

The perceived value of Environmental Assessment (EA) for the Government of South Africa

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ABBREVIATIONS

BA → Basic Assessment

CA → Competent Authority

CAQDAS → Computer Assisted/Aided Qualitative Data Analysis Software

CONNEPP → Consultative National Environmental Policy Process

DEADP → Department of Environmental Affairs and Development Planning

DEAT → Department of Environmental Affairs and Tourism

EA → Environmental Assessment

EAP → Environmental Assessment Practitioner

ECO → Environmental Control Officer

EIA → Environmental Impact Assessment

EMF → Environmental Management Framework

EMPr/EMP → Environmental Management Programme

EMS → Environmental Management System

EPA → Environmental Protection Agency

I&AP → Interested and Affected Party

IAIA → International Association for Impact Assessment

IAP2 → International Association for public participation

IDP → Integrated Development Plan

IEM → Integrated Environmental Management

JPOI → Johannesburg Plan of Implementation

MDG → Millennium Development Goals

MSc → Master of Science

NEMA → National Environmental Management Act

NEPA → National Environmental Policy Act

NFSD → National Framework for Sustainable Development

NSSD1 → National Strategy for Sustainable Development

PhD → Doctor of Philosophy

PPP → Public Participation Programme

SA → South Africa

SDP → Spatial Development Plan

SEA → Strategic Environmental Assessment

UNEP → United Nations Environment Programme

USA → United States of America

ABSTRACT

Environmental Assessment (EA) is a fundamental environmental management tool in South Africa that plays an important role in the management of environmental impacts in the country. EA aims to ensure that development takes place in an environmentally sustainable manner while also generating social, economic, and governmental benefits. The exact nature of these benefits and the extent to which they are realized have, however, not been determined, resulting in uncertainty around the value of EA. The aim of this study was to explore the benefits, and subsequently the value, of EA for the South African government. These insights contribute to the current debate on the value of EA and could potentially facilitate the process of specifying focus areas to which EA resources could be directed to ensure the realization and overall enhancement of sustainable development in South Africa. A total of 175 semi-structured questionnaires were completed by EA government officials testing their views on the benefits of EA for the South African government. Questionnaires were transcribed and analyzed through coding and content analysis. The findings suggest that EA offers numerous potential benefits for government of which the most significant was its ability to promote legal compliance and enforcement. In terms of realized benefits, most officials mentioned the protection of biodiversity and sensitive environmental features as a key contribution of EA. To breach the gap between the potential benefits offered by EA and the realization of these benefits, most officials suggested that more effort should be invested into environmental education, capacity building and raising awareness on environmental issues. The findings from this study provide new insights into the value of EA, especially for the government sector. EA value, characterized by identifying benefits and gaps, should contribute to governmental introspection which should lead to more informed decision-making on issues affecting the environment and people, and assist government in dealing with current environmental issues.

Key words: Environmental Assessment, Value, government, Perspectives, Benefits, Sustainable Development.

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1 John 5:4-5 Amplified Bible (AMP)

4 For everyone born of God is victorious and overcomes the world; and this is the victory that has conquered and overcome the world — our [continuing, persistent] faith [in Jesus the Son of God].

5 Who is the one who is victorious and overcomes the world? It is the one who believes and recognizes the fact that Jesus is the Son of God.

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CHAPTER 1: Introduction

1.1 Introduction

Humanity is currently finding itself in a geological epoch referred to as the Anthropocene in which the impact of human activities, at both the local and global scales, are greater and more significant than ever before (Latour, 2017). In this era, humans have demonstrated its ability to alter and transfigure the natural world. The first signs of the Anthropocene were recorded in the 1800s when industrialization became a prominent feature of society (Steffen *et al.*, 2007). As this era progressed, industrial development, society's reliance on fossil fuels, and mass anthropogenic development drastically increased resulting in an upsurge of activities with detrimental impacts on the natural environment.

Although humans have generally been aware of the impact of their actions on their surrounding environment (local impacts), the sum of these impacts and its effects at the regional, national, and global scales have only been recognized and made evident in recent years (UNEP, 2012). It is, however, fortunate that local and international “*responsive action*” has been activated in the past due to the growing awareness of the increasingly negative impacts humankind exerts on the natural environment (Tickell, 2011). This responsive action occurred in many different forms such as strategic action plans, policies, legislation, and environmental intervention tools. Therefore, the importance of the environment was reflected in local and global legislation and policies, essentially making the governments of the world responsible for the enforcement of environmental protection.

The environmental problems faced by the world are not simplistic, but rather complex, often interconnected and ranges over various spatial and temporal scales (Whitmarsh, 2011). Responsive action, therefore, has to come in many different and often dynamic forms. Some of these responsive actions are in the form of integrated environmental management tools such as strategic environmental assessments (SEAs), conservation plans, strategic action plans, environmental assessments (EAs) and environmental management frameworks. Tools such as these have been developed to help facilitate the management of these complex environmental problems, while also facilitating sustainable development (Cilliers, 2015).

According to the National Framework of Sustainable Development (NFSD, 2008), the South African government is tasked with re-orientating South Africa's development path in a more sustainable development orientated direction, along with motivating community practice. To assist in this task, the NSDF (2008) proposes the implementation of a model known as the nested egg model of sustainable development, which argues that the four main systems through which sustainable development should be achieved, are ecosystem services, the socio-political system, the economy and the governance system. The South African

government is therefore an important role player in achieving sustainable development and often relies on environmental management tools such as EA to facilitate this task.

EA has played a very important role in South Africa in this regard over the past couple of decades. By conveying relevant information obtained from assessments and specialist studies, EA has created a new method of identifying potentially negative environmental impacts that anthropogenic development may have on the natural environment and the welfare of humans. This information can be utilized to influence the initial decision-making of relevant parties such as developers and the Competent Authority (CA) by introducing alternative and more sustainable proposals (Wathern, 2013; Retief & Chabalala, 2009; Glasson *et al.*, 2013). EA, therefore, creates a platform for transparency, by taking all relevant role players (e.g. developers, stakeholders, and the public) into account so that fair and sustainable decisions around proposed developments may be made.

EA has, however, often been criticised for being expensive, time consuming and unnecessarily delaying important development projects (Retief & Chabalala, 2009), leading to debate around the actual value of EA for society, government and developers alike (Jay *et al.*, 2007; Retief, 2010). Retief and Chabalala (2009) argue that the benefits obtained from implementing an EA system outweighs the costs involved whilst others state that it is simply impossible to accurately establish what the exact costs and benefits are of EA (Wood, 2003). To date, very little is known about the benefits, and subsequently the value, of EA and even less is known about the value of EA for specific stakeholders, i.e. government, society and developers.

Considering that government essentially commissions the agenda for EA in South Africa and is ultimately responsible for the further development and implementation of EA in the country, insights on governments perspective on the benefits, and subsequently the value, of EA for government could contribute to a general understanding of the value of EA. Furthermore, this understanding can also provide insights into the longevity of this tool and its future in South Africa.

1.2 Problem statement

EA is a very important tool for the South African government as it assists them in managing potential environmental impacts and steering development towards the sustainable development vision portrayed in the NFSD (Retief *et al.*, 2008), while also generating multiple social, environmental and governmental benefits (Morgan, 2012). However, the exact nature of these benefits – especially for government – and the extent to which they are realized is not exactly clear, resulting in uncertainty around the value of EA for the government of South Africa. It is within this context, that it would be valuable to establish the perspectives of government officials who are involved in EA with regard to the benefits of this tool.

1.3 Research aim and questions

Retief (2010) compiled a paper titled, *“The evolution of environmental assessment debates: a critical perspective from South Africa”*, which argues that there are three main themes of debate regarding environmental assessment namely:

- What is EA? (understanding)
- How to conduct EA? (quality)
- What are we achieving? (effectiveness)

The aim of this study speaks to the third theme as it aims to establish the value of EA for government (what benefits are we achieving) from a government perspective, and is:

“Exploring the perspectives of EA government officials on the value of EA for the South African government.”

The three following research questions (see Table 1) informs the aim of the study.

Table 1: Research questions

Questions
1. What are the perceived potential benefits of EA for government from a government perspective?
2. What are the perceived realized benefits of EA for government from a government perspective?
3. What must be done to successfully bridge the gap between potential and perceived realized benefits (where gaps may exist)?

Subsequently, this acquired knowledge could ultimately contribute to the current debate regarding the value of EA (Retief, 2010) and could potentially facilitate the process of specifying focus areas to which EA resources could be directed to ensure the realization and overall enhancement of sustainable development in South Africa. Because EA plays a significant role in achieving sustainable development in different systems of South Africa, the perceived benefits of EA (from a governmental perspective) will be considered against the nested egg model of sustainable development provide context on where the value of EA lies within the model of sustainable development.

1.4 Dissertation structure

In this section, the structure of the dissertation is briefly discussed. The dissertation follows a logical structure which allows the research questions to be logically answered. The overall body of the dissertation consists of six chapters. Table 2 presents a brief description of each chapter.

Table 2: Chapter structure of the dissertation.

Chapters	Description
Chapter 1: Introduction	In this chapter, the theme of the dissertation is discussed and described. The basis of the dissertation is contextualized whilst the main drivers are highlighted e.g. the problem statement, research aim, research questions and dissertation structure.
Chapter 2: Research Design and Methodology	In this chapter, the methods that were used to answer the research questions are discussed.
Chapter 3: Literature review	In this chapter, the literature review is presented. A “ <i>funnel method</i> ” where it starts out by discussing general broad concepts and topics followed by more focused and specific topics in subsequent sections (Hofstee, 2006). By implementing the funnel method correctly objectives may automatically be met whilst the theory base, significance and overall context emerges simultaneously without excessive writing effort (Hofstee, 2006).
Chapter 4: Results and Discussion	Results are presented as generated through the implementation of the methods. The presented results are then analysed, interpreted and discussed.
Chapter 5: Conclusion	All discussions and learning are collated so that overall conclusions are derived regarding the research questions.

CHAPTER 2: Research design and methodology

2.1 Introduction

The discussion relating to the research design and methodology is elucidated in this chapter. More specifically, the methodology regarding the data accumulation and interpretation which was used to answer the research questions, are discussed to demonstrate the process which was followed. Firstly, the research approach is discussed, followed by comments relating to the research design of the study. Following this section is the methodology discussion, where all the individual methodological steps are elaborated on and discussed. The chapter concludes with discussions on the methodological limitations and ethical considerations of the study.

2.2 Research approach

Quantitative, qualitative and mixed methods are all methodological approaches that may be used in scientific studies. Qualitative approaches include the handling and interpretation of information that comes in the form of words that communicate feelings, thoughts and perspectives, while quantitative approaches handle and interpret numbers and quantities (Flick, 2014). A mixed methods approach refers to a combination of these two different research approaches. This study employed a qualitative research approach which is now discussed.

Ostrom *et al.* (2015) state that qualitative research has the ability to provide the theory of social action and perspective which is grounded in personal experiences. Perspective is the style in which we think about something and therefore, our point of view respective towards any topic. It is, therefore, a form of awareness and having a certain attitude towards something (Efron, 1969). In this study, the aim was to explore perspectives or views on the topic of EA value, which meant that a research approach suited to this task was needed. A qualitative research design was thus employed to achieve the aim and objectives of this study.

Qualitative methods are methods such as interviewing, semi-structured questionnaires and observation research (Ladner, 2017). Qualitative research can be seen as the scientific approach which facilitates in evaluating and identifying patterns and meanings found within specific topics of focus (Schensul *et al.*, 1999). The qualitative approach was therefore suited for this study since the main focus of the study was to unravel the perspectives of EA government officials with regard to the value of EA for the South African government, and this approach has the ability to discover what people think (perspectives).

2.3 Research design

A research design may be seen as the logic behind the process of linking research questions with the data used in a study, and can be seen as the process which the researcher applies to achieve the aims and objectives of the study (Hesse-Biber & Leavy, 2006). Research should be driven by problems and queries rather than being driven by a method (Gillham, 2005). Thus, the most adequate method of solving the research questions should be identified and selected. Table 3 communicates the structure of the research design for this study.

Table 3: Research design

Research Questions	Data capturing methods	Data analysis methods
Q1: What are the perceived potential benefits of EA for government from a government perspective?	Qualitative research: • Semi-structured questionnaires	• Coding and thematic analysis
Q2: What are the perceived realized benefits of EA for government from a government perspective?	Qualitative research: • Semi-structured questionnaires	• Coding and thematic analysis
Q3: What must be done to successfully bridge the gap between potential and perceived realized benefits (where gaps may exist)?	Qualitative research: • Semi-structured questionnaires	• Coding and thematic analysis

The suitability and relevance of the type of methods of research determine the actual level of reliability and validity of the results (Grossoehme, 2014). These two terms are often found in qualitative research and analysis. Joppe (2000) refers to the term, reliability, as:

“The extent to which results are consistent over time and an accurate representation of the total population under study”

Kirk and Miller (1986) add to this by stating that reliability can come in the form of three representations, namely:

- The degree a measurement tends to repeat itself;
- The stability of measurement; and
- The overall similarity between measurements.

It is therefore important to use the appropriate method to solve different research questions so that the results may be reliable.

Validity, which is the second term, finds its origin in a tradition of positivism. This term is found in conjunction with other terms such as truth, deduction and evidence within the positivist paradigm (Winter, 2000). Joppe (2000) states the following regarding this concept:

“Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are.”

Validity, therefore, refers to the adequacy of the research in achieving the objectives. Wainer and Braun (1988) came up with the term, *“construct validity”*. The construct term of research refers to the initial questions or concepts that have to be addressed and answered. Construct, therefore, determines which data need to be generated, gathered and analysed. It does not assist the researcher if the wrong questions are answered.

These two terms were considered throughout this study to ensure that the method of gathering data and information and the analysis thereof was adequate, accurate and directly relevant to answer the specific research questions of this study. The procedure followed in answering the research questions will now be explored. This is followed by a discussion on semi-structured questionnaires and the qualitative data analysis process utilized for this study.

2.4 Procedural methodology

Creswell (2014) developed a basic qualitative research design process (Fig. 1) when using qualitative data analysis software to facilitate developing order in the data one is working with.

Roughly half of the process is done using a qualitative data analysis software which is used to conduct the analysis, while the other half is dependent on the researcher to develop interpretations. This research design process was adapted for this specific study and is presented below.

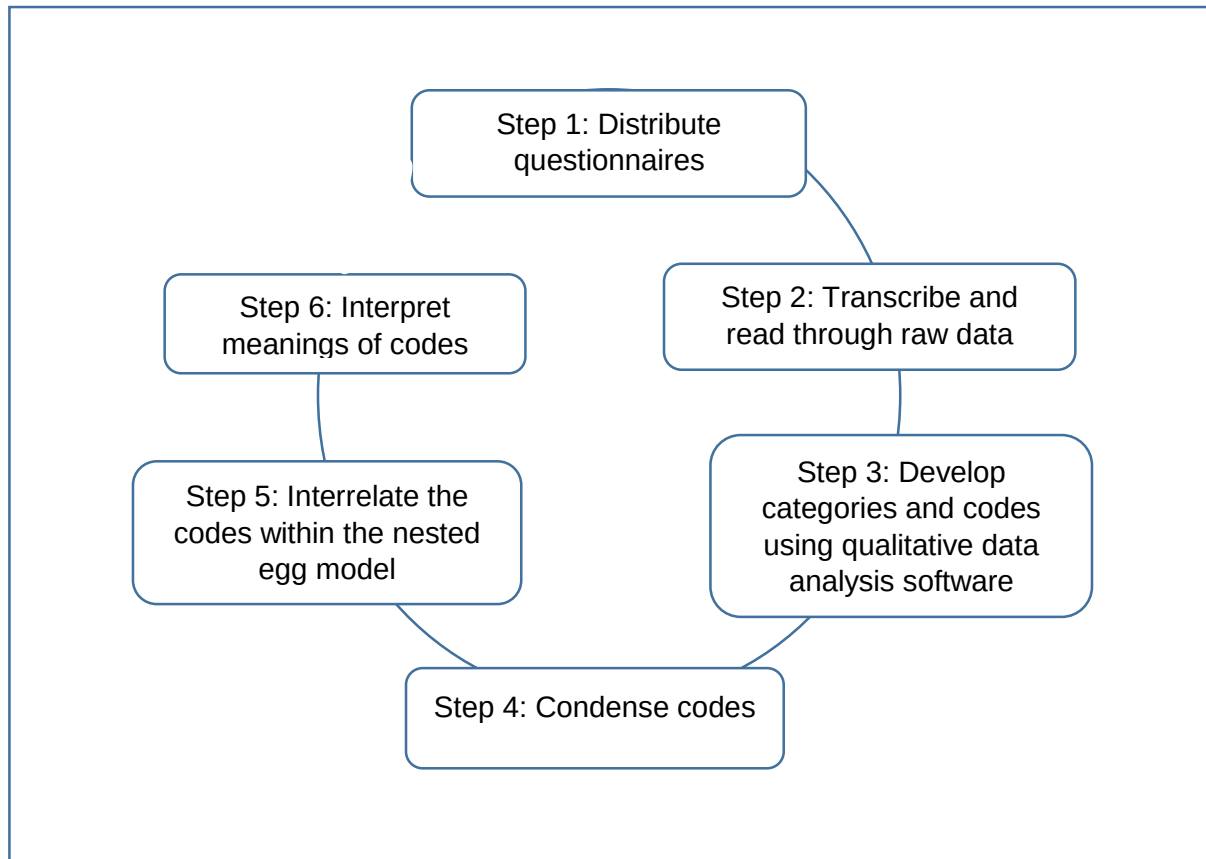


Figure 1: The (adapted) Creswell research design (Creswell, 2014).

This cycle process is followed within the methodology of this study. By following these steps, the interpretation of descriptions and themes should be accurate.

2.4.1 Step 1: Distributing questionnaires

This section refers to the first step of the Creswell (2014) research design process. As per step one, it is important to distribute and populate the questionnaire as it forms the basis for the analyses. A semi-structured questionnaire can be defined as a questionnaire which comprises of open-ended questions giving the respondent enough freedom to express personal ideologies, feelings and views, whilst still retaining some structure within the non-verbal conversation (Clifford *et al.*, 2016). It can thus be seen as an “on paper” interchange of information between the respondent and the researcher aiming to retrieve the answers.

A total of 175 semi-structured questionnaires were completed by EA government officials in 2016. This was achieved by distributing the questionnaires during compulsory national EA training sessions which EA governmental officials from across South Africa had to attend. Although the training was compulsory, participation in the completion of the questionnaire was voluntary and done on an anonymous basis. The questionnaires were completed at the three locations where the training was presented, which were Johannesburg, Port Elizabeth and Durban. A total of 175 questionnaires were concluded which included almost all EA officials in South Africa, meaning that the sample is representative of the government's perspective on EA for the government of South Africa.

Each questionnaire consisted of three questions and these questions are depicted in Table 4.

Table 4: The questionnaire questions

Questions
1. In your opinion what are the potential benefits of EA for government?
2. In your experience what are the actual realized benefits of EA for government?
3. In your opinion what must happen in order to successfully bridge the gap between potential and realized benefits (if gap exists)?

The research questions were designed to trigger EA government officials to individually discuss their personal insights and in-depth opinions.

2.4.2 Step 2: Transcribing and reading through raw data

Questionnaires were filled out on printed sheets and as a result it was necessary to digitize the responses through transcription in Microsoft Word. For this study, it was important to read through the raw data before coding could take place. When receiving new data through data generating methods such as questionnaires it is important to summarise any significant observations in the form of memos or short notes. Glaser (1978) refers to memos as the physical write-up of significant ideas about codes while the process of coding occurs. This can be done as a single sentence or short paragraph.

DURBAN 2016

Reflection exercise: Reflecting on the benefits of EIA for government

Please answer the three questions provided below. Explain your answer using examples, where possible. Please write on the back if you need more space.

1. In your opinion what are the **potential** benefits of EA for government?
Please explain your answer using examples where possible.
The potential benefits of EA for government would be to monitor proposed developments, to ensure that all developments are sustainable, looking at the economic, social and environmental impacts, and coming up with mitigation measures. This can help government fight the current global warming issues e.g. drought, heat etc resulted from bad environmental decisions. EA is aimed at helping government make better decisions. Helps create jobs & improve the economy.
2. In your experience what are the **actual realized** benefits of EA for government?
Please explain your answer using examples where possible.
The actual benefits of EA is that government gets to know before hand of all upcoming developments. It does reduce the degradation of our ecosystems, e.g. I have come across developments where a certain group (wealthy) develop or proposed developments that have major negative impacts for a private use just because they own the land. The EIA controlled this & only allowed development in areas with less environmental impacts. Negatives are current, where you find politics interfering with the EIA, reports that are poor, negative understanding about EIA. Issue also is DE Application already own the land, therefore limitations alternative.
3. In your opinion what must happen in order to successfully **bridge the gap** between potential and realized benefits (if gap exists)?
Please explain your answer using examples where possible.
Integration between departments & legislation, must work or talk to each other, helping the small / poor applicants. Ensure the funding from EIA goes into rehabilitating the environment.

Figure 2: An example of the semi-structured questionnaire that was filled out by an EA government official.

This type of memo-ing was followed in this study by doing a “pilot run” through all of the semi-structured questionnaires. A pilot run refers to a type of mini-version study of the actual full-scale study (Van Teijlingen & Hudley, 2001). This facilitates the development of a good perception of the data before the real study commences. Thus, it can be seen as a trial run in preparation of the major study. In this specific study, a pilot run was done by reading through each of the questionnaires and simply writing down all the main concepts that were identified in the discussions of the questionnaires. This gave the researcher a good insight into the content of the discussions whilst simultaneously becoming more familiar with the coding process. This approach therefore provided an initial overview of the content of the data.

2.4.3 Step 3: Developing categories and codes

The term, coding, refers to the systematic process of assigning a label or code to a relevant piece of data (Frieze, 2014; Saldaña, 2015). In this study, the condensing and categorising of data evolved through coding, which contributed to the structuring of data. Strauss and Corbin (1998) stated that as analysis occurs data similarities and differences are identified. Similar pieces of data were thus grouped together through coding in this study.

In the process of coding and structuring, the two types of hierarchical entities facilitated the process of structuring. Firstly, “*categories*” were established and are the first hierarchical entity in this study, for it refers to the three research questions. Subsequently “*codes*” were assigned to each of these respective categories. This can be seen as the second hierarchical entity which facilitates in the structuring of data. Codes were assigned to highlight information that were relevant or simply interesting within each of the categories (research questions). Subsequently, under each of the categories, different codes with different interpretations were established. These two different entities are thus parts of a “*coding system*”.

2.4.3.1 ATLAS.ti software

Many software programs exist that all have the common purpose of analysing this type of qualitative data. Miles and Huberman (2013) state that whatever approach is used to analyse qualitative data it should always:

- *Condense the data that is being analysed:*
This is done by structuring the data through assigning categories and codes to the questionnaires.
- *Display the data that is being analysed:*
This main categories and codes regarding the value of EA, are displayed in the results section of this study.
- *Draw conclusions from the displayed data:*
When the results are presented an analysis of this information takes place so that conclusions may be drawn.

The software used to adequately analyse this qualitative, semi-structured questionnaire data, was ATLAS.ti. ATLAS.ti belongs to the pool of CAQDAS programs, which stands for Computer-Aided Qualitative Data Analysis Software (Frieze, 2014). It is stipulated that this type of software does not actually analyse the data but rather facilitates the analysing process as an analysis support tool (Smith & Hesse-Biber, 1996; Frieze, 2014). By utilising software such as ATLAS.ti, the process of analysing data becomes easier and more time-efficient. Furthermore, the software is used to assign code words to specific data, to retrieve any

needed data linked to specific criteria, to search for specific words or phrases, to connect notes with specific paragraphs, and to provide in-depth overviews, and counting codes. This functionality facilitates the analysis process significantly as it prompts the researcher to raise questions not necessarily generated readily through manual processing due to time issues involved in processing large volumes of data. Therefore, large amounts of data can be handled, sorted, integrated and structured through the application of this type of software (Saillard, 2011). Strauss and Corbin (1998) stated that as the analysis evolves, similarities and differences are identified thereby allowing similar data to be grouped together through coding. Though coding, descriptions and categorisation of data contribute to the concept of data structuring.

The 175 semi-structured questionnaires were inserted as input text file data within ATLAS.ti. Codes were then assigned to the data, categories developed, and overall impressions derived with regard to the main thoughts and trends that became apparent through this process of qualitative analysis.

2.4.4 Step 4: Condensing codes

After codes were assigned it was important to review the coding list as it was crucial to condense and categorize the coded information and thereby apply a hierarchical structure to the data. Condensing took place in mid-2018 through expert group meetings where the identified codes were discussed and condensed. The expert panel consisted out of the supervisor, co-supervisor and the candidate researcher of this dissertation. This was done in an attempt to address the issue of subjectivity and individual bias. Condensing occurred by merging similar codes, as there were a significant amount of codes conveying the similar messages. In this study, the underlying codes of the three different categories were condensed four times before the final condensed coding system was completed. Consequently, the final coding system was only completed when all the codes were assigned to all the relevant data and each of the codes condensed and categorized.

After developing the structured coding system, the system facilitated the analysis process of tracking personal thoughts. It further helped with establishing transparency within the research so that others (reviewers or interested parties) may follow the analysis. Lastly, the coding system facilitated a descriptive approach to the analysis while simultaneously allowing analysis to progress beyond the descriptive level (such as querying and developing networks).

Because EA plays a significant role in achieving sustainable development in South Africa, it is important to refer back to section 1.1, where the nested egg model of sustainable development was first introduced. The concept of the nested egg model can be seen as a key concept in

this study as it presents the backdrop against which EA should be applied to ensure sustainable development. The value of EA should ultimately be contextualized within this model. The coding system therefore not only underpins the main themes of perceptions of EA-value but also facilitates in contextualizing the perspectives regarding EA-value with the nested egg model of sustainable development.

2.4.5 Step 5: Interrelating the codes within the nested egg model

As mentioned in section 2.4.4, once all the relevant codes were assigned and established, the codes were contextualized with the nested egg of sustainable development. Each code represents a specific theme which falls within one of the four systems found within the nested egg of sustainable development, i.e. ecosystem services, socio-political system, economy and the governance system. To this end, every code is assigned a colour with regard to where it fits within the nested egg model of sustainable development.

Table 5: The five colour-coded systems of the nested egg model of sustainable development in which a code could fit.

1. Ecosystem services
2. Socio-political system
3. Economy
4. Governance
5. Falls within all systems

The codes, which were condensed from the questionnaires, were thus interrelated with this model due to the fact that EA plays a significant role in facilitating the journey of achieving sustainable development in different systems of South Africa.

2.4.6 Step 6: Interpreting meanings of codes

After all the above-mentioned steps were completed, the final step of the Creswell (2014) cycle commenced, which was the interpretation of the meanings of codes. Each code that was assigned throughout step three, consisted of numerous quotations. A quotation refers to the exact words that were highlighted within the questionnaires. The quotations contribute to the frequency of a code. For example, when 18 participants discuss economic growth as a potential benefit which EA may provide, a total of 18 quotations (frequency of 18) are allocated under the 'economic growth' code.

Therefore, each code was analysed in depth by reading through each of the quotations that fell under each code, across the three research questions. By reading through each of the quotations, a holistic interpretation could be made with regard to what was being said by all the participants under each code. It was important to holistically analyse each code because

different participants sometimes communicated different concepts and aspects under the same codes and it is important to take all perspectives into consideration. In doing so, a holistic interpretation could be made with regard to the benefits, and subsequently the value of EA, and how it relates to the nested egg model of sustainable development.

2.5 Limitations

In any research, it is crucial to acknowledge possible limitations to the research. By acknowledging limitations, the validity of the research could be measured, and it can then apply an appropriate level of credibility to any conclusions that are made during the research (Loannidis, 2007). Hence, this section highlights the significant limitations that were observed during the analysis stage of the research.

There are numerous limitations that become prominent when working with open-ended questionnaires and qualitative data analysis software.

1. The lack of conscientious response. It is important that the researcher generates accurate data. It can be problematic when the respondent, in this case, the government official, simply writes an answer without conscientiously considering the question (Holbrook *et al.*, 2003). Bias can occur where respondents already have a premeditated answer before considering what the question actually enquires. This is referred to as “*response bias*” (Holbrook *et al.*, 2003)
2. Due to the fact that the data was not collected in a face-to-face conversation, it is possible to easily misinterpret what the respondent is trying to convey (Cranny & Doherty, 1988). Fortuitously, in most cases within this study, the respondents fairly consistently referred to similar concepts making it less likely to misinterpret responses.
3. Conveying the actual feelings and thoughts can be challenging for some respondents and can limit accurate message portrayal. As with the second limitation, it is difficult to pinpoint true emotion and expressiveness without having a face-to-face conversation. This can have an impact on concluding remarks and subsequent interpretation.
4. Some qualitative questions used in open-ended questions for research poses difficult analysis challenges. It cannot be analytically quantified and must be analysed through human input due to abstractness (Swyngedouw, 2001).
5. Another major limitation that required addressing is the concept of researcher bias that may be present during qualitative data analysis. Researcher bias is problematic in the

world of qualitative research (Chenail, 2011). In this study, the researcher had to analyse the recorded answers and interpret it to develop conclusions. No contact was made between the researcher and the respondents. This created a scenario where misinterpretations by the researcher were possible as the questionnaires were the only form of communication as opposed to interviews which provide the researcher direct contact with the respondent (Holstein & Gubrium, 2003). Researcher bias may encroach during analysis due to misinterpretation of the communicated message within the questionnaire. This problem was addressed through expert workshops with other researchers in the field with discussions focussing on the assigned codes and interrelations so that sound conclusions could be compiled regarding each code's accuracy, interpretation, and "*fit*" within the nested egg model of sustainable development. This problem was furthermore addressed through attending training workshops regarding the analysis software, which provided knowledge on how to approach and analyse the data, adequately.

6. Factors such as poor hand-writing, skipped questions and disinterest created some additional complexity in terms of transcribing and interpretation. In limited cases, it was observed that some questionnaires were answered with half-hearted "*one-liner*" answers or simply left unanswered.
7. Incomplete opinions is also another limitation because the respondents are restricted in the space available for their comments and might focus on only a subset of possible answers.
8. Lastly, framing bias can also be a limitation where respondents overestimate the value of EA because it is their main job and point of focus.

2.6 Ethical considerations

The study was considered by an ethics committee which concluded that there were no ethical issues in any area of the study due to the fact that all participants were kept anonymous throughout the study and no direct contact was made by the researcher.

In this chapter, the research design and methodological approach were discussed in order to develop an understanding of how the data was accumulated and what methods were used to interpret the data so that the research questions may be answered. Furthermore, the limitations and ethical considerations of the study were addressed. The literature review pertaining to the subject matter is conducted in the following chapter.

CHAPTER 3: Literature review

3.1 Introduction

A literature review can be defined as the selection of relevant and available documents which inherits certain ideas and information that can be used to achieve certain research aims or represent theoretical views on a concept of concern and/or importance (Hart, 1998). Fink (2010) defines a literature review as the systematic process of analysing the already-existing body of knowledge on a concept of importance, while Hart (1998) states that a literature review is important to conduct within any scientific study as it assists the author to acquire the necessary understanding on relevant subjects, how these subjects may be researched, and which issues should be acknowledged.

By researching and processing existing literature on relevant topics and concepts of research, an adequate foundation for advancing present knowledge may be established. Webster and Watson (2002) state that a literature review is important since it aids in developing new theory, removes any vagueness from theory and practice, and assists in identifying areas where in-depth research is required.

The subject matter under investigation in this dissertation is the concept of EA and its value to the South African government. Since EA is an internationally established concept it is appropriate that literature emanating from the international academic community may be used to develop a general understanding of the concept before discussing it within the South African context.

The literature review investigates broad topics such as environmental management, integrated environmental management (IEM), EA, associated environmental tools and sustainable development. Furthermore, the sections of the literature review were deliberately placed so that each section narrows the scope of study down to the main concepts that are being researched in this study. This information serves as the foundation for the discussion of the value of EA in South Africa.

Essentially, the literature review was conducted by searching online academic catalogues and other library catalogues and inventories by using keywords relevant to topics such as EA and environmental management. Booth *et al.* (2016) propose the application of an information literacy approach which entails the skill of assessing information in terms of its significance and recognizing when information is essential for application within the discussion when conducting a literature study. This literacy approach was applied in this dissertation to highlight critical concepts and elaborate on important topics of concern. By conducting the literature review a platform for the development of context and understanding was established.

The concept of environmental management is discussed first followed by discussions on the concepts of integrated environmental management (IEM) and IEM tools. The concept of EA is finally discussed, reflecting, amongst other things, on the legal mandate of EA in South Africa, the value of EA, and finally the concept of sustainable development and how it is contextualized with the value of EA.

3.2. Environmental management

3.2.1 The history of environmental management

For background information purposes and context, it is important to reflect on the history of environmental management. In the past, environmental management could typically be coupled with the concept of conservation, e.g. the establishment of conservation camps and/or national parks (Mittermeier *et al.*, 2003). Conservation follows the principle of creating efforts to protect and conserve species and ecosystems that are directly or indirectly threatened by human influence (Mittermeier *et al.*, 2003). According to Allen (1959), environmental management and conservation seemingly could have had the same origin.

Some of the earliest references to environmental management date back thousands of years to the Roman Empire (Pinderhughes, 2004). Systems of management were developed where all the inhabitants of village communities started allocating their waste in strategic areas so that the relevant authorities could collect and transport the waste via horse-cart to large pits where it could be dumped, buried and left to decompose (Pinderhughes, 2004). This was one of the first structured practical frameworks of managing the environment while simultaneously improving human well-being.

The Romans furthermore progressed in the management of their environment by building aqueducts with the purpose of transporting water from springs to the towns (Shifrin, 2005). Later on, these types of systems were altered for other purposes such as sewage transport. This could be seen as one of the first sewage transport systems where human sewage was transported away from the central town areas to avoid any accumulation of wastes and secure human health (Shifrin, 2005).

It is important to note that the above strategies of environmental management were not implemented with the aim of preserving the environment but rather to reduce the risks of sickness and the breeding of parasites.

Environmental management could be seen in the late 1800s in another form called “*conservation*”. Signs of environmental conservation have been recorded between the late 1800s and early 1900’s in European countries, as well as Canada and the United States of America (USA) (Merchant, 2007). This was not implemented with the health of the

environment kept in mind, but it was largely implemented with the simple aim of preserving the environment's natural attractiveness for recreational pleasure (Merchant, 2007).

As time passed new ways of thinking and doing things developed. Between 1900 and 1948 several breakthroughs took place in terms of the way people viewed the environment and its wellbeing (Adams, 1997). When humans started to realize that the health and prosperity of their own species were at stake they started to think about protecting and managing the environment in such a manner that humans may benefit from such management efforts (McMichael & Woodruff, 2005).

Records between 1900 and 1950 show that researchers quickly realized that simply placing fences around areas for conservation was simply not enough to secure long-term environmental health and overall wellbeing (Adam, 2004) and as a result, more active forms of management started to develop. Examples of these are the pioneering of air pollution studies (Brimblecombe, 1977; Akimoto, 2003) and the publications of the first water quality standards in the USA (Crittenden *et al.*, 2012).

The industrial sector of Germany could be seen as the “*eco-pioneers*” of the globe due to its stance taken in the 1950's. By 1970 Germany followed a new path by incorporating public relation strategies within their frameworks of managing the environment. Any fallout from criticism could thus be evaded whilst also creating opportunities for alterations in the culture of the corporate environment and thereby promote sustainability (Jones & Lubinski, 2014). This can be viewed as one of the first instances where social aspects were integrated with environmental management strategies. Since then, the importance of the environment has been incorporated within all relevant environmental policy and legislation developmental planning processes, not only in Germany but most of the world (Judge & Douglas, 1998).

It can be seen that the development of environmental management has come a long way since the early 1900s. It is a field which is still developing to this day. Hence, it is constantly dependant on the input that humans make to ensure that the environment is taken into consideration. Humans have many views with regards to the environment and the management towards it. The worldviews regarding environmental management will be explored next.

3.2.2 Environmental management worldviews and ideologies

Many different ideologies and worldviews can be applied (Dunlap *et al.*, 2000) when defining the concept of environmental management hence making it a challenging process (Barrow, 2006). However, it is important that these worldviews and ideologies are thoroughly considered when developing a sensible definition of environmental management.

An ideology can be seen as the cornerstone of systematic thought and rationalization and is self-evident in nature, while a worldview can be defined as a set of presuppositions which individuals hold about the basic makeup of their world (O’Riordan, 1977; Schultz & Swezey, 2013). Different understandings of environmental management within the context of different worldviews will now be discussed in an effort to arrive at a better understanding of the concept.

3.2.2.1 Technocentrism

According to Bryant and Wilson (1998), the profession called environmental management started as a *“technocentric problem-solving initiative”*, which provided direct practical assistance to any relevant official who found themselves in this field. Technocentrism can be defined as a system where humans solemnly focus on technology to help manage the environment (Bryant & Wilson, 1998). People who share this worldview firmly believe that industrial technology has the power to manage the environment and that they have total control over nature. This is seen as one of the more primitive worldviews held by people in the mid-1900’s.

This ideology developed a way of rationalizing in a scientific manner. This could be seen as the first *“American conservation era”* (O’Riordan,1977). This view is directly related to other aspects such as *“managerial elitism”*, which is a social science phenomenon (Pettigrew, 1992). This elite theory, which handles and describes the power relationships found in society, states that a small minority of the elite economic individuals has the most power relative to other groups. This environmental ideology furthermore comprises two different views, namely, *“Accommodatorism”* and *“Cornucopianism”* and will now be discussed.

3.2.2.2 Accommodatorism

Accommodatorism is the technocentric view stipulating that it acknowledges the existence of problems found within the environmental sector but fully relies on scientific and technological factors to help mitigate and solve the problems (O’Riordan, 2004). Wilson and Bryant (1997) state that this view acknowledges that the concept of environmental management can be used as a middleman between the natural environment and human life.

3.2.2.3 Cornucopianism

The second view found within technocentrism is cornucopianism stating the *“fact”* that there are no such things as environmental problems. Supporters of this view argue that humans will always create new ways of dealing with problems that may arise in the environmental sector by utilizing different approaches (e.g. scientific, technological etc.) (O’Riordan, 1995; Wilson & Bryant, 1997).

3.2.2.4 Ecocentrism

Another common ideology regarding environmental management is ecocentrism. People who have this ecocentric worldview believe that humans are directly dependant on nature which is the most important medium through which they can examine and establish their personal feelings and personalities (Hoffman & Sandelands, 2005). Ecocentrics thus believe that through the denial (in the form of human development) of natural phenomena the meaning of true existence is actually denied (O’Riordan, 1977).

The above-mentioned ideologies present the mental space in which the concept of environmental management could be understood. This discussion on different ideologies contributes to the discussion on environmental management due to the fact that there are different angles of understanding this topic. The reader can thus develop an own understanding by identifying with one of the ideologies, or a combination of them. Importantly the above-mentioned ideologies will be considered in the next section where the general understanding of environmental management is discussed.

3.2.3 A general understanding of environmental management

Environmental management is difficult to define, which also makes it difficult to agree to an overall and definite understanding regarding the concept. This makes it difficult for different authors and researchers to establish a mutual understanding due to the dynamics of its different applications. The physical context to which this concept is applied to further also plays a fundamental role within the meaning of the term (Brown *et al.*, 1987).

Jagers *et al.* (2018) define environmental management as the direct adoption of various strategies such as policy measures with the aim of establishing an environmental action which is collective in nature. Reed (2008) adds to this by stating that environmental management can be seen as a flexible and transparent decision-making tool that can be utilized in dynamic and ever-changing scenarios while still promoting environmental knowledge and values.

Theobald (2011) defines the concept in a more ecological context by stating that it is an environmental tool that can be applied to mitigate human impact on the natural environment. By using this tool sensitive environmental areas could be preserved and protected. Theobald *et al.* (2011) also adopts a more ecological viewpoint, whilst O’Riordan (2014) takes on a more political approach defining it as a scientific technique which can be utilized as a “*political weapon*” in the legal framework with the aim of determining the quality of the environment and managing it forward.

The different worldviews mentioned in Section 3.1.2 can be linked with the above-mentioned definitions of environmental management. The definitions proposed by researchers such as

Jager *et al.* (2018) are ecocentric and accommodatorism in nature because most of the referenced researchers are renowned environmentalists that do not undermine the importance of the environment but rather find ways to preserve it. Ecocentrics and accommodatorists has a dependability on nature and acknowledges that human input may be used to protect the environment. These attributes are clearly reflected in their definitions.

Although there are different ways to understand the concept of environmental management, it does not negate the fact that environmental management is a crucial concept, which needs to be implemented to its full extent.

The concept was generally defined above, however, the way of interpretation in a local context needs to be explored further. A local, South African, understanding of environmental management will be now be discussed.

3.2.4 A local understanding of environmental management

This section discusses a local understanding of environmental management. Prior to the discussion, it is important to define what is meant by “environment” within a South African context. According to the National Environmental Management Act (NEMA) (107 of 1998):

“Environment” means the surroundings within which humans exist and that are made up of -

(i) the land, water and atmosphere of the earth;

(ii) micro-organisms, plant and animal life;

(iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and

(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing”

Per definition “surroundings” is mentioned first. This implies that the definition is based on the interaction of human life (and the well-being thereof) with the surrounding biophysical and social aspects. Therefore, there is a definite inter-linkage between environmental health and human well-being. It is noticed that all the important elements are mentioned such as water, air, fauna flora and inter-relationships between them, but these elements are not mentioned as aspects which need to be managed, but rather as aspects which influence human health and well-being. It could be perceived that environmental management only deals with managing and sustaining the environment, but the definition makes it clear that the environment is not the aspect which should be managed, but rather managing human nature, which could have an effect on the environment (Wehrmeyer, 2017). Humans can thus be seen

as a significant aspect of the environment. This gives good context regarding the definition of “*environment*” within the South African (local) context.

Barrow (2006) produced the most appropriate definition for the concept which is widely accepted and acknowledged in South Africa (Nel & Kotze, 2009). Barrow (2006) states that environmental management can be defined as an active process focussed on meeting the basic needs of all humans while simultaneously mitigating any environmental impacts that can be ascribed to anthropogenic development. This definition can be directly linked to the NEMA (107 of 1998) definition of the environment.

After considering the above-mentioned definitions from different viewpoints it becomes more apparent that the environment is not the phenomenon that must be managed but rather the human activities. The environment can only be adequately managed when impacts associated with anthropogenic activities are managed in a sustainable manner.

In 1996 the Constitution of South Africa introduced the right that all South Africans are entitled to a healthy environment that is not harmful to the wellbeing of individuals (South Africa, 1996). Hence, the aim of environmental management is found in improving the overall quality of life for all humans while sustaining the natural environment to its maximum. This type of management has the objective of mobilizing various political, social and economic factors such as resources and certain government roles which can facilitate the process of regulating the utilization of environmental and economic commodities (Ahmed, 2016).

According to Nel and Kotze (2009), environmental management may be seen as the planning, doing, checking and acting activities that should be implemented by governing agents and managers as they relate to either the green environment or a combination of green environment and other environmental elements. This relatively new field, environmental management, can be seen as an innovative profession which enables humans to change their way of thinking about the health of the environment. By efficiently implementing environmental management, informed decision-making can occur which leads to smarter and more conscious development. Subsequently, this enhances the quality of life for humans and preserves the natural health of the environment in a sustainable manner.

The local understanding of environmental management was discussed in this section. Environmental management is therefore used as a way to adequately protect the environment and human health by addressing different aspects such as human nature and actions. These aspects are dynamic in nature and should be addressed in a dynamic manner by integrating as much information as possible from different areas so that well-informed decisions can be

made. One approach that will assist in the aforementioned is integrated environmental management, which will now be discussed.

3.3 Integrated Environmental Management (IEM)

3.3.1 General understanding of IEM

According to Cairns and Crawford (1991), early approaches to environmental management were regarded by many as inadequate as they failed to address issues such as interconnectedness, multiple perspectives, and the complexities associated with environmental constraints. This resulted in the development of the concept of integrated environmental management (IEM). Margerum and Born (1995) argued that an integrated approach to environmental management would allow for the acknowledgement of a wide range of factors such as ecosystem components, affected entities and inter-related processes in decision making. IEM, therefore, takes significantly more information into account. Cairns and Crawford (1991) define IEM as:

“Co-ordinated control, direction or influence of all human activities in a defined environmental system to achieve and balance the broadest possible range of short- and long-term objectives.” (Cairns & Crawford, 1991)

While Margerum and Born (1995) state that IEM is:

“A process of formulating and implementing a course of action involving natural and human resources in an ecosystem taking into account the social, political, economic, and institutional factors operating within the ecosystem in order to achieve specific societal objectives.”

Although there are some obvious differences between these definitions – and in the manner in which the concept is applied in different countries – the idea of a holistic, integrated approach to environmental management is central to the concept. It is not surprising then that IEM has been mostly justified by the fact that most researchers argue that environmental problems must be addressed in a far more holistic manner (Odum, 1982). According to Parker *et al.* (2002), there are many case studies that have proven the success of implementing IEM (Parker *et al.*, 2002).

In practice, IEM comes in the form of different tools, concepts and techniques (Margerum & Born, 1995) tailored for managing complex environmental problems. Cairns (1991) states that by using IEM complex and inter-related problems can be comprehended with more ease. This is due to IEM having the ability to adequately identify all the main sub-systems which are

involved within the environmental problem and then developing complimentary assessments, models, and frameworks using the available databases (Cairns, 1991).

The concept of integrating human and environmental aspects in a holistic manner became apparent in the discipline of environmental management on an international scale and later became more apparent in countries such as South Africa, where the concept was embraced. In this context, a local, South African, understanding regarding IEM will thus be discussed.

3.3.2 IEM in the South African context

South Africa has an obligation to protect, preserve and sustain its natural resources, as it is the key to economic, social and political prosperity (Hřebíček *et al.*, 2014). To achieve the aforementioned, a wide range of environmental management tools, which has the ability to assist in the achievement of sustainable outcomes, are applied (Cilliers, 2015). These tools are referred to as the IEM tools.

The concept of IEM was formally introduced in South Africa in 1989 (Hamann *et al.*, 2000). Ten years later, in 1998, the Department of Environmental Affairs initiated formalisation of the concept through the publication of an IEM discussion document (Lindique, 2003; Cilliers, 2015) to clarify uncertainties that existed around the concept at the time. The National Environmental Management Act (107 of 1998) further facilitated the establishment of the IEM concept by stating its main objectives. These objectives as stipulated in Section 23 of NEMA (107 of 1998) states that IEM should aim to achieve the following:

- Promoting the integration of the IEM concept within all decision-making.
- Sufficiently identifying and predicting environmental impacts with the aim of mitigating any negative impacts, while maximising benefits.
- Providing environmental assurance by sufficiently considering the potential impacts that human development may have on the environment.
- Creating a platform for the public to be incorporated in the decision-making process regarding the environment.
- Assuring that environmental parameters are considered within decision-making and management viewpoints.
- Assuring that each individual project/activity is handled according to the principles of environmental management.

While the objectives of IEM are clear its definition remains vague. As in the case of environmental management, IEM can also be interpreted and defined in many different ways. Nel and Du Plessis (2004) states that IEM is:

“The adoption of a holistic and integrative perspective of planning and decision processes by considering numerous parameters to inform the decision-making processes.” (Nel & Du Plessis, 2004).

It is further described IEM as the integration and alignment of governance actions by different organs of state (Nel & Du Plessis, 2004). IEM can also be seen as the strategic adoption of different environmental management tools (e.g. EA, EMF, SDP, EMP) and NEMA principles, whilst keeping these tools and principles in direct context with environmental governance (Nel & Du Plessis, 2004). It is furthermore argued that the concept of IEM should not just consist of principles but ought to become a philosophical cornerstone of thinking alongside the implementation and use of associated tools and systems.

According to the IEM guidelines of 1992, there is a clear link between IEM and EA which is important to understand. The IEM guidelines (1992) stated that:

“Integrated Environmental Management (IEM) is designed to ensure that the environmental consequences of development proposals are understood and adequately considered. The purpose of IEM is to resolve or mitigate any negative impacts and to enhance positive aspects of development proposals” (South Africa, 1992).

Generally, the guidelines hold true, however, it implies that IEM is mainly focussed on the assessment of impacts whereas, in reality, tiered levels of decision-making exist. IEM, therefore, has a much broader role to play than simply assessing project-level impacts.

According to the Integrated Environmental Management Series, IEM can be viewed as a paradigm for sustainable development which requires the integration of all areas of the country (e.g. economic, environmental, political and social aspects) for it to efficiently commence (South Africa, 2004). As a conclusion to this concept in the South African context the IEM Series (2004) defines IEM in the following manner:

“IEM provides a holistic framework that can be embraced by all sectors of society for the assessment and management of environmental impacts and aspects associated with an activity for each stage of the activity life cycle, taking into consideration a broad definition of environment and with the overall aim of promoting sustainable development.” (South Africa, 2004).

The often-blurred concept of sustainable development and its interrelation with IEM requires some contextualisation and will consequently be discussed in the following section.

3.3.3 Sustainable development and IEM

The concept of “*sustainable development*” is a widely used phrase that is used across different professions and disciplines. As with most other concepts discussed thus far, it has many different understandings and provokes many different responses (Hopwood *et al.*, 2005).

3.3.3.1 A general understanding of sustainable development

According to chapter 2 of the United Nations document “*Our Common Future*” published in 1987 in Geneva, Switzerland, sustainable development can be defined as:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations, 1987).

Hopwood *et al.* (2005) expand on this by defining sustainable development as an attempt to integrate and combine developing environmental concerns with those concerns that are socio-economic in nature. In doing so, the importance of the environment may be seen as an aspect which can facilitate in solving economic issues. The concept of sustainable development also has the potential to identify and address any significant challenges for human well-being. Therefore, present and future challenges may be addressed (Hopwood *et al.*, 2005; Kates *et al.*, 2005).

The 2002 World Summit on Sustainable Development contributed to the definition of the concept by elaborating on the three “*systems*” of sustainable development, i.e. social, economic and environmental (Report of the World Summit, 2002). In the same year, it was stated that sustainable development may take place through the joint responsibility of managing and improving the integrated systems of the concept (The Johannesburg Declaration on Sustainable Development, 2002). These systems can, therefore, be seen as, environmental protection and management, social development and economic development.

Another way of defining and discussing the concept of sustainable development is by elaborating on the values it inhabits (Redclift, 1993). As with the term “*sustainable development*” the term “*values*” also has a wide range of meanings. In this context, values can be seen as the belief in the worth and desirability of something. With regard to sustainable development, these values are mostly connected with responsibility and environmental care. Kates *et al.* (2005) state that there are a set of underlying fundamental values that articulates the 60 goals found within the Millennium Declaration and can be seen as the main values that should be achieved for sustainable development. The six key values are stipulated as; responsibility, overall respect for the environment, tolerance, equality/fairness, freedom and solidarity (Kates *et al.*, 2005).

In keeping with the theme of this investigation, it is important to address what is supposed to be sustained through sustainable development which is established through the utilization of environmental management tools such as EA. According to Daly (2006), there are two fundamental aspects that should be sustained. Firstly, “*utility*” is the first aspect that should be sustained. He argues that the utility of future generations should be just as provided for as the present generation (Daly, 2006). The second aspect that should be sustained is “*physical throughput*”. Physical throughput refers to the physical process where natural resources move from nature in and through the economy and society and back into the environment’s sinks. To be more specific, this term refers to the capacity that ecosystems inhabit to sustain these movements (Daly, 2006). Therefore, by sustaining this physical throughput, biophysical services and resources may be sustained not only for the present generation but for the future generations as well.

Morrison-Saunders and Retief (2012) state that South Africa can be seen as a country which has embraced this concept of sustainability. Sustainable development, with all its different definitions and perspectives, can therefore be seen as a concept which represents a range of global efforts which aims to initiate the development of a world where the need of all humans is adequately met, without degrading the natural environment that mankind depends on. The concept of sustainable development will now be discussed in the South African context and contextualized within the South African IEM regime.

3.3.3.2 Sustainable development in the South African context

It can be stated that IEM is applied in South Africa to facilitate the integration of sustainable development objectives in decision-making processes related to any activities that might impact the environment. These impacts can then be mitigated or even fully rectified so that development may continue in a more sustainable manner (Ahmed, 2016). But what is meant by ‘integration’ in terms of IEM, is still uncertain. Strydom and King (2009) suggest that this integration might include:

- The integration of authorizations between different levels and areas of the government.
- The integration of authorizations within the same, single area of the government
- The recognition of how integrated and dynamic the environmental management cycle actually is and assigning the appropriate tools for each phase.
- The recognition of the dire need to address all areas of the development cycle. From planning to authorization, to development, to use and follow-up.

Although the concept of IEM has been around since 1989, the effective implementation thereof remains an obstacle. Initially, it was simply too focussed, which was also the case for IEM in

South Africa as it was only associated with the authorizations of controlled activities (South Africa, 2004). It became clear that the country drastically needed the consideration of other important aspects such as economics, social factors and all stages of the development process. Therefore, IEM now comprises additional tools where each of them has different purposes and applications, which may be utilized to address this issue and promote sustainability in South Africa.

These tools are significant, due to the fact that they have the ability to cover the whole body of the classic management cycle (Plan - Check - Do - Act) (Jørgensen *et al.*, 2006) and could furthermore be applied to different levels of development from project level, to strategic level, to implementation level (Cilliers, 2015).

All these different tools seemingly play a fundamental and integrated role within the promotion of informed decision-making and should lead to sustainable development. The tools, as used in South Africa, will thus be discussed within a local context in the effort of enhancing the current understanding.

3.4 Types of IEM tools

Strydom and King (2009) state that this form of integrated management has three goals in mind, i.e. economic efficiency, social equity and ecological sustainability and the tools found in the IEM “*toolbox*” are utilized with the purpose of achieving these goals (Retief, 2001). NEMA (107 of 1998), Section 24(5)(bA) lists the following integrated environmental management tools:

- Environmental management frameworks (EMF)
- Strategic environmental assessments (SEA)
- Environmental impact assessments (EIA)
- Environmental management programmes (EMPr)
- Norms and Standards
- Spatial development tools or
- Any other tool/instruments that may be utilized in the practice of environmental management.

These tools have different purposes and are very specific in their application. The tools can be applied at the outset to project or strategic level (Wynberg, 2002; Cilliers, 2015) in the form of either “*planning and problem identification*”, or “*operation and management*” instruments/tools. These two different applications of environmental management tools are discussed in the following sections to contextualise and discuss the tools and their application in greater detail.

3.4.1 Planning and problem identification

Planning and problem identification tools mostly have to do with identifying any effects that could lead to negative impacts on either the biophysical or socio-economic environment and are usually utilised prior to any implementation of activities or development. Normally tools such as EMF, EA and spatial development tools are applied in this context as they assist significantly in predevelopment planning and the identification of possible environmental sensitivities and issues.

To facilitate effective environmental management, planning tools should be developed and applied at three different levels. Firstly, planning should take place at a strategic level (Wynberg, 2002). This can be done by incorporating the importance of the environment within regional and/or national policies, legislation and strategic programmes. In a South African context, NEMA requires all provinces and their relevant national departments to prepare plans and frameworks such as implementation plans and EMPs which then further promote the concept of cooperative governance in the relevant spheres of environmental management. These tools therefore also have the duty of “*mainstreaming*” the concept of environmental health within decision-making (De Groot *et al.*, 2010).

Secondly, planning should take place at a physical level which can be seen as a spatial approach. By utilizing physical planning noticeable successes have been gained across all areas where bioregional approaches have been adopted (Wynberg, 2002). By integrating these types of tools with conservation plans and management programs, sufficient and sustainable informed decisions can be made regarding the quality of the natural environment (Wynberg, 2002).

Finally, environmental planning can take place at a habitat and species level. Note that this is not always the case. Tools are sometimes developed according to administrative boundaries and not based on any biophysical considerations. Nonetheless, this can be seen as one of the most advanced and specialised levels, and when implemented correctly, great success could be gained (Moilanen *et al.*, 2005). It is crucial for these plans to be developed within a holistic and dynamic way of thinking and be complemented by the above-mentioned plans and programs. This is where the concept of integration between the tools can be observed. For instance, biodiversity studies can be found within other tools such as EA thus integrating different tools with one another to create a holistic and sustainable way of making decisions regarding the environment (Wynberg, 2002). Examples of successful planning and problem identification tools are SEA, EMF, and EA (Cilliers, 2015). Only after adequate planning has occurred may the implementation, operation and management of the tools commence.

3.4.2 Operation and management

After the planning and impact identification has been completed and authorised, implementation may begin where other IEM tools can then be used. These tools are called the operation and management tools. These tools have the purpose of ensuring that any environmental effects and impacts previously identified are managed and mitigated whilst also assuring that management policy is adequately adhered to throughout the process of operation (Cilliers, 2015). Examples of these tools which are well-known in South Africa are tools such as EMPr (Cilliers, 2015).

When focussing more directly on the IEM tools *per se* rather than the planning and integration behind it, it becomes apparent that the function fulfilled by each specific tool is highly purposeful and important. NEMA, Section 24(5)(bA)(ix) states that the tools that fall within the IEM toolbox should always remain open-ended without limitation so as not to constrain the process of integration (South Africa, 1998). Therefore, Nel and Du Plessis (2004) argues that the concept of IEM should be seen and acknowledged as a framework in which different tools and instruments could be coincided and integrated with one another for the purpose of developing a sustainable way of functioning.

It is clear that these tools play a fundamental role in environmental management in South Africa. The different IEM tools will be discussed briefly in the following sections, while EA will be discussed in depth as it is central to the study.

3.5 Brief overview of IEM tools

In this section, a selection of IEM tools will be discussed in more detail. The purpose of this is to provide the reader with a better understanding of the IEM toolbox by reflecting on some of the most prominent tools contained therein.

Table 6: The different IEM tools that will be discussed.

<i>Planning and problem identification</i>	<i>Operation and management</i>
3.5.1 SEA	3.5.3 EMPr
3.5.2 EMF	
3.5.4 EA	

3.5.1 Strategic Environmental Assessment (SEA)

SEA can be seen as a procedural instrument, while also being spatially explicit for the evaluation of all stages of the decision-making cycle (Jacob *et al.*, 2008). According to Brown and Therivel (2000), SEA aims to move beyond the assessment of policies and programmes

towards sustainable outcomes, making this tool a significant means of achieving sustainable development.

This tool may be used for assessments and analyses that can then develop in a “*sustainability component*” within local decision-making (Stinchcombe & Gibson, 2001). It can hence be seen as an approach which has the focus of incorporating sustainability considerations within a strategic level of decision-making.

There is not a specific and correct definition for the tool due to the different ways in which it could be applied (Brown & Thérivel, 2000). However, the previous environmental affairs Department, DEAT (South Africa, 2004), provides a general way of describing the tool by stating that it entails the evaluation and active assessment of any decisions that are made at the planning and policy levels of long-term decisions regarding development.

The concept of utilizing SEA has been applied to a number of different processes and scenarios such as the energy sector and most recently, fracking. This tool is therefore dynamic in its application. Partidário and Clarke (2000) define SEA as:

“A systematic on-going process for evaluating, at the earliest appropriate stage of publicly accountable decision making, the environmental quality, and consequences of alternative visions and development intentions incorporated in policy, planning, program initiatives, ensuring full integration of relevant biophysical, economic, social and political considerations.” (Partidário & Clarke, 2000).

Sadler and Verheem (1996) contribute to the discussion by also defining the concept. They define SEA as:

“The formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations.” (Sadler & Verheem, 1996).

By acknowledging the different views and discussions on the concept of SEA, it can thus be seen as an important tool in the IEM toolbox geared towards promoting the concept of sustainable development. Its application enables the evaluation and assessment of decisions at the planning and programme level of decision-making. This will contribute to sustainable outcomes over the long term. Another tool, the so-called EMF, which is regarded as an important strategic environmental management tool, will now be discussed.

3.5.2 Environmental Management Frameworks (EMF)

An environmental management framework (EMF) can be defined as a spatially explicit, environmental management tool meant to inform decision-making in a specific geographical area (South Africa, 2010). The EMF Regulations (2010) defines an EMF as:

“The study of the biophysical and socio-cultural systems of a geographically defined area to reveal where specific land-uses may best be practised and to offer performance standards for maintaining appropriate use of such land.” (South Africa, 2010).

This spatial framework has the role of setting out specific environmental parameters and attributes in the form of a compilation of different maps which has the purpose of displaying the environmental character of a geographical area (Ahmed, 2016). Cilliers (2015) adds to this by stating that EMF is strategic in nature as it aims to proactively identify, address and deal with any conflicts that may arise between sensitive features in the environment and activities associated with anthropogenic development. According to Marais *et al.* (2015), possible conflicts can be dealt with through the outlining and delineation of so-called “*environmental sensitivity zones*”. The early mapping of sensitive areas and useable resources are thus crucial to pre-empting any future land-use conflicts that may arise (Slootweg *et al.*, 2009).

Other authors such as Marais *et al.* (2015) state that because this tool has the ability to facilitate informed decision-making, its application may be used as an EA “*screening device*”. It, therefore, has the capability to assist in the screening phase of EA reporting by identifying areas which show serious conflict and those that do not (Marais *et al.*, 2015; Ahmed, 2016). In the process undesired project-level EA’s may be screened out and minimised potentially saving time and resources (Cilliers, 2015; Marais *et al.*, 2015; Ahmed, 2016). Furthermore, EMF is a tool that relies on sensitivity maps, as these sensitivity maps can be seen as specialist input which could subsequently be used within EMFs to influence decision-making (Marais *et al.*, 2015; Cilliers, 2015).

EMF serves as an important management and decision-support tool, as it provides decision makers with an understanding of the sensitivities in an area and the activity types that might potentially be detrimental to them. Note that EMF should not be viewed as a “*decision-maker*” but rather as a tool supporting sustainable decision making.

3.5.3 Environmental Management Programme (EMPr)

An EMPr is usually a requirement within the process of EA and is mandated under the regulations in terms of Chapter 5 of NEMA (107 of 1998) (South Africa, 1998). These programmes usually have the potential to become (and may be seen as) legally binding documents that must be approved by the Department of Environment Affairs (DEA).

The aim of an EMPr is to ensure that all environmental controls are implemented and facilitated throughout the process of the proposed development project. In the process, any liabilities and environmental degradation may be avoided when the project is developed and commissioned. To develop assurance of environmental safety, the programme must contribute by presenting conditions that fall under the active planning, construction and operational phase of the project. The programme furthermore has the role of presenting the development limitations to the relevant contractors, as well as appropriate methods of action so that they may comply with the legally binding logistic planning. This will result in the assurance of environmental health.

This programme has the capability of providing a clear framework regarding the responsibility for environmental management requirements for each person who has the role and responsibility of environmental management within the development. Therefore, a concrete form of guidance is supplemented through EMPr. It can therefore be concluded that EMPr is required by most development projects for it develops and provides an adequate framework for environmental compliance.

3.5.4 Environmental Assessment (EA)

As mentioned earlier, EA is both central to the study and a key environmental management tool used in South Africa and will be dealt with in more depth than the previously discussed IEM tools.

3.5.4.1 An historic overview

The United States of America (USA) was the first country to develop and adopt the concept of environmental assessment (EA) as an environmental management tool through their National Environmental Policy Act (NEPA) in the 1970's (O'Riordan & Sewell, 1981). The environmental policy and legislation that was set out by this Act established a guide regarding activities that were implemented by agencies whose actions had a significant impact on the natural environment and the people of the public (Ashby, 1976). All companies were obligated to release formal statements to the public regarding the companies' environmental impacts and the manner in which they would be addressed. Therefore, this Act was used to keep federal agencies and companies, which have the potential to negatively affect the environment and surrounding communities, directly accountable to the public. This enhanced environmental decision-making globally. By 1985 the application of EA had spread worldwide where it had become a significant tool within project planning (Glasson *et al.*, 2013). The concept of EA gained popularity and recognition over the last 15 to 20 years as emphasis grew on topics such as climate change and rapid biodiversity loss (Morgan, 2012). Many other

countries adopted this thinking and way of addressing environmental issues. Today, thousands of EA's are issued in most countries of the world by utilizing this tool and its accompanying regulations (Glasson & Therivel, 2013). In this context, countries such as Sweden, New Zealand, Canada, Australia and South Africa may be seen as pioneer countries regarding the adoption of the EA Acts and tools (Wood, 2003).

With the constant incorporation of EA and legislation on a global scale, the concept of EA was being recognized within a number of different conventions and protocols. Examples of these conventions and protocols are; the Convention on Wetlands of International Importance, the United Nations Framework Convention on Climate Change and the Protocol on Environmental Protection to the Antarctic Treaty (Morgan, 2012). It is therefore apparent that after forty years the concept and process of EA as an environmental management instrument is firmly embedded within environmental policy at a global level (Morgan, 2012).

Prior to elaborating on the process of EA, it is important to understand what the tool actually entails. The Convention on Biological Diversity defines EA as:

“A process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.”

According to Cashmore (2004):

“EA is a decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions in order to facilitate informed decision-making and sound environmental management”.

IAIA (2009) furthermore defined the concept of EA as the crucial process utilized to accurately identify, predict, assess and mitigate all relevant social, environmental, economic and political effects that could arise from a project development before any major decisions are made regarding the commencement of development.

Duinker and Greig (2007) add to this discussion by stating that EA can be seen and interpreted as the process which was designed with the purpose of ensuring that all potential impacts are adequately identified, acknowledged and taken into account during all phases of development (planning, design and implementation). This process can thus be seen as the evaluation and assessment of environmental conditions and all the potentially significant impacts that can accompany it due to the implementation of the proposed development (Krattiger & Lesser, 1994).

Another important interpretation of EA to consider is that of the United Nations Environment Programme (UNEP). According to UNEP (1987), it aims to facilitate in predicting any relevant and significant impacts that have the potential of disturbing the natural environment. This is done in the early phases of project planning so that new alternative ways to help mitigate the impact may be developed and used so that the well-being of the environment may be sustained.

EA furthermore has different objectives that contribute to its importance. It can be argued that the main objective of EA is to promote sustainable development through the management of impacts (which can be found in different environmental, social and economic spheres) so that:

- Environmental commodities and resources may be protected and preserved (Glasson *et al.*, 2013).
- The well-being and prosperity of human health are sustained (Li *et al.*, 2010).
- Overall enhancement can take place over socio-economic dimensions (Morrison-Saunders & Arts, 2005).

The above-mentioned information served as background information to the concept of EA, however, developing an understanding regarding the current purposes that EA aims to fulfil is furthermore important. To this end, the general purposes of EA will be discussed in the following section.

3.5.4.2 The Different Purposes of EA

After extensive research was done on the different EA purposes, the information could be condensed to four main purposes. These purposes will now be elaborated.

Firstly, EA facilitates decision-making (Sadler 1996; Sandham *et al.*, 2008; Glasson *et al.*, 2013) by providing the relevant authorities with systematic assessments of any environmental consequences that may arise during or after development takes place (Sandham *et al.*, 2008; Glasson *et al.*, 2013). Thomas (1998) adds by stating that EA facilitates in the identification of possible trade-offs between the environment and project development. This then facilitates informed decision-making. The EA tool can thus be used as a negotiating tool between planners, developers and the public, thereby creating a balance between the differing interests of the environment and the process of development (Sandham *et al.*, 2008; Thomas 1998; Glasson *et al.*, 2013).

Secondly, EA facilitates the strategic establishment of developmental actions (Glasson *et al.*, 2013). As previously mentioned many planners will argue that this process is a waste of money and time (Legg & Nagy, 2006), but what is often overlooked is that this process can assist significantly by providing an adequate, aligned framework between the design and location

problems and any environmental consequences that may arise when developing commences (Glasson *et al.*, 2013). Therefore, it can facilitate in developing sufficient development processes and actions so that any environmental consequences may be mitigated or even completely avoided.

O'Riordan (1990) adds to this discussion by stating that when development takes place in an environmentally friendly manner, relationships between the public, developers and planning authority should significantly improve. The process of development is therefore made much smoother and worthwhile, whilst also increasing trust between parties.

Thirdly, EA can be regarded as a vehicle for the process of public participation and stakeholder engagement (Glasson *et al.*, 2013). It is a reality that some developments may not only have a negative impact on the environment but also have an effect on the local communities where it takes place. Fortunately, through the application of EA, much emphasis is placed on the importance of the engagement and consultation of the public and relevant stakeholders (Shepherd & Bowler, 1997). Through the use of public participation and engagement programs the public voice may be heard where all potentially interested and affected parties (I&APs) have a platform to raise their concerns. This improves governmental trust whilst also informing the proposed development. This concept of public participation is discussed in more detail later on.

Lastly, EA promotes sustainable development (Htun, 1990; Wilkins, 2003; Glasson *et al.*, 2013). It provides the opportunity for responsible actions and sustainable resource use to be implemented, therefore meeting current needs, without compromising the needs of future generations. In extreme cases, EA may be the tool which could facilitate the complete shutdown of dangerous and harmful development projects. According to Glasson *et al.* (2013), EA thus follows a principle of prevention. In other words, it is far better to address any potential impacts and consequences development may have before any physical development commences so as to enable adequate management and mitigation measures from the outset. It is problematic when development has already commenced due to exhaustion of financial resources and development timeframes (Legg & Nagy, 2006). Therefore, it is better to prevent rather than to cure (Glasson *et al.*, 2013).

The EA tool includes the relevant environmental policy and legislation with the necessary authority to help prevent negative impacts such as pollution and habitat degradation which might originate from development. This tool can thus be seen as playing a fundamental role in the process of achieving sustainable development. Jay *et al.* (2007) add that this role is often hidden by some authors but should receive more attention when the value of EA is being evaluated.

The background and purposes of EA have been discussed thus far. The following section will elaborate on the process itself, discussing the generic steps of the EA process, so that the concept of EA may be understood in totality.

3.5.4.3 The EA Process

There are many authors which emphasise different steps of the EA process (Sadler, 1996; Glasson *et al.*, 1999; Morris & Therivel, 2001; Weston, 2010; Glasson *et al.*, 2013). When taking all the different interpretations of the process into account the main steps which could be established, are:

- Screening
- Scoping
- Baseline Studies
- Impact Prediction
- Assessment of Significance
- Mitigation Measures
- Public Consultation and Participation
- Decision-making
- Monitoring (Morris & Therivel, 2001; Glasson *et al.*, 2013)

Glasson *et al.* (2013) state that it is important to take note that although the steps are discussed in a linear fashion, the process should be implemented in a cyclical manner, where constant interaction takes place between each of the fundamental steps. The above-mentioned steps will now be discussed shortly so that a better understanding of the process may be developed.

3.5.4.3.1 Screening

“*Screening*” can be seen as the first step to be taken before the actual EA process may commence (Retief *et al.*, 2011). From an IEM perspective, screening can be seen as the determinant whether proposed development projects require the necessary environmental assessment or not (South Africa, 2002). It can thus be seen as a decision-making process within the decision-making process of EA.

The Department of Environmental Affairs (1992) officially stated that screening could be defined as, “*The classification of proposals*”. This aligns with Sadler (1996) which states that screening contributes to the definition by stating that the screening step of the EA process can be seen as a process which involves the determination of whether or not an EA is needed to

be done on a specific proposed project, and if so, it is furthermore necessary to determine what level of detail is required for the assessment.

This stage of the process can be compared to a physical sand-screen in action. All the fine sand particles which make it through the openings of the screen can be seen as the development proposals which comprise of insignificant impacts. This means that these proposals may commence without any environmental assessment. However, the bigger sand particles which resemble rocks and pebbles, are not fine enough to simply go through the screen and therefore does not fall through. These rocks resemble the proposals which comprise of identified, potential impacts, which should be further assessed. This type of proposal could be rejected immediately (depending on its significance), or subjected to an EA (South Africa, 2002).

It is thus the screening process's purpose to determine which proposals should or should not require an EA. When a proposal is proven to require an EA, the screening process furthermore determines what detail of assessment is required for such EA-requiring projects. The screening phase is followed by the scoping process which will now be discussed.

3.5.4.3.2 Scoping

The next step that follows the screening phase, is called the “*scoping*” phase. This phase can be seen as the first step in the process of assessment for a proposal after the necessary screening actions were implemented (Morris & Therivel, 2001).

The aim of scoping is firstly to identify at an early stage (before any project development actually commences) which impacts, receptors and alternatives should be acknowledged and considered. (Morris & Therivel, 2001). Secondly, this process aims to ensure that time and resources are intensively focussed on so that no financial resources and time is used as effectively as possible (Morris & Therivel, 2001). In doing so, the third aim can be achieved, which is adequate communication between developers, planners and relevant authorities at an early stage of development (Morris & Therivel, 2001). Lastly, the process of scoping has the aim of notifying the developer of any constraints that may be problematic in nature even if it is not currently a problem but has the potential to become problematic at later on stages. Glasson *et al.* (2013) summarise the scoping phase as the step which seeks to identify at an early stage, all the relevant potential impacts that a development may have, the alternatives of development, while also classifying the significance of the identified issues.

The scoping phase thus has the function of developing an effective plan through preliminarily assessing all potential impacts that are estimated, the impact area, mitigation measures, the

need for continual monitoring and methods of study that will have the ability to obtain information so that informed decisions may be made (Morris & Therivel, 2001)

The scoping process can thus be seen as the process where key issues and impacts are identified and studied which determines the terms of reference for further actions to be taken along the line of the EA phases that follows. Many specialists, however, recognize that better approaches are drastically needed to bypass wastefulness, inappropriate studies and counter productiveness in EA (Lash *et al.*, 1974; Peterson, 1976; Bardach & Pugliaresi, 1977). These wrongs can be made right through effective baseline studies, which forms part of the EA process (Hilborn & Walters, 1981).

3.5.4.3.3 Baseline Studies

The biggest problem the scoping step of the EA process face is the availability of detailed information (Morris & Therivel, 2001). This means that all informed decisions must then rely on information that comes from baseline studies, which is the next step of the EA process (Beanlands, 1988). Baseline studies are therefore a fundamental step within the EA process. Keep in mind that this phase is not part of the scoping phase but is seen as a phase that supplementary in nature and is conducted to inform the assessment process, for it provides the assessment process with relevant information. These studies can be seen as the fundamental backbone of environmental assessments. Hirsch (1980) defines baseline studies as a:

“Description of conditions existing at a point in time against which subsequent changes can be detected through monitoring”

Baseline information has two main purposes. The first purpose is to provide the planners and developers with the overall status of environmental factors (e.g. water pollution) (Sharma *et al.*, 2011). The status of these factors can then be compared to the predicted impacts so that these factors may be evaluated in terms of its significance. Secondly, these studies provide a way of monitoring and detecting any environmental changes that may occur once the proposed project starts with its development phase (Sharma *et al.*, 2011).

According to Sharma *et al.* (2011) and Wathern (2013) state that there are some main environmental parameters that must be considered during this phase of environmental study namely, socio-economics, culture, the physical environment and the biological environment.

When these critical studies are done, adequate information may be provided regarding socio-economic, cultural and environmental factors. By integrating these different spheres, effective impact predictions can be made according to the nature of each system (e.g. environmental,

social, and economic). From there on forward, sufficient monitoring and mitigation plans can be formulated through the utilization of this information.

With all the benefits of baseline studies in mind, there can be concluded that by determining “*background values*” through these studies (Wathern, 2013), they could be compared to the predicted impacts and be managed accordingly. The process of predicting potential impacts within the EA process will now be discussed.

3.5.4.3.4 Impact Prediction

Numerous authors agree strongly that the impact prediction phase is a critical and fundamental step within the EA process (Beanlands & Dunker, 1983; Thomas, 1998; Glasson *et al.*, 1999; Morris & Therivel, 2001; Glasson *et al.*, 2013). It is therefore important that the likelihood of impacts must always be acknowledged and considered for all the environmental aspects present (Morris & Therivel, 2001).

The process of impact prediction can be described as the process where documented information such as ecological studies, biodiversity assessments and wetland studies (which is gathered during the impact assessment) is used and analysed to foresee any potential, significant impacts that a development may have on the environment, society and/or economy (Andersson, 2000). The aim of this process is thus to use information for developing predictions, which can then be used to improve informed decision-making.

According to Burris and Canter (1997), there are four main types of impacts that should be included within the concept of impact prediction, namely:

- Direct impacts: These impacts refer to the direct result that occurs because of development.
- Indirect impacts: Morris and Therivel (2001) describes these impacts as “*knock-on*” impacts that arise due to the stimulation of other impacts in the same geographic area.
- Cumulative impacts: This term refers to impacts that accrue over time and physical space due to the impacts and actions that come from different sources, but still contributes to a combined impact (Burris & Canter, 1997; Morris & Revivel, 2001).
- Induced impacts: These impacts refer to those that are not directly caused by the development, but are likely to occur because of it.

The above-mentioned impacts can be seen as the main impacts that should always be included within impact prediction. However, other important aspects, such as impact interactions, should also be acknowledged within the prediction phase (Morris & Therivel, 2001). This refers to the interactions and trade-offs that takes place between different impacts

which are found within a project or different projects within the same geographic area. This can then cause the issue of additional impacts (Morrison-Saunders & Arts, 2012).

Impacts can furthermore be positive (which refers to impacts that may be beneficial over different spheres) or negative (which refers to impacts which may have adverse impacts over different spheres).

The process of impact prediction therefore firstly requires an adequate understanding of the nature and systematic logistic planning of the potential project. Secondly, an adequate understanding of the potential outcomes (as seen in other similar project-level EA's) is required. Thirdly, accurate predictions of impacts on all relevant aspects must be developed. Lastly, sufficient knowledge regarding all receptors (and how they respond to change) must be gathered for an effective impact prediction process (Morris & Therivel, 2001).

In complying with the requirements of this process, adequate impact prediction may be made which can enhance the quality of decision-making so that the environment, society and economy will be favoured in a balanced manner. Following this step, it is important to then assess the significance of the identified impacts, which will now be discussed.

3.5.4.3.5 Assessment of Significance

After predicting the potential impacts, it is crucial to assess the level of significance each of the predicted impacts has, as it is an important decision in the EA process (Ehrlich & Ross, 2015). EA can then focus on the impacts that matter the most.

The EA Regulations (2014 as amended in 2017) of South Africa, as well as many other countries around the globe (Canter & Canty, 1993) defines the term “*significant impact*” as:

“An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence” (South Africa, 2014 as amended in 2017).

According to Pierzynski *et al.* (2005), there are five main factors to consider when determining the significance of impacts. They are mainly geographic extent, reversibility, magnitude frequency and duration, ecological context.

When taking all the above-mentioned factors into account, a good understanding of the significance of potential impacts may be determined. Therefore, assessing the significance of impacts has the aim of identifying and evaluating the significance of predicted impacts so that the main focus may be on the most important impacts.

3.5.4.3.6 Mitigation measures

The effectiveness and efficiency of EA (which is the core theme of the dissertation) mostly depends on the effectiveness of implementing relevant and cost-effective mitigation measures (Sánchez & Gallardo, 2005). The phase of impact prediction and identification is therefore followed by the phase where mitigation measures are set in place. Hence, the focus shifts from the accuracy of impact prediction to the effective prevention of significant environmental impacts and consequences. The effectiveness and value of EA lie in its ability to prevent environmental degradation (Bojórquez-Tapia, *et al.*, 1998).

Establishing mitigation measures can be seen as the phase in the EA process where relevant environmental studies, information and identified potential impacts are used to develop systematic processes and management plans that can then be implemented with the purpose of minimizing any significant effects that identified environmental impacts may have on the environment. This will then furthermore dictate and influence the role of decision-making within the EA context, which contributes to more sustainable patterns of project planning (Jay *et al.*, 2007).

Authors such as Noble (2004) states that the purpose of true EA is to manage the real impacts of development, rather than placing too much emphasis on the predicted impacts. This phase of the EA process has the potential to directly influence the decisions that are made regarding real impacts, prior to the approval of development proposals. It is therefore argued that the effectiveness and value of EA do not lie in the accuracy and the prediction that is made regarding potential impacts, but rather in its ability to place its emphasis in the implementation of impact management (Bailey *et al.*, 1992). However, it is important to mention that there is still a strong link between quality and EA effectiveness.

This process of impact mitigation can thus be seen as a fundamental step within the EA process as it secures the process of development, while also promoting the health of the environment and relevant communities. This brings the discussion to the following step, which is the public participation process.

3.5.4.3.7 Public Participation Process (PPP)

In modern times of environmental management and decision-making, there is an overall increased awareness of the importance for more public involvement in concluding decisions, policy and democracy regarding development and technology (Rowe & Frewer, 2000). EA literature expresses that public participation is a crucial component found within the EA process (O'Faircheallaigh, 2010) and that public participation can be seen as intrinsic to the EA process for it is seen as a fundamental requirement by the EA regulations of South Africa (South Africa, 2014 as amended in 2017). This form of involvement is thus a critical component

within the process. For in some cases, it can depend on the concerns raised by those that are from relevant communities whether or not development may commence (Canter, 1996).

The phase of public participation can be seen and defined as the fundamental process where the concerns, values and basic needs of the surrounding public are incorporated within governmental decision-making. It is a communication method which proceeds both ways between the public and the relevant authorities, with the main goal of better decision-making that will mutually support the government and the public (Creighton, 2005). Other authors such as Rowe and Frewer (2000), which specializes in public participation furthermore defines it as:

“The practice of consulting and involving members of the public in the agenda-setting, decision-making, and policy-forming activities of organizations or institutions responsible for policy development” (Rowe & Frewer, 2000).

Within this description of public participation (and other similar definitions), there are different elements that should be acknowledged in an effort to clarify what public participation is, and what it is not. Firstly, this process applies to decisions that are administrative in nature, which refers to decisions that are made by EA government officials themselves. Secondly, it is important to make it clear that public participation is not just about providing the affected communities with information, but it is rather about the interaction between the public and the relevant developers and the government to come to an agreement (Creighton 2005; Li *et al.*, 2012). Thirdly, it is not a coincidental process, but rather a systematic process which actively involves the public (Creighton, 2005). Lastly, it is important to state that any public individuals who act as participants have the potential to influence any decision-making (Creighton, 2005)

The International Association of Public Participation (IAP2) furthermore highlights the main values of public participation, which is creating a public voice, assuring that participation will affect decisions, creating access to information and enhancing adequate communication between all relevant parties (IAP2, 2000).

According to Creighton (2005) to effectively implement public participation and receive the most adequate feedback, information must be made available to the public, while procedural public participation must take place. This should then be followed by adequate consultation and collaborative problem-solving so that the interests of all developers, affected public and stakeholders are met. In doing so, fair and transparent decision making may take place throughout the EA process. The decision-making step is discussed next.

3.5.4.3.8 Decision-making

As mentioned earlier, EA can be seen as a tool which actively seeks to identify, predict and address certain environmental issues that may arise during or after proposed development takes place. This tool then uses this information set out by predictions, studies, reporting and public participation to make informed, sustainable development orientated, decisions (Leknes, 2001).

Leknes (2001) states that when all relevant information has been taken into consideration (e.g. impact information, baseline information, the needs of the community and public voice), decision-makers which is the governmental authorities, can use this information to make the most informed, equitable and sustainable decisions.

It is important to take note that this process does not make the decisions, but rather serves as an informative tool which is utilized to aid adequate and fair decision-making regarding the environment.

Within the context of EA, it is also important to establish who makes decisions, regarding environmental policy. Initially, decisions regarding environmental policy and management are usually made by officials who have been elected.

It is stated that the concept of decision-making shines through every phase of the EA process (Weston, 2000). Decisions thus take place from the screening phase to the actual stage of authorizing projects. Furthermore, the concept of making informed decisions can be seen as the true essence of EA. For decisions take place throughout the whole process of EA. As soon as the best decisions are made and authorized the construction and operation of proposed projects may commence. This, however, needs to be monitored and followed up on. Monitoring and EA follow-up are discussed next.

3.5.4.3.9 Monitoring and EA follow-up

After the decision-making stage takes place and the proposed developed gets authorized, the development of the project may commence. This, however, does not mean that the developers are free to do as they please. EA requires that constant monitoring and EA follow-up must take place when the implementation of development is granted the necessary authorization (Arts *et al.*, 2001; Hulett & Diab, 2002; Morrison-Saunders & Arts, 2012).

Monitoring may be defined as repeated (or ongoing) recording and evaluation of selected parameters found within the development and/or commissioning process, which can then enable the assessment of the effects originating from ongoing development (Frost, 1997). In doing so, the developers and commissioners of the facility are still kept accountable to consider the health of the environment and local society at all times.

Monitoring may be seen as one of the four tiers of EA follow-up (Morrison-Saunders & Arts, 2012). The other three tiers are *auditing*, *management* and *communication*. Monitoring has the duty to ensure that all actions that take place during and after development are in compliance with all relevant conditions and standards and also ensures that all predicted impacts are in the range of prediction (Morrison-Saunders & Arts, 2012).

Auditing has the responsibility of comparing all monitoring results with the relevant standards and expectations that are set out in the environmental authorisation so that an understanding may be developed and that it may be improved (Hulett & Diab, 2002; Morrison-Saunders & Arts, 2012). Morrison-Saunders and Arts (2012) identify a third tier of EA follow-up, namely, management. After taking all of the findings of monitoring and auditing into account, it is crucial that facilities use this knowledge to address any non-compliance or unforeseen impacts.

The last tier that is identified by Morrison-Saunders and Arts (2012) is communication. After receiving new information in the form of monitoring plans and audits regarding environmental compliance, this information must be communicated to the relevant parties managing the developed area so that gaps may be identified, and improvement of management may commence. Through utilizing this knowledge, facilities may be developed and commissioned in a sustainable manner, enhancing the economy, Society and environment.

By taking all this information on the different tiers of EA follow-up into account, the process of follow-up may be defined as

“The monitoring and evaluation of the impacts of a project or plan (that has been subject to EA for management of, and communication about, the environmental performance of that project or plan.” (Morrison-Saunders & Arts, 2004)

This process of EA follow-up is therefore critical for determining and evaluating the actual outcomes that are brought by the use of the EA process. The monitoring and EA follow-up may thus be seen as a systematic process which enables learning from relevant experience to occur. It is essential for this phase of the EA process to occur so that the EA process itself, may achieve its full potential as an environmental intervention tool.

Up until this point, the process of EA has been discussed. The history of EA in South Africa will be discussed next, with the purpose of developing extra context and understanding.

3.5.4.4 The history of EA in South Africa

The concept of EA has been applied in South Africa since the mid-1970s (Snowman *et al.*, 1995). It was initially applied only as a voluntary tool and developers were not obligated to conduct an EA (Wood, 1999). Its use only became a regulatory requirement in 1997 when

enabling environmental legislation was promulgated as a result of the realisation that all the more projects started to have unforeseen impacts on the environment. With this realization, more interest and focus started to develop around the concept of sustainability and balancing human development with the environment (Glasson *et al.*, 2013). Henceforth, the development of EA and its wider acceptance in progress.

In 1997, the first form of legal provisioning was made for EA through incorporating it within the Environmental Conservation Act (73 of 1989). This included the efficient promulgation of EA regulations. According to the Western Cape's Department of Environmental Affairs and Development Planning (DEADP), the first recorded regulations regarding South African EA, only listed nine activities which had the potential of detrimentally impacting the environment (South Africa, 2007).

By 1998, the remainder of IEM started being regulated (Wood, 1999) and then promulgated in 2006 (South Africa 1996; Sandham *et al.*, 2008). In this case, it was promulgated in terms of Section 24 of NEMA (107 of 1998) which can now be seen as the law and policy framework for environmental management in South Africa. Updated EA regulations were promulgated again in 2010, amended in 2014 and amended once more in 2017.

Therefore, EA is a fundamental tool within the profession of environmental management in South Africa and it is constantly evolving and growing in its application. The concept of EA will now be discussed within a South African context for the purpose of enhancing understanding regarding this intervention tool.

3.5.4.5 EA in the South African context

It is important to take note that EA is more of an international term, where in South Africa, the terms, basic assessment (BA) and environmental impact assessment (EIA) are used in a synonymous manner for the same concept. BA's are the assessments that are applied when activities are triggered in so-called *Listing 1* and *Listing 3* of the EA Regulations of South Africa. This is usually smaller scale activities, which will be easy to manage and mitigate any liabilities. However, EIA is required where activities fall under *Listing 2* of the EA Regulations of South Africa. These activities usually need thorough assessment due to the fact that the activities' have a much larger likelihood to comprise of significant environmental impacts.

The assessment of the environment and its sustainability has become a rapidly developing area of study and partitioning (Ness *et al.*, 2007). EA thus has a fundamental role to play regarding the achievement of sustainable development. This may be achieved through using the EA tool, together with environmental policy and legislation, to develop the assurance that environmental compliance is achieved by all government agencies.

The NEMA Regulations (South Africa, 2010) defines South African EIA's as:

“The process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application”

South African EIA Regulations currently comprise of the promulgated Regulations, 543, 544, 546 and 547. These Regulations apply in cases where human development triggers the need for environmental assessments. EA in South Africa, therefore, plays a fundamental role in decision-making regarding the environment. This tool can be seen as an effective key to achieve environmental sustainability through evaluating and assessing the sustainability of development proposals found within the boundaries of South Africa.

3.6 The legal mandate of EA in South Africa

During the early 1990's, the Constitution of the Republic of South Africa (108 of 1996) was the first Constitution in the world to list the “environment” as a priority and place humans (and not the concept of nature conservation) at the forefront of environmental management of South Africa. Later on, the NEMA (107 of 1998) was introduced and can be seen as the fundamental overarching framework policy which was created through a collaborative and involving process called the Consultative National Environmental Policy Process (CONNEPP). This framework policy that was developed in the late 1990's, helped to facilitate the representation of the vision that South Africa had regarding sustainable development and furthermore indicating all strategic intervention tools that may help shift the path of development of South Africa into a direction which is more sustainably orientated.

EA's are therefore mandated through NEMA Sections 24(1) and (7). Section 24(1) states that:

In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on-

(a) the environment;

(b) socio-economic conditions: and

(c) the cultural heritage,

of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity (South Africa, 1998).

The process of EA is furthermore mandated in Section 24(7) (a-f) of NEMA, which states that:

Procedures for the investigation, assessment and communication of the potential impact of activities must, as a minimum, ensure the following:

(a) Investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto:

(b) investigation of the potential impact, including cumulative effects, of the activity and its alternatives on the environment, socio-economic conditions and cultural heritage, and assessment of the significance of that potential impact;

(c) investigation of mitigation measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity;

(d) public information and participation, independent review and conflict resolution in all phases of the investigation and assessment of impacts;

(e) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;

(f) investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation (South Africa, 1998).

NEMA is thus the overarching law mandating the use of EA in South Africa so that the environment may be monitored and managed in a sustainable manner. Section 2 of the 2014 EA Regulations, which was amended in 2017, furthermore links EA (and the purpose of its Regulations) to Section 24 of the NEMA mandate by stating that:

The purpose of these Regulations is to regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto (South Africa, 2014).

The EA Regulations together with the Listing Notices have a large role to play through enforcing a legal mandate to protect the natural environment of South Africa. Listing Notice 1 governs all BA's done in South Africa and is applied to activities which fall under this Listing Notice. According to the Regulations of Listing Notice 1, the purpose of this Listing is to:

“Identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of the Act.” (South Africa, 2014 as amended in 2017).

All of the above-mentioned reports, assessments and planning are therefore dependant on what activities in the Listing Notices are triggered and are therefore mandated by the EA Regulations and Listing Notices of South Africa. Scoping processes and EA are thus mandated and given legal authority by the above-mentioned NEMA and Regulations. It is furthermore important to keep other environmental legislation in mind such as white papers, strategic action plans and most importantly, the Constitution of the Republic of South Africa. All of these different forms of policy and legislation influences the manner in which EA is implemented in South Africa.

3.7 The value of EA

The concept of value is a key theme to this specific study. Therefore, it is necessary to reflect on what value means and how it has been studied - this will now be discussed. EA has facilitated greatly for effective environmental management, not only in South Africa but also in the rest of the world. Although it has received some critique regarding the time, finances and other resources it exhausts (Retief & Chabalala, 2009), it is crucial to highlight and underpin the true value of this tool as proof that its benefits outweigh its costs. Before the value of EA is discussed, the meanings of “value” and “benefits” will be discussed and contextualized in line with the theme of this study.

3.7.1 Defining value and benefits

The term value, can and has been, defined in many different ways and from many perspectives (Perry, 1914; Bowman & Ambrosini, 2000). Authors such as Perry (1914) argued long ago that this term is not definable because it is believed that value is adjectival rather than substantive. The closest Perry (1914) came to a definition was referring to it as a condition of an identified object or resource (in this case, EA) and the expression, “*good for*” was usually used to describe the term. Bowman and Ambrosini (2000) adds to this discussion by stating that resources (in this case, EA) are assumed to be “*valuable*” when they comprise of anything which could be thought of as a strength of a given firm (in this case, the

government). The sources' definitions are not aimed to explain these terms within an environmental management context, but it could be interpreted within the context of EA.

Next, it is important to define what the term "*benefit*" refers to because EA benefits will be discussed shortly. Benefits are important to discuss because it is the sum of these benefits that contribute to the overall value and effectiveness of EA in South Africa. The Oxford dictionary simply defines the term as:

"An advantage or profit gained from something."

It is self-evident that EA brings many benefits to environmental management in South Africa and therefore has great value in its utilization. However, this tool has received much criticism in the past with regard to its costs involved. It is subsequently important to also address the negative pressure that EA receives.

3.7.2 Current issues and uncertainties of EA

One could argue that the costs of EA may overrule the benefits within a company perspective, but it is important to keep in mind that most environmental liabilities are dealt with through the process of EA (Lenzen *et al.*, 2003). This could lead to the saving of much more time and resources than would have been saved by simply not implementing EA. This can be seen as a "spend money to save money" paradox. However, whether or not the EA process is expensive, it is important to take note that NEMA encourages the precautionary principle and should be adhered to by developers. Trade-offs are therefore made through the allocation of time, finances and other resources into the process of EA in order to develop effective long-term stability with minimum chances of any liabilities occurring.

EA is experiencing a significant increase in pressure from decision-makers and other role-players (e.g. developers, contractors and public) regarding its value (Meyer, 2007). The perception that EA is a vital tool which significantly facilitates the incorporation of environmental considerations into decision-making seems to be waning rapidly. The focus has shifted from "*what can be done by EA in South Africa?*" to "*what are we actually achieving with EA in South Africa?*" The politicians and decision-makers of South Africa are therefore demanding proof and evidence regarding the value and effectiveness of EA in achieving its goals and what advantages are gained from it.

According to Streatfield and Markless (2009), it is important to conduct research and collate evidence on the topic of the value of impact assessment. Firstly, it measures whether projects are being conducted effectively. Secondly, the evidence and research can show whether or not EA is making a difference in people's lives. Subsequently, the evidence may be used to advocate for the continuation of support and funding of EA from relevant stakeholders.

Literature indicates that there is a progressive increase in the level of research currently being undertaken regarding the issues of EA value and effectiveness. The concept of value and effectiveness of EA consists of both substantive (which refers to whether or not EA is achieving its goals) and procedural (which refers to whether or not it is undertaken according to certain expectations) criteria (Sadler, 1996; Meyer, 2007). Most research has been focussed on the procedural criterion (Bond *et al.*, 2004) even though the substantive criterion is the overall test of its value and effectiveness (Doyle & Sadler, 1996). This finding is a significant motivating factor for this study which focuses on the substantive criterion mentioned by Meyer (2007) through the exploration of the existing perceptions with regards to EA value and the achievement of its associated goals in South Africa.

Through the literature review, it was found that only limited research has been performed specifically on the value of EA in South Africa. This research should thus contribute much to the body of knowledge regarding the value and effectiveness of EA in South Africa.

EA has multiple benefits which contribute to the total sum of its value. In principle by incorporating EA within development it has the potential to yield numerous benefits and profits. Although costs may be high at times, significant liabilities may be addressed which could have had detrimental effects in the long term at far greater costs. In this context, the theoretical value of EA is therefore discussed next where the emphasis is placed on its value and benefits.

3.7.3 Current research on the value of EA

Environmental assessment is receiving an increased amount of pressure and critique regarding its actual value, globally. It has become clear that the acceptance of perceptions and classic assumptions which states that the EA tool ensures environmental governance and proper decision-making, does not seem to hold any longer (Meyer, 2007) and it is becoming more apparent in the world of development that role-players within the process of EA are enquiring what the actual value and effectiveness of EA is (Duthie, 2001; Retief, 2007).

This growing concern regarding the effectiveness and value of EA has initiated the progressive improvement and development of research on the topic of EA effectiveness and value. The effectiveness may be found in its ability to achieve goals and outcomes but can also be found in the way that procedures are implemented and if they are implemented within the established expectations (Sadler, 1996).

Wood (1999) states that, after research was conducted with regards to the white paper of environmental management policy (through utilizing surveys which were handed out in different businesses of South Africa), it was found that 25% of the developers spent less than 1% of the development costs to conduct the project-level EA, 13% spent between 2-4% of the total development costs on the EA to be conducted. Furthermore, 60% of the other developers

who were surveyed did not have accurate assurance on what they spend on EA. It is also important to mention the theoretical benefits EA provides to justify its value and effectiveness. This theory may also be used to assess the process of mandatory EA to identify areas for improvement.

From the literature that was researched it was noticed that more studies were conducted on the costs of EA rather than its value and what it is actually achieving in South Africa. Essentially, there is not a large amount of research done on the value of global and South African EA and echoes the importance of this specific study. This study endeavours to shed light on what EA is achieving within a South African context and address its value. Considerations for EA will be discussed shortly by reflecting on the value of SEA because not much research was found specifically on the value of EA. The value of SEA will, however, give some insights on EA value.

3.7.3.1 The value of SEA: considerations for EA

Stinchcombe and Gibson (2001) identify seven fundamental benefits that arise through the utilization of SEA and will be discussed shortly. Just to recapitulate, SEA may be defined as:

“A systematic on-going process for evaluating, at the earliest appropriate stage of publicly accountable decision making, the environmental quality, and consequences of alternative visions and development intentions incorporated in policy, planning, program initiatives, ensuring full integration of relevant biophysical, economic, social and political considerations.” (Partidário & Clarke, 2000)

According to NEMA (1998), SEA and EA follow the same principles regarding its consideration of integrating economic, social and environmental aspects. The difference is that EA focusses on project-specific impacts within a specific delineated geographic area, while SEA takes a much broader and flexible approach (on an international level) (Gontier *et al.*, 2010). This means that while EA is focussed on mitigating negative impacts and enhancing the positive effects, SEA is focussed on maintaining an appropriate level of social, economic and environmental quality (through the identification of sustainable objectives) (Lee & Walsh, 1992). It is important to take note that these two approaches are very different in practice, but insights may be used to supplement an understanding regarding the value of EA.

Stinchcombe and Gibson (2001) concluded seven fundamental benefits that SEA brings to countries utilizing this process within the world of decision-making and development. These seven benefits can be directly coupled with EA and supports its value as an environmental intervention tool in South Africa. These benefits will be discussed shortly.

1. SEA can be associated with EA in the sense that this process provides a pursuit of sustainability objectives in all development planning and policy-making (Stinchcombe & Gibson, 2001). This is done with the main aim of incorporating sustainability objectives within all policy and decision-making which will enhance governmental activity. This benefit thus facilitates in promoting attention to topics and aspects that are usually undermined in decision-making.
2. SEA can be associated with EA in the sense that the use of this process enhances and operationalizes sustainability principles (Stinchcombe & Gibson, 2001). SEA and EA can therefore be seen as sources which have the application of clarifying and shedding light on sustainability principles and the way they should be applied.
3. It has the potential to improve and enhance the information base for development planning and policy-making (Stinchcombe & Gibson, 2001). The concept of SEA and EA can improve project-level decision-making by introducing more enhanced methodologies and concepts and through the incorporation of the considerations that are usually undermined in decision-making processes. This makes SEA and EA multidisciplinary in nature (Partidário, 1996).
4. It finds reactive methods to enhance the consideration of fundamental problems (Stinchcombe & Gibson, 2001). EA comprises of the holistic functionality to take many different considerations and aspects (environmental, social, economic etc.) into account so that optimum, informed decision-making may commence through the relevant decision-making authorities.
5. It facilitates proper attention to all relevant effects that may be cumulative in nature (Stinchcombe & Gibson, 2001). Most researchers strongly agree that these tools and processes should deal with cumulative effects on a strategic level (Thérivel & Partidário 1996). The problem of vagueness regarding impacts could be removed by making it mandatory to actively give attention to cumulative effects within assessments. SEA and EA allow all assessors to identify and give adequate attention to multiple activities that occur within a specific area. This aspect found within these processes contributes to the overall value of EA.
6. It facilitates better transparency and more adequate and sufficient public participation (Stinchcombe & Gibson, 2001). There are multiple benefits that arise during effective public participation. Ecological knowledge becomes communicated to the public by the decision-makers or vice versa. New overall perspectives can hence be developed (Bregha *et al.*, 1990). Another benefit that arises through this transparency, is an increased confidence in decision-making due to the involvement between the decision-makers and the public (Bregha *et al.*, 1990). Another benefit of this transparency is

that this public involvement promotes better policy understanding and democratic vision and goals.

7. It provides sufficient and effective project-level assessments (Stinchcombe & Gibson, 2001). Thérivel *et al.* (1992) state that:

“SEA can set the theoretical requirements of sustainability in a practical context and establish a framework within which project EA’s can be carried out. This is a considerably broader, and more impressive role for SEA than the limited one generally considered so far.”

European Union cases (regarding decisions and assessments) have been analysed by Nootboom (2000) and the results have shown that sufficient enhancements and fundamental re-orientation regarding decision-making towards sustainability, have occurred. Wood (1999) furthermore explains that development stakeholders of South Africa, strongly believe that EA has altered their way of thinking and their behaviour regarding the environment. All stakeholders are like-minded regarding the fact that the quality of the environment and decision-making are directly improved by the process of EA.

By taking all of these theoretical benefits of SEA and EA into account, it is made clear what we can learn from SEA for EA and that these processes play a fundamental role within modern-day development and the informed decision-making supporting it. Although EA has its costs (Retief & Chabalala, 2009), the theoretical benefits and contributions make it clear that EA is a fundamental tool not only to be used in South Africa but globally as well. The *“Nested egg of sustainable development”* will be discussed in greater detail in the following section.

3.8 The nested egg of sustainable development

In this section, the nested egg of sustainable development, and all other relevant concepts it comprises of will be elaborated.

When referring back to section 3.5 which deals with the value of EA, it is apparent that EA finds its value by aiming to achieve sustainable development in South Africa. A definite link can thus be made between the value of EA and sustainable development, for it is through the adequate implementation of the value of EA that sustainable development may be achieved. This means that by applying EA, development which meets the present needs of all without compromising the needs of future generations, can occur in all systems of the nested egg of sustainable development. It can thus be concluded that there is a clear linkage between section 3.5 (value of EA) and section 3.2.3 (sustainable development and IEM). Because EA

assists the country in achieving sustainable development, the value of EA should be reflected on against the nested egg model of sustainable development.

Because EA plays a significant role in achieving sustainable development in different systems of South Africa, its identified value will be plotted and contextualized against the nested egg model of sustainable development to give context on where the value of EA lies in the model of sustainable development in South Africa. It is necessary to discuss this concept. This model was created by the National Framework for Sustainable Development (NFSD) in 2008 and will now be elaborated.

3.8.1 The systems of the nested egg and the National Framework for Sustainable Development

The NFSD was developed and published in 2008 with the purpose of presenting the national vision that South Africa has regarding the achievement of sustainable development and stipulate all strategic interventions which may help facilitate in reorienting South Africa's path to achieving sustainability (NFSD, 2008). The NFSD also signalled a new way of thinking that was specifically aimed at promoting sufficient and effective stewardship of South Africa's economic, social and environmental resources. It furthermore proposes a national vision, areas of strategic intervention and principles which may guide the development of other documents which builds on this document, such as the National Strategy for Sustainable Development and Action Plan (NSSD1) (2011-2014).

The NFSD (2008) stated that:

“South Africa aspires to be a sustainable, economically prosperous and self-reliant nation that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration.”

According to the NEMA (107 of 1998),

“Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.”

The NFSD (2008) further states that sustainable development is based on two main premises; equity between generations; and adequately maintaining the integrity of natural, human and - financial capital. This will then ensure that social and economic development is reconciled with environmental protection. The NFSD (2008) therefore proposed a systems approach to sustainability in the form of a model where the socio-political system, the economic system and the ecosystem (the environment) is directly fixed onto one another. It is further implied by

the document that these three systems are all held together and governed by the government (fig 3). The model is called the nested egg model of sustainable development.

The 4 main systems the nested egg model of sustainable development comprise of is:

1. *Ecosystem services*
2. *Socio-political systems*
3. *Economy*
4. *Governance*

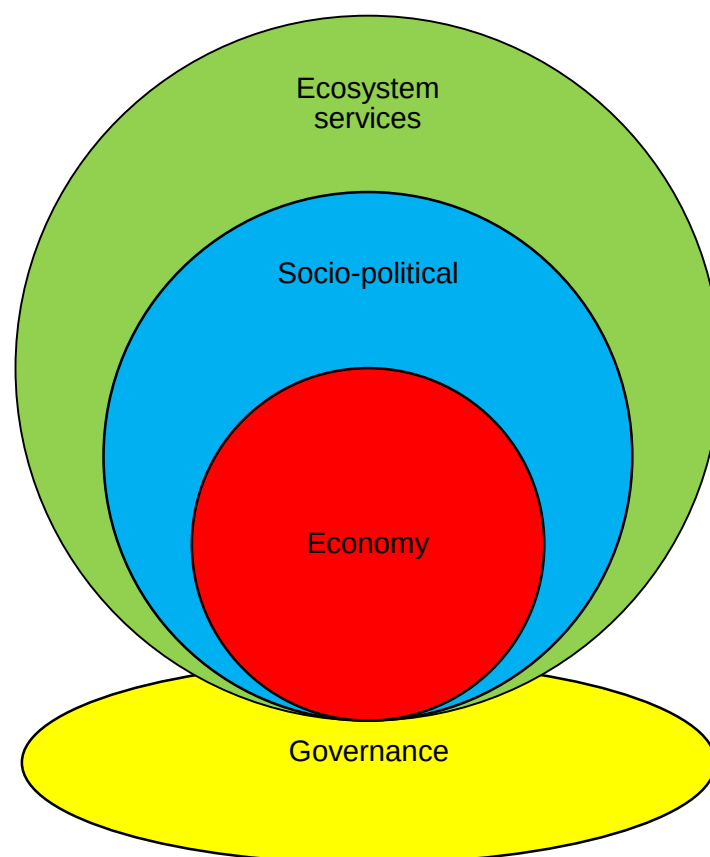


Figure 3: The nested egg of sustainable development.

Each of these systems plays a significant role in achieving sustainable development in South Africa and will be discussed shortly.

3.8.1.1 Ecosystem services

The natural environment provides an essential basis for economic development and growth. Subsistence farming, fisheries, wetlands, rivers, vegetation, animals, medicinal industry and wildlife tourism is dependent on the natural environment and contributes greatly towards the economy of South Africa. Consequently, it is crucial to keep South Africa's biodiversity intact

and thereby ensuring the ongoing provision of its natural resources and ecosystem services, such as natural water purification and the availability of arable land. There is a need for improving aquatic systems, investing in ecosystem services, enhancing air and water quality and the overall value of ecosystems.

3.8.1.2 Socio-political system

This system refers to systems which are composed of both social aspects and political aspects and the constant interaction between them. South Africa is diverse with regards to its people, their standards of living, their income variations and political movements.

3.8.1.3 Economy

This system of the nested egg refers to the focus area which addresses the economic aspects of sustainability and responds mainly to economic development and poverty eradication targets in the Millennium Development Goals (MDGs) and Johannesburg Plan of Implementation (JPOI) goals which focusses on alleviating poverty and altering unsustainable trends within the balance between consumption and production in the economy. There is a need to promote sustainable infrastructure investment, developing skills and capacity building and overall intervention of the current South African economy.

3.8.1.4 Governance

The governance system is the system that keeps all the above-mentioned systems together and underpinned through the implementation of a legitimate regulatory framework. There is an ongoing need to prioritise sufficient governance capacity to ensure effective implementation of policies, programmes and laws. To move in a sustainable direction implies that these systems must be in continuous and mutually compatible integration with one another at all times. Sustainable development thus means that there should always be assurance that these systems are compatible with one another at all times as the key development challenges are solved and met through specific interventions and actions (NFSD, 2008). For this specific study, the above-mentioned interventions and actions refer to EA. EA, and the value it contains is the tool of focus, for it is used as a method of intervention so that the natural environment, social system and economic system is simultaneously enhanced.

EA value and what it provides for the South African government, plays a significant role in guiding South Africa achieve sustainable development. The value of EA will be considered within the context of the nested egg model of sustainable development, for EA and sustainable development is linked with one another and the value of EA can then be reflected on in the light of the nested egg model. This indicates which area of sustainable development different attributes of the value of EA inhabits. The value of EA will furthermore be coupled with the

nested egg model to establish where the value lies in the model of sustainable development and see if expected priorities set out by the NFSD (2008), are met.

3.8.2 The NFSD (2008) priorities

The NFSD (2008) presents five priorities that should be achieved through different interventions and actions and all five of them have a specific area where they fit within the nested egg of sustainable development. The five priorities are:

1. *“Enhancing systems for integrated planning and implementation.*
2. *Sustaining our ecosystems and using natural resources efficiently.*
3. *Economic development via investing in sustainable infrastructure.*
4. *Creating sustainable human settlements.*
5. *Responding appropriately to emerging human development, economic and environmental challenges.”* (NFSD, 2008).”

These can thus be seen as the outcomes that are expected if the value of EA is successful in establishing sustainable development in South Africa. By keeping this in mind, this study can conclude to which extent these priorities are achieved by analysing the perspectives of the EA government officials regarding the value that EA brings and where this value lies within the nested egg model of sustainable development.

3.8.3 National Strategy for Sustainable Development and Action Plan (2011-2014)

The National Strategy for Sustainable Development and Action Plan (NSSD1) (2011-2014) can be seen as another relevant document that echo's the importance of the nested egg model of sustainable development. This document followed and built on the NFSD of 2008 and several other initiatives that have been launched in order to address any issues regarding sustainable development in the country.

The NSSD1 presents a logical understanding of sustainable development and elaborates on the paths that must be taken to achieve it. It furthermore comprises of the Action plan and relevant indicators for the enforcement and adequate implementation of the strategy to achieve sustainable development, while still echoing the relevance of the nested egg model of sustainable development.

The NSSD1 presents the main areas which is in need of attention to develop assurance that a shift can take place towards a more sustainable way of doing things. According to the NSSD1, the following elements have been identified:

- *“Directing the development path towards sustainability*
- *Changing behaviour, values and attitudes*

- *Restructuring the governance system and building capacity*” (South Africa, 2011)

The action plan which forms part of the strategy that is set out by the NSSD1, has been considered and formulated in context with the priorities which were set out in the NFSD of 2008. Although the NSSD1 altered the priorities to a small extent, the priorities still have the same theme of objectives which needs to be achieved. Therefore, all the key interventions, achievable targets and indicators for each priority are presented in the Action plan. The document furthermore presents the twenty headline indicators which have been identified to facilitate in the monitoring of progress with regards to the enforcement of the NSSD1 document.

It is important to highlight and elaborate on the NFSD (2008) and NSSD1 (2011) for two reasons. Firstly, it presents the nested egg model of sustainable development and links the concept of sustainable development with EA. The value of EA, which will be presented in the results section of this study, will be considered within the context of the framework provided by the nested egg model to identify in which system(s) of the model, different attributes of the value of EA fall in and therefore present the linkage between the concept of sustainable development and EA. Secondly, it presents exactly what is expected from South Africa’s vision for sustainable development, which can be used as backdrop against which the value of EA can be discussed and may thus be used as a framework to look back on when results are obtained.

3.9 Conclusion

This chapter dealt with a wide range of different topics and concepts for the purpose of providing background to the study, developing an understanding of the field of study and contextualizing literature with the theme of this study. Concepts such as environmental management, IEM, the IEM toolbox, EA and its applications were discussed to provide context, communicate the importance of this study and communicate what contribution this study will make to the current debate on the value of EA. According to the NFSD (2008) and NSSD1 (2011), Sustainable development is the primary goal which needs to be achieved in South Africa. However, sustainable development can only be achieved through the implementation of adequate actions and strategies. EA is a valuable environmental tool that may be used to achieve this goal in South Africa. Therefore, the main areas of focus for this study is the value of EA in South Africa and presenting this value within the context of the nested egg model of sustainable development. EA and its benefits, which contributes to its overall value, play a fundamental role within South Africa by guiding the country and its government on the path of achieving sustainable development in all systems as defined by the nested egg model and can therefore be used as one of the tools that the government uses

to achieve this sustainable development. The government's perceptions on its value might shed light on the extent to which it contributes to the goal of achieving sustainable development. The results regarding the value of EA from a government official perspective is presented and contextualized with the nested egg model of sustainable development in the following chapter.

CHAPTER 4: Results and discussion

4.1 Introduction

This chapter presents the findings from the 175 open-ended questionnaires that were completed by South African EA government officials. The research findings are discussed against the research questions that were presented in Chapter 1:

1. What are the perceived potential benefits of EA for government from a government perspective?
2. What are the perceived realized benefits of EA for government from a government perspective?
3. What must be done to successfully bridge the gap between potential and perceived realized benefits (where gaps may exist)?

The results are presented in tables that list the main codes and the number of times (frequency) they were mentioned by respondents. The codes are further colour-coded (Table 7) to illustrate how they relate to the different systems of the nested egg model of sustainable development (see Section 3.6.1).

Table 7: The colour-coding system linking codes to the nested egg model of sustainable development.

1. Ecosystem services
2. Socio-political system
3. Economy
4. Governance
5. Falls within all systems

After the results of the three research questions have been presented and discussed, a cross-case discussion will follow which aims to interpret the results as a whole so as to develop a holistic conclusion. The cross-case discussion will then be followed by a discussion on the so-called 'negatives' that were identified during the analysis. More information regarding the 'negatives' will be provided in Section 4.6. The results will now be presented and discussed.

4.2 Perceived potential benefits of EA for the government of South Africa

Responses on the perceived potential benefits of EA were condensed into 14 codes or themes as shown in Table 8. The frequencies of the most prominent codes will be discussed first, followed by a discussion of the codes within the context of the nested egg model of sustainable development.

Table 8: The 14 most mentioned codes within the potential benefits category.

Potential Benefit Codes	Frequency
ECOSYSTEM SERVICES:	
PROTECTION OF BIODIVERSITY AND SENSITIVE ENVIRONMENTAL FEATURES	84
SOCIO-POLITICAL SYSTEM:	
GIVING EFFECT TO ENVIRONMENTAL RIGHT	43
ENVIRONMENTAL EDUCATION, CAPACITY BUILDING AND AWARENESS	10
ECONOMY:	
PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT	81
GOVERNANCE	
LEGAL COMPLIANCE AND ENFORCEMENT	112
DEALING WITH POSITIVE AND NEGATIVE IMPACTS	80
TRANSPARENCY AND ACCOUNTABILITY IN DECISION-MAKING	62
PUBLIC PARTICIPATION PROCESS	40
COOPERATIVE GOVERNANCE	32
GIVING EFFECT TO POLICY AND PLANNING	29
ACCESS TO INFORMATION	22
DEALING WITH ALTERNATIVES	18
DEALING WITH TRADE-OFFS	9
CODES FALLING WITHIN ALL SYSTEMS OF THE NESTED EGG MODEL:	
PROMOTE SUSTAINABLE DEVELOPMENT	84

4.2.1 Code frequencies

The predominant coded theme of discussion was the “*legal compliance and enforcement*” code, which had a total of 112 participants mentioning/elaborating on this specific topic as a potential benefit. This can be seen as the main benefit that contributes to the overall value of EA with regards to its potential benefits that it may bring. The code furthermore falls within the governance system of the nested egg of sustainable development. The second most-mentioned code that was perceived as a potential benefit of EA for government was the “*protection of biodiversity and sensitive environmental features*”. This code fell within the ecosystem services system of the nested egg and was discussed by 84 government officials.

The third most predominant coded theme was the *“promotion of sustainable development”* which was mentioned a total of 84 times.

The 14 themes will now be discussed in further detail and within the context of the nested egg model.

4.2.2 Ecosystem services

The only code that was classified under ecosystem services was the *“protection of biodiversity and sensitive environmental features”*, which will now be discussed.

4.2.2.1 Protection of biodiversity and sensitive environmental features

The concept of protecting the environment was mentioned by most of the government officials as a potential benefit of EA. Words such as *“conserve”*, *“protect”*, *“preserve”* were used to describe the way in which EA may facilitate the well-being of the environment. It was furthermore interesting to see that human well-being was the second most mentioned concept within this theme, besides protection of the environment itself. For example, participant 55 stated that by implementing EA, assurance is given that people are not left with an environment that is harmful to their health, which is a right set out by the Constitution. This resonates with one of the five strategic focus areas of the NFSD (2008) mentioned within section 3.8.2, which deals with the protection of ecosystems and efficient utilization of natural resources. The perception of the participants, which highlighted this information, thus aligns with the pathways as discussed in the NFSD (2008).

Besides the protection of people, EA is seen as a tool that promotes the protection of animal species, sensitive areas (e.g. wetlands) and environmental resources. South Africa is rich in biodiversity, which unlocks economic benefit for the country. It is thus crucial that aspects such as endangered species, high biodiversity areas and aesthetically appealing areas are kept from any harm. Accordingly, EA has the ability to potentially preserve sensitive areas and species for the benefit of society and the economy.

Furthermore, the concept of spatial planning is also coupled by the participants with the concept of protecting the environment. According to some respondents EA plays an important role in the planning phase of protecting the environment. This resonates with what is being stated in the first pathway of achieving sustainable development, which addresses integrated planning and implementation (NFSD, 2008). It is a strategic focus area to enhance planning within environmental management although it is acknowledged as a challenge by some participants.

Other concepts such as, avoiding the extinction of species, was simply mentioned and not elaborated on e.g. *“potential minimization or avoiding the extinction of animal or plant species”*.

These statements might imply that EA is seen as a tool that helps government to avoid the extinction of species due to the fact that the presence of a species will be revealed during the EA process which can assist in avoiding areas where a species is present. This can again be contextualized with the second pathway to achieve sustainable development, which is sustaining the natural environment.

The above-mentioned information is found within the ecosystem service area of the nested egg model of sustainable development, due to the fact that the perspectives involve the environment, the well-being thereof, and sustaining all aspects found within it, such as humans, fauna and flora. Thus, EA finds its value in its potential to adequately sustain and protect the biophysical environment and everything within it. By sustaining the biophysical environment, ongoing provision of ecosystem services may be ensured which will enhance human livelihood, the economy and the continuation of natural environmental processes.

4.2.3 Socio-political system

There were two codes which were categorised under the socio-political system of the nested egg of sustainable development. These codes will now be discussed.

4.2.3.1 Giving effect to environmental rights

Participants mentioned that government is mandated by Section 24 of the Constitution to protect the environment. For that reason EA plays a fundamental role as it is seen as the systematic process that is utilized by government to give effect to Section 24 of the Constitution. It is also mentioned that EA facilitates in guiding development according to the constitutional requirements and therefore upholds the mandate. EA therefore finds its value in the fact that it guides all role players involved in the development process (e.g. developers, CA, stakeholders and the public) by ensuring that all role players are aware of the role that they play in the EA process and what the correct steps are to successfully achieve sustainable development. EA thus gives effect to environmental policy through its application.

Another right that is given effect to through EA, is the protection of people. It was also mentioned in section 4.2.2.1 that the well-being of people is critical, while also being coupled with the health of the environment. The concept of protecting people was mostly simply mentioned in this case. Participants discussed this concept as the protection of humans from negative impacts such as unauthorized developments that might negatively affect them and activities which do not comply with environmental policy. Terms such as “*better living*” and “*human health*” were used throughout (which is mandated by the Constitution).

People in South Africa are often negatively affected by developments and facilities that do not adequately comply with environmental policy and regulations. Examples are facilities which emit dangerous amounts of toxic gasses into the atmosphere which are then breathed in by

residents of close by communities. Another example is developments which have negative effects on the surrounding communities such as exceeding noise levels or compromising natural aesthetics. It was furthermore coupled with the Constitution's responsibility to have a duty of care for the people of South Africa. The human rights of people were also incorporated by the participants within this theme. EA therefore adds value to the fact that it plays a role in informing and making people aware of their right to have access to a safe and healthy environment. This creates fairness and transparency in the process of development.

4.2.3.2 Environmental education, capacity building and awareness

EA provides an opportunity for environmental education around environmental laws in the country. This will lead to a governmental workforce and general public that is well informed on issues pertaining to their surrounding environment i.e. *"EA provides an opportunity for environmental education around environmental issues"*. EA provides a process which gives the opportunity for all people to be informed regarding development projects and the possible impacts that can take place. It is also a requirement of NEMA that all reports that are written for a project, must be submitted to the CA and made public so that all stakeholders are informed, kept updated regarding the status of a project, and given an opportunity to comment on the project. In doing so, government and the public are informed regarding the process of development and the importance of the environment. By enriching people's minds with knowledge regarding environmental issues, more responsible decisions could be reached, thus making EA a valuable tool for the government and the public.

Furthermore, the EA process guides the government on how to serve and create awareness amongst the community through education and engagement. More environmental awareness may be developed based on the findings of EA processes. By communicating general information and legislative requirements to the public, people may become more aware of protecting the environment. Subsequently, it might positively affect their actions and behaviour in this context.

EA adds value as it informs the public on environmental issues. It raises their awareness around environmental issues and as a result, leads to a sort of *"environmental education"*. This code is classified under the socio-political system of the nested egg because it deals with the education and capacity building of societies. Sustainable development can thus be achieved by making everyone aware of environmental issues through the process of EA. Consequently, the more that people become informed and involved in the pursuit of reaching sustainable development the less effort it will require to be achieved over the longer term.

4.2.4 Economy

Only one code could be categorised within this system of the nested egg of sustainable development. The code encompasses the promotion of sustainable economic development and will now be discussed.

4.2.4.1 Promotes sustainable economic development

The concept of economic development was mostly expressed in the context of job creation. It was argued that EA develops a new platform for developing jobs for skilled and unskilled people, thus enhancing the economy. Another potential benefit is the fact that EA assesses projects so that economic benefits are enhanced, while indirect benefits such as service delivery are enhanced. EA seemingly opens many doors with regards to economic progress to not only the government of South Africa but also its people. This can be contextualized with section 4.2.2.1 and 4.2.3.2, which handles human well-being and capacity building. It should, however, be mentioned that EA is not the driver for economic development but that it can add value to development projects by, for example, ensuring that local communities benefit from a proposed development.

Where job creation was discussed, it was made apparent that it could drastically alleviate poverty, improve economic well-being, enhance service delivery and enhance local living standards. In a third world country such as South Africa, problems such as lack of jobs and services are significant problems. EA therefore adds value in the sense that it becomes a profession which could be utilized by different capacities of people e.g. control officers, EAPs, specialists and government officials. By applying the EA process, a platform is developed which has the potential to play a large role in improving human and economic well-being through jobs and sustainable development.

It was furthermore mentioned that EA could significantly contribute to financial growth i.e. *“to collect revenue – by collecting money through applications lodged”*. The government is making money out of application fees. This contributes to the overall growth in governmental revenue. Any offences (such as Section 24G offences) are subject to fines which also further contributes to the revenue increase. According to these comments, it is made clear that EA creates a platform that consists of different requirements and conditions which could be used for financial gain.

It was also mentioned that EA could possibly assist developers in saving money. EA ensures that developments are carefully planned and reduces the risk of externalized costs (e.g. payment for non-compliant development plans or Section 24G fines in cases where development commenced without the necessary environmental authorisation). Others state that EA helps government to function in a more cost-effective manner, where the repetition of

failed development practices is avoided e.g. constructing within a wetland without good mitigation methods. EA, therefore, finds its value in the economic system of the nested egg of sustainable development through guiding good and responsible decision-making and avoiding wasteful expenditure by addressing potential implications before it becomes a real problem.

Lastly, EA ensures that socio-economic issues are accommodated, and social and economic benefits are enhanced. For instance, EA should be authorized with the objective of providing economic benefits for the local community, such as jobs and instituting trusts that the community can utilize for education. In so doing community livelihood and social welfare may be uplifted.

It can thus be concluded that the overall perception of government officials is that EA is seemingly valuable in the sense that it ensures that revenue is generated, responsible decisions – which will save money and avoid wasteful expenditure – are made, some jobs are created, and that human lives are enhanced and kept out of harm's way. All this should thus contribute to sustainable development in South Africa.

4.2.5 Governance

This was the system of the nested egg model of sustainable development which had the most codes linked to it, making governance a significant area with regard to EA benefits. A total of nine codes were assigned to the governance system of the model and will now be discussed in-depth.

4.2.5.1 Legal compliance and enforcement

Participants stated that through EA, the government has the authority and legal right to monitor and audit all developments and/or activities to ensure that developers and/or commissioners comply with all legal requirements. It was also stated that in cases where non-compliance was identified, fines could be issued and in extreme cases prosecution considered. It can, therefore, be interpreted that EA has the potential to provide the government with the opportunity to implement fair governance, which will contribute to compliance from developers and/or commissioners. Through the EA process, strict monitoring conditions could be prescribed and enforced through management plans, in effect promoting and facilitating compliance. This grants the government the necessary authority to govern the actions of developers and already-commissioned facilities.

By enforcement of compliance through EA, the government would be able to monitor authorised developments. Many officials stated that activities may be monitored which will lead to the assurance of environmental compliance. EA thus seemingly provides government with a platform to become aware of all development and activities. EA is therefore beneficial to government as it becomes informed on what developments are occurring within the country

and can furthermore be provided with guidance towards ensuring that development is sustainable. Subsequently, unauthorized activities may be traced and illegal developments minimised. This also links to earlier statements relating to enforcement.

Furthermore, developers are bound by a legal document (EA authorization) which holds them responsible for their actions. Issuing fines or criminally charging non-compliant developers should ultimately ensure compliance. EA furthermore places responsibility on government to ensure that nobody is excluded from the EA process and will potentially limit fraudulent activities. The government also has international legal obligations that it should abide by, EA contributes as a tool which may be utilized by government to ensure that South Africa is conforming to international obligations and targets.

It seems that the overall perception of government officials is that EA potentially allows government the opportunity to identify and thus regulate all types of activities taking place in the country so that proper governance may take place. Through EA government can ensure that specific environments and natural resources are safeguarded while developers are kept accountable for their actions. Any proposed development is thus regulated in terms of NEMA which should facilitate South Africa in conforming not only to local aims but also to international standards of sustainable development.

4.2.5.2 Dealing with positive and negative impacts

There was a clear view amongst the respondents that EA plays a significant role in the process of identifying and dealing with potential impacts. Participants stated that EA has the direct responsibility of assessing potential significant impacts. Others stated that EA is the *“most effective tool that the government can use to identify and assess any impacts”*. It was interesting to notice that most participants coupled the concept of impact identification with mitigation measures. The fact that EA assists in the identification and consideration of impacts in a proactive manner was clearly seen as a valuable characteristic.

The participants made it evident through their answers that EA facilitates the development and implementation of mitigation measures in developments where impacts may be significant. The word, *“impacts”* was mostly recorded with regard to what is being mitigated. According to the participants, this then leads to the preservation of resources. It was furthermore mentioned multiple times that EA grants government the necessary control to effectively mitigate all identified impacts. It was also noted that EA promotes the enhancement of positive impacts. Positive impacts can be defined as those impacts that have the ability to solve various environmental and social problems or enhance current environmental and social aspects (Canter, 1996). It thus ensures government that negative impacts are managed and mitigated, while positive impacts are enhanced.

Some respondents also pointed out the fact that EA promotes the consideration of development and design alternatives as a benefit. EA requires that alternatives be proposed in cases where initially proposed development plans are not adequate for sustainable development. By combining the fact that EA identifies, mitigates and finds alternatives for potential impacts, makes it a significant valuable tool to facilitate government in achieving sustainable development.

Section 24 of the Constitution requires government to ensure that the general public is protected from issues that might affect their health and well-being. Participants made it clear that EA adds value in assisting government in the process of minimising the threats posed by such issues and address concepts such as climate change and global warming by managing negative impacts and enhancing positive impacts.

4.2.5.3. Transparency and accountability in decision-making

Participants state that EA ensures that the holder of an EA is held accountable for non-compliance by implementing recommendations made by specialists in EAs. Therefore, the applicant is held accountable for any significant damage caused to the environment. EA thus supply developers with the “*Duty of Care*” responsibilities. Increased accountability leads to a larger reduction in environmental liabilities, which makes EA an effective and valuable tool to be used in compliance monitoring so that decision-making may be governed and informed.

Furthermore, the concept of transparency in decision-making was merely mentioned by the participants and not elaborated anywhere in the transcripts. However, transparency is an important concept within decision-making, for it contributes to overall fairness. Transparent decision making ensures the public’s trust in the government. EA ensures that all opinions and concerns are considered during the process to ensure that everyone is taken to account and considered in decision making.

It was made evident by the government officials that informed decision-making is a fundamental potential outcome of applying EA. Words such as “*reliable*”, “*fair*”, and “*good*” are used to describe the manner in which EA may enhance initial decision-making. It is furthermore made apparent that better planning is coupled with informed decision-making. There can be concluded that EA assists government significantly by facilitating better-informed decision-making and sets the standard of criteria required for effective management so that applicants, and EAPs, may be presented with a sound procedural process to ensure that sustainable development is attained.

4.2.5.4 Public Participation Process

Participants stated that through EA, multiple benefits arise through the implementation of public participation processes. Firstly, it assists government in ensuring that development

does not compromise people's direct environment i.e. "*ensuring public health*". Secondly, the process raises awareness on the basic rights of South African citizens. Thirdly, a voice is given to the public which means that all thoughts and opinions of the public, must be taken into consideration when decisions must be made by government. This ensures an integrated process of informed decision-making and avoiding conflict.

It can thus be interpreted that through EA the public and all relevant stakeholders are taken into consideration. By taking the public and all stakeholders into consideration assurance may be given that the needs of those who will be affected by any type of development are well addressed in decision-making, enabling development to commence in a community aligned manner. As a result, the path of achieving sustainable development is made much easier by eradicating any conflict through effective communication, assisted through EA.

4.2.5.5. Cooperative governance

It was stated by participants that EA has the potential to minimise the degradation of the environment through it's the promotion of cooperative environmental governance across different sectors and different spheres of government. The three sectors that should be balanced, is the environment, social aspects and economics. EA promotes a balance between these three sectors and therefore, assists government in making the correct decisions so that the environment is favoured, while socio-economic benefits are enhanced in South Africa.

Furthermore, EA facilitates government significantly in avoiding any environmental compromise of sustainable development, but still includes economic development and societal aspects. Other participants stated that EA is responsible for interlinking these three sectors of sustainable development so that sufficient results may be obtained. EA, therefore, adds value by leading government to sustainable enhancements such as conflict resolution in government structures and inter-governmental coordination, which makes it a significant tool. This helps to harmonize internal processes and the speedy resolution of the conflict that may arise between either government itself or against the public, which will facilitate in cooperative governance between all relevant parties. By applying EA, the resistance between different parties is solved while internal cooperation is enhanced.

4.2.5.6 Giving effect to policy and planning

Participants state that EA is important for the government because it feeds into other environmental management tools. For instance, it indicates where SEAs and EMF's will be needed in the future or whether development is in line with a specific IDP. Furthermore, it facilitates planning due to the fact that EA assists government in the identification of development trends, that they can respond to through proper planning and tool development. It may thus be interpreted that EA allows the government to adequately plan for the future.

Through efficient planning the path to sustainable development is made much easier. This also helps with avoiding unplanned mishaps such as flaws in development and/or commissioning procedures which leads to wasteful expenditure. EA, therefore, adds value by contributing to the planning process.

4.2.5.7 Access to information

EA in principle provides government access to updated information on issues such as fauna, flora, socio-economic circumstances, potential threats, environmental aspects and human aspects. Through adequate utilization of relevant environmental information, informed decisions may be made.

According to government officials, specialist studies play a large role in the information aspect of EA. By making informed decisions through the use of specialist studies waste in financial and time expenditure will be avoided i.e. *“the government can always know the state of the environment and what activities are happening in certain areas”*.

It seems that the overall perception of government officials is that better understanding regarding the state of the environment may be achieved by utilizing information supplied in EA reports. More people will have an understanding (including the government and public) of the natural environment and its processes. It is a requirement that all written reports of the EA process be circulated to the general public, which furthermore contributes to information access. Therefore, EA adds value by determining and communicating what the state of the environment is through access to information. This information is then used to make sustainable and informed decisions.

4.2.5.8 Dealing with alternatives

Participants communicated that EA assists government in identifying appropriate areas that could be utilized for development. EA supports the process of delineating geographical areas that contribute to sustainable development by anticipating potential impacts. This facilitates avoiding areas of importance during development.

It seems that the overall perception of government officials is that EA provides alternatives by giving the government a chance to take all relevant information into account so that better ways to sustainably develop may be considered. This will have less of a negative impact on the environment. As mentioned in section 4.2.5.2, EA requires that alternatives be proposed in cases where initially proposed development plans are not adequate for sustainable development. EA, therefore, promotes that applicants should consider more sustainable methods and materials usage during developments.

4.2.5.9 Dealing with trade-offs

Participants stated that EA adds significant value by establishing a balance between development and environmental protection. Until a balance is developed between these trade-offs, EA may allow government to effectively assess proposed developments with regards to their environmental, social and economic benefits and losses. In South Africa, there is a fine line between economic growth and degrading the natural environment. It seems that the overall perception of participants was that EA possesses an incentive of sorts in dealing with these trade-offs so that the best balance can be achieved. EA, therefore, gives a platform for governance to be implemented so that sustainable development may be achieved.

4.2.6 Codes falling within all systems of the nested egg model

When referring back to section 4.1, it is mentioned that there are codes that are not confined to only one system of the nested egg model of sustainable development. The code that could reside under all systems, was the promotion of sustainable development. This code will now be discussed.

4.2.6.1 Promote sustainable development

When analysing the underlying quotations of the code the key messages being conveyed became apparent in this context. In most cases sustainable development was only mentioned by government officials, e.g. *“provides a framework within which sustainable development can be attained”*. Sustainable development was described by some respondents as a way of benefiting the current generation as well as future generations. Officials further connected sustainable development with the use of resources and overall land-use. Other officials also stated that sustainable development is the achievement of a balance between the environment, social aspects and the economy. Lastly, sustainable development is coupled with equitable, fair and informed decision-making. It was stated that all the above-mentioned could be facilitated through the application of EA.

It may be said that EA adds value as a tool that considers a broad spectrum of issues with a goal of achieving sustainable development outcomes. In a third world country such as South Africa, it is important to manage all available resources at a responsible level so that all may benefit from it. By regulating supply and demand regarding environmental resources, constitutional obligations may be fulfilled, a balance could be established between all systems of the nested egg of sustainable development and fair/informed decisions may be made. By implementing EA efficiently, sustainable development in all systems of the nested egg model may be realized. This makes EA crucial to implement during the pursuit of achieving sustainable development.

4.2.7 Conclusion

By interpreting what government officials state regarding the potential benefits that EA brings to the government of South Africa, it is evident that EA is perceived as a tool that offers a variety of potential benefits. In the context of the overall aim of the study, 14 main codes or themes were identified which communicates the potential value that EA may bring to the government. In terms of frequency it was found that the top five potential benefits mentioned most often by government officials were:

- Legal Compliance and enforcement (112)
- Protection of biodiversity and sensitive environmental features (84)
- Promote sustainable development (84)
- Promote sustainable economic development (81)
- Dealing with positive and negative impacts (80)

The hierarchy of the frequencies communicates the most important different forms of value which EA may potentially bring for government. It was found that these individual codes all occupied a different system of the nested egg model of sustainable development. The system that was discussed the most (through nine codes) regarding EA benefits was the governance system. This suggests that EA can potentially assist government in achieving effective and transparent governance, a prerequisite for any effective and trustworthy government. Governance is a current problem in South Africa and by enhancing legal compliance, enforcement, transparency, decision-making, public participation, cooperative governance and access to information, the situation might be improved.

Furthermore, the socio-political system of the nested egg model comprised the second most codes (through two codes). By giving effect to environmental rights and building on social aspects such as education and capacity building, this system may be enhanced. These codes, together with all the other codes, communicated the significance and value that EA has in directing the government into a sustainable direction of development in all systems of the nested egg model.

4.3 Perceived realized benefits of EA for the government of South Africa

The perceived realized benefits obtained from the questionnaires were condensed into 13 main codes. Under each codes, there were numerous statements which reflects the frequency number of each code. Table 9 presents the 13 mentioned and/or explained coded concepts for the research question on the benefits of EA that were perceived as realized.

Table 9: Thirteen most mentioned coded concepts within the perceived realized benefits category.

Perceived Realized Benefit Codes	Frequency
ECOSYSTEM SERVICES:	
PROTECTION OF BIODIVERSITY AND SENSITIVE ENVIRONMENTAL FEATURES	80
SOCIO-POLITICAL SYSTEM:	
ENVIRONMENTAL EDUCATION, CAPACITY BUILDING AND AWARENESS	9
GIVING EFFECT TO ENVIRONMENTAL RIGHT	8
ECONOMY:	
PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT	50
GOVERNANCE:	
LEGAL COMPLIANCE AND ENFORCEMENT	57
DEALING WITH POSITIVE AND NEGATIVE IMPACTS	26
PUBLIC PARTICIPATION PROCESS	25
GIVING EFFECT TO POLICY AND PLANNING	10
DEALING WITH ALTERNATIVES	9
TRANSPARENCY AND ACCOUNTABILITY IN DECISION-MAKING	8
COOPERATIVE GOVERNANCE	6
DEALING WITH TRADE-OFFS	1
CODES FALLING WITHIN ALL SYSTEMS OF THE NESTED EGG MODEL:	
PROMOTE SUSTAINABLE DEVELOPMENT	24

4.3.1 Code frequencies

The most predominant coded theme of discussion was the “*protection of biodiversity and sensitive environmental features*”, which had a frequency of 80 participants mentioning/elaborating on this specific theme. This can be seen as the main benefit that contributes to the overall value of EA with regard to its benefits that are perceived as realized by government officials. It is furthermore observed that this code falls within the ecosystem service system of the nested egg of sustainable development. It is satisfying to see that the only system that involves the protection of the natural environment is discussed the most and communicates a positive message about the contribution of EA to the management of the natural environment.

The second most discussed code was that of *“legal compliance and enforcement”* with a frequency of 57. It is significant that legal compliance and enforcement is seen as an important realized benefit as it is often seen as something that is undermined in practice. This code falls within the governance system of the nested egg model of sustainable development.

The third most discussed code was *“promote sustainable economic development”*. The well-being of the South African economy plays a large role in sustainable development in South Africa and should, therefore, be prioritized. Note that this code inhabits the economy system of the nested egg model of sustainable development.

All of the codes listed in Table 9 and the statements that fell under them were interpreted during an in-depth analysis. The key perceptions of the government officials with regard to the perceived realized benefit of EA will now be discussed

4.3.2 Ecosystem services

There was only one code that fell in this system of the nested egg model of sustainable development. This code which represents the perceived realized benefit with regards to ecosystem services will now be discussed.

4.3.2.1 Protection of biodiversity and sensitive environmental features

Participants stated that EA benefits government greatly due to the fact that it supplies a process to preserve sensitive habitats and their associated ecosystem goods and services, leading to less dependency on *“hard engineering systems”*, which can also have a detrimental impact on the environment. The concept was simply mentioned, but it is made clear that EA creates a baseline for future developments and ensures that different technologies are addressed to ensure that effective environmental protection is in place. It is furthermore interesting that the well-being of humans was also mentioned quite extensively. By studying these comments, a strong interdependency between humans and the environment could be identified. Enhancing one of these enhances the other and *vice versa*. Environmental health is therefore coupled with societal health. This is also shown in the nested egg model of sustainable development where socio-political systems are found within the ecosystem service sphere. There can be concluded that humans make out a fundamental part of the environment itself and EA adds its value by aiming to preserve all aspects of the environment.

The role of EA in the management of resources and protection of species is furthermore explained by participants, in addition to the general protection of the environment. EA is seen as a very important tool, assisting in the protection of sensitive environments and species. In the process EA contributes to the protection of biodiversity and important ecological infrastructure/services. Although the concept of preserving natural resources was mostly only mentioned, it was clear that respondents felt that EA offers significant benefits to government

due to the fact that it provides a platform that assists in the protection biodiversity, sensitive features in the environment and natural resources in general. By adequately managing resource use, sustainable development may be achieved. Some examples were mentioned how resources may be preserved such as the development of “*clean energy facilities*”. Other examples entail the “*refusal of developments that may harm the environment*”. EA thus facilitates the government to manage resource use and the impact of developments on natural features.

Therefore, it can be concluded that it was the view of most participants that EA assists government in the task of protecting biodiversity and sensitive environmental features.

4.3.3 Socio-political system

The socio-political system found in the nested egg model of sustainable development inhabited two codes. These codes which represent the perceived realized benefits of EA with regard to socio-political aspects will now be discussed.

4.3.3.1 Environmental education, capacity building and awareness

Participants stated that community well-being and environmental education is a by-product of the adequately implementation of EA during development processes. More people become educated on business development, the environment and the EA process itself so that all may contribute to the pursuit of achieving sustainable development. EA, therefore, has the potential to educate the general public, the government, and any other relevant role-players. This education leads to awareness, which could then furthermore contribute by changing people’s actions regarding concepts such as pollution and sanitation. Education that changes initial ways of thinking will thus enhance overall sustainable development. EA is therefore valuable in the sense that it creates a platform where all could be educated and informed regarding the environment and its importance, while also promoting sustainable development. This approach may develop a sense of a joint goal where no one is excluded.

Lastly, participants communicated that skills development also takes place through education and awareness. EA can be seen as a profession and skills may be developed within this field through formal studies or getting experience in the field e.g. “*projects*”. EA, therefore, adds value in education, awareness, enriching lives through skills development and broadening capabilities, which contributes greatly towards achieving development that is sustainable in all systems of the nested egg model.

4.3.3.2 Giving effect to environmental right

Respondents stated that there are environmental laws that govern development and by following these laws – and their associated tools, such as EA – government is able to carry out their mandate, knowing that the environment must be protected without compromise. It

can be interpreted that EA is the tool which assist government in its mandate of protecting and managing the environment. Furthermore, participants stated that the protection of people is a right that is being given effect to through the implementation of EA. EA ensures that the rights of people are protected and plays an important role in ongoing environmental law.

EA thus aims to preserve the environment and the people living in it by acting as a tool that government can utilize. Hence, EA adds value in facilitating the pursuit of achieving sustainable development by helping the government fulfil the Constitutional mandate of Section 24 to protect the environment and the people living in it. EA plays a significant role in enhancing the socio-political system of the nested egg model.

4.3.4 Economy

This system of the nested egg model of sustainable development was inhabited by one code. This code which represents the perceived realized benefits with regards to the economy will now be discussed.

4.3.4.1 *Promotes sustainable economic development*

Some participants stated that economic benefits can be seen at most important benefits that EA brings to government. It was the view of many respondents that the economy gets boosted by EA due to developments being authorised and investments from independent sources. Once the development is commissioned, more money will be generated which will enhance economic development even further. This view could be challenged as EA does not initiate developments, and if EA did not exist, developments would still take place. It can however be argued that some investments by environmentally conscious investors and funders is more likely because of the environmental legislation and the EA system in South Africa.

Participants stated that another realized benefit that contributes to sustainable economic development is job creation. In some cases, EA assists the government and the economy of South Africa by addressing unemployment, through projects and findings related to the outcomes of the EA process.

Participants further stated that financial growth is another realized benefit of EA. This benefit can be seen as supplementary to the previous benefit (job creation). It can be interpreted that EA facilitates overall financial growth due to the fact that revenue is generated and collected when applicants need to pay application fees whenever an application is lodged. This money that needs to be paid, goes to the government. Other ways money is obtained through EA is through the payment of fines in cases such as 24G applications, where unlawful commencement of development has taken place. BA reports and EA reports, which forms part of the EA process, as well as assigning environmental control officers (ECO) for compliance

monitoring and auditing also have fees involved. This contributes to the financial growth of the economy and government.

All of these benefits have a large effect on the path of achieving sustainable economic development in South Africa. The most significant benefit of EA is that it aims to guide development in such a way as to ensure that natural resources are managed in both an environmentally and economically sustainable manner. The above-mentioned benefits that fall within the promotion of sustainable economic development, contributes significantly to the value which EA provides for the government.

4.3.5 Governance

This system of the nested egg model of sustainable development was represented by most of the identified codes of the second research question. The codes which represent the perceived realized benefits with regard to governance will now be discussed and interpreted.

4.3.5.1 Legal compliance and enforcement

Participants communicated that EA facilitates government in monitoring and enforcement through processes such as auditing and compliance monitoring. Through these processes, laws protecting the environment are implemented. Through EA, the government is able to identify problematic areas and propose improvements or alternatives through legally binding documents i.e. *“It has allowed the government to be able to enforce laws in matters concerning the environment”*.

EA assist in carrying out enforcement through tools such as EMPs and auditing checklists. These tools set out all the necessary conditions that should be complied with from the beginning of construction, its operation and even when a development gets decommissioned. In cases where conditions are not complied with, developers are required to explain their reasons for non-compliance. EA therefore holds value for government by promoting the adherence of developers to best practice guidelines through the enforcement of compliance monitoring. government can therefore monitor the actions of developers, and ensure that development takes place in such a way that detrimental impacts to the environment are avoided. Developer accountability is hence generated through compliance requirements and the relevant party (applicant) is held accountable for any potential transgressions.

Other benefits such as making government aware about the latest international standards and trends are also prevalent within this theme. According to some respondents government is often made aware about new trends and international best practices through EA processes. This new learning assists government in revising and updated their practices and requirements, i.e. improves legal requirements.

The implementation and enforcement of policy are generally regarded as one of the weak points in the regulatory system of South Africa. This seem to not be the case for EA as the overall perception of government officials is that EA is succeeding in guiding development in the country into a more sustainable direction through legal compliance and enforcement.

4.3.5.2 Dealing with positive and negative impacts

Participants stated that EA assists in the identification of possible impacts before an activity commences. This is mostly achieved through “*baseline and specialist studies*”. If a specialist can prove through study that the area is not adequate for a development because of environmentally assessed reasons, the development may be refused, thus effectively saving the environment. Participants further state that another way in which EA deals with impacts is through the development and utilization of mitigation measures associated with envisaged impacts. EA, therefore, assists government in the formulation of mitigation measures that can be specified through conditions that are enforceable and legally binding. The overall perception of government officials is that a key benefit of EA is that it assists government in the identification and effective mitigation of impacts. The value of EA is therefore that it informs government on envisaged impacts of developments and how they should be managed, effectively contributing to the goal of sustainable development.

4.3.5.3 Public Participation Process

Respondents stated that the public participation phase of EA is beneficial to government as it facilitates interaction with the general public and provides the public with a platform through which they can express their views and concerns related to a particular development. This not only assists government in fostering a healthy relationship with the public, but it also gives a voice to the public. Another benefit that was voiced is that this process helps EAPs and applicants to proactively identify potential issues and deal with it, in partnership with stakeholders, before actual development commences. It can therefore be said that the public participation process in EA promotes engagement and communication between all stakeholders, EAP's and government itself, which is a valuable benefit for government.

4.3.5.4 Giving effect to policy and planning

It was the view of some participants that EA facilitates the implementation of policy and contributes to environmental planning conducted through other environmental management tools such as EMFs, which maps out environmental sensitivity. Tools such as SEA and SDFs are also furthermore used as developing tools which help guide and inform development areas. Specialist studies (e.g. wetland assessments, heritage assessments and ecological studies) also play a large role and should be integrated with these other environmental management tools. Some participants argued that EA interacts with some of these tools essentially contributing to planning processes and policy implementation.

4.3.5.5 Dealing with alternatives

Participants stated that one very important realized benefit of EA for government has been its ability to provide better alternatives for future planning. EA allows for alternatives to be considered to ensure that neither the biophysical or socioeconomic environments are compromised. EA, therefore, assists in providing alternatives to mitigate the envisaged impact of a development. These impacts and alternatives are usually informed by specialist inputs. This subsection could be directly contextualized with subsection 4.3.5.2, subsection 4.3.5.3 and subsection 4.3.5.4 because these further benefits also focus on seeking alternatives in the light of sustainable development. It is crucial in a third world country such as South Africa that the best decision is made the first time round as financial resources are limited. Respondents stated that EA adds value by proposing informed alternatives which government can consider in the decision making process.

4.3.5.6 Transparency and accountability in decision-making

Some participants stated that EA ensures that the decision making process is transparent and fair as decisions, agreements and all documentation are made public. This relates to subsection 4.3.5.3 which deals with the public participation process, as the process promotes transparency in decision-making. EA furthermore contributes to the process of accountable decision-making by assisting government in identifying which projects may take place in accordance with the protection of the environment although some participants did acknowledge that this is not always the case. The EA process is beneficial in that it provides government with a set roadmap for transparent and sound decision making as outlined in the EA Regulations. The prescribed process also allows affected parties to appeal any decision made by government, promoting the concept of accountable decision making.

4.3.5.7 Cooperative governance

The concept of cooperative governance was only briefly mentioned as a realized benefit but not elaborated. However, the integration of the four systems (environmental, socio-political, economy and governance) of the nested egg model was apparent and mentioned throughout the questionnaires and is partially achieved through cooperative governance. It could be suggested that EA adds value by facilitating this cooperation and the integration of all systems during the planning phase of development and therefore informs proper decision-making, while also improving the relationships and work done between all role-players (e.g. developers, stakeholders, public and organs of state).

4.3.5.8 Dealing with trade-offs

EA is a valuable tool for dealing with the trade-offs between development needs and environmental protection. Through specialist input and consultation with the general public important information becomes available which assists government in first understanding

possible conflicts and secondly dealing with conflicts through trade-offs. Conflicts can rarely be totally avoided, but the contribution of EA in dealing with these types of conflicts proves to be valuable for government.

4.3.6 Codes falling within all systems of the nested egg model

Only one code was considered to fall within all systems of the of the nested egg model of sustainable development. The code which represents the perceived realized benefits with regards to a combination of all the systems of the nested egg model will now be interpreted and discussed.

4.3.6.1 Promote sustainable development

The concept of sustainable development was simply mentioned by most respondents with little elaboration on the topic. However, some did mention that EA benefits government because it facilitates the protection of the environment for future generations. According to participants, sustainable development thus *“meets the needs of the present without compromising the needs of future generations”* i.e. enhancing development while still protecting natural resources. From the responses it could be argued that EA is seen as a mechanism through which government is actively working towards the goal of sustainable development.

4.3.7 Conclusion

In this section, the realized benefits of EA for the South African government as perceived by government officials was presented, discussed, and interpreted. In summary, it is important to emphasise the key learning points from the discussion. By interpreting what government officials stated regarding the perceived realized benefits of EA for government it was clear that EA offers a wide variety of realized benefits. Frequency-wise, the top five benefits which were mentioned and/or discussed the most by government officials were:

- *Protection of biodiversity and sensitive environmental features (80)*
- *Legal compliance and enforcement (57)*
- *Promote sustainable economic development (50)*
- *Dealing with positive and negative impacts (26)*
- *Public participation process (25)*

The hierarchy of the frequencies communicates the most important different forms of perceived realized benefits which EA may hold for government. It was found that these individual codes all inhabited different systems of the nested egg model of sustainable development. This suggests that the value of EA is prominent in many different areas and systems of the country. The system that was discussed the most (through eight codes) with regard to EA benefits, was the governance system. This confirms that the EA process contributes significantly to governance in South Africa which is also a fundamental system in

the nested egg of sustainable development. EA plays a significant role in enhancing a variety of aspects of governance such as legal compliance, enforcement, transparency, decision-making, public participation, cooperative governance and access to information. The socio-political system was the system of the nested egg which comprised of the second most codes (two codes). By giving effect to environmental right and building on social aspects such as education and capacity building, EA is assisting in the enhancement of this system of the model. The rest of the systems of the nested egg model was only represented by single codes as seen in Table 9. These codes, together with all the other codes, communicated the perceived realized value that EA has in helping the government into a more sustainable direction of development in all systems of the nested egg model.

4.4 What should be done to successfully bridge the gap between perceived potential and realized EA benefits

Possible ways in which the gap between perceived potential and realized benefits could be bridged was condensed to 14 codes. The 14 mentioned and/or discussed codes within this research question, is presented in Table 10 and it should be noted that each concept or theme of importance is represented by a single code.

Table 10: The 14 coded concepts representing ways in which the gap between potential and perceived realized benefits could be bridged.

Ways To Bridge The Gap Codes	Frequency
ECOSYSTEM SERVICES:	
PROTECTION OF BIODIVERSITY AND SENSITIVE ENVIRONMENTAL FEATURES	3
SOCIO-POLITICAL SYSTEM:	
ENVIRONMENTAL EDUCATION, CAPACITY BUILDING AND AWARENESS	108
ECONOMY:	
PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT	27
GOVERNANCE:	
LEGAL COMPLIANCE AND ENFORCEMENT	63
COOPERATIVE GOVERNANCE	39
PUBLIC PARTICIPATION PROCESS	29
COMMUNICATION	28
GIVING EFFECT TO POLICY AND PLANNING	26
IMPROVING COMPETENCE	24

TRANSPARENCY AND ACCOUNTABILITY IN DECISION-MAKING	13
DEALING WITH ALTERNATIVES	13
REVIEWING	12
ACCESS TO INFORMATION	12
DEALING WITH TRADE-OFFS	2

4.4.1 Code frequencies

The most predominant code was the “*environmental education, capacity building and awareness*” code, with a frequency of a 108. It was the view of most government officials that this was the best way to bridge the gaps between potential and realized benefits. Education is one of the most important tools which can be used to achieve sustainable development as it equips people of different capacities to learn new things and most importantly, to learn from mistakes. Education, therefore, enriches human lives and their decisions which affect the environment. This code fell within the socio-political system of the nested egg model of sustainable development. The second most mentioned and/or discussed code was the “*legal compliance and enforcement*” code, which was mentioned 63 times by government officials and discussed as a method of bridging any gaps between the potential and realized benefits that EA faces. Only through adequate and sufficient enforcement of environmental policy can change become noticed. This code fell within the governance system of the nested egg model of sustainable development. The third most mentioned and/or discussed code was that of “*cooperative governance*”, which was mentioned 39 times and fell within the governance system of the nested egg of sustainable development.

All of the codes in Table 10 and the associated quotations were interpreted during an in-depth analysis of these quotations. The main perceptions of government officials with regard to the bridging of the gap between potential and realized benefits will now be discussed and will also be interpreted from the author’s point of view in terms of EA value and the nested egg model of sustainable development.

4.4.2 Ecosystem services

4.4.2.1 Protection of biodiversity and sensitive environmental features

To contribute to the protection of biodiversity and sensitive environmental features more effectively, participants called for EA to become more active or dynamic, seeking not only to instruct, but actually to ensure that the environment is protected. According to participants, once EA starts to become less passive and generic, desired results will be realized. These views suggest that the EA process should be actively used throughout a development process and not just during the decision making phase. To achieve the aforementioned EA should shift

from simply being a passive guide to becoming a tool which is active and intentional, especially on issues such as biodiversity.

4.4.3 Socio-political system

4.4.3.1. *Environmental education, capacity building and awareness*

Participants stated that all role players in EA (public, EAPs, developers and CA) have to be well educated on the importance of the environment and understand the potential impacts of envisaged activities. The general view of participants was that environmental education (regarding the environment and the EA process) should be maximised in order to achieve effective results. Programs and workshops may be developed and promoted to enhance overall understanding and knowledge on the environment.

It was stated by some participants that people and developers are generally not aware of their rights and responsibilities insofar as environmental issues are concerned. To this end, awareness may be brought through education, awareness programs and workshops. Only when the people are informed, will they be able to actively participate in processes and will adequate decision-making be achieved.

Another way to bridge the gap is to avoid misinterpretations of regulations and reports. Participants state that *“different districts/provinces interpret the regulations differently and therefore write-up different conditions”*. Some participants raised the concern that the writing of regulations in formal language is a hindrance as the public gets lost in translation. The conditions should be simple, practical and enforceable. Regulations and conditions must therefore be uncomplicated. Some participants further argued that *“one integrated environmental system”* should be set in place to avoid misinterpretations.

Participants also stated that another way to bridge the gap is by changing the mindset of role players. Unfortunately, many people (developers, municipalities, politicians) do not believe that the EA process is actually beneficial for the people and the environment. Their mindsets should be changed because EA has generally been seen as a stumbling block for developers. Participants state this could be rectified by mainstreaming projects and making developers aware of their actions.

Lastly, participants stated that there is a lack in capable staff within government departments. There is thus a dire need for better trained staff to ensure compliance and monitoring. government must, therefore, invest in broadening the resource base of competent environmental officers. It seems participants perceive that environmental education, awareness, simplifying regulations and building a capacity is a crucial way of bridging the gap between potential and perceived realized benefits.

4.4.4 Economy

4.4.4.1 Promoting sustainable economic development

A need for proper financing to ensure the smooth running of the EA process was flagged as an important prerequisite for EA to operate effectively and add value to government. It was further stated funding should be used by government to invest in more specialized skills, a well capacitated workforce and effective planning. Funds may also be allocated to education and awareness (as discussed in 4.4.3.1) which could contribute to more effective EA processes. Many participants argued that finances play a vital role in achieving sustainable development through EA. However, some participants stated that the reality is that tax payers are doing their part, but what the government actually do with the tax money, is still unclear. Problems such as corruption should be confronted and addressed so that finances allocated for EA funding, may be used sufficiently to realize all potential benefits.

4.4.5 Governance

4.4.5.1 Legal compliance and enforcement

Participants argued that adequate government capacity is needed if compliance is to be ensured. Compliance may further be ensured by allocating sufficient resources to compliance monitoring, enforcement and EA follow-up. Some participants went as far as to state that EA should be moved out of government and moved to an external and independent agency, which will provide an incentive for compliance. This implies that some officials are not satisfied with the way government operates with regard to EA and that issues such as capacity will have to be addressed for potential benefits to be realized.

Participants further stated that enforcement is a critical concept that should be implemented much more stringent. By developing enforceable conditions that are binding and maintainable, the gap between potential and realised benefits may be bridged. This can be achieved by increasing and publicizing enforcement against illegal developments. Through implementation and enforcement, government could unlock the full potential of EA.

Participants further argued that legal compliance and enforcement can be more effectively achieved by ensuring monitoring. government should enhance the monitoring of projects and developments. Conditions set out must be enforceable so that the developers are forced to implement them. By doing so, this will reduce the cases of Section 24G applications. Monitoring and follow-up should, therefore, be strengthened. Through constant monitoring, compliance will be improved.

More effective legal compliance and enforcement can furthermore be facilitated by strategies such as the polluter-pays principles. Whoever is responsible for environmental degradation must be identified and forced to rehabilitate affected areas. Some argue that politicians should

be penalised for making poor decisions that lead to negative impacts which goes against the norm of them typically being excused due to their relatively safe and protected positioning in society.

It can be derived from the above discussion that more stringent governmental control over developments is needed to achieve compliance and enforcement. government, and its relevant *“foot soldiers”* have the responsibility to put stricter measures in place which will favour the environment and not the government. Some participants stated that *“government should stop looking at financial figures and start taking what they have written in Section 24 of the Constitution into consideration”* – stringent assessment and control must be implemented by government. Scare tactics such as polluter-pays principles can once again be applied in scenarios such as these.

Another way of bridging the gap between potential and perceived realized benefits is by promoting the refusal of EA in cases where non-compliance is identified. It is important for government and assigned EAPs not to shy away from the responsibility to follow-through. Participants stated that environmental law and the EA process must be applied evenly to all, regardless of who the applicant is, what they are developing and how much money they have to invest. This should be addressed by internally establishing worker's integrity and ethics and intervening when necessary to maintain the desired work culture.

4.4.5.2 Cooperative governance

It was mentioned by participants that improved cooperative governance would significantly address the gap between the potential and realized benefits of EA. Participants stated that one way to assist is by improving cooperative governance through the implementation of an *“integrated environmental system”*, which can assist in ensuring that implementation of legislation is kept consistent across different sectors and spheres. Another proposed way of bridging the gap is through the integration of government Departments. Proper interaction between Departments will ensure that the EA process proceeds with minimal conflict whilst upholding cooperative governance. In conclusion, the information implies that there is a dire need for simplification of regulation alongside the integration between all systems of the nested egg model of sustainable development. This integration also refers to the integration between different Departments and organs of state. This will enhance communication, the procedural flow of EA and overall agreements, which should lead to more realized benefits and enhance sustainable development.

4.4.5.3 Public Participation Process

Participants stated that the public participation process should be promoted to all relevant role players of the EA process. It can be argued that integrated decision-making may take place

by continuously engaging with the public, all I&AP's, relevant stakeholders and developers. EA grants the opportunity to comment on development that takes place, which means that everyone can practice their responsibility to protect the environment. This will ensure fair and transparent decisions where everyone is taken into account. This will lead to less friction and conflict during the EA process and smooth out the journey which leads to sustainable development.

4.4.5.4 Communication

This subsection could be directly contextualized with subsection 4.4.5.2 and subsection 4.4.5.3, which handles cooperative governance and the public participation process. Respondents argued that more communication is needed amongst developers, stakeholders, ECOs and CAs in order to get clarity and agreement on how to implement a project before non-compliance is evident. If all role players effectively consult with one another some of the potential benefits of EA is more likely to be realised.

4.4.5.5 Giving effect to policy and planning

Participants made it apparent that EA must be part of the planning process from the outset i.e. *"it should actually be implemented even if no environmental authorisation is required"*. People should realize that it should be part and parcel of what determines the feasibility of a project. A large number of participants argued that other environmental management tools should be incorporated into EA planning. Many participants stated that it is crucial that tools such as SEA, EMF and SDP should be used within the EA process so that they could inform one another and enhance decision-making and preliminary planning. In general participants argued that more sustainable and informed decisions regarding development, will be enabled during planning when different environmental tools could be used in unison within the EA process.

4.4.5.6 Improving competence

Improving competency in government was a code that was raised by a number of participants. The participants stated that EA must be done without compromise and that it is important for officials and EAPs to make competent and uncompromised decisions, i.e. effective EA must be done at all costs. Consistent practice must also be applied in all applications by the CA. According to some respondents, effort should be made by government to improve the competency levels of EAPs. Adequate levels of competency will ensure that good decisions are taken and that all possible impacts are considered. If competency can be ensured EA will be applied more effectively resulting in the realization of potential benefits

4.4.5.7 Transparency and accountability in decision-making

It was stated by respondents that procedural communication should always be clear, honest and fair so that everyone is incorporated within the process and have a clear understanding.

Through improved transparency, more effective stakeholder involvement could be achieved resulting in a more effective EA process and subsequently more realized benefits. This will ensure that decision-making is at all times objective and assists in avoiding corruption and/or any bias within decision-making.

4.4.5.8 Dealing with alternatives

The consideration of alternatives is an important step in the EA process as it allows stakeholders to consider and compare alternative development options and select the most desirable one. Alternatives should be properly considered in the EA process to ensure that the most sustainable development option is approved. government should ensure that alternatives are thoroughly considered by developers and EAPs and that it is not just dealt with as a 'tick box' exercise.

4.4.5.9 Reviewing

Participants made it clear that reviewing is an important strategy to bridge the gap between potential and perceived realized benefits. According to participants, there are two aspects that should be reviewed namely, reports and environmental legislation.

Specific training on reviews of specialist reports is recommended by participants to make informed decisions as opposed to relying solely on the specialist. Relooking at listing notices and some of the attractions which are listed is also necessary. According to participants, the country needs to fast track or review the state of the Environmental Report and the Environmental Outlook Report in order to bridge the gap. It can be interpreted that reviewing is an integral aspect which must be implemented throughout the EA process. By reviewing documents internally, more than one perspective is incorporated within the document. Combining different people with different ways of thinking will ensure that considerations are broadened, which will enhance the EA process.

Secondly, some participants argued that reviewing environmental legislation and its utilization, will bridge the gap between potential and perceived realized benefits. This can be contextualized with subsection 4.4.5.2 which argues that overlapping mandates should be minimised. It is made clear that many of the participants are not satisfied with current legislation and overlapping policy. Introspection regarding legislation should, therefore, take place with the purpose of simplifying legislation and making it easier to enforce without compromising any legislation and regulations.

4.4.5.10 Access to information

Participants stated that competent authorities (the government) sometimes authorize developments that are not compatible with surrounding land uses or aligned with the needs of the surrounding communities, resulting in bad decisions. Access to the right information is

therefore crucial for bridging the gap between potential and perceived realized benefits. Access to good quality information on issues such as environmentally sensitive areas, must be promoted and used to adequately inform the EA process. Specialists such as zoologists, botanists, wetland specialists with adequate qualifications are needed to generate this information and make it accessible for consideration in decision making processes. This discussion can be further contextualized through subsection 4.4.5.9, which discusses reviewing. By reviewing all the collected information and written reports, the best information could be used to inform decision making, which will contribute to sustainable development.

4.4.5.11 Dealing with trade-offs

Some of the participants elaborated on balancing the “*triple P*”. The three P’s are people, place and profit. These participants angle of discussion could be interpreted that for every EA that is produced, environmental protection, profit generation, as well as sound cohesion should be ensured. This contributes to cooperative governance in South Africa (subsection 4.4.5.2). When all these elements are balanced with one another, it means that all systems of the nested egg are in near-perfect cohesion with one another thereby facilitating definite sustainable development and unlocking the benefits of EA.

4.4.6 Conclusion

In this section, the perceptions of government officials on the ways through which the gap between potential and realized benefits could be bridged, were discussed. This was done by contextualizing this information with concepts such as the value of EA and the nested egg model of sustainable development. Fourteen main codes, discussing the ways in which the gap between potential and realized benefits could be bridged were discussed. The top five codes which were mentioned and/or discussed the most by government officials were:

- *Environmental education (108)*
- *Legal compliance and enforcement (63)*
- *Cooperative governance (39)*
- *Public participation process (26)*
- *Communication (25)*

It was made clear by the participants that there are definite gaps between potential benefits and realizing these benefits through EA. The 14 individual codes populated different systems in the nested egg model of sustainable development. This implies that the ways which can be used to bridge the gaps can be applied in different systems of the nested egg model.

The system that was discussed the most (through 11 codes) was the governance system. Subsequently, governance can be seen as the system which needs the most attention and is

a high priority in this context. Furthermore, and importantly, by addressing the governance system first, a positive effect on the other systems of the nested egg is affected as the three other main systems balance and depend on the governance system.

The rest of the systems were only represented by single codes, except for the system which refers to a presence in all systems, which received zero codes. Furthermore, although the socio-political system only received one code (environmental education, capacity building and awareness), it was found to have the highest frequency of all the codes in this research question – this finding is significant and noteworthy. It can thus be concluded that one of the most important ways to bridge the gap between potential and realized benefits, is by adequately enforcing proper environmental education, capacity building and awareness in all relevant areas such as government, developers, EAPs and the public. While education, capacity building and awareness is the most discussed code (which could be used to realize benefits), the most important system of the nested egg model of sustainable development that should be addressed as mentioned earlier, is governance, due to the fact that most codes fell within this system.

By interpreting the codes, it is clear that different ways exist to bridge the gap between potential and realized benefits that EA provides in South Africa. By implementing aspects that were mentioned in the sub-sections such as providing environmental education, simplifying legislation, enhancing communication, promoting public participation, testing alternative ideas and improving overall competence, gaps may be bridged between potential and realized benefits that are provided by EA. This will furthermore enhance responsible and sustainable development in South Africa, which will benefit all.

4.5 Overview

In this chapter, the three research questions were discussed with regard to the codes/themes that fell under each of them. The three research questions will now be discussed in a more holistic manner and the most prominent findings across the three research questions will be discussed.

4.5.1 Heatmap of the three research questions

The most mentioned and/or explained codes, over the three different research questions, are displayed in Table 11 as a “*heat map*”. A heat map is used to facilitate the visualization of data over different variables to make it more understandable and easier to perceive and interpret (Pryke *et al.*, 2007). Some interesting observations can be made from the heat map, which will now be discussed.

Table 11: Heatmap indicating the frequencies of all the codes found over the three research questions.

<u>Codes</u>	<u>Potential benefits</u> (Research question 1)	<u>Realized benefits</u> (Research question 2)	<u>Ways to bridge the gap</u> (Research question 3)
<u>Ecosystem services:</u>			
Protection of biodiversity and sensitive environmental features	84	80	3
<u>Socio-political system:</u>			
Giving effect to environmental right	43	9	0
Environmental education, capacity building and awareness	10	8	108
<u>Economy:</u>			
Promotes sustainable economic development	81	50	27
<u>Governance:</u>			
Access to information	22	0	12
Transparency and Accountability in decision-making	62	8	13
Cooperative Governance	32	6	39
Legal compliance and enforcement	112	57	63
Dealing with positive and negative impacts	80	26	0
Dealing with trade-offs	9	1	2
Dealing with alternatives	18	9	13
Giving effect to policy and planning	29	10	26
Public Participation Process	40	25	29
Improving competence	0	0	24
Reviewing	0	0	12
Communication	0	0	28
<u>Codes falling within all systems of the nested egg model:</u>			
Promote sustainable development	84	24	0

The individual coded theme that was mentioned and/or discussed most frequently, was that of *“legal compliance and enforcement”* (research question 1), which resides under the governance theme in the nested egg model of sustainable development. The individual coded theme with the second highest frequency of quotations was that of *“environmental education, capacity building and awareness”* (research question 3), which resides under the socio-political system of the nested egg model of sustainable development. The third most mentioned and/or discussed individual code, was tied between that of *“protection of biodiversity and sensitive environmental features”* code (research question 1), which falls within the ecosystem service area of the nested egg model and *“promote sustainable development”* code (research question 1) which falls within the system which refers to a presence in all systems. The codes which were discussed the most, all inhabit a different area of the nested egg model of sustainable development. This reflects the broadness of the value that EA provides for the government. EA thus has the potential to:

- Enhance current legal compliance (research question 1), while also
- Enabling the implementation of environmental education, capacity building and awareness development (research question 3), which can bridge the gap between potential and realized benefits, and to
- Potentially protect the environment and sensitive environmental features (research question 1), which will
- Contribute to enhanced sustainable development (research question 1).

By implication, the above-mentioned codes are the most significant of all the codes, due to the high frequencies at which they were discussed by government officials. Importantly, it is noted that the above-mentioned benefits are simply potential benefits perceived by participants and is therefore not seen as realized benefits yet. Similarly, when further analysing Table 11, this is also found for research question 1 and research question 2 with regards to the *“promoting of sustainable development”* code. A total of 84 participants regarded sustainable development as a potential benefit of EA for government, while only 24 participants regarded it as realized. When the table is analysed further, it becomes apparent that not one code of research question 2 received higher frequencies than research question 1 within their respective codes. This suggests that EA has the potential to be a valuable tool for the government but is not yet perceived as such as there is a clear mismatch between the potential benefits and the perceived realized benefits of EA.

This phenomenon speaks directly to the *“legal compliance and enforcement”* code over all three of the research questions, with an emphasis on enforcement. This code is discussed the

most in research question 1 and 2 while being the second most mentioned way of bridging the gap between the potential and realized benefits of EA (research question 3). This makes this code the most holistically discussed code when calculating the sum of frequencies over the three research questions (with a total of 232). It is therefore clear that enforcement is crucial if the value of EA is to be realized in all systems and subsequently bridge the gap between potential and realized EA benefits. Because legal compliance and enforcement are found within the governance system of the nested egg model of sustainable development, it should be the first system that should be addressed. By addressing the governance system, potential benefits in all other systems may be realized through proper overall enforcement.

The second most mentioned coded theme over the three research questions, was the *“protection of biodiversity and sensitive environmental features”*, with a total of 167 frequencies. This code fell within the ecosystem service system of the nested egg model of sustainable development, which makes this code significant to become realized. Table 11 shows that this environmental protection code is perceived as a benefit and also seen as being achieved because both research question 1 and 2 have similar high frequencies with very low frequencies for research question 3, which suggests that not much effort is needed to enhance this code as it is perceived as being adequately realised already.

The third most significant code which was identified by calculating its sum over the three research questions, was the *“promote sustainable economic development”* code, with a sum total of 158 frequencies. This code fell within the economy system of the nested egg model of sustainable development. The economy is an integral part in the pursuit of achieving sustainable development in South Africa. The frequencies of research question 2 (under this code) however implies that this code has not been adequately realised yet. A need for proper economic planning and financing is made clear. Funding is needed to ensure the smooth running of the EA process. It is important to generate profit and revenue which can be used by the government to invest in more specialized skills, workforce and planning. Once again, economic growth can only be achieved through adequately implementing governance factors through the application of EA, such as compliance and enforcement, cooperative governance, accountability in decision-making and proper communication.

It can be concluded that the significant codes, across all the research questions, all refer back to the importance of proper governance in South Africa. This aligns with the theory around the nested egg model of sustainable development which states that all the systems are balanced, managed and kept in place by the governance system (NFSD, 2008). The value of EA can therefore only truly be provided for government when a functional governance system is set in place. Only then will sustainable development be fully achievable through the

implementation of EA. Codes such as communication, reviewing and improving competence were not discussed as benefits within research questions 1 and 2 although these are crucial ways of bridging the gap between these potential and realized benefits that were discussed. These concluding remarks call for governmental introspection. The negative aspects that were identified within the questionnaires will now be discussed and interpreted.

4.6 Negative perspectives on EA

Some responses could not be reasonably classified into one of the aforementioned themes as they dealt with negative perceptions around EA. Rather than excluding these statements from the study, they were dealt with as 'negative perspectives' highlighting certain issues perceived by some respondents. It is important for the negative aspects to be highlighted so that governmental could consider and address them.

Table 12: The negatives that were identified over the three different research question.

The Negatives	Frequency
Ecosystem services:	
Environment is compromised by government	3
Socio-political system:	
Not enough training	1
EA suffers from political interference	1
Economy:	
Economics is more important than the environment	1
Governance:	
Cumulative impacts not addressed	3
Compliance not always achieved	3
Not always enforceable	3
EAPs not always trustworthy	2
Poor reporting	2
No fines are paid	1
government does not care for EA	1
Negatives within all systems of the nested egg model:	
Greedy corruption	9
Benefits not fully realized	8

4.6.1 Negatives under ecosystem services

Some participants felt that non-compliance was not dealt with adequately by government and that the physical environment came in second place to economic gain. From table 11, it is clear that compliance is perceived as a benefit (found within "legal compliance and

enforcement”) but this negative suggests that compliance is not adequately being realised and therefore it can be seen why this concern is raised. It was suggested that government needs to become stricter by ensure that the natural environment does not get compromised and that worker’s integrity is re-established within all government structures.

4.6.2 Negatives under the socio-political system

The negative participants stated that officials are not adequately trained in reviewing specialists’ reports and that they rely solely on specialists and their opinions. This should not be the case and government should ensure that all officials have the necessary skillset (or access to skilled capacity) to interpret information contained in specialist reports.

Participants also perceived that EA is currently suffering from ‘*greedy corruption and dishonesty*’ due to “*political interference*”. Others perceive that decision-making is compromised by internal bribery, e.g. politicians and other powerful representatives may come with hidden agendas, which could have a detrimental effect on best EA practice. This issue should be managed through the enhancement of governmental competence and proper enforcement.

It is important that these perceived negatives are thoroughly considered by government and addressed where necessary as they have a significant negative impact on current EA practice with regard to the socio-political system. By hindering proper EA practice, sustainable development is made much harder to achieve.

4.6.3 Negatives under the economy system

Some participants stated that economic gain is much more important than the health of the natural environment. This statement could be contextualized through section 4.6.2, which states that politics (or any other structure of authority) may have a strong influence on proper EA practice. These influences may result in situations where the economy should be enhanced first, without taking the environment into account. However, what should also be realized is many economic benefits may be unlocked by taking the environment into account. Although economic development is crucial and needed in South Africa it should be approached in harmony with the natural environment.

4.6.4 Negatives under the governance system

Participants stated that cumulative impacts are not always considered and that a holistic perspective is lacking within EA. The consideration of cumulative impacts is a challenging endeavour but one that should be required and promoted by government.

Another negative that is highlighted, is non-compliance. According to some participants, most authorisation holders do not even read these authorisations and therefore do not comply with

the requirements. This perceived problem falls within the governance system once again. This then speaks on behalf of the poor frequency the realized benefit, legal compliance and enforcement received (relative to its potential benefits). Without proper enforcement, EA, will not be effective.

Participants also mentioned that some EAs are simply not enforceable. It is too enthusiastic and irrational according to some officials. There is, however, also a problem with implementation (as mentioned in the previous paragraph). The combination of these two aspects makes it hard for EA to achieve set goals. According to the participants, EA should be reassessed in terms of its conditions so that accurate and realistic goals could be set.

Another problem that was made clear by some participants, is that EAPs are not always trustworthy. They may mislead clients at times, which reflects badly on government because it may affect timeframes and EA outcomes. The formalisation of the EAP profession under a statutory body might assist in dealing with this issue.

It is further mentioned that the quality of the reports that are written during the EA process is sometimes not up to standard. It can be interpreted that the overall quality of work done by EAPs, specialists and government officials should be improved. Participants stated that government bodies require more capacity in order to give applications more attention and time. This will reduce delays and enhance quality in the report writing and review process. Governance should thus be enhanced so that the level of quality may be improved in all sectors.

Furthermore, it is this same governance that should be enforced when it involves the payment of fines. When analysing Table 12, it shows that the payment of fines is still a problem as fines are often not paid. This problem can only be solved by making examples of parties that violate the compliance conditions through legal action.

The enforcement issue relates to the next problem, which is accountability. According to some participants, a culture of poor accountability exists amongst applicants, developers and government itself. Accountability could be ensured through proper governance, which will also make sustainable development much more achievable.

Lastly, Table 12 shows that participants believe that poor governmental governance causes a gap as there is fragmentation between the current level of governance on paper and what is actually being implemented. According to participants, many projects are unfortunately driven by economic gain and not by a balance of the ecosystem services, social-political, and economical systems. It can thus be argued that the government and other stakeholders do not really care about EA in the way they are supposed to.

This is the system which received the most critique with regard to different identified negatives. It can be concluded that governance is a crucial system that should be addressed and improved so that the EA system may function optimally. The largest obstacle which hinders this improvement is the pursuit of economic gain instead of trying to establish a balance between this system and the rest of the systems found in the nested egg model of sustainable development. When governance is improved, all the above-mentioned negatives such as non-compliance and poor reporting will be eradicated and improved.

4.6.5 Negatives under all systems of the nested egg model

Some participants stated that the economic system is often the most prioritized for the benefit of personal gain, which is also discussed in section 4.6.4. Some participants stated that the benefit of EA for government is to help those who are politically connected, get richer and do as they please, while still harming the environment. There seems to be cases where developments are approved without care for the environment or sustainability. Where applicable, corrupt practices must, therefore, be identified and neutralized.

Corruption is regarded by some officials as a significant obstacle standing between EA practice and sustainable development. The path to sustainable development would be significantly hampered if corrupt activities, such as those described by some respondents, persist in South Africa. This issue of corruption was mentioned the most of all the negatives which suggests that it isn't an unusual phenomenon in South Africa.

Some participants further believe that benefits are not fully realized due to a lack of communication between government Departments which result in many targets not being met by government. This leads to authorizations that are more focused on damage control rather than sustainability. This should not be the case for EA. EA seeks to identify potential negative impacts before it becomes a problem. The progress towards sustainable development would become stagnant if damage control was the only outcome of EA.

4.6.6 Conclusion

In this section, the negative views of government officials regarding EA were explored. The analysis suggests that the biggest constraints faced by EA, as perceived by government officials, relates to poor enforcement, incompetence among the workforce, and corruption. The problems that were discussed most frequently were the negative concepts of “*greedy corruption*” and the “*benefits not realized*”. These negatives can be seen as the main obstacles which EA needs to overcome to ensure that sustainable development is achievable. It is furthermore important to take note that EA alone cannot be blamed for benefits not being realized, but that issues such as governance, procedural efficiency and capacity should also

be considered. By analysing Table 11 it is clear that most of these problems may be overcome by improving the current EA governance system.

4.7 Conclusion

In this chapter, the results of this study were presented and discussed. The thoughts and perceptions of government officials regarding the benefits, and subsequently the value, of EA were explored and interpreted. Potential benefits, perceived realized benefits, ways to bridge the gap between these two benefits, and the negatives were discussed, interrelated with one another and contextualised with the nested egg model of sustainable development. In this process the perceived strengths and weaknesses of EA were identified, which could contribute as supplementary information to the ongoing debate regarding what the actual value of EA is. This chapter will be followed by an overall conclusion of this study.

CHAPTER 5: Conclusions and Recommendations

5.1 Introduction

In this study, the perspectives of EA government officials were explored regarding their views on the benefits, and subsequently the value, of EA for the government of South Africa. To this end, the value of EA was explored within a South African governmental context through qualitatively analysing 175 open ended questionnaires completed by government officials. The acquired knowledge contributes to the current debate around the value of EA (Retief, 2010). In doing so, the question posed by Retief (2010), “*what are we achieving?*” in his paper titled, “*The evolution of environmental assessment debates: critical perspectives from South Africa*” and the research questions of this study, could be answered.

In this context three research questions were formulated to inform the research aim as discussed in section 1.3, namely:

1. What are the perceived potential benefits of EA for government from a government perspective?
2. What are the perceived realized benefits of EA for government from a government perspective?
3. What must be done to successfully bridge the gap between potential and perceived realized benefits (where gaps may exist)?

By addressing these questions, sufficient information was generated which could be considered as supplementary information to the questions raised in Retief’s (2010) paper. Essentially, it is the purpose of the conclusion section to link the research questions with the most significant findings emanating from the results section in a logical manner so that overall concluding remarks are made possible. The main concluding remarks are thus provided in terms of the four systems found within the nested egg model of sustainable development, i.e. conclusions are derived by contextualizing the systems with the three research questions of this study. The concluding remarks for each of the research questions will now be discussed.

5.2 Ecosystem services

The natural environment provides an essential basis for development and growth in all systems which contribute to sustainable development. This makes ecosystem services a crucial system found within the nested egg model of sustainable development. Concluding remarks will be made by discussing how EA plays a role in this system across the three research questions.

With regard to the perceived potential benefits that EA provides only one code fell under the ecosystem services system and is called, “*protection of biodiversity and sensitive*

environmental features” and was discussed a total of 84 times. The main apparent perspectives were that EA finds its value in having the potential of adequately protecting and enhancing natural systems. Furthermore, value is demonstrated in its potential of protecting humans by keeping their surrounding environments healthy and ecologically stable. This significantly resonates with the NFSD focus area which deals with sustaining ecosystems and using natural resources efficiently. EA furthermore has the potential to protect endangered species and identifying areas which are too sensitive to be developed. EA therefore finds its (potential) value in its potential to adequately sustain and protect the environment. By sustaining the environment, ongoing provision of ecosystem services may be ensured which will enhance human livelihood, the economy and the continuation of natural environmental processes.

When investigating the perceived realized benefits that EA provides under the ecosystem service system, again the only resulting code forthcoming from the analyses was the *“protection of biodiversity and sensitive environmental features”* code, which had a frequency of 80 participants mentioning/elaborating on this specific topic as a potential benefit. Out of all the codes assigned in this study, this code was discussed the most and can be viewed as the main perceived realized benefit that contributes to the overall value of EA according to the government officials. The perspectives overlapped significantly between the potential and perceived as realized benefits. Again, the health of the environment and people were strongly emphasised. The management of resources was also emphasised. By implementing EA, money may be saved, and all of the mentioned benefits could be realized.

The *“protection of biodiversity and sensitive environmental features”* was barely mentioned in the research question which dealt with ways to bridge the gap between potential and realized benefits. The reason for this might be that this code is seen more as an aim/objective and not a method of achieving objectives. It can, however, be argued that by implementing the rest of the gap-bridging methods that fall under other systems e.g. *“environmental education, capacity building and awareness”* and *“legal compliance and enforcement”*, the gaps may be overcome so that all benefits of environmental protection may be realized.

It can be concluded that EA finds its value in having the potential (and realized value in some cases) to adequately protect the biodiversity and sensitive environmental features of South Africa, through the protection of ecosystems, sensitive areas, people and the responsible management of natural resources. Ways to bridge the gaps with regard to this benefit is not clear, but by implementing codes found in other systems such as the socio-political and-governance system, many potential benefits may become realized. EA, therefore, finds its value in providing a platform where the natural world may be protected and enhanced, which

can then unlock more benefits for South Africa in other systems. Concluding remarks regarding EA value findings within the socio-economic system are presented in the following section.

5.3 Socio-economic system

This system refers to systems which comprise both social and political aspects and the constant interaction between them. Concluding remarks of this system as found within the nested egg model of sustainable development are provided in terms of the associated codes found across the three research questions.

The investigation found two codes that represented the potential benefits that EA could provide. These two codes were termed “*giving effect to environmental right*” and “*education, capacity building and awareness*”.

When focussing on environmental right, government is mandated by Section 24 of the Constitution to protect the environment. According to participants, EA plays a fundamental role for it is seen as the systematic process that is utilized by government to give effect to Section 24 of the Constitution. Therefore, EA facilitates in guiding development according to constitutional requirements and therefore upholds the mandate. Subsequently, EA finds its value in the fact that it guides all role players found within the process of development. EA also has the potential to give effect to the human right which stipulates access to a healthy environment. By protecting the environment, human well-being may be sustained. Furthermore, when investigating the education and awareness code, the EA process guides government on how to serve and create awareness in the community through education of different capacities. More environmental awareness may potentially be developed based on the findings of EA processes. By mainstreaming legislation to the public, people may become more aware of protecting the environment, resulting in more cautious decisions being made by the public. Subsequently, lives may potentially be enriched through capacity building and awareness of sustaining environmental health.

When moving to the second research question, dealing with realized benefits, the same two codes are present. However, the frequencies of discussion are worrying, and it is alarming to notice that environmental right and education are discussed significantly less. This may imply that the realization of enhancing the socio-political system is not currently coming to pass. In this context, governmental introspection should seemingly take place to enable and ultimately ensure such realization.

The research question which addresses ways to bridge the gap between potential and realized benefits is now concluded in this context. Participants made it clear that environmental

education and awareness training should be maximised and promoted by government so that the issue realization of benefits could be overcome. Simplifying current legislation, regulations and conditions could also possibly contribute to overcoming any uncertainty or misinterpretation within EA. Enhancing capacity within the environmental sector of government will have a significant effect on improving the socio-political system of South Africa.

By implementing the above-mentioned ways to bridge the gap, EA could reach its full potential and value to the government of South Africa. According to the participants, EA finds its value by creating a platform for giving effect to the environmental right and educating people of different capacities with regard to preserving the environment. Other systems such as the ecosystem services system may also be enhanced greatly by the fact that this system balances on the socio-political system. Sustainable development could thus be achieved in different systems of the nested egg model through the proper and adequate implementation of the EA tool. It is, however, government's responsibility to determine at which level of adequacy it is implemented and enforced. A concluding discussion relating to the next system found in the nested egg model of sustainable development, i.e. the economic system, now follows.

5.4 Economic system

This economic system of the nested egg model of sustainable development was represented by one code. This code was termed, *"promoting sustainable economic development"*. Concluding remarks pertaining to the three research questions in terms of this code, which endows value to EA, will now be made.

When viewing the first research question, EA finds its potential value in enhancing the economy of South Africa through its utilization and had a respondent frequency of 80. According to participants, its value is mainly found through job creation. This enhances not only the economy but the livelihoods of all the people involved. People's lives are enriched, while adequate capacity is established with the aim of preserving the environment, which will contribute greatly to sustainable development. Furthermore, EA finds its value in potentially facilitating financial growth and saving money through adequate planning. Therefore, participants believe that EA is valuable in the sense that it has the potential to ensure that revenue is generated, responsible decisions are made, which will save money and avoid wasteful expenditure and that human lives are enhanced and kept out of harm's way.

When analysing the benefits that were perceived as realized, promoting sustainable development was mentioned far less (frequency of 50), although it remained one of the most mentioned codes regarding the perceived realized benefits. This indicates that economic

growth is a concept that contributes greatly to the value of EA. However, EA's full potential is not currently being reached due to the lack of realization. The third research question, i.e. ways to realise this important benefit, attempts to address the economic growth concept and concluding remarks will now follow.

South Africa is a developing country and thus relies on economic development for progress and prosper. Economic development may be promoted and enhanced through more job opportunities and adequate financing through government. Careful management is therefore needed by the government to ensure that tax money is responsibly allocated to the practice of EA and that corruption is minimised. Through implementing these ways to bridge the gap, EA could reach its full value in promoting the development of the economic system of South Africa. When EA enhances the economic system, enhancement in the socio-political and ecosystem services system is expected to follow naturally due to the significant interdependency of these systems as indicated within the nested egg model of sustainable development. If EA is procedurally followed, it could be a significant contributor to a potentially brighter future in the economy of South Africa.

5.5 Governance

Moving in a sustainable direction implies that these systems must always be in continuous and mutually compatible integration with one another. Sustainable development thus means that there should always be assurance that these systems are always compatible with one another as the key development challenges are solved and met through specific interventions and actions (NSFD, 2008). For this study, the mentioned interventions and actions refer to EA. The EA tool (and its value) is the topic of focus, for it is used as a method of intervention so that the natural environment, social system, and economic system is enhanced simultaneously. EA and the value which it provides to the South African government plays a significant role in helping South Africa achieve sustainable development. The value of EA was therefore plotted according to the nested egg model of sustainable development due to the linkage of EA and sustainable development. This was done so that the value of EA could be demonstrated in the context of the nested egg model.

In this study, the governance system was the system that received the most perspectives and thoughts across all three the research questions. When looking at the potential benefits that EA brings in terms of governance, ten main codes were identified, where the three most discussed codes were, *“legal compliance and enforcement”*, *“dealing with positive and negative impacts”* and *“transparency and accountability in decision-making”*. The communicated message derived from this is that EA has potential value by giving government the necessary legal authority to monitor environmental compliance while also developing a

platform for the government to enforce appropriate environmental law which ensures compliance from developers. This initiates accountability between all role-players found within the EA process and has the potential to enhance proper sustainable development in South Africa.

The same pattern was observed in the codes of the second research question, which handles the benefits that are perceived as realized. Of all the systems within the nested egg model, most of the codes discussed fell under the governance system, which confirms that EA is an important tool within the governance system. As in the case of the first question, most of the codes were found under the governance system once again, but with the public participation process in the top three most mentioned codes. This suggests that EA plays an important role in granting government the legal right of enforcing environmental legislation, ensuring environmental compliance and establishing fair and transparent decision-making through PPP. The results, therefore, communicate that EA finds its value and significance in the way it has the ability to realize (as perceived) and enhance the governance system in South Africa.

Considering the third research question, which relates to ways to bridge the gap, it was apparent, that any gaps in the governance system may be bridged through adequate *“environmental education, capacity building and awareness”*. It is therefore implied that gaps may be bridged through environmental education and making all relevant role-players aware of the importance of environmental health and sustainable development. Furthermore, other codes such as *“communication”* and *“reviewing”* were also identified as important gap-filling instruments which can play a significant role in enhancing overall governance in South Africa. It was again found that the governance system was populated the most with codes aimed at bridging any gaps between potential and realized benefits.

It is noteworthy that the results overlapped significantly with the information set out by the NFSD (2008) and NSSD (2011-2014) in terms of the nested egg model of sustainable development, the focus areas and goals that are set out by these documents. In these documents, it is stated that the governance system plays a significant role in balancing and enhancing the other three systems of the nested egg model of sustainable development and therefore promotes sustainable development in all systems. This is also clearly shown in the results where the governance system received the most responses in all three research questions regarding the benefits that EA provides for the government and how gaps may be bridged through codes falling under governance. In this context, the governance system can be seen as the platform which enables sustainable development throughout the rest of the systems and could also be interpreted as such in the model. EA, therefore, finds its most significant value by providing for the governance system so that sustainable development

could be promoted and enhanced in all other systems of the nested egg model. The last category, which refers to the presence of a code in all systems of the nested egg model of sustainable development, is concluded in the following section.

5.6 Codes falling within all systems of the nested egg

It was found that the only code that showed a presence in all the systems of the nested egg was the “*promote sustainable development*” code. This contributes to the previous discussion in section 6.5, due to the fact that EA pursues the achievement of sustainable development in South Africa. By enhancing proper governance sustainable development may be enhanced in all systems of the nested egg of sustainable development. It is thus not unexpected that this code would be present in all systems of the nested egg and shows that EA is currently effective in its value. These findings, therefore, support each other.

By considering and applying the above-mentioned information with regards to the nested egg model of sustainable development model, the locality of EA value (across the three research questions) may be plotted on the nested egg model (fig 4).

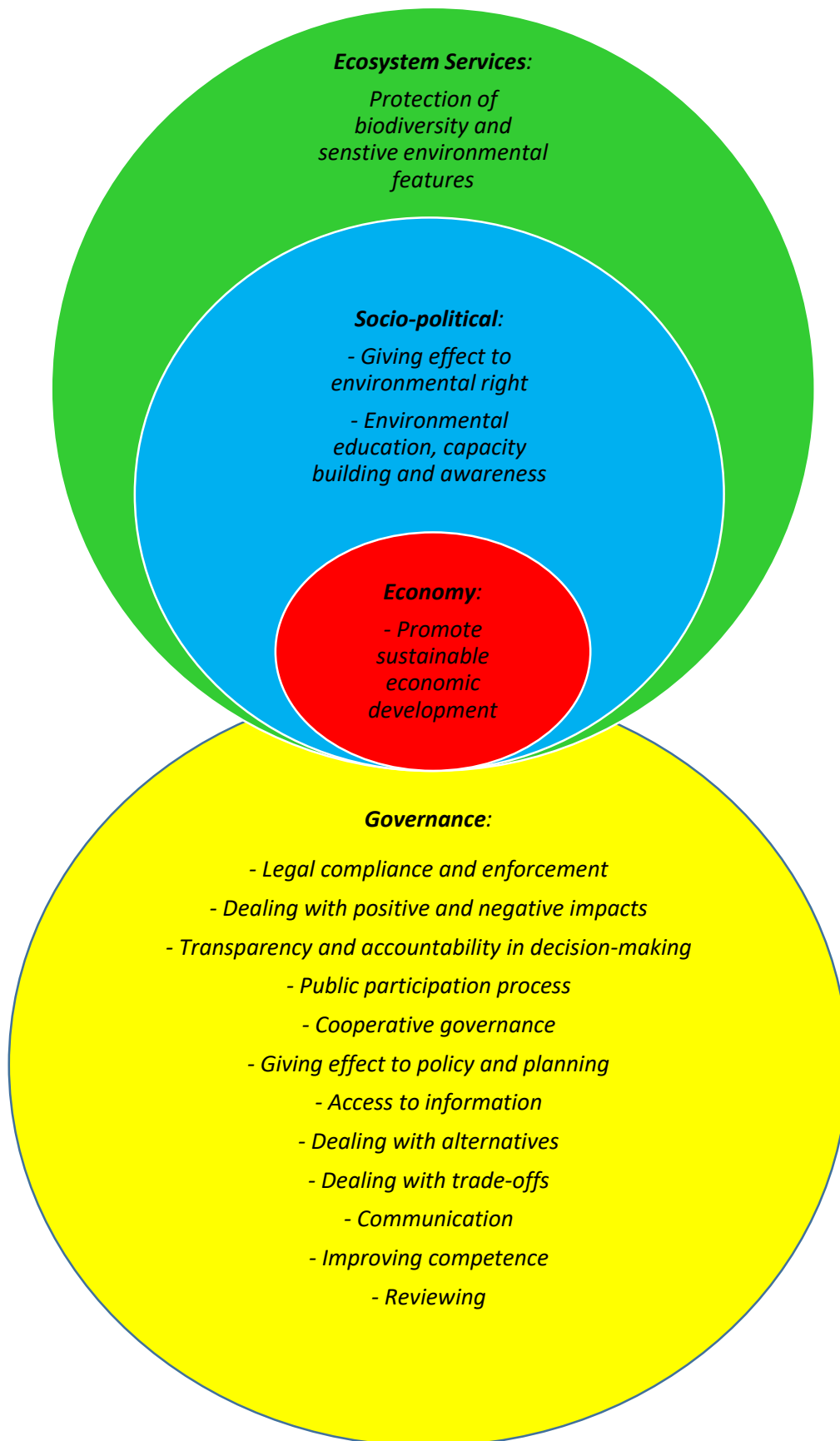


Figure 4: Positioning of each EA benefit within the nested egg of sustainable development model.

5.7 The negatives

Across the different research questions, there were EA government officials which stated that there are different aspects that have not been addressed at all through EA and that there are still negative factors that arise although EA is implemented. These participants were referred to as “*the negative participants*” that highlights the fact that there are still many gaps found within the EA process and current practice in South Africa.

Most participants falling in the negative participant group stated that the main negative factor is the fact that EA benefits are not fully realized, although it is perceived by others that EA is reaching its full potential. Factors such as corruption, governmental compromise, ignoring and not addressing the cumulative impacts of development, no trustworthiness, non-compliance, not enough environmental training and overall incompetence of government EA staff were identified and highlighted.

5.8 The way forward

By identifying and addressing the different benefits and negatives that may arise through the utilization of EA in South Africa, strengths and weakness were be identified. This study provides government with a platform for introspection and self-assessment regarding current performance relating to the utilisation of EA in the country. It is only through a process of earnest self-assessment and commitment that current mismanagement may be identified and addressed whilst also identifying new alternatives to facilitate the achievement of sustainability in different spheres of government.

5.9 Future research

The results and concluding remarks of this dissertation can inform future research relating to the ongoing debates on the effectiveness of EA in South Africa and what is being achieved as a country in its quest towards achieving economic equality and sustainable development (Retief, 2010). By narrowing the scope of research under each of the respective research questions of this dissertation, more detailed information may be drawn with the aim advising best-practice EA in South Africa. Such a study in conjunction with other current South African research literature will contribute to the understanding of EA and environmental management whilst providing a significant contribution to the improvement of EA practice in South Africa.

5.10 Conclusion

This study explored the perspectives and perceptions of EA-trained, South African government officials regarding the benefits, and subsequently the value, of EA for the government of South Africa. In addition to the benefits of EA, the opinions of officials regarding possible ways to bridge the gap between potential and realized benefits were also explored. These subjective perceptions were investigated through the use of a qualitative research

approach and analysis software tools. In the process, 175 semi-structured questionnaires were analysed for three predetermined research questions.

In summary, the findings of the study showed that the most mentioned potential benefit that EA may bring was that of legal compliance and enforcement. The most mentioned benefit that was perceived as realized by participants, was the protection of biodiversity and sensitive environmental features. Furthermore, it was concluded that the most agreed-upon way to bridge the gap between potential and realized benefits was through environmental education, capacity building and awareness. Subsequently, the main benefits identified by way of the different research questions were then mapped against the nested egg of sustainable development model to investigate how the value of EA facilitates the task of achieving sustainable development in South Africa. The findings on the benefits of EA contributes towards a better understanding of its value. It can be concluded that EA is a valuable tool for government as it offers a wide variety of benefits. Although EA does have cost implications (time and money) and are facing some challenges (negatives and some unrealized benefits) the value that it adds to decision making processes and towards the goal of sustainable development in general (through realized benefits) cannot be ignored. These findings agree with the statement made by Retief and Chabalala (2009) that the benefits obtained from implementing an EA system, i.e. the value, outweighs the costs involved.

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