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THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT STRATEGY

SUBTHEME 9: QUALITY OF TOOLS:

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1. SUBTHEME 9: EXISTING AND NEW ENVIRONMENTAL MANAGEMENT TOOLS

At the "Ten Years of EIA in South Africa Conference" (2008) it was agreed that an **Environmental Impact Assessment and Management Strategy (EIAMS)** should be formulated for SA. The strategy should facilitate a participatory process that, in the context of the objectives of integrated environmental management contained in Section 23 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the principles of sustainable development of Section 2 of NEMA, revises the environmental management scheme in a systematic and rigorous manner. The sub- directorate: Environmental Impact Management Strategy at the **Department of Environmental Affairs (DEA)** has been tasked with the development and promotion of this comprehensive strategy to manage the environmental impacts of development in South Africa

The DEA therefore conceived a project that has to look at the desired future state for the EIAMS and path the way to achieve it within the mandate provided by Chapter 5 of NEMA and within a strategic policy context. The desired future includes an environmental impact assessment and management system, consisting of voluntary and regulated instruments in the next five years, where -

- the inefficiencies and ineffectiveness of the current system have been corrected and the efficiencies and effectiveness optimized;
- regulated Environmental Impact Assessment (EIA) is used only when it is the most appropriate tool;
- Integrated Environmental Management (IEM) is given effect through a variety of other instruments that would, depending on the nature of activities and/or the receiving environment supplement, compliment or replace EIA;
- EIAM takes place within a strategic context of environmentally informed spatial instruments, sector strategies and policies;
- authorities are sufficiently capacitated with skilled and experienced officials;
- other stakeholders are capacitated and empowered to ensure maximum impact on the effectiveness and efficiency of the strategy;
- government regulatory processes have been as far as possible integrated, or at least aligned; and

- all stakeholders are equally committed to make it work: Government, EAPs, developers, community etc.

The project was conceived as a conglomerate of smaller tasks and studies, arranged around specific themes. Within this context, the DEA appointed **SSI Engineers & Environmental Consultants** to assist the Department with a specialist study in relation to the development of the national EIAMS. This specific specialist report relates to **Subtheme 9: Existing and new Environmental Impact Management Tools** under the **Theme: Impacts and Instruments**.

The Specialist Report will ensure that the most suitable, acceptable and efficient environmental impact assessment and management tools are developed, implemented and consistently, adequately and appropriately applied in order to give effect to Section 23 objectives and NEMA principles.

The investigation has three goals:

Goal 1:	To highlight the key benefits and limitations of the tools within the current EIAM system
Goal 2:	To identify additional tools to strengthen/supplement/improve the future and existing EIAM system which cover the total project cycle
Goal 3:	To identify tools and mechanisms to address deficiencies of EIA

2. BACKGROUND AND PROJECT METHODOLOGY

The research for the Subtheme 9 report addresses 10 distinct steps or issues, as detailed in Table 1 below. It starts off with a look at which tools are available to environmental practitioners in South Africa, and which ones are in fact being used. The nature of the application of the tools will be looked at, in order to identify problems and obstacles to the proper implementation of environmental management mandates. Finally, the collated knowledge will be used to focus recommendations on how the EIAMS can be improved in terms of the application of environmental management tools.

During the course of the investigations, cross-referencing with other sub-theme specialist investigations will take place.

TABLE 1: FOCUS AREAS FOR SUBTHEME 9

Key Focus	Description	Assessment method	Outcome
1. Existing Tools	Research existing Environmental Impact Assessment and Management Tools as allowed in terms of NEMA and other legislation.	Primary research, literature searches, direct consultation In particular, a reference sheet will be developed that can collect information on the tools in a consistent manner during further tasks (e.g. on application, problems, etc.)	List and description of existing tools
2. Tool Application	Indicate where EIAM tools identified in this deliverable are developed/managed and implemented within the existing organisational structures and procedures identified in Deliverable 1.	Direct consultation, coordination with Specialist team for Sub-theme 1	Network description indicating loci of tool application
3. Problems	Identify problems experienced with regard to existing EIAM tools in	Direct consultation, literature searches, review of available	Classification of problem areas, both perceived

Key Focus	Description	Assessment method	Outcome
	the implementation of section 2 and 23 of NEMA as well as in achieving sustainable development.	research	and actual
4. I&AP Participation	Evaluate the effect of the Public Participation and I&AP communication process as identified in Deliverable 3 on the effectiveness and suitability of the tools.	Liaison with Specialist team for Sub-theme 3, literature searches, review of available research, consultation with representative stakeholder groups	Summary of the findings
5. Alternatives	Research other available (National and International) Environmental Impact Assessment and Management Tools.	Literature searches, review of available research, consultation with international partners and practitioners	List and description of alternative tools
6. Tool Suitability	Determine suitability of other EIAM tools as identified in this deliverable within existing organisational structures.	Review of tool descriptions against sustainability criteria	Rating of tools according to applicable scenarios
7. Recommendations	Propose the most effective, efficient, suitable and fair EIAM tools to be implemented in future within the proposed organisational structure proposed in subtheme 1 and proposed public participation process proposed in subtheme 3.	Coordination with Specialist team for Sub-themes 1 & 3, write-up of review findings	Draft consolidated report with recommendations
8. Mechanisms	Propose suitable mechanisms to ensure that the strategic development context is integrated into EIAM	Coordination with Specialist teams for all other Sub-themes, review of recommendations against sustainability	Draft report with implementation guidance

Key Focus	Description	Assessment method	Outcome
		criteria	
9. Improvements	Recommend improvements for existing tools	Review of recommendations based on coordination with Specialist teams for all other Sub-themes	Draft report with implementation guidance
10. Obstacles	Identify problem areas which may prevent implementation of newly identified tools.	Review of recommendations based on coordination with Specialist teams for all other Sub-themes	Draft report with final set of recommendations and guidance

3. STATUS QUO

3.1. WHAT IS AN ENVIRONMENTAL MANAGEMENT TOOL?

Before any assessment of environmental management tools can proceed, it is necessary to pause and reflect carefully on what is defined as an '*environmental management tool*'. At face value, it could be described as any technique or product that uses environmental information for decision-making. It immediately conjures up the names of the two most commonly used tools in South Africa, namely Environmental Impact Assessment (EIA) and Environmental Management Framework (EMF), but beyond those two most people will hesitate before naming others. This is partly due to the big difference in the 'rate of application' between these two tools and any others, but also due to overlapping function and alternative naming conventions that muddle the picture. Beyond the obvious differences between EIA (as a site specific impact assessment) and EMF (spatial planning tool), a differentiation between tools can be very difficult. Even between EIA and EMF there could be some overlap in function, since both rely on base data in the form of ecological surveys and sensitivity maps.

Consequently, before the study can delve into the use of, and opportunities associated with environmental management tools, it has to bring some structure to the assessment in order to define what is meant as an 'environmental management tool' and set a reference framework for the assessment of such tools.

Environmental management itself can be hard to define as a concept due to its evolution as a multi-disciplinary field, and therefore the tools used in the application of environmental management are similarly hard to define. For the purposes of this report, however, a focus will be placed on the project management cycle implied by the 'management' component of the environmental management concept. This is appropriate, since environmental management is a concept applied in all four commonly distinguished project management phases, namely Planning, Testing, Checking, and Execution - i.e. the so-called Deming Cycle of 'Plan-Do-Check-Act' (Figure 1).

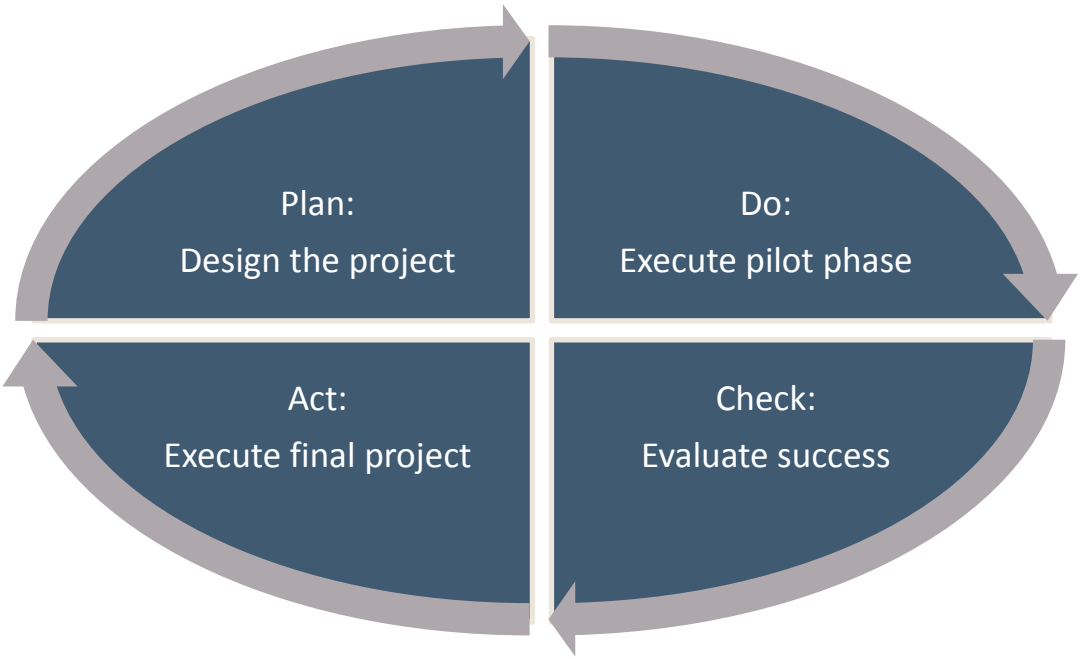

FIGURE 1: TYPICAL P-D-C-A DEMING CYCLE

However, the Deming cycle envisages the 'Do' phase as a project pilot that is evaluated before a final full scale implementation takes place. From an integrated environmental management (IEM) perspective, the cycle is less iterative, with no pilot phase but instead an information collection phase that precedes project execution, and distinct monitoring and feedback phases. The environmental management cycle is therefore conceived as a Planning, Commissioning, Monitoring and Enforcement cycle (Figure 2).

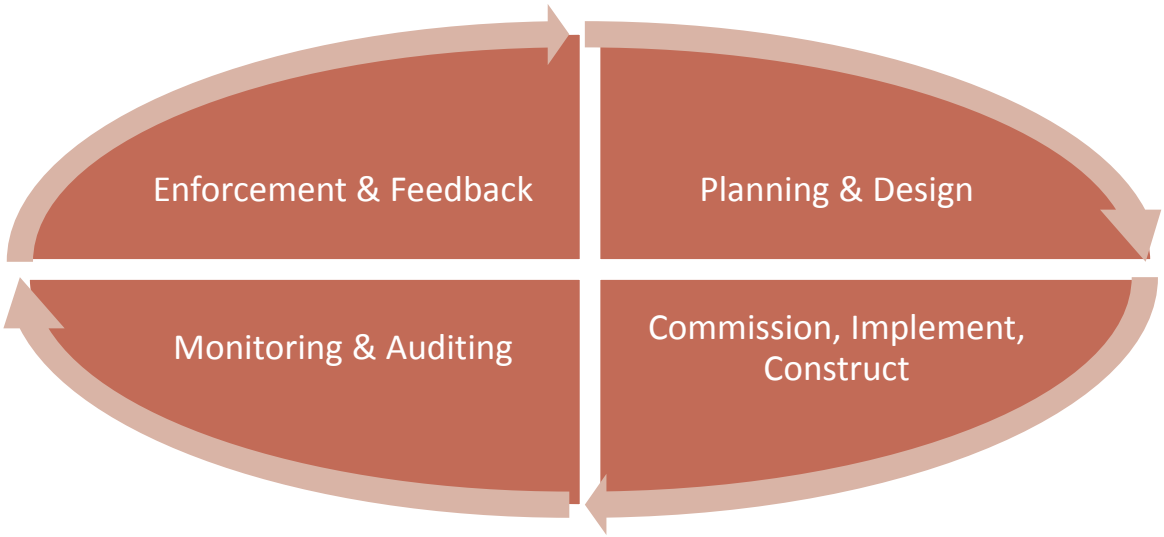

FIGURE 2: THE INTEGRATED ENVIRONMENTAL MANAGEMENT CYCLE

This IEM cycle is therefore visualized as an iterative process that starts with the collection and processing of data, the use of the new knowledge in decision-making, parallel processes, construction etc., the monitoring of the implementation actions, and finally a phase that takes stock of how implementation took place and implements corrective actions in terms of either the existing application or new iterations of the cycle.

When these environmental management phases are employed as reference framework, environmental management actions can be tested against the phases to evaluate their function, relationships and position within the management cycle as is shown in Figure 3. Typical actions or steps within the integrated environmental management project cycle are matched to the four IEM phases, and immediately, structure is given to the spectrum of environmental tools available to environmental practitioners.

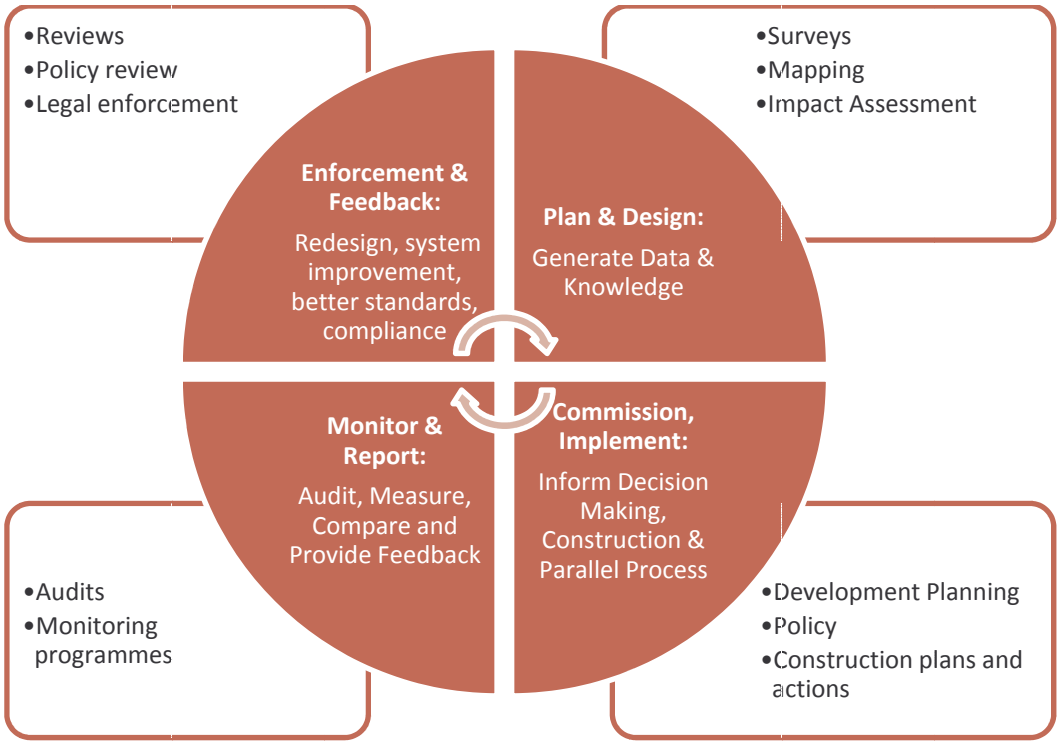

FIGURE 3: TYPICAL ACTIONS WITHIN THE INTEGRATED ENVIRONMENTAL MANAGEMENT PROJECT CYCLE

A similar analysis of whether the current application of environmental management tools cover the project management cycle – i.e. whether it offers environmental guidance for all stages of development planning and execution was done by Retief (undated). This analysis is presented in Table 2:

TABLE 2: DO THE TOOLS THAT WE USE COVER THE ENTIRE PDCA CYCLE? (RETIEF)

ANALYTICAL AND PLANNING TOOLS	CRITERIA AND STANDARDS	MANAGEMENT OR DOING TOOLS	CHECKING AND ACTING TOOLS	REPORT AND COMMUNICATION TOOLS
Environmental, Social and Cultural Impact Assessment	Legislation and national standards, i.e., SANS standards and guidelines	Environmental Management Systems	Environmental and Social Monitoring and Measuring	Environmental and Social Reporting Triple Bottom Line Reporting
Strategic Environmental Assessment	ISO 14001 standard and other guidelines	Emergency Plans	Inspection, Analysis and Records	Environmental and Social Communication
Risk Assessment	SA 8000 Social Accountability	Administrative tools, i.e., standard operating procedures	Environmental and Social Auditing	Statutory Reporting
Life Cycle Assessment	AA Accountability	Environmental Management Plan	Improvement Management	Public participation
Disaster Planning	Sectoral environmental performance standards	Disaster Management Plan	EMP performance monitoring	
	Triple Bottom Line GRI requirements		Continual improvement tools	

This basic analysis is informative and provides an indication of where different tools fit but, however, it is not sufficient. When one considers particular tools included in the list of 'EM techniques' in more detail, the seamlessness of their 'fit' in the cycle is lost. In Table 3, EIA and EMF are used as illustration.

TABLE 3: A PROJECT MANAGEMENT CYCLE ANALYSIS OF EIA AND EMF TOOLS

	Tools and their constituent parts	
EM management phase	**EIA**	**EMF**
Survey & Assess	• Surveys • Mapping	• Surveys • Mapping

	Tools and their constituent parts	
EM management phase	**EIA**	**EMF**
	• Impact description • Impact assessment • Cumulative impact assessment • EMP	• Impact description • Impact assessment • Environmental objectives • Strategic EMP
Use & Execute	• Permitting • Operational management	• Municipal zoning • Permitting • Biodiversity conservation practice
Monitor & Report	• Compliance monitoring & reporting	• Monitoring & reporting framework
Enforce	• Enforcement	• Policy review

When the tools themselves are analysed according to the environmental management cycle, evidence emerges that they contain elements of different environmental management phases rather than represent individual components themselves. For example, an EIA could be seen as a 'planning' tool within the overall environmental management project cycle, but the EIA actually consists of components that, themselves, fall in all four planning phases (see Figure 4).

The conclusion is therefore that environmental management tools will not necessarily fit neatly into a simple model of management techniques. Instead, the framework for analysis has to be aware of the presence of different layers of application or classification. The commonly perceived tools are therefore potentially or likely to consist of combinations of steps that might cover several management phases. A 'tool' is therefore seen as a combination of parts, with the combination being determined by the particular situation or field of application.

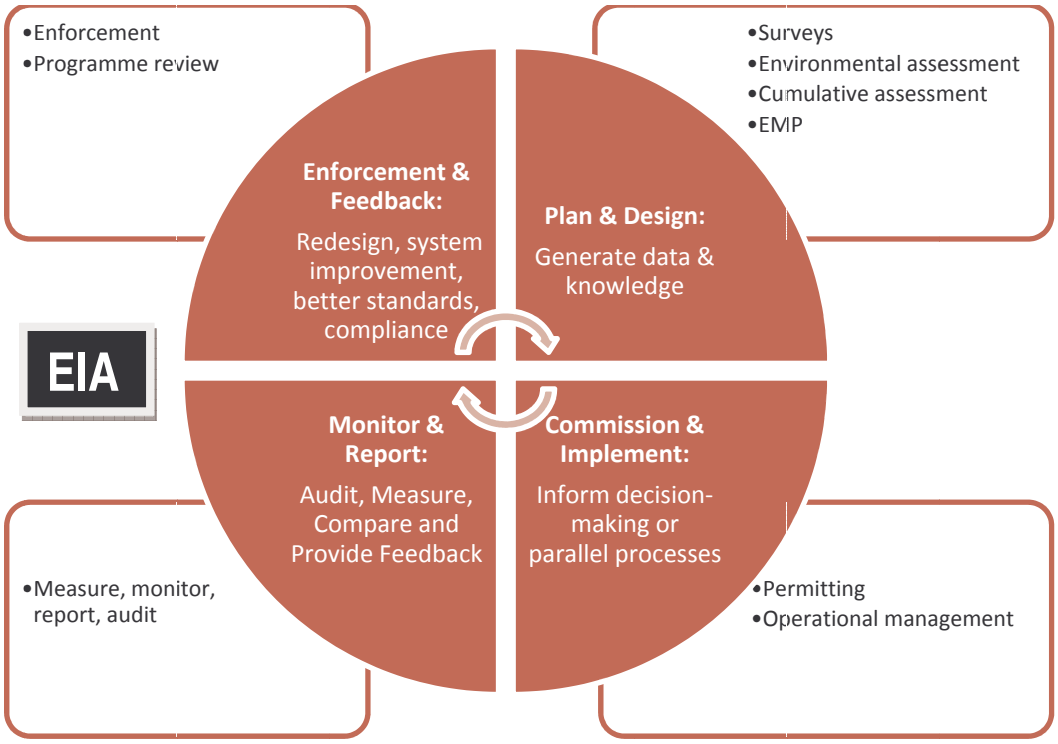

FIGURE 4: TYPICAL EIA COMPONENTS PLOTTED AGAINST A MANAGEMENT CYCLE

Consequently, the best systematic approach to be taken is to view the concept of environmental management as a framework of '*environmental management techniques*' that can be used either in isolation or as a combination as '*environmental management tools*'. That would reduce the uncertainty and duplication naturally involved in the assessment of the application of tools in different contexts and formats. It would also offer insight into the strengths and weaknesses of the tools, since the problem with tool application could relate to the component parts, i.e:

- in the actual composition of the tool – when the components are not well matched,
- in incorrect application – such as using one tool when there is a more specific one available, or
- in the failings of the individual components of a tool.

In this assessment, therefore, the concept of an environmental management tool will be used as potentially representative of a number of individual environmental management techniques. Questions regarding the applicability and implementation of the tools will similarly also be aware of the constituent parts.

3.2. THEORETICAL PERSPECTIVE ON THE DEVELOPMENT OF ENVIRONMENTAL MANAGEMENT TOOLS

Retief (undated) believes that in terms of the development and application of environmental management tools, we are getting left behind. Whereas 'command and control' tools found common application in the 1970s, market-based instruments and hybrid approaches characterised the subsequent decades. When looking at the South African field of application, however, it is clear that the focus on EIA-related processes still embed practice in the earlier phase of tool development:

FIGURE 5: EVOLUTION OF ENVIRONMENTAL POLICY INSTRUMENTS (RETIEF, UNDATED)

A slightly different perspective is presented by Robinson and Ryan (2002) who simply classifies environmental management tools as command-and-control, market based or morally persuasive. They believe that market based instruments have a higher likelihood of success as compared to a complex and inefficient regulatory system or unenforceable moral suasion approaches.

There is, nevertheless, common consensus that environmental management should be moving towards more strategic approaches with sustainability objectives as outcome rather than individual focused impact assessments – i.e. a move away from EIA and towards the universal use of Strategic Environmental Assessment (SEA) and complete life cycle accounting.

3.3. LEGAL BASIS (LEGISLATED TOOLS)

Chapter 5, Section 24(5), of NEMA identifies the following environmental management tools as available for application in South Africa:

- environmental management frameworks;
- strategic environmental assessments;
- environmental impact assessments;
- environmental management programmes;
- environmental risk assessments;
- environmental feasibility assessments;
- norms or standards;
- spatial development tools; or
- any other relevant environmental management instrument that may be developed in time.

In respect of the legal provisions, more detail can be gained from the Specialist Report for EIAMS Subtheme 1: Procedures and Organisational Structures

Of these, EIA and EMF have the best legal basis and extensive regulations provided to ensure the consistent and correct application of the tools. A lot of possibility is, however, built into the legislation – there are enabling clauses that could be used for further application of tools.

3.3.1. Policy and Strategy

Many acts require of organs of state to compile policies or strategies that specify how a matter relating to environmental management will be managed. This includes, for example, the requirement for a National Waste Management Strategy (Section 6 of the National Environmental Management: Waste Act, 2008), a National Framework for Air Quality Management (Section 7 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) and need for a National Water Resources Strategy and Catchment Management Strategies. A National

Biodiversity Framework is also required by the National Environmental Management: Biodiversity Act, 2004, to guide all strategic development planning process regarding the integration of biodiversity planning and monitoring in South Africa.

3.3.2. Integrated Environmental Planning (e.g. IEP, IWMP, IWRS)

Integrated Environmental Programmes (IEP) are required by law in various guises and sectors. For example, it finds application in the requirements for Integrated Waste Management Plans as per the NEM: Waste Act, 2008. In terms of spatial planning, IEP has no explicit legal mandate and is only required in terms of the Integrated Development Plan (IDP) Guide Packs. However, the main objective of the IEP is to establish if the NEMA Chapter 1 principles have been integrated with the strategies and projects emanating from the IDP process.

3.3.3. EIP

Every national department that exercises functions which may affect the environment, and every province must compile and regularly review Environmental Implementation Plans (EIP) according to sections 11 and 12 of NEMA. According to section 12:

"The purpose of environmental implementation and management plans is to -

(a) coordinate and harmonise the environmental policies, plans, programmes and decisions of the various national departments that exercise functions that may affect the environment or are entrusted with powers and duties aimed at the achievement, promotion, and protection of a sustainable environment, and of provincial and local spheres of government, in order to -

(i) minimise the duplication of procedures and functions; and

(ii) promote consistency in the exercise of functions that may affect the environment;

(b) give effect to the principle of cooperative government in Chapter 3 of the Constitution;

(c) secure the protection of the environment across the country as a whole;

(d) prevent unreasonable actions by provinces in respect of the environment that are prejudicial to the economic or health interests of other provinces or the country as a whole; and

(e) enable the Minister to monitor the achievement, promotion, and protection of a sustainable environment."

3.3.4. Conservation Planning

The need for systematic biodiversity and conservation planning has been stipulated in the:

- National Environmental Management: Biodiversity Act (NEMBA) (Act No 10 of 2004) and
- National Environmental Management: Protected Areas Act (NEMPAA) (Act No 57 of 2003)

However, conservation planning takes many forms and it is not only the principles of, and processes associated with, the declaration of formally protected areas that have been legislated. Also mentioned in the NEM: Biodiversity Act, 2004, are:

- Bioregional plans that highlight critical areas requiring conservation action;
- Biodiversity Management Plans (BMPs) that operate at a finer scale than Bioregional Plans and are focussed on threatened ecosystems and species;
- Biodiversity Management Agreements necessary to implement any Biodiversity Management Plan;
- The identification, listing and promotion of threatened or protected species and ecosystems; and
- Control measures for alien invasive species.

3.3.5. Permitting

Various pieces of legislation makes provision for assessment and permitting of activities deemed to pose a potential risk to natural resources or the social environment. Indirectly, the assessments contribute to improved activity design and execution, but they also function as important facilitators of public involvement in environmental matters.

3.3.5.1. EIA

The environmental permitting process with the most general application and widest ranging scope is the Environmental Impact Assessment Authorisation process. It is defined under the EIA Regulations, of which the last major revision was released in 2010. The regulations are published under the auspices of Section 24 of National Environmental Management Act, 1998, and specify which development activities require permits as well as the processes required to assess environmental impacts for the purposes of permitting. All the activities listed in the three schedules of the Regulations must obtain EIA approvals before they may commence.

The regulations also make provision for compliance and enforcement actions and penalties.

Generally, an EIA must contain a scoping phase, an impact evaluation, and a form of management plan/programme to mitigate the negative residual impacts of a development.

3.3.5.2. Atmospheric Emissions License

A list of activities with potential emissions impacts has been published under the auspices of Section 21 of the National Environmental Management: Air Quality Act, 2004. These activities require permits before they may commence, or before they may exceed certain thresholds.

3.3.5.3. Conservation Ordinances

Various activities, like hunting practices and movement of specimens, still require permits under the Nature Conservation Ordinances as published for provincial jurisdictions.

3.3.5.4. EMPR

An Environmental Management Programme Review (EMPR) is an EIA that has been compiled specifically for the purpose of mining prospecting and processes, in accordance with the specifications of the Mineral and Petroleum Resources Development Act, 2002, and its regulations from 2004.

3.3.5.5. Waste Management Licenses

A list of waste management activities that may generate excessive or dangerous waste has been published under the auspices of Section 19 of the National Environmental Management: Waste Act, 2008. These activities require permits before they may commence, or before they may exceed certain thresholds.

3.3.5.6. Water Use Licenses

Unless granted *de facto* approval under a General Authorisation, the extraction, use or disposal of water requires an approval under Section 21 of the Water Act, 1998.

3.3.5.7. Heritage

Activities that are deemed potential threats to known or undiscovered heritage resources require heritage assessments under the auspices of the National Heritage Resources Act, 1999. These may be absorbed into similar assessment processes such as EIA applications.

3.3.6. Norms & Standards

Some legislation makes provision for norms and standards that may represent thresholds for the execution of potentially detrimental activities, or guidance for the compilation of various forms of management plans. A common example is the General Authorisations that allow water uses that comply with certain standards to proceed without additional authorizations under the Water Act, 1998. Another example is the requirement for norms and standards to determine the different categories and descriptions of waste and waste related activities as found in section 7 of the NEM: Waste Act, 2008.

The most recent amendments to NEMA allow for the compilation for standards for activities which are listed as well as non- listed activities.

3.3.7. SEA

The requirement for Strategic Environmental Assessments is found in Section 2(4)(f) of the Local Government: Municipal Planning and Performance Management Regulations, 2001, which insist on an SEA component for all Spatial Development Frameworks (SDF). Reference is also found in the Land Use Bill of 2002.

A form of SEA is contained in part 2 of the Water Act, 1998, which requires the determination of water resource quality objectives, in relation to a water resource classification system. According to the explanation under section 2 of the Act: "*In determining resource quality objectives a balance must be sought between the need to protect and sustain water resources on the one hand and the need to develop and use them on the other.*" The setting of the objectives therefore needs to assess the impact of the objectives on the water users, the socio-economic context, the natural environment, and the different geographical areas in which they will apply.

3.3.8. EMF

EMF processes are defined through a combination of legal references, including NEMA Section 24(2) & (3), NEMA Section 24(4)(bA)(i), NEMA Section 24O(1)(b)(v), NEMA Section 44(2), and the EMF Regulations. These provide the legal mechanisms for EMF compilation and application, especially with regards to their use to inform the EIA process. The EMF regulations were issued along with the EIA regulations in 2010, and detail the requirements for EMF studies in terms of purpose, content, process and function.

3.3.9. EMP

Environmental Management Plans or Programmes (EMP) are required at different levels of application, ranging from site specific to national or strategic. On the highest level, sections 11 and 14 of NEMA require every national department that exercises functions involving the management of the environment to compile and maintain an environmental management plan. On an individual site level, EMPs are required as core components of EIA and EMPR applications.

3.3.10. Risk Assessment

The need for risk assessment emerged primarily in the private sector in response to the King II report, Code of Corporate Practices and Conduct in 2002. However, risk assessments have been required for the assessment of new and existing dams in terms of the Water Act since 1998.

Local authorities have not explored risk assessment in relation to IDP except in some cases as part of Disaster Management Sector Plans. The main legislation introducing risk assessment to local authorities is:

- Disaster Management Act (Act No 57 of 2002)
- National Environmental Management: Biodiversity Act (NEMBA) (Act No 10 of 2004)

3.3.11. Monitoring and Reporting

The need to monitor the status of natural resources or the progress of implementing environmental management actions is captured in various places in South African legislation. An example is the need to monitor the status of national water resources, as per chapter 14 of the Water Act, 1998.

3.3.12. Fiscal Policy

Environmental management is increasingly becoming ingrained in fiscal policy and regulation.

The NEM: Waste Act, 2008, for example, allows the Minister to set standards for the collecting and application of tariffs specifically related to waste and waste management. Similar provisions are found in the Water Act, 1998.

3.3.13. Public Participation

Public participation is included in most, if not all regulatory prescriptions that deal with the design and application of environmental management tools. In all cases, stakeholder participation is required before a tool can be used to affect the real or perceived rights of interested and/or

affected parties. Different pieces of legislation require different levels of participation, but generally allow for both active consultation with stakeholders and the opportunity for stakeholders to submit representations in respect of proposed policy or regulation.

3.4. PRIMARY TOOLS OR COMPONENTS OF TOOLS

Often, environmental management tools consist of a range of actions or techniques through which information is gathered, processed and implemented. Breaking well-known tools down into their constituent components can assist in understanding the nature of the issues surrounding the use of environmental management tools, and possibly pave the way towards improvements to the tools or their use. This section therefore considers the four phases of the environmental management cycle, and attempts to distinguish basic components that together constitute commonly known and used tools.

3.4.1. Primary Data Collection & Knowledge Creation

The first distinct type of environmental management tools or techniques relate to primary data collection. These techniques aim to gather status quo information about the presence or absence of various social or environmental resources or elements, with no data processing other than for the purposes of simplified representation. Included in this category are:

TABLE 4: TOOLS FOR PRIMARY DATA COLLECTION

Name
Bioregion demarcation
Buffer zones
Ecosystem services assessment
Environmental Impact Reporting - visual impact, noise impact etc.
Environmental Resource Assessment (environmental goods & services)
Full cost accounting
Inventories and surveys (Thematic Specialist Studies)
National Spatial Biodiversity Assessment (NSBA)
Threatened or Protected Species and Habitats
Surveys

The value-add component of the environmental management cycle also takes place at an early stage, and involves the analysis of raw environmental data in order to improve understanding of the relationships between environmental facets, and convert the understanding into concrete guidance for decision-making or actions.

The actual assessment and calculations of cumulative and relative impacts, comparison against levels of acceptability and representation in various ways fall within this category. A more complete list includes:

TABLE 5: TOOLS FOR KNOWLEDGE CREATION

Name
Bioregional plan
Causal networks
Certification
Charters & codes of practice
Cost-benefit assessment
Cumulative assessment
Ecological Risk Assessment
EMPR
Environmental Management Accounting
Geographic Information System analysis
Health Impact Assessment
Impact significance rating
Integrated Coastal Management
Integrated Environmental Management
Integrated transportation planning
Integrated Water Resource Management
Island biogeography
Levels of acceptable change
Life cycle assessment
Norms and standards
Participatory (rural) appraisal
Policies
Rapid Assessment
Risk Assessment
Scenarios
Setbacks
Statistical risk assessments
Systematic Conservation Planning
Waste management plans

3.4.2. Implementation and Decision-Making

An environmental management tool in this category can be seen as any action that uses environmental data to inform decision-making, whether the decisions fall within the 'environmental' field or not. It also includes the actual implementation of the decisions and environmental management actions.

TABLE 6: TOOLS USED FOR IMPLEMENTATION AND DECISION-MAKING

Name
(National) sustainable development strategies
Biodiversity management plans
Biodiversity offsets
Business supply chains
Carbon Trading
Clean Development Mechanism (CDM)
Eco-labelling
EIP
EMP
EMPR
Environmental Management System (EMS) (ISO 14000)
Environmental Education & Awareness
Estuary management plans
Fiscal policy (taxes, incentives, etc)
Green building
Green design
Green procurement
Green servitudes
IDP
Payments for environmental services
Permitting and licensing
Protected Areas – Biospheres, NEMPA protected areas,
Rehabilitation plans
Spatial Planning (SDF etc.)
Stewardship

3.4.3. Monitoring & Reporting

Monitoring of the presence, correctness of implementation, and effectiveness of environmental management is the final step in the environmental management cycle. Very obviously, this phase contains:

TABLE 7: TOOLS FOR MONITORING AND REPORTING

Name
Carbon disclosure/footprinting
Community-based monitoring
Compliance monitoring and reporting
Corporate Responsibility Reporting
Environmental audits / inspections
Environmental Monitoring Committees
Environmental Rating Schemes
Project, programme and policy implementation monitoring

State of Environment Reporting(SOER)
Sustainability assessment
Sustainability reporting (e.g. GRI)

3.4.4. Enforcement & Feedback

The fourth phase involves following up on information being generated on the execution of projects and decisions. It could be positive or negative, involving both punitive actions and corrective steps. The tools essentially come down to actions aimed at enforcing compliance with standards or obligations, and measures to use the learning to improve the cycle of environmental management such as reviews of programmes.

3.5. COMPLEX AND CROSS-SECTORAL TOOLS

This section dwells on some generic environmental management tools that are fairly well defined and understood, but typically consist of a number of constituent components or sub-tools. Such tools need to be seen in their complexity since the whole is usually more than the sum of the parts.

3.5.1. SEA & EMF

The recognition of Strategic Environmental Assessment (SEA) as an environmental management tool started in 1998, when the Department of Environmental Affairs and Tourism defined it as

"…a process to assess the environmental implications of a proposed strategic decision, policy, plan, programme, piece of legislation or major plan." (DEAT, 2007)

Subsequent definitions maintained the idea that SEA should focus on bringing environmental issues into planning processes. The most recent official definition narrows the scope somewhat, by limiting its application to policies, plans and programmes:

"…a process that integrates sustainability considerations into the formulation, assessment and implementation of policies, plans and programme[s]." (DEAT, 1998)

This slightly narrower focus is similar to the approach taken in the European Union, where a comprehensive Directive on the application of SEA by member states is available.

Whereas an Environmental Impact Assessment (EIA) is typically a 'grudge' item in development projects, an SEA is a 'choice' item that can be used to:

i. allow for a wider consideration of impacts and alternatives (as compared to e.g. EIA)

ii. play a role as a pro-active tool to support the formulation of strategic action for sustainable development (an increasingly important aspect of all development projects)
iii. increase the efficiency of tiered decisionmaking (including strengthening of EIA)
iv. allow for a systematic and effective consideration of the environment at higher tiers of decisionmaking (this also becomes an important competitive aspect)
v. facilitate consultation and participation by stakeholders

Actually, SEA not only aims at supporting an environmentally sound and sustainable development, it also attempts to strengthen strategic processes, improving good governance and building public trust and confidence in strategic decision making. Ultimately, SEA can lead to saving time and money by avoiding costly mistakes.

SEA remains an umbrella term, however, and describes a type of assessment process rather than a particular tool. According to the latest official guideline, the Department of Environmental Affairs and Tourism (DEAT, now the Department of Environmental Affairs or DEA) publication on SEA from 2007 (DEAT, 2007), the process can follow one of three models:

TABLE 8: DIFFERENT SEA MODELS

EIA Based Model	Integrated Model	Sustainability Framework Model
• Screening • Scoping • Alternative plans & programmes • Public participation • Mitigation and follow-up measures • Documentation • Review	Custom process matched to existing and defined policy formulation or planning process	Sets a framework for the formulation, assessment and management of many policies, plans & programmes by outlining sustainability criteria upfront

Because of the wide scope for application, SEA can include studies such as:

- Environmental Assessment of Trade Related Agreements and Policies in South Africa

- Environmental Assessment of International Agreements
- Etc.

The Minister of Water and Environmental Affairs defines an EMF as:

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

This immediately ascribes it a strong spatial planning focus, with an assessment of natural resources being the foundation. An EMF is, however, an SEA process that is customised to generate decision-making guidance in a spatial form. It follows the normal SEA process, but ultimately provides spatial planning practitioners with geospatial references of how planning can take the development and protection of natural resources into account.

The regulations that have been published to specify the process that needs to be followed during the course of the compilation of an EMF prescribe a Status Quo phase, a sensitivity assessment, Desired State Assessment, evaluation of environmental opportunities and constraints, identification of specific management zones and management guidelines, as well as actions related to the official adoption of the EMF as planning and development control tool. This manages to stretch the EMF as tool all the way across the spectrum from basic data gathering to monitoring of the implementation of planning guidance.

3.5.2. EIA

EIA is generally seen as a single environmental management tool, but since it encapsulates all four environmental management phases in its process requirements, it has to be seen as a complex tool that relies on the integration of various components. The value of the integration lies in the possibility to maintain coherence between the different constituent tools, and thereby allow a more seamless throughput of environmental information.

Typical components of an EIA are:

- Thematic Specialist Studies
- Screening
- Scoping
- Impact evaluation

- Environmental Management Programme
- Stakeholder Engagement

With this recipe in place, the nature of the specialist inputs can determine what kind of an EIA it becomes – e.g. a heritage impact assessment, social impact assessment or health impact assessment.

3.5.3. Public Participation

Stakeholder engagement is a component of, or process associated with, a number of the more comprehensive management tools. It is a legal requirement for many forms of environmental planning, and where assessments are taking place for activities that could impact on a person's environmental rights. Techniques and theories related to stakeholder engagement abound, and are listed in Table 9.

TABLE 9: TECHNIQUES OF PUBLIC PARTICIPATION (AFTER WWW.IIED.ORG)

Type	Name
DELIBERATION & ENGAGEMENT	Community-based natural resource management (CBNRM) Community meetings Community mobilisation Conferences Eco clubs Environmental tribunal Internal meetings Lobbying Meetings with external actors Multi-stakeholder consultation/processes National councils for SD Participatory mapping Participatory planning Participatory rural appraisal Partnerships (e.g. citizen-city administration) Private-public committees Public consultation Public hearing Public participation (general) Reward systems/motivation/funds augmentation Stakeholder mapping Workshops & seminars
CREATING DEMAND & AWARENESS	Awareness workshops Media (campaigns) Negotiations Practical examples

Type	Name
	Public online databases Right to Information Act

3.6. SPHERE OF APPLICATION

An important question to ask is who is using the various environmental management tools, and for what purpose. Knowing where tools are applied will add a dimension to the environmental management cycle that can inform the analysis of the issues surrounding the tools and their use. Table 10 provides the answer to this particular question. It gives an overview of the tools in use by the various spheres of society, and some statements regarding the focus area for each sector.

TABLE 10: THE SPHERES OF APPLICATION OF ENVIRONMENTAL MANAGEMENT TOOLS

Sphere of Application	Tools Used	Predominant focus
National Government	• Specialist Studies • EMPR • WUL • EIA	Permitting relating to natural resources with national interest
	• International agreements • IWRM • SEA • Conservation planning • GIS	Planning relating to national interest resources
	• Policy & Framework (e.g. NFSD) development	Coordination of responses to national and global issues
	• EIP • Certification schemes	Coordination and encouragement of best practice
	• Compliance monitoring and reporting • SOER • Audits	Monitoring and reporting
	• EMP • Fiscal policy • Carbon Trading • CDM • Protected Areas • Enforcement actions	Field of practical execution
Provincial Government	• Specialist Studies • EIA • Risk Assessment • Biodiversity Offsets	Permitting relating to natural resources with provincial interest

Sphere of Application	Tools Used	Predominant focus
	• GIS • Coastal setbacks • Buffer zones • SEA • Biodiversity planning	Planning relating to provincial interest resources
	• EIP	Coordination and encouragement of best practice
	• SOER • Audits • Compliance monitoring and reporting	Monitoring and reporting
	• Enforcement actions • Protected Areas • EMP	Field of practical execution
Local Government	• Emissions permitting • Biodiversity Offsets • Green Servitudes • Specialist Studies	Permitting relating to natural resources with local interest
	• GIS • Air Quality management plans • SEA • Resource economics	Planning relating to provincial interest resources
	• EIP	Coordination and encouragement of best practice
	• SOER • Audits • Compliance monitoring and reporting	Monitoring and reporting
	• EMP • Waste Management Plan • Fiscal policy • Enforcement actions	Field of practical execution
Public	• EIA • Audits • GIS • Compliance monitoring and reporting	Participation as stakeholders
	• Carbon Trading • Stewardship	Support for conservation actions
Social & Environmental NGO	• SIA • Resource economics	Sector studies
	• Accreditation schemes • Environmental Education	Support for conservation actions

Sphere of Application	Tools Used	Predominant focus
	• GIS	
	• EIA • Compliance monitoring and reporting	Participation as stakeholders
Private sector	• EIA • Specialist Studies • GIS	Permitting
	• CBA	Viability/feasibility assessment
	• Certification schemes • Carbon footprinting • Sustainability reporting • Norms & Standards (ISO 14000) • Audits • Compliance monitoring and reporting	Monitoring and reporting
	• Waste Management Plan • EMS • EMP • CDM • Green procurement	Field of practical execution

4. THE APPLICATION OF IEM TOOLS

4.1. METHOD OF ANALYSIS

This section assesses information on problems experienced, or concerns expressed, about the application of environmental management tools. These issues are, however, viewed as merely being the one side of a coin – the other side being recommendations on how the system or component under scrutiny can be improved. The method of analysis will therefore not progress from a 'what is wrong' to a 'what should be done' component, but rather rephrase issues and constraints to resemble recommendations on what can be done to improve the use of environmental management tools, as well as the tools themselves, resulting in a single comprehensive set of suggestions and recommendations.

A simple classification is used to give structure to the analysis – issues are classified as either tool specific or generally applicable to the environmental management system. The tool specific issues are dealt with first, followed by the overview of the concerns relating to the entire system.

The content for this section is an amalgam of commonly perceived concerns, issues and comments raised through the course of the EIAMS consultation process, as well as issues identified in the substantial body of knowledge that has been generated during the four decades or so of environmental management practice.

4.2. ISSUES WITH, AND IMPROVEMENTS TO, SPECIFIC TOOLS

4.2.1. Screening

One of the main criticisms of the environmental assessment and management process is that it places onerous assessment requirements on projects that do not merit time and resource intensive investigation. Although the current EIA regulations go to great lengths to apply a screening framework to limit the need for unnecessary impact assessments, the common consensus is still that the current environmental assessment system can benefit from further 'streamlining' through additional levels of screening.

Screening can occur at different levels in the environmental management cycle, and can be applied to reduce unnecessary components of an assessment. The current EIA screening process already looks at project extent, context, geographic location, history and sensitivity, but once and EIA is triggered, a default application and assessment has to follow irrespective of the actual

details of the development. It can be argued that there should be mechanisms to further reduce the requirements for the environmental assessments even if EIA authorizations are required. For example, there could be different process requirements for large projects in brown field sites versus projects in green field sites.

A simple or rapid screening process could possibly be applied at an early stage in the assessment cycle in order to determine further requirements for assessment. This could include screening for compatibility with plans, standards and guidelines in the areas they are proposed, prior to the identification and assessment of impacts and alternatives. Such a measure is heavily dependent though on the quality and content of the reference planning instruments. For example, if Spatial Development Frameworks are used as screening reference, there needs to be assurance that they were developed in such a way that sensitive or non sensitive environments have been identified accurately. The use of strategic references and planning could, however, be used in some situations to completely negate the need for site or project specific investigations.

A more risky method of screening, in the sense that it has a higher risk of misuse, is the application of government discretionary power to enforce or waive EIA assessment requirements.

4.2.2. Norms and Standards

The use of Norms and Standards as a screening tool for EIA has been touted for some years now, and the enabling legal provisions already exist. The idea is that for standard activities where accepted norms and standards (e.g. SABS standards) exist, the need for additional assessments and authorizations should be eliminated in favour of a focus on self-regulation and heavy penalties for non-compliance. The application of norms and standards further allow for the control of activities that do not ordinarily require environmental impact authorizations yet have the potential to impact on the environment.

Norms and standards can be linked to various other screening levels in order to incentivize appropriate forms of development. For example, in order to reduce development pressures in bio-sensitive areas the administrative controls on activities in non-sensitive areas can be reduced through the use of acceptable practice standards.

A closely related tool, the use of ‘levels of acceptable change’ can also be applied in the same manner. However, the application would be less certain due to the likelihood of differing opinions over acceptability and uncertainty with regards to cumulative impacts.

4.2.3. EMP

One of the consequences of the current inordinate reliance on the regulatory requirements of the EIA process is that related tools such as Environmental Management Programmes are neglected, thereby eroding the effectiveness of the entire environmental management cycle. The concern is that EMP compilation comes too late in the environmental assessment and management process. It is believed that many concerns of the public or government officials could be addressed in proper management of the environment as opposed to an obsessively detailed investigation. EMPs should therefore be used to describe the qualitative and quantitative environmental management measures to be employed during the actual development process, based on the information on environmental impacts and levels of acceptability established during the environmental assessment process. Closer contact and better communication should also be established between the development proponent, environmental assessment practitioners, contractors and building construction councils in order to make EMPs as practical and relevant as possible. Additionally, or alternatively, there should be allowance for peer review by persons with experience in construction/implementation.

It should be noted though that even the best EMP becomes a paper exercise if there is no compliance or follow up to correct non-compliance or unanticipated environmental consequences. Monitoring of development impacts and compliance with the EMP should be a requirement, and should be used to inform Interested and Affected Parties about the environmental objectives and controls to be achieved, and the status of compliance.

EMPs do, however, need to be dynamic tools that can adapt to changing circumstances and conditions in order to ensure an optimal strategy for environmental management during project implementation. This becomes problematic when there are different stakeholders involved and amendment processes that take time to conclude. The principle and practice could therefore be at odds.

4.2.4. EMS

The role of International Standards Organisation (ISO) standards and certification, and other environmental management systems, can be expanded to allow for full life cycle environmental management. A properly constituted environmental management system would establish procedures for day-to-day environmental management, environmental incidents as well as

institutional procedures for continuous information management and iterative system improvements.

4.2.5. EIA

Because EIA studies represent the complete spectrum of the environmental management cycle, just about every criticism that is levied against environmental management or its constituent parts will be applicable to the EIA process. It has been pointed out that EIA is often confused with the full spectrum of IEM, thereby leading to the confusion over the role and function of EIA studies (Retief & Kotzé, 2008).

Concerns consequently relate to whether or not EIA is invoked in the correct instances, whether the process is robust, effective and efficient, whether EIAs lead to appropriate substantive outcomes, and whether there are enough linkages with other tools and processes. In addition, concerns are raised about the necessary levels of competence and skills for EAPs.

In order for the EIA process to remain legitimate as an environmental management tool, its relevance should be ensured. Coupled to this is the necessary efficiency in process execution and administration. Applicability would need to be ensured by eliminating the need for irrelevant (paper exercise) assessments and extraneous specialist investigations.

Effectiveness of the EIA process is a much more involved issue. It relates to both the constituent components of the EIA process being made more relevant, accurate and useful, and the completion of the environmental management cycle to ensure that the outcome of the EIA serves to improve compliance with the objectives of environmental sustainability. Ideas that have been bandied about on how the EIA process can be improved include more selective requirements for assessment of development alternatives, the increased use of class assessments, and closer links with related processes such as spatial planning.

The EIA process can, however, also be improved through a more rigorous impact investigation and assessment phase. EIA investigations do not always apply other environmental management tools correctly, or in some cases completely omit them from the suite of investigative procedures. Specific concerns that have been raised is the absence or incorrect use of contextual issues, cumulative effects assessment, cost-benefit analysis, life cycle assessment and risk assessments (including health, social, ecological etc.) as well as poor linkages with EMPs. Correct application of appropriate constituent tools will improve the scientific accuracy of the EIA process, thereby

improving the legitimacy, credibility and practical value of the assessment. For example, an appropriate EIA process will result in information that can be used to inform emergency and disaster management plans to be in place immediately upon project implementation, thereby improving the certainty about environmental protection for stakeholders.

Necessarily, the improved application and use of the EIA process and its constituent parts will require the presence of the necessary skills and capacity of the EAPs administrating the process.

The value of the EIA process will also be increased if post-approval tools are implemented more rigorously. This relates to ensuring compliance with conditions imposed and recommendations made in the specialist reports and EMP.

4.2.6.SEA

One of the ways in which other environmental management tools can be made more effective is to frame their application in a more strategic or spatial context through the use of SEA or EMF. The idea would be to use a strategic, contextualized and 'big picture' assessment to precede and inform detailed and site-specific assessments. The strategic level investigation can then effectively deal with off-site and cumulative impacts, and potentially create a framework through which detailed investigations can be streamlined.

Various forms of SEA can be used to fulfill this function – anything from the SEA component of spatial planning, to EMFs, and even strategic assessments of policy and programmes.

The imposition of Strategic Environmental Assessments as a mandatory tool is difficult though since it is inherently flexible and applied to a myriad of different planning systems. SEA is therefore not necessarily standardisable or enforceable. Typically in South Africa, legislation instructs decision-makers to refer to and take guidance from relevant SEA (or EMF) guidance but do not make it compulsory to comply with the guidance provided. There is also little legislative directive to ensure a wide application of SEA, and not much to guide non-environmental sectors and fields in the application of SEA. It is also difficult to determine at which scale SEA should take preference over EIA, and how the processes relate in practice.

The nature of the SEA process also means that the timelines of strategic projects can be long, stakeholder participation extensive and the appeal process vague. Public participation during an SEA can also be used or misused to reduce the opportunity for stakeholder engagement on more specific studies (such as an EIA falling within an EMF study area). A similar concern relates to the

possibility for prominent sector stakeholders to manipulate strategic planning processes for their sector.

4.2.7. Conservation Planning

Conservation planning is one of the specialist fields that inform the application of more universal environmental management tools. It is usually the basis from which ecological base data is originated, and the framework against which ecological impacts are evaluated. It is even used as a layer of screening in the EIA process.

This central importance therefore means that there should be clear standards that allow 'good' conservation planning to be separated from 'bad' planning. Such standards should be set for both the planning process (methodology) and the national, provincial and local conservation targets that are to be achieved. Appropriate standards or legal status will also give structure to the manner in which conservation planning can be challenged, to prevent challenges such as high-level modeling being accused of site-specific inaccuracy.

It is important though to ensure that appropriate public participation takes place as part of the compilation of the plans. Typically, the methodology for systematic conservation planning doesn't include public participation in the process, although some examples in the Western Cape are exceptions to the rule. The need for stakeholder participation should therefore be determined in accordance with the intended use of the conservation planning, and the requirements of common law.

In order for conservation plans to be used appropriately, more awareness can be created in terms of how the different tiers of conservation planning relate to each other, and to external environmental management tools. This could potentially be linked to legal requirements for compliance with conservation planning by environmentally destructive activities such as mining and urban expansion.

4.2.8. Cumulative Effects Assessment

Cumulative effects assessment should be one of the basic information sources that informs EIA and SEA, since the synergism between issues within a cumulative impact effect may result in different outcome as opposed to assessing only individual impacts. However, cumulative effects are hard to assess at the level of project specific EIA, and therefore represent a compelling argument for the increased use of strategic level assessments.

4.2.9. Life Cycle Assessment

Life cycle assessment is one of the tools with which longer term, externalized, and hidden effects can be discovered and brought to bear on the assessment of development proposals. As a tool it is more common in business modeling, since by using a more encompassing perspective, the economic advantages of a development can be measured and the most suitable technology selected. Such considerations should inform environmental assessments and decisions as well, or alternatively, the life cycle environmental impacts of a project should be used to determine the nature and design of the project.

A particular field of application where life cycle assessment would add value and realism to environmental impact assessment is mining, where the environmental and social impacts over a long term can better inform the actual costs of the project and inform procedures and safeguards for mine closures.

The main concern with life cycle assessment is that it is not always possible to put a monitory value on environmental issues, and therefore the environmental costs cannot always be comfortably compared to non-environmental effects, especially if perceptions or value judgments are involved. It is also difficult in some cases to determine what constitutes the life span of a project. Nevertheless, theoretically it should be possible to put values to environmental resources and thereby make a business case for green processes within an industry if the actual effects of a given technology or development is calculated.

Issues that typically don't but should inform environmental impacts, and consequently should be included in life cycle assessment, include social and cumulative health impacts, long term effects on water resources (e.g. Acid Mine Drainage) and post-disposal effects.

4.2.10. Cost Benefit Assessment

Life cycle assessment is closely related to cost benefit assessment. Full cost accounting, i.e. calculating the real cost of a development can inform the comparison of development benefits against the real costs of the development. This is especially valuable to determine whether an activity will be able to meet preset environmental standards. It is also a tool that can inform how environmental resources such as ecosystem services can improve the feasibility and operational costs of developments.

4.3. SUCCESSESFUL APPLICATION OF TOOLS

Whilst there is a fair amount of criticism directed at environmental management tool application practice, it should not be seen as a completely flawed process. Various scenarios can be described where the application of tools serves the correct purpose and leads to better environmental management. Some of these need to be highlighted in order to encourage or improve the practices.

4.3.1. Conservation Planning

Recent advances in systematic biodiversity planning have brought about a significant improvement in the overall understanding of conservation requirements, and the opportunity for consistent application of base information in practice. For example, systematically derived provincial scale conservation plans can now inform spatial planning and EIA alike, improving the consistency of decision making in both fields of application.

4.3.2. Public Participation

The need to involve public stakeholders during the formulation of policies and plans that might affect their environmental rights is a constitutional imperative. It is, however, not always practical to involve stakeholders in all processes, partly because of the risk of stakeholder fatigue and partly because of the limited value of involving laypersons in highly technical procedures. Effort should therefore be spent on finding meaningful channels of participation for public stakeholders, and potentially forums that can combine related participation processes. For example, biodiversity planning could be ‘participated’ through the course of municipal spatial planning. Another opportunity could lie with regular well-publicized public meetings organized by the provincial or local authorities that would serve as the platforms for people to contribute on whichever stakeholder engagement processes are selected for the day.

4.3.3. Strategic Planning & Sustainability Objectives

Environmental planning on a strategic level, and specifically planning that drives decision making towards stated sustainability objectives, has the potential to act as a unifying force in environmental management practice. Some of the benefits of the use of more strategic environmental planning tools include:

- The formulation a clear and shared vision, goals and direction for specified locations, areas or regions.
- The opportunity to translate strategic objectives into practical measures to inform day-to-day decision such as competing land-uses or EIA applications.
- The formulation of a sustainability framework that serves as reference for the critical review of decisions or planning.
- Giving specific guidance to development planning, based on broader strategic considerations, to steer development away from sensitive areas.
- The use of strategic tools can assist in raising the profile of environmental issues in non-environmental forums, or serve in an integrative role.
- It provides information on the opportunities and constraints that the environment places on development.
- SEA streamlines project level decision making and authorization processes such as EIA.

4.3.4. Cumulative Effects Assessment and Life Cycle Assessment

The study of possible cumulative effects is necessary in order to determine whether or not changes have already been set in motion that are detrimental to the long-term health of the environment and the people who rely on it. Cumulative effects could take effect over the course of an individual project's life, or due to the combined effects of different projects. Full life cycle investigations will indicate the extent of the project's contribution to environmental degradation, or to the required costs to offset the loss of ecosystem services over time. An accurate determination of the desirability of a project would then be possible, or alternatively a more correct assessment of the issues of priority associated with a particular project or project area.

5. THE IEM SYSTEM AND FRAMEWORK

5.1. METHOD OF ANALYSIS

This section details recommendations on how the IEM system as a whole can be improved. This is done on the basis of an analysis of the current concerns over the system, and resultant recommendations on how the concerns can be addressed appropriately. To an extent, the recommendations on the improved use of specific tools is used to inform system improvements that can facilitate the implementation of the recommendations, but specific guidance is also provided in terms of general system improvement.

The analysis and guidance is presented in four steps:

- Assessment of current concerns
- System analysis
- Overall system design
- Specific tools and their role in the system
- Implementation

5.2. ASSESSMENT OF CURRENT CONCERNS

The actual design of the environmental management system should keep certain principles and design features in mind when incorporating tools into a coherent environmental management framework. These are provided in Table 11 below.

The analysis classifies the recommendations as issues related to principles, system components and implementation.

Principles represent universal ambitions for IEM in the country, and apply at a high level. They are intended to inform the overall system design and to act as reference guidelines in case of doubt or when situations or issues need to be interpreted. System components, on the other hand, are specific processes or steps that must be provided for in the system in order to address particular concerns.

Implementation guidance is provided as an attempt to preemptively avoid issues when it comes to actual application of tools – whether related to impracticality or incapacity.

TABLE 11: IEM SYSTEM DESIGN PRINCIPLES

Principle	System components	Implementation

• Some tools will need to manage the impacts of existing activities and developments and incentivized improvement in their performance.
• It should be clear whether external imposition (control) or internal reform (conscience) is the most appropriate approach in a given situation.
• The intrinsic value or rights of all ecosystem components must be acknowledged.
• The use of tools should be positive – i.e. be aimed at custodianship actions to preserve natural resources for the future, or maximise positive impacts of development (enhance, improve or maintain). At the same time there must be measures in place to correct perverse economic incentives.
• The use of tools should be aimed at achieving defined sustainable development objectives. Similarly, an absolute baseline of minimum conservation requirements should be determined.
• The idea of an enviable example of environmental legislation should not be compromised through over- or under-regulation.
• Overarching environmental regulation must be reviewed every 2 to 3 years.
• Assessment tools have to fully describe
	• A clear framework or hierarchy of tools has to inform the use of tools either separately or in combination.
	• There should be a clear distinction between the use of information management tools – e.g. EIA - and the application of information in practice.
	• Environmental authorizations should focus on what the development activity must achieve rather than on how to achieve the desired outcome.
	• The system must allow for the incorporation of traditional knowledge in appropriate tools.
	• Judgment of significance should be systematic and scientifically valid.
	• A systematic impact assessment approach, at strategic level must inform and prevent incremental decisions that lead to erosion of environmental value.
	• Project EIA should be conducted with levels of information and certainty that do not exist and could not be provided to the same extent at policy and planning levels.
	• A suite of approaches should be available for environmental management, including (Retief, undated):
	  ○ Command and control (e.g. Effluent and emission standards in permits)
	  ○ Market-based instruments (e.g. Pollution taxes and tradable permits)
	  ○ Civil based instruments (e.g. Eco-labelling, performance reporting, technical assistance)
	  ○ Agreement based (e.g. International, covenants and EMCA's)
	  ○ Self regulation (e.g. Communities of Practice)
	  ○ Voluntarism (e.g. ISO 14001)
	• The system must make provision for integration of permitting processes (NEMA section 24(8)), intergovernmental coordination (NEMA section 24 (k)) and alignment of authorization processes (NEMA section 24 (l)).
	• System design must make provision for data, knowledge or capacity constraints.
	• Strategic tools (E.g. EMF) or related processes (e.g. IDPs and SDFs) can only be used as alternatives or to supplement specific tools if, in the process of being formulated, they have adequately assessed the potential environmental impacts of the suggested development types.
	• Consumptive, destructive or extractive activities must be investigated fairly.
	• Biodiversity conservation tools such as Biodiversity Off-sets must be given more consideration and be linked to other tools.
		• More environmental impact management tools should be legislated.
		• Corruption results in the need for command and control and overregulating.
		• Ecosystem guidelines & training for EAPs & officials in national biodiversity priority areas should become a requirement.
		• Assessments must be designed to be simpler to comment on, and should be in appropriate mediums of communication.
		• Slow authorization/ licensing and permitting result in illegal activities and an overall worse outcome.
		• Implementation requirements should be realistic – e.g. environmental damage is often hard to completely reverse.

Principle	System components	Implementation
and inform the management of environmental impacts over the life span of development activities. • Tools, and the incentives that they advocate, must address the hierarchy of impact management namely, Avoidance, Mitigation, Compensation, Management (Including Compliance Monitoring, auditing, enforcement). • Appropriate determinations of need and desirability of a development must be considered in terms of how it influences decisions. • The use of tools must redirect the environmental impact management process from a reactive requirement to a proactive planning instrument. • Environmental management should provide insight into the effects of projects, plans, programmes and policies. • Environmental management should provide a forum for stakeholder participation. • The use of tools has to be cognizant of information gaps / uncertainties / assumptions. • The application of tools must be comprehensive enough to address direct, indirect and cumulative impacts.	• Tools need to be pro-active and current – i.e. deal with current issues such as climate change (Mitigation & Adaptation) biodiversity strategies economic (growth & development) strategies & renewable energy. • There should be flexibility in the system • The provision for exemption from the entire process must be carefully considered • There must be more universal alignment of policy – e.g. make the national biodiversity framework, regional plans, the national protected areas expansion strategy reconcile with EMFs and SDFs. • The right of participation must be retained in new tools and approaches. • Early involvement of EAPs in development planning and design can improve the efficiency of the system. • Policies can be developed to improve the reliability and consistency of tools such as SEA and biodiversity offsets, or principles such as 'no net loss'. • Health effects must be thoroughly considered. • Transportation issues must be considered to ensure minimum impact on emissions and road congestion. • A Social Impact Assessment incorporating primary field work and local social groups should be incorporated in all EIA's to consider potential effects on social well-being with sensitivity to cultural and ethnic issues. • A bigger focus should be placed on the carbon footprint of development. • Methodologies such as the CBD ecosystems approach, or off-sets and "net benefit" principles can be considered. Ultimately, tools must adequately capture social-ecological interaction in a complex system. • Biodiversity assessment should take cognizance of the suite of biodiversity conservation tools, and inform environmental management in accordance therewith. • Three types of assessment is possible: social, biophysical and valuation (Cowling et al, 2008) • Allowance must be made for self regulation	

5.3. OVERALL SYSTEM DESIGN

Specific recommendations on how to improve the IEM system necessarily need to be based on a clear understanding of how the system functions, and what needs to be achieved at various stages in the IEM cycle. For this purpose, an indicative representation of the IEM process is provided in the three panels below:

1. Strategic planning and sustainability objectives
2. Development design, assessment and execution
3. Monitoring, reporting, enforcement and review

As can be seen this is a roughly linear, but ultimately cyclical process, with the last phases feeding back into the first. What is also shown are specific considerations for the various phases or components. The overall system design and considerations are used to inform a more detailed discussion on improvements to the system in section 5.4.

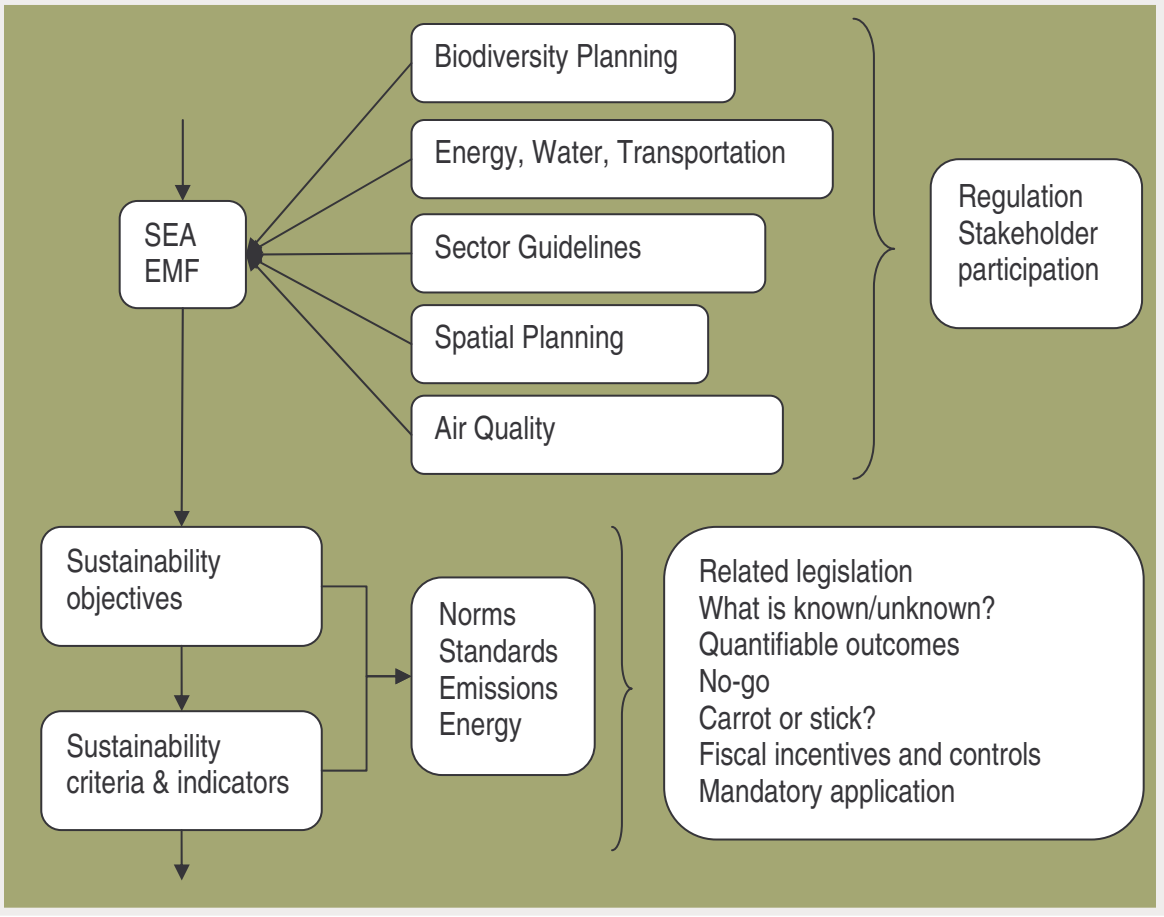

FIGURE 6: STRATEGIC PLANNING AND SUSTAINABILITY OBJECTIVES

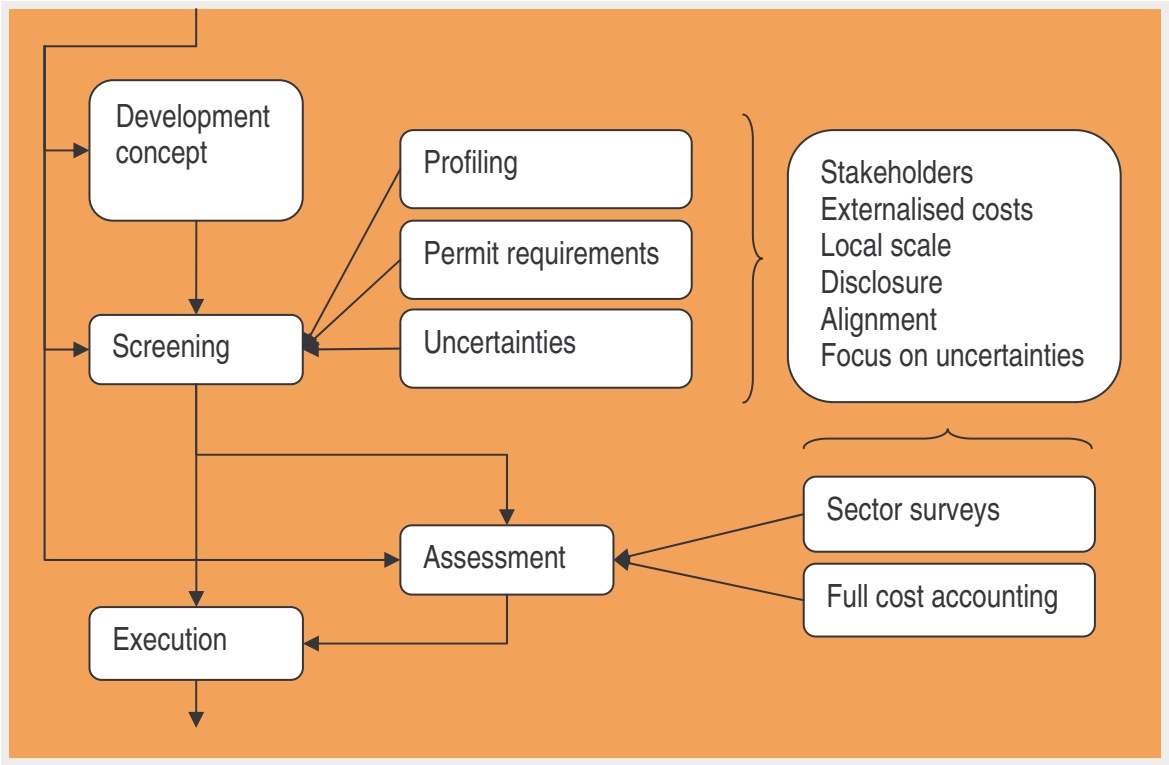

FIGURE 7: DEVELOPMENT DESIGN, ASSESSMENT AND EXECUTION

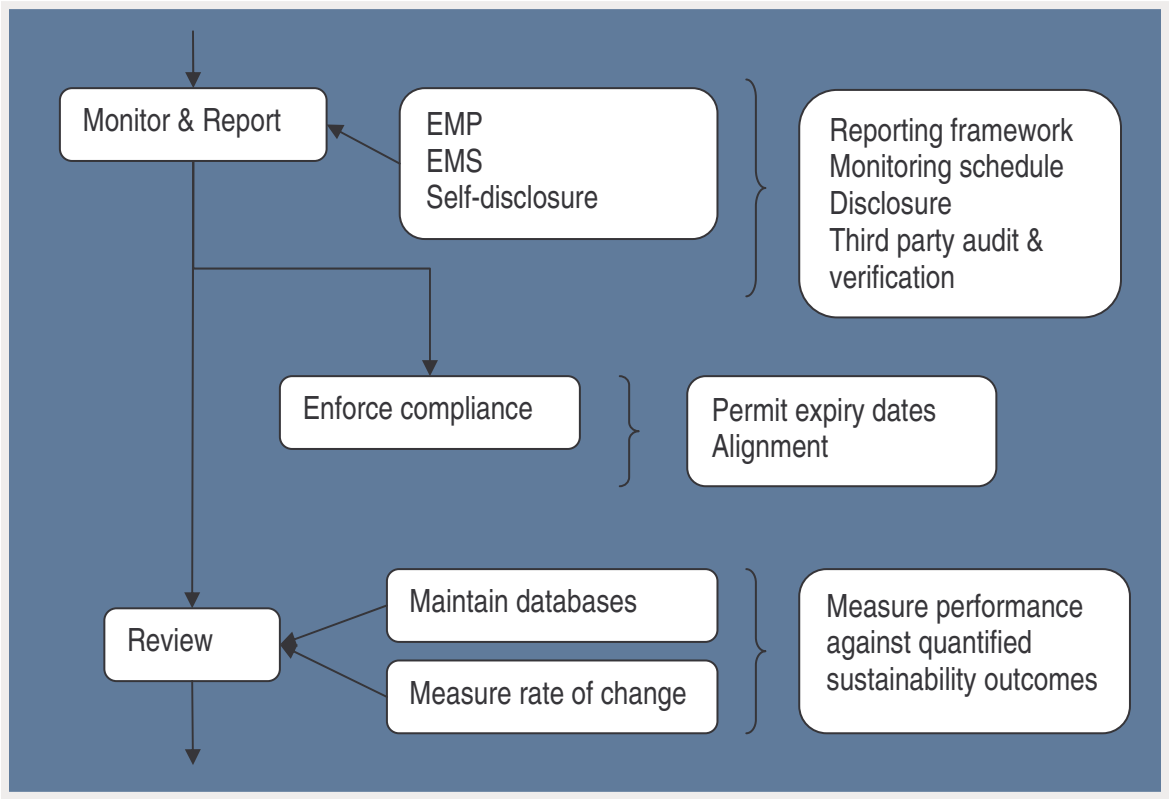

FIGURE 8: MONITORING, REPORTING, ENFORCEMENT AND REVIEW

5.4. IMPROVEMENTS TO THE CURRENT SYSTEM

5.4.1. Sustainability Objectives

If you aim at nothing, you'll hit it every time. This well-worn phrase seems to ring true at the moment in the field of environmental management in South Africa. There is a fixation on 'incremental' tools such as project-specific EIA, without a clear idea of what the tools should achieve beyond the issuing of a permit for another development. This translates to a clear need for objectives or outcomes to be specified, in order to align individual actions and decisions and create a coordinated framework of environmental management tools. The objectives need to be strategic in nature (i.e. strategic environmental objectives) in order to allow for a high level integration of cross-sectoral issues, and may take the form of SEA based tools, conservation plans, development plans or socio-economic upliftment targets. Objectives may be set based on many different considerations, but care should be taken to ensure that the objectives strive for the best improvement to the conditions of the worst-off stakeholders.

TABLE 12: CONCEPTUAL OBJECTIVES AND COMPONENTS COMMONLY IDENTIFIED FOR MANAGEMENT OF SUSTAINABLE FISHERIES

Conceptual objectives	Components
Natural resources conserved and environment not degraded	Fishery target species Fishery by-catch and incidentally impacted species Ecosystem structure and abundance of the components Habitats Food chain structure, productivity and flows Biodiversity at ecosystem, species and genetic levels Reversibility of impacts Effects of non-fishery uses on the marine environment
Human needs met now and in future	Fishery production of food and other products Economic production Social values Inter-generational equity Fishing effects on non-fishery uses of the environment
Effective management system	Legislative and policy framework Clear operational objectives and targets Management plan to achieve objectives and targets Management of precaution, risk and recovery Implementation of management measures Monitoring Evaluation against objectives and intent

Specifically, sustainability objectives must be specified as outputs of the IEM process, but then translated into quantified sustainability criteria that can be measured and reported against. This is achieved by first specifying the strategic objectives of the subject field as well as specific

components related to the objectives, and then specifying performance criteria for both the objectives and components. Sainsbury & Sumaila (2001) provides an example in respect of fisheries in Table 12.

In order to reduce the risk of conflicting sustainability objectives, and to identify where and how measurement of performance will take place, there has to be a level of system analysis that can conceptualise the relationships between the identified components. Again, an example cited by Sainsbury & Sumaila (2001) is used to illustrate such a system analysis (Figure 9).

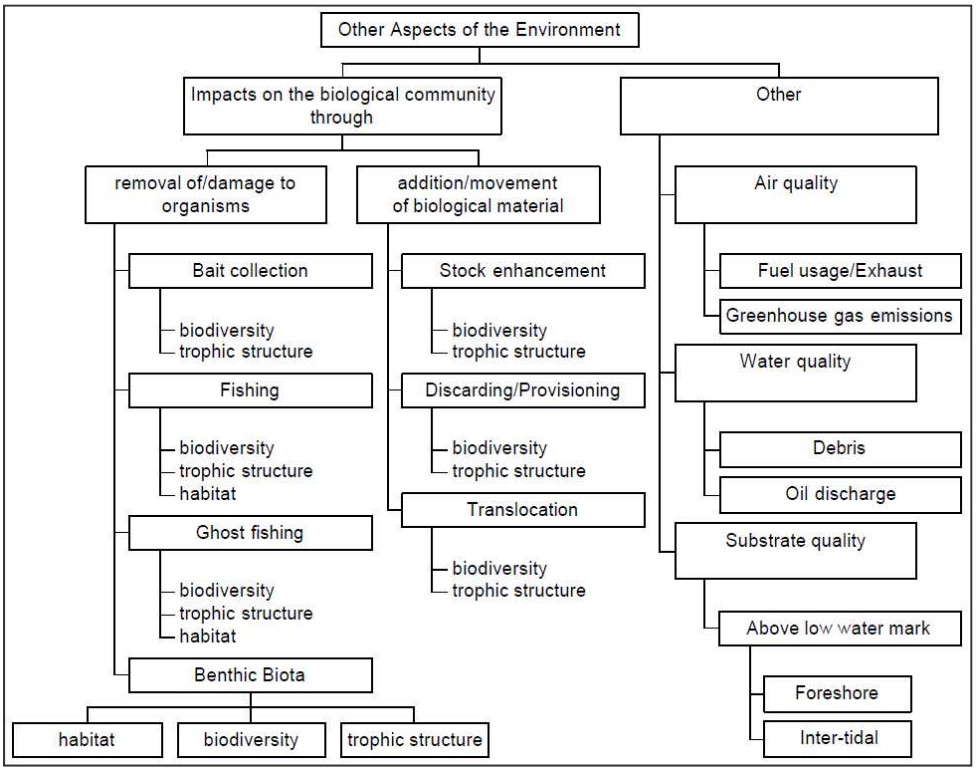

FIGURE 9: A 'COMPONENT TREE' FOR THE COMPONENT 'OTHER ENVIRONMENTAL ISSUES' IN AN AUSTRALIAN CASE (SAINSBURY & SUMAILA, 2001)

In practice, the use of sustainability objectives takes form in the application of strategic environmental planning and assessment. In particular, a major system improvement will be found in the standardization of the strategic environmental design, planning and evaluation of government actions and decisions under the banner of SEA - i.e. make it mandatory to conduct an SEA for each policy, plan or programme conceived by government. The sustainability objectives to be strived for must be specified by either the Environmental Implementation Plan, Strategy for Sustainable Development or similar of the relevant sphere of government. The SEA process to be

followed can be derived from the existing SEA guideline (DEAT IEM Series vol.10), but should draw strongly on the European Union's Directive on SEA (European Union, 2001).

This standardization also allows non-environmental fields to internalize environmental management guidance. For example, spatial planning (SDF) will conduct an appropriately scaled SEA to inform the actual planning, and hence negate the need for, and conflict over an EMF. The planning expertise remains in the hands of planners, but their work becomes subject to the expertise of environmental management practitioners.

In addition, the strategic objectives need to direct environmental management along the lines of a hierarchy of impact management namely: Avoidance, Mitigation, Compensation and lastly Management. Appropriate tools for each level or management need to be identified and used, in accordance with the data availability and nature of the guidance that is required.

5.4.2. Integration and Alignment

Strategic objectives also need to inform a process of real integration and alignment of processes and tools. A plethora of different permitting processes are in existence, all with a broad intention of conserving environmental resources, yet with widely varying process requirements and review criteria. These processes need to be aligned better, in order to have distinct decision making actually contribute towards the same strategic environmental objectives, and to eliminate duplication. In fact, the elimination of duplication and extraneous process will become increasingly realistic and practically possible if clear sustainability objectives can be set.

Elimination of process can be instituted in many ways and forums. It does not necessarily need to be limited to formal permitting processes. For example, river management plans can be linked to land use plans, in order to share ideas, principles and objectives, and ultimately prevent land use and environmental resource conflicts. However, one of the biggest opportunities for process alignment is centered on the EIA process – specifically due to its wide project management scope. Scope exists for the linking of EIA to water use licensing, Risk Assessment, waste management permits etc., whilst the EIA process can gain from the integration of seldom used tools such as specialized surveys or assessments.

Alignment needs, however, not only refer to conflation of process. The distribution of environmental management actions into and throughout other processes should be considered. Perceptions from both inside and outside the environmental management field tend to view the environmental sector

as an impenetrable island, and 'delegate' all matters environmental to whichever entity or practitioner is at hand. A different view that considers 'distributed environmental management' is, however, also possible. This perspective would actively include relevant environmental management tools in 'non-environmental' process. The requirement for an SEA as part of SDF formulation processes is a good example of such an arrangement. The SDF planning remains a specialized process within the ambit of municipal management and land use planning, but the SEA component is added to this 'non-environmental' field of application. Effectively, this distributes environmental management practice to where it can achieve marked change. Such disaggregated environmental management might lead to a better sense of ownership over the actual implementation actions and environmental obligations, but it will be highly dependant on the setting of appropriate sustainability targets as coordination mechanism.

Official delegation of more environmental management functions must also receive attention, as it can assist in avoiding duplication and concentrate environmental function in locations where the right expertise exists. However, such delegation must be done on the basis of strategic level environmental/sustainability objectives alignment - e.g. allow trusted local authorities to review EIA's but first ensure that their policies are aligned with provincial environmental and sustainability targets.

Care must be taken though to consider the implications of the alignment action on stakeholder engagement processes whilst some efforts at alignment should be aimed at improving public participation processes.

5.4.3. Appropriate Tool Selection

It nearly goes beyond saying, but the use of tools must select the right tool for the job at hand. Locally, the use and abuse of EIA processes as a stopgap measure to address any and all environmental management problems is a case in point. Whereas EIA should be a project specific investigation, it gets used to address many other issues such as the lack of coordinated biodiversity conservation planning, poor development planning, inconsiderate construction practice etc.

The need therefore exists for the environmental management system to be defined, and tools associated with the different phases or components. Tool selection should also focus on what the

nature is of the information that is required, which parties are involved, and what the time and resource implications will be.

5.4.4. Throughflow of Information

A robust flow of information between related tools is required. For example, biodiversity conservation planning has to inform biodiversity assessments, which in turn has to inform EIA investigations, and the EIA has to relate directly to specifications in the EMP. This will require checks and balances in the course of information use, in order to ensure that information is used in accordance with the purpose and format that is was generated for, and that the information does not get transformed, eroded or completely lost during the course of the process.

The opposite could also be applied – for example using the collective knowledge generated by different EIA investigations to inform larger scale planning processes.

5.4.5. Closing the Loop

One of the main obstacles to successful roll-out of IEM is the lack of follow-up action and iterative improvements. As Retief & Kidd (2009) argues, one of the biggest concerns of the IEM field is the absence of performance evaluation – both in terms of the outcome of individual impact assessments and the process required to come to a decision on development applications. Closing the loop in order to correct in-process errors, uncertainties and non-compliance, and ultimately learn from experience for future improvements to the system, will require an evaluation framework that specifies criteria and desired outcomes.

All policies, plans, programmes, decisions and projects must be evaluated to identify:

- What worked, and what didn't work during the planning, assessment and implementation processes;
- What the level of compliance is/was, and how the compliance was corrected; and
- How similar processes or the study subject itself can be improved in future.

What can be considered is a policy shift that takes onerous or 'non-environmental' work (e.g. spatial planning) away from environmental managers and makes them focus on how to improve the environmental sustainability of projects in terms of compliance, and of policies, plans and programmes in terms of alignment with sustainability targets. This can be as simple as reducing

the complexity of an EIA to allow related processes such as spatial planning to handle non-biophysical assessments.

5.4.6. Full Cost Accounting

Full cost accounting, cumulative effects assessment, life cycle assessment, ecological footprinting, etc. - all these tools were developed to accurately capture the full extent of the environmental impacts of developments, and incorporate non-obvious externalized costs in assessments. In practice, however, most of them are neglected. Impact assessments tend to focus on a simple before/after comparison, and not strategic considerations or contextual issues. Assessment processes (not only EIA) have to be conscious of the need to consider the total impact of development or planning, and identify an appropriate tool to determine the impact.

The full cost accounting can also specifically be structured to address currently neglected fields of impacts such as health impacts, transportation planning impacts, transportation disruptions, and social impacts. In such cases more specific or more comprehensive surveys and assessments need to be undertaken.

5.4.7. Appropriate Legal Provisions

The current legal and regulatory system makes a limited number of environmental management tools mandatory. This is positive in the sense that it allows for more freedom and opportunity for the exercise of discretion, but at the same time it inappropriately focuses attention on the regulated tools. The ‘legalisation’ of further tools can therefore be considered, but has to consider the use of tools within a context of process alignment. It would make sense, for example, to increase the obligations for the use of environmental management tools (especially SEA) within other processes such as town planning or building design, or even macro economic policy. Similarly, regulation could increase the obligations for defining sustainability objectives and criteria and processes for consistently monitoring progress towards achieving the targets.

5.4.8. Self-Regulation

Self-regulation, in the form of the application of industry standards, must be encouraged. By incentivizing self-regulation, the need for compliance monitoring and enforcement could be internalized by the subject industry, more awareness of environmental issues will be created and more environmentally responsible designs will be encouraged. Specifically, self-regulation could be

offered as a reward for an industry that gets its 'act in order' and proves that it can be trusted to steer its members' actions towards identified sustainability targets.

Sector-specific regulation should focus on sustainability targets that are translated into specific norms and standards for relevant industries. This would, for example, see the respective contributions to air quality deterioration assigned to different polluting activities, thereby leading to quality and emissions regulations being aligned along the lines of levels of acceptability, with standards specified for industries and limits set for particular sectoral contributions (as determined by national or other commitments). Carbon footprinting and subsequent least-cost emissions reductions (e.g. CDM and carbon trading) will be the main tools in this respect.

The various forms of self-regulation may not be used as a substitute for monitoring and control by authorities, or as a method to by-pass stakeholder participation. The capacity that may be released in terms of reduced permitting procedures should be redirected to compliance and enforcement actions, whilst the principle of full public disclosure of performance monitoring and reporting must be applied throughout.

5.4.9. Screening

Screening can be used to filter development projects for the purpose of eliminating extraneous process, or to determine the appropriate administrative process and environmental management tool/s. Although screening of development projects does take place within the EIA process, calls for even more screening are heard. Further methods for screening must therefore be considered – for example only requiring specific specialist studies in lieu of a full EIA assessment.

The two risks with further screening levels lie in the possibility of creating large holes through which sensitive developments may pass without triggering appropriate levels of investigation, or in setting up even further bureaucratic process layers and delays. A key component would be appropriate capacity at the decision-making point where screening and discretionary judgments take place.

Appropriate screening systems would take into account the presence of environmental management as part of a design phase of any development that optimizes the development design from an environmental and sustainability perspective, and pro-actively screen the project for environmental sensitivities, thereby eliminating the need for further impact assessment.

5.4.10. Emerging Issues

Current affairs and emerging issues, such as global warming, climate change, water scarcity, internationalization of environmental impacts etc. need to be considered in the environmental management process. They can preferably be translated into strategic objectives that can inform the direction of environmental resource planning and decision-making.

5.5. TOOL SELECTION RELATIVE TO THE IEM SYSTEM

5.5.1. Fitting tools to the IEM system

Based on the recommendations on tool use and system improvements, it becomes possible to allocate specific tools to particular phases or functions in the integrated environmental management cycle.

Key to this process is the conceptualization of environmental management practice as four levels of tool application:

- 1st level – an Integrated Environmental Management System comprising different environmental management components distributed throughout the governance system
- 2nd level – complex environmental management tools that rely on the combination of a number of environmental management phases, or combination of primary tools
- 3rd level – basic components of environmental management tools, or single purpose/process tools
- 4th level – approaches and tools common to all phases and levels of application

The framework is populated in Table 13.

TABLE 13: FITTING TOOLS TO AN INTEGRATED ENVIRONMENTAL MANAGEMENT FRAMEWORK

	Plan & Design	Use and Execute	Monitor and Report	Enforcement and Feedback
	Generate Data and Knowledge	Inform Decision making, Construction and Parallel Processes	Audit, measure, compare and provide feedback	Redesign, system improvement, better standards, compliance
IEM	• Set sustainability targets • Stipulate the regulatory framework • Assess impacts	• Align processes • Implementation & Decision making • Development Planning • Regulate detrimental activities	• Assess effectiveness • Check status of sustainability objectives • Monitor extent of implementation & compliance	• Review policies, plans and programmes • Enforcement actions • Assistance in implementation • Measures to improve effectiveness of tools
Complex Tools	• EIA • SEA • Strategy for Sustainable Development • Biodiversity conservation planning • Norms & Standards • NBF • National Spatial Biodiversity Assessment • EMF • Charters and code of practice • Cost-benefit assessment • EMPR • Levels of Acceptable Change • Sustainability assessment	• EIA (in the form of an EMP) • EMF • Policy • Fiscal controls • CDM • EMS • Stewardship	• EMF • EIA (in the form of compliance monitoring) • Environmental rating schemes • EMS	• EMS

	Plan & Design	Use and Execute	Monitor and Report	Enforcement and Feedback
	Generate Data and Knowledge	**Inform Decision making, Construction and Parallel Processes**	**Audit, measure, compare and provide feedback**	**Redesign, system improvement, better standards, compliance**
Basic Tools	• Surveys • Impact Assessment • Mapping (GIS) • Risk Assessment • Feasibility Assessment • Bioregional plans • TOPSE • Screening • Buffer zones • Ecosystem Services Assessment • Full cost accounting / life cycle assessment • Cumulative assessment • Causal networks • Island biogeography • Participatory (rural) appraisal • Rapid Assessment • Scenario planning • Setbacks	• Protected areas • Carbon Trading • Biodiversity offsets • Green servitudes • Permitting & licensing • Biodiversity Management Plans • Implementation and action plans • Sectoral Integrated Environmental Management Plans • Rehabilitation plans • NEMA Sections 11&14 EMP • Biodiversity Management Agreements • Mapping (GIS) • EIP • EMP • Certification	• SOER • Audits • Compliance monitoring (ECO work) & reporting • Surveys • Carbon footprinting and disclosure • Community based monitoring • Corporate Responsibility Reporting • Sustainability Reporting	• Legal action • Rehabilitation • Framing review questions • Environmental Education & Awareness
General Requirement	• Public Participation • NEMA Principles • Environmental Rights			

5.5.2. Tool suitability

The actual selection of tools for application in various contexts and for various functions is a complex process. It is therefore necessary to understand the issue or situation and its context in enough detail to select an appropriate tool. The tool selection can then be specific to the context (e.g. sensitive bioregions), the defined scope (e.g. components of the environmental management cycle, or the entire process) and the nature of the field of investigation (e.g. resource economics).

Robinson & Ryan (2002: 6-8) provides an example of how to apply such an approach (Table 14). They list a number of aspects to consider when deciding on the use of market-based (economic) environmental management tools. A similar consideration is required for the various questions asked during the course of any work dealing with environmental resources.

TABLE 14: CONSIDERATIONS FOR CHOICE OF ECONOMIC INSTRUMENT (ROBINSON & RYAN, 2002)

Consideration	Comment
Tenure	Land ownership significantly affects instrument design. If the issue being addressed is largely on privately owned land then it is likely to attract compensation. For State controlled land, access and maintenance issues must be given more attention.
Diffuse / Point Source Problem	Most tradable permit or load-based licensing systems require accurate monitoring and are more amenable to point source discharges.
Single issue Multiple Benefits	Instruments, such as carbon trading, address single issues with discreet benefits, such as limiting climate change. Where a problem (such as water quality) has multiple solutions or the solution (such as riparian vegetation) has multiple benefits. It is best dealt with through a combination of instruments or through flexible instruments, such as Environmental Management Systems, which can incorporate a broad range of management actions.
Available Information	Design of market-based instruments generally requires reliable data on sustainable yields/limits and the operation of market instruments requires information on issues such as compliance costs. Regulation and financial incentive may be preferable in information poor environments.
Proportional cost of tool	Charges, bonds and permit prices can have limited effect on management practices if they represent a relatively small proportion of the total costs for a firm or individual.
Intended Environmental Outcome	Ideally, clear, science based, quality or quantity standards should be stipulated from the outset and the instrument should respond proportionally to the achievement of those standards.

Consideration	Comment
Efficiency Gains	Efficiency gains refer to any improvement in resource use over time as a consequence of the implementation of economic instruments to regulate emissions or product use. Water trading is regarded as leading to efficiency gains as entitlements tend to move to producers with the highest marginal returns. The criterion is difficult to assess if base-line environmental conditions or returns on investment in abatement technology are not readily available.
Ongoing incentives	Economic instruments, such as permit systems, that provide the incentive for perpetual self-management of emissions by industry are generally superior to those that are dependant on limited funding arrangements or require intensive administration and enforcement.
Timing	When environmental degradation is imminent, instruments that are readily available are preferable to those that may take some time to implement. However, implementation of an instrument without due consideration of its impacts may also create problems.
Flexibility	Some instruments may need to be responsive to ongoing scientific research and monitoring information to confirm their effectiveness and to facilitate any necessary adjustments.
Equity aspects	Economic instruments can have equity considerations that should be addressed or acknowledged in their implementation. Examples include: (a) Charges for 'public rights' e.g. access to National Parks etc; (b) Differential treatment of similar entities e.g. targeting properties for economic incentives while neighbours are denied funds; (c) Flat charges or levies which act regressively, impacting most on those less able to pay; and (d) Charges/subsidies leading to industry restructuring e.g. cost recovery for water or prohibitively large discharge licence fees.
Transaction Costs	For market-based incentives, impediments to locating and forming agreements with buyers and sellers and government intervention in trading can create high transaction costs, reducing their efficiency.
Community acceptance	A perception of legitimacy on the part of the community is an important requirement for economic instruments to be effective. For example community support for environmental levies can evaporate if they are seen a merely as method for increasing general revenue. Emissions caps and trading rules also require legitimacy and certainty to gain market acceptance and induce trade.

Consideration	Comment
Administrative feasibility and costs	Financial instruments should not cost more to administer than equivalent command and control regulation and established market instruments should theoretically have low enforcement and administration costs. None the less, costs and management of the instruments should be kept within the capacity of the administering authority. As such, complex emissions trading schemes may be inappropriate for small local governments.

Retief (undated) similarly proposes a structured approach based on the following:

1. Availability of information – is the necessary information available in the province at the right scale and level of detail to allow for easy application?
2. Legal mandate – Does a legal mandate exist for the application of the tool in the […] process?
3. Addressing key weaknesses – Will the tool address the identified key weaknesses in the […] process?
4. Experience gained in the province – Has experience been gained in the province in the application of the tool in relation to the […] process?
5. Available capacity – Does the required capacity exist in the province to apply the tool in relation to the […] process?

Naturally, the more questions are asked about the tool application, the better the match between the expressed need and the selected tool will be. Based on the assessment in this report, the following set of questions is suggested:

1. What is unknown/ uncertain?
2. Who is affected?
3. Should tradeoffs be quantified?
4. What is the level of certainty/ detail required?
5. Where is the best information located, or who can best generate it?
6. Who should fund the work?
7. Are there time constraints?
8. Should it be a continuous process, or will a snapshot do?
9. Will the cost of the tool exceed the benefit of the project?
10. What level of management, monitoring & reporting does it imply?

5.5.3. Alternative tools available

It is not immediately obvious that there are particular examples of environmental management tools that are not available for use in South Africa. What is the case, is that the priorities are different between different regions. For example, in much of the developed world, there is a much higher focus on health impacts and strategic level assessments than what is present in developing countries. In contrast, the typical modus operandi in developing countries is to focus on short term developmental issues relating to socio-economic development rather than long-term sustainability. This obviously tends to restrict the use of environmental management tools to reactive impact mitigation as opposed to predictive long-term planning.

This situation implies that the focus of the environmental management system in South Africa needs attention, rather than the individual tools. With a well-defined framework in place, the considerations outlines in section 5.5.2 will guide an environmental management practitioner towards an appropriate tool. Most of the available tools are listed in section 3 of this report, but it does not preclude the availability of additional tools. What is common practice is that legislated tools get preference over voluntary tools, or over the primary components of more integrated and complex tools (Retief & Kotzé, 2008).

5.6. IMPLEMENTATION

5.6.1. Mechanisms for implementation

From the assessment, a number of specific requirements that will facilitate improvement in the use of environmental management tools can be listed:

- A framework of sustainability objectives has to be established, with appropriate objectives at different levels of application and decision-making. The different levels have to relate and ‘add up’ though.
- More environmental impact management tools should be legislated.
- Examples of best practice environmental management coordination should be identified and replicated in both regulated and voluntary forms.
- Officials must be trained in the use of various environmental management tools, in order to be able to guide EAPs and understand their application.
- The application of sector-specific tools must be restricted to EAPs who have the necessary qualifications or skills, and similarly, reviewed by officials or peers with the same abilities.

- Ecosystem guidelines, as well as training for EAPs and officials operating in national biodiversity priority areas should become a requirement.
- Assessments must be designed to be simpler to review and comment on.
- Implementation requirements should be realistic – for example, it is often hard to completely reverse and rehabilitate environmental damage.
- Continual improvement of compliance enforcement that targets both 'on site' implementation issues and further refinement of process.

5.6.2. Obstacles to implementation

Current obstacles to implementation relate directly to the issues listed above under 'Mechanisms for Implementation', but also include:

- Limited legal obligation for the use of alternative or problem specific tools
- Corruption results in the need for command and control and overregulation.
- Slow authorization/ licensing and permitting result in illegal activities and an overall worse outcome.
- The mobility of environmental practitioners within the industry means that it becomes hard to retain appropriate skills and experience in key positions.
- Perpetual uncertainty about mandates and competencies, and overlaps in the regulatory framework.
- Conflict of mandates – i.e. organs of state with competing mandates such as Housing and Environmental Management.
- The non-binding nature of regulations that require the consideration of environmental management information (i.e. not compulsory to conform to the guidance)
- Issues of scale determine the appropriateness of different tools, but at the same time complicates the roll-out due to escalating implementation costs and timeframes.

5.6.3. EIA

System improvements related to the EIA process include:

- Reducing the required investigations to studies that are specifically suited to provide information on unknown or uncertain impacts
- Screening based on an Environmental Impact Statement

- Measurement of impact significance in terms of relevant sustainability criteria
- Full life cycle accounting
- Setting standards for Environmental Management Programmes, based on industry experience and related to impact investigation processes
- Strict requirements for monitoring of implementation and reporting against sustainability criteria

6. CONCLUSION

It is well known that simple prescriptive regulatory control over resources is far simpler to implement than a policy of complex resource management trade-offs based one sustainability principles. This might explain the current high level of reliance on environmental permitting as the mainstay of environmental management in South Africa.

This investigation into the use of environmental management tools shows that the reliance on EIA and similar control instruments comes at the cost of effective strategic coordination and planning, and a near absence of 'learning' through monitoring and review. The 'problem' is therefore not the lack of tools, or particular gaps where new tools are required, but rather the failure to use and implement tools appropriately. In fact, it can be stated that no 'new' tools are available to magically transform the current IEM system, but rather that more attention must be given to niche applications and tools that will address specific questions and uncertainties in the IEM cycle.

The identification and use of tools, both those already in use and tools available for use, should therefore occur within a robust and clearly structured framework that covers all phases of the IEM cycle, and focuses attention on ensuring that the cycle is 'closed' in order for learning and improvement to occur following development/project execution. With such a system, the identification, naming conventions, definitions and territorial disputes of many tools might be reduced. Furthermore, there must be consensus on the strategic environmental objectives to be achieved through the use of all the instruments.

The main recommendations on how the system can be made more functional therefore include:

Firstly, a clear goal must be defined for the environmental management system. Unfortunately the current default – 'protect everyone's environmental rights' – does not translate well into guidance for tool application. Therefore, this objective should be defined in terms of sustainability objectives, measurable sustainability criteria, and then applied at the level of decision-making.

Secondly, the integration of process can bring many benefits like simpler public participation, but it also leads to shortcuts, improper tool application, and potentially sub-optimal results. Rather, what should be focused on is the proper *alignment* of processes. Good alignment will ensure that the different tools share a central line of data and information flow, and that crucial information or steps are not 'lost in translation'.

Thirdly, there should be provision made for a continued improvement to the environmental management system in respect of the regulation of the use of tools. Specifically, inappropriate use and dysfunctional tools must be identified and corrected, whilst new or more appropriate tools are applied to new and emerging issues.

Lastly, significantly more effort must be made to ensure that the IEM cycle ‘closes the loop’ through post-execution monitoring, reporting, compliance enforcement and review. This will ensure that decision makers, enforcement agents, policy writers and planning officials all benefit from an understanding of how effective the use of particular tools are.

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