANBI)/CapeNature, the Cape Winelands District Municipality and the Departments of Agriculture and Water Affairs.

Additional sources of data came from the public participation process, which consisted of advertising, public workshops, questionnaires to I&APs and progress newsletters that were provided to registered I&APs (DEA&DP, 2015:1-158).

Shortcomings and information gaps were identified. There was a lack of data information regarding water quality within the Drakenstein region, as well as the absence of receiving water standards (DEA&DP, 2015:1-158). Though an ecological reserve has been established for certain sub-catchments, no reserve determination was undertaken in the Berg River catchment. The ecological reserve is defined as “the quantity and quality of water required...to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource” (RSA, 1998b). The Cape Winelands District Disaster Management Plan offered some spatial information on risks; the criteria used to define, or determine significance, such as fire risks and other risks were not accessible. This is why these data were not included in this EMF database.

The environmental attributes were centered on the information pertaining to development planning, “resources critical” to maintain economic activities and well-being and human health, as well as “issues that may present risks to development” such as flood risks and erosion possibility (DEA&DP, 2015:1-158). Geology and climate factors were not mapped as individual attributes; instead, cognisance was taken of these to define themselves in the landscape. The environment or landscape is defined by different factors and interactions amongst them. For instance, geology is influenced by groundwater systems, topography and mineral resources, while the topography is influenced mainly by streams and rivers which are affected by climate conditions. Thus, detailed information on vegetation types and rock types were not incorporated in this EMF.

Environmental attributes centered on development planning were biodiversity, water, agricultural, cultural and heritage resources (DEA&DP, 2015:1-158). Biodiversity resources include threatened ecosystems, fauna, protected areas, likely and known critical biodiversity areas, as well as special habitat. Significant areas for delivery of ecosystem services were outlined, such as rivers, wetlands, mountain catchments, productive soil and remaining areas of priority biodiversity. Also, ecological corridors were considered. River systems and water resources such as availability of water resources, water quality in river systems, freshwater ecosystem priority areas were outlined. Agricultural resources include irrigated lands, dry-land

farming. Scenic and cultural resources were considered.

Socio-economic conditions include employment and poverty levels; local economic development projects/programmes; infrastructure, urbanisation and housing; community facilities; recreational and public tourism facilities/opportunities (DEA&DP, 2015:1-158).

4.5.2 Strategic Assessment

Strategic informants incorporate the national policy; programme of action; sector-specific strategies and policies such as climate change, greening the economy, natural resources and provincial policy; municipal plans and policies – SDF and IDP (DEA&DP, 2015:1-158).

Priorities, trends, pressure, constraints and opportunities were identified. Strategic objectives and vision of this EMF take into consideration the inputs of stakeholders, situation analysis, policy, as well as analysis of trends, pressures and opportunities (DEA&DP, 2015:1-158). The objectives related to SD were put forward by local, provincial and national government.

4.5.3 Strategic Environmental Management Plan

The Strategic Environmental Management Plan (SEMP) plays a key role in the EMF (DEA&DP, 2015:1-158) as it offers guidance to help promote environmental decision-making processes that benefit the management of significant resources of the Drakenstein region. The SEMF is about managing the implementation of the EMF. It also covers the Environmental Management Zones (EMZs) updating/revision of the EMF and IDP/SDF integration. The Drakenstein Municipal Area EMF will be updated every five years (DEA&DP, 2015:1-158). The revision phase of this EMF will be integrated and synchronised with the SDF/IDP revision. This phase will be instructed by the DEA&DP together with related municipalities/municipality. It is significant for the DEA&DP to enlighten the National Department of Environmental Affairs about the revision procedure of the EMF. The DEA&DP must notify other related authorities at local, provincial and national level about the revision phase of the EMF (DEA&DP, 2015:1-158) in order for all authorities to also contribute or provide valuable information.

The revision procedure must determine if revised or new data of environmental attributes is accessible and available. It is important to always ensure that the situation assessment and GIS database is updated (DEA&DP, 2015:1-158). Establish if revised or new guidelines and policies, relating to heritage resources, water, biodiversity and sustainability, – and other environmental management and natural resources management of significance to the EMF zone, – have been issued. There is a need to review the criterion associated with desired outcomes and management objectives, as well as limit-of-acceptable change relating to any revised or new guidelines and

policies. Evaluate if the attribute criterion for the Environmental Management Zones (EMZs) are still related and revise as obligatory. Then update the environmental management zone maps, as well as related tables.

There is a need to establish if identified pressures and trends in the EMF are still related (DEA&DP, 2015:1-158), if negative trends have exacerbated, reversed, or stabilised and whether there are new trends developing that cause challenges specifically for environmental management, Environmental Outlook report and SoER. Review of the EMZ classifications and criterion associating with desired outcomes, management objectives, as well as limits-to-acceptable change is deemed important as it helps in addressing the trends.

The information-base utilised to establish the EMZs of this EMF where up-to-date data and consisted of wide-range diversity of environmental attributes (DEA&DP, 2015:1-158). It is important for the EMZs to inform the direction and pattern regarding future development and the decision-making processes. They must be utilised by the municipalities/municipality to help define the urban edge and supply environmental in-put into the zoning schemes and the SDF. The EMF focuses on both opportunities and important areas to help direct future development, as well as constraints towards development. These constraints and opportunities could come into effect when integrated with the SDF – that is why it is significant for the EMF and the SDF “to speak the same language” (DEA&DP, 2015:1-158). Eventually, there is a need for the EMF to be embedded in the zoning schemes.

4.6 Sandveld EMF

The Sandveld EMF has been an initiative of the agricultural and environmental functions of the Western Cape Government (DEA&DP, 2018:1-171) and was implemented in terms of the National Environmental Management Act (NEMA) by the Western Cape DEA&DP and Department of Agriculture. The EMF process included involvement and participation of a variety of affected farming sectors, landowners, agricultural associations, communities, government departments, relevant key stakeholders, agencies holding regulatory and functional responsibilities with regard to the sustainable resource use, conservation of biodiversity in development and planning domain (DEA&DP, 2018:1-171). All these sectors or stakeholders who play a huge role in supporting the social well-being and economic life in the Agter-Cederberg and Sandveld region also contributed to drafting this EMF.

The EMF was drafted because the region is dependent on farming for economic and social development. That is why there is an urgent need for protection of the ecosystems and agricultural resources. These should be used wisely in order to sustain and secure the livelihood and well-

being of people who farm and live in this region. It covers the analysis of a diverse geographical area (DEA&DP, 2018:1-171), with the main purpose of providing a strategic guide to sustainable land use, or agricultural development, and to provide ideal standards that can assist in maintaining a desired environmental quality level and function.

As mentioned in the EMF guideline, “the purpose of the EMF is to function as a support mechanism in the environmental impact assessment process for evaluation and review of development applications (by environmental authorities), as well as informing decision-making regarding land use planning applications” (DEA&DP, 2018:1-171). This means that the EMF does not order restrictions on land use rights, but assists with informed decision-making processes and planning (DEA&DP, 2018:1-171). For instance, if a strategic assessment is undertaken on an appropriate ecological and social scale, EMF can act as an essential guide to assist with proactive planning. This is centered mostly on achieving a balance between justifiable economic and social development and ecological protection – to guide the implementation. In drafting the Sandveld EMF, the aims were to make it easy for farmers to cultivate land whilst critically protecting their natural resources and ecosystems.

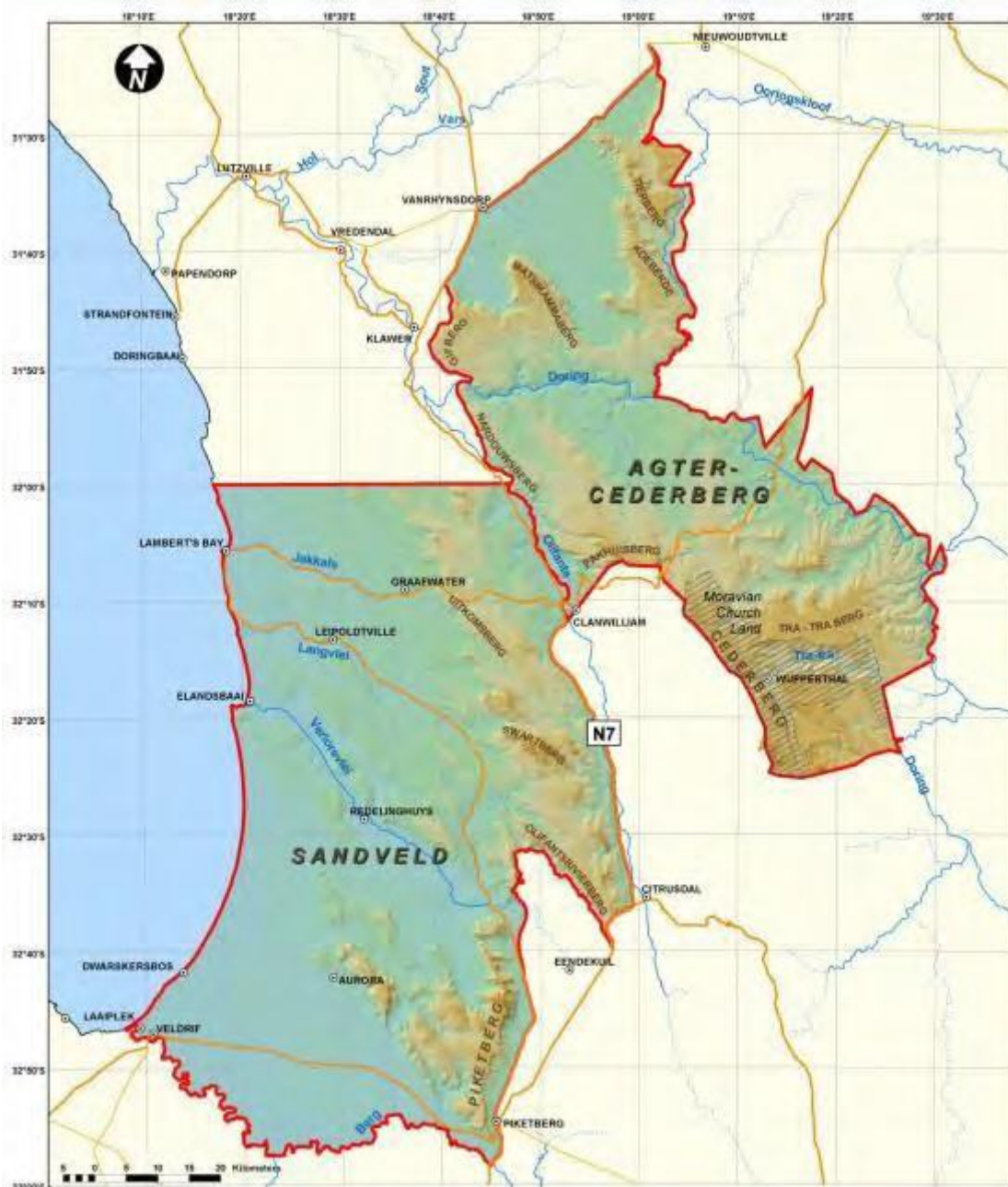
The objectives of the Sandveld EMF were to:

- “Promote sustainable development by strategic planning that supports efficient application and decision-making procedures in terms of environmental legislation, thereby minimising potential obstacles to legal compliance;
- Proactively steer new development away from areas of high biodiversity significance;
- Use a holistic approach to land use planning on farms so as to assist producers in making informed decisions about new expansion and sustainable use of agricultural resources;
- Encourage a participatory planning process that will allow local stakeholders – particularly the Sandveld farming community – to take informed co-ownership of the Sandveld EMF and the subsequent Farm-Level Management Plans that are to be developed and
- Develop the Sandveld EMF as a best practice initiative within a market environment that is increasingly demanding the production of environmentally friendly produce” (DEA&DP, 2018:1-171).

The Sandveld is in the Western Cape (DEA&DP, 2018:1-171), for about 9 350 km² of the Olifants River. The Agter-Cederberg is in the north-east and the Sandveld in the south-west. The Berg River and Piketberg are in the south of Sandveld, it extends to Lamberts Bay in the north.

The Sandveld is surrounded by the Olifantsrivier Mountain in the east (DEA&DP, 2018:1-171) and the Agter-Cederberg lies between the Northern Cape and Olifants River boundary. The Northern section of the Agter-Cederberg comprises the Urionskraal valley.

Figure 6: Location of the Sandveld EMF in the Western Cape Province



Source: DEA&DP (2018:1-171).

The geographic zone included in the Sandveld EMF is considered a core agricultural production area in the Western Cape (DEA&DP, 2018:1-171), well-known for economic and land use activities, mostly for production of rooibos and potatoes. It also contributes to creating employment for the population of the West Coast region. It is a threatened area in the Greater

Cederberg Biodiversity Corridor (DEA&DP, 2018:1-171) and represents an important area for an initiative in support of sustainable agriculture and integrated biodiversity conservation action. The EMF was required to help manage and protect the natural resources in this area for a long-term period by informing decision-making regarding the planning application of land use. Farms in this region represent key elements linked together to maintain and preserve the ecological integrity and the Western Cape biodiversity.

What sets this area apart from other areas is the significant scale of the loss of habitat – especially the sand fynbos ecosystems – caused by the rapid expansion of rooibos and potato farming in this region, which achieved their production peak levels between 2003 and 2008 (DEA&DP, 2018:1-171). Wine, fruit and cereal farming in the Western Cape Province is considered to be a large-scale conversion of biodiversity and ecosystem loss.

One of the biggest challenges with regards to farming in the Sandveld area is the concomitant reduction of the extent of natural resources, including vegetation and plants. The critical biodiversity areas encompass high priority habitat and span approximately 30% of Sandveld landscape (DEA&DP, 2018:1-171). This landscape is dominated by working or active farms rich with places for farmland of irrigated potato and rooibos fields. It coincides with remnants of threatened wetlands or indigenous vegetation. Also, abstraction of groundwater for irrigation purposes has negatively impacted on water quality and aquifer yield. To solve this problem, there is an urgent need to obtain sustainable balance in order to support the agricultural sector through preserving a threatened biodiversity – this is, however, challenging to farmers, society and the state.

The planning and regulatory framework used during the development of this EMF included the National Environmental Management Act 107 of 1998, with its national environmental management principles (DEA&DP, 2018:1-171). The provincial and national policy associated with sustainability of agricultural development includes the NDP, Medium Term Strategic Framework (MTSF), Western Cape Strategic plan, Western Cape Department of Agriculture Strategic Plan and Draft Climate Change Response Framework for the Agriculture Sector.

The Sandveld EMF was led by using a situation analysis conducted from November 2013 to November 2014. This analysis generated a status quo report, with three key functions:

- “Record land use pressures and their effects on the receiving environment;
- Make projections about potential future land use trends and
- Identify areas of heightened risk of conflict between agricultural and biodiversity

conservation” (DEA&DP, 2018:1-171).

The EMF represents a proactive approach to help reduce the costs in terms of time and money, and compliance with environmental legislation such as the National Environmental Management Act (NEMA) 107 of 1998 by reducing the scope of assessment for application proposals, while protecting the value of natural resources and embedded ecosystems.

This EMF provides a groundbreaking and novel approach to assist in relieving the regulatory burden of farmers in the Western Cape Province who are a threat to plant species and ecosystems. That is why it “served as a super Environmental Assessment” to identify environmental features that must be protected and safeguarded against extreme cultivation (DEA&DP, 2018:1-171). It helps to provide a strategy guide to agricultural development of the Agter-Cederberg and Sandveld regions, which are rich in cultural and environmental resources.

It is significant that all farmers who wish to establish or expand new lands for cultivation are required to take the findings or outcomes of this EMF into account during the application of environmental authorisation as stated in the National Environmental Management Act 107 of 1998 (DEA&DP, 2018:1-171). All farmers who effectively consider the outcomes of this EMF “will not have to subscribe to onerous and expensive environmental assessment procedures in order to do what they can do best: farm productively and profitably” (DEA&DP, 2018:1-171). This will assist in maintaining the vision of this EMF and the people of Agter-Cederberg and Sandveld to fully commit to social and sustainable agricultural development within the limitations and opportunities defined in this EMF as offered by climate change, nature and its resources.

This EMF forms part of phase one of the proactive approach of the Sandveld strategy. Phase two deals with the EMF implementation throughout a regulatory approach that provides specifications, particularly for a proposed cultivation land and preserving natural resources in order to guarantee that cultivation complies with the EMF findings (DEA&DP, 2018:1-171). Only a proponent who complies with the specifications will be authorised to continue with cultivation. As a result, the two main aims realised in this phase were to protect natural resources and their interactions between economic and human well-being activities, mostly agriculture. Also, to reduce regulatory requirements for proper extension of cultivation land.

The Sandveld EMF will be updated and reviewed every five years (DEA&DP, 2018:1-171). Revision timeframe of this EMF will be coordinated with the revision timeframe of main key spatial informants namely, CBA and SDFs. Also, each and every plan that stems from this EMF and still grants rights to all farmers in respect of NEMA, will be revised to achieve sustainable alignment with this EMF.

4.7 Summary

This chapter provided a synopsis concerning the five different types of SEA case studies in SA. These were: Square Kilometre Array (SKA) SEA, iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF.

All these reports shared a common goal of supporting the implementation of SEA and promoting sustainability/SD, as well as a decision-making process as promulgated in the National Environmental Management Act (NEMA). They represent a diversity of applications, but they all adopt a strategic approach towards identifying opportunities and constraints for further development in SA. The next chapter will focus on the findings and analysis of results.

CHAPTER 5: FINDINGS AND ANALYSIS OF RESULTS

5.1 Introduction

This chapter presents an evaluation of the case studies discussed in the previous chapter.

These case studies all had a common goal of identifying constraints and opportunities for further development – despite their diversity of application – and a strategic approach of promoting sustainability. This case study’s approach is to answer the research question of “whether the SEA tool can effectively promote sustainable development in South Africa”.

5.2 Evaluation of Case Studies using the Five SEA Performance Criteria

The five SEA performance criteria are discussed in tables 2 to 6 below, also how these promote SD during the strategic decision-making process of the proposed development. The performance criteria for SEA are described in Appendix A. These criteria were judged to be the most suitable to use in this study, as they provide “guidance on how to build effective new SEA processes and evaluate the effectiveness of existing SEA processes” (IAIA, 2002:1-1). The meaning of the performance descriptors were explained in 1.6.3 of this report.

Table 2: SKA SEA and SEA Performance Criteria

Performance Criteria	Description of how the Case Study Aligns with the Criteria or not	Performance Descriptor
Integrated	Interrelations of the three sustainability aspects such as social, economic and biophysical were integrated during the strategic planning stage, but biophysical aspects were not strongly integrated as compared to economic and social aspects. Because of this, it can be said that it partially aligns with the integrated criterion. If all impacts are clearly explained, it will help with integrating all sustainability aspects early into the decision-making process (Wu & Ma, 2018:1-11).	Moderate
Sustainability-led	This is a large-scale innovative infrastructure project to promote science, technology and communications. The sustainability-led criteria were partially considered because this infrastructure was introduced to accelerate economic development and create jobs within the study area.	Moderate

Focused	Focused criteria were partially attained when it came to gathering of data. This is because some of the spatial information was found to be insufficient as “limited access to the affected land parcels resulted in limited ground truthing of the environmental features to be impacted by the SKA Phase 1 infrastructure and activities” (CSIR, 2016:1-80). Due to insufficient time and budget, specialists could not be sent to carry out additional fieldwork within the study area.	Moderate
Accountable	<p>This criterion was strongly achieved by involving the Department of Environmental Affairs (DEA) as a leading agency and to be accountable for any strategic decision undertaken in this project. The Council for Scientific and Industrial Research (CSIR) was appointed by the DEA to conduct the SEA project.</p> <p>The DEA validated that all relevant documents for spatial planning for district and local municipalities were reviewed, and ensured that sustainability issues were considered during the decision-making process.</p>	Strong
Participative	<p>Interested and affected parties (I&APs) participated in the decision-making related to this project.</p> <p>This case study partially aligns with the participative criteria because of lack of clarity with regard to the activities of the project. Field observation and spatial data was another constraint. There was an inadequate engagement among local stakeholders and SKA SA on consultations with the Department of Science and Technology (DST) and SKA SA with regard to the strategic planning and decisions that may affect local communities. Rega and Baldizzone (2015:105-115) indicate that public participation needs to involve all constructive public perception for decision-making.</p>	Moderate

Source: Author

Table 3: iLembe EMF/SEA and SEA Performance Criteria

Performance Criteria	Description of how the Case Study Aligns with the Criteria or not	Performance Descriptor
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Integrated	<p>This was strongly integrated by integrating all three aspects of sustainability namely social, economic and environmental during the earliest stage decision-making processes.</p> <p>The social aspect was incorporated by addressing social resilience throughout employment, job creation, settlements, social well-being and eradication of poverty. The economy was included by addressing economic growth and development opportunities within the iLembe area, such as agricultural development, agro-processing, tourism, investment, transport and job creation. The environmental aspect was integrated by addressing the environmental quality of ecosystems, watercourses and wetland systems.</p>	Strong
Sustainability-led	<p>Strongly sustainability-led by means of formulating the Environmental Management Framework (EMF) and the Strategic Environmental Management Plan (SEMP). This was to appropriately manage the environment within the iLembe district municipality. All sustainability aspects were included in this project.</p>	Strong
Focused	<p>Strongly focused by incorporating SEA maps and GIS that were produced from several layers of available data. The maps and GIS highlighted all constraints and opportunities visually, conflicts and converges amid areas of constraint and opportunity for all features. Also, this showed areas which were mostly deemed appropriate for activities that encompass commercial agriculture.</p>	Strong
Accountable	<p>By engaging the Department of Agriculture and Environmental Affairs (DAEA) to act as a lead agency for undertaking this project, it was strongly accountable. The DAEA was responsible for ensuring that the project was conducted appropriately and accountable for all strategic decisions. It ensures that two reports, namely Desired State and Status Quo, presented a summary of constraints and opportunities.</p>	Strong
Participative	<p>By engaging with the project steering committee and stakeholders this criterion was strongly achieved.</p> <p>Stakeholders participated in this project and were aligned according</p>	Strong

	to their responsibilities and roles. DEA, KZN DAEA and iLembe District Municipality were responsible for biodiversity conservation planning, local authorities were liable for development applications, land use management and spatial planning, whereas the Department of Water Affairs was responsible for the water resource management plan and the National Department of Agriculture for agricultural support.	
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Source: Author

Table 4: Greater Saldanha Bay EMF and SEA Performance Criteria

Performance Criteria	Description of how the Case Study Aligns with the Criteria or not	Performance Descriptor
Integrated	By addressing social, economic and environmental aspects (DEA&DP, 2017:1-210), the project was strongly integrated. Socio-economic aspects were employment, poverty, education, housing, infrastructure and economic development opportunities, while environmental attributes were water resources, biodiversity, agricultural production, heritage and cultural resources. All these sustainability aspects were part of the situation analysis theme.	Strong
Sustainability-led	This EMF was formulated to act as a management framework to effectively and sustainably manage the environment of Saldanha Bay municipality area and the Greater Saldanha Bay area which made it strongly sustainability-led.	Strong
Focused	This criterion was partially achieved with regard to gathering of spatial information. It was found that there was “no primary research” (DEA&DP, 2017:1-210) to verify spatial information or to collect more GIS data. GIS information was obtained from agencies, or government departments, such as the South African National Biodiversity Institute (SANBI). The only additional data that were included from non-governmental sources into the GIS database, were important areas for birds, heritage and marine resources.	Moderate
Accountable	This was strongly attained by considering the Department of	Strong

	Agriculture and Environmental Affairs (DAEA) of KZN to be accountable for developing this EMF. Documents and relevant reports reviewed included “the State of the Bay Reports for Saldanha Bay and St Helena Bay, technical reports relating to the biodiversity Fine Scale Plan (FSP), Rural Land Use Planning and Management Guidelines and documents such as the SDFs for the Saldanha Bay and the Bergrivier Municipalities” (DEA&DP, 2017:1-210). These were to ensure that sustainability factors were incorporated into this EMF.	
Participative	<p>This criterion was integrated by involving Interested and Affected Parties (I&APs) to render input and contribute to decisions during the meetings. Organisations that hold local knowledge or useful information also participated in the project meetings.</p> <p>It can be stated that this criterion was partially addressed because the spatial data for groundwater available was for South Africa, but data availability for Saldanha was found to be a constraint.</p>	Moderate

Source: Author

Table 5: Drakenstein Municipal Area EMF and SEA Performance Criteria

Performance Criteria	Description of how the Case Study Aligns with the Criteria or not	Performance Descriptor
Integrated	This was strongly addressed by incorporating social, economic and environmental aspects of the project. Environmental attributes covered biodiversity, ecosystems, agricultural, water, river, scenic and cultural resources. Socio-economic included employment, poverty, economic development, infrastructure, housing, community facilities, recreation and tourism opportunities.	Strong
Sustainability-led	This EMF was strongly sustainability-led to promote sustainability, protect, and manage the environment, as well as promote cooperative environmental government. The Department of Environmental Affairs & Development Planning (DEADP) provided direction on the preparation of this Drakenstein Municipality EMF.	Strong

Focused	<p>This criterion was attained as the collation and collection of baseline data were centered on spatial data that was accessible in the GIS database and existing studies and reports. For the purposes of achieving this EMF, reliable information was also obtained from relevant policy documents, as well as documents that encompass scientific data, research and statistics information.</p> <p>Some primary study was undertaken to identify and map wetlands. This was deemed significant as wetlands play a key role in preserving, maintaining and conserving water resources.</p> <p>Heritage resources data were found to be another key feature. The information for this feature was accessible in hard copies – it was then digitised to be included into the GIS database and applied in this EMF.</p> <p>More specialist studies undertaken show the gaps in terms of availability of the information – that is why this criterion was partially addressed because heritage and wetlands data were missing or lacking. Due to these constraints, the Drakenstein municipality commissioned a heritage survey completed in 2009. Spatial data were accessible in a hard copy and included in the Drakenstein EMF GIS database.</p>	Moderate
Accountable	<p>Accountable criteria were strongly addressed by the DEA&DP. This department acted as a lead agency and was accountable for all strategic decisions taken in terms of this project. Different reports and documents reviewed for this EMF, incorporate the State of Environment Reports, IDP, SDF, related legislation and studies conducted on the Berg River.</p>	Strong
Participative	<p>The participative criterion was partially addressed due to the fact that gaps were found in terms of access to information. The public participation process sourced relevant information regarding this project and to engage the public to participate. A questionnaire on this project was circulated to the I&APs.</p>	Moderate

Source: Author

Table 6: Sandveld EMF and SEA Performance Criteria

Performance Criteria	Description of how the Case Study Aligns with the Criteria or not	Performance Descriptor
Integrated	This criterion was partially addressed as it was found that only the environmental aspect was fully considered and integrated in this instance as compared to social and economic aspects.	Moderate
Sustainability-led	Sustainability-led was strongly considered. The Sandveld EMF was established to promote SD and to act as an environmental management framework for this area and develop the agricultural sector through preserving threatened biodiversity which was found to be a challenging factor to farmers, society and the state.	Strong
Focused	GIS data were used to generate maps that were utilised to develop this EMF. It was partially attained as uncertainties were found – such as lack of reliable information with regards to a vegetation survey and aquatic assessment.	Moderate
Accountable	The Western Cape Departments of Environmental Affairs and Development Planning, and Agriculture, were accountable for all strategic decisions for this EMF. These departments are liable for developing and implementing this EMF in terms of the National Environmental Management Act (NEMA) 107 of 1998. The accountable criterion was strongly reached. Related legislation on planning, water and environment, were reviewed and incorporated to achieve this EMF.	Strong
Participative	The participatory planning process afforded local stakeholders, especially the farming community area of Sandveld, the opportunity to participate in the strategic environmental planning and implementation of this EMF, and to query, suggest or amend and review the EMF during the project life cycle. It was therefore strongly participative.	Strong

Source: Author

5.3 Evaluation of Case Studies on how they Align with the Six SDGs

The alignment of the case studies with the six SDGs are discussed in tables 7 to 11 below and how these promote SD during the strategic decision-making process of the proposed development. The SDGs are described in Appendix B. The researcher selected these six SDGs criteria out of 17 because they best suit the scope of this study. Since it is important to incorporate these SDGs into national PPPs to help attain global SDGs by 2030, this study investigated if indeed the selected SDGs were included during the development and planning process of these SEA/EMF case studies, showing progress in incorporation of these SDGs into strategic environmental instruments.

Table 7: SKA SEA and its Alignment with SDGs

Six SDGs	Description on how SDGs were addressed to the Case Study	Alignment Descriptor
SDG 1: Eradicate Poverty	The developmental challenges within the Karoo region in the Northern Cape Province has led to an increase in the poverty level and inequality (CSIR, 2016:1-80), that is why this goal was strongly addressed to help “eradicate poverty in all its forms everywhere” by introducing the Square Kilometre Array (SKA) project to promote sustainability/SD in this area. The National Development Plan (NDP) Vision 2030 also supports this goal (NPC, 2011:1-484) by informing the issue of eliminating poverty and reducing inequality to promote good quality environments and greater access to services through improved infrastructure and spatial planning.	Strong
SDG 2: Zero Hunger	This was strongly addressed by conducting “specialist scoping level pre-assessments” (CSIR, 2016:1-80) specifically for agriculture to prevent any damage/impact to the agricultural resources when undertaking the SKA SEA project. No-go and sensitive areas were identified to preserve areas that are potentially unsuitable for development and to encourage sustainable agriculture – since the majority of the population in this area depends on agricultural production for their daily livelihoods and their health. This production plays a key role in providing job opportunities in this area. Also, by implementing the SKA SEA project can help to end hunger	Strong

	and achieve food security for other local communities of this region.	
SDG 8: Economic Growth	Economic growth was strongly aligned to ensure economic development and job creation opportunities throughout the initiation of the SKA SEA project. This SDG was addressed in this project to sustainably grow the economy of this area.	Strong
SDG 9: Sustainable Infrastructure	It was strongly achieved by introducing and constructing the SKA innovative technology to help promote the development of sustainable/resilient infrastructure in the Karoo region. This large-scale infrastructure was introduced to unlock the development potential and to foster innovation, such as telecommunications development (CSIR, 2016:1-80). The Infrastructure Development Act 23 of 2014 supported the strategic development and implementation of infrastructure to help with social and economic growth (RSA, 2014:1-32).	Strong
SDG 13: Climate Action	Mitigation measures were strongly implemented during the development or construction of the SKA SEA infrastructure project. The Karoo Hoogland and Hantam local municipalities included this project in their disaster management planning and climate adaptation strategies (CSIR, 2016:1-80). Also, the National Climate Change Adaptation Strategy (NCCAS) of 2018, the National Climate Change Response Strategy (NCCRS) of 2004 and the Intergovernmental Panel on Climate Change (IPCC) assessment report (AR4) speaks to this SDG in terms of reducing carbon (CO ₂) emissions.	Strong
SDG 15: Terrestrial Ecosystems	Biodiversity was partially aligned with this SDG due to the gaps with regard to understanding of the species and missing of baseline biodiversity data in the Karoo area. Also, there was limited information in terms of the ecology of species and spatial information relevant to environmental attributes. This speaks to the National Environmental Management Biodiversity Act (NEMBA) 10 of 2004 regarding conservation and management of biodiversity to sustainably manage, prevent biodiversity loss and	Medium

	land degradation during the development of the SKA project.	
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Source: Author

Table 8: iLembe EMF/SEA and its Alignment with SDGs

Six SDGs	Description on how SDGs were addressed to the Case Study	Alignment Descriptor
SDG 1: Eradicate Poverty	This was strongly introduced by addressing the socio-economic aspects, such as poverty through efficient implementation of provincial and national poverty eradication programmes at the local level with the main goal of striving to alleviate poverty in the iLembe Municipality. It can be stated that this SDG was incorporated into the iLembe Environmental Management Framework (EMF) and Strategic Environmental Management Plan (SEMP).	Strong
SDG 2: Zero Hunger	It was strongly addressed by promoting the practices of sustainable agriculture to reduce any negative impacts on the environment during the development of a project to help conserve the natural environment in the long term and ensure/attain food security that local communities of this area depend on.	Strong
SDG 8: Economic Growth	Economic development was identified as a key aspect to promote a sustainability framework during the formulation of this EMF. This aspect was described during the Desired State and Status Quo phases of this project. The development and good management of agri-processing, agriculture, furniture and timber, crafts and arts, investment and property, tourism and transport were deemed as features that can grow the economy and create decent employment opportunities for rural communities of this district. That is why it was strongly addressed to promote economic development opportunities and proper management of natural resources.	Strong
SDG 9: Sustainable Infrastructure	The “infrastructure and development corridors” (DAEA, 2013:1-75), was part of the environmental management zone to be considered and managed during the development of this EMF, but it was not focused on a particular large-scale innovative infrastructure as compared to	Moderate

	the SKA SEA project where it clearly concentrated on constructing the SKA innovation technology to sustainably assist in providing opportunities to South Africans. Thus it can be stated that it was partially addressed.	
SDG 13: Climate Action	The impacts of climate change were identified and addressed as key constraints during the formulation of the iLembe EMF since it has negative impacts on agricultural resources, watercourses, humans, land sea interface and raises the temperature levels. Due to this it can be stated that the climate action goal was partially addressed. That is the reason why the EMF was introduced to act as a management framework to manage the environment.	Moderate
SDG 15: Terrestrial Ecosystems	Biodiversity was strongly aligned to ensure sustainable use of and protection of terrestrial ecosystems of the iLembe district. Also, to prevent the loss of biodiversity and land degradation. It was addressed by describing “the terrestrial biodiversity particularly sensitive environmental features” (DAEA, 2013:1-75), including environmental management zones, protected areas, watercourses and waterbodies. This was achieved to ensure sustainable managing and conserve the natural resources, and to properly manage this area.	Strong

Source: Author

Table 9: Greater Saldanha Bay EMF and its Alignment with SDGs

Six SDGs	Description on how SDGs were addressed to the Case Study	Alignment Descriptor
SDG 1: Eradicate Poverty	The poverty disparity increased from 1992 to 2002 (DEA&DP, 2017:1-210), which means that the majority of individuals living in the Saldanha Bay Municipal district become poorer every year due to a lack of job opportunities and low skill levels in this area. Also, the rate of population growth poses complexities around natural resources and opportunities for employment and the possibility of poverty growth.	Strong

	<p>A total number of 21,383 individuals were identified to be living under the poverty zone with the highest being located in the urban parts of Vredenburg and Saldanha (DEA&DP, 2017:1-210). That is why this goal was strongly addressed in this EMF to decrease social inequality, eradicate poverty and encourage long-term development.</p>	
<p>SDG 2: Zero Hunger</p>	<p>The agricultural sector was deemed as a main employer in the Berggrivier and Saldanha Bay Municipalities' area. This sector helps to create job opportunities in order to reduce poverty and enhance the standard of living. It also provides sustainable food to end hunger in this area over the long term.</p> <p>That is why this EMF strongly addressed this goal by considering factors that could benefit both the environment and society, including opportunities that could help support social aspects such as the alleviation of poverty and job creation. It was also addressed in this EMF that achieving poverty eradication will not prosper if environmental degradation still continues (DEA&DP, 2017:1-210).</p>	Strong
<p>SDG 8: Economic Growth</p>	<p>Economic growth was strongly aligned in this EMF by promoting "industrial development in less sensitive areas to ensure sustainable economic development" (DEA&DP, 2017:1-210) in the Port of Saldanha Bay as it deals with the export and import of bulk materials including iron ore and oil. These materials are deemed to be key economic drivers in this district. They increase economic growth opportunities and the Gross Domestic Product (GDP) in a sustainable manner.</p> <p>Saldanha and St Helena Bay are renowned for fishing. Tourism was identified as a key economic sector, and this was centered mainly on cultural and natural resources. This sector creates jobs for the local members of this community.</p>	Strong
<p>SDG 9: Sustainable Infrastructure</p>	<p>This was explained in the EMF in terms of the NSSD as one of the sustainability priorities which speaks to "greening the economy" and is a strategic goal to promote cleaner technologies and invest in sustainable infrastructure (DEA&DP, 2017:1-210).</p>	Moderate

	Based on this information, this goal was partially addressed as it did not focus much on a specific innovative infrastructure as compared to the SKA project.	
SDG 13: Climate Action	Climate change was strongly addressed in the Greater Saldanha Bay EMF through the National Climate Change Response Strategy (NCCRS) and NSSD to reduce greenhouse gas (GHG) emissions, improve communities' resilience to climate change and ensuring that the resilience of ecosystems is not interrupted in this area.	Strong
SDG 15: Terrestrial Ecosystems	It was strongly addressed and information used to formulate this EMF was drawn from the Biodiversity Sector Plan of 2010 and with reference to Chapter 3 of the National Environmental Management Biodiversity Act (NEMBA) 10 of 2004. The plan included the aquatic and terrestrial ecosystems information, whereas NEMBA covered biodiversity planning and monitoring. Spatial data were achieved to provide critical information on biodiversity and ecological areas.	Strong

Source: Author

Table 10: Drakenstein Municipal Area EMF and its Alignment with SDGs

Six SDGs	Description on how SDGs were addressed to the Case Study	Alignment Descriptor
SDG 1: Eradicate Poverty	The Drakenstein Local Economic Development (LED) strategy was part of this EMF as it focused on growing the economy and the need to eliminate poverty. That is why this goal was strongly aligned by incorporating opportunities that could promote social aspects relevant to poverty eradication and job creation.	Strong
SDG 2: Zero Hunger	This SDG was strongly attained by including the agricultural sector to act as the backbone of the Cape Winelands, while the Drakenstein municipality is considered to be the agriculture centre of fruit and wine. That is why agriculture continues to be a leading sector in the Drakenstein municipality in terms of creating employment and impact on the local economy. Considerable manufacturing activity in	Strong

	<p>this area is connected to agriculture, for instance agro-processing, machinery, packaging and fertilisers.</p> <p>Through resilience of agricultural practices sustainably can help to achieve food security, improve nutrition and end hunger in this area.</p>	
SDG 8: Economic Growth	<p>It was strongly achieved by including agriculture as a valuable sector that contributes to growing the economy of the Drakenstein municipality since individuals depend on farming activity. Tourism also plays a significant role in the development of economic growth due to the scenic beauty of rural farm landscapes that brings tourists to visit this area. Because of this it helps to improve the quality and standard of living and provide employment opportunities.</p>	Strong
SDG 9: Sustainable Infrastructure	<p>This was discussed in the Drakenstein Municipal EMF in terms of the NSSD as one of the sustainability priorities that focused on “greening the economy” and its strategic goal to promote cleaner technologies and invest in sustainable infrastructure to foster innovation (DEA&DP, 2017:1-210).</p> <p>This SDG was partially addressed as it did not focus much on a certain project or innovative infrastructure compared to the SKA project where a resilient infrastructure was constructed.</p>	Moderate
SDG 13: Climate Action	<p>It was strongly considered in the form of including a climate change aspect in this EMF to properly manage and combat the impacts of climate change on the natural resources of this area. Also, the NSSD and National Climate Change Response Strategy (NCCRS) were incorporated in this EMF as strategies that assist in reducing greenhouse gas (GHG) emissions to help promote sustainability/SD.</p>	Strong
SDG 15: Terrestrial Ecosystems	<p>Terrestrial ecosystems were strongly achieved by including attributes that inform the environmental management zone related to biodiversity resources such as Protected Areas, Critical Biodiversity Areas (CBAs), Freshwater Ecosystem Priority Areas (FEPAs) and endangered ecosystems that are considered to be at risk or threatened. This goal was addressed to foster sustainable use of ecosystems and to prevent land degradation and loss of biodiversity.</p>	Strong

	The National Environmental Management Biodiversity Act (NEMBA) 10 of 2004 was included in this EMF to help with spatial information to protect and conserve natural resources and biodiversity.	
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Source: Author

Table 11: Sandveld EMF and its Alignment with SDGs

Six SDGs	Description on how SDGs were addressed to the Case Study	Alignment Descriptor
SDG 1: Eradicate Poverty	<p>Poverty has been considered as a major concern in the Agter-Cederberg and Sandveld region. That is why it was strongly introduced in an attempt to help eradicate it. The total percentage of individuals living in poverty, mostly in the rural municipalities located in the West Coast District, such as Cederberg contribute 42.7%, while Bergrivier is about 33.8% and Matzikama 31.7% (DEA&DP, 2018:1-171). It can be said that the rate of poverty in the Cederberg Local Municipality is alarming.</p> <p>The implementation of this EMF could aid in the management of this area, reduce inequality and eradicate poverty.</p>	Strong
SDG 2: Zero Hunger	<p>The population in this district fully depends on farming practices for its economic and social development opportunities. This goal was strongly addressed in this EMF to promote sustainable agriculture, improve food access and end malnutrition through promoting resilient agricultural activities.</p> <p>That is why this EMF was formulated – to act as a management framework in this area to secure the well-being and livelihood of people who farm and live in the area.</p>	Strong
SDG 8: Economic Growth	<p>The Sandveld has been considered to be the area for economic and land use activities, particularly for crops such as rooibos and potatoes. That is why people of this area depend mainly on agricultural production for job opportunities and to grow their economy. It can be</p>	Strong

	stated that this goal was strongly attained.	
SDG 9: Sustainable Infrastructure	Sustainable infrastructure was introduced in the form of addressing the need for ecological infrastructure in this EMF, but it was not sufficiently focused on the specific innovative infrastructure compared to the SKA SEA development where the emphasis was on constructing the SKA innovation technology to sustainably help to foster innovation. For this reason it can be stated that it was partially achieved.	Moderate
SDG 13: Climate Action	During the formulation of the Sandveld EMF “closing gap between climate change, reduced ecosystem services and impacts on agriculture” were identified (DEA&DP, 2018:1-171) in terms of how climate change could play a major role in affecting agriculture services and individuals living in the Agter-Cederberg and Sandveld. This was partially addressed.	Moderate
SDG 15: Terrestrial Ecosystems	This goal was strongly considered by introducing biodiversity of the Sandveld in this EMF to help conserve and sustainably use the terrestrial ecosystems. Critical Biodiversity Areas (CBAs) were identified.	Strong

Source: Author

5.4 Summary

This chapter provided a series of tables to explain/clarify how each case study aligned with the five SEA performance criteria and the six SDGs during their execution.

CHAPTER 6: DISCUSSION OF THE FINDINGS

6.1 Introduction


This chapter discusses the evaluation of the case studies that was presented in chapter 5. Both sets of evaluations utilised the same three descriptors, namely, “strong”, “moderate” and “weak”.

6.2 Evaluation of Case Studies using the Five SEA Performance Criteria

Table 12 is a summary of the evaluations for the five case studies of which one was an SEA, and the rest were EMFs. The SEA performance criteria are described in Appendix A and were developed by the IAIA in 2002. Their content is discussed in the section that follows the table.

Table 12: Evaluating Case Studies against SEA Performance Criteria

Key: Strong (S) strongly meets criteria, Moderate (M) partially, Weak (W) does not.

SEA Performance Criteria	SEA Case Studies					
	1: Square Kilometre Array (SKA) SEA	2: iLembe EMF/SEA	3: Greater Saldanha Bay EMF	4: Drakenstein Municipal Area EMF	5: Sandveld EMF	
	1.Integrated					
	Ensures an appropriate environmental assessment of all strategic decisions relevant for the achievement of sustainable development.	S	S	S	S	S
	Addresses the interrelationships of biophysical, social and economic aspects.	M	S	S	S	M
	Is tiered to policies in relevant sectors and (transboundary) regions and, where appropriate, to project	M	M	M	M	M

EIA and decision-making.					
2.Sustainability-led					
Facilitates identification of development options and alternative proposals that are more sustainable	M	S	S	S	S
3.Focused					
Provides sufficient, reliable and usable information for development planning and decision-making.	M	S	M	M	M
Concentrates on key issues of sustainable development.	S	S	S	S	S
Is customised to the characteristics of the decision-making process.	S	S	S	S	S
Is cost- and time-effective.	M	S	M	M	S
4.Accountable					
Is the responsibility of the leading agencies for the strategic decision to be taken.	S	S	S	S	S
Is carried out with professionalism, rigor, fairness, impartiality and balance.	S	S	S	S	S
Is subject to independent checks and verification	S	S	S	S	S
Documents and justifies how sustainability issues were taken into account in decision-making.	S	S	S	S	S
5.Participative					
Informs and involves interested and affected public and government	S	S	S	S	S

bodies throughout the decision-making process.					
Explicitly addresses their inputs and concerns in documentation and decision-making.	S	S	S	S	S
Has clear, easily understood information requirements, and ensures sufficient access to all relevant information.	M	S	M	M	S

Source: Author

6.2.1 Performance Criterion: Integrated

SD was integrated into all case studies.

Sustainability aspects such as social, economic and biophysical were fully incorporated into iLembe EMF/SEA, Greater Saldanha Bay EMF and Drakenstein Municipal Area EMF, while to a lesser extent addressed in Square Kilometre Array (SKA) SEA and Sandveld EMF.

Each case study was tiered up to related projects and policies to support decision-making processes.

6.2.2 Performance Criterion: Sustainability-led

iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF were strongly, or fully sustainability-led, by facilitating “identification of development options and alternative proposals that are more sustainable” (IAIA, 2002:1-1). The Square Kilometre Array (SKA) SEA only partially addressed the sustainability-led criterion.

6.2.3 Performance Criterion: Focused

This criterion was partially addressed in the Square Kilometre Array (SKA) SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF, but it was strongly considered in the iLembe EMF/SEA by providing reliable, usable and sufficient information for decision-making and development planning, and concentrated much on the main issues of SD.

All case studies were customised to characteristics of the decision-making process. Only iLembe EMF/SEA and Sandveld EMF were found to be strongly cost- and time-effective, while the Square Kilometre Array (SKA) SEA, Greater Saldanha Bay EMF and Drakenstein Municipal

Area EMF were found to be partially cost- and time-effective.

6.2.4 Performance Criterion: Accountable

This criterion was addressed in all case studies, with lead agencies responsible for any strategic decision made and a guarantee that development will be undertaken with fairness, rigor, balance and professionalism; also ensuring that the issue of sustainability is taken into consideration during decision-making.

6.2.5 Performance Criterion: Participative


All case studies fully addressed this criterion by involving and informing interested and affected parties (I&APs), government departments and stakeholders in the process. Concerns and inputs of every relevant stakeholder was strongly addressed in all case studies. It was partially addressed in the Square Kilometre Array (SKA) SEA, Greater Saldanha Bay EMF and Drakenstein Municipal Area EMF, and strongly in the iLembe EMF/SEA and Sandveld EMF, with stakeholders easily or clearly understanding the information, or having access to important information.

6.3 Evaluation of Case Studies against the SDGs

Table 13 presents the evaluation for effectiveness of the five SEA case studies by measuring their alignment with a subset of six out of a set of 16 SDGs described in Appendix B, which were developed by the United Nations (UN) General Assembly in 2015. Their content is discussed in the section that follows the table.

Table 13: Evaluating Five Case Studies against Six SDGs

Key: Strong (S) = strongly meets criteria, Moderate (M) partially, Weak (W) does not.

SDGs	SEA Case Studies				
	1: Square Kilometre Array (SKA) SEA	2: iLembe EMF/SEA	3: Greater Saldanha Bay EMF	4: Drakenstein Municipal Area EMF	5: Sandveld EMF
Goal NO.1					
End poverty in all its	S	S	S	S	S

forms everywhere.					
Goal NO.2					
End hunger, achieve food security and improved nutrition and promote sustainable agriculture.	S	S	S	S	S
Goal NO.8					
Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.	S	S	S	S	S
Goal NO.9					
Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.	S	M	M	M	M
Goal NO.13					
Take urgent action to combat climate change and its impacts.	S	M	S	S	M
Goal NO.15					
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity	M	S	S	S	S

loss.					
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Source: Author

6.3.1 SDG 1: Eradicate Poverty

All case studies showed strong alignment in terms of addressing SDG 1, which focused on eradication of poverty (UN, 2015:1-35), encouraging good quality environments and sustainable livelihoods by promoting long-term development, poverty reduction strategies and opportunities that could help in supporting social aspects and reducing inequality across the board.

6.3.2 SDG 2: No Hunger

All case studies strongly incorporated SDG 2 aimed at ending hunger, achieving food security and promoting sustainable agriculture during the development of projects in South Africa. This included encouraging small-scale farmers, gaining access, or equal access, to land and technology to help promote resilient agricultural production.

6.3.3 SDG 8: Economic Growth

All case studies strongly aligned with the SDG 8 aiming to promote economic growth and develop acceptable employment opportunities for all. This involves promoting sustainable tourism to boost the local Gross Domestic Product (GDP).

6.3.4 SDG 9: Sustainable Infrastructure

Only the Square Kilometre Array (SKA) SEA strongly addressed SDG 9 by introducing large-scale innovative technology to help build resilient and sustainable infrastructure during the development of the project aimed at unlocking development opportunities that could assist in boosting social and economic aspects. However, the iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF partially addressed this SDG.

6.3.5 SDG 13: Climate Action

The Square Kilometre Array (SKA) SEA, Greater Saldanha Bay EMF, and Drakenstein Municipal Area EMF strongly incorporated SDG 13, which is focused on combating climate change by reducing CO₂ emissions and temperature levels, while iLembe EMF/SEA and Sandveld EMF partially addressed the climate change aspect.

This goal was addressed by introducing mitigation measures, adaptation and response strategies

to help combat the effects of climate change on natural resources, and the manner in which it negatively impacts communities who rely mostly on natural resource for daily survival.

6.3.6 SDG 15: Terrestrial Ecosystems/Biodiversity

The Square Kilometre Array (SKA) SEA partially addressed SDG 15, but the iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF strongly addressed this SDG by protecting, conserving terrestrial and biodiversity to help prevent land degradation and loss of biodiversity during the project's development in order to foster sustainable management of the terrestrial ecosystems.

6.4 Summary

This chapter discussed the evaluation of the five SEA case studies against the five SEA performance criteria and alignment with the six selected SDGs. Three measurement descriptors “strong”, “moderate” and “weak” were employed.

The summary in table 12 shows that the alignment of the case studies with the SEA performance criteria is mainly “strong”. Of the 75 performance descriptors in the table, 56 are “strong”, and 19 are “moderate”; this translates into some 75% and 25% of descriptors respectively. Visually, the table has mostly green cells. There are no descriptors indicated as “weak”. This provides a positive answer to the research question of “whether the SEA tool can effectively promote sustainable development in South Africa”.

Similarly, table 13 shows that the overall alignment against the SDGs is mostly “strong”. Of the 30 performance descriptors in the table, 23 are “strong”, and seven are “moderate”; this translates into some 76% and 24% of descriptors respectively. Visually, the table also has mostly green cells. There were no descriptors indicated as “weak”. As with the SEA performance criteria, this is also a positive answer to the research question of “whether the SEA tool can effectively promote sustainable development in South Africa”.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter draws conclusions from the findings and analysis in chapters 5 and 6 and makes specific recommendations based on the findings. These recommendations will be useful for SEA/EMF projects and in the long run contribute to decision-making processes and developmental planning that will reduce environmental issues associated with economic development, such as climate change, environmental degradation and pollution.

7.2 Conclusions

7.2.1 Study Objectives

The manner in which the four specific objectives outlined in chapter 1 of this study were addressed are presented below.

7.2.1.1 Objective 1: Theoretical Framework

“Use published literature to provide a **theoretical framework for evaluation** of whether SEA is effective in promoting sustainable development”.

In order to develop this theoretical framework, the researcher established the following from a review of the published literature in Chapter 2:

- Clarity on concepts of sustainability and sustainable development – from the range of definitions published;
- The credentials of SEA as the appropriate tool and gaining clarity on the definitions and applications in the literature;
- Criteria for measuring the effectiveness of SEA as a tool for sustainability;
- Selection of a subset of the SDGs against which to assess the alignment of the outcomes of the SEA process.

7.2.1.2 Objective 2: Strengths and Weaknesses for SEA

“Identify and explain the significant **strengths and weaknesses for SEA**”.

This was clarified in detail in chapter 2.9, where the strengths and weakness with regards to SEA were highlighted and discussed.

One of the identified strengths of SEA was that it is a proactive tool for identifying opportunities and constraints, and goal alternatives, towards anticipated outcomes (Alshuwaikhat, 2005:307-317; Bina, 2007:585-606; Noble & Nwanekezie, 2017:165-173).

One of the identified weaknesses was a lack of consensus with regard to the appropriate methodology to achieve the outcomes of the SEA (Noble *et al.*, 2012:139-147; Thériverel &

Partidário, 2013:3-21). Therefore, there is an urgent need to establish the essentials of a proper methodology to inform the application of an SEA.

In addition, opportunities and constraints were also identified and explained in chapter 4 during the reviews of the SEA case studies.

7.2.1.3 Objective 3: Legislative Framework and Policies

“Provide the **legislative framework and policies** that promote sustainability and sustainable development in South Africa”. This was attained in chapter 3.

7.2.1.4 Objective 4: Appropriate Case Studies

“Identify **appropriate case studies** where SEA was applied in South Africa”.

Five different types of SEA case studies were identified and reviewed in chapter 4 of this study. Case study no. 1 was an SEA, while cases no. 2, 3, 4 and 5 were EMFs.

7.2.1.5 Objective 5: Evaluation of the Case Studies

“**Evaluate the case studies** to determine whether SEA is an effective tool for promoting environmentally sustainable development in SA”.

This was achieved by evaluating the five SEA case studies in chapter 5 and discussing the evaluation in chapter 6. The evaluation was to determine how each case study aligned with the five selected SEA performance criteria and the set of six SDGs during the development and planning of their proposed projects.

7.2.2 Research Aim: Effectiveness of SEA as a Tool to Promote SD

The research aim is achieved when the study objectives are met. In light of the objectives being achieved, as described in the previous section, – where each case study was evaluated on alignment with the SEA performance criteria and selected SDGs, the researcher concludes that SEA, as a tool, can effectively promote SD in South Africa.

7.3 Recommendations

The following recommendations will be of value for future SEA/EMF projects.

7.3.1 Public Participation

Public participation was found to be lacking in some of the case studies. This ranged from full participation of relevant stakeholders to moderate participation. It is a critical consideration (Khosravi & Jha-Thakur, 2019:979-1000; Théritel, 2012:1-30) so that the public is fully involved to participate and provide meaningful opinions during the decision-making and planning processes for the project. This will ensure that these processes are robust and transparent.

7.3.2 Sustainability Aspects

To fully promote SD in South Africa, all three key pillars of sustainability must be integrated throughout the strategic decision-making process of each proposed SEA/EMF. Integrating these during formulation of SEA/EMF will create an equal balance and ensure that development is more solid, valuable and effectively attained, while ensuring that there is no detrimental damage to the natural environment for present and future generations. This will guarantee that the natural environment – which communities of poor people from developing countries rely on – is strongly managed, protected and conserved in the long-term.

7.3.3 Sustainable Development Goals

From the six SDGs¹ utilised during the evaluation of case studies, SDGs 1, 2 and 8 were fully addressed in all the case studies. While SDG 9 was fully aligned into the Square Kilometre Array (SKA) SEA, it was only partially addressed in the iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and Sandveld EMF. SDG 13, on climate action, was fully addressed in the Square Kilometre Array (SKA) SEA, Greater Saldanha Bay EMF and Drakenstein Municipal Area EMF, but only partially aligned to the iLembe EMF/SEA and Sandveld EMF. SDG 15, focused on terrestrial/ biodiversity, was partially included in the Square Kilometre Array (SKA) SEA, but fully addressed in the iLembe EMF/SEA, Greater Saldanha Bay EMF, Drakenstein Municipal Area EMF and the Sandveld EMF.

Based on the abovementioned information it is vital to fully incorporate the sustainable development goals, especially the climate action goal, when formulating SEA/ EMF to help “combat climate change and its impacts” (UN, 2015:1-35), and to encourage climate resilience, adaptation, mitigation and response measures to aid in achieving development goals. Since climate change has been deemed one of the biggest environmental issues in developing countries, including this goal during the integrated planning of the projects will strongly reduce greenhouse gas (GHG) emissions, promote adaptation and prevent any harmful impacts to people and the environment.

7.3.4 Implementation

¹ SDG 1: Eradicate Poverty; SDG 2: Zero Hunger; SDG 8: Economic Growth; SDG 9: Sustainable Infrastructure; SDG 13: Climate Action; SDG 15: Terrestrial Ecosystems/Biodiversity

Implementation must be taken into consideration by decision-makers when formulating an SEA/EMF for the expected outcomes of the proposed projects to be monitored during implementation and post-implementation of the project. Considering this with the backing of a well-prepared SEMP or IEMP will promote and encourage sustainability in South Africa.

7.3.5 Outcomes Desirability Guideline

A national guideline on how to incorporate the SDGs as outcomes for the SEA/EMF, an “Outcomes Desirability Guideline”, akin to the “Guideline on Need and Desirability” for EIA in South Africa (DEA, 2017), should be developed, as a mandatory resource for all EIAs and SEAs/EMFs. Like the aforementioned guideline, it can be a set of questions or checklists that must be answered, and be a part of the assessment report.

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APPENDICES**Appendix A: Six SEA Performance Criteria**

Performance Criteria	Interpretation
“Integrated	<ul style="list-style-type: none"> • Ensures an appropriate environmental assessment of all strategic decisions relevant to the achievement of sustainable development. • Addresses the interrelationships of biophysical, social and economic aspects. • Is tiered to policies in relevant sectors and (transboundary) regions and, where appropriate, to project EIA and decision-making.
Sustainability-led	<ul style="list-style-type: none"> • Facilitates identification of development options and alternative proposals that are more sustainable
Is focused	<ul style="list-style-type: none"> • Provides sufficient, reliable and usable information for development planning and decision-making. • Concentrates on key issues of sustainable development. • Is customised to the characteristics of the decision-making process. • Is cost- and time-effective
Accountable	<ul style="list-style-type: none"> • Is the responsibility of the leading agencies for the strategic decision to be taken. • Is carried out with professionalism, rigor, fairness, impartiality and balance. • Is subject to independent checks and verification • Documents and justifies how sustainability issues were taken into account in decision-making
Participative	<ul style="list-style-type: none"> • Informs and involves interested and affected public and government bodies throughout the decision-making process. • Explicitly addresses their inputs and concerns in documentation and decision-making. • Has clear, easily understood information requirements, and ensures

	sufficient access to all relevant information.
Iterative	<ul style="list-style-type: none"> • Ensures availability of the assessment results well in time to influence the decision-making process and inspire future planning. • Provides sufficient information on the actual impacts of implementing a strategic decision to judge whether this decision should be amended, and to provide a basis for future decisions” (IAIA, 2002:1-1).

Source: IAIA (2002:1-1)

Appendix B: Sustainable Development Goals

Sustainable Development Goals	
“Goal 1	End poverty in all its forms everywhere.
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
Goal 3	Ensure healthy lives and promote well-being for all at any age.
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
Goal 5	Achieve gender equality and empower all women and girls.
Goal 6	Ensure availability and sustainable management of water and sanitation for all.
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all.
Goal 8	Promote sustained, inclusive, and sustainable economic growth, full and productive employment and acceptable work for all.
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.
Goal 10	Reduce inequality within and among countries.
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12	Ensure sustainable consumption and production patterns.
Goal 13	Take urgent action to combat climate change and its impacts.
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for

	sustainable development.
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
Goal 16	Promote peaceful and inclusive societies for sustainable development, guarantee access to justice for all and build effective, accountable and inclusive institutions at all levels.
Goal 17	Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development” (UN, 2015:1-35).

Source: UN (2015:1-35)

Appendix C: Principles of SEA in South Africa

The following are the principles of SEA that are published in the South African Guidelines for SEA in 2000 (DEAT, 2000:15-16):

The Principles of SEA in South Africa	
Substantive Principles	
“SEA is driven by the concept of sustainability.	The SEA process aims to integrate the concept of sustainability into plans and programmes.
SEA identifies the opportunities and constraints that the environment places on the development of plans and programmes.	The opportunities and constraints that the environmental resources present for development are identified. These opportunities and constraints are used to guide the formulation of the plan or programme.
SEA sets the criteria for levels of environmental quality or limits of acceptable change.	The levels of acceptable change in the environment are identified (e.g. levels of emissions permitted in an industrial area) and should be informed by scientific information and public view. These levels may already exist in current legislation or country standards.
Procedural Principles	
SEA is a flexible process that is adaptable to the planning and sectoral development cycle.	A single SEA process to be applied in all situations does not exist. Each SEA process is designed in a manner that is integrated into the relevant process for plan and programme development.
SEA is a strategic process, which begins with the conceptualisation of the plan or programme.	The SEA begins in the earliest stages of the process of plan or programme development, from conceptualisation through the various stages of decision-making.
SEA is part of a tiered approach to environmental assessment and management.	SEA relates to the higher levels of decision-making (e.g. plans and programmes) in order

	to provide the context for the lower levels (e.g. project level).
The scope of an SEA is defined within the wider context of environmental processes.	SEA considers significant local, regional, national and international linkages.
SEA is a participative process.	The entire SEA process should be informed and enhanced by the public participation process.
SEA is set within the context of alternative scenarios.	The SEA includes the development of alternatives (e.g. scenarios and alternative plan and programme options) in a participatory manner.
SEA includes the concepts of precaution and continuous improvement.	In conducting the SEA, a risk-averse approach is used which recognises the limitations of current knowledge regarding the consequences of decision-making. In conjunction with this, however, a commitment is made to continuous learning and improvement” (DEAT, 2000:15-16).

Source: DEAT (2000:15-16)

Appendix D: EMF’s Regulatory Framework

Legislative Reference	Legislative Text
“NEMA S24 (2)&(3)	The minister, or an MEC with the concurrence of the minister, (2) may identify geographical areas based on environmental attributes, and as specified in spatial development tools adopted in the prescribed manner by the environmental authority, in which specified activities may not commence without environmental authorisation from the competent authority, or may be excluded from authorisation by the competent authority, may also identify activities contemplated in paragraphs (a) and (b) that may commence without an environmental authorisation, but that must comply with prescribed norms or standards (the listing of

	<p>activities must comply with the process prescribed in section 24a).</p> <p>(3) may compile information and maps that specify the attributes of the environment, particularly geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority (i.e. delegated regulatory authority).</p>
<p>NEMA S24 (4)(b)(vi)</p>	<p>Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment (commonly known as environmental impact assessments) must include – with respect to every application for an environmental authorisation and where applicable – consideration of environmental attributes identified in the compilation of information and maps as contemplated in subsection 24(3).</p>
<p>NEMA S10</p>	<p>The minister, or an MEC with the concurrence of the minister, (10) may develop, or adopt norms, or standards for activities, or for any part of an activity, or for a combination of activities, contemplated in terms of subsection (2)(d); may prescribe the use of the developed, or adopted norms, or standards, in order to meet the requirements of this act; may prescribe reporting and monitoring requirements and may prescribe procedures and criteria to be used by the competent authority for the monitoring of such activities in order to determine compliance with the prescribed norms or standards.</p> <p>Norms or standards contemplated in paragraph (a) must provide for rules, guidelines or characteristics that may commonly and repeatedly be used; and against which the performance of activities, or the results of those activities, may be measured for the purposes of achieving the objects of this act.</p>

<p>EIA Regulations Chapter 8, part 1</p>	<p>Information and maps compiled in terms of section 24(3) of NEMA can be used as environmental management frameworks in the consideration – in terms of section 24 (4)(b)(vi) of NEMA – of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply. They also provide specific regulatory requirements pertaining to the development of an EMF specifying that either the minister or MEC, with the concurrence of the minister, may initiate an EMF for an area. For this purpose, the minister or MEC, must compile a draft environmental management framework and subject it to a public participation process (by making the draft available for public inspection at a convenient place; and inviting potential interested and affected parties by way of advertisements in newspapers circulating in the area and in any other appropriate way to inspect the draft and submit representations, objections and comments in connection with the draft to that person or organ of state). The draft EMF should then be reviewed in the light of any representations, objections and comments received.</p> <p>In terms of the regulations, the minister or MEC may adopt – with or without amendments – an EMF. When an EMF has been adopted, notice must be given in the government gazette or the official gazette of the relevant province of (a) the adoption of the environmental management framework; and (b) the place where the environmental management framework is available for public scrutiny. Finally, the regulations prescribe that an EMF, which has been adopted, must be taken into account in the consideration of applications for environmental authorisation in or affecting the geographical area to which the framework applies. An EMF should therefore be regarded as a supportive instrument to assist environmental impact assessment and related decision-making processes in the iLembe District Municipality” (DEA&DP, 2017:1-210).</p>
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Source: DEA&DP (2017:1-210)