Integrated Environmental Management Information Series

Environmental
Impact Reporting

15

Other topics in the series of overview information documents on the concepts of, and approaches to, integrated environmental management are listed below. Further titles in this series are being prepared and will be made available periodically. Sequence of release and titles are subject to change.

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REFERENCING

PREFACE

This document is one of a series of overview information documents on the concepts of, and approaches to, integrated environmental management (IEM). IEM is a key instrument of South Africa's National Environmental Management Act (NEMA). South Africa's NEMA promotes the integrated environmental management of activities that may have a significant effect (positive and negative) on the environment. IEM provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. It includes the use of several environmental assessment and management tools that are appropriate for the various levels of decision-making.

The aim of this document series is to provide general information on techniques, tools and processes for environmental assessment and management. The material in this document draws upon experience and knowledge from South African practitioners and authorities, and published literature on international best practice.

This document is aimed at a broad readership, which includes government authorities (who are responsible for reviewing and commenting on environmental reports and interacting in environmental processes), environmental professionals (who undertake or are involved in environmental assessments as part of their professional practice), academics (who are interested in and active in the environmental assessment field from a research, teaching and training perspective), non-government organisations (NGOs) and interested persons. It is hoped that this document will also be of interest to practitioners, government authorities and academics from around the world.

This document has been designed for use in South Africa and it cannot reflect all the specific requirements, practice and procedures of environmental assessment in other countries.

This series of documents is not meant to encompass every possible concept, consideration, issue or process in the range of environmental assessment and management tools. Proper use of this series of documents is as a generic reference, with the understanding that it will be revised and supplemented by detailed guideline documents.

The opinions expressed and conclusions drawn are those of the author's and are not necessarily the official view of the publisher, the Department of Environmental Affairs and Tourism. The author and publisher make no representation or warranty, expressed or implied, as to the completeness, correctness or utility of the information in this publication. Whilst every effort has been made to ensure that the information contained herein is accurate, the author and publisher assume no liability of any kind whatsoever resulting from the use or reliance upon the contents of this publication.

SUMMARY

The findings of an Environmental Impact Assessment are presented in a written report, the Environmental Impact Report (EIR). The EIR forms the basis for decision-making, and is an important tool for communicating with interested and affected parties. As such, the EIR is arguably considered to be the most important document in the EIA process.

The purpose of an EIR is to help the responsible authority in decision-making, the public in understanding the likely impacts of the proposal, and the proponent in managing these impacts. It should provide useful, reliable and sufficient information, focusing on those issues which should be considered in reaching a decision. The EIR considers alternatives to the proposal which would meet the stated need for the activity. It also provides the point of departure for the preparation of a plan or programme to manage impacts during the project's implementation.

The soundness of an EIR relies heavily on the adequacy of the EIA process; if the EIA is conducted in accordance with current best practice, the preparation of the EIR becomes relatively straightforward. In South Africa, a number of players contribute to the quality of the EIR: an independent environmental consultant responsible for preparing the EIR, with input by various specialists; relevant authorities and the interested public who assist in defining its scope, contents and quality; and the proponent who provides project information.

Different EIA systems have different reporting requirements, defined through law and/or through guidelines or structured review packages which assist in assessing the adequacy and quality of EIRs.

Virtually every EIA system requires the EIR to:
* present a non-technical summary of the findings of the EIA;
* describe the proposed activity and affected environment;
* forecast the significant impacts likely to result from the implementation of the activity;
* evaluate alternatives; and
* identify and evaluate the effectiveness of mitigation measures.

A good EIR is:
* tightly focussed on the important issues;
* scientifically and technically sound, with feasible and legally defensible findings;
* clearly and coherently organised and presented, to enable its contents to be easily understood;
* timely; and
* free from bias, and emotive language.

The main challenge facing EIRs in South Africa, as in countries elsewhere, is to provide the right information in the right form. It is important that this information can be linked to the broader goals and priorities of sustainable development in South Africa, and that it explains clearly how the proposed activity would add to or detract from such goals.

CONTENTS

1. INTRODUCTION

The findings of an Environmental Impact Assessment (EIA), on a particular project proposal, conventionally are presented to stakeholders (including decision-makers) in the form of a written report. This report is known in different countries as an Environmental Impact Report (EIR), an Environmental Impact Statement (EIS), Environmental Statement (ES), an Environmental Impact Assessment Report (EIAR), or Environmental Effects Statement (Canter, 1996; UNEP, 2002). The term EIR is used in this document.

The EIR is at the heart of the EIA process (Wood, 1995). For this reason, and given its importance as a communications tool, its preparation is perhaps the most important component of the EIA process (Canter 1996). An EIR forms the basis for review by I&APs and for decision-making. The EIR does not define whether a project is "good" or "bad." It provides a neutral, independent assessment of a proposed project's impacts on the environment. The purpose of an EIR is to provide the decision-makers with an understanding of the environmental consequences of approving a project by giving them useful, reliable and sufficient information. The EIR also provides a discussion of alternatives to the proposal which would meet the stated need for the activity, and ways to reduce the impact of a project by imposing mitigation measures.

The information provided in an EIR should assist the decision-maker by focusing on those criteria which have to be considered in reaching a decision with regard to the environment and sustainable development.

The EIR provides the point of departure for the preparation of a plan or programme to mitigate, manage and monitor environmental impacts during the implementation and operational phases of a proposed project. As such, it should give sufficient reliable information at an appropriate level of detail to enable the preparation of a sound environmental management plan or programme.

Despite extensive literature on EIA methods, there is little guidance on how the findings presented in EIRs should be derived. The minimum content of the EIR is frequently specified as are procedures to be followed in preparing the report (Wood 1995).

2. PURPOSE OF THIS DOCUMENT

This document has been written for a wide audience, to serve as an initial reference text on the reporting of environmental impacts. It includes a discussion on the common problems with EIRs, the content, quality and language of EIRs, the importance of an "issues trail", the step from draft to final EIR, as well as current challenges in reporting on EIAs.

The aim of the document is not to provide detailed guidelines on reporting, but to give introductory information to government authorities, environmental practitioners, advocacy groups, non-governmental organisations, industry, project proponents, academics, students and other I&APs.

3. FUNCTION OF THE ENVIRONMENTAL IMPACT REPORT

The function of the Environmental Impact Report (EIR), is, to help the responsible authority in making informed decisions, the public in understanding the likely impacts of the proposal, and the proponent in managing these impacts (UNEP, 2002).

Spelt out in more detail, the EIR:

1. Documents and communicates, clearly and impartially:
   * the context of the proposed activity;
   * the probable impacts and risks associated with the proposed activity and its alternatives;
   * measures to mitigate and manage negative impacts - and enhance benefits - associated with the proposed activity and its alternatives, and the residual significance of impacts if mitigation measures were to be implemented effectively;
   * the concerns of the interested public, authorities, and the communities affected by the proposal; and
   * the level of confidence in predicting and evaluating impacts, any gaps in knowledge and areas of uncertainty which could substantially influence the findings.
2. Forms the basis for stakeholder review. For this reason, the EIR must use simple language and be easily understood.
3. Forms a sound basis for informed decision-making. In this respect, the EIR should give explicit, reliable and easily understood information to guide the decision-maker. The EIR should enable the decision-maker to decide on an action in the best interests of society and the environment where appropriate, set relevant conditions of authorisation.

   The EIR is ideally prepared within the broad goals and framework of "sustainable development", which strive to safeguard ecological integrity, economic security and social equity. That is, global, national, regional and local criteria for sustainable development, and even project-specific performance targets, standards or limits of acceptable change, provide yardsticks against which to evaluate the consequences of a proposed activity. In South Africa, the environmental clause in the Constitution of South Africa's Bill of Rights (Act 108 of 1996), the national environmental management principles contained in Chapter 1 of the National Environmental Management Act, 107 of 1998, as well as other national, regional and local objectives of sustainable development, provide such criteria.

   The EIR should thus give a clear indication as to the degree to which the proposed activity and its alternatives would be consistent with, contribute to, or detract from, sustainable development. A comparison of alternatives should highlight these considerations, and make explicit the tradeoffs between these different dimensions of development (Weaver et al 1998).
4. For any chosen alternative, provides a sound point of departure for the proponent in managing the impacts of the proposal in an environmentally and socially responsible way.

The soundness of an EIR relies heavily on the adequacy of the EIA process. If the EIA is conducted in accordance with current best practice, the preparation of the EIR becomes relatively straightforward. If, however, there is little consistency in the approach to assessing and evaluating impacts, and considering alternatives and mitigation, the preparation of an acceptable EIR is likely to be extremely difficult.

4. RESPONSIBILITY AND ACCOUNTABILITY FOR THE EIR

In South Africa, a number of players contribute directly or indirectly to the quality of the EIR. An independent environmental consultant is ultimately responsible for preparing the EIR, although in most cases, an interdisciplinary team of specialists contributes to that EIR. Stakeholders who participate in, or review, the EIA process may influence the scope, contents and quality of the EIR. Such stakeholders comprise relevant authorities and the interested public. In addition, the proponent is responsible for providing sufficient relevant information about the proposed activity to enable reliable prediction, assessment and evaluation of impacts to be reflected in the EIR.

In some states of the USA, the EIR is prepared by the decision-maker or lead environmental agency to avoid bias or prejudice on the part of environmental consultants who are invariably paid by the project proponent.

In a number of countries, some form of certification of consultants conducting EIAs and preparing EIRs is required, often linked to a code of ethics or practice. Certification, often voluntary (as currently the case in South Africa), but in some instances a formal requirement (e.g. Belgium) is required to ensure that consultants preparing EIRs meet some predetermined criteria reflecting their competence (Wood, 1995).

4.1 Environmental consultant

In South Africa the environmental consultant is responsible for preparing the EIR. The consultant needs to integrate and reflect accurately the main findings of specialists who contributed to the EIA. The environmental consultant needs to ensure that specialists cover direct, indirect and cumulative impacts, that the scope of their studies is sound, that they use common criteria for assessing and evaluating the significance of impacts, and address such issues as gaps in information or knowledge, uncertainty, and assurance of mitigation being implemented. In addition, specialists need to interact with each other where there are areas of overlap between disciplines. The Terms of Reference and instructions to specialists are thus of critical importance (refer to DEAT, 2002a). A standard format for preparing specialist reports, the use of clearly defined criteria in assessing and evaluating impacts, and standardised terminology, are of great value in facilitating the later integration of different studies. Also, clear instructions for interacting or collaborating with other specialists involved in the EIA, and at what stage of the EIA, are valuable.

Preparation of the draft EIR can begin during the impact assessment phase of an environmental investigation, after the findings of the Scoping Report, which determine the scope of and Terms of Reference (ToR) for the EIA, have been accepted by the environmental authority.

4.2 Specialists

Specialists in different disciplines are responsible for fulfilling their Terms of Reference and using the most appropriate, up to date and reliable methods to predict, assess and evaluate the potential significance of impacts associated with the different alternatives.

4.3 Authority

The authority is ultimately responsible for ensuring that the EIR provides an adequate basis for decision-making. Some form of structured review process forms an important part of the authority's activities prior to decision-making.

5. CONTENTS OF THE EIR

Different EIA systems have different reporting requirements. Some countries formally specify the contents of the EIR, while others rely on the diffusion of best practice to guide the EIR contents (Wood, 1995).

A number of structured review packages and other guidelines have been developed around the world, to assist in assessing the adequacy and quality of EIRs and Environmental Impact Statements, both for project-level EIAs and for Strategic Environmental Assessments (SEAs). Examples of such packages include those used in the United States (United States Environmental Protection Agency, 1998; World Bank, 1999), the United Kingdom (Lee et al., 1999), the Netherlands (Milieu-Effectrapportage, 1996), Canada (Canadian Environmental Assessment Agency, 1997), the Commonwealth of Australia and New Zealand (Australian and New Zealand Environment and Conservation Council, 2000) and Namibia (Ministry of Environment and Tourism, 1998). All of these packages draw on international practice, provide valuable insights into the scope of information and considerations that should be included in an EIR, and set high standards for the content of environmental impact reports (Simpson, 2001).

Virtually every EIA system requires the EIR (Wood, 1995) to:
* present a non-technical summary of the findings of the EIA.
* describe the proposed activity and affected environment.
* forecast the significant impacts likely to result from the implementation of the activity.

In addition, information such as treatment of alternatives and mitigation measures are required.

Some states or countries recommend a page limit to an EIR (e.g. in California, USA the limit is 150 pages (Wood, 1995)). However, it is believed inappropriate to equate page numbers with adequacy of an EIR; the complexity, scale and likely level of controversy of the proposed activity will, to a large extent, determine the amount of information appropriate to the EIR.

5.1 Guidelines for report requirements in South Africa

Prior to the promulgation of the EIA Regulations in 1997, the then Department of Environment Affairs published a guideline document on preparing EIRs (1992). The report requirements for an EIR are given in Table 1.

Table 1: Report requirements for Impact Assessment (Department of Environment Affairs, 1992)

1. Cover page	7. Assumptions and limitations	14. Conclusions and recommendations
2. Executive summary	8. Administrative, legal and policy	15. Definition of technical terms
3. Contents page	requirements	16. List of preparers
4. Introduction	9. Project proposal	17. References
5. Terms of reference	10. The affected environment	18. Personal communications
6. Approach to the study	11. Assessment	19. Appendices.
	12. Evaluation	
	13. Incomplete or unavailable information	

5.2 Mandatory requirements in South Africa

In terms of the EIA Regulations (R1183 of 5 September 1997, promulgated in terms of the Environment Conservation Act 73 of 1989), the contents of the EIR should be as follows:

* A description of each alternative, including particulars on:
  . The extent and significance of impacts.
  . The possibility for mitigation of impacts.
* Comparative assessment of alternatives.
* Appendices of:
  . The affected environment.
  . The proposed activity.
  . The public participation process followed, with list of I&APs and their comments.
  . Any media coverage given to the proposed activity.
  . Any other information included in the accepted plan of study for the EIA.

According to the Department of Environmental Affairs and Tourism (1998), the assessment of impacts should be in terms of the nature of impact, extent, duration, intensity, probability. The significance of impacts is then determined through a synthesis of these aspects.

In terms of South Africa's National Environmental Management Act, 107 of 1998 (NEMA), although the EIR contents are not prescribed, the minimum requirements of an EIA, to be investigated, assessed and communicated are given as follows:

a) Investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto;
b) Investigation of the potential impact, including cumulative impacts, of the activity and its alternatives on the environment, socio-economic conditions and cultural heritage, and assessment of the significance of that potential impact;
c) Investigation of mitigation measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity;
d) Public information and participation, independent review and conflict resolution in all phases of the investigation and assessment of impacts;
e) Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;
f) Investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation;
g) Co-ordination and co-operation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;

h) That the findings and recommendations flowing from such investigation, and the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in Section 2 are taken into account in any decision made by an organ of state in relation to the proposed policy, programme, plan or project; and
i) That environmental attributes identified in the compilation of information and maps contemplated in subsection (2)(e) are considered. [Prepare compilations of information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every organ of state charged by law with authorising, permitting or otherwise allowing the implementation of a new activity, or with considering, assessing and evaluating an existing activity.]

Adequate provision should be made for the ongoing management and monitoring of the impacts of the activity on the environment throughout the life cycle of the activity. This requirement emphasises the need for EIRs to translate the findings of the EIA into clear provisions to be contained in an Environmental Management Programme or Plan, or Environmental Management System. This requirement in turn underlines the need for EIRs to cover adequately and at an appropriate level of detail the prediction, assessment and evaluation of impacts, as well as mitigation or enhancement measures, to enable and give assurance about effective and sound management.

5.3 Best practice requirements

A review of EIA systems and EIR review packages world-wide (deVilliers Brownlie Associates 2000, Institute of Environmental Management and Assessment 2001, European Commission review package 2001), indicates a number of trends in EIR contents to ensure the adequacy of reporting. The EIR frequently comprises an Executive Summary, a Main Report and Appendices, Addenda and/or Annexures. The commonly required contents are listed in Table 2.

Table 2: Contents of Draft EIR: Executive Summary, Main Report, Appendices/Addenda

EXECUTIVE SUMMARY	MAIN REPORT
Introduction	
Purpose, extent and context of the EIA	* Cover page: Title, location of project, proponent, environmental consultant, contact details, date. * Table of contents. * General background: rationale, objectives of, need and motivation for the proposed project, Terms of Reference for the EIA. * The structure of the EIR (a "road map"). * The approach to the EIA, the process followed. * Assumptions.
Description of Project and Alternatives	
Nature, scale and location of project, alternatives	* Location, siting, scale, nature and design, phasing (if relevant), production processes (if relevant), main inputs (eg water, energy, raw materials, labour, infrastructure, traffic) and sources, main outputs (eg noise, odours, traffic, residues, emissions, products, wastes and their disposal. * Activities during different phases of the project.
Description of Affected Environment and Any Trends	
Brief description of significant characteristics of affected environment and any trends	* Current biophysical, socio-economic, cultural heritage, status. * Any predictable trends (eg increasing air pollution, settlement, etc) which would define the future conditions of the affected area without the proposed activity. * Key characteristics- opportunities & constraints of affected site/s, eg: sensitive, protected, dynamic, important or vulnerable ecosystems; characteristics of main affected parties, particularly vulnerable or disadvantaged; important heritage resources; unique or irreplaceable, special or valued components, main uses and livelihoods. * Instabilities, hazards (eg disease, flooding) or contamination.
	Policy, planning, legal and "environmental quality" context, in terms of which the potential significance of impacts can be evaluated: * Laws, policies and plans which define the boundaries for, or regulate, particular activities and their impacts. * Environmental standards. * Objectives or limits of acceptable change for the affected area, and/or performance targets which have a bearing on the proposed activity.
Assessment and Evaluation of Impacts and Risks of Project and Alternatives	
Summary of potentially significant impacts and their distribution, comparative evaluation of alternatives	Potentially significant impacts and risks for each alternative, before and after mitigation or optimisation. To cover: * Approach to evaluating significance and criteria used; * Positive & negative impacts; * Direct, indirect & cumulative impacts, during different phases of the proposed project; * Impacts of the proposed activity & its alternatives on the biophysical environment, including on important biodiversity areas, sensitive areas, unique or special areas; * Impacts of the proposed activity & its alternatives on the socio-economic environment, including on health and safety, lifestyle and livelihoods, cultural heritage, access to resources. * Risks accompanying different alternatives; * Impacts of the environment on the proposed activity and its alternatives (including hazardous, unstable or contaminated areas, disease); * The distribution of impacts, namely who would stand to gain and who to lose from the proposed activity, and whether the distribution of impacts was fair, giving particular consideration to vulnerable or disadvantaged persons; * Any impacts associated with proposed mitigation measures (eg noise barriers next to roads interfere with movement of threatened animal species).

EXECUTIVE SUMMARY	MAIN REPORT
Description of Interested and Affected Party Issues	
Level of public interest & controversy or acceptability	* I&AP involvement in the process. * Key issues, concerns and alternatives raised, & how they have been addressed. * Level of public interest, acceptability to or resistance from affected parties, controversy. * Any outstanding issues and matters that need to be resolved.
Description of Proposed Mitigation, Management and Monitoring	
Summary of mitigation, management and monitoring. Assurance and probable effectiveness of mitigation	* Measures to reduce or avoid potentially significant negative impacts, and enhance positive impacts. * Iterative consideration of alternatives to achieve mitigation. * Proposed arrangements for management and implementation of mitigation measures. * Evaluation of the likelihood of such measures being implemented, including evaluation of capacity or capability of implementing agent, as well as any assurances or guarantees to this effect. Some form of financial assurance, a formal commitment to implementing mitigation measures, or an evaluation of capability / capacity of the responsible agent or institution, may be appropriate. * Clear arrangements for preparation and content of EMP, EMS.
Evaluation of Alternatives and Trade-offs	
Compare project & alternatives after mitigation, highlight significant impacts & risks, & trade-offs with respect to meeting sustainable development objectives	* Implications of the proposed activity and alternatives should be systematically compared to enable the most appropriate option to be determined. * An explicit basis for choice of the most appropriate alternative should be established. * An evaluation of the degree to which the proposed activity and its alternatives would be consistent with, contribute to, or detract from, sustainable development objectives, including laws, policies, plans, standards, goals or targets at different scales is important. * The likely significance of positive and negative impacts, residual cumulative impacts, public acceptability of impacts; the distribution of significant impacts among affected parties and associated equity and environmental justice implications; social sustainability implications (including health and safety aspects, livelihood implications), ecological and economic sustainability implications, as well as the probable effectiveness of mitigation measures, are often used to compare alternatives and evaluate trade-offs. * Trade-offs should be clarified.
Difficulties, Limitations and Uncertainties, and Implications For Decision-Making	
Summary of adequacy of information, implications for decision-making of gaps, uncertainty, assumptions	Implications for the findings of the EIA, and for decision-making, of: * Assumptions; * Difficulties, limitations, constraints; * Gaps in information; and * Inherent uncertainties.
	Proposed environmental management plan, programme and/or environmental management system *The "action" section, containing explicit practical plans or systems to implement sound environmental management should the proposed activity be approved. Commonly consists of:* * Clear responsibility for preparing and implementing EMPs and/or EMSs; * Integration of EMP with EMS, where appropriate; * Objectives, targets and priorities for management; * Precise, easily understood mitigation, monitoring or other management actions, with clear responsibilities for their implementation;

EXECUTIVE SUMMARY	MAIN REPORT

	* Schedule and programme for actions; * Strategy to manage impacts which are larger than predicted or unexpected; * Contingency and emergency response plans; * Documentation and record-keeping; * Communication, reporting, audit and review procedures; * Education, training, awareness or capacity building programmes.
	Conclusions *For the proposed activity and its alternatives:* * Key issues, significant residual positive & negative, and cumulative impacts; * Implications for meeting sustainable development objectives; * Risks & uncertainties related both to the findings of the EIA and future management assurance, and associated implications for decision-making.
	Recommendations * Ways to optimise mitigation, management and monitoring of the selected alternative.
	Sources of Information * Written documents, published papers, books. * Personal communication. * Traditional or conventional knowledge.
	Glossary * Technical terms, acronyms, other abbreviations.

Appendices and/or Addenda

* Material supporting the EIR, often detailed or technical.
* Environmental consultant's names, qualifications, ToR for the EIA, contact details.
* Specialists' names, qualifications, ToR, contact details.
* Specialists' reports including technical and scientific information.
* Details of interested and affected party participation, advertisements placed, other methods of involvement used (e.g. radio, posters, etc), any capacity building meetings, minutes of public meetings, records of correspondence, etc;
* Comments on the draft EIR, and responses to these comments in an appropriate form.
* Financial or other guarantees, assurances or commitments, that mitigation measures would be implemented.

Source : Adapted from deVilliers Brownlie Associates, 2000 (unpublished)

As noted above, the level of detail given in an EIR will largely depend on the scale, complexity, likely significance of impacts and/or public acceptability of a proposed activity. The reporting requirements for each project will thus differ, depending on the nature thereof.

* The Executive Summary
  · This document should be presented clearly and concisely as a stand-alone report. It is often the only part of the EIR that decision-makers and most people will read. The Executive Summary should thus focus on the critical findings and options for decision-making addressed in the EIR, rather than trying to summarise all the contents of the EIR. The Executive Summary should be short, no more than seven pages and preferably less (UNEP 2002). The key part of the Executive Summary is that it describes the action or tasks required to be executed.

* The Main Report
  · *Statement of need for and purpose of the proposed activity.* A clear statement of the rationale, objectives of, and motivation for the proposed project is critical, because it provides the starting point for identifying the range of alternatives that could meet that need (Bass and Herson, 1993).
  · *Describing the approach to the EIA.* An explanation of 'where are we' in the planning process, methods used, how specialist studies have been integrated, and what provision for participation by I&APs has been made, is important. It is also believed to be critical to state clearly the time horizons and spatial scales (geographical detail and spatial extent) used in the EIA, since these scales can significantly affect the outcomes of the EIA. According to João (2002), EIRs very rarely address scale; not one of 42 EIRs reviewed in the United Kingdom mentioned the spatial

boundaries of the EIA.

- *Assumptions.* It is essential that the underlying assumptions and any associated uncertainties, as well as the implications for decision-making, are given. That is, how sensitive are the predictions made in the EIR to changes in these assumptions, and what if any significant risks may arise if an assumption is found to be incorrect.

- *Difficulties, limitations, gaps in information, constraints and uncertainties.* Difficulties in acquiring, compiling and analysing appropriate, reliable and sufficient information, may have a substantial effect on the reliability of impact predictions. Such difficulties, as well as any inherent uncertainties in the behaviour of the affected environment, are most usefully presented as a separate section in the EIR. Common limitations in the information base of an EIR include a lack of seasonal sampling of biota; common uncertainties arise with regard to predicting settlement patterns in peri-urban areas, predicting the impacts of climate change on plant distribution, etc. It is essential that the implications and significance for decision-making of the limitations and uncertainties are clearly spelt out.

- *Description of the proposed project and reasonable alternatives, including the "no project" option.* The consideration of alternatives during an EIA relates principally to ways of improving the proposed activity, and/or attempting to avoid or minimise potentially significant negative impacts. Alternatives may be: a) discrete options generally identified during the pre-feasibility, feasibility and/or scoping phases (e.g. different locations or sites for a proposed activity, or substantially different ways of meeting a particular need, e.g. wind generators or coal-fired power station to meet energy needs), or b) incremental alternatives considered during the course of the assessment process to reduce adverse impacts and/or enhance benefits. Different types of alternatives are shown in Box 1.

  Consideration of these latter alternatives is frequently intertwined with identification of mitigation measures. They may thus be incorporated in the final project proposal, or discussed under the EIR section addressing mitigation.

Box 1: Different types of alternatives that can be evaluated in project level EIA

- * Demand alternatives - eg using energy more efficiently by managing patterns of demand rather than supplying more energy.
- * Activity alternatives - eg providing public transport rather than increasing the number or capacity of roads.
- * Location alternatives - eg considering different areas for locating the entire, or components of, a proposed development or activity.
- * Siting alternatives - eg considering different sites on the same location for the entire, or components of, a proposed development or activity.
- * Process alternatives - eg re-use of process water, minimising wastes, using energy efficient technology.
- * Sequencing or phasing alternatives - eg changing order of components of overall plan to increase effectiveness.
- * Material alternatives - eg using different materials in construction to optimise local benefits and sustainability.
- * Financial alternatives - eg using different methods of funding or providing assurance.
- * For public proposals, the no-project alternative should also be examined

The range of alternatives that should reasonably be addressed in the EIA is likely to differ, depending on whether the proponent is a private developer or the State. For relatively large-scale projects, programmes or plans, a Strategic Environmental Assessment (SEA) should ideally inform the consideration and identification of appropriate alternatives.

In some developing countries, the need to report on alternatives is highlighted and defined as both the need to look at options for carrying out the proposed activity, as well as alternatives to the proposed activity (Appiah-Opuku, 2001).

Where the potentially significant impacts associated with a number of discrete alternatives have been evaluated to a point at which a clear "optimum" alternative has emerged, documentation of this process should be provided and the criteria used in the comparison noted.

Maps and plans at an appropriate scale should be provided to assist in understanding the context of any impacts.

- *Policy, planning, legal and "environmental quality" context.* The evaluation of potential significance of environmental impacts is done within the context of our current value system (DEAT, 2002b). For this reason, it is essential that the tools which define the boundaries for, or regulate, particular activities and their impacts are brought to the attention of I&APs and decision-makers. Such tools comprise relevant laws, policies, plans, standards, objectives, limits of acceptable change, performance targets or other environmental quality goals which have a bearing on the proposed activity and its associated impacts.

- *Assessment and evaluation of impacts.* The "best practice" EIR presents succinct information for each alternative - including the "no-go" option - on the potentially significant impacts on the environment, the main parties likely to be affected by these impacts and the fairness of their distribution, and the likely significance of impacts and risks after mitigation or optimisation.

In order to evaluate the potential significance of impacts both before and after mitigation or optimisation, it is common practice in EIRs to provide a concise statement of measures which should be used to reduce adverse impacts or enhance

benefits, as part of this section. However, detailed discussion on the implementation of such measures is usually left to a separate "action section" of the EIR. Highlighting those sections where mitigation or optimisation measures are discussed within a broader context of assessment and evaluation, for example by the use of a separate subheading, is often used to draw the reader's attention to this particular discussion.

In evaluating the potential significance of impacts after mitigation, it is important to give due consideration to the likelihood of such measures being implemented (see the section on mitigation below). Where there is uncertainty in this respect, clear guidance should be given as to the reliability of using the residual significance ratings in decision-making.

Explicit criteria used to assess and evaluate impacts need to be provided (see for example, DEAT, 2002b). Typically, the following largely technical criteria are used to assess impacts: magnitude, duration, spatial extent, likely compliance with laws, and consistency with relevant policies, plans and/or environmental standards (from local to national, to international standards, as relevant). Additional criteria are often used or required in different countries; e.g. the probability of the impact occurring, risk, level of confidence in predictions, inherent uncertainty, the irreversibility of the impact where unique, valued or important resources are likely to be affected, and any irretrievable commitment of irreplaceable resources (Canter, 1996).

The prediction and evaluation of impacts relies on sufficient data. Often such data are not available, or there is lack of knowledge about cause and effect relationships, or the response of the affected environment is unpredictable. These shortcomings in prediction must be recognised, and clarity on the implications for predicting and evaluating impacts, as well as suggesting mitigation, needs to be given. Application of the "precautionary principle" (Box 2) to any areas of uncertainty, or gaps in information or knowledge, should be clearly explained. In some instances, contingency analysis is useful to anticipate possible consequences and plan for their appropriate management or mitigation should they happen (Sager, 2001).

Box 2: The Precautionary Principles

When the consequences of an impact may be severe or irreversible and/or there is little prior experience or scientific confidence about the outcome of undertaking a proposed activity in a particular environment, a risk-averse and cautious approach should be applied

To assist decision-makers, an EIR should:

* Include a clear statement of any uncertainty or low level of confidence in impact predictions;
* Make provision for a safety margin where the consequence of potential impacts may be serious, appear irreversible or, where there is little prior experience or scientific confidence about the outcome; and
* Err on the side of caution in determining measures to mitigate, monitor and/or manage negative impacts where there are uncertainties about either the significance of impacts, or the effectiveness of mitigation measures.

According to Ross (1987), it is important that the EIR is scientifically and technically sound. To this end, the quality of data and the analytical procedures used need to be explicit, and the sources of information should be given.

An appropriate balance has to be struck between using scientific or technical criteria, and the value sets of affected parties. In multi-cultural, multi-ethnic countries such as South Africa, where societal values are complex and often divergent, tools like Multi-Criteria Decision Analysis (Goodwin and Wright, 1991) and Citizen Values Assessment (Stolp et al., 2002) can assist in providing a rational basis for evaluating significance. The relative weight of values and scientific or technical criteria needs to be explained and motivated.

Where impacts are likely to occur beyond the immediate "footprint" of the proposed activity, or could be additive over time and/or space, could interact with other impacts not associated with the proposed project, or could contribute to recognised global environmental problems (e.g. loss of biodiversity, rising levels of greenhouse gases or climate change), such cumulative impacts should be specifically included in the EIR. Also, consideration of cumulative impacts should form part of the comparative evaluation of the proposed activity and its alternatives.

- *Mitigation, management and monitoring.* The reduction of negative impacts to acceptable levels, partly through iterative consideration of alternatives, is one of the principal aims of the EIA process. Measures to reduce or avoid potentially significant negative impacts, and enhance positive impacts, should be presented in the EIR. These measures preferably, should be affordable, relevant and effective (it is important to provide an answer to the question "will they work?" (Ross, 1987)). They should also be described in a precise and explicit way, rather than be vague and generalised.

Particular attention should be paid to proposed emergency measures in the event of accidents or upset operating conditions which could result in significant adverse impacts on the receiving environment and/or affected communities.

- *Recommendations.* It is generally agreed that it is not the function of the EIR to present recommendations with regard to authorising the proposed activity or its alternatives. Rather, the EIR should make clear the implications of authorising the proposed activity or its alternatives to decision-makers.

  It is common, however, to include specific recommendations that would accompany any chosen alternative, to improve the proposed activity or provide mitigation or management assurance. These recommendations are aimed at the decision-maker for consideration as possible conditions of authorisation should that particular activity or alternative be approved.

- Overall evaluation of alternatives and of the implications of the proposed activity. The implications of the proposed activity and alternatives should be systematically compared to enable the most appropriate option to be determined. As far as possible, the trade-offs should be clarified and an explicit basis for choice established. In some countries, it is a formal requirement to address the trade-offs between short term gains versus long term losses, and to highlight actions which could foreclose future options (e.g. USA's Council on Environmental Quality guidelines for the content of Environmental Impact Statements, in Canter, 1996).

- Supporting documentation
  Appendices, Addenda and/or Annexures contain the information that may be needed for reference or detailed review by technical specialists. They should be organised rationally in relation to the structure of the main report.

  Providing the names and qualifications of specialists who have contributed to the EIR allows others to judge the likely quality of information, and assures responsibility for such information (Ross,1987).

6. QUALITY OF THE EIR

The quality of the EIR can be measured in a number of different ways. For example, Elkin and Smith (1988) state that the EIR should:
- (a) predict environmental impacts,
- (b) organize information in a concise, rational way, and
- (c) communicate that information intelligibly.

According to Ross (1987) a good EIR is one that is:
- (a) focussed on the important issues,
- (b) scientifically and technically sound, and
- (c) is clearly and coherently organised and presented.

Alton and Underwood (2003) believe that an EIA (and thence an EIR) should demonstrate the following five characteristics in order to be useful, namely they should be:
- (a) scientifically sound,
- (b) easily understood,
- (c) feasible ,
- (d) legally defensible ,and
- (e) timely.

It is critical that the findings of the EIR are successfully communicated to decision-makers and stakeholders. Little is achieved if the "so what" question of data and information is not addressed, and if the findings of the EIA are not interpreted in the context of the broader policy, legal, planning and sustainable development framework.

Canter (1996) notes that the target audience of an EIR typically consists of a non-technical component, represented by decision-makers and members of the public, and a technical component represented by specialists in government bodies, NGOs and other expert groups.

The EIR should, therefore, be:

- * clearly communicated in plain, non-technical language which is accessible to the non-specialist.
- * structured in a user-friendly way.
- * project-specific and of direct relevance to the decision-maker.
- * logical and balanced, free from bias and non-emotive.
- * comprehensive, concise and analytic - as opposed to encyclopaedic. Information overload results in

"nothing but obfuscation", according to Ross (1987). Superfluous information should not be included in the EIR. Appendices, addenda or annexures, rather than the main body of the EIR should contain that material which provides technical backup and "substantiates the analysis" (Regulations in terms of the National Environmental Protection Act, 1969).
- * precise and accurate, rather than vague and generalised.
- * terminology used should be consistent throughout the EIR.
- * sources of information should be clearly referenced.
- * all maps, tables and figures should be clear and explicit.

It is possible to group the above issues in terms of four headings, as follows: language of the EIR, presenting information, layout and the issues trail.

6.1 Language of the EIR

"It is all too easy to obscure critical issues with poor organisation and writing" (Ross, 1987). The EIR, especially the Executive Summary, should use clear and simple language. It is important that such language would be easily understood by local readers likely to be affected by the proposed activity, as well as decision-makers.

Clear definitions should be given for terms used to describe or evaluate impacts, and impacts should be described in easily recognisable ways (e.g. number and frequency of truckloads rather than millions of cubic metres of soil), bearing in mind the many audiences of the EIR (Bisset, 2002). Use of slang, jargon, cliches, catchwords or colloquialisms, which may be incomprehensible to I&APs and/or decision-makers, should be avoided in the EIR.

The EIR should be made available to I&APs and decision-makers in the dominant language of the affected area. Generally, English is accepted as the dominant language. However, the Executive Summary, at least, should be made available in other, secondary languages used by communities in that area. Where the predominant language is not English, and/or where substantial numbers of I&APs use another language, communication of the draft findings of the EIR should be undertaken in that language, either in written form or through use of other media such as radio or workshops/presentations.

The EIR should not be used as a means to legitimise a proposed project. It should give appropriate emphasis; ie due emphasis on key issues and impacts rather than on relatively minor or inconsequential aspects. Conclusions should be supported by information and analysis. Bisset (2002) notes that any attempts by proponents to hide material which could be either contentious or detrimental to the project, or give undue emphasis to project benefits, often lead to much greater opposition and result in delays or even stoppage of the proposal.

Vague generalities should also be avoided. Canter (1996) notes that a frequent criticism of EIRs is that information is so general that it has little relevance to the analysis of impacts. For example, vague statements such as "construction noise will be minimised" and "special attention will be given to controls" should be replaced with explicit method statements.

6.2 Presenting Information

A major challenge to preparing the EIR is to achieve an appropriate balance between providing just enough, as opposed to too much, or too little, information. This challenge

extends to providing the right kind of information, too. Information needs to be provided on both the process followed during the EIA, including stakeholder engagement as well as technical or scientific aspects.

Facts should be distinguished from opinions (DEA, 1992).

Decisions around whether to include information in an Executive Summary, the Main EIR document, or in addenda and appendices, are central to environmental reporting. In general, complex, scientific and technical information is best presented in appendices or addenda to the main EIR document.

For this reason, specialist studies are usually included in total as appendices, with the key findings incorporated in the main body of the EIR. Sound terms of reference for specialists, including explicit instructions with regard to reporting requirements, facilitate the preparation of a good EIR (DEAT, 2002a).

Bisset (2002) notes that any inconsistencies and inaccuracies in the EIR increase its susceptibility to challenge by stakeholders, and there is thus a need for strong quality control to ensure consistency and accuracy of information.

EIRs should ideally contain minimal written text and liberal use of visual display material. The use of this material is valuable where words won't suffice, where the information would be faster and easier understood in graphic or picture form, and/or where it can serve to highlight or emphasise important points. Charts, graphs, drawings, photographs or tables can be used; photographs can supply more realism than drawings or diagrams. All visual display material should be clearly and simply labelled, numbered sequentially within each chapter of the EIR, and footnotes used for extensive explanations of data or headings.

Maps and plans should have clear co-ordinates, a reliable indication of scale, and a title. Locality maps should include obvious and easily recognised landmarks. All visual material should be presented neutrally, without distorted perspectives, false camera positions, etc. Photomontage or simulated images are increasingly being used in EIRs to give the reader a visual impression of what the proposed development would look like. A consistent system of referencing and citing sources of information should be used, and plagiarism should be avoided (Canter, 1996). Any conflicts of professional opinion or scientific information in substantive areas should be highlighted in the EIR, to inform stakeholders and decision-makers. Where such conflicts are based on misinformation or errors in interpretation, however, they should be eliminated from the report.

6.3 Layout

The layout of the EIR should enable the reader to find and assimilate information easily and quickly. For example:

* There should be a clear table of contents, as well as a glossary of terms and acronyms used in the report.
* A "road map" through the EIR should be provided as part of the introduction.
* Unless the chapters are very short, it is useful to provide brief chapter summaries outlining the main findings at the start of each chapter.
* The EIR structure should show clearly how issues and alternatives raised by I&APs have been addressed in different phases of the EIA.

6.4 The Issues Trail

Information in an EIR should be presented in such a way that it allows I&APs and decision-makers to understand how conclusions are reached. That is, continuity from one section to the next is important (Canter, 1996).

One of the main objectives of scoping is to identify the main issues and alternatives that need to be addressed (DEAT, 2002c). Many issues raised during scoping are dealt with at this stage, whilst those issues, which cannot be answered, form the basis for the Terms of Reference of specialist studies.

It is essential that the EIR allows I&APs and decision-makers to follow a particular issue from its identification through to the conclusions. A natural progression from one section of the EIR to the next, with a clear thread linking issues through the subsequent sections (e.g. from the identification of issues, prediction of impacts, through their assessment and evaluation, mitigation, and residual significance) is thus important.

In addition, it is essential that the response to concerns raised around that issue are made explicit in the EIR. Common pitfalls in addressing issues and associated concerns in an EIR include appearing to respond honestly to concerns raised by I&APs, while presenting the same information and unadjusted solutions throughout (Sager, 2001).

The consistent use of headings and systematic dealing with issues, so that none "disappears" in the EIR, helps improve the quality and communication of the EIR.

7. PREPARING THE DRAFT EIR

Mills and Walter (1978, in Canter, 1996) give five important principles in preparing a draft report, namely:

* Always assume that the readers of an EIR are intelligent but uninformed.
* Having decided on the purpose of the report, ensure that every paragraph, every sentence and every word makes a contribution to that purpose at the right time.
* Use simple, concrete, familiar language.
* Tell the readers what you're going to tell them, then tell them, then tell them what you've told them.
* Make the report visually attractive.

Canter (1996) states that the preparation of an EIR should follow a logical process. He states that there are usually three distinct phases to preparing a draft EIR, namely an initial report planning phase at project inception, a detailed report planning phase somewhere near the midpoint of the EIA, and the writing phase at the end. The "bare bones" of a report structure and contents are outlined in the initial phase, fleshed out during the detailed phase, and written up during the writing phase. The sequence of report writing which should yield the most targeted and concise products would be as follows: Firstly, prepare the basic EIA report, then a summary of the EIA report, an executive summary drawn from the summary, and finally an abstract drawn from the executive summary.

Often, the period of report writing, editing and production is a crisis time for the authors of an EIR. According to Bisset (2002), an early start to writing the EIR can be a good idea, although it is important to avoid the temptation to give too detailed a description of the existing environment and proposed project, since this material is available early on in the process. The EIR is intended to be a statement of the impact, and this information should comprise the bulk of the EIR. Weiss (1989, in Canter, 1996) gives three broad classes of writing-related errors in EIRs, namely:

* Strategic errors with regard to mistakes in planning the EIA, failure to understand why the EIR is being written and for whom.
* Structural errors, consisting of organisational mistakes and failure to arrange the elements in the document so that they can be easily followed.
* Tactical errors, comprising editing, failure to revise the text for clarity, readability and appropriate emphasis.

The value of having someone who is unfamiliar with the project review the first draft of an EIR, particularly when an EIR is complex or likely to be controversial, cannot be overstated. Such an outsider can assist in checking for consistency, accuracy, completeness and "understandability" before the final EIR is reproduced and distributed.

8. FROM DRAFT EIR TO FINAL EIR

The Draft EIR is made available to I&APs for comment before it is finalised. Comments received are synthesised, and the environmental consultant (or relevant specialist's) response to these comments is documented. Such response often indicates how and where the Final EIR has been amended in the light of comments or, if no amendments have been made, gives reasons why the information presented in the Draft EIR was adequate. In many instances, and depending on the scale of the EIR, revision of the entire EIR to produce a Final EIR is inappropriate and costly. Rather, the Final EIR comprises the synthesis of comments and responses, and a separate volume which is submitted with the Draft EIR, comprising a revised Executive Summary, Conclusions and Recommendations sections, and individual pages of specific amendments to specialist reports and different sections in the Main Report.

9. COMMON PROBLEMS WITH EIRS

The overall performance of the EIA process depends on many factors but, among these, the quality of the EIR is of particular importance (Lee et al, 1994). Despite their importance, a significant proportion of EIRs are of unsatisfactory quality (Wood, 1995; Lee et al., 1999, Modak and Biswas, 1999). Lee (2000) notes that in both developing and developed countries, there is clear evidence of unsatisfactory quality EIRs being produced and for this to be a source of concern. The areas in which quality problems are found in EIRs are very similar in both developing and developed countries.

The quality of EIRs has improved from the early 1990s to date in developed countries. In developing countries, there is evidence to suggest a similar trend (Lee 2000), although problems with lack of adequate data and information, and expertise, are common (Appiah-Opuku, 2001; Zubair, 2001). Modak and Biswas (1999) cite the lack of qualified environmental experts, as well as insufficient time and money as the two primary reasons for poor quality EIA reports submitted to the Asian Development Bank.

In South Africa, the introduction of legislation enforcing EIA in 1997 triggered rapid growth in the market for EIA practitioners. In the absence of any certification system for such practitioners, levels of competence in undertaking EIA have been varied, leading to poor EIRs being produced. The step between scoping and specialist investigation (including the assessment and evaluation of impacts) is seen to be a weak link in current EIA practice (Weaver et al 1998), and often leads to inadequacies in the EIR.

In the USA, overly detailed and long Environmental Impact Statements are a problem, and there has not been an overall improvement in their quality of information since the 1970s (Tzoumis and Finegold, 2000). Welles (1997) notes that fear of litigation is often the driving force in producing voluminous

reports, and that often there is too much descriptive material rather than a focused analysis which would be more useful to the decision-maker.
Some of the problems encountered include:
* Editing / censoring of the EIR, especially the Executive Summary, in such a way that negative impacts are obscured and benefits emphasised (Lee, 2000; Spooner, 1998). In some cases, the EIR has been written to justify, rather than assess, the impacts associated with the development proposal, and could rightly be seen as "proponent statements" (Wood, 1995). Subtle techniques and use of language are often used to discredit and undermine issues and concerns raised by stakeholders (Spooner, 1998).
* Few EIRs explicitly consider the need for the project (Elkin and Smith, 1988). Lee (2000) states that there is often a lack of clear objectives or justification for the proposed activity. The need for a proposed activity is often substantiated from a narrow perspective, neglecting the broader opportunity costs and implications (Netherlands EIA Commission, in UNEP, 2002).

Example of inadequate description of the objective of the activity, and thus inadequate consideration of alternatives
The motivation for a new road is based on existing problems with transporting people and goods between two towns. The option for rail or other means of transport is not addressed.

* Commonly, those sections of the EIR describing the proposed development and affected environment are relatively sound.

    However, problems with technical language and lack of consideration of construction activities in the description of the proposed activity are common (Lee, 2000). The Netherlands EIA Commission (UNEP, 2002) notes that the proposed development is frequently described in a very limited window and that the broader links and impacts, taking into account inputs to and outputs from the proposed activity, are often ignored.

    "Padding" the description of the affected environment with excessive information is often problematic (Lee, 2000). Frequently, this "padding" reflects an inability to interpret this information, often linked to a lack of understanding of its relevance to the EIR.

Example of inadequate description of the proposed activity:
The EIR describes the proposed construction of a nuclear power plant, but fails to include information on the source of radioactive materials, their transport, the disposal of wastes, etc.

The EIR describes the proposed development as "a resort", but neglects to unpack the various components of such resort; e.g. a golf course, restaurant, petrol station, etc.

* Sections identifying (ie scoping), assessing and evaluating the key impacts before and after mitigation (residual impacts), as well as discussing alternatives and mitigation, are frequently inadequate (Lee et al., 1999; Lee, 2000).
* Lee et al (1999) note that deficiencies in EIRs are most evident in the scoping and impact prediction stages, and in the evaluation of impact significance. These reporting deficiencies are directly linked to shortcomings in the methods and approach to identifying, assessing and evaluating impacts.

    The Netherlands EIA Commission notes that insufficient or outdated methods are often used to predict impacts (UNEP, 2002). The translation of impact prediction

and assessment into an evaluation of impact significance is dealt with implicitly rather than explicitly in many EIRs (Elkin and Smith, 1988). In addition, the problems encountered in acquiring and analysing information, as well as the implications for predictions of gaps in knowledge and uncertainty are frequently not presented (Lee, 2000).

Example of inadequate impact prediction, assessment and evaluation:
"The proposed site does not support material numbers of animals. The proposed development will have no impact on fauna adjacent to the site."

*   In evaluating the potential significance of impacts, compliance with environmental regulations, standards or quality targets are often overlooked (Netherlands EIA Commission in UNEP, 2002).
*   The identification of reasonable alternatives in the EIR is often inadequate (Lee et al, 1999). Deficiencies often arise when the EIA process has been started too late in the project cycle, and the proponent has already focused on a specific activity rather than considering an appropriate range of options. In some cases, focusing the consideration of alternatives at a project EIA level rather than at a broader planning and SEA level, can lead to the evaluation of inappropriate options. Alternatives are frequently too narrowly stated, and often do not give due consideration to the full spectrum of possibilities (Netherlands EIA Commission in UNEP, 2002). In Sri Lanka, the best alternatives have been known to be deliberately avoided, and non-viable alternatives are superficially covered instead (Zubair, 2001). Lack of reasons for rejecting alternatives proposed by stakeholders is another common problem.
*   With regard to mitigation, vagueness about the actual measures proposed, as well as their implementation, is common, and there is often no indication of commitment or assurance that mitigation would, in fact, occur (Canter, 1996; Lee, 2000).
*   The effect of uncertainty and/or gaps in information on the reliable prediction and evaluation of impacts, and on determining effective mitigation, is often not addressed in an EIR. Key constraints to, and risks associated with the proposal are also often overlooked (Netherlands EIA Commission in UNEP, 2002).
*   Cumulative and indirect impacts are often neglected (Elkin and Smith, 1988; Lee, 2000; UNEP, 2002; Wood, 1995;, Zubair, 2001).
*   Problems of poor layouts and bias are often evident throughout the EIR (Canter, 1996; Lee, 2000; Wood, 1995).

10. CHALLENGES

EIRs are expected to provide sufficient reliable and relevant information to stakeholders (including decision-makers). Criticisms of EIRs have come from a number of sources:

*   Scientists feel that the scientific quality of EIRs is poor. They are frequently lacking when it comes to rigorous sampling, methodology, analysis and prediction, research in support of an EIA is often superficial, there is inadequate use of predictive techniques and poor statistical design (Beanlands and Duinker, 1984). "In short, as a tool in public decision-making, EIA needs "much better applied science" (Warnken and Buckley, 1998).

*   Decision-makers feel that EIRs are often too long, "encyclopaedic" (Wood, 1995), too scientific and technical, and don't give them what they need to make a sound decision. Lengthy documents and a plethora of acronyms and scientific language tend to make EIRs inaccessible to the average authority.

Some EIA practitioners feel that EIRs focus too much on scientific considerations and ignore local community or citizen values. Alton and Underwood (2003) point out that many decisions ultimately rest on issues of law, policy and public choice. Inclusion of local, indigenous knowledge in the collection of information, prediction and evaluation of impacts, is frequently overlooked in the EIA, and hence not reflected in the EIR. For example, in an Africa-wide review by the World Bank of EIAs between 1992 and 1994, in 86% of cases, local community involvement comprised being informed of impending development. Of 30 EIAs reviewed in Tanzania, only two incorporated a structured approach to public involvement (Donnelly et al., 1998). Expert judgements can be different from citizen's perceptions about the environment and lifestyle values. Since such knowledge can have a significant effect on the findings of an EIA, particularly in developing countries (Appiah-Opuku, 2001), explicit evidence in the EIR, showing that local communities have participated in and contributed to the EIA, is increasingly being called for. Meredith (1992) similarly notes that attention is being drawn to the importance of factoring in consideration of local value sets to evaluate the significance of potential impacts, and not relying exclusively on scientific predictions. Systematic and objective methods of incorporating local community values in the EIR are emerging; e.g. Citizen Values Assessment (Stolp et al., 2002).
*   There is a growing need for EIRs to include information on the incremental impacts that a proposed development would have on the environment. These cumulative impacts on common property resources such as air, water, climate and biodiversity, are of growing concern at both a local and international level. EIA is generally reactive in its approach and lacks a broad perspective. For this reason, it is widely recognised that environmental assessment at the policy, plan and programme level is best suited to addressing cumulative impacts
*   There is increasing interest in sustainability issues within environmental assessment, and environmental assessment as a tool for sustainability assurance (Sadler, 1996; Lee, 2000). Given that ecological sustainability is seen as the baseline condition of sustainable development, the need to determine thresholds or limits of acceptable change against which potential impacts can be evaluated is urgent. As Sadler (1996) states, "the combination of uncertainty, penalty and irreplaceability summarises the challenge to decision-makers with respect to sustainable development. Although this interest is beginning to be reflected in the content of EIRs, in many cases it is not yet being done satisfactorily, often due to the absence of well-defined and justified sustainability indicators.
*   In South Africa, whilst the environmental management principles contained in the National Environmental Management Act (1998) provide some guidance on measuring sustainability, specific criteria for use in EIAs are lacking. Such criteria need to be developed if EIAs are, indeed, to contribute to sustainability assurance.
*   EIRs are the conventional tool used in communicating information, both to stakeholders (and inviting informed feedback) and to decision-makers. Increasingly however, it is recognised that supplements to the EIR may be more effective communication methods than lengthy and complex written documents, particularly where literacy, social or cultural barriers prevent local people accessing the EIR (Donnelly et al., 1998).

The need to choose appropriate ways of communicating with stakeholders is particularly acute in South Africa, with its eleven national languages. This need presents itself both during the EIA process and at its end. Supplements to the written EIR may take the form of local language videos,

presentations, local radio programmes, narratives, meetings and workshops, feedback through political representatives or other power structures, and in some instances local theatre.

Where the main stakeholders have ready access to the internet and/or computers, access to the EIR can be improved through the use of websites and compact discs being made available.

11. CONCLUSIONS

A sound EIA provides the basis for a good EIR. Many of the shortcomings in EIRs noted in South Africa and elsewhere in the world stem from a poor EIA process.

Environmental impact reporting is critical to the usefulness of the EIA process. In order for the EIR to act as an effective communication tool, the information contained in the EIR must be relevant, reliable and adequate enough to help decision-makers and other stakeholders to understand the implications of the proposed activity. Also, the way in which that information is presented in the EIR has an important bearing on how easily it is understood by readers.

As the basis for sound environmental management during project implementation, the EIR is essential in establishing foundations for the preparation of an EMP and/or EMS. For this reason it is important that the prediction, assessment and evaluation of probable impacts, as well as identification of appropriate and effective mitigation measures, is adequately undertaken.

The main challenge facing EIRs in South Africa, as in countries elsewhere, is to provide the right information in the right form. It is important that this information be linked to the broader goals and priorities of sustainable development, and that it explains clearly how the proposed activity would add to or detract from such goals.

12. REFERENCES

Alton, C.C and Underwood, P.B. (2003) Let us make Environmental Impact Assessment more accessible, *Environmental Impact Assessment Review, 23, 141-153.*

Appiah-Opuku, S. (2001) Environmental Impact Assessment in Developing Countries: the case of Ghana, *Environmental Impact Assessment Review, 21, 59-71.*

Asian Development Bank (2003) Content and Format: Environmental Impact Assessment. http://www.adb.org/Documents/Guidelines/Environment al_Assessment/

ANZECC (2000) Australian EIA Network. ANZECC guidelines and criteria for determining the need for and level of EIA in Australia. Australian and New Zealand Environment and Conservation Council http://www.environment.gov.au/epg/eianet/eia/anzecc_ criteria.html.

Bass, R.E. and Herson, A.I. (1993) Mastering NEPA: *A Step-by-step Approach,* Solano Press Books, Point Arena, California.

Beanlands, G.E. and Duinker, P.N. (1984) An Ecological Framework for Environmental Impact Assessment, *Journal of Environmental Management, 18, 267-277.*

Bisset, R. (2002) EIA Training Resources Manual: Issues, Trends and Practice, United Nations Environment Programme, Second Edition.

CEAA (1997) *Guide to the Preparation of a Comprehensive Study for Proponents and Responsible Authorities: Step 2.4, Reviewing the Comprehensive Study Report; Phase 3: The Review of the Comprehensive Study Report and Ministerial Decisions,* Canadian Environmental Assessment Agency www.ceaa.gc.ca/comps/comps_e.htm

Canter, L.W. (1996) *Environmental Impact Assessment,* Second Edition, McGraw-Hill Inc.

deVilliers Brownlie Associates (2000) (unpublished) *Draft Review Guidelines for Environmental Impact Assessment in the Cape Metropolitan Area,* Prepared for the then Cape Metropolitan Council, in association with Arcus Gibb (Pty) Ltd, the Environmental Evaluation Unit of the University of Cape Town, and Sue Lane & Associates.

DEA (1992) *Guidelines for Report Requirements,* Integrated Environmental Management Guideline Series, Document 3, Department of Environment Affairs, Pretoria.

DEAT (1998a) *EIA Regulations: Implementation of Sections 21, 22 and 26 of the Environment Conservation Act,* Guideline Document, Department of Environmental Affairs and Tourism Government Printer, Pretoria.

DEAT (2002a) *Specialist Studies,* Integrated Environmental Management, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2002b) *Impact Significance,* Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2002c) Scoping, Integrated Environmental Management Information Series 2, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Donnelly, A., Dalal-Clayton, B. and Hughes, R. (1998) *A Directory of Impact Assessment Guidelines.* Second Edition. A product of the International Environmental and Natural Resource Assessment Information Service (INTERAISE), a collaborative project undertaken by the International Institute for Environment and Development (IIED), the World Resources Institute (WRI), and the World Conservation Union (IUCN). Printed by Russell Press, Nottingham.

Elkin, T.J. and Smith, P.G.R. (1988) What is a Good Environmental Impact Statement? Reviewing Screening Reports from Canada's National Parks, *Journal of Environmental Management,* 25, 71-89.

European Commission (2001) *Guidance on EIA-EIS Review,* Appendix A: Environmental Information Requirements set out in Annex IV of Directive 97/11/EC. Luxembourg.

Institute of Environmental Management and Assessment (2001) European Commission Review Criteria. http://www.iema.net/ceam/reviewcrit.pdf.

João, E. (2002) How Scale Affects EIA, *Environmental Impact Assessment Review,* 22, 289-310.

Lee, N. (2000) Reviewing the Quality of Environmental Assessments, in: Lee, N and George, C. (eds) *Environmental Assessment in Developing and Transitional Countries,* Wiley, Chichester, 137-148.

Lee, N., Walsh, F. and Reeder, G. (1994), Assessing the Performance of the EIA Process, *Project Appraisal,* 9(3), 161-172.

Lee, N., Colley, R., Bonde, J. and Simpson, J. (1999) *Reviewing the quality of environmental statements and environmental appraisals,* Occasional Paper Number 55, EIA Centre, Department of Planning and Landscape, University of Manchester.

Meredith, T.C. (1992) Environmental Impact Assessment, cultural diversity, and sustainable rural development, *Environmental Impact Assessment Review,* 12, 125-138.

Milieu-effectrapportage (MER) (1996) *Environmental Impact Assessment in the Netherlands: Experiences and views presented by and to the Commission for EIA,* Utrecht, the Netherlands, Commission for Environmental Impact Assessment.

Ministry of Environment and Tourism (1998) *Guidance Notes for Review,* Directorate of Environmental Affairs, Namibia.

Modak, P. and Biswas, A.K. (1999) Reviewing and Evaluating an EIA Report, in: *Conducting Environmental Impact Assessment for Developing Countries,* UNU Press.

Ross, W.A. (1987) Evaluating Environmental Impact Statements, *Journal of Environmental Management,* 26, 137-147.

Sadler, B. (1996) Environmental Assessment in a Changing World: Evaluating Practice to Improve Performance, *Final Report of the International Study of the Effectiveness of Environmental Assessment,* Canadian Environmental Assessment Agency, Ottawa, Canada.

Sager, T. (2001) A Planning Theory Perspective on the EIA, in : Hilding-Rydevik, T. (ed), *EIA, large development projects and decision-making in the Nordic countries.* Stockholm, Nordregio Report.

Simpson, J. (2001) Developing a review package to assess the quality of EA reports of local authority structure and local plans in the UK, Environmental Impact Assessment Review, 21, 83-95.

Spooner, B. (1998) *Review of the Quality of EIA Guidelines, their use and Circumnavigation,* Environmental Planning Issues No. 19, IIED.

Stolp, A., Groen, W., Van Vliet, J. and Vanclay, F. (2002) Citizen values assessment: incorporating citizen's value judgements in environmental impact assessment, *Impact Assessment and Project Appraisal,* 20(1), 11-23.

Tzoumis, K. and Finegold, L. (2000) Looking at the Quality of Draft Environmental Impact Statements over time in the United States: Have Ratings Improved? *Environmental Impact Assessment Review,* 20, 557-578.

Weaver, A., Morant, P., Ashton, P. and Kruger, F. (1998) Strengthening the effectiveness of EIA in South Africa. Paper represented at the *International Association for Impact Assessment - South Africa (IAIA-SA) Conference, Conference Papers and Notes, Drakensberg, 300 - 310.*

Welles, H. (1997) The CEQ NEPA Effectiveness Study: Learning From Our Past and Shaping Our Future, in: Clark, R. and Canter, L. (eds), *Environmental Policy and NEPA: Past, Present and Future,* St Lucie Press.

Wood, C. (1995) Environmental Impact Assessment; a Comparative Review, Longman Group Ltd, England.

World Bank. (1999a) The World Bank Operational Manual. Bank Procedures. Environmental Assessment. http://wbln0018.worldbank.org/Institutional/Manuals/Op Manual.nsf/toc2/C4241D657823FD818525672C007D096E? OpenDocument

World Bank. (1999b) Sample Outline of a Project-specific Environmental Assessment Report. http://www.worldbank.ord/html/opr/opmanual/ods/400a 1.html.

United Nations Environment Programme. (2002) UNEP EIA Training Resource Manual - Topic 8 - Reporting. Economics, Trade and Environment Unit, UNEP. Geneva. http://www.unep.ch/etu/publications/EIAMan_2edition_t oc.htm

United States Environmental Protection Agency (1998) *Principles of Environmental Impact Assessment- An International Training Course,* Washington D.C.

Zubair, L. (2001) Challenges for EIA in Sri Lanka, *Environmental Impact Assessment Review,* 21, 469-478.

13. GLOSSARY

Definitions

Affected environment
Those parts of the socio-economic and biophysical environment impacted on by the development.

Affected public
Groups, organizations, and/or individuals who believe that an action might affect them.

Alternative proposal
A possible course of action, in place of another, that would meet the same purpose and need. Alternative proposals can refer to any of the following but are not necessarily limited thereto:
* alternative sites for development
* alternative projects for a particular site
* alternative site layouts
* alternative designs
* alternative processes
* alternative materials
In IEM the so-called "no-go" alternative also requires investigation.

Authorities
The national, provincial or local authorities, which have a decision-making role or interest in the proposal or activity. The term includes the lead authority as well as other authorities.

Baseline
Conditions that currently exist. Also called "existing conditions."

Baseline information
Information derived from data which:
* Records the existing elements and trends in the environment; and
* Records the characteristics of a given project proposal

Decision-maker
The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.

Decision-making
The sequence of steps, actions or procedures that result in decisions, at any stage of a proposal.

Environment
The surroundings within which humans exist and that are made up of -
i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, cultural, historical, and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

Environmental Assessment (EA)
The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as EIA, strategic environmental assessment, sustainability assessment and risk assessment.

Environmental consultant
Individuals or firms who act in an independent and unbiased manner to provide information for decision-making.

Environmental Impact Assessment (EIA)
A public process, which is used to identify, predict and assess the potential environmental impacts of a proposed project on the environment. The EIA is used to inform decision-making.

Fatal flaw
Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped.

Impact
The positive or negative effects on human well-being and/or on the environment.

Integrated Environmental Management (IEM)
A philosophy which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at the local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools to a particular proposal or activity. These may include environmental assessment tools (such as Strategic Environmental Assessment and Risk Assessment); environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision-support systems or advisory councils).

Interested and affected parties (I&APs)
Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. These may include local communities, investors, business associations, trade unions, customers, consumers and environmental interest groups. The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Lead authority
The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

Mitigate
The implementation of practical measures to reduce adverse impacts.

Non-governmental organizations (NGOs)
Voluntary environmental, social, labour or community organisations, charities or pressure groups.

Proponent
Any individual, government department, authority, industry or association proposing an activity (e.g. project, programme or policy).

Proposal
The development of a project, plan, programme or policy. Proposals can refer to new initiatives or extensions and revisions to existing ones.

Public
Ordinary citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Role-players
The stakeholders who play a role in the environmental decision-making process. This role is determined by the level of engagement and the objectives set at the outset of the process.

Scoping
The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

Screening
A decision-making process to determine whether or not a development proposal requires environmental assessment, and if so, what level of assessment is appropriate. Screening is initiated during the early stages of the development of a proposal.

Significant/significance
Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic). Such judgement reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts.

Stakeholders
A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Stakeholder engagement
The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".

Stakeholder engagement practitioner
Individuals or firms whose role it is to act as independent, objective facilitators, mediators, conciliators or arbitrators in the stakeholder engagement process. The principle of independence and objectivity excludes stakeholder engagement practitioners from being considered stakeholders.

ABBREVIATIONS

CBO	Community-based Organization
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management Systems
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
NGO	Non-governmental Organization
SEA	Strategic Environmental Assessment
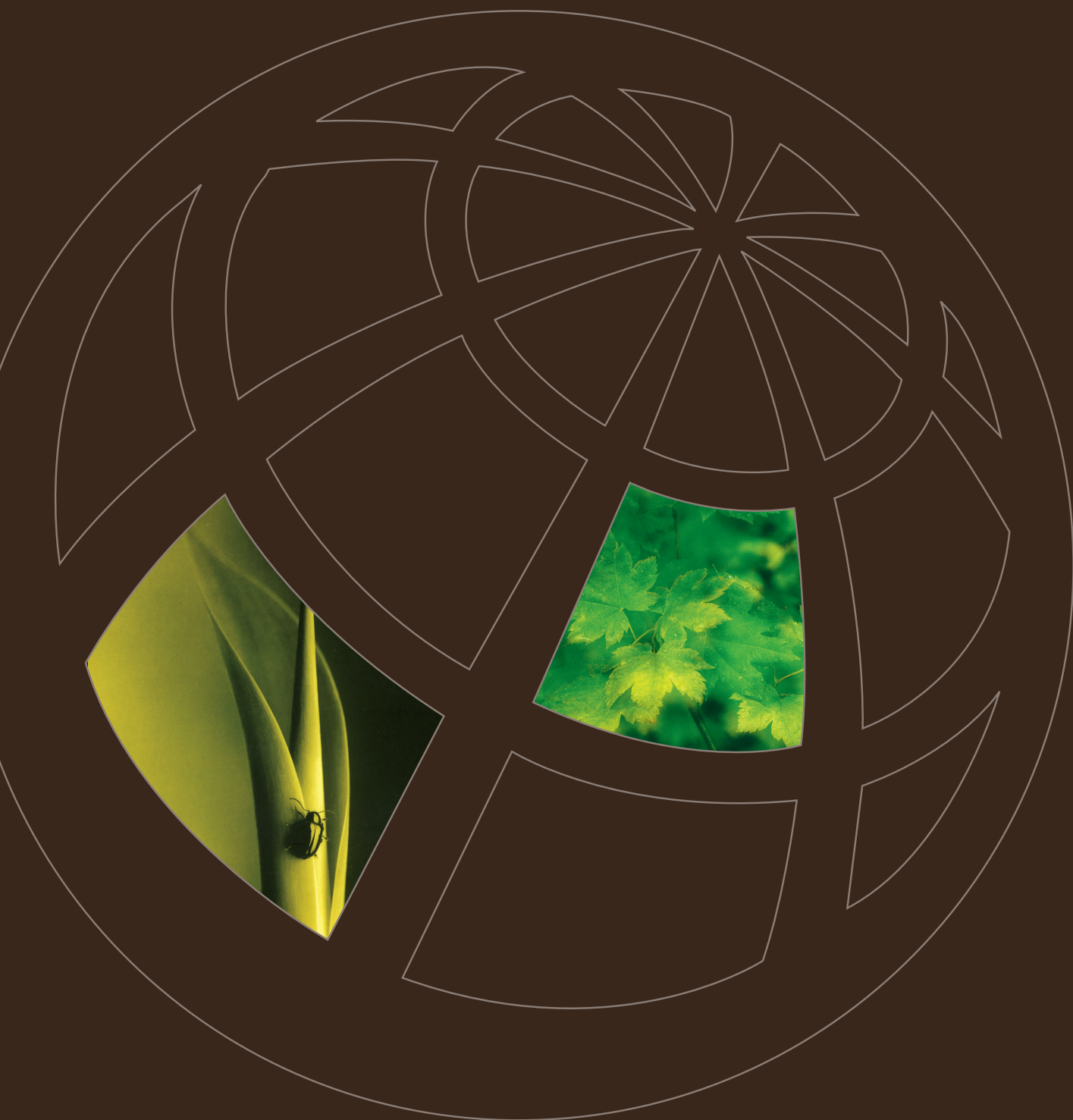
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