

Module 1 – Introduction to Environmental Assessment

Overview

This module highlights different types of environmental assessment, and the context within which Integrated Environmental Assessment and reporting (IEA) has evolved. By the end of the module, you will have learned about:

- The different types of environmental assessment
- State of the environment (SOE)
- Integrated Environmental Assessment and reporting (IEA)
- Environmental impact assessment (EIA)
- Strategic environmental assessment (SEA)
- Corporate environmental assessment and reporting

1.1 Introduction

Environmental assessment has come into its own since the 1970s as a key tool in environmental management. While such assessment had been practised in one form or another long before the 1970s, it is perhaps after the United Nations Conference on the Human Environment, Stockholm, 1972, that environmental assessment became part of the common lexicon among environmental stakeholders as well as the private sector. Environmental assessments are conducted by various stakeholders and to meet disparate objectives as numerous as the stakeholders themselves.

The different types of environmental assessment include, but are not limited, to:

- State of the environment (SOE)
- Integrated Environmental Assessment and reporting (IEA)
- Environmental impact assessment (EIA)
- Strategic environmental assessment (SEA)
- Corporate environmental assessment and reporting

Common to these and other environmental assessment processes is the need for policy responses for effective environmental management and/or sustainable utilization of the environment.

1.2 State of the environment

State of the environment (SOE) reporting has been largely the preserve of government, through a department or ministry mandated to undertake such an assessment and to report to parliament or government or for public information. Traditional SOE reporting has the objective of providing information on the environment and the trends in its key variables. It is mainly concerned about the biophysical environment and less about the human dimension except in the context of the pressures humanity exerts on the environment. It gives information on what is happening to the environment. This information is very useful and may be used to analyse trends in key variables of the environment.

1.3 Integrated environmental assessment and reporting

State of the environment (SOE) reporting has evolved over the past three decades into Integrated Environmental Assessment and reporting (IEA). With the emergence of the concept of sustainable development – whose three main pillars are social, economic and environment – practitioners responded with the introduction of IEA, which integrates social, economic and environmental issues in the analyses. Integrated environmental assessment and reporting tries to show the cause-effect linkages of human and natural action on the environment, and in turn, the resultant environmental change in the state of the environment and human well-being. The end result of environmental assessment should be more than just knowing the state of the environment. It should give policymakers and other stakeholders some guidance on how to better manage the environment. In order to achieve this, information obtained from such reports should be

integrated with other social and economic data and information to assist in policy formulation for the environment. The growing interest in linking environmental, social and economic data and information within the context of sustainable development facilitates integrated analysis of the complex interactions between people and their environment. It is also essential to consider leverages required on policies to promote sustainable development. This is the concept of IEA and it introduces new challenges to the process of environmental assessment:

- It implies an acknowledgement of the environment and human interactions and the impacts they have on each other over time.
- It incorporates environmental assessment into the whole process of environmental policy planning, pulling together the impact of policies from different sectors over time and the existing opportunities to promote sustainable livelihoods and options.
- It gives us an inventory of available resources which can be used as a starting opportunity for working towards sustainable development.
- It requires the development of appropriate measures to assess existing and changing pressures and opportunities in the environment, and achievements in reducing or containing these pressures and increasing available opportunities in a progressive movement towards sustainable development.

Integrated Environmental Assessment and reporting (IEA) encourages all stakeholders to constantly ask whether enough is being done in: looking out for and utilizing opportunities currently available in environmental resources, achieving sustainable development, reducing poverty, conserving and improving the state of the environment, and utilizing scenarios in constructing an outlook.

1.4 Environmental impact assessment

Of the various environmental assessment processes, EIA is arguably one of the most famous or notorious, depending on the protagonists. Often in the past, investors/developers have viewed EIA with suspicion as a tool used by environmentalists to undermine development. However, EIA is a tool used to determine the social, economic and environmental impacts of major developments in order to determine the necessary mitigatory measures. In the context of IEA, EIA is considered a policy response, along with other policies such as multilateral environmental agreements (MEAs) and natural resource management laws and institutions. The Southern African Institute for Environmental Assessment (SAIEA) describes environmental assessment as: a process to identify, evaluate and assess the potential effects on the environment of a proposed development before a major decision or commitment is made (SAIEA 2005). The main aims of the assessment are to:

- Understand the consequences or impacts of the proposed development on the environment.
- Identify ways in which the development can be improved. These could include ways to minimize negative impacts and ways to enhance its benefits.

- Provide this information to decision-makers.

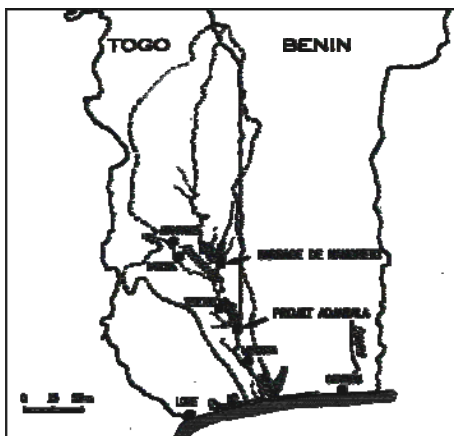
Ultimately, the aim of an environmental assessment is to ensure that developments are sustainable and do not detrimentally affect people's lives or the natural environment (SAIEA 2005).

Box 1.1: EIA of the Adjarala hydroelectric project (Togo-Benin): the aquatic environment component

1. Introduction

The electrical consumption of Togo and Benin has been increasing at the rate of 5 per cent per year. To satisfy the increasing demand the Nangbeto dam was constructed in 1987. A new dam, the Adjarala dam, was constructed on the Mono River to supplement the Nangbeto dam in supplying electric power to both Togo and Benin. The sponsors of the Nangbeto dam required a comprehensive EIA. This box only summarises the aquatic component of the EIA and is based on the situation as analyzed in 1997-98.

The optimal location of the Nangbeto dam was the Adejalara site halfway between Nangbeto to the north and the coast, at a point where the river forms part of the border between Togo and Benin. It is designed to cover 9 500 ha, have a maximum depth of 50 m, and an average turbinated flow of 40-50 m³.



The Mono River watershed is 20 600 km² and has a complex system of wetlands, mainly made up of brackish coastal lagoons and flood plains for which it is the main freshwater inflow. The observed impacts of the Nangbeto dam and its effect in modifying the river-lagoon hydrosystem provided a good starting point and the reference state to project the environmental impacts of the Adjarala project. It was possible to predict the potential impacts of the Adjarala project in light of the observed impacts of the Nangbeto dam. Specifically, modifications of the fluvial system by the Nangbeto dam reduced fluctuations in the peaks of water flow; reduced suspended matter

but increased ammonia concentrations downstream from the dam; and increased pollution from irrigation and fertilizer use for cotton cultivation in the Adjarala watershed, discharges from the TOGOTEX textile factory, and increased urban effluents from Atkapame (population 42 000). Aquatic fauna and flora were also affected. Some areas of the estuary were colonized by the water lettuce *Pistia stratiotes* and the Nangbeto impoundment supported an informal traditional fishing industry.

2. Potential impacts of the Adjarala dam project on the aquatic environment as identified by the IEA

In carrying out the EIA for the aquatic environment for the Adjarala dam project, two key groups of impacts were identified related respectively to the filling of the reservoir, and the hydrosystem downstream from the Adjarala dam.

- a. Impacts related to the filling of the reservoir: "The creation of the Adjarala reservoir

will be accompanied in typical fashion by a modification of the fish population, the lentic and pelagic species (*Cichlidae*, *Cyprinidae*, *Characidae*) becoming predominant over the lotic and benthic or benthophagic (siluriform) species.” The potential fisheries production is estimated in the range of 800 to 1 300 t per year.

Given the current level of nutrient inputs and the rapid turnover time of the water in the reservoir (2.5 months), there is no reason to fear eutrophication of the future impoundment. The inputs of nitrogen, phosphorus and organic matter of anthropic origin should instead have a beneficial effect on the productivity of the impoundment.

- b.** Impact on downstream aquatic environments: the development of the Nangbeto dam has already resulted in very significant modifications to the river’s low-water regime. The commissioning of the Adjarala dam will not modify the current situation and will therefore not have a significant impact on the river’s regime, nor on the hydrodynamic and ecological functioning of the lagoons and wetlands of the lower Mono. The river’s capacity to transport solids will not be modified by development of the Adjarala dam. However, the supply of sediments by the watershed, already reduced by the Nangbeto dam, will be reduced further downstream of Adjarala, which will trap the inflows from the Amou, the last important tributary.

3. Environmental action plan, “aquatic environments” component

The EIA recommended a list of environmental action plan activities to both reduce the negative impacts of the Adjarala project to an acceptable level and mitigate certain persistent impacts of the Nangbeto dam. The following were the key actions:

- a.** Partial tree cutting around the impoundment to improve the aesthetics of the impoundment and the circulation of fishing boats
- b.** Reduction of discharges from the TOGOTEX factory
- c.** Control of the proliferation of floating macrophytes to prevent the proliferation of water hyacinths (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*) in the hydrosystem.

4. Monitoring the impacts afterwards and the effectiveness of the plan suggested by the EIA

An environmental monitoring plan was recommended by the EIA to make it possible to verify the effectiveness of the action plan, and eventually to adapt its methods.

5. Conclusion

In the area that will be submerged by the reservoir, the Adjarala dam will have the usual impacts on the aquatic environment, similar to those observed following construction of the Nangbeto dam in 1987.

Source: Trebaol and Chabal 2003

1.5 Strategic environmental assessment

According to Opio-Odongo and Woodsworth (2006) SEA contributes to decisions related to both environmental protection and sustainable development by:

- Providing broader environmental vision.

- Considering the effects of proposed strategic actions (policy, programme and plan).
- Identifying the best practicable environmental option.
- Providing early warning of cumulative effects and large-scale changes
- Contributing to integrated policy-making and planning.

Strategic Environmental Assessment (SEA) has six distinct features:

- Helping to incorporate sustainability principles in the policy making process.
- Helping to influence and improve decision making in ways that ensures integration and sustainability of the environment.
- Enabling the tiering of environmental sustainability and ensuring an integrated approach to policy, planning and programming.
- Providing better context for assessment of cumulative effects.
- Providing the context for screening for lower level environmental assessment through the EIA.
- Enabling the anticipation of impacts that can occur at project level, helping to strengthen the attendant EIA.¹

Box 1.2: Strategic environmental assessment of the Durban South Basin Area

Background

The South Industrial Basin is the economic heartland of the Durban Metropolitan Area. It contributes over 40 per cent of Durban's gross geographic product and occupies over 50 per cent of the industrial land in the city. It is also environmentally degraded, experiencing air pollution and waste disposal problems, and the loss of important natural resources.

This situation has undermined the quality of life of residential communities in the area. It has also negatively impacted on the competitiveness of the business environment. The close interface between residential and industrial activities in the area has also created tensions between residential communities, local government and industry regarding future development in the area.

Strategic Environmental Assessment

¹ For more information, refer to Guidelines on Policy Analysis for Integrated Environmental Assessment and Reporting, developed by Joseph Opio-Odongo and Gregory Woodsworth as part of the AEO-2 process. The guidelines are part of a wide range of capacity building materials coordinated by UNEP-DEWA as part of its work in integrated environmental assessment in Africa.

In order to start a process of addressing these problems, an SEA was commissioned for the Durban South Basin area in 1997. The aim of the SEA was, firstly, to assess the problems and opportunities in the area. Secondly, the SEA would propose sustainable development guidelines and management programmes to address current environmental problems and to guide future development.

Summary of methodology used in the SEA:

- Produce a baseline assessment of the Durban South Basin identifying opportunities and constraints for future development
- Identify key strategic development criteria
- Evaluate the impacts of different types of potential development (petrochemical, port, mixed use, light industry)
- Develop a policy planning framework for sustainable development

The study has addressed both short-term and long-term development scenarios for the area. Each scenario was assessed as to its impact on living environments, air quality, waste generation and disposal, and institutional and infrastructural needs.

Public participation

As with all of the projects undertaken within the context of the Local Agenda 21 programme, a process of constructive engagement has been pursued with all stakeholders during the course of the SEA. This has included among others:

- A school education programme aimed at familiarising young people in the area with the project.
- A field worker development programme for a limited number of individuals from residential sectors within the study area. This increased the understanding of environmental issues by local communities. It also facilitated their informed participation in the SEA.

Disaster management

One of the key recommendations to emerge from the SEA to date has been the need for improved disaster management in the Durban South Basin. To this end, the UNEP Awareness and Preparedness for Emergencies and the Local Level (APELL), will be launched in Durban in October 1999 as a Phase 3 Local Agenda 21 programme.

Source: Metropolitan Durban 1999

1.6 Corporate environmental assessment and reporting

The private sector has become a major player in producing annual environmental reports, which assess their environmental performance in production. About 25 per cent of all Global Fortune 500 companies now produce some type of report that charts their environmental, social or sustainability efforts (Oracle 2005). The increased presence of corporate responsibility in daily business operations is driven by factors such as the erosion of trust in large corporations, the globalization of business, the corporate governance movement, the rise in importance of socially-responsible funds and sheer competitive pressures.

The Global Reporting Initiative (GRI) has developed globally applicable *Sustainability Reporting Guidelines* to facilitate the private sector's public account of its economic, environmental, and social performance in relation to its operations, products, and services. The GRI, which is a UNEP collaborating centre (CC), "seeks to elevate sustainability reporting to the same level of rigor, comparability, credibility, and verifiability expected of financial reporting, while serving the information needs of a broad array of stakeholders from civil society, government, labour, and the private business community itself" (GRI 2002). According to GRI, by 2002, organizations worldwide had produced about 3 000 sustainability, environmental, social and citizenship reports (GRI 2002). The GRI guidelines include economic, environmental and social indicators.

Box 1.3: Extracts from Eskom (South Africa)'s corporate environmental report

Eskom (South Africa)'s mission statement on the environment

In its environmental policy, Eskom will:

- Promote open communication on environmental issues
- Establish an environmental management system (EMS) with a view to ensuring continual improvement
- Contribute towards sustainable development
- Educate, train and motivate its employees about the environment

Management Board Environmental Steering Committee statement

Eskom is committed to providing for the energy needs of South Africa and the southern African region and continues to maintain its environmental stewardship and socially responsible investment. The Corporate Environmental Affairs Manager is tasked with ensuring the overall setting of policies and directives, giving strategic direction and providing input to the determinations and processes of the Environmental Steering Committee, comprising Management Board members. A representative from each group, who has been nominated by the relevant executive director, serves on the Eskom Liaison Committee and liaises with the Corporate Environmental Affairs Manager on strategic and policy issues.

This 2000 Environmental Report demonstrates Eskom 's commitment to the principles of transparency and of continual improvement, through reporting on our performance, our environmental management system, our impact management and future planning.

Eskom 's strategic ambient air quality monitoring network plays an important role for Eskom and national and local authorities. The network assesses compliance with ambient air quality guidelines and provides strategic information on long-term trends in air quality from various sources on national and regional scales.

Sustainability index (SI)

Eskom 's impact on the environment is monitored by many indices including the following:

- Relative particulate emissions: amount of ash emitted per unit of generated power sent out by Eskom, measured in kilograms per megawatt-hour sent out (kg/MWh sent out). Relative emissions for 2000 were 0.35 kg/MWh sent out, 0.02 kg/MWh

sent out less than 1999 and 0.1 kg/MWh sent out less than 1998 (See graph of Particulate emission reductions since 1982 below).

Particulate emission reductions since 1982



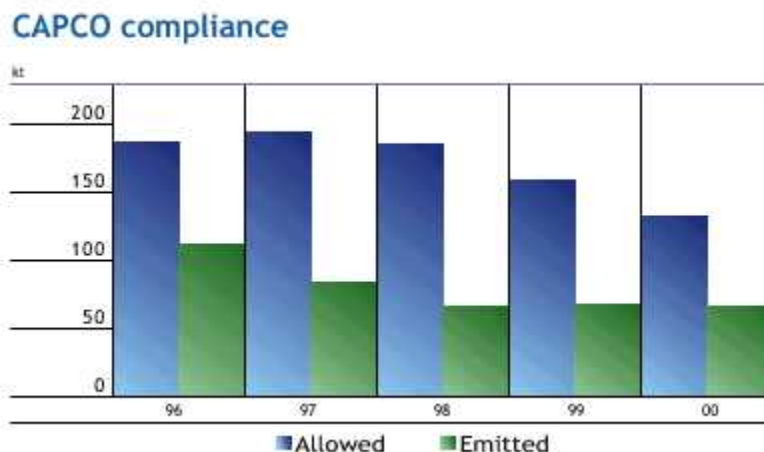
- Specific water consumption: volume of water consumed per unit of power sent out by all generating stations in Eskom, measured in litres of water per kilowatt-hour sent out (l/kWh sent out). Water consumption decreased to 1.21 l/kWh sent out, the best performance since 1997, as the result of improved water management practices (see graph of Specific water consumption over the last ten years).
- Sustainability index

List of SI indicators and targets: 2000 sustainability index: Environmental component

| Key Performance Indicator (KPI) | Unit of Measure | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 2000 Target |
|--|---|------|------|------|------|------|------|-------------|
| Legal compliance ¹ | Number of contraventions to environmental legislation | 3 | 9 | 9 | 15 | 11 | 16 | 0 |
| PreCare /MaxiCare (customer satisfaction) ² | PreCare/ MaxiCare environmental index | 8.82 | 8.78 | 8.90 | 9.10 | 8.72 | 8.38 | >8.0 |
| Relative particulate emissions | Relative performance (kg/MWh ash particulate emissions) sent out | 0.35 | 0.37 | 0.36 | 0.44 | 0.60 | 0.67 | 0.36 |
| Specific water consumption | l/kWh sent out by all stations (before 1997: coal-fired sent out stations only) | 1.21 | 1.25 | 1.23 | 1.20 | 1.32 | 1.38 | 1.41 |

- Legal compliance

Particulate emissions: the emission of particulates (ash) is regulated by the Chief Air Pollution Control Officer (CAPCO) of the Department of Environmental Affairs and Tourism. Registration certificates for individual power stations are issued by CAPCO. These certificates state the actual quantity of particulate emissions that may be emitted from the power station stacks during a 31-day period. For 2000, the overall particulate emissions performance of 66.08 kt is well within the permitted allowance by CAPCO of 131.76 kt.



- ¹ Measurement of this KPI was amended to introduce certainty on what comprises a legal incident in relation to business risk. This change was introduced to encourage reporting on environmental contraventions. Of the twenty-one legal contraventions reported, three were registered against the sustainability index, in accordance with the amended definition. Areas of non-conformance to legislation included waste management, a sewage spillage and the removal of protected vegetation without a permit. Reported incidents have been investigated and appropriate preventative actions to lessen the potential for recurrence have been implemented.
- ² The PreCare/MaxiCare survey has a specific question on how Eskom is perceived with respect to its environmental performance. Respondents are required to rate Eskom on a scale of 1 to 10. Performance in terms of the PreCare/MaxiCare indicator improved from 8.78 to 8.82.

Source: Eskom 2000

Performance indicators, both qualitative and quantitative, are the core of a sustainability report. The performance indicators are grouped under three sections covering the economic, environmental, and social dimensions of sustainability.

Economic indicators concern an organization's impacts, both direct and indirect, on the economic resources of its stakeholders and on economic systems at the local, national, and global levels. Included within economic indicators are the reporting organization's wages, pensions and other benefits paid to employees; monies received from customers and paid to suppliers; and taxes paid and subsidies received.

Environmental indicators concern an organization's impacts on living and non-living natural systems, including ecosystems, land, air and water. Included within environmental indicators are the environmental impacts of products and services; energy, material and water use; greenhouse gas and other emissions; effluents and waste generation; impacts on biodiversity; use of hazardous materials; recycling, pollution, waste reduction and other environmental programmes; environmental expenditures; and fines and penalties for non-compliance.

Social indicators concern an organization's impacts on the social systems within which it operates. GRI social indicators are grouped into three clusters: labour practices (e.g. diversity, employee health and safety), human rights (e.g. child labour, compliance issues), and broader social issues affecting consumers, communities, and other stakeholders (e.g. bribery and corruption, community relations).

Box 1.4: Global Reporting Initiative performance indicators

Source: GRI 2002

1.7 Questions for discussion

Q: What are the different types of environmental assessment and reporting processes which have been covered in this module?

A:

Q: What are the similarities and differences among these environmental assessment and reporting processes? Can you explain?

A:

Q: Identify the main target audience of each assessment process and describe the similarities and differences of the needs of these target audiences.

A:

Q: Can you explore opportunities for synergy among these different environmental processes?

A:

1.8 References

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